

★
NAVSHIPS 900,401

INSTRUCTION BOOK

for

**NAVY MODELS TCM, TCN, TCU,
TCM-1, TCN-1, TCU-1, TCM-2 AND TCU-2**

**RADIO TRANSMITTING
EQUIPMENTS**

**GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y.**

NAVY DEPARTMENT

BUREAU OF SHIPS



ADDRESS NAVY DEPARTMENT
BUREAU OF SHIPS

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NAVY DEPARTMENT
BUREAU OF SHIPS
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To: All Activities concerned with the Installation,
Operation and Maintenance of the Subject
Equipment.

Subj: Instruction Book for Radio - Transmitting
Equipment, Navy Models TCM, TCN, TCU, TCM-1,
TCN-1, TCU-1, TCM-2 and TCU-2 (NAVSHIPS 900,401).

1. NAVSHI S 900,401 is the instruction book for the
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2. When superseded by a later edition, this publi-
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3. Extracts from this publication may be made to
facilitate the preparation of other Navy instruction books
and handbooks.
4. Copies of this publication may be obtained from
the nearest Electronics Officer.

E. L. COCHRANE
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTIONS

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CONTRACTUAL GUARANTEES

GUARANTEE —

Contracts NOs-48078, NOs-98843.

The contractor guarantees all parts and spare parts of these equipments, except vacuum tubes and other parts noted in this paragraph, for a service period of TWO YEARS and will replace at no expense to the Government such parts if found to be defective as to design, material, workmanship, or manufacture; provided that failures due to these causes occur within a period of FIVE YEARS from the acceptance of the equipments by the Government. If failures to any part or parts of the equipments (except vacuum tubes and other parts noted in this paragraph) show them to be defective in ten percent or more of the equipments supplied, such parts will be judged as of defective design and will be replaced one hundred percent on all equipments supplied. Such replacements which will assure proper operation of the equipments, will be shipped promptly, transportation paid, to any location desired by the Government without cost to it. The guarantee period of FIVE YEARS and the service period of TWO YEARS does not include any portion of the time that the equipment fails to give satisfactory performance due to defective items and the time necessary for replacement thereof, and any replacement part will be guaranteed to give TWO YEARS of service. The following material which is not included in the guarantee is to be of the best grade to assure the longest possible life.

Rubber, wherever used but particularly in gaskets, shock absorbers, and wire insulation.

The contractor is exempt from the necessity of replacing any parts which may be damaged as a result of the deterioration of the materials listed above.

GUARANTEE — Contract NXs-15910.

The equipment including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced f.o.b. any part within the continental limits

of the United States designated by the Government without delay and at no expense to the Government provided that such guarantee will not obligate the contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

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

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

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

INSTALLATION RECORD

Contract Numbers	Dates of Contracts
NOs-48078	4 January 1941
NOs-98843	11 February 1942
NXs-15910	1 June 1943
Serial number of equipment	
Date of acceptance by the Navy	
Date of delivery to contract destination	
Date of completion of installation	
Date placed in service	

Blank spaces in this table shall be filled in at time of installation. Operating personnel shall also mark the "date placed in service" on the date of acceptance plate located below the model name plate on the equipment, using suitable methods and care to avoid damaging the equipment.

REPORT OF FAILURE

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

ORDERING PARTS

All requests or requisitions for replacement material should include the following data:

1. Navy stock number or, when ordering from an Army supply depot, the Army stock number.
2. Name of part.

If the Navy stock number has not been assigned, the requisitions should specify the following:

1. Equipment model designation.
2. Name of part and complete description.
3. Manufacturer's designation.
4. Contractor's drawing and part number.
5. AWS, JAN, or Navy type designation.

DESTRUCTION OF ABANDONED MATERIEL IN THE COMBAT ZONE

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

MEANS:

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

PROCEDURE:

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

DESTROY EVERYTHING

SAFETY NOTICE

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

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed.

KEEP AWAY FROM LIVE CIRCUITS.

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE SUPPLY ON. DO NOT DEPEND UPON DOOR SWITCHES OR INTERLOCKS FOR PROTECTION BUT ALWAYS SHUT DOWN MOTOR-GENERATORS OR OTHER POWER EQUIPMENT AND OPEN MAIN SWITCH IN POWER SUPPLY CIRCUIT. UNDER CERTAIN CONDITIONS DANGEROUS POTENTIALS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE "OFF" POSITION, DUE TO CHARGES RETAINED BY CAPACITORS, ETC. TO AVOID CASUALTIES ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM.

DO NOT SERVICE OR ADJUST ALONE. Under no circumstances should any person reach within or enter the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

DO NOT TAMPER WITH INTERLOCKS. Under no circumstances should any access gate, door or safety interlock switch be removed, short circuited, or tampered with in any way, nor should reliance be placed upon the interlock switches for removing voltages from the equipment.

RESUSCITATION

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

SECTION I GENERAL DESCRIPTION

1. GENERAL.

This instruction book describes Radio Transmitting Equipment Navy Models TCM, TCN, TCU, TCM-1, TCN-1, TCU-1, TCM-2 and TCU-2. These equipments are designed for either shore or shipboard installation wherever a compact medium-powered radio transmitter is required. They are constructed to provide efficient, reliable and rapid communication. Section II of this instruction book is a comprehensive study of the theory of operation and section IV describes the actual operation of the equipment.

2. DIFFERENCES IN MODELS.

a. NAVY MODELS TCM, TCM-1 AND TCM-2.

(See figure 1-1.)

(1) The Radio Transmitting Equipments Navy Models TCM, TCM-1 and TCM-2 consist of the following components: H-f Radio Transmitter Navy Type CG-52206, Rectifier Navy Type CG-20122 and Control Unit Navy Type CG-23241.

(2) The h-f transmitter used is a multi-channel, CW, MCW and voice frequency transmitter, capable of continuously variable adjustment in the specified frequency range of 2000 to 18,100 kc when working into antenna systems described under "Antenna Characteristics". (Refer to section I, paragraph 4m.) The rectifier houses all of the d-c power supply circuits required for operation of the transmitter.

(3) The construction of these radio transmitting equipments is described in section I, paragraph 3.

b. NAVY MODELS TCU, TCU-1 AND TCU-2.

(See figure 1-2.)

(1) The Radio Transmitting Equipments Navy

Models TCU, TCU-1 and TCU-2 consist of the following components: I-f Radio Transmitter Navy Type CG-52205, Rectifier Navy Type CG-20122 and Control Unit Navy Type CG-23241.

(2) The i-f transmitter is a multi-channel CW and MCW transmitter, capable of continuously variable adjustment in the specified frequency range of 300 to 2000 kc. The rectifier is the same as the one in the Model TCM series.

(3) The construction of these radio transmitting equipments is described in section I, paragraph 3.

c. NAVY MODELS TCN AND TCN-1.

(See figure 1-3.)

(1) The Navy Models TCN and TCN-1 Radio Transmitting Equipments consist of the following components: H-f Radio Transmitter Navy Type CG-52206, I-f Radio Transmitter Navy Type CG-52205, Rectifier Navy Type CG-20122, Control Unit Navy Type CG-23241, and Power Transfer Switch Navy Type CG-24094.

(2) The Models TCN series equipments are a combination of the Models TCM and TCU series equipments.

(3) By employing both the h-f and i-f transmitters the Models TCN and TCN-1 equipments can be used as multi-channel CW, MCW and voice frequency transmitters capable of continuously variable adjustment over the frequency range of 300 to 2000 kc and 2000 to 18,100 kc when working into antenna systems described under "Antenna Characteristics". (Refer to section I, paragraph 4m.) The rectifier is the same as the one used for the Models TCM and TCU series equipments.

(4) The construction of these radio transmitting equipments is described in section I, paragraph 3.

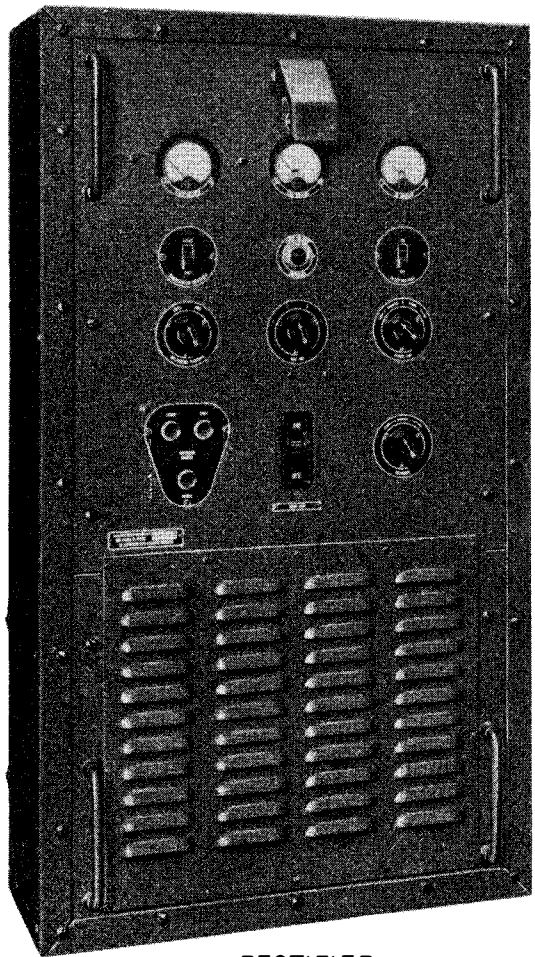
3. MAJOR UNITS.

a. The following table lists the major component units and different models of the radio transmitting equipments.

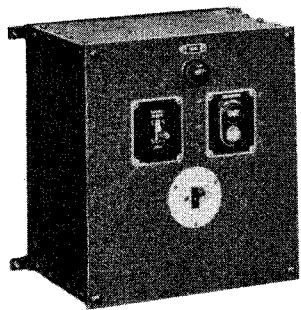
TABLE 1-1. — MAJOR UNITS AND MODELS OF THE RADIO TRANSMITTING EQUIPMENTS.

Navy Model	H-f Radio Transmitter Navy Type CG-52206	Rectifier Navy Type CG-20122	Control Unit Navy Type CG-23241	I-f Radio Transmitter Navy Type CG-52205	Power Transfer Switch	Hand Microphone	Chest Microphone Assembly
	<i>Units Used</i>						
TCM	G. E. Co Model 4G9C1	G. E. Co Model 4MR3C1	G. E. Co Model 4MY27A1			*	*
TCN	G. E. Co Model 4G9C1	G. E. Co Model 4MR3C1	G. E. Co Model 4MY27A1	G. E. Co Model 4G10C1	Navy Type CG-24094	*	*
TCU		G. E. Co Model 4MR3C1	G. E. Co Model 4MY27A1	G. E. Co Model 4G10C1		*	*
TCM-1	G. E. Co Model 4G9C1	G. E. Co Model 4MR3C1	G. E. Co Model 4MY27A1			Navy Type CAU-51006A	Navy Type CAU-51046

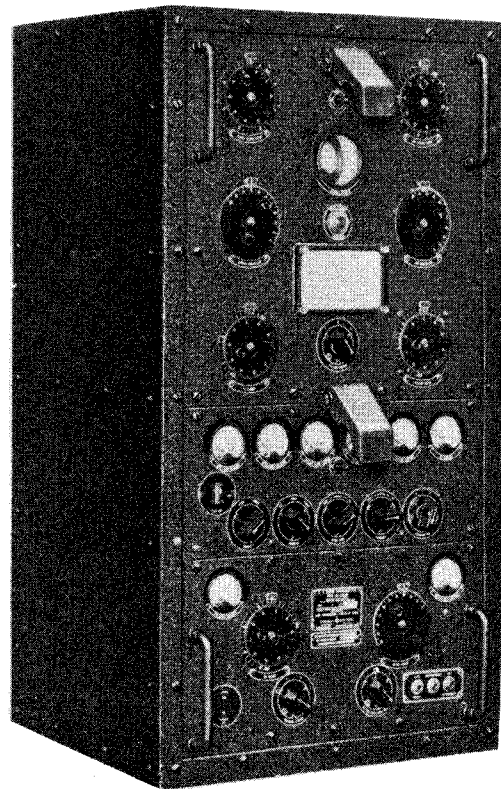
* Government furnished equipment — Supplied separately



RECTIFIER
TYPE CG-20122

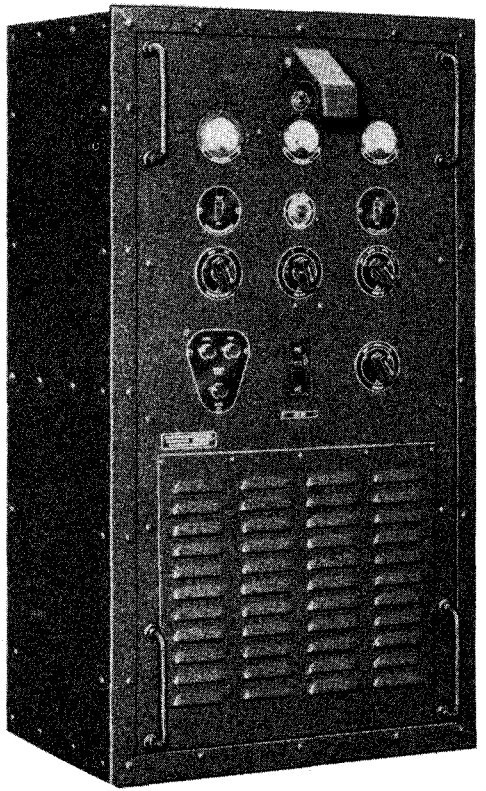


CONTROL UNIT
TYPE CG-23241

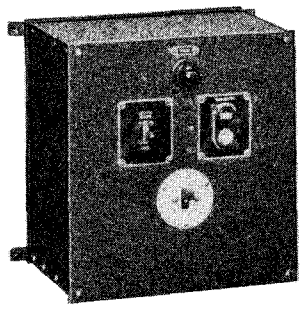


H.F. RADIO TRANSMITTER
TYPE CG-52206

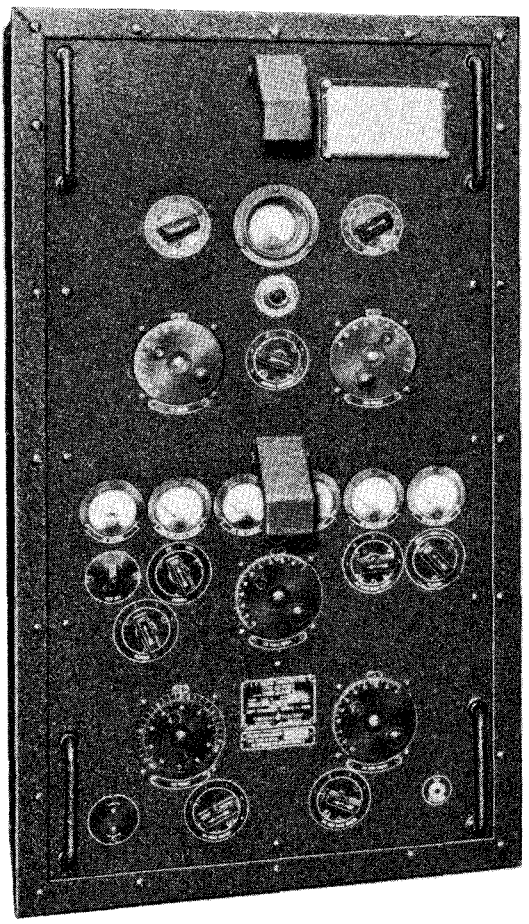
Figure 1-1. Navy Models TCM, TCM-1 and TCM-2 Radio Telegraph and Telephone Transmitting Equipments



RECTIFIER
TYPE CG-20122



CONTROL UNIT
TYPE CG-23241



I.F. RADIO TRANSMITTER
TYPE CG-52205

Figure 1-2. Navy Models TCU, TCU-1 and TCU-2 Radio Telegraph Transmitting Equipments

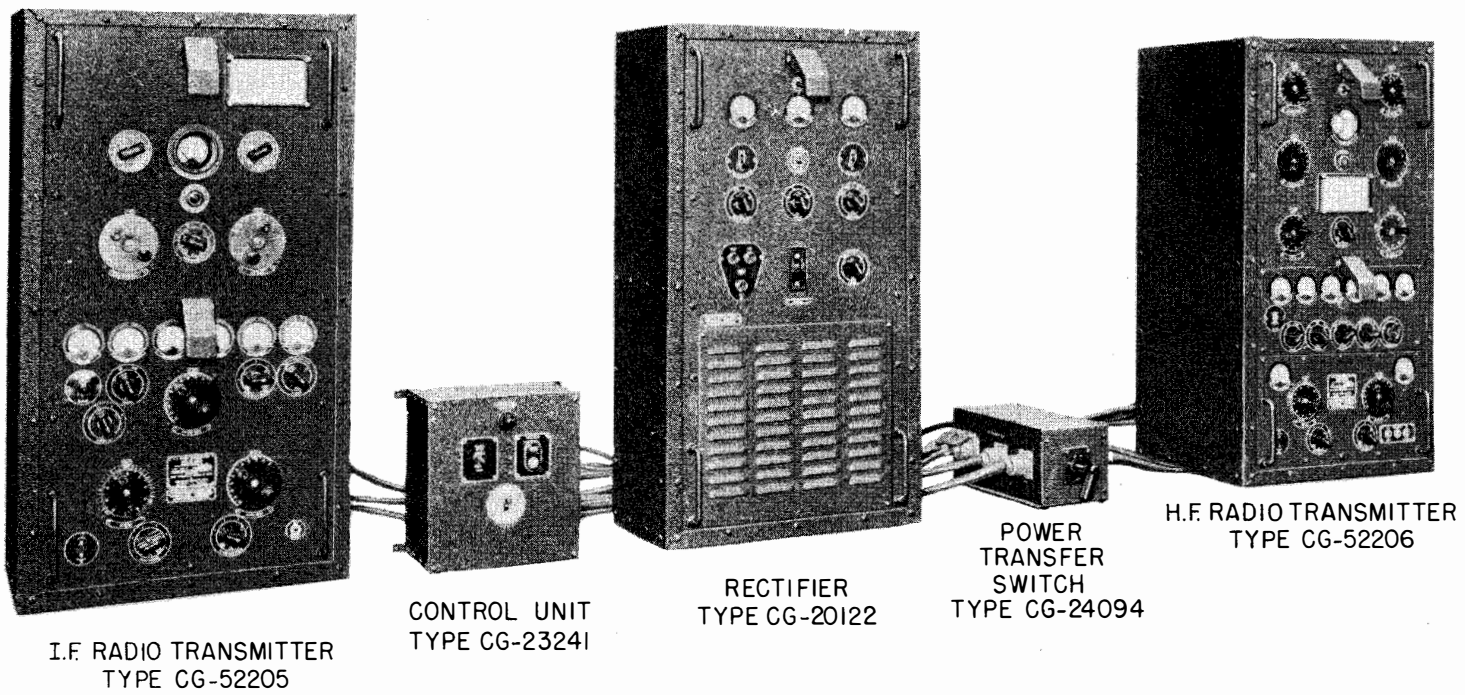


Figure 1-3. Navy Models TCN and TCN-1 Radio Telegraph and Telephone Transmitting Equipments

TABLE 1-1. — MAJOR UNITS AND MODELS OF THE RADIO TRANSMITTING EQUIPMENTS. (Continued)

Navy Model	Units Used						
	H-f Radio Transmitter Navy Type CG-52206	Rectifier Navy Type CG-20122	Control Unit Navy Type CG-23241	I-f Radio Transmitter Navy Type CG-52205	Power Transfer Switch	Hand Microphone	Chest Microphone Assembly
TCN-1	G. E. Co Model 4G9C1	G. E. Co Model 4MR3C1	G. E. Co Model 4MY27A1	G. E. Co Model 4G10C1	Navy Type CG-24094	Navy Type CAU-51006A	Navy Type CAU-51046
TCU-1		G. E. Co Model 4MR3C1	G. E. Co Model 4MY27A1	G. E. Co Model 4G10C1		*	*
TCM-2	G. E. Co Model 4W313A	G. E. Co Model 4W315A	G. E. Co Model 4MY27B1			Navy Type CMX-51004C	*
TCU-2		G. E. Co Model 4W315A	G. E. Co Model 4MY27B1	G. E. Co Model 4G10D1		*	*

* Government furnished equipment — Supplied separately

Note

All models are similar and interchangeable. The equipments are identical in construction except for differences in components and internal cabling.

b. H-F RADIO TRANSMITTER NAVY TYPE CG-52206.

(1) FUNCTION.—The h-f radio transmitter is designed for telegraphic operation at any speed up to 40 words per minute, for 1000-cycle tone modulation, and also for voice modulation over the audio frequency range of 200 to 3000 cycles. The audio characteristics from input transformer to antenna is flat within plus or minus two decibels.

(2) CONSTRUCTION.—The chassis consists mainly of a sturdy duralumin angle frame to which a vertical front panel is permanently secured. The various circuit components are mounted on shelves within the frame. In order to maintain a low center of gravity, the heaviest items are located on the lower shelves. Four rigid handles fixed to the front panel are used to remove the chassis from the case. All panels are equipped with panel lamps of the hinged type which can be adjusted to illuminate all instruments and controls.

The unit is equipped with a louvered rear shield which is clamped to the chassis by means of large screws. Entrance of insects and rodents is prevented by wire mesh screens placed over the louver openings. Hinged access doors provided on the rear shields are interlocked so as to automatically remove high voltages from the units when the doors are opened. All vacuum tubes are accessible for replacement upon opening these access doors.

(3) FRONT PANEL CONTROLS. (See figure 1-4).—The panel is divided into three sections. The controls in the top section are arranged in three vertical rows. Starting from the left side of the panel these controls are: the "OUTPUT TUNING INDUCTIVE" control (307), the "OUTPUT TUNING CAPACITIVE" control (237), the "PA TUNING" control (306), the "ANTENNA CURRENT" meter with the hinged illuminating lamp directly above it, the "PLATE VOLT-

AGE INDICATOR" lamp, the tuning chart, the "PA BAND CHANGE" switch (380), the "ANTENNA TUNING INDUCTIVE" control (308), the "ANTENNA TUNING CAPACITIVE" control (238), and the "2ND IPA TUNING" control (304).

The controls on the middle panel are arranged in two horizontal rows. Starting from the left side of the panel, these instruments are: the "MOD PLATE CURRENT" meter, the "MODULATION INDICATOR" meter, the "2ND IPA PLATE" meter (342), the "GRID CURRENT" meter (345), the "PA PLATE CURRENT" meter (343), the "FIL VOLTAGE" meter, the "TEST KEY", the "MCW-PHONE" carrier switch, the "CW-MCW-PHONE" emission switch (381), the "AUDIO GAIN" control (280), the "FILAMENT" control (288), and the "FILAMENT TAP" switch.

The bottom panel contains the following controls: the "MO PLATE CURRENT" meter, the "CALIBRATION-COMPENSATOR" switch, the "MO TUNING" control (200), the "MO BAND CHANGE" switch (375 and 376), the "1ST IPA PLATE BAND CHANGE" switch (377), the "1ST IPA TUNING" control (217), the "1ST IPA PLATE CURRENT" meter (341) and the "LINE INPUT", "MICROPHONE" and "KEY EXTENSION" jacks.

c. I-F RADIO TRANSMITTER NAVY TYPE CG-52205.

(1) FUNCTION.—The i-f radio transmitter is designed for telegraphic operation at any speed up to 40 words per minute.

(2) CONSTRUCTION.—The construction of the i-f transmitter is exactly the same as that of the h-f radio transmitter except for depth. Refer to this section, paragraph 3b(2).

(3) FRONT PANEL CONTROLS. (See figure 1-5.)—The front panel controls are arranged in horizontal rows. Starting from the top left of the equipment, these controls are: the hinged illuminating lamp, the tuning chart, the "PA BAND CHANGE" switch (551), the "ANTENNA CURRENT" meter, the "ANTENNA BAND CHANGE" switch (553), the "PLATE VOLTAGE INDICATOR" lamp, the "PA TUNING" control (495), the "ANTENNA COUPLING" switch (552), the "ANT. TUNING" control (527), the "FIL VOLTAGE" meter, the "AUDIO OSC PLATE CURRENT" meter, the "IPA GRID CURRENT" meter (568), the "IPA PLATE CURRENT" meter (569), the "PA GRID CURRENT" meter (570), the "PA PLATE CURRENT" meter, the "TEST KEY" (558), the "CW-MCW" emission switch (554), the "FILAMENT TAP" switch, the "IPA PLATE TUNING" control (468), the "IPA PLATE BAND CHANGE" switch (550), the "FILAMENT" control (515), the "MO TUNING" control (450), the "IPA GRID TUNING" control (529), the "CALIBRATION-COMPENSATOR" switch, the "MO BAND CHANGE" switch (548), the "IPA GRID BAND CHANGE" switch (549), and the "KEY EXTENSION" jack.

d. RECTIFIER NAVY TYPE CG-20122.

(1) FUNCTION.—The rectifier receives the main line power supply and meters the d-c voltages through fuses to the h-f and i-f radio transmitter circuits.

(2) CONSTRUCTION.—The construction of the rectifier is exactly the same as that for the h-f radio transmitter except for the depth of the equipment. Refer to this section, paragraph 3b(2).

(3) FRONT PANEL CONTROLS. (See figure 1-6.)—The front panel controls are arranged in four horizontal rows. Starting from the top left part of the equipment these components are located as follows:

(a) ROW NO. 1.—The "PLATE VOLTAGE" meter, the "LINE VOLTAGE" meter (668), and the "FIL VOLTAGE" meter.

(b) ROW NO 2.—The "TRANSMITTER-RECTIFIER START-STOP" switch (651), the "PLATE VOLTAGE INDICATOR" lamp, and the "PLATE VOLTAGE ON-OFF" switch.

(c) ROW NO. 3.—The "VOLTMETER TRANSFER" switch, the "LINE TAP" switch (648), and the "POWER TAP" switch (649).

(d) ROW NO. 4.—The "START-STOP-CHOKE" switch, the "MAIN LINE ON-OFF" switch (654), and the "FILAMENT" control (630).

e. CONTROL UNIT NAVY TYPE CG-23241.

(1) FUNCTION.—The control unit provides local or remote control for the filament and plate circuits of the radio transmitters.

(2) CONSTRUCTION.—The unit has a square duralumin frame to which the front, side and rear panels are attached by means of screws. Four brackets

at the corners of the rear panel are used for wall mounting.

(3) FRONT PANEL CONTROLS. (See figure 1-7.)—The controls mounted on the front panel are: the "POWER" indicating lamp (1760), the "REMOTE-LOCAL CONTROL" switch (1755), the "TRANSMITTER STOP-START" push-button switch (1757), and the "EMERGENCY OPERATE-STOP" switch (1758).

f. POWER TRANSFER SWITCH CG-24094.

(1) FUNCTION.—The power transfer switch is used to transfer energy from the h-f to the i-f radio transmitters and vice-versa.

(2) CONSTRUCTION.—The power transfer switch has a duralumin frame to which the front, side and rear panels are assembled by means of screws. Receptacles are provided in the rear and side panels for cables leading from the radio transmitters and the rectifier. The handle switch (1700 and 1701) is located on the front panel.

4. REFERENCE DATA.

a. MODEL DESIGNATIONS.—Radio Transmitting Equipments, Navy Models TCM, TCN, TCU, TCM-1, TCN-1, TCU-1, TCM-2 and TCU-2.

b. CONTRACT NUMBERS AND DATES.—NOs-48078, 4 Jan 1941 (TCM, TCN and TCU); NOs-98843, 11 Feb 1942 (TCM-1, TCN-1 and TCU-1); NXs-15910, 1 June 1943 (TCM-2 and TCU-2).

c. CONTRACTOR.—General Electric Co., Schenectady, N. Y.

d. COGNIZANT NAVAL INSPECTOR.—Inspector of Naval Material, Schenectady, N. Y.

e. NUMBER OF PACKAGES PER COMPLETE SHIPMENT OF EQUIPMENT INCLUDING SPARE PARTS BOXES

TCM, TCM-1, TCM-2	— 5 cases
TCN, TCN-1	— 7 cases
TCU, TCU-1, TCU-2	— 5 cases

f. TOTAL CUBICAL CONTENT OF EQUIPMENTS.

(1) Uncrated.

(a) TCM, TCM-1, TCM-2. 15.29 cu. ft. (excluding equipment spares.)

(b) TCN, TCN-1. 24.09 cu. ft. (excluding equipment spares.)

(c) TCU, TCU-1, TCU-2. 15.29 cu. ft. (excluding equipment spares.)

(2) Crated.

(a) TCM, TCM-1, TCM-2. 96.01 cu. ft. (including 9.75 cu. ft. equipment spares.)

(b) TCN, TCN-1. 131.26 cu. ft. (including 19.50 cu. ft. equipment spares.)

(c) TCU, TCU-1, TCU-2. 96.01 cu. ft. (including 9.75 cu. ft. equipment spares.)

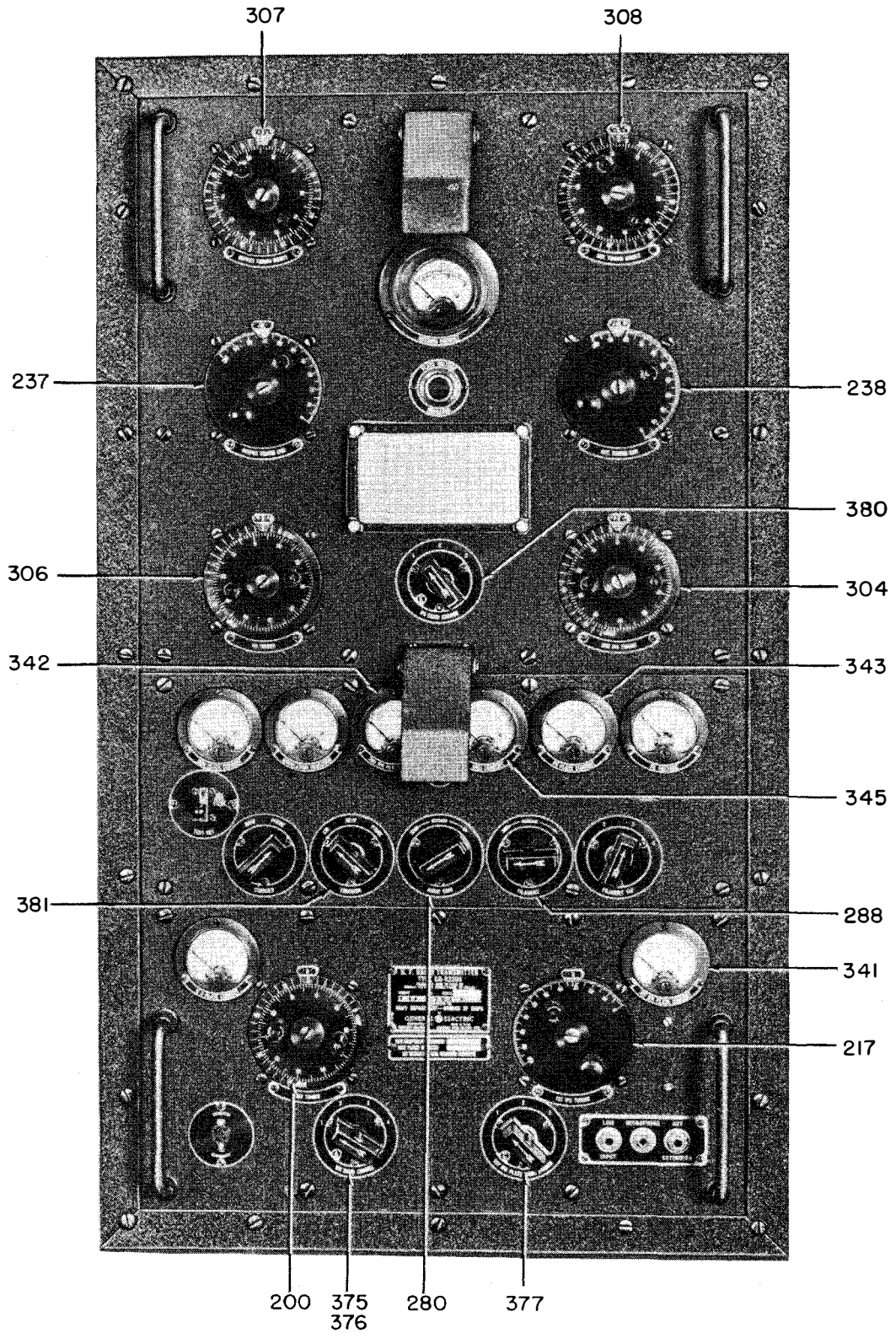


Figure 1-4. H-f Radio Transmitter Navy Type CG-52206, Front View

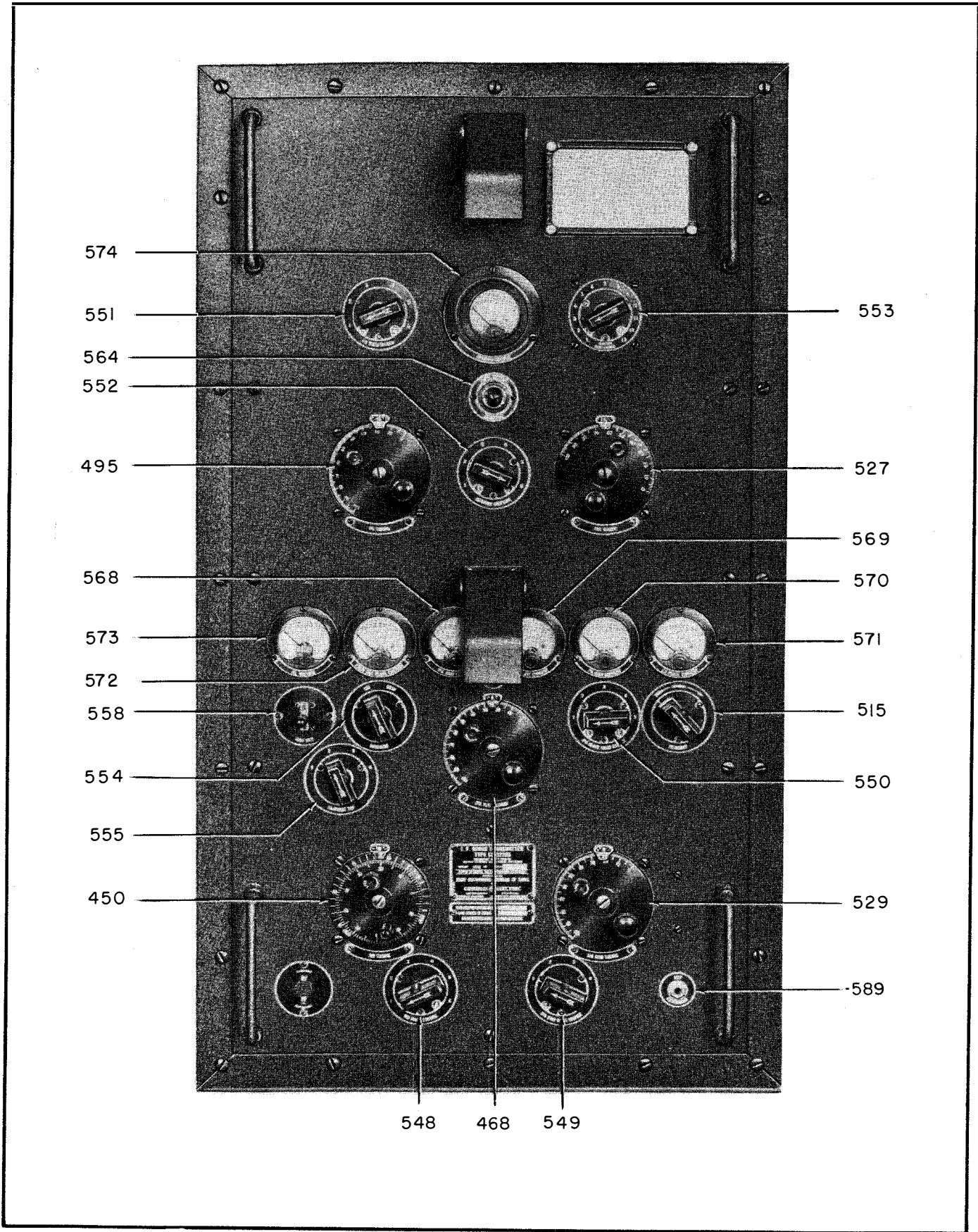


Figure 1-5. I-f Radio Transmitter Navy Type CG-52205, Front View

g. TOTAL WEIGHT OF EQUIPMENTS.

- (1) Uncrated.
 - (a) TCM. 606 lbs. (including 105 lbs. equipment spares.)
 - (b) TCM-1 and TCM-2. 540 lbs. (including 105 lbs. equipment spares.)
 - (c) TCN. 902 lbs. (including 190 lbs. equipment spares.)
 - (d) TCN-1. 793 lbs. (including 186 lbs. equipment spares.)
 - (e) TCU. 569 lbs. (including 93 lbs. equipment spares.)
 - (f) TCU-1 and TCU-2. 505 lbs. (including 93 lbs. equipment spares.)

(2) Packed for Shipment.

- (a) TCM. 1079 lbs. (including 205 lbs. equipment spares.)
- (b) TCM-1 and TCM-2. 1013 lbs. (including 205 lbs. equipment spares.)
- (c) TCN. 1681 lbs. (including 390 lbs. equipment spares.)
- (d) TCN-1. 1568 lbs. (including 372 lbs. equipment spares.)
- (e) TCU. 986 lbs. (including 195 lbs. equipment spares.)
- (f) TCU-1 and TCU-2. 922 lbs. (including 195 lbs. equipment spares.)

b. FREQUENCY RANGES AND TYPE OF FREQUENCY CONTROL.

TABLE 1-2. — FREQUENCY RANGES AND TYPE OF CONTROL.

<i>Navy Model Designation</i>	<i>Frequency Range</i>	<i>Type of Frequency Control</i>
TCM, TCM-1, TCM-2	2000 kc to 18,100 kc	Electron Coupled Oscillator Circuit
TCN, TCN-1	300 kc to 2000 kc 2000 kc to 18,100 kc	Electron Coupled Oscillator Circuit
TCU, TCU-1, TCU-2	300 kc to 2000 kc	Electron Coupled Oscillator Circuit

i. TYPES OF EMISSION AND MODULATION CAPABILITY.

TABLE 1-3. — TYPES OF EMISSION AND MODULATION CAPABILITY.

<i>Radio Transmitting Equipment Navy Model</i>	<i>Major Units Used</i>	<i>Type of Emission</i>	<i>Modulation Frequency Cycles Per Second</i>	<i>Modulation Capability*</i>
TCM, TCM-1, TCM-2	H-f Radio Transmitter Navy Type CG-52206	CW (A1)	1000 200-3000	80 to 90 percent 80 to 90 percent
		MCW (A2)		
		PHONE (A3)		
TCN, TCN-1	H-f Radio Transmitter Navy Type CG-52206	CW (A1)	1000 200-3000	80 to 90 percent 80 to 90 percent
		MCW (A2)		
		PHONE (A3)		
TCU, TCU-1, TCU-2	I-f Radio Transmitter Navy Type CG-52205	CW (A1)	1000	90 to 95 percent
		MCW (A2)		

* Using 25 percent of the required carrier (CW) output, with the carbon microphone supplied.

j. PEAK POWER OUTPUT.

TABLE 1-4. — PEAK POWER OUTPUT.

<i>Navy Model Radio Transmitter Equipment</i>	<i>Output</i>	<i>Emission</i>	<i>Frequency Range</i>
TCM, TCM-1, TCM-2	125 watts	CW (A1)	2000-18,100 kc
	30 watts	MCW (A2)	2000-18,100 kc
	30 watts	PHONE (A3)	2000-18,100 kc
TCN, TCN-1	125 watts	CW (A1)	300-2000/2000-18,100 kc
	30 watts	MCW (A2)	300-2000/2000-18,100 kc
	30 watts	PHONE (A3)	2000-18,100 kc
TCU, TCU-1, TCU-2	125 watts	CW (A1)	300-2000 kc
	30 watts	MCW (A2)	300-2000 kc

Note

The transmitting apparatus is designed to deliver pure continuous-wave radio-frequency power output to the antenna system, exclusive of loading system loss.

k. CHARACTERISTICS OF POWER SUPPLY REQUIRED FOR OPERATION.—Models TCM, TCM-1, TCM-2, TCN, TCN-1, TCU, TCU-1 and TCU-2 are designed to operate from a 115-volt (± 10 to -15 percent), single phase, 60-cycle power supply (varying from 50 to 62 cycles, inclusive).

The power required from the 115-volt, 60-cycle supply line, for full-power operation of the transmitting equipments is approximately 1200 watts.

l. OUTPUT IMPEDANCE.

- (1) Antenna—5 to 50 ohms.
- (2) Microphone—30 ohms.

m. ELECTRICAL CHARACTERISTICS OF RECOMMENDED ANTENNA.

- (1) Models TCM, TCM-1, TCM-2, TCN, TCN-1,

TCU, TCU-1 and TCU-2 are designed to be coupled to an antenna having the following characteristics: an electrostatic capacity of 380 *mmfd*, an inductance of 38 uh, a resistance of 5 to 50 ohms and a fundamental frequency of 1310 kc. The antenna resonating system is flexible enough to tune to antenna with inductance and capacitance values which vary from those mentioned. I-f Radio Transmitter Navy Type CG-52205 will tune to an antenna which has an inductance as high as 180 *mh*.

(2) Over the high-frequency band, it is necessary to feed antennas above and below their fundamental frequencies. Therefore, the circuit constants are selected so as to permit both current and voltage feed. A single-wire antenna, either vertical or a combination of vertical and horizontal, with a total length of approximately 100 feet, will be found to be satisfactory.

n. RECTIFIER EQUIPMENT.

TABLE 1-5. — RECTIFIER EQUIPMENT.

<i>Navy Model</i>	<i>Navy Type</i>	<i>Manufacturer</i>	<i>Manufacturer Model No.</i>	<i>Input</i>	<i>Output</i>
TCM TCN TCU	CG-20122	G. E. Co.	4MR3C1	115 volts, single phase, 60 cycles	1300 volts, 0.35 amp., dc; 500 volts, 0.425 amp., dc; 55 volts, 0.45 amp., dc.
TCM-1 TCN-1 TCU-1	CG-20122	G. E. Co.	4MR3C1	115 volts, single phase, 50 to 62 cycles	1300 volts, 0.35 amp., dc; 500 volts, 0.425 amp., dc; 55 volts, 0.45 amp., dc.
TCM-2 TCU-2	CG-20122	G. E. Co.	4W315A	115 volts, single phase, 50 to 62 cycles	1300 volts, 0.35 amp., dc; 500 volts, 0.425 amp., dc; 55 volts, 0.45 amp., dc.

Note

All models are similar and interchangeable. The rectifiers are identical in construction except for differences in components and internal cabling.

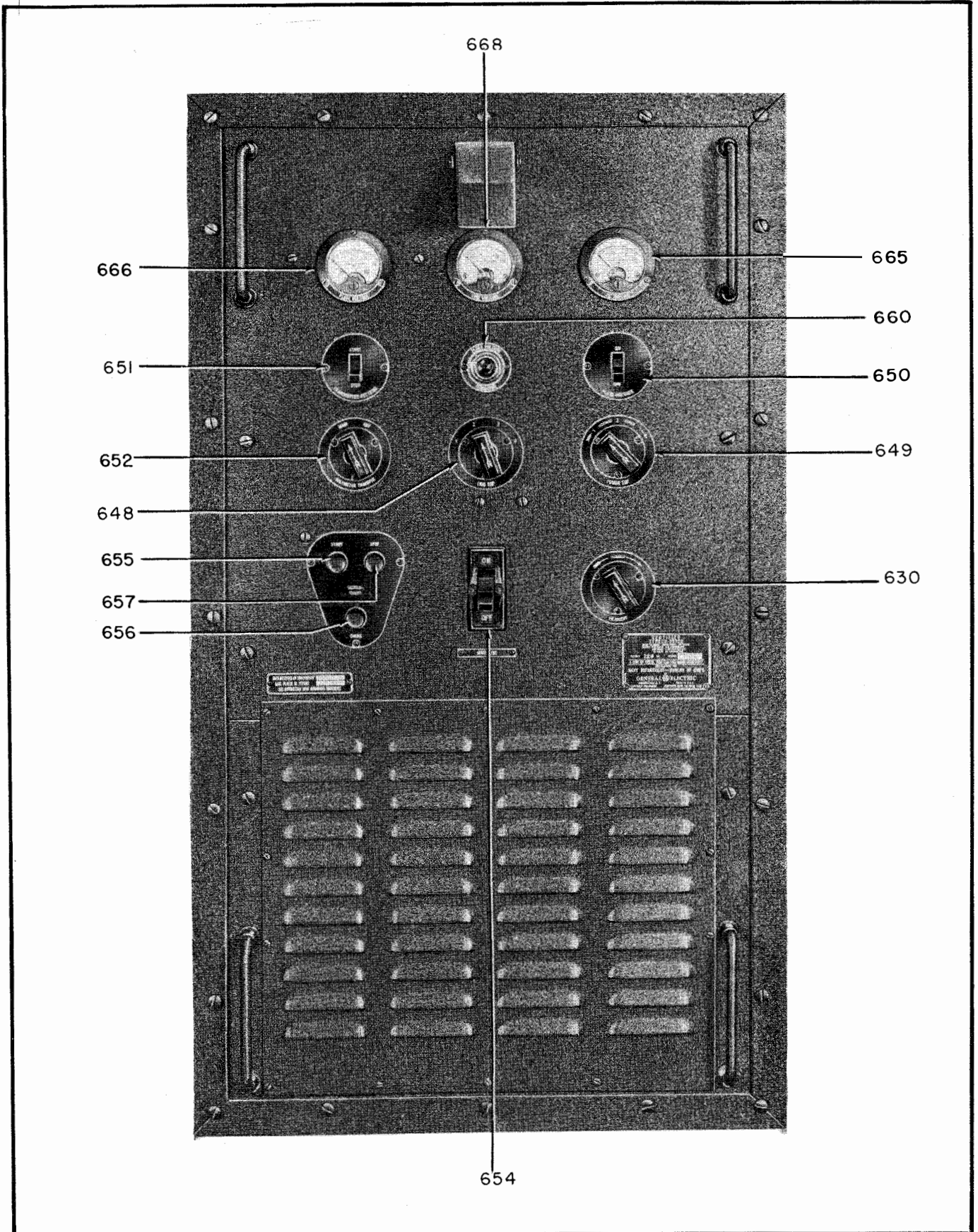


Figure 1-6. Rectifier Navy Type CG-20122, Front View

5. EQUIPMENT SUPPLIED.

TABLE 1-6. — EQUIPMENT SUPPLIED.

Navy Model Equipment	Quantity Per Model	Name of Unit	Navy Type	Manufacturer Model	Overall Dimensions (inches)						Volume (Cu. In.)		Weight (Lbs.)	
					Crated			Uncrated			Crated	Uncrated	Crated	Uncrated
					H.	W.	D.	H.	W.	D.				
TCM	1	H-f Radio Transmitter	CG-52206	4G9C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	390	200
	1	Rectifier	CG-20122	4MR3C1	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	389	259
	1	Control Unit	CG-23241	4MY27A1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	45	35
	1 case	Spare Parts			39	27	16				9.75		205	105
	10	Tubes			34	32	28				17.63		50	7
TCM-1	1	H-f Radio Transmitter	CG-52206	4G9C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	359	169
	1	Rectifier	CG-20122	4MR3C1	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	359	229
	1	Control Unit	CG-23241	4MY27A1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	40	30
	1	Hand Microphone	CAU-51006A		Spare Parts						Spare Parts		Spare Parts	
	1	Chest Microphone	CAU-51046		Spare Parts						Spare Parts		Spare Parts	
	1 case	Spare Parts			39	27	16				9.75		205	105
	10	Tubes			34	32	28				17.63		50	7
TCM-2	1	H-f Radio Transmitter	CG-52206	4W313A	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	359	169
	1	Rectifier	CG-20122	4W315A	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	359	229
	1	Control Unit	CG-23241	4MY27B1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	40	30
	1	Hand Microphone	CMX-51004C		Spare Parts						Spare Parts		Spare Parts	
	1 case	Spare Parts			39	27	16				9.75		205	105
	10	Tubes			34	32	28				17.63		50	7

TABLE 1-6. — EQUIPMENT SUPPLIED. (Continued)

Navy Model Equipment	Quantity Per Model	Name of Unit	Navy Type	Manufacturer Model	Overall Dimensions (inches)			Volume (Cu. In.)		Weight (Lbs.)				
					Crated			Uncrated			Crated	Uncrated	Crated	Uncrated
					H.	W.	D.	H.	W.	D.				
TCN	1	H-f Radio Transmitter	CG-52206	4G9C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	390	200
	1	I-f Radio Transmitter	CG-52205	4G10C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	307	175
	1	Rectifier	CG-20122	4MR3C1	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	389	259
	1	Power Transfer Switch	CG-24094	4MY28A1				6-1/4	10	18-3/4	Spare Parts	0.68	Spare Parts	25
	1	Control Unit	CG-23241	4MY27A1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	45	35
	2 cases	Spare Parts			39	27	16				9.75		390	190
	15	Tubes			34	32	28				17.63		160	18
TCN-1	1	H-f Radio Transmitter	CG-52206	4G9C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	359	169
	1	I-f Radio Transmitter	CG-52205	4G10C-1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	278	146
	1	Rectifier	CG-20122	4MR3C1	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	359	229
	1	Power Transfer Switch	CG-24094	4MY28A1				6-1/4	10	18-3/4		0.68		15
	1	Control Unit	CG-23241	4MY27A1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	40	30
	3*	Shock Mountings		ML7468603G1	Spare Parts						Spare Parts		Spare Parts	
	2*	Shock Mountings		ML7468602G1	Spare Parts						Spare Parts		Spare Parts	
	1*	Shock Mountings		ML7468602C2	Spare Parts						Spare Parts		Spare Parts	
	1	Hand Microphone	CG-51006A		Spare Parts						Spare Parts		Spare Parts	
	1	Chest Microphone	CAU-51046		Spare Parts						Spare Parts		Spare Parts	
	2 cases	Spare Parts			39	27	16				19.50		372	186
	15	Tubes			34	32	28				17.63		160	18
TCU	1	I-f Radio Transmitter	CG-52205	4G10C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	307	175
	1	Rectifier	CG-20122	4MR3C1	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	389	259
	1	Control Unit	CG-23241	4MY27A1				11-1/2	12-3/8	9	17.63	0.74	45	35
	1 case	Spare Parts			39	27	16				9.75		195	93
	9	Tubes									17.63		50	7

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Section I
Paragraph 5

TABLE 1-6. — EQUIPMENT SUPPLIED. (Continued)

Navy Model Equipment	Quantity Per Model	Name of Unit	Navy Type	Manufacturer Model	Overall Dimensions (inches)						Volume (Cu. In.)		Weight (Lbs.)	
					Crated			Uncrated			Crated	Uncrated	Crated	Uncrated
					H.	W.	D.	H.	W.	D.				
TCU-1	1	I-f Radio Transmitter	CG-52205	4G10C1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	278	146
	1	Rectifier	CG-20122	4MR3C1	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	359	229
	1	Control Unit	CG-23241	4MY27A1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	40	30
	1 case	Spare Parts			39	27	16				9.75		195	93
	9	Tubes									17.63		50	7
TCU-2	1	I-f Radio Transmitter	CG-52205	4G10D1	51	32	27	36-3/4	20-1/2	18-3/4	25.50	8.12	278	146
	1	Rectifier	CG-20122	4W315A	51	32	27	36-3/4	20-1/2	14-3/4	25.50	6.43	359	229
	1	Control Unit	CG-23241	4MY27B1	34	32	28	11-1/2	12-3/8	9	17.63	0.74	40	30
	1 case	Spare Parts			39	27	16				9.75		195	93
	9	Tubes									17.63		50	7

*Shock mountings to be used only where necessary.

Note

All overall dimensions include plugs inserted. This manual, which is shipped with each equipment, applies completely to all models.

6. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

The letter "x" in the "Navy Model Equipment" columns of the following table designates the model for which equipment is required but not supplied.

TABLE 1-7. — EQUIPMENT REQUIRED BUT NOT SUPPLIED.

Navy Model Equipment										Quantity per Equipment	Name of Unit	Navy Type Designation	G.E. Part Number
TCM	TCM-1	TCM-2	TCN	TCN-1	TCU	TCU-1	TCU-2	Rectifier	Transfer Switch				
x			x							1	Hand Microphone	CAU-51006-A	P-7765044-P2
x		x	x							1	Chest Microphone Assembly	CAU-51016-A	P-7765043-P2
x	x	x	x	x	x	x	x	x		1	Cable (1305)		ML-7660386-G5
x	x	x	x	x	x	x	x		x	1	Cable (1306)		ML-7660386-G7
x	x	x	x	x	x	x	x		x	1	Cable (1307)		ML-7660386-G8
x	x	x	x	x	x	x	x		x	1	Cable (1308)		ML-7660386-G12
x	x	x	x	x	x	x	x		x	1	Cable (1309)		ML-7660386-G11

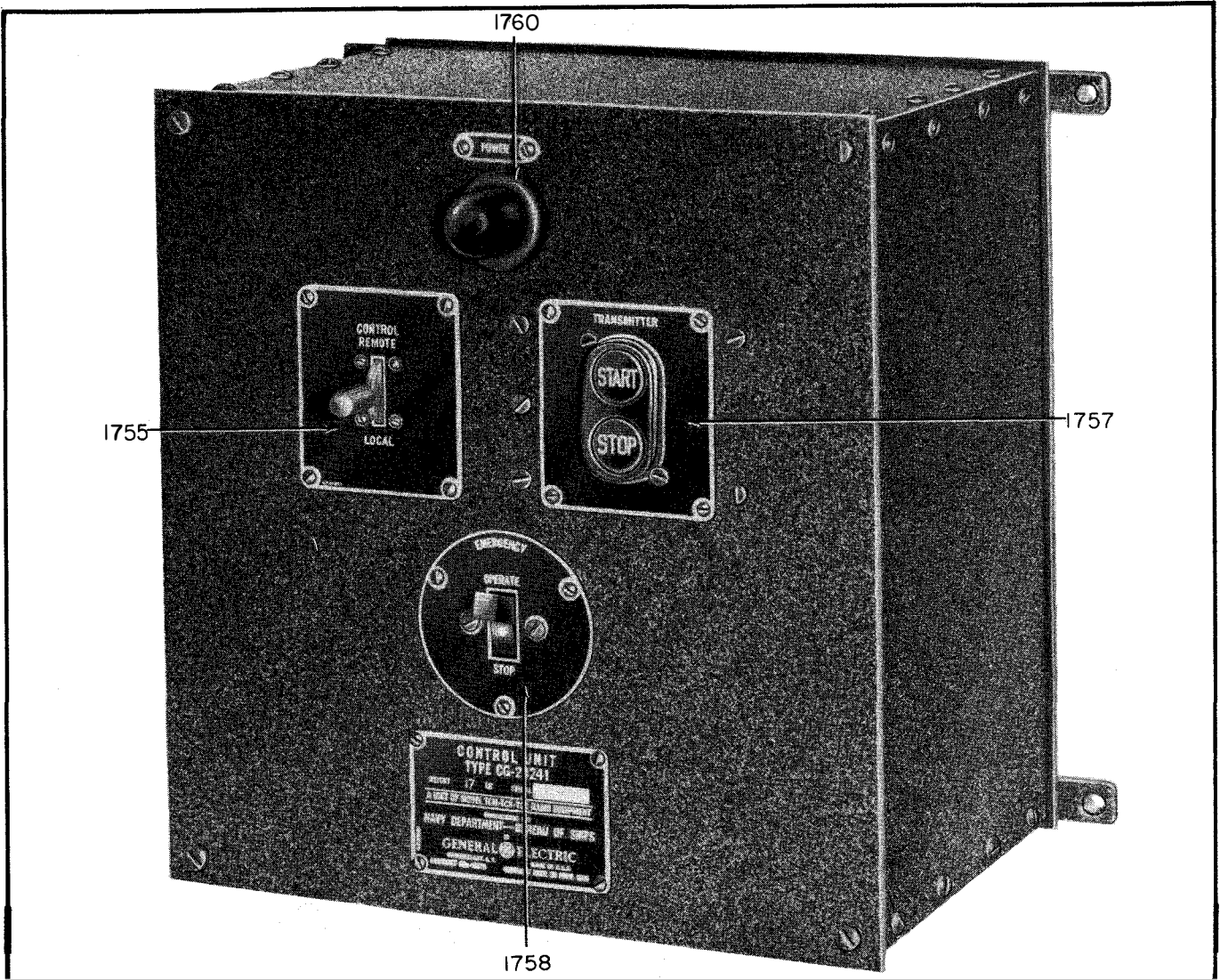


Figure 1-7. Control Unit Navy Type CG-23241, Front View

7. VACUUM TUBES.

a. The following is a list of the vacuum tubes and their uses:

TABLE 1-8. — VACUUM TUBE COMPLEMENT.

Major Unit	Quantity	Type	Use
H-f Radio Transmitter CG-52206	1	—837	Master oscillator
	1	—837	First intermediate power amplifier or frequency doubler
	1	—837	Second intermediate power amplifier or frequency doubler
	1	—837	Modulator
	2	—803	Power amplifier
I-f Radio Transmitter CG-52205	1	—837	Master oscillator
	1	—837	Intermediate power amplifier, frequency doubler or tripler
	1	—837	Audio oscillator
	2	—803	Power amplifier
Rectifier CG-20122	2	—836	Main plate rectifier
	2	—836	Auxiliary plate rectifier

Section I
Paragraph 7

NAVSHIPS 900,401

b. The type —837 vacuum tube is a pentode transmitting tube of the heater cathode type designed for use as an r-f amplifier or oscillator. The heater of this tube requires 0.7 ampere at 12.6 volts. The tube is designed to operate at a maximum d-c plate potential of 500 volts and a maximum d-c plate current of 80 milliamperes. Neutralization is generally unnecessary in adequately shielded circuits. The suppressor grid and the internal shields are connected to individual base pins. The type —837 tube may be operated at its maximum ratings at frequencies as high as 20 megacycles.

The type —803 vacuum tube is rated at 130 to 210 watts gross output when used as a Class C r-f amplifier for telegraphic operation. The thoriated tungsten filament of this tube requires five amperes at 10 volts. A

d-c plate potential of approximately 1350 volts is used. Like the type —837 this tube includes a screen grid and a suppressor grid.

The type —836 rectifier tube has an average plate current rating of 0.25 ampere and a maximum peak inverse rating of 5000 volts. Its coated heater requires five amperes at 2.5 volts.

CAUTION

A very decided decrease in the useful life of a vacuum tube filament is occasioned by overvoltage or undervoltage. Personnel are cautioned to operate filaments at exactly rated voltage unless specifically instructed otherwise.

SECTION II

THEORY OF OPERATION

1. GENERAL.

An understanding of the theory of operation of the transmitting equipments is essential in obtaining peak performance. The schematic and connection diagrams referred to in this section should be consulted in studying the circuits of the major units and their functions in the system. Component part numbers used in this section (and throughout the book) correspond to circuit symbol designations as they appear in the diagrams, illustrations, and in the parts list (section VIII).

The description of the transmitters, which follows, begins in each case with the master oscillator stage, continues with successive stages to the antenna, and deals with control circuits last.

2. H-F RADIO TRANSMITTER NAVY TYPE CG-52206.

(See figures 2-1 to 2-4 inclusive.)

a. MASTER OSCILLATOR (MO) CIRCUIT.

(1) The H-f Radio Transmitter Navy Type CG-52206 is designed to provide operation over the frequency band of 2000 to 18,100 kc. To design a master oscillator stage covering such a wide band of frequencies would involve cumbersome switches and considerable space. It therefore becomes necessary to resort to a method of doubling the mo frequency through an amplifier stage. This doubling may be done with two successive stages so that the result is a quadrupling of the initial frequency, or it may be done with three successive stages so that the mo frequency is multiplied by eight. (Refer to tables 2-1 and 2-2.)

**TABLE 2-1. — MINIMUM AND MAXIMUM FREQUENCY
DOUBLING CHARACTERISTICS.**

	<i>M-o Grid Kc</i>	<i>M-o Plate Kc</i>	<i>First I-p-a Kc</i>	<i>Second I-p-a Kc</i>	<i>P-a Kc</i>
Minimum	1000	2000	2000	2000	2000
Maximum	2262.5	4525	9050	18,100	18,100

**TABLE 2-2. — FREQUENCY DOUBLING CHARACTERISTICS OF
MO CIRCUIT.**

<i>Desired Output Freq. (Kc)</i>	<i>M-o Tuning Freq. (Kc)</i>	<i>1st I-p-a Tuning Freq. (Kc)</i>	<i>2nd I-p-a Tuning Freq. (Kc)</i>	<i>P-a Tuning Freq. (Kc)</i>
2000	1000	2000	2000	2000
3000	1500	3000	3000	3000
4200	2100	4200	4200	4200
5000	1250	5000	5000	5000
6000	1500	6000	6000	6000
7200	1800	7200	7200	7200
8000	2000	8000	8000	8000
10,000	1250	5000	10,000	10,000
12,000	1500	6000	12,000	12,000
16,000	2000	8000	16,000	16,000
18,100	2262.5	9050	18,100	18,000

(2) The master oscillator circuit in this radio transmitter has been designed to operate over a range of 1000 kc to 2262.5 kc. The frequency band selected is determined by grid circuit inductor 300. Taps on this inductor provide for the selection of any one of four bands by means of the "MO BAND CHANGE" switch (375). The plate circuit of the master oscillator is automatically tuned so as to double the mo frequency by means of switch 376, which operates in conjunction with switch 375. Thus it will be noted that the output frequency always operates at a harmonic of the mo frequency. If, for instance, an output frequency of 2000 kc is desired, the mo must be tuned to 1000 kc. Should the mo be tuned to 2000 kc, the first ipa could not be tuned to 2000 kc, but would be tuned to 4000 kc, since the mo plate circuit is already tuned to twice the mo grid circuit frequency.

The frequency range covered by the various stages is shown in table 2-1.

(3) The mo circuit is an electron-coupled oscillator employing an -837 type tube. The advantage of this type of oscillator is its constant frequency characteristic which is relatively unaffected by supply voltage variations or the loading effect of other stages. The components which determine the frequency of this oscillator are in the control and screen grid circuits and consist of inductance 300, fixed capacitors 201 and 202, variable air capacitor 200, and "MO BAND CHANGE" switch 375. Switch 375 selects any one of the four master oscillator bands of the circuit, and capacitor 200 is used to adjust the frequency.

The "CALIBRATION COMPENSATING" capacitor (203), located on the front panel, is provided with a screw driver adjustment for calibrating the master oscillator when a new oscillator tube is installed. Capacitor 204 is the mo tank circuit bypass capacitor in the low-impedance tank to cathode return circuit. Capacitor 205 is the grid blocking capacitor and resistor 265 is the grid leak resistor.

The suppressor grid of the mo tube, which is connected directly to the cathode, is maintained at r-f ground potential. Capacitor 206 prevents a short circuit of the d-c potential on the screen grid (oscillator plate) and completes the r-f circuit to the tank. Choke coil 326 prevents any r-f currents from entering the keying circuits. Choke coil 316 offers a high impedance to r-f currents and prevents a short circuit occurring across the r-f potential of the tank circuit. Capacitor 228 provides a low impedance return to ground for the mo cathode current.

The plate circuit of the mo tube is electron-coupled through the tube to the oscillator circuit, and hence acts as a buffer amplifier isolating the oscillator from the successive amplifier stages which reduces the reaction on the mo circuit. The plate tank circuit is composed of inductor 301, the stray circuit capacities, and "BAND CHANGE" switch 376. The required frequency range of this circuit is 2000 to 4525 kc. The plate tank inductance is designed to provide a broad resonance curve which

eliminates the necessity for tuning other than by taps. Switch 376, which is mechanically included with and controlled by the "MO BAND CHANGE" switch (375), selects the correct tap so as to operate the plate tank circuit at twice the frequency of the mo circuit. Bypass capacitor 208 completes the r-f circuit from the plate tank to the cathode and r-f ground. Choke coil 317 serves to prevent any stray r-f voltages from returning through the d-c voltage supply. Resistor 267 is the plate voltage-dropping resistor for the mo plate supply.

Coupling capacitor 209 feeds the r-f excitation from the mo plate circuit to the control grid of the first ipa tube, and blocks the mo d-c plate voltage from entering the grid circuit of the 1st ipa tube.

The plate and screen grid voltages required for operation of the mo stage are obtained from the 500-volt d-c auxiliary plate rectifier; filament voltage from one of the secondary windings of transformer 355. The plate current is indicated by the plate current milliammeter (340). Capacitor 211 bypasses this meter to protect it from stray r-f currents.

In standby operation (key open), when the transmitter is at "CW" or "MCW", keying is accomplished by applying a negative bias or blocking voltage to the control grid of the tube. When the key is depressed (key closed), this negative blocking bias is removed from the control grid and normal bias is restored to the control grid, thus permitting the tube to operate. For PHONE operation the control grid is supplied with normal operating bias.

For a detailed discussion of keying see section II, paragraph 2f.

b. FIRST INTERMEDIATE AMPLIFIER (IPA).—The first ipa stage uses a type -837 tube in a conventional amplifier circuit. This stage is operated either as an amplifier or as a frequency doubler. The r-f excitation voltage from the mo stage on the grid of the first ipa tube is isolated from ground by grid choke coil 318. Resistor 268 is the grid leak resistor which is bypassed by capacitor 210. Capacitor 212 is the cathode r-f bypass capacitor. Capacitors 213, 214, and 215 are screen grid, suppressor grid, and plate bypass capacitors, respectively, and maintain the grids and plate at r-f ground potential across cathode bypass capacitor 212. The plate impedance of the amplifier is a tank circuit consisting of tapped inductance 302, fixed capacitor 207, variable capacitor 217, and "1ST IPA BAND CHANGE" switch 377. Switch 377 provides three bands for covering the frequency range of 2000 to 9050 kc required for this stage. Choke coil 319 prevents any stray r-f voltages from passing into the d-c plate supply source. Capacitor 215 provides a low impedance path for the r-f current to return to the cathode, thus keeping the low end of the plate tank circuit inductance (302) at r-f ground potential.

The plate, screen grid, and suppressor grid voltages required for operation of the first ipa stage are obtained from the 500-volt d-c auxiliary plate rectifier; filament

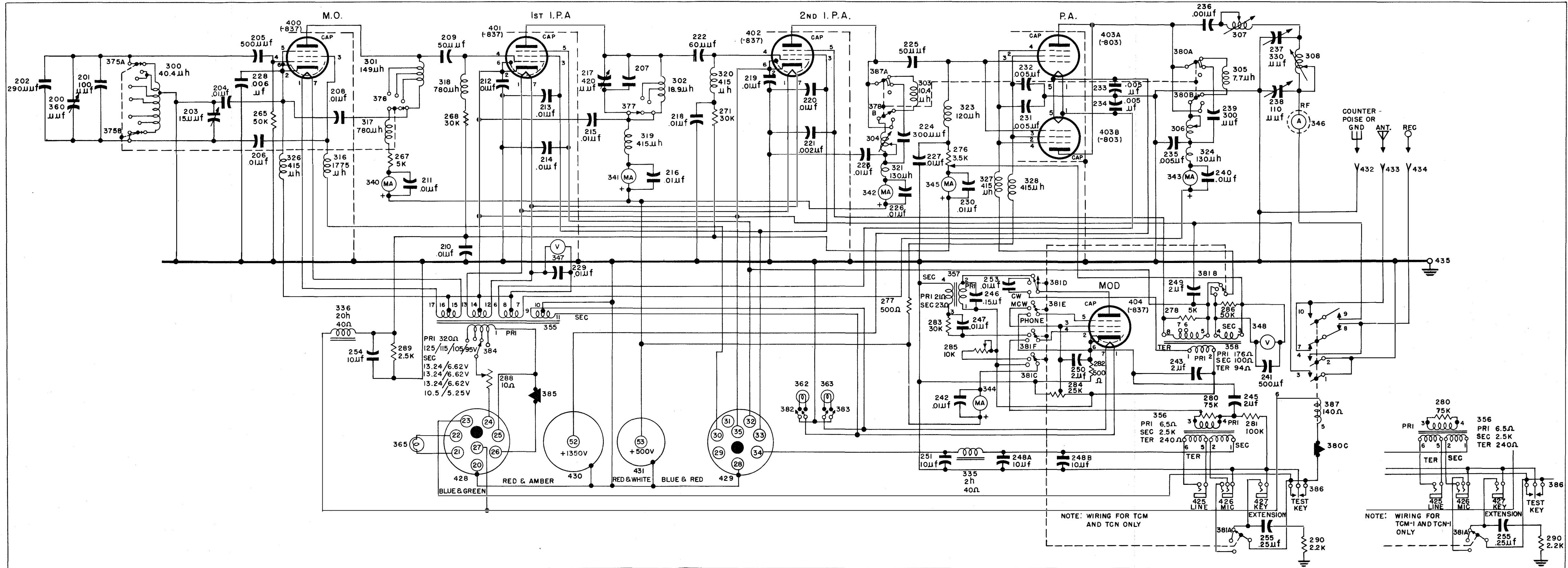


Figure 2-1. Schematic Diagram, H-f Radio Transmitter Navy Type CG-52206 (Navy Models TCM, TCM-1, TCN and TCN-1)

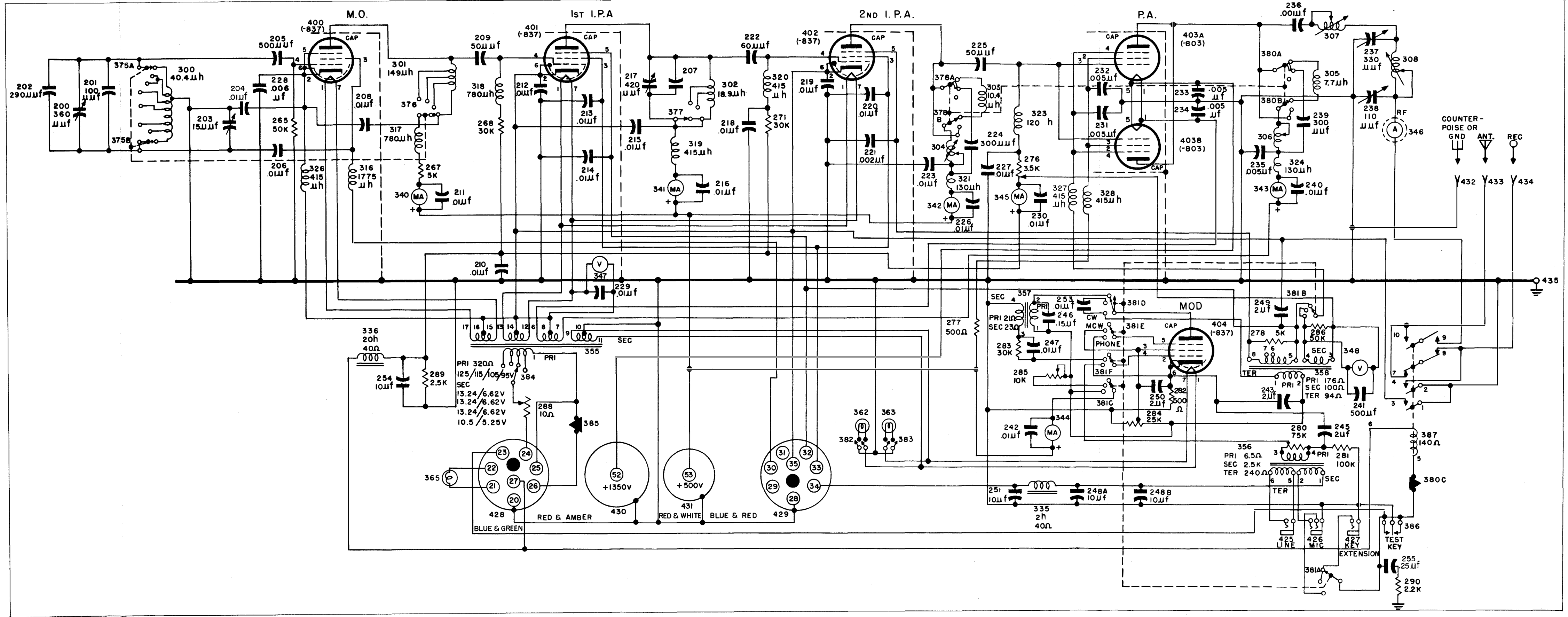
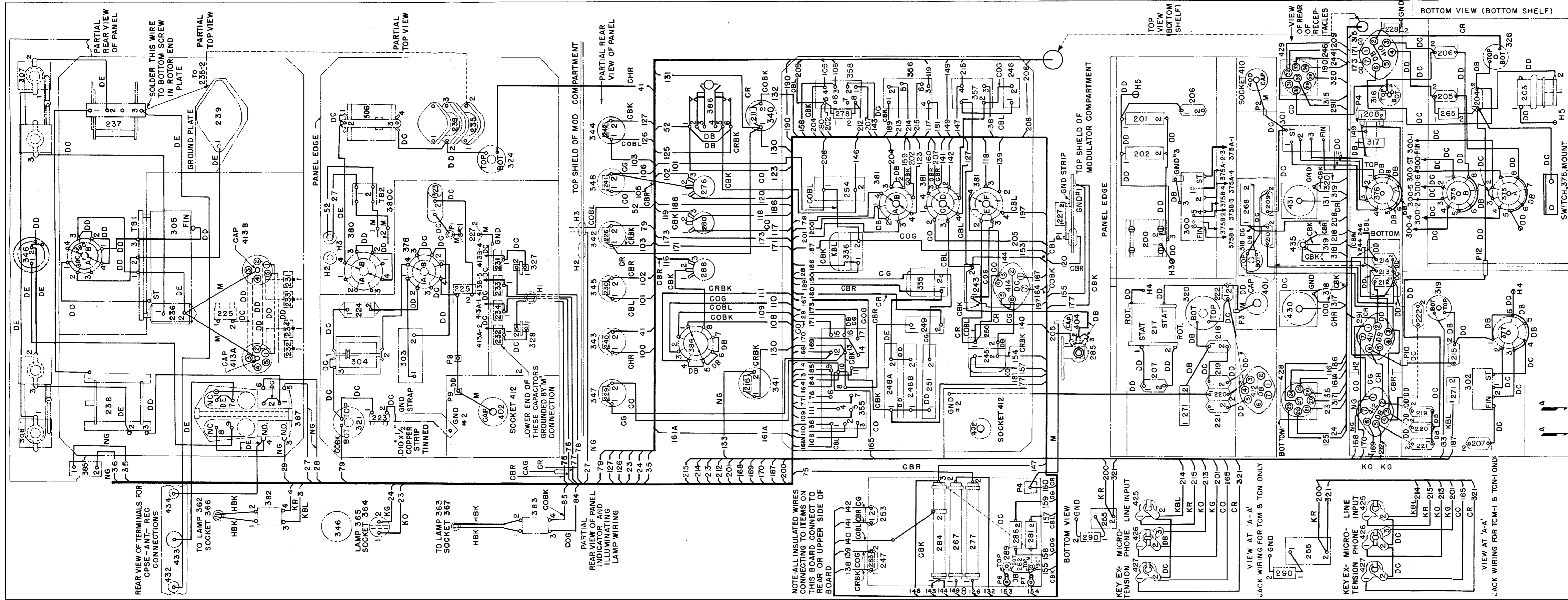


Figure 2-2. Schematic Diagram, H-f Radio Transmitter Navy Type CG-52206 (Navy Model TCM-2)



WIRE TABLE (CONTINUED)

CONNECTION	DESCRIPTION	UNIT PIECE OF APPARATUS
DB	#.040" DIA. COPPER WIRE, TINNED	
DC	#.061" DIA. COPPER WIRE, TINNED	
DD	#.080" DIA. COPPER WIRE, TINNED	
DE	#.102" DIA. COPPER WIRE, TINNED	
HBK	# 22 AWG, CELLULOSE ACETATE BRAID, WHITE WITH BLACK TRACER G.E.SPEC. K-7875044 P2	
KBL	# 22 AWG, STRANDED, BLUE, TINNED COPPER BRAID SHIELD, O.D.-.160" G.E.SPEC. K-7875099 P3	
KG	# 22 AWG, STRANDED, GREEN, TINNED COPPER BRAID SHIELD, O.D.-.160" G.E.SPEC. K-7875099 P2	
KO	# 22 AWG, STRANDED, ORANGE, TINNED COPPER BRAID SHIELD, O.D.-.160" G.E.SPEC. K-7875099 P1	
KR	# 22 AWG, STRANDED, RED, TINNED COPPER BRAID SHIELD, O.D.-.160" G.E.SPEC. K-7875099	
LRBL	# 20 AWG, SOLID, TWO CONDUCTOR TWISTED, ONE RED AND ONE BLUE, TINNED COPPER BRAID OVERALL, O.D.-.215" G.E.SPEC. K-7875000 P1	
NG	# 16 AWG, STRANDED, GREEN, TINNED COPPER BRAID SHIELD, O.D.-.155" G.E.SPEC. K-7876933 P1	
"M" OR UNMARKED		

WIRE TABLE

CONNECTION	DESCRIPTION	UNIT PIECE OF APPARATUS
CAG	#14 AWG, STRANDED, 1/32" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.180" G.E.SPEC. K-7872345 P12	
CBK	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P2	
CBL	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P6	
GBR	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P3	
CG	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P5	
CHR	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P11	
CO	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P1	
GOBK	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, ORANGE/BLACK LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P7	
COBL	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, ORANGE/BLUE LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P9	
COG	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, ORANGE/GREEN LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P10	
CR	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P4	
CRBK	#16 AWG, STRANDED, 1/4" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P8	

Figure 2-3. Connection Diagram, H-f Radio Transmitter Navy Type CG-52206 (Navy Models TCM, TCM-1, TCN and TCN-1)

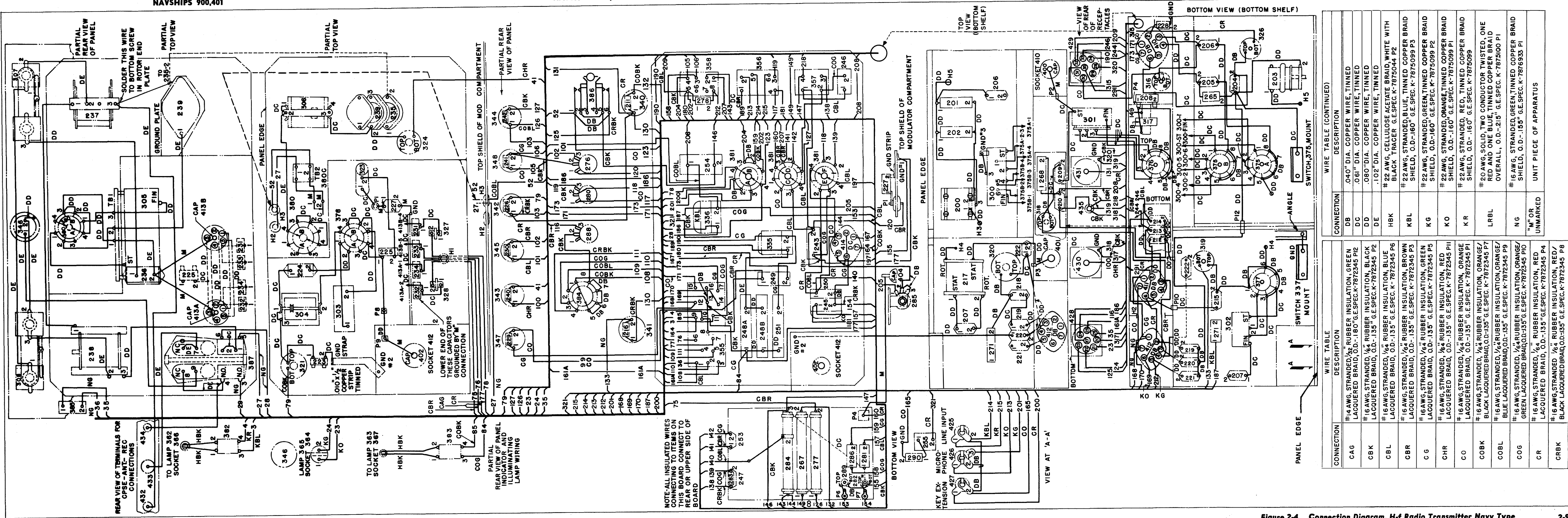


Figure 2-4. Connection Diagram, H-f Radio Transmitter Navy Type CG-52206 (Navy Model TCM-2)

voltage from one of the secondary windings of transformer 355; and grid bias voltage from the copper-oxide rectifier (692) through the smoothing filter network consisting of choke coil 336, capacitor 254, and resistor 289. The plate current is indicated by milliammeter 341. Bypass capacitor 216 protects this milliammeter from stray r-f currents.

On standby (key open), for CW or MCW transmission, the operation of the tube is blocked by a negative bias on the control grid. With the key depressed (key closed), the negative bias is removed from the control grid and normal bias applied permitting tube to operate. When using PHONE operation, normal operating bias is supplied to the control grid and the tube conducts under normal conditions. Keying is described in detail in section II, paragraph 2f.

c. SECOND INTERMEDIATE AMPLIFIER (IPA).—A type -837 tube is employed in a conventional amplifier circuit. This stage is operated either as an amplifier or as a frequency doubler. Excitation voltage from the first ipa stage is fed to the control grid across coupling capacitor 222. This capacitor also prevents the first ipa d-c plate voltage from appearing on the grid circuit of the second ipa. The grid circuit, which is similar to the first ipa grid circuit, consists of choke coil 320, grid leak resistor 271, and grid bypass capacitor 218. Capacitors 220, 221 and 223 are the screen grid, suppressor grid, and plate bypass capacitors, respectively.

Inductor 303, variable tuning inductor 304, capacitor 224, and "2ND IPA BAND CHANGE" switch 378 compose the plate tank circuit. Frequency variation is obtained by variable inductor 304. Switch 378 provides coverage of the frequency range from 2000 to 18,100 kc required for this stage in three steps. When low frequency operation is required, tap 1 is used, which connects inductor 303, in series with inductor 304. Capacitor 224 is connected in shunt across the inductance, formed by coil 303 and 304 connected in series. For mid-frequency operation, tap 2 is used, which shorts out inductor 303 and removes it from the circuit. The tank circuit is then composed of variable inductor 304 and capacitor 224. When high frequency operation is required, tap 3 is used, disconnecting capacitor 224 from the circuit. The plate tank circuit is then formed by inductor 304, the stray circuit capacities and the tube capacity.

Choke coil 321 is used to prevent stray r-f voltages from returning through the d-c supply source. Capacitor 223 provides a low impedance return path from the plate tank coil to the cathode. Thus, the low end of the plate tank coil (304) is kept at r-f ground potential.

The plate, screen grid, and suppressor grid voltages for operation of the second ipa stage is obtained from the 500-volt d-c auxiliary plate rectifier; filament voltage from one of the secondary windings of transformer 355; and grid bias from the copper-oxide rectifier (692) through the smoothing filter network consisting of choke coil 336, capacitor 254, and resistor 289. Plate current is indicated by milliammeter 341 while bypass capacitor 216 protects this meter from stray r-f currents.

When the transmitter is on standby (key open) for CW or MCW operation, keying or negative blocking bias is applied to the grid of this amplifier in the same manner as described for the first ipa. With the key down, keying bias is removed from the tube restoring normal operating voltages, and the tube operates.

Modulation voltage is impressed on the suppressor grid in this stage when the transmitter is operating on "MCW" or "PHONE". The method used to modulate the transmitter is discussed in paragraph f(2).

For a more detailed discussion on keying refer to section II, paragraph 2f.

d. POWER AMPLIFIER (PA).—This stage, which employs two type-803 tubes connected in parallel, operates as a straight amplifier. Excitation voltage from the second ipa stage is fed to the grids of both tubes through coupling capacitor 225. The grid circuit consists of choke coil 323, grid leak resistor 276, bypass capacitor 227, and grid current milliammeter 345 with its bypass capacitor 230. Potentiometer grid leak 276 is used to apply bias to the control grids of the pa tubes, and when the transmitter is operated on "MCW" or "PHONE", the potentiometer connection supplies voltage to the suppressor grids of the pa tubes. Capacitors 231 and 232 are suppressor grid and screen grid bypass capacitors, respectively. Capacitors 233 and 234 are filament bypass capacitors. Choke coil 328 offers a high impedance to r-f voltages in the screen grid circuit and prevents them from entering the d-c supply source. Choke coil 327 prevents r-f voltages on the suppressor grid from entering the modulation transformer.

The plate impedance consists of a tank circuit similar to that used in the second ipa stage. This tank circuit is formed by inductor 305, variable inductor 306, capacitor 239 and "PA BAND CHANGE" switch 380. This switch, which operates in conjunction with the "2ND IPA BAND CHANGE" switch (378), provides coverage of the frequency range from 2000 to 18,100 kc required for this stage in three steps. When low frequency operation is desired, tap 1 is used. This connects inductor 305 in series with inductor 306, which with capacitor 239 completes the tank circuit. For mid-frequency operation, tap 2 is used, which removes inductor 305 from the circuit, leaving variable inductor 306 and capacitor 239 as the components of the tank circuit. For high frequency operation, tap 3 is used, which removes capacitor 239 from the circuit. The tank circuit then consists of inductor 306, the stray circuit capacities, and the capacities of the pa tubes. It will be noted that inductor 306 provides continuous frequency variations over each band of the frequency range. Capacitor 235 is the pa tank bypass or grounding capacitor and provides a short path to ground for r-f potentials, thus keeping the low end of the plate inductance at r-f ground potential. Choke coil 324 prevents stray r-f voltages from entering the d-c supply source.

The plate voltage necessary for operation of the pa tubes is obtained from the 1350-volt main plate rectifier.

The screen grid and suppressor grid voltages are obtained from the 500-volt auxiliary plate rectifier. The control grid bias voltages are obtained from the copper-oxide rectifier (692) through the smoothing filter network consisting of choke coil 336, capacitor 254, and resistor 289. The filament voltage is supplied from one of the secondary windings of transformer 355. The plate current is indicated by milliammeter 343 while bypass capacitor 240 protects this meter from stray r-f currents.

In standby operation (key open) for CW or MCW transmission, negative keying bias is applied to the grids of the pa tubes thus blocking the tubes. When the key is down, the keying bias is removed, and normal operating bias is restored to the control grids and the tubes operate.

Modulation voltage is applied to the suppressor grids of the pa across resistor 286 and is discussed in paragraph f(2). For detailed discussion on keying refer to section II, paragraph 2f.

e. OUTPUT COUPLING CIRCUIT.—Because of the wide frequency range over which the radio transmitter operates, it is necessary to provide a coupling system which is very flexible. The system employed is capable of properly feeding the antenna over the entire frequency range. As shown in the schematic diagrams, figures 2-1 and 2-2, the full r-f voltage existing across the pa tank circuit is coupled to the antenna system across capacitor 236 and through variable inductor 307. The coupling capacitor (236) passes r-f voltages, but prevents the pa d-c plate voltage from entering the antenna circuit. The antenna driving voltage is the voltage which appears across capacitor 238. The antenna matching network is composed of inductors 307, 308 and variable capacitors 237 and 238. This system provides a means for delivering power to the antenna which may require either current or voltage feed. It is generally necessary to use current feed when operating slightly above or below the fundamental frequency of the antenna. This is accomplished by resonating capacitor 237 with inductor 308 which is set for maximum value. Under this condition inductor 307 acts as a coupling control. Adjustment of the coupling is achieved by varying inductor 307 and capacitor 237 while maintaining resonance for the current fed condition by means of inductor 308. For voltage feed, the antenna driving voltage is made high by series resonating capacitors 237 and 238 used with inductor 308. The greater the capacity ratio of capacitor 237 to capacitor 238, the higher will be the driving voltage.

When the transmitter is on standby, the normally open contacts (9 and 10) of keying relay 387 keeps the circuit from inductor 308 of the matching network to the antenna terminal open, while the normally closed contacts (7 and 8) connect the antenna and receiver terminals. When the transmitter is keyed, relay 387 is energized. Contacts 7 and 8 open disconnecting the antenna terminal from the receiver and removing the receiver from the circuit. Contacts 9 and 10 close, providing a circuit from the network through these contacts

to the antenna. The antenna current is indicated on the r-f current ammeter (346).

f. KEYING.—Keying of the radio transmitter is accomplished by a special multi-pole keying relay (387). The relay is operated by any one of the following controls: "EMISSION" switch 381, test key 386, the external telegraph key when plugged into key jack 427, or the microphone pushbutton when the microphone is plugged into microphone jack 426. Capacitor 255 and resistor 290 prevent current surges in the keying relay circuit.

When the transmitter is on standby for CW or MCW operation, contacts 3 and 1 of relay 387 are open. When these contacts are open a positive potential is applied to the cathode and filament circuits of all of the tubes except the audio oscillator tube (404). This is achieved by returning the cathode and filament circuits of the tubes to the junction of resistors 620 and 621 in the bleeder resistor composed of resistors 623, 622, 621 and 620 located in the rectifier. A positive potential above ground corresponding to the voltage drop across resistor 620 is thus applied to the cathodes and filament circuits. This maintains the control grids of the tubes at a negative potential with respect to the cathode and filament circuits by an amount corresponding to this positive potential. The magnitude of this voltage is such that the tubes are biased to cut off.

Depressing the key closes contacts 3 and 1 on relay 387 which shorts out resistor 620 and returns the cathode and filament circuits of the tubes to ground. This action restores normal operating bias to the tubes. A suitable filter consisting of reactor 336, capacitor 254 and resistor 289, is employed to reduce the ripple to a minimum. Voltage for energizing the coil of the keying relay (387) is obtained from the copper-oxide rectifier (692).

(1) CW OPERATION.—When the "EMISSION" switch (381) is on "CW", the microphone circuit through jack 426 is removed from the keying circuit. The external telegraph circuit through jack 427 and the "TEST KEY" (386) are then connected to the keying relay. The audio circuit is also removed from the circuit by the action of the "EMISSION" switch (381).

(a) EXTERNAL TELEGRAPH KEYING.—When the telegraph extension plug is inserted in jack 427 and the key is depressed, the d-c circuit is completed from the negative side of the copper-oxide rectifier to the coil of relay 387, through interlock 380G, through the "CW" contact of switch 381A through the external telegraph circuit to ground and to the positive side of the copper-oxide rectifier. This action energizes relay 387 closing contacts 9 and 10 which provide a circuit from the antenna network through inductor 308 to the antenna terminal. Contacts 7 and 8 open, removing the receiver from the circuit. Contact 4 closes and grounds the receiver. Contact 3 closes and shorts out resistor 620 placing the cathodes of the amplifiers at ground potential. Switch 381B, in the "CW" position, connects the suppressor grids of the pa stage to the d-c supply voltage. The amplifier stages are then at normal operating bias and the tubes conduct.

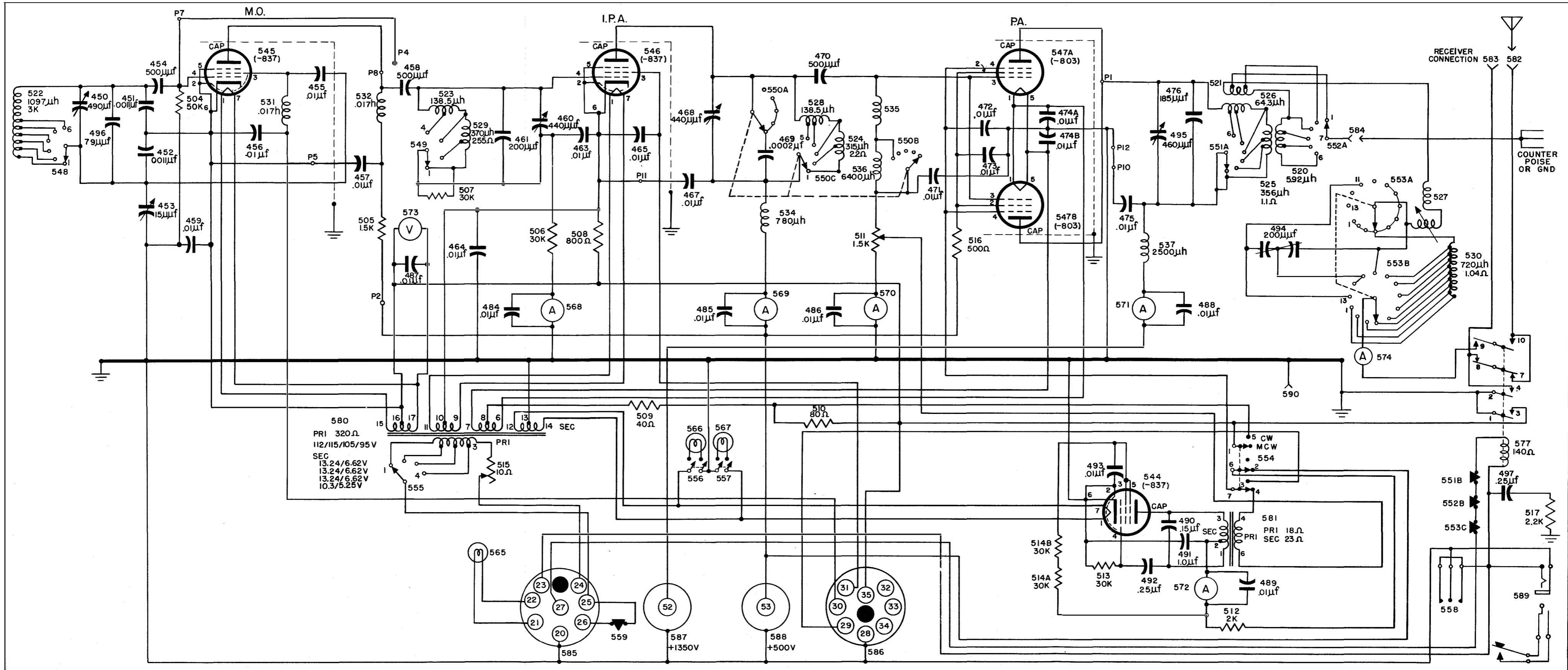
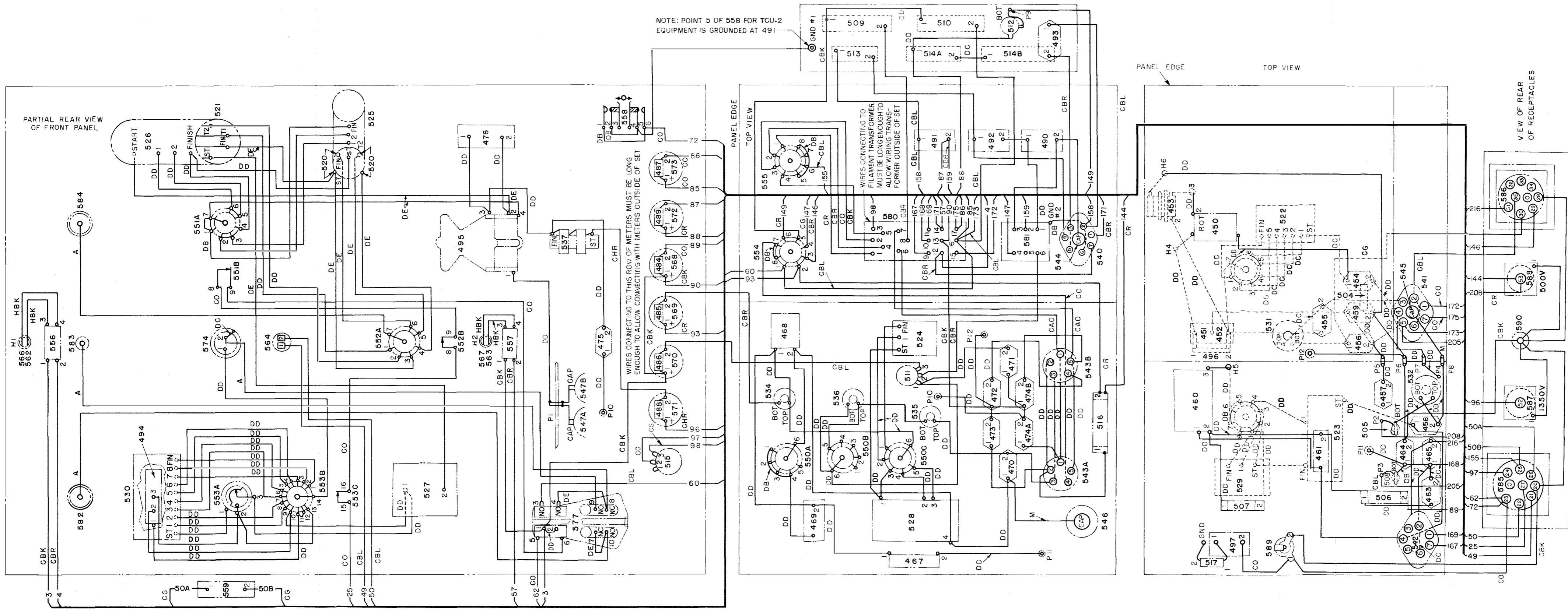


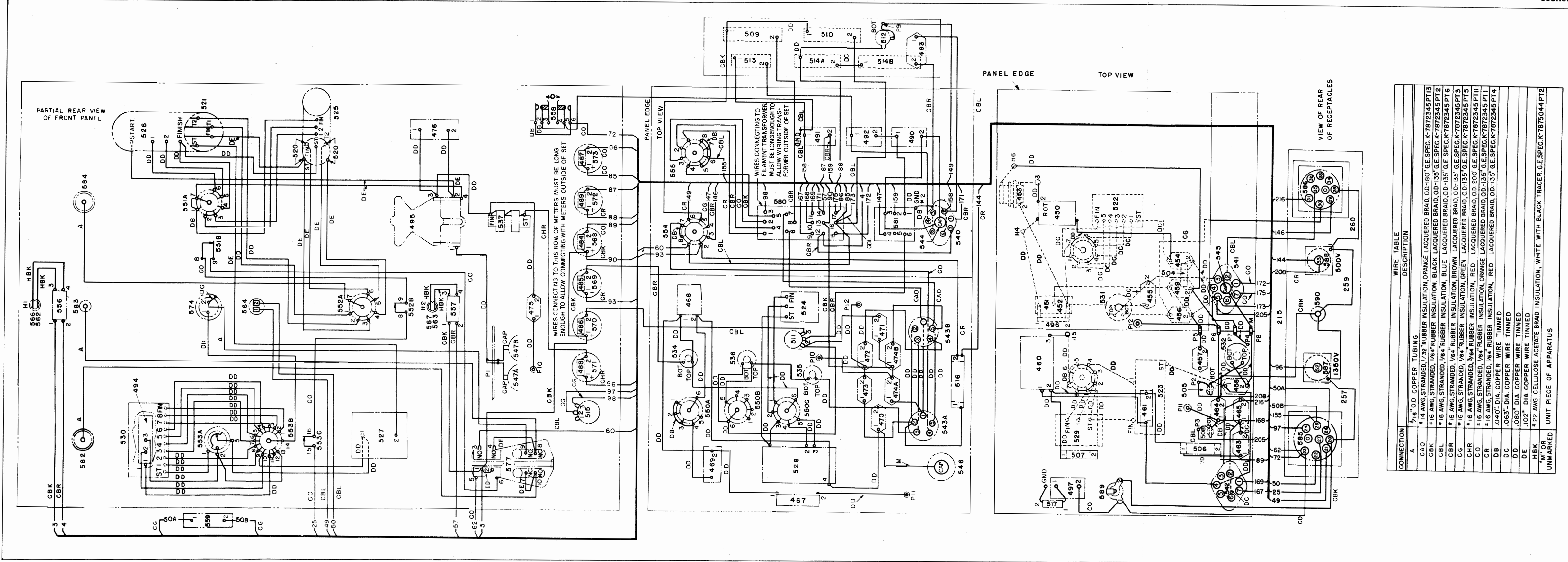
Figure 2-5. Schematic Diagram, I-f Radio Transmitter Navy Type CG-52205 (Navy Models TCN, TCN-1, TCU, TCU-1 and TCU-2)



WIRE TABLE

CONNECTION	DESCRIPTION
A	3/16" O.D. COPPER TUBING
CAO	#14 AWG. STRANDED, 1/32" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.:180" GE SPEC K-7872345 P13
CBK	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D.:135" GE SPEC K-7872345 P2
CBL	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D.:135" GE SPEC K-7872345 P6
CBR	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.:135" GE SPEC K-7872345 P3
CG	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.:135" GE SPEC K-7872345 P5
CHR	#16 AWG. STRANDED, 3/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.:200" GE SPEC K-7872345 P1
CO	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.:135" GE SPEC K-7872345 P1
CR	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.:135" GE SPEC K-7872345 P4
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
DD	.080" DIA. COPPER WIRE TINNED
DE	.102" DIA. COPPER WIRE TINNED
HBK	#22 AWG. CELLULOSE ACETATE BRAID INSULATION, WHITE WITH BLACK TRACER GE SPEC K-7875044 P2
"M" OR UNMARKED	UNIT PIECE OF APPARATUS

Figure 2-6. Connection Diagram, 1-f Radio Transmitter Navy Type CG-52205 (Navy Models TCN, TCN-1, TCU and TCU-1)



CONNECTION	DESCRIPTION
A	3/16" O.D. COPPER TUBING
CAO	#14 AWG. STRANDED, 1/32" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.180" G.E. SPEC. K-7872345 PT13
CAO	#14 AWG. STRANDED, 1/32" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT2
CBK	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT6
CBL	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT3
CBR	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT5
CG	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT4
CHR	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT11
CO	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT4
CR	#16 AWG. STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 PT11
DB	.040" DIA. COPPER WIRE TINNED
DC	.063" DIA. COPPER WIRE TINNED
DD	.080" DIA. COPPER WIRE TINNED
DE	.102" DIA. COPPER WIRE TINNED
HBK	#22 AWG. CELLULOSE ACETATE BRAID INSULATION, WHITE WITH BLACK TRACER, G.E. SPEC. K-7875044 PT2
"M" OR UNMARKED	UNIT PIECE OF APPARATUS

Figure 2-7. Connection Diagram, I-f Radio Transmitter Navy Type CG-52205 (Navy Model TCU-2)

(b) TEST KEYING.—When the "TEST KEY" is pressed down, the d-c circuit is completed in the same manner as described in paragraph (a) immediately preceding because the test key is connected across the terminals of the external telegraph key jack.

(2) MCW OPERATION.—When the "EMISSION" switch 381 is on "MCW" the external telegraph circuit and the test key (386) are connected to the keying relay (387) as described in paragraph (a) preceding. The microphone is removed from the circuit, and the audio oscillator circuit is connected to the suppressor grids of the second ipa and the pa tubes through the modulation transformer 358.

When the transmitter is in the "MCW" position, the modulator tube operates as an oscillator amplifier. The grid circuit consists of grid leak resistor 283, bypass capacitor 247, one winding of the audio oscillator transformer (357), and the "MCW" contact of the "EMISSION" switch (381F). Resistor 282 in the cathode return circuit is used to self-bias the audio tube. The screen and suppressor grid voltages are bypassed to the cathode by capacitor 250. The plate circuit consists of the second winding of the audio oscillator transformer (357), the modulation transformer (358), capacitors 243 and 246. Capacitor 246 is used to tune the plate circuit to approximately 1000 cycles. The plate circuit is bypassed to the cathode by capacitor 243.

The plate voltage required for operation of the audio tube is obtained from the 500-volt d-c auxiliary rectifier and is supplied through the "MCW" contact of switch 381C, potentiometer 285, the plate winding of the audio oscillator transformer (357), and through the "CW" contact of switch 381D. Milliammeter 344, bypassed by capacitor 242, indicates the plate current.

The screen and suppressor grid voltages are obtained from the 500-volt d-c auxiliary plate rectifier, and are reduced to the required voltage by resistor 284. The filament voltage is obtained from one of the secondary windings of transformer 355.

Modulation of the power amplifier is accomplished by suppressor type modulation. Both the second ipa and pa suppressor grids are modulated by using two secondary windings of transformer 358. Resistor 286 is a load resistance across the pa suppressor modulation source. Modulation is indicated by voltmeter 348 which is bypassed by capacitor 241.

(a) EXTERNAL TELEGRAPH KEYING.—When the key of the telegraph extension circuit is depressed, the d-c circuit is completed from the negative side of the copper-oxide rectifier, through interlock 380G, the coil of relay 387, the "MCW" contact of switch 381A and the external telegraph circuit to ground, returning to the positive side of the copper-oxide rectifier.

The foregoing action energizes relay 387 closing contacts 9 and 10 which connect the antenna to the antenna matching network. Contacts 7 and 8 of the relay open, removing the receiver from the circuit. Contact 4 closes and connects the receiver to ground. Contact 3 closes

and shorts out resistor 620, connecting the cathodes of the amplifier stages to ground. Normal operating bias is thus restored and the amplifier tubes operate.

In the "MCW" position the audio oscillator amplifier tube (404) generates a 1000-cycle audio voltage. Since this tube is not connected in the keying circuit, this audio voltage furnishes a continuous output which is impressed across the windings of modulation transformer 358. This induces an audio voltage in the secondary windings of the transformer which is impressed on the suppressor grids of the second ipa and pa stages, through the "MCW" contacts of switch 381B and across load resistors 286 and 287.

(b) TEST KEYING.—When the "TEST KEY" is depressed, the d-c circuits are completed as described in paragraph (a) immediately preceding since the test key is connected across the external telegraph key jack.

(3) PHONE OPERATION.—When phone operation is required, the "EMISSION" switch (381) is placed on "PHONE" position. This switches the audio circuits so that the type -837 tube (V404) acts as a pentode audio amplifier. The audio oscillator transformer is isolated from the plate and grid circuits.

The grid circuit then consists of the microphone input transformer (356), potentiometer 280 which controls the input level of the signal to the control grid, grid leak resistor 281, bypass resistor 245, and the "PHONE" contact of switch 381F. Resistor 282 in the cathode return circuit is used to self-bias the tube. The grid voltage is bypassed to the cathode by capacitor 250. The plate circuit consists of modulation transformer 358 and capacitor 243. Capacitor 243 bypasses the plate circuit to the cathode.

The plate voltage required for operation of the audio tube is obtained from the 500-volt d-c auxiliary rectifier and is supplied through the "PHONE" contact of switch 381C, the primary winding of transformer 358, and the "PHONE" contact of switch 381D. Milliammeter 344, bypassed by capacitor 242, is used to indicate the plate current.

Resistor 284 reduces the screen voltage obtained from the 500-volt d-c auxiliary rectifier. The suppressor grid is directly connected to the cathode through the "PHONE" contact of switch 381E. The control grid excitation is obtained from transformer 356. The filament voltage is obtained from one of the secondary windings of transformer 355.

The microphone voltage is supplied from the voltage drop across resistor 628. A smoothing filter, consisting of capacitors 248A, 248B, 251 and reactor 335, removes any ripple in the microphone voltage supply circuit.

The d-c circuits and relay action are the same as discussed in the preceding paragraphs. The microphone input is fed to the primary winding of transformer 356. This induces a voltage in the secondary winding of transformer 356 and impresses a signal on the control grid of the audio tube, through potentiometer 280. The output signal is impressed on the primary winding of transformer 358 and is then fed to the suppressor grids of the second ipa and pa stages.

**3. I-F RADIO TRANSMITTER
NAVY TYPE CG-52205.**

(See figures 2-5 to 2-7 inclusive.)

The required frequency ranges of the various stages of this unit are listed in table 2-3.

a. MASTER OSCILLATOR (MO) CIRCUIT.—A type -837 vacuum tube (545) is used as an electron-coupled oscillator. The advantage of this type of oscillator is its constant frequency characteristic which is relatively unaffected by supply voltage variations or the loading effect of other stages. The frequency determining components are located in the control and screen grid circuits and consist of inductance 522, variable capacitor 450, fixed capacitors 451, 452, 496 and "MO BAND CHANGE" switch 548. Switch 548 selects any one of the six master oscillator bands of 150 kc to 333.3 kc of the circuit and capacitor 450 is used to adjust the frequency. The center connection of capacitors 451 and 452 is connected to the cathode, thereby producing suitable out-of-phase voltages for operating the master oscillator. Capacitor 454 is the control grid d-c blocking capacitor, and resistor 504 is the grid leak resistor. Choke 531 and capacitor 456 prevent the screen grid r-f excitation from being short circuited and entering the d-c supply. Capacitor 455 blocks the d-c screen grid voltage from entering the r-f circuit. The cathode bypass capacitor (459) allows radio frequency to pass from the mo cathode to the cathode of the ipa stage, thus completing the r-f excitation path. Variable capacitor 453 compensates for any change in tube capacity when a new master oscillator tube is installed.

The plate circuit consists of inductor 532, capacitor 457 and resistor 505. Choke 532 and capacitor 457 pre-

vent the plate r-f excitation from being short circuited and entering the d-c supply. Resistor 505 is the plate dropping resistor used to give frequency compensation when the plate and screen grid supply is varied.

Coupling capacitor 458 feeds the r-f excitation from the mo plate circuit to the control grid of the ipa tube, and blocks the d-c plate voltage from the grid circuit.

The plate and screen grid voltages required for operation of this stage are obtained from the 500-volt d-c auxiliary plate rectifier and the filament voltage from one of the secondary windings of transformer 580. Voltmeter 573 is used to indicate the filament voltage. Capacitor 487 protects this meter from stray r-f voltages.

When the voltage to the screen grid and plate is increased, the increase in the screen grid voltage causes a decrease in frequency, and the increase in plate voltage causes an increase in frequency. The proper value of the plate-dropping resistor equalizes the decrease and increase in frequency, thus stabilizing the frequency.

A "balancing connector" lead is attached to the control grid terminal of the mo tube and to an adjustable metal clamp anchored to one terminal of coupling capacitor 458. This lead provides a small amount of capacity coupling between these two circuits, so as to balance feedback between the plate circuit and the control and screen grid circuits of the oscillator tube. The effects of feedback on the oscillator frequency in tuning the ipa grid circuit are thus minimized. The adjustable clamp is set for optimum coupling at the factory and should not be changed.

**TABLE 2-3. — REQUIRED RANGE OF STAGES.
I-f Radio Transmitter Navy Type CG-52205.**

M-o Freq. (Kc)	I-p-a Grid Freq. (Kc)		I-p-a Plate Freq. (Kc)		P-a Freq. (Kc)
	Doubler	Tripler	Amplifier	Doubler	
150*	300*		300*		300*
150	300			600	600
200	400		400		400
200	400			800	800
223	446		446		446
223	446			892	892
300	600		600		600
333.3*	600			1200	1200
222.2	666.6			1333.2	1333.2
250		666.6		1333.2	1333.2
300		750		1500	1500
333.3*		900		1800	1800
300		1000.0*		2000*	2000*

*Limiting frequencies covered by circuit.

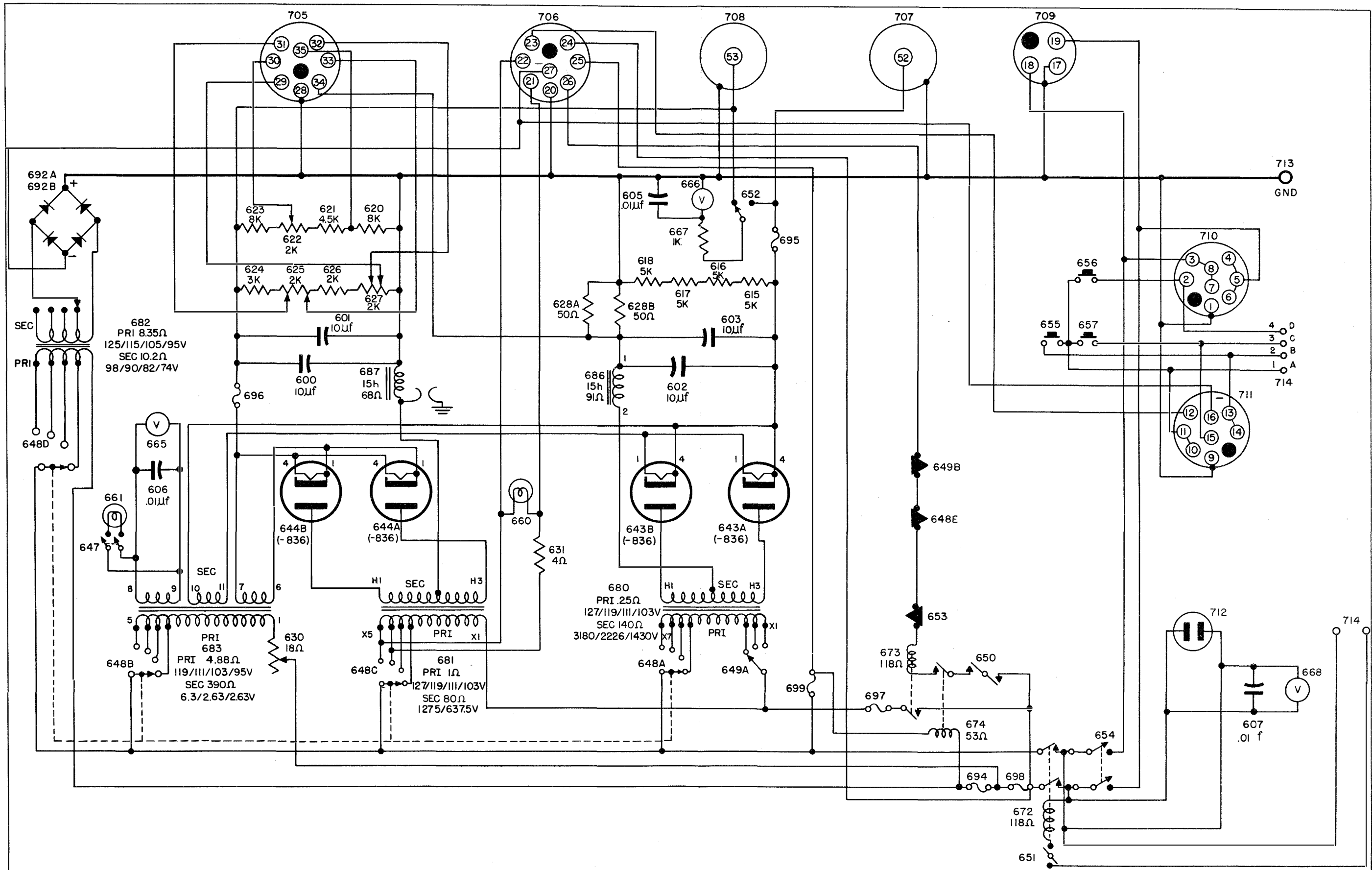
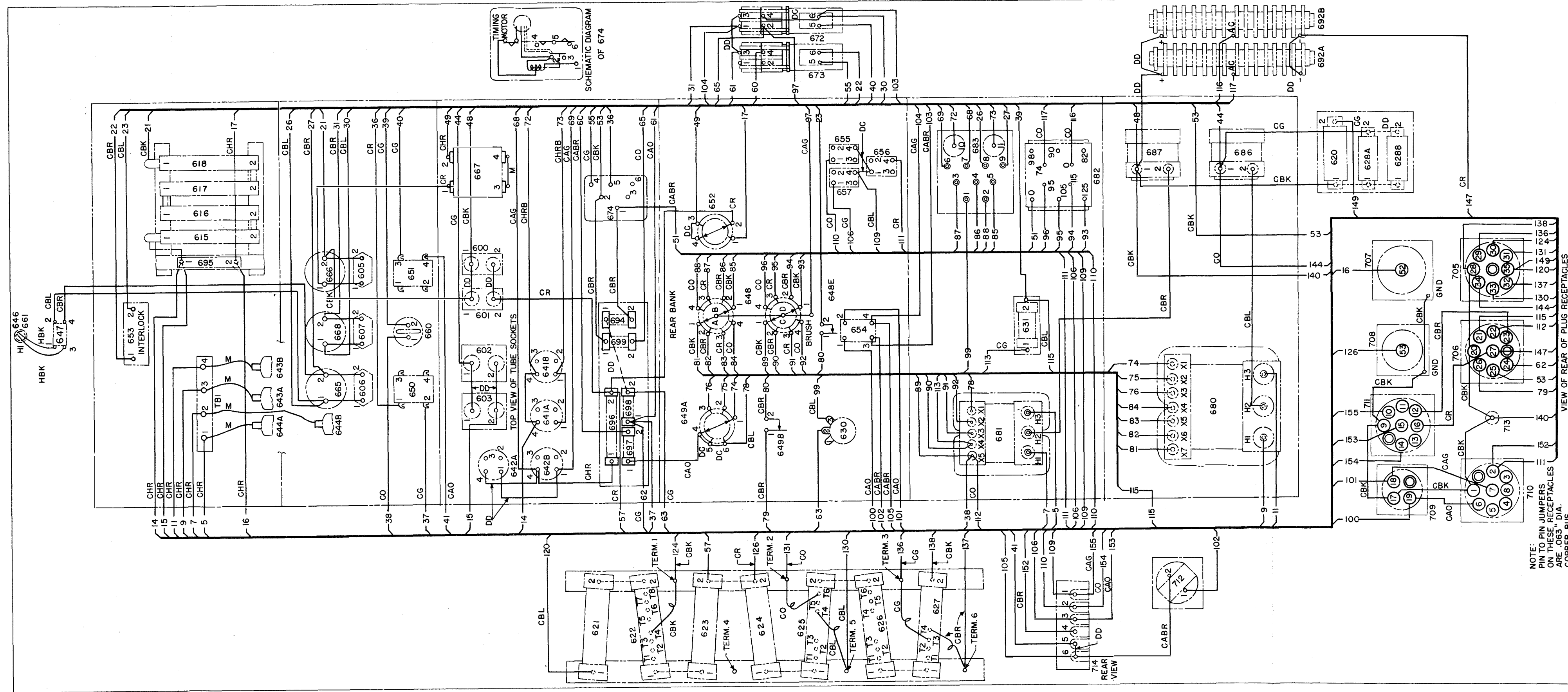


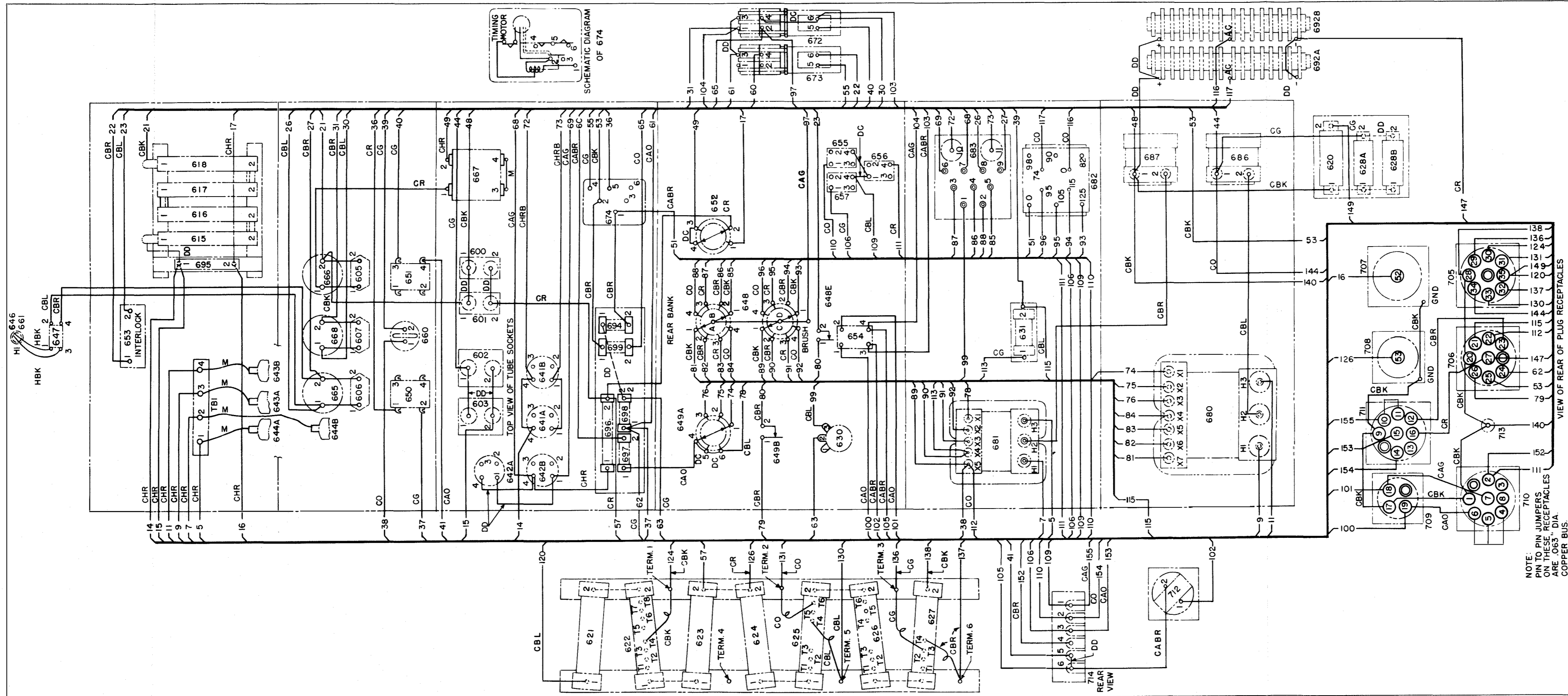
Figure 2-8. Schematic Diagram, Rectifier Navy Type CG-20122 (Navy Models TCM, TCM-1, TCM-2, TCU, TCU-1, TCU-2, TCN and TCN-1)



NOTE:
PIN TO PIN JUMPERS
ON THESE RECEPTACLES
ARE .063" DIA.
COPPER BUS.

CONNECTION	DESCRIPTION
CABR	# 14 AWG, STRANDED, 1/32" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.-.180" G.E. SPEC. K-7872345 P14
CAG	# 14 AWG, STRANDED, 1/32" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.180" G.E. SPEC. K-7872345 P12
CAO	# 14 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.180" G.E. SPEC. K-7872345 P13
CBK	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P2
CBL	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P6
CBR	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P3
CG	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P5
CHR	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.200" G.E. SPEC. K-7872345 P11
CHRB	# 14 AWG, STRANDED, 3/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D.-.211" G.E. SPEC. K-7872345 P15
CO	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P1
CR	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.135" G.E. SPEC. K-7872345 P4
HBK	# 22 AWG, STRANDED, CELLULOSE ACETATE BRAID, WHITE WITH BLACK TRACER G.E. SPEC. K-7875044 P2
DC	.063" DIA. COPPER WIRE TINNED
DD	.080" DIA. COPPER WIRE TINNED
M OR UNMARKED	UNIT PIECE OF APPARATUS

Figure 2-9. Connection Diagram, Rectifier Navy Type CG-20122 (Navy Models TCM, TCM-1, TCU, TCU-1, TCN and TCN-1) 2-23 2-24



NOTE:
PIN TO PIN JUMPERS
ON THESE RECEPTACLES
ARE .065" DIA.
COPPER BUS.

CONNECTION	DESCRIPTION
CABR	# 14 AWG, STRANDED, 1/32" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.-.180" G.E.SPEC. K-7872345 P14
CAG	# 14 AWG, STRANDED, 1/32" RUBBER INSULATION, GREEN LACQUERED BRAID, O.D.-.180" G.E.SPEC. K-7872345 P12
CAO	# 14 AWG, STRANDED, 1/32" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.180" G.E.SPEC. K-7872345 P13
CBK	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLACK LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P2
CBL	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, BLUE LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P6
CBR	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, BROWN LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P5
CG	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.200" G.E.SPEC. K-7872345 P11
CHR	# 14 AWG, STRANDED, 3/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.211" G.E.SPEC. K-7872345 P15
CHRB	# 14 AWG, STRANDED, 3/64" RUBBER INSULATION, RED/BLACK LACQUERED BRAID, O.D.-.211" G.E.SPEC. K-7872345 P15
CO	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, ORANGE LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P1
CR	# 16 AWG, STRANDED, 1/64" RUBBER INSULATION, RED LACQUERED BRAID, O.D.-.135" G.E.SPEC. K-7872345 P4
HBK	# 22 AWG, STRANDED, CELLULOSE ACETATE BRAID, WHITE WITH BLACK TRACER G.E.SPEC. K-7875044 P2
DC	.063" DIA. COPPER WIRE TINNED
DD	.080" DIA. COPPER WIRE TINNED
M	FOR UNMARKED UNIT PIECE OF APPARATUS

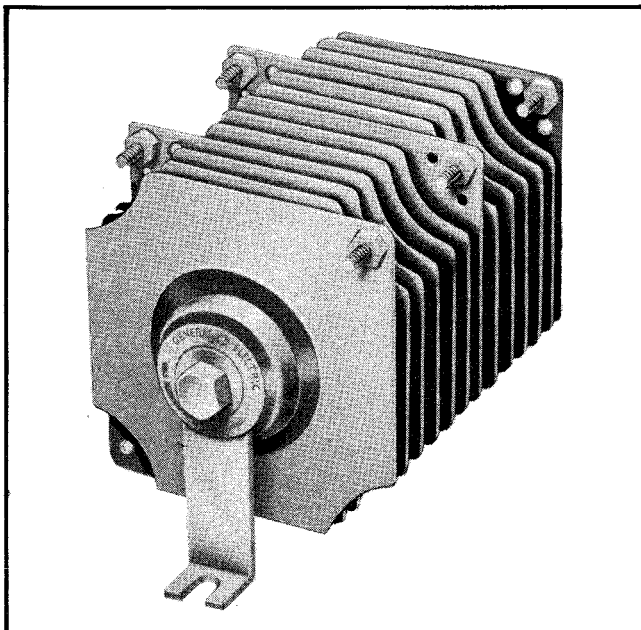
Figure 2-10. Connection Diagram, Rectifier Navy Type CG-20122 (Navy Models TCM-2 and TCU-2)

When the transmitter is on standby, keying bias is applied to the circuit making the control grid negative with respect to ground. This negative bias is made high enough to cut off the tube. When the key is closed, keying bias is removed and the control grid circuit is returned to normal operating bias and the tubes conduct.

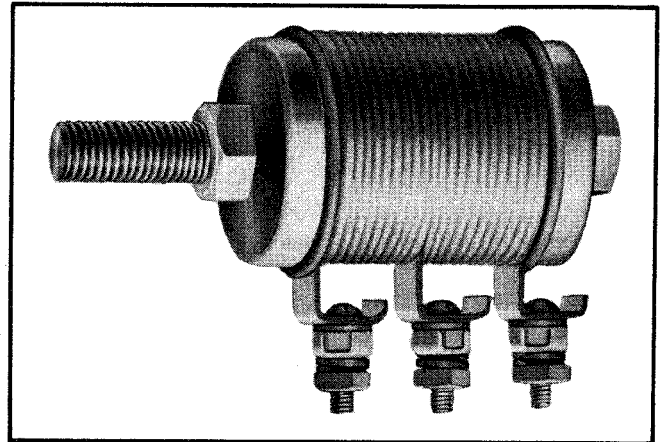
For a more detailed discussion of keying see section II, paragraph 3e.

b. INTERMEDIATE POWER AMPLIFIER (IPA) CIRCUIT.—This stage employs a type -837 tube and is used as a frequency doubler or tripler. R-f excitation from the mo circuit is coupled to the control grid of the ipa tube through capacitor 458.

The grid tank circuit is composed of inductors 523 and 529, fixed capacitor 461, variable capacitor 460, and the "IPA BAND CHANGE" switch (549). Switch 549 selects the frequency range of 300 to 1000 kc required for operation of this stage in four bands. Capacitor 460 adjusts the frequency over any one of these bands. Resistor 507 maintains bias voltage on the control grid by insuring continuity of the grid tank circuit when the grid tank circuit is momentarily open while switching from one band to another. Resistor 506 is the grid leak resistor. Milliammeter 568, connected in series with resistor 506, indicates the d-c grid current. This reading is dependent upon the excitation received by the control grid. Capacitor 484 protects this meter from stray r-f currents. Capacitor 463 allows radio frequency to return from the cathode to the grid tank circuit, and capacitor 464 serves as the cathode r-f return path. Resistor 508 is used to self-bias the tube and also reduces the plate voltage to approximately 450 volts when the tube is in operation. It also provides a bias on the control grid if excitation fails. Capacitor 465 maintains the screen grid



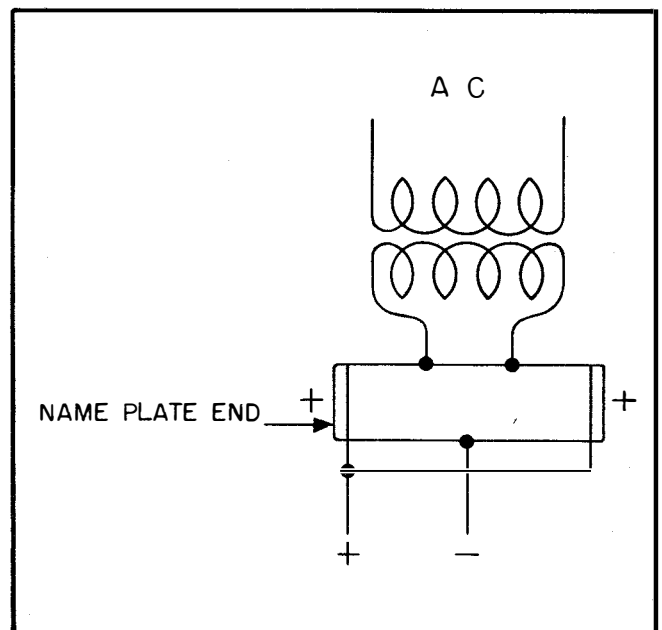
**Figure 2-11. Copper-Oxide Rectifier (692)
(with ventilating fins)**



**Figure 2-12. Copper-Oxide Rectifier (692)
(without ventilating fins)**

at the r-f potential of the cathode. The suppressor grid is connected directly to the cathode.

The plate tank circuit is composed of inductances 528 and 524, fixed capacitor 469, variable capacitor 468, and the "IPA BAND CHANGE" switch 550A and C. Switch 550 selects the frequency range of 300 to 2000 kc required for operation in 5 bands. When bands 3 or 4 are used, inductor 524 is removed from the circuit. When switch 550 is on band 5 (when high frequency operation is required) capacitor 469 and inductor 524 are removed from the circuit. The plate tank circuit is connected to the cathode across capacitor 467. Direct current is fed to the plate tank through r-f choke 534 which prevents radio frequency from entering the d-c plate supply. Capacitor 467 serves as a low impedance path for the radio frequency, thus keeping the low side of the plate inductance (524) at r-f ground potential.



**Figure 2-13. Wiring Diagram of
Copper-Oxide Rectifier (692)**

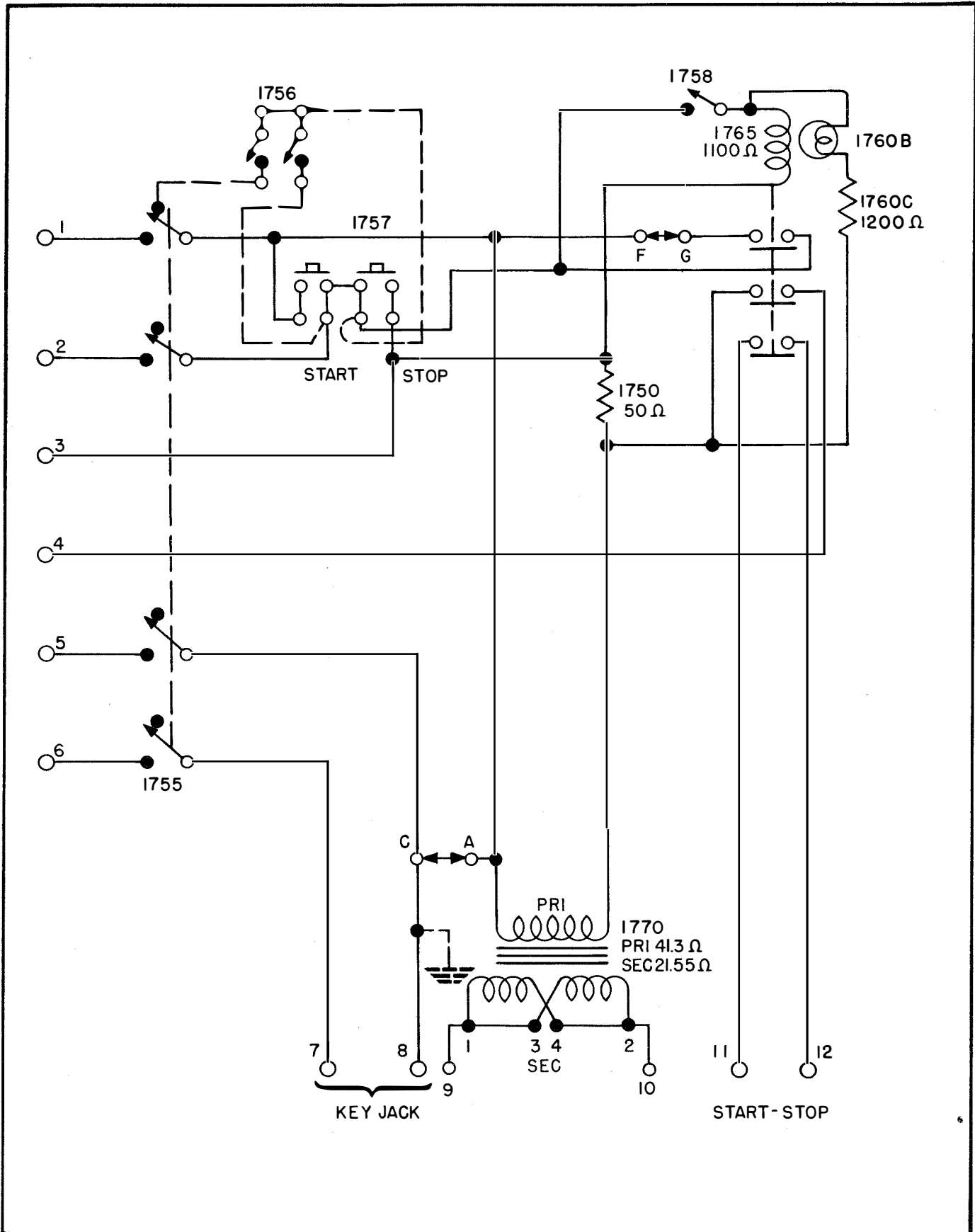
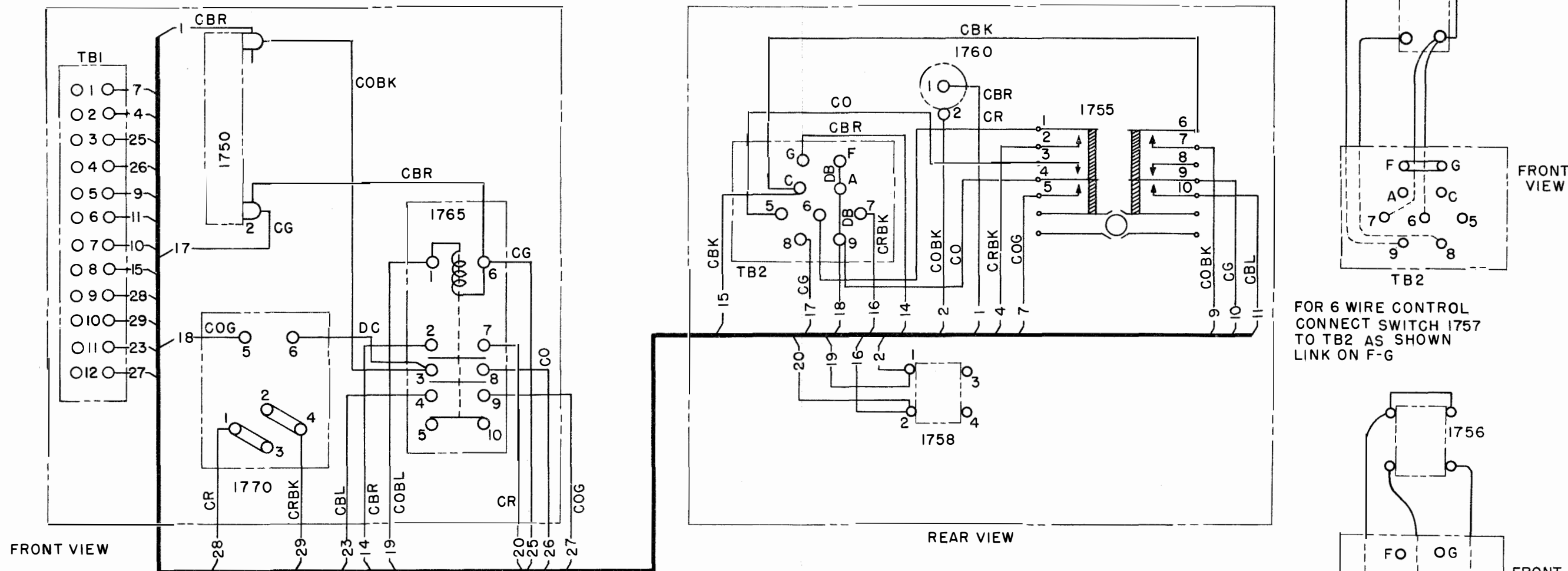


Figure 2-14. Schematic Diagram, Control Unit Navy Type CG-23241

NOTE: LINKS ON TRANSFORMER 1770 SHOWN FOR 110 VOLTS AC
FOR 220 VOLTS REMOVE LINKS 1-3 AND 2-4 AND CONNECT LINKS 2-3



CODED WIRE C ()*	#16 AWG, $\frac{1}{64}$ " RUBBER INSULATION, COLORED LACQUERED BRAID, O.D. - .135" GE. SPEC. K-7872345
DB	.040" DIA. COPPER WIRE TINNED
DC	.064" DIA. COPPER WIRE TINNED

- ()*
- R-RED
 - O-ORANGE
 - BR-BROWN
 - BK-BLACK
 - BL-BLUE
 - G-GREEN
 - OBL-ORANGE/BLUE
 - RBK-RED/BLACK
 - OBK-ORANGE/BLACK
 - OG-ORANGE/GREEN

FOR 6 WIRE CONTROL
CONNECT SWITCH 1757
TO TB2 AS SHOWN
LINK ON F-G

FOR 4 WIRE CONTROL
CONNECT SWITCH 1756 TO
TB2 AS SHOWN.
LINK ON A-C

Figure 2-15. Connection Diagram, Control Unit Navy Type CG-23241

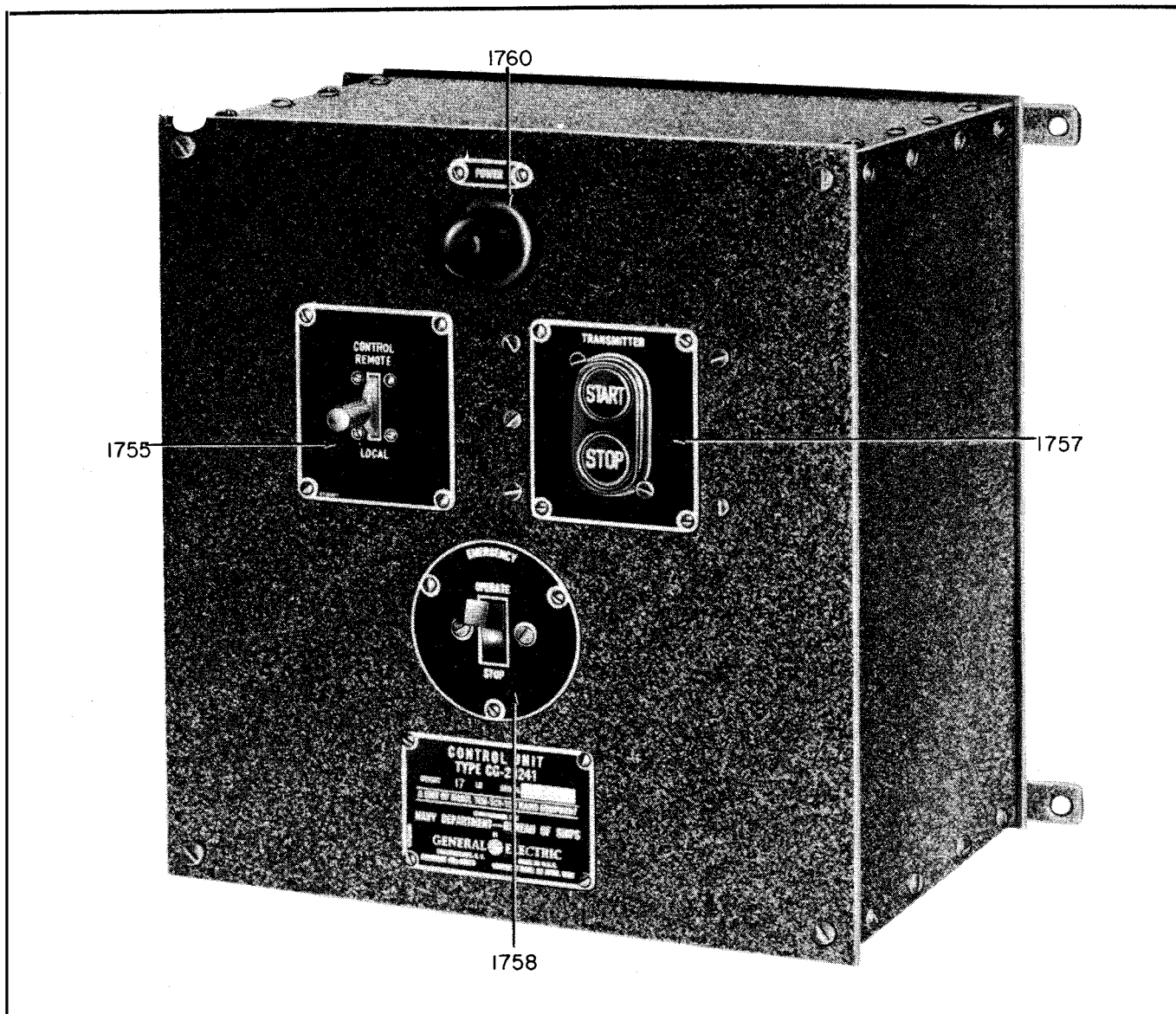


Figure 2-16. Control Unit Navy Type CG-23241, Front View

The plate and screen voltages required for operation of this stage are obtained from the 500-volt d-c auxiliary plate rectifier. The filament voltage is obtained from one of the secondary windings of transformer 580. Plate current is indicated on meter 569, which is bypassed by capacitor 485 for protection against stray r-f currents.

Capacitor 470 couples the r-f output of this stage to the control grids of the pa tubes and blocks the ipa d-c plate supply from pa grids.

When the transmitter is on standby, keying bias is applied to the circuit making the control grid negative with respect to ground. The grid is thus biased to cutoff and will not operate. When the transmitter is keyed (key closed), blocking bias is removed and normal operating bias is restored.

For a more detailed discussion on keying, refer to section II, paragraph 3e.

c. POWER AMPLIFIER (PA) CIRCUIT.—This stage uses two type -803 tubes connected in parallel and is always used as an amplifier.

The frequency determining circuit is located in the control grid circuit and is composed of inductors 535 and 536, the stray circuit capacities and "IPA BAND CHANGE" switch 550B. Switch 550 is a band of the "IPA BAND CHANGE" switch 550 and selects the frequency range of 300 to 2000 kc required for operation in five steps. For high frequency operation, switch 550 is set on position 5 and shorts out inductor 536 from the tank circuit. Capacitor 471 is the grid leak bypass capacitor. Capacitors 472, 473 and 474 are the suppressor, screen grid and filament bypass capacitors, respectively. Resistor 516 is the screen grid voltage dropping resistor and resistor 511 is the grid leak resistor.

The plate tank circuit consists of inductors 525 and 526, fixed capacitor 476, variable capacitor 495 and "PA

Section II
Paragraph 3

NAVSHIPS 900,401

BAND CHANGE" switch 551. Switch 551 selects the frequency range required for operation of this stage in six steps. When the switch is on positions 4, 5, and 6 inductor 525 is isolated from the circuit. Capacitor 495 adjusts the frequency over any one of the frequency ranges. Capacitor 475 is the plate bypass capacitor which provides a low impedance path for the r-f circuit and blocks the high d-c voltage. Inductor 537 prevents r-f voltages from entering the d-c plate supply. The self-biasing resistor (509) holds the plate current to a safe value in case the r-f excitation is removed.

The plate voltage required for operation of this stage is obtained from the 1350-volt d-c main plate rectifier. Screen grid voltage is obtained from the 500-volt d-c

auxiliary plate rectifier. Filament voltage is obtained from one of the secondary windings of transformer 555. Milliammeter 571, bypassed by capacitor 488, is used to indicate the plate current, and milliammeter 570, bypassed by capacitor 486, indicated the control grid current. This current is dependent upon the excitation fed to the grid.

When the transmitter is on standby, keying bias is applied to the control grid circuit and the tubes are biased to cut off. When the transmitter is keyed (key closed), bias is removed restoring normal operating bias and the tubes conduct.

For a more detailed discussion of keying, refer to section II, paragraph 3e.

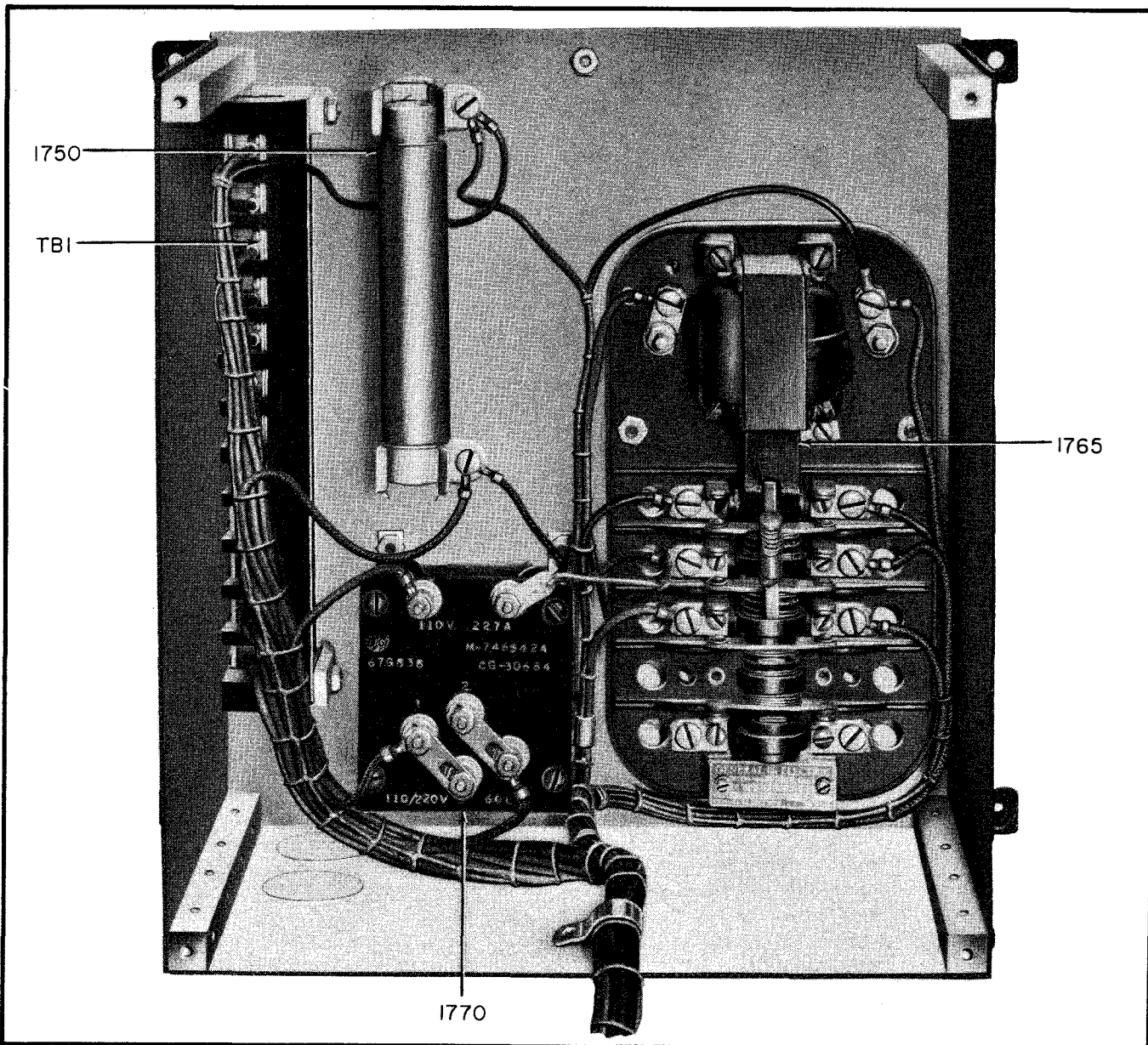


Figure 2-17. Control Unit Navy Type CG-23241, Inner Side of Rear Panel

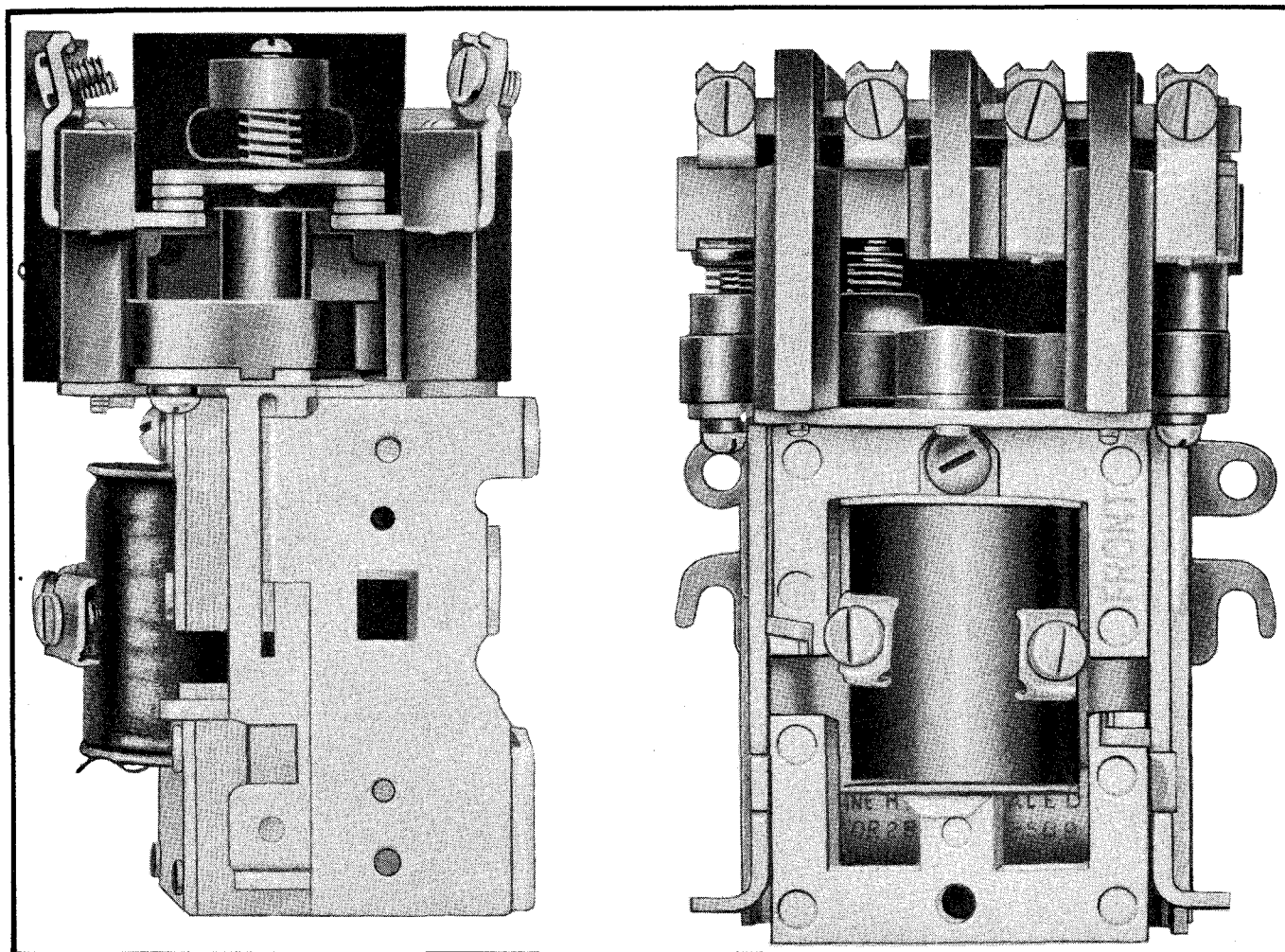


Figure 2-18. Starting Contactor (1765)

d. ANTENNA COUPLING NETWORK.—The output of the pa stage is inductively coupled to the antenna circuit through inductors 520 and 521. The amount of coupling is varied by means of switch 552 and six taps on inductors 520 and 521. The antenna tuning circuit consists of variometer 527, coil 530, capacitor 494 and "ANTENNA BAND CHANGE" switch 553. Switch 553 selects the frequency range of 300 to 2000 kc in 13 steps. When a frequency of 300 to 640 kc is required, tuning is accomplished by variometer 527 and coil 530. When the frequency range of 620 to 1000 kc is required, variometer 527 alone tunes the antenna as all the other components are isolated by switch 553. When operation over the frequency range of 800 to 2000 kc, tuning is accomplished by variometer 527 and capacitor 494. Antenna ammeter 574, connected to the high potential side of the antenna circuit, indicates the antenna current.

When the transmitter is on standby, the normally closed contacts (7 and 8) of the keying relay (577) connect the receiver and antenna terminals. The normally open contacts (9 and 10) keep the antenna terminal open.

When keying is accomplished, keying relay 577 is

energized and the normally closed contacts (7 and 8) open, disconnecting the antenna terminal from the receiver. Contact 4 closes and grounds the receiver terminal. Normally open contacts (9 and 10) close connecting the antenna circuit to the antenna terminal. Contact 3 closes, removing the blocking bias voltage from the control grids of all tubes except the audio oscillator. Normal operating bias is thus restored, the tubes conduct and r-f excitation is impressed upon the antenna.

e. KEYING.—Keying of the transmitter is accomplished by the keying relay (577). Keying is controlled by the external telegraph circuit when plugged in jack 589, "TEST KEY" (558) and "EMISSION" switch 554. CW and MCW transmission is possible.

When the transmitter is on standby (key open) keying bias is applied to all tubes except the audio oscillator tube (544). The cathode and filament circuits of the transmitting tubes are returned to a point which is the junction of the bleeder potentiometers consisting of resistors 620 and 621 in the rectifier. This places the cathode at a positive potential above ground corresponding to the voltage drop across resistor 620. The grids are then

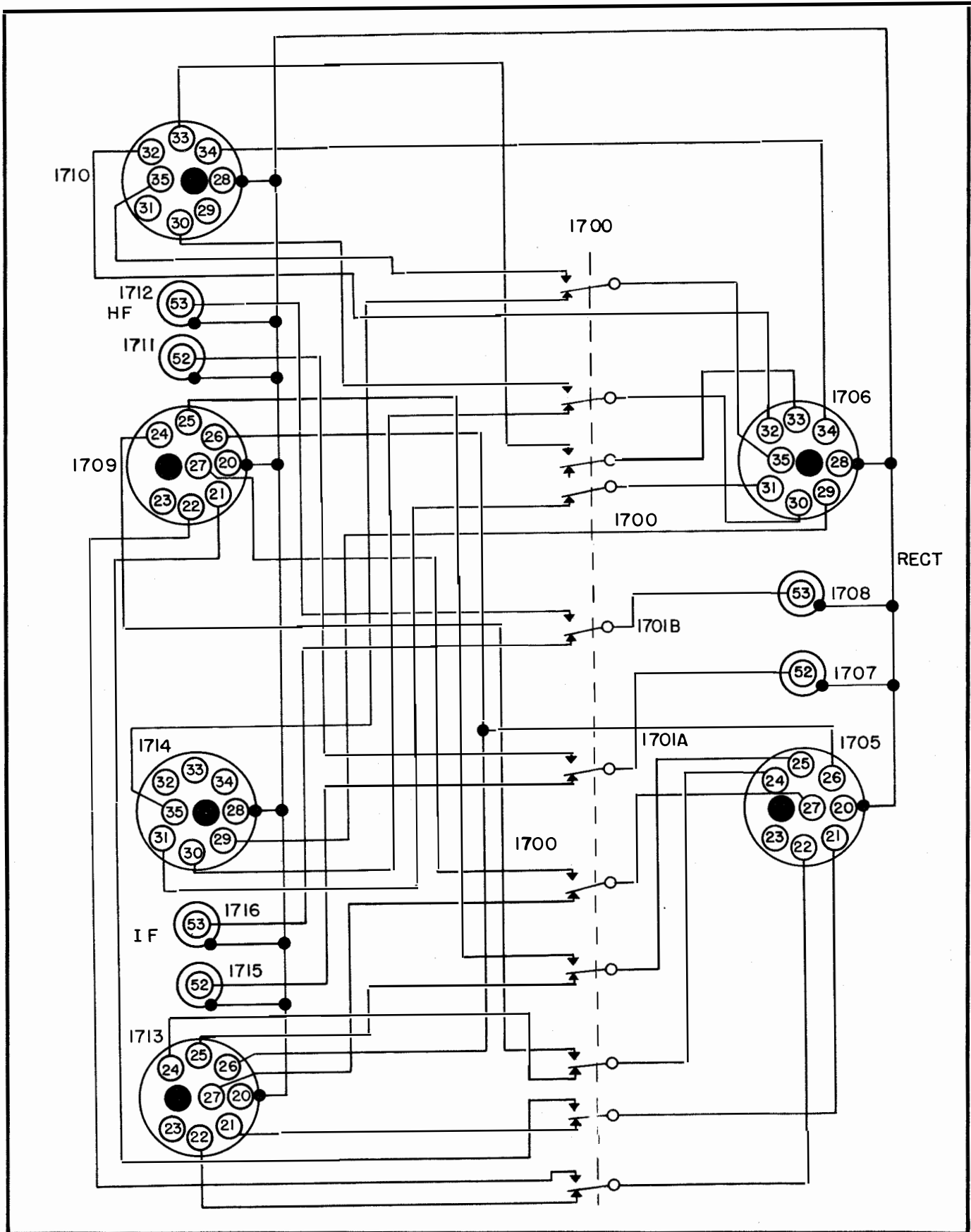


Figure 2-19. Schematic Diagram, Power Transfer Switch Navy Type CG-24094

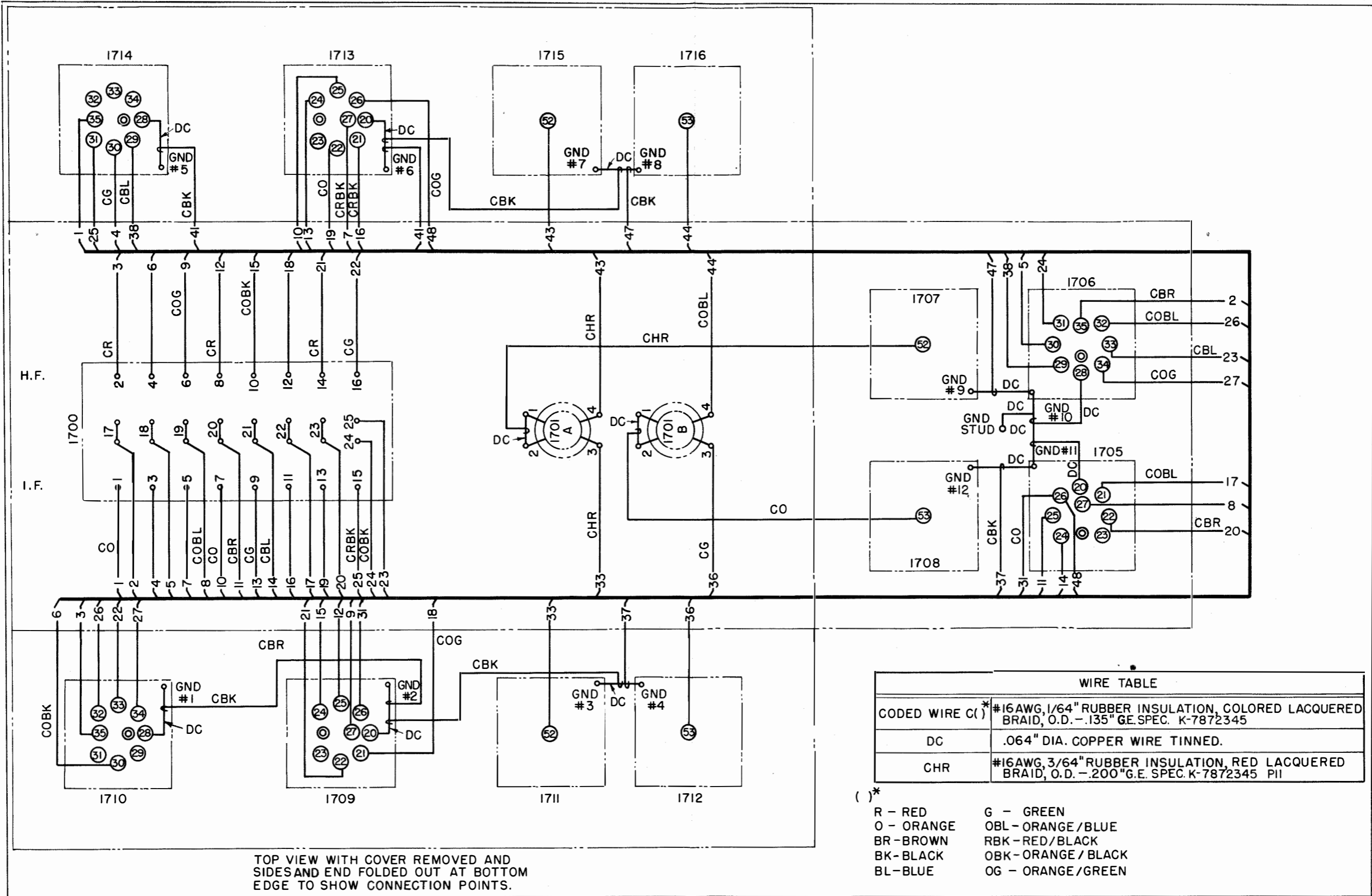


Figure 2-20. Connection Diagram, Power Transfer Switch Navy Type CG-24094

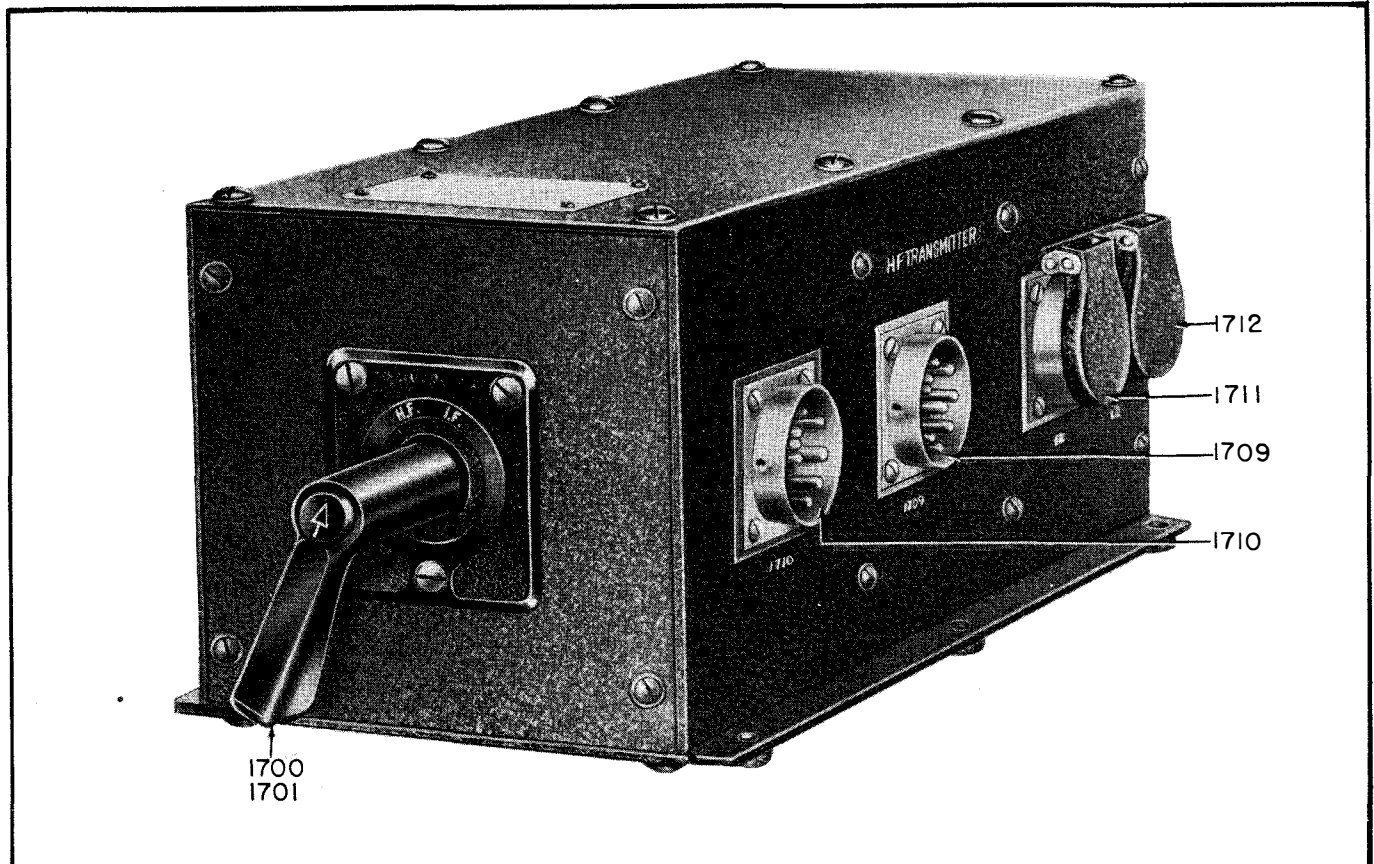


Figure 2-21. Power Transfer Switch Navy Type CG-24094, Front View

negative with respect to the cathodes by an amount corresponding to this voltage, which is made high enough to bias the tubes to cutoff. When the key is down, the relay is energized closing contacts 1 and 3 which short out resistor 620 and returns the cathodes to ground through contact 3 of the keying relay. Keying bias is removed, normal operating bias is restored, and the tubes conduct. Voltage for energizing the relay 577 is obtained from the copper-oxide rectifier (692). Capacitor 497 and resistor 517 prevent current surges in the keying relay circuit.

The audio oscillator stage employs a type -837 tube. The plate tank circuit is of the Hartley type and is tuned to a frequency of approximately 1000 cycles. The tank circuit consists of audio transformer 581 and capacitor 490. Capacitor 491 is the plate and audio bypass capacitor. Resistor 512 is the plate voltage-dropping resistor. Capacitor 492 is the grid blocking capacitor and resistor 513 is the grid leak resistor. Resistor 514 is the screen grid voltage-dropping resistor. The screen and suppressor grids are directly connected. The "EMISSION" switch (554) selects the circuits for either CW or MCW transmission.

Plate and screen grid voltages required for operation of the oscillator are obtained from the 500-volt d-c auxiliary plate rectifier. Filament voltage is obtained from one of the secondary windings of transformer 580.

Milliammeter 572 indicates the plate current and capacitor 489 bypass r-f currents.

(1) CW OPERATION.—When switch 554 is placed on "CW", the audio oscillator is isolated from the transmitter circuit. The d-c keying circuit is completed from the negative side of the copper-oxide rectifier (692), through switch interlocks 553C, 552B and 551B, through the coil of keying relay 577, through the external telegraph circuit to ground returning to the positive side of the copper-oxide rectifier. Relay 577 becomes energized and contacts 7 and 8 open, disconnecting the antenna from the receiver terminal. Contact 4 closes and grounds the receiver. Contact 3 closes, shorting out resistor 620 and grounds the cathodes of all the amplifier transmitting tubes. Contacts 9 and 10 close connecting the antenna terminal to the antenna network. Normal operating bias is now restored allowing the tubes to conduct and impressing an r-f excitation on the antenna.

(2) MCW OPERATION.—When the "EMISSION" switch 554 is placed on "MCW", plate voltage is applied to the audio oscillator tube (344) and a 1000-cycle voltage is generated in the plate tank circuit of this tube. This tank circuit consists of audio transformer 581 and capacitor 490. The secondary of audio transformer 581 couples the 1000-cycle voltage to the suppressor grids of the pa tubes. When modulating, a negative bias is

obtained from pa grid leak 511 and applied to the suppressor grids through the secondary of the audio transformer (581). Keying of the transmitter on "MCW" is achieved in the same manner as explained for "CW" operation. The difference in this case is that the audio oscillator is not isolated from the transmitter circuits, but is connected in the circuit so that the r-f emission of the transmitter is modulated by the 1000-cycle audio voltage generated by the audio oscillator.

4. RECTIFIER NAVY TYPE CG-20122.

(See figures 2-8 and 2-10 inclusive.)

a. GENERAL.—The rectifier contains the following principal circuits: the main plate rectifier, the auxiliary plate rectifier and the keying and bias circuit rectifier.

b. MAIN PLATE RECTIFIER.—The main plate rectifier is a single-phase, full-wave type employing two type -836 high vacuum rectifier tubes (643). Plate transformer 680 supplies plate voltage for these tubes. Reactor 686 and capacitors 602 and 603 filter the d-c output of the main plate rectifier so that the peak voltage ripple in the rectifier output does not exceed one percent. The output voltage of this rectifier under full load is approximately 1350 volts direct current. The voltage regulation of this rectifier, key-up to key-down conditions, with the radio transmitter adjusted at rated output, is approximately 10 percent. Resistors 628A and B, in series with

reactor 686 which is connected to ground, are used for obtaining microphone voltage for the h-f radio transmitter. A voltage of 6 to 8 volts is built up across these resistors when the rectifier is loaded by the radio transmitter. Bleeder resistors 615, 616, 617, and 618, connected across the output circuit of the main plate rectifier, provide proper voltage regulation and serve to discharge the filter capacitors.

c. AUXILIARY PLATE RECTIFIER.—The auxiliary plate rectifier is a single-phase, full-wave type employing two type -836 high-vacuum rectifier tubes (644). Filament transformer 683 supplies filament voltage for these tubes. Plate transformer 681 supplies plate voltage to these tubes. Reactor 687 and capacitors 600 and 601 filter the d-c output of the auxiliary plate rectifier so that the peak voltage ripple in the rectifier d-c output does not exceed one percent. A safety gap, connected between the high-potential terminal of reactor 687 and ground, protects this rectifier from high-voltage surges. This gap is adjusted to 0.040 inch. The output voltage of this rectifier under full load is approximately 500 volts. The voltage regulation of this rectifier, key-up to key-down condition, under full-load operation, is approximately 10 percent. Bleeder resistors 620 through 627, which are connected across the output circuit of the auxiliary plate rectifier, are used: to obtain proper regulation of the voltage supplied to the screen grids of the type -837

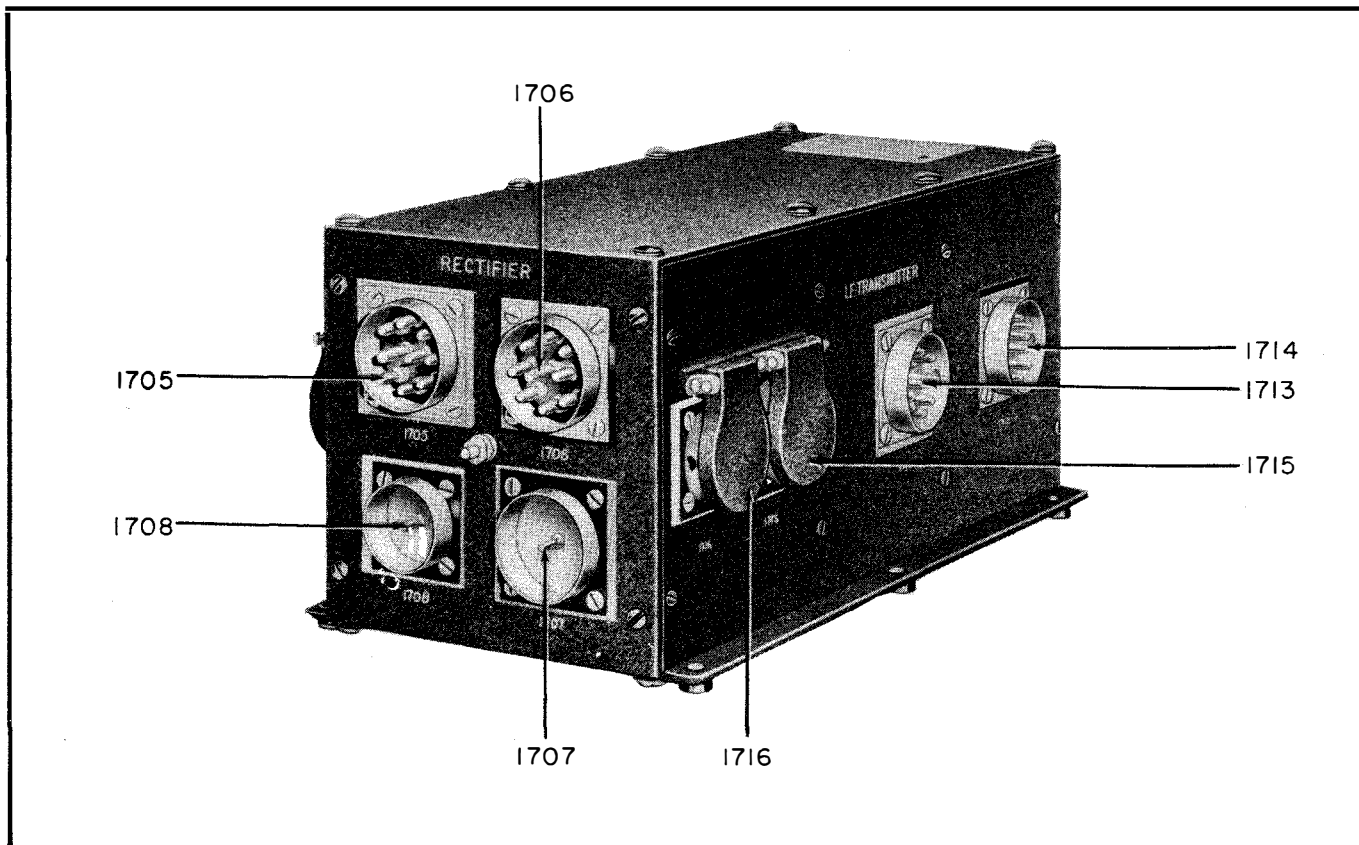


Figure 2-22. Power Transfer Switch Navy Type CG-24094, Rear View

transmitter tubes, to provide the keying voltage, and to discharge the filter capacitors.

d. KEYING AND BIAS CIRCUIT RECTIFIER.—The keying and bias circuit rectifier is a full-wave, copper-oxide type (figures 2-11, 2-12, and 2-13). Transformer 682 supplies the a-c voltage for this rectifier. Approximately 55 volts is obtained from this rectifier for operation of the keying relay in the radio transmitter, and for bias supply to the h-f radio transmitter.

Secondary taps are provided on transformer 682 so that additional voltage can be obtained from the transformer to compensate for aging of the copper-oxide rectifier unit. Thus a d-c voltage of approximately 55 volts is always available for operating the d-c relays and supplying bias.

Line-tap switch 648 selects the correct output voltages of transformers 680, 681, 682, and 683 for the various line voltages. Tap 1 is used for a line voltage of 125 volts; tap 2, for 115 volts; tap 3, for 105 volts; and tap 4, for 95 volts. Rheostat 630 is used to maintain the filament voltage at exactly 6.3 volts which is indicated on filament voltmeter 665. Panel lamp 661 lights up when the filament transformer is energized. When light from this lamp is not required it may be shut off by lamp switch 647. Power tap switch 649 is used to select the taps of the primary of plate transformer 680, to reduce the output voltage and the power output from the radio transmitter.

5. CONTROL UNIT NAVY TYPE CG-23241.

(See figures 2-14 and 2-15.)

Control Unit Navy Type CG-23241 (figure 2-16) enables the radio transmitter to be controlled from Navy four- or six-wire remote control units. Transformer 1770 (figure 2-17) is a 110-volt transformer which grounds point "A" when the four-wire control is used. Links are provided on transformer 1770 which permit its operation from either 110- or 220-volt a-c input. The "LOCAL-REMOTE" switch (1755), when placed in the "LOCAL" position, provides transmitter control from Control Unit Navy Type CG-23241. When placed in the "REMOTE" position, it provides transmitter control from a Navy four- or six-wire control unit. Switch 1756 is a "start-stop" tumbler type switch used in Control

Unit Navy Type CG-23241 for four-wire Navy Control Units. Switch 1757 is the "START-STOP" push-button type switch used in Control Unit Navy Type CG-23241 for six-wire Navy Control Units. The radio transmitter is cut off in emergencies by throwing the "EMERGENCY-STOP" switch (1758). This switch removes power from the rectifier regardless of any operation involving the remote control units. Operation of the radio transmitter cannot be resumed until the "EMERGENCY-STOP" switch is restored to the closed position.

Two links are used to change from the four- to the six-wire Navy Control Units. For six-wire units link F-G is in place and link C-A is removed. For four-wire units link C-A is in place, and link F-G is removed.

Relay 1765 (figure 2-18) is a starting contactor. Two of its contacts close the starting-contactor circuit in the rectifier. A second set of contacts provides a push-button interlock circuit for six-wire control operation. This interlock circuit is completed through link F-G. A third set of contacts completes the circuit to the remote control unit indicator lamps which warn the operator that power is on in the rectifier. Control Unit Navy Type CG-23241 is provided with indicator lamp 1760. Resistor 1750 in series with relay coil 1765 permits the relay coil to be shorted out by means of the "STOP" push-buttons without shorting the voltage supply.

When keying from a remote station, leads are provided from key jack 1427 or 589 on the radio transmitter to terminals "7" and "8" on Control Unit Navy Type CG-23241.

6. POWER TRANSFER SWITCH NAVY TYPE CG-24094.

(See figures 2-19 and 2-20.)

Power Transfer Switch Navy Type CG-24094 (figures 2-21 and 2-22) is used for switching power from the rectifier to either the h-f or the i-f radio transmitter in the Navy Model TCN and TCN-1 Radio Transmitting Equipment. Switches 1700 and 1701 are provided with a handle which is thrown in the direction indicated on the panel for either h-f or i-f operation. Receptacles are provided for the external connecting cables of both radio transmitters and the rectifier.

SECTION III INSTALLATION AND INITIAL ADJUSTMENTS

1. UNPACKING.

Before installing any of the models of the radio transmitting equipment carefully examine each major unit to insure that all packing material, such as tape used for lashing items in place during shipment, has been removed.

2. INSTALLATION.

a. The types of installation are as follows:

(1) Models TCM, TCM-1 and TCM-2 consist of H-F Transmitter Navy Type CG-52206, Rectifier Navy Type CG-20122 and Control Unit Navy Type CG-23241. (See figures 3-1, 3-2 and 3-3.)

(2) Models TCN and TCN-1 consist of H-F Transmitter Navy Type CG-52206, I-F Transmitter Navy Type CG-52205, Rectifier Navy Type CG-20122, Power Transfer Switch Navy Type CG-24094 and Control Unit Navy Type CG-23241. (See figures 3-1, 3-2, 3-3, 3-4 and 3-5.)

(3) Models TCU, TCU-1 and TCU-2 consist of I-F Transmitter Navy Type CG-52205, Rectifier Navy Type CG-20122 and Control Unit CG-23241. (See figures 3-2, 3-3 and 3-4.)

b. Install major units equipped with shock mountings, in accordance with the type of installation required, by firmly bolting the shock mountings to the necessary horizontal and vertical supporting surfaces. (See figure 3-6.) If shock mountings are not included, remove the major units from their cabinets and bolt the cabinets securely in place. Make sure that a good metal-to-metal ground is obtained. Replace the units in their respective cabinets.

c. Secure the interconnecting cables to their proper

receptacles and binding posts in accordance with the external connection diagrams (figures 3-7, 3-8 and 3-9). It is recommended that two different antennas be used with the h-f and i-f transmitters in the installation of model TCN-1. This is desirable since the optimum operation can be affected only by using the proper antenna coupling with each transmitter. (Refer to Section I, paragraph 3*m*.) Install microphones as shown in figures 3-10, 3-11 and 3-12.

3. INITIAL ADJUSTMENTS.

a. Before starting the radio transmitter for the first time, check the external cable connections for tightness. Make sure that all plugs are properly assembled. Inspect the ground connections for proper location and security. Attach the antenna leads to the terminals provided for that purpose.

b. Voltmeter 668 on the Rectifier Navy Type CG-20122 is used to indicate the line voltage. Set line tap switch 648 of the rectifier on tap number "2" to obtain 115 volts. The line tap switch may also be set on tap number "1" to obtain 125 volts, on tap number "3" to obtain 105 volts or on tap number "4" to obtain 95 volts, if any of these voltages should be desired. Set filament tap switch 384 of the h-f transmitter, or tap switch 555 of the i-f transmitter so as to correspond with the setting of rectifier line tap switch 648. Set rectifier filament control 630, h-f transmitter filament control 288, and i-f transmitter filament control 515 at the center of their respective scales. Set the "POWER TAP" switch on the rectifier on tap number "1", for reduced power.

The equipment is now ready for operation.

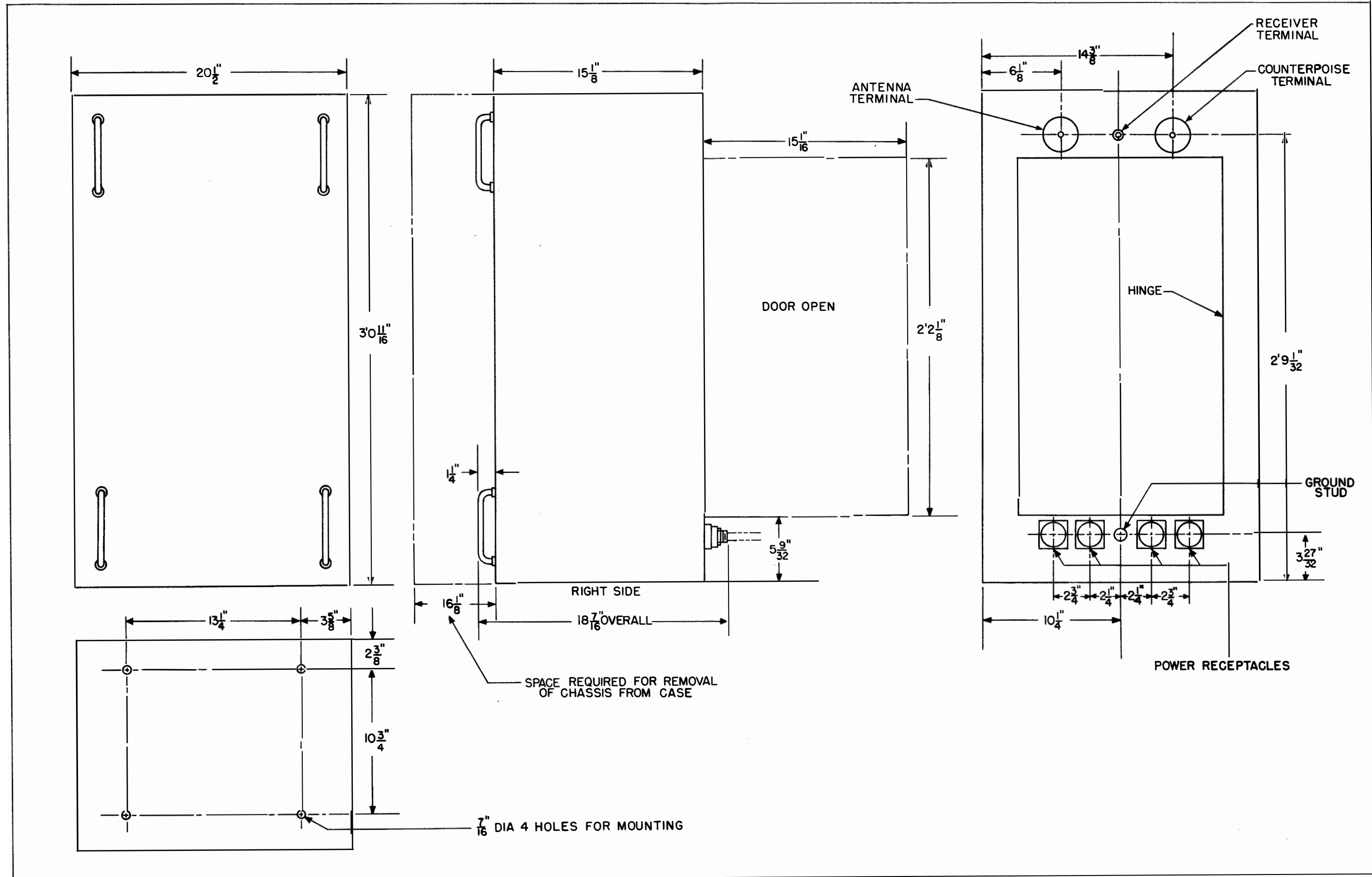


Figure 3-1. Outline Drawing, H-f Radio Transmitter Navy Type CG-52206

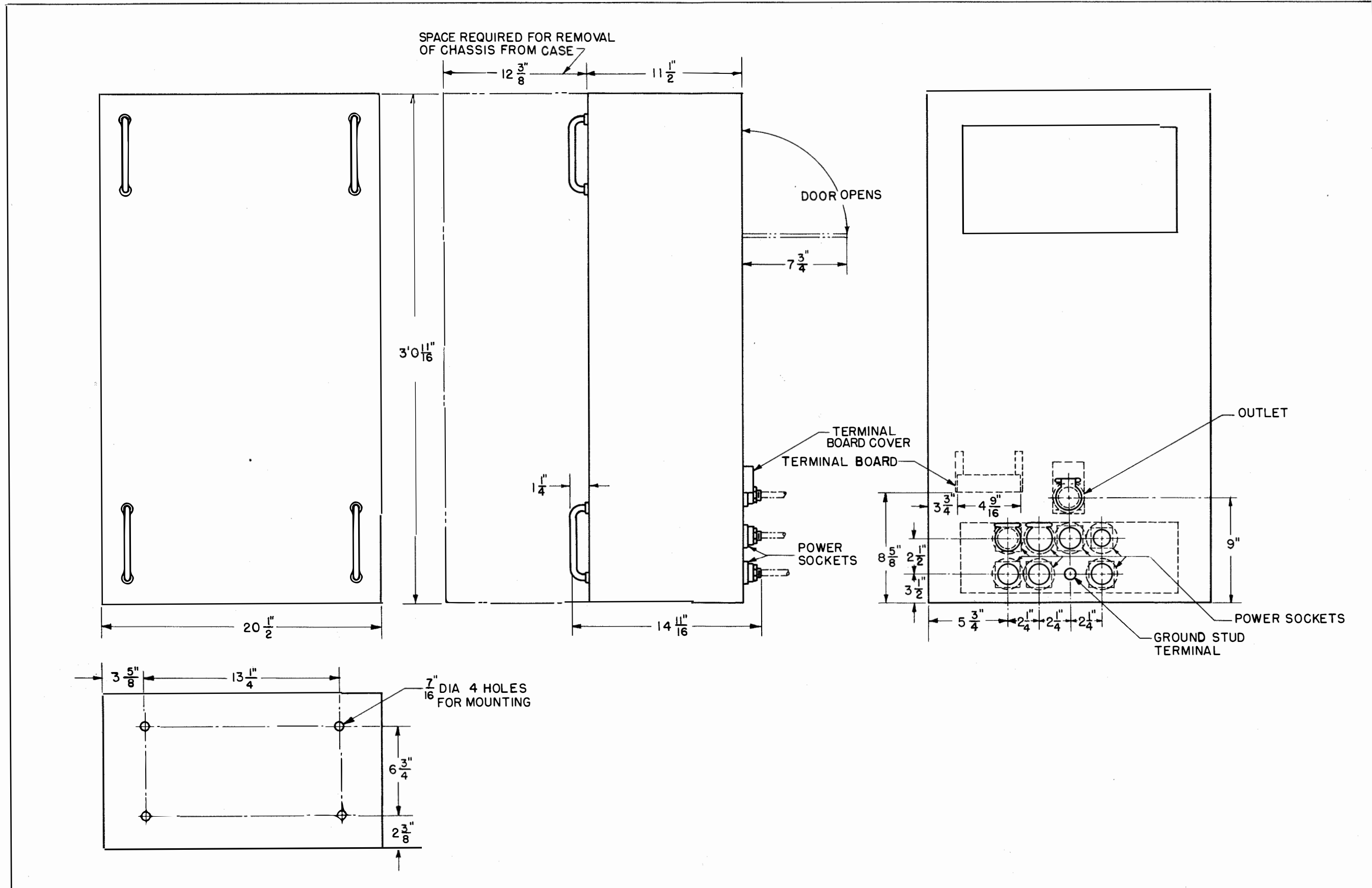


Figure 3-2. Outline Drawing, Rectifier Navy Type CG-2012

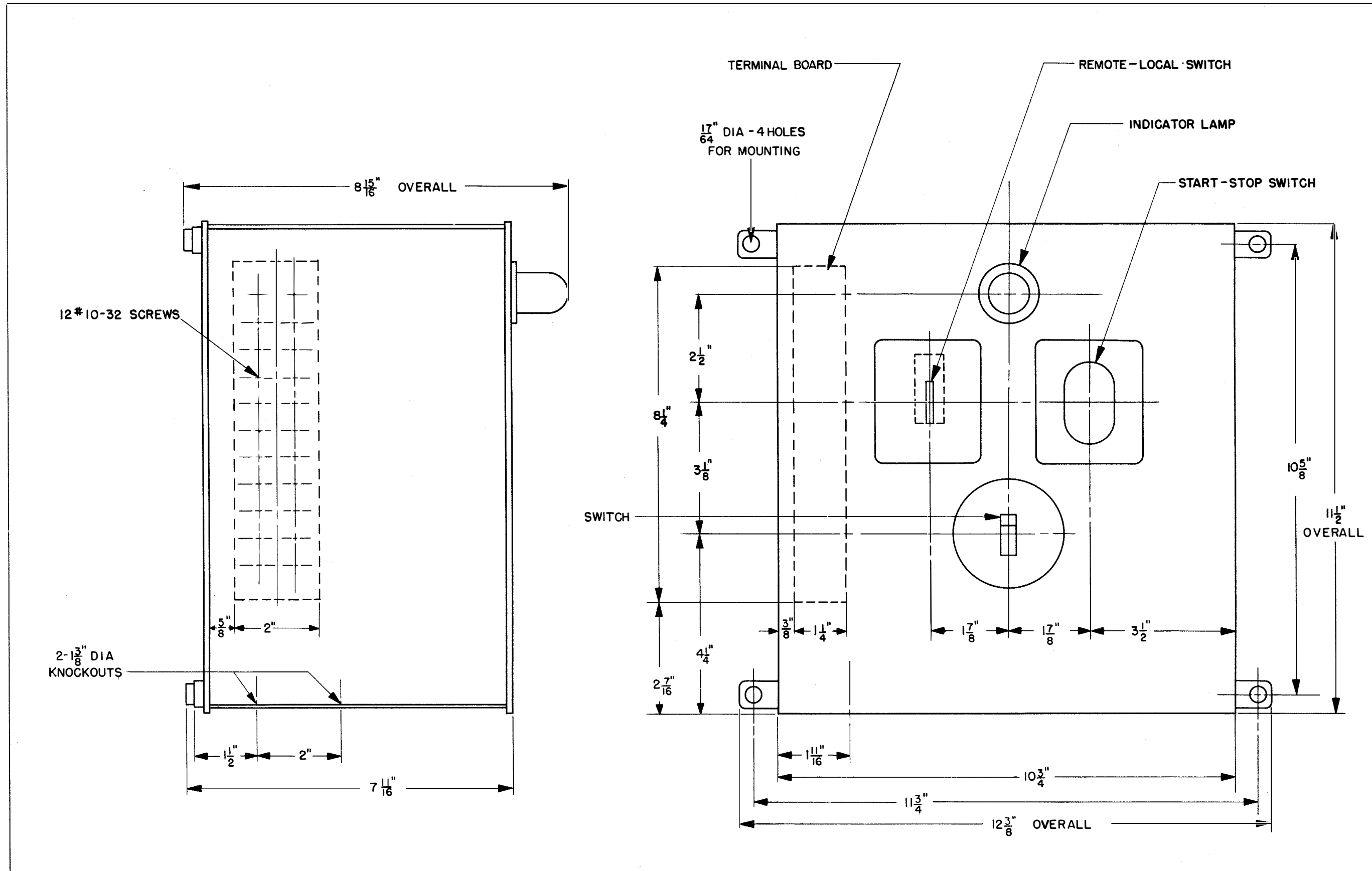


Figure 3-3. Outline Drawing, Control Unit Navy Type CG-23241

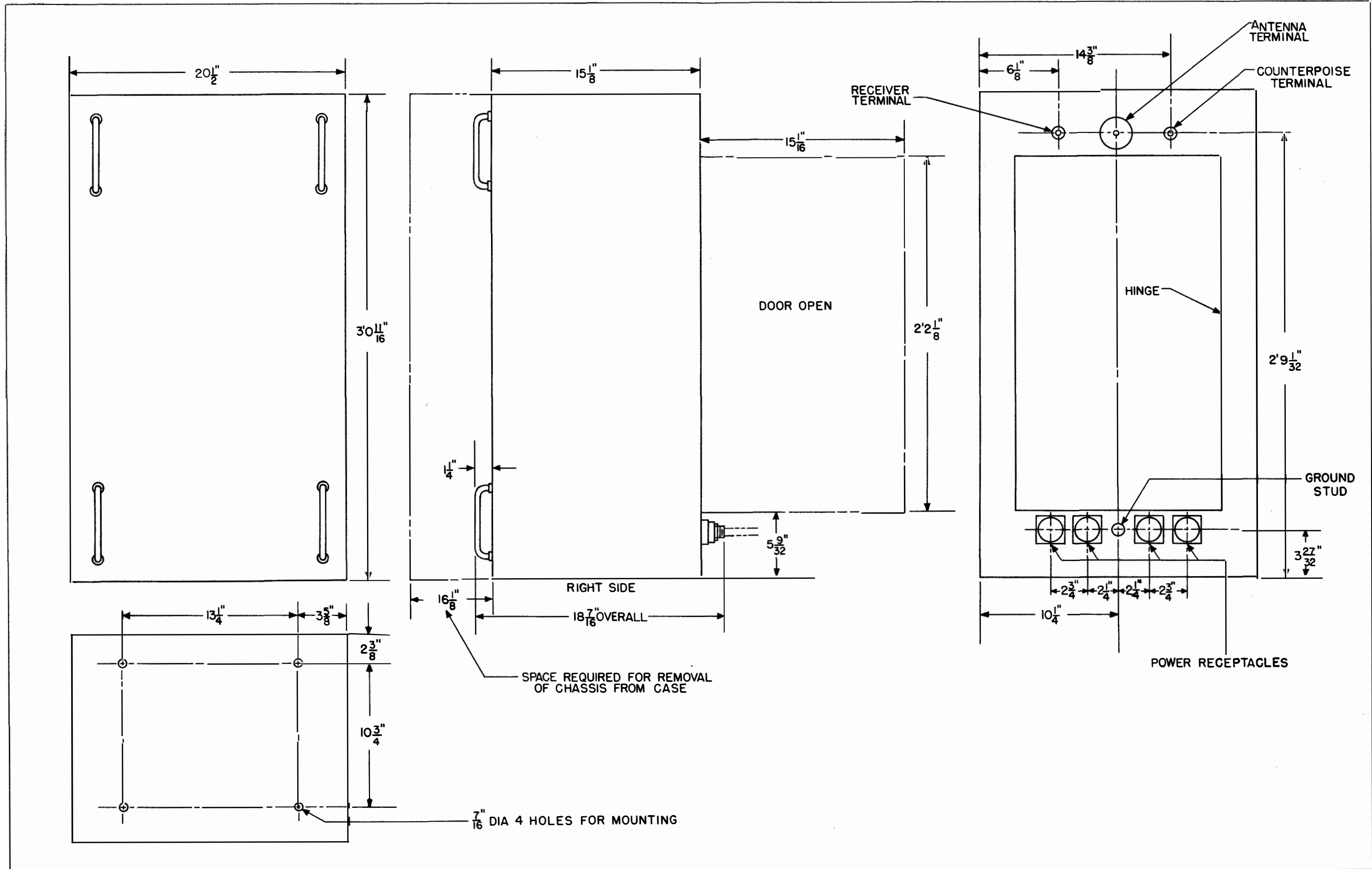


Figure 3-4. Outline Drawing, I-f Radio Transmitter Navy Type CG-52205

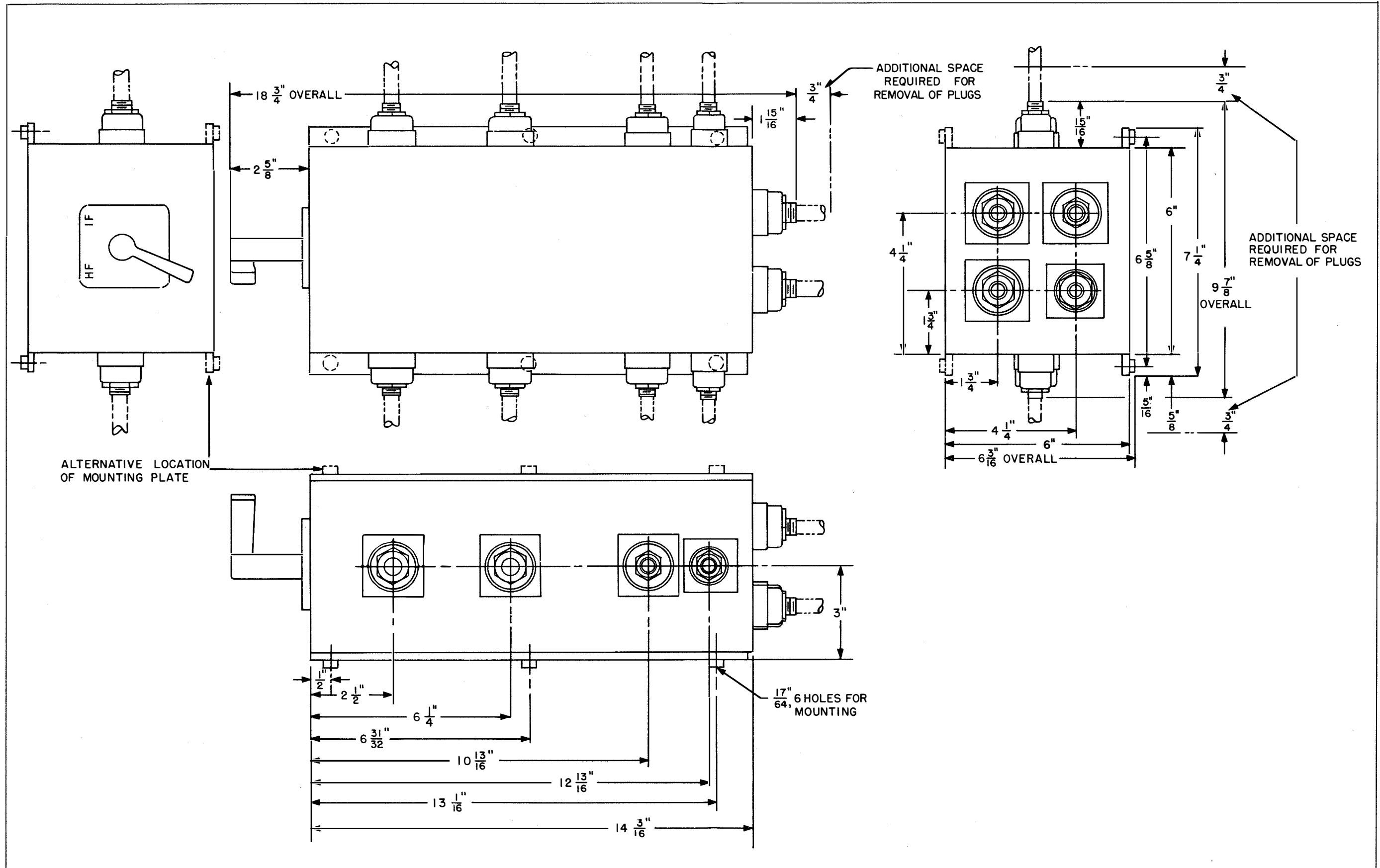
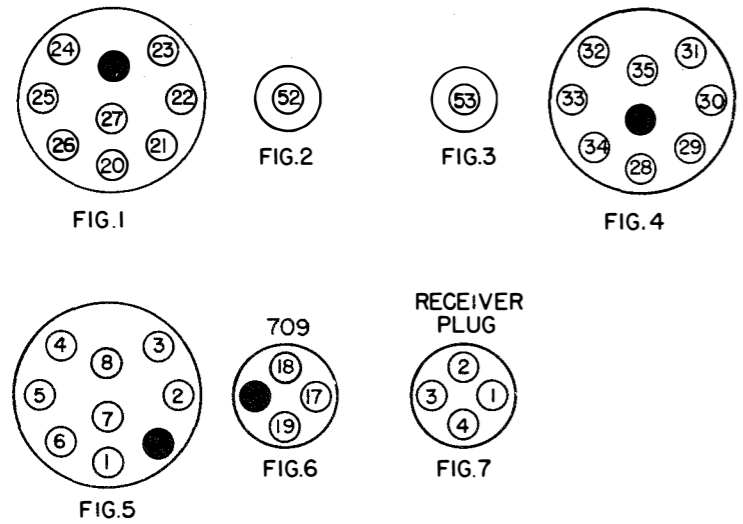
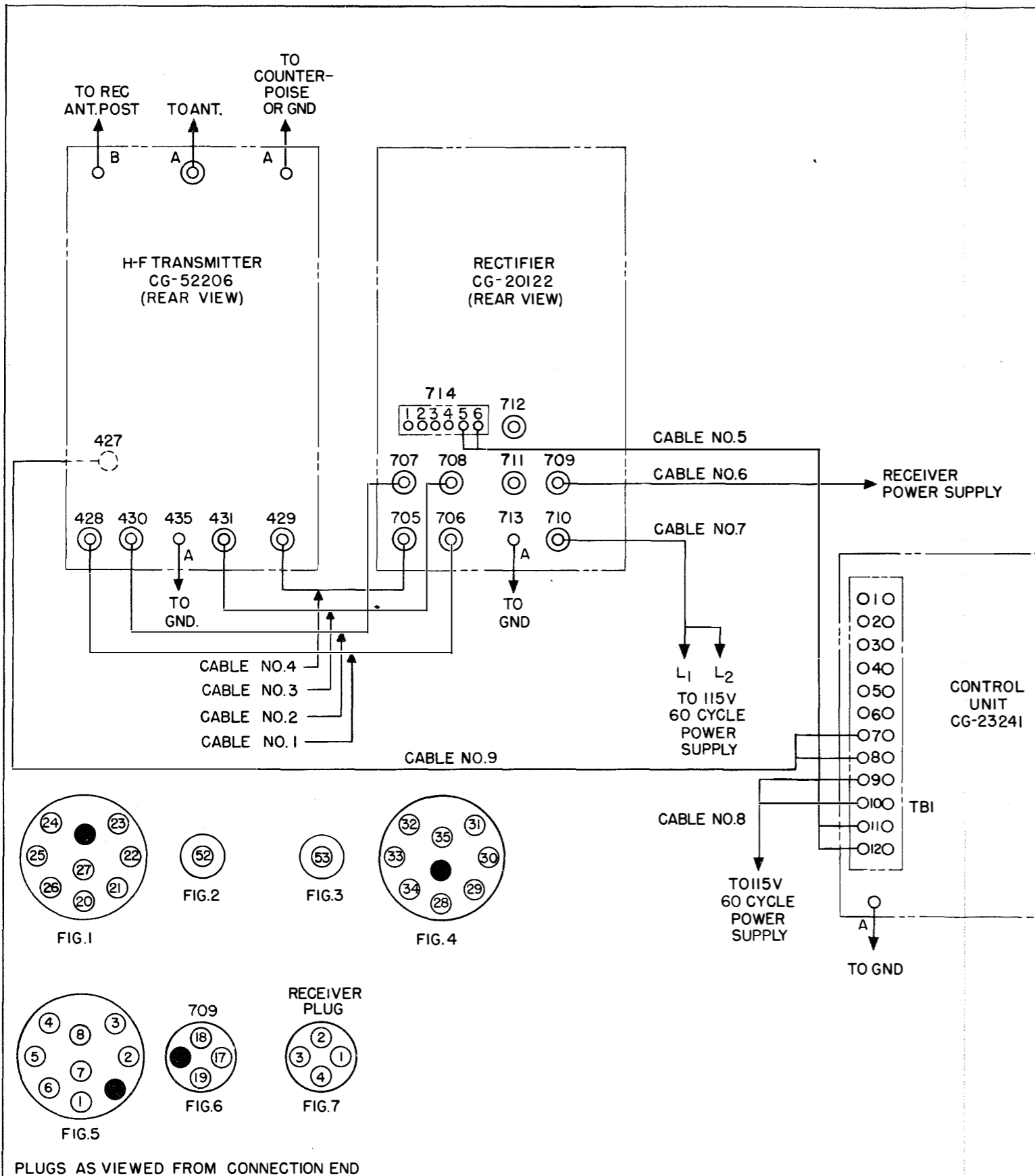


Figure 3-5. Outline Drawing, Power Transfer Switch Navy Type CG-24094



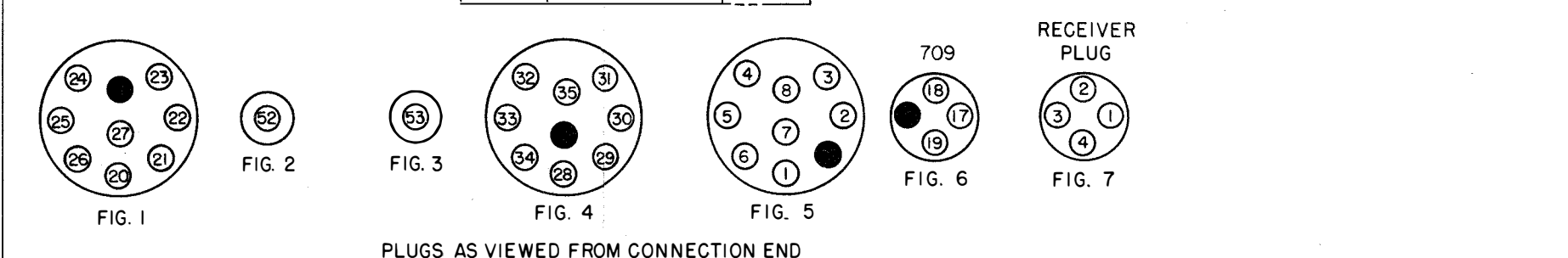
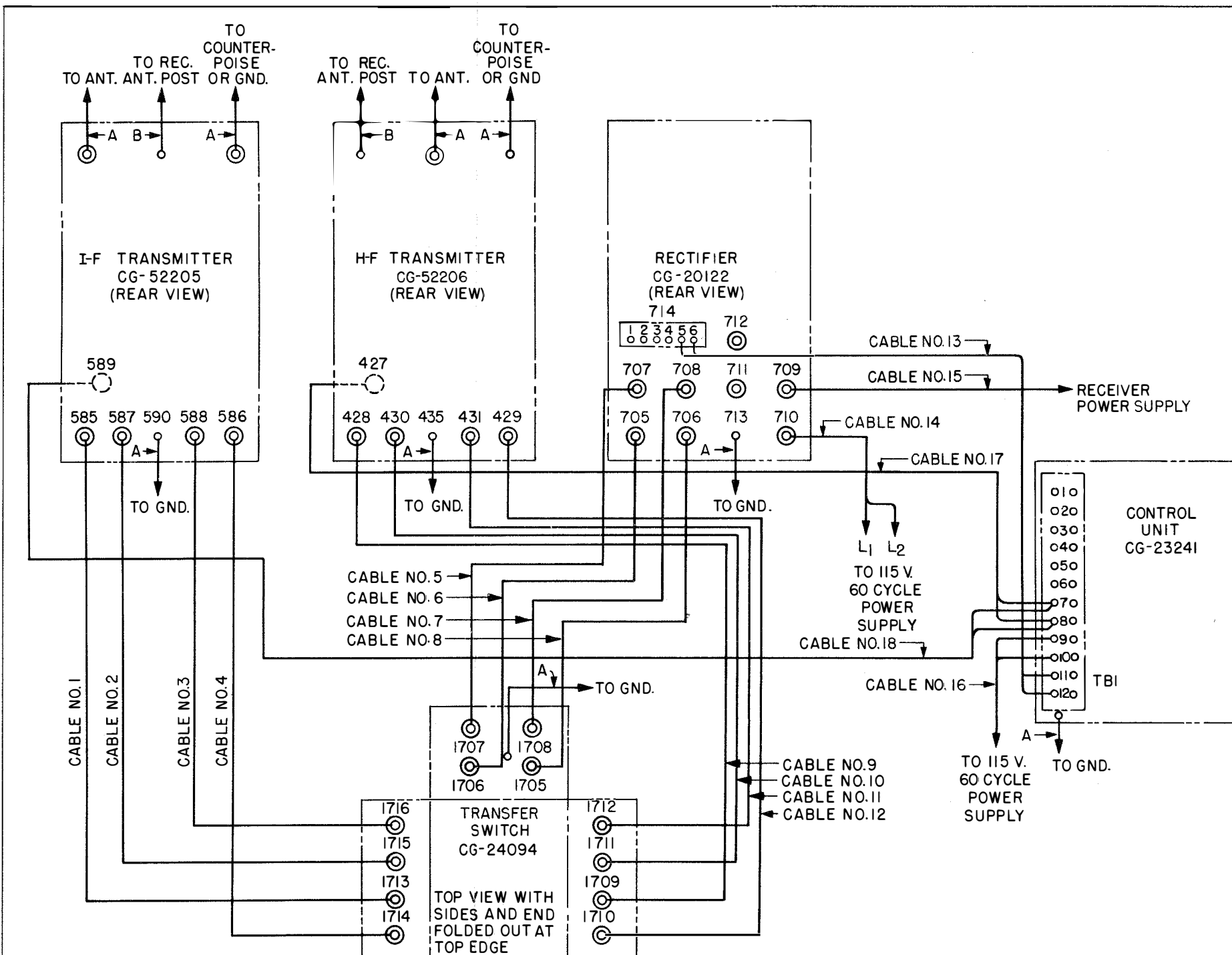
PLUGS AS VIEWED FROM CONNECTION END

COLOR CODE	CABLE NO.	G.E. CABLE REFERENCE	EQUIV CABLE NAVY I5CI	CONNECTIONS		PLUG	REMARKS						
				FROM	TO								
BLUE & GREEN	1	1306 ML-7660386 G7	MCS-7	H.F. TRANSM.	RECTIFIER	SEE FIG.1	EACH CONDUCTOR SHALL BE #16 AWG WITH AT LEAST 1/32" 40% COLORED RUBBER INSULATION.						
				428-27	706-27								
				428-21	706-21								
				428-22	706-22								
				428-23	706-23								
				428-24	706-24								
428-25	706-25												
428-26	706-26												
RED & AMBER	2	1309 ML-7660386 G11	NONE	430-52	707-52	SEE FIG.2	EACH CONDUCTOR #14 AWG, 5/64" OF R-344-40% RUBBER						
RED & WHITE	3	1308 ML-7660386 G12	NONE	431-53	708-53	SEE FIG.3	SAME AS FOR CABLE NO. 2						
BLUE & RED	4	1307 ML-7660386 G8	MCS-7	429-29	705-29	SEE FIG.4	SAME AS FOR CABLE NO. 1						
				429-30	705-30								
				429-31	705-31								
				429-32	705-32								
				429-33	705-33								
				429-34	705-34								
429-35	705-35												
	5	S-392382-1-E1	SRLL-4	RECTIFIER	CONTROL UNIT		#14AWG-LOW TENSION-LEADED						
				714-5 714-6	TBI-11 TBI-12								
	6	K-7871913 P2	MCS-2	RECTIFIER	RECEIVER PLUG	SEE FIG.6 & FIG.7	EACH CONDUCTOR SHALL BE #16 AWG INSULATED WITH AT LEAST 2/64" COLORED 40% RUBBER						
				709-18 709-19	PIN 2 PIN 3 CONNECT SHIELD TO PIN NO.1								
BLUE & AMBER	7	1305 ML-7660386 G5	MCS-7	RECTIFIER	115 V. 60 CYCLE POWER SUPPLY	SEE FIG.5	SAME AS FOR CABLE NO. 1						
				710-3 710-7 710-8 710-4 710-5 710-6	L ₁ L ₂								
				CONTROL UNIT	115 V. 60 CYCLE POWER SUPPLY				SAME AS FOR CABLE NO. 5				
										TBI-9 TBI-10	L ₁ L ₂		
					8			S-392382-1-E1	SRLL-4	H.F. TRANSM.	CONTROL UNIT		#18 AWG, STRANDED, 2 CONDUCTOR FLEXIBLE RUBBER CORD. O.D.-9/32"
										427-TIP 427-SLEEVE	TBI-7 TBI-8		

A- AT LEAST #12 AWG BARE COPPER WIRE
NOTE: LEADS FROM ANT. POST MUST BE SUPPORTED ON INSULATORS AT LEAST 6 INCHES AWAY FROM ALL METALLIC SURFACES.

B- #16 AWG, 2/64" RUBBER INSULATION
NOTE: CAPACITY OF THIS CONDUCTOR TO GROUND MUST BE KEPT LOW BY SUPPORTING THIS CONDUCTOR ON INSULATORS AT LEAST 3 INCHES AWAY FROM ALL METALLIC WALLS AND SURFACES.

Figure 3-7. Connection Diagram, Navy Models TCM, TCM-1 and TCM-2 Radio Telegraph and Telephone Transmitting Equipments

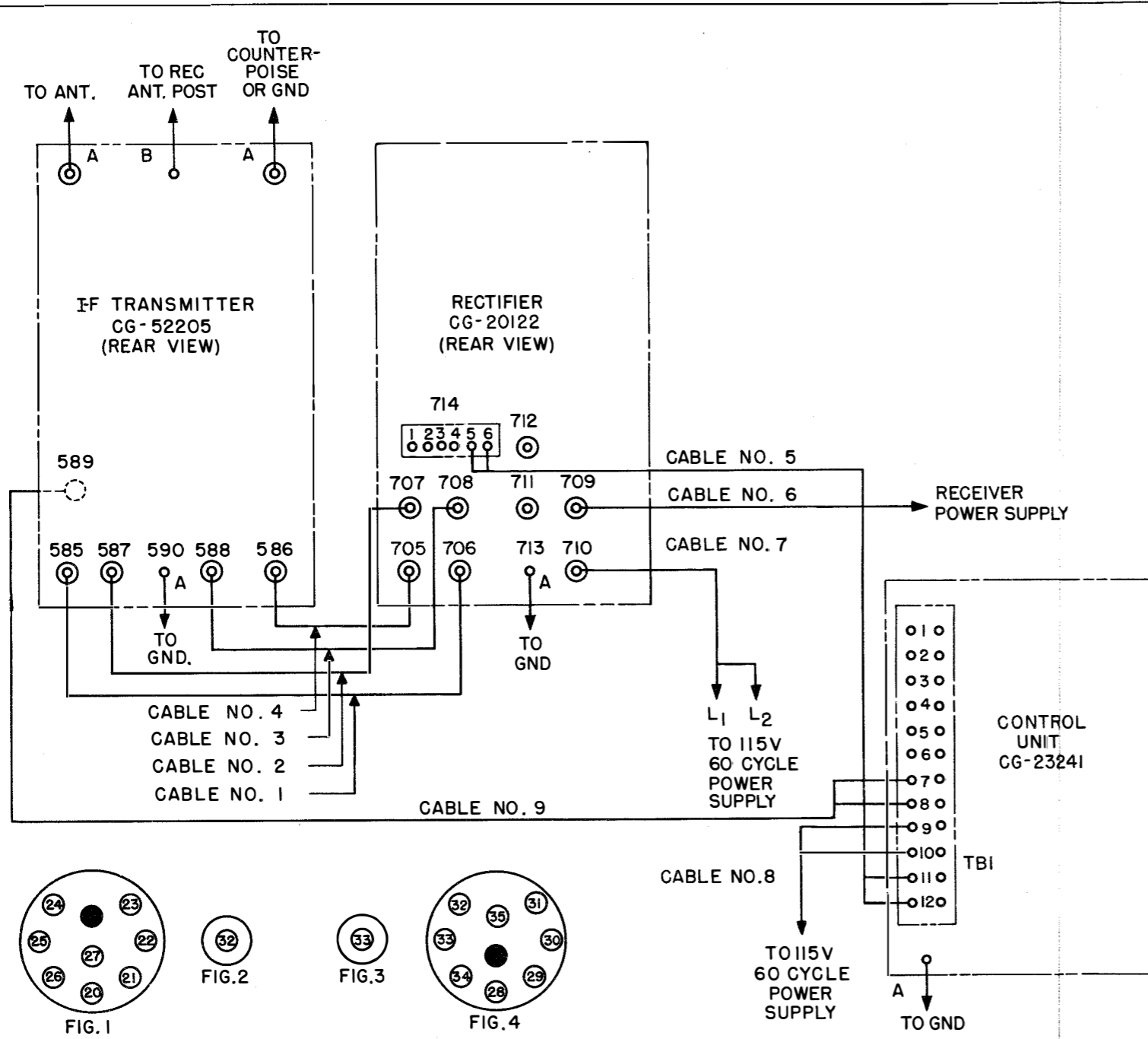


COLOR CODE	CABLE NO.	G.E. CABLE REFERENCE	EQUIV. CABLE NAVY 15CI	CONNECTION		PLUG	REMARKS
				FROM	TO		
BLUE & GREEN	1	1306 ML-7660386 G7	MCS-7	I.F. TRANSM. 585-27 585-21 585-22 585-23 585-24 585-25 585-26	TRANSFER SWITCH 1713-27 1713-21 1713-22 1713-23 1713-24 1713-25 1713-26	SEE FIG. 1	EACH CONDUCTOR SHALL BE #16 AWG WITH AT LEAST 1/32" 40% COLORED RUBBER INSULATION
RED & AMBER	2	1309 ML-7660386 G11	NONE	587-52	1715-52	SEE FIG. 2	EACH CONDUCTOR #14 AWG, 5/64" OF R 344-40% RUBBER
RED & WHITE	3	1308 ML-7660386 G12	NONE	588-53	1716-53	SEE FIG. 3	SAME AS FOR CABLE NO. 2
BLUE & RED	4	1307 ML-7660386 G8	MCS-7	586-29 586-30 586-31 586-32 586-33 586-34 586-35	1714-29 1714-30 1714-31 1714-32 1714-33 1714-34 1714-35	SEE FIG. 4	SAME AS FOR CABLE NO. 1
RED & AMBER	5	1309 ML-7660386 G11	NONE	RECTIFIER 707-52	TRANSFER SWITCH 1707-52	SEE FIG. 2	SAME AS FOR CABLE NO. 2
BLUE & RED	6	1307 ML-7660386 G8	MCS-7	705-29 705-30 705-31 705-32 705-33 705-34 705-35	1706-29 1706-30 1706-31 1706-32 1706-33 1706-34 1706-35	SEE FIG. 4	SAME AS FOR CABLE NO. 1
RED & WHITE	7	1308 ML-7660386 G12	NONE	708-53	1708-53	SEE FIG. 3	SAME AS FOR CABLE NO. 2
BLUE & GREEN	8	1306 ML-7660386 G7	MCS-7	706-21 706-22 706-23 706-24 706-25 706-26 706-27	1705-21 1705-22 1705-23 1705-24 1705-25 1705-26 1705-27	SEE FIG. 1	SAME AS FOR CABLE NO. 1
BLUE & GREEN	9	1306 ML-7660386 G7	MCS-7	H.F. TRANSM. 428-21 428-22 428-23 428-24 428-25 428-26 428-27	TRANSFER SWITCH 1709-21 1709-22 1709-23 1709-24 1709-25 1709-26 1709-27	SEE FIG. 1	SAME AS FOR CABLE NO. 1

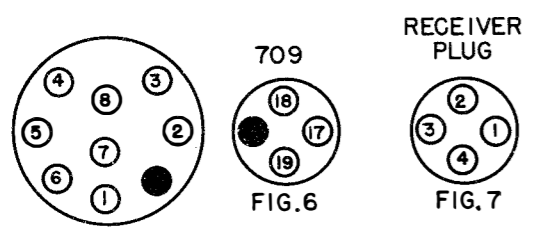
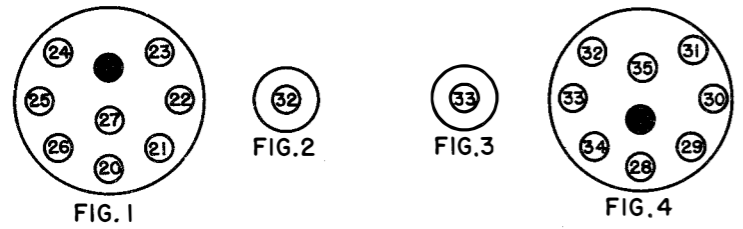
COLOR CODE	CABLE NO.	G.E. CABLE REFERENCE	EQUIV. CABLE NAVY 15CI	CONNECTION		PLUG	REMARKS
				FROM	TO		
RED & AMBER	10	1309 ML-7660386 G11	NONE	H.F. TRANS. 430-52	TRANS. SW 1711-52	SEE FIG. 2	SAME AS FOR CABLE NO. 2
RED & WHITE	11	1308 ML-7660386 G12	NONE	431-53	1712-53	SEE FIG. 3	SAME AS FOR CABLE NO. 2
BLUE & RED	12	1307 ML-7660386 G8	MCS-7	429-29 429-30 429-31 429-32 429-33 429-34 429-35	1710-29 1710-30 1710-31 1710-32 1710-33 1710-34 1710-35	SEE FIG. 4	SAME AS FOR CABLE NO. 1
	13	S-392382-1-E1	SRLL-4	RECTIFIER 714-5 714-6	CONTROL UNIT TBI-11 TBI-12		#14 AWG LOW TENSION LEADED
BLUE & AMBER	14	1305 ML-7660386-G5	MCS-7	RECTIFIER 710-3 710-7 710-8 710-4 710-5 710-6	115 VOLT 60 CYCLE POWER SUPPLY L1 L2	SEE FIG. 5	SAME AS FOR CABLE NO. 1
	15	K-7871913 P2	MCS-2	RECTIFIER 709-18 709-19	RECEIVER PLUG PIN 2 PIN 3 CONNECT SHIELD TO PIN NO. 1	SEE FIG. 6 & FIG. 7	EACH CONDUCTOR SHALL BE #16 AWG INSULATED WITH AT LEAST 2/64" COLORED 40% RUBBER
	16	S-392382-1-E1	SRLL-4	CONTROL UNIT TBI-9 TBI-10	115 VOLT 60 CYCLE POWER SUPPLY L1 L2		SAME AS FOR CABLE NO. 13
	17		MCS-2	H.F. TRANSM. 427-TIP 427-SLEEVE	CONTROL UNIT TBI-7 TBI-8		#18 AWG, STRANDED, 2 CONDUCTOR FLEXIBLE RUBBER CORD O.D. 9/32"
	18		MCS-2	I.F. TRANSM. 589-TIP 589-SLEEVE	CONTROL UNIT TBI-7 TBI-8		

A - AT LEAST #12 AWG BARE COPPER WIRE
NOTE: LEADS FROM ANTENNA POST MUST BE SUPPORTED ON INSULATORS AT LEAST 6 INCHES AWAY FROM ALL METALLIC SURFACES.

B - #16 AWG, 2/64" RUBBER INSULATION
NOTE: CAPACITY OF THIS CONDUCTOR TO GROUND MUST BE KEPT LOW BY SUPPORTING THIS CONDUCTOR ON INSULATORS AT LEAST 3 INCHES AWAY FROM ALL METALLIC WALLS AND SURFACES.



COLOR CODE	CABLE NO.	G.E. CABLE REFERENCE	EQUIV CABLE NAVY 15CI	CONNECTIONS		PLUG	REMARKS
				FROM	TO		
BLUE & GREEN	1	1306 ML-7660386 G7	MCS-7	I. F. TRANSM	RECTIFIER	SEE FIG.1	EACH CONDUCTOR SHALL BE #16 AWG WITH AT LEAST 1/32" 40% COLORED RUBBER INSULATION
				585-27	706-27		
				585-21	706-21		
				585-22	706-22		
				585-23	706-23		
				585-24	706-24		
585-25	706-25						
585-26	706-26						
RED & AMBER	2	1309 ML-7660386 G11	NONE	587-52	707-52	SEE FIG.2	EACH CONDUCTOR #14 AWG, 5/64" OF R-344-40% RUBBER
RED & WHITE	3	1308 ML-7660386 G12	NONE	588-53	708-53	SEE FIG.3	SAME AS FOR CABLE NO.2
BLUE & RED	4	1307 ML-7660386 G8	MCS-7	586-29	705-29	SEE FIG.4	SAME AS FOR CABLE NO.1
				586-30	705-30		
				586-31	705-31		
				586-32	705-32		
				586-33	705-33		
				586-34	705-34		
586-35	705-35						
	5	S-392382-1-E1	SRLL-4	RECTIFIER	CONTROL UNIT		#14 AWG-LOW TENSION-LEADED
				714-5 714-6	TBI-11 TBI-12		
	6	K-7871913 P2	MCS-2	RECTIFIER	RECEIVER PLUG	SEE FIG.6 & FIG.7	EACH CONDUCTOR SHALL BE #16 AWG INSULATED WITH AT LEAST 2/64" COLORED 40% RUBBER
				709-18 709-19	PIN 2 PIN 3 CONNECT SHIELD TO PIN NO.1		
BLUE & AMBER	7	1305 ML-7660386 G5	MCS-7	RECTIFIER	115 V. 60 CYCLE POWER SUPPLY	SEE FIG.5	SAME AS FOR CABLE NO.1
				710-3	L ₁		
				710-7			
				710-8	L ₂		
				710-4			
				710-5			
710-6							
	8	S-392382-1-E1	SRLL-4	CONTROL UNIT	115 V. 60 CYCLE POWER SUPPLY		SAME AS FOR CABLE NO.5
				TBI-9 TBI-10	L ₁ L ₂		
	9		MCS-2	I. F. TRANSM.	CONTROL UNIT		#18 AWG, STRANDED, 2 CONDUCTOR FLEXIBLE RUBBER CORD, O.D. 9/32
				589-TIP 589-SLEEVE	TBI-7 TBI-8		



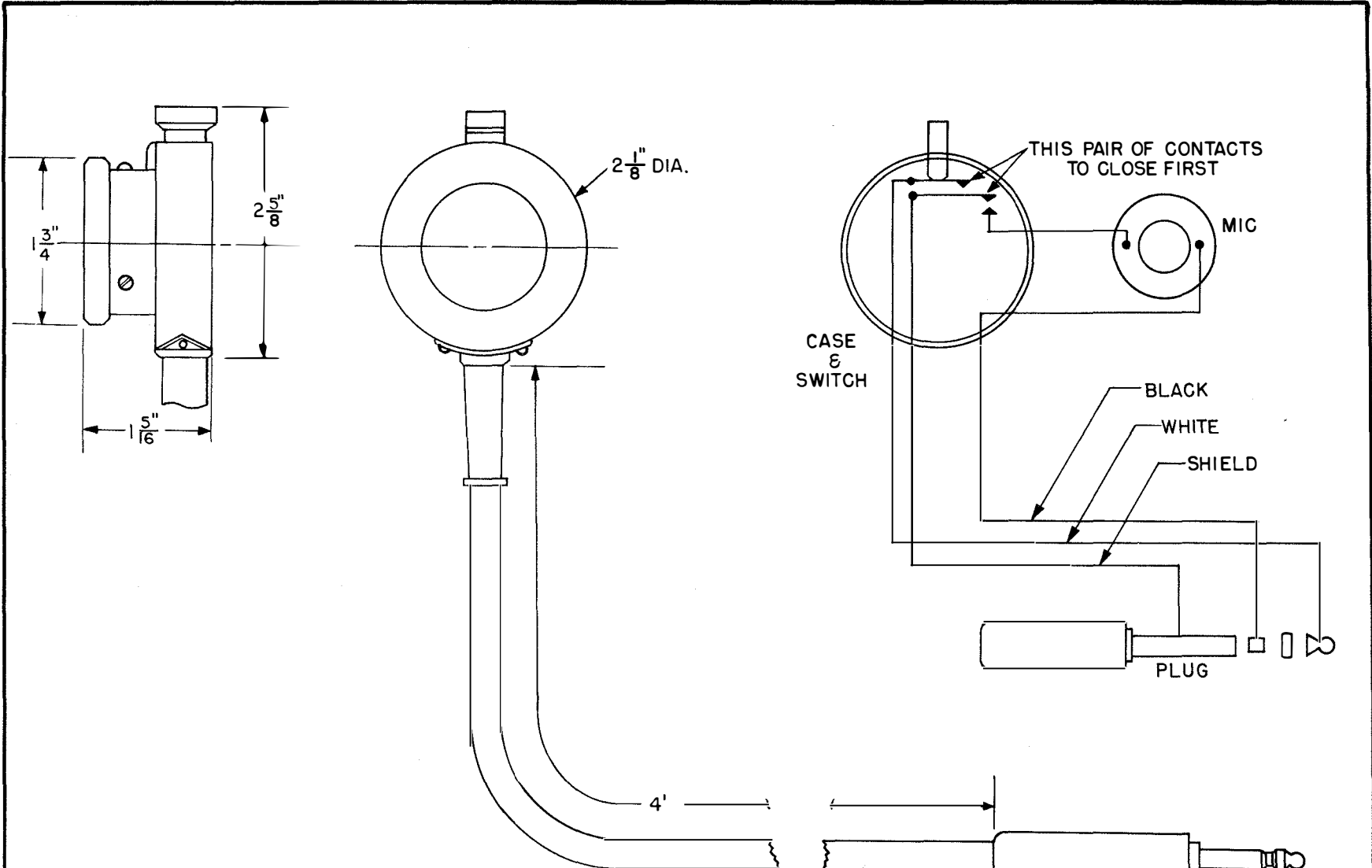
PLUGS AS VIEWED FROM CONNECTION END

A- AT LEAST #12 AWG BARE COPPER WIRE
NOTE: LEADS FROM ANT. POST MUST BE SUPPORTED ON INSULATORS AT LEAST 6 INCHES AWAY FROM ALL METALLIC SURFACES.

B- #16 AWG, 2/64" RUBBER INSULATION
NOTE: CAPACITY OF THIS CONDUCTOR TO GROUND MUST BE KEPT LOW BY SUPPORTING THIS CONDUCTOR ON INSULATORS AT LEAST 3 INCHES AWAY FROM ALL METALLIC WALLS AND SURFACES.

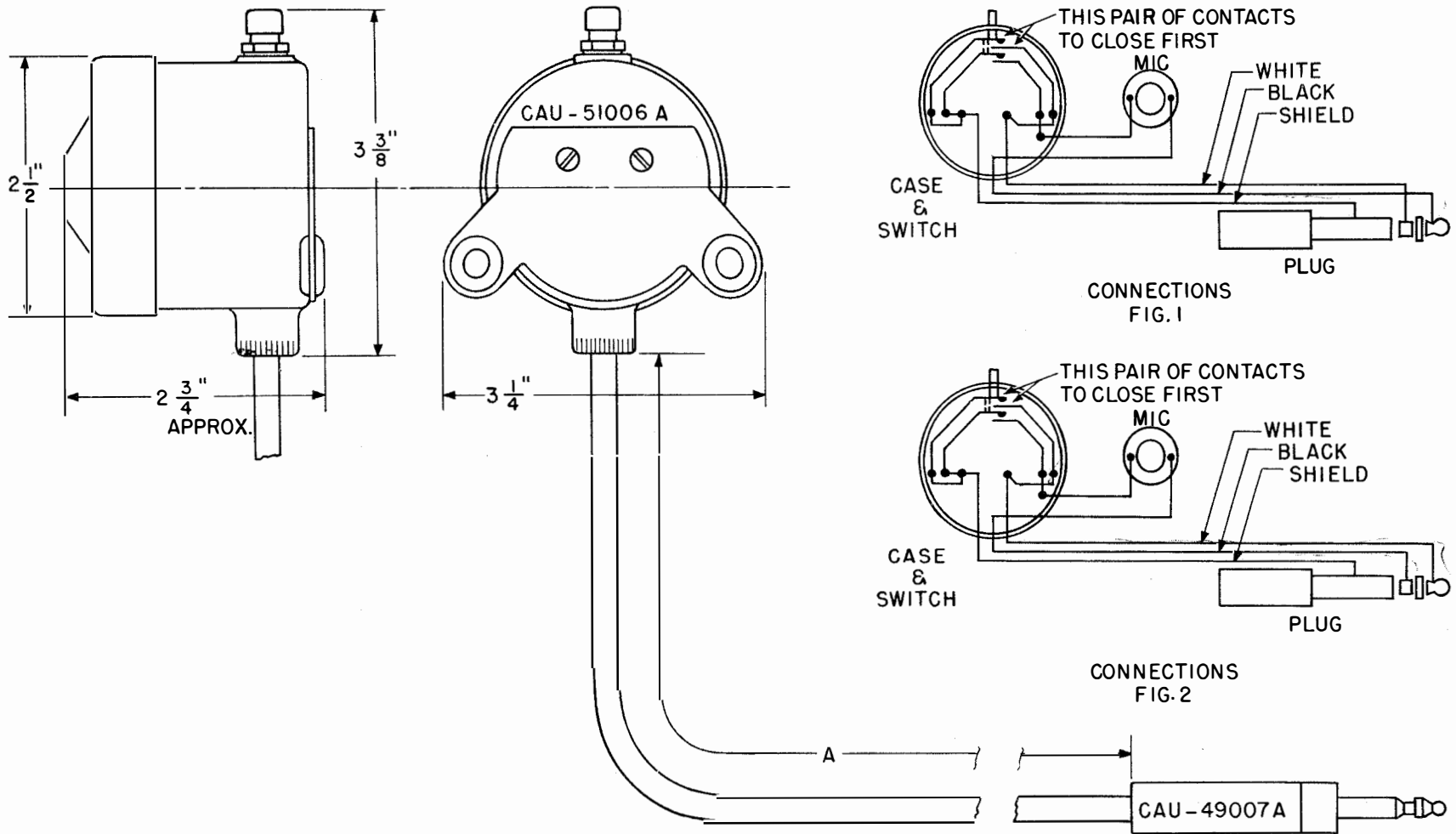
Figure 3-9. Connection Diagram Navy Models TCU, TCU-1 and TCU-2 Radio Telegraph Transmitting Equipments

Figure 3-10. Connection Diagram, Microphone Navy Type CMX-51004C



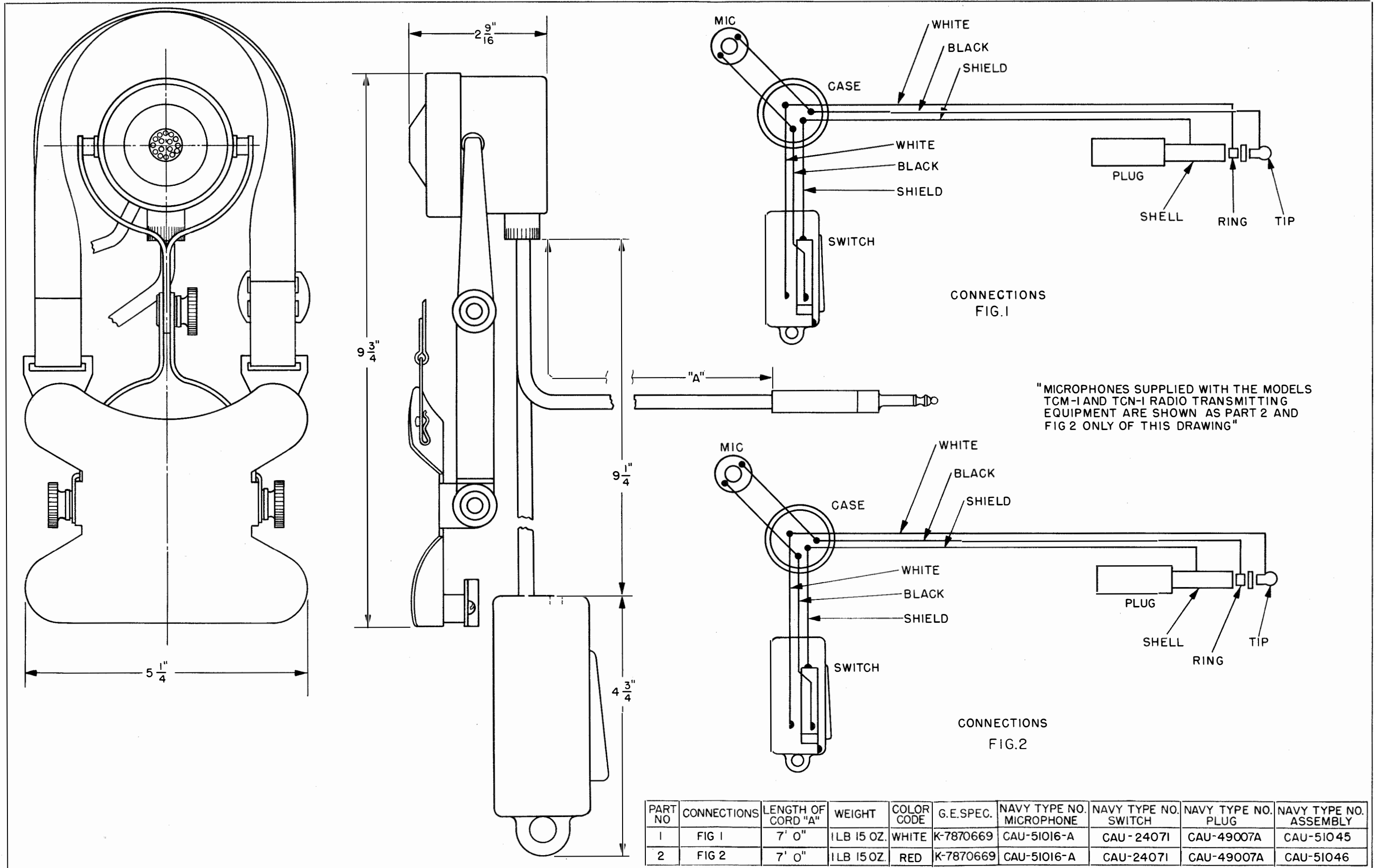
WEIGHT (MICROPHONE, CORD & PLUG) - 7 OZ.
NAVY TYPE NUMBER - CMX 51004C.

Figure 3-11. Connection Diagram, Microphone Navy Type CAU-51006A



PART NO.	CONNECTIONS	LENGTH OF CORD "A"	WEIGHT	COLOR CODE	G.E. SPECS.	NAVY TYPE NO MICROPHONE	NAVY TYPE NO PLUG
1	FIG. 1	6'0"	15 OZ.	WHITE	K-7870699	CAU-51006A	CAU-49007A
2	FIG. 2	6'0"	15 OZ.	RED	K-7870699	CAU-51006A	CAU-49007A
3	FIG. 2	6'11"	13 OZ.	RED	K-7872312	CAU-51006A	CAU-49007A

MICROPHONES SUPPLIED WITH THE MODELS TCM-1 AND TCN-1 RADIO TRANSMITTING EQUIPMENT ARE SHOWN AS PART 2 AND FIG. 2 ONLY OF THIS DRAWING.



PART NO	CONNECTIONS	LENGTH OF CORD "A"	WEIGHT	COLOR CODE	G.E.SPEC.	NAVY TYPE NO. MICROPHONE	NAVY TYPE NO. SWITCH	NAVY TYPE NO. PLUG	NAVY TYPE NO. ASSEMBLY
1	FIG 1	7' 0"	1LB 15 OZ.	WHITE	K-7870669	CAU-51016-A	CAU-24071	CAU-49007A	CAU-51045
2	FIG 2	7' 0"	1LB 15 OZ.	RED	K-7870669	CAU-51016-A	CAU-24071	CAU-49007A	CAU-51046

Figure 3-12. Connection Diagram, Microphone Navy Type CAU-51046

SECTION IV OPERATION

WARNING

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL MUST AT ALL TIMES OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE ON. DO NOT DEPEND UPON DOOR SWITCHES OR INTERLOCKS FOR PROTECTION. ALWAYS SHUT DOWN THE RECTIFIER OR OTHER POWER EQUIPMENT AND OPEN THE MAIN SWITCH IN THE SUPPLY LINE TO THE EQUIPMENT.

1. GENERAL.

The following procedures for operation of H-f Radio Transmitter Navy Type 52206 and I-f Radio Transmitter Navy Type 52205 assume that the operator is not familiar with the equipment and that frequency settings for the transmitter controls have not been recorded. The operation of each transmitter will become simplified as the operator becomes familiar with the tuning of the various circuits and after complete settings have been recorded on the tuning chart for all frequencies ordinarily used.

The tuning calibration curves included in this manual are representative curves to be used only as a guide in tuning the transmitters. If greater accuracy is required a frequency standard should be employed to set the master oscillator frequency.

2. RECTIFIER NAVY TYPE CG-20122.

Adjust the rectifier as instructed in section III, paragraph 3*b*.

3. H-F RADIO TRANSMITTER NAVY TYPE CG-52206.

a. TUNING PROCEDURE.—The following procedure for tuning H-f Radio Transmitter Navy Type CG-52206 (figure 4-1) is based on the assumption that the desired frequency is 18,100 kc. In general this procedure is applicable to any frequency within the band of 2000 to 18,100 kc.

(1) Set the "REMOTE LOCAL" switch (1755, figure 4-2) on the control unit in the "LOCAL" position. Close the main line switch (654, figure 4-3) on the rectifier panel.

(2) Place the transmitter-rectifier "START-STOP" switch (651, figure 4-3) on the rectifier panel in the

"START" position. Place the panel illuminating lamp switches (382 and 383) on the transmitter panel in the "ON" position. The panel illuminating lamps (362 and 363) on the transmitter panel will light, indicating that power has been applied to the equipment. Place the "START-STOP" switch (1756 or 1757, figure 4-2) on the control unit in the "START" position.

(3) Adjust the rectifier filament voltage to 6.3 volts by means of the rectifier filament rheostat (630, figure 4-3). Adjust the transmitter filament voltage to 6.3 volts by means of the transmitter filament rheostat (288, figure 4-1). Plate voltage will be applied to the radio transmitter 40 seconds after the equipment has been started. When plate voltage is applied the "PLATE VOLTAGE INDICATOR" lamp (364) on the transmitter panel will light.

(4) Place the "EMISSION" switch (381, figure 4-1) on the transmitter panel in the "CW" position.

(5) Place the "POWER TAP" switch (649, figure 4-3) on the rectifier panel on tap "1". The plate voltage is thus reduced to approximately 600 volts on the power-amplifier tubes while preliminary tuning of the low-power stage is accomplished.

(6) Set the "MO BAND CHANGE" switch (375-376, figure 4-1) on tap "4". Depress the "TEST KEY" (386, figure 4-1) and adjust the "MO TUNING" control (200, figure 4-1) to a dial setting of approximately "2100". The frequency at this point is approximately 2262.5 kc. By referring to sample tuning chart (figure 4-4) the operator will be guided in adjusting the master oscillator to any frequency within its range. If greater accuracy than this approximate calibration is required, it will be necessary to employ a frequency meter or standard to set the master oscillator. The sample tuning charts contained in this instruction book are not to be used for accurate frequency setting. They are to be used only as a guide to the general settings of the various controls.

(7) Set the "1st IPA BAND CHANGE" switch (377, figure 4-1) on tap "3" and resonate the "1st IPA TUNING" control (217, figure 4-1) at a dial setting of approximately 93. Resonance will be indicated by a dip in plate current of the first i-p-a plate milliammeter (341, figure 4-1), and also by a reading of maximum current on the second i-p-a plate milliammeter (342, figure 4-1). The plate tank circuit of the first i-p-a is now resonating at twice the frequency of the m-o plate circuit, or at 9050 kc. The m-o plate circuit is tuned automatically to twice the frequency of the m-o oscillator by means of a tapped inductance (301) controlled by the "MO BAND CHANGE" (375, figure 4-1) switch.

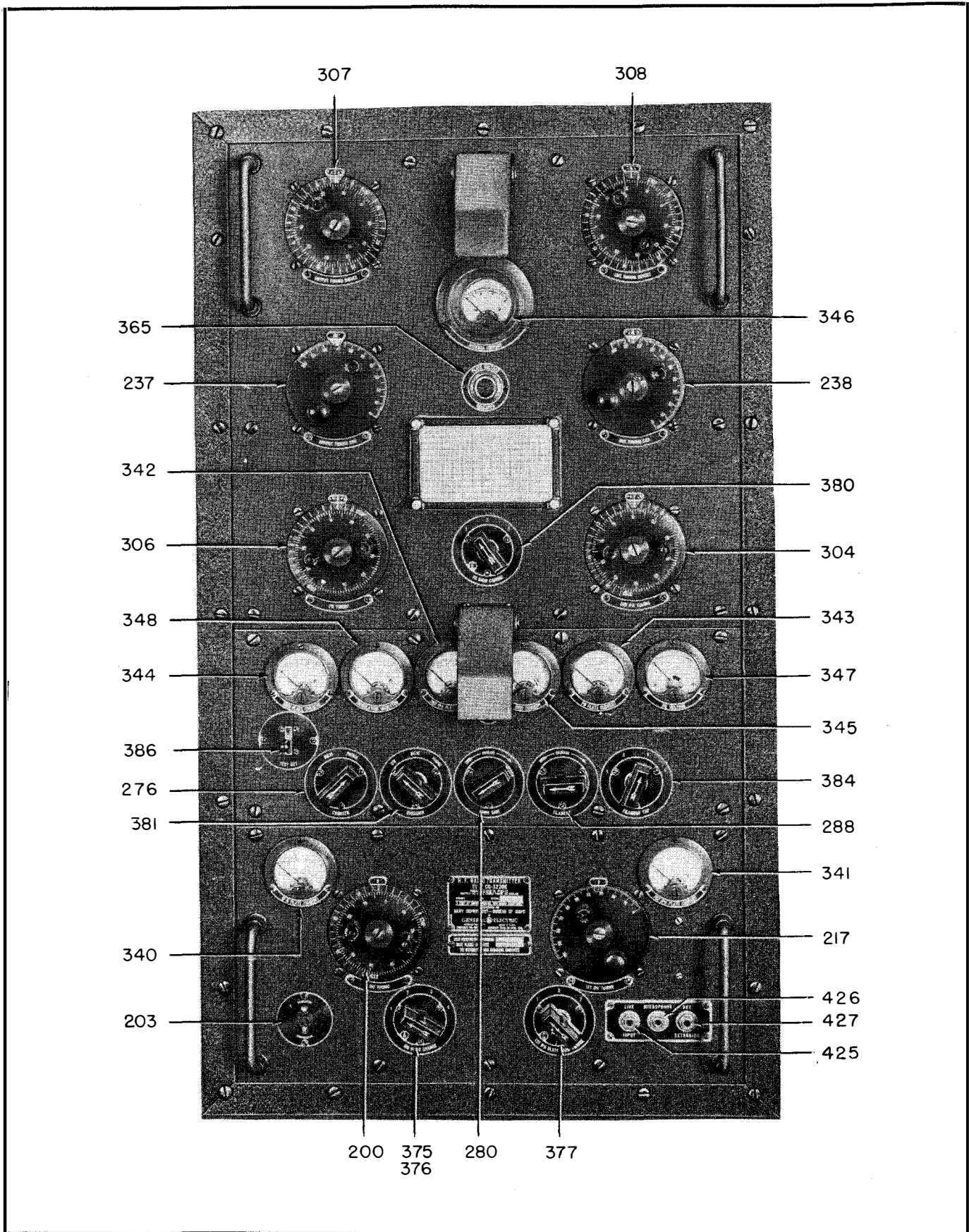


Figure 4-1. H-f Radio Transmitter Navy Type CG-52206, Front View

The sample tuning chart (figure 4-5) will aid the operator in tuning the first i-p-a plate circuit.

(8) Set the "PA BAND CHANGE" switch (380, figure 4-1) to the proper band before tuning the second i-p-a tank circuit, since this switch selects the proper band for the second i-p-a as well as for the p-a.

Set the "PA BAND CHANGE" switch (380, figure 4-1) on tap "3". Resonate the "SECOND IPA TUNING" control (304, figure 4-1) at a dial setting of approximately 1770, until resonance is indicated by a dip in plate current on the second i-p-a plate milliammeter (342, figure 4-1) and by a maximum reading of the p-a grid milliammeter (345, figure 4-1). The sample tuning chart (figure 4-6) will aid the operator to tune this stage.

(9) Before resonating the power amplifier tank circuit, set the "OUTPUT TUNING INDUCTOR" (307, figure 4-1) at 1800 which is the middle of its operating scale. Set the "OUTPUT TUNING CAPACITOR" (237, figure 4-1) at 50. Set the "ANTENNA TUNING INDUCTOR" (308, figure 4-1) at 1800, which is the center of its range. Set the "ANTENNA TUNING CAPACITOR" (238, figure 4-1) at 100. Depress the "TEST KEY" and tune the power amplifier to resonance by rotating the "PA TUNING" control (306, figure 4-1). Resonance is indicated by a dip in plate current on the p-a plate milliammeter (343, figure 4-1). For the operating frequency of 18,100 kc the approximate setting of the "PA TUNING CONTROL" is at 1560. The sample tuning chart (figure 4-7) will aid the operator in tuning this stage.

(10) Set the rectifier panel "POWER TAP" switch (649, figure 4-3) on tap "3". This brings the power amplifier voltage up to normal for operating conditions.

(11) To maintain the power amplifier tank circuit at resonance throughout the antenna tuning procedure, slightly readjust the power amplifier control (306, figure 4-1) after each adjustment of the antenna tuning controls. With the power amplifier tank circuit tuned to resonance, increase or decrease the setting of "ANTENNA TUNING INDUCTOR" dial (308, figure 4-1) until the power amplifier plate current rises. Also increase or decrease the setting of the "OUTPUT TUNING CAPACITOR" dial (237, figure 4-1) to obtain a rise in power amplifier plate current. This will change the resonance point of the power amplifier tank circuit. Return the power amplifier control (306, figure 4-1) to the new resonance point. Keep the "OUTPUT TUNING CAPACITOR" dial near the maximum dial setting, especially when operating at the lower frequencies. Vary the "ANTENNA TUNING INDUCTOR" (308, figure 4-1) and "OUTPUT TUNING CAPACITOR" (237, figure 4-1) until the power amplifier plate current is approximately 0.230 to 0.250 ampere. If the p-a cannot be loaded to the proper value of plate current, rotate the "OUTPUT TUNING INDUCTOR" (307, figure 4-1) to increase the power amplifier plate current. Readjust the power amplifier control (306, figure 4-1) for resonance each time the current is raised until the

plate current is 0.230 to 0.250 ampere. In some cases where the operating frequency is near an odd quarter of a wavelength of the antenna, the input resistance will be low. In this case reduce the dial setting of "ANTENNA TUNING CAPACITOR" (238, figure 4-1) in order to load the power amplifier to the required plate current. Antenna resonance will be indicated by a maximum reading of antenna current on "ANTENNA CURRENT" meter 346 on the transmitter panel.

Approximate settings for several frequencies throughout the band for a typical antenna are given in the table in sub-paragraph *b* (1) following. Note these settings are approximate, since the location of the antenna with respect to adjacent antennas and other objects will require changing the dial settings appreciably.

Do not operate the radio transmitter on full power if the antenna circuit has not been properly resonated. The antenna equipment must tune antennas with resistance and reactance which vary from very low to very high values. This requires a very flexible system providing step-up and step-down in voltage from the power amplifier tank circuit and consequently great care is to be exercised in tuning.

For maximum step-down in voltage when a low-resistance antenna is used, the voltage is made low for current feed by setting antenna tuning capacitor (238, figure 4-1) at its minimum capacity (maximum dial reading), and resonating output tuning capacitor (237, figure 4-1) with antenna tuning inductor (308, figure 4-1). For optimum power transfer the relatively high impedance of the capacitive section of the resonated network is matched by adjustment of the output tuning inductor (307, figure 4-1). In the case of a high-resistance antenna, the driving voltage is made high for voltage feed by the output tuning capacitor (237, figure 4-1), antenna tuning capacitor (238, figure 4-1) and the antenna tuning inductor (308, figure 4-1). The greater the capacity ratio of the output tuning capacitor (237) to the antenna tuning capacitor (238), the higher the antenna driving voltage. As in the case of current feed, the resonated network is driven across the capacitive section (237) by inductor 307.

(12) To provide for MCW and Phone operation, first tune the radio transmitter for "CW" as described in the preceding steps (1) to (11) inclusive and proceed as follows.

(a) For MCW operation, place the "EMISSION" switch (381, figure 4-1) in the "PHONE" position. Close the "TEST KEY" (386, figure 4-1) and adjust the "MCW-PHONE CARRIER" control (276, figure 4-1) until the power amplifier plate current is between 110 and 120 milliamperes. Then set the "EMISSION" switch in the "MCW" position. This starts the audio oscillator-modulator tube and provides the proper modulation for "MCW". With the "TEST KEY" closed the modulation indicator motor (348, figure 4-1) should read approximately 75 to 80 volts.

(b) For Phone operation, set the "MCW-PHONE CARRIER" control as described in the preceding sub-

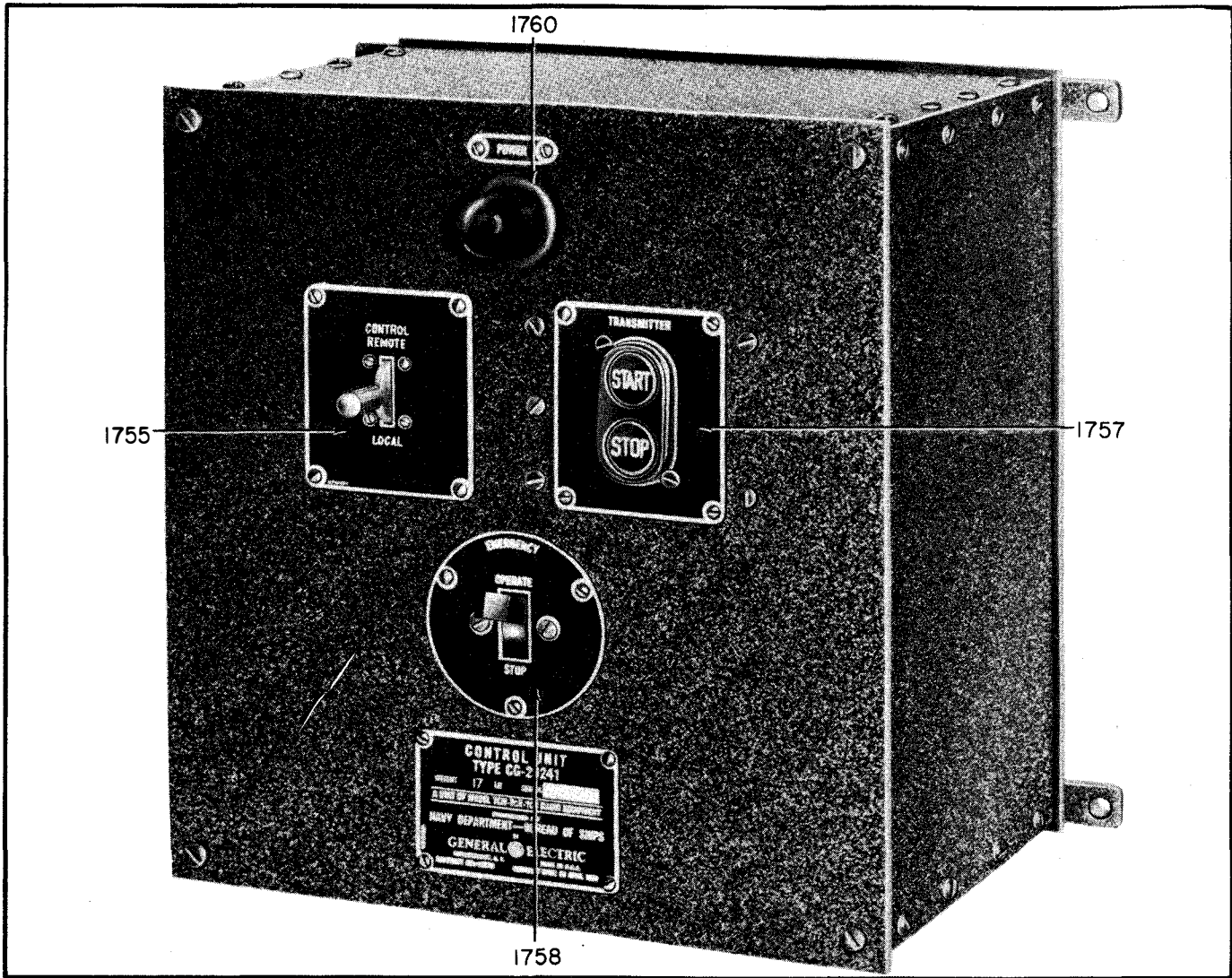


Figure 4-2. Control Unit Navy Type CG-23241, Front View

paragraph (a) and place the "EMISSION" switch (381, figure 4-1) in the "PHONE" position. This connects the audio amplifier-modulator tube and permits the transmitter output to be modulated from the microphone.

Produce a steady voice tone or low whistle into the microphone, while depressing the microphone key. Ad-

just the "AUDIO GAIN" control (280, figure 4-1) until the modulation indicator reads approximately 75 to 80 volts on steady modulation. If ordinary voice modulation is used the peak swing is not to exceed 75 volts. This will provide approximately 80 to 90 percent modulation on peaks of modulation.

b. TYPICAL PERFORMANCE DATA.

(1) Table 4-1 indicates approximate control settings for a typical antenna operated at the frequencies shown.

TABLE 4-1. — APPROXIMATE CONTROL SETTINGS AT FREQUENCIES SHOWN.

Controls	Control Setting at					
	2000kc	3500kc	4500kc	9000kc	12,000kc	18,100kc
"PA BAND CHANGE" SWITCH (380)	1	2	2	3	3	3
"PA TUNING" CONTROL (306)	230	725	1065	1050	1300	1560
"OUTPUT TUNING INDUCTOR" (307)	0	0	0	0	1240	1773
"OUTPUT TUNING CAPACITOR" (237)	40	48	86	100	100	100
"ANTENNA TUNING INDUCTOR" (308)	0	0	0	1924	2475	2923
"ANTENNA TUNING CAPACITOR" (238)	0	100	100	100	100	100
"PA PLATE CURRENT" (343)	240	240	240	240	240	235
"ANTENNA CURRENT" (346)	2.9	0.6	0.6	0.9	1.2	0.5

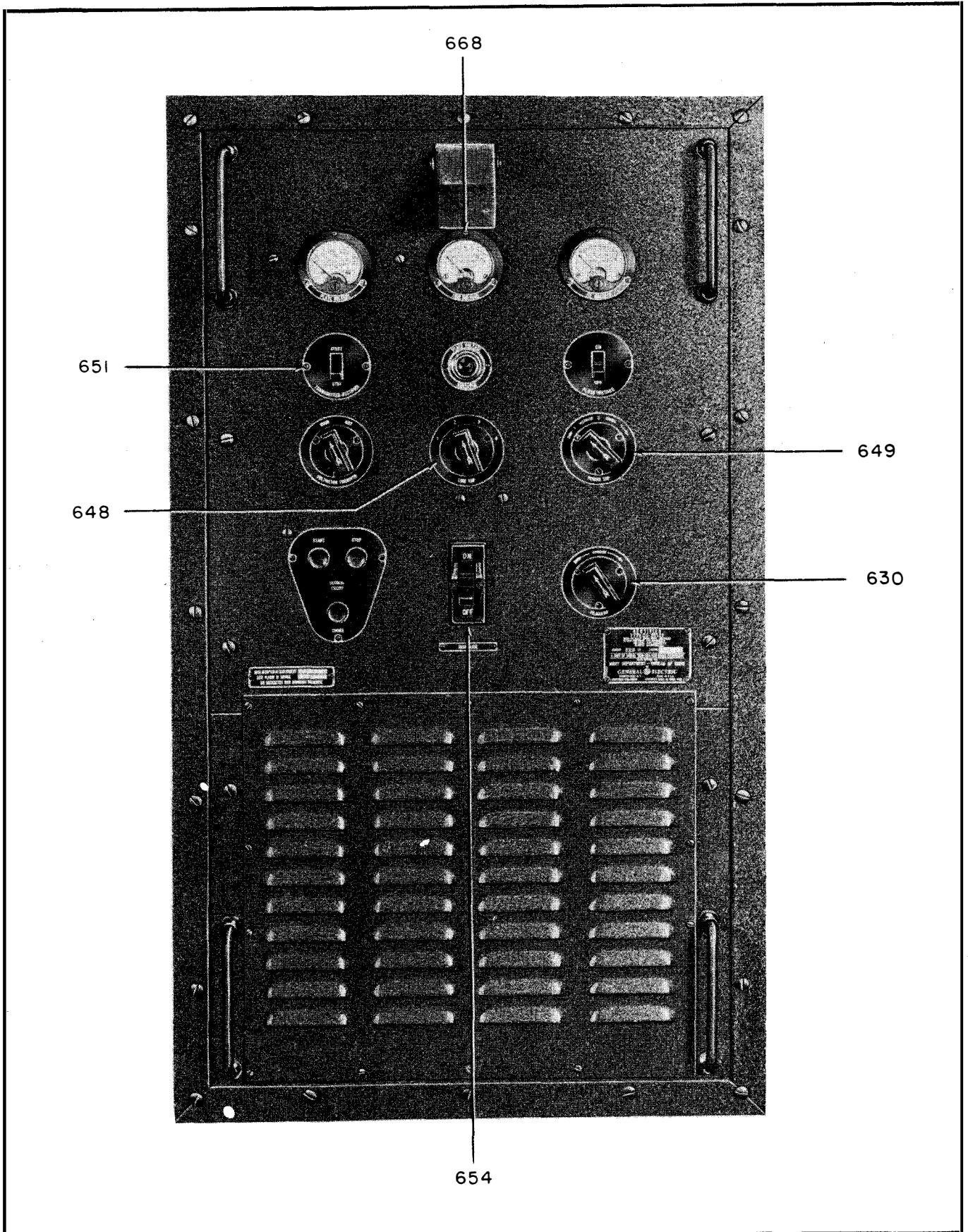


Figure 4-3. Rectifier Navy Type CG-2012, Front View

Section IV
Paragraphs 3 and 4

NAVSHIPS 900,401

The preceding table is read as shown in the following example:—To tune the "OUTPUT TUNING CAPACITOR" (237) at 4500 kc the control would be set at 86.

(2) Table 4-2 presents typical meter readings and control settings for operation into a typical antenna at frequencies shown.

TABLE 4-2. — APPROXIMATE METER READINGS AND CONTROL SETTINGS AT FREQUENCIES SHOWN.

Controls	Control Settings at								
	2000 kc			12,000 kc			18,000 kc		
"MO BAND CHANGE" SWITCH (375-376)	1			2			4		
"MO TUNING" CONTROL (200)	662			2140			2059		
"1st IPA BAND CHANGE" SWITCH (377)	1			3			3		
"1st IPA TUNING" CONTROL (217)	32			46			93		
"PA BAND CHANGE" SWITCH (380)	1			3			3		
"2nd IPA TUNING" CONTROL (304)	470			1400			1761		
"PA TUNING" CONTROL (306)	208			723			1511		
"OUTPUT TUNING CAPACITOR" (237)	21			86			87		
"OUTPUT TUNING INDUCTOR" (307)	0			2500			2608		
"ANTENNA TUNING CAPACITOR" (238)	100			100			97		
"ANTENNA TUNING INDUCTOR" (308)	0			2540			3055		
Meters									
	CW	MCW	Voice Unmod.	CW	MCW	Voice Unmod.	CW	MCW	Voice Unmod.
"MO PLATE CURRENT" (340)	19	19.5	19	19.5	19	19	26	25	25
"1st IPA PLATE CURRENT" (341)	30	26	25	34	34	34	27	26	26
"MOD. PLATE CURRENT" (344)		32	40		34	43	38	37	39
"MODULATION INDICATOR" (348)		82.7			80				
"2nd IPA PLATE CURRENT" (342)	65	56	60	34	36	33	38	37	39
"PA GRID CURRENT" (345)	54	50	56	28	30	31	26	28	29
"PA PLATE CURRENT" (343)	300	120	110	260	120	110	275	120	110
"RECTIFIER PLATE VOLTAGE" (666)	1350	1350	1350	1350	1350	1350	1350	1350	1350
"ANTENNA CURRENT" (346)	2.7	1.3	1.3	2.1	1.0	1.0	1.7	.85	.85
"FILAMENT VOLTS" (347)	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3

The preceding table is read as shown in the following example:—With the transmitter operating at 12,000 kc and all the controls set as shown in the column for this frequency, the meters should indicate the values for CW, MCW and Voice as shown in the lower section in the same frequency column.

4. I-F RADIO TRANSMITTER
NAVY TYPE CG-52205.

a. TUNING PROCEDURE. — The following procedure for tuning I-f Radio Transmitter Navy Type CG-52205 is based on the assumption that the desired frequency is 2000 kc. In general, this procedure is applicable to any frequency within the band of 300 to 2000 kc.

(1) Set the "REMOTE-LOCAL" switch (1755, figure 4-2) on the control unit in the "LOCAL" position. Close the main line switch (654, figure 4-3) on the rectifier panel.

(2) Place the transmitter-rectifier "START-STOP" switch (651, figure 4-3) on the rectifier panel in the "START" position. Place the panel illuminating lamp switches (556 and 557) on the transmitter panel in the "ON" positions. The panel illuminating lamps (566 and 567) on the transmitter panel will light showing that power is applied to the equipment. Place the "START-STOP" switch (1756 or 1757, figure 4-2) on the control unit in the "START" position.

(3) Adjust the rectifier filament voltage to 6.3 volts by means of the rectifier filament rheostat (630, figure 4-3). Adjust the transmitter filament voltage to 6.3 volts

by means of transmitter filament rheostat (515, figure 4-8). Plate voltage will be applied to the radio transmitter 40 seconds after the equipment has been started. When plate voltage is applied, the "PLATE VOLTAGE INDICATOR" lamp (565) on the transmitter panel will light.

(4) Place the "EMISSION" switch (554, figure 4-8) in the "CW" position.

(5) Place the rectifier panel "POWER TAP" switch (649, figure 4-3) on tap "1". This will reduce the plate voltage on the p-a tubes to approximately 600 volts.

(6) Set the "MO BAND CHANGE" switch (548, figure 4-8) on tap "6". Depress the "TEST KEY" (558, figure 4-8) and set the "MO TUNING" control (450, figure 4-8) at approximately 1880. The frequency at this point will be approximately 333.3 kc. The sample tuning chart (figure 4-9) will aid the operator in tuning this stage.

(7) Set the "IPA GRID BAND CHANGE" switch (549, figure 4-8) on tap "4". Set the "IPA GRID TUNING" control (529, figure 4-8) at approximately 72. At this point resonance is indicated by the maximum reading of the i-p-a grid milliammeter (568, figure 4-8).

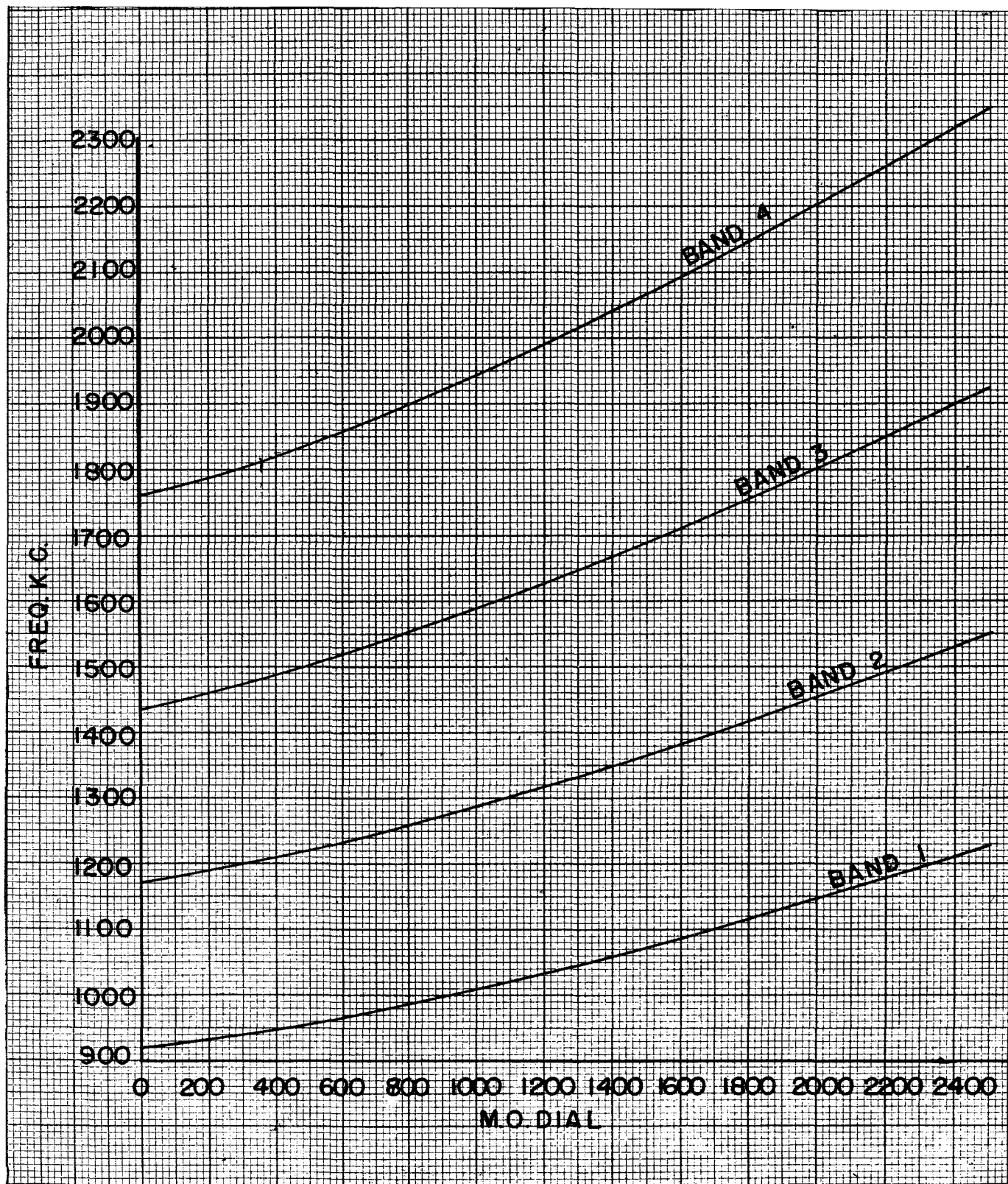


Figure 4-4. Typical MO Tuning, H-f Radio Transmitter Navy Type CG-52206 (Panel Control 200)

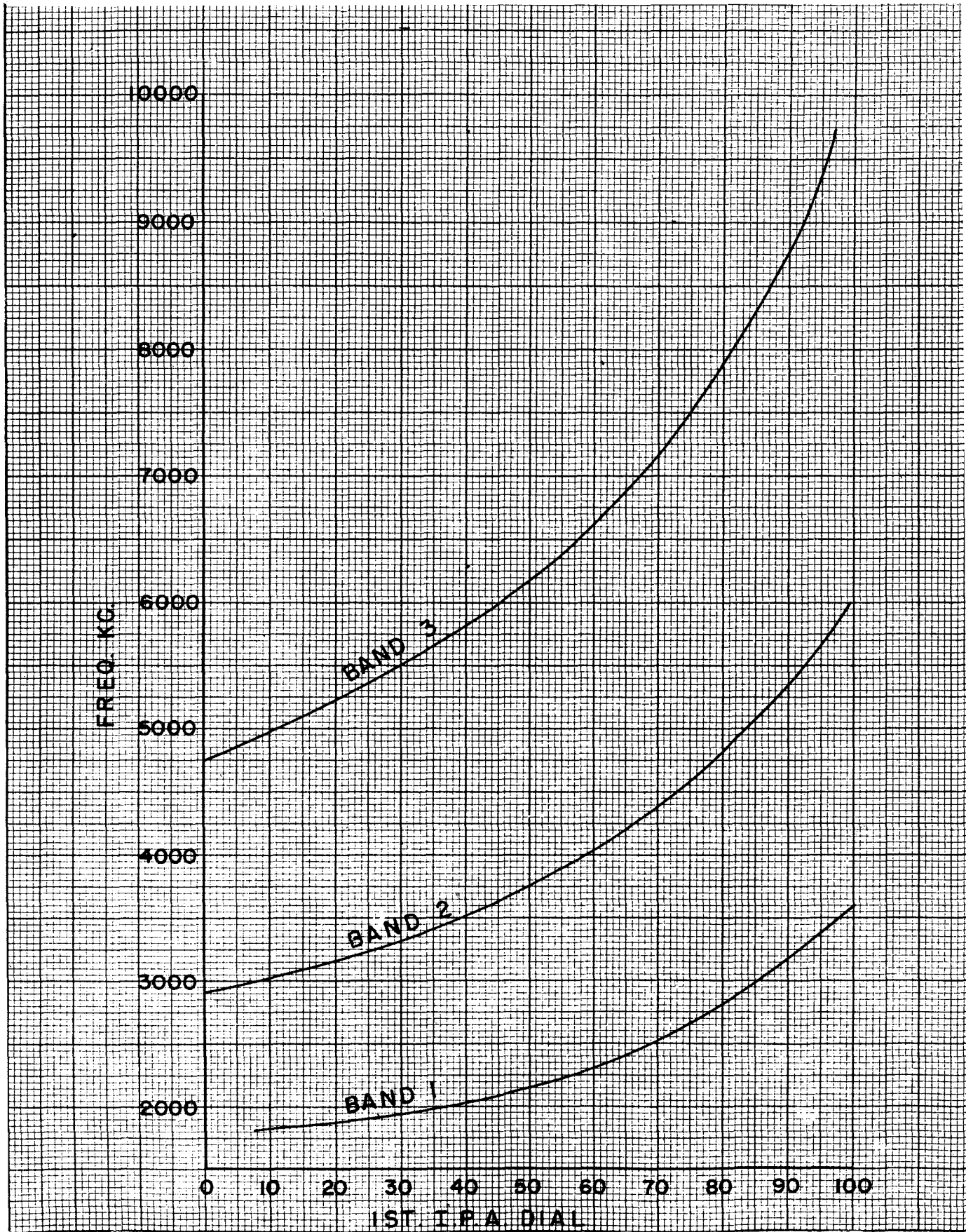


Figure 4-5. Typical 1st IPA Tuning, H-f Radio Transmitter Navy Type CG-52206 (Panel Control 217)

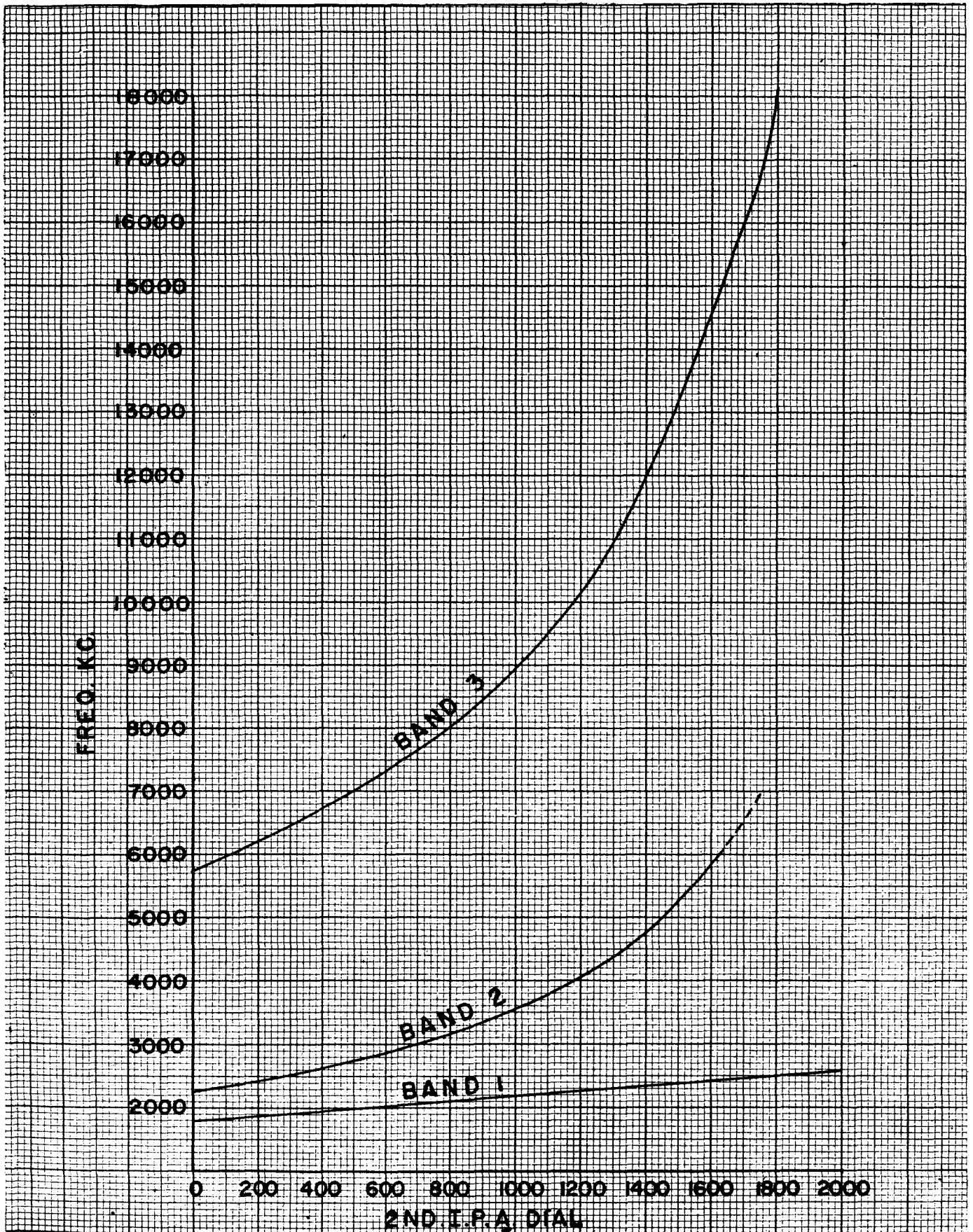


Figure 4-6. Typical 2nd IPA Tuning, H-f Radio Transmitter Navy Type CG-52206 (Panel Control 304)

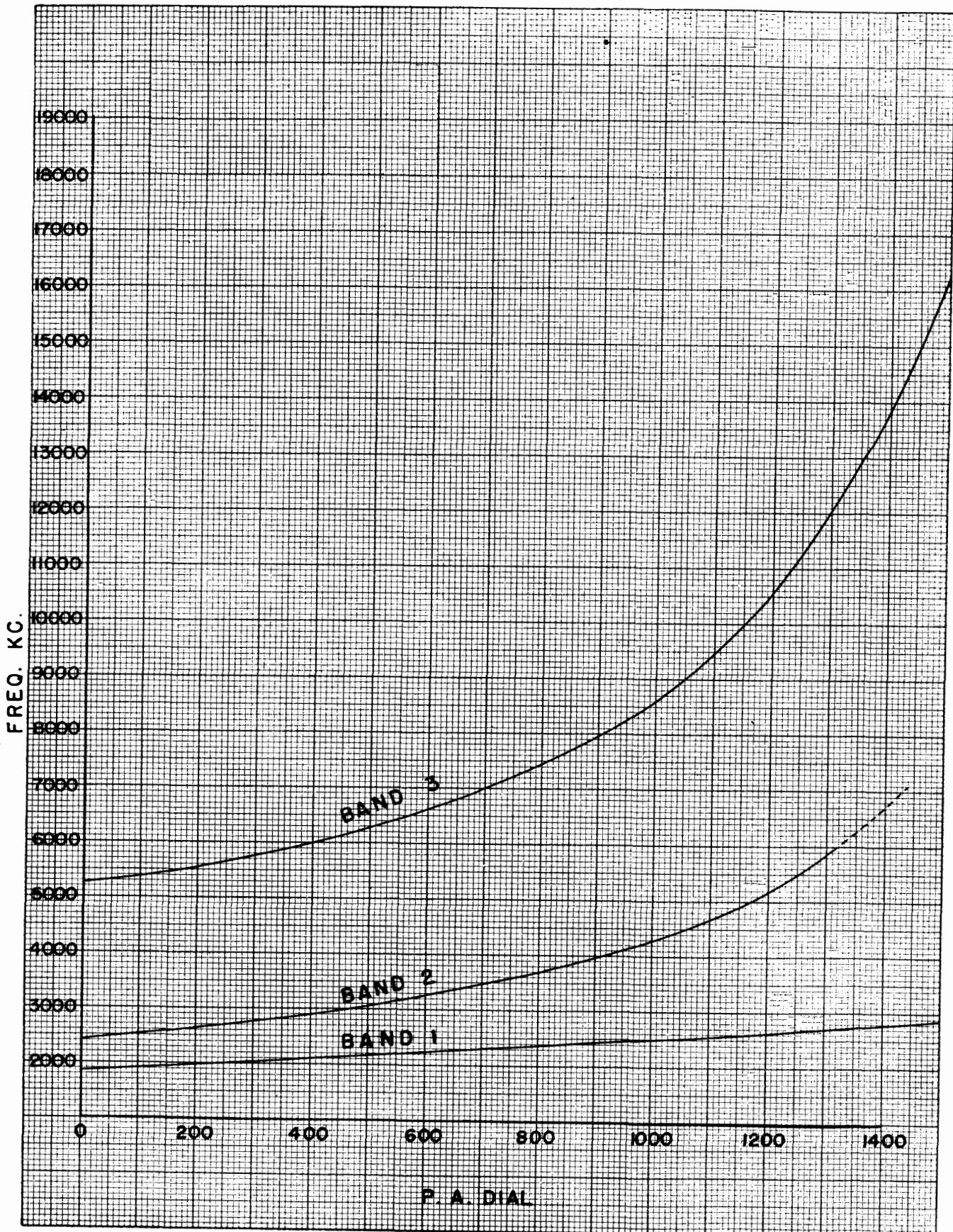


Figure 4-7. Typical PA Tuning, H-f Radio Transmitter Navy Type CG-52206 (Panel Control 306)

This circuit is now resonant at three times the frequency of the master oscillator, or at 1000 kc. The sample tuning chart (figure 4-10) will aid the operator in tuning this circuit.

(8) Set the "IPA PLATE BAND CHANGE" switch (550, figure 4-8) on tap "5" and the "IPA PLATE TUNING" control (468, figure 4-8) at approximately 97. At this point resonance is indicated by the minimum dip in plate current on the i-p-a plate milliammeter (569, figure 4-8) and by maximum grid current on the p-a grid milliammeter (570, figure 4-8). The plate circuit in this case is resonated to a frequency of 2000 kc. The sample tuning chart (figure 4-11) will aid the operator to tune this stage.

(9) Set the "PA PLATE BAND CHANGE" switch (551, figure 4-8) on tap "6". Set the "PA TUNING" control (495, figure 4-8) at approximately 82, for a frequency of 2000 kc. Resonance is indicated by the minimum dip in plate current on the p-a plate milliammeter (571, figure 4-8). The sample calibration chart (figure 4-12) will aid the operator to tune this stage.

(10) Set the "ANTENNA COUPLING" switch (552, figure 4-8) on tap "1". Set the "ANTENNA BAND CHANGE" switch (553, figure 4-8) on tap "13". Resonate the antenna by means of the "ANTENNA TUNING" control (527, figure 4-8). Resonance is indicated by a maximum reading of antenna

current on antenna ammeter (574, figure 4-8). Then set the "ANTENNA COUPLING" on switch tap "2" or "3" until a maximum reading of antenna current is obtained when the "ANTENNA TUNING" control is varied. Use coupling tap "1" where possible since this gives minimum coupling to the antenna. A higher coupling tap is required as the frequency is increased.

(11) Set the "POWER TAP" switch (649, figure 4-3) on the rectifier to tap "3". Adjust the "PA" tuning control (495, figure 4-8) and the "ANTENNA TUNING" control (527, figure 4-8) for peak tuning. As a rule it will not be necessary to vary the "POWER TAP" switch once all the settings are known for various frequencies since all controls can be set with approximate accuracy before tuning the circuit for exact resonance.

CAUTION

To avoid damaging the p-a vacuum tube, its plate current should *never* exceed a value of 350 milliamperes. An average value of 320 milliamperes is recommended.

(12) For MCW operation place the "CW-MCW EMISSION" switch (554, figure 4-8) in the "MCW" position. The transmitter carrier will then be modulated approximately 90 to 95 percent at an audio frequency of 1000 cycles.

b. TYPICAL PERFORMANCE DATA.

Table 4-3 presents typical meter readings and control settings for operation into a typical antenna at frequencies shown.

TABLE 4-3. — APPROXIMATE METER READINGS AND CONTROL SETTINGS AT FREQUENCIES SHOWN.

Controls	Control Settings at							
	300 kc		500 kc		1000 kc		2000 kc	
"MO BAND CHANGE" SWITCH (548)	1		4		4		6	
"MO TUNING" CONTROL (450)	1040		1980		1980		1880	
"IPA GRID BAND CHANGE" SWITCH (549)	1		2		2		4	
"IPA GRID TUNING" CONTROL (529)	23		69		69		72	
"IPA PLATE BAND CHANGE" SWITCH (550)	1		2		4		5	
"IPA PLATE TUNING" CONTROL (468)	30		82		90		97	
"PA PLATE BAND CHANGE" SWITCH (551)	1		2		4		6	
"PA TUNING" CONTROL (495)	20		64		70		82	
"ANTENNA COUPLING" SWITCH (552)	4		2		2		2	
"ANTENNA BAND CHANGE" SWITCH (553)	2		8		11		13	
"ANTENNA TUNING" CONTROL (527)	43		50		34		90	
Meters	CW		MCW		CW		MCW	
"PA PLATE CURRENT" (571)	320	145	300	120	300	120	300	120
"PA GRID CURRENT" (570)	41	43	42	44	40	41	28	29
"IPA PLATE CURRENT" (569)	28	29	32	33	31	32	27	27
"IPA GRID CURRENT" (568)	4.6	4.7	4.6	4.7	4.6	4.7	1.3	1.3
"AUDIO OSCILLATOR CURRENT" (572)		18		18		18		18
"RECTIFIER PLATE VOLTAGE" (666)	1320	1330	1320	1330	1330	1340	1340	1350
"ANTENNA CURRENT" (574)	4.8	2.5	5.4	2.8	5.7	2.9	2.9	1.5

The preceding table is read as shown in the following example:—With the transmitter operating at 500 kc and all the controls set as shown in the column for this frequency, the meters should indicate the values for CW, and MCW as shown in the lower section in the same frequency column.

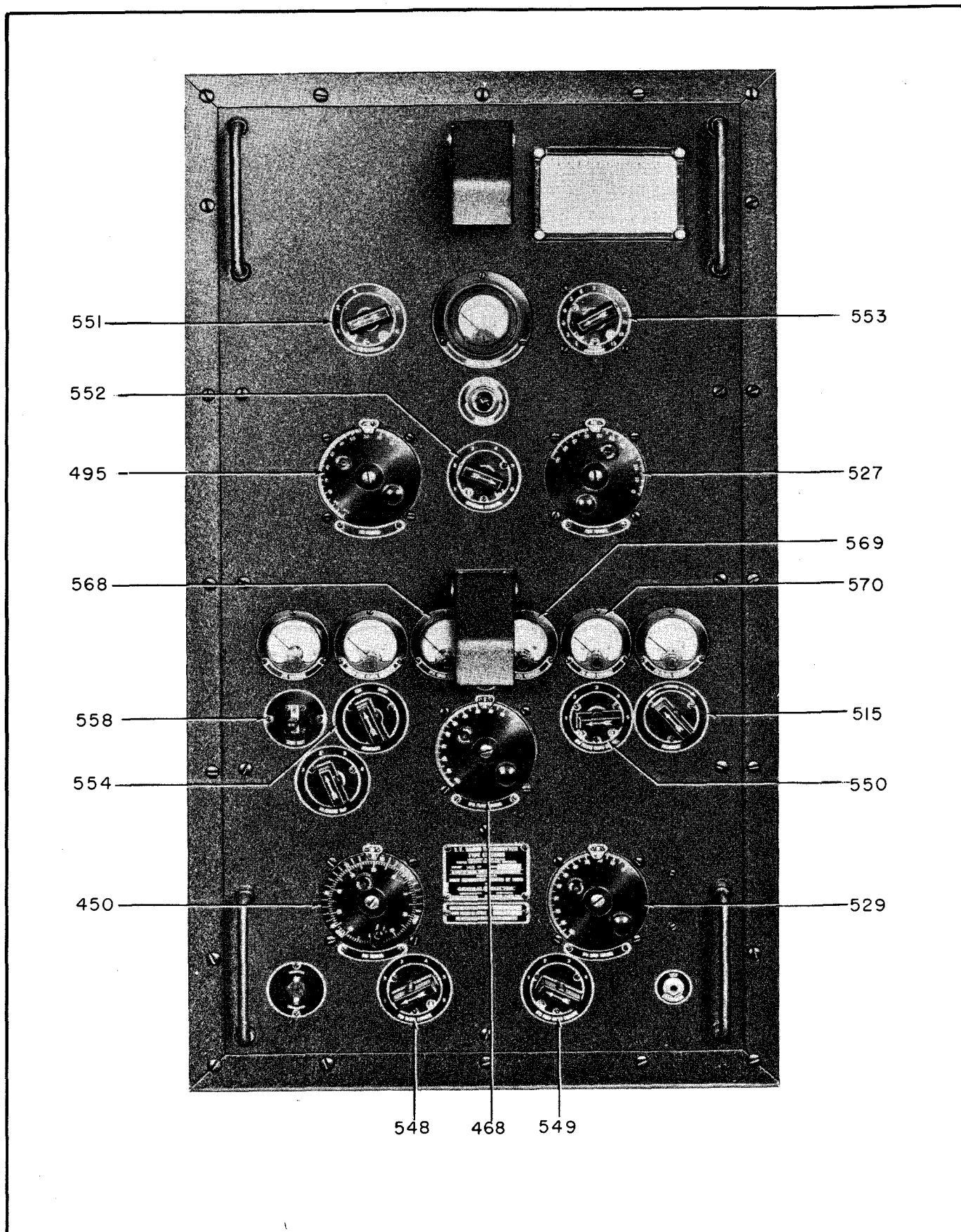


Figure 4-8. 1-f Radio Transmitter Navy Type CG-52205, Front View

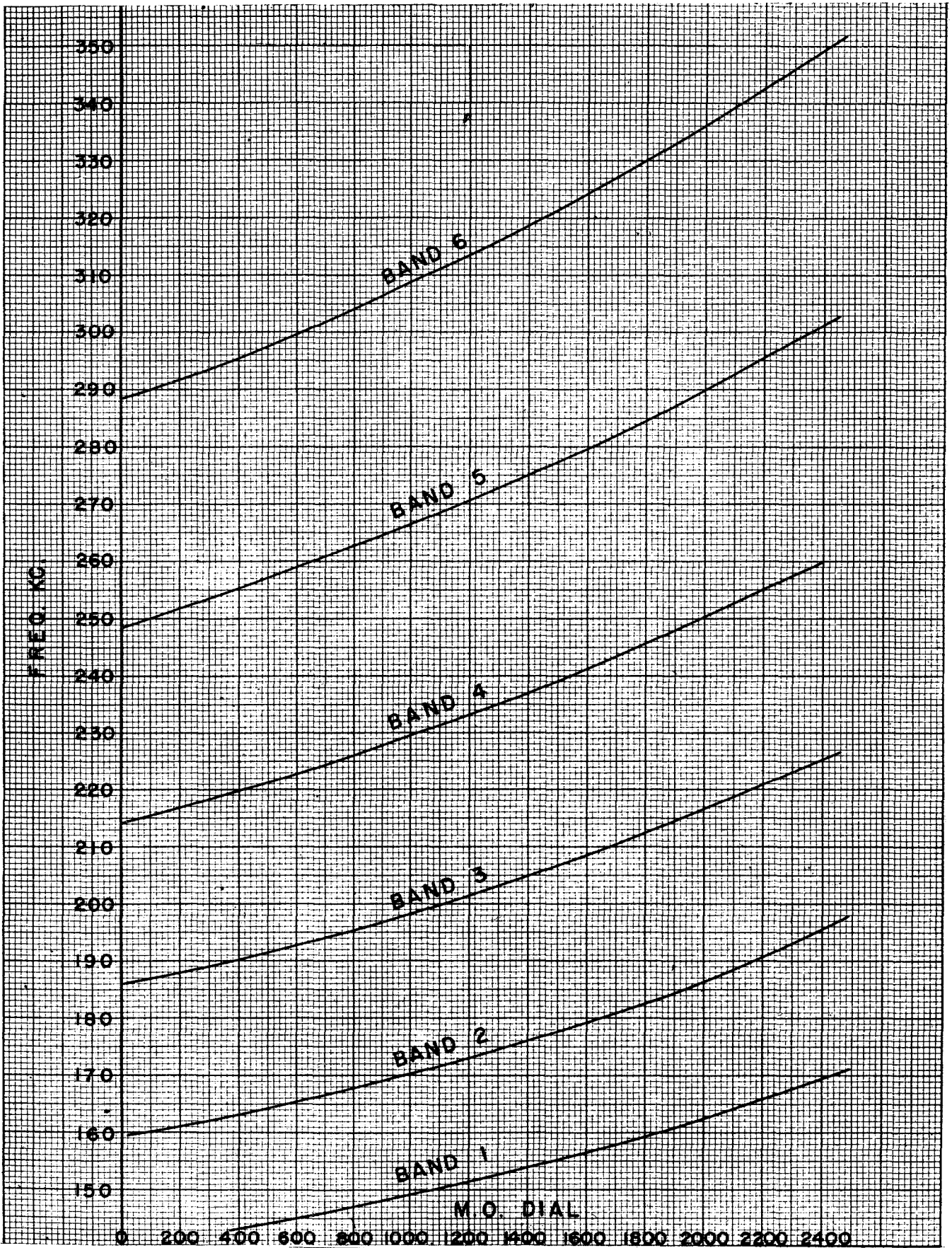


Figure 4-9. Typical MO Tuning, I-f Radio Transmitter Navy Type CG-52205 (Panel Control 450)

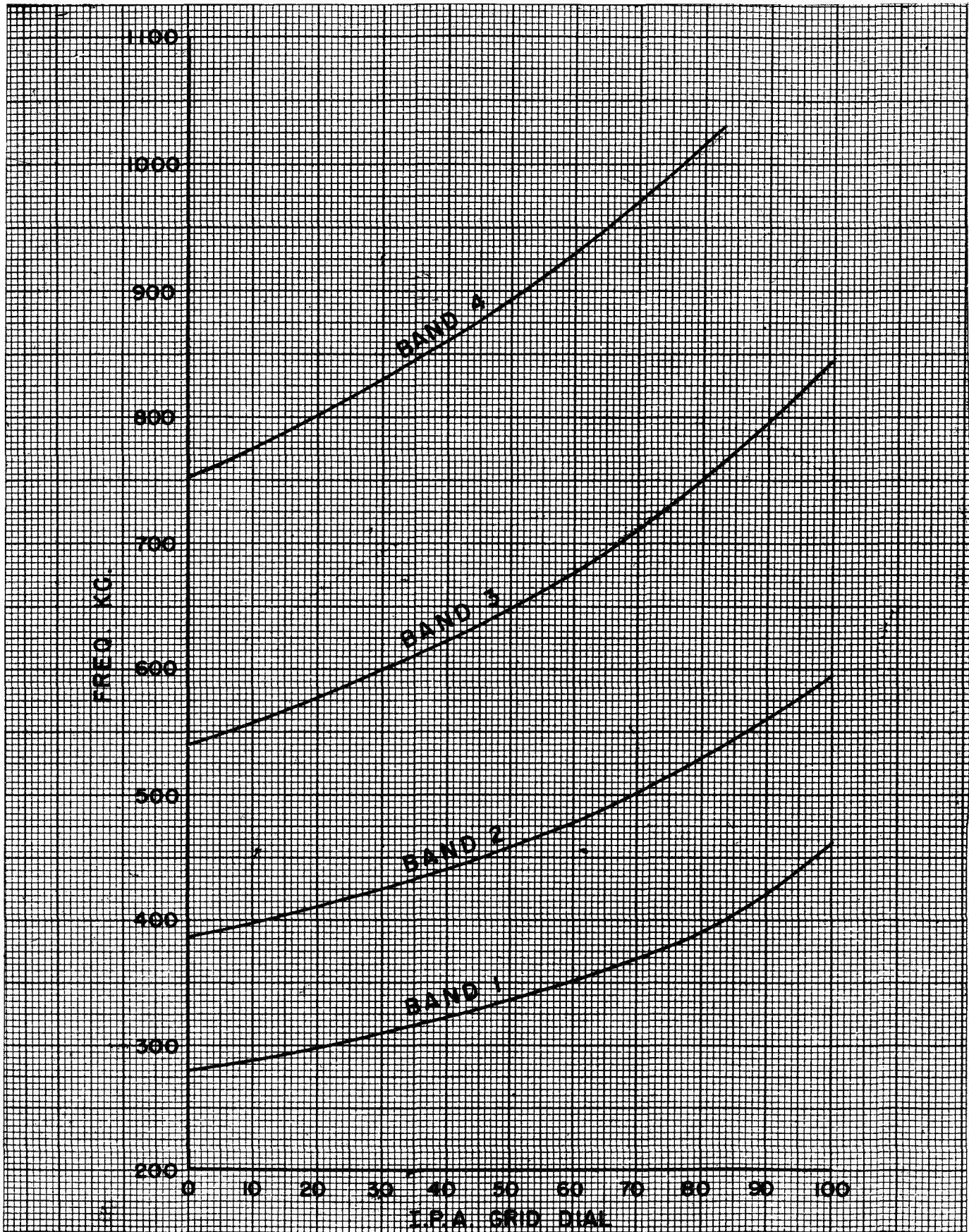


Figure 4-10. Typical IPA Grid Tuning, I-f Radio Transmitter Navy Type CG-52205 (Panel Control 529)

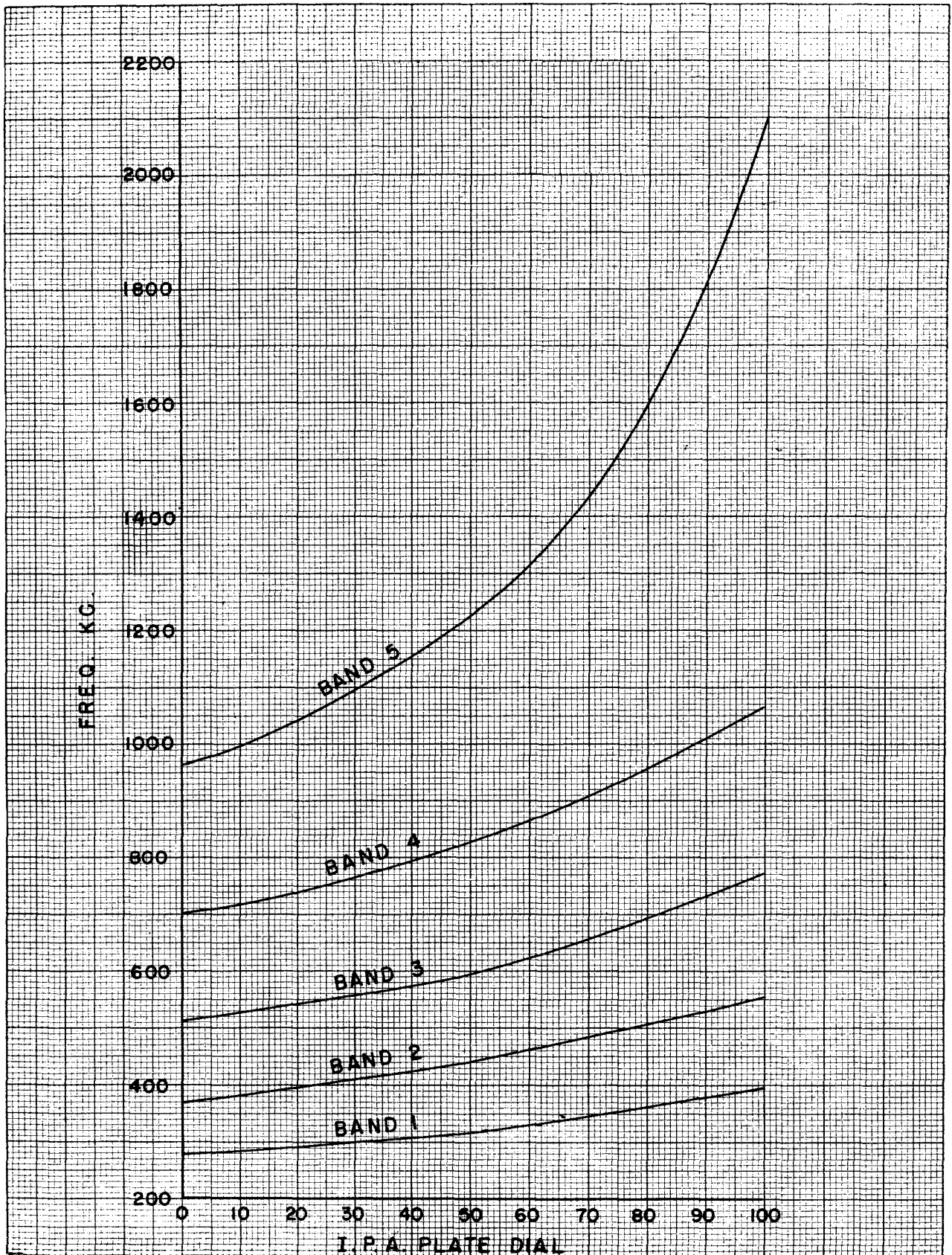


Figure 4-11. Typical IPA Plate Tuning, I-f Radio Transmitter Navy Type CG-52205 (Panel Control 468)

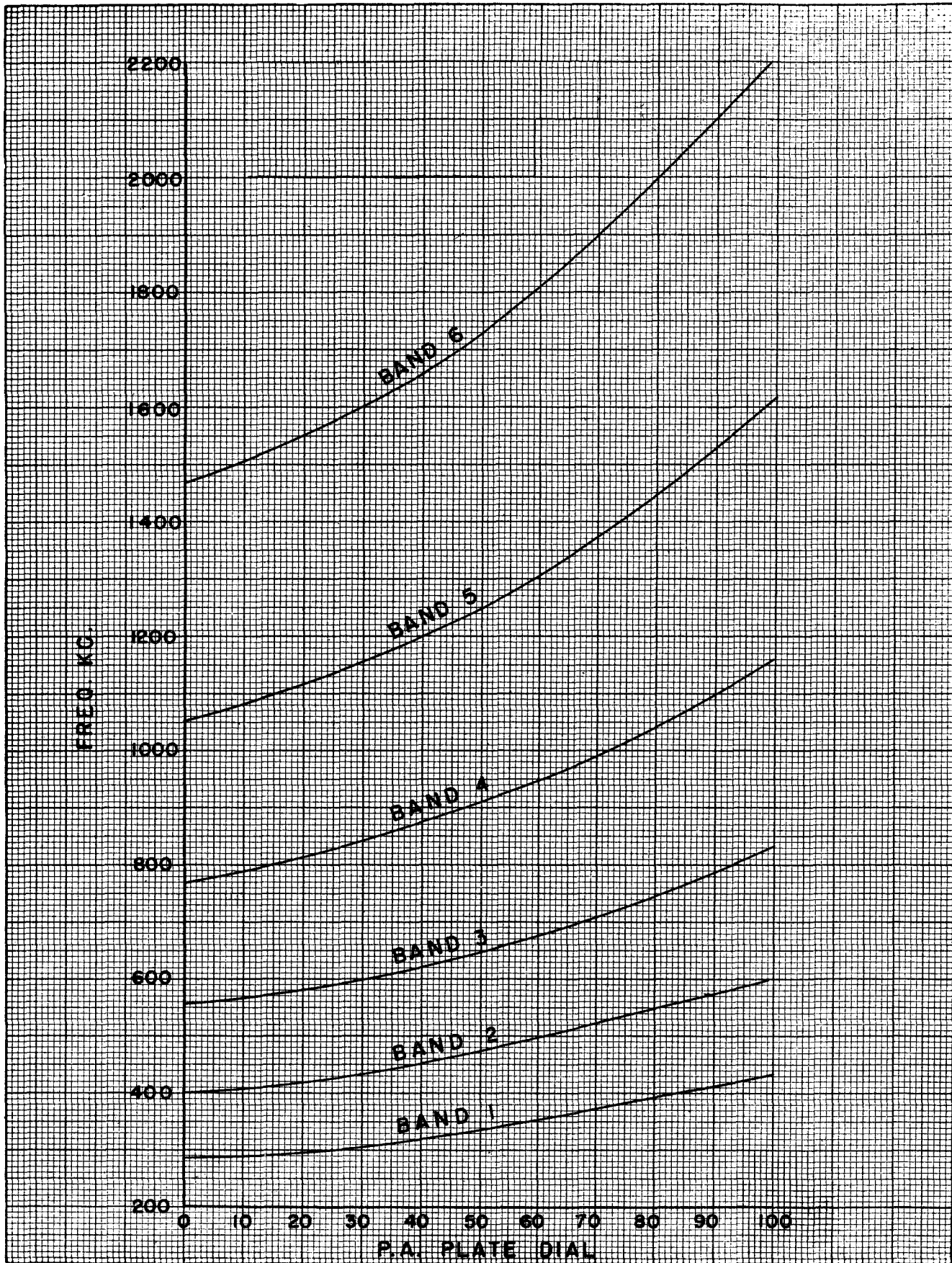


Figure 4-12. Typical PA Tuning, I-f Radio Transmitter Navy Type CG-52205 (Panel Control 495)

5. CONTROL CIRCUITS.*a.* Refer to the following drawings:

- Figure 2-8 Schematic Diagram, Rectifier
Navy Type CG-20122
- Figure 2-9 Connection Diagram, Rectifier
Navy Type CG-20122
- Figure 2-10 Connection Diagram, Rectifier
Navy Type CG-20122
- Figure 2-14 Schematic Diagram, Control Unit
Navy Type CG-23241
- Figure 2-15 Connection Diagram, Control Unit
Navy Type CG-23241
- Figure 3-7 External Connection Diagram,
Navy Models TCM, TCM-1, TCM-2
Radio Transmitting Equipment
- Figure 3-8 External Connection Diagram,
Navy Models TCN, TCN-1
Radio Transmitting Equipment
- Figure 3-9 External Connection Diagram,
Navy Models TCU, TCU-1, TCU-2
Radio Transmitting Equipment

b. The rectifier is operated and stopped by operating the "START-STOP" control on either Control Unit Navy Type CG-23241 or remote four- or six-wire control unit furnished by the Navy. Remote or local operation is accomplished by the "REMOTE-LOCAL" switch (1755) on Control Unit Navy Type CG-23241.

WARNING

Before placing the equipment in operation close all interlocks, including switch interlocks 648 and 649 and door interlock 653.

c. To start the equipment from Control Unit Navy Type CG-23241, the following steps are followed.

(1) Place "REMOTE-LOCAL" switch (1755) in the "LOCAL" position, close "MAIN LINE" switch (654) on the rectifier panel.

(2) Close "START-STOP" switch (651). Keep this switch closed.

(3) Place the "START-STOP" switch (1756 or 1757) in the "START" position to actuate the starting contactor (672).

(Switch 1756 is a tumbler switch provided for four-wire control installations. Switch 1757 is a push button switch provided for six-wire control installations.) This energizes relay 1765, shorting out terminals "5" and "6" of terminal board 714 and completing the circuit for relay 672. The filaments of all tubes are now lit. Place the plate switch (650) in the "ON" position. The 40-second time delay relay (674) connected across the filament supply is actuated, permitting plate voltage to be applied 40 seconds after the filaments are lit. When the time delay relay closes, the coil of the plate contactor (673) is energized and a-c voltage is applied to the primaries of plate transformers 680 and 681.

(4) To stop the rectifier place switch 1756 or 1757 in the "STOP" position.

d. To start and stop the equipment from a remote four- or six-wire Navy control unit, place the "REMOTE-LOCAL" switch in the "REMOTE" position. All other steps are the same as in subparagraph *c.* preceding, except that the "START-STOP" switch of the four- or six-wire control unit is used in place of switch 1756 or 1757. Indicator lamp 1760 in Control Unit Navy Type CG-23241 warns the operator that power has been applied to the rectifier. Switch 1758 is the "EMERGENCY-STOP" switch.

e. The rectifier is protected against overloads and short circuits by the line switch and breaker (654), the bias fuse (694), the filament fuses (698 and 699), the primary fuse (697), the main-plate-rectifier high-voltage fuse (695), and the auxiliary-rectifier high-voltage fuse (696)

IMPORTANT

When changing over from one radio transmitter to another, throw the "START-STOP" switch (651) to the "STOP" position. Then throw Power Transfer Switch Navy Type CG-24094 to the proper position. If only one antenna is used, throw the antenna changeover switch to the proper position. Then close switch 651 immediately, since the time-delay relay (674) must recycle completely after any interruption of its primary circuit.

SECTION V OPERATOR'S MAINTENANCE

1. EMERGENCY AND ROUTINE INSPECTION.

Perform the scheduled checks listed in the following tables.

TABLE 5-1. — EMERGENCY SCHEDULE.

What to Check	How to Check
Interlocks.	Make certain that access doors and panels are closed. Inspect switches on panels. Make certain that they are in the "ON" position.
Switches.	
Fuses.	Inspect fuses. Refer to tables 5-3 and 5-4.

TABLE 5-2. — SCHEDULE FOR EACH WATCH.

What to Check	How to Check
Transmitter filament voltage.	Read meter on instrument panel.
Plate voltage.	Read meter on instrument panel.
Bias voltage.	Read meter on instrument panel.

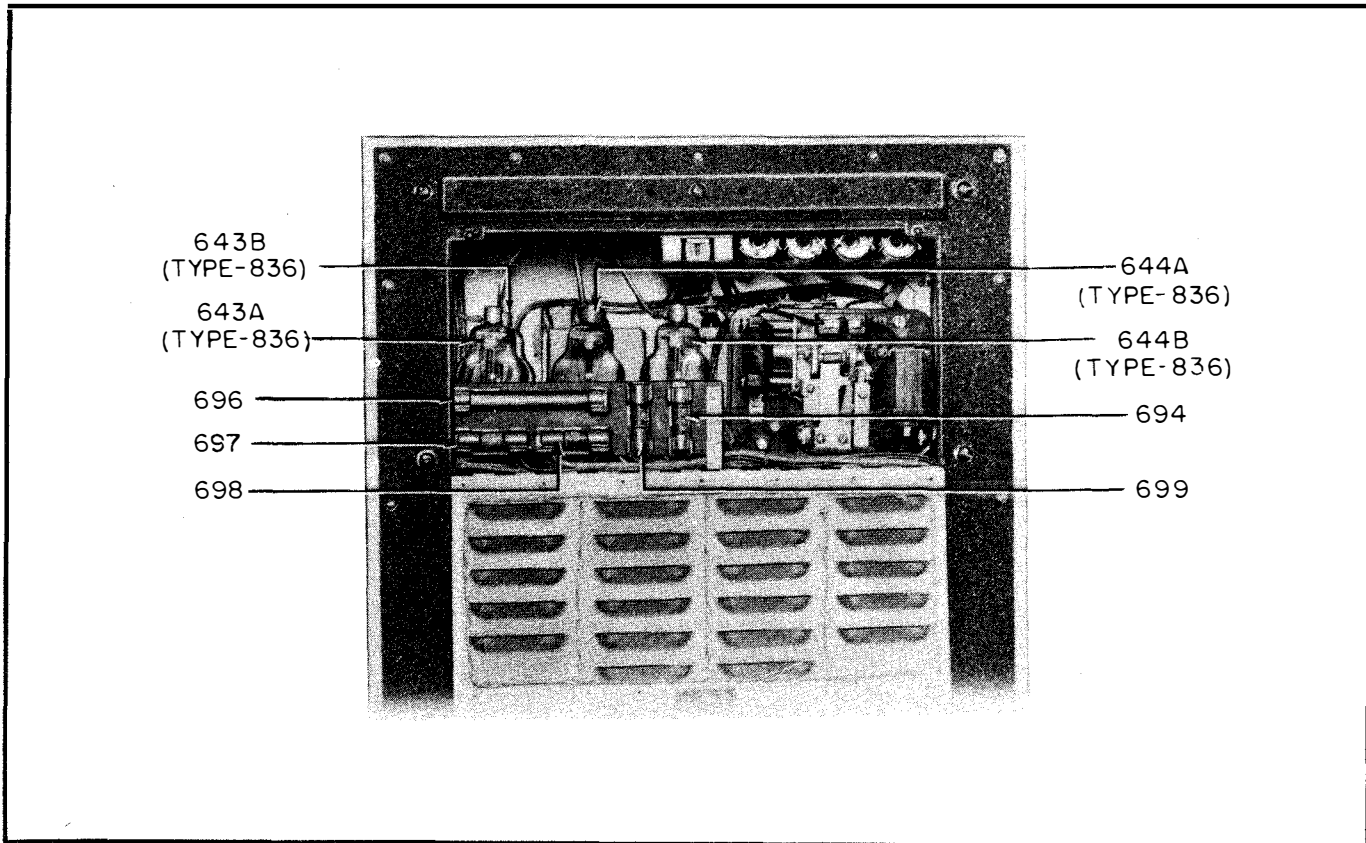


Figure 5-1. Vacuum Tube and Fuse Locations, Rectifier Navy Type CG-20122

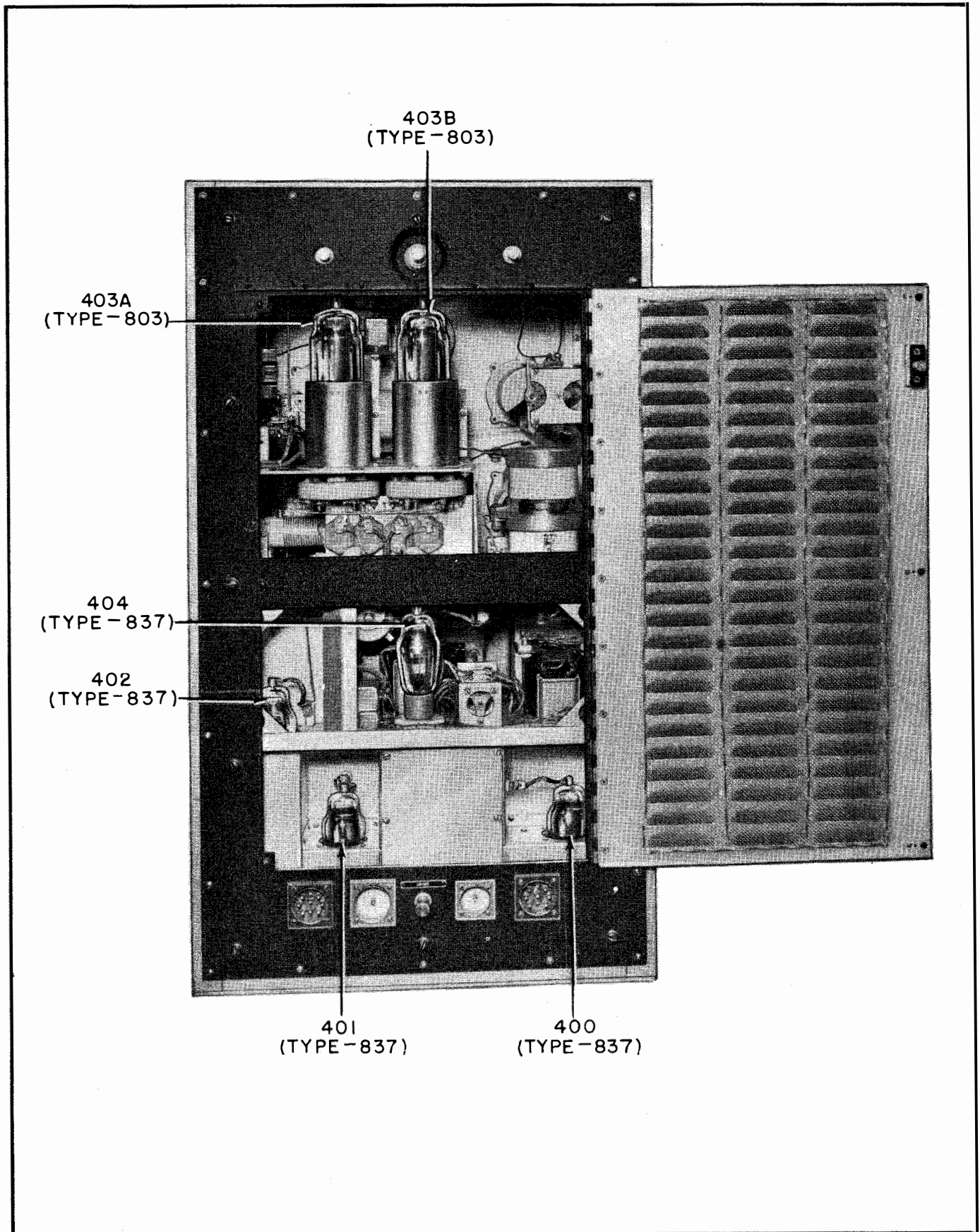


Figure 5-2. Vacuum Tube Locations, H-f Radio Transmitter Navy Type CG-52206

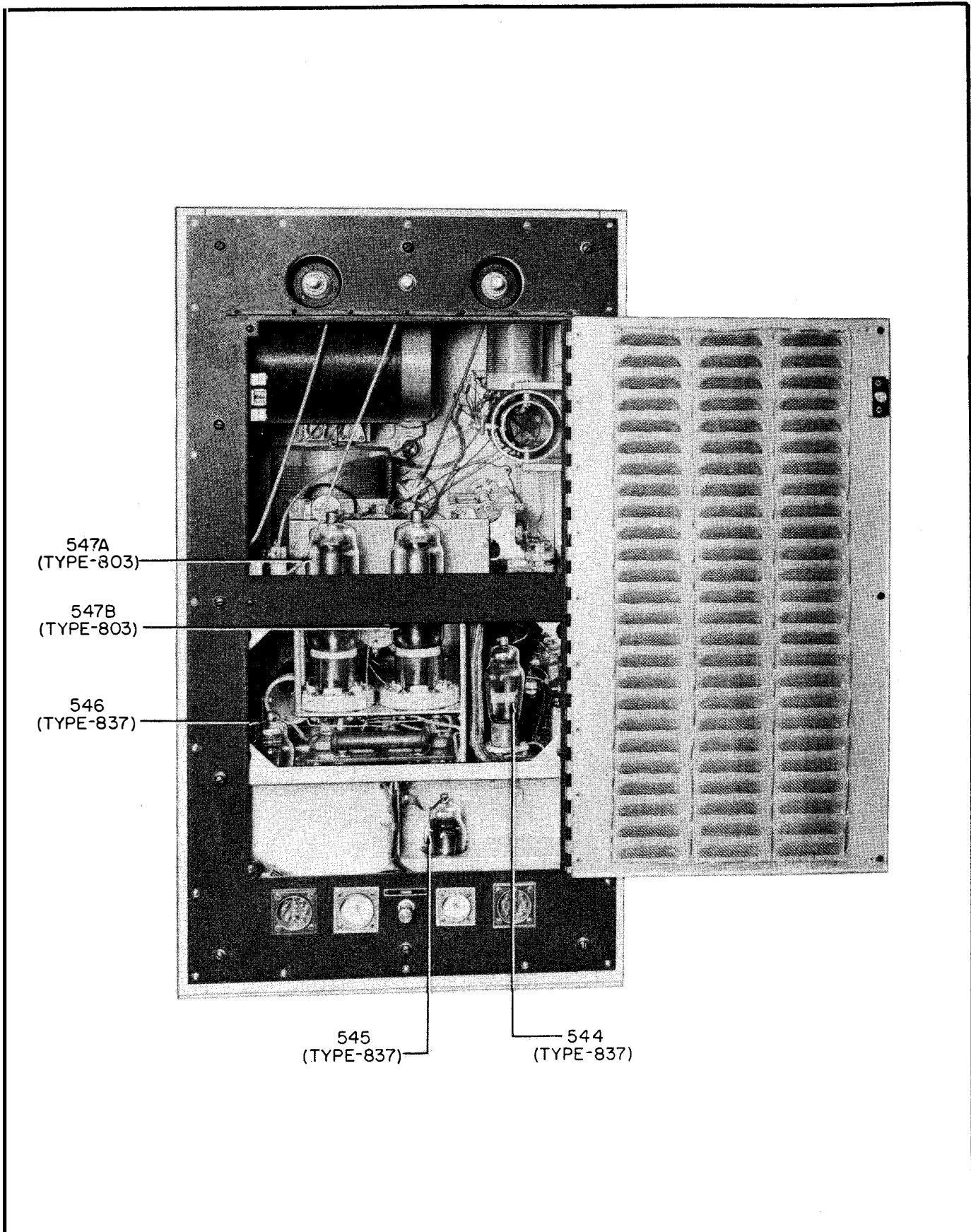


Figure 5-3. Vacuum Tube Locations, I-f Radio Transmitter Navy Type CG-52205

2. VACUUM TUBES.

a. Tube Life.—A very decided decrease in the useful life of most vacuum tubes is caused almost as much by under-voltage as by over-voltage. Operating personnel are cautioned to operate plates and filaments at exactly rated voltages unless specifically instructed otherwise.

b. Vacuum Tube Replacement.—Before replacing vacuum tubes turn off all power. Then allow a reasonable length of time to elapse before removing tubes. DO NOT attempt to remove hot tubes, since painful burns may result. Tubes are replaced through the access doors on the rear panels of the h-f radio transmitter, i-f radio

transmitter, and rectifier. Figures 5-1, 5-2, and 5-3 show types and location of vacuum tubes used in these units.

3. FUSES.

a. The following table shows the symptoms of fuse failure in the different rectifier circuits.

WARNING

Never replace a fuse with one of higher rating unless continued operation of the equipment is more important than probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause of trouble has been corrected.

TABLE 5-3. — SYMPTOMS OF FUSE FAILURE.

<i>Defective Fuse</i>	<i>Value (Amps.)</i>	<i>Rectifier Plate Voltage</i>	<i>Rectifier Filament Voltage</i>	<i>Transmitter Filament Voltage</i>	<i>Auxiliary Plate Voltage</i>	<i>Main Plate Voltage</i>	<i>Relay 674 Operative</i>	<i>Copper-Oxide Rectifier 692A Operative</i>
694	1.0	Yes	Yes	No	Yes	Yes	No	No
695	0.75	Yes	No	Yes	Yes	No	Yes	Yes
696	0.75	Yes	Yes	Yes	No	Yes	Yes	Yes
697	20.0	No	Yes	Yes	No	No	Yes	Yes
698	3.0	Yes	No	Yes	Yes	Yes	No	No
699	3.0	Yes	Yes	No	Yes	Yes	Yes	Yes

b. The following table gives the amperage, location and function of each fuse in the rectifier circuits. Refer to figure 5-1.

TABLE 5-4. — FUSE LOCATIONS.

<i>Fuse</i>	<i>Value (Amps.)</i>	<i>Location</i>	<i>Function</i>
694	1.0	Rear Top Center of Rectifier	Bias Fuse
695	0.75	Rear Top Left of Rectifier	Main Plate Rectifier H.V. Fuse
696	0.75	Rear Top Left of Rectifier	Auxiliary Rectifier Plate Fuse
697	20.0	Rear Top Left of Rectifier	Main Plate Auxiliary Plate Rectifier Primary Fuse
698	3.0	Rear Top Left of Rectifier	Rectifier Filament Fuse
699	3.0	Rear Top Center of Rectifier	Filament Transformer Fuse

SECTION VI PREVENTIVE MAINTENANCE

1. MAINTENANCE TEST SCHEDULE.

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 (OR 68) OF THE "BUREAU OF SHIPS MANUAL", OF THE LATEST ISSUE.

TABLE 6-1. — MAINTENANCE TEST SCHEDULE.

Each Watch	
What to Check	How to Check
Transmitter filament voltage.	Read meter on instrument panel.
Transmitter plate voltage.	Read meter on instrument panel.
Transmitter bias voltage.	Read meter on instrument panel.
Rectifier filament voltage.	Read meter on instrument panel.
Rectifier plate voltage.	Read meter on instrument panel.
Daily	
What to Check	How to Check
AN connectors.	For security and tightness.
External cabling.	For security and insulation.
Panels and access doors.	For tightness.
Operation of interlocks.	Remove each access door separately. Note if operating voltage cuts off as doors are removed. Replace doors and note if operating voltage is present.
Fuses.	Place all power switches in the "OFF" position. Remove the rear panel of the rectifier unit. Inspect fuses and fuse clips for tightness.
Resistors.	Remove rear panel of rectifier unit. Check resistors for security. Replace rear panel.
Exterior of equipment.	Dust, especially around the antenna posts.
Tubes.	Check ratings daily and record readings in Transmitter Log Book.
Weekly	
What to Check	How to Check
Tubes.	Compare with daily meter readings in the Transmitter Log Book. Any variations from tube ratings will be indicated by a gradual change in the plate current, with plate, filament and bias voltages constant.
Interior of equipment.	Remove rear and side panels and access doors. Inspect the interior of the equipment for security and tightness. Clean: particularly the master-oscillator air-tank capacitors, r-f inductors and all parts which operate at high potential.
Insulators.	Clean. Inspect for cracks.
Relays.	Operate equipment and check relays for proper sequence of operation. Then shut off power, remove panels and access doors, and inspect condition and clearances of relay contacts.

TABLE 6-1. — MAINTENANCE TEST SCHEDULE. (Continued)

Monthly	
What to Check	How to Check
Controls.	See that all controls function by properly operating the equipment.
Tap switches and filament rheostat.	Operate equipment with tap switch and filament rheostat in their normal operating positions. The filament voltmeter should indicate normal operating voltage for these settings.
Capacitors.	WARNING Discharge all capacitors before inspecting them. Check air capacitors for bent plates, foreign particles between plates, and alignment of shafts. Inspect leads for security and tightness.
Insulation.	Check all insulation for tightness, security and chipping.
Lubrication.	Refer to this section, paragraph 2.

2. LUBRICATION DATA.

TABLE 6-2. — LUBRICATION CHART.

<i>Period</i>	<i>Part</i>	<i>Location</i>	<i>Lubricant</i>
Monthly	Tuning control bearings.	Tuning Control Shafts.	Navy Spec. 5065
Monthly	Ball bearings.	Transmitter keying relay armature shaft.	Navy Spec. 5065

FAILURE REPORTS

A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as 358, in the case of a transformer, or 281, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from any Electronics Officer.

NAVSHIPS (NBS) 383A

NAVY DEPARTMENT
BUREAU OF SHIPS
WASHINGTON, D. C.
OFFICIAL BUSINESS

NAVY DEPARTMENT
BUREAU OF SHIPS
ELECTRONIC DIVISION, CODE 980
WASHINGTON 25, D. C.

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, \$300

FAILURE REPORT—ELECTRONIC EQUIPMENT

NOTE: Attach photo on separate slip. Add drawings (showing failed part) and schematic drawings (showing location of failed part) to back of report.

NAME OF SHIP: *USS Benning* DATE: *27 Nov 1944*

NAME OF OFFICER IN CHARGE: *J. D. Benning*

ELECTRONIC EQUIPMENT INVOLVED: *RCR*

CHECK ONE: RADIO RADAR SONAR OTHER

EQUIPMENT MODEL IDENTIFICATION: *RCR-2*

TYPE NUMBER AND NAME OF SHIP EQUIPMENT INVOLVED: *CRV-23338*

THIS SIDE FOR FLIES

ITEM WHICH FAILED: *Resistor*

DATE OF FAILURE: *18-2-40*

TIME OF FAILURE: *10-2-40*

CAUSE OF FAILURE: *due to short circuit at the lead light socket. A poorly soldered connection allowed wires to work together due to the vibration of the ship.*

REMARKS (Continued)

Previous instructions pertaining to the preparation and submission of reports are being amended to conform to current procedures.

Report form shall be used to report immediately all failures (whatever the cause) of electronic equipment parts (fuses and components of Ship's Code 980, Washington 25, D. C.). No copies are required, but in the case of improvements to design, and for contractual action, report is to indicate the cause and rate of failure, it will form the basis for improvements to design, and for contractual action.

Adjustments of contractual orders will be made between authorized representatives of the Bureau and the ship.

When replacement is required, it must be ordered from your Tender, Supply Depot, Supply Officer, or Radio Material Designer.

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Figure 7-0. Sample Failure Report Cards Properly Filled In

SECTION VII

CORRECTIVE MAINTENANCE

1. FAILURE REPORT.

(See figure 7-0.)

2. GENERAL.

ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK. Replace defective tubes and adjust contacts of relays and contactors through the access doors in the rear shields of the radio transmitters and rectifier. Accomplish additional necessary servicing and repairs to any unit by removing the chassis from the case.

Inspect radio transmitters and rectifier periodically to verify that all parts are operating properly. (Refer to section VI.) Dust all parts of the radio transmitters, particularly the master-oscillator air-tank capacitors and other parts which operate at high potential. See that connections are secure at all times.

3. TROUBLE SHOOTING.

The following table lists the most frequent symptoms of trouble, their probable causes and remedies.

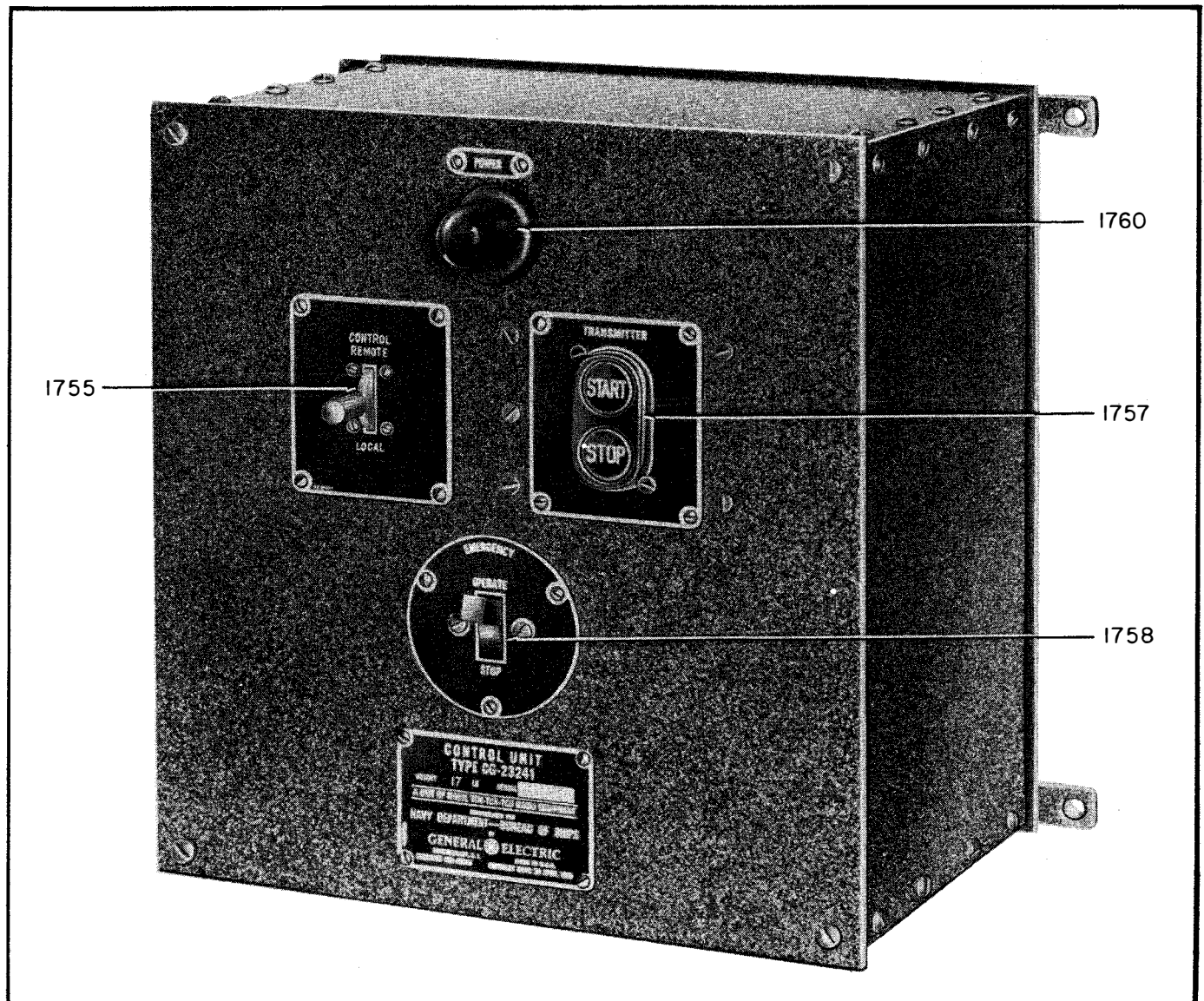


Figure 7-1. Control Unit Navy Type CG-23241, Front View

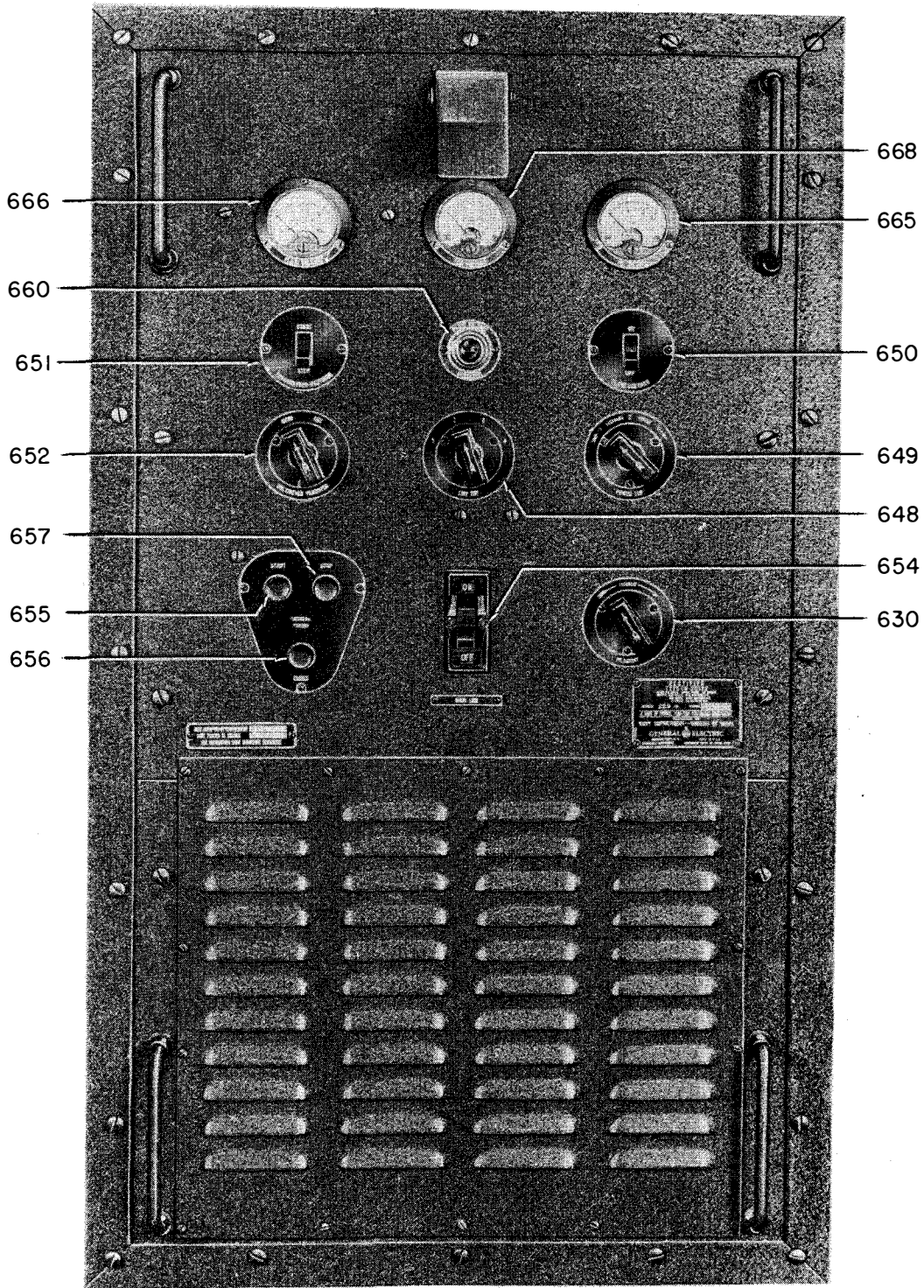


Figure 7-2. Rectifier Navy Type CG-2012, Front View

TABLE 7-1. — TROUBLE SHOOTING CHART.

Symptom	Probable Cause	Remedy
1. Starting contactor (672) does not close when control unit "START-STOP" switch (1757, figure 7-1) is placed in the "START" position.	1a. Line switch (654, figure 7-2) or "START-STOP" switch (651) not closed.	1a. Close line and "START-STOP" switches.
	1b. Line circuit breaker in line switch (654, figure 7-2) open due to overload or short circuit.	1b. Throw switch handle from the middle position to the "OFF" position and then to the "ON" position.
	1c. A-c line to rectifier not connected. In this case line voltmeter (668, figure 7-2) will show no reading.	1c. Connect a-c line to rectifier. Inspect connections.
	1d. A-c line to control unit not connected.	1d. Connect line to control unit.
	1e. "EMERGENCY - STOP" switch (1758, figure 7-1) in "STOP" position.	1e. Place switch in "OPERATE" position.
	1f. "REMOTE-LOCAL" switch in "LOCAL" position.	1f. Place switch in "REMOTE" position.
	1g. Links C-A or F-G not correctly positioned for type of control unit used.	1g. Place links C-A or F-G in correct positions.
2. Starting contactor (672) remains closed when remote control "START-STOP" switch (1757, figure 7-1) is placed in the "STOP" position.	2. Link not removed between terminals "5" and "6" on rectifier terminal board (714, figure 7-6).	2. Remove link.
3. No filament voltage on rectifier tubes.	3a. Filament fuse (698, figure 7-6) open.	3a. Replace this fuse.
	3b. Filament rheostat (630, figure 7-2) open.	3b. Place rheostat in correct position. Repair or replace defective rheostat.
4. Rectifier filament voltage cannot be adjusted to correct value (6.3 volts on voltmeter 665, figure 7-2) by means of filament rheostat (630).	4. Line tap switch (648, figure 7-2) not set to correct position for available line voltage.	4. Reset line tap switch to correct position.
5. No filament voltage in transmitter tubes.	5a. Filament fuse (669, figure 7-6) open.	5a. Replace this fuse.
	5b. Filament rheostat of h-f transmitter (288, figure 7-10) for filament rheostat of if transmitter (515, fig. 7-17) open.	5b. Place rheostat (s) in operating position. Repair or replace defective filament rheostat (s).
6. No auxiliary plate voltage.	6a. Defective rectifier tube (s) (644, figure 7-6).	6a. Replace defective tube (s).
	6b. Plate contactor (673, figure 7-6) failed to close.	6b. Tighten contactor connections. Replace contactor, if necessary.

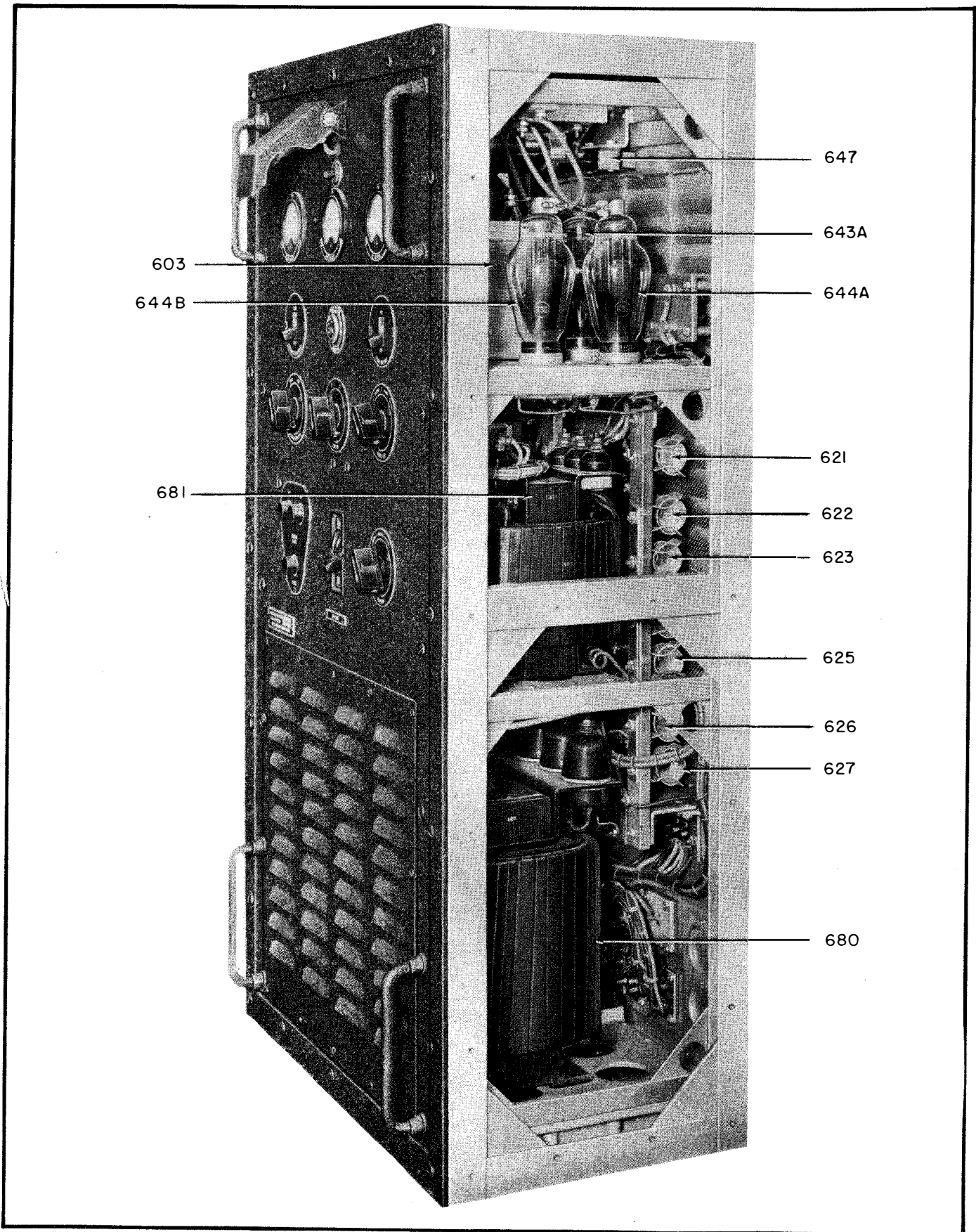


Figure 7-3. Rectifier Navy Type CG-20122, Front Right Oblique View

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	6c. Time-delay relay (674, figure 7-6) failed to close.	6c. Tighten time-delay relay connections. Repair or replace time-delay relay, if necessary.
	6d. Door interlock (653, figure 7-6) open.	6d. Repair or replace defective door interlocks.
	6e. Interlock switch (648) or (649) open. (See figures 7-2 and 7-6).	6e. Repair or replace defective switch.
	6f. Plate switch (650, figure 7-2) open.	6f. Place switch in "ON" position. Tighten switch connections. Replace switch, if necessary.
	6g. Plate rectifier fuse (697, figure 7-6) open.	6g. Replace this fuse.
	6h. Auxiliary plate fuse (696, figure 7-6) open.	6h. Replace this fuse.
7. No main plate voltage.	7a. Defective rectifier tube (s) (643, figure 7-6).	7a. Replace defective tube or tubes.
	7b. Plate contactor (673, figure 7-6) failed to close.	7b. Tighten contactor connections. Replace contactor, if necessary.
	7c. Time-delay relay (674, figure 7-6) failed to close.	7c. Tighten time-delay relay connections. Replace time-delay relay, if necessary.
	7d. Door interlock (653, figure 7-6) open.	7d. Close door tightly. Repair or replace door interlock.
	7e. Interlock switch (648) or (649) open. (See figures 7-2 and 7-6).	7e. Repair or replace defective switch.
	7f. Plate switch (650, figure 7-2) open.	7f. Place switch in "ON" position. Tighten connections. Replace switch, if necessary.
	7g. Plate rectifier fuse (697, figure 7-6) open.	7g. Replace this fuse.
	7h. Main plate fuse (695, figure 7-7) open.	7h. Replace this fuse.
8. Auxiliary plate voltage less than 475 or more than 500 volts (key-down, full-load condition).	8a. Defective rectifier tube (s) (644, figures 7-6 and 7-7).	8a. Replace defective tube (s).
	8b. Line tap switch (648, figure 7-2) not in correct position for existing line voltage.	8b. Reset line tap switch to correct position.
9. Main plate voltage less than 1240 or more than 1350 volts (key-down, full-load condition).	9a. Defective rectifier tube (s) (643, figures 7-6, 7-7, and 7-8).	9a. Replace defective tube (s).
	9b. Line tap switch (648, figure 7-2) not in correct position for existing line voltage.	9b. Reset line tap switch to correct position.

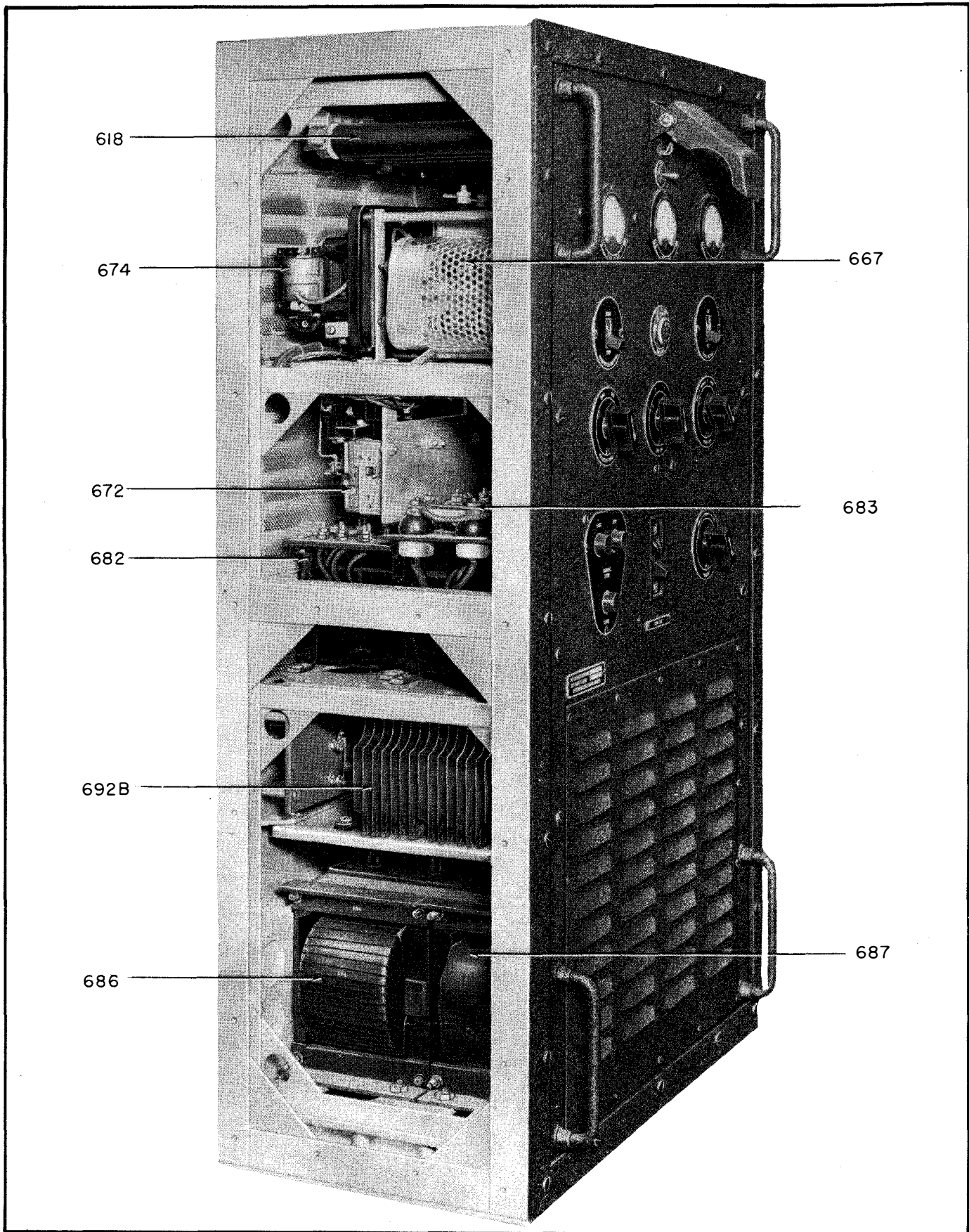


Figure 7-4. Rectifier Navy Type CG-20122, Front Left Oblique View

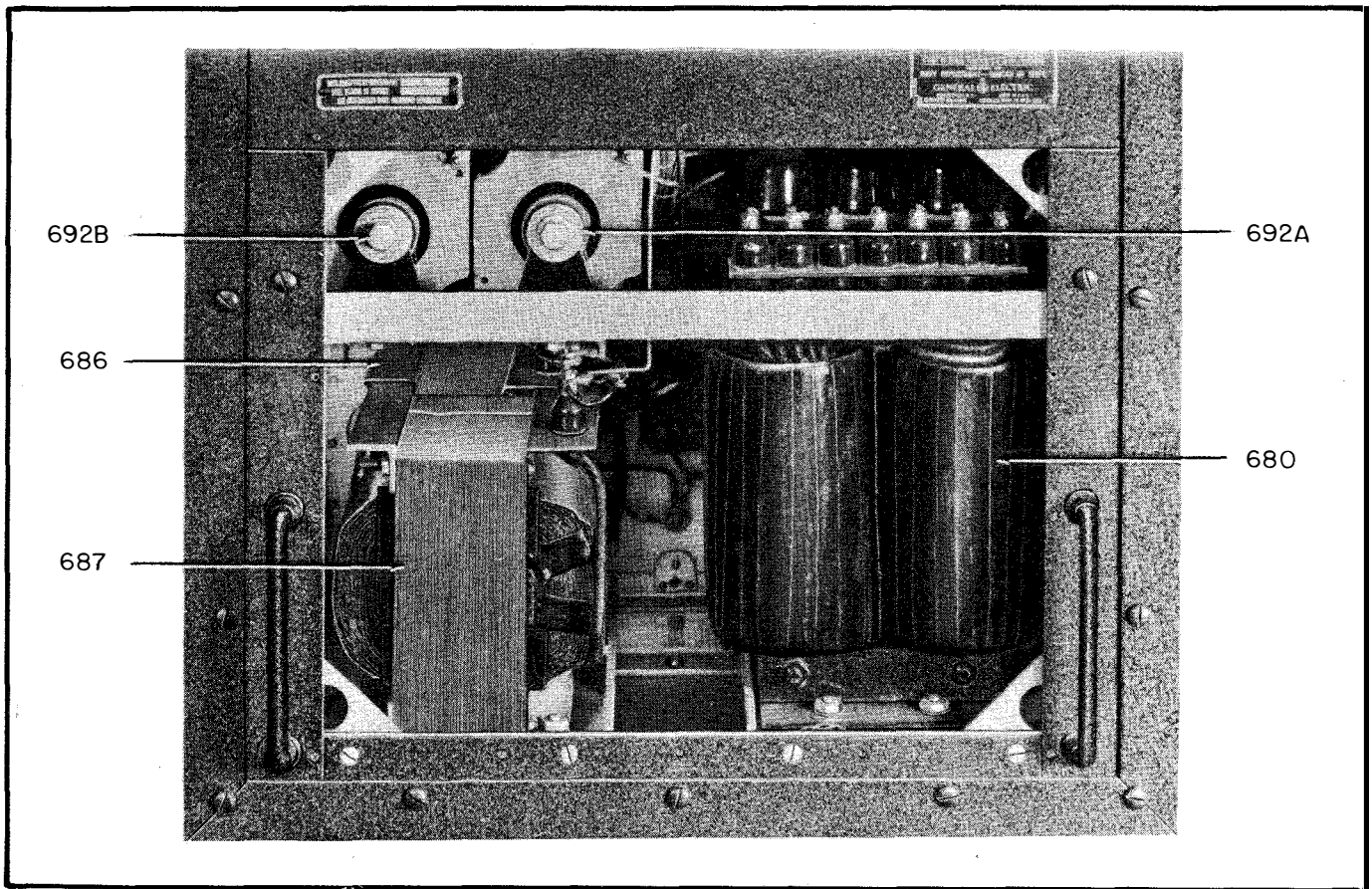


Figure 7-5. Rectifier Navy Type CG-20122, Front View with Transformer Access Cover Removed

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	9c. "POWER-TAP" switch (649, figure 7-2) not set on tap "3".	9c. Set "POWER-TAP" switch on tap "3".
10. Keying relay of h-f transmitter (387, figures 7-11 and 7-13) or keying relay of i-f transmitter (577, figures 7-18, 7-20, and 7-22) does not function properly.	10a. Relay not adjusted. 10b. Output voltage of copper-oxide rectifier unit (692, figures 7-4 and 7-5) low due to aging.	10a. Readjust relay. 10b. Shift to next higher secondary tap on transformer (682, figure 7-6), so that d-c output of rectifier measures approximately 55 volts. If highest tap is used and 55 volts is not obtained replace copper-oxide rectifier.
	10c. Interlock contacts on p-a band-change switch (380, figure 7-10) of h-f transmitter or interlock contacts on p-a band-change switch (551, figures 7-17 and 7-22) of i-f transmitter not closed properly.	10c. Correct condition preventing proper closure of contacts.

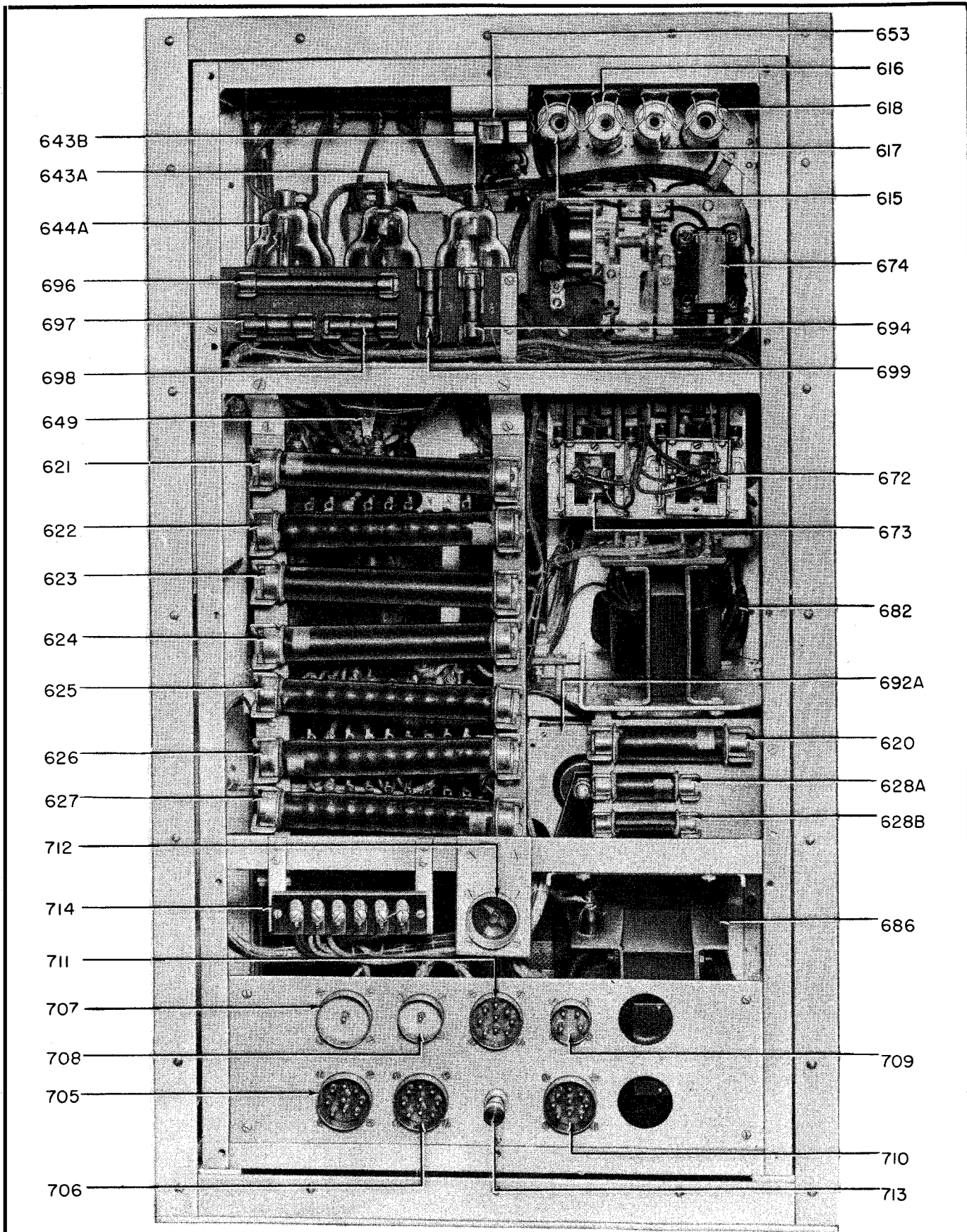


Figure 7-6. Rectifier Navy Type CG-2012, Rear View

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	10d. Interlock contacts on coupling switch (552, figures 7-17 and 7-20) not closed properly (applies only to i-f radio transmitter).	10d. Determine and correct condition preventing proper closure of contacts.
	10e. Interlock contacts on antenna tap switch (553, figure 7-17) not closed properly (applies only to i-f radio transmitter).	10e. Determine and correct condition preventing proper closure of contacts.
	10f. Defective copper-oxide rectifier (692, figures 7-4 and 7-5).	10f. Replace defective copper-oxide rectifier.
11. M-o stage h-f radio transmitter does not tune properly.	11a. Defective m-o tube (400, figure 7-13).	11a. Replace defective tube.
	11b. Contacts of m-o band-change switch (375, figure 7-10) require adjustment or cleaning.	11b. Clean and adjust these contacts.
	11c. M-o tuning capacitor (200, figure 7-10) defective due to bent plates or collection of dust and foreign matter between plates.	11c. Replace m-o tuning capacitors.
	11d. M-o calibration capacitor (203, figure 7-10) defective due to bent plates or collection of dust and foreign matter between plates.	11d. Replace m-o calibration capacitor.
12. First i-p-a stage of h-f transmitter does not tune properly.	12a. Defective first i-p-a tube (401, figure 7-13).	12a. Replace tube.
	12b. Contacts of first i-p-a grid band-change switch (376, figure 7-10) require adjustment or cleaning.	12b. Clean and adjust these contacts.
	12c. First i-p-a grid band-change switch (376, figure 7-10) not in correct position for desired operating frequency.	12c. Set switch in correct position.
	12d. Contacts of first i-p-a plate band-change switch (377, figure 7-10) require adjustment or cleaning.	12d. Clean and adjust these contacts.
	12e. First i-p-a plate band-change switch (377, figure 7-10) not in correct position for desired operating frequency.	12e. Set switch in correct position.
	12f. First i-p-a tuning capacitor (217, figures 7-10 and 7-14) defective due to bent plates or collection of dust and foreign matter between plates.	12f. Replace this capacitor.

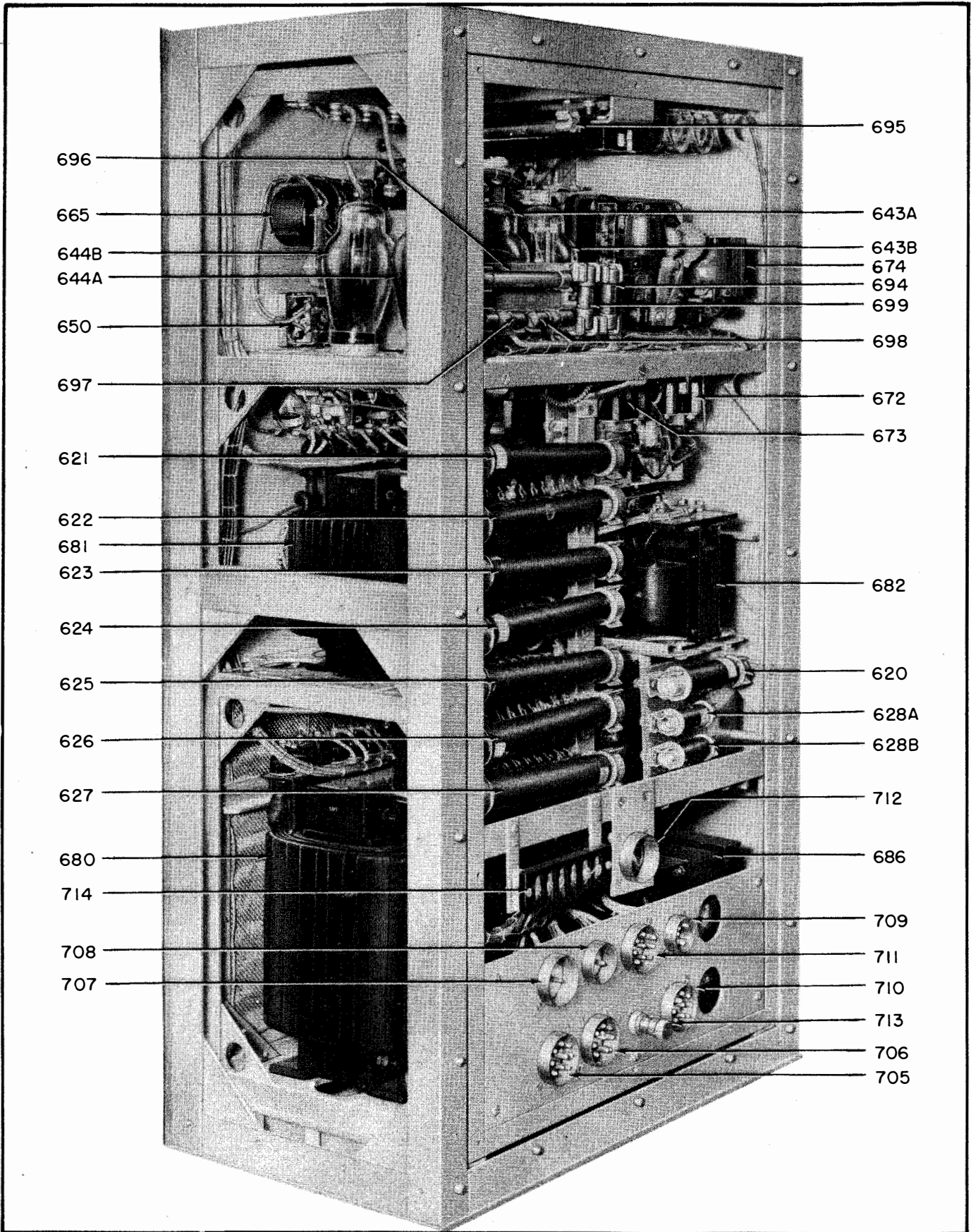


Figure 7-7. Rectifier Navy Type CG-20122, Rear Right Oblique View

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	12g. Defective m-o plate milliammeter (340, figure 7-10).	12g. Inspect for loose or improper external connections. Replace defective meter (340).
	12h. Defective first i-p-a plate milliammeter (341, figure 7-10).	12h. Inspect for loose or improper external connections. Replace defective meter (341).
13. Second i-p-a stage of h-f radio transmitter does not tune properly.	13a. Defective second i-p-a tube (402, figures 7-13 and 7-15.)	13a. Replace tube.
	13b. Contacts of second i-p-a band-change switch (380, figure 7-10) require adjustment or cleaning.	13b. Clean and adjust contacts.
	13c. Second i-p-a band-change switch (380, figure 7-10) not in correct position for desired operating frequency.	13c. Set switch in correct position.
	13d. Second i-p-a tuning inductor (304, figures 7-10, 7-11, and 7-14) defective due to accumulation of dust and foreign matter at moving contact points.	13d. Clean moving contacts with carbon tetrachloride or equivalent.
	13e. Defective second i-p-a plate milliammeter (342, figure 710).	13e. Inspect for loose or improper external connections. Replace defective meter (342).
14. P-a stage h-f radio transmitter does not tune properly.	14a. Defective p-a tube (s) (403, figures 7-11, 7-12, 7-13, 7-14, and 7-15).	14a. Replace defective p-a tube(s).
	14b. Contacts of p-a band-change switch (380, figure 7-10) require adjustment or cleaning.	14b. Clean and adjust contacts.
	14c. P-a band-change switch (380, figure 7-10) not in correct position for desired operating frequency.	14c. Set switch in correct position.
	14d. P-a tuning inductor (306, figures 7-10, 7-12, and 7-15) defective, due to accumulation of dust and foreign matter at moving contact points.	14d. Clean moving contact points with carbon tetrachloride or equivalent.
	14e. Defective p-a grid milliammeter (345, figure 7-10).	14e. Inspect for loose or improper external connections. Replace defective meter (345).
	14f. Defective p-a plate milliammeter (343, figure 7-10).	14f. Inspect for loose or improper external connections. Replace defective meter (343).
15. Antenna stage of h-f radio transmitter does not tune properly.	15a. Output inductor (307, figures 7-10, 7-12, and 7-15) defective, due to accumulation of dust and foreign matter at moving contact points.	15a. Clean moving contact points with carbon tetrachloride or equivalent.

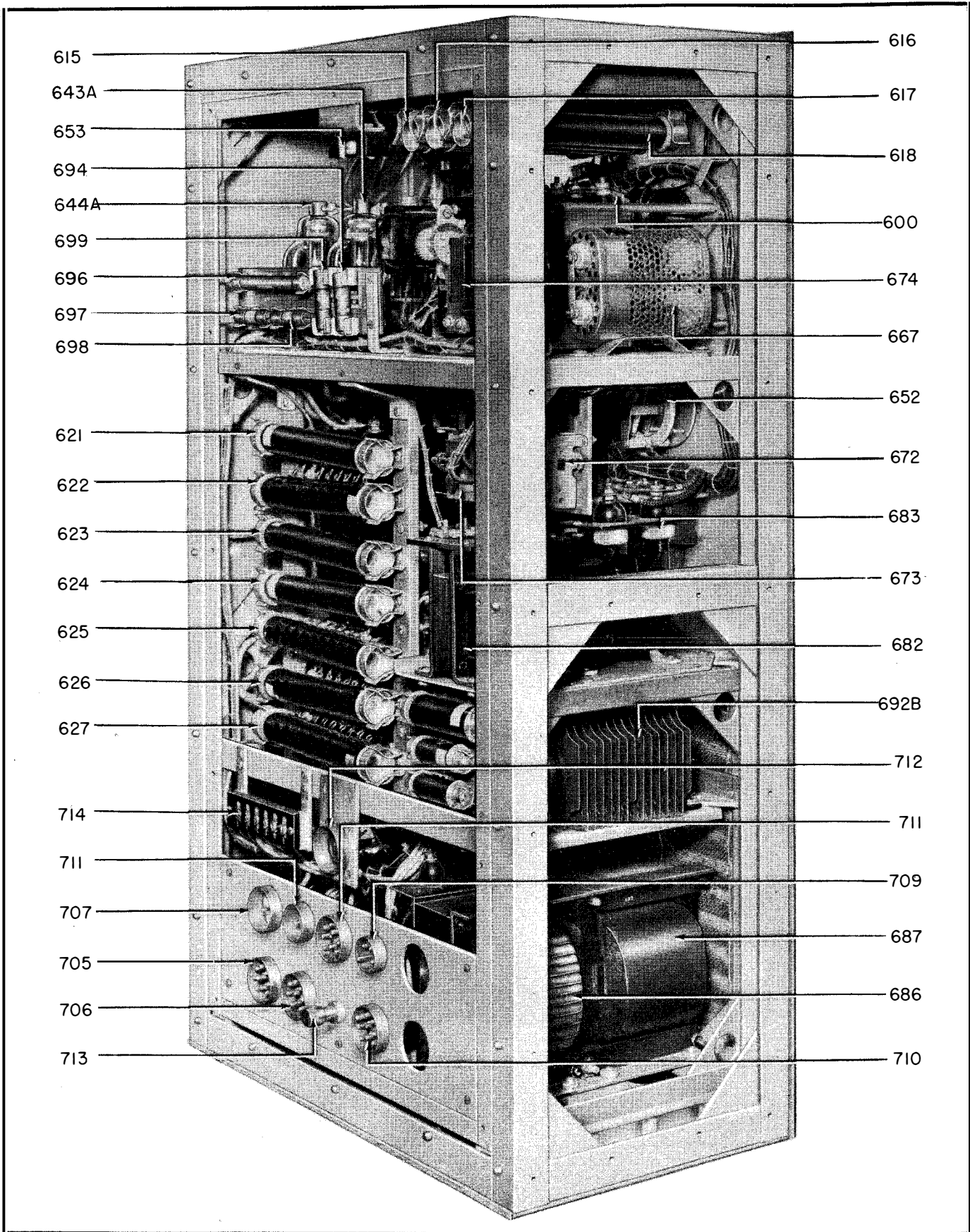


Figure 7-8. Rectifier Navy Type CG-20122, Rear Left Oblique View

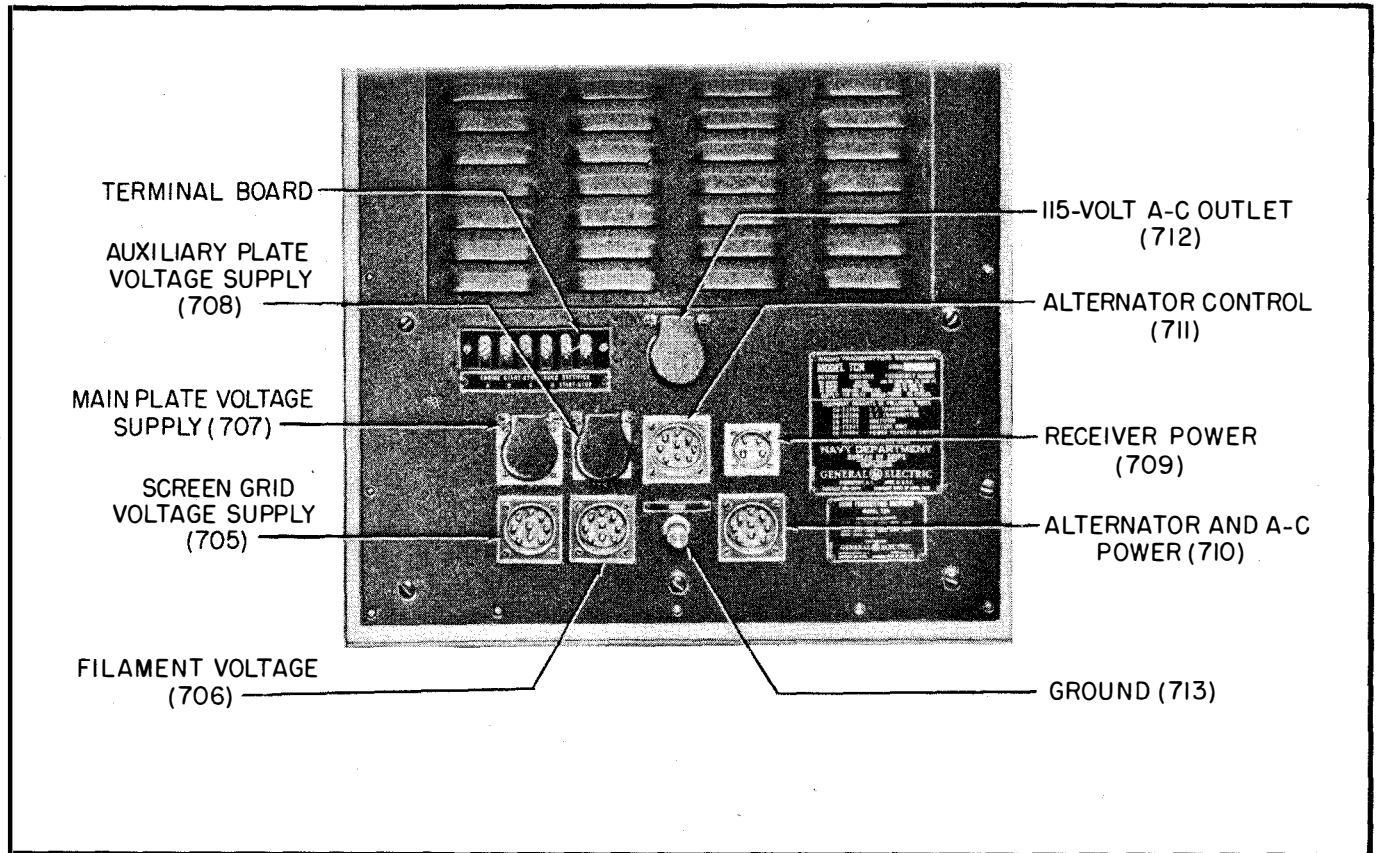


Figure 7-9. Rectifier Navy Type CG-20122, Rear View with Tube, Fuse, and Terminal Board Shown

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	15b. Output capacitor (237, figures 7-10, 7-12, 7-13, and 7-15) defective, due to bent plates or collection of dust and foreign matter between plates.	15b. Replace defective capacitor.
	15c. Antenna inductor (308, figures 7-10, 7-11, and 7-14) defective, due to bent plates or collection of dust and foreign matter between plates.	15c. Replace defective inductor.
	15d. Antenna capacitor (238, figures 7-10, 7-11, 7-13, and 7-14) defective, due to bent plates or collection of dust and foreign matter between plates.	15d. Replace defective capacitor.
	15e. Antenna contacts of keying relay (387, figures 7-11, 7-13, 7-14, and 7-15) not functioning properly.	15e. Refer to section VII, paragraph 5, for adjustment procedure.

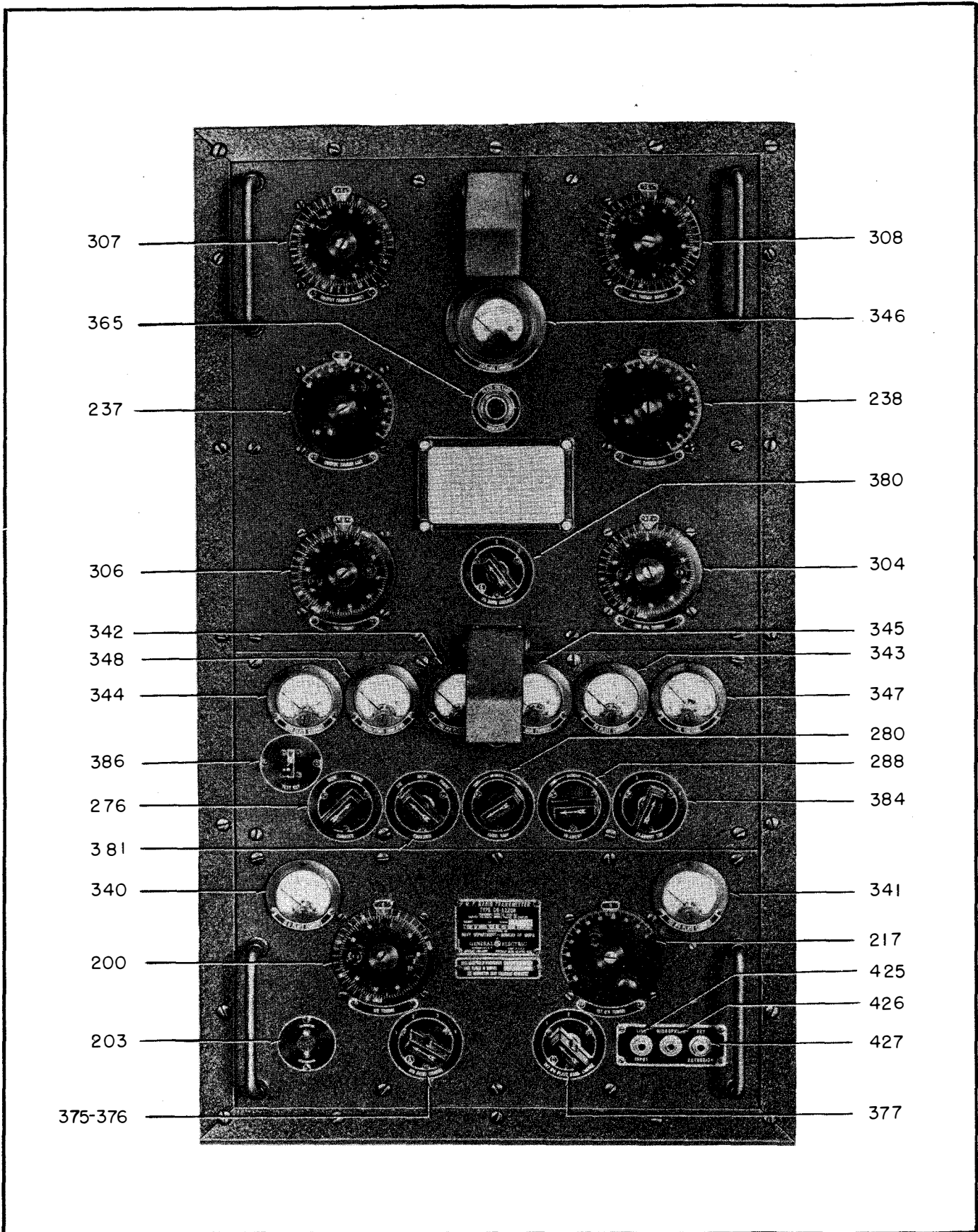


Figure 7-10. H-f Radio Transmitter Navy Type CG-52206, Front View

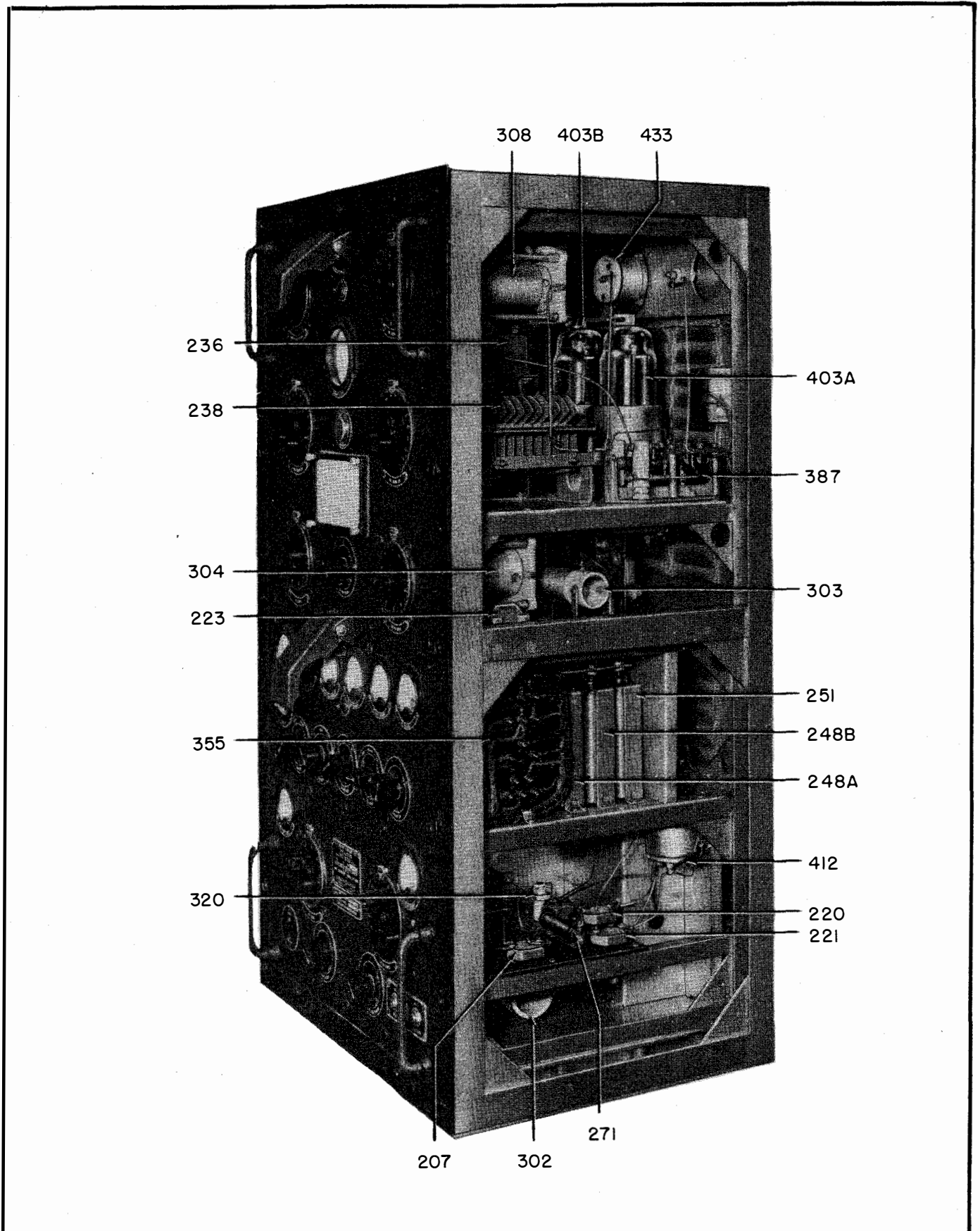


Figure 7-11. H-f Radio Transmitter Navy Type CG-52206, Front Right Oblique View

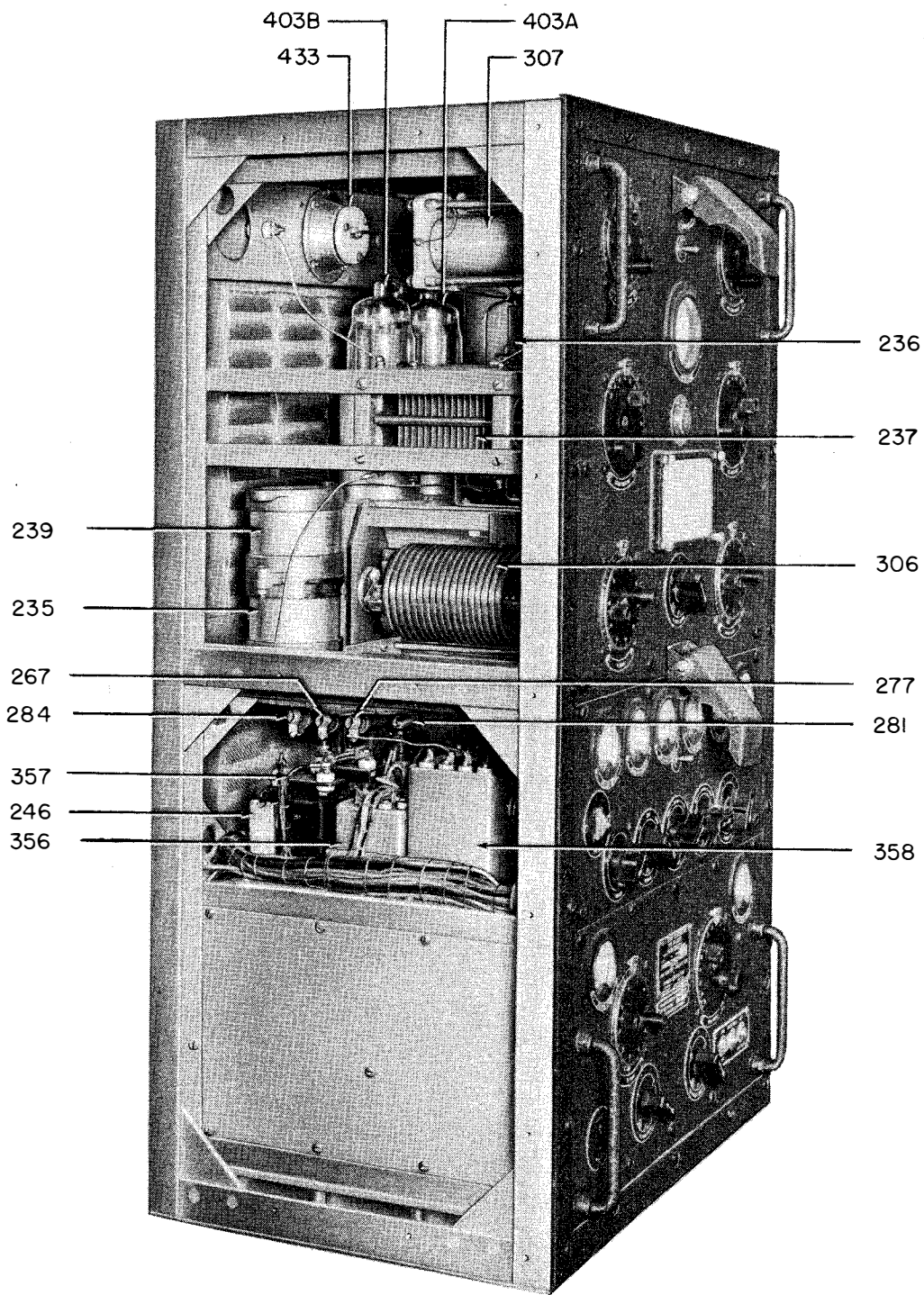


Figure 7-12. H-f Radio Transmitter Navy Type CG-52206, Front Left Oblique View

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	15f. Antenna system open-circuited, short-circuited, or grounded.	15f. Inspect antenna system and correct faulty condition.
	15g. Antenna ammeter (346, figure 7-10) defective.	15g. Inspect for loose or improper external connections. Replace defective ammeter (346).
16. H-f radio transmitter fails to modulate properly on MCW or Phone.	16a. Modulator tube (404, figures 7-13, 7-14, and 7-15) defective.	16a. Replace tube.
	16b. Contacts of emission switch (381, figures 7-10, 7-13, 7-14, and 7-15) require adjustment or cleaning.	16b. Clean and adjust contacts.
	16c. Microphone jack (426, figure 7-10) defective.	16c. Clean and adjust. Replace if defective.
	16d. Carrier control (276, figures 7-10 and 7-15) incorrectly set, or moving contact dirty, out of adjustment, or defective.	16d. Set carrier control correctly. Clean and adjust moving contact, or replace if defective.
	16e. Audio gain control (280, figure 7-10) incorrectly set, or moving contact dirty, out of adjustment, or defective.	16e. Set audio gain control correctly. Clean and adjust moving contact, or replace if defective.
	16f. Modulation indicator meter (348, figure 7-10) defective.	16f. Inspect for loose or improper external connections. Replace defective meter (348).
	16g. Modulator plate milliammeter (344, figure 7-10) defective.	16g. Inspect for loose or improper external connections. Replace defective meter (344).
17. M-o stage of i-f radio transmitter does not tune properly.	17a. M-o tube (545, figures 7-21 and 7-22) defective.	17a. Replace defective tube.
	17b. Contacts of m-o band-change switch (548, figure 7-17) require adjustment or cleaning.	17b. Clean and adjust contacts.
	17c. M-o tuning capacitor (450, figures 7-17, 7-19, and 7-22) defective, due to bent plates or collection of dust and foreign matter between plates.	17c. Replace defective capacitor.
	17d. M-o calibration capacitor (453, figure 7-22) defective.	17d. Replace defective capacitor.
18. I-p-a stage of i-f radio transmitter does not tune properly.	18a. I-p-a tube (546, figure 7-18) defective.	18a. Replace defective tube.
	18b. Contacts of i-p-a grid band-change switch (549, figure 7-17) require cleaning or adjustment.	18b. Clean and adjust contacts.
	18c. I-p-a grid band-change switch (549, figure 7-17) not in correct position for desired operating frequency.	18c. Place switch in correct position.

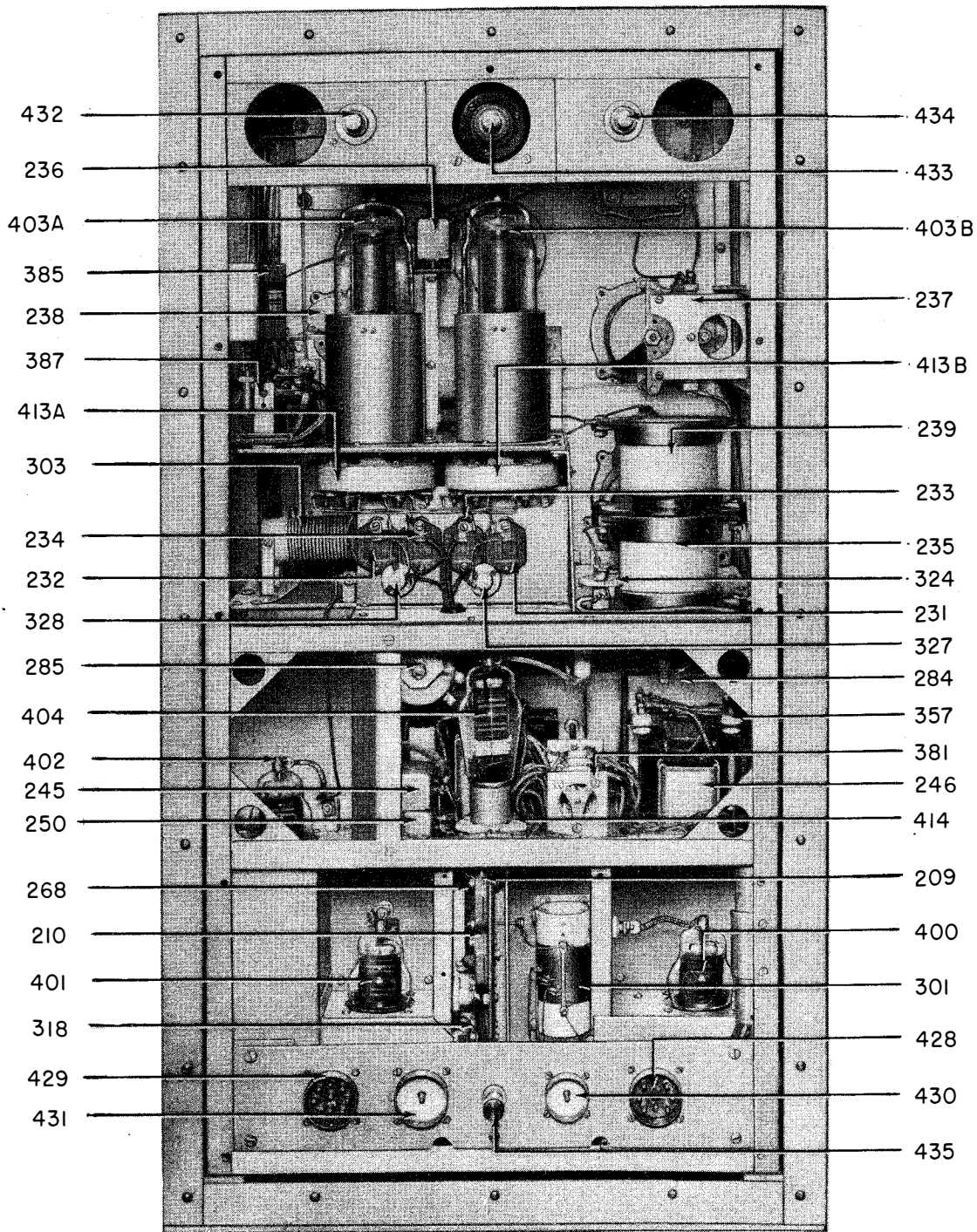


Figure 7-13. H-f Radio Transmitter Navy Type CG-52206, Rear View

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
	18d. I-p-a grid tuning capacitor (460, figures 7-18 and 7-21) defective, due to bent plates or collection of dust and foreign matter between plates.	18d. Replace defective capacitor.
	18e. Contacts of i-p-a plate band-change switch (550, figures 7-17 and 7-21) require adjustment or cleaning.	18e. Clean and adjust contacts.
	18f. I-p-a plate band-change switch (550, figure 7-17) not in correct position for desired operating frequency.	18f. Set switch in correct position.
	18g. I-p-a plate tuning capacitor (468, figures 7-17 and 7-18) defective, due to bent plates or collection of dust and foreign matter between plates.	18g. Replace defective capacitor.
	18h. I-p-a grid milliammeter (568, figure 7-17) defective.	18h. Inspect for loose or improper external connections. Replace defective meter (568).
	18i. I-p-a plate milliammeter (569, figure 7-17) defective.	18i. Inspect for loose or improper external connections. Replace defective meter (569).
19. P-a stage of i-f radio transmitter does not tune properly.	19a. P-a tube(s) (547, figures 7-18, 7-20, 7-21, and 7-22) defective.	19a. Replace defective tube(s).
	19b. Contacts of p-a band-change switch (551, figures 7-17 and 7-22) require cleaning or adjustment.	19b. Clean and adjust contacts.
	19c. P-a band-change switch (551, figure 7-17) not in correct position for desired operating frequency.	19c. Set switch in correct position.
	19d. P-a tuning capacitor (495, figures 7-17, 7-19, 7-20, 7-21, and 7-22) defective, due to bent plates or collection of dust and foreign matter between plates.	19d. Replace defective capacitor.
	19e. P-a grid milliammeter (570, figure 7-17) defective.	19e. Inspect for loose or improper external connections. Replace defective meter (570).
	19f. P-a plate milliammeter (571, figure 7-17) defective.	19f. Inspect for loose or improper external connections. Replace defective meter (571).

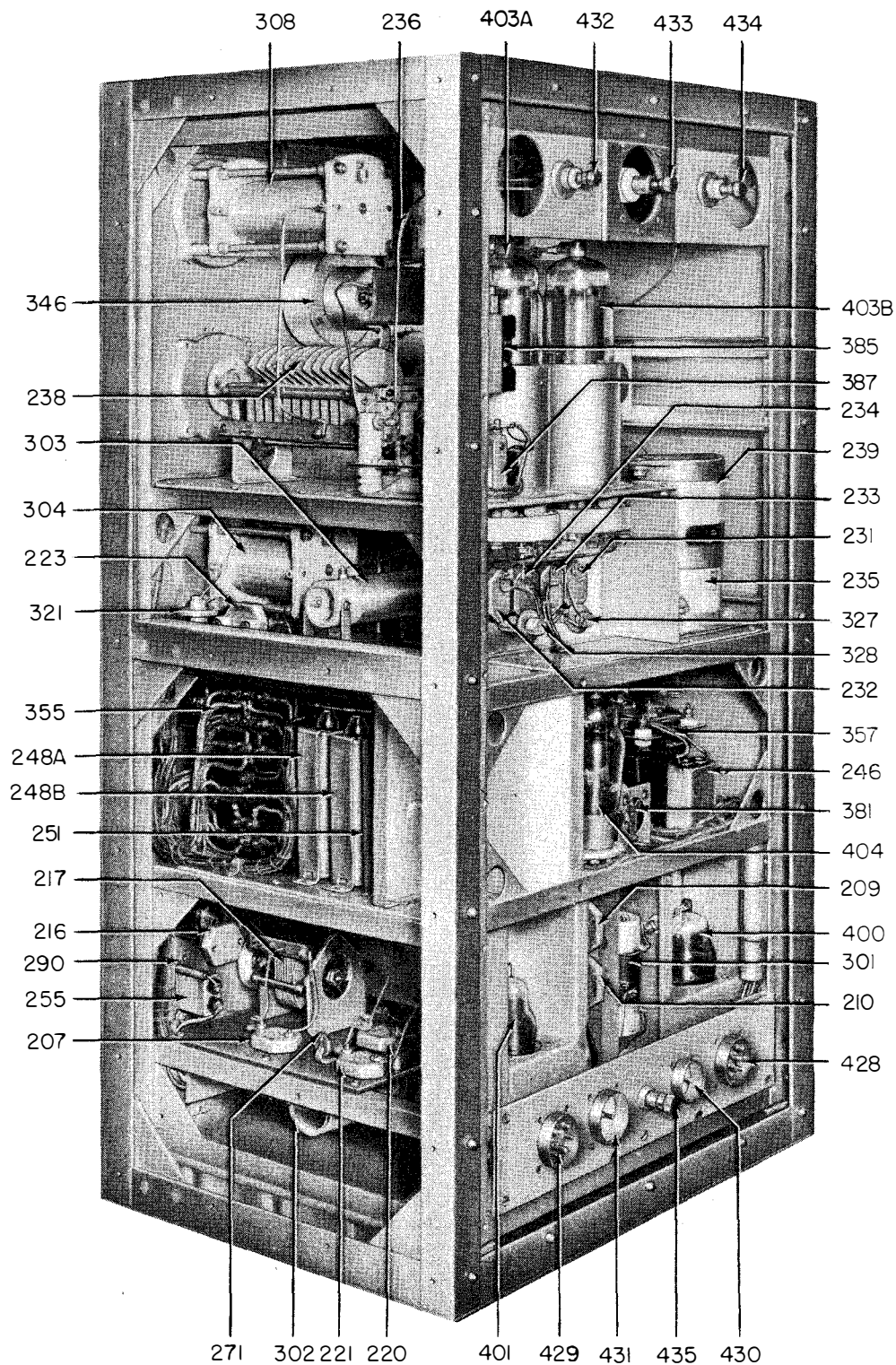
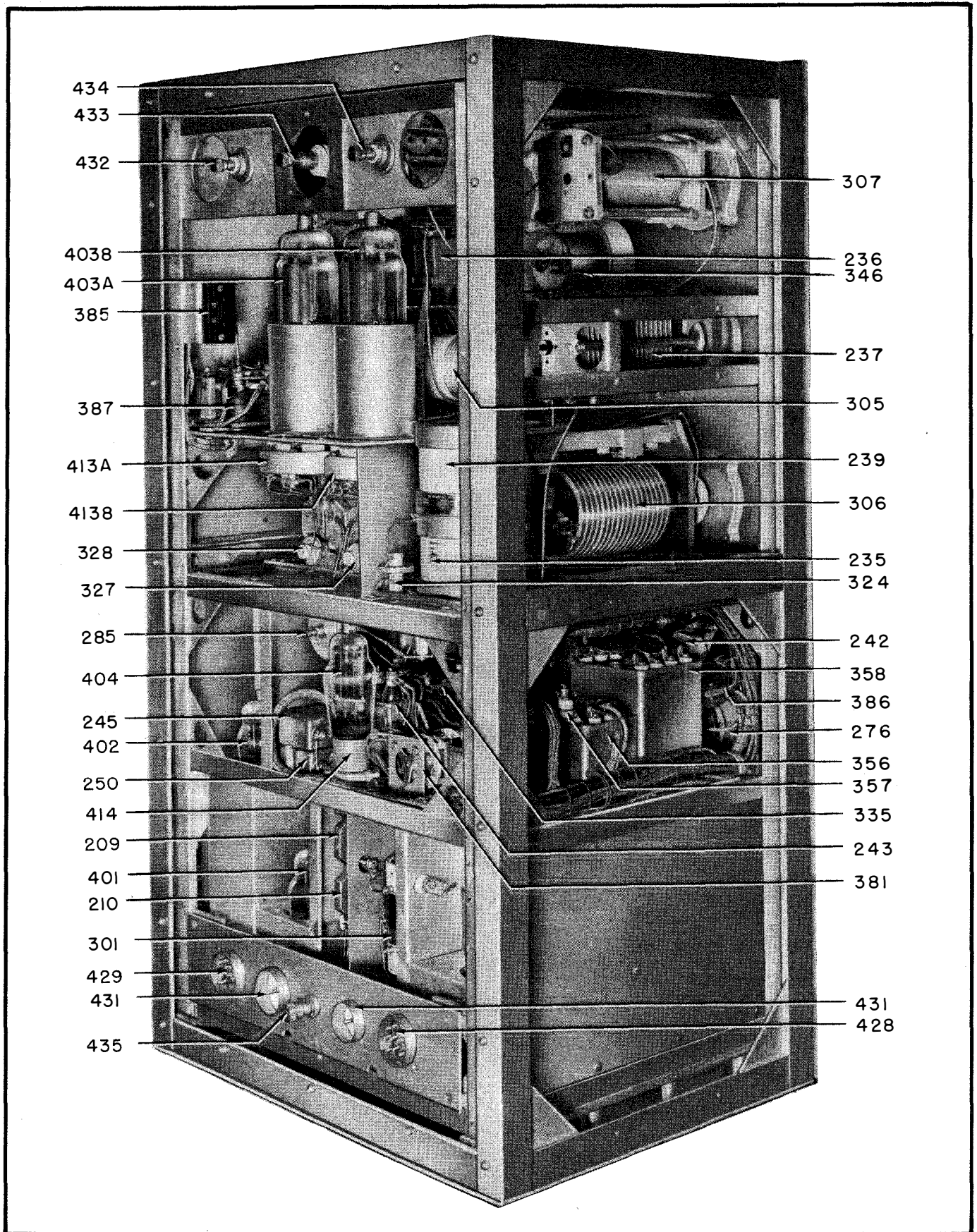


Figure 7-14. H-f Radio Transmitter Navy Type CG-52206, Rear Right Oblique View



- 434
- 433
- 432
- 4038
- 403A
- 385
- 387
- 413A
- 4138
- 328
- 327
- 285
- 404
- 245
- 402
- 250
- 414
- 209
- 401
- 210
- 301
- 429
- 431
- 435

- 307
- 236
- 346
- 237
- 305
- 239
- 306
- 235
- 324
- 242
- 358
- 386
- 276
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- 381
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- 428

Figure 7-15. H-f Radio Transmitter Navy Type CG-52206, Rear Left Oblique View

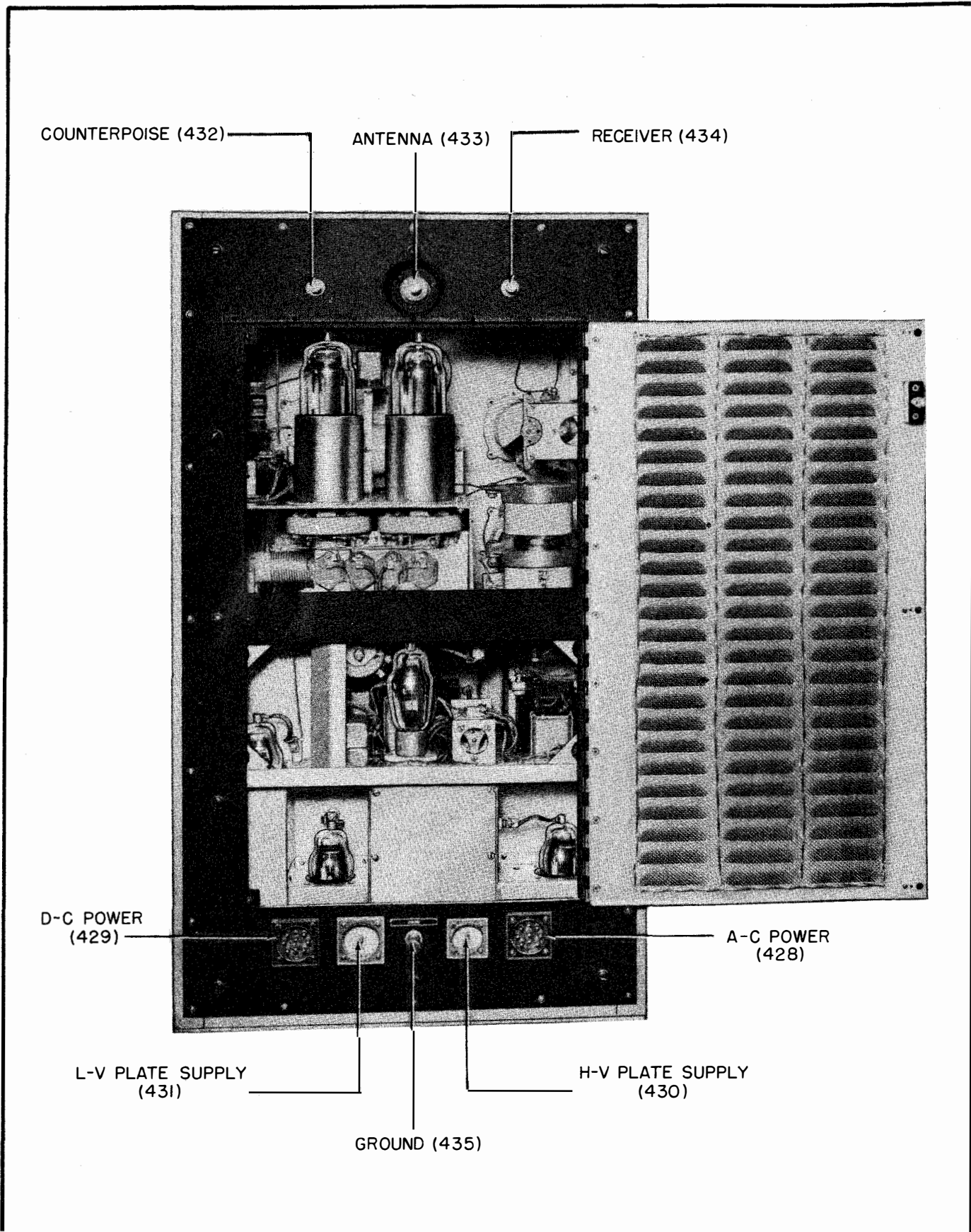


Figure 7-16. H-f Radio Transmitter Navy Type CG-52206, Rear View with Access Door Open

TABLE 7-1. — TROUBLE SHOOTING CHART. (Continued)

Symptom	Probable Cause	Remedy
20. Antenna stage of i-f radio transmitter does not tune properly.	20a. Antenna coupling switch (552, figure 7-17) not in correct position for operating frequency and antenna characteristics.	20a. Place switch in correct position.
	20b. Contacts of antenna coupling switch (552, figures 7-17 and 7-20) require cleaning or adjustment.	20b. Clean and adjust contacts.
	20c. Antenna band-change switch (553, figure 7-17) not in correct position for operating frequency and antenna characteristics.	20c. Place switch in correct position.
	20d. Contacts on antenna band-change switch (553, figure 7-17) require cleaning or adjustment.	20d. Clean and adjust contacts.
	20e. Antenna series capacitor (494, figures 7-18, 7-21, and 7-22) defective, due to bent plates or collection of dust and foreign matter between plates.	20e. Replace defective capacitor.
	20f. Antenna contacts of keying relay (577, figures 7-18, 7-20, 7-21, and 7-22) not functioning properly.	20f. Refer to section VII, paragraph 5, for service and adjustment procedure.
	20g. Antenna system open circuited, short circuited or grounded.	20g. Inspect antenna system and correct faulty condition.
	20h. Antenna ammeter (574, figure 7-17) defective.	20h. Inspect for loose or improper external connections. Replace defective antenna ammeter (574).
21. I-f radio transmitter fails to modulate properly on MCW.	21a. Modulator tube (544, figures 7-20 and 7-21) defective.	21a. Replace defective modulator tube (544).
	21b. Contacts of emission switch (544, figure 7-17) require cleaning or adjustment.	21b. Clean and adjust contacts.
	21c. Modulator plate ammeter capacitor (489) defective.	21c. Replace defective capacitor.

4. COIL WINDING DATA.

Coil winding data for H-f Radio Transmitter Navy Type CG-52206, I-f Radio Transmitter Navy Type CG-52205, Rectifier Navy Type CG-20122, and Control Unit Navy Type CG-23241 are included in the following tables.

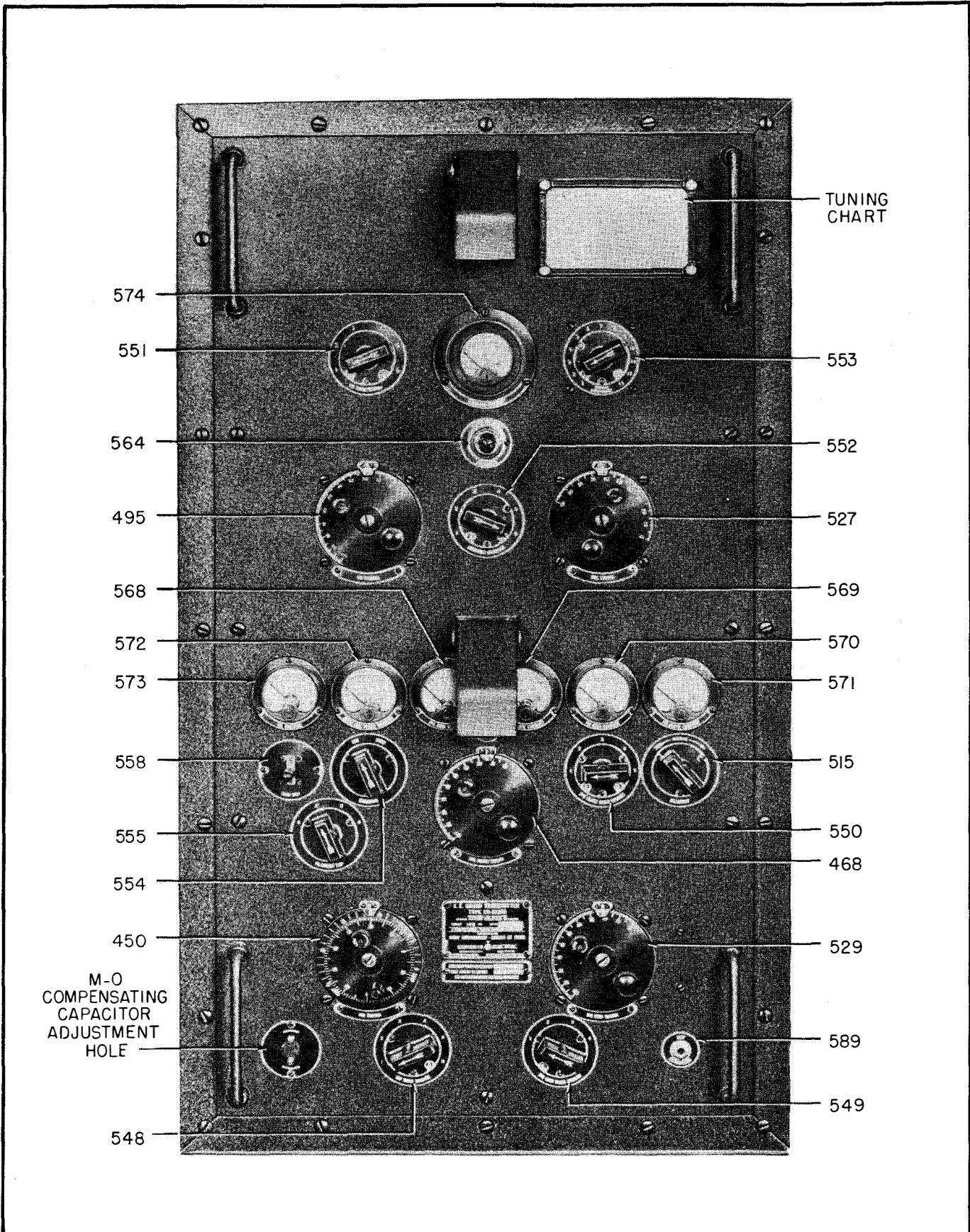
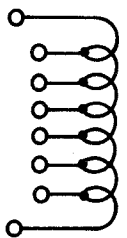
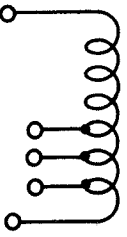
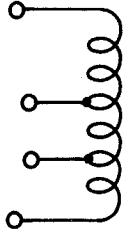
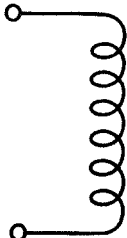


Figure 7-17. I-f Radio Transmitter Navy Type CG-52205, Front View

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206.

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Incb</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
300	ML-7761701-G2		Single layer	0.040	32 with 6 taps (1) 4 3/4 (2) 5-11/12 (3) 11-1/2 (4) 18 (5) 21-1/4 (6) 26-3/4	Non-critical	Term. to: Tap (1) 2.5-2.6 uh (2) 3.3-3.5 uh (3) 9.8-10.09 uh (4) 17.8-18.5 uh (5) 22.2-23.5 uh (6) 30.7-31.9 uh Term. 38.8-40.4 uh	Bare Copper Wire wound on 2-1/2 in. O.D. grooved Isolantite form.
301	ML-7946468-G1		Single layer	0.0226	70 with 3 taps (1) 30-1/16 (2) 40-1/19 (3) 52-1/8	0.670 to 0.696	Term. to: Tap (1) 44-45.8 uh (2) 67.3-69.4 uh (3) 97.0-99.6 uh Term. 145-149 uh	Bare Copper Wire wound on 1-3/4 in. O.D. grooved Isolantite form.
302	ML-7946469-G1		Single layer	0.064	26 with 2 taps (1) 14 (2) 20	Non-critical	Term. to: Tap (1) 7.9-8.1 uh (2) 12.8-13.4 uh Term. 318.4-18.9 uh	Bare Copper Wire wound on 2 in. O.D. grooved Isolantite form.
303	ML-7946470-G1		Single layer	0.064	26	Non-critical	9.9 to 10.4 uh	Bare Copper Wire (tinned) wound on 1-1/2 in. O.D. grooved Isolantite form.

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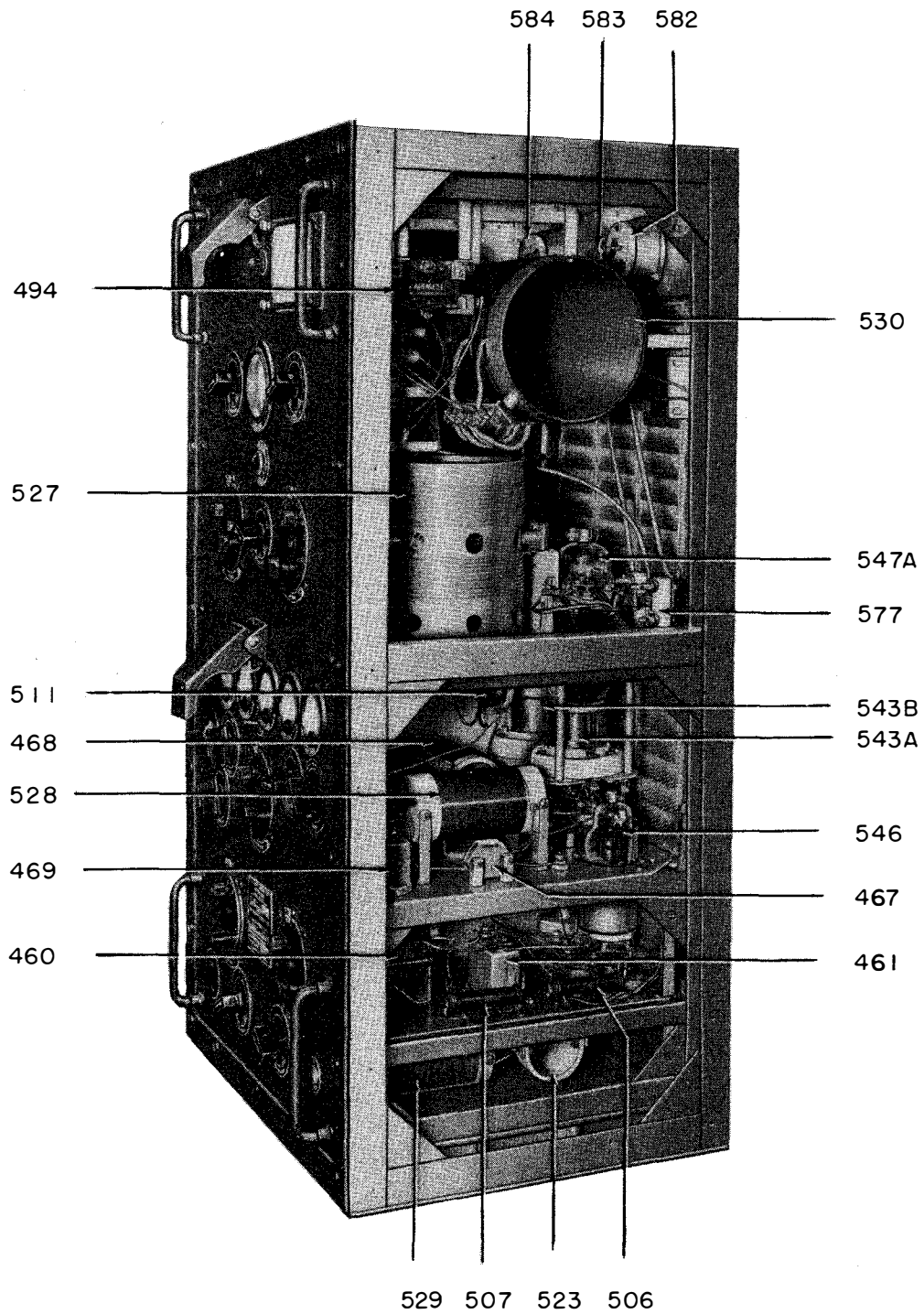
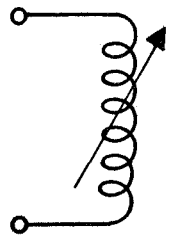
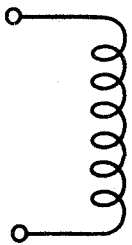
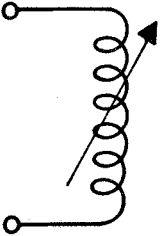


Figure 7-18. I-f Radio Transmitter Navy Type CG-52205, Front Right Oblique View

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
304	ML-7761957-G2		LH wound single layer	0.064	21-3/4	Non-critical		Silver Plated Copper Wire wound on 1.976 in. O.D. grooved Isolantite form.
305	ML-7463364-G1		Single layer	0.080	12-1/2	Non-critical	7.5 to 7.7 uh	Silver Plated Copper Wire wound on 2-1/2 in. O.D. grooved Isolantite form.
306	ML-7660366-G1		Single layer	1/8 in. x 1/4 in.	17-1/2	Non-critical		Silver Plated Copper Wire wound on grooved Myalex frame.

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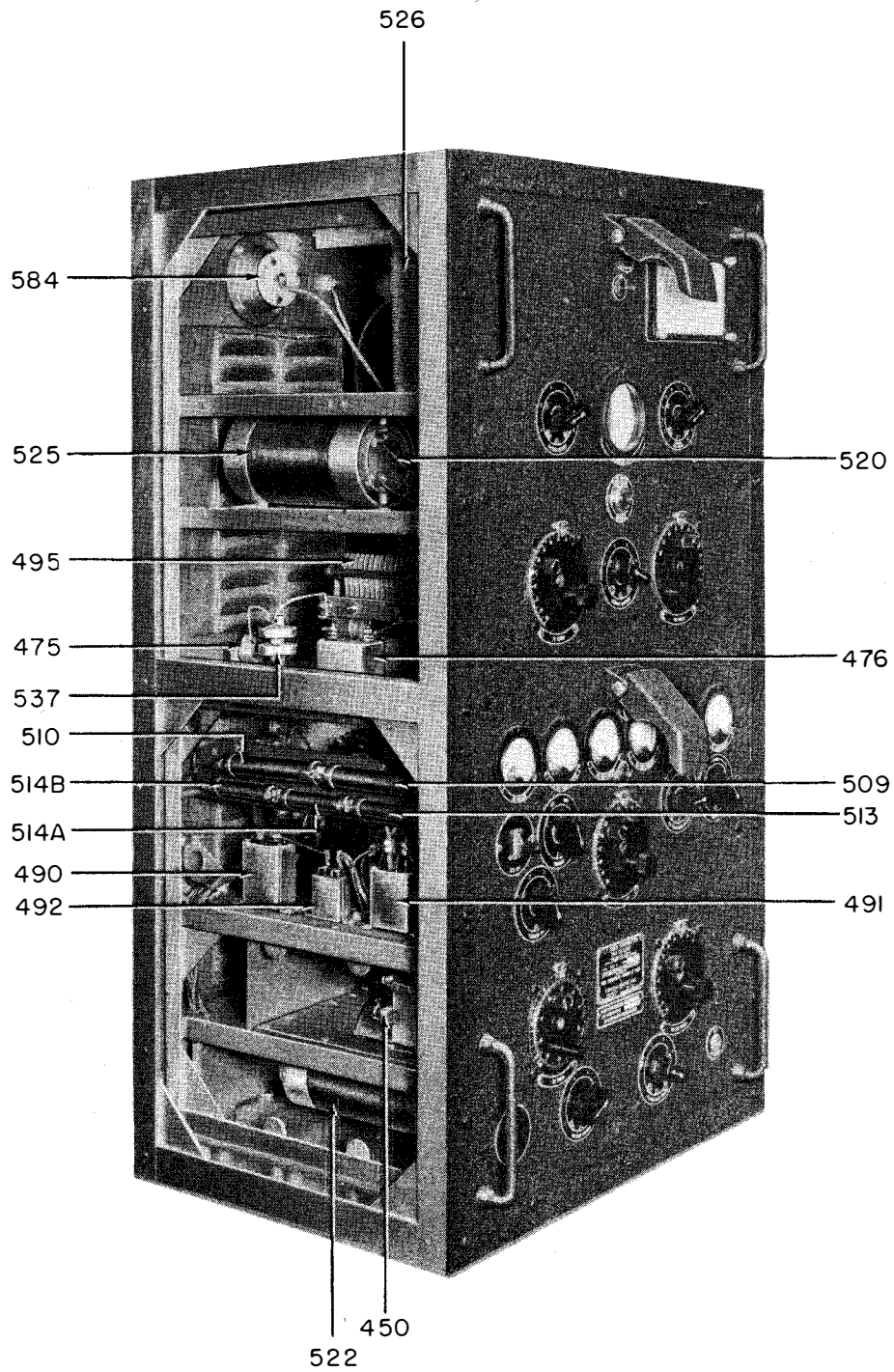
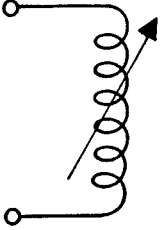
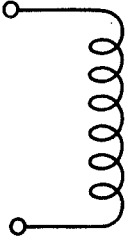
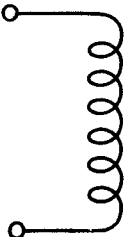


Figure 7-19. 1-f Radio Transmitter Navy Type CG-52205, Front Left Oblique View

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
307 308	ML-7761957-G1		RH wound single layer	0.064	35-3/4	Non-critical		Silver Plated Copper Wire wound on 1.976 in. O.D. grooved Isolantite form.
316	ML-7462709-G1		Universal wound, 2 crosses per turn	0.010	300	Non-critical	1600 to 1775 uh	Bare Copper Wire (tinned) wound on 1/2 in. O.D. Isolantite form Resonant frequency 2000 to 2100 kc.
317 318	ML-7462716-G1		Universal wound, 2 crosses per turn	0.010	200	Non-critical	735 to 780 uh	Bare Copper Wire (tinned) wound on 1/2 in. O.D. Isolantite form Resonant frequency 2900 to 3100 kc.

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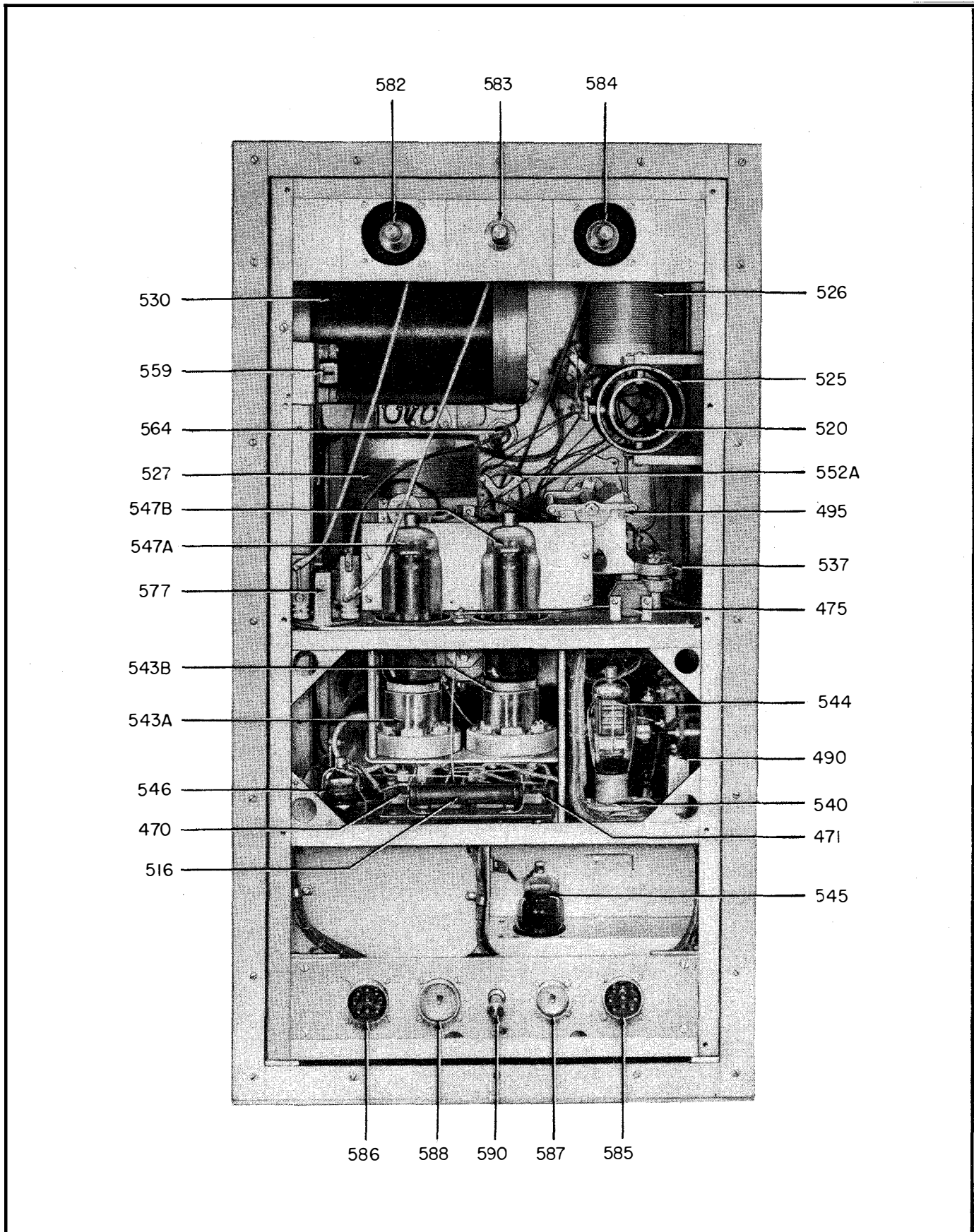
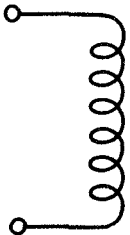
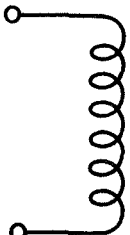
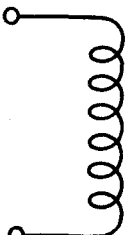


Figure 7-20. I-f Radio Transmitter Navy Type CG-52205, Rear View

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
319 320 326 327 328	ML-7462716-G2		Universal wound, 2 crosses per turn	0.010	150	Non-critical	385 to 415 uh	Bare Copper Wire (tinned) wound on 1/2 in. O.D. Isolantite form Resonant frequency 4000 to 4400 kc.
321 324	ML-7462716-G3		Universal wound, 4 crosses per turn	0.020	75	Non-critical	100 to 130 uh	Bare Copper Wire (tinned) wound on 1/2 in. O.D. Isolantite form Resonant frequency 7500 to 8000 kc.
323	ML-7462772-G1		Single layer	0.016	100	Non-critical	105 to 120 uh	Bare Copper Wire (tinned) wound on 1 in. O.D. Isolantite form Resonant frequency 12,000 to 13,000 kc.

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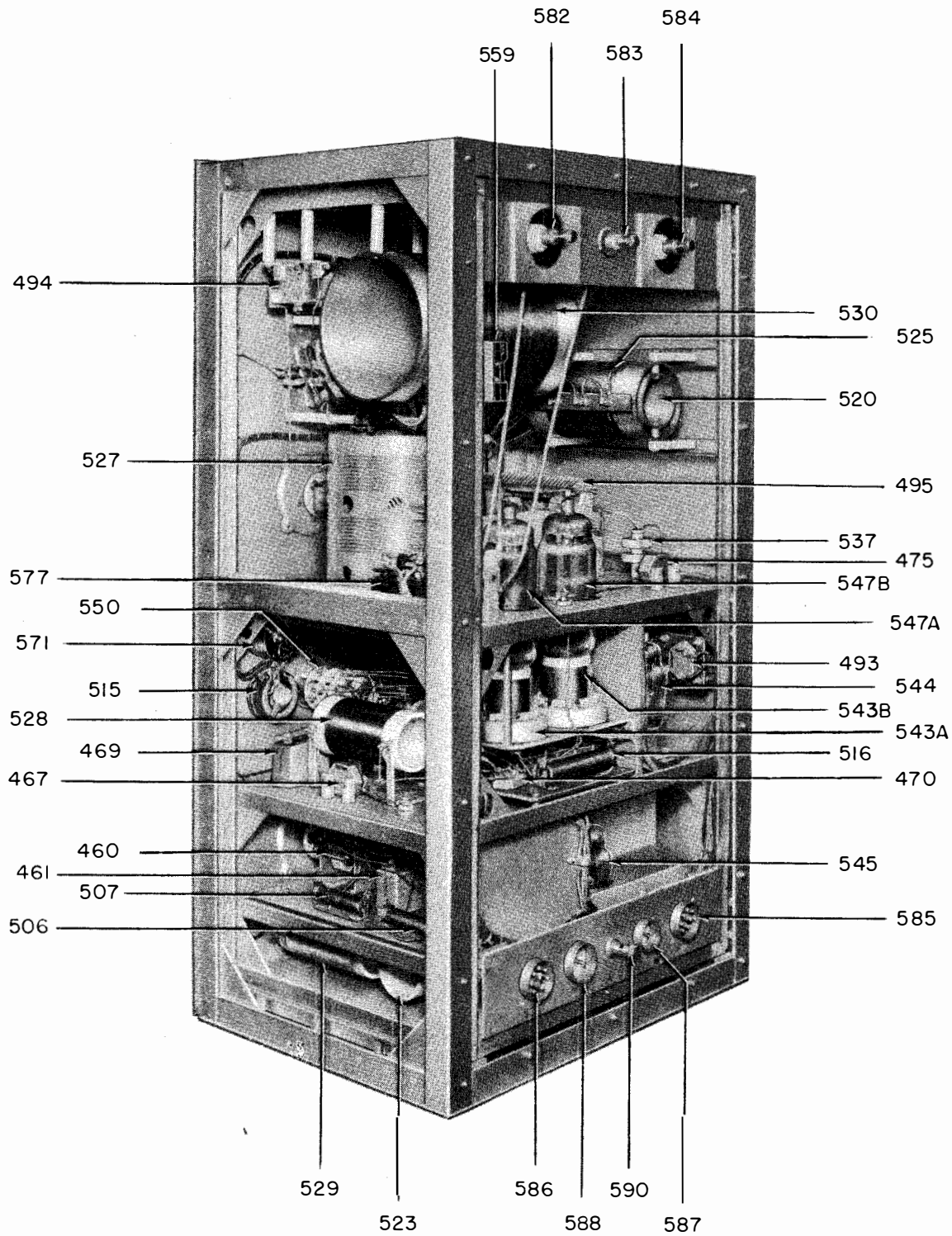
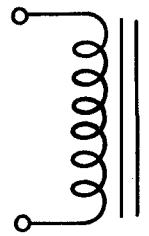
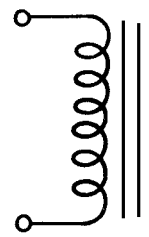
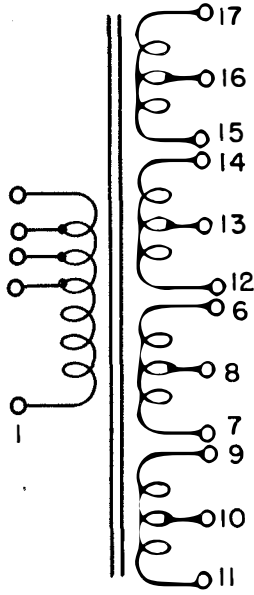


Figure 7-21. I-f Radio Transmitter Navy Type CG-52205, Rear Right Oblique View

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
335	Cat. No. 66G70		Layer wound	0.016	1275	40.0	2.0 h	0.125 amp. dc. 0.100 kv. insulation
336	Cat. No. 66G138		Layer wound	0.011	4250	220	20 h	0.05 amp. dc. 0.75 kv insulation.
355	Model No. 9TD1244E1		Layer wound	Pri: 0.040 Sec: (1) 0.091 (2) 0.040 (3) 0.040 (4) 0.028	Pri: 320 Sec: (1) 28 (2) 36 (3) 36 (4) 36	Pri: 320 Sec: (1) 0.0256 (2) 0.250 (3) 0.260 (4) 0.540		50 to 62 cycles. 0.5 kv insulation. Pri: 125/115/105/95 volts. Sec: (1) 13.24/6.62 volts. (2) 13.24/6.62 volts. (3) 13.24/6.62 volts. (4) 10.5/5.25 volts.

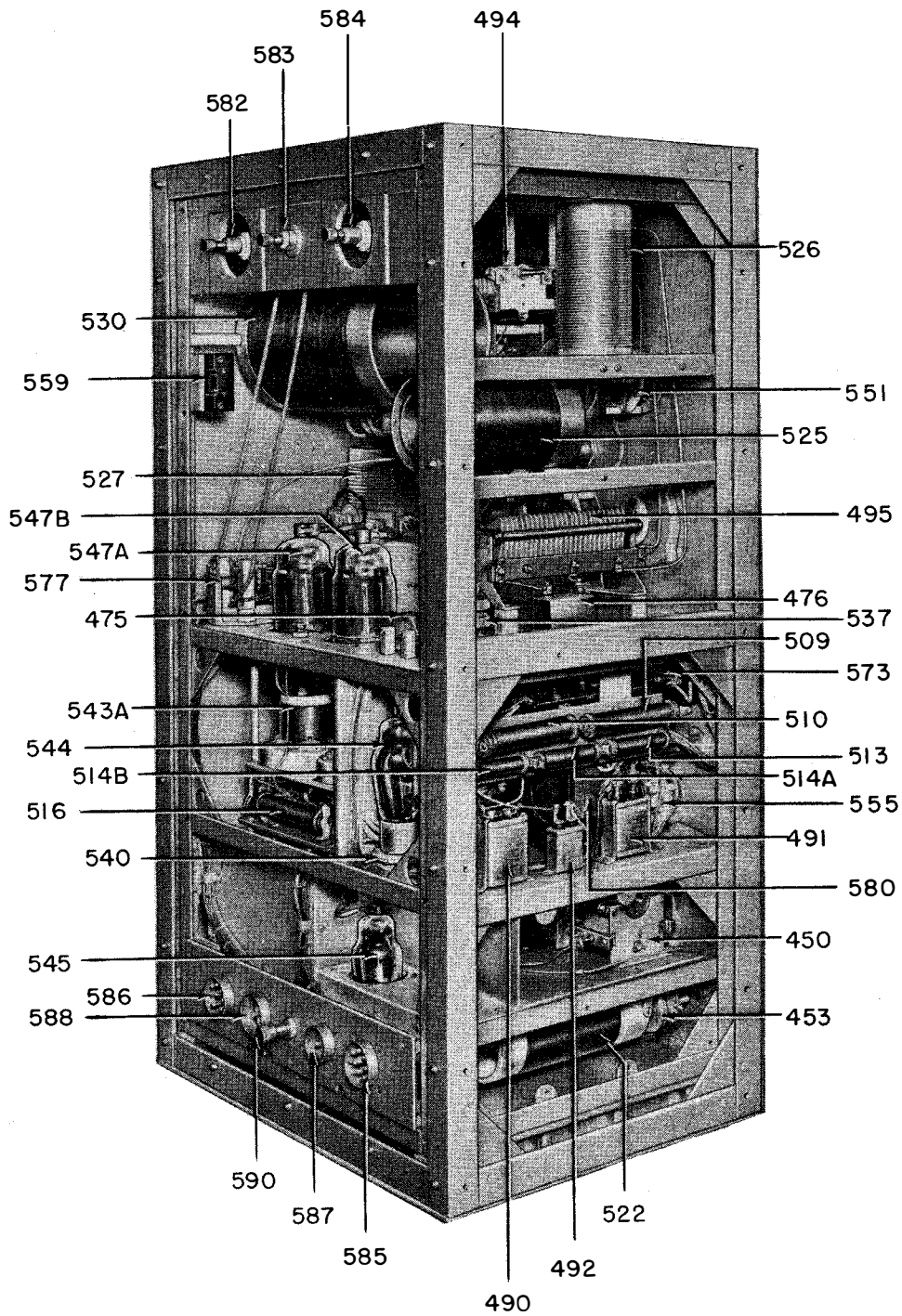
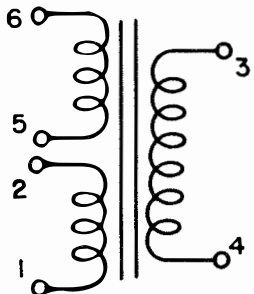
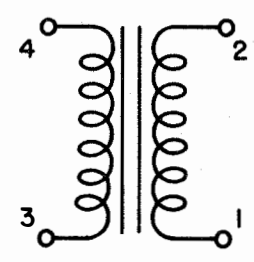
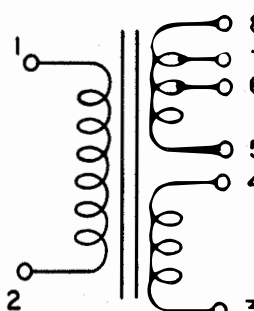


Figure 7-22. I-f Radio Transmitter Navy Type CG-52205, Rear Left Oblique View

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
356	Cat. No. 66G48		Layer wound	Pri: .0036 Sec: 0.0036 Ter: 0.0036	Pri: 150 Sec: 7500 Ter: 635	Pri: 6 Sec: 2650 Ter: 250		200 to 3000 cycles. $N_p/N_{sec} 1/50.$ $N_p/N_{ter} 1/4.07$
357	Cat. No. 66G49		Layer wound	Pri: 0.018 Sec: 0.011	Pri: 1300 Sec: 435	Pri: 21 Sec: 23		1000 cycles. $N_p/N_{sec} 3/1.$
358	Cat. No. 66G50		Layer wound	Pri: 0.010 Sec: 0.010 Ter: 0.010	Pri: 171 Sec: 937 Ter: 1240 (5 to 6) (5 to 7) (5 to 8)	Pri: 176 Sec: 100 Ter: (5 to 6) 20 (5 to 7) 30 (5 to 8) 41		200 to 3000 cycles. $N_p/N_{sec} 2.29/1.$ $N_p/N_{ter} 3.48/1.$

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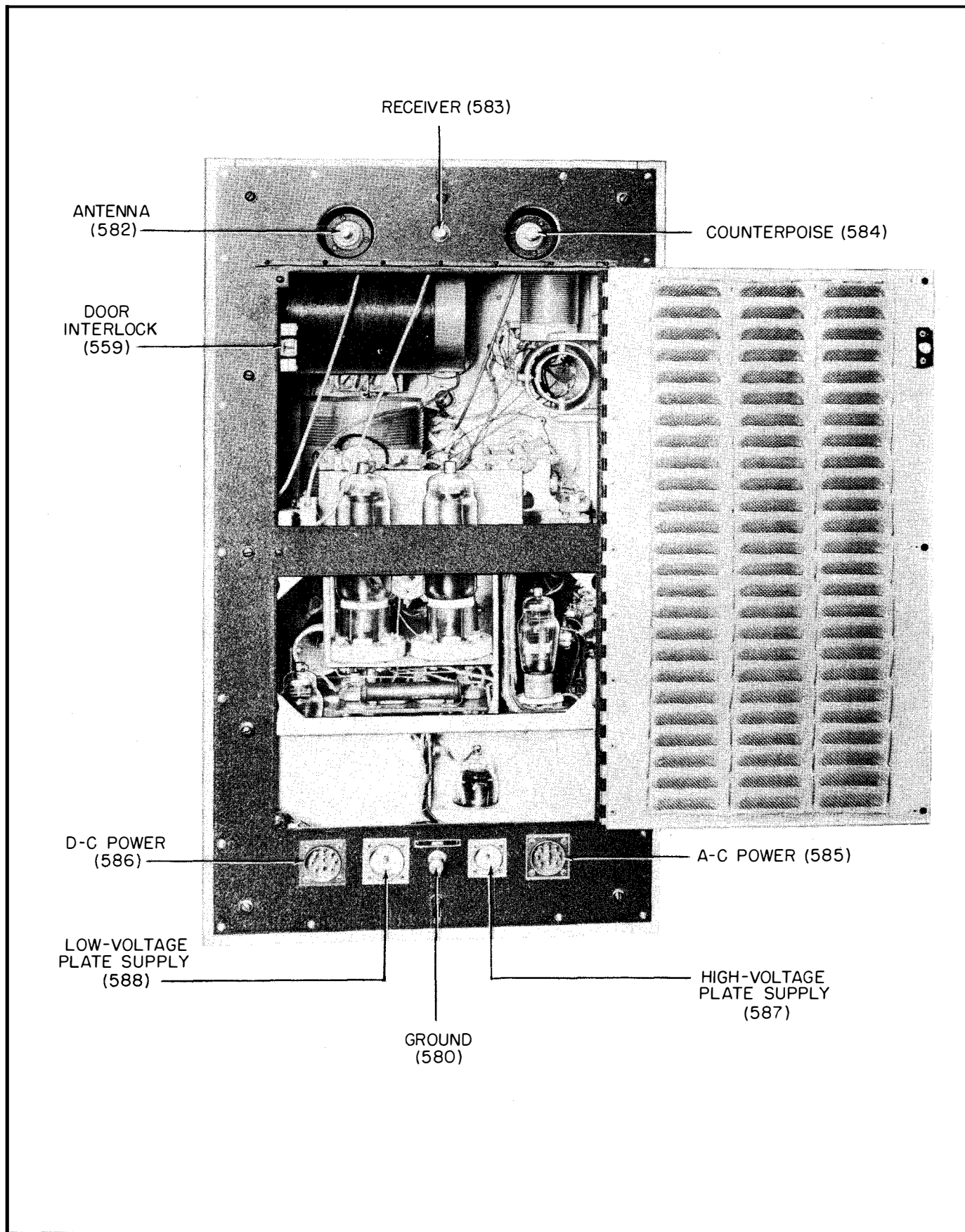


Figure 7-23. I-f Radio Transmitter Navy Type CG-52205, Rear View with Access Door Open

TABLE 7-2. — COIL WINDING DATA H-F RADIO TRANSMITTER NAVY TYPE CG-52206. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
387	ML-7660603-G1		Random layer	0.012	1750 ± 50	140 ± 5 140 ± 5		2 coils connected in series. Current 0.20 amp. at 25° C at 55 volts dc across coils. 1 set large contacts SPDT, NC 1 set large contacts SPDT, NO 1 set small contact SPDT, NO 1 set small contact SPDT, NO.

TABLE 7-3. — COIL WINDING DATA — I-F RADIO TRANSMITTER NAVY TYPE CG-52205.

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
520	ML-7462835-G1		Single layer	0.096	8 with 2 taps (1) 3 (2) 5	0.025 to 0.030	Term. to: Tap (1) 0.72-0.77 uh (2) 2.04-2.16 uh Term. 5.58-5.92 uh	Litz Wire Spec. SI-8718D 128/0.005 in. wound on 2-1/2 in. O.D. Phenolic Compound tube.

TABLE 7-3. — COIL WINDING DATA I-F RADIO TRANSMITTER NAVY TYPE CG-52205. (Continued)

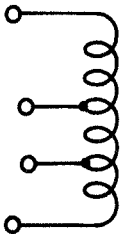
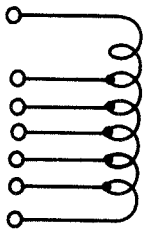
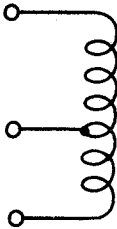
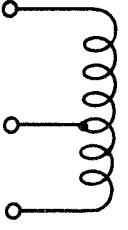
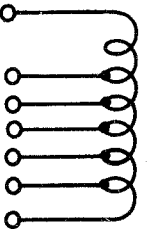
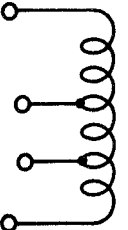
Designation Symbol	G.E. Co. Part No.	Diagram	Winding	Wire Size in Inch	Turns	DC Resistance in OHMS	Inductance	Remarks
521	ML-7462824-G1		Single layer	0.080	12 with 2 taps (1) 4 (2) 8	Non-critical		Bare Copper Wire (tinned) wound on 2 in. O.D. grooved Isolantite form.
522	ML-7462714-G1		Single layer	0.022	170 with 5 taps (1) 55 (2) 68 (3) 85 (4) 106 (5) 135	2.19 to 3K	Term. to: Tap (1) 232-241.5 uh (2) 314-327 uh (3) 427-446.6 uh (4) 577-601.4 uh (5) 790-822.8 uh Term. 1053-1097 uh	Bare Copper Wire (0.025 in. dia. Double Enamel) wound on 3 in. O.D. grooved Isolantite form.
523	ML-7462722-G1		Single layer	0.032	64.5 with 1 tap (1) 38.5	Non-critical	Term. to: Tap (1) 69.5-72.5 uh Term. 134.5-138.5 uh	Bare Copper Wire (0.036 in. dia. Double Enamel) wound on 2-1/2 in. O.D. grooved Isolantite form.

TABLE 7-3. — COIL WINDING DATA I-F RADIO TRANSMITTER NAVY TYPE CG-52205. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
524	ML-7462745-G1		Single layer	0.030	94 with 1 tap (1) 46	2.0 to 2.2	114-122 uh	Litz Wire Spec. SI-8718-3A 20/0.005 in. wound on 2-1/2 in. O.D. grooved Isolantite form.
525	ML-7462779-G1		Single layer	0.045	81 with 2 taps (1) 22 (2) 45	1.10	Term. to: Tap (1) 54-58 uh (2) 157-165 uh Term. 350-356 uh	Litz Wire Spec. SI-8718H 32/0.005 in. O.D. grooved Ceramic form.
526	M-7462765-G1		Single layer	0.064	40 with 2 taps (1) 15 (2) 24	Non-critical	Term. to: Tap (1) 15.9-16.9 uh (2) 31.1-33.1 uh Term. 60.5-64.3 uh	Bare Copper Wire (tinned) wound on 3 in. O.D. grooved Isolantite form.

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TABLE 7-3. — COIL WINDING DATA I-F RADIO TRANSMITTER NAVY TYPE CG-52205. (Continued)

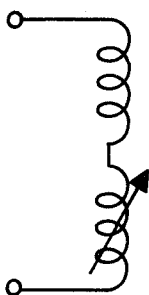
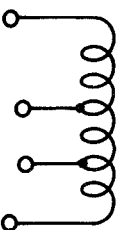
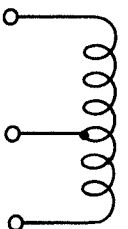
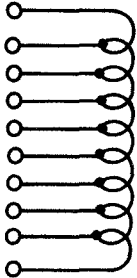
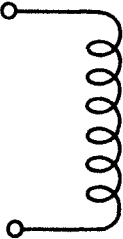
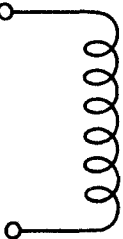
<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
527	ML-7660364-G1		2-Single layer	0.10	20 turns on rotor 20 turns on stator	Non-critical		
528	ML-7462751-G1		Single layer	0.032	64.5 with 2 taps (1) 32.5 (2) 39.5	Non-critical	Term. to: Tap (1) 55.0-56.7 uh (2) 71.0-75.0 uh Term. 134.5-138.5 uh	Bare Copper Wire (0.036 in. dia. Double Enamel) wound on 2-1/2 in. O.D. grooved Isolantite form.
529	ML-7461821-G1		Single layer	0.030	109 with 1 tap (1) 49	2.55	Term. to: Tap (1) 126-132 uh Term. 360-370 uh	Litz Wire Spec. SI-8718-3J 20/0.005 in. wound on 2-1/2 in. O.D. grooved Isolantite form.

TABLE 7-3. — COIL WINDING DATA I-F RADIO TRANSMITTER NAVY TYPE CG-52205. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
530	ML-7761963-G1		LH wound single layer, 12 turns per inch	0.080	88 with 8 taps (1) 18 (2) 29-1/4 (3) 40-1/4 (4) 49 1/4 (5) 58 1/4 (6) 67 (7) 74 (8) 82	0.970 to 1.04	Term. to: Tap (1) 68.5-72.8 uh (2) 144.0-152.8 uh (3) 231-245 uh (4) 310-329 uh (5) 392-416 uh (6) 475-505 uh (7) 541-575 uh (8) 619-658 uh Term. 678-720 uh	Litz Wire Spec. SI-8718E 64/0.005 in. wound on 6 in. O.D. Phenolic Compound form.
531 532	ML-7462717-G1		Universal wound, 2 crosses per turn	0.010	900	Non-critical	0.0155 to 0.017 h	Bare Copper Wire (0.018 in. D.C.C.) wound on 1/2 in. O.D. Isolantite form. Resonant frequency 400 to 500 kc.
534 535	ML-7462716-G1		Universal wound, 2 crosses per turn	0.010	200	Non-critical	0.015 to 0.017 h	Bare Copper Wire (tinned) wound on 1/2 in. O.D. Isolantite form.

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TABLE 7-3. — COIL WINDING DATA I-F RADIO TRANSMITTER NAVY TYPE CG-52205. (Continued)

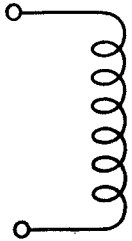
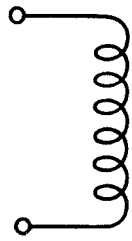
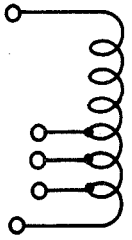
Designation Symbol	G.E. Co. Part No.	Diagram	Winding	Wire Size in Inch	Turns	DC Resistance in OHMS	Inductance	Remarks
536	ML-7462718-G1		Universal wound, 2 crosses per turn	0.010	575	Non-critical	0.0055 to 0.0064 h	Bare Copper Wire (0.018 in. D.C.C.) wound on 1/2 in. O.D. Isolantite form.
537	ML-7462712-G1		Universal wound, 2 crosses per turn	0.0159 0.0159	235 235	Non-critical Non-critical	2000-2500 uh 2000-2500 uh	2 Coils Bare Copper Wire (0.0239 in. D.C.C.) wound on 1/2 in. O.D. Isolantite form. Resonant frequency 1500 to 2000 kc.
577	ML-7660603-G1		Random layer	0.012	1750 ± 25	140 ± 5 140 ± 5		2 Coils connected in series current 0.20 amp. at 25° C at 55 volts dc across coils. 1 set large contacts SPDT, NC 1 set large contacts SPDT, NO 1 set small contacts SPST, NO 1 set small contacts SPST, NO.

TABLE 7-3. — COIL WINDING DATA I-F RADIO TRANSMITTER NAVY TYPE CG-52205. (Continued)

Designation Symbol	G.E. Co. Part No.	Diagram	Winding	Wire Size in Inch	Turns	DC Resistance in OHMS	Inductance	Remarks
580	Model No. 9TD1244E1		Layer wound	Pri: 0.040 Sec: (1) 0.091 (2) 0.040 (3) 0.040 (4) 0.028	Pri: 320 Sec: (1) 28 (2) 36 (3) 36 (4) 36	Pri: 320 Sec: (1) 0.0256 (2) 0.250 (3) 0.260 (4) 0.540		50 to 62 cycles 0.5 kv insulation Pri: 125/115/105/95 volts. Sec: (1) 13.24/6.62 volts. (2) 13.24/6.62 volts. (3) 13.24/6.62 volts. (4) 10.5/5.25 volts.
581	Cat. No. 66G25		Layer wound	Pri: 0.018 Sec: 0.011	Pri: 1200 Sec: 432	Pri: (1 to 2) 5 (1 to 3) 18 Sec: (4 to 5) 20 (4 to 6) 22		1000 cycles. $N_p/N_{sec} = 2.78/1.$

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TABLE 7-4. — COIL WINDING DATA RECTIFIER NAVY TYPE CG-20122.

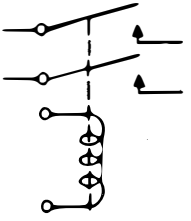
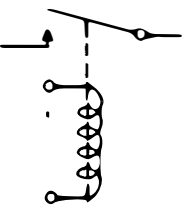
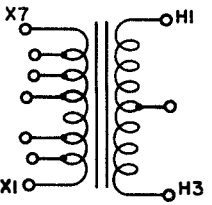
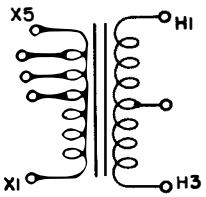
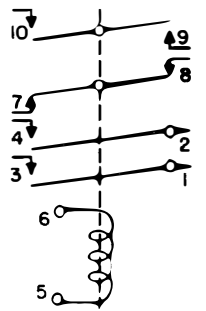
Designation Symbol	G.E. Co. Part No.	Diagram	Winding	Wire Size in Inch	Turns	DC Resistance in OHMS	Inductance	Remarks
672 673	Cat. No. 4986342EK100		Layer wound	0.008	2100	118		Coil, 115 volts, 60 cycles. Double Pole, NO.
674	Cat. No. 5366956G86		Layer wound	0.011	1800	53		Coil, 115 volts, 60 cycles.
680	Model No. 9TD1252E1		Layer wound	Pri: (1) 0.040 (2) 0.051 (3) 0.064 Sec: 0.020	Pri: 828 Sec: 4960	Pri: 0.25 Sec: 140		50 to 62 cycles. Pri: 0.670 kva, 127/119/ 111/103 volts. Sec: 0.950 kva, 3180/2226/ 1430 mid. 3.5 kv H-V Insulation.

TABLE 7-4. — COIL WINDING DATA RECTIFIER NAVY TYPE CG-20122. (Continued)

<i>Designation Symbol</i>	<i>G.E. Co. Part No.</i>	<i>Diagram</i>	<i>Winding</i>	<i>Wire Size in Inch</i>	<i>Turns</i>	<i>DC Resistance in OHMS</i>	<i>Inductance</i>	<i>Remarks</i>
681	Model No. 9TD1254E1		Layer wound	Pri: 0.045 Sec: 0.020	Pri: 347 Sec: 3600	Pri: 1 Sec: 80		50 to 62 cycles. Pri: 0.248 kva, 127/119/ 111/103 volts. Sec: 0.350 kva, 1275/637.5 volts 1.5 kv insulation.
682	Cat. No. 66G139		Layer wound	Pri: 0.022 Sec: 0.022	Pri: 755 Sec: 650	Pri: 7.1 to 8.35 Sec: 8.4 to 10.2		50 to 62 cycles. Pri: 0.053 kva, 125/115/ 103/95 volts. Sec: 98/90/82/74 volts.

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TABLE 7-4. — COIL WINDING DATA RECTIFIER NAVY TYPE CG-20122. (Continued)

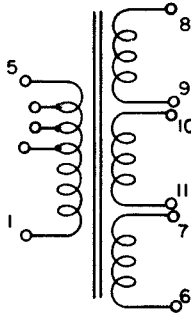
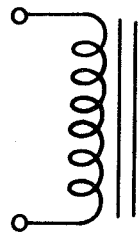
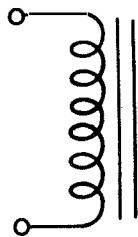
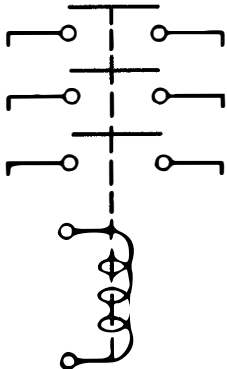
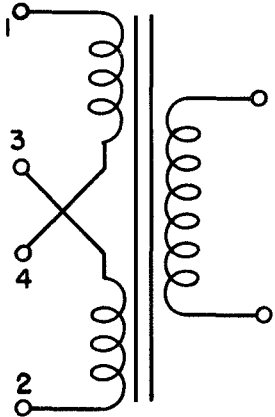
Designation Symbol	G.E. Co. Part No.	Diagram	Winding	Wire Size in Inch	Turns	DC Resistance in OHMS	Inductance	Remarks
683	Model No. 9TD1256E1		Layer wound	Pri: 0.025 Sec: 0.025	Pri: 534 Sec: 31	Pri: 4.88 Sec: 0.390		50 to 62 cycles kva. Pri: 119/111/103/95 volts. Sec: (1) 6.3 volts, 0.75 kv insulation. (2) 2.63 volts, 1.5 kv insulation. (3) 2.63 volts, 4.0 kv insulation.
686	Model No. 9XD407E1		Layer wound	0.025	4000	91	15 h	0.42 amp. dc, 1.5 kv insulation.
687	Model No. 9XD408E1		Layer wound	0.028	3400	68	15 h	0.45 amp. dc, 0.75 kv insulation.

TABLE 7-5. — COIL WINDING DATA CONTROL UNIT NAVY TYPE CG-23241.

Designation Symbol	G.E. Co. Part No.	Diagram	Winding	Wire Size in Inch	Turns	DC Resistance in OHMS	Inductance	Remarks
1765	P-7763201-P14		Layer wound	0.0051	8200	1100		Coil, 110 volts, 60 cycles. 3 contacts NO. 1 contact NC
1770	M-7465424-P1		Layer wound	Pri: 0.011 Sec: 0.012	Pri: 1100 Sec: 600	Pri: 41.3 Sec: 21.55		Pri: 110/220 volts, 60 cycles. Sec: 110 volts, 0.227 amp., kva 0.025.

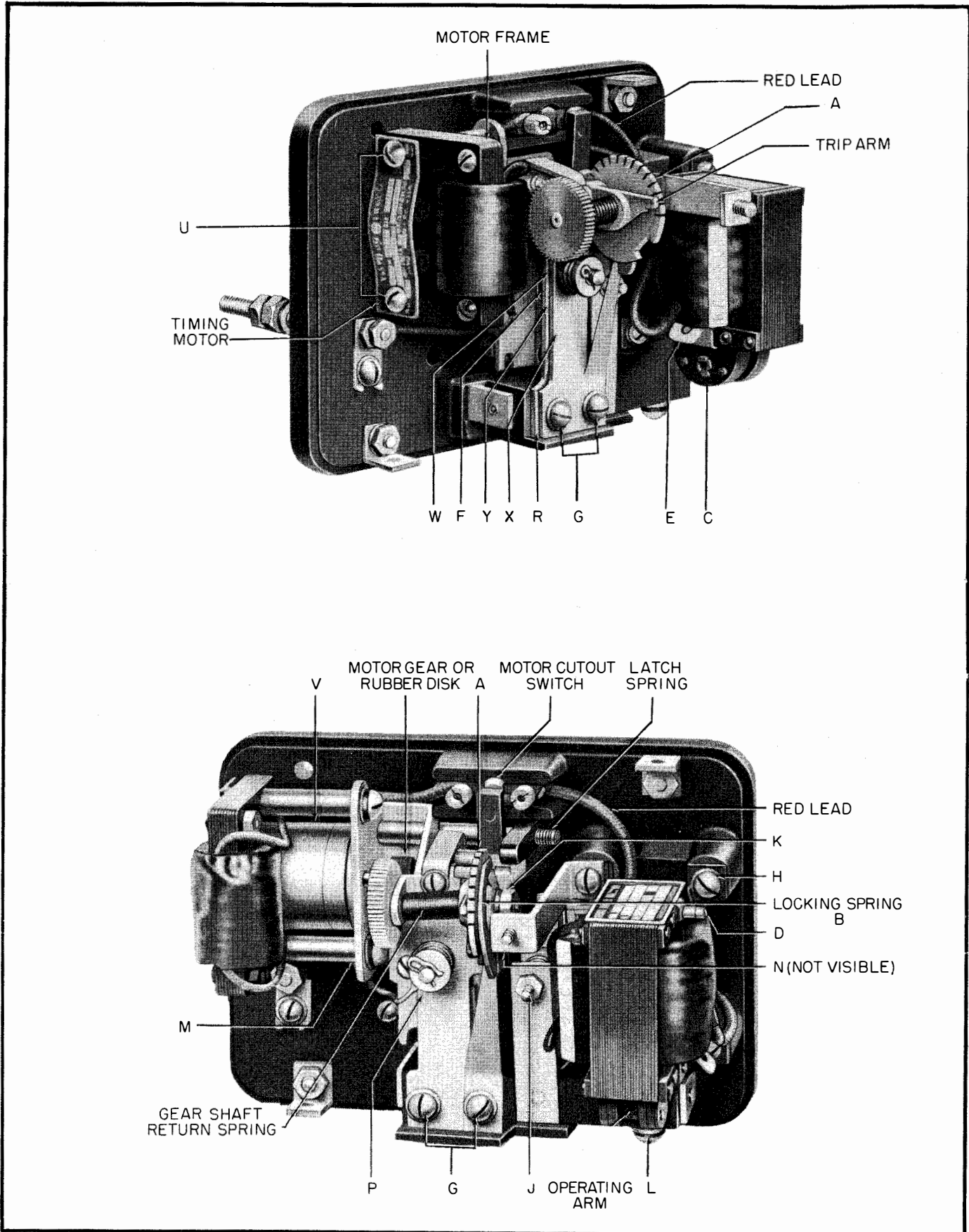
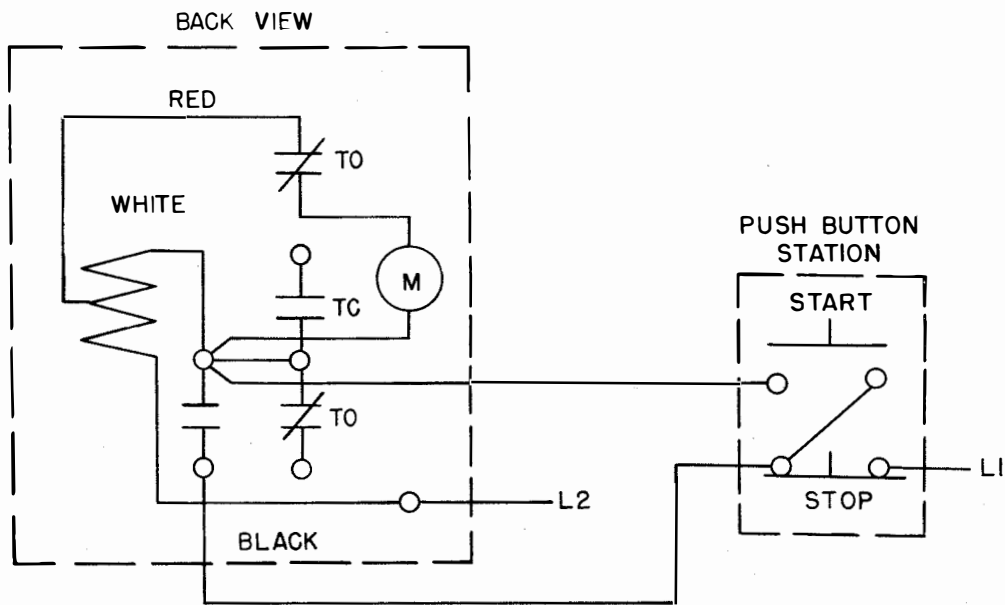
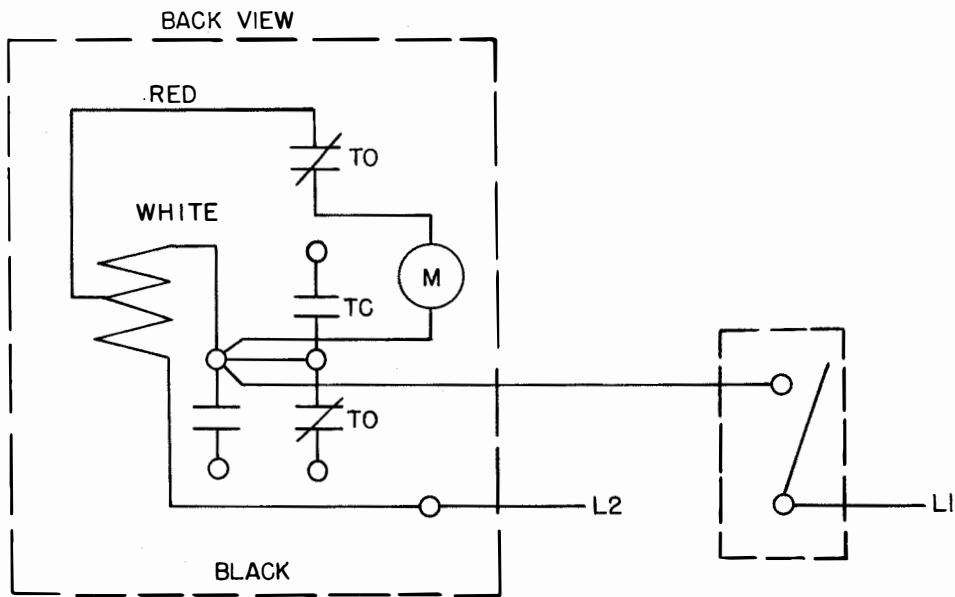


Figure 7-24. Plate Time Delay Relay (674)



CONNECTIONS WITH MOMENTARY-CONTACT PUSH-BUTTON STATION



CONNECTIONS WITH MAINTAINING-CONTACT MASTER SWITCH

Figure 7-25. Connection Diagram, Plate Time Delay Relay (674)

5. ADJUSTMENTS.

a. H-F RADIO TRANSMITTER KEYING RELAY (387) AND I-F RADIO TRANSMITTER KEYING RELAY (577).

(1) Rotate the armature shaft until the armature rests tightly against the pole shoes when the relay is in the closed position. Loosen the locknut and adjust the armature stop screw to obtain a clearance of 0.043-inch (plus or minus 0.001-inch) between the top of the armature and bottom of the stop screw. Tighten the locknut on the stop screw.

(2) With the armature at rest against the stop screw, and the relay in the open position, adjust the contact spacing of the two large normally open contacts, at extreme right, to 0.031-inch (plus or minus 0.001-inch).

(3) Insert a 0.004-inch thick shim between the armature and the stop screw. Adjust the two large normally closed contacts until they barely touch each other when the armature is at rest against the shim and stop screw. Remove the shim.

(4) With the armature against the stop screw, adjust the contact spacing of the small normally open contacts; at extreme left, to 0.035-inch (plus or minus 0.001-inch). Adjust the contact spacing of the other small contacts to 0.023-inch (plus or minus 0.001-inch).

(5) Adjust the ball bearing pivot screws at each end of the armature shaft until the armature is free to rotate but has no "play" axially.

(6) Adjust the spring tension so that the relay will give clean keying at any speed up to 40 words per minute.

Note

Keep the contacts of the transmitter keying relay properly lined up. Should the contacts become pitted as a result of service, smooth them with crocus cloth. Lubricate the armature shaft bearings with lubricating oil, Navy specification 5065. (Refer to section VI, paragraph 2.)

b. PLATE TIME-DELAY RELAY (674).

(1) TIME SETTING ADJUSTMENT. (See figure 7-24.)

(a) Release the locking spring (B). Turn the calibration dial (A) until the locking spring is dropped into the slot marked with the desired time.

(b) Tighten the locking spring.

(2) REPLACING SOLENOID OR COIL.

(a) The solenoid consists of a frame, a plunger, a coil, and two springs. Remove the four screws (H) to remove the solenoid assembly from the base. Disengage the plunger (C) from the operating arm and remove the plunger. Remove the cotter pin (D) and

spring (E). Remove the coil.

(b) Before assembling the solenoid, clean the upper end of the plunger and the surface of the frame against which the plunger seats. Connect the color coded coil leads as shown in figure 7-25.

(3) MAINTENANCE.

(a) The silver contacts of the plate time-delay relay will not require any attention until the silver has worn almost completely away. To replace the interlock contacts, remove the nut (J), the movable contact, and spring. Remove the stationary contact by unscrewing it from the front of the base.

(b) To replace the main contacts, remove the screws (G) and the calibrating unit assembly. Then, remove the screw (F) and the movable contacts. To remove the stationary contacts, remove the nut (M) and remove the complete movable contact assembly. Unscrew the stationary contacts from the mounting studs.

On relays having a metal gear on the motor shaft, rewind the contact arm resetting spring before tightening the screw (M). Insert a screwdriver in the slotted end of the shaft (N) and turn it three turns counterclockwise. Hold the spring in this position and tighten the screw (M). When replacing the calibrating unit assembly on relays having a rubber driving disk on the motor shaft, install the pivoting bushings with screws (G) and insert the washers (R) between the two brackets of the calibrating unit assembly.

(c) To replace the gear shaft return spring, remove the calibrating unit assembly. Remove the nut (K), then the calibrating disk, and withdraw the gear shaft. Insert one end of the new spring through the hole in the gear side of the calibrating unit bracket. Insert the gear shaft through the spring and pass the loose end of the spring through the hole in the trip arm. Install the gear shaft through the bearing and trip arm. Assemble the calibrating disk and install the nut (K). Bend the end of the spring projecting through the calibrating unit bracket at a right angle to the bracket. Pull the opposite end of the spring out 1-1/2 inches, bend it at a right angle and cut off the excess. When assembling the calibrating disk on the shaft make sure to have the forked portion over the projection on the bracket.

(d) To replace the latch spring, insert one end of the spring through the hole in the latch arm. Tighten the spring by giving it 1/2-turn clockwise. Reset the other end of the spring in the slot in the end of the shaft. Pinch the slotted end of the shaft together to clamp the end of the spring in place.

On relays having a rubber disk on the motor shaft, replace the rubber disk if it is worn so that the gap between the brackets (X and Y) is reduced to 1/32-inch at point W.

SECTION VIII

PARTS LIST

TABLE I
LIST OF MAJOR UNITS

TCM	TCN	TCU	TCM-1	TCN-1	TCU-1	NAVY TYPE DESIGNATION	NAME	SYMBOL DESIGNATION GROUP
X	X	-	X	X	-	CG-52206	H-F RADIO TRANSMITTER UNIT	200-449
-	X	X	-	X	X	CG-52205	I-F RADIO TRANSMITTER UNIT	450-594
X	X	X	X	X	X	CG-20122	RECTIFIER POWER UNIT	600-749
X	X	X				-	CABLES	1300-1350
-	X	-	-	X	-	CG-24094	JUNCTION BOX AND TRANSFER SWITCH	1700-1749
X	X	X	X	X	X	CG-23241	CONTROL UNIT	1750-1799
-	-	-	X	X	-	CAU-51016A	CHEST MICROPHONE	
-	-	-	X	X	-	CAU-51006A	HAND MICROPHONE	

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TABLE I

LIST OF MAJOR UNITS

TCU-2	TCU-2	NAVY TYPE DESIGNATION	NAME	SYMBOL DESIGNATION GROUP
X	-	CG-52206	H-F RADIO TRANSMITTER UNIT	200-449
-	X	CG-52205	I-F RADIO TRANSMITTER UNIT	450-594
X	X	CG-20122	RECTIFIER POWER UNIT	600-749
X	X	-	CABLES	1300-1350
X	X	CG-23241	CONTROL UNIT	1750-1799
X	-	CMX-51004C	HAND MICROPHONE	-

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	MLP			
CAPACITORS								
200	M-o Tuning Capacitor	Variable: 360 μ f max, $\pm 2\%$ $\pm 1\%$ 14.5 μ f min, Isolantite insulation	-	-	-	3	-	T-7660312-G1
*201	M-o Grid Fixed Capacitor	Ceramic: 100 μ f $\pm 1\%$, -0.0003 μ f/ μ f/deg C, 500 volts d-c working	-481475-0003N1	-	-	13	Class E	K-7885330-P1
*202	M-o Padding Capacitor	Mica: 290 μ f $\pm 1.0\%$, 500 volts d-c working, (molded silver cap)	-481474-E1	-	-	17	-	M-7465676-P22
203	M-o Calibration Capacitor	Air: 4 μ f, min; 15 μ f, max	-	-	-	1 19	-	ML-7462719-G2
*204	M-o Cathode By-pass Capacitor	Mica: 0.01 μ f $\pm 10\%$, 600 volts d-c working	-48027-B10	RE 13A 389 RE 48AA 112	-	2 20	Cat. No. 9LS-11010	P-7761560-P1
*205	M-o Grid Blocking Capacitor	Mica: 0.0005 μ f $\pm 10\%$, 600 volts d-c working	-48011-B10	RE 13A 389 RE 48AA 112	-	2 20	Cat. No. 9LS-13050	P-7761560-P2
*206	M-o Screen Blocking Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*207	1st I-p-a Tank Capacitor	Mica: 0.00005 μ f $\pm 5\%$, 2500 volts d-c working	-48038-B5	RE 13A 389 RE 48AA 112	-	2 20	Cat. No. 9LS-54050	P-7761560-P10
*208	M-o Plate Blocking Capacitor	Mica: 0.01 μ f $\pm 10\%$, 1200 volts d-c working	-48035-B10	RE 13A 389 RE 48AA 112	-	2 20	Cat. No. 9LS-21010	P-7761560-P3
*209	1st I-p-a Grid Coupling Capacitor	Mica: 0.00005 μ f $\pm 5\%$, 1200 volts d-c working	-48910-B5	RE 13A 389 RE 48AA 112	-	2 20	Cat. No. 9LS-24050	P-7761560-P4
*210	1st I-p-a Grid Leak By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*211	M-o Plate Meter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*212	1st I-p-a Cathode By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*213	1st I-p-a Screen By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*214	1st I-p-a Suppressor By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-

▲ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS
H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	M.F.R.			
△								
CAPACITOR (Cont.)								
*215	- 1st I-p-a Plate Blocking Capacitor	Same as 208	-48035-B10	-	-	-	-	-
*216	- 1st I-p-a Plate Meter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
217	- 1st I-p-a Tank Tuning Capacitor	Variable: 400-420 μ f max, 15-20 μ f min, Mycalex insulation	-	-	-	4 Type XR-375-PS	-	M-7462676-P1
*218	- 2nd I-p-a Grid Leak By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*219	- 2nd I-p-a Cathode By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*220	- 2nd I-p-a Screen By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*221	- 2nd I-p-a Suppressor By-pass Capacitor	Mica: 0.002 μ f \pm 10%, 1200 volts d-c working	-48913-B10	RE-13A-389 RE 48AA 112	A	2 20	Cat. No. 9LS-22020	P-7761560-P11
*222	- 2nd I-p-a Grid Coupling Capacitor	Mica: 0.00006 μ f \pm 10%, 1200 volts d-c working	-48911-B10	RE-13A-389 RE 48AA 112	A	2 20	Cat. No. 9LS-24060	P-7761560-P12
*223	- 2nd I-p-a Plate Blocking Capacitor	Same as 208	-48035-B10	-	-	-	-	-
*224	- 2nd I-p-a Fixed Tank Capacitor	Mica: 0.0003 μ f \pm 5%, 5000 volts test	-48426-C5	RE-13A-389 RE 48AA 131	I	2 20	Cat. No. PL-611-6LST	P-7761566-P16
*225	- P-a Grid Coupling Capacitor	Same as 207	-48038-B5	-	-	-	-	-
*226	- 2nd I-p-a Plate Meter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*227	- P-a Grid Leak By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*228	- M-o Cathode By-pass Capacitor	Mica: 0.006 μ f \pm 10%, 300 volts d-c working	-48847-B10	RE-13A-389	-	2	Cat. No. 1WLS	P-7762455-P27
*229	- Filament Voltmeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-

- △ Symbol part designation, if any.
● Style or other applicable designation, if any.
• SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS
H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC. NUMBER	MFR.	MFR. DESIG	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
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CAPACITORS (Cont.)

*230	-	P-a Grid Meter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-
*231	-	P-a Suppressor By-pass Capacitor	Mica: 0.005 μ f \pm 10%, 1200 volts d-c working	-48409-B10	RE-13A-389 RE 48AA 112	A 20	Cat. No. 9LS-22050	P-7761560-P9
*232	-	P-a Screen By-pass Capacitor	Same as 231	-48409-B10	-	-	-	-
*233	-	P-a Filament By-pass Capacitor	Same as 231	-48409-B10	-	-	-	-
*234	-	P-a Filament By-pass Capacitor	Same as 231	-48409-B10	-	-	-	-
*235	-	P-a Plate Blocking Capacitor	Mica: 0.005 μ f \pm 5%, 5000 volts test	-48915-B5	RE 48AA 122	- 2	Cat. No. PL-178-50	M-7462694-P1
*236	-	Output Circuit Blocking Capacitor	Mica: 0.001 μ f \pm 5%, 5000 volts test	-48337-C5	RE-13A-389 RE 48AA 131	1 20	Cat. No. PL-246-6LST	P-7761566-P18
237	-	Output Circuit Impedance Matching Capacitor	Variable: 330 μ mf max, 41 μ mf min, Myoalex insulation	-	-	- 4	Type No. XP-330KS	M-7462676-P4
238	-	Antenna Tuning Capacitor	Variable: 110 μ mf max, 31 μ mf min	-	-	- 4	Type No. XC-110MS	M-7462676-P3
*239	-	P-a Fixed Tank Capacitor	Mica: 0.0003 μ f \pm 5%, 10,000 volts test	-48380-5	RE-13A-389 RE 48AA 122	- 20	Cat. No. PL-763-50	M-7462694-P3
*240	-	P-a Plate Milliammeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-
*241	-	Modulation Indicator By-pass Capacitor	Same as 205	-48011-B10	-	-	-	-
*242	-	Modulator Plate Meter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-
*243	-	Modulator-oscillator Plate By-pass Capacitor	Paper, Pyrnaol askarel filled, 2 μ f, 600 volts, d-c working	-48883	RE 13A 488	- 1	Model No. 9CE5A93	-
244	-	Not Used	-	-	-	-	-	-
*245	-	Modulator Grid By-pass Capacitor	Paper, 2 μ f -2.5% + 10%, 400 volts d-c working	-48403	RE 13A 488	- 2	Cat. No. VC-278	M-7462695-P1

▲ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II

PARTS LIST BY SYMBOL DESIGNATIONS FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	REF.			
CAPACITORS (Cont.)								
*246	- A-f Oscillator Tank Capacitor	Paper, Pyranol askarel filled, 0.15 μ f, 405 volts d-c, 1000 cycles	-48916	RE 13A 488	-	1	-	M-5213288-G1
*247	- A-f Oscillator Grid Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*248	- Microphone Filter Capacitor (2 used)	Paper, Pyranol askarel filled, 10 μ f, 600 volts d-c working	-48721	RE 13A 488	-	1	Model No. 9CE5A87	-
*249	- P-a Suppressor Voltage By-pass Capacitor	Same as 243	-48883	-	-	-	-	-
*250	- Screen Grid By-pass Capacitor	Same as 245	-48403	-	-	-	-	-
*251	- Microphone Filter Capacitor	Same as 248	-48721	-	-	-	-	-
252	- Not Used	-	-	-	-	-	-	-
*253	- MCW Plate Voltage Blocking Capacitor	Same as 208	-48035-B10	-	-	-	-	-
*254	- Bias Filter Capacitor	Same as 248	-48721	-	-	-	-	-
*255	- Keying Surge Capacitor	Paper, Pyranol askarel filled, 0.25 μ f, 1000 volts d-c working	-48802	RE 13A 488	-	1	Model No. 9CE6A15	P-7763475-P11 **P-7765502
256 to 264 Incl.	- Not Used	-	-	-	-	-	-	-

RESISTORS

*265	- M-o Grid Leak Resistor	Metallized: 50,000 ohms $\pm 10\%$, 2 watts	-63474-10	RE 13A 340	-	5	Type BT-2	P-7761577-P24
266	- Not Used	-	-	-	-	-	-	-
*267	- M-o Plate Dropping Resistor	Wire wound: 5000 ohms $\pm 5\%$, 20 watts	-63645-5	RE 13A 372	-	5	Type EP	P-7761577-P22

- ▲ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.
 ** For replacement use this reference.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER		
				NUMBER	M.F.R.					
	△				●					
RESISTORS (Cont.)										
*268	-	1st I-p-a Grid Leak Resistor	Wire wound: 30,000 ohms ±5%, 12 watts	-63641-5	RE 13A 372	-	5	Type DJ	-	P-7761577-P9
269	-	Not Used	-	-	-	-	-	-	-	-
270	-	Not Used	-	-	-	-	-	-	-	-
*271	-	2nd I-p-a Grid Leak Resistor	Same as 268	-63641-5	-	-	-	-	-	-
272	-	Not Used	-	-	-	-	-	-	-	-
273	-	Not Used	-	-	-	-	-	-	-	-
274	-	Not Used	-	-	-	-	-	-	-	-
275	-	Not Used	-	-	-	-	-	-	-	-
*276	-	P-a Grid Leak Resistor	Variable: 3500 ohms, 50 watts, 119 ma max	-	-	-	6	Model J	-	M-7462674-P5
*277	-	P-a Screen Dropping Resistor	Wire wound: 500 ohms ±5%, 20 watts	-63644-5	RE 13A 372	-	5	Type EP	-	P-7761577-P14
*278	-	Modulator Load Resistor	Metallized: 5000 ohms ±10%, 1 watt	-63288-10	RE 13A 340	-	5	Type BT-1	-	P-7761577-P23
279	-	Not Used	-	-	-	-	-	-	-	-
*280	-	Modulator Gain Control Potentiometer	Variable: 75,000 ohms, 13000 ohms; semilogarithmic taper	-63673	-	-	7	Type C	-	M-7461827-P1
*281	-	Modulator Decoupling Resistor	Metallized: 100,000 ohms ±10%, 1 watt	-63288-10	RE 13A 340	-	5	Type BT-1	-	P-7761577-P1
*282	-	Modulator Cathode Resistor	Wire wound: 500 ohms ±5%, 2 watts	-63637-5	RE 13A 372	-	5	Type AA	-	P-7761577-P21
*283	-	A-f Oscillator Grid Leak Resistor	Metallized: 30,000 ohms ±5%, 1 watt	-63291-5	RE 13A 372G	-	5	Type BT-1	-	P-7761577-P2
*284	-	Modulator Sorsen Resistor	Wire wound: 25,000 ohms, tapped at 10,000 ohms ±10%, 20 watts	-63646-10	RE 13A 372	-	5	Type EP	-	P-7761577-P19
285	-	A-f Oscillator Plate Rheostat	Variable: 10,000 ohms, 50 watts, 70 ma max current screw driver slot in shaft	-	-	-	6	Model J	-	M-7462674-P3

△ Symbol part designation, if any.
● Style or other applicable designation, if any.
• SPARE PARTS FURNISHED. Refer to Table IV for quantities.

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TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE OG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	W.R.			
RESISTORS (Cont.)								
*286	-	Modulator Output Transformer Secondary Resistor	Metallized: 50,000 ohms ±10%, 1 watt	-63288	RE 13A 372G	- 5	Type BT-1	P-7761577-P3
287	-	Not Used	-	-	-	-	-	-
288	-	Filament Transformer Rheostat	Variable: 10 ohms, 50 watts, 2200 ma max current, flat on shaft	-	-	- 6	Model J	M-7462674-P1
*289	-	Bias Filter Resistor	Wire wound: 2500 ohms ±5%, 2 watts	-63640	RE 13A 372	- 5	Type AA	P-7761577-P4
*289	-	Bias Filter Resistor (Used on TCM-2 only)	Wire wound: 1500 ohms ±10%, 2 watts	-	RE 13A 340	- 5	Type AA	P-7761577-P25
*290	-	Keying Surge Resistor	Metallized: 2200 ohms ±10%, 1 watt	-63288	RE 13A 372G	- 5	Type BT-1	P-7762300-P66
291 to 299 Incl.	-	Not Used	-	-	-	-	-	-
R-F INDUCTORS AND CHOKE COILS								
300	-	M-o Grid Tank Coil	Consists of 32 turns of 0.040 in. diam bare copper wire with 6 taps: one at 4 3/4 turns, one at 5 11/12 turns, one at 11 1/2 turns, one at 18 turns, one at 21 1/4 turns, one at 26 3/4 turns. Wound on 2 1/2-in. O.D. grooved Isolantite form.	-	-	- 1	-	ML-7761701-G2
301	-	M-o Plate Inductor	Consists of 70 turns of 0.0226 in. diam bare copper wire (0.0256 in. diam D.E.) with 3 taps: one at 30 1/16 turns, one at 40 1/9 turns, and one at 52 1/8 turns. Wound on 1 3/4 in. O.D. grooved Isolantite form.	-	-	- 1	-	ML-7946468-G1

- △ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC. NUMBER	MFR.	MFR. DESIG	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
△								
R-F INDUCTORS AND CHOKE COILS (Cont.)								
302	- 1st I-p-a Tank Coil	Consists of 26 turns of 0.064 in. diam bare copper wire tinned with two taps: one at 14 turns and one at 20 turns. Wound on 2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7945469-G1
303	- 2nd I-p-a Tank Coil	Consists of 26 turns of 0.064 in. diam bare copper wire tinned. Wound on 1 1/2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7946470-G1
304	- 2nd I-p-a Rotating Tank Coil	Variable: Consists of 21 3/4 left-hand turns of 0.064 in. diam silver plated copper wire, wound on 1.976 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7761957-G2
305	- P-a Fixed Tank Coil	Consists of 12 1/2 turns of 0.080 in. diam silver plated copper wire. Wound on 2 1/2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7463364-G1
306	- P-a Rotating Tank Coil	Variable: Consists of 17 1/2 turns of 1/8 in. x 1/4 in. cross section silver plated copper wire. Wound on grooved Mycoalex frame.	-	-	-	1 19	-	ML-7660366-G1
307	- Impedance Matching Inductor	Variable: Consists of 35 3/4 right-hand turns of 0.064 in. diam silver plated copper wire. Wound on 1.976 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7761957-G1
308	- Antenna Tuning Inductor	Same as 307	-	-	-	-	-	-
309 to 315 Incl.	- Not Used	-	-	-	-	-	-	-

△ Symbol part designation, if any.
● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				
	△								
R-F INDUCTORS AND CHOKE COILS (Cont.)									
*316	-	M-o Screen Grid Choke Coil		-	-	-	1	-	ML-7462709-G1
		Consists of 300 turns of 0.010 in. diam bare tinned copper wire (0.018 in. diam D.C.C.) Universal wound, 2 crosses per turn on 1/2 in. O.D. Isolantite form.							
*317	-	M-o Plate Choke Coil		-	-	-	1	-	ML-7462716-G1
		Consists of 200 turns of 0.010 in. diam bare tinned copper wire (0.018 in. diam D.C.C.) Universal wound, 2 crosses per turn on 1/2 in. O.D. Isolantite form.							
*318	-	1st I-p-a Grid Choke Coil		-	-	-	-	-	-
		Same as 317							
*319	-	1st I-p-a Plate Choke Coil		-	-	-	1	-	ML-7462716-G2
		Consists of 150 turns of 0.010 in. diam bare tinned copper wire (0.018 in. diam D.C.C.) Universal wound, 2 crosses per turn on 1/2 in. O.D. Isolantite form.							
*320	-	2nd I-p-a Grid Choke Coil		-	-	-	-	-	-
		Same as 319							
*321	-	2nd I-p-a Plate Choke Coil		-	-	-	1	-	ML-7462716-G3
		Consists of 75 turns of 0.020 in. diam bare tinned copper wire (0.028 in. diam D.C.C.) Universal wound, 4 crosses per turn on 1/2 in. O.D. Isolantite form.							
322	-	Not Used		-	-	-	-	-	-
*323	-	P-a Grid Choke Coil		-	-	-	1	-	ML-7462772-G1
		Consists of 100 turns of 0.016 in. diam bare tinned copper wire (0.0184 in. diam double enamel). Wound on 1 in. O.D. Isolantite form.							
*324	-	P-a Plate Choke Coil		-	-	-	-	-	-
		Same as 321							
325	-	Not Used		-	-	-	-	-	-

- △ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER	
				NUMBER	●				
R-F INDUCTORS AND CHOKE COILS (Cont.)									
*326	-	M-o Cathode Choke Coil	Same as 319	-	-	-	-	-	
*327	-	P-a Suppressor Grid Choke Coil	Same as 319	-	-	-	-	-	
*328	-	P-a Screen Grid Choke Coil	Same as 319	-	-	-	-	-	
329 to 334 Incl	-	Not Used	-	-	-	-	-	-	
REACTORS									
335	-	Microphone Filter Reactor	2 henries, 0.125 amp d-o, 40 ohms max d-o, 0.100 kv insulation	-30413	-	-	1	Cat. No. 66670	-
336	-	Bias Filter Reactor	20 henries, 0.05 amp d-o, 220 ohms d-o, 0.75 kv insulation	-30414	-	-	1	Cat. No. 666138	-
337 to 339 Incl	-	Not Used	-	-	-	-	-	-	-
METERS									
*340	-	M-o Plate Milliammeter	Scale 0-50 ma d-o, 2 1/2 in. diam flush, phenolic case, antiglare glass	-22057	17112	-	1	Type 8 DW-41	P-7761557-P1
*341	-	1st I-p-a Plate Milliammeter	Scale 0-100 ma d-o, 2 1/2 in. diam flush, phenolic case, antiglare glass	-22058	17112	-	1	Type 8 DW-41	P-7761557-P2
*342	-	2nd I-p-a Plate Milliammeter	Same as 341	-22058	-	-	-	-	-
*343	-	P-a Plate Milliammeter	Scale 0-500 ma d-o, 2 1/2 in. diam flush, phenolic case, antiglare glass	-22068	17112	-	1	Type 8 DW-41	P-7761557-P3
*344	-	Modulator Plate Milliammeter	Same as 340	-22057	-	-	-	-	-

- ▲ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

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TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.			MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER		MFR.			
△									
METERS (Cont.)									
*345	-	P-a Grid Milliammeter	Same as 341	-22058	-	-	-	-	-
*346	-	Antenna Ammeter	Scale 0-5 amp, r-f, 2 1/2 in. diam flush, phenolic case, antiglare glass, internal thermocouple	-22026	17I12	-	1	Type 8 DW-44	P-7761557-P4
*347	-	Filament Voltmeter	Scale 0-10 volts, a-c with red mark on scale at 6.3 volts, 2 1/2 in. diam flush, phenolic case, antiglare glass	-22079	17I12	-	1	Type 8 DW-41	P-7761557-P9
*348	-	Modulation Indicator	Scale 0-150 volts, a-c, 200-3000 cycles, copper-oxide rectifier type, 2 1/2 in. diam flush, phenolic case, antiglare glass	-22269	17I12	-	1	Type 8 DW-46	P-7761557-P6
349 to 354 Inol	-	Not Used	-	-	-	-	-	-	-
TRANSFORMERS									
355	-	Filament Transformer	50/62 cycles, 0.5 kv insulation. Pri: 125 volts/115 volts/ 105 volts/95 volts Sec.1: 13.24 volts/6.62 volts Sec.2: 13.24 volts/6.62 volts Sec.3: 13.24 volts/6.62 volts Sec.4: 10.5 volts/5.25 volts	-30409	-	-	1	Model No. 9TD1244E1	-
356	-	Microphone Transformer	200 to 3000 cycles Turn ratio $N_p/N_{sec} = 1/50$ $N_{ter}/N_{sec} = 1/4.07$ Pri: 6 ohms, d-c Sec: 2650 ohms, d-c Ter: 250 ohms, d-c	-30404	-	-	1	Cat. No. 66G48	-

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				
TRANSFORMERS (Cont.)									
357	-	A-f Oscillator Transformer	1000 cycles, ratio 3 to 1, Pri to Sec, Pri 2l ohms d-c Sec: 23 ohms, d-c	-30405	-	-	1	Cat. No. 66G49	-
358	-	Modulator Output Transformer	200-3000 cycles Turn Ratio N_p/N_{sec} 2.29/1 N_p/N_{ter} 3.48/1 Pri: 176 ohms d-c Sec: 100 ohms d-c Ter: 5 to 6 - 20 ohms d-c 5 to 7 - 30 ohms d-c 5 to 8 - 41 ohms d-c	-	-	-	1	Cat. No. 66G50	-
359 to 361 Incl.	-	Not Used	-	-	-	-	-	-	-
ILLUMINATING AND INDICATING LAMPS									
*362	-	Panel Illuminating Lamp	3 candlepower, 6-8 volts, double contact base	-	-	-	1	GE Mazda No. 64	-
*363	-	Panel Illuminating Lamp	Same as 362	-	-	-	-	-	-
*364	-	Plate Voltage Indicator Lamp	Same as 362	-	-	-	-	-	-
365	-	Plate Voltage Indicator Lamp	Lamp assembly consisting of:	-	-	-	1	-	ML-7871649-G2
*365	A		Indicating lamp, red jewel with bezel ring	-	-	-	2	-	K-7871647-P2
365	B		G-E Mazda lamp, 3 candlepower, 6-8 volts, double contact base	-	-	-	-	GE Mazda No. 64	-
366	-	Panel Illuminating Lamp Assembly	Double contact, end connection with Bakelite insert, mounting bracket, and reflector	-	-	-	1	-	ML-7463388-G1

△ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

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Section VIII
Table II

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				
ILLUMINATING AND INDICATING LAMPS (Cont.)									
367	- Panel Illuminating Lamp Assembly	Same as 366	-	-	-	-	-	-	-
368 to 374 Incl	- Not Used	-	-	-	-	-	-	-	-
SWITCHES									
375	- M-o Grid Band Change Switch	Rotary, 3 bank, 4 position, isolantite insulation, includes 376	-	-	-	1 23	-	-	ML-7761563-G1
376	- M-o Plate Bank Change Switch	Same as 375, included with 375	-	-	-	-	-	-	-
377	- 1st I-p-a Band Change Switch	Rotary, 1 bank, 3 position, isolantite insulation	-	-	-	1 23	-	-	ML-7660329-G4
378	- 2nd I-p-a Band Change Switch	Rotary, 4 bank, 3 position, with interlock, isolantite insulation, includes 380	-	-	-	1 23	-	-	ML-7761583-G1
379	- Not Used	-	-	-	-	-	-	-	-
380	- P-a Band Change Switch	Same as 378, included with 378	-	-	-	1 23	-	-	-
381	- Emission Selector Switch	Rotary, 6 bank, 3 position, isolantite insulation	-	-	-	1 23	-	-	ML-7761661-G1
*382	- Panel Illuminating Lamp Switch	Toggle, double-pole, single-throw, 1 amp, 250 volts, 3 amp, 125 volts	-24001	RE 24AA 118	-	1	Cat. No. 1GA2A21	-	-
*383	- Panel Illuminating Lamp Switch	Same as 382	-24001	-	-	-	-	-	-
384	- Filament Transformer Primary Tap Switch	Rotary, 1 bank, 4 position, isolantite insulation	-	-	-	1 23	-	-	ML-7761765-G1
*385	- Rear Access Door Interlock	25 amp, 250 volts	-24067-A	-	-	1 22	-	-	ML-7460330-G4

- △ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC. NUMBER		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER
					●				
SWITCHES (Cont.)									
*386	- Test Key	Key switch, telephone type, single-pole, double-throw, 3 amp, not more than 110 watts. Test voltage 500 volts, a.c., 60 cycles	-	-	-	9	Cat. No. Z-2877	-	M-7461816-P1
RELAYS									
387	- Keying Relay	1 - Set large contacts single-pole, double-throw, N.O. 1 - Set large contacts single-pole, double-throw, N.O. 1 - Set small contacts single-pole, single-throw, N.O. 1 - Set small contacts single-pole, single-throw, N.O. 2 - Coils each 140 ohms ± 5 ohms connected in series current 0.20 amp at 25 deg C at 55 volts across coils	-	-	-	1 25	-	-	ML-7660603-G1
388 to 399 Incl	- Not Used	-	-	-	-	-	-	-	-
VACUUM TUBES									
*400	- Master Oscillator Tube	R-f power amplifier and oscillator, pentode type	JAN-837	JAN-1	-	15	-	-	-
*401	- 1st I-p-a Tube	Same as 400	JAN-837	-	-	-	-	-	-
*402	- 2nd I-p-a Tube	Same as 400	JAN-837	-	-	-	-	-	-
*403	- P-a Tube (2 used)	R-f power amplifier, pentode type	JAN-803	JAN-1	-	15	-	-	-
*404	- Modulator Tube	Same as 400	JAN-837	-	-	-	-	-	-
405 to 409 Incl	- Not Used	-	-	-	-	-	-	-	-

△ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCW SERIES OF RADIO TRANSMITTING EQUIPMENTS
H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER		
				NUMBER	●					
VACUUM TUBE SOCKETS										
410	-	M-o Tube Socket	Medium, 7 prong, with cadmium plated contacts and Isolantite insulation	-49317	RE 13A 524	-	3 12	Type S-7	-	K-7873980
411	-	1st I-p-a Tube Socket	Same as 410	-49317	-	-	-	-	-	-
412	-	2nd I-p-a Tube Socket	Same as 410	-49317	-	-	-	-	-	-
413	-	P-a Tube Socket (2 used)	Giant, 5 prong, with nickel-plated contacts and ceramic insulation	-	-	-	12	Type 216	-	M-7463389-P1
414	-	Modulator Tube Socket	Same as 410	-49317	-	-	-	-	-	-
415	-	Not Used	-	-	-	-	-	-	-	-
PLUGS										
416	-	A-c Power Plug (2 used)	9-pin plug. Included with cable 1306	-	-	-	1 26	-	-	ML-7761589-G1
417	-	D-c Power Plug (2 used)	9-pin plug. Included with cable 1307	-	-	-	1 26	-	-	ML-7761589-G2
418	-	H-v Plate Supply Plug (2 used)	Single-contact plug. Included with cable 1308	-	-	-	1 26	-	-	ML-7761591-G1
419	-	L-v Plate Supply Plug (2 used)	Single-contact plug. Included with cable 1309	-	-	-	1 26	-	-	ML-7761589-G7
420 to 424 Incl	-	Not Used	-	-	-	-	-	-	-	-
JACKS AND RECEPTACLES										
425	-	Input Line Jack	One spring, open circuit, midget type	-49025A	-	-	1	-	-	M-7463112-G1
426	-	Microphone Jack	Three circuit, 2 spring open, midget type	-49039	-	-	1	-	-	ML-7463113-G1
427	-	Key Jack	Same as 425	-49025A	-	-	-	-	-	-
428	-	A-c Power Receptacle	8 contact, marked 20 to 27 incl	-	-	-	1 22	-	-	ML-7761590-G1

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

H-F RADIO TRANSMITTER NAVY TYPE CG-52206

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER	
				NUMBER	●					
JACKS AND RECEPTACLES (Cont.)										
429	-	D-o Power Receptacle		5 contact, marked 28 to 35 incl	-	-	-	1 22	-	ML-7761590-G2
430	-	H-v Plate Supply Receptacle		1 contact with Isolantite base, marked 52	-	-	-	1 22	-	ML-7761590-G7
431	-	L-v Plate Supply Receptacle		1 contact with Isolantite base, marked 53	-	-	-	1 22	-	ML-7761592-G1
BINDING POSTS										
432	-	Counterpoise Terminal		Consists of Eby Co. "Sergeant" nickel plated binding post, insulator, flange, washers, etc	-	-	-	1	-	ML-7871785-G1
433	-	Antenna Terminal		Consists of Eby Co. "Sergeant" nickel plated binding post, insulator, shell, gasket, etc.	-	-	-	1	-	ML-7761634-G2
434	-	Receiver Terminal		Same as 432	-	-	-	-	-	-
435	-	Ground Terminal		Consists of Eby Co. "Captain" nickel plated binding post, spacer, stud, pin, etc.	-	-	-	1	-	ML-7871786-G1
436 to 449 Incl	-	Not Used		-	-	-	-	-	-	-

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

L-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER
				NUMBER	MFR.			
△					●			
CAPACITORS								
450	M-o Variable Tank Capacitor	Variable: 475-490 μ f max, 15-20 μ f min, Myosalex insulation	-	-	-	4	-	M-7462676-P8
*451	M-o Grid Tank Capacitor	Mica: 0.0011 μ f/0.0027 μ f \pm 2%, 1000 volts d-c test, includes 452	-48914-D2	RE 13A 389	-	2	Cat. No. PL-892-6H	M-7462693-P2
*452	M-o Screen Grid Tank Capacitor	Included in 451	-	-	-	-	-	-
453	M-o Tube Compensating Capacitor	Variable: 4 μ f min, 15 μ f max	-	-	-	1 19	-	ML-7462719-G1
*454	M-o Grid Capacitor	Same as 205	-48011-B10	-	-	-	-	-
*455	M-o Screen Grid Blocking Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*456	M-o Screen Grid Choke By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*457	M-o Plate Choke By-pass Capacitor	Same as 208	-48035-B10	-	-	-	-	-
*458	M-o Plate Coupling Capacitor	Mica: 0.0005 μ f, \pm 10%, 1200 volts d-c working	-48912-B10	RE 13A 389	-	2 20	Cat. No. 9LS-23050	P-7761560-P5
*459	M-o Cathode By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
460	I-p-a Grid Tuning Capacitor	Variable: 420-440 μ f max, 16-22 μ f min, Myosalex insulation	-	-	-	4	-	M-7462676-P5
*461	I-p-a Grid Tank Capacitor	Mica: 0.0002 μ f \pm 5%, 5000 volts d-c test	-48366-C5	RE 13A 389	I	2 20	Cat. No. PL-307-6LST	P-7761566-P17
462	Not Used	-	-	-	-	-	-	-
*463	Grid Return By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*464	I-p-a Self-biasing Resistor By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
*465	I-p-a Screen Grid By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-
466	Not Used	-	-	-	-	-	-	-

- △ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODEL TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTING NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC. NUMBER			MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●	MFR.			
△									
CAPACITORS (Cont.)									
*467	I-p-a Plate By-pass Capacitor	Same as 205	-48035-B10	-	-	-	-	-	-
468	I-p-a Plate Tank Tuning Capacitor	Same as 460	-	-	-	-	-	-	-
*469	I-p-a Plate Tank Capacitor	Same as 461	-48366-C5	-	-	-	-	-	-
*470	P-a Grid Coupling Capacitor	Same as 458	-48912-B10	-	-	-	-	-	-
*471	P-a Grid Leak By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*472	P-a Suppressor By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*473	P-a Screen By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*474	P-a Filament By-pass Capacitor (2 used)	Same as 204	-48027-B10	-	-	-	-	-	-
*475	P-a Plate By-pass Capacitor	Mica: 0.01 μ f $\pm 10\%$, 2500 volts d-c working	-48382-B10	RE 13A 389 RE 48AA 112	A	20	Cat. No. 9LS-51010	-	P-7761560-P7
*476	P-a Tank Capacitor	Mica: 0.000185 μ f $\pm 5\%$, 5000 volts test	-48951-C5	RE 13A 389 RE 48AA 131	I	20	Cat. No. PL-556-6LST	-	P-7761566-P15
477 to 483 Incl	Not Used	-	-	-	-	-	-	-	-
*484	I-p-a Grid Ammeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*485	I-p-a Plate Ammeter Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*486	P-a Grid Ammeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*487	Filament Voltmeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*488	P-a Plate Ammeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-
*489	Audio Oscillator Plate Ammeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-	-	-

△ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

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Section VIII
Table II

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTING NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	MFR.			
CAPACITORS (Cont.)								
*490	-	Audio Oscillator Plate Tank Capacitor	Same as 246	-48916	-	-	-	-
*491	-	Audio Oscillator Plate By-pass Capacitor	Paper, Pyranol bakrel filled: 1 μ f, 600 volts d-c	-48719	RE 13A 488	-	1	Model No. 9CE5A90
*492	-	Audio Oscillator Grid Blocking Capacitor	Same as 255	-48802	-	-	-	-
*493	-	Audio Oscillator Screen Grid By-pass Capacitor	Same as 208	-48035-E10	-	-	-	-
494	-	Antenna Series Capacitor	Variable: 175-200 μ f max in each section, min capacity not greater than 36 μ f each section, Myoalex insulation	-	-	-	4	Type XE-180-KD
495	-	P-a Tank Capacitor	Variable: 452-460 μ f max, 52-56 μ f min, Myoalex insulation	-	-	-	4	Type XP-440-KS
496	-	Compensating Capacitor	Capacity 69.0 to 79.0 μ f	-	-	-	1	-
*497	-	Keying Surge Capacitor	Same as 255	-48802	-	-	-	-
PLUGS								
498	-	A-c Power Plug	Same as 416	-	-	-	-	-
499	-	D-c Power Plug	Same as 417	-	-	-	-	-
500	-	H-v Plate Supply Plug	Same as 418	-	-	-	-	-
501	-	L-v Plate Supply Plug	Same as 419	-	-	-	-	-
502	-	Not Used	-	-	-	-	-	-
503	-	Not Used	-	-	-	-	-	-

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

• SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER
				NUMBER	MFR.			
RESISTORS								
*504	- M-o Grid Leak Resistor	Same as 265	-63474	-	-	-	-	-
*505	- M-o Plate Dropping Resistor	Same as 289	-63640	-	-	-	-	-
*506	- I-p-a Grid Leak Resistor	Same as 268	-63641	-	-	-	-	-
*507	- I-p-a Grid Tank Resistor	Same as 268	-63641	-	-	-	-	-
*508	- I-p-a Self-biasing Resistor	Wire wound: 800 ohms ±5%, 2 watts	-63638	RE 13A 372	-	5	Type AA	P-7761577-F5
*509	- P-a Self-biasing Resistor	Wire wound: 40 ohms ±10%, 20 watts	-63642	RE 13A 372	-	5	Type EP	P-7761577-PL3
*510	- MCW P-a Self-biasing Resistor	Wire wound: 80 ohms ±5%, 20 watts	-63643	RE 13A 372	-	5	Type EP	P-7761577-PL2
511	- P-a Grid Leak Resistor	Variable: 1500 ohms, 50 watts, 180 ma max current, screwdriver slot in shaft	-	-	-	6	Model J	M-7462674-P4
*512	- Audio Oscillator Plate Voltage Dropping Resistor	Wire wound: 2000 ohms ±5%, 2 watts	-63639	RE 13A 372	-	5	Type AA	P-7761577-P7
*513	- Audio Oscillator Grid Leak Resistor	Same as 268	-63641	-	-	-	-	-
*514	- Audio Oscillator Screen Grid Voltage Dropping Resistor (2 used)	Same as 268	-63641	-	-	-	-	-
515	- Filament Rheostat	Same as 288	-	-	-	-	-	-
*516	- P-a Screen Grid Voltage Resistor	Same as 277	-63644	-	-	-	-	-
*517	- Keying Surge Resistor	Same as 290	-63288	-	-	-	-	-

- △ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	● MFR.			
R-F INDUCTORS AND CHOKE COILS								
518	- Not Used	-	-	-	-	-	-	-
519	- Not Used	-	-	-	-	-	-	-
520	- Antenna Coupling Coil	Consists of 8 turns of Litz wire Spec. SI-8718D, 125/0.005 in. 0.096 in. diam with 2 taps, one at 3 turns and one at 5 turns. Wound on 2 1/2 in. O.D. phenolic compound tube.	-	-	-	1	-	ML-7462835-G1
521	- Antenna Coupling Coil	Consists of 12 turns of 0.080 in. diam bare tinned copper wire with 2 taps, one at 4 turns, and one at 8 turns. Wound on 2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7462824-G1
522	- M-o Tank Inductor	Consists of 170 turns of 0.022 in. diam bare copper wire (0.025 in. diam double enamel) with 5 taps: one at 55 turns, one at 68 turns, one at 85 turns, one at 106 turns, and one at 135 turns. Wound on 3 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7462713-G1
523	- I-p-a Grid Tank Inductor	Consists of 64.5 turns of 0.032 in. diam bare copper wire (0.036 in. diam double enamel) with one tap at 38.5 turns. Wound on 2 1/2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7462722-G1
524	- I-p-a Plate I-f Tank Inductor	Consists of 94 turns of Litz wire Spec. SI-8718-J 20/0.004 in. 0.030 in. diam with one tap at 46 turns. Wound on 2 35/64 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7462745-G1

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER
				NUMBER	●			
△								
R-F INDUCTORS AND CHOKE COILS (Cont.)								
525	P-a I-f Tank Inductor	Consists of 81 turns of Litz wire Spec. SI-8718H, 32/0.005 in., 0.045 in. diam with 2 taps, one at 22 turns and one at 45 turns. Wound on 3 1/2 in. O.D. grooved ceramic form.	-	-	-	1	-	ML-7462779-G1
526	P-a H-f Tank Inductor	Consists of 40 turns of 0.064 in. diam bare tinned copper wire with 2 taps, one at 15 turns and one at 24 turns. Wound on 3 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7462765-G1
527	Antenna Variometer	-	-	-	-	1	-	ML-7660364-G1
528	I-p-a Plate H-f Tank Inductor	Consists of 64.5 turns of 0.032 in. diam bare copper wire (0.036 in. diam double enamel) with 2 taps, one at 32.5 turns and one at 39.5 turns. Wound on 2 1/2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7462751-G1
529	I-p-a I-f Grid Tank Inductor	Consists of 109 turns of Litz wire Spec. SI-8718J, 20/0.004 in., 0.030 in. diam with one tap at 49 turns. Wound on 2 1/2 in. O.D. grooved Isolantite form.	-	-	-	1	-	ML-7461821-G1
530	Antenna Loading Coil	Consists of 88 turns of Litz wire Spec. SI-8718E, 64/0.005 in., 0.080 in. diam with 8 taps, tap No. 1 at 18 turns, tap No. 2 at 29 1/4 turns, tap No. 3 at 40 1/4 turns, tap No. 4 at 49 1/4 turns, tap No. 5 at 58 1/4 turns, tap No. 6 at 67 turns, tap No. 7 at 74 turns, tap No. 8 at 82 turns. Left-hand wound single layer, 12 turns per inch. Wound on 6 in. O.D. phenolic compound form.	-	-	-	1	-	ML-7761963-G1

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.

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Section VIII
Table II

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER					
R-F INDUCTORS AND CHOKE COILS (Cont.)									
*531	M-o Screen Grid Choke Coil	Consists of 900 turns of 0.010 in. bare copper wire (0.018 in. D.C.C.) Universal wound, 2 crosses per turn, on 1/2 in. O.D. Isolantite form.	-	-	-	1	-	-	ML-7462717-G1
*532	M-o Plate Choke Coil	Same as 531	-	-	-	-	-	-	-
533	Not Used	-	-	-	-	-	-	-	-
*534	I-p-a Plate Choke Coil	Same as 317	-	-	-	-	-	-	-
*535	P-a H-f Grid Choke Coil	Same as 317	-	-	-	-	-	-	-
*536	P-a I-f Grid Choke Coil	Consists of 575 turns of 0.010 in. diam bare copper wire (0.018 in. D.C.C.) Universal wound, 2 crosses per turn on 1/2 in. O.D. Isolantite form.	-	-	-	1	-	-	ML-7462718-G1
*537	P-a Plate Choke Coil	Consists of two coils, each having 235 turns of 0.0159 in. diam bare copper wire (0.0239 in. D.C.C.) Universal wound, 2 crosses per turn on 1/2 in. O.D. Isolantite form.	-	-	-	1	-	-	ML-7462712-G1
538	Not Used	-	-	-	-	-	-	-	-
539	Not Used	-	-	-	-	-	-	-	-
VACUUM TUBE SOCKETS									
540	Audio Oscillator Tube Socket	Same as 410	-49317	-	-	-	-	-	-
541	M-o Tube Socket	Same as 410	-49317	-	-	-	-	-	-
542	I-p-a Tube Socket	Same as 410	-49317	-	-	-	-	-	-
543	P-a Tube Socket (2 used)	Same as 413	-	-	-	-	-	-	-

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC. NUMBER			MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER
					●	MFR.			
VACUUM TUBES									
*544	-	Audio Oscillator Tube	JAN-837	-	-	-	-	-	-
*545	-	M-o Tube	JAN-837	-	-	-	-	-	-
*546	-	I-p-a Tube	JAN-837	-	-	-	-	-	-
*547	-	P-a Tube (2 used)	JAN-803	-	-	-	-	-	-
SWITCHES									
548	-	M-o Tank Inductor Switch	-	-	-	1 23	-	-	ML-7660329-G2
549	-	I-p-a Grid Tank Inductor	-	-	-	1 23	-	-	ML-7660329-G3
550	-	I-p-a Plate Band Change Switch	-	-	-	1 23	-	-	ML-7660313-G2
551	-	P-a Tank Inductor Switch	-	-	-	1 23	-	-	ML-7660346-G1
552	-	Antenna Coupling Switch	-	-	-	-	-	-	-
553	-	Antenna Loading Coil Tap Switch	-	-	-	1	-	-	ML-7761572-G1
554	-	CW-MCW Switch	-	-	-	1 23	-	-	ML-7660313-G4
555	-	Filament Switch	-	-	-	-	-	-	-
*556	-	Panel Illuminating Lamp Switch	-24001	-	-	-	-	-	-
*557	-	Panel Illuminating Lamp Switch	-24001	-	-	-	-	-	-

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER		
				NUMBER	MFR.					
SWITCHES (Cont.)										
*558	-	Test Key	Same as 386	-	-	-	-	-		
*559	-	Door Interlock	Same as 385	-24067	-	-	-	-		
560	-	Not Used	-	-	-	-	-	-		
561	-	Not Used	-	-	-	-	-	-		
ILLUMINATING AND INDICATING LAMPS										
562	-	Panel Illuminating Lamp Assembly	Same as 366	-	-	-	-	-		
563	-	Panel Illuminating Lamp Assembly	Same as 366	-	-	-	-	-		
564	-	Plate Voltage Indicator Lamp Assembly	Same as 365	-	-	-	-	-		
*564	A		Same as 365A	-	-	-	-	-		
564	B		Same as 365B	-	-	-	-	-		
*565	-	Plate Voltage Indicator Lamp	Same as 362	-	-	-	-	-		
*566	-	Panel Illuminating Lamp	Same as 362	-	-	-	-	-		
*567	-	Panel Illuminating Lamp	Same as 362	-	-	-	-	-		
METERS										
*568	-	I-p-a Grid Milliammeter	Scale 0-10 ma, d-c, 2 1/2 in. diam flush, phenolic case, antiglare glass	-22053	17112	-	1	Type 8 DW-41	-	P-7761557-P12
*569	-	I-p-a Plate Milliammeter	Same as 341	-22058	-	-	-	-	-	-
*570	-	P-a Grid Milliammeter	Same as 341	-22058	-	-	-	-	-	-
*571	-	P-a Plate Milliammeter	Same as 343	-22068	-	-	-	-	-	-
*572	-	Audio Oscillator Plate Milliammeter	Same as 340	-22057	-	-	-	-	-	-

- Δ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●			
METERS (Cont.)								
*573	-	Filament Voltmeter	Same as 347	-22079	-	-	-	-
*574	-	Antenna Ammeter	Scale 0-8 amp r-f, 2 1/2 in. diam flush, phenolic case, antiglare glass, internal thermocouple	-22268	17112	-	1 Type 8 DW-44	P-7761557-P8
575	-	Not Used	-	-	-	-	-	-
576	-	Not Used	-	-	-	-	-	-
RELAYS								
†577	-	Keying Relay	Same as 387	-	-	-	-	-
578	-	Not Used	-	-	-	-	-	-
579	-	Not Used	-	-	-	-	-	-
TRANSFORMERS								
580	-	Filament Transformer	Same as 355	-30409	-	-	-	-
581	-	Audio Oscillator Plate Transformer	1000 cycles, ratio Pri/Sec 2.78/1, Pri 1 to 2, 5 ohms, Pri 1 to 3, 18 ohms, Sec 4 to 5, 20 ohms, Sec 4 to 6, 22 ohms	-30407	-	-	1 Cat. No. 66G25	-
BINDING POSTS, JACKS, AND RECEPTACLES								
582	-	Antenna Terminal	Same as 433	-	-	-	-	-
583	-	Receiver Terminal	Same as 432	-	-	-	-	-
584	-	Counterpoise Terminal	Same as 433	-	-	-	-	-
585	-	A-c Power Receptacle	Same as 428	-	-	-	-	-
586	-	D-c Power Receptacle	Same as 429	-	-	-	-	-

- △ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.
† Spare coils and contacts furnished. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

I-F RADIO TRANSMITTER NAVY TYPE CG-52205

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				
BINDING POSTS, JACKS, AND RECEPTACLES (Cont.)									
587	-	H-v Plate Supply Receptacle	Same as 430	-	-	-	-	-	-
588	-	L-v Plate Supply Receptacle	Same as 431	-	-	-	-	-	-
589	-	Input Line Jack	Same as 425	-49025A	-	-	-	-	-
590	-	Ground Terminal	Same as 435	-	-	-	-	-	-
591 to 599 Incl	-	Not Used	-	-	-	-	-	-	-

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	REF.			
CAPACITORS								
*600	-	Auxiliary Plate Rectifier Filter Capacitor	Same as 248	-48721	-	-	-	-
*601	-	Auxiliary Plate Rectifier Filter Capacitor	Same as 248	-48721	-	-	-	-
*602	-	Main Plate Rectifier Filter Capacitor	Paper; Pyranol askarel-filled, 10 μ F, 1500 volts d-c working	-48917	RE 13A 488	- 1	Model No. 9CE5A92	P-7762164-P3
*603	-	Main Plate Rectifier Filter Capacitor	Same as 602	-48917	-	-	-	-
604	-	Not Used	-	-	-	-	-	-
*605	-	Plate Voltmeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-
*606	-	Filament Voltmeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-
*607	-	Line Voltmeter By-pass Capacitor	Same as 204	-48027-B10	-	-	-	-
608 to 614 Incl	-	Not Used	-	-	-	-	-	-
RESISTORS								
*615	-	Main Plate Rectifier Filter Discharge Resistor	Wire wound: 5000 ohms, Grade 1, Class I, Style B	-63149F *RW12P502	RE 13A 372 JAN-R-26	- 14	-	M-7464451-P38 **P-3R54-P68
*616	-	Main Plate Rectifier Filter Discharge Resistor	Same as 615	-63149F *RW12P502	-	-	-	-
*617	-	Main Plate Rectifier Filter Discharge Resistor	Same as 615	-63149F *RW12P502	-	-	-	-
*618	-	Main Plate Rectifier Filter Discharge Resistor	Same as 615	-63149F *RW12P502	-	-	-	-
619	-	Not Used	-	-	-	-	-	-

△ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

** For replacement use this reference.
† JAN Type designation.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TGN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	MFR.			
△								
RESISTORS (Cont.)								
*620	- Keying Resistor	Wire wound: 5000 ohms, Grade 1, Class II, Style D	-63055E †RW14E802	RE 13A 372 JAN-R-26	-	14	-	M-7464052-P40
*621	- Auxiliary Rectifier Potentiometer Resistor	Wire wound: 4500 ohms, Grade 1, Class II, Style B	-63148E	RE 13A 372	-	14	-	P-7762172-P26
*622	- Auxiliary Rectifier Potentiometer Resistor	Wire wound: 2000 ohms, tapped 10, equal values Grade 1, Class I, Style B	-63229F †RW12P202	RE 13A 372 JAN-R-26	-	14 6	-	K-7893349-F1
*623	- Auxiliary Rectifier Potentiometer Resistor	Wire wound: 5000 ohms, Grade 1, Class I, Style B	-63152F †RW12P802	RE 13A 372 JAN-R-26	-	14	-	M-7464451-P40 **P-3R54-P70
*624	- Auxiliary Rectifier Potentiometer Resistor	Wire wound: 3000 ohms, Grade 1, Class II, Style B	-63145E	RE 13A 372	-	14	-	P-7762172-P20
*625	- Auxiliary Rectifier Screen Grid Potentiometer Resistor	Same as 622	-63229F †RW12P202	-	-	-	-	-
*626	- Auxiliary Rectifier Potentiometer Resistor	Same as 622	-63229F †RW12P202	-	-	-	-	-
*627	- Auxiliary Rectifier Suppressor Potentiometer Resistor	Same as 622	-63229F †RW12P202	-	-	-	-	-
*628	- Microphone Resistor (2 used)	Wire wound: 50 ohms, Grade 1, Class I, Style E	-63275F †RW15P500	RE 13A 372	-	14	-	M-7464454-P18 **P-3R51-P38
629	- Not Used	-	-	-	-	-	-	-
630	- Filament Rheostat	Wire wound: 18 ohms, 50 watts, 1650 ma max current, flat on shaft	-	RE 13A 372	-	6	Model J	M-7462674-P2
*631	- Plate Indicator Lamp Resistor	Wire wound: 4 ohms, Grade 1, Class I, Style E	-63559F †RW15P4R0	RE 13A 372	-	14	-	M-7464454-P7 **P-3R51-P17
632 to 640 Incl	- Not Used	-	-	-	-	-	-	-

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

** For replacement use this reference.

† JAN type designation.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC. NUMBER		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER	
VACUUM TUBES SOCKETS										
△ 641	-	Main Rectifier Tube Socket (2 used)	For use with tubes having medium, 4-pin bayonet base	-	-	-	12	Cat. No. 209 (modified)	-	M-7468165-P3
642	-	Auxiliary Rectifier Tube Socket (2 used)	Same as 641	-	-	-	-	-	-	-
VACUUM TUBES										
*643	-	Main Rectifier Tube (2 used)	Half-wave, high-vacuum rectifier tube	JAN-836	JAN-1	-	18	CNU-836	-	-
*644	-	Auxiliary Rectifier Tube (2 used)	Same as 643	JAN-836	-	-	-	-	-	-
645	-	Not Used	-	-	-	-	-	-	-	-
ILLUMINATING LAMPS										
646	-	Panel Illuminating Lamp Assembly	Same as 366	-	-	-	-	-	-	-
SWITCHES										
*647	-	Panel Illuminating Lamp Switch	Same as 382	-24001	-	-	-	-	-	-
648	-	Line Tap Switch	Rotary, 4 bank, 4 position, with Isolantite insulation	-	-	-	1 23	-	-	ML-7660313-G3
649	-	Primary Tap Switch	Rotary, 1 bank, 3 position with Isolantite insulation	-	-	-	1 23	-	-	ML-7660154-G4
*650	-	Plate Voltage On-Off Switch	Toggle, double-pole, single-throw, 30 amp, 125 volts	-	-	-	1	-	-	M-235685
*651	-	Start and Stop Switch	Same as 650	-	-	-	-	-	-	-

△ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.

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Section VIII
Table II

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS
RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	WFR.			
SWITCHES (Jont.)								
652	- Voltmeter Switch	Rotary, 1 bank, 2 position, with Isolantite insulation	-	-	-	1 23	-	ML-7660346-G2
*653	- Door Interlock	Same as 385	-24067	-	-	-	-	-
*654	- Main Line Switch	Circuit breaker, 2 pole, 20 amp, 230 volts a-c	-	-	-	1	Type AF-1 (modified)	P-7764268-P2
655	- Gas Engine Start Switch	Push button, momentary contact, single-pole, 1 normally open, 1 normally closed, 2 amp, 125 volts	-	-	-	1	-	M-4324194-G1
656	- Gas Engine Choke Control Switch	Same as 655	-	-	-	-	-	-
657	- Gas Engine Stop Switch	Same as 655	-	-	-	-	-	-
ILLUMINATING AND INDICATING LAMPS								
658	- Not Used	-	-	-	-	-	-	-
659	- Not Used	-	-	-	-	-	-	-
*660	- Plate Voltage Lamp	Same as 362	-	-	-	-	-	-
*660	A	Same as 365A	-	-	-	-	-	E-7871647-P2
*661	- Panel Illuminating Lamp	Same as 362	-	-	-	-	-	-
662 to 664 Incl	- Not Used	-	-	-	-	-	-	-
METERS								
*665	- Filament Voltmeter	Same as 347	-22079	-	-	-	-	-
*666	- Rectifier Output Plate Voltmeter	Scale 0-2 kv d-c, sensitivity of 1000 ohms per volt, 2 1/2 in. diam flush, phenolic case, anti-glare glass, includes 667	-22270	17112	-	1	Type 8 DW-41	P-7761557-P10

- △ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 • SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC. NUMBER		MFR. OESIG	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER	
					●				
METERS (Cont.)									
*667	-	Plate Voltmeter External Multiplier Resistor for 666	1000 ohms per volt, 2 tube oage multiplier, included in 666	-	-	-	-	-	
*668	-	Line Voltmeter	Scale 0-150 volts a-c, 2 1/2 in. diam flush, penolic case, anti-glare glass	-22085	17112	-	1	8AW-41	P-7761557-P11
669 to 671 Incl	-	Not Used	-	-	-	-	-	-	
CONTACTORS AND RELAYS									
672	-	Starting Contactor	2 pole, normally open, max continuous rating, 10 amp 600 volts, a-c coil, 115 volts, 60 cycles	-	-	-	1	Cat. No. DL-4986342EK-100	-
673	-	Plate Contactor	Same as 672	-	-	-	-	-	-
674	-	Plate Time Delay Relay	Time setting 4 to 40 seconds. Contact continuous rating 15 amp, 220 volts, a-c coil, 115 volts, 60 cycles	-	1TR6	-	1	Cat. No. DL-5366956G86, CR2820-1099-BK86	-
675 to 679 Incl	-	Not Used	-	-	-	-	-	-	
TRANSFORMERS									
680	-	Main Rectifier Plate Transformer	50/62 cycles, Pri: 0.670 kva, 127/119/111/103 volts Sec: 0.950 kva, 3180/2226/1430 mid. 3.5 kv hv insulation	-30410	-	-	1	Model No. 9TD1252E1	-

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

RECTIFIER POWER UNIT NAVY TYPE OG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC. NUMBER		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
					●			
TRANSFORMERS (Cont.)								
681	- Auxiliary Rectifier Plate Transformer	50/62 cycles, Pri: 0.248 kva, 127/119/111/103 volts Sec: 0.350 kva, 1275/637.5 volts 1.5 kv insulation	-30411	-	-	1	Model No. 9TD1254E1	-
682	- Copper Oxide Rectifier Transformer	50/62 cycles, Pri: 0.053kva, 125/115/105/95 volts Sec: 98/90/82/74 volts	-30408	-	-	1	Cat.No. 66G139	-
683	- Filament Transformer	50/62 cycles, 0.057 kva, Pri: 119/111/103/95 volts Sec 1: -6.3 volts, 0.75 kv insulation Sec 2: - 2.63 volts, 1.5 kv insulation Sec 3: - 2.63 volts, 4.0 kv insulation	-30412	-	-	1	Model No. 9TD1256E1	-
684	- Not Used	-	-	-	-	-	-	-
685	- Not Used	-	-	-	-	-	-	-
REACTORS								
686	- Main Plate Rectifier Reactor	15 henries, 0.42 amp d-c, 91 ohms, d-c resistance, 1.5 kv insulation	-30415	-	-	1	Model No. 9XD407E1	-
687	- Auxiliary Plate Rectifier Reactor	15 henries, 0.45 amp d-c, 68 ohms, d-c resistance, 0.75 kv insulation	-30416	-	-	1	Model No. 9XD408E1	-
688 to 691 Incl	- Not Used	-	-	-	-	-	-	-

- △ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC. NUMBER		MFR. DESIG	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
					●			

COPPER OXIDE RECTIFIERS

692	-	Bias and Control Circuit Rectifier (2 used)	Full wave, copper oxide rectifier, input - 98 volts, a-c, output - 55 volts d-c, 0.45 amp d-c (for 2 units)	-	-	-	1	Model No. 6RC3E37V	-	-
693	-	Not Used	-	-	-	-	-	-	-	-

FUSES

*694	-	Bias Fuse	Cartridge, nonrenewable, 1 amp, 250 volts	-	17F2	-	1	Cat. No. 59950	-	-
*695	-	Main Plate Rectifier H-v Fuse	Cartridge, nonrenewable, 0.75 amp, 2000 volts	-	17F2	-	1	Cat. No. 230074	-	-
*696	-	Auxiliary Rectifier Plate Fuse	Same as 695	-	-	-	-	-	-	-
*697	-	Main Plate Auxiliary Plate Rectifier Primary Fuse	Cartridge, renewable, 20 amp, 250 volts	**28044-20	17F2	-	1	Cat. No. GE1025 **Cat. No. GE3171	-	-
*698	-	Rectifier Filament Fuse	Cartridge, renewable, 3 amp, 250 volts	**28044-3	17F2	-	1	Cat. No. GE1017 **Cat. No. GE3167	-	-
*699	-	Filament Transformer Fuse	Same as 698	-	-	-	-	-	-	-
700 to 704 Incl	-	Not Used	-	-	-	-	-	-	-	-

RECEPTACLES

705	-	Screen Grid, Voltage Supply Cable Receptacle	Same as 429	-	-	-	-	-	-	-
706	-	Filament Voltage Supply Cable Receptacle	Same as 428	-	-	-	-	-	-	-

- △ Symbol part designation, if any.
 ● Style or other applicable designation, if any.
 * SPARE PARTS FURNISHED. Refer to Table IV for quantities.
 ** For replacement use this reference.

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TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS
RECTIFIER POWER UNIT NAVY TYPE CG-20122

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER
				NUMBER	●			
RECEPTACLES (Cont.)								
707	-	Main Plate Voltage Supply Cable Receptacle	Same as 430	-	-	-	-	-
708	-	Auxiliary Plate Voltage Supply Cable Receptacle	Same as 431	-	-	-	-	-
709	-	Receiver Power Supply Cable Receptacle	3 contact, marked 17 to 19 inclusive	-	-	-	1 22	ML-7761594-G2
710	-	Alternator and A-c Power Receptacle	8 contact, marked 1 to 8 inclusive	-	-	-	1 22	ML-7761590-G3
711	-	Alternator Control Cable Receptacle	8 contact, marked 9 to 16 inclusive	-	-	-	1 22	ML-7761590-G4
712	-	115 Volts, A-c Outlet Receptacle	Female receptacle	-	-	-	1	ML-7462840-G1
MISCELLANEOUS								
713	-	Ground Terminal	Same as 435	-	-	-	1	-
714	-	Terminal Board	6 point, phenolic base	-	-	-	1	K-5904041-G1
715 to 719 Incl	-	Not Used	-	-	-	-	-	-
PLUGS								
720 to 723 Incl	-	Not Used	-	-	-	-	-	-
724	-	Alternator and A-c Power Plug	8-pin plug. Included with cable 1305	-	-	-	1	ML-7761589-G3
725 to 749 Incl	-	Not Used	-	-	-	-	-	-
△ Symbol part designation, if any. ● Style or other applicable designation, if any.								

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

CABLES

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				
CABLES FOR H-F RADIO TRANSMITTER									
1306	- Cable for H-f Transmitter	Seven-conductor cable x 7 ft long approx, each conductor shall be No. 16 Awg, 26/0.010-in. stranded tinned copper, wrapped with a closed cotton separator, insulated with 2/64-in. colored 40 per cent rubber, includes plug 416 and end-colors blue and green.	-	-	-	1	-	-	ML-7660386-G7
1307	- Cable for H-f Transmitter	Same as 1306, except includes plug 417 on end. Colors blue and red.	-	-	-	-	-	-	ML-7660386-G8
1308	- Cable for H-f Transmitter	Single-conductor cable x 7 ft long approx, No. 14 Awg, 41/0.010-in. stranded tinned copper, wrapped with a closed cotton separator, insulated with 5/64 in. of R-344 40 per cent rubber, includes plug 418 on end. Colors red and white.	-	-	-	1	-	-	ML-7660386-G12
1309	- Cable for H-f Transmitter	Same as 1308, except includes plug 419 on end. Colors red and amber.	-	-	-	-	-	-	ML-7660386-G11
CABLES FOR I-F RADIO TRANSMITTER									
1306	- Cable for I-f Transmitter	Seven conductor cable x 7 ft long approx, each conductor shall be No. 16 Awg, 26/0.010-in. stranded tinned copper, wrapped with a closed separator, insulated with 2/64-in. colored 40 per cent rubber, includes plug 498 on end. Colors blue and green	-	-	-	1	-	-	ML-7660386-G7
1307	- Cable for I-f Transmitter	Same as 1306, except includes plug 499 on end. Colors blue and red.	-	-	-	1	-	-	ML-7660386-G8

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

CABLES

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	MFR.			
△					●			
CABLES FOR I-F RADIO TRANSMITTER (Cont.)								
1308	- Cable for I-f Transmitter	Single-conductor cable x 7 ft long approx, No. 14 Awg, 41/0.010-in. stranded tinned copper, wrapped with a closed cotton separator, insulated with 5/64 in. of R-344 40 per cent rubber, includes plug 500 on end. Colors red and white.	-	-	-	1	-	ML-7660386-G12
1309	- Cable for I-f Transmitter	Same as 1308, except includes plug 501 on end. Colors red and amber.	-	-	-	1	-	ML-7660386-G11
CABLE FOR RECTIFIER								
1305	- Rectifier Cable	Seven-conductor cable x 10 1/2 ft long approx, each conductor shall be No. 16 Awg, 26/0.010-in. stranded tinned copper, wrapped with a closed cotton separator, insulated with 2/64-in. colored 40 per cent rubber, includes plug 724 on one end and terminal on other. Colors blue and amber.	-	-	-	1	-	ML-7660386-G5
CABLES FOR TRANSFER SWITCH								
1306	- Transfer Switch Cable	Seven-conductor cable x 7 ft long approx, each conductor shall be No. 16 Awg, 26/0.010-in. stranded tinned copper, wrapped with a closed cotton separator, insulated with 2/64-in. colored 40 per cent rubber, includes plug 1720 on end. Colors blue and green.	-	-	-	1	-	ML-7660386-G7
1307	- Transfer Switch Cable	Same as 1306, except includes 1721 on end. Colors blue and red.	-	-	-	-	-	ML-7660386-G8

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR
NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS
CABLES

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●			
△								
CABLES FOR TRANSFER SWITCH (Cont.)								
1308	- Transfer Switch Cable	Single-conductor cable x 7 ft long approx, No. 14 Awg, 41/0.010-in. stranded tinned copper, wrapped with a closed cotton separator, insulated with 5/64 in. of R-344 40 per cent rubber, includes plug 1722 on end. Colors red and white.	-	-	-	-	-	ML-7660386-G12
1309	- Transfer Switch Cable	Same as 1308, except includes plug 1723 on end. Colors red and amber	-	-	-	-	-	ML-7660386-G11

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENT
JUNCTION BOX AND POWER TRANSFER SWITCH NAVY TYPE CG-24094

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				

SWITCHES

1700		Power Transfer Switch	Type SE-1 switch, 8-pole, double-throw, 8-stage, 7 stages to be 2 single-break contacts with center connections. One stage to be 2 single-break contacts with electrically separate connections at rear of switch	-	17S18 Type VC	-	1	-	-	P-7763071-P1
1701	-	Power Transfer Switch	2-bank, 2-position shorting type switch. Each bank used as a single-throw, double-pole. Includes 1701A and 1701B	-	-	-	1	-	-	M-7465379-G1
1701	A		Included in 1701	-	-	-	-	-	-	-
1701	B		Included in 1701	-	-	-	-	-	-	-
1702 to 1704 Incl	-	Not Used	-	-	-	-	-	-	-	-

RECEPTACLES

1705	-	A-c Power Input Receptacle	Same as 428	-	-	-	-	-	-	-
1706	-	D-c Power Input Receptacle	Same as 429	-	-	-	-	-	-	-
1707	-	H-v Plate Input Receptacle	Same as 430	-	-	-	-	-	-	-
1708	-	L-v Plate Input Receptacle	Same as 431	-	-	-	-	-	-	-
1709	-	A-c Power Output Receptacle for H-f Radio Transmitter	Same as 428	-	-	-	-	-	-	-
1710	-	D-c Power Output Receptacle for H-f Radio Transmitter	Same as 429	-	-	-	-	-	-	-

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS
 JUNCTION BOX AND POWER TRANSFER SWITCH NAVY TYPE CG-24094

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				

RECEPTACLES (Cont.)

1711	-	H-v Plate Output Receptacle for H-f Radio Transmitter	Same as 430	-	-	-	-	-	-
1712	-	L-v Plate Output Receptacle for H-f Radio Transmitter	Same as 431	-	-	-	-	-	-
1713	-	A-o Power Output Receptacle for I-f Radio Transmitter	Same as 428	-	-	-	-	-	-
1714	-	D-o Power Output Receptacle for I-f Radio Transmitter	Same as 429	-	-	-	-	-	-
1715	-	H-v Plate Output Receptacle for I-f Radio Transmitter	Same as 430	-	-	-	-	-	-
1716	-	L-v Plate Output Receptacle for I-f Radio Transmitter	Same as 431	-	-	-	-	-	-
1717 to 1719 Incl	-	Not Used	-	-	-	-	-	-	-

PLUGS

1720	-	A-o Power Input Plug	Same as 416	-	-	-	-	-	-
1721	-	D-o Power Input Plug	Same as 417	-	-	-	-	-	-
1722	-	H-v Plate Input Plug	Same as 418	-	-	-	-	-	-
1723	-	L-v Plate Input Plug	Same as 419	-	-	-	-	-	-
1724 to 1749 Incl	-	Not Used	-	-	-	-	-	-	-

△ Symbol part designation, if any.
 ● Style or other applicable designation, if any.

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TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

CONTROL UNIT NAVY TYPE CG-23241

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING PART NUMBER	
				NUMBER	●				
RESISTORS									
*1750	-	Control Relay Series Resistor	Wire wound, 50 ohms $\pm 5\%$, Grade 1, Class I, Style C	-63838F †RW13F500	RE 13A 372 JAN-R-26	-	14	-	M-7464452-P1 & **P-3R53-P38
1751 to 1754 Incl.	-	Not Used	-	-	-	-	-	-	-
SWITCHES									
1755	-	Remote-local Switch	Toggle, 2 circuits break-make, 2 circuits break, 1400 volts rms, 60 cycles, a-o test	-	-	-	9	Cat. No. H-70278-2	P-7763305-P2
1756	-	Start-stop Switch for 4-wire Control	Tumbler switch, 125 volts, 30 amp D.P. or 250 volts, 20 amp	-24062	-	-	1	Cat. No. 235685	M-7462691-P1 **M-7465200
1757	-	Start-stop Switch for 6-wire Control	Start-stop switch, 2 contacts normally open	-	17P4	-	4	Type CR-2940	M-7464438-P1
1758	-	Emergency Stop Switch	Same as 1756	-24062	-	-	-	-	-
INDICATOR LAMPS									
1760	-	Power Indicator Lamp	Indicating lamp assembly rated 110 to 140 volts consisting of:	-	-	-	1	-	M-7460883-P3
*1760	A		Cap: red	-	-	-	1	-	K-2841431-P2
*1760	B		Lamp: 18 volts, 0.11 amp	-	-	-	1	GE Mazda T-4	-
1760	C		Resistor: 1200 ohms	-	-	-	1	-	QLK-1924006
1761 to 1764 Incl.	-	Not Used	-	-	-	-	-	-	-

- △ Symbol part designation, if any.
● Style or other applicable designation, if any.
* SPARE PARTS FURNISHED. Refer to Table IV for quantities.
** For replacement use this reference.

† JAN type designation.

TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM, TCN, TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

CONTROL UNIT NAVY TYPE CG-23241

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG OR SPEC.		MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●				
RELAYS									
1755	- Power Contactor	3 contacts normally open, 1 contact normally closed, Coil, 110 volts, 50 cycles	-	-	-	1	-	-	P-7763201-P14
TRANSFORMERS									
1770	- Contactor Circuit Transformer	Pri: 110/220 volts, 60 cycles Sec: 110 volts, 0.227 amp, kva 0.025	-30684	-	-	1	Cat. No. 67G838	-	M-7465424-P1
1771 to 1799 Incl	- Not Used	-	-	-	-	-	-	-	-
MICROPHONES									
	- Chest Microphone	Consists of one microphone pendant Press-to-Talk Switch, Navy Type CAU-24071, 7-ft rubber-covered cord, and Plug, Navy Type CAU-49007A	-51016A	-	-	9	Spec. H-70750-9	-	P-7765043-P2
	- Microphone	Hand type, consists of hand grip, Press-to-Talk Switch, 6-ft rubber-covered cord, and Plug, Navy Type CAU-49007A, microphone 30 ohms, 200/3000 cycles	-51006A	-	-	9	Spec. H-70740-20 (modified)	-	P-7765044-P2

△ Symbol part designation, if any.

● Style or other applicable designation, if any.

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TABLE II
PARTS LIST BY SYMBOL DESIGNATIONS
FOR

NAVY MODELS TCM-2 AND TCU-2 SERIES OF RADIO TRANSMITTING EQUIPMENTS

CONTROL UNIT NAVY TYPE CG-23241

SYMBOL DESIGNATION	FUNCTION	DESCRIPTION	NAVY TYPE DESIG.	NAVY DWG. OR SPEC.		MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	G.E. COMPANY DRAWING & PART NUMBER
				NUMBER	●			
MICROPHONE								
△	- Microphone	Hand-type, consists of non-locking push to talk switch, 4 ft. shielded two conductor cord, and three circuit plug Navy Type 49007, microphone 213 ohms	-51004C	-	-	3	Type RS38A	K-7890172-P1

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△ Symbol part designation, if any.

● Style or other applicable designation, if any.

TABLE III
PARTS LIST BY NAVY TYPE DESIGNATION FOR
NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED
MISCELLANEOUS (Class 10)			ELECTRICAL INDICATING INSTRUMENTS (Class 22 Cont.)			SWITCHES (Class 24 Cont.)			RELAYS AND CONTACTORS (Class 29 Cont.)		
8	-	362, 363, 364, 565, 566, 567, 660, 661	1	-	1760A	1	-	654	1	-	674B
2	-	365, 564	1	-	1760B	3	-	655, 656, 657	1	-	674C
3	-	365A, 564A, 660A	1	-	1760C	1	-	1700	1	-	674D
2	-	365B, 564B	SWITCHES (Class 24)			1	-	1701	1	-	674E
5	-	366, 367, 562, 563, 646	5	-24001	382, 383, 556, 557, 647	1	-	1755	1	-	1765
1	-	714	2	-24062	1756, 1758	FUSES (Class 28)			1	-	1765A
RECTIFIERS (COPPER OXIDE) (Class 20)			3	-24067	385, 559, 653	2	**28044-3	698, 699	1	-	1765B
1	-	692	1	-	375	1	**28044-20	697	1	-	1765C
ELECTRICAL INDICATING INSTRUMENTS (Class 22)			1	-	376	1	-	694	1	-	1765D
1	-22026	346	1	-	377	2	-	695, 696	1	-	1765E
1	-22053	568	2	-	378, 380	RELAYS AND CONTACTORS (Class 29)			TRANSFORMERS AND REACTORS (Class 30)		
3	-22057	340, 344, 572	1	-	381	2	-	387, 577	1	-30404	356
5	-22058	341, 342, 345, 569, 570	2	-	384, 555	2	-	387A, 577D	1	-30405	357
2	-22068	343, 571	1	-	386, 558	2	-	387B, 577C	1	-30406	358
3	-22079	347, 573, 665	1	-	548	1	-	387C, 577E	1	-30407	581
1	-22085	668	1	-	549	1	-	387D, 577B	1	-30408	682
1	-22268	574	1	-	550	2	-	387E, 577A	2	-30409	355, 580
1	-22269	348	2	-	551, 552	2	-	672, 673	1	-30410	680
1	-22270	666	1	-	553	2	-	672A, 673A	1	-30411	681
1	-	667	1	-	554	2	-	672B, 673B	1	-30412	683
1	-	1760	1	-	648	2	-	672C, 673C	1	-30413	335
			1	-	649	1	-	674	1	-30414	336
			2	-	650, 651	1	-	674A	1	-30415	686
			1	-	652	1	-				

** For replacement use this reference.

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TABLE III

PARTS LIST BY NAVY TYPE DESIGNATIONS FOR

NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED
TRANSFORMERS AND REACTORS (Class 30 Cont.)			R-f INDUCTORS AND TRANSFORMERS (Class 47 Cont.)			CAPACITORS (Class 48 Cont.)			CAPACITORS (Class 48 Cont.)		
1	-30416	687	1	-	522	2	-48366-C5	461, 469	1	-	237
1	-30684	1770	1	-	523	1	-48380-5	239	1	-	238
VACUUM TUBES (Class 38)			1	-	524	1	-48382-B10	475	1	-	450
2	JAN-803	403, 547	1	-	525	2	-48403	245, 250	1	-	452
2	JAN-836	643, 644	1	-	526	4	-48409-B10	231, 232, 233, 234	1	-	453
7	JAN-837	400, 401, 402, 404, 544, 545, 546	1	-	527	1	-48426-C5	224	2	-	460, 468
R-f INDUCTORS AND TRANSFORMERS (Class 47)			1	-	528	1	-48719	491	1	-	494
1	-	300	1	-	529	5	-48721	248, 251, 254, 600, 601	1	-	495
1	-	301	1	-	530	3	-48802	255, 492, 497	1	-	496
1	-	302	2	-	531, 532	1	-48847-B10	228	PLUGS AND SOCKETS, JACKS, RECEPTACLES AND BINDING PARTS (Class 49)		
1	-	303	1	-	536	2	-48883	243, 249	3	-49025A	425, 427, 589
1	-	304	1	-	537	1	-48910-B5	209	1	-49039	426
1	-	305	CAPACITORS (Class 48)			1	-48911-B10	222	7	-49317	410, 411, 412, 414, 540, 541, 542
1	-	306	3	-48011-B10	205, 241, 454	2	-48912-B10	458, 470	2	-	413, 543
2	-	307, 308	37	-48027-B10	204, 206, 210, 211, 212, 213, 214, 216, 218, 219, 220, 226, 227, 229, 230, 240, 242, 247, 455, 456, 459, 463, 464, 465, 471, 472, 473, 474, 484, 485, 486, 487, 488, 489, 605, 606, 607	1	-48913-B10	221	3	-	416, 498, 1720
1	-	316	1	-	471, 472, 473, 474, 484, 485, 486, 487, 488, 489, 605, 606, 607	2	-48914-D2	451	3	-	417, 499, 1721
4	-	317, 318, 534, 535	1	-	471, 472, 473, 474, 484, 485, 486, 487, 488, 489, 605, 606, 607	1	-48915-B5	235	3	-	418, 500, 1722
5	-	319, 320, 326, 327, 328	2	-	471, 472, 473, 474, 484, 485, 486, 487, 488, 489, 605, 606, 607	2	-48916	246, 490	3	-	419, 501, 1723
2	-	321, 324	7	-48035-B10	208, 215, 223, 253, 457, 467, 493	1	-48917	602, 603	6	-	428, 585, 706, 1705, 1709, 1713
1	-	323	1	-	208, 215, 223, 253, 457, 467, 493	1	-48951-C5	476	6	-	429, 586, 705, 1706, 1710, 1714
1	-	520	2	-48038-B5	207, 225	1	-481474-E1	202	6	-	430, 587, 707, 1707, 1711, 1715
1	-	521	1	-48337-C5	236	1	-481475- 0003N1	201	6	-	431, 588, 708, 1708, 1712, 1716
1	-	521	1	-	236	1	-	200	6	-	430, 587, 707, 1707, 1711, 1715
1	-	521	1	-	236	1	-	203	6	-	431, 588, 708, 1708, 1712, 1716
1	-	521	1	-	236	1	-	217	6	-	431, 588, 708, 1708, 1712, 1716

TABLE III

 PARTS LIST BY NAVY TYPE DESIGNATIONS FOR
 NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	QUAN- TITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED
PLUGS AND SOCKETS, JACKS, RECEPTACLES AND BINDING PARTS (Class 49 Cont.)			CABLES FOR TRANSFER SWITCH (Class 62)			RESISTORS (Class 63 Cont.)					
3	-	432, 434, 583	1	-	1306	1	-63639-5	512			
3	-	433, 582, 584	1	-	1307	2	-63640-5	289, 505			
3	-	435, 590, 713	1	-	1308	6	-63641-5	268, 271, 506, 507, 513, 514			
2	-	641, 642	1	-	1309	1	-63642-10	509			
1	-	709	CABLE FOR RECTIFIER (Class 62)			1	-63643-5	510			
1	-	710	1	-	1305	2	-63644-5	277, 516			
1	-	711	RESISTORS (Class 63)			1	-63645-5	267			
1	-	712				1	-63646-10	284			
1	-	724				1	-63673	280			
MICROPHONES (Class 51)			1	-63088E	620	1	-63838F	1750			
			†	RW14E802		†	TRW13F500				
			1	-63145E	624	2	-	288, 515			
1	-51004C	-	1	-63148E	621	1	-	630			
1	-51006A	-	4	-63149F	615, 616, 617, 618	1	-	511			
1	-51016A	-	†	RW12F502		1	-	285			
CABLES FOR I-f TRANSFORMERS (Class 62)			1	-63152F	623	1	-	276			
			†	RW12F802		1	-				
			4	-63229F	622, 625, 626, 627						
			†	RW12F202							
1	-	1306	1	-63275F	628						
			†	RW15F500							
1	-	1307	1	-63288-10	278						
1	-	1308	1	-63288-10	281						
1	-	1309	1	-63288-10	286						
			2	-63288-10	290, 517						
CABLES FOR H-f TRANSFORMERS (Class 62)			1	-63291-5	283						
1	-	1306	2	-63474-10	265, 504						
1	-	1307	1	-63559F	631						
1	-	1308	†	RW15F480							
1	-	1308	1	-63637-5	282						
1	-	1309	1	-63638-5	508						

† JAN type designation.

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Section VIII
Table III

TABLE IV									
SPARE PARTS LIST BY NAVY TYPE NUMBERS									
NAVY MODEL TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS									
BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
MISCELLANEOUS (CLASS 10)									
1	8	-	362, 363, 364, 565, 566, 567, 660, 661	Panel illuminating lamp, 3 candle power, 6-8 volts, double contact base	-	1	GE Mazda No. 64	-	-
1	3	-	365A, 564A, 660A	Indicating lamp globe, red jewel with bezel ring	-	1	-	-	K-7871647-P2
1	3	-	1760	Indicating lamp assembly rated 110 to 140 volts consisting of:	-	1	-	-	M-7460883-P3
1	3	-	1760A	Indicator lamp cap (red)	-	1	-	-	K-7874582-P2
1	3	-	1760B	Indicating lamp bulb, 18 volts, 11 amp	-	1	GE Mazda T-4	-	-
METERS (CLASS 22)									
1	1	-22026	346	Ammeter, scale 0-5 amp, r-f, 2½ in. diam flush, phenolic case, anti-glare glass, internal thermocouple	17I12	1	Type 8 DW-44	-	P-7761557-P4
1	1	-22053	568	Milliammeter, scale 0-10 ma, d-c, 2½ in. diam flush, phenolic case, anti-glare glass	17I12	1	Type 8 DW-41	-	P-7761557-P12
1	2	-22057	340, 344, 572	Milliammeter, scale 0-50 ma, d-c, 2½ in. diam flush, phenolic case, anti-glare glass	17I12	1	Type 8 DW-41	-	P-7761557-P1
1	2	-22058	341, 342, 345, 569, 570	Milliammeter, scale 0-100 ma d-c, 2½ in. diam flush, phenolic case, anti-glare glass	17I12	1	Type 8 DW-41	-	P-7761557-P2
1	2	-22068	343, 571	Milliammeter, scale 0-500 ma d-c, 2½ in. diam flush, phenolic case, anti-glare glass	17I12	1	Type 8 DW-41	-	P-7761557-P3
1	3	-22079	347, 573, 665	Voltmeter, scale 0-10 volts, a-c with red mark on scale at 6.3 volts, 2½ in. diam flush, phenolic case, anti-glare glass	17I12	1	Type 8 AW-41	-	P-7761557-P9
1	1	-22085	668	Voltmeter, scale 0-150 volts a-c, 2½ in. diam flush, phenolic case, anti-glare glass	17I12	1	Type 8 AW-41	-	P-7761557-P11
1	1	-22268	574	Ammeter, scale 0-8 amp, r-f, 2½ in. diam flush, phenolic case, anti-glare glass, internal thermocouple	17I12	1	Type 8 DW-44	-	P-7761557-P8

TABLE IV

SPARE PARTS LIST BY NAVY TYPE NUMBERS

NAVY MODEL TCM. TCN. AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. RATING OR MODIFICATION	G.E. COMPANY DRAWING NUMBER
METERS (CLASS 22 Cont.)									
1	1	-22269	348	Voltmeter, scale 0-150 volts, a-c, 200-3000 cycles, copper-oxide rectifier type, 2½ in. diam flush, phenolic case, anti-glare glass	-	1	Type 8 DW-46	-	P-7761557-P6
1	1	-22270	666, 667	Voltmeter, scale 0-2 kw, d-c, sensitivity of 1000 ohms per volt furnished with one two-tube cage multiplier, 2½ in. diam flush, phenolic case, anti-glare glass	17112	1	Type 8 DW-41	-	P-7761557-P10
SWITCHES (CLASS 24)									
1	3	-24001	382, 383, 556, 557, 647	Toggle, double pole, single-throw, 1 amp, 250 volts, 3 amp, 125 volts	RE 24AA 118	1	Cat. No. 1GA2A21	-	-
1	7	-24067A	385, 559, 653	Interlock, 2.5 amp, 250 volts	-	1	-	-	ML-7460330-G4
1	1	-	386, 558	Key switch, toggle, telephone type, single pole, double-throw, 3 amp, not more than 110 watts. Test voltage 500 volts, a-c, 60 cycles	-	9	Type Z-2877	-	M-7461816-P1
1	1	-	650, 651	Toggle, double-pole, single-throw, 230 amp, 125 volts	-	1	Cat. No. 235685	-	-
1	1	-	654	Circuit breaker, 2 pole, 20 amp, 230 volts a-c	-	1	GE Cat. No. Type AF-1	-	P-7764268-P2
FUSES (CLASS 28)									
1	2	**28044-3	698, 699	Cartridge, renewable, 3 amp, 250 volts	17F2	1	Cat. No. GE1017 **GE3167	-	-
1	2	**28044-20	697	Cartridge, renewable, 20 amp, 250 volts	17F2	1	Cat. No. GE1025 **GE3171	-	-
1	10	-	694	Cartridge, non-renewable, 1 amp, 250 volts	17F2	1	Cat. No. 59950	-	-
1	10	-	695, 696	Cartridge, non-renewable, 0.75 amp, 2000 volts	17F2	1	Cat. No. 230074	-	-
1	10	-	697A	Fuse link, 20 amp, 250 volts	-	1	Cat. No. GE1102	-	-
1	10	-	698A, 699A	Fuse link, 3 amp, 250 volts	-	1	Cat. No. GE1094	-	-

** For replacement use this reference.

TABLE IV
SPARE PARTS LIST BY NAVY TYPE NUMBERS
NAVY MODELS TCM, TCN, AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
RELAY PARTS (Class 29)									
1	16	-	387A, 577D	Screw and contact	-	1	-	-	ML-7871663-G1
1	32	-	387B, 577C	Movable contact	-	1	-	-	ML-7870259-G1
1	16	-	387C, 577E	Movable contact	-	1	-	-	ML-7873178-G1
1	32	-	387D, 577B	Contact	-	1	-	-	ML-7869530-G2
1	3	-	387E, 577A	Coil	-	1	-	-	ML-7462352-G3
1	1	-	672A, 673A	Coil	-	1	Cat. No. 22D72-G108	-	-
1	4	-	672B, 673B	Movable contact	-	1	-	-	K-5303307-G32
1	4	-	672C, 673C	Stationary contact	-	1	-	-	M-5197821-G1
1	1	-	674A	Coil	-	1	Cat. No. F-22D2-G229	-	-
1	1	-	674B	Synchronous timer	-	1	-	-	K-5305284-P22
1	4	-	674C	Stationary contact	-	1	-	-	K-3805657
1	4	-	674D	Movable contact	-	1	-	-	K-4901681-G1
1	4	-	674E	Movable contact	-	1	-	-	K-3805658-G1
1	1	-	1765A	Coil	-	1	Cat. No. 22D2G227	-	-
1	4	-	1765B	Stationary contact	-	1	-	-	K-4900573-G1
1	4	-	1765C	Stationary contact	-	1	-	-	K-4900573-G2
1	4	-	1765D	Stationary contact	-	1	-	-	K-4900573-G3
1	4	-	1765E	Stationary contact	-	1	-	-	K-4900573-G4
1	4	-	1765F	Movable contact	-	1	-	-	K-3863767-G2
VACUUM TUBES (Class 38)									
1	4*	JAN-803	403, 547	R-f power amplifier, pentode type	JAN-1	15	-	-	-
1	4*	JAN-836	643, 644	Half-wave, high vacuum rectifier tube	JAN-1	10	-	-	-
1	7*	JAN-837	400, 401, 402, 404, 544, 545, 546	R-f power amplifier, and oscillator, pentode type	JAN-1	15	-	-	-

* Shipped under separate cover.

TABLE IV
SPARE PARTS LIST BY NAVY TYPE NUMBERS
NAVY MODELS TCM, TCN, AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
R-f INDUCTORS AND CHOKE COILS (Class 47)									
1	1	-	316	Consists of 300 turns of 0.010 in. diam bare tinned copper wire (0.018 in. diam D.C.C.) Universal wound, 2 crosses per turn on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462709-G1
1	2	-	317, 318, 534, 535	Consists of 200 turns of 0.010-in. diam bare tinned copper wire (0.018 in. diam D.C.C.) Universal wound, 2 crosses per turn on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462716-G1
1	3	-	319, 320, 326, 327, 328	Consists of 150 turns of 0.010 in. diam bare tinned copper wire (0.018 in. diam D.C.C.) Universal wound, 2 crosses per turn on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462716-G2
1	1	-	321, 324	Consists of 75 turns of 0.020 in. diam bare tinned copper wire (0.028 in. diam D.C.C.) Universal wound, 4 crosses per turn on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462716-G3
1	1	-	323	Consists of 100 turns of 0.016 in. diam bare tinned copper wire (0.018 in. diam double enamel) wound on 1 in. O.D. Isolantite form.	-	1	-	-	ML-7462772-G1
1	1	-	531, 532	Consists of 900 turns of 0.010 in. diam bare copper wire (0.018 in. D.C.C.) Universal wound, 2 crosses per turn, on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462717-G1
1	1	-	536	Consists of 575 turns of 0.010 in. diam copper wire (0.018 in. D.C.C.) Universal wound, 2 crosses per turn on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462718-G1
1	1	-	537	Consists of 2 coils, each having 235 turns of 0.0159 in. diam bare copper wire (0.0239 in. D.C.C.) Universal wound, 2 crosses per turn on $\frac{1}{2}$ in. O.D. Isolantite form.	-	1	-	-	ML-7462712-G1

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Table IV

TABLE IV									
SPARE PARTS LIST BY NAVY TYPE NUMBERS									
NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENT									
BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
CAPACITORS (Class 48)									
1	2	-48011-B10	205, 241, 454	Mica: 0.0005 μ f $\pm 10\%$, 600 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-13050	-	P-7761560-P2
1	20	-48027-B10	204, 206, 210, 211, 212, 213, 214, 216, 218, 219, 220, 226, 227, 229, 230, 240, 242, 247, 455, 456, 459, 463, 464, 465, 471, 472, 473, 474A, 474B, 484, 485, 486, 487, 488, 489, 605, 606, 607	Mica: 0.01 μ f $\pm 10\%$, 600 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-11010	-	P-7761560-P1
1	4	-48035-B10	208, 215, 223, 253, 457, 467, 493	Mica: 0.01 μ f $\pm 10\%$, 1200 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-21010	-	P-7761560-P3
1	1	-48038-B5	207, 225	Mica: 0.00005 μ f $\pm 5\%$, 2500 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-54050	-	P-7761560-P10
1	1	-48337-C5	236	Mica: 0.001 μ f $\pm 5\%$, 5000 volts test	RE 13A 389 RE 48AA 131	2	Cat. No. PL-246-6LST	-	P-7761566-P18
1	1	-48366-C5	461, 469	Mica: 0.0002 μ f $\pm 5\%$, 5000 volts d-c test	RE 13A 389 RE 48AA 131	2	Cat. No. PL-307-6LST	-	P-7761560-P17
1	1	-48380-5	239	Mica: 0.0003 μ f $\pm 5\%$, 10,000 volts test	RE 13A 389 RE 48AA 122	2	Cat. No. PL-763-50	-	M-7462676-P3
1	1	-48382-B10	475	Mica: 0.01 μ f $\pm 10\%$, 2500 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-51010	-	P-7761560-P7
1	1	-48403	245, 250	Paper, Pyranol, askarel-filled, 2 μ f 2.5% $\pm 10\%$, 400 volts d-c working	RE 13A 488	2	Cat. No. VC-278	-	M-7462695-P1
1	2	-48409-B10	231, 232, 233, 234	Mica: 0.005 μ f $\pm 10\%$, 1200 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-22050	-	P-7761560-P9
1	1	-48426-C5	224	Mica: 0.0003 μ f $\pm 5\%$, 5000 volts test	RE 13A 389 RE 48AA 112	2	Cat. No. PL-611-6LST	-	P-7761566-P16
1	1	-48719	491	Paper, Pyranol askarel-filled, 1 μ f, 600 volts d-c	RE 13A 488	1	Model No. 9CE5A90	-	-
1	3	-48721	248, 251, 254, 600, 601	Paper, Pyranol, askarel-filled, 10 μ f, 600 volts d-c working	RE 13A 488	1	Model No. 9CE5A87	-	-

TABLE IV

SPARE PARTS LIST BY NAVY TYPE NUMBERS

NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
CAPACITORS (CLASS 48 Cont.)									
1	2	-48802	255, 492, 497	Paper, Pyranol askarel-filled, 0.25 μ f, 1000 volts d-c working	RE 13A 488	1	Model No. 9CE6A15	-	P-7763475-P11 *P-7765502-P11
1	1	-48847-B10	228	Mica: 0.006 μ f \pm 10%, 300 volts d-c working	RE 13A 389	2	Cat. No. 1WLS	-	P-7762455-P27
1	1	-48883	243, 249	Paper, Pyranol askarel-filled, 2 uf, 600 volts d-c working	RE 13A 488	1	Model No. 9CE5A93	-	-
1	1	-48910-B5	209	Mica: 0.00005 μ f \pm 5%, 1200 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-24050	-	P-7761560-P4
1	1	-48911-B10	222	Mica: 0.00006 μ f \pm 10%, 1200 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-24060	-	P-7761560-P12
1	1	-48912-B10	458, 470	Mica: 0.0005 μ f \pm 10%, 1200 volts d-c working	RE 13A 389	2	Cat. No. 9LS-23050	-	P-7761560-P5
1	1	-48913-B10	221	Mica: 0.002 μ f \pm 10%, 1200 volts d-c working	RE 13A 389 RE 48AA 112	2	Cat. No. 9LS-22020	-	P-7761560-P11
1	1	-48914-D2	451, 452	Mica: 0.0011 μ f/0.0027 uf, \pm 2%, 1000 volts d-c test	RE 13A 389	2	Cat. No. PL-892-6H	-	M-7462693-P2
1	1	-48915-5	235	Mica: 0.005 μ f \pm 5%, 5000 volts test	RE 48AA 122	2	Cat. No. PL-178-50	-	M-7462694-P1
1	2	-48916	246, 490	Paper, Pyranol askarel-filled, 0.15 μ f, 405 volts a-c, 1000 cycles	RE 13A 488	1	Cat. No. 5213288G1	-	-
1	1	-48917	602, 603	Paper, Pyranol askarel-filled, 10 μ f, 1500 volts d-c working	RE 13A 488	1	Model No. 9CE5A92	-	P-7762164-P3
1	1	-48951-C5	476	Mica: 0.000185 μ f \pm 5%, 5000 volts d-c test	RE 13A 389	2	Cat. No. PL556-6LST	-	P-7761566-P15
1	1	-481474-E1	202	Mica: 290 μ pf \pm 1.0%, 500 volts d-c working. (Molded silver cap)	-	17	-	-	M-7465676-P22
1	1	-481475-0003N1	201	Ceramic: 100 μ pf \pm 1%, 0.0003 uuf/uuf/deg C, 500 volts d-c working	-	13	Class E	-	K-7885330-P1
RESISTORS (Class 63)									
1	1	-63088E †NW14E802	620	Wire wound: 8000 ohms, 60 watts, Grade 1, Class II, Style D	RE 13A 372	14	-	-	M-7464052-P40
1	1	-63145E	624	Wire wound: 3000 ohms, 100 watts, Grade 1, Class II, Style B	RE 13A 372	14	-	-	P-7762172-P20

* For replacement use this reference.

† JAN type designation.

TABLE IV
SPARE PARTS LIST BY NAVY TYPE NUMBERS
NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
RESISTORS (Class 63 Cont.)									
1	1	-63148E	621	Wire wound: 4500 ohms, 100 watts, Grade 1, Class II, Style B	RE 13A 372	14	-	-	P-7762172-P26
1	2	-63149F †RW12F502	615, 616, 617, 618	Wire wound: 5000 ohms, 100 watts, Grade 1, Class I, Style B	RE 13A 372 JAN-R-26	14	-	-	M-7464451-P38 **P-3R54-P68
1	1	-63152F †RW12F802	623	Wire wound: 8000 ohms, 100 watts, Grade 1, Class I, Style B	RE 13A 372 JAN-R-26	14	-	-	M-7464451-P40 **P-3R54-P70
1	2	-63229F †RW12F202	622, 625, 626, 627	Wire wound: 2000 ohms, 100 watts tapped 10, equal values, Grade 1, Class I, Style B	RE 13A 372 JAN-R-26	14	-	-	K-7893349-P1
1	1	-63275F †RW15F500	628	Wire wound: 50 ohms, 20 watts, Grade 1, Class I, Style E	RE 13A 372 JAN-R-26	14	-	-	M-7464454-P18 **P-3R51-P38
1	1	-63288-10	278	Metallized: 5000 ohms ±10%, 1 watt	RE 13A 340	5	Type BT-1	-	P-7761577-P23
1	1	-63288-10	281	Metallized: 100,000 ohms ±10%, 1 watt	RE 13A 340	5	Type BT-1	-	P-7761577-P1
1	1	-63288-10	286	Metallized: 50,000 ohms ±10%, 1 watt	RE 13A 340	5	Type BT-1	-	P-7761577-P3
1	2	-63288-10	290, 517	Metallized: 2200 ohms ±10%, 1 watt	RE 13A 340	5	Type BT-1	-	P-7762300-P66
1	1	-63291-5	283	Metallized: 30,000 ohms ±5%, 1 watt	RE 13A 340	5	Type BT-1	-	P-7761577-P2
1	2	-63474-10	265, 504	Metallized: 50,000 ohms ±10%, 2 watts	RE 13A 340	5	Type BT-2	-	P-7761577-P24
1	1	-63559F †RW15F4R0	631	Wire wound: 4 ohms, 20 watts, Grade 1, Class I, Style E	RE 13A 372 JAN-R-26	14	-	-	M-7464454-P7 **P-3R51-P17
1	1	-63637-5	282	Wire wound: 500 ohms ±5%, 2 watts	RE 13A 372	5	Type AA	-	P-7761577-P21
1	1	-63638-5	508	Wire wound: 800 ohms ±5%, 2 watts	RE 13A 372	5	Type AA	-	P-7761577-P5
1	1	-63639-5	512	Wire wound: 2000 ohms ±5%, 2 watts	RE 13A 372	5	Type AA	-	P-7761577-P7

†JAN type designation. ** For replacement use this reference.

TABLE IV
SPARE PARTS LIST BY NAVY TYPE NUMBERS
NAVY MODELS TCM, TCN AND TCU SERIES OF RADIO TRANSMITTING EQUIPMENTS

BOX NUMBER	QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC. NUMBER	MFR.	MFR. DESIGNATION	SPECIAL TOL. OR RATING MODIFICATION	G.E. COMPANY DRAWING NUMBER
RESISTORS (Class 63 Cont.)									
1	2	-63640-5	289, 505	Wire wound: 2500 ohms $\pm 5\%$, 2 watts	RE 13A 372	5	Type AA	-	P-7761577-P4
1	3	-63641-5	268, 271, 506, 507, 513, 514	Wire wound: 30,000 ohms $\pm 5\%$ 12 watts	RE 13A 372	5	Type DJ	-	P-7761577-P9
1	1	-63642-10	509	Wire wound: 40 ohms $\pm 10\%$, 20 watts	RE 13A 372	5	Type EP	-	P-7761577-P13
1	1	-63643-5	510	Wire wound: 80 ohms $\pm 5\%$, 20 watts	RE 13A 372	5	Type EP	-	P-7761577-P12
1	2	-63644-5	277, 516	Wire wound: 500 ohms $\pm 5\%$, 20 watts	RE 13A 372	5	Type EP	-	P-7761577-P14
1	1	-63645-5	267	Wire wound: 5000 ohms $\pm 5\%$, 20 watts	RE 13A 372	5	Type EP	-	P-7761577-P22
1	1	-63646-10	284	Wire wound: 25,000 ohms tap- ped at 10,000 ohms, $\pm 10\%$, 20 watts	RE 13A 372	5	Type EP	-	P-7761577-P19
1	1	-63673	280	Variable: 75,000 ohms, 13,000 ohms, semilogarithmic taper	-	7	Type C	-	M-7461827-P1
1	1	-63838F †RW13F500	1750	Wire wound: 50 ohms $\pm 5\%$, Grade 1, Class I, Style C	RE 13A 372 JAN-R-26	14	-	-	M-7464452-P18 **P-3R53-P38
1	1	-	276	Rheostat, 3500 ohms, 50 watts, 119 ma max	-	6	Model J	-	M-7462674-P5

†JAN type designation. ** For replacement use this reference.

NAVSHIPS 900.401

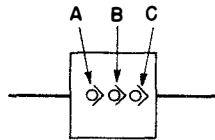
Section VIII
Table IV

TABLE V

APPLICABLE COLOR CODES AND MISCELLANEOUS DATA

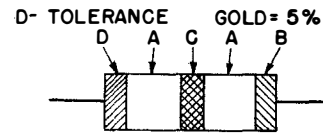
COLOR CODE IN MMFD FOR CAPACITORS

COLOR	A 1ST. DIGIT	B 2ND. DIGIT	C CYPHERS
BLACK	-	0	.0
BROWN	1	1	0
RED	2	2	00
ORANGE	3	3	000
YELLOW	4	4	0000
GREEN	5	5	00000
BLUE	6	6	000000
PURPLE	7	7	0000000
GREY	8	8	00000000
WHITE	9	9	000000000

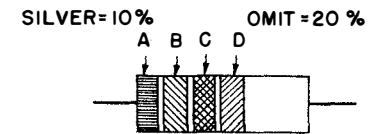


RMA COLOR CODE FOR RESISTORS

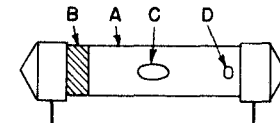
COLOR	A 1ST. DIGIT	B 2ND. DIGIT	C CYPHERS
BLACK	-	0	0
BROWN	1	1	0
RED	2	2	00
ORANGE	3	3	000
YELLOW	4	4	0000
GREEN	5	5	00000
BLUE	6	6	000000
PURPLE	7	7	0000000
GREY	8	8	00000000
WHITE	9	9	- -



ORIGINAL COLOR ARRANGEMENT
FOR AXIAL LEADS



NEW COLOR ARRANGEMENT
FOR AXIAL LEADS



STANDARD COLOR ARRANGEMENT
FOR RADIAL LEADS

TABLE VI

LIST OF MANUFACTURERS

CODE NUMBER	MFR. PREFIX	NAME	ADDRESS
1	CG	General Electric Co.	Schenectady, N. Y.
2	CD	Cornell-Dubilier Electric Corp.	South Plainfield, N. J.
3	CHC	Hammarlund Mfg. Co.	New York, N. Y.
4	CBK	Allen D. Cardwell Corp.	Brooklyn, N. Y.
5	CIR	International Resistance Co.	Philadelphia, Pa.
6	COM	Ohmite Mfg. Co.	Chicago, Ill.
7	CSA	Stackpole Carbon Co.	St. Mary's, Pa.
8		International Motors Co., General Service Dept.	Plainfield, N. J.
9	CAU	Automatic Electric Co.	Chicago, Ill.
10	CRC	RCA Mfg. Co., Radiotron Division	Camden, N. J.
11	CEB	H. B. Eby Mfg. Co.	Philadelphia, Pa.
12		E. F. Johnson Co.	Waseca, Minn.
13	CBN	Central Radio Lab.	Milwaukee, Wis.
14	CAO	Ward Leonard Co.	Mount Vernon, N. Y.
15	CWL	Westinghouse Lamp Works	Bloomfield, N. J.
16	CR	Wireless Specialty & Apparatus Co.	Jamaica Plains, Boston, Mass.
17	CFW	F. W. Sickles Co.	Springfield, Mass.
18	CNU	National Union Radio Corp.	Newark, N. J.
19		Waterman Products Co.	Philadelphia, Pa.
20	CAN	Sangamo Electric Co.	Springfield, Ill.
21	CMX	Magnavox Co.	Fort Wayne, Ind.
22	CFK	A. W. Franklin Mfg. Co.	New York, N. Y.
23	CUA	Uconite Co.	Newtonville, Mass.
24		Simmons Mfg. Co.	Ashland, Ohio
25		United Cinephone Co.	Torrington, Conn.
26	CUA	A. J. Ulmer Co.	New York, N. Y.

