INSTRUCTION BOOK

FOR

TYPE 30J MODEL 18 RADIO TRANSMITTER

MANUFACTURED BY

COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA, U. S. A.

RESTRICTED

PUBLISHED BY AUTHORITY
OF
THE CHIEF SIGNAL OFFICER

INSTRUCTIONS

COLLINS Type 30J

MODEL 18

RADIO TRANSMITTER

Output 250 Watts Radiotelegraph

Output 250 Watts Radiotelephone

Frequencies

Manufactured For

By

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA U. S. A.

231-15

W A R N I N G

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL SHOULD AT ALL TIMES OBSERVE ALL THE SAFETY RULES LISTED BELOW. DO NOT CHANGE TUBES OR MAKE ADJUSTMENTS INSIDE EQUIPMENT WITH HIGH VOLTAGE SUPPLY ON. DO NOT DEPEND UPON DOOR SWITCHES FOR PROTECTION BUT ALWAYS SHUT DOWN POWER EQUIPMENT AND OPEN MAIN SWITCH IN POWER SUPPLY CIRCUIT. ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM.

Since the use of high voltages which are dangerous to human life is necessary to the successful operation of the radio transmitting equipment covered by these instructions, certain precautionary measures must be carefully observed by the operating personnel during the adjustment and operation of the equipment.

The major portions of the equipment are within metal cabinet enclosures, provided with access doors which are generally fitted with safety interlock switches which remove dangerous voltages within the cabinets when access doors are open.

Interlocks are also provided on certain removable panels within the cabinets. Other panels, if removed, will not cause interlocks to function and will thereby allow access to circuits carrying voltages dangerous to human life.

KEEP AWAY FROM LIVE CIRCUITS: Under no circumstances should any person reach within a cabinet with interlocked gates while power supply line switches to the equipment are closed; or handle any portion of exposed equipment which is supplied with power; or to connect any apparatus external to the cabinets to circuits within the cabinets; or to apply high voltages to the equipment even for testing purposes while any non-interlocked portion of the cabinet is removed. Whenever feasible in testing circuits, make continuity and resistance checks rather than directly checking voltage at various points when any high voltage is applied to the transmitter circuits.

DON'T SERVICE OR ADJUST ALONE: Under no circumstances should any person reach within a cabinet for the purpose of servicing or adjusting the equipment without the presence or assistance of another person capable of rendering aid.

DON'T TAMPER WITH INTERLOCKS: Door or safety interlock switches should not be removed or short circuited, nor should reliance be placed upon the interlock switches for removing voltages from the equipment.

GUARANTEE

This equipment is guaranteed against defects in material, workmanship or manufacture, for a period of one year from the date of delivery. Our obligation under this guarantee is limited to repairing or replacing any item which shall prove, by our examination, to be thus defective, provided the item is returned to the factory for inspection with all transportation charges paid. Before returning any item believed to be of defective material, workmanship or manufacture, a detailed report must be submitted to the company giving exact information as to the nature of the defect. The information shall include, in as much detail as possible, all subject material listed under instructions for replacement of parts. Upon receipt of the report by the company, a returned equipment tag will be forwarded to the shipper without delay. The returned equipment tag must accompany all shipments of defective parts. No action will be taken on any equipment returned to the company unless the shipment includes the return tag.

THE COLLINS RADIO COMPANY

REPLACEMENT OF PARTS

In case a replacement under the guarantee is desired, a full report must be submitted to the company. This report shall cover all details of the failure and must include the following information:

(A) Date of delivery of equipment.
(B) Date placed in service.
(C) Number of hours in service.
(D) Part number of item.
(E) Item number (obtain from Parts List or Schematic Diagram).
(F) Type number of unit from which part is removed.
(G) Serial number of unit.
(H) Serial number of the complete equipment.
(I) Nature of failure.
(J) Cause of failure.
(K) Remarks.

When requisitioning replacement parts, the following information must be furnished:

(A) Quantity required.
(B) Part number of item.
(C) Item number (obtain from Parts List or Schematic Diagram).
(D) Type number of unit.
(E) Serial number of unit.
(F) Serial number of equipment.

NOTE: Blank Service Report forms will be found in the appendix of this instruction book.

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I GENERAL CHARACTERISTICS

EQUIPMENT

The 30J Transmitter is completely self-contained except for microphone and key. It is housed in a cabinet whose dimensions are 60 inches high, 20 inches wide and 14 inches deep. The height is exclusive of antenna terminals or mounting pedestal. A minimum of two inches clearance in height should be allowed for antenna feed-through terminals.

The weight of the complete transmitter ready for operation is approximately 386 pounds.

The actual floor space required for the transmitter is 20 inches wide and 14 inches deep; however, at least 20 inches additional depth must be allowed for the opening of the cabinet door on the rear.

TUBES

The tube complement of the 30J Transmitter is as follows:

Tube Type No.	Quant.	Circuit Function	Unit Type
802	1	R.F. Oscillator	10Y-12
807	1	Frequency Multiplier	10Y-12
807	2	Intermediate Amplifier	10Y-12
813	2	R.F. Power Amplifier	10Y-12
6J7G	2	Voltage Amplifiers	9RD-7
6F6G	2	Class"A" Driver	9RD-7
C-120	2	Class"B" Modulator	9RD-7
45	1	Keying Rectifier	401N-4
5Z3	1	Bias Rectifier	401N-4
866A	2	L.V. Plate Power Rectifier	401N-4
866A	2	H.V. Plate Power Rectifier	401N-4

GENERAL CHARACTERISTICS

GENERAL DESCRIPTION

The Type 30J Transmitter is a single channel transmitter designed for general applications such as police service, aeronautical ground stations, or general purpose point-to-point communication, where service is intermittent. The adaptability of this transmitter is attested to by the wide frequency range and the flexible pi tank output circuit arrangement, which permits the use of a variety of antenna types.

The 30J Transmitter is assembled in an enclosed cabinet. The cabinet is constructed of heavy gauge sheet steel reinforced to form a substantial framework for mounting the individual units. The cabinet is finished with St. James gray crinkle, baked enamel on the outside and flat gray lacquer on the inside. A large door is provided on the rear of the cabinet, allowing access to tubes, coils, etc. This door has been provided with perforated grilles, which furnish adequate ventilation, and is fitted with a safety power interlock so that the plate voltage is turned off immediately when the door is opened. An access door is provided on the front of the transmitter and permits access to the exciter tuning controls. This door is also furnished with a power interlocking safety switch.

TYPE OF EMISSION

As the transmitter is normally supplied, radiotelegraph operation (A1) and radiotelephone operation (A3) only are provided. The transmitter is capable of being modulated 100 per cent with the audio harmonic distortion less than 10 per cent. The audio frequency response is uniform within 2 db from 50 to 6000 c.p.s. The carrier noise is more than 40 db below 100 per cent modulation. The audio frequency response of the 30J Transmitter is within 2 db from 50 to 6000 cycles per second. The total harmonic distortion is less than 10%.

GENERAL CHARACTERISTICS

FREQUENCY RANGE

The output radio frequency range of this equipment is 1500 to 60,000 kc. Proper tuning elements can be supplied for matching balanced antennas and balanced transmission lines having impedances of 70 to 1200 ohms and up to 60 degree phase angle or unbalanced antennas and transmission lines of 50 to 300 ohms impedance up to 60 degree phase angle.

FREQUENCY CHANGE METHOD

Plug-in coils are used throughout the 30J Transmitter. Over the intermediate frequency range, the buffer coils and power amplifier grid coil only are changed, the power amplifier output coils being of a tapped variety which permits of adjustment over a wide frequency range.

POWER OUTPUT

The 30J Transmitter is nominally rated at a power output of 250 watts, either telephone or telegraph, in the frequency range 1500 to 30,000 kc. and 200 watts, either telephone or telegraph, in the frequency range 30,000 to 60,000 kc.

POWER SOURCE AND INPUT REQUIREMENTS

The 30J Transmitter is designed to operate from a 110 volt 50-60 cycle power source. The maximum input required from the line for rated output is tabulated below. The average power factor is 0.9.

Emission	Operating Condition	Input Watts
A1	Stand-by	310
A1	Key Open	500
A1	Key Closed	1000
A2	Stand-by	500
A2	Carrier On - Unmodulated	1100
A2	Carrier On - Modulated	1400

GENERAL CHARACTERISTICS

CONTROL

All power switching in the 30J Transmitter is accomplished by means of manually operated switches. Remote control of the power circuits over short distances (under 100 ft.) may be obtained by installing suitable apparatus connected to the transmitter by a multi-conductor cable. The terminal arrangement at the bottom of the transmitter is such that a single remote send-receive switch may be used.

ACCESSORIES

A microphone and telegraph key are the only required accessories for the 30J Transmitter. It is recommended that a diaphragm type crystal microphone be used.

Accessories available on special order include the Type 14NA-1 Control Unit and cable, Type 66G-1 Audio Input Adapter for 500 ohm balanced input, antenna transfer relay, push-to-talk relay and a time delay relay.

II INSTALLATION

UNCRATING

The 30J Transmitter is shipped with the units removed from the cabinet and packed separately. Remove each part of the equipment from its crate and inspect it carefully to be certain it has not been damaged in shipment. Inspect cables and be sure that all cable connections are tight. Inspect each unit for loose screws or bolts. Be sure all controls such as switches, dials, etc., operate properly. All claims for damage should be filed promptly with the transportation company. It is necessary to preserve the original packing box and the packing material in case a claim is to be filed with the transportation company.

GENERAL

The tabulation below lists the various units making up the transmitter and which are packed separately. For purposes of ready identification, the unit letter designation which appears on the schematic diagram is also shown.

Unit Letter Designation	Unit Type Number	Description
A, F, H	29H-7	Transmitter Cabinet Assembly
B	80Z-5	Meter Panel Assembly
C	122C-7	R. F. Output Network
D	10Y-12	Radio Frequency Unit
E	9RD-7	Modulator Unit
G	401N-4	L.V. Bias and Rectifier Power Unit

It will be noted that the cabinet assembly has been shipped with units A, F, and H, completely installed except for H. V. power components which are shown on the schematic as a part of unit H. The main cable assembly is tied in place within the cabinet.

INSTALLATION

PLACING THE CABINET

The transmitter cabinet may now be set in place. It may be located for convenience of operation, but at the same time consideration should be given to power connections, control cables (if required), antenna and ground connections, and maintenance. Reference to the installation drawing, number1920A will indicate the required clearances and base dimensions. As all units are placed in the cabinet from the rear, sufficient clearance should be allowed for a workman between the cabinet and any obstruction. In addition, sufficient clearance should be provided to allow for the rear door to swing back full out of the way.

INSTALLATION OF UNITS

Reference to the photographic illustrations will assist in the assembly of the transmitter. The style strips which are shipped within the cabinet may be removed. Any cords designed to hold the cable in place during shipment may now be untied. Before placing any of the units in the cabinet, mount the style strips, the meter panel glass, the meter panel and the front access door in the order named. The connections to the meters should now be made while the terminals are readily accessible. The antenna blocking condensers mount upon ceramic standoffs on the inside of the left-hand side of the cabinet. The copper tubing connectors for the antenna system are marked with tags on each end. Terminals and lugs bearing the same letter designation are fastened together.

The first of the units to be installed are the two high voltage filter chokes which mount on the bottom of the cabinet. Make the connections to the chokes. Next put the plate transformer in place and connect it to the cable. The remaining units may now be installed in order, working from the bottom upward. As each unit is put in place, it should be bolted solidly to the mounting cleat, when such provision is made. Particular care must be used in placing the 122C Network and the 10Y R.F. Unit. The 10Y Unit must be centered

below the network so that the 813 plate leads will be the same length and the copper grounding strap can be properly terminated. It is very important that the heavy copper ground strap rising from the 10Y R. F. Unit be connected to the high voltage by-pass condenser on the 122C Network.

INTERNAL CONNECTIONS

The connections between units in the 30J Transmitter are made by means of a pre-formed cable. The cable leads are formed and laced tightly so that they have a natural tendency to seek the proper terminal. Each wire is color coded and otherwise identified on the schematic drawing by means of the unit letter and terminal number to which the wire should be terminated. Each cable connection in the transmitter is marked by a tag when the transmitter is dismantled for shipment. The cable connections can therefore be properly installed by following the markings on the tags.

The order of designation of inter-unit cabling is as follows: When a wire terminates on a single numbered terminal on a unit, the wire route is from the source to the terminal on the specified unit and is indicated by the unit letter designation followed by the terminal number. Thus, if a wire emanating from terminal number 2 on Unit A is to be connected to terminal number 7 on Unit D, an arrow at terminal number 2 on Unit A would indicate D7 and a similar arrow at terminal 7 on Unit D would indicate A2.

Color coding of wires follows the Standard Cable Wire Code designations, a copy of which will be found in the appendix section of this book. The code is indicated by a letter such as A, B, etc., followed by a figure such as 1, 3, 5, etc. The letter designates the wire structure, size, amount, and kind of insulation and rating. The figures refer to the RMA color code for resistors, etc. The RMA code is reproduced here for convenience:

Identifying Number	Color
0	Black
1	Brown
2	Red
3	Orange
4	Yellow
5	Green
6	Blue
7	Violet
8	Gray
9	White

Tracer wires are designated by these figures as follows: A red (2) wire with white (9) tracer will carry the number 29. A class "A" wire (see Standard Cable Wire Code) with a red body and white tracer would be designated A29.

FUSES

All fuses should be examined and their ratings checked. The fuses used in this equipment with the parts list item numbers and the units in which they are located, are tabulated below:

Unit Designation	Unit Type Number	Fuse Item Number	Circuit	Fuse Rating
G	401N-4	22	Rectifier Filament Pri.	3 amp.
G	401N-4	23	Fil. Transformer Pri.	6 amp.
G	401N-4	24	L.V. Transformer Pri.	6 amp.
G	401N-4	25	H.V. Transformer Pri.	15 amp.
H	29H-7	19,20	A.C. Line Fuses	20 amp.

EXTERNAL CONNECTIONS

Place all power switches in the OFF position before attempting to make any external connections. The external

connections for the 30J Transmitter consist of the following:

(1) A. C. Power Line
(2) Control and Audio
(3) Radiation System

Power Line

The 30J Transmitter is designed to operate from a 110 volt, single phase, 50/60 cycle power source. The supply line should be checked before connections are made. The maximum load taken by this equipment is 1400 watts. A power line of at least 2 k.v.a. capacity should be installed for each transmitter installation. The power line is to be connected directly to terminals on the fuse block in the bottom of the cabinet. Number 10 or larger wires suitably insulated should be used. It is recommended that an external, wall mounting, disconnect switch be installed between the transmitter and the main line connections.

Control and Audio Input

Remote power switches may be installed by making proper connections to the terminal strip at the bottom of the cabinet. These terminals were arranged to be used with the Type 14NA Control Unit; however, individual switches may be installed if desired. Drawing 1922A will assist in making proper connections of such remote switches.

The microphone plug and cable are passed through an opening in the right side of the cabinet. The plug is inserted in the microphone receptacle on the rear of the 9RD modulator unit. It is very important, in order to avoid r-f feedback problems, to make sure that the clamping ring on the microphone plug is tightly turned up on the threads around the input receptacle.

Radiation System

All antenna and ground connections for the radiation system are made to insulated terminals on the top of the cab-

inet. If a balanced antenna system is employed, the feeders should be connected to the two terminals. In this case no ground connection is made to the output terminals. If an unbalanced antenna feed system such as single wire feed or concentric transmission line is used, the feeder or center conductor is connected to the right-hand terminal, as viewed from the rear of the transmitter, and a good ground is connected to the left-hand terminal. In the case of the concentric line, the left-hand terminal is connected to the outside conductor.

In addition to the ground connection for the antenna system, a heavy ground lead should be connected to terminal number 3 on the terminal strip at the bottom of the transmitter.

III PRELIMINARY ADJUSTMENT

OPERATION OF THIS EQUIPMENT INVOLVES THE USE OF HIGH VOLTAGES WHICH ARE DANGEROUS TO LIFE. OPERATING PERSONNEL SHOULD AT ALL TIMES OBSERVE ALL SAFETY PRECAUTIONS. 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 POWER EQUIPMENT AND OPEN THE MAIN SWITCH IN SUPPLY LINE TO EQUIPMENT.

INSPECTION

Before any adjustments are made, a thorough inspection of all connections and terminals should be made to assure freedom from faulty operation. Inspect each unit for loose screws or bolts. Any loose connections, screws, or bolts, should be made tight.

INSERTION OF TUBES

Each of the units requires tubes in accordance with the lists shown below:

R-F UNIT	MODULATOR	RECTIFIERS
1-802 Oscillator	1-6J7 Input	1-5Z3 Bias Supply
1-807 1st Amp.	1-6J7 Voltage Amp.	1-45 Keying
2-807 2nd Amp.	2-6F6 Audio Drivers	2-866A L.V. Supply
2-813 Power Amp.	2-C-120 Modulators	2-866A H.V. Supply

The locations of the tubes in the R-F Unit are indicated directly on the chassis. When placing the plate leads on the tubes use care so as to avoid putting any mechanical strain on the glass envelope.

In the Modulator Unit the input and first amplifier tubes (6J7) should be placed in the first two sockets at the rear of the chassis and the two driver tubes (6F6) placed directly in front of them. The two modulator tubes (C-210) should be placed in the two large sockets.

PRELIMINARY ADJUSTMENT

The rectifier tubes are all located on the Power Unit. The sockets for the 5Z3 and 45 tubes are marked. The four remaining sockets are for the 866A tubes.

FILAMENT VOLTAGE ADJUSTMENT

The primary taps on all filament transformers have been adjusted so that when the FILAMENT VOLTAGE meter registers 10 volts, proper filament voltage is applied to all tubes. Turn on the filament power and adjust rheostat, designated FIL. VOLT. ADJ., so that the filament voltmeter reads 10 volts.

PLUG-IN COILS

The plug-in coil units for the oscillator and first amplifier stages are wound on ceramic forms fitted with pins to match medium seven-prong sockets. Each coil is shielded with a 2 x 2 x 4 inch aluminum can. This type of coil is designated as the 7000B Series. The name plate on each coil further indicates, by means of the model number, the type of coil as related to pin connections and frequency.

When the transmitter is being operated upon the crystal frequency, the first amplifier tube is not used and the yellow plate lead is placed on the 802 oscillator tube. It should be noted at this time that, whereas only one actual tuning unit is required when operating on the fundamental frequency of the crystal, it is necessary to place a type 7000B-8 coil unit in the oscillator coil socket in order that proper screen voltage may be applied to the 802 oscillator tube. The 7000B-8 unit consists of a plug-in base and shield the same as the other 7000B units; however, this unit contains no coil, but a jumper connection which performs the function of connecting the proper d-c voltage to the screen circuit of the oscillator tube. When operating on other than crystal frequencies, both the 802 and 807 tubes are employed. In this case the green plate lead is placed upon the 802 oscillator tube and the yellow plate lead is placed upon the 807 tube. The

coil identification numbers and the proper coil arrangements for the several modes of operation are shown in Table I. As indicated, each coil unit is stamped with the frequency in kilocycles to which that particular coil will tune. Also, the proper crystal frequency is indicated. As shown by the table, a number of different coil and crystal combinations may be employed. In this way it can be seen that a minimum number of coils is required.

The r-f coil units for the remainder of the stages are as follows:

Combination 2nd Amp. and P.A. Grid Tank - Type 131C

Pi-Tank Output Network - Type 130B

The 131C Unit plugs in the jack base on the R.F. Unit and the 130B Coils plug in the jack strips on the Output Network.

The coil arrangements as described above cover the operation of the equipment with a balanced load only. When the equipment is required to operate into an unbalanced load, a phasing coil is supplied. In general, depending on the operating frequency, additional padding condensers are required to resonate the phasing coil. These padding condensers are mounted on a mycalex plate along with the output network coils and the whole plugs into the network as a unit. This type of coil assembly is designated the 192B. The phasing coils are designated Type 130E.

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TABLE I

TABLE FOR USE OF COILS IN 30J TRANSMITTER

OPERATING FREQUENCY KC.	CRYSTAL FREQUENCY KC.	POSITION #1 OSCILLATOR COIL SOCKET	POSITION #2 BUFFER COIL SOCKET	POSITION OF GREEN PLATE LEAD	POSITION OF YELLOW PLATE LEAD	GRID TANK UNIT	OUTPUT COIL UNIT
1715 to 2000	1715 to 2000	7000B-8	7000B-7 1700 KC.	On Insulated Post	On 802 Osc. Tube	131C-11 1700 KC.	130BA-3
3500 to 4000	1750 to 2000	7000B-7 1700 KC.	7000B-4 3500 KC.	On 802 Osc. Tube	On 807 Buff. Tube	131C-11 3500 KC.	130BA-2
3500 to 4000	3500 to 4000	7000B-8	7000B-7 3500 KC.	On Insulated Post	On 802 Osc. Tube	131C-11 3500 KC.	130BA-2
7000 to 7300	3500 to 3650	7000B-7 3500 KC.	7000B-4 7000 KC.	On 802 Osc. Tube	On 807 Buff. Tube	131C-12 7000 KC.	130BA-1
14000 to 14400	3500 to 3600	7000B-7 7000KC.	7000B-4 14000 KC.	On 802 Osc. Tube	On 807 Buff. Tube	131C-12 14000 KC.	130BA-1
28000 to 30000	3500 to 3750	7000B-4 7000 KC.	7000B-4 14000 KC.	On 802 Osc. Tube	On 807 Buff. Tube	131C-9 28000 KC.	130BC-2
56000 to 60000	4667 to 5000	7000B-4 10,000 KC.	7000B-4 20,000KC.	On 802 Osc. Tube	On 807 Buff. Tube	131C-14 56,000 KC.	130BC-1

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PRELIMINARY ADJUSTMENT

CRYSTALS

A five-prong socket is provided in the R.F. Unit for a plug-in mounted crystal. Crystals furnished in the Collins Type 2C fixed airgap holders provide a frequency accuracy of .04 per cent. If greater accuracy is required, a crystal mounted in an adjustable airgap holder such as Collins Type 294 is recommended. The mounting will give an accuracy of .01 per cent.

RADIO FREQUENCY CIRCUIT ADJUSTMENTS

It is suggested that the installation engineer read this complete section before beginning the tuning adjustments. After this he will be able to make proper adjustments for the particular frequency coil combination which will be used. Make certain that the coils, tubes and crystal are in their proper positions as previously described. The initial adjustment should then be made as noted below.

1. Place the SEND-RECEIVE and the PLATE switches in the OFF position. Place the TELEPHONE-TELEGRAPH switch in the TELEGRAPH position. Close the key or place a short on the KEY terminals.

2. Turn the FILAMENT POWER switch ON. Note whether the glass tubes are lighted to normal brilliancy. The modulator tubes will light only if the Telephone-Telegraph switch is in the Telephone position. Adjust the filament rheostat so that the filament voltmeter reads 10 volts.

NOTE: Permit the equipment to operate in this manner, with filament power only turned on, for a period of 15 minutes. This will permit the 866A rectifier tubes to attain proper operating conditions. Such procedure is necessary only when new rectifier tubes are placed in service.

TUNING PROCEDURE

The tuning controls and switches in the exciter section are engraved with a letter on each dial. The oscillator tuning condenser is engraved with the letter "A". The first amplifier tuning condenser is engraved with the letter "B". The excitation plate and grid switch carries the designation "C". The second amplifier plate tuning condenser is engraved "D", while the final amplifier grid tuning condenser is engraved "E".

When the switches are all in the off position, including the switch C on the r-f chassis, the filament power is turned on. The switch C is then placed in the number 1 position, the oscillator tuning control A is then tuned for maximum reading on the grid current meter. A grid current reading of 1½ to 2 ma. should be obtained. Switch C is then placed in the number 2 position. The first amplifier tuning condenser B is then adjusted for a maximum grid current reading. A reading of 2 to 3 ma. should now be obtained. The switch C is then turned to the number 3 position. The tuning control D is adjusted for minimum plate current to the excitation plate meter and tuning control E is adjusted for maximum grid current to the final amplifier. The tuning controls A, B, D and E may then be readjusted for maximum grid current to the final amplifier after which the plate power may be turned on and the power amplifier adjusted for proper loading. The pi tank circuit controls are on the front of the transmitter just below the meter panel. The control on the left should be adjusted for resonance, while the one on the right is adjusted for proper plate current loading.

When operation is desired on the crystal frequency and the coils are placed in the unit as shown on the coil table, and the plate leads have been adjusted to the proper position, the oscillator tuning control A is not employed. In this case the switch C is immediately placed to the number 2 position, after which the first amplifier tuning control B becomes the oscillator control and is adjusted for a maximum grid current reading and a minimum excitation plate current reading. The tuning procedure than follows as directed above.

PRELIMINARY ADJUSTMENT

Before connecting the transmitter to the antenna, it is good practice to use a dummy load in checking the operation. This dummy load may be a 300-watt light bulb or two 150-watt bulbs in series. These should be connected directly across the antenna terminals.

In adjusting the loading on the final amplifier, tune the left-hand condenser for resonance and the right-hand condenser for proper plate current loading. The proper plate current loading for full rated output is 300 ma. Each time the setting of the antenna loading condenser is changed, the plate condenser must be tuned to resonance. If proper conditions for operation cannot be obtained, change the position of the tap on the output network coils and repeat. The tap must be in the same place on each coil or the output circuit will be unbalanced.

The output network may be arranged for either a balanced or an unbalanced load. The output circuit connections are shown on the 122C schematic drawing 1750D. The balanced circuit employed is a conventional pi section network designed for operation into a balanced load. Unbalanced operation is accomplished with the use of a 130E Phasing Coil L1. As shown in the diagram, this coil is placed directly across the output condenser of the network. Placing a jumper connection in the "B" position (see diagram), one antenna terminal is connected to the rotor plates of the output condenser. This terminal should be connected to the ground of the antenna circuit. The other terminal remains connected to the radio frequency meter the same as for balanced output. This terminal should be connected to the antenna. Tuning adjustments for unbalanced operation of the network on the higher frequency bands are identical to the adjustments for balanced output. When the unbalanced circuit is used on the low frequencies, special pads are required. In this case a special plug-in unit consisting of proper coils and padding condensers mounted upon a mycalex plate are supplied. This plate is plugged into the output network in place of the two separate coils and is used in the same manner with the 130E Phasing Coil mounted on the output tuning condenser terminals. Tuning adjustments for

the low frequencies will then be as previously described; however, it will be found that the position of the taps on the output coils and the corresponding tuning adjustments will be more critical than is found to be the case on the higher frequencies.

ULTRA-HIGH FREQUENCY OPERATION

Tuning adjustments for ultra-high frequency operation are identical to the adjustments for the lower frequency bands. When making adjustments at the ultra-high frequencies, it should be remembered that the tuning will appear to be more critical than at the lower frequencies because a small change in capacity will tune over a greater frequency range. It should also be noted that the minimum dips in plate current are not as noticeable on the ultra-high frequencies as they are on the lower frequency bands.

NEUTRALIZATION

The screen grid tubes such as the type 813 used in the power amplifier of this transmitter normally do not require neutralization; however, when these tubes are employed on the ultra-high frequency bands, circuit characteristics are such that a slight amount of neutralization is required. For this reason very small neutralizing capacities have been installed in this transmitter. These have been adjusted for proper operation on a frequency of 60 mc. These condensers have been fixed and cannot be adjusted. No attempt should be made to alter this neutralizing circuit.

ROUTINE OPERATION

The adjustments described above have placed the transmitter in proper condition for operation from the transmitter panel.

PRELIMINARY ADJUSTMENT

Telegraph Operation

The transmitter may be keyed whenever the "TELEPHONE-TELEGRAPH" switch is in the "TELEGRAPH" position. The transmitter should never be keyed with this switch in the "TELEPHONE" position.

Telephone Operation

The TELEPHONE-TELEGRAPH switch should never be changed from one position to another without first turning off the plate power. It is important that the modulators be operated only when the power amplifier is adjusted for the proper plate current loading (300 ma.). Tuning adjustments for telephone operation are exactly the same as those for telegraph operation. 100% modulation is obtained when the modulator plate meter swings up to approximately 180 ma. during voice modulation. The plate current from a pure tone source such as a sine wave audio oscillator is approximately 240 ma., but this value is not reached for 100% voice modulation because of the wave form error of the plate current instrument. It is extremely bad practice to allow the plate current to greatly exceed 180 ma. under voice modulated operating conditions, since this will result in overmodulation causing serious distortion and interference on adjacent channels. It is suggested that the practice of speaking quite close to the microphone be followed, and that the gain control of the amplifier be adjusted for proper modulation when the operator is speaking in a normal tone of voice. The advantage gained by adjusting the level for close talking is that variation in level due to movement of the operator is likely to be much less than if the gain control setting is increased so that the operator has to stay a certain distance from the microphone to maintain the desired level.

Remote Operation

As previously mentioned, remote operation of this equipment is possible over short distances, by means of external switches connected to ther terminal strip at the bottom of the cabinet. For remote operation it is merely necessary to place

the Telephone-Telegraph switch in the position required, the Send-Receive switch in the Receive position and the power switches in the OFF position. All remote switches are connected in parallel with panel switches.

IV CIRCUIT DESCRIPTION

A-C POWER CONTROL

A simplified power control circuit is employed in the 30J Transmitter. The three toggle switches labeled "FILAMENT POWER", "PLATE POWER" and "SEND-RECEIVE", control the filament power, the 1250 volt plate power, and the 500 volt plate power and bias power, respectively. The "SEND-RECEIVE" switch is connected in such a manner that if it is operated alone, it disconnects both the 1250 and 500 volt plate supplies. The "TELEPHONE-TELEGRAPH" switch disconnects the modulator filaments and opens the keying circuit when it is placed in the telegraph position. This switch also operates a relay in the modulator unit which shorts the modulation transformer and part of the 1250 volt filter when the telegraph position is used. Two door interlock switches are employed in the 30J Transmitter. One switch is placed on the access door in the front of the unit. This switch cuts off only the 1250 volt supply when the access door is open. In this way the buffer stages may be tuned through the door. The other door interlocking switch is placed upon the rear cabinet door and cuts off both the 1250 and 500 volt rectifiers.

NOTE: Neither of these door interlocking switches should be shorted out under any circumstances.

REMOTE CONTROL

Remote control of the power circuits in the 30J Transmitter is possible over short distances by means of separate switches connected to the terminal strip. This control may consist of a single "Send-Receive" switch or a full complement of switches for filament power control, plate power control and "stand-by". Telephone-Telegraph change-over is not practical except by the use of a special relay at the transmitter. All remote switches connect in parallel with the corresponding panel switches. Proper connections are shown on drawing number 1922A.

CIRCUIT DESCRIPTION

RECTIFIER POWER SYSTEM

The 30J Transmitter employs three separate d-c power circuits. These consist of a bias supply, a low voltage supply for the low power buffer stages, and a high voltage supply for the power amplifier and modulator stages. The bias supply consists of one 5Z3 rectifier tube in a single phase, full wave rectifier circuit. The bias supply plate transformer has a 110 volt, 50 to 60 cycle per second primary. The d-c output of this system is approximately 375 volts and provides fixed bias for the radio frequency amplifier stages and plate power for the speech amplifier stage. A separate rectifier tube, type 45, is connected to the bias supply transformer in the half-wave rectifier circuit and provides a separate negative d-c voltage which serves as the block grid keying voltage.

The low voltage plate supply consists of two type 866A mercury vapor rectifier tubes in a single phase, full wave rectifier circuit. This supply is operated from the 110 volt, 50/60 c.p.s. source and furnishes 500 volts plate power for the low level radio frequency stages and screen power for the amplifier tubes.

The high voltage plate power supply consists of two 866A mercury vapor rectifier tubes in a single phase, full wave rectifier circuit. It is supplied from the 110 volt, 50/60 c.p.s. source and furnishes plate power to the radio frequency power amplifier and the modulator stages. The plate power transformer is arranged with a tapped secondary winding so that voltages of 750,1000 and 1250 volts may be obtained for operation of the power amplifier at different power output levels.

KEYING SYSTEM

This transmitter uses grid-block keying of the exciter amplifiers. A half-wave rectifier is connected across half of the L.V. plate transformer so as to apply a negative bias of approximately 190 volts to the grids of the first and

second r-f amplifiers and to the oscillator suppressor so as to effectively block excitation to the final amplifier.

AUDIO SYSTEM

A single speech amplifier-modulator unit is employed in the 30J Transmitter. The input consists of a 6J7 tube and is designed for use with a diaphragm type crystal microphone. An intermediate, transformer coupled, 6J7 voltage amplifier stage comes next and is followed by two 6F6 tubes operating Class "A" push pull, which serve to drive the modulator stage. The class "B" modulator stage consists of a pair of type C-120 zero bias tubes. These tubes are capable of supplying 250 watts of audio power with negligible amount of audio frequency distortion. The modulation transformer is arranged with two secondary windings in order that the screen grid circuit of the power amplifier tube can be modulated to the same degree and in phase with the plate circuit. For 100% modulation, a pure tone input to the modulator of approximately -30 db across 500 ohms is required (using 6 mw. as zero level).

When the transmitter is operated telegraph, the filaments of the modulator tubes are turned off and the secondary of the modulation transformer and a section of the high voltage power supply filter are short circuited.

RADIO FREQUENCY SECTION

Oscillator

The 30J Transmitter employs a type 802 pentode oscillator tube which is controlled by a low temperature coefficient quartz crystal, providing an oscillator having high frequency stability. The oscillator is designed so that power output can be obtained on the harmonic frequencies as well as the fundamental frequency of the crystal. The control grid and the screen grid of the tube, together with the cathode, constitute the primary oscillator circuit which is allowed

to oscillate at all times voltage is applied to the screen grid. The primary oscillator circuit is coupled to the plate circuit by means of the electron stream and is controlled by the suppressor grid. When the suppressor grid is at ground potential, full output is obtained from the oscillator plate circuit, and when a negative of about 200 volts is applied to the suppressor the r-f output of the oscillator section is effectively blocked from the plate circuit. The transmitter is keyed for telegraph operation by means of the control voltage on the suppressor grid. The tuning of the plate circuit is independent of the oscillator section.

Frequency Multiplier

This stage employs a type 807 beam power tube with a plug-in tank coil and is operated as a frequency multiplier when required. The grid circuit is capacitatively coupled to the plate circuit of the oscillator tube and employs a combination of fixed and grid leak bias. When the transmitter is operated on crystal frequency, the tube in this stage is not used. By changing the plate lead to the oscillator tube, the tank circuit becomes the oscillator plate output tank circuit.

Intermediate Amplifier

This stage employs two type 807 beam power amplifier tubes with a plug-in tank coil in combination with the final amplifier grid tank coil to which it is inductively coupled. At frequencies less than 20 mc. this stage is always operated as a straight push-pull amplifier. At higher frequencies this stage operates as either a push-pull doubler or a push-pull tripler, depending on the frequency. The grid is capacitatively coupled to the preceding stages and uses a combination of fixed and grid leak bias. The tubes are capacitatively neutralized.

Final Amplifier

The final radio frequency amplifier employs two type 813 tubes operating in push-pull. These tubes are operated

as plate modulated Class C amplifiers. A combination of fixed and grid leak bias is employed in the grid circuit which is inductively coupled to the output of the preceding stage. This stage is capacitatively neutralized. The final amplifier employs a balanced pi tank output network.

Radio Frequency Output Circuit

The output circuit employed in the 150S Transmitter consists of a pi section plate tank circuit. It is designed to operate over the frequency range 1500 to 60,000 kc. by means of plug-in coils. It is designed to operate into a balanced transmission line with high harmonic attenuation. The network is arranged, however, so that a variety of output circuit configurations may be obtained. As a matter of fact the entire output network may readily be replaced by a special unit when special circuit configurations are desired.

V MAINTENANCE

This radio equipment is constructed of materials considered to be the best obtainable for the purpose, and has been carefully inspected and adjusted using accurate test equipment. No one but an authorized and competent service man equipped with proper test facilities should be permitted to service this equipment.

ROUTINE INSPECTION

Routine inspection schedules should be set up for periodic checks of this equipment. This inspection should include examination of the mechanical system for excessive wear or binding and of the electrical system for electrical defects. Make a check of emission characteristics of all tubes. After the emission check, examine the prongs on all tubes to make sure that they are free from corrosion. See that all tubes are replaced correctly and fully in their sockets, and that good electrical contact is made between the prong of the tube and the socket. Check all relays for proper operation and inspect relay contacts to make certain that the contact surfaces are clean and free from pits and projections. Make certain that contacts of all receptacles and plugs such as microphone, key and cable connectors are clean and that these make firm mechanical connection between one another.

If the routine inspection of the equipment is carried out faithfully, the chances of improper operation of the equipment are greatly minimized. It is, therefore, important that this inspection be made as frequently as possible and it should be sufficiently thorough to include all major electrical circuits of the equipment as well as the mechanical portion.

CLEANING

The greatest enemy to uninterrupted service in equipment of this type is corrosion and dirt. Corrosion itself is accelerated by the presence of dust and moisture on the component parts of the assembly. It is impossible to keep

moisture out of the equipment in certain localities, but foreign particles and dust can be periodically removed by means of a soft brush and a dry, oil-free jet of air. Remove the dust as often as a perceptible quantity accumulates in any part of the equipment. It is very important that rotating equipment such as variable condensers and tap switches be kept free from dust to prevent undue wear. Likewise, variable condenser plates should be kept free from dirt to avoid flashover on modulation peaks.

RELAYS

In general the contact adjustment of the a-c type relay is not critical. Spare contacts and spare coils can be obtained and replacement made when necessary. Never use an abrasive on the contact surfaces. Relays which have excessive hum are usually not seating properly. Dirt on the pole faces is the most likely cause of this and may be removed by washing with gasoline.

FUSES

This equipment is supplied with fuses of correct rating in each position. Fuse failures should be replaced with spares only after the circuit in question has been carefully examined to make certain that no permanent fault exists. Always replace a fuse with the rating as specified in the table on page 8.

CRYSTALS

The low frequency-temperature coefficient quartz crystals as supplied in Collins transmitters are extremely active and rugged. They should require little or no attention over long periods of time. The type 1 series crystal holders are sealed against moisture and dirt and should not be opened unless all tests of the oscillator circuit point to erratic condition in the crystal.

MAINTENANCE

If required, the crystal and electrodes may be cleaned with carbon tetrachloride and a soft cloth. After reassembling the holder and before resealing with duco cement in the case of type 1 series holder, the holder with crystal in position should be heated to drive out any excess moisture. The temperature in the heating process should not exceed 60 degrees C.

It is recommended that crystals should not be examined unless a fault develops, since frequent cleanings and handling will in time change the frequency.

TROUBLE SHOOTING

The most general cause of improper operation of radio equipment is tube failure. A complete set of tested tubes of the same types specified should be kept on hand at all times. If faulty operation of the transmitter is observed and tube failure suspected, each tube may be checked by replacing it with a like tube known to be in good condition. In case an open fuse is found, it is an indication of overload on some circuit in the transmitter. The overload may be caused by a short circuit. The short circuit may be due to a foreign article being dropped into the cabinet, a defective condenser, defective tubes or a high voltage arc. A direct short is most readily found by means of continuity meter. The d-c resistance of the various circuits may be checked in order to locate the fault.

Defective tubes causing an overload in power circuits may usually be located by inspection. It will be found that excessive heating or sputtering within the vacuum tubes is a good indication of a fault in the tube circuit. High voltage arcs may be caused by bent condenser plates, corrosion or dust. It is well known that one of the greatest sources of trouble in equipment located in a salt atmosphere is corrosion. Corrosion resulting from salt spray or salt laden atmosphere may cause failure of the equipment for no apparent reason. In general it will be found that contacts such as tap switches, tube prongs, cable plug connectors and relay contacts are most effected by corrosion. When it is necessary to operate

the equipment in localities subject to such corrosive atmosphere, inspection of wiping contacts, cable plug, relays, etc., should be made more frequently in order to keep the equipment in good condition.

In general trouble encountered in radio apparatus may be isolated by means of various tests and measurements, and the section of the transmitter determined in which the trouble is located. If this is done, the components of the associated circuit may be checked and the trouble located.

APPENDIX

TABLE II

TYPICAL METER READINGS FOR 30J

	1.5 to 20 Megacycles				20 Megacycles & Over			
	Switch Position				Switch Position			
	Plate Off			Pl.On	Plate Off			Pl.On
	1	2	3	3	1	2	3	3
Filament (Volts a.c.)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Excitation Plate (ma.)	0	30	60	60	20	80	270	270
Amplifier Grid (ma.)	0	2	20	15	2	4	20	15
Amplifier Plate (ma.)	0	0	0	300	0	0	0	300
Static Mod. Pl. (ma.)	0	0	0	90	0	0	0	90
Plate Voltage	0	0	0	1250	0	0	0	1250

Note: Antenna current varies widely due to different antenna circumstances. Typical antenna currents cannot, therefore, be given.

TABLE III

VOLTAGES OCCURRING IN THE 30J

Line Voltage 110-115 Volts 50/60 c.p.s.		VOLTS						
		AC	DC					
		Fil.	Grid		Plate		Screen	
			L.F.	H.F.	L.F.	H.F.	L.F.	H.F. *
Oscillator	802	6.3	-22	-32	400	470	180	250
1st R-F Amp	807	6.3	-190	-128	470	420	280	300
2nd R-F Amp.	807	6.3	-300	-190	470	430	200	260
Final R-F Amp.	813	10.0	-100	- 90	1250	1250	400	400
Input Sp. Amp.	6J7	6.3	8		215		-	
2nd Sp. Amp.	6J7	6.3	13		330		-	
Audio Drivers	6F6	6.3	42		420		-	
Modulators	C-120	10.0	0		1250		-	
Bias Rectifier	5Z3	5.0	-		420		-	
Keying Rectifier	45	2.5	-		190		-	
L.V. Supply	866A	2.5	-		560		-	
H.V. Supply	866A	2.5	-		1250		-	

* L.F. - Frequencies below 20 meters.
H.F. - 20 meters or above.

NOTE: The above d-c voltages were measured with a 1000 ohm-per-volt meter. For more specific information concerning an individual transmitter, consult the Engineering Test Data sheets which accompany the transmitter.

TABLE IV

TYPICAL AUDIO FREQUENCY DATA

FREQUENCY RESPONSE

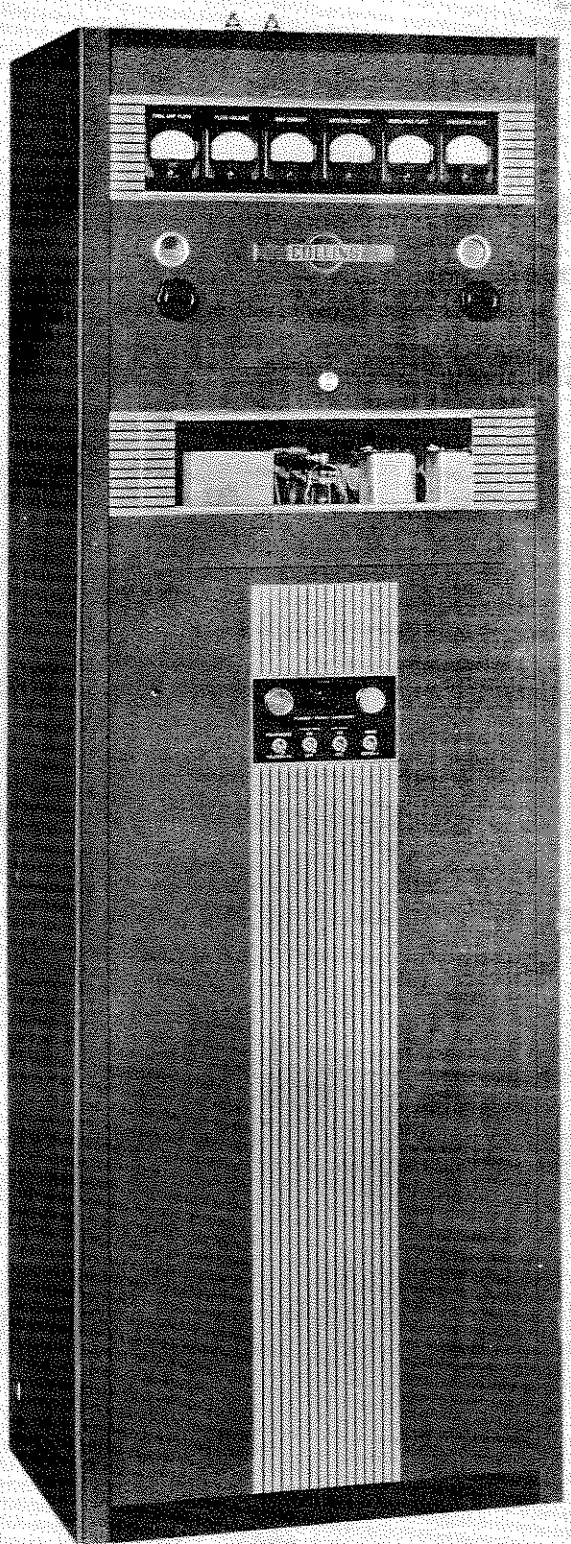
Taken at an input level of -19 db to the modulator unit. Modulation level 95% at 1000 c.p.s.

Frequency	DB	Frequency	DB
60	0	1000	0
120	+.5	2000	- .2
200	+.2	3000	-2.0
300	0	5000	-7.5
500	0	6000	-6.0
		8000	-3.0

DISTORTION: Distortion at 95% modulation 5.5% r.m.s. measured at 400 c.p.s.

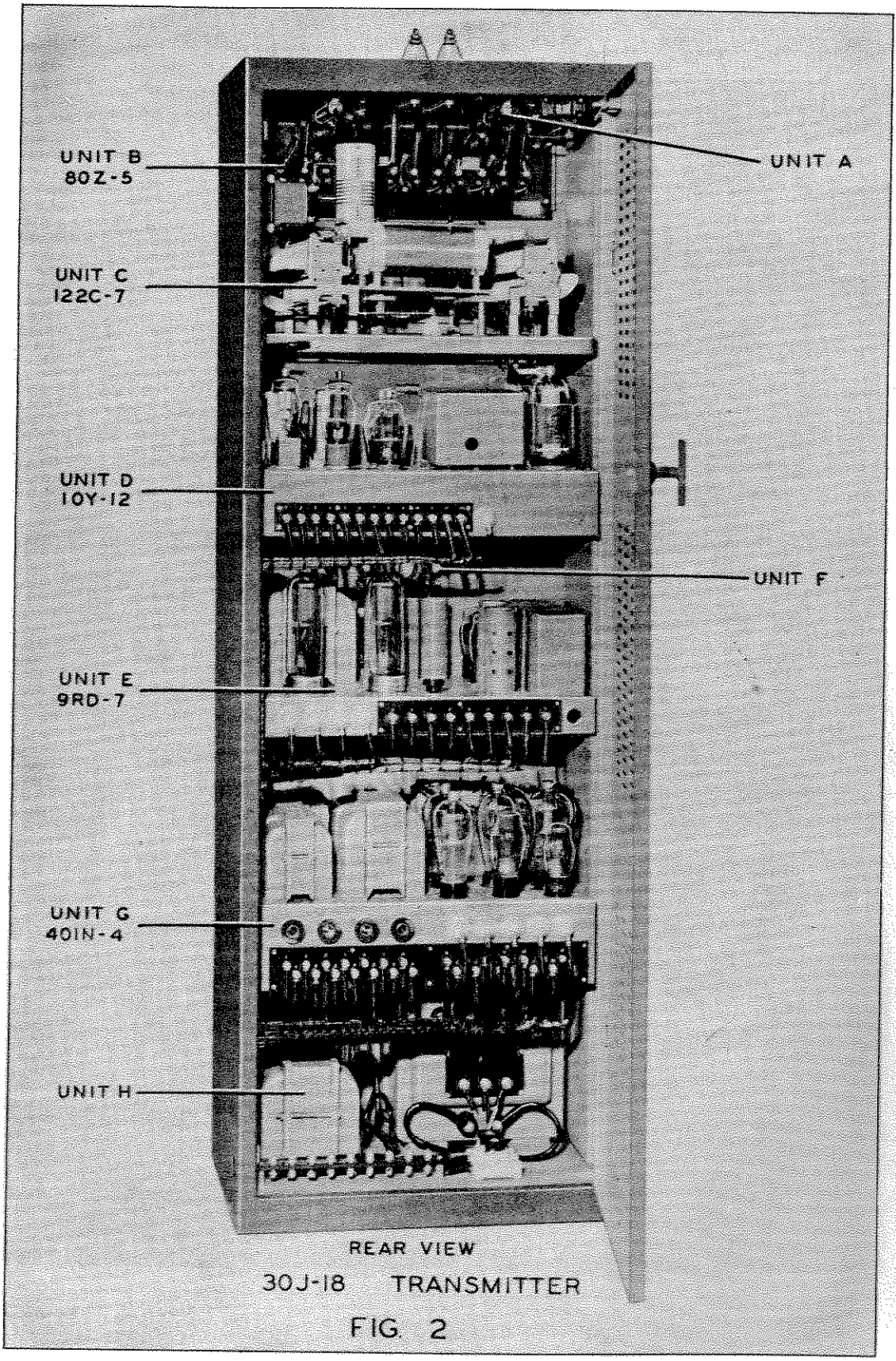
NOISE LEVEL: Noise level on carrier -40 db below 100% modulation.

CARRIER SHIFT: Carrier shift at 100% modulation -2.0%.



30J-18 TRANSMITTER

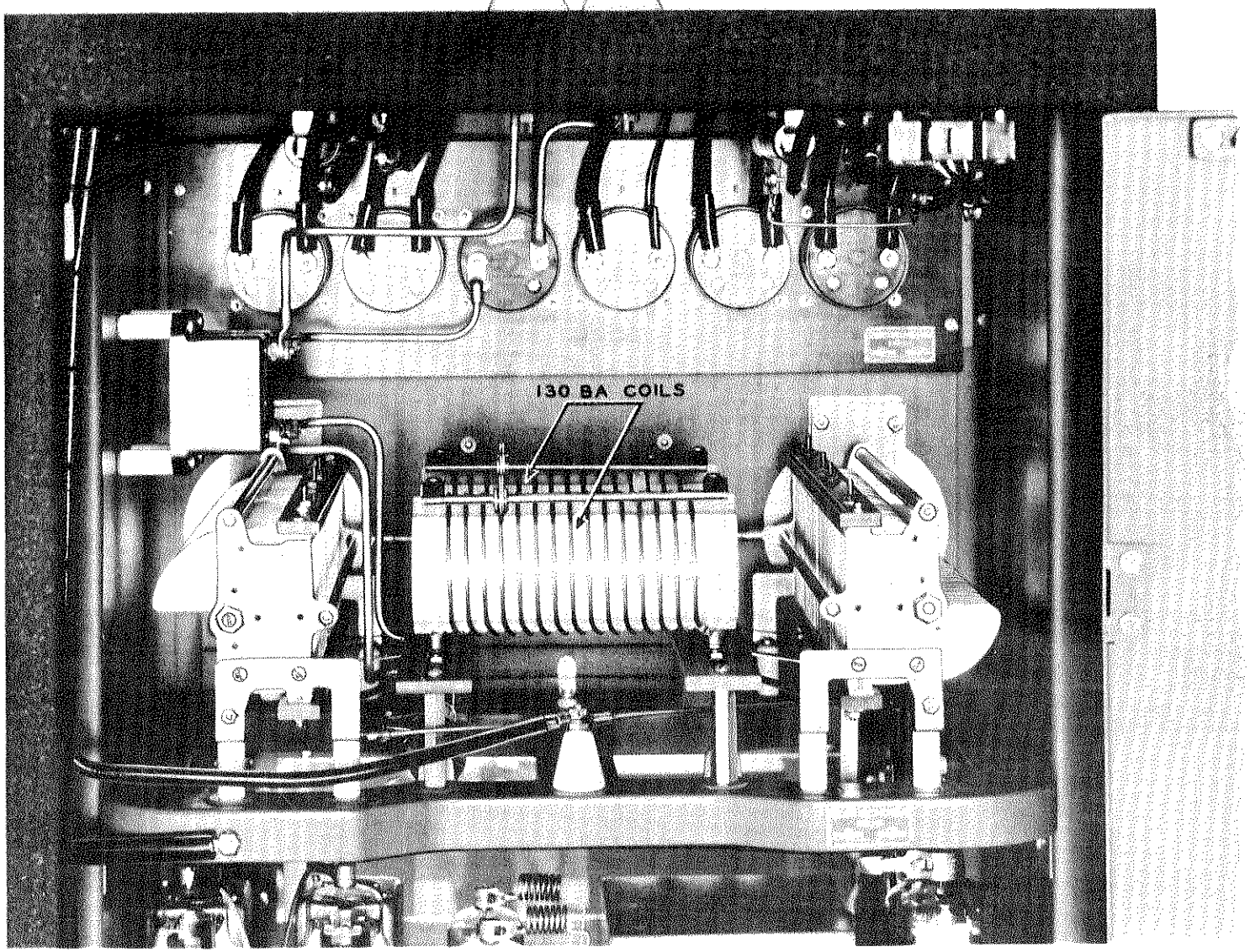
FIG. 1



REAR VIEW

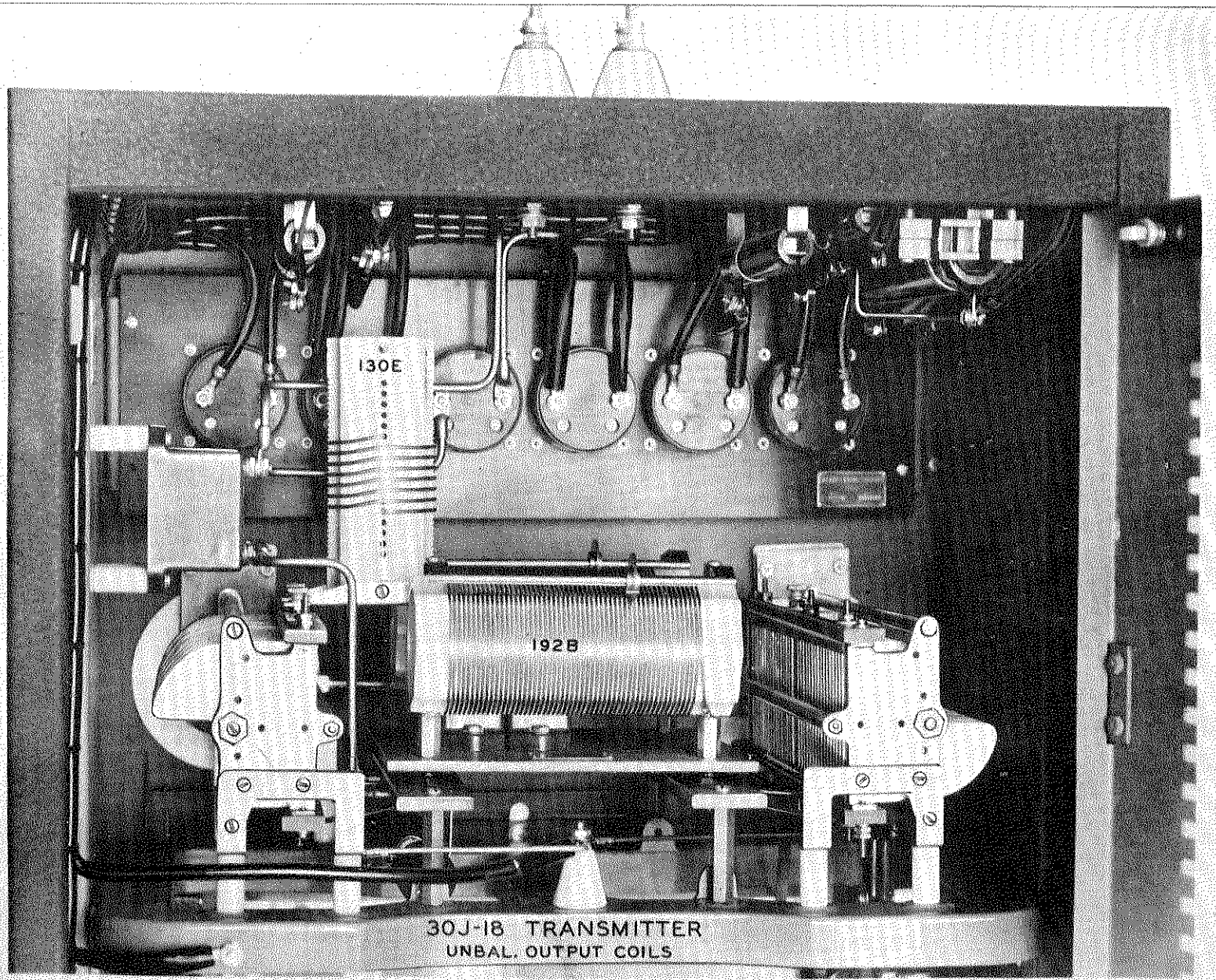
30J-18 TRANSMITTER

FIG. 2



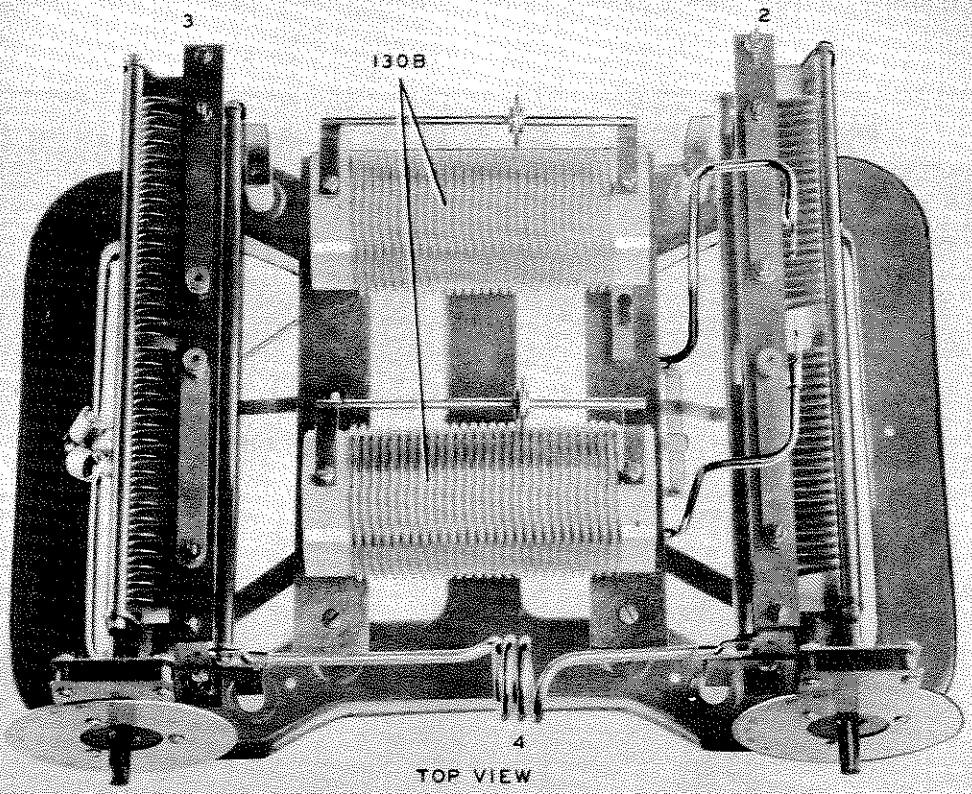
30J-18 TRANSMITTER — BALANCED OUTPUT COILS

FIG. 3

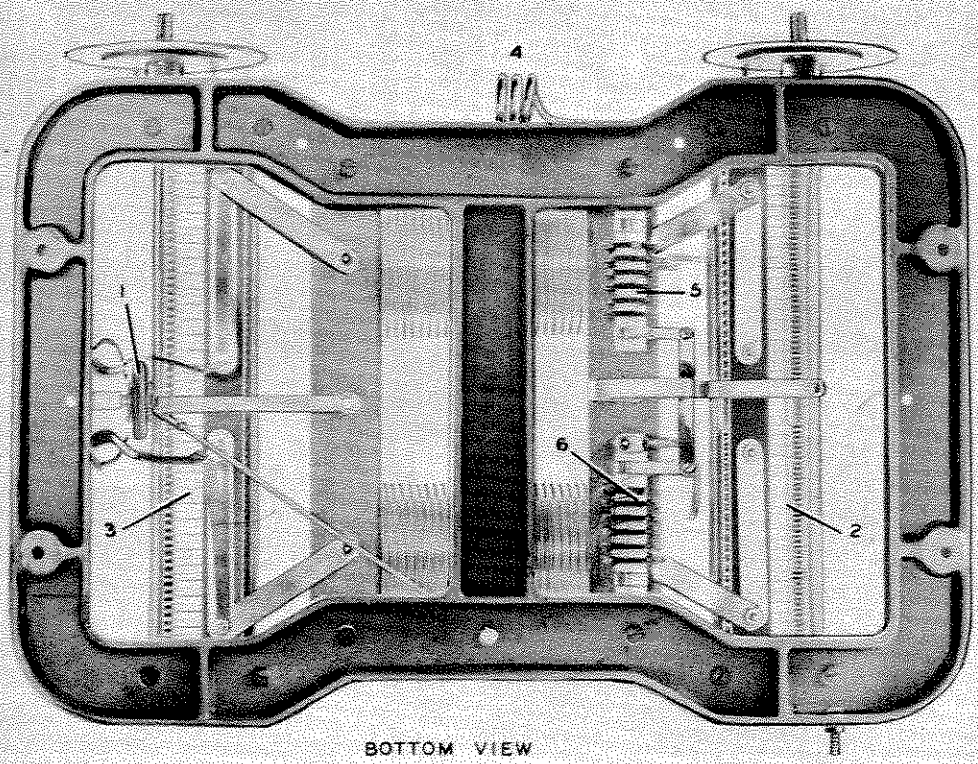


30J-18 TRANSMITTER
UNBAL. OUTPUT COILS

FIG. 4



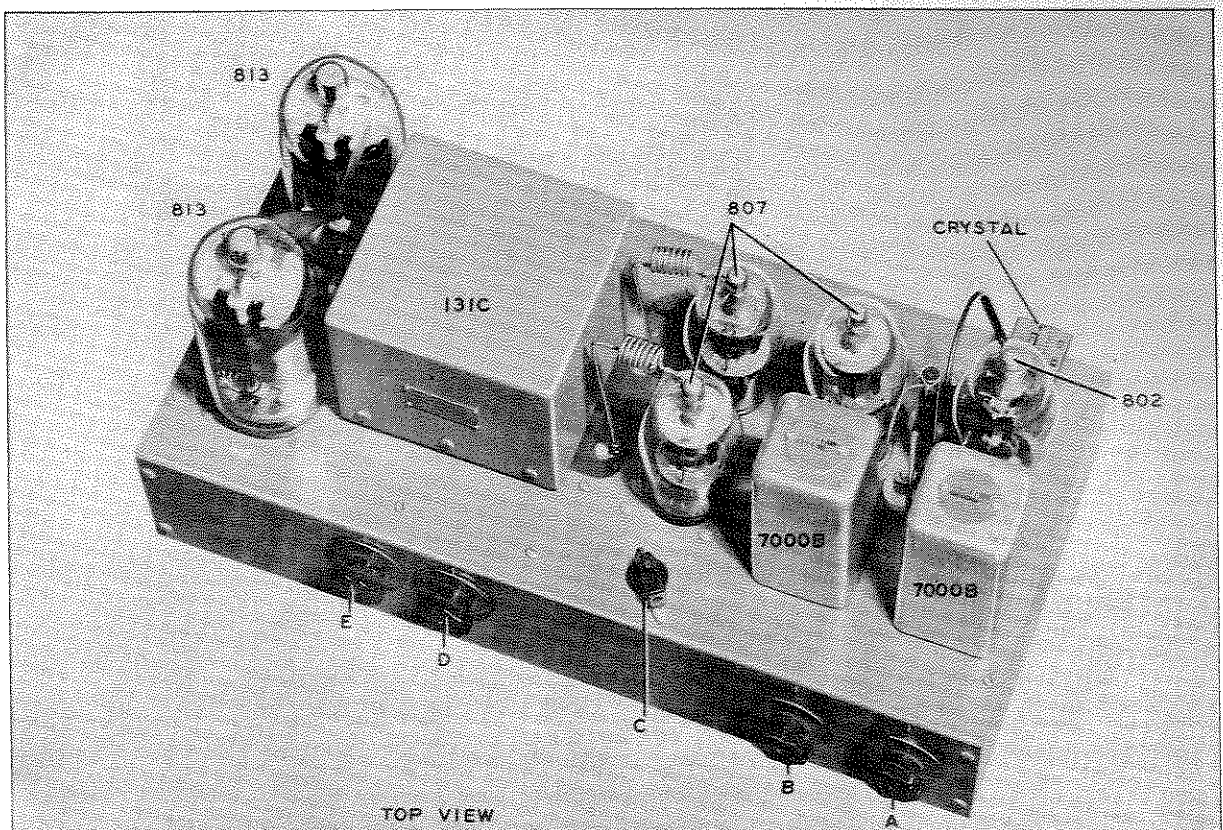
TOP VIEW



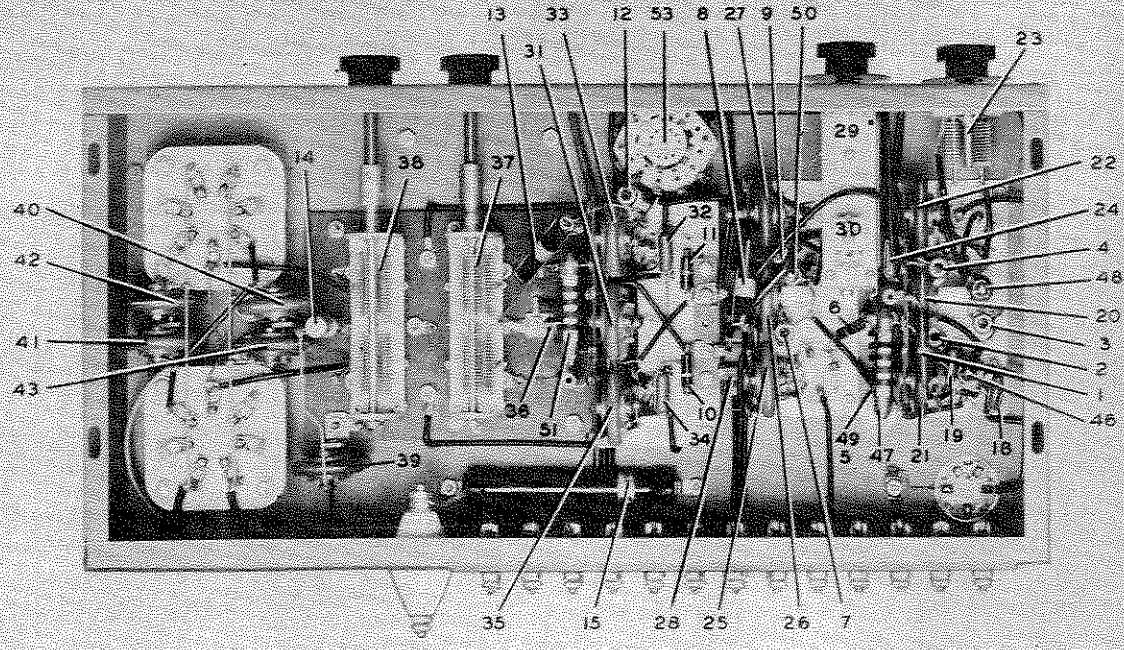
BOTTOM VIEW

122C-7 OUTPUT NETWORK

FIG. 5



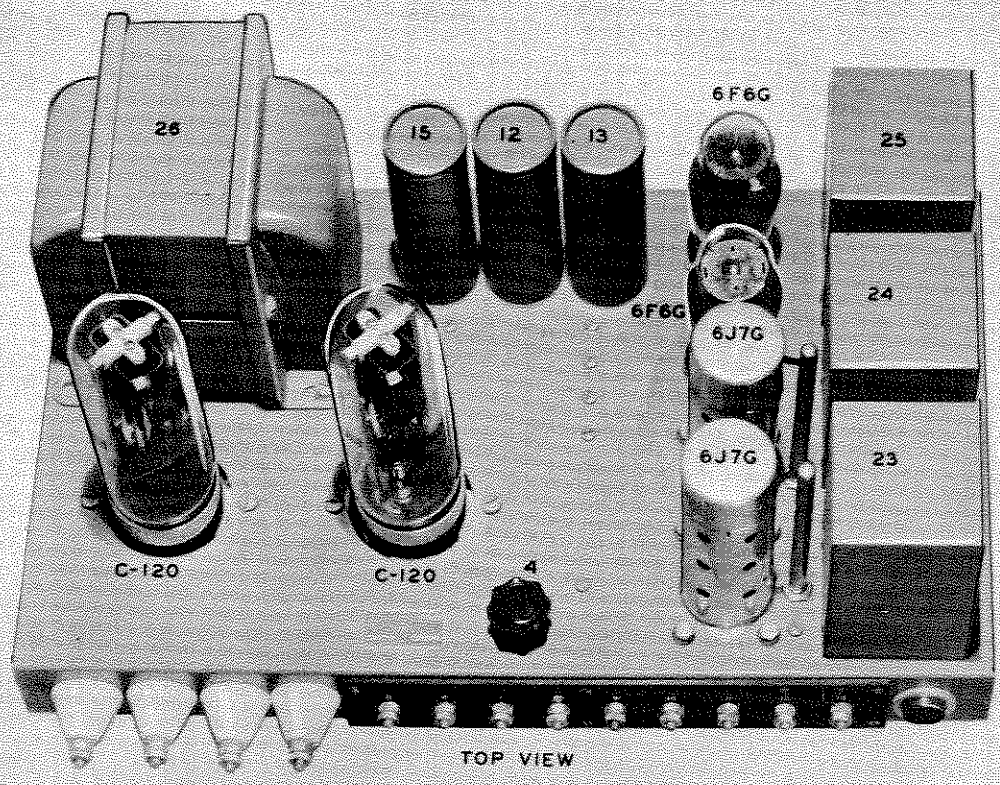
TOP VIEW



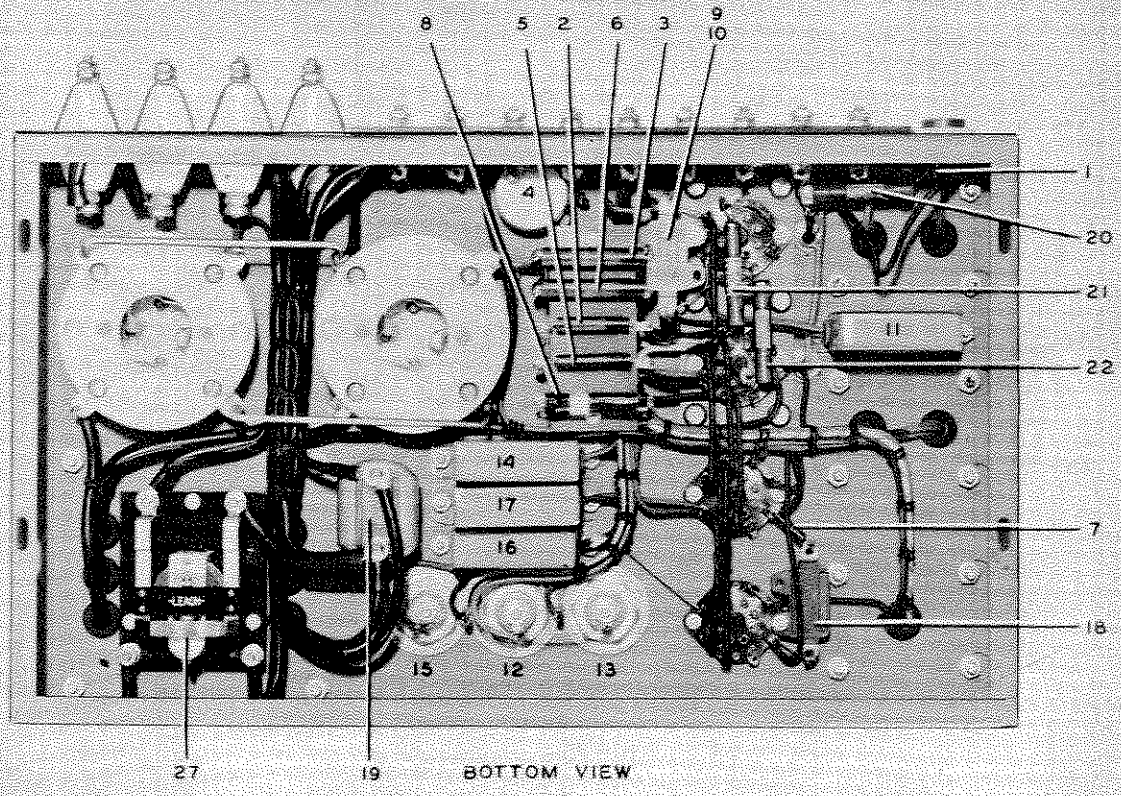
BOTTOM VIEW

10Y-12 R.F. UNIT

FIG. 6



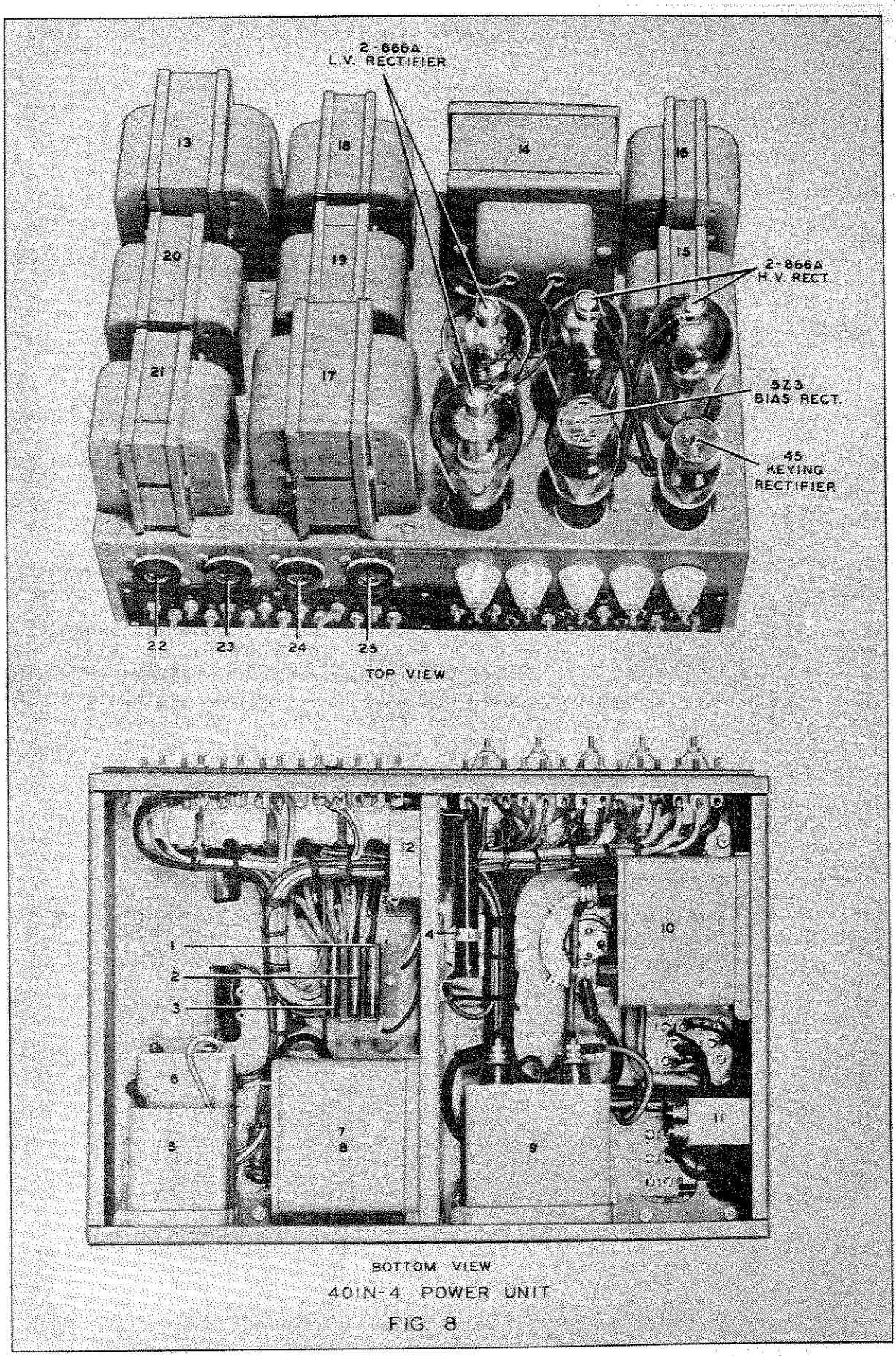
TOP VIEW



BOTTOM VIEW

9RD-7 MODULATOR

FIG. 7



401N-4 POWER UNIT

FIG. 8

PARTS LIST
29H-7 CABINET ASSEMBLY

UNIT A: BLEEDER SECTION

Item	Function	Specification	Part No.
1	Bias Voltage Divider	500 ohm 100 w. ±10%	710NE500
2	Bias Voltage Divider	2000 ohm 100 w. ±10%	710NE2M
3	H.V. Bleeder Resistor	50,000 ohm 160 w. ±10%	710NF50M
4	V.M. Multiplier Resistor	100,000 ohm 50 w. ±1%	728N100M
5	V.M. Multiplier Resistor	100,000 ohm 50 w. ±1%	728N100M
6A	Male Section Rear Door Sw.		260N404
6B	Female Section Rear Door Sw.		260N405

UNIT F: SWITCH PANEL

7	Filament Rheostat	8 ohm 50 watt	736N8
8	Filament Voltmeter	15 v. A.C. Vane Type	452NJ15
9A	Fil. Pwr. Pilot Socket		262N136
9B	Fil. Pilot Green Filter		262N237
9C	Pilot Lamp Bulb	125 v. 3 watt	262N331
10A	Plate Pwr. Pilot Socket		262N136
10B	Plate Pilot Red Filter		262N236
10C	Pilot Lamp Bulb	125 v. 3 watt	262N331
11A	Male Section Access Door Sw.		260N404
11B	Female Section Access Door Sw.		260N405
12	Filament Power Switch	DPST Toggle	260N101
13	Send-Receive Switch	DPST Toggle	260N101
14	Plate Power Switch	DPST Toggle	260N101
15	Telephone-Telegraph Sw.	DPST Toggle	260N101

UNIT H: POWER COMPONENTS

16	Plate Power Transformer		662S448
17	H.V. Filter Choke		668S456A
18	H.V. Filter Choke		668S456A
19	A.C. Line Fuse	20 amp. Plug Type	264N120
20	A.C. Line Fuse	20 amp. Plug Type	264N120

PARTS LIST
80Z-5 METER PANEL

UNIT B

Item	Function	Specification	Part No.
1	Final Amp. Plate Meter	500 ma. d.c.	450NJ500
2	Plate Voltage Meter	2000 v. d.c. (10 ma.)	458N016J
3	Grid Current Meter	50 ma. d.c.	450NJ50
4	Antenna Current Meter	3 amp. R.F.	451NJ3
5	Modulator Plate Meter	500 ma. d.c.	450NJ500
6	Excitation Plate Meter	500 ma. d.c.	450NJ500

122C-7 OUTPUT NETWORK

UNIT C

1	H.V. Bypass Condenser	.001 mfd. 5000 v.	950N210A
2	Antenna Loading Cond.	440 mmfd. Dual Variable	920N35
3	Plate Tank Condenser	240 mmfd. Dual Variable	920N37
4	Isolation Choke	2.5 mh. 0.5 amp.	240N25
5	Plate Choke	2.5 mh. 0.5 amp.	240N25
6	Plate Choke	2.5 mh. 0.5 amp.	240N25
7*	Ant. Blocking Cond.	.002 mfd. 6000 v. ±5%	906N220H
8*	Ant. Blocking Cond.	.002 mfd. 6000 v. ±5%	906N220H

* Mounted on side of cabinet.

PARTS LIST
10Y-12 R.F. UNIT

UNIT D

Item	Function	Specification	Part No.
1	Osc. Grid Resistor	100,000 ohm 1 w.	704N100M
2	Osc. Cathode Resistor	1,000 ohm 10 w.	710NA1M
3	Osc. Screen Resistor	15,000 ohm 10 w.	710NA15M
4	Osc. Plate Resistor	2,500 ohm 10 w.	710NA2500
5	First Buffer Grid Resistor	100,000 ohm 2 w.	706N100M
6	First Buffer Parasitic Res.	27 ohm 1 w.	703N27
7	First Buffer Screen Res.	25,000 ohm 10 w.	710NA25M
8	First Buffer Plate Res.	1,000 ohm 10 w.	710NA1M
9	Second Buff. Grid Res.	100,000 ohm 2 w.	706N100M
10	Second Buff. Parasitic Res.	10 ohm 1 w.	703N10
11	Second Buff. Parasitic Res.	10 ohm 1 w.	703N10
12	Second Buff. Screen Res.	20,000 ohm 10 w.	710NA20M
13	Second Buff. Screen Res.	20,000 ohm 10 w.	710NA20M
14	Amplifier Grid Res.	5,000 ohm 10 w.	710NA5M
15	Amplifier Screen Resistor	3,000 ohm 50 w.	710ND3M
16			
17			
18	Osc. Grid Condenser	.000025 mfd. 900 v.	909N425D
19	Osc. Cathode Cond.	.0001 mfd. 900 v.	909N310C
20	Osc. Screen Cond.	.006 mfd. 1000 v.	910N260A
21	Osc. Suppressor Cond.	.006 mfd. 1000 v.	910N260A
22	Osc. Plate Cond.	.0005 mfd. 1000 v.	910N350A
23	Osc. Plate Tuning Cond.	100 mmfd. Var.	922N2
24	First Buff. Grid Cond.	.0001 mfd. 900 v.	909N310C
25	First Buff. Cathode Cond.	.006 mfd. 1000 v.	910N260A
26	First Buff. Screen Cond.	.006 mfd. 1000 v.	910N260A
27	First Buff. Plate Cond.	.0005 mfd. 1000 v.	910N350A
28	First Buff. Pl. Res. Bypass	.006 mfd. 1000 v.	910N260E
29	First Buff. Tank Cond.	140 mmfd. Dual	922N6
30	First Buff. Equalizing Cond.	30 mmfd. Var.	918N1
31	Second Buff. Cathode Cond.	.006 mfd. 1000 v.	910N260A
32	Second Buff. Screen Cond.	.004 mfd. 900 v.	909N240C
33	Second Buff. Screen Cond.	.006 mfd. 1000 v.	910N260A
34	Second Buff. Screen Cond.	.004 mfd. 900 v.	909N240C
35	Second Buff. Screen Cond.	.006 mfd. 1000 v.	910N260A
36	Second Buff. H.V. Bypass	.006 mfd. 1000 v.	910N260A
37	Second Buff. Plate Tank Cond.	140 mmfd. Dual	922N6
38	Amp. Grid Tank Cond.	140 mmfd. Dual	922N6
39	Amp. Grid Bias Cond	.006 mfd. 1000 v.	910N260A
40	Amp. Screen Condenser	.002 mfd. 5000 v.	950N220A

PARTS LIST
10Y-12 R.F. UNIT

Item	Function	Specification	Part No.
41	Amp. Screen Condenser	.002 mfd. 5000 v.	950N220A
42	Amp Fil. Bypass Cond.	.006 mfd. 1000 v.	910N260A
43	Amp Fil Bypass Cond.	.006 mfd. 1000 v.	910N260A
44			
45			
46	Osc. Grid Choke	2.5 mh. 125 ma.	240N2
47	Osc. Cathode Choke	2.5 mh. 125 ma.	240N2
48	Osc. Plate Choke	2.5 mh. 125 ma.	240N2
49	First Buffer Grid Choke	2.5 mh. 125 ma.	240N2
50	First Buffer Plate Choke	2.5 mh. 125 ma.	240N2
51	Second Buffer Cathode Choke	2.5 mh. 125 ma.	240N2
52			
53	Tuning-Stage Selector Sw.	4 pos. 2 Section	259N100

PARTS LIST
9RD-7 MODULATOR UNIT

UNIT E

Item	Function	Specification	Part No.
1	Input Grid Resistor	5 megohm 1/2 w.	702N5meg.
2	First 6J7 Cathode Res.	2000 ohm 1 w.	704N2M
3	Audio Decoupling Res.	50,000 ohm 2 w.	706N50M
4	Speech Amp. Gain Control	200,000 ohm Pot.	376N102
5	Second 6J7 Cathode Res.	2000 ohm 1 w.	704N2M
6	Audio Decoupling Res.	10,000 ohm 2 w.	706N10M
7	Equalizing Resistor	50,000 ohm 1/2 w.	702N50M
8	6F6 Cathode Resistor	750 ohm 10 w.	710NA750
9	First 6J7 R.F. Filter Cond.	.002 mfd. 1000 v.	910N220E
10	First 6J7 R.F. Filter Cond.	.002 mfd. 1000 v.	910N220E
11	First 6J7 Cathode Condenser	20 mfd. 100 v.	183N5
12	Audio Decoupling Cond.	4 mfd. 600 v.	930N3
13	Audio Decoupling Cond.	4 mfd. 600 v.	930N3
14	Second 6J7 Cathode Cond.	20 mfd. 100 v.	183N5
15	Audio Decoupling Cond.	4 mfd. 600 v.	930N3
16	Audio Coupling Cond.	0.1 mfd. 600 v.	931N12
17	6F6 Cathode Cond.	20 mfd. 100 v.	183N5
18	Equalizing Condenser	.00025 mfd. 1000 v.	910N325E
19	Mod. Phasing Condenser	.006 mfd. 5000 v.	950N260A
20	Input R.F. Choke	5.4 /uh 0.85 ohm	240N34
21	6J7 Filament Choke	5.4 /uh 0.85 ohm	240N34
22	6J7 Filament Choke	5.4 /uh 0.85 ohm	240N34
23	Audio Interstage Transformer		667S228E
24	Audio Coupling Unit		667S460A
25	Class "B" Driver Trans.		667S138C
26	Modulation Transformer		667S606A
27	Telephone Telegraph Relay	SPST N.C. Contacts	407N74

PARTS LIST
401N-4 POWER SUPPLY

UNIT G

Item	Function	Specification	Part No.
1	Keying Rectifier Load	25,000 ohm 2 w.	706N25M
2	Keying Rectifier Load	25,000 ohm 2 w.	706N25M
3	Keying Resistor	50,000 ohm 2 w.	706N50M
4	L.V. Bleeder Resistor	25,000 ohm 50 w.	710ND25M
5	Bias Supply Filter Cond.	4 mfd. 600 v.	930N8
6	Bias Output Filter Cond.	6 mfd. 600 v.	930N9
7	L.V. Supply Filter Cond.	8 mfd. 800 v.	930N18
8	L.V. Output Filter Cond.	8 mfd. 800 v.	930N18
9	H.V. Filter Condenser	4 mfd. 2000 v.	930N40
10	H.V. Filter Condenser	4 mfd. 2000 v.	930N40
11	Bias Voltage Bypass Cond.	2 mfd. 600 v.	930N61
12	Keying Voltage Filter Cond.	0.25 mfd. 600 v.	931N10
13	Bias Power Transformer		662S458A
14	L.V. Power Transformer		662S573A
15	5Z3 Fil. Transformer	5 v. 3 a. C.T.	662S509C
16	866A Fil. Transformer	2 Sec. 2.5 v. 10A	662S539
17	Filament Transformer	2.5 v. 5A. 6.3 v. 4A. 6.3 v. 2A. 10 v. 14A	662S638
18	L.V. Input Filter Choke	4 hy. 0.4 A	668S75B
19	L.V. Output Filter Choke	4 hy. 0.4 A	668S75B
20	Bias Input Filter Choke	6 hy. 0.3 A	668S467
21	Bias Output Filter Choke	6 hy. 0.3 A	668S467
22	866 Fil. Pri. Fuse	3 A. Plug Type	264N103
23	Fil. Pri. Fuse	6A. Plug Type	264N106
24	L.V. Pri. Fuse	6A. Plug Type	264N106
25	H.V. Pri. Fuse	15A. Plug Type	264N115

STANDARD CABLE WIRE CODE

Numerals refer to RMA Color Code
Letters refer to wire size & type

ALL WIRE RUBBER INSULATED WITH BRAID COVERING

NEW Color Code	OLD Color Code	COLOR	CONSTRUCTION RATINGS
A0	B	Black	16 Strands No. 30 Tinned 0.0156" Rubber Comp. Wall Glazed Cotton Braid 3 Amp. 500 Volts D.C.
*A1	N	Brown	
A2	R	Red	
A3	O	Orange	
*A4	Y	Yellow	
A5	G	Green	
A6	L	Blue	
A9	W	White	
A02		Black - Red Tracer	
A32		Orange - Red Tracer	
A52		Green - Red Tracer	
A62		Blue - Red Tracer	
A92		White - Red Tracer	
B0	RB	Black	26 Strands No. 30 Tinned 0.0313" Rubber Comp. Wall Glazed Cotton Braid 6 Amp. 750 Volts D.C.
B2	RR	Red	
B3		Orange	
*B4	RY	Yellow	
B5	RG	Green	
B6	RL	Blue	
B9	RW	White	
C0		Black	65 Strands No. 30 Tinned 0.031" Rubber Comp. Wall Glazed Cotton Braid 20 Amp. 750 Volts D.C.
C2		Red	
C3		Orange	
C5		Green	
C6		Blue	
C9		White	
C09	CF	Black - White Tracer	
C29	CC	Red - White Tracer	
C39		Orange - White Tracer	
C59	CB	Green - White Tracer	
C69		Blue - White Tracer	
*C10	CA	Brown - Black Tracer	
*C40	CE	Yellow - Black Tracer	
*C90	CD	White - Black Tracer	
D0	H	Black	19 Strands No. 27 Tinned 3/64" Live Rubber Wall Lacquered Double Braid - 5KV

Standard Cable Wire Code

NEW Color Code	OLD Color Code	COLOR	CONSTRUCTION RATINGS
E0		Black	7 Strands No. 30 Tinned 0.01" Unvulcanized Rubber Wall Glazed Cotton Braid 1.5 Amp. 300 V. D.C.
E2		Red	
E3		Orange	
E5		Green	
E6		Blue	
E9		White	
E03		Black - Orange Tracer	
E23		Red-Orange Tracer	
E53		Green--Orange Tracer	
E63		Blue - Orange Tracer	
E93		White - Orange Tracer	
E05		Black - Green Tracer	
E25		Red - Green Tracer	
E35		Orange - Green Tracer	
E95		White - Green Tracer	
E06		Black - Blue Tracer	
E26		Red - Blue Tracer	
E36		Orange - Blue Tracer	
E96		White - Blue Tracer	
F0		Black	52 Strands No. 25 Tinned 0.094" Rubber Comp. Wall Glazed Cotton Braid 35 Amp. 500 Volts
F2		Red	
F9		White	
G0		Black	No. 4 Stranded Double Braid Rubber Insulated Indoor House Wire
H0	HH	Black	19 Strands No. 27 Tinned 1/16" Live Rubber Wall Lacquered Double Braid - 10KV
J0	HHH	Black	19 Strands No. 27 Tinned 1/8" Live Rubber Wall Lacquered Double Braid - 15KV
K0		Black	10 Strands No. 30 Tinned 0.0156" Rubber Comp. Wall Glazed Cotton Braid Tinned Copper Braid Shielding 3 Amp. 300 Volts D.C.
K2		Red	
K3		Orange	
K5		Green	
K6		Blue	

*Obsolete for new design.

Revised 8-9-40.

SERVICE REPORT
REPLACEABLE COMPONENTS

Please fill out this form and submit it by mail to the COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA, USA, when reporting failure of component parts. A properly completed report must be submitted for each part before any accounts will be adjusted. An accurate report will assure the correct replacement part.

IDENTIFICATION OF COMPONENT

Owner_____

Equipment Type No._____ Serial No._____

Unit Type No._____ Serial No._____

Component Item No._____ Stock No._____

Description of Component_____

SERVICE DATA

Date Equipment Received_____ Date in Service_____

Date of Failure_____ Hours of Service_____

NATURE OF FAILURE_____

OPERATING DATA AND CONDITIONS (At time of Failure)

Line Voltage_____ Abnormal Meter Readings_____

Ambient Temperature_____ °F, Electrical Storm?_____

Associated Fuse Failure_____

Additional Comments_____

PRESENT STATUS OF EQUIPMENT

Out of Service_____ Component Replaced_____

Temporary Repair (state nature)_____

Date of Report_____ Signed_____

-o-

THESE ENTRIES TO BE MADE BY THE COLLINS RADIO COMPANY

Received_____ R.T. No._____ Replacement Order No._____

Results of Factory Test:_____

Disposition_____

Form CDF-7

SERVICE REPORT
REPLACEABLE COMPONENTS

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Results of Factory Test:_____

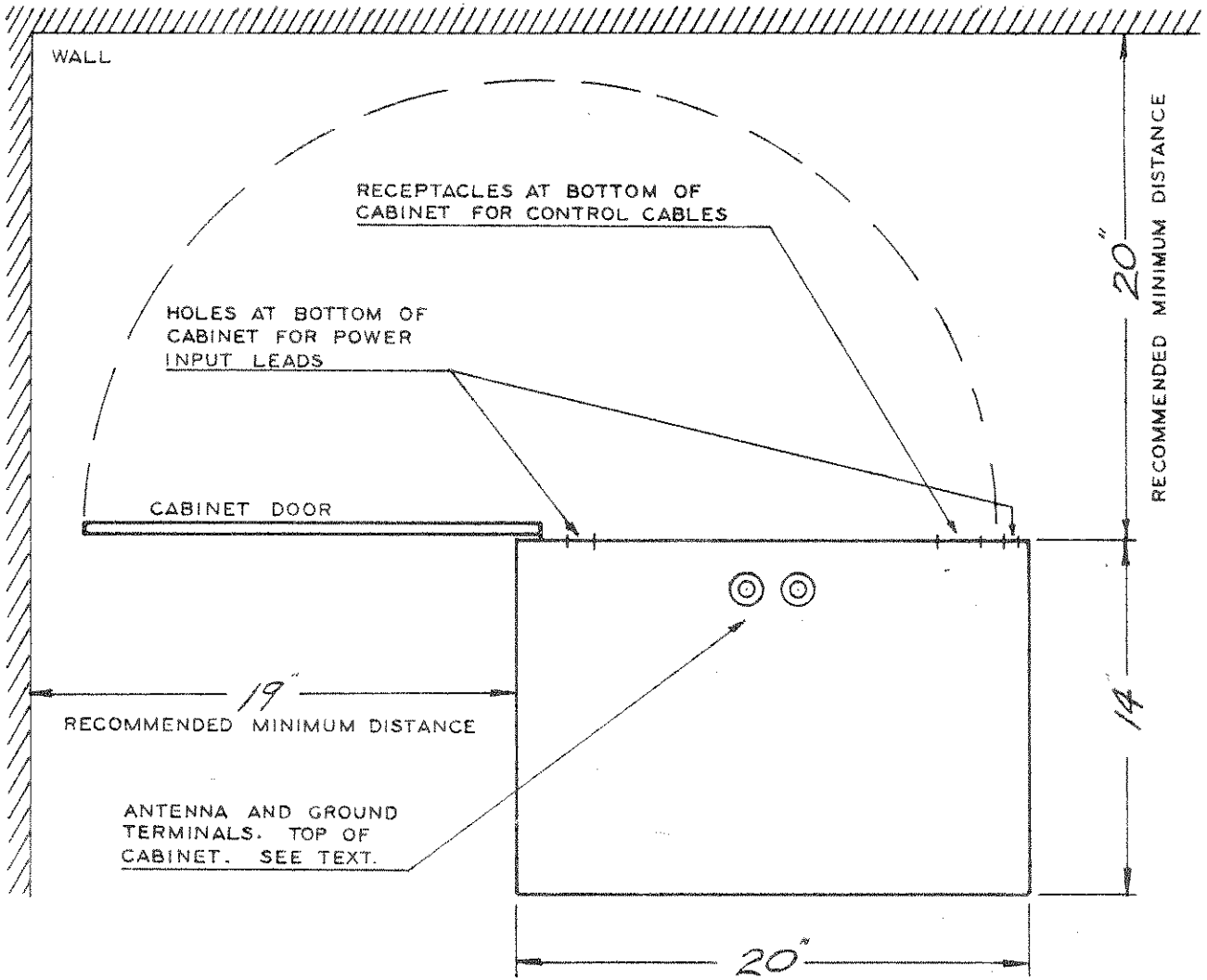
Disposition_____

Form CDF-7

DRAWINGS

	Dwg.
GROUP I - DRAWINGS BOUND IN BOOK	
Installation Layout	1920A
Simplified Schematic	1751B
Remote Control Connections	1922A
GROUP II - DRAWINGS PLACED IN COVER ENVELOPE	
30J-18 Complete Schematic	1750D

MAT.:	GRADE:	DRAWN BY: M.S.S. DATE: 6 - 1 -1940 TRACED BY: DATE: 6 -14 -1940 CHECKED BY: W.L.L. DATE: 4 - 14 -1940	COLLINS RADIO COMPANY CEDAR RAPIDS. IOWA
FINISH:			
UNIT: 30J INSTALLATION LAYOUT - PLAN VIEW		SCALE	DRAWING NO 1920A-1



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