INSTRUCTION BOOK

Type 50HG-2

AMPLITUDE MODULATED BROADCAST TRANSMITTER

Westinghouse Electric Corporation

I.B. 81-120-2

I.B. 81-120-2 A

INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

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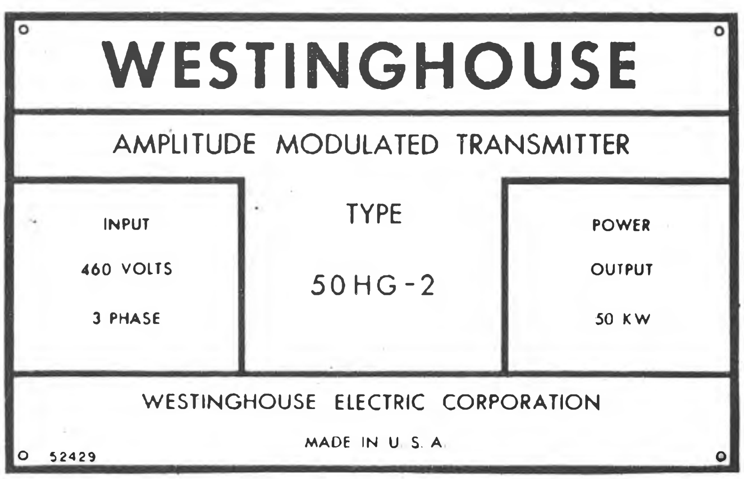
SPECIAL INQUIRIES

When communicating with Westinghouse in reference to the equipment described by this Instruction Book, include *all* information contained on the nameplate attached to the equipment. A typical nameplate is illustrated below for your convenience. Also, to facilitate replies when particular operational data is desired, be sure to state fully and clearly the information wanted. Please address all communications to the nearest Westinghouse District Office.



MP-140

WARNING!

HIGH VOLTAGE!

THE VOLTAGES ENCOUNTERED IN THIS EQUIPMENT ARE DANGEROUS TO HUMAN LIFE. TO BE SAFE, DISCONNECT THE POWER SOURCE WHEN SERVICING ANY OF THE UNITS.

The use of high voltages which are dangerous to life is necessary for the operation of of the electronic equipment covered by these instructions. While all practical safety precautions have been incorporated in the design of the equipment, they are not infallible; therefore, certain precautionary measures must be carefully observed by the operating personnel during the operation, inspection and maintenance of the equipment.

KEEP AWAY FROM LIVE CIRCUITS -- Do not reach into an enclosure or handle any portion of the externally installed units without first removing the power and grounding the circuit.

OBSERVE EXTREME CAUTION WHEN SERVICING OR ADJUSTING THE EQUIPMENT -- Do not connect any apparatus external to the enclosure, to circuits within the equipment, or apply voltages to the equipment for testing purposes while any non-interlocked portion of the shielding or enclosure is removed or opened. Connection of apparatus external to the enclosure in addition to being a hazard may cause failure of the interlock circuits.

DO NOT TAMPER WITH INTERLOCKS -- Under no circumstances should any door or safety interlock be removed or short circuited, nor should interlocks be relied upon for removing voltages from the equipment.

DO NOT DEFEAT THE MECHANICAL INTERLOCK SYSTEM BY THE USE OF DUPLICATE KEYS.

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LIST OF SUPPLEMENTS

(See Tab)

Modulation Transformer and Reactor	(W) I.B. 399950-15
Automatic Induction Regulator (If Used)	(W) I.B. 5521-A
Switchgear	(W) I.B. 35-225-1A
CSP Lifeline Motor	(W) I.L. 3100-1
DN Contactor - Size 2	(W) I.L. 2303-C
DN Contactor - Size 00	(W) I.L. 3283-A
CV Relay	(W) I.L. 41-291-C
SC Relay	(W) I.L. 41-380-D
SG Relay	(W) I.L. 41-350-C
MG-6 Relay	(W) I.L. 41-321
TK Relay	(W) I.L. 41-366-1
KA-24 Meter	(W) I.L. 43-230-A
RX-33 Meter	(W) I.L. 43-330-C
RH-35 Meter	(W) I.L. 43-351

LIST OF SUPPLEMENTS (Concluded)

RX-35 Meter	(W) I. L. 43-350
RT-37 Meter	(W) I. L. 43-370-C
Lapp Capacitor	Lapp Insulator Co. Bulletin 266
Variac Type V5H	General Radio Co. Operating instructions V-5 Series VARIACS
Pliotron Tube WL-5671	(W) Data Sheet, WL-5671
Pliotron Tube WL-5736	(W) Data Sheet, WL-5736
Pliotron Tube WL-813	(W) Data Sheet, 86-176
Pliotron Tube WL-807	(W) Data Sheet, 86-170
Pliotron Tube WL-802	(W) Data Sheet, 86-165
Railway Industrial Engrg	Bulletin No. 1725
Switchgear Renewal Parts	(W) Renewal Parts Data for PHZF-91538

INTRODUCTION

The Westinghouse Type 50HG-2 Transmitter is a high-level-modulated standard broadcast transmitter with nominal RF power output of 50 kw. It incorporates the latest developments in electrical and mechanical design and meets all the operational requirements for a modern broadcast transmitter. Years of experience with the problems of the broadcaster has resulted in a Westinghouse transmitter designed for easy installation and economical operation and maintenance.

The following summary of electrical and mechanical specifications, and list of major components will serve to introduce the Westinghouse 50HG-2 Transmitter to the new owner.

ELECTRICAL SPECIFICATIONS

Type of Emission	A-3
Power Output (to transmission line or common point)	53 kw, max.
Frequency Range (single specified frequency)	
Lower Limit	540 kc
Upper Limit	1600 kc
Frequency Stability	±10 cps
Modulation Capability (50 to 7500 cps inclusive)	100 percent
Carrier Shift (100 percent modulation with 400 cps sine tone)	less than 5 percent
Audio Distortion (0-95 percent modulation from 50 to 7500 cps, including all harmonics up to 45 kc)	less than 3 percent
Modulation	high level Class B
Frequency Response (30 to 10,000 cps)	±1 db
Carrier Hum	better than 60 db below 100 percent modulation
Audio Input Level (100 percent modulation at 1000 cps)	10 ±2 dbm
Power Line Requirements (see note 1 below):	
Incoming Power Lines	see note 2
Line volts	460 volts
Phase	3 phase
Frequency (see note 3 below)	60 cps
Power Input for 0 percent modulation	103.5 kw
Power Input for average modulation (25 percent)	113 kw
Power Input for 100 percent modulation	147 kw
Power Factor (approximate)	90 percent
Maximum Permissible Power Line Variation:	
Frequency	±2 percent
Deviation of full load phase-to-phase voltage from 460 volts	±5 percent
Deviation of full load phase-to-phase voltage from average for the three phases	±2 percent
Regulation	±2 percent
Total permissible variation, including regulation from no load to full load, in percentage of 460 volts	±5 percent
Crystal Heater Power Supply Requirements:	
Line volts	115 volts
Phase	1 phase
Frequency	50-60 cps
Power	30 watts
Output Impedance (one side of output coil grounded)	40 to 250 ohms
Ambient Temperature Operating Range	±5°C to ±45°C
Distribution Bus Regulator	Automatically maintains 230 volts for an input variation of approximately ±10 percent
Main Rectifier Regulator (when furnished)	Automatically maintains any setting point in range of 70 to 100 percent of full voltage output for an input variation of approximately ±5 percent

Note 1: The power requirements specified in this section do not include provision for the lights and convenience outlets in each transmitter cubicle. A 115 volt, single phase supply of approximately 1 kw capacity should be available.

Note 2: Lightning and switching surges on the incoming power lines can damage transmitter equipment. Therefore, it is suggested that the incoming circuits be examined for the probability of such transients and protective devices installed as necessary.

As a minimum requirement, three lightning arrestors, equal to Westinghouse style 1254825 should be used on the incoming 460 volt line, one between each line and ground.

Note 3: The Type 50HG-2 Transmitter can be supplied for operation with a 50 cycle supply.

MECHANICAL SPECIFICATIONS

Description	Dimensions in Inches			Approximate Weight in Pounds
	Height	Depth	Width	
Power Control Cubicle	84	54-1/4	48-1/4	2225
Exciter Cubicle	84	54-1/4	48-1/4	2370*
Modulator Cubicle	84	54-1/4	48-1/4	2100*
Left Power Amplifier Cubicle	84	54-1/4	48-1/4	1920*
Center Power Amplifier Cubicle	84	54-1/4	48-1/4	1550
Right Power Amplifier Cubicle	84	54-1/4	48-1/4	1920*
Switchgear Cubicle	90-3/8	48	20	1225
Rectox Rectifier and Frame, each of two	64	28	41	350
Modulation Transformer	78-7/8	46-1/2	56	5700
Filter Capacitor, each of three	29-3/16	7-1/4	18	75
Filter Reactor	17-1/2	12-3/4	11-3/4	175
Distribution Bus Regulator, each of two	30-3/4	10-1/2	10	250
Audio Filter Capacitor	5-3/4	6-1/2	5	5
Modulation Reactor	67-1/2	29-1/2	40-1/2	2450
Auxiliary Audio Choke	16-1/2	22	18	25
Modulation Coupling Capacitor	26-1/2	18	7-1/2	75
Blower	70-5/16	65-5/8	49-1/4	920
Blower Motor and Base	15	22-1/2 †	20	250
Control Box	24-3/8	5-5/8	9	25
RF Current Transformer-Rectifier	12	12	8	25
Main Rectifier Transformer	75	50	56	3300
Main Rectifier Regulator (when furnished)	75-5/8	43-3/4	24	3325
Distribution Bus Transformer, each of three	22-1/8	14-3/4	16-3/4	235

* Weight does not include tubes. † Includes 4-3/8 inch shaft dimension.

UNITS OF THE COMPLETE TRANSMITTER

The Westinghouse Type 50HG-2, 50 KW Standard Broadcast Transmitter consists of the following individual units:

		Power Supply 60 cps	Power Supply 50 cps
1.	One Power Control Cubicle	S#1475118	S#1475121
2.	One Exciter Cubicle (less tubes and crystal oscillators and crystals)	S#1474773	S#1474780
3.	One Modulator Cubicle (less tubes)	S#1474774	S#1474781
4.	One Left Power Amplifier Cubicle (less tubes)	S#1475119	S#1475122
5.	One Center Power Amplifier Cubicle.	S#1474775	S#1474782
6.	One Right Power Amplifier Cubicle (less tubes)	S#1475120	S#1475123
7.	Two Type FA Crystal Oscillators for Exciter Cubicle	S#1472593	S#1472593
8.	Two crystals, Type TMV-129B for Crystal Oscillators	Dwg. 7431159	Dwg. 7431159
9.	One Rectox Rectifier and Frame for Power Amplifier	S#1474566	S#1474566
10.	One Rectox Rectifier and Frame for Modulator	S#1474565	S#1474565
11.	One Modulator P.S. Filter Reactor	KR-7822469	KR-7822469
12.	One Main Rectifier Plate Transformer	S#1646118	S#1646118
13.	One Main Rectifier Induction Voltage Regulator (Optional Equipment)	S#1486437	S#1476438
14.	One Modulation Transformer	S#1483785	S#1483785
15.	One Modulation Reactor	S#1453629	S#1453629
16.	One Modulation Coupling Capacitor	S#1081020	S#1081020
17.	One Auxiliary Audio Choke	S#1472317	S#1472317
18.	Audio Filter Capacitor	S#1471665	S#1471665
19.	Three Distribution Bus Transformers	S#1483783	S#1483783
20.	Two Distribution Bus Induction Voltage Regulators	S#1486439	S#1486439
21.	One Switchgear Cubicle.	S#1474865	S#1474864
22.	P.A. and Modulator Filter Capacitors (Three)	S#1474519	S#1474519
23.	One Blower	Dwg. 7426385 Pt. 11	Dwg. 7426385 Pt. 11
24.	One Blower Motor	S#1442202	S#1442202
25.	One Control Box for Blower Motor.	Dwg. 7426385 Pt. 10	Dwg. 7426385 Pt. 10
26.	One Set of End Radii (to suit installation)	Dwg. 7718801 Pt. 21	Dwg. 7718801 Pt. 21
27.	One RF Current Transformer	S#1471694A	S#1471694A
28.	60 Feet of RF Cable	RG-17/U	RG-17/U
29.	70 Feet of RF Cable	RG-62/U	RG-62/U
30.	One Installation Kit (consisting of touch-up paint and miscellaneous hardware)	Dwg. 7427705	Dwg. 7427705
31.	One complete set of Operating Tubes.	Dwg. 7503652 GR. 1	Dwg. 7503652 GR-1
32.	Two Instruction Books	IB 81-120-2A	IB 81-120-2A
33.	Westinghouse Nameplate	S#1472812	S#1472812
34.	One Station Call Letter Plate	Dwg. 7718801 Pt. 25	Dwg. 7718801 Pt. 25

Note 1: Interconnection wiring material is not furnished as a part of the Type 50-HG-2 Transmitter.

Note 2: Although not furnished as a part of the transmitter, the following accessory equipment can be supplied by Westinghouse:

Antenna Phasing Equipment
Transmitter Control Console S#1472247
Precipitron Air Filter
Main Rectifier Induction Voltage Regulator
Spare Blower, Motor and Control Box
25 KW Power Cutback Facility
10 KW Power Cutback Facility
Spare Tubes
Spare Parts

TUBE COMPLEMENT

The following tubes are supplied with the transmitter:

Qty.	Tube Type
4	WL-5671
4	WL-5736
4	WL-813
3	WL-807
2	WL-802
2	OD3/VR-150
3	RCA-1V

These tubes are used as follows:

Location	Tube Type	Quantity
Right Power Amplifier	WL-5671	1
Left Power Amplifier	WL-5671	1
Exciter, RF	WL-5736	2
Exciter, RF	WL-813	2
Exciter, RF	WL-807	1
Exciter, Oscillator	WL-802*	2
Exciter, Oscillator	OD3/VR-150*	2
Center Power Amplifier	RCA-1V	2
Antenna House	RCA-1V	1
Modulator	WL-5671	2
Exciter, Audio	WL-5736	2
Exciter, Audio	WL-813	2
Exciter, Audio	WL-807	2

* These tubes are part of the oscillator units. One complete spare oscillator is mounted in the Exciter.

DESCRIPTION

The purpose of this section is to familiarize the station engineers with the electrical and mechanical details of the 50HG-2 transmitter.

The text is in two sections: the Electrical Description, and the Mechanical Description. Although there are no specific references to the photographs, they are so identified that they may be used to further clarify the text.

ELECTRICAL DESCRIPTION

1. Radio Frequency Circuits

The radio frequency system of the transmitter consists of the following stages:

a. A WL-802 crystal oscillator with an OD3/VR-150 regulator tube for stabilizing the screen voltage.
b. A WL-807 buffer amplifier.
c. The first amplifier, two WL-813 tubes, in parallel.
d. The second, or driver amplifier, two WL-5736 tubes, in parallel.
e. The final amplifier, two WL-5671 tubes, in push-pull.

The Type FA Crystal Oscillator is an individual plug-in unit containing the TMV-129B crystal and heater assembly, the oscillator and voltage regulator tubes, and the associated circuitry. Frequency stability is maintained by the use of a highly stable quartz crystal in an electron-coupled circuit. The crystal is kept at a constant temperature in an automatic oven. Approximately 15 watts of 115 volt, single phase, power is required for operation of the oven. To further insure stability, a voltage regulator tube is used in the screen supply.

Two complete crystal oscillator units are included with the transmitter. A relay, operated by a switch on the front panel of the Exciter Cubicle, allows transfer from one unit to the other without noticeable interruption of carrier. The unit not in use is constantly in readiness with crystal heater and tube filaments energized.

The buffer stage uses a lightly loaded WL-807 tube as a Class C amplifier. The grid circuit is untuned and no neutralization is required. A cathode current meter is included. Cathode bias is provided to protect the tube in the event of excitation failure.

The first radio frequency amplifier consists of two WL-813 tubes in parallel as a Class C amplifier. The grid circuit is untuned and is capacitively coupled to the tuned plate circuit of the buffer stage. Grid and plate current meters are provided. The plate circuit is tuned by a motor-driven capacitor. No neutralization is required. Cathode bias protects the tubes in the event of excitation failure. A loop coupled to the plate inductor is provided for feeding energy to a frequency monitor.

The second, or driver amplifier, uses two parallel WL-5736 tubes as a Class C amplifier. The grid circuit is connected to a tap on the shunt-fed plate tank of the preceding stage. This tap can be adjusted to provide the proper grid drive. Neutralization is accomplished by a variable vacuum capacitor connected between the plates of the WL-5736 tubes and the plate tank inductor of the preceding stage. A motor-driven variable compressed-gas capacitor is used in the plate tank circuit. Total grid current and individual plate currents are metered. The total plate current is indicated by a large scale instrument. Fixed bias is supplied by an individual power supply.

The final amplifier is a Class C stage employing two WL-5671 tubes in push-pull. These tubes have thoriated tungsten filaments. The grid tank circuit is inductively coupled to the plate tank circuit of the driver stage. The coupling inductor is on the same coil form as the plate inductor of the driver stage, and has a motor-driven variable tap for coupling adjustment. An individual bias supply is provided for each half of the push-pull amplifier. Grid current and bias voltage for each tube is individually metered. A motor-driven variable compressed-gas capacitor is used in each grid circuit.

The plate tank circuit of the power amplifier is shunt fed in order that the two motor-driven compressed-gas tank capacitors may be mounted at ground. Plate voltage and individual plate currents are metered. Inductive neutralization is used.

The output coupling coil is mounted inside the final tank inductor and has a motor-driven variable tap at ground potential. A Faraday shield is between the final tank inductor and the output coupling coil for suppression of harmonics. A thermocouple radio-frequency ammeter is in series with the output lead. This instrument is mounted behind a glass window in the Center Power Amplifier Cubicle and may be shunted out of the circuit by a switch on the lower front panel. A rectifier-type meter is provided for remote indication of the output current.

A spare tube socket and filament transformer are provided for each of the operating tubes in the final amplifier. Substitution of the spare tube for its associated operating tube can be accomplished quickly.

RF energy for a modulation monitor may be obtained from the power amplifier tank circuit by tapping on to the tank coil end ring at a suitable point.

2. Audio Frequency Circuits

The audio frequency system of the transmitter consists of the following push-pull stages:

a. First audio, two WL-807 Class A.
b. Second audio, two WL-813 Class A.
c. Third audio, two WL-5736 Class AB.
d. Modulator, two WL-5671 Class B.

The first audio stage contains a line-to-grid input transformer which can be connected for either a 600 or a 150 ohm line. This stage has individual cathode bias for each tube. The total cathode current is metered. The plate circuit is resistance coupled to the following stage.

The second audio stage has individual bias adjustment for both tubes and is resistance coupled to the following stage.

The driver audio stage is a cathode follower, with an individual bias supply for each tube. Instruments are included for indication of cathode current, grid current and bias voltage for each tube. Cathode current in each tube is indicated by individual large scale instruments. This stage is directly coupled to the grids of the modulator tubes.

The Class B, high-level modulator stage employs two WL-5671 tubes in push-pull. These tubes have thoriated tungsten filaments. Individual bias supplies, adjustable and with separate indicating instruments, are used. Large scale instruments are supplied for plate voltage and individual indication of cathode current, and filament voltage, for each tube.

A spare tube socket and filament transformer are provided for each of the modulator tubes.

The audio power is fed to the final radio frequency amplifier across a modulation reactor, making it unnecessary to pass the plate current for this stage through the modulation transformer. An equalizer circuit stabilizes the modulator load impedance to permit the application of inverse voltage feedback.

3. Power Supplies

All power supplies in the transmitter use Rectox rectifiers. Rectox units have essentially unlimited life unless subjected to abuse. All except the two main rectifier supplies obtain primary power from a bus which is maintained at constant voltage by means of two automatic induction regulators connected in open delta. The regulators automatically maintain a constant output voltage of 230 volts for an input supply variation of approximately plus or minus 10 percent. Manual regulator control is also provided. Primary power for filament supplies is also obtained from this regulated distribution bus.

The two main rectifier supplies use a common transformer. By means of mechanically interlocked contactors inside the case of the transformer, the primary can be connected in Wye or Delta for tuning or full power output. Switching any of these contactors is accomplished by an **OFF-TUNE-ON** switch on the panel of the Center Power Amplifier.

The individual power supplies included in the transmitter are listed and briefly described below:

a. 400 Volt Supply -- this is a single phase, bridge rectifier. It supplies plate and screen voltage to the crystal oscillator and the RF buffer. It also supplies screen voltage to the first and second audio stage and bias to the second audio stage.

b. 1500-3000 Volt Supply -- this is a 3000 volt, three phase, full-wave rectifier and a 1500 volt, three phase, half-wave rectifier. The 1500 volt supply furnishes plate and screen voltage for the first RF amplifier stage and plate voltage for the first audio amplifier stage. The 3000 volt supply furnishes power for the audio and RF driver stages and it also supplies plate voltage for the second audio stage.

c. Main Rectifier Supplies -- These are two separate high voltage, three phase, full-wave rectifiers using a common transformer. One rectifier supplies approximately 11, 500 volts d-c to the power amplifier; while the other supplies approximately 13, 500 volts to the modulator.

d. Exciter RF Bias Supply -- this is a single phase, bridge rectifier. It supplies bias for the RF driver stage.

e. Audio Driver Bias Supplies -- these are two adjustable single phase, bridge rectifiers. They supply bias for the audio driver stage.

f. Modulator Bias Supplies -- these are two identical single phase, bridge rectifiers. They supply bias for the modulator, one for each of the two operating tubes. Output voltage of each of these rectifiers is controlled from the front panel of the Exciter Cubicle.

g. Power Amplifier Bias Supplies -- these are two identical single phase, bridge rectifiers. They supply holding bias for each of the two operating tubes, and they furnish the fixed portion of the combination fixed and self-bias required to maintain modulation linearity.

4. Control Circuits

Controls for all necessary operational circuit and tuning adjustments are provided on the front panels of the cubicles. The associated indicating instruments and lights are coordinated with these controls. Individual switches are provided for all power circuits. These switches are sequence interlocked to prevent possibility of damage to the transmitter components, especially the tubes, which might result from the application of power to a circuit in incorrect sequence. Normally, the transmitter is put into operation by energizing each circuit separately. If desired, however, one switch control of the entire transmitter is possible. The transmitter can be shut down completely by opening the first switch in the sequence which controls power for the filaments and blowers, leaving the other switches in the "on" position. Then to return the transmitter to operation, it is necessary only to close the first switch; the other circuits will be energized in proper sequence and timing.

The transmitter includes a complete supervisory control system which provides indication of abnormal conditions such as overloads and open interlocks. This system is coordinated with the protection and safety provisions described in the following section. Overloads are registered even if they are only momentary; lock-in supervisory relays energize circuit identifying indicator lamps which remain lighted until the operator resets the relays by means of a reset switch on the control panel. This feature assists in locating trouble which can be investigated during normal maintenance period, decreasing future outages.

The supervisory control system includes individual indicator lamps for the following:

400 Volt Overload
1500-3000 Volt Overload
Power Amplifier Rectifier DC Overload
Modulator Rectifier DC Overload
Main Rectifier AC Overload
813 RF Overload
Left 5736 RF Overload
Right 5736 RF Overload
Left Power Amplifier Overload
Right Power Amplifier Overload
Left 813 Audio Overload
Right 813 Audio Overload
Left 5736 Audio Overload
Right 5736 Audio Overload
Left Modulator Overload
Right Modulator Overload
Antenna Arc-over
Carrier Interruption
Power Control Door Interlock
Exciter Door Interlock
Modulator Door Interlock
Left Power Amplifier Door Interlock
Center Power Amplifier Door Interlock
Right Power Amplifier Door Interlock
Rectifier and Filter Door Interlocks
Antenna Phasing Door Interlock
Search Relay
Supervisory Relay Test
Spare
High Voltage Enclosure Door Interlock

The search relay can be connected into any one of the other transmitter protection systems that are not listed above in order to check the operation of that system in searching for faults. The spare relay is provided for such uses as an antenna house interlock indicator, etc.

The major switching functions, together with their associated indicators, can be duplicated at a transmitter console.

Two clocks are provided. One registers Outage Duration and the other registers the time at which outage occurred.

5. Overload and Safety Protection

The basic overload protection in the Type 50HG-2 Transmitter is designed around two draw-out-type Westinghouse DB-25 Air breakers in the Metal-Enclosed Switchgear Cubicle. These breakers have their own a-c trip coils. One breaker supplies the main rectifiers. The other supplies all other power except that for the breaker trip circuits, blowers, crystal heaters, cubicle lights, and convenience outlets in the transmitter cubicles.

Protection is provided by fast-acting relays and circuit breakers. Any overload, undervoltage, or open interlock will remove the primary power from the supply or supplies involved. The design of the transmitter provides for a choice of automatic or manual return of the transmitter to operation.

With the OVERLOAD PROTECTION CONTROL set in the AUTO position, an overload will trip the set off but power will be reapplied immediately. In the event of successive overloads, the transmitter will trip off three times but, after the third time, power will not be reapplied for a predetermined period of time, normally set for five seconds. After this delay time, power will be automatically reapplied and the transmitter returned to normal operation. If the overload condition persists, the sequence will be repeated until the transmitter is turned off manually.

With the OVERLOAD PROTECTION CONTROL in the MANUAL position, any overload which trips the 400 volt supply off will leave the transmitter off until the operator resets the control. Any other overload will trip the transmitter off three times, if the condition persists, and then leave it off until reset by the operator.

A partial list of the overload and undervoltage relays in the transmitter is given below:

Undervoltage relays, a-c:
- Main rectifier
- Distribution bus
- Filament

Undervoltage relays, d-c:
- Exciter bias supply
- Left audio driver bias supply
- Right audio driver bias supply
- Left modulator bias supply
- Right modulator bias supply
- Left power amplifier bias supply
- Right power amplifier bias supply

Overcurrent relays, a-c:
- Distribution bus
- Main rectifier

Overcurrent relays, d-c:
- 400 volt supply
- 1500-3000 volt supply
- Power amplifier supply
- Modulator supply
- RF 813 stage
- Left 5736 RF tube
- Right 5736 RF tube
- Left modulator tube
- Right modulator tube
- Left power amplifier tube
- Right power amplifier tube
- Left 813 audio tube
- Right 813 audio tube
- Left 5736 audio tube
- Right 5736 audio tube

De-ion a-c thermal overload breakers:
- Exciter filaments
- Left power amplifier filament No. 1
- Left power amplifier filament No. 2
- Right power amplifier filament No. 1
- Right power amplifier filament No. 2
- Left modulator filament No. 1
- Right modulator filament No. 2
- Left modulator filament No. 3
- Right modulator filament No. 4
- Switchgear control bus
- Panel lights
- Transmitter control bus
- Bus regulators
- Audio bias
- RF bias
- 400 volt supply
- 1500-3000 volt supply

Other relays employed in the control and supervisory circuits are the time-delay, auxiliary supervisory, stepping, etc., which have not been classified above.

In the entire transmitter there is only one fused circuit affecting operation. That circuit supplies closing power to the distribution bus breaker.

Protective provisions not mentioned above which are included in the transmitter are air interlocks, door interlocks, and the Antenna Arc-Interrupter Unit.

Every reasonable precaution for the safety of personnel is incorporated in the design of the transmitter. All components except those to be installed in the power room are of the dead-front type. The switchgear cubicle uses draw-out type breakers. All cubicle doors which allow access to dangerous potentials are electrically interlocked. In addition, the cubicles are provided with grounding sticks and with automatic mechanical shorting switches which ground dangerous voltages when access doors are opened. It is possible to extend the interlock system to include electrical interlocks on vault doors, phasing cubicle doors, antenna tuning houses, and any other enclosure which the purchaser may desire to protect. The purchaser may also use the keys from the switchgear as the basis for a mechanical door interlock system. The necessary ordering information for such a system may be found under the SUPPLEMENTS in the back of this book.

MECHANICAL DESCRIPTION

The six transmitter cubicles have welded steel frames and aluminum panels. Each cubicle has four leveling screws. A detachable wiring trough is built into the lower rear of each cubicle, thus providing a full length wiring trough for the interconnection cables. Full length, full width front and rear doors are provided, and each door has a large, unobstructed window. Four large scale meters are mounted on an inclined panel on the top front of each cubicle. Instrument and control panels are illuminated, and each cubicle is equipped with a convenience outlet and a service light. All controls and indicators are completely identified. Details of particular cubicles are listed below:

1. Power Control Cubicle

This cubicle functions as the basic power control center for the entire transmitter, and contains the following:

- 1500-3000 volt supply
- De-ion switches
- Bus regulator controls
- Supervisory control relays and lamps
- Outage time clock
- Outage duration clock
- Blower controls
- Bias supply controls
- Miscellaneous relays

The four large meters at the top of the cubicle indicate Line Current, Line Voltage, Bus Current, and Bus Voltage. Line and Bus Phase Selector switches are provided for the meters. These switches also have an off position. The drop-down panel in the front door provides access to the supervisory control indicators and switches, the two outage clocks, the blower control switches and lamps, and the bias supply switches and indicators.

The front door provides access to all De-ion switches, the bus regulator controls, the meter switches and the elapsed hour meter, all of which are mounted just above the control panel. This door is not interlocked. The rear doors are electrically interlocked and a grounding switch automatically grounds the output of the 1500 volt and 3000 volt supplies.

2. Exciter Cubicle

This cubicle contains the driver sections for the modulator and the power amplifier stages. It also contains the following:

- 400 volt supply
- Exciter RF bias supply
- Both audio 5736 bias supplies
- Both modulator bias supplies
- Both type FA crystal oscillators
- First, second and driver audio stages
- RF buffer, amplifier, and driver stages

The four large scale meters at the top of the cubicle indicate Left 5736 Audio Cathode Current, Right 5736 Audio Cathode Current, 3000 Volt Rectifier volts and 5736 RF Total Plate Current.

The drop-down panel in the front door allows access to the control panel. This panel, which is hinged to facilitate servicing, mounts the switches and lamps for the 400 volt supply, the 1500-3000 volt supply, and the crystal heater circuits. It also mounts the audio 5736 bias controls, the modulator bias controls, the 813 tank tuning motor drive control, the 5736 tank tuning motor drive control, and the crystal oscillator selector switch. In addition to the position indicating meters associated with the motor driven tuning elements, the following meters are mounted on this panel:

- 400 Volt Rectifier Voltage
- 1500 Volt Rectifier Voltage
- Left 5736 Audio Driver Bias
- Right 5736 Audio Driver Bias
- 807 Audio Cathode Current
- Left 813 Audio Power Amplifier Cathode Current
- Right 813 Audio Power Amplifier Cathode Current
- Left 5736 Driver Grid Current
- Right 5736 Driver Grid Current
- Left Modulator Bias
- Right Modulator Bias
- Oscillator Cathode Current
- 807 RF Buffer Cathode Current
- 813 RF Amplifier Total Grid Current
- 813 RF Amplifier Total Cathode Current
- 5736 RF Driver Total Grid Current
- Left 5736 RF Driver Plate Current
- Right 5736 RF Driver Plate Current

The audio circuits are contained in the left side of the cubicle and the radio frequency circuits in the right side, viewed from the front. The controls and indicators on the control panel are correspondingly grouped. When the front door is opened, two smaller doors below the control panel and two tube compartments above the control panel are exposed. The low level audio stages are mounted on the inside of the lefthand door, and the low level RF stages are mounted on the inside of the righthand door. Components and wiring are accessible when these doors are open. The crystal oscillators are individual plug-in units.

The left compartment above the control panel houses the audio 5736 stage, and the right compartment houses the RF 5736 stage.

Audio and RF components mount at the rear on the side walls of the cubicle. A partial partition divides the left and right sides of the cubicle to isolate the audio circuits from the radio frequency circuits. All doors are interlocked, except the drop-down panel.

3. Modulator Cubicle

This cubicle contains four tube sockets and four filament transformers (two of each are spares), transfer switches, two feedback dividers, and two gas surge suppressor resistors. The four large scale meters at the top of the cubicle indicate Left Modulator Plate Current, Modulator Filament Volts, Modulator Plate Volts, and Right Modulator Plate Current.

The panel in the front door is fixed in position as there are no controls on this cubicle. On the upper part of this panel are mounted four indicator lamps and a switch. The lamps are "ON" indicators for Left Filament, Bias, Plate, and Right Filament. The switch is used to connect any one of the four filament transformers to the filament voltmeter at the top of the cubicle.

The lower part of the cubicle is used as the plenum chamber for the cooling air. The four filament transformers are mounted from the top of the cubicle, each one directly above its associated tube socket. The plate suppressor resistors and the plate transfer switches are mounted between each front and rear tube. The grid transfer switches are mounted on the side walls between each front and rear tube.

The plenum chamber is equipped with removable metal panels in the front and rear and these panels are interlocked with the air supply. The front and rear cubicle doors are interlocked. The electrical interlocks remove the modulator and driver plate voltage and bias voltages. The mechanical switch grounds the modulator plate supply.

4. Left Power Amplifier Cubicle

This cubicle encloses one side of the push-pull amplifier circuit. It contains one of the power amplifier tubes with provisions for mounting and switching a spare tube, two filament transformers, bias supply, plate choke, neutralizing coil, plate tank capacitor, grid tank circuit, grid leak, overload and under-voltage relays.

The four large scale meters mounted at the top of the cubicle indicate Left PA Filament Volts, Left PA Grid Volts, Left PA Grid Current and Left PA Plate Current.

The basic construction of the cubicle is identical to that of the Modulator Cubicle previously described.

The panel in the front door is fixed and mounts four indicator lamps and a filament voltmeter selector switch. The lower part of the cubicle is used as the air plenum chamber. It has two removable metal access panels which are interlocked with the air supply.

The filament transformers are mounted from the top of the cubicle directly above the tube sockets. The compressed gas plate tank capacitors are mounted in the plenum chamber with their tops protruding for connection to the tuning motor drive. The plate selector switch is mounted between the two tube sockets. A grid parasitic suppressor and a switch are mounted on both side walls near the grid connections to the tubes. The grid tank inductor and capacitor are mounted from the top of the cubicle. The plate choke is mounted in the plenum chamber and the neutralizing coil and its associated capacitors are mounted on the top of the plenum chamber.

The front and rear doors are both interlocked. The electrical interlocks remove the power amplifier and driver plate voltage and bias voltages when either door is opened. The mechanical switch grounds the plate supply.

5. Center Power Amplifier Cubicle

This cubicle is similar in general construction to the Power Control and Exciter cubicles previously described. It contains the power amplifier circuit controls, the plate tank inductor, and the output coupling inductor assembly with the Faraday shield. It also contains the Antenna Arc Interrupter control panel, current transformer-rectifier, the thermo-couple output ammeter and the remote output ammeter and its current transformer-rectifier.

The four large scale meters at the top of the cubicle indicate PA Plate Volts, Total PA Plate Current, RF Output Current, and Total Transmitter Input Power. The drop-down panel in the front door covers the control panel which mounts the following controls and indicators:

Antenna Arc Protector Control Switch and Indicators
Main Rectifier Control Switch and Indicators
Main Rectifier Regulator Selector Switch
Main Rectifier Regulator Automatic Voltage Control
Main Rectifier Regulator Manual-Raise-Lower Switch
Main Rectifier Regulator Indicators

The front door, which is not interlocked, provides access to the tuning controls and indicators mounted above the control panel. They are:

Left Grid Tuning
Right Grid Tuning
Ganged Grid Tuning
Left Plate Tuning
Right Plate Tuning
Ganged Plate Tuning
Driver Coupling
Output Coupling

The indicating instruments are:

Left Grid Current
Right Grid Current
Left Plate Current
Right Plate Current
Left Grid Tuning Position
Right Grid Tuning Position
Driver Coupling Position
Left Plate Tuning Position
Right Plate Tuning Position
Output Coupling Position

On the left, below the center control panel, is the plug-in Antenna Arc Interrupter Unit. To the right is a glass window behind which is mounted the output thermocouple RF ammeter. Near the window is a handle which operates a make-before-break shorting switch for the ammeter.

The interior of the cubicle is partitioned into three sections. The lower half houses the tank inductor, the output coupling inductor, and the output coupling motor drive. The current transformer-rectifier for the output ammeter and the current transformer-rectifier used in the antenna arc interrupter system are also mounted in this section. The upper half of the cubicle is divided into two sections by a vertical partition. These two sections are provided for housing optional antenna phasing components. Cutouts are provided on either side of the upper front panel for bringing out controls for these components.

The rear doors, which are electrically interlocked, provide immediate access to the upper two sections. In addition, removable panels in the lower front and rear of the cubicle allow access to the tank inductor compartment.

6. Right Power Amplifier Cubicle

This cubicle contains the other side of the push-pull amplifier circuit. It is identical to the Left Power Amplifier Cubicle in construction and contents except that the arrangement is reversed for symmetry.

7. Equipment External to the Cubicles

The equipment external to the transmitter cubicles consists of the Switchgear Cubicle, the Power Amplifier and Modulator Rectox Rectifier, the Filter Capacitors and Reactor, the Main Rectifier Induction Regulator if used, the two Bus Induction Regulators, the Main Rectifier Plate Transformer, the three Distribution Bus Transformers, the Modulation Transformer and Reactor, the Blower and Control Box, the Auxiliary Audio Choke, the Modulation Coupling Capacitor, and the

Arc Interrupter Current Transformer-Rectifier. The design of the transmitter provides for control of this equipment from the transmitter cubicles or from a console in the transmitter room. No oil-cooled components are used, making it unnecessary to provide a fire-proof vault.

The Switchgear Cubicle houses the two DB-25 air breakers and associated control system. The cubicle is standard Westinghouse Metal-Enclosed Switchgear and will match other switchgear the purchaser might obtain from Westinghouse for other purposes. This cubicle is intended for installation near the power room, preferably in the wall of the room with the front panel exposed so that manual operation or inspection is possible without entering the room.

The main Rectifier Filter Capacitors and Reactor are intended for installation in the power room.

The Auxiliary Audio Choke is an air core inductor intended for mounting on the wall of the power room.

The Blower is a Sturtevant Silentvane horizontal bottom discharge unit, clockwise rotation. The blower is equipped with a 7-1/2 horsepower motor. Adjustable-pitch sheaves are provided to allow adjustment of blower speed to suit the particular air duct installation. The Blower is intended for installation outside the power room, discharging into the room through the two Rectox units. A Wall Mounting Control Box is supplied for the Blower.

The Current transformer-rectifier used in connection with the Antenna Arc Interrupter system is intended for connection in series with the lead to the antenna in the antenna tuning equipment. It may be wall or bracket mounted.

RECEIVING, HANDLING, AND STORAGE

Any obvious shortages or damage should be noted by the customer on the waybill and claim made to the transporation company immediately. It is imperative that when unpacked, the equipment be inspected mechanically and electrically and a concealed damage claim submitted within the time limit set by the carrier.

INSPECTION OF THE SHIPMENT

To assist in inspecting and identifying the equipment, the 50HG-2 Transmitter Packing List, which follows, should be used. Note that some of the master items, such as the transmitter cubicles, are shipped with the more fragile components removed. These components will be found separately boxed.

All boxes of the shipment will have stencilled on the outside surface the following information:

1. The box number.
2. Westinghouse style numbers, if applicable.
3. Description and assigned symbol number of units and separately packed components.

Uncrating should proceed as follows:

1. Begin by selecting box No. 1.
   a. Place it in a position near the selected permanent location for this unit.
   b. Unpack carefully.
   c. Move the unit into place using the section on Handling Procedure as a guide.
2. Select box No. 2, etc.

To further assist in the inventory, identification and assembly of all units and component parts, the following references are submitted:

1. Units of the complete transmitter listed in the INTRODUCTION.
2. Photographs.
3. Wiring Diagrams.

HANDLING PROCEDURE

1. Lifting and Skidding

Each of the 50HG-2 transmitter cubicles is separately crated and is provided with a standard skid base. This skid base permits the use of rollers and fork lift.

Eye bolts are provided in the top of each cubicle permitting the use of an "A" frame or other hoisting device for lifting. Care should be used to insure that the pull on the eye bolts is largely vertical and that there is little horizontal strain because of the danger of breaking the bolts or bending the cubicle frame. Never use a short sling.

2. Uncrating the Cubicles

After the crated cubicle has been rolled into place, remove the crating from the cubicle, leaving the skid base intact. Use care in the removal of the crating to prevent scratching the finish. Next remove the lag screws from the clamps which secure the cubicle to the skid base. From this point the procedure for installation is described in the section on INSTALLATION.

STORAGE

The 50HG-2 transmitter may be stored in a clean, dry, well ventilated room for an indefinite period provided that the gas pressure is maintained in gas filled capacitors.

PACKING LIST

This list only includes units of a standard 50HG-2 Transmitter. Any accessory units ordered such as Antenna Phasing Cubicle, Console, etc., will appear on the packing lists included with the shipment.

1. Method of Packing

Some of the components within the cubicles such as transformers, chokes, capacitors, and resistors are tied down or supported by bracing or blocking. The interlocks are tied down or removed from their mountings and tied down. The contactors and relays are tied down and their moving contacts secured firmly with tape or blocked with paper. The fluorescent lamps are removed from their sockets, packed separately and placed within the cubicle. The ceramic lead-in bowls are removed, packed separately and placed within the cubicle. Sets of door keys are tied to the front doors, door keepers are removed, packed separately, and placed in the cubicle.

The fragile components which cannot be properly supported within the cubicle are removed from the cubicle and packaged separately as indicated in the packing list below.

Box #1 Power Control Cubicle - style 1475118
Box #2 Exciter Cubicle - style 1474773
Box #3 Exciter Cubicle components

a. Six Metal Rectifier units

RX-101	RX-104
RX-102	RX-105
RX-103	RX-106

b. Two RF coils
L-109 - WL-813 RF plate tank coil
L-112 - WL-5736 RF plate tank coil

c. Three Capacitors
C-122 - WL-5736 neutralizing capacitor
C-127 - WL-5736 plate coupling
C-129 - WL-5736 plate tank capacitor

Box #4 Exciter Cubicle components

a. Two crystal oscillator units - style 1472593
b. Two oscillator crystals - the resonant frequency to be specified by the customer

Box #5 Modulator Cubicle - style 1474774
Box #6 Modulator Cubicle components

a. Two feedback divider assemblies consisting of 4 resistors in each assembly.
R-210-1 to R-210-4
R-212-1 to R-212-4
b. Two voltage feedback capacitors, C-207 and C-209.
c. Two parasitic chokes, RL-201 and RL-202
d. Four micarta air ducts

Box #7 Left Power Amplifier Cubicle - style 1475119
Box #8 Left Power Amplifier components

a. One metal rectifier unit - RX-301
b. One WL-5671 plate RF choke - L-304
c. One WL-5671 plate blocking capacitor - C-319
d. One WL-5671 grid blocking capacitor - C-316
e. One WL-5671 grid tank coil - L-301
f. One WL-5671 neutralizing blocking capacitor - C-318
g. Two WL-5671 grid parasitic suppressors - RL-302 and RL-303
h. Two micarta air ducts

Box #9 One WL-5671 Neutralizing Coil - L-303
Box #10 Center Power Amplifier Cubicle - style 1474775
Box #11 Center Power Amplifier components

a. One WL-5671 plate tank coil - L-401
b. One Load current ammeter - M-415

Box #12 Right Power Amplifier Cubicle - style 1475120
Box #13 Right Power Amplifier components

a. One metal rectifier unit - RX-501
b. One WL-5671 plate RF choke - L-504
c. One WL-5671 plate blocking capacitor - C-519
d. One WL-5671 grid blocking capacitor - C-516
e. One WL-5671 grid tank coil - L-501
f. One WL-5671 neutralizing blocking capacitor - C-518
g. Two WL-5671 grid parasitic suppressors - RL-502 and RL-503
h. Two micarta air ducts.

Box #14 One WL-5671 neutralizing coil - L-503
Box #15 Switchgear cubicle - style 1474865, including levering mechanism and 2 instruction books
Box #16 Switchgear Cubicle component - Type DB-25 breaker - S-2001
Box #17 Switchgear Cubicle component - Type DB-25 breaker - S-2002
Box #18 Filter Reactor - Dwg. 7822469
Box #19 One PA Rectox Rectifier - style 1474566
Box #20 One Modulator Rectox Rectifier - style 1474565
Box #21 One Auxiliary Audio Choke - style 1472317, symbol L-1502
Box #22 One set of Lefthand End Radius
Box #23 One set of Righthand End Radius
Box #24 One installation kit per Dwg. 7427705
Box #25 One audio coupling capacitor - style 1081020, symbol C-1502
Box #26 One RF current transformer-rectifier for antenna arc interrupter- style 1471694A
Box #27 One set of vacuum tubes consisting of:

Qty.	Type
4	WL-5736
4	WL-813
3	WL-807
2	WL-802
2	WL-VR-150
3	RCA 1V

Box #28, 29, 30, 31, Contain one each of the WL-5671 thoriated tungsten tubes
Box #36, 37, 38 One each of the three distribution bus transformers - style 1483783, symbols T-1502A, B, C
Box #39 One main rectifier plate transformer - Dwg. 50-D-5771, symbol T-1501
Box #40 One modulation transformer - style 1483785, symbol T-1503
Box #41 Filter Capacitor - style 1474519, symbol C-1503
Box #42 Filter Capacitor - style 1474519, symbol C-1504
Box #43 One each of two Distribution Bus Regulators, style 1486439, symbol YR-1301
Box #44 One each of two Distribution Bus Regulators, style 1486439, symbol YR-1302
Box #45 One modulation reactor - style 1453629, symbol L-1501
Box #46 One blower fan and housing assembly per Dwg. 7426385, symbol BM #1
Box #47 Line Starter - Dwg. 7426385, Pt. 10
Box #48 One 7-1/2 HP motor - S#1442202 Two R-150 Belts - Dwg. 7426385, Pt. 8
Box #49 One Vari-pitch Texrope drive - Dwg. 7426385, Pt. 6
Box #50 One Sheave "Magic-Grip" - Dwg. 7426385, Pt. 7
Box #51 One Motor Base "Texslide #3" - Dwg. 7426385, Pt. 9
Box #52 One each of the items listed below:

a. Station call letters
b. Nameplate S#1472812
c. RG-17/U cable - 60 ft.
d. RG-62/U cable - 70 ft.
e. One Audio Filter Capacitor S#1471665, symbol C-1501

INSTALLATION PLANNING

The 50HG-2 Transmitter has been designed for maximum installation flexibility to fit various situations. This section on installation planning is intended to assist the architect, station engineers and consultants, in planning the building layout and should NOT be considered an exact specification.

BUILDING LAYOUT

The building plans must include provisions for:

The Transmitter Cubicles
The External Components
The Cooling System
Cables and Conduits

These items are discussed below.

1. Transmitter Cubicles

A suggested equipment layout for a single floor installation appears on figure 27, and for a two floor installation in figure 28.

These figures illustrate the installation of the six transmitter cubicles and their related external equipment.

The cubicle construction of the transmitter provides adaptability to meet individual installation requirements, but it is preferable to install the cubicles in line. If it is necessary to install the cubicles in a different arrangement, however, Westinghouse will assist the purchaser in planning the installation.

Figure 36 and figure 37 illustrate in-line layouts for the six cubicles. The first figure shows the cubicles built into the wall, and the other shows the cubicles installed free-standing. In either case, appropriate end radii are supplied to provide a finished appearance to the transmitter. The installed length of the six cubicles is 289-1/2 inches and the end radii add 12 inches, making a total of 301-1/2 inches. The cubicles are all 54-1/4 inches deep and a minimum clearance of 60 inches should be allowed in front of and behind the cubicles.

A typical 50HG-2 Transmitter cubicle is shown on figure 35. All six cubicles are identical in general construction and the basic installation requirements are the same. The transmitter room floor should be designed to carry a minimum dead load of approximately 4000 pounds per cubicle, although none of the transmitter cubicles actually weigh that much. The floor should include two parallel "I" beams, 50 inches apart, with top faces level with the floor. The cubicles are set on these beams. After all the cubicles are in place and leveled, they are bolted together and the two end cubicles are bolted down to the "I" beams to prevent creepage. Note that the wooden blocks shown on figure 35 are to prevent either the drill or the tap from contacting concrete.

2. The External Components

The equipment external to the six transmitter cubicles is illustrated on figure 33. All of the items on this figure are individual units and installation is mostly a matter of placement and electrical interconnection. However, it is necessary to install the Rectox Units directly in the main air stream.

The remaining power components should be installed in the power room, with the Switchgear Cubicle built into the wall and its front panel available from outside the room.

A suggested layout for these components is shown on figure 27 and figure 28.

3. The Cooling System

The basic air supply system is illustrated on figure 39. For a two floor layout, the supply air duct is the power room and for a single floor layout, it is a concrete trench built into the floor. A 26 by 26 inch hole in the floor beneath each cubicle allows the air to flow into the cubicles. See the Transmitter Floor Plan, figure 29.

The cubicles are constructed to direct the cooling air properly through the cubicles and out through the exhaust grills. An exhaust air duct with a cross-section area of at least 12 square feet is required above the cubicles. This duct should be equipped to allow for direct exhaust or for recirculation of air. A Typical Air Exhaust Duct is shown in figure 38. Recirculation of the air may be provided to assist in heating of the building in cool weather.

Two Blowers are installed so that either may be used to supply the cooling air in case a spare blower is purchased. Air Filters for use with these blowers may be installed directly at the intake to the blowers or in the walls of the building, depending on the situation. If desired, a Precipitron electronic air cleaner may also be used in connection with the air supply system. The Blower Outline showing overall dimensions appears on figure 34.

The Rectox Units must be installed in the air stream from the Blowers. These units are constructed to facilitate such installation, the frames themselves actually forming part of the air duct. It is not necessary to provide any direct cooling for the other components in the power room, but allowance should be made for convection air circulation as in the single floor installation.

4. Cables and Conduits

The cable and conduit runs appear on the Power Room Layout figure 31 (Two Floor) and figure 30 (One Floor). These figures illustrate in a general way the cross wiring of the external power equipment. In a two floor plan, two floor openings, in addition to those provided for the cooling system should be provided, directly beneath the transmitter proper. Other openings are required when a control desk and an audio rack are used with the transmitter; see the Transmitter Floor Plan and Power Room Layout on figure 29 and figure 31.

In a single floor installation, two troughs for high voltage conductors and one trough for power and control wires are required. See Power Room Layout (one floor) on figure 30.

INSTALLATION

The basic installation plan for the 50HG-2 Transmitter includes two centers of placement of the transmitter components. One is the transmitter room, where the transmitter cubicles are installed, and the other is the power room where the equipment external to the transmitter cubicles is installed.

TRANSMITTER INTERCONNECTIONS

1. The complete interconnection wiring information appears on figures 42 and 43. Figure 42 lists point-to-point wiring between cubicles and between cubicles and the power room. Figure 43 shows point-to-point wiring for power room components.

2. The types of wires and lugs and their electrical ratings appear on the last sheet of figure 42. Only items so marked in the figure are supplied as part of the transmitter.

   a. The wires and lugs shown on figure 42 are suggested types only. If these are not available or not convenient to use, a satisfactory equivalent may be substituted.
   b. Other materials, not listed on figure 42 but required for installation are:
      (1) Cable clamps and brackets
      (2) Conduit and conduit brackets
      (3) House breaker box
      (4) Hardware

TRANSMITTER CUBICLES

The transmitter proper consists of six cubicles. Additional cubicles may be added when necessary for directional antenna arrays. Figure 35 (Typical Cubicle) shows all important dimensions and general constructional details of the cubicles. It should, however, only be used to supplement the layout drawings. These cubicles house the major electronic elements of the transmitter as well as all the low voltage supplies, supervisory control circuits and transmitter controls.

The transmitter is generally installed in conjunction with an operating console, as well as racks containing the audio frequency and measuring equipment. For suggested arrangement of the cubicles with the transmitter room, please turn to Building Layout of this instruction book. Proceed to install the transmitter as follows:

1. Place each cubicle in its permanent position by carefully following instructions under Handling Procedure of this instruction book.

2. Align and level all cubicles on the floor rails.

3. Bolt all cubicles together securely by means of 1/2"-13 studs, washers and nuts supplied in the Installation Kit. Make sure of good electrical contact between cubicles.

4. Mark hold-down bolt holes in first and last cubicle.

5. Move first and last cubicles back after removing bolts from sides. Drill and tap 1/2" x 13 holes in the floor rail.

6. Replace cubicles; align and level and bolt cubicles together tightly, making sure of good electrical contact between cubicles. Bolt end cubicles down with two inch 1/2"-13 bolts and washers.

At this time the caulking should be done to prevent air leakage. With a caulking gun, apply compound around all the inside and accessible outside edges of the base of each cubicle. The inside may be reached through the air opening in the floor beneath cubicles. This completes the cubicle installation.

7. Install two RG-17/U coaxial cables to connect the RF driver terminals located on the Exciter Cubicle with the RF input terminals on the Power Amplifier cubicles. The four cable plugs for the RG-17/U cable are shipped assembled to the panel terminations mounted on the top of the cubicles. Figure 44 and figure 45 show RG-17/U wiring and termination respectively. In order to preserve circuit balance, the RG-17/U cables must be cut to the same length.

8. Install two .375 OD hard-drawn copper tube leads to connect the audio driver terminals (two porcelain feed-through bowls) located on top of the Exciter Cubicle with the audio input terminals (located on top of the Modulator Cubicle). Figure 44 shows the audio driver connection between Exciter and Modulator.

EXTERNAL POWER EQUIPMENT

The Auxiliary Power Equipment shown on figure 33 is installed in the power room adjacent to the transmitter room.

For suggested arrangements of the Auxiliary Power Equipment within the power room, refer to the Auxiliary Components under INSTALLATION PLANNING.

Proceed to install the Auxiliary Power Equipment as follows:

1. The Switchgear Cubicle houses the two DB-25 Air Breakers and associated control system. This cubicle is intended for installation near the power room, preferably in the wall of the room with the front panel exposed and accessible from outside.

2. The two Rectox Frames house the metal rectifiers for the power amplifier and modulator supplies. They are intended for installation in the air stream, serving as part of the air duct. Clearance shall be provided for the spark gaps mounted on top of the frame.

3. The two filter capacitors and the filter reactor should be mounted adjacent to the rectox frames and with at least one foot of clearance on all sides.

4. The Main Rectifier Induction Voltage Regulator, if used, should be installed with clearances of at least two feet from the top and the sides which mount the primary relay, De-ion switch and potential transformer.

5. The Distribution Bus Induction Voltage Regulators should be installed with clearances of at least one foot on all sides.

6. The Main Rectifier Plate Transformer, and the Modulation Transformer and Modulation Reactor are floor-mounted. Access to these units is through the front and rear panels and clearances should be provided accordingly.

7. The three Distribution Bus Transformers are floor-mounted adjacent to the bus regulators. At least 18" of clearance should be provided about these units.

8. The Auxiliary Audio Choke is an air core inductor intended for wall mounting adjacent to the Modulation Reactor.

9. The Modulation Coupling Capacitor may be floor-mounted (terminals up) near the Modulation Transformer, or wall-mounted on a special bracket (bracket is not supplied).

10. The Audio Filter Capacitor is mounted on top of the Modulation Transformer. It is connected to and mounted on secondary terminal X-1 and a ceramic standoff insulator supplied in the Installation Kit.

11. Install all copper tubing conductors using figure 43 as a reference.

    a. The Power Room Layout, figure 30 for a one floor building, and figure 31 for a two floor building, may be used as a reference for the copper tubing conduction layout.

GROUND SYSTEM

Install the transmitter ground strap using figure 43 as a reference.

1. The transmitter cubicle ground strap is placed in the wire trough and runs from cubicle #1 to cubicle #6.

This ground strap runs along the inside surface of the rear "I" beam. It is fastened to the center of the "I" beam in each cubicle base using a 1/2"-13 bolt. The Exciter Cubicle base is then grounded to the transmitter ground system.

2. Each unit of external equipment is grounded to the cubicle ground strap and thus returned to the transmitter ground system.

INTERLOCKS

1. Electrical

Each cubicle is equipped with interlock switches. Additional switches in the air duct, power room, doors to vaults, etc., should be connected into the transmitter control circuit as shown on figure 49, so that any interruption of the interlocking series will remove power from the transmitter.

2. Mechanical

In addition to electrical interlocking, the power room can be protected from entry by a mechanical key interlocking system. Inspection of the Switchgear will disclose two keys marked #RE-1130. These keys, removable only after the switches are locked in their "off" position, can be used to gain entry into the power room, which should be provided with two identical locks so that both switchgear keys are required to gain admittance.

It would be desirable for the air tunnel trap door to be included in this interlock system. See attached copy of "R. and I. E. Kirk Catalog" for suggestions. All door locks other than the two on the Switchgear should be supplied by the customer. To obtain locks using the keys supplied in the Switchgear, it is necessary to supply R. and I. E. Co. with three items of information: (1) Neg. #4708179, (2) Key #1130, (3) Type of locks selected as listed in the Kirk Catalogue. A duplicate set of keys is necessary in case the first set is misplaced, but it is recommended that the duplicate set be kept behind non-removable glass so that breakage is necessary to obtain them. A word of warning at this time: Defeating the key interlock or electrical interlock system is dangerous. THE PURPOSE OF THESE SYSTEMS IS TO PROTECT LIFE.

COOLING SYSTEM

1. Ducts

After the transmitter is bolted down in its final location, the exhaust air duct can be installed. A typical installation is shown on figure 38. If sound-proof duct lining is used, it must be of fire-proof material. The duct work should be extended to all locations requiring heat and should be equipped with automatic or manually controlled registers. See figure 39, Basic Air Supply System.

For discharge of the heated air to the outside, a ventilator in the roof or ventilators on two sides of the building should be provided to take advantage of the prevailing winds. Self-closing shutters to prevent back-draft are extremely important to prevent back pressure from reducing the flow of cooling air to a dangerous level. Screening should be provided to prevent entry of small animals and birds.

2. Air Returns

An unrestricted air return circuit to the blowers should be planned for normal recirculation. This may be in the form of gratings in the floor, doors, walls or a combination of gratings and filters so arranged as to disperse the flow of air and reduce the velocity. Care should be taken to see that the total back resistance pressure of the return circuit is not excessive for the volume of air handled, (approximately 12,000 CFM). The exhaust duct should not present more than 1/4" water gauge pressure drop.

3. Air Requirements

Normal air requirement for the 50HG-2 Transmitter at sea level in the ambient range +5° to +45°C, is approximately 12,000 CFM at a resistance pressure of 2" water gauge. The fan speed for this delivery is 570 RPM (4.6 HP). If necessary, the fan speed can be regulated between 460 RPM and 875 RPM by means of the "Vari-Pitch" sheave. The oil level indicators on the bearings should be installed and the bearings filled to proper level with a good quality oil (SAE 10). Check frequently for the first week after filling to be sure that the fan bearing cups maintain a safe oil level.

4. Blower

The Blower supplied with the transmitter is a Sturtevant "Silentvane," size 90 shown on figure 34. Make certain the Blower is mounted on a level surface.

5. Motor

The motor supplied is Westinghouse Type CPS "Life-line" with standard NEMA frame No. 284. The electrical characteristics are 7-1/2 HP, three phase, 50/60 cycles, 220/440 volts with medium starting torque. The slide base is an Allis-Chalmers "Texslide No. 3." Some slipping of the belts will be noticed upon starting. This is a normal condition and helps to limit the motor starting current.

6. Sheaves and Belts

The motor is equipped with an Allis-Chalmers "Vari-Pitch" wide-range, two groove sheave allowing a variation from 5-1/4 inch pitch diameter to 10 inch pitch diameter. The Blower has a fixed, two groove sheave of 20 inch pitch diameter. Belts for the above are of a special section to allow for the wide range of speed variation and are known as R-150 "Texrope." A word of caution when replacing belts; always replace both belts, since a new belt will have a shorter circumference than a used one.

7. Starter

The motor starter is a combination switch (with magnetic trip overload protection) and contactor (with thermal trip overload protection). Connections to the starter should be made as shown on figure 43. It is recommended that the starter be installed within sight of the blower motor.

8. Filters

Some means of cleaning the circulated air should be employed. This may be in the form of spun glass filters or the highly efficient Westinghouse Precipitron. In many cases both are used. The Precipitron is used to clean air brought in from the outside and the spun glass filters are used to clean the recirculated air.

The recommendation of Owens-Corning to filter 12,000 cfm of air is to use 15 of their #2, 20" x 20" "Dust Stop" filters. This allows each filter to pass 800 cfm and thus maintain maximum cleaning efficiency. The average resistance of the #2 filter when clean is .13" water gauge. (This drop doubles when they are stacked double.) A loss of more than .15" water gauge for the inlet is not recommended.

The Westinghouse District Office has among its personnel a specialist in Precipitron installation and filter problems. He will be glad to give assistance and make recommendations.

HEATING FACILITIES

Approximately 50 kw is available for use in heating the transmitter building, when the transmitter is in full power operation.

INITIAL ADJUSTMENT AND TESTS

Before proceeding with these tests, the following should be observed:

1. Transmitter installation should have been completed according to the section on RECEIVING, HANDLING, AND STORAGE and the section on INSTALLATION of this book.

2. Make a thorough mechanical inspection of the transmitter installation, noting particularly that good wiring practice is used throughout. Check all wires to make sure that the lugs have been properly applied. Burndy-type lugs depend entirely upon the success of the clamping operation for electrical continuity, therefore it is imperative that the proper size lug is properly installed.

3. Check mechanical operation of all doors to make sure that the latches are functioning properly, and that the mechanical and electrical interlocks which depend upon door operation have been installed in their proper places and have been adjusted for positive action.

4. Check the mechanical operation of all relays and make sure that all traces of packing, blocks, twine, tape, wires, etc., have been removed.

5. Remove VR-150, 802, 807, and 813 tubes from their sockets. Disconnect filament leads from the 5736 and 5671 tubes.

6. Make sure that all switches and breakers are off and that the 460 volt, three phase, incoming line is deenergized.

GROUNDS AND SHORT CIRCUITS

1. Open fuses F-2001, F-2002, F-2003, F-2006, F-2007 in Switchgear Cubicle and test 460 volt lines for short circuits and grounds. Use megger (500 volts d-c).

2. Replace fuses, check 460 volt line for grounds.

3. Remove two primary line wires from Distribution Bus Transformers, T-1502, A, B, C. Check for short circuits and grounds. Replace wires.

4. If a Main Rectifier Regulator has been purchased, disconnect leads No. 1 and No. 3 from Main Regulator YR-1201, two leads from primary of Main Rectifier Plate Transformer T-1501, and one fuse from potential transformer on Regulator YR-1201. Check lines for short circuits and grounds. Replace connections.

5. Remove ground from secondary of Distribution Transformer T-1502-B and remove two incoming bus wires from TS-20 in the Power Control Cubicle. Remove fuse F-1C from tube hour meter M-7. Check both ways for shorts and grounds on all wires of bus. Check only for grounds in Distribution Transformer direction.

6. Replace fuse and wires in Power Control Cubicle, but do not replace ground on Distribution Transformer secondary.

7. a. Connect an ohmmeter between ground and a distribution bus wire, then close in sequence the power control De-ion switches shown below:

S-1, LEFT PA FILAMENT NO. 1
S-2, LEFT PA FILAMENT NO. 2
S-3, RIGHT PA FILAMENT NO. 1
S-4, RIGHT PA FILAMENT NO. 2
S-5, LEFT MODULATOR FILAMENT NO. 1
S-6, RIGHT MODULATOR FILAMENT NO. 2
S-7, LEFT MODULATOR FILAMENT NO. 3
S-8, RIGHT MODULATOR FILAMENT NO. 4
S-10, PANEL LIGHTS
S-11, TRANSMITTER CONTROL BUS
S-12, EXCITER FILAMENTS
S-13, AUDIO BIAS
S-14, RF BIAS
S-15, 400 VOLT SUPPLY
S-16, 1500 VOLT - 3000 VOLT SUPPLY
S-22, BUS REGULATOR

No ground should appear.

7. b. If a Main Rectifier Regulator has been purchased, turn on VRS-1201 on the Main Regulator. Operate AUTO/MANUAL, LOWER/RAISE switches S-19 and S-20 in the Power Control Cubicle and VOLTAGE CONTROL SELECTOR and MANUAL VOLTAGE CONTROL switches S-411 and S-412 in the Center Power Amplifier Cubicle. No ground should appear.

8. Close manually, in sequence, the DN magnetic contactors K-37 to K-40 in the Power Control Cubicle. No ground should appear.

9. Remove ground from secondary of switchgear control transformer (T-2005) and check for grounds. No ground should appear. Replace lead.

10. Open TRANSMITTER CONTROL BUS switch and observe 27.5 ohms d-c resistance between Power Control terminals No. 61 and No. 73 with all cubicle doors open.

11. Measure (with ohmmeter or bridge using less than 10 volt battery) the resistance at terminals of the following Rectox units. (Do not remove Rectox from circuit, since this is primarily a check of the associated circuit and not of the Rectox Units.) The resistance should be approximately as indicated.

Unit	Term.	Res.	Term.	Res.
RX-101	a-c	20 ohms	d-c	10,700 ohms
RX-102	a-c	140 ohms	d-c	7,600 ohms
RX-103	a-c	140 ohms	d-c	7,600 ohms
RX-104	a-c	70 ohms	d-c	3,600 ohms
RX-105	a-c	70 ohms	d-c	3,580 ohms
RX-106	a-c	20 ohms	d-c	850 ohms
RX-1	a-c	8 ohms	d-c	30,000 (With Exciter and Power Control ground switches open)
RX-301	a-c	19 ohms	d-c	800 ohms
RX-501	a-c	19 ohms	d-c	800 ohms

12. Measure insulation resistance, using potential not less than 500 volts d-c, of high voltage conductors in power room.

a. Conductors from T-1501 to both high voltage rectox units.
b. Conductors from high voltage rectox units to filter capacitors and reactor.
c. Conductors from filter units to Modulation Transformer and Modulation Reactor.
d. Conductors from Modulator and Power Amplifier to Modulation Transformer and to Audio Auxiliary Choke. Do not disconnect leads from transmitter. Doors to Modulator and Power Amplifier cubicles must be closed.
e. Investigate any of above, a to d readings, if less than 50 megohms.
f. Connect automatic capacitor shorting switches on the three filter capacitors to the voltage bus with No. 28 bare copper wire. Bend the springs up so ends are level with the high voltage terminals. (Note: This fuse wire is supplied in the Installation Kit.)

SWITCHGEAR ADJUSTMENTS

Before application of power the two type DB-25 circuit breakers S-2001 and S-2002, mounted in the Switchgear Enclosure should be withdrawn part way out of the enclosure using the extension rails and levering handle.

Inspect the two breakers with the aid of the inspection list furnished on page 7 of I.B. 35-225-1. Check the overcurrent tripping devices for proper settings as follows:

1. Long time delay setting
   - S-2001 100% of rated current
   - S-2002 80% of rated current

2. Instantaneous settings
   - S-2001 1000% of rated current
   - S-2002 1000% of rated current

The above adjustments are normally accomplished at the factory but should be checked prior to the application of power to the equipment. For details of adjustment, consult I.B. 35-225-1 pages 15 through 18.

RELAY SETTINGS

1. Set overload relays as follows, and using battery, rheostat, and ammeter, check operating point by application of test leads to relay coil terminals. Do not remove shunting resistors.

Symbol	Description	Scale Setting	Operating Point
K-9	1500/3000 Volt	5.5 amp 6.7	4.5 to 5.5 amp 5.6
K-11	Modulator Rectifier	9.5 amp 11.4	8.5 to 9.5 amp 9.5
K-12	Power Amplifier Rectifier	11.5 amp 14	11.0 to 12.0 amp 12.
K-105	400 Volt	0.4 amp 6	0.45 to 0.65 amp .65
K-106	813 RF	0.6 amp 75	0.5 to 0.7 amp .7
K-107	Left 5736 RF	1.4 amp 1.6	1.05 to 1.35 amp 1.42
K-108	Right 5736 RF	1.4 amp 1.6	1.05 to 1.35 amp 1.43
K-110	Left 813 Audio	0.15 amp .16	0.14 to 0.16 amp
K-111	Right 813 Audio	0.15 amp .16	0.14 to 0.16 amp
K-114	Left 5736 Audio	0.25 amp .3	0.5 to 0.7 amp
K-115	Right 5736 Audio	0.25 amp .3	0.5 to 0.7 amp
K-201	Left Modulator	3.5 amp 4	4.2 to 4.8 amp 4.9
K-202	Right Modulator	3.5 amp 3.1	4.2 to 4.8 amp 4.9
K-301	Left Power Amplifier	3.0 amp 3.8	4.4 to 4.8 amp 5.
K-501	Right Power Amplifier	3.0 amp 3.9	4.4 to 4.8 amp 5.

2. Set bias undervoltage relays:

Symbol	Description	Scale Setting
K-109	Exciter	90 volts
K-112	Left Audio Driver	50 volts
K-113	Right Audio Driver	50 volts
K-203	Left Modulator	90 volts
K-204	Right Modulator	90 volts
K-302	Left Power Amplifier	60 volts
K-502	Right Power Amplifier	60 volts

2.5
9.0 || 2.5
1.5

GAS FILLED CAPACITORS

Capacitors which are identified with symbols C-129, C-320, C-517 and C-520 are Lapp gas-filled, variable capacitors.

Observe the following precautions when handling these capacitors, (also refer to Lapp Bulletin 266 in the SUPPLEMENT section of this instruction book):

1. When first received:
   a. Check for possible damages.
   b. Check gauge pressure. This should be between 50 and 65 psi.
   c. Measure safety gap spacing and record for future reference.
   d. Check gauge pressure frequently to make no leaks.

3/16" Small
13/16" large

2. Before installation:
   a. If gauge pressure is between 50 and 65, add oil pumped dry nitrogen to 150.
   b. If gauge pressure is below 50, add Freon gas (F-12) to 65 and then add oil pumped dry nitrogen to 150.
   c. Check safety gap spacing.

3. After installation:
   a. Inspect periodically to see that the proper gauge pressure (150 ±20) is maintained.
   b. If gauge pressure is less than 85, drain to 2.5 and refill to 65 with Freon (F-12) and then to 150 with oil pumped dry nitrogen.
   c. If gauge pressure is 85 or more, refill to 150 with oil pumped dry nitrogen.
   d. Keep ceramic bowl clean and dry.

4. Storage
   a. See that the gauge pressure is between 100 and 150 so that the gaskets will be held in proper position to prevent leakage.

RF COMPONENT SETTINGS

The following information is to be used as a guide in adjusting the Type 50HG-2 Transmitter for operation on a specific carrier frequency. At frequencies for which a choice of adjustments exists, either will be suitable.

1. Crystal Oscillator, Type FA
   a. L-102
      540 to 650 KC - connect tap 6 to tap 5
      650 to 840 KC - connect tap 6 to tap 4
      840 to 1300 KC - connect tap 6 to tap 3
      1300 to 1600 KC - connect tap 6 to tap 2
   b. L-103
      540 to 650 KC - connect plate to 1, output to 2
      650 to 840 KC - connect plate to 2, output to 3
      840 to 1000 KC - connect plate to 2, output to 4
      1000 to 1300 KC - connect plate to 3, output to 4
      1300 to 1600 KC - connect plate to 4, output to 4

2. 807 Buffer Amplifier
   a. L-105
      540 to 660 KC - use all sections
      660 to 808 KC - short out one section (nearest panel)
      808 to 985 KC - short out two sections (nearest panel)
      985 to 1300 KC - short out two sections (nearest panel)
      1300 to 1600 KC - short out three sections (nearest panel)

Change Grid tap to increase Grid Drive

3. 813 RF Plate Tank
   a. L-109
      540 to 660 KC - use all (62) turns
      660 to 800 KC - short out 7 turns on each end
      800 to 900 KC - short out 11 turns on each end
      900 to 1020 KC - short out 15 turns on each end
      1020 to 1300 KC - short out 19 turns on each end
      1300 to 1600 KC - short out 23 turns on each end
   b. L-109 - Grid tap and neutralizing tap
      540 to 660 KC - 17 turns above and below center tap
      660 to 800 KC - 15 turns above and below center tap
      800 to 900 KC - 13 turns above and below center tap
      900 to 1000 KC - 11 turns above and below center tap
      1000 to 1100 KC - 9 turns above and below center tap
      1100 to 1300 KC - 7 turns above and below center tap
      1300 to 1400 KC - 6 turns above and below center tap
      1400 to 1600 KC - 5 turns above and below center tap

4. 5736 Plate Tank
   a. L-112 - Tap location
      540 to 600 KC - 13-3/4 turns from ground
      600 to 660 KC - 12-3/4 turns from ground
      660 to 800 KC - 12-3/4 turns from ground
      800 to 1000 KC - 12-3/4 turns from ground
      1000 to 1300 KC - 11-3/4 turns from ground
      1300 to 1500 KC - 10-3/4 turns from ground
      1500 to 1600 KC - 8-3/4 turns from ground
   b. C-129-A
      540 to 600 KC - use 4 padders 560 $\mu\mu$f each
      600 to 660 KC - use 3 padders 560 $\mu\mu$f each
      660 to 800 KC - use 2 padders 560 $\mu\mu$f each
      800 to 1000 KC - use 1 padder 560 $\mu\mu$f each
      1000 to 1600 KC - none

5. Left and Right Power Amplifier Grid Circuit
   a. L-301 or L-501
      540 to 600 KC - use all turns
      600 to 660 KC - short out 2 turns
      660 to 800 KC - short out 7 turns
      800 to 1000 KC - short out 13 turns
      1000 to 1300 KC - short out 15 turns
      1300 to 1600 KC - short out 18 turns

6. Left and Right Power Amplifier Neutralizing Circuit
   a. L-303 and L-503 - See Power Amplifier Neutralization
      540 to 660 KC - total turns 196
      660 to 1000 KC - total turns 156
      1000 to 1600 KC - total turns 96

7. Power Amplifier Plate Tank
   a. L-401-A
      540 to 750 KC - use all turns
      750 to 800 KC - short out one turn each end of coil
      800 to 1000 KC - short out two turns each end of coil
      1000 to 1200 KC - short out three turns each end of coil
      1200 to 1500 KC - short out four turns each end of coil
      1500 to 1600 KC - short out five turns each end of coil
   b. C-320-A and C-520-A
      540 to 800 KC - one 450 $\mu\mu$f, 45 KV Capacitor

POWER-ON ADJUSTMENTS

WARNING

THE USE OF HIGH VOLTAGES IS NECESSARY FOR THE OPERATION OF THE ELECTRONIC EQUIPMENT COVERED BY THESE INSTRUCTIONS. WHILE ALL PRACTICAL SAFETY PRECAUTIONS HAVE BEEN INCORPORATED IN THE DESIGN OF THIS EQUIPMENT, THEY ARE NOT INFALLIBLE; THEREFORE, ALL PRECAUTIONARY MEASURES MUST BE CAREFULLY OBSERVED BY THE OPERATING PERSONNEL DURING THE OPERATION, INSPECTION AND MAINTENANCE OF THE EQUIPMENT. SEE WARNING IN THE FRONT OF THIS BOOK.

POWER LINE VOLTAGE

Apply 460 volts a-c to Switchgear. All De-ion switches should be off and all control switches turned to left (if no duplicate controls have been connected). Observe that the line voltage meter reads 460 volts, and the line current meters reads zero.

BLOWERS

Turn on as follows:

1. Turn S-30 (BLOWER CONTROL) to BLOWER ONLY position.

2. Turn S-29 (BLOWER SELECTOR) to No. 1 position.

3. Close S-9 (SWITCHGEAR CONTROL BUS).

4. Turn S-28 (BUS BREAKER) on. Observe:
   a. Indicator I-40 (BUS BREAKER SWITCH ON) lights.
   b. Blower No. 1 starts; check direction of rotation.

If not same as arrow on blower housing, reverse two leads on blower motor.

   c. After Blower No. 1 comes up to normal speed, S-515 (air flow interlock) operates allowing I-36 (BLOWER NO. 1 ON) to light.

5. If a spare blower has been purchased, turn BLOWER SELECTOR to NO. 2 position. Observe: Blower No. 2 starts; check direction of rotation. I-41 (BLOWER NO. 2) lights.

AIR VELOCITY

1. Measure air velocity at following points using an integrating vane-type anemometer such as the four-inch diameter "CENCO" anemometer, (Central Scientific Co., Chicago, Ill. Cat. No. 78605).

Measurements on the power tubes should be the average of maximum readings around the tube with the instrument held horizontal just above the radiator fins and midway between the glass bulb and the outside edge of the radiator. The Rectox units must be installed, all tubes in tube sockets, all cubicle doors must be closed, and exhaust ducts in normal condition when measurements are taken.

Location	Component	Minimum Velocity, Fpm
Power Control	RX-1	1000
Exciter	RX-104	800
Modulator	Each WL-5671	1000 1100
Left Power Amplifier	Each WL-5671	1000 1025
Left Power Amplifier	RX-301	800
Right Power Amplifier	Each WL-5671	1000 1100
Right Power Amplifier	RX-501	800 800

2. Remove one 5736 tube from its socket on the left side of the Exciter and measure air velocity to be 800 fpm minimum. Replace tube and remove one 5736 from right side and measure air velocity to be 800 fpm minimum. 2000 FPM

3. Orient the air nozzles in the Modulator, Left Power Amplifier and Right Power Amplifier cubicles so that air is directed on the 5671 tube filament seals.

4. If necessary, change speed of Blowers by adjusting "Vari-Pitch" sheave or install baffles to meet above minimum air requirements.

DISTRIBUTION BUS

Check that primary switch positions on T-1502-A, B, C are all on position 3. Positions 1 and 5 are ±5 percent and positions 2 and 4 are ±2-1/2 percent. Switches are mounted on transformers, under top cover plates.

1. Turn BLOWER CONTROL to TRANSMITTER AND BLOWER position. Observe:
   a. The Distribution Bus Breaker closes. (Do not allow breaker to "pump." If abnormal operation is encountered, see Switchgear Instruction Book I.B. 35-225-1 in SUPPLEMENT Section.)
   b. I-35 (BUS BREAKER ON) lights.
   c. M-4 (BUS VOLTAGE) indicates 230 volts on each of the three phases selected by S-18 (BUS METERS PHASE SELECTOR). Note that if the phase voltages are not in balance, throw S-19 (BUS REGULATOR SELECTOR CONTROL) to MANUAL position; throw S-22 (BUS REGULATOR) to its ON position; hold S-20 (BUS REGULATOR MANUAL CONTROL) in its LOWER position until both regulators have reached their lower limit positions and all three phases are balanced. Next, hold S-20 in its RAISE position until all three phases show 230 volts.
   d. With S-19 in AUTOMATIC position, note that the bus voltages on each of the three phases are equal (230 volts). See Regulator Instruction Book 5521-A for adjustment of regulator relays in case the three phases are unbalanced or not 230 volts.

FILAMENT VOLTAGES

1. Throw S-12 (EXCITER FILAMENTS) to ON position. Observe:
   a. K-8 (Exciter filament undervoltage) timing relay begins to operate and should close after a 22-second delay, lighting I-42 (EXCITER FILAMENT NORMAL VOLTAGE) indicator. Note that K-8 should be adjusted to close in 22 seconds and drop out in 5 seconds. See Instruction Leaflet 41-291D in SUPPLEMENTS Section of this book.
   b. The Exciter filament transformers should be energized.

2. Voltages at the filament terminals of the following tube sockets: (bus voltage 230 volts)

	Without Tubes	With Tubes	
Audio WL-807	6.3 to 6.6 volts	6.1 to 6.3 volts	6.3
RF WL-807	6.3 to 6.6 volts	6.1 to 6.3 volts	6.2
Audio WL-813	10.0 to 10.4 volts	9.7 to 10.3 volts	10.0
RF WL-813	10.0 to 10.4 volts	9.7 to 10.3 volts	10.0

3. Voltages at all 5736 filament connectors:

	Filaments Not Connected	Filaments Connected	
Audio WL-5736	5.9 to 6.5 volts	5.7 to 6.3 volts	5.8
RF WL-5736	5.9 to 6.5 volts	5.7 to 6.3 volts	5.7

4. Modulator and Power Amplifier filament voltages.
   a. Make sure that filament connectors are not touching filament terminals of 5671 tubes in Modulator, Left Power Amplifier, Right Power Amplifier.

LPA 9.5
RPA 10.5

(1) Turn ON all filaments in Modulator, Left Power Amplifier and Right Power Amplifier.
(2) Observe, using filament voltmeter selector switch on each cubicle, that each voltage is 10 to 11 volts.
(3) Try combinations of Power Amplifier Filament Switches, S-1, 2, 3, 4. Check voltages to be same as above.
(4) Turn Bus Breaker OFF and connect all 5671 filaments.
(5) Repeat (1), (2), (3) above, and observe each filament voltage to be between 9.6 and 10.2 volts. (Bus voltage 230 volts on all three phases.) Using an accurate laboratory-type voltmeter, measure voltage at filaments of the 5671 tubes. Adjust the indication on M-202, M-301, M-501 to be the same as the laboratory-type voltmeter (adjust zero set screw). Do this after the set has been checked and operated long enough for voltmeters to have reached operating temperature.

EXCITER BIAS AND PLATE VOLTAGES

Adjust Bus Voltage to be 230 volts.

1. Audio Bias
   Close S-13 (AUDIO BIAS). Turn on S-31 (AUDIO BIAS). Observe:
   a. I-43 (AUDIO BIAS SWITCH ON) lights, (amber).
   b. K-37 (audio bias contactor) operates.
   c. M-111 (LEFT 5736 AUDIO DRIVER BIAS), 130 volts - adjusted by R-119.
   d. M-112 (RIGHT 5736 AUDIO DRIVER BIAS), 130 volts - adjusted by R-120.
   e. M-116 (LEFT MODULATOR BIAS), 330 volts - adjusted by S-108.
   f. M-117 (RIGHT MODULATOR BIAS), 330 volts - adjusted by S-109.
   g. The following undervoltage relays operated, and bias ON indicators light.
      K-112, I-38, Power Control AUDIO BIAS ON (red)
      K-113, I-403, Center Power Amplifier AUDIO BIASES ON (green)
      K-203, K-204, I-202, Modulator BIAS (green)

2. RF Bias

Close S-14 (RF BIAS). Turn on S-32 (RF BIAS). Observe:

a. I-44 (RF BIAS SWITCH ON), (amber).
b. K-38, RF bias contactor operates.
c. M-302 (LEFT PA GRID VOLTS), 340 to 360 volts.
d. M-502 (RIGHT PA GRID VOLTS), 340 to 360 volts.
e. K-109 (exciter bias undervoltage) closes, I-39 (RF BIAS ON), (red) and I-404 (RF BIASES ON), (green) light.
f. K-302 (left power amplifier bias undervoltage) closes, I-302 (BIAS), (green) lights.
g. K-502 (right power amplifier bias undervoltage) closes, I-502 (BIAS), (green) lights.
h. Using a d-c voltmeter, observe 300 to 400 volts negative from RF 5736 tube grids to ground.

3. 400 Volt Supply

Close S-15 (400 VOLT SUPPLY) on Power Control Panel. Turn on S-103, (400 VOLT SUPPLY) switch on Exciter Control Panel. Observe:

a. I-105 (amber) lights. (SWITCH ON).
b. K-39 closes - contactor, 400-volt supply.
c. I-106 (red) lights - (POWER ON).
d. M-118 (400 VOLT RECTIFIER) indicates between 440 and 460 volts.
14 ma e. M-101 (OSCILLATOR CATHODE CURRENT) indicates between 10 and 14 milliamperes. Note that as the oscillator is tuned through resonance by adjusting C-105, that the 802 cathode current goes through a sharp dip, a gradual rise and then a sharp rise.
48 f. M-102 (807 RF BUFFER CATHODE CURRENT) indicates between 35 and 55 ma. Tune to minimum with C-112 (plate tank capacitor).
? 22 g. M-103 (813 RF AMPLIFIER TOTAL GRID CURRENT) indicates between 14 and 18 ma.

4. 1500 Volt Supply

Put S-110 in OPERATE and S-111 in TUNE and put S-113 in OPEN position. Close S-16 (1500 VOLT - 3000 VOLT SUPPLY) in Power Control. Turn on S-104 (1500-3000 VOLT RECTIFIER) on Exciter Control Panel. Observe:

a. I-107 (green) lights (SWITCH ON).
b. K-40 closes - contactor, 1500-3000 volt supply.
c. I-108 (red) lights - (POWER ON) and K-104 operates 807 and 813 screen interlock relay).
d. Using S-106 (813 RF AMPLIFIER PLATE TUNING), tune for maximum reading on M-108 (1500 VOLT RECTIFIER).

RF DRIVER NEUTRALIZATION

1. Turn off 1500-3000 VOLT RECTIFIER and couple a wavemeter, or some other RF indicating device to the RF 5736 plate tank (L-112). A suggested method is to use link coupling, with one 6" turn on each end of link, and place the wavemeter outside the cubicle.

2. Remove cable plugs (RG-17/U from sockets on top of cubicle.

3. Turn on 1500-3000 VOLT RECTIFIER and adjust S-107 (5736 RF DRIVER PLATE TUNING) for maximum indication on wavemeter.

4. Readjust 813 RF AMPLIFIER PLATE TUNING for maximum indication on wavemeter.

5. Adjust neutralizing capacitor (C-122) for minimum indication on wavemeter. (A piece of cord may be wrapped around the sleeve of C-122 to permit adjustment from outside the cubicle.)

6. Place S-111 in OPERATE position and repeat 3, 4, and 5 above.

MAIN RECTIFIER REGULATOR OPERATION

When a Main Rectifier Regulator (YR-1201) is supplied with 50HG-2 equipment, power wiring should be according to figure 43 and control circuit wiring according to figure 42.

1. With S-421 (MAIN RECTIFIER CONTROL) in the off position, YR-1201 has run down to minimum position and the DELTA-WYE contactors are deenergized. No power is applied through the switchgear breaker, S-2002.

2. With switch S-421 in the "TUNE" position, power is applied to the primary of T-1501 through the WYE contactor. The regulator will automatically run up to a predetermined voltage when S-411 (REGULATOR CONTROL SELECTOR) is in the "AUTOMATIC" position.

With S-411 in the "MANUAL" position, the regulator is controlled by S-412 (MANUAL VOLTAGE CONTROL) and any desired voltage in the range 6 to 10 kv approx. may be obtained.

3. With switch S-421 in the "ON" position, power is applied to the primary of T-1501 through the "DELTA" contactors. If S-411 is in the "AUTOMATIC" position when going from "TUNE" to "ON", the regulator will have reached its "HIGH LIMIT" and the increase in voltage is brought about by the change in transformer primary connections from WYE to DELTA. If S-411 is in the "MANUAL" position when S-421 is placed in the "ON" position, any desired voltage in the range 9 kv to 12 kv approx. may be obtained.

MAIN RECTIFIER REGULATOR ADJUSTMENTS (IF USED)

1. Remove conductors from primary terminals of T-1501 (Main Rectifier Plate Transformer).

2. Connect secondary links on Main Rectifier Plate Transformer from No. 4 to No. 6 on all three phases.

3. Place S-411 (REGULATOR CONTROL SELECTOR) in MANUAL position.

4. Release brake on YR-1201 (Main Rectifier Induction Voltage Regulator).

5. By hand, rotate regulator to full LOWER position (full counterclockwise on regulator LOWER-RAISE dial). Observe:

   I-407 (LOW LIMIT) indicator on Center Power Amplifier Control Panel lights.

6. Rotate regulator to full RAISE position (full clockwise on regulator LOWER-RAISE dial). Observe:

   I-408 (HIGH LIMIT) indicator on Center Power Amplifier Control Panel lights.

7. Rotate regulator to mid-range (zero on LOWER-RAISE dial).

8. Set brake on regulator.

9. Block the undervoltage relay on the primary relay panel of regulator in the closed position. This can be done by inserting insulating material between the righthand contact (as seen from the front) and the movable contact, and then screwing up the adjustments on the contacts until the movable contact is firmly against the lefthand contact of the undervoltage relay.

10. Close VRS-1201 (De-ion breaker mounted on side of regulator).
    a. If motor runs the regulator toward RAISE, immediately open breaker and interchange two leads from the regulator motor. (Terminals for the motor are under the limit switch cover.)
    b. Close breaker and allow motor to run regulator down to lower limit and stop.

11. Turn S-421 (MAIN RECTIFIER CONTROL) ON. Observe:
    a. I-406 (green) lights - (SWITCH ON).
    b. K-1601 and K-1602 (Modulator bleeder contactors on Rectox Frame) operate.
    c. S-2002 (Main Rectifier Breaker in Switchgear) closes.
    d. I-203 (PLATE), I-303 (PLATE), I-405 (MAIN RECTIFIER POWER ON), I-503 (PLATE) (all red) light on Modulator, Left Power Amplifier, Center Power Amplifier, and Right Power Amplifier, respectively.
    e. Determine that three phase output voltage of Main Rectifier Regulator is between 350 and 380 and that all three phase voltages are equal.

12. Operate S-412 (MANUAL VOLTAGE CONTROL) and determine that regulator runs in proper direction.

13. Turn MAIN RECTIFIER CONTROL off and observe that regulator runs down to lower limit stops.

14. Turn MAIN RECTIFIER CONTROL on and S-411 (VOLTAGE CONTROL SELECTOR) to AUTOMATIC and observe that regulator setting is under control of R-417 (AUTOMATIC VOLTAGE CONTROL).

MAIN RECTIFIER POWER ADJUSTMENTS

1. Remove conductors from primary terminals of T-1501 (Main Rectifier Plate Transformer).

2. Connect secondary links of Main Rectifier Plate Transformer from No. 4 to No. 6 on all three phases.

3. Turn S-421 (Main Rectifier Control) to the TUNE position. Observe:
    a. I-406 (green) lights - (SWITCH ON).
    b. K-1601, K-1602 (bleeder contactors in Rectox Frame) operate.
    c. K-1503 in High Voltage Transformer operates connecting primaries in Wye.
    d. S-2002 (Main Rectifier Breaker in switchgear) closes.
    e. I-203 (PLATE), I-303 (PLATE), I-405 (MAIN RECTIFIER POWER ON), I-503 (PLATE), (all red) light on Modulator, Left Power Amplifier, Center Power Amplifier, and Right Power Amplifier, respectively.

4. Repeat 3 above except turn S-421 to the ON position and in (c) K-1501 and K-1502 should close in sequence connecting the Transformer primaries in Delta.

FINAL TUNE-UP

1. Replace primary leads on Main Rectifier Plate Transformer.

2. Protective gap settings:
    a. Set the protective gap on the Modulator Reactor to 0.2 inch. A number 8 or 13/64 straight shank twist drill may be used as a gauge. Set the protective gaps on the Modulation Transformer to 0.15 inch each. A No. 25 or 5/32 straight shank twist drill may be used as a gauge. These are initial settings. If sparking of the gaps occurs during program operation, each gap may be opened up an additional .05 inch.
    b. Set the two protective ball gap assemblies in the Rectox Frame to 1/16inch each

3. Set up for audio input level, response, distortion and modulation measurements as follows:
   a. Obtain sample of carrier for modulation monitor and distortion analyzer from two separate lines each connected across a portion of the end ring on the PA inductor L-401.
   b. Using a Western Electric Type 111-C (or equivalent) repeat coil for isolation between a 500 ohm attenuator and the input of the transmitter, read level in dbm with volume indicator meter on the audio oscillator side of the attenuator. This applies to all audio input level and audio response measurements.

4. Turn MAIN RECTIFIER CONTROL to tune. Power Amplifier plate volts should be approximately 8.1 kv. Tune Power Amplifier for minimum plate current indicated on M-402 (TOTAL PA PLATE CURRENT).
   a. Observe:
      (1) M-415 (LOAD CURRENT) 10.6 to 11.0 amperes RF (230 ohm load).
      (2) M-304, M-413 (LEFT POWER AMPLIFIER PLATE CURRENT) 1.7 to 1.8 amperes.
      (3) M-504, M-414 (RIGHT POWER AMPLIFIER PLATE CURRENT) 1.7 to 1.8 amperes.
      (4) M-203 (MODULATOR PLATE VOLTS) 9.7 to 10 kv.
   b. Adjust C-101 in the Type FA Crystal Oscillators for correct carrier operating frequency. The shaft of C-101 (screwdriver adjustment) is accessible through holes in the RF door of the Exciter. The range of C-101 is approximately ±30 cycles.
   c. Reduce MODULATOR BIAS until the tubes draw 0.1 amperes plate current each.
   d. Apply 1000 cycle tone to transmitter input at a level of about -14 dbm in order to produce 50 percent modulation of the carrier.
   e. Allow transmitter to run at this level for 15 minutes. During this period an occasional Modulator or Power Amplifier plate overload may occur with no apparent reason. If no other abnormal indications are encountered, it may be assumed that the interruptions are "gas flashes" in the WL-5671 tubes.
   f. At the end of the 15 minute run, shut down the transmitter completely, including blowers. Inspect and feel all components for indications of abnormal operation or heating. Inspect and feel metal rectifiers, including all stacks of the Modulator and Power Amplifier Rectox Units.

NO

5. If no overloads occurred in e. above, switch main rectifier control to ON and readjust MODULATOR BIAS so that tubes draw 0.2 amperes each with modulation.
   a. Modulate 50 percent with 100 cycle tone for 15 minutes. Repeat f. above. If more than one gas flash occurs in a 10 minute period, the run must be extended until the gas "cleans up." Note that with all feedback disconnected, the carrier envelope as seen on an oscilloscope will be considerably distorted. At 11.5 kv on M-401 (POWER AMPLIFIER PLATE VOLTS), observe:
      (1) LOAD CURRENT 14.7 amp. RF (230 ohm load). Operate S-405 (OUTPUT COUPLING) as required to give 50 kw output.
      (2) LEFT POWER AMPLIFIER PLATE CURRENT 2.55 amp maximum, and equal to Right Power Amplifier plate current.
      (3) RIGHT POWER AMPLIFIER PLATE CURRENT equal to Left Power Amplifier plate current.

      Note: The plate currents for (2), (3) above must be obtained with equal (or within 3 percent of average) capacitance in C-320 and C-520. Check capacities after tuning to maximum plate efficiency.

      (4) M-402 (TOTAL PLATE CURRENT) 5.1 amp maximum.
      (5) M-203 (MODULATOR PLATE VOLTS) 13.4 to 13.8 kv.
      (6) M-201 (LEFT MODULATOR PLATE CURRENT), M-204 (RIGHT MODULATOR PLATE CURRENT) 0.2 amp each. Operate S-108 and S-109 (LEFT AND RIGHT MODULATOR BIAS) switches on Exciter control panel to give 0.2 amp Modulator plate current each.
      (7) M-404 (TOTAL TRANSMITTER INPUT POWER) 98.5 to 103.5 kw.

b. Apply 1000 cps sine tone to the input of the transmitter to give 85 percent modulation. Observe:
(1) Modulator plate currents do not differ from each other by more than 0.2 amps.
c. Repeat (b) except use 50 cps sine tone modulation.
d. Repeat (b) except use 7500 cps sine tone modulation.
e. Input level for 50 percent modulation at 1000 cps should be between -12 and -14 dbm.

6. Shut down all power and bias supplies and:
a. Reconnect wire to TS-125 terminal 325 (audio relay removed in Low Level Audio Adjustments, 807 Stage).
b. Reconnect wires TS-126, terminal 340, and terminal 342. Remove grounds from terminals 340 and 342.

7. Turn on transmitter, observe same conditions as in 5a above.
a. Apply 1000 cycle sine tone to the input of the transmitter at an input level of +8.6 dbm. Adjust voltage feedback potentiometers R-1117 and R-1118 until Modulator plate currents are equal at 85 percent modulation. Observe that:
(1) The noise level is better than 60 db below 100 percent modulation.
(2) The modulation capability is at least one hundred percent from 50 to 7500 cycles.
(3) The frequency response from 30 to 10,000 cycles is uniform within ±1 db.
(4) The distortion is less than 3 percent up to 95 percent modulation from 50 to 7500 cycles.
(5) The carrier shift is less than 5 percent for 100 percent modulation at 1000 cycles.

ANTENNA ARC INTERRUPTER ADJUSTMENTS

1. Disconnect lead from Center Power Amplifier TS-408, terminal 114 and from the tower tuning RF Current Transformer-Rectifier Unit.
a. Measure capacitance to ground of the above lead.
b. Obtain fixed paper or mica capacitor, 600 volt rating, within 10 percent of above measured value and connect the capacitor between terminals 359 and 362 on TS-414 in the Center Power Amplifier.

2. Replace leads removed in 1 above. Note: If station does not employ pattern change, place permanent jumper between terminals 111 and 112 of TS-408.

3. Remove Antenna Arc Interrupter Unit from Center Power Amplifier.
a. Turn ARRAY BALANCE, ANTENNA BALANCE, and LINE BALANCE controls full counterclockwise.
b. Connect Interrupter Unit to Center Power Amplifier by means of the extension cable supplied.
c. Turn on transmitter (50 kw carrier).
d. Turn S-409 (OFF-CALIBRATE-OPERATE) to CALIBRATE.

4. With d-c voltmeter of 1/4 megohm or more resistance, observe 75 to 100 volts across R-1405 (LINE BALANCE) and across R-1403 (ANTENNA BALANCE). The two voltages must be of same polarity. If not, reverse output leads on tower tuning RF Current transformer-rectifier. If voltages are not between 75 and 100 volts, adjust tap switches on RF Current transformer-rectifier Units to bring them within the above range.

5. Observe:
a. Clockwise rotation of R-1405 (LINE BALANCE CONTROL) causes M-1401 (BALANCE INDICATOR) to deflect, and that with S-1401 (METER SHUNT) button depressed, a deflection of 300 microamperes causes K-1401 (sensitive relay) to close, which closes K-1402 and lights J-401 (ANTENNA SYSTEM UNBALANCE).

b. Similarly, deflecting the BALANCE INDICATOR 300 microamperes in the opposite direction by turning ANTENNA BALANCE CONTROL, should cause the same operations as in a. above.
c. If station employs pattern change, switch ANTENNA ARRAY to DIRECTIONAL, and note action similar to above with R-1404 (ARRAY BALANCE).
d. Increase sensitivity by turning all controls clockwise, keeping BALANCE INDICATOR near zero.

6. Turn OFF-CALIBRATE-OPERATE switch to OPERATE and observe that a 300 microampere unbalance causes momentary interruption of the carrier and lights I-26 (ANTENNA ARC-OVER). Note that if the unbalance is done deliberately by turning one of the controls, the transmitter will be keyed on and off at a rapid rate which may cause one or more overloads to operate if allowed to continue for more than about one second. In normal operation, the cause of an unbalance is removed by momentary interruption of the carrier.

NOISE, FEEDBACK, DISTORTION, AND RESPONSE

NOISE

1. Power Amplifier

Carrier noise is caused mainly by a-c heating of the Power Amplifier filaments. It is minimized in the 50HG-2 by:

a. Operating the Left Power Amplifier filaments and Right Power Amplifier filaments in quadrature.
b. Current feedback.
c. Adequate grid drive.
d. Symmetry of the Power Amplifier - (circuit balance).

With normal meter indications as listed in the Section on MAINTENANCE, Normal Meter Readings with the Modulator tube plates connected together, the carrier hum should be better than 60 db below 100 percent modulation. With Modulator tubes darkened and with the plates not connected together, the carrier hum should be better than 60 db below 100 percent modulation.

2. Modulator

Modulator noise is caused by a-c heating of the tube filaments, and is minimized b

a. In-phase operation of filaments and out-of-phase operation of plates (push-pull).
b. Symmetry of Modulator circuit (plate current balance, uniformity of tubes).
c. Voltage feedback.

With Modulator grids connected together, the carrier noise should be better than 54 db b low 100 percent modulation.

3. Exciter

a. RF Amplifier: The RF amplifiers in the Exciter operate Class C, and do not contribute appreciable hum.
b. 5736 Cathode Follower Audio Stage: The large amount of inherent inverse feedback vided by the cathode follower circuit suppresses hum originating within this s
c. 813 Audio Stage: Filament hum is reduced by negative feedback within the stage by the use of a cathode resistor. The hum measured between an 813 plate and ground with the modulator tubes dark, should be less than 3 volts rms.
d. 807 Audio Stage: Very little carrier noise should be contributed by this stage. The tubes, however, must have no loose elements or heater-cathode leakage. A cathode resistor provides negative feedback.

POWER SUPPLY RIPPLE VOLTAGES

With a 60 cycle supply and normal operating loads, the ripple voltages should be approximately as shown below:

Left 5736 Audio Bias	0.02 volts rms
Right 5736 Audio Bias	0.02 volts rms
Left Modulator Bias	0.03 volts rms
Right Modulator Bias	0.03 volts rms
400 Volt Supply	0.04 volts rms
Exciter RF Bias	0.12 volts rms
1500 Volt Supply	0.70 volts rms
3000 Volt Supply	1.2 volts rms
Left Power Amplifier Bias Supply	0.10 volts rms
Right Power Amplifier Bias Supply	0.10 volts rms
Modulator Plate Supply (0.4 amp load)	10 volts rms
Power Amplifier Plate Supply (5.0 amp load)	100 volts rms (out of rectifier)

VOLTAGE FEEDBACK

Voltage feedback is most effective at frequencies greater than 400 cycles. Voltage feedback is used to reduce noise and distortion appearing at the plates of the modulator tubes.

Enough feedback is used at the hum frequencies to bring the hum output of the Modulators well below the power amplifier filament hum.

CURRENT FEEDBACK

Current feedback is most effective at frequencies below 400 cycles. The change from voltage to current feedback in the feedback loop is accomplished by a cross-over network such that flat overall frequency response within the audio system is maintained, eliminating the need for equalizing.

Current feedback also eliminates instability in the audio system such as may be caused by heavy low frequency modulation (below 30 cps).

Turntable rumble, program amplifier "thumps," antenna arcs are familiar examples of low frequency phenomena which cause audio instability and overloads.

This audio stability is accomplished by taking the sample of current feedback from the primary side of the modulation transformer. Then in the event of heavy low frequency modulation, the magnetizing current which tends to saturate the transformer and cause overloads is limited by the feedback loop.

DISTORTION

1. In a correctly adjusted transmitter, the chief reasons for distortion are:
   a. Shift of Modulator plate supply voltage with modulation level. The effect of the Modulator plate voltage change is minimized by utilizing the increase in driver cathode current to change the operating bias on the modulator tubes.
   b. Modulator driver regulation.

Each of the above reasons cause "symmetrical" or even-order harmonic distortion since the same effect occurs during each half cycle. The first (a) may be seen at medium audio frequencies on the modulation envelope as a slight departure from a sine wave at the abscissa. The second (b) is evidenced as a slight flattening of sine wave peaks.

2. If the two sides of the audio system do not have the same gain, "non-symmetrical" distortion will be produced as evidenced by inequality between positive and negative modulation peaks. Distortion from this source is minimized by symmetry of circuit components and by proper set-up of the audio system to compensate for non-uniformity of tubes.

3. Insufficient emission capability of the Power Amplifier tubes can cause distortion due to flattening of positive modulation peaks.

FREQUENCY RESPONSE

The frequency response between 30 and 10,000 cycles is controlled mainly (1) by the characteristics of the voltage and current feedback divided networks, (2) by the "step circuit" network consisting of C-163 and R-143 or C-164 and R-144 for high frequencies and R-145 and C-1105 or R-146 and C-1106 for low frequencies of the grid of the second audio stage.

The input level in dbm required to produce 50 percent modulation in a representative 50HG-2 is as follows:

Frequency	Feedback Connected	Current and Voltage Feedback Disconnected
30 cycles	+5.9 dbm	- 3.8 dbm
50 cycles	+5.4 dbm	- 7.8 dbm
100 cycles	+5.5 dbm	-10.5 dbm
200 cycles	+5.8 dbm	-12 dbm
400 cycles	+5.4 dbm	-12.1 dbm
1000 cycles	+4.8 dbm	-12.1 dbm
2000 cycles	+4.4 dbm	-11.6 dbm
4000 cycles	+4.0 dbm	-10 dbm
5000 cycles	+4.0 dbm	- 9 dbm
7500 cycles	+4.0 dbm	- 6.5 dbm
10000 cycles	+5.0 dbm	- 4.2 dbm

CONTROL CIRCUITS

FUNDAMENTAL CONTROL SCHEMATIC DIAGRAM

The Fundamental Control Schematic, figure 47, should be used as a reference in following the operation of the control circuits. Information pertinent to this diagram follows:

1. All switches are shown in the OFF position. All power is off.

2. All relays and contactors are shown deenergized. A normally closed contact is designated by a diagonal line through the contact.

3. All door and enclosure interlock switches are shown in the "door open," or "enclosure open" position.

4. The air interlock switch, S-515, is open.

5. Reference numbers that appear on coils, contacts, switches, etc., also appear on the same component terminals or are terminal board numbers in the wiring diagrams. This makes it possible to correlate points on the control schematic with terminals or terminal board connections in the transmitter cubicles themselves.

THE TURN-ON SEQUENCE

With all switches on the upper Power Control Panel turned ON except SWITCHGEAR CONTROL BUS, TRANSMITTER CONTROL BUS, and the filament switches for the spare Modulator and Power Amplifier Tubes, the turn-on sequence is as follows:

S-9 SWITCHGEAR CONTROL BUS
S-30 BLOWER CONTROL (This will normally be left in the TRANSMITTER AND BLOWER position)
S-28 BUS BREAKER
S-11 TRANSMITTER CONTROL BUS
S-31 AUDIO BIAS
S-32 RF BIAS
S-103 400 VOLT RECTIFIER
S-104 1500-3000 VOLT RECTIFIER
S-410 MAIN RECTIFIER CONTROL

The manner in which the above sequence is maintained can be followed on the Fundamental Control Schematic, figure 47. This is facilitated by the dotted lines which connect each relay or contactor coil to all of its contacts.

ACTION ON SUSTAINED FAULT

The sequence is as follows:

With S-27 in AUTOMATIC position, assume that K-301, L PA overload has operated due to excessive plate current.

1. K-16, Main Master overload operates.
2. K-7, Main Rectifier Breaker Auxiliary, is deenergized.
3. K-7 normally closed contacts energize trip coil of S-2002, the Main Rectifier Breaker.
4. S-2002 opens.
5. S-2002 normally closed contact energizes K-2014 (MG-6 in Switchgear Cubicle).
6. K-2014 normally open contact energizes K-47, Stepping Switch Auxiliary No. 1.
7. K-47 normally open contact energizes step coil of K-13, stepping switch and K-13 advances one step.
8. K-13 normally open contact closes.
9. K-4, Time Delay, starts.
10. Removal of power by S-2002 will remove the overload and allow K-301 to drop out.
11. K-16 opens, closing K-7, energizing the breaker pull-in coil "CC" in the Switchgear. When breaker is nearly closed, a normally open breaker auxiliary contact energizes the "anti-pump" relay K-2008, which in turn opens the circuit to the pull-in coil "CC" which no longer needs to be energized since the breaker latches in mechanically. With the breaker closed, the Main Rectifier is again connected and the transmitter is returned to operation. The function of switches S-2010 and S-2011 is to allow the breaker toggle mechanism to reset before the closing coil is re-energized. This is accomplished by keeping K-2008 energized through switch S-2013 until the closing coil plunger reaches the bottom of its travel, thus opening switch S-2012 and allowing the closing coil to be energized.

12. Application of power again operates overload relay K-301 if the fault condition is still present and the above sequence (1 to 11) is repeated (K-13 advancing one step each time) until the arms on K-13 reach the fourth contact. Then:

13. K-16 is locked in by its own normally open contact, thus holding the Main Rectifier off.

14. K-4 continues to run until it closes, energizing K-5.

15. K-5, Time Delay Auxiliary, normally closed contact opens K-13 step coil, and K-5 normally open contact energizes K-13 release coil.

16. K-13 resets and the entire sequence listed above is repeated until stopped by the operator.

17. The operator may stop the sequence by turning off the Main Rectifier, or any switch ahead of it in the turn-on sequence, or by switching S-27 to MANUAL.

NOTE

A sustained fault in the 1500/3000 Volt Supply causes a similar performance, with the supply held off when the stepping relay reaches the fourth contact. (S-410 must be closed and S-27 in AUTOMATIC for the 1500/3000 Volt Supply to operate the step sequence.) Note that an overload on the 400 Volt Supply will cause K-13 to step up, but will not shut down the supply. That must be done with S-103 or some switch ahead of it in turn-on seauence.

SUPERVISORY RELAY TEST POSITION

Socket X-20 is provided in the Power Control Cubicle for use as a test position for the supervisory system relays. As can be seen from the Fundamental Control Schematic, figure 47, a relay plugged into X-20 will be energized, closing both normally open contacts and causing I-32 (SUPERVISORY RELAY TEST) to light, the relay is working properly.

SUPERVISORY SEARCH RELAY

As a special supervisory search relay, K-1 may be employed to detect erratic operation of enclosure interlocks, air switch, undervoltage relays or other circuits not equipped with supervisory relays and indicator lights. Terminals of K-1 and I-31 (SEARCH RELAY) appear on TS-2, terminals 13 to 20, at the rear of the Power Control Cubicle where they are conveniently accessible and may be connected to other circuits as desired by the station engineer.

OUTAGE CLOCKS

The OUTAGE TIME and OUTAGE DURATION clocks on the Power Control Panel are set as follows:

1. With Transmitter in operation, set the OUTAGE TIME clock to correct time and start it by pressing the RESET button below it.

2. Set the OUTAGE DURATION clock at 12. The clock will run with the transmitter in operation as long as the RESET button is pressed, thus making it possible to set the second hand accurately.

Operation of the clocks can be followed on the Control Schematic, figure 47. Briefly, whenever the Main Rectifier Breaker S-2002 trips, the OUTAGE TIME clock stops, the OUTAGE DURATION clock starts and I-25 (CARRIER INTERRUPTION) lights.

FILAMENT UNDERVOLTAGE RELAY K-8

The operation of K-8 is as follows:

1. K-8 begins a timing cycle when the exciter filament circuit is turned on.

2. After approximately 22 seconds, depending on the voltage slider setting, (see I. L. 41-291-D in the Supplement Section) the normally open contact closes, lighting I-42 (EXCITER FILAMENTS NORMAL VOLTAGE) and "latching-in" relay K-46, the Filament Delay Auxiliary.

3. An interruption in supply voltage will cause the normally open contact to open and after a delay of approximately 8 seconds (depending on the time lever setting of K-8) the normally closed contact to close.

Note that reapplication of power before the 8 seconds have expired will return the transmitter to the air without delay.

BUS BREAKER S-2001

The operation of the Bus Breaker is as follows:

1. With switches S-28 and S-30 closed and series interlocks closed, relay K-3, Bus Breaker Auxiliary, is energized.

2. The normally open contacts of K-3 close, energizing the "pull-in" coil "CC."

3. When the breaker is nearly closed, a normally open breaker auxiliary contact energizes and seals in the "anti-pump" relay K-2004 which in turn opens the circuit to the "pull-in" coil "CC" which no longer needs to be energized since the breaker latches in mechanically. Switches S-2010 and S-2011 function the same as switches S-2012 and S-2013 in the high voltage breaker S-2002.

4. With the breaker closed, the normally open contact in series with the trip coil "T" of S-2001 closes, but the trip coil receives no energy until K-3 becomes deenergized. When this occurs, the breaker is returned to its original "off" position.

5. Note that the breaker will follow relay K-3 off and on; however, the presence of K-2004 in the circuit prevents "pumping" of the breaker due to tripping from a-c overloads or undervoltage. It also prevents the breaker from coming back on automatically if it is manually tripped.

MAINTENANCE

SUGGESTED SCHEDULES

1. <u>Daily</u>

   a. Check pressure in all gas filled capacitors.
   b. Check and polish, if necessary, protective gaps on gas filled capacitors, on 5736 audio driver cathode chokes, on Modulation Transformer, on Modulation Reactor, and on Rectox units.
   c. Inspect fuse wires on high voltage capacitors in Filter.

2. Weekly

   a. Check operation of all control circuit devices, door interlocks, and other protective devices.
   b. Check air interlock as follows: With the distribution bus on, but with filaments off, open the Blower line starter breaker (shutting down blower). This should cause I-36 or I-41 light to go out and the distribution bus to be deenergized.
   c. Thoroughly clean interior and exterior of transmitter cubicles. Clean power equipment external parts with special attention to insulators.
   d. Inspect and oil Blower bearings. Use light machine oil, (SAE No. 10).

3. Monthly

   a. Inspect and, if necessary, clean contactors and relays in the transmitter cubicles. Take particular care to keep the contacts clean on K-3, K-7, and K-13 in the Power Control. Abrasives should not be used on silver contacts, because particles of the abrasives may become embedded in the contact surface. Cleaning the contact fingers and contact arcs of relay K-13 should be done with a soft rag saturated in carbon tetrachloride. After cleaning, remove all lint, and lubricate the contact fingers, bearing pins, and ratchets sparingly with a light mineral oil.
   b. Inspect and, if necessary, clean Main Rectifier and Distribution Bus Switchgear, Type DB-25. Refer to I.B. 35-225-1.
   c. Inspect, clean and lubricate Bus Regulators, also Main Rectifier Regulator if used. Refer to I.B. 5521-A.
   d. Inspect and, if necessary, tighten all electrical connections.
   e. Operate the spare Modulator and Power Amplifier tubes with reduced plate voltage and increase to full power in approximately 15 minutes. Check modulation capability with tone or program material.

4. Quarterly Schedule

   a. Lubricate the exposed parts of the motor operated tuning controls. The reduction gears are packed in grease and with normal usage will require no attention during the life of the equipment. Put a drop of light machine oil on the motor bearings once or twice a year.
   b. Metal rectifiers age slightly during the first several thousand hours of use resulting in a small decrease of output voltage. This decrease may be cancelled by changing the transformer primary taps of the 400 volt and RF bias supplies and by adjusting the controls of the audio bias supplies. Following this initial period, the rectifiers should be closely inspected regularly for evidence of overheating or corrosion. A casual inspection is usually unsatisfactory, because in practice first evidence of these effects usually shows up in individual cells rather than a general deterioration.
   c. The dry type power transformers may require cleaning to prevent clogging of the ventilating ducts if the air contains an excessive amount of dust or lint. If a dry type transformer gets wet, it must be removed from service and thoroughly dried.
   d. The air inlet filter cleaning schedule will depend on local air conditions. The condition of the filters may be determined by inspection or by checking the air flow through the transmitter as specified in the section on Air Velocity under the main heading POWER-ON ADJUSTMENTS. Any indication of a reduction in the normal flow of air should call for replacement or cleaning at once.

If a Precipitron, the Westinghouse Electronic Air Cleaner is used, little maintenance is required besides periodic washings according to instructions furnished with the equipment.

RECTOX RECTIFIERS

The following is a general discussion of the characteristics of rectox rectifiers.

1. Forward Aging

   a. A small increase in resistance to the flow of load current is normal. The resulting reduction in output voltage should not be more than about 5 percent over a period of years. Most rectifier transformers are provided with "aging" taps whereby the voltage can be increased after a year or so of operation. Thereafter no further adjustments should be necessary. A further indication of normal forward aging is a slight increase in output hum of three-phase full-wave rectifiers.

2. Reverse Aging

   a. Normal aging: The reverse resistance will decrease somewhat with age. This is normal and will have no appreciable effect on the rectifier operation.
   b. Effects of excessive reverse aging: If the aging in the reverse direction becomes excessive, the rectifier will overheat. The overheating may damage the cells, or may accelerate forward aging. An abnormal increase in reverse current may overload and damage the rectifier transformer.
   c. Indication of reverse aging: Excessive reverse aging may be detected from any of the effects listed in b. above. In addition, it is possible to measure directly the reverse current in any stack by following the procedure as set forth in paragraph 3 "Replacement of Rectifier Stacks."
   d. Allowable limits of reverse current: It is not possible to give the exact limits of reverse current which may be considered normal. The following general statements apply, however:
      (1) Using the original reverse current measurements supplied by the manufacturer as a standard, the current should not increase over four times this value as aging takes place.
      (2) The reverse current will increase with increasing temperature.
      (3) The reverse aging rate will be less with selenium than with copper oxide.

3. Replacement of Rectifier Stacks

The condition of selenium or copper oxide rectifiers can usually be determined by checking output d-c voltage and rms ripple voltage. A sudden increase in normal ripple with a simultaneous decrease in the output may be the fault of the rectifier and would warrant further investigation. A gradual decrease of approximately 5 percent in the output d-c voltage is to be expected from the normal aging of the rectifier. This also may result in some increase in hum due to some of the rectifiers aging more rapidly than others. If it is decided that the rectifier may be at fault, the following test should be made.

Ordinarily a faulty rectifier stack can be located by running the unit at full load for a short time and then immediately after shutting off the power, checking the temperature of the various rectifier stacks with a thermometer or with the hand. A faulty stack will usually be hotter than the rest. This stack should be disconnected and checked as follows:

Use a d-c power supply capable of supplying the current and voltage shown in the following chart. To check the forward rectifier resistance, connect the positive terminal of the d-c test supply to the negative terminal on the rectifier and the negative terminal of the test supply to the opposite end of the rectifier stack or center tap as noted in some cases. Adjust the test voltage to the proper value. The resulting forward current should be approximately as shown in the table. In checking the back resistance of the rectifier, connect the positive lead of the test supply to the positive rectifier stack terminal.

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DRAWING NO. 50-B-8600 SHEET 1 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ____

STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS
		EXC.						
B-101 *	Motor, 813 R. F. Plate Tuning Drive	Single Phase, 230 V. with capacitor and 1 R. P. M. Gear	Similar To KWC 2505	17	7619371 Pt.1	3	1	
B-102*	Motor, 5736 R. F. Plate Tuning Drive	Single phase, 230 V.A.C., 60 cy., 3 wire reversible motor with capacitor reducer 1120/1	Style 1473814	1	7619371 Pt.2	6	1	
B-103	Motor, 5736 Pl. Coupling	Same as B-102			7619371 Pt.3			
B-104	Motor, L. Mod., Bias Adj.	Same as B-101			7619371 Pt.4			
B-105	Motor, R. Mod., Bias Adj.	Same as B-101			7619371 Pt.5			
		L.P.A.						
B-301	Motor, grid tuning drive	Same as B-102			7619013 Pt.1			
B-302	Motor, plate tuning drive	Same as B-102			7619013 Pt.2			
		C.P.A.						
B-401	Motor, Ant.Coupling	Single phase, 230 V.A.C., 60 cy., 3 wire reversible motor with capacitor reducer 1080/1	Style 1473815	1	7619388 Pt.1	1	1	
		R.P.A.						
B-501	Same as B-301	Same as B-102			7619053 Pt.1			
B-502	Same as B-301	Same as B-102			7619053 Pt.2			
		AUXILIARY COMPONENTS						
B-1601*	Motor, Main #1 Blower	Westinghouse "Lifeline" motor type CSP, 3 phase, 50/60 cycle, 460 volts, 7-1/2 horsepower, type 284 frame.	Style 1442202	1	7426385 Pt.5	2		
B-1602	Motor, Main #2 Blower	Same as B-1601			7426385 Pt.5			
	Main Blower Drive	Wide range vari-pitch texrope drive, 2 groove R section texrope belts 5.250 to 10,000 pitch dia. bore for 1-1/4 dia. motor shaft: keyway 1/4 wide, 1/8 DP., 2-7/8 lg.		59	7426385 Pt.6	2		
	Sheave, Main Companion	Magic grip companion sheave, 2 groove (R section texrope belts), 20 in. pitch dia. bore bushings to receive 2-3/16 shaft, keyway 1/2 wide 1/4 deep, 5 in. lg.		59	7426385 Pt.7	2		
	Drive belts, main blower	Type R-150 texrope belts	R-150	59	7426385 Pt.8	4	2	
BM-1601*	Blower, Main #1	Silentvane fan with oil indicators and extensions, size 90, design 10, arrangement 3, bottom horizontal discharge, clockwise rotation, single width single inlet.	#90	35	7426385 Pt.11	2		
BM-1602	Blower, Main #2	Same as BM-1601			7426385 Pt.11			

DRAWING NO. 50-B-8600 SHEET 2 OF 29 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P.C.						
B-1	BELL, OUTAGE WARNING	12-18 V. RANGE, 50/60 CYCLE, WITH 4 IN. BELL.	560	47	7619416 PT.1	1		
C-1*	CAP., 1500 V. RECT. FILTER	15 MFD., 2000 VDC	STYLE 1363473	1	7619416 PT.10	2	1	1
C-2	CAP., 1500 V. RECTIFIER FILTER	SAME AS C-1			PT.11			
C-3*	CAP., 3000 V. RECTIFIER FILTER	8 MFD., 4000VDC	STYLE 1363485	1	PT.12	4	1	1
C-4	CAP., 3000 V. RECTIFIER FILTER	SAME AS C-3			PT.13			
C-5	CAP., 3000 V. RECTIFIER FILTER	SAME AS C-3			PT.14			
C-6	CAP., 3000 V. RECTIFIER FILTER	SAME AS C-3			PT.15			
C-7*	CAP., POWER FACTOR CORRECTING	0.1 MFD., 7500 V.	S#1346581		PT.16	3	1	
C-8	CAP., POWER FACTOR CORRECTING	SAME AS C-7			PT.17			
C-9	CAP., POWER FACTOR CORRECTING	SAME AS C-7			PT.18			
C-10	CAP., BUS BREAKER TIME DELAY	150 MFD, 150 V,	#TVA-1422	60	7619416 PT.9			
C-11	CAP., H.V. BREAKER TIME DELAY	SAME AS C-10			7619416 PT.8			
		OSCILLATOR						
C-101	CAP., OSC. FREQ. ADJ.	20 MMF., VARIABLE	MC-20-SX	18	7720527 PT.1	1	1	
C-102*	CAP., OSC. CATHODE BY-PASS	.047 MFD., 600 VDC	S#1353155	1	7720527 PT.2	3	2	1
C-103	CAP., OSC. PL. BY-PASS	SAME AS C-102			PT.3			
C-104	CAP., OSC. VOLT REG. BY-PASS	SAME AS C-102			PT.4			
C-105	CAP., OSC. SCREEN GRID	100 MMF., VARIABLE	APC-100	18	PT.5	1	1	
C-106*	CAP., OUTPUT COUPLING	470 MMF., 500 V	S#1353121	1	PT.6	2	2	1
C-107	CAP., THERMOSTAT	SAME AS C-106			7720527 PT.7			
		EXCITER						
C-109*	CAP., 807 CATH. BY-PASS	.047 MFD., 600 VDC	S#1471517		7619371 PT.13	6	2	1
C-110	CAP., 807 SCREEN BY-PASS	SAME AS C-109			PT.14			
C-111	CAP., 807 PLATE BY-PASS	SAME AS C-109			PT.15			
C-112	CAP., 807 PLATE TANK	465 MMF., VARIABLE, 3/8 IN. SHAFT, SCREW DRIVER SLOT	TC440-L	18	PT.16	1	1	
C-113	CAP., 813 GRID COUPLING	.0022 MFD., 2.5 KV., DC	S#1353150	1	PT.17	1	1	1
C-114	CAP., 813 GRID BY-PASS	SAME AS C-109			PT.18			

C-320A
C-520A

DRAWING NO. 50-B-8600 SHEET 3 OF 19 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT (QUANTITY)	RECOM'D SPARE PARTS LIST (QUANTITY)	MINIMUM SPARE PARTS LIST (QUANTITY)
		EXCITER (CONTINUED)						
C-115	Cap., 813 fil. by-pass	Same as C-109			Pt.19			
C-116	Cap., 813 fil. by-pass	Same as C-109			Pt.20			
C-117	Cap., 813 screen by-pass	.047 MFD., 1.5 KV., DC	S#1471379	1	Pt.21	1	1	1
C-118	Cap., 813 plate by-pass	.0047 MFD., 2.5 KV., DC	S#1471506	1	Pt.22	1	1	1
C-119	Cap., 813 plate coupling	.0047 MFD., 3 KV., DC	S#1471368	1	Pt.23	1	1	1
C-120	Cap., 813 plate tank	335 MMF., per section	S#1474429	18	7619371 Pt.24	1	1	
C-120A	Cap., 813 pl. tank pad	390 MMF., 5 KV., DC	S#1471357	1	7619372 Pt.104	2	1	1
C-120B	Cap., 813 pl. tank pad	Same as C-120A			7619372 Pt.105			
C-121	Cap., 5736 grid by-pass	.01 MFD., 1.2 KV., DC	S#1471412	1	7619371 Pt.25	1	1	1
C-122	Cap., 5736 neuting	10-50 MMF., variable; 20 KV peak	Type At	50	Pt.26	1	1	1
C-123*	Cap., 5736 fil. by-pass	.1 MFD., 500 VDC	S#1471383	1	Pt.27	20	2	1
C-124	Cap., 5736 fil. by-pass	Same as C-123			Pt.28			
C-125	Cap., 5736 fil. by-pass	Same as C-123			Pt.29			
C-126	Cap., 5736 fil. by-pass	Same as C-123			Pt.30			
C-127*	Cap., 5736 pl. coupling	.0018 MFD., 10 KV., DC	S#1471588	1	Pt.31	2	1	1
C-128	Cap., 5736 pl. by-pass	Same as C-127			Pt.32			
C-129*	Cap., 5736 pl. tank	Lapp gas filled, variable, 250-1000 MMF., 12 KV., peak	Pt.3 7617959	1	Pt.33	2	1	
C-129A	Cap., 5736 pl. tank pad	Freq. sensitive item	Dwg. 7427828	1	7619372 Pt.106	1		
C-132*	Cap., 400 V. rect. filter	8 MFD., 600 VDC	S#1346527	1	7619371 Pt.36	26	4	2
C-133	Cap., 400 V. rect. filter	Same as C-132			Pt.37			
C-134	Cap., 400 V. rect. filter	Same as C-132			Pt.38			
C-135	Cap., 400 V. rect. filter	Same as C-132			Pt.39			
C-136	Cap., L.Speech bias rect. filter	Same as C-132			Pt.40			
C-137	Cap., L.Speech bias rect. filter	Same as C-132			Pt.41			
C-138	Cap., L.Speech bias rect. filter	Same as C-132			Pt.42			
C-139	Cap., L.Speech bias rect. filter	Same as C-132			Pt.43			
C-140	Cap., R.Speech bias rect. filter	Same as C-132			Pt.44			
C-141	Cap., R.Speech bias rect. filter	Same as C-132			Pt.45			
C-142	Cap., R.Speech bias rect. filter	Same as C-132			7619371 Pt.46			
C-143	Cap., R.Speech bias rect. filter	Same as C-132			7619371 Pt.47			
C-144*	Cap., L.mod. bias rect. filter	8.0 MFD, 1 KV., DC	S#1346536	1	Pt.48	8	2	1
C-145	Cap., L.mod. bias rect. filter	Same as C-144			Pt.49			
C-146	Cap., L.mod. bias rect. filter	Same as C-144			Pt.50			

DRAWING NO. 50-B-8600 SHEET 4 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER
INPUT
STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
C-147	Cap., L.Mod. bias rect. filter	Same as C-144			Pt.51			
C-148	Cap., R.Mod. bias rect. filter	Same as C-144			Pt.52			
C-149	Cap., R. Mod. bias rect. filter	Same as C-144			Pt.53			
C-150	Cap., R. Mod. bias rect. filter	Same as C-144			Pt.54			
C-151	Cap., R. Mod. bias rect. filter	Same as C-144			Pt.55			
C-152	Cap., Exc. rect. filter	Same as C-132			Pt.56			
C-153	Cap., Exc. rect. filter	Same as C-132			Pt.57			
C-154	Cap., Exc. rect. filter	Same as C-132			Pt.58			
C-155	Cap., Exc. rect. filter	Same as C-132			Pt.59			
C-156*	Cap., part of B-101	1.0 MFD., 220 V., A.C. used with type RWC 2505 Holtzer Cabot, single phase, 230 V. motor.	PC.NO. 100,295	17	Pt.60	3	2	1
C-157*	Cap., Part of B-102	1.0 MFD., ~~220 V., A.C.~~ used with type B-2259E-M-12 Bodine, single phase, 230 V. motor.	2100-1-1 ~~75C~~	7	7619372 Pt.61	7	2	1
C-158	Cap., part of B-103	Same as C-157			Pt.62			
C-159	Cap., part of B-104	Same as C-156			Pt.63			
C-160	Cap., part of B-105	Same as C-156			Pt.64			
C-161	Cap., 807 audio pl. by-pass	2.0 MFD., 2 KV., DC	S#1392032	1	Pt.65			
C-162*	Cap., 807 audio screen by-pass	2.0 MFD., 600 V., DC	S#1397267		Pt.66	4	5	2
C-163*	Cap., 807 L. audio pl. coupling	0.1 MFD., 2 KV., DC	S#1392028	1	Pt.67	2	2	1
C-164	Cap., 807 R. audio pl. coupling	Same as C-163			7619372 Pt.68			
C-166*	Cap., 813 audio plate by-pass	1.0 MFD., 4 KV., DC	S#1346572	1	7619372 Pt.70	4	3	1
C-167	Cap., 813 L. audio plate coupling	Same as C-166			Pt.71			
C-168	Cap., 813 R. audio plate coupling	Same as C-166			Pt.72			
C-172*	Cap., meter by-pass	.015 MFD., 600 V., DC	S#1471414	1	Pt.76	46	5	2
C-173	Same as C-172	Same as C-172			Pt.77			
C-174	Same as C-172	Same as C-172			Pt.78			
C-175	Same as C-172	Same as C-172			Pt.79			
C-176	Same as C-172	Same as C-172			Pt.80			
C-177	Same as C-172	Same as C-172			Pt.81			
C-178	Same as C-172	Same as C-172			Pt.82			
C-179	Same as C-172	Same as C-172			Pt.83			
C-180	Same as C-172	Same as C-172			Pt.84			
C-181	Same as C-172	Same as C-172			Pt.85			
C-182	Same as C-172	Same as C-172			Pt.86			
C-183	Same as C-172	Same as C-172			Pt.87			
C-184	Same as C-172	Same as C-172			Pt.88			
C-185	Same as C-172	Same as C-172			Pt.89			
C-186	Same as C-172	Same as C-172			Pt.90			
C-187	Same as C-172	Same as C-172			Pt.91			

DRAWING NO. 50-B-8600 SHEET 5 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
C-188	Same as C-172	Same as C-172			Pt. 92			
C-189	Same as C-172	Same as C-172			Pt. 93			
C-190	Same as C-172	Same as C-172			Pt. 94			
C-191	Same as C-172	Same as C-172			Pt. 95			
C-192	Same as C-172	Same as C-172			Pt. 96			
C-193	Same as C-172	Same as C-172			Pt. 97			
C-194	Same as C-172	Same as C-172			Pt. 98			
C-195	Same as C-172	Same as C-172			Pt. 99			
C-196*	Cap., 813 L. audio fil. by-pass	50 MFD., 330 V., A.C.	KG-3500	12	Pt. 100	2	1	1
C-199*	Cap., 813 R. audio fil. by-pass	Same as C-196			Pt. 103			
C-1100	Cap., 807 aud. cathode by-pass	2200 MMF., 500 V., DC	S#1353127	1	Pt. 108	5	5	2
C-1101	Cap., 807 aud. fil. by-pass	Same as C-1100			Pt. 109			
C-1102	Cap., 807 aud. fil. by-pass	Same as C-1100			Pt. 110			
C-1105*	Cap., left audio step circuit	Nominal capacity 2200 MMFD., 500 VDC (used only in matched pair with C-1106)	2156 to 2242 MMFD. Select from S#1353127	1	Pt. 113	One matched pair	One matched pair	One matched pair
C-1106	Cap., right audio step circuit	Nominal capacity 2200 MMFD., 500 VDC (used only in matched pair with C-1105)	Matched within 11 MMFD. of C-1105 Select from S#1353127	1	Pt. 114			
C-1109	L. audio 813 screen by-pass	Same as C-162			7619372 Pt. 117			
C-1110	R. audio 813 screen by-pass	Same as C-162			7619372 Pt. 118			
C-1111	Cap., 1500 V., supply decoupling	1.0 MFD., 2 KV., DC	S#1392031		7619372 Pt. 119	1	1	
C-1116	Cap., 802 cathode by-pass	Same as C-1100			7619847 Pt. 586			
C-1117	Cap., 802 cathode by-pass	Same as C-1100			7619847 Pt. 587			
C-1118	Cap., audio 807 screen by-pass	Same as C-162			7619847 Pt. 588			
C-1119*	Capacitor-tuning switch S-109 by-pass	.1 MFD., 600 V., DCW	Type 689X	40	7619847 Pt. 589	4	5	2
C-1120	Capacitor-tuning switch S-109 by-pass	Same as C-1119			7619847 Pt. 590			
C-1121	Capacitor-tuning switch S-108 by-pass	Same as C-1119			7619847 Pt. 591			
C-1122	Capacitor-tuning switch S-108 by-pass	Same as C-1119			7619847 Pt. 592			
C-1123*	Audio 807 cathode by-pass	Capacitor .05 MFD., 400 volts	TM15-4	28	7619847 PT. 593	2	1	0
C-1124	Audio 807 cathode by-pass	Same as C-1123			7619847 PT. 594			
C-1125	Cap., audio by-pass	7 MFD., 330 VAC	KG 3070	12	7619847 PT. 595			
		MODULATOR						
C-201	Cap., meter by-pass	Same as C-172			7617688 Pt. 1			
~~C-202~~								
C-203	Cap., meter by-pass	Same as C-172			Pt. 3			
C-204	Cap., meter by-pass	Same as C-172			Pt. 4			
C-207*	Cap., L. vol., F. B.	.005 MFD., 25 KV.	S#1318089	1	Pt. 7	2	2	1
C-209	Cap., R. vol., F. B.	Same as C-207			Pt. 9			

DRAWING NO. 50-B-8600 SHEET 6 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		MODULATOR (CONTINUED)						
~~C-212~~	~~CAPACITOR-RIGHT VOLTAGE F. B.~~	~~SAME AS C-211~~			~~PT 186~~			
C-213*	CAPACITOR-METER R. F. FILTER	470 MMF., 500 V., DC	S#1353121		PT 187	6	2	2
C-214	SAME AS C-213	SAME AS C-213			7620115 PT. 188			
C-215*	CAP., L-VOLT FEED-BACK	4 MFD., 600 VAC	3.9 TO 4.1 MFD. SELECT FROM S#1392004	1	7620115 PT. 189	2	1	1
C-216	CAP., R-VOLT FEED-BACK	SAME AS C-215			7620115 PT. 190			
		L.P.A.						
C-302	CAPACITOR-METER BY-PASS	SAME AS C-172			7619013 PT. 9			
C-303	CAPACITOR-METER BY-PASS	SAME AS C-172			7619013 PT. 10			
C-304	CAPACITOR-METER BY-PASS	SAME AS C-172			7619013 PT. 11			
C-305	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			7619013 PT. 12			
C-306	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			7619013 PT. 13			
C-307	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 14			
C-308	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 15			
C-309	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 16			
C-310	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 17			
C-311	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 18			
C-312	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 19			
C-313	CAPACITOR - PART OF WL-5671 GRID TANK CAP. DRIVE MOTOR B-301	SAME AS C-157			PT. 20			
C-314	CAPACITOR - PART OF WL-5671 PLATE CAP. DRIVE MOTOR B-302	SAME AS C-157			PT. 21			
C-315*	CAPACITOR-GRID BY-PASS	.0022 MFD., 5 KV	S#1471364	1	PT. 22	2	1	1
C-316*	CAPACITOR-GRID BLOCKING	.01 MFD., 5 KV	S#1471597		PT. 23	2	2	1
C-317*	CAPACITOR-GRID TUNING	SAME AS C-129			PT. 24			
C-317A*	CAPACITOR-GRID TUNING PAD	470 MMF., 20 KV	S#1471622		PT. 34	2	1	1
C-317B*	CAPACITOR-GRID TUNING PAD	FREQUENCY SENSITIVE ITEM	PT. 11 7427628	1	PT. 35			
C-318*	CAPACITOR-GRID BLOCKING	.001 MFD., 10 KV	S#1471585	1	PT. 25	2	1	1
C-319*	CAPACITOR-PLATE BLOCKING	.0018 MFD., 35 KV.	S#1472185	1	PT. 26	2	2	1
C-320	CAPACITOR - PLATE TUNING	105 AMPS., AT 1 MC. LAPP GAS FILLED CAPACITOR 310-1000 MMF., 31 KV. PEAK	PART 2 7617959	1	PT. 27	1	1	
C-320A*	CAPACITOR - PLATE TANK PAD	FREQUENCY SENSITIVE ITEM	PART 2 7427628	1	PT. 33			
C-321*	CAPACITOR - PLATE SUPPLY BY-PASS	100 MMF., 30 KV.	S#1471650	1	PT. 28	2	1	1

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		L.P.A. (CONTINUED)						
C-322	Capacitor - Left Power Amp. Bias Supply Filter	Same as C-132			Pt. 29			
C-323	Capacitor - Left Power Amp. Bias Supply Filter	Same as C-132			Pt. 30			
C-324	Capacitor - Left Power Amp. Bias Supply Filter	Same as C-132			Pt. 31			
C-325	Capacitor - Left Power Amp. Bias Supply Filter	Same as C-132			Pt. 32			
C-326	Capacitor - Meter R. F. Filter	Same as C-213			Pt. 37			
C-327	Capacitor - Meter R. F. Filter	Same as C-213			7619013 Pt. 38			
		C.P.A.						
C-401	Capacitor - Meter By-Pass	Same as C-172			7619388 Pt. 5			
C-402	Capacitor - Meter By-Pass	Same as C-172			Pt. 6			
C-403	Capacitor - Meter By-Pass	Same as C-172			Pt. 7			
C-407	Capacitor - Meter By-Pass	Same as C-172			Pt. 11			
C-408	Capacitor - Meter By-Pass	Same as C-172			Pt. 12			
C-409	Capacitor - Meter By-Pass	Same as C-172			Pt. 13			
C-410	Capacitor - Meter By-Pass	Same as C-172			Pt. 14			
C-411	Capacitor - Part of Main Tank Coil Drive Motor B-401	Same as C-157			Pt. 15			
C-412	Capacitor - Meter By-Pass	Same as C-172			Pt. 17			
C-413	Capacitor - Meter By-Pass	Same as C-172			Pt. 18			
C-414	Capacitor - Meter By-Pass	Same as C-172			Pt. 19			
C-415	Capacitor - Meter By-Pass	Same as C-172			Pt. 20			
C-416	Capacitor - Meter By-Pass	Same as C-172			Pt. 21			
C-417	Capacitor - Meter By-Pass	Same as C-172			Pt. 22			
		R.P.A.						
C-502	Capacitor - Meter By-Pass	Same as C-172			7619053 Pt. 9			
C-503	Capacitor - Meter By-Pass	Same as C-172			Pt. 10			
C-504	Capacitor - Meter By-Pass	Same as C-172			Pt. 11			
C-505	Capacitor - WL-5671 Filament By-Pass	Same as C-123			Pt. 12			

DRAWING NO. 50-B-8600 SHEET 8 OF 31 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ____ STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		R.P.A. (CONTINUED)						
C-506	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 13			
C-507	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 14			
C-508	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 15			
C-509	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 16			
C-510	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 17			
C-511	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 18			
C-512	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 19			
C-513	Capacitor - part of WL-5671 grid tank cap. drive motor B-501	Same as C-157			Pt. 20			
C-514	Capacitor - part of WL-5671 grid tank cap. drive motor B-502	Same as C-157			Pt. 21			
C-515	Capacitor - WL-5671 grid by-pass cap.	Same as C-315			Pt. 22			
C-516	Capacitor - WL-5671 grid blocking cap.	Same as C-316			7619053 Pt. 23			
C-517	Capacitor - WL-5671 grid tuning	Lapp gas filled, variable 220-1000 MMF, 15 KV peak	Pt. 4 7617959		7619053 Pt. 24	1		
C-517A	Capacitor - Grid padder	Same as C-317A			Pt. 34			
C-517B	Capacitor - Grid padder	Same as C-317B			Pt. 35			
C-518	Capacitor - WL-5671 grid blocking	Same as C-318			Pt. 25			
C-519	Capacitor - WL-5671 plate blocking	Same as C-319			Pt. 26			
C-520	Capacitor - WL-5671 plate tuning	105 Amps. at 1 MC. Lapp gas filled capacitor 310-1000 MMF., 50 KV. peak	Pt. 1 7617959		Pt. 27			
C-521	Capacitor - WL-5671 D.C. plate supply by-pass	Same as C-321			Pt. 28			
C-522	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 29			
C-523	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 30			
C-524	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 31			
C-525	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 32			
C-525A	Capacitor - WL-5671 plate tank padder	Freq. Sensitive (Same as C-320A)	Pt. 3 7427628		Pt. 33			
C-526	Capacitor - meter, R. F. filter	Same as C-213			Pt. 37			
C-527	Capacitor - Meter, R. F. filter	Same as C-213			7619053 Pt. 38			

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ____ STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY – PER UNIT	QUANTITY – [illegible]	QUANTITY – [illegible]
		ANT. ARC-OVER						
C-1401	Capacitor - Filter	4 MFD., 100 V.	JAN-C-25 CP53B1EB-405K		7619585 Pt.1	2	1	0
C-1402	Capacitor - Meter by-pass	Same as C-172			7619585 Pt.2			
		H. V. COMPONENTS						
C-1501	Capacitor - Audio filter	Mica Capacitor 2200 MMF., 20 KV., D.C.	S#1471665	1	7718801 Pt.39	1		
C-1502	Capacitor - Mod. trans. coupling	Type F. P., 4 MFD., 20 KV., D. C.	S#1081020	1	7426385 Pt.4	1	1	
C-1503*	Capacitor - Mod. H.V. rectifier filter	Type F. P. 70, 4 MFD., 15 KV., D. C.	S#1397282	1	50-B-8481 It.2	2	1	1
C-1504	Capacitor - Mod. H.V. Rectifier filter	Same as C-1503						
		P.C.						
F-1	Fuse Holder	Fuse block, 7 pole	356007	23	7619416 Pt.19	1		
F-1A*	Fuse, spare	250 V., 1 amp., "Littelfuse"	312001 -	23	Pt.20	7	35	17
F-1B	Fuse, bus voltmeter	Same as F-1A			Pt.21			
F-1C	Same as F-1B	Same as F-1A			Pt.22			
F-1D	Same as F-1B	Same as F-1A			Pt.23			
F-1E	Fuse, tube hour meter	Same as F-1A			Pt.24			
F-1F	Same as F-1E	Same as F-1A			Pt.25			
F-1G	Same as F-1A	Same as F-1A			7619416 Pt.26			
		EXC.						
F-101	Fuse Holder	Fuse block, type "S"	357003	23	7619373 Pt.168	2		
F-101A*	Fuse	Fuse, type 3AG, 1/2 amp.	312500	23	Pt.169	10	50	25
F-101B	Same as F-101A	Same as F-101A			Pt.170			
F-101C	Fuse, spare	Same as F-101A			7619373 Pt.171			
		C.P.A.						
F-401	Same as F-101	Same as F-101			7619388 Pt.57			
F-401A	Same as F-101A	Same as F-101A			Pt.58			
F-401B	Same as F-101B	Same as F-101A			Pt.59			
F-401C	Same as F-101C	Same as F-101A			7619388 Pt.60			

DRAWING NO. 50-B-8600 SHEET 10 OF 29 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		ANT. ARC-OVER						
F-1401	Fuse, A. C. Line	Same as F-101A			7619585 Pt.6	-	-	-
F-1402	Same as F-1401	Same as F-101A			Pt.7			
F-1403	Fuse, A. C. Line Spare	Same as F-101A			Pt.8			
F-1404*	Fuse, Relay & Meter	250 V./1/200 amp.	361005	23	Pt.9	2	10	5
F-1404A	Fuse, extr. post	Finger operated fuse retainer	372001	23	Pt.10	2	2	1
F-1405	Same as F-1404	Same as F-1404			Pt.11			
F-1405A	Same as F-1404A	Same as F-1404A			7619585 Pt.12			
		SWITCHGEAR						
F-2001 F-2002 F-2003	Fuse-Potential trans. primary	Type BAL, 2 amp., current limiting fuse	S#1254953	1	~~PH-15590A Pt.5~~ PH-23-A-339 Pt.5	3	3	3
F-2004 F-2005	Fuse, potential trans. secondary	6 amp., 250 volts	~~37168~~ 25,006	1	~~PH-15590A Pt.8~~ PH-23-A-339 Pt.8	2	2	2
F-2006 F-2007	Fuse, "GP" trans. primary	Type BAL, 5 amps., current limiting fuse	S#1254955	1	~~PH-15590A Pt.6~~ PH-23-A-339 Pt.6	2	2	2
		H.V. COMPONENTS						
	Fuse H.V. Capacitor used with C-1563 & C-1504	No. 28 tinned copped wire	PDS-2003-2.	1		4 FT.	10 FT.	10 FT.
		P. C.						
I-1*	Lamp, Panel Illumination	8 watt daylight fluorescent min. bi-pin	T-5	1	7619416 Pt.30	18	9	5
I-1A*	Starter, for panel lamp	120 V., 50/60 cy., for 8 watt fluorescent lamp	FS-5	14	7619416 Pt.31	18	6	3
I-1B*	Ballast, for panel lamp	120 V., 60 cy., for 8 watt fluorescent (SEE NOTE FOR 50 CY. OPERATION SH. 59).	89G435	14	Pt.32	18	4	2
I-1D*	Filter, lamp interference	Line filter	TYPE+216	61	Pt.34	18	2	1
I-2	Same as I-1				Pt.35			
I-2A	Same as I-1A				Pt.36			
I-2B	Same as I-1B				Pt.37			
I-2D	Same as I-1D				Pt.39			
I-3	Same as I-1				Pt.46			
I-3A	Same as I-1A				Pt.41			
I-3B	Same as I-1B				Pt.42			
I-3D	Same as I-1D				Pt.44			

DRAWING NO. 50-B-8600 SHEET 11 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT (QUANTITY)	RECOM'D SPARE PARTS LIST (QUANTITY)	MINIMUM SPARE PARTS LIST (QUANTITY)
		P.C. (CONTINUED)						
1-4	Same as 1-1				Pt.45			
1-4A	Same as 1-1A				Pt.46			
1-4B	Same as 1-1B				Pt.47			
1-4D	Same as 1-1D				7619416 Pt.49			
1-5*	Indicator, 400 V. overload	Opalescent 25 V. rect. minilite	Receptacle Style - ~~1124158~~ 1589180 Bulb Style - 1124156 Lens Style - ~~1124155~~ 1615693	1	7619416 Pt.50	18	2	1
1-6	Ind., R.F. 813 O.L.	Same as 1-5			7619416 Pt.51			
1-7	Ind., L.Aud.813 O.L.	Same as 1-5			Pt.52			
1-8	Ind., R.Aud.813 O.L.	Same as 1-5			Pt.53			
1-9*	Indicator, P. C. interlock	Opalescent, 250 V., rect. minilite	Receptacle Style - ~~1124184~~ 1589187 Bulb Style - 1124156 Lens Style - ~~1124155~~ 1615693	1	Pt.54	14	2	1
1-10	Ind., Exc. Intlk.	Same as 1-9			Pt.55			
1-11	Ind., 1.5-3 KV., D.C., O.L.	Same as 1-5			Pt.56			
1-12	Ind., L. R.F.5736 O.L.	Same as 1-5			Pt.57			
1-13	Ind., L.Aud.5736 O.L.	Same as 1-5			Pt.58			
1-14	Ind., R.Aud.5736 O.L.	Same as 1-5			Pt.59			
1-15	Ind., Mod. Intlk.	Same as 1-9			7619416 Pt.60			
1-16	Ind., L.P.A. Intlk.	Same as 1-9			7619417 Pt.61			
1-17	Ind., P.A. HV., D.C. O.L.	Same as 1-5			7619417 Pt.62			
1-18	Ind., R.R.F.5736 O.L.	Same as 1-5			Pt.63			
1-19	Ind., Mod. 1 or 3 O.L.	Same as 1-5			Pt.64			
1-20	Ind., Mod. 2 or 4 O.L	Same as 1-5			Pt.65			
1-21	Ind., C. P. A. Intlk.	Same as 1-9			Pt.66			
1-22	Ind., R.P.A. Intlk.	Same as 1-9			Pt.67			
1-23	Ind., Mod. H.V. D.C. O. L.	Same as 1-5			Pt.68			
1-24	Ind., L.P.A., O.L.	Same as 1-5			Pt.69			
1-25	Ind., Carrier Interr.	Same as 1-5			Pt.70			
1-26	Int., Ant. Arc-Over	Same as 1-5			Pt.71			
1-27	Ind., Rect.Frame Intlk.	Same as 1-9			Pt.72			
1-28	Ind., Aux.Frame Intlk	Same as 1-9			Pt.73			
1-29	Ind., A. C., O. L.	Same as 1-5			Pt.74			
1-30	Ind., R.P.A., O.L.	Same as 1-5			Pt.75			
1-31	Ind., Spare	Same as 1-9			Pt.76			
1-32	Ind., Spare	Same as 1-9			Pt.77			
1-33	Ind., Ant.Phas.Intlk.	Same as 1-9			Pt.78			
1-34	Ind., Spare	Same as 1-9			Pt.79			
1-35*	Ind., Breaker "ON"	Red, 250 V. rect. minilite	Receptacle Style - ~~1124184~~ 1589187 Bulb Style - 1124156	1	7619417 Pt.80	10	1	1

DRAWING NO. 50-B 8600 SHEET 12 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER — INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		P. C. (CONTINUED)						
			LENS STYLE - ~~1124150~~ 1615688					
I-36	IND., BLOWER #1 "ON"	BLUE; 250 V. RECT. MINILITE	RECEPTACLE STYLE - ~~1124164~~ 1589187 BULB STYLE - 1124156	1	7619417 PT. 81	2	1	1
			LENS STYLE - ~~1124153~~ 1615691					
I-37*	IND., CONTROL BUS "ON"	AMBER; 250 V. RECT. MINILITE	RECEPTACLE STYLE - ~~1124164~~ 1589187 BULB STYLE - 1124156 LENS STYLE - ~~1124154~~ 1615692	1	PT. 82	9	1	1
I-38	IND., AUDIO BIAS "ON"	SAME AS I-35			PT. 83			
I-39	IND., R.F. BIAS "ON"	SAME AS I-35			PT. 84			
I-40	IND., BREAKER SWITCH "ON"	SAME AS I-37			PT. 85			
I-41	IND., BLOWER #2 "ON"	SAME AS I-36			PT. 86			
I-42*	IND., EXIT. FIL. VOLTAGE NORMAL	GREEN; 250 V. RECT. MINILITE	RECEPTACLE STYLE - ~~1124184~~ 1589187 BULB STYLE - 1124156 LENS STYLE - ~~1124151~~ 1615689	1	PT. 87	11	1	1
I-43	IND., AUD. BIAS SWITCH "ON"	SAME AS I-42			PT. 88			
I-44	IND., R.F. BIAS SWITCH "ON"	SAME AS I-42			7619417 PT. 89			

DRAWING NO. 50-B-8600 SHEET 13 OF 31 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER						
1-101*	Ind., Osc. #1 Heater "ON"	Amber; 125 V. rectangular minilite	Receptacle Style - ~~1124161~~ 1589184 Bulb Style - 1124156 Lens Style - ~~1124154~~ 1615692	1	7619373 Pt.121	2	1	1
1-102A*	Ind., Osc. #1 Thermo-stat	Clear; 25 V. rectangular minilite	Receptacle Style - ~~1124158~~ 1589180 Lens Style - ~~1124152~~ 1615690	1	7619373 Pt.122	2	1	1
1-102B*	Lamp, neon, for 1-102A.		~~1124156~~ Type #5122	# 23	7619373 Pt.123	2	2	1
1-103	Ind., Osc. 2 heater "ON"	Same as 1-101			7619373 Pt.124			
1-104A	Ind., Osc. 2 thermo-stat	Same as 1-102A.			7619373 Pt.125			
1-104B	Lamp, neon for 1-104A	Same as 1-102B.			7619373 Pt.126			
1-105	Ind., 400 V. rect. SW. "ON"	Same as 1-42			7619373 Pt.127			
1-106	Ind., 400 V. rect. power "ON"	Same as 1-35			7619373 Pt.128			
1-107	Ind., 1.5-3 KV. rect. SW. "ON"	Same as 1-42			7619373 Pt.129			
1-108	Ind., 1.5-3 KV. rect. power "ON"	Same as 1-35			7619373 Pt.130			
1-109	Same as 1-1				7619373 Pt.131			
1-109A	Same as 1-1A				7619373 Pt.132			
1-109B	Same as 1-1B				7619373 Pt.133			
1-109D	Same as 1-1D				7619373 Pt.135			
1-110	Same as 1-1				7619373 Pt.136			
1-110A	Same as 1-1A				7619373 Pt.137			
1-110B	Same as 1-1B				7619373 Pt.138			
1-110D	Same as 1-1D				7619373 Pt.140			
1-111	Same as 1-1				7619373 Pt.141			
1-111A	Same as 1-1A				7619373 Pt.142			
1-111B	Same as 1-1B				7319373 Pt.143			
1-111D	Same as 1-1D				7619373 Pt.145			
1-112	Same as 1-1				7619373 Pt.146			
1-112A	Same as 1-1A				7619373 Pt.147			
1-112B	Same as 1-1B				7619373 Pt.148			
1-112D	Same as 1-1D				7619373 Pt.150			
		MODULATOR						
1-201	Ind., Mod. L.Fil."ON"	Same as 1-37			7617688 Pt.11			
1-202	Ind., Mod. Bias "ON"	Same as 1-42			7617688 Pt.12			
1-203	Ind., Mod. Plate "ON"	Same as 1-35			7617688 Pt.13			

DRAWING NO. 50-B-8600 SHEET 14 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		MODULATOR (CONTINUED)						
1-204	Ind., Mod., R.Fil. "ON"	Same as 1-37			7617688 Pt.14			
1-205	Same as 1-1				7617688 Pt.15			
1-205A	Same as 1-1A				7617688 Pt.16			
1-205B	Same as 1-1B				7617688 Pt.17			
1-205D	Same as 1-1D				7617688 Pt.23			
1-206	Same as 1-1				7617688 Pt.19			
1-206A	Same as 1-1A				7617688 Pt.20			
1-206B	Same as 1-1B				7617688 Pt.21			
1-206D	Same as 1-1D				7617688 Pt.24			
		L.P.A.						
1-301	Ind. L.H. Fil. "ON"	Same as 1-37			7619013 Pt.45			
1-302	Ind. Bias "ON"	Same as 1-42			7619013 Pt.46			
1-303	Ind. Plate "ON"	Same as 1-35			7619013 Pt.47			
1-304	Ind. R.H. Fil. "ON"	Same as 1-37			7619013 Pt.48			
1-305	Same as 1-1				7619013 Pt.49			
1-305A	Same as 1-1A				7619013 Pt.50			
1-305B	Same as 1-1B				7619013 Pt.51			
1-305D	Same as 1-1D				7619013 Pt.57			
1-306	Same as 1-1				7619013 Pt.53			
1-306A	Same as 1-1A				7619013 Pt.54			
1-306B	Same as 1-1B				7619013 Pt.55			
1-306D	Same as 1-1D				7619013 Pt.58			
		C.P.A.						
1-401	Ind. Ant. Unbalance	Same as 1-9			7619388 Pt.26			
1-402	Ind. Ant. Arc Over"ON"	Same as 1-101			7619388 Pt.27			
1-403	Ind. Aud. Bias "ON"	Same as 1-42			7619388 Pt.28			
1-404	Ind. R.F. Bias "ON"	Same as 1-42			7619388 Pt.29			
1-405	Ind. P.A. Rectifier "ON"	Same as 1-35			7619388 Pt.30			
1-406	Ind. P.A. Rect. Switch "ON"	Same as 1-42			7619388 Pt.31			
1-407	Ind. Rect. Low Limit	Same as 1-9			7619388 Pt.32			
1-408	Ind. Rect. High Limit	Same as 1-35			7619388 Pt.33			
1-409	Same as 1-1				7619388 Pt.34			
1-409A	Same as 1-1A				7619388 Pt.35			
1-409B	Same as 1-1B				7619388 Pt.36			
1-409D	Same as 1-1D				7619388 Pt.38			
1-410	Same as 1-1				7619388 Pt.39			
1-410A	Same as 1-1A				7619388 Pt.40			
1-410B	Same as 1-1B				7619388 Pt.41			
1-410D	Same as 1-1D				7619388 Pt.43			
1-411	Same as 1-1				7619388 Pt.44			

DRAWING NO. 50-B-8600 SHEET 15 OF 57 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		C.P.A. (CONTINUED)						
1-411A	Same as 1-1A				7619388 Pt.45			
1-411B	Same as 1-1B				7619388 Pt.46			
1-411D	Same as 1-1D				7619388 Pt.48			
1-412	Same as 1-1				Pt.49			
1-412A	Same as 1-1A				Pt.50			
1-412B	Same as 1-1B				Pt.51			
1-412D	Same as 1-1D				7619388 Pt.53			
		R.P.A.						
1-501	Indicator, L. H. filament "ON"	Same as 1-37			7619053 Pt.45			
1-502	Indicator, Bias "ON" indicator	Same as 1-42			Pt.46			
1-503	Indicator, Plate "ON"	Same as 1-35			Pt.47			
1-504	Indicator, R. H. filament "ON"	Same as 1-37			Pt.48			
1-505	Same as 1-1				Pt.49			
1-505A	Same as 1-1A				Pt.50			
1-505B	Same as 1-1B				Pt.51			
1-505D	Same as 1-1D				Pt.57			
1-506	Same as 1-1				Pt.53			
1-506A	Same as 1-1A				Pt.54			
1-506B	Same as 1-1B				Pt.55			
1-506D	Same as 1-1D				Pt.58			
		MINILITE PARTS						
	Bulbs, Minilite		Style - 1124156	1		65	32	32
	Lens, Minilite	Amber	Style - ~~1124154~~ 1615692	1		10	2	1
	Lens, Minilite	Clear	Style - ~~1124152~~ 1615690	1		2	1	1
	Lens, Minilite	Green	Style - ~~1124151~~ 1615689	1		11	3	1
	Lens, Minilite	Red	Style - ~~1124150~~ 1615688	1		10	2	1
	Lens, Minilite	Opalescent	Style - ~~1124155~~ 1615693	1		32	8	4
	Lens, Minilite	Blue	Style - ~~1124153~~ 1615691	1		2	1	1

DRAWING NO. 50-B-8600 SHEET 16 OF 54 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		P.C.						
J-1*	Receptacle, 117 V. A. C. Outlet	Plug 125 V., 15 amps.	5727	33	7619417 Pt.111	6		
		EXCITER						
J-101*	Receptacle, RG8/U	R. F. Coax. connector	83-1RTY	3	7720527 Pt.9	2		
J-102	Same as J-101				7619373 Pt.162			
J-103*	Receptacle, RG17/U	R. F. Coax. connector	G-1 7619445	1	7619373 Pt.163	2		
J-104	Same as J-103				7619373 Pt.164			
J-105*	Receptacle, osc.	Jack, 14 terminals	Pt.1 7724153	1	7619373 Pt.165	4	1	
J-106	Same as J-105				7619373 Pt.166			
J-107	Same as J-1				7619373 Pt.161			
		MODULATOR						
J-201	Same as J-1				7617688 Pt.26			
		L.P.A.						
J-301	Same as J-1				7619014 Pt.61			
		C.P.A.						
J-401	Same as J-1				7619389 Pt.65			
J-402	Receptacle, Ant. Arc.-Over	Same as J-105.			7619389 Pt.66			
J-403	Receptacle, Test Cable	Same as J-105			7619391 Pt.231			
J-404	Receptacle, Test Cable	Plug, 14 terminals	Pt.2 7724153	1	7619391 Pt.232			
		R.P.A.						
J-501	Same as J-1				7619054 Pt.61			

DRAWING NO. 50-B-8600 SHEET 17 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ____ STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P. C.						
K-1*	Relay, spare aux.	Type SG-auxiliary relay, 230 V., 50/60 cy.	Style 1162957	1	7619418 Pt.121	8	1	
K-2	Relay, 3 KV. intlk. aux.	Same as K-1			7619418 Pt.122			
K-3	Relay, bus. breaker control	Same as K-1			7619418 Pt.123			
K-4	Relay, time delay	Type TK, timing relay, 230 V., 60 cy. (see note for 50 cycle operation on page 59).	Style 1059954	1	7619418 Pt.124	1		
K-5	Relay, T. D. aux.	Same as K-1			7619418 Pt.125			
K-6	Relay, Bias aux.	Same as K-1			7619418 Pt.126			
K-7	Relay, H.B. Brkr. aux.	Same as K-1			7619418 Pt.127			
K-8	Relay, Excit. fil. U.V.	Type CV. voltage S.P.D.T. relay 230 V.	Style 1056487	1	7619418 Pt.128	1		
K-9	Relay, 3 KV., D.C. O.L.	Type SC current relay 2.0-8.0 amps. range (2 N. O. contacts)	Style 1096939	1	7619418 Pt.129	1		
K-10	Relay, A.C.O.L.Aux.	Same as K-1			7619418 Pt.130			
K-11*	Relay, H. V. Audio D.C. O.L.	Type SC current relay, 4-16 amp. range 2 N. O. contacts	Style 1096940		7619418 Pt.131	2		
K-12	Relay, H.V., R.F., D.C., O.L.	Same as K-11			7619418 Pt.132			
K-13	Relay, stepping	2 lever stepping relay 24, V., D.C.	RA74	4	7619418 Pt.133	1		
K-14*	Relay, 3 KV., master O. L.	Type MG-6 Aux. relay, 230 V., 60 cy. (see note for 50 cycle operation on page 59.).	Style 1163930	1	7619418 Pt.134	2		
K-15	Relay, 400 V., O. L. Aux. #1	Same as K-1			7619418 Pt.135			
K-16	Relay, main master O.L.L.	Same as K-14 (except contacts #1 and 2 assembled as break)			7619418 Pt.136			
K-17*	Relay, 400 V. O. L. Aux. #2	Type "SK" aux. O. L. D.P.D.T. relay, 24 V. D.C., 300 ohms coil. (2 form "C" contacts)	Type SK-5001	10	7619418 Pt.137	20	5	2
K-18	Relay, R.F. 813 O.L. Aux.	Same as K-17			7619418 Pt.138			
K-19	Relay, L. Aud. 813 O.L. Aux.	Same as K-17			7619418 Pt.139			
K-20	Relay, R.Aud., 813 L. Aux.	Same as K-17			7619418 Pt.140			
K-21	Relay, 3 KV., O.L. Aux.	Same as K-17			7619418 Pt.141			
K-22	Relay, L. RF, 5736 O.L. Aux.	Same as K-17			7619418 Pt.142			
K-23	Relay, L. Aud. 5736 O.L. Aux.	Same as K-17			7619418 Pt.143			
K-24	Relay, R. Aud. 5736 O.L. Aux.	Same as K-17			7619418 Pt.144			
K-25	Relay, R.F., H.V., D.C., O. L. Aux.	Same as K-17			7619418 Pt.145			
K-26	Relay, R. R.F. 5736 O.L. Aux.	Same as K-17			7619418 Pt.146			
K-27	Relay, Mod. #1 or #3 O.L. Aux.	Same as K-17			7619418 Pt.147			
K-28	Relay, Mod. #2 or #4 O.L. Aux.	Same as K-17			7619418 Pt.148			
K-29	Relay, Aud. H.V. D.C. O.L. Aux.	Same as K-17			7619418 Pt.149			
K-30	Relay, L.P.A., O.L. Aux.	Same as K-17			7619418 Pt.150			
K-31	Relay, Ant. Arc-over Aux.	Same as K-17			7619418 Pt.151			
K-32	Relay, A.C. O.L. Aux.	Same as K-17			7619418 Pt.152			

DRAWING NO. 50-B-8600 SHEET 18 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ______
STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		P.C. (CONTINUED)						
K-33	Relay, R.P.A., O.L. Aux.	Same as K-17			7619418 Pt.153			
K-34	Relay, carrier Inter. Aux.	Same as K-17			7619418 Pt.154			
K-35	Relay, spare	Same as K-17			7619418 Pt.155			
K-36	Relay, spare	Same as K-17			7619418 Pt.156			
K-37*	Contactor, audio bias	Type DN-00 10 amp. contactor, 3 pole N. O., 230 V., 60 cycles.	Style 1301694	1	7619418 Pt.157	1		
K-38	Contactor, R.F. bias	Type DN-00 10 amp. contactor, 4 pole N. O., 230 V., 60 cycles	Style 1190560	1	7619418 Pt.158	1		
K-39	Contactor, 400 V. supply	Same as K-37			7619418 Pt.159			
K-40	Contactor, 1.5-3 KV. supply	CLASS 15-825 N2 SIZE 2. Type N-240 45 amp. contactor, 4 pole N. O., 230 V., 60 cycles (see note for 50 cycle operation on page 59).	Style ~~1014691~~ 1614216	1	7619418 Pt.160	1		
K-41*	Relay, aux. frames intlk.	Type SG aux. relay, 230 V., 50/60 cy.	Style 1008540	1	7619418 Pt.161	10	1	
K-42	Relay, P.C. intlk.	Same as K-41			7619418 Pt.162			
K-43	Relay, Exc. & Mod. intlk.	Same as K-41			7619418 Pt.163			
K-44	Relay, L.P.A. intlk.	Same as K-41			7619418 Pt.164			
K-45	Relay, C.P.A. & R.P.A. intlk.	Same as K-41			7619418 Pt.165			
K-46	Relay, fil. delay aux.	Type MG-6 aux. relay, 230 V., 60 cy. (see note for 50 cycle operation on page 59).	Style 1163957	1	7619418 Pt.166	1		
K-47	Relay, aux. No. 1 stepping	Same as K-41			7619418 Pt.167			
K-48	Relay, aux. No. 2 stepping	Same as K-41			7619418 Pt.168			
K-49	Relay, bus breaker time delay	Same as K-41			7619418 Pt.169			
K-50	Relay, HV breaker time delay	Same as K-41			7619418 Pt.174			
		EXCITER						
K-101	Relay, audio input shorting	Same as K-41			7619373 Pt.172			
K-102	Relay, osc. selector	D.P.D.T. latching relay, 24 V., D.C. coil	Similar to 2759	37	7619373 Pt.173	1		
K-103	Relay, carrier inter.	Same as K-41			7619373 Pt.174			
K-104	Relay, 807 & 813 audio screen intlk.	Same as K-41			7619373 Pt.175			
K-105*	Relay, 400 V., D.C., O. L.	Type SC current relay, 0.25-1.0 amp. range	Style 1096937-(Modified)	1	7619373 Pt.176	2		
K-106	Relay, 813 R.F., Pl. O. L.	Same as K-105			7619373 Pt.177			
K-107*	Relay, L.5736, R.F. O.L.	Type SC current relay 0.5-2.0 amp. range	Style 1096937	1	7619373 Pt.178	4		
K-108	Relay, R.5736, R.F., Pl. O. L.	Same as K-107			7619373 Pt.179			
K-109*	Relay, Exc. Bias, U. V.	Type SV voltage relay, 50-150 V.D.C.	Style 1096958	1	7619373 Pt.180	7		
K-110*	Relay, L. Audio 813 Pl. O. L.	Type SC current relay, 0.1-0.4 amp. range	Style 1096937-(Modified)	1	7619374 Pt.181	4		
K-111	Relay, R. Audio 813 Pl., O. L.	Same as K-110			7619374 Pt.182			
K-112	Relay, L. Audio bias, U. V.	Same as K.109			7619374 Pt.183			

DRAWING NO. 50-B-8600 SHEET [illegible] OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
K-113	Relay, R. audio bias, U. V.	Same as K. 109			7619374 Pt. 184			
K-114	Relay, L. Audio 5736 Pl. O. L.	Same as K-110			7619374 Pt. 185			
K-115	Relay, R. audio 5736 Pl. O. L.	Same as K-110			7619374 Pt. 186			
		MODULATOR						
K-201*	Relay, Mod. L. Pl. O. L.	Type SC current relay 1-4 amp. range	Style 1096938	1	7617688 Pt. 28	4		
K-202	Relay, Mod. R. Pl. O. L.	Same as K-201			7617688 Pt. 29			
K-203	Relay, Mod. L. bias U. V.	Same as K-109			7617688 Pt. 30			
K-204	Relay, Mod. R. bias, U. V.	Same as K-109			7617688 Pt. 31			
		L.P.A.						
K-301	Relay, Pl. current O. L.	Same as K-201			7619014 Pt. 63			
K-302	Relay, Bias U.V.	Same as K-109			7619014 Pt. 64			
		R.P.A.						
K-501	Relay, Plate current, O. L.	Same as K-201			7619054 Pt. 63			
K-502	RELAY, BIAS UNDER VOLTAGE	SAME AS K-109			7619054 PT. 64			
		ANT. ARC-OVER						
K-1401	Relay, sensitive	Zero center type, sensitive relay contacts close at 300 microamps.	Surface Bakelite Model-534	31	7619585 Pt. 17	1		
K-1402	Relay, power	6 volt, D.P.D.T.	Model 712 Type 4	31	7619585 Pt. 18	1		
K-1601	Relay, H.V. Capacitor discharge	15 KV. D.C. rated S.P.D.T., 230 v.	PT-2 7720454	1	51-C-6168 Pt. 26	2		
K-1602	Relay, H.V. Capacitor discharge	Same as K-1601			51-C-6168 Pt. 27	2		

DRAWING NO. 50-B-8600 SHEET 20 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		SWITCHGEAR						
K-2004	Relay, anti-pumping	Type SG relay - open type 2M428 contacts 240 volts 50/60 cycle			PH-15590A ~~Pt. 41~~ PH-23-A-339 PT.20			
K-2008	Relay, Anti-pumping	Same as K-2004						
K-2013	Relay, A.C. Overload	Same as K-2004						
K-2014	Relay-recycling	Type MG-6 open type, self-reset, with six normally open contacts, (see note for 50 cycle operation on page 59).	S#1163804	1	~~PH-15590A~~ PT.42 PH-23-A-339 PT.21	1		
	The following parts are for the type SC-Current relay S#-1096937, S#1096938, S#-1096939, S#-1096940, also for type SV-voltage Relay S#-1096958.							
	Operating coil for S#-1096937	0.5 to 2.0 amp. range	S#1003396			2		
	Operating coil for Modified S#-1096937	0.1 to 0.4 amp. range				4		
	Operating coils for Modified S#-1096937	0.25 to 1 amp. range				2		
	Operating coil for S#-1096938		S#1003397	1		4		
	Operating coil for S#-1096939		S#1003398	1		1		
	Operating coil for S#-1096940		S#1003399	1		2		
	Operating coil for S#-1096958		S#1003406	1		7		
	Stationary contacts for both SC and SV Relays		S#1097234	1		30	8	4
	Moving contacts for both SC and SV Relays		S#1055993	1		15	4	2
	The following parts are for the SG-Aux. Relay S#1008540 and S#-1162957.							
	Operating coil		S#1008520	1		17	2	1
	Moving contacts and arm (L. Hand)		S#1008709	1		17	-	
	Moving contacts and arm (R. Hand)		S#1008710	1		17	-	
	Stationary make contacts for S#1008540		S#1008711	1		18	4	2
	Stationary make contacts for S#1162957		S#1102942	1		16	4	2
	Stationary break contacts for S#1162957		S#1102943	1		16	4	2
	The following parts are for type CV-voltage relay S#1056487.							
	Electromagnet complete		Style 1155134	1		1		
	Stationary contact assembly		Style 704825	1		1	1	1
	Contactor SW. moving contact assy. with spring and spring adjustor		Style 1157609	1		1	1	1

DRAWING NO. 50-B-8600 SHEET 21 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
	THE FOLLOWING PARTS ARE FOR TYPE MG-6 MULTI-CONTACT AUX. RELAY S#1163930 AND S#1163957.							
	OPERATING COIL FOR S#1163930 & S#1163957	230 VOLTS, 60 CYCLES	STYLE 1269651	1		3		
	RESET COIL FOR S#1163957		STYLE 1269683	1		1		
	CONTACT FINGER WITH LEAD AND INS.		STYLE 1201021	1		3	1	1
	STATIONARY CONTACT ASSEMBLY		STYLE 1158609	1		3	1	1
	THE FOLLOWING PARTS ARE FOR TYPE DN-00 CONTACTORS, S#1301694 AND S#1190560.							
	OPERATING COIL		STYLE 1186538	1		3	1	
	SHADING COIL		STYLE 1072832	1		3	1	
	MOVING CONTACTS		STYLE 1040078	1	CAT. NO. 22-000	7	6	3
	STATIONARY CONTACTS		STYLE 1072845	1	CAT. NO. 22-000	14	6	3
	CONTACT SPRING		STYLE 1091161	1		3	1	1
	THE FOLLOWING PARTS ARE FOR TYPE N-240 CONTACTORS CLASS 15-825 N2 SIZE 2. S#1614216							
	OPERATING COIL	230 VOLTS, 60 CYCLES	STYLE 1470222	1		1	1	
	CONTACT SPRING		1314961	1		4	4	
	STATIONARY CONTACT		1314986	1		8	8	4
	MOVING CONTACT		1314985	1		4	4	2
	THE FOLLOWING PARTS ARE FOR TYPE K-1601 AND K-1602, HIGH VOLTAGE RELAY							
	CONTACT ASSEMBLY	H.V. MOVING ARM, TWO CONTACTS			7720454 PT.3	2	2	1
	CONTACT ASSEMBLY	H.V. STATIONARY ARM, FOUR CONTACTS			PT.4	2	2	1
	CONTACT ASSEMBLY	L.V. MOVING ARMS, TWO CONTACTS EACH			PT.5	2	2	1
	CONTACT ASSEMBLY	L.V. STATIONARY ARM, FOUR CONTACTS			7720454 PT.6	2	2	1

DRAWING NO. 50-B-8600 SHEET 22 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P.C.						
L-1*	Reactor, 1.5 KV. supply	4.5 H. filter reactor, 0.7 amps., 1.5 KV., D.C., 150 cy.	L-Spec. 453657	1	7619419 Pt.181	2	1	1
L-2	Reactor, 3 KV., D.C. supply	4.0 H. Filter reactor, 3. KV., D.C., 150 cy.	L-Spec. 453658	1	Pt.182	1	1	1
L-3	Same as L-1				7619419 Pt.183			
		EXCITER						
L-101	Choke, 802 osc. grid	Low level R.F. basketwound choke 900 T/.005 wire /5/8 dia.	G-1 7606743	1	7720527 Pt.11	1	1	1
L-102	Coil, 802 osc. screen grid tank	Low level R.F. tank coil	G-7 7607998	1	Pt.12	1	1	
L-103	Coil, 802 osc. plate tank	Low level R.F. tank coil	G-3 7607998	1	7720527 Pt.13	1	1	
L-105	Coil, 807 R.F. plate tank	Low level R.F. tank coil	G-1 7607036	1	7619374 Pt.198	1	1	
L-108	Choke, 813 R.F. plate	Low level R.F. choke	L-Spec. 453668		7619374 Pt.201	1	1	1
L-109	Coil, 813 R.F. plate tank	6.4 MH., 900 V., 400-1900 KC. low level R.F. tank coil	G-1 7619060		7619374 Pt.202	1		
L-110*	Choke, 5736 R.F.grid	Low level R.F. choke, 4.0 MH., 1300 V., 300-1800 KC.	L-Spec. 453659		7619374 Pt.203	3	2	1
L-111	Choke, 5736 R.F. plate	Low level R.F. choke 2.5 MH., 2.5 KV., 600-1200 KC.	L-Spec. 453666		7619374 Pt.204	1	1	
L-112	Coil, 5736 R.F. plate tank	25 UH., 2.5 KV., 600-1200 KC. low level R.F. tank coil	G-1 7425780		Pt.205	1		
L-113*	Reactor, 400 V., rectifier filter	10 henries, 50/60 cy., 500 V./0.3 amp. D.C.	L-Spec. 453647	1	Pt.206	12	2	1
L-114	Same as L-113	Same as L-113.			Pt.207			
L-115*	Reactor, L.speech bias rectifier filter	18 henries, 100 cy., 500 V./0.1 amp. D.C.	L-Spec. 453660	1	Pt.208	4	1	1
L-116	Same as L-115	Same as L-115			Pt.209			
L-117	Reactor, R.speech bias rectifier filter	Same as L-115			Pt.210			
L-118	Same as L-117	Same as L-115			7619374 Pt.211			
L-119	Reactor L. Mod. rectifier filter	Same as L-113.			Pt.212			
L-120	Same as L-119	Same as L-113			Pt.213			
L-121	Reactor, R. Mod. rectifier filter	Same as L-113			Pt.214			
L-122	Same as L-121	Same as L-113			Pt.215			
L-123	Reactor, Exc. bias rectifier filter	Same as L-113			Pt.216			
L-124	Same as L-123	Same as L-113			Pt.217			
L-128*	Choke, L. audio 5736 grid	150 henries, 30-10,000 cycles, 600 V. peak.	L-Spec. 453689	1	Pt.221	2	1	1
L-129	Choke, R. audio 5736 grid	Same as L-128			Pt.222			
L-130*	Choke, L. audio 5736 cathode	50 henries, 30-10,000 cycles, 500 V./ 0.2 amps.	L-Spec. 453664	1	Pt.223	2	1	1

DRAWING NO. 50-B-8600 SHEET [illegible] OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
L-131	CHOKE, R. AUDIO 5736 CATHODE	SAME AS L-130			PT.224			
L-132	CHOKE LOW LEVEL AUDIO BIAS	SAME AS L-115			PT.225			
L-133	SAME AS L-132	SAME AS L-115			PT.226			
L-134	COIL, STATIC DRAIN	7 TURNS EACH SIDE OF C. T. ON CERAMIC COIL FORM	G-1 7724079	1	7619374 PT.227	1		
		MODULATOR						
L-201*	CHOKE, R. F. FILTER	2.5 MH., R.F. CHOKE	TYPE - R-100	56	7617688 PT. 33	6	2	2
L-202	SAME AS L-201				7617688 PT.34			
		L.P.A.						
L-301*	COIL, 5736 GRID TANK	AIR CORE	G-4 7606741	1	7619014 PT.69	2		
L-302	CHOKE, R.F. GRID	SAME AS L-110	~~SELECT FROM 7427628~~		PT.70			
L-303*	COIL, NEUTING	FREQ. SENSITIVE	SELECT FROM 7427628		PT.71	2	1	
L-304*	CHOKE, R.F. PLATE	CERAMIC WOUND	G-5 7707576	1	PT.72	2	1	1
L-305	REACTOR, BIAS SUPPLY	SAME AS L-113			PT.73			
L-306	SAME AS L-305	SAME AS L-113			PT.74			
L-308	SAME AS L-201	SAME AS L-201			PT.76			
L-309	SAME AS L-201	SAME AS L-201			7619014 PT.77			
		C.P.A.						
L-401A	COIL, PLATE TANK	AIR CORE VARIABLE COIL	G-1 7426170	1	7619389 PT.69	1		
L-401B	COIL, COUPLING	PART OF L-401A			PT.70			
		R.P.A.						
L-501	COIL, 5736 GRID TANK	SAME AS L-301			7619054 PT.69			
L-502	CHOKE, R.F. GRID	SAME AS L-110			PT.70			
L-503	COIL, NEUTRALIZING	SAME AS L-303			PT.71			
L-504	CHOKE, R.F. PLATE	SAME AS L-304			PT.72			
L-505	REACTOR, R.P.A. BIAS SUPPLY	SAME AS L-113			PT.73			
L-506	REACTOR, R.P.A. BIAS SUPPLY	SAME AS L-113			PT.74			

DRAWING NO. 50-B-8600- SHEET 24 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		R.P.A. (CONTINUED)						
L-508	CHOKE, METER R.F. FILTER	SAME AS L-201			PT. 76			
L-509	CHOKE, METER R.F. FILTER	SAME AS L-201			7619054 PT. 77			
		H.V. COMPONENTS						
L-1503	REACTOR, MOD. FILTER	3.0 H., 1.1/1.4 AMP., D.C. 15 KV., D.C.	LANS. DWG. NUMBER-KR-7822469	1	7619302 PT. 28	1		
		H. V. COMPONENTS						
L-1501	REACTOR, AUDIO MODULATION	DRY TYPE HYPSERSIL 25 HENRIES AT .7 AMPS 7800 VOLTS, 30-10,000 CYCLES, 40 KV. TO GROUND INSULATION 55° RISE AT CONTINUOUS FULL LOAD	S#1453629	1	7718801 PT. 15	1		
L-1502	CHOKE, AUXILIARY PLATE	30 MILLIHENRY	1472317	1	7718801 PT. 38	1		
		POWER AMP. GRID TANK COIL ASSEMBLY COMPONENTS						
	RING, L-301 AND L-501 GRID TANK COIL	MICARTA RING 4" O.D. X 3-1/4" I.D.	PT. 1 7407685	1	7407685 PT. 1	4		
	INSULATOR, L-301 AND L-501 GRID TANK COIL.	ISOLANTITE SPACING INSULATOR 10-3/4" LG.	PT. 4 7707530	1	7707530 PT. 4	12	1	1
		POWER AMP. PLATE TANK COIL ASSEMBLY COMPONENTS						
	RING, MAIN PLATE TANK COIL, L-401	ALUMINUM END RING 25-3/4 O.D. X 15-1/2 I.D.	PTS-1 & 2 7619350	1	7619350 PTS. 1 & 2	2		
	PLATE, MAIN PLATE TANK L-401	MYCALEX END PLATE 18" LG. X 3" WIDE	PTS. 3&4 7619350	1	7619350 PTS. 3 & 4	2	1	1
	INSULATOR, MAIN PLATE TANK COIL L-401	ISOLANTITE, SPACING INSULATOR TYPE L-4, WHITE, GLAZED 26-1/2" LG.	PT. 17 7607337	1	7607337 PT. 17	8	2	1
		POWER CONTROL						
M-1	METER, LINE CURRENT	TYPE KA-24, SIMILAR TO S#1274677, EXCEPT DIAL TO BE BLACK WITH WHITE LETTERING; FOR USE WITH 300/5 AMP. CURRENT TRANSFORMER CALIBRATED 0-300 AMPS FULL SCALE. METER FACE WINDOW TO BE GLASS.	SIMILAR TO 1274677	1	7619419 PT. 193	1		
M-2	METER, LINE VOLT	TYPE KA-24, SIMILAR TO S#1274678, EXCEPT DIAL TO BE BLACK WITH WHITE LETTERING; FOR USE WITH 4/1 POTENTIAL TRANSFORMER, CALIBRATED 0-600 VOLTS FULL SCALE. METER FACE WINDOW TO BE GLASS.	SIMILAR TO 1274678	1	PT. 194	1		
M-3	METER, BUS CURRENT	TYPE KA-24, SIMILAR TO S#1274677, EXCEPT DIAL TO BE BLACK WITH WHITE LETTERING; FOR USE WITH 200/5 CURRENT TRANSFORMER; CALIBRATED 0-200 AMPERES FULL SCALE. METER FACE WINDOW TO BE GLASS.	SIMILAR TO 1274677	1	PT. 195	1		

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		POWER CONTROL (CONTINUED)						
M-4	Meter, bus volt	Type KA-24, similar to S#1274679, except dial to be black with white lettering; calibrated 0-300 volts full scale. Meter face window to be glass.	Similar To 1274679	1	7619419 Pt.196	1		
M-5	Clock, outage duration	(See note, for 50 cy. operation, on page 59). 115 V./60 cycle, 12 hour clock.	G-1 7620240	1	Pt.197	1		
M-6	Clock, Time of outage	(See note, for 50 cy. operation, on page 59.). 115 V./60 cycle, 12 hour clock.	G-2 7620240	1	Pt.198	1		
M-7	Meter, tube hour	Type RH-35, 240 V./60 cy. (See note for 50 cycles operation, on page 59.).	S#1205874	1	7619419 Pt.199	1		
		EXCITER						
M-101*	Meter, osc. cathode current	Type RX-33, 0-30 MA., D.C.	S#1203597	1	7619374 Pt.237	4		
M-102*	Meter, 807 (R.F.) cathode current	Type RX-33, 0-100 MA., D.C.	S#1203602	1	Pt.238	3		
M-103	Meter, 813 (R.F.) grid current	Same as M-101			Pt.239			
M-104*	Meter, 813 (R.F.) cathode current	Type RX-33, 0-500 MA., D.C.	S#1203608	1	7619374 Pt.240	2		
M-105	Meter, 5736 (R.F.) grid current	Same as M-104			7619375 Pt.241			
M-106*	Meter, L. 5736 (R.F.) plate current	Type RX-33, 0-2 amps., D.C.	S#1203486	1	Pt.242	2		
M-107	Meter, R. 5736 (R.F.) plate current	Same as M-106			Pt.243			
M-108	Meter, 1.5 KV., rect.	Type RX-33, 1.0 MA., D.C. movement, similar to S#1203584, except dial calibrated 0-2 KV. and marked with "KV. D.C." supply with multiplier resistor S#1158215 and two mtgs. S#1202797.	Similar to 1203584	1	Pt.244	1		
M-109*	Meter, 813 (R.F.) plate tuning ind.	Type RX-33, 1.0 MA., D.C. movement, similar to S#1203584, except dial calibrated 0-100 and marked with "Position".	Similar to 1203584	1	Pt.245	2		
M-110	Meter, 5736 (R.F.) plate tuning ind.	Same as M-109			Pt.246			
M-111*	Meter, L. 5736 audio bias voltage	Type RX-33, 0-500 V., D.C., supply with multiplier resistor S#1158211 and two mountings S#1202797.	S#1203860	1	Pt.247	4		
M-112	Meter, R. 5736 audio bias voltage	Same as M-111			Pt.248			
M-113	Meter, 807 audio cathode current	Same as M-102			PT. 249			
M-114	Meter, L. 813 audio cathode current	Same as M-102			Pt.250			
M-115	Meter, R. 813 audio cathode current	Same as M-102			Pt.251			
M-116	Meter, L. mod. bias voltage	Same as M-111			Pt.252			
M-117	Meter, R. mod. bias voltage	Same as M-111			Pt.253			
M-118	Meter, 400 V. rectifier	Type RX-33, 1.0 MA., D.C. movement, similar to S#1203584, except dial calibrated 0-750 and marked "Volts, D.C." supply with multiplier resistor style #1158212 and two mountings S#1202797.	Similar To S#1203584	1	Pt.254	1		
M-119	Meter, L. 5736 audio grid current	Same as M-101			Pt.255			
M-120	Meter, R. 5736 audio grid current	Same as M-101			Pt.256			

DRAWING NO. 50-B-8600 SHEET 24 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
						QUANTITY		
		EXCITER (CONTINUED)						
M-121*	Meter, L. 5736 audio cathode current	Type KX-24, 0-0.5 amp., D. C. (special)	Similar To 1274651	1	Pt.257	2		
M-122	Meter, R. 5736 audio cathode current	Same as M-121			Pt.258			
M-123	Meter, 3 KV, rectifier voltage	Type KX-24, 1.0 MA., D.C. movement, dial calibrated 0-5000 and marked "Volts, D.C.".	Type KX-24	1	Pt.259	1		
M-124	Meter, 5736 R.F. total plate current	Type KX-24, 0-3 amp., D. C.	S#1274653	1	7619375 Pt.260	1		
		MODULATOR						
M-201*	Meter, Mod. L. Plate current	Type KX-24, 0-5 amp., D. C.	S#1274654	1	7617688 Pt.36	4		
M-202*	Meter, Mod. filament voltage	Type KC-24, 0-20 volts, A.C. (rect. type) the deviation due to temperature change shall not exceed 0.6% of full scale for a 10° C change.	Type KC-24	1	Pt.37	3		
M-203	Meter, Mod. plate voltage	Type KX-24, 0-1 mil. movement, calibrated 0-20 KV.	Type KX-24	1	Pt.38	1		
M-204	Meter, Mod. R. plate current	Same as M-201			7617688 Pt.39			
		L.P.A.						
M-301	Meter, filament voltage	Same as M-202			7619014 Pt.82			
M-302*	Meter, grid voltage	Type KX-24, 1.0 MA., D.C. movement dial calibrated 0-2000 volts D.C. Use with external multiplier R-312. Dial to be black with white letters.	Type KX-24	1	Pt.83	2		
M-303*	Meter, grid current	Type KX-24, 0-1 amp., D.C.	S#1274651	1	Pt.84	2		
M-304	Meter, plate current	Same as M-201			7619014 Pt.85			
		C.P.A.						
M-401	Meter, P. A. plate voltage	Type KX-24, 1.0 MA., D.C. movement, calibrated 0-20 KV, for use with 10 megohm, sectional resistors S#1158223, dial to be black with white letters.	Type KX-24	1	7619389 Pt.79	1	1	1
M-402	Meter, total P.A. plate current	Type KX-24, 0-10 amps, D. C.; similar to S 1543906 except dial to be black with white letters. Minimum of 40 scale divisions.	Similar To ~~S#1274655~~ S#1543906	1	Pt.80	1	1	1

X

DRAWING NO. 50-B-8600 SHEET [illegible] OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		C.P.A. (CONTINUED)						
M-403	METER, OUTPUT CURRENT	TYPE KX-24, 0-200 MICROAMPERE MOVEMENT, CALIBRATED 0-50 AS SHOWN BELOW; BLACK DIAL WITH WHITE LETTERS; METER TITLE TO BE "R.F. AMPERES".	TYPE KX-24	1	7619389 PT.81	1		

SCALE INDICATION	MICROAMPERES
50	200
45	180
40	159.6
35	139.7
30	119.3
25	99.2
20	79.0
15	58.8
10	39.0
5	21.1
0	5.0

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
M-404	METER, TOTAL TRANS. INPUT WATT.	3 PHASE, 3 WIRE, 5 AMP., 120 VOLTS WATTMETER FOR USE WITH 480/120 VOLT POTENTIAL TRANSFORMER AND 300/5 AMP. CURRENT TRANSFORMER. SIMILAR TO S#1274688, EXCEPT WITH BLACK DIAL AND WHITE LETTERS.	SIMILAR TO S#1274688	1	7619389 PT.82	1		
M-405*	METER, L.P.A. GRID TUNING	TYPE RX-35, STYLE #1159687, EXCEPT SCALE TO BE CALIBRATED 0-100 WITH MINIMUM OF 50 DIVISIONS. METER TITLE TO BE "POSITION".	SIMILAR TO S#1159687	1	PT.83	6		
M-406	METER, R.P.A. GRID TUNING	SAME AS M-405.			PT.84			
M-407*	METER, L.P.A. GRID CURRENT	TYPE RX-35, 0-1 AMPS., D.C.	S#1159169	1	PT.85	2		
M-408	METER, R.P.A. GRID CURRENT	SAME AS M-407			PT.86			
M-409	METER, 5736 COUPLING	SAME AS M-405			PT.87			
M-410	METER, ANT. COUPLING	SAME AS M-405			PT.88			
M-411	METER, L.P.A. PLATE TUNING	SAME AS M-405			PT.89			
M-412	METER, R.P.A. PLATE TUNING	SAME AS M-405			PT.90			
M-413*	METER, L.P.A. PLATE CURRENT	TYPE RX-35, 0-5 AMPS., D.C. (MINIMUM OF 40 DIV.)	S#1159175	1	PT.91	2		
M-414	METER, R.P.A. PLATE CURRENT	SAME AS M-413			PT.92			
M-415	METER, R.F. OUTPUT CURRENT	TYPE RT-37, 50 AMPERE R.F. AMMETER, SAME AS S#1160370, EXCEPT WITH EXPANDED SCALE, WITH 6 INCH LEADS: SUPPLIED AND CALIBRATED WITH A 50 AMP. EXTERNAL THERMOCOUPLE S#878654. TO MOUNT ON 3/32 INCH THICK STEEL PANEL. METER TITLE TO BE "R.F. AMPERES".	SIMILAR TO S#1160370	1	7619389 PT.93	1	1	1
		R.P.A.						
M-501	METER, FILAMENT VOLT	SAME AS M-301			7619054 PT.82			
M-502	METER, GRID VOLT.	SAME AS M-302			PT.83			
M-503	METER, GRID CURRENT	SAME AS M-303			PT.84			
M-504	METER, PLATE CURRENT	SAME AS M-304			7619054 PT.85			
		ANT. ARC-OVER						
M-1401	METER	500-0-500 MICROAMP. SCALE	TYPE - RX-35	1	7619585 PT.23	1		

DRAWING NO. 50-B-8600 SHEET 28 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		EXCITER						
P-101	Plug, osc. coax, connector	Male, screw type RG8/U connector	83-1AP	3	7720527 Pt. 15	1		
P-102*	Plug, osc. coax, connector	Male, screw type RG8/U connector	83-1SP	3	7619375 Pt.267	2		
P-103	Same as Pt. 102				7619375 Pt.268			
P-104*	Plug, osc. cable	Male plug, 14 terminals, ant. arc-over	Pt.2 7724153	1	7720527 Pt. 16	2		
P-1401	Plug, Ant. Arc-Over	Same as P-104.			7619585 Pt. 27			
		P. C.						
R-1	Res., 1.5 K.V. supply bleeder	50,000 ohms, 120 W.	JAN-R-26 RW11G503		7619419 Pt.216	1	2	1
R-2*	Res., 3 K.V. supply bleeder	16,000 ohms, 120 W.	JAN-R-26 RW11G163		7619419 Pt.217	3	2	1
R-3	Same as R-2				7619419 Pt.218			
R-4	Same as R-2				7619419 Pt.219			
R-9*	Resistor, voltage dropping; for rect. minilite	7100 ohms resistor to fit. Style 1124164 rect. minilite	Style 1124148	1	7619419 Pt.224	50	5	2
R-10	Same as R-9				7619419 Pt.225			
R-15	Same as R-9				7619419 Pt.230			
R-16	Same as R-9				7619419 Pt.231			
R-21	Same as R-9				7619419 Pt.236			
R-22	Same as R-9				7619419 Pt.237			
R-27	Same as R-9				7619420 Pt.242			
R-28	Same as R-9				7619420 Pt.243			
R-31	Same as R-9				7619420 Pt.246			
R-32	Same as R-9				7619420 Pt.247			
R-33	Same as R-9				7619420 Pt.248			
R-34	Same as R-9				7619420 Pt.249			
R-35	Same as R-9				7619420 Pt.250			
R-36	Same as R-9				7619420 Pt.251			
R-37	Same as R-9				7619420 Pt.251			
R-38	Same as R-9				7619420 Pt.252			
R-39	Same as R-9				7619420 Pt.253			
R-40	Same as R-9				7619420 Pt.254			
R-41	Same as R-9				7619420 Pt.255			
R-42	Same as R-9				7619420 Pt.256			
R-43	Same as R-9				7619420 Pt.257			
R-44	Same as R-9				7619420 Pt.258			
					7619420 Pt.259			
R-45	Res., K-9, D.C., O.L. relay shunt	10 ohms, 50 watts	JAN-R-26 RW12H100		7619420 Pt.260	1	2	1
R-46*	Res., K-11, D.C., O.L. relay shunt	5 ohms, 50 watts	JAN-R-26 RW12H5R0		7619420 Pt.261	2	1	1
R-47	Res., K-12, D.C., O.L. relay shunt	Same as R-46.			7619420 Pt.262			
R-48	Resistor, bus breaker time delay	1500 ohms, 50 watts	Cat.#0573	27	7619420 Pt.263			
R-49	Resistor, bus breaker time delay	10 ohms, 1 watt	S#1473752		7619420 Pt.264			
R-50	Resistor, H.V. breaker time delay	Same as R-48			7619420 Pt.265			
R-51	Resistor, H.V. breaker time delay	Same as R-49			7619420 Pt.266			

DRAWING NO. 50-B-8600 SHEET___OF___SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER						
R-101	Res., osc. grid	.22 megohm, 1 W.	S-1471204	1	7720527 Pt.17	1	5	2
R-102	Res., osc. cathode	400 ohms, 10 W.	10F	44	Pt.18	1		
R-103	Res., osc. volts divider	6000 ohms, 20 W.	20K	44	Pt.19	1		
R-104	Res., osc. volt divider	20,000 ohms, 10 W.	10F	44	Pt.20	1		
R-105	Res., ind. current limit	47,000 ohms, 1/2 W.	S-1471167	1	7720527 Pt.21	1	5	2
R-106	Res., R.F. 807 grid	15,000 ohms, 2 W.	S-1471266	1	7619375 Pt.271	1	5	2
R-107	Res., R.F. 807 cathode	200 ohms, 13 W.	JAN-R-26 RW20J201		Pt.272	1		
R-108	Res., R.F. 807 screen	0.1 meg., 2 W.	S-1471276		Pt.273	1	5	2
R-109	Res., R. F. 813 grid	5,000 ohms, 6 W.	JAN-R-26 RW15E502		Pt.274	1		
R-110*	Res., R.F. 813 grid suppressor	56 ohms, 1 W.	S-1471012		Pt.275	2	5	2
R-111	Same as R-110				Pt.276			
R-112*	Res., R.F. 813 cathode	500 ohms, 86 W.	JAN-R-26 RW12G501		Pt.277	2	2	1
R-113	Res., R. F., 813 screen divider	40,000 ohms, 20 W.	20F	46	Pt.278	1		
R-114	Res., R.F.813 screen divider	25,000 ohms, 120 W.	JAN-R-26 RW11G253		Pt.279	1	2	1
R-115*	Res., grid balancing	100 ohms, 50 W.	JAN-R-26 RW13G101		Pt.280	3	2	1
R-116	Res., grid balancing	Same as R-115			Pt.281			
R-117A	Res., R.F. Exc. bias	Same as R-112			Pt.282			
R-117B	Res., R.F. Exc. bias	310 ohms, 86 W.	JAN-R-26 RW12G311		Pt.283	1	2	1
R-119*	Pot., L. audio 5736 bias	10,000 ohms, 50 W.	1106-22	46	Pt.285	2	2	1
R-120	Pot., R. audio 5736 bias	Same as R-119			Pt.286			
R-121*	Res., L. Mod. bias	200 ohms, 90 W.	JAN-R-26 RW12G201		Pt.287	2	2	1
R-122A*	Res., L. Mod. bias	2500 ohms, 90 W.	JAN-R-26 RW12G252		Pt.288	4	2	1
R-122B	Same as R-122A	Same as R-122A			Pt.289			
R-124	Res., R. Mod. bias	Same as R-121			Pt.291			
R-125A	Res., R. Mod. bias	Same as R-122A			Pt.292			
R-125B	Same as R-125A	Same as R-122A			Pt.293			
R-126*	Res., M-123 shunt	.47 megohm, 1 W.	S-1471208	1	Pt.294	2	5	2
R-127	Res., M-108 shunt	Same as R-126			Pt.295			
R-128*	Pot., R.F. 813 plate tuning cal.	7500 ohms, 2 W., Linear Taper Pot.	~~JAN-R-19 RA15A1SA-752AK~~ Series 43 Type 43	44	Pt.296	8	2	1
R-129	Pot., R. F. 5736 plate tuning cal.	Same as R-128			Pt.297			
R-130	Pot., R. F. 813 plate tuning ind.	300 Ohms, ± 10%, 2 W.	Pt.8 7422247	1	7619375 Pt.298	1	2	1
R-131*	Pot., R.F. 5736 plate tuning ind.	250 ohms	~~JAN-R-19~~ RA25A1FG-251AK Series 58 Type 58	44	7619375 Pt.299	7	2	1
R-132	Pot., R.F. 5736 plate coupling ind.	Same as R-131			7619375 Pt.300			
R-134*	Res., aud. input trans. load	Nominal resistance 33,000 ohms, 2 W. used only in matched pair with R-135.	29,700 to 36,300 ohms, select from S#1471270	1	7619376 Pt.302	One matched pair	One matched pair	One matched pair
R-135	Same as R-134	Nominal resistance 33,000 ohms, 2 W. (used only in matched pair with R-134)	Matched within 660 ohms of R134 select from S#1471270	1	7619376 Pt.303			

DRAWING NO. 50-B-8600 SHEET 30 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
						QUANTITY		
		EXCITER (CONTINUED)						
R-143*	Res., L. Audio 813 Grid	Nominal resistance 33,000 ohms, 2 W. (Used only in matched pair with R-144)	29,700 to 36,300 select from S#1471270	1	7619376 Pt.313	One matched pair	One matched pair	One matched pair
R-144	Res., R. Audio 813 Grid	Nominal resistance 33,000 ohms, 2 W. (Used only in matched pair with R-143)	Matched within 330 ohms of R-143 select from S#1471270	1	Pt.314			
R-145*	Res., L. Audio 813 Step Circuit	2200 ohms, 2 W., nominal resistance (Used only in matched pair with R-146)	1980 to 2420 ohms, select from S#1471256	1	Pt.315	One matched pair	One matched pair	One matched pair
R-146	Res., R. Audio 813 Step Circuit	Nominal resistance 2200 ohms, 2 W. (Used only in matched pair with R-145)	Matched within 44 ohms of R-145 select from S#1471256	1	Pt.316			
R-149A*	Res., L. Audio 813 Plate	Nominal resistance 20,000 ohms, 50 W.	Within ± 1/2% of nom. resistance JAN-R-26 RW13G203	1	Pt.319	2	2	1
R-149B*	Res., L. Audio 813 Plate	Nominal resistance 16,000 ohms, 50 W.	Within ± 1/2% of nom. resistance JAN-R-26 RW13G163	1	7619376 Pt.320			
R-150A	Res., R. Audio 813 Plate	Same as R-149A.			7619376 Pt.321			
R-150B	Res., R. Audio 813 Plate	Same as R-149B.			Pt.322			
R-151	Pot., L. Audio 813 Bias	Same as R-138.			Pt.323			
R-152	Pot., R. Audio 813 Bias	Same as R-138.			Pt.324			
R-153*	Res., L. Audio 5736 Grid	31,000 ohms, 35 W.	Type 4-1/8 T. Ferrule 312	46	Pt.325	2	2	1
R-154	Res., R. Audio 5736 Grid	Same as R-153.			Pt.326			
R-157	Same as R-9				Pt.329			
R-158	Same as R-9				Pt.330			
R-159	Same as R-9				Pt.331			
R-160	Same as R-9				Pt.332			
R-161	Same as R-9				Pt.333			
R-162	Same as R-9				Pt.334			
R-165*	Res., 1.5 KV. Rect.	10,000 ohms, 140 W.	JAN-R-26 RW10G103		Pt.337	5	2	1

DRAWING NO. 50-B-8600 SHEET 31 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ______

STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
R-166A	Res., 3 KV. Rect.	Same as R-165			Pt. 338			
R-166B	Same as R-165				Pt. 339			
R-166C	Same as R-165				Pt. 340			
R-166D	Same as R-165				Pt. 341			
R-167*	Res., M-108, Multi.		S#1158215	1	Pt. 342	3		
R-168*	Res., M-116, Multi.		S#1158211	1	Pt. 343	4		
R-169	Res., M-117, Multi.	Same as R-168			Pt. 344			
R-170	Res., M-118, Multi.		S#1158212	1	Pt. 345	1		
R-171	Res., M-123 Multi.		S#1158220	1	Pt. 346	1		
R-175	Res., M-111 Multi.	Same as R-168			7619847 Pt. 541			
R-176	Res., M-112 Multi.	Same as R-168			Pt. 542			
R-177*	Res., L. Audio 5736 Bias U. V. Relay Divider	3100 ohms, 20 W.	JAN-R-26 RW15G312		Pt. 543	2	1	
R-178	Res., R. Audio 5736 Bias U. V. Relay Divider	Same as R-177			Pt. 544			
R-179	Res., L. Audio 5736 Cathode	5,000 ohms, 50 W.	JAN-R-26 RW13G502		Pt. 545	1	1	
R-180	Res., R. Audio 5736 Cathode	Same as R-179			Pt. 546			
R-184*	Res., L. Audio 813 Screen	Nominal resistance 10,000 ohms, 2 watts (used only in matched pair with R-185)	9,000 to 11,000 ohms select from S#1471264		7619847 Pt. 550	One matched pair	One matched pair	One matched pair
R-185	Res., R. Audio 813 Screen	Nominal resistance 10,000 ohms, 2 watts (used only in matched pair with R-184)	Matched within 500 ohms of R-184 select from S#1471264		Pt. 551			
R-186*	Res., L. Audio 813 Cathode	1,600 ohms, 40 W.	JAN-R-26 RW14G162	1	Pt. 552	2	1	1
R-187	Res., R. Audio 813 Cathode	Same as R-186			Pt. 553			
R-188*	Res., Audio 813 Bias Divider	16,000 ohms, 40 watts.	JAN-R-26 RW14G163-WL40W		Pt. 554	1	1	
R-189*	Res., Left Audio 5736 O.L. Relay Coil Shunt	33 ohms, ± 20%, 2 W.	JAN-R-11 RC40AE-330M		Pt. 555	2	5	2
R-190	Res., Right Audio 5736 O.L. Relay Coil Shunt	Same as R-189			Pt. 556			
R-193*	Res., 807 Screen Suppressor	100 ohms, 1 watt.	S#1472447	1	Pt. 559	2	5	1
R-194	Same as R-193	Same as R-193			Pt. 560			
R-196	Res., R.F. 5736 Grid Suppressor	50 ohms, 37 W. Globar	Type CX 1" x 4"	9	Pt. 562	1	2	1
R-197*	Res., Audio 5736 Grid Suppressor	100 ohms, 2 W.	S#1471240	1	Pt. 563	2	5	2
R-198	Same as R-197	Same as R-197			Pt. 564			
R-199*	Res., Audio 807 Screen Shunting	330 ohms, 2 W	S#1471246	1	7619847 Pt. 565	2	5	2
R-1105	Resistor - Audio 807 Screen Shunting	Same as R-199			7619847 Pt. 571			
R-1106	Res., 1500 V. Supply Decoupling	5000 ohms, 40 W.	JAN-R-26 RW-14G502		PT. 572	1	1	
R-1107*	Resistor - Audio 807 Screen	Nominal resistance 220,000 ohms, 2 W. (used only in matched pair with R-1108)	215,600 to 224,400 Select from S#1471280 ~~Select from S#1471262~~		PT. 573	One matched pair	One matched pair	One matched pair
R-1108	Res., Audio 807 Screen	Nominal resistance 220,000 ohms, 2 W. (used only in matched pair with R-1107)	Matched within 1100 ohms of R-1107 Select from S#1471280		PT. 574			

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PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ____ STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
R-1109*	Res., audio 807 plate load	10,000 ohms, 27 W.	JAN-R-26 RW13H103		7619847 Pt.575	4	2	0
R-1110	Res., audio 807 plate load	Same as R-1109.			Pt.576			
R-1111	Res., audio 807 plate load	Same as R-1109.			Pt.577			
R-1112	Res., audio 807 plate load	Same as R-1109.			Pt.578			
R-1113*	Res., audio 807 cathode	Nominal resistance 470 ohms, 2 W. (Used only in matched pair with R-1114).	465 to 475 ohms select from S#1471248		7619847 Pt.579	One matched pair	One matched pair	One matched pair
R-1114	Res., audio 807 cathode	Nominal resistance 470 ohms, 2 W. (Used only in matched pair with R-1113).	Matched within 5 ohms of R-1113 select from S#1471248		Pt.580		-	
R-1115	Hum Bucking Divider	25,000 ohms, 27 W.	JAN-R-26 RW13H253		55-A-8124 It.602	1		
R-1116	Hum Bucking Divider	1,000 ohms, 5 W.	S#1473357		It.603	1		
R-1117*	Pot. right voltage feedback control	5,000 ohms, 2 W.	Pt.19 7611594		It.604	1		
R-1118	Pot. left voltage feedback control	Same as R-1117			Pt.605			
R-1119*	Res., right audio feedback divider	Nominal resistance 18,000 ohms, 2 W. (Used only in matched pair with R-1120).	18,620 to 19,280 select from S#1473898		It.606	One matched pair	One matched pair	One matched pair
R-1120	Res., left audio feedback divider	Nominal resistance 18,000 ohms, 2 W. (Used only in matched pair with R-1119).	Matched within 900 ohms of R-1119 select from S#1473898		It.607			
		MODULATOR						
R-201	Same as R-9				7617688 Pt. 49			
R-202	Same as R-9				Pt. 50			
R-203	Same as R-9				Pt. 51			
R-204	Same as R-9				Pt. 52			
R-205*	Res., Mod. L. O.L. relay shunt	1.0 ohm, 50 W.	JAN-R-26 RW12H1R0		Pt. 53	4	2	1
R-206	Same as R-205				Pt. 54			
R-210-1	* Res., F.B. Divider	20,000 ohms, 120 W.	JAN-R-26 RW11G203		7617688 Pt. 58	26	5	2
R-210-2	Same as R-210-1				Pt. 59			
R-210-3	Same as R-210-1				Pt. 60			
R-210-4	Same as R-210-1				7617689 Pt. 61			
R-212-1	Same as R-210-1				Pt. 71			
R-212-2	Same as R-210-1				Pt. 72			
R-212-3	Same as R-210-1				Pt. 73			
R-212-4	Same as R-210-1				Pt. 74			
R-214*	Res., Mod. L. Pl. current limiting	Type "M" resistor, 25 ohms, 5.5 amps., continuous rating	S#1239114	1	7617689 Pt. 84	2	2	1
R-215	Same as R-214				Pt. 85			
R-217*	Res., Mod. L. Plate suppressor	15 ohms, ± 20%, 39 W., at 3W./Sq. In. "Globar"	Type - CX 1" x 4-1/2	9	Pt. 87	6	6	4
R-218	Same as R-217				Pt. 88			

INSTRUCTION BOOK

Type 50HG-2

AMPLITUDE MODULATED BROADCAST TRANSMITTER

Westinghouse Electric Corporation

I.B. 81-120-2

I.B. 81-120-2 A

INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

DUSENBURY

LAMMERS

westinghouse

atlanta Pl. 1641

Pete Allen

Industrial Prog

Mr. Strong

Mr. Pemberton –

Type 50HG-2

Max Owenby

AMPLITUDE MODULATED BROADCAST TRANSMITTER

Mr. H.J. Morrison (JUD)

BALTIMORE

EDMONSON 6-230

Phelps – Engineer

WESTINGHOUSE ELECTRIC CORPORATION

ELECTRONICS AND X-RAY DIVISION BALTIMORE, MARYLAND

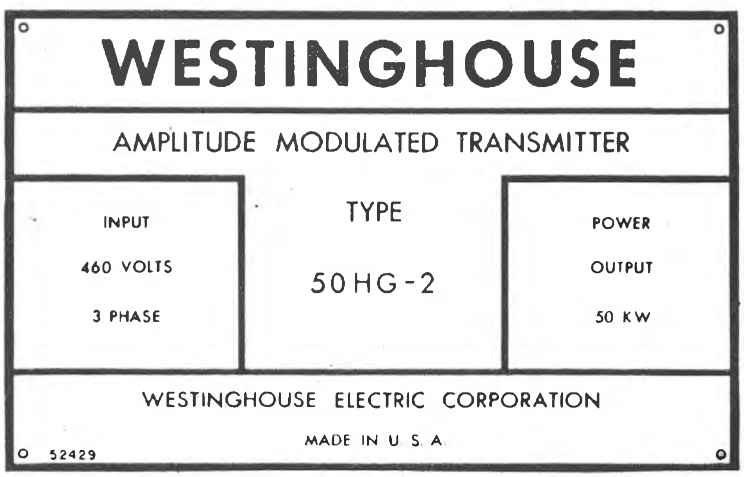
SUPERSEDES I.B. 81-120-2

EFFECTIVE JULY 1953

Printed in U.S.A.

SPECIAL INQUIRIES

When communicating with Westinghouse in reference to the equipment described by this Instruction Book, include *all* information contained on the nameplate attached to the equipment. A typical nameplate is illustrated below for your convenience. Also, to facilitate replies when particular operational data is desired, be sure to state fully and clearly the information wanted. Please address all communications to the nearest Westinghouse District Office.



MP-140

WARNING!

HIGH VOLTAGE!

THE VOLTAGES ENCOUNTERED IN THIS EQUIPMENT ARE DANGER OUS TO HUMAN LIFE. TO BE SAFE, DISCONNECT THE POWER SOURCE WHEN SERVICING ANY OF THE UNITS.

The use of high voltages which are dangerous to life is necessary for the operation of of the electronic equipment covered by these instructions. While all practical safety precautions have been incorporated in the design of the equipment, they are not infallible; therefore, certain precautionary measures must be carefully observed by the operating personnel during the operation, inspection and maintenance of the equipment.

KEEP AWAY FROM LIVE CIRCUITS -- Do not reach into an enclosure or handle any portion of the externally installed units without first removing the power and grounding the circuit.

OBSERVE EXTREME CAUTION WHEN SERVICING OR ADJUSTING THE EQUIPMENT -- Do not connect any apparatus external to the enclosure, to circuits within the equipment, or apply voltages to the equipment for testing purposes while any non-interlocked portion of the shielding or enclosure is removed or opened. Connection of apparatus external to the enclosure in addition to being a hazard may cause failure of the interlock circuits.

DO NOT TAMPER WITH INTERLOCKS -- Under no circumstances should any door or safety interlock be removed or short circuited, nor should interlocks be relied upon for removing voltages from the equipment.

DO NOT DEFEAT THE MECHANICAL INTERLOCK SYSTEM BY THE USE OF DUPLICATE KEYS.

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LIST OF SUPPLEMENTS

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Modulation Transformer and Reactor	(W) I.B. 399950-15
Automatic Induction Regulator (If Used)	(W) I.B. 5521-A
Switchgear	(W) I.B. 35-225-1A
CSP Lifeline Motor	(W) I.L. 3100-1
DN Contactor - Size 2	(W) I.L. 2303-C
DN Contactor - Size 00	(W) I.L. 3283-A
CV Relay	(W) I.L. 41-291-C
SC Relay	(W) I.L. 41-380-D
SG Relay	(W) I.L. 41-350-C
MG-6 Relay	(W) I.L. 41-321
TK Relay	(W) I.L. 41-366-1
KA-24 Meter	(W) I.L. 43-230-A
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Lapp Capacitor	Lapp Insulator Co. Bulletin 266
Variac Type V5H	General Radio Co. Operating instructions V-5 Series VARIACS
Pliotron Tube WL-5671	(W) Data Sheet, WL-5671
Pliotron Tube WL-5736	(W) Data Sheet, WL-5736
Pliotron Tube WL-813	(W) Data Sheet, 86-176
Pliotron Tube WL-807	(W) Data Sheet, 86-170
Pliotron Tube WL-802	(W) Data Sheet, 86-165
Railway Industrial Engrg	Bulletin No. 1725
Switchgear Renewal Parts	(W) Renewal Parts Data for PHZF-91538

INTRODUCTION

The Westinghouse Type 50HG-2 Transmitter is a high-level-modulated standard broadcast transmitter with nominal RF power output of 50 kw. It incorporates the latest developments in electrical and mechanical design and meets all the operational requirements for a modern broadcast transmitter. Years of experience with the problems of the broadcaster has resulted in a Westinghouse transmitter designed for easy installation and economical operation and maintenance.

The following summary of electrical and mechanical specifications, and list of major components will serve to introduce the Westinghouse 50HG-2 Transmitter to the new owner.

ELECTRICAL SPECIFICATIONS

Type of Emission	A-3
Power Output (to transmission line or common point)	53 kw, max.
Frequency Range (single specified frequency)	
Lower Limit	540 kc
Upper Limit	1600 kc
Frequency Stability	±10 cps
Modulation Capability (50 to 7500 cps inclusive)	100 percent
Carrier Shift (100 percent modulation with 400 cps sine tone)	less than 5 percent
Audio Distortion (0-95 percent modulation from 50 to 7500 cps, including all harmonics up to 45 kc)	less than 3 percent
Modulation	high level Class B
Frequency Response (30 to 10,000 cps)	±1 db
Carrier Hum	better than 60 db below 100 percent modulation
Audio Input Level (100 percent modulation at 1000 cps)	10 ±2 dbm
Power Line Requirements (see note 1 below):	
Incoming Power Lines	see note 2
Line volts	460 volts
Phase	3 phase
Frequency (see note 3 below)	60 cps
Power Input for 0 percent modulation	103.5 kw
Power Input for average modulation (25 percent)	113 kw
Power Input for 100 percent modulation	147 kw
Power Factor (approximate)	90 percent
Maximum Permissible Power Line Variation:	
Frequency	±2 percent
Deviation of full load phase-to-phase voltage from 460 volts	±5 percent
Deviation of full load phase-to-phase voltage from average for the three phases	±2 percent
Regulation	±2 percent
Total permissible variation, including regulation from no load to full load, in percentage of 460 volts	±5 percent
Crystal Heater Power Supply Requirements:	
Line volts	115 volts
Phase	1 phase
Frequency	50-60 cps
Power	30 watts
Output Impedance (one side of output coil grounded)	40 to 250 ohms
Ambient Temperature Operating Range	±5°C to ±45°C
Distribution Bus Regulator	Automatically maintains 230 volts for an input variation of approximately ±10 percent
Main Rectifier Regulator (when furnished)	Automatically maintains any setting point in range of 70 to 100 percent of full voltage output for an input variation of approximately ±5 percent

Note 1: The power requirements specified in this section do not include provision for the lights and convenience outlets in each transmitter cubicle. A 115 volt, single phase supply of approximately 1 kw capacity should be available.

Note 2: Lightning and switching surges on the incoming power lines can damage transmitter equipment. Therefore, it is suggested that the incoming circuits be examined for the probability of such transients and protective devices installed as necessary.

As a minimum requirement, three lightning arrestors, equal to Westinghouse style 1254825 should be used on the incoming 460 volt line, one between each line and ground.

Note 3: The Type 50HG-2 Transmitter can be supplied for operation with a 50 cycle supply.

MECHANICAL SPECIFICATIONS

Description	Dimensions in Inches			Approximate Weight in Pounds
	Height	Depth	Width	
Power Control Cubicle	84	54-1/4	48-1/4	2225
Exciter Cubicle	84	54-1/4	48-1/4	2370*
Modulator Cubicle	84	54-1/4	48-1/4	2100*
Left Power Amplifier Cubicle	84	54-1/4	48-1/4	1920*
Center Power Amplifier Cubicle	84	54-1/4	48-1/4	1550
Right Power Amplifier Cubicle	84	54-1/4	48-1/4	1920*
Switchgear Cubicle	90-3/8	48	20	1225
Rectox Rectifier and Frame, each of two	64	28	41	350
Modulation Transformer	78-7/8	46-1/2	56	5700
Filter Capacitor, each of three	29-3/16	7-1/4	18	75
Filter Reactor	17-1/2	12-3/4	11-3/4	175
Distribution Bus Regulator, each of two	30-3/4	10-1/2	10	250
Audio Filter Capacitor	5-3/4	6-1/2	5	5
Modulation Reactor	67-1/2	29-1/2	40-1/2	2450
Auxiliary Audio Choke	16-1/2	22	18	25
Modulation Coupling Capacitor	26-1/2	18	7-1/2	75
Blower	70-5/16	65-5/8	49-1/4	920
Blower Motor and Base	15	22-1/2 †	20	250
Control Box	24-3/8	5-5/8	9	25
RF Current Transformer-Rectifier	12	12	8	25
Main Rectifier Transformer	75	50	56	3300
Main Rectifier Regulator (when furnished)	75-5/8	43-3/4	24	3325
Distribution Bus Transformer, each of three	22-1/8	14-3/4	16-3/4	235

* Weight does not include tubes. † Includes 4-3/8 inch shaft dimension.

UNITS OF THE COMPLETE TRANSMITTER

The Westinghouse Type 50HG-2, 50 KW Standard Broadcast Transmitter consists of the following individual units:

	Power Supply 60 cps	Power Supply 50 cps
1. One Power Control Cubicle	S#1475118	S#1475121
2. One Exciter Cubicle (less tubes and crystal oscillators and crystals)	S#1474773	S#1474780
3. One Modulator Cubicle (less tubes)	S#1474774	S#1474781
4. One Left Power Amplifier Cubicle (less tubes)	S#1475119	S#1475122
5. One Center Power Amplifier Cubicle.	S#1474775	S#1474782
6. One Right Power Amplifier Cubicle (less tubes)	S#1475120	S#1475123
7. Two Type FA Crystal Oscillators for Exciter Cubicle	S#1472593	S#1472593
8. Two crystals, Type TMV-129B for Crystal Oscillators	Dwg. 7431159	Dwg. 7431159
9. One Rectox Rectifier and Frame for Power Amplifier	S#1474566	S#1474566
10. One Rectox Rectifier and Frame for Modulator	S#1474565	S#1474565
11. One Modulator P.S. Filter Reactor	KR-7822469	KR-7822469
12. One Main Rectifier Plate Transformer	S#1646118	S#1646118
13. One Main Rectifier Induction Voltage Regulator (Optional Equipment)	S#1486437	S#1476438
14. One Modulation Transformer	S#1483785	S#1483785
15. One Modulation Reactor	S#1453629	S#1453629
16. One Modulation Coupling Capacitor	S#1081020	S#1081020
17. One Auxiliary Audio Choke	S#1472317	S#1472317
18. Audio Filter Capacitor	S#1471665	S#1471665
19. Three Distribution Bus Transformers	S#1483783	S#1483783
20. Two Distribution Bus Induction Voltage Regulators	S#1486439	S#1486439
21. One Switchgear Cubicle.	S#1474865	S#1474864
22. P.A. and Modulator Filter Capacitors (Three)	S#1474519	S#1474519
23. One Blower	Dwg. 7426385 Pt. 11	Dwg. 7426385 Pt. 11
24. One Blower Motor	S#1442202	S#1442202
25. One Control Box for Blower Motor.	Dwg. 7426385 Pt. 10	Dwg. 7426385 Pt. 10
26. One Set of End Radii (to suit installation)	Dwg. 7718801 Pt. 21	Dwg. 7718801 Pt. 21
27. One RF Current Transformer	S#1471694A	S#1471694A
28. 60 Feet of RF Cable	RG-17/U	RG-17/U
29. 70 Feet of RF Cable	RG-62/U	RG-62/U
30. One Installation Kit (consisting of touch-up paint and miscellaneous hardware)	Dwg. 7427705	Dwg. 7427705
31. One complete set of Operating Tubes.	Dwg. 7503652 GR. 1	Dwg. 7503652 GR-1
32. Two Instruction Books	IB 81-120-2A	IB 81-120-2A
33. Westinghouse Nameplate	S#1472812	S#1472812
34. One Station Call Letter Plate	Dwg. 7718801 Pt. 25	Dwg. 7718801 Pt. 25

Note 1: Interconnection wiring material is not furnished as a part of the Type 50-HG-2 Transmitter.

Note 2: Although not furnished as a part of the transmitter, the following accessory equipment can be supplied by Westinghouse:

Antenna Phasing Equipment
Transmitter Control Console S#1472247
Precipitron Air Filter
Main Rectifier Induction Voltage Regulator
Spare Blower, Motor and Control Box
25 KW Power Cutback Facility
10 KW Power Cutback Facility
Spare Tubes
Spare Parts

TUBE COMPLEMENT

The following tubes are supplied with the transmitter:

Qty.	Tube Type
4	WL-5671
4	WL-5736
4	WL-813
3	WL-807
2	WL-802
2	OD3/VR-150
3	RCA-1V

These tubes are used as follows:

Location	Tube Type	Quantity
Right Power Amplifier	WL-5671	1
Left Power Amplifier	WL-5671	1
Exciter, RF	WL-5736	2
Exciter, RF	WL-813	2
Exciter, RF	WL-807	1
Exciter, Oscillator	WL-802*	2
Exciter, Oscillator	OD3/VR-150*	2
Center Power Amplifier	RCA-1V	2
Antenna House	RCA-1V	1
Modulator	WL-5671	2
Exciter, Audio	WL-5736	2
Exciter, Audio	WL-813	2
Exciter, Audio	WL-807	2

* These tubes are part of the oscillator units. One complete spare oscillator is mounted in the Exciter.

DESCRIPTION

The purpose of this section is to familiarize the station engineers with the electrical and mechanical details of the 50HG-2 transmitter.

The text is in two sections: the Electrical Description, and the Mechanical Description. Although there are no specific references to the photographs, they are so identified that they may be used to further clarify the text.

ELECTRICAL DESCRIPTION

1. Radio Frequency Circuits

The radio frequency system of the transmitter consists of the following stages:

a. A WL-802 crystal oscillator with an OD3/VR-150 regulator tube for stabilizing the screen voltage.
b. A WL-807 buffer amplifier.
c. The first amplifier, two WL-813 tubes, in parallel.
d. The second, or driver amplifier, two WL-5736 tubes, in parallel.
e. The final amplifier, two WL-5671 tubes, in push-pull.

The Type FA Crystal Oscillator is an individual plug-in unit containing the TMV-129B crystal and heater assembly, the oscillator and voltage regulator tubes, and the associated circuitry. Frequency stability is maintained by the use of a highly stable quartz crystal in an electron-coupled circuit. The crystal is kept at a constant temperature in an automatic oven. Approximately 15 watts of 115 volt, single phase, power is required for operation of the oven. To further insure stability, a voltage regulator tube is used in the screen supply.

Two complete crystal oscillator units are included with the transmitter. A relay, operated by a switch on the front panel of the Exciter Cubicle, allows transfer from one unit to the other without noticeable interruption of carrier. The unit not in use is constantly in readiness with crystal heater and tube filaments energized.

The buffer stage uses a lightly loaded WL-807 tube as a Class C amplifier. The grid circuit is untuned and no neutralization is required. A cathode current meter is included. Cathode bias is provided to protect the tube in the event of excitation failure.

The first radio frequency amplifier consists of two WL-813 tubes in parallel as a Class C amplifier. The grid circuit is untuned and is capacitively coupled to the tuned plate circuit of the buffer stage. Grid and plate current meters are provided. The plate circuit is tuned by a motor-driven capacitor. No neutralization is required. Cathode bias protects the tubes in the event of excitation failure. A loop coupled to the plate inductor is provided for feeding energy to a frequency monitor.

The second, or driver amplifier, uses two parallel WL-5736 tubes as a Class C amplifier. The grid circuit is connected to a tap on the shunt-fed plate tank of the preceding stage. This tap can be adjusted to provide the proper grid drive. Neutralization is accomplished by a variable vacuum capacitor connected between the plates of the WL-5736 tubes and the plate tank inductor of the preceding stage. A motor-driven variable compressed-gas capacitor is used in the plate tank circuit. Total grid current and individual plate currents are metered. The total plate current is indicated by a large scale instrument. Fixed bias is supplied by an individual power supply.

The final amplifier is a Class C stage employing two WL-5671 tubes in push-pull. These tubes have thoriated tungsten filaments. The grid tank circuit is inductively coupled to the plate tank circuit of the driver stage. The coupling inductor is on the same coil form as the plate inductor of the driver stage, and has a motor-driven variable tap for coupling adjustment. An individual bias supply is provided for each half of the push-pull amplifier. Grid current and bias voltage for each tube is individually metered. A motor-driven variable compressed-gas capacitor is used in each grid circuit.

The plate tank circuit of the power amplifier is shunt fed in order that the two motor-driven compressed-gas tank capacitors may be mounted at ground. Plate voltage and individual plate currents are metered. Inductive neutralization is used.

The output coupling coil is mounted inside the final tank inductor and has a motor-driven variable tap at ground potential. A Faraday shield is between the final tank inductor and the output coupling coil for suppression of harmonics. A thermocouple radio-frequency ammeter is in series with the output lead. This instrument is mounted behind a glass window in the Center Power Amplifier Cubicle and may be shunted out of the circuit by a switch on the lower front panel. A rectifier-type meter is provided for remote indication of the output current.

A spare tube socket and filament transformer are provided for each of the operating tubes in the final amplifier. Substitution of the spare tube for its associated operating tube can be accomplished quickly.

RF energy for a modulation monitor may be obtained from the power amplifier tank circuit by tapping on to the tank coil end ring at a suitable point.

2. Audio Frequency Circuits

The audio frequency system of the transmitter consists of the following push-pull stages:

a. First audio, two WL-807 Class A.
b. Second audio, two WL-813 Class A.
c. Third audio, two WL-5736 Class AB.
d. Modulator, two WL-5671 Class B.

The first audio stage contains a line-to-grid input transformer which can be connected for either a 600 or a 150 ohm line. This stage has individual cathode bias for each tube. The total cathode current is metered. The plate circuit is resistance coupled to the following stage.

The second audio stage has individual bias adjustment for both tubes and is resistance coupled to the following stage.

The driver audio stage is a cathode follower, with an individual bias supply for each tube. Instruments are included for indication of cathode current, grid current and bias voltage for each tube. Cathode current in each tube is indicated by individual large scale instruments. This stage is directly coupled to the grids of the modulator tubes.

The Class B, high-level modulator stage employs two WL-5671 tubes in push-pull. These tubes have thoriated tungsten filaments. Individual bias supplies, adjustable and with separate indicating instruments, are used. Large scale instruments are supplied for plate voltage and individual indication of cathode current, and filament voltage, for each tube.

A spare tube socket and filament transformer are provided for each of the modulator tubes.

The audio power is fed to the final radio frequency amplifier across a modulation reactor, making it unnecessary to pass the plate current for this stage through the modulation transformer. An equalizer circuit stabilizes the modulator load impedance to permit the application of inverse voltage feedback.

3. Power Supplies

All power supplies in the transmitter use Rectox rectifiers. Rectox units have essentially unlimited life unless subjected to abuse. All except the two main rectifier supplies obtain primary power from a bus which is maintained at constant voltage by means of two automatic induction regulators connected in open delta. The regulators automatically maintain a constant output voltage of 230 volts for an input supply variation of approximately plus or minus 10 percent. Manual regulator control is also provided. Primary power for filament supplies is also obtained from this regulated distribution bus.

The two main rectifier supplies use a common transformer. By means of mechanically interlocked contactors inside the case of the transformer, the primary can be connected in Wye or Delta for tuning or full power output. Switching any of these contactors is accomplished by an OFF-TUNE-ON switch on the panel of the Center Power Amplifier.

The individual power supplies included in the transmitter are listed and briefly described below:

a. 400 Volt Supply -- this is a single phase, bridge rectifier. It supplies plate and screen voltage to the crystal oscillator and the RF buffer. It also supplies screen voltage to the first and second audio stage and bias to the second audio stage.

b. 1500-3000 Volt Supply -- this is a 3000 volt, three phase, full-wave rectifier and a 1500 volt, three phase, half-wave rectifier. The 1500 volt supply furnishes plate and screen voltage for the first RF amplifier stage and plate voltage for the first audio amplifier stage. The 3000 volt supply furnishes power for the audio and RF driver stages and it also supplies plate voltage for the second audio stage.

c. Main Rectifier Supplies -- These are two separate high voltage, three phase, full-wave rectifiers using a common transformer. One rectifier supplies approximately 11,500 volts d-c to the power amplifier; while the other supplies approximately 13,500 volts to the modulator.

d. Exciter RF Bias Supply -- this is a single phase, bridge rectifier. It supplies bias for the RF driver stage.

e. Audio Driver Bias Supplies -- these are two adjustable single phase, bridge rectifiers. They supply bias for the audio driver stage.

f. Modulator Bias Supplies -- these are two identical single phase, bridge rectifiers. They supply bias for the modulator, one for each of the two operating tubes. Output voltage of each of these rectifiers is controlled from the front panel of the Exciter Cubicle.

g. Power Amplifier Bias Supplies -- these are two identical single phase, bridge rectifiers. They supply holding bias for each of the two operating tubes, and they furnish the fixed portion of the combination fixed and self-bias required to maintain modulation linearity.

4. Control Circuits

Controls for all necessary operational circuit and tuning adjustments are provided on the front panels of the cubicles. The associated indicating instruments and lights are coordinated with these controls. Individual switches are provided for all power circuits. These switches are sequence interlocked to prevent possibility of damage to the transmitter components, especially the tubes, which might result from the application of power to a circuit in incorrect sequence. Normally, the transmitter is put into operation by energizing each circuit separately. If desired, however, one switch control of the entire transmitter is possible. The transmitter can be shut down completely by opening the first switch in the sequence which controls power for the filaments and blowers, leaving the other switches in the "on" position. Then to return the transmitter to operation, it is necessary only to close the first switch; the other circuits will be energized in proper sequence and timing.

The transmitter includes a complete supervisory control system which provides indication of abnormal conditions such as overloads and open interlocks. This system is coordinated with the protection and safety provisions described in the following section. Overloads are registered even if they are only momentary; lock-in supervisory relays energize circuit identifying indicator lamps which remain lighted until the operator resets the relays by means of a reset switch on the control panel. This feature assists in locating trouble which can be investigated during normal maintenance period, decreasing future outages.

The supervisory control system includes individual indicator lamps for the following:

400 Volt Overload
1500-3000 Volt Overload
Power Amplifier Rectifier DC Overload
Modulator Rectifier DC Overload
Main Rectifier AC Overload
813 RF Overload
Left 5736 RF Overload
Right 5736 RF Overload
Left Power Amplifier Overload
Right Power Amplifier Overload
Left 813 Audio Overload
Right 813 Audio Overload
Left 5736 Audio Overload
Right 5736 Audio Overload
Left Modulator Overload
Right Modulator Overload
Antenna Arc-over
Carrier Interruption
Power Control Door Interlock
Exciter Door Interlock
Modulator Door Interlock
Left Power Amplifier Door Interlock
Center Power Amplifier Door Interlock
Right Power Amplifier Door Interlock
Rectifier and Filter Door Interlocks
Antenna Phasing Door Interlock
Search Relay
Supervisory Relay Test
Spare
High Voltage Enclosure Door Interlock

The search relay can be connected into any one of the other transmitter protection systems that are not listed above in order to check the operation of that system in searching for faults. The spare relay is provided for such uses as an antenna house interlock indicator, etc.

The major switching functions, together with their associated indicators, can be duplicated at a transmitter console.

Two clocks are provided. One registers Outage Duration and the other registers the time at which outage occurred.

5. Overload and Safety Protection

The basic overload protection in the Type 50HG-2 Transmitter is designed around two draw-out-type Westinghouse DB-25 Air breakers in the Metal-Enclosed Switchgear Cubicle. These breakers have their own a-c trip coils. One breaker supplies the main rectifiers. The other supplies all other power except that for the breaker trip circuits, blowers, crystal heaters, cubicle lights, and convenience outlets in the transmitter cubicles.

Protection is provided by fast-acting relays and circuit breakers. Any overload, undervoltage, or open interlock will remove the primary power from the supply or supplies involved. The design of the transmitter provides for a choice of automatic or manual return of the transmitter to operation.

With the OVERLOAD PROTECTION CONTROL set in the AUTO position, an overload will trip the set off but power will be reapplied immediately. In the event of successive overloads, the transmitter will trip off three times but, after the third time, power will not be reapplied for a predetermined period of time, normally set for five seconds. After this delay time, power will be automatically reapplied and the transmitter returned to normal operation. If the overload condition persists, the sequence will be repeated until the transmitter is turned off manually.

With the OVERLOAD PROTECTION CONTROL in the MANUAL position, any overload which trips the 400 volt supply off will leave the transmitter off until the operator resets the control. Any other overload will trip the transmitter off three times, if the condition persists, and then leave it off until reset by the operator.

A partial list of the overload and undervoltage relays in the transmitter is given below:

Undervoltage relays, a-c:
- Main rectifier
- Distribution bus
- Filament

Undervoltage relays, d-c:
- Exciter bias supply
- Left audio driver bias supply
- Right audio driver bias supply
- Left modulator bias supply
- Right modulator bias supply
- Left power amplifier bias supply
- Right power amplifier bias supply

Overcurrent relays, a-c:
- Distribution bus
- Main rectifier

Overcurrent relays, d-c:
- 400 volt supply
- 1500-3000 volt supply
- Power amplifier supply
- Modulator supply
- RF 813 stage
- Left 5736 RF tube
- Right 5736 RF tube
- Left modulator tube
- Right modulator tube
- Left power amplifier tube
- Right power amplifier tube
- Left 813 audio tube
- Right 813 audio tube
- Left 5736 audio tube
- Right 5736 audio tube

De-ion a-c thermal overload breakers:
- Exciter filaments
- Left power amplifier filament No. 1
- Left power amplifier filament No. 2
- Right power amplifier filament No. 1
- Right power amplifier filament No. 2
- Left modulator filament No. 1
- Right modulator filament No. 2
- Left modulator filament No. 3
- Right modulator filament No. 4
- Switchgear control bus
- Panel lights
- Transmitter control bus
- Bus regulators
- Audio bias
- RF bias
- 400 volt supply
- 1500-3000 volt supply

Other relays employed in the control and supervisory circuits are the time-delay, auxiliary supervisory, stepping, etc., which have not been classified above.

In the entire transmitter there is only one fused circuit affecting operation. That circuit supplies closing power to the distribution bus breaker.

Protective provisions not mentioned above which are included in the transmitter are air interlocks, door interlocks, and the Antenna Arc-Interrupter Unit.

Every reasonable precaution for the safety of personnel is incorporated in the design of the transmitter. All components except those to be installed in the power room are of the dead-front type. The switchgear cubicle uses draw-out type breakers. All cubicle doors which allow access to dangerous potentials are electrically interlocked. In addition, the cubicles are provided with grounding sticks and with automatic mechanical shorting switches which ground dangerous voltages when access doors are opened. It is possible to extend the interlock system to include electrical interlocks on vault doors, phasing cubicle doors, antenna tuning houses, and any other enclosure which the purchaser may desire to protect. The purchaser may also use the keys from the switchgear as the basis for a mechanical door interlock system. The necessary ordering information for such a system may be found under the SUPPLEMENTS in the back of this book.

MECHANICAL DESCRIPTION

The six transmitter cubicles have welded steel frames and aluminum panels. Each cubicle has four leveling screws. A detachable wiring trough is built into the lower rear of each cubicle, thus providing a full length wiring trough for the interconnection cables. Full length, full width front and rear doors are provided, and each door has a large, unobstructed window. Four large scale meters are mounted on an inclined panel on the top front of each cubicle. Instrument and control panels are illuminated, and each cubicle is equipped with a convenience outlet and a service light. All controls and indicators are completely identified. Details of particular cubicles are listed below:

1. Power Control Cubicle

This cubicle functions as the basic power control center for the entire transmitter, and contains the following:

- 1500-3000 volt supply
- De-ion switches
- Bus regulator controls
- Supervisory control relays and lamps
- Outage time clock
- Outage duration clock
- Blower controls
- Bias supply controls
- Miscellaneous relays

The four large meters at the top of the cubicle indicate Line Current, Line Voltage, Bus Current, and Bus Voltage. Line and Bus Phase Selector switches are provided for the meters. These switches also have an off position. The drop-down panel in the front door provides access to the supervisory control indicators and switches, the two outage clocks, the blower control switches and lamps, and the bias supply switches and indicators.

The front door provides access to all De-ion switches, the bus regulator controls, the meter switches and the elapsed hour meter, all of which are mounted just above the control panel. This door is not interlocked. The rear doors are electrically interlocked and a grounding switch automatically grounds the output of the 1500 volt and 3000 volt supplies.

2. Exciter Cubicle

This cubicle contains the driver sections for the modulator and the power amplifier stages. It also contains the following:

400 volt supply	Both type FA crystal oscillators
Exciter RF bias supply	First, second and driver audio stages
Both audio 5736 bias supplies	RF buffer, amplifier, and driver stages
Both modulator bias supplies	

The four large scale meters at the top of the cubicle indicate Left 5736 Audio Cathode Current, Right 5736 Audio Cathode Current, 3000 Volt Rectifier volts and 5736 RF Total Plate Current.

The drop-down panel in the front door allows access to the control panel. This panel, which is hinged to facilitate servicing, mounts the switches and lamps for the 400 volt supply, the 1500-3000 volt supply, and the crystal heater circuits. It also mounts the audio 5736 bias controls, the modulator bias controls, the 813 tank tuning motor drive control, the 5736 tank tuning motor drive control, and the crystal oscillator selector switch. In addition to the position indicating meters associated with the motor driven tuning elements, the following meters are mounted on this panel:

400 Volt Rectifier Voltage	Left Modulator Bias
1500 Volt Rectifier Voltage	Right Modulator Bias
Left 5736 Audio Driver Bias	Oscillator Cathode Current
Right 5736 Audio Driver Bias	807 RF Buffer Cathode Current
807 Audio Cathode Current	813 RF Amplifier Total Grid Current
Left 813 Audio Power Amplifier Cathode Current	813 RF Amplifier Total Cathode Current
Right 813 Audio Power Amplifier Cathode Current	5736 RF Driver Total Grid Current
Left 5736 Driver Grid Current	Left 5736 RF Driver Plate Current
Right 5736 Driver Grid Current	Right 5736 RF Driver Plate Current

The audio circuits are contained in the left side of the cubicle and the radio frequency circuits in the right side, viewed from the front. The controls and indicators on the control panel are correspondingly grouped. When the front door is opened, two smaller doors below the control panel and two tube compartments above the control panel are exposed. The low level audio stages are mounted on the inside of the lefthand door, and the low level RF stages are mounted on the inside of the righthand door. Components and wiring are accessible when these doors are open. The crystal oscillators are individual plug-in units.

The left compartment above the control panel houses the audio 5736 stage, and the right compartment houses the RF 5736 stage.

Audio and RF components mount at the rear on the side walls of the cubicle. A partial partition divides the left and right sides of the cubicle to isolate the audio circuits from the radio frequency circuits. All doors are interlocked, except the drop-down panel.

3. Modulator Cubicle

This cubicle contains four tube sockets and four filament transformers (two of each are spares), transfer switches, two feedback dividers, and two gas surge suppressor resistors. The four large scale meters at the top of the cubicle indicate Left Modulator Plate Current, Modulator Filament Volts, Modulator Plate Volts, and Right Modulator Plate Current.

The panel in the front door is fixed in position as there are no controls on this cubicle. On the upper part of this panel are mounted four indicator lamps and a switch. The lamps are "ON" indicators for Left Filament, Bias, Plate, and Right Filament. The switch is used to connect any one of the four filament transformers to the filament voltmeter at the top of the cubicle.

The lower part of the cubicle is used as the plenum chamber for the cooling air. The four filament transformers are mounted from the top of the cubicle, each one directly above its associated tube socket. The plate suppressor resistors and the plate transfer switches are mounted between each front and rear tube. The grid transfer switches are mounted on the side walls between each front and rear tube.

The plenum chamber is equipped with removable metal panels in the front and rear and these panels are interlocked with the air supply. The front and rear cubicle doors are interlocked. The electrical interlocks remove the modulator and driver plate voltage and bias voltages. The mechanical switch grounds the modulator plate supply.

4. Left Power Amplifier Cubicle

This cubicle encloses one side of the push-pull amplifier circuit. It contains one of the power amplifier tubes with provisions for mounting and switching a spare tube, two filament transformers, bias supply, plate choke, neutralizing coil, plate tank capacitor, grid tank circuit, grid leak, overload and under-voltage relays.

The four large scale meters mounted at the top of the cubicle indicate Left PA Filament Volts, Left PA Grid Volts, Left PA Grid Current and Left PA Plate Current.

The basic construction of the cubicle is identical to that of the Modulator Cubicle previously described.

The panel in the front door is fixed and mounts four indicator lamps and a filament voltmeter selector switch. The lower part of the cubicle is used as the air plenum chamber. It has two removable metal access panels which are interlocked with the air supply.

The filament transformers are mounted from the top of the cubicle directly above the tube sockets. The compressed gas plate tank capacitors are mounted in the plenum chamber with their tops protruding for connection to the tuning motor drive. The plate selector switch is mounted between the two tube sockets. A grid parasitic suppressor and a switch are mounted on both side walls near the grid connections to the tubes. The grid tank inductor and capacitor are mounted from the top of the cubicle. The plate choke is mounted in the plenum chamber and the neutralizing coil and its associated capacitors are mounted on the top of the plenum chamber.

The front and rear doors are both interlocked. The electrical interlocks remove the power amplifier and driver plate voltage and bias voltages when either door is opened. The mechanical switch grounds the plate supply.

5. Center Power Amplifier Cubicle

This cubicle is similar in general construction to the Power Control and Exciter cubicles previously described. It contains the power amplifier circuit controls, the plate tank inductor, and the output coupling inductor assembly with the Faraday shield. It also contains the Antenna Arc Interrupter control panel, current transformer-rectifier, the thermo-couple output ammeter and the remote output ammeter and its current transformer-rectifier.

The four large scale meters at the top of the cubicle indicate PA Plate Volts, Total PA Plate Current, RF Output Current, and Total Transmitter Input Power. The drop-down panel in the front door covers the control panel which mounts the following controls and indicators:

Antenna Arc Protector Control Switch and Indicators
Main Rectifier Control Switch and Indicators
Main Rectifier Regulator Selector Switch
Main Rectifier Regulator Automatic Voltage Control
Main Rectifier Regulator Manual-Raise-Lower Switch
Main Rectifier Regulator Indicators

The front door, which is not interlocked, provides access to the tuning controls and indicators mounted above the control panel. They are:

Left Grid Tuning
Right Grid Tuning
Ganged Grid Tuning
Left Plate Tuning
Right Plate Tuning
Ganged Plate Tuning
Driver Coupling
Output Coupling

The indicating instruments are:

Left Grid Current
Right Grid Current
Left Plate Current
Right Plate Current
Left Grid Tuning Position
Right Grid Tuning Position
Driver Coupling Position
Left Plate Tuning Position
Right Plate Tuning Position
Output Coupling Position

On the left, below the center control panel, is the plug-in Antenna Arc Interrupter Unit. To the right is a glass window behind which is mounted the output thermocouple RF ammeter. Near the window is a handle which operates a make-before-break shorting switch for the ammeter.

The interior of the cubicle is partitioned into three sections. The lower half houses the tank inductor, the output coupling inductor, and the output coupling motor drive. The current transformer-rectifier for the output ammeter and the current transformer-rectifier used in the antenna arc interrupter system are also mounted in this section. The upper half of the cubicle is divided into two sections by a vertical partition. These two sections are provided for housing optional antenna phasing components. Cutouts are provided on either side of the upper front panel for bringing out controls for these components.

The rear doors, which are electrically interlocked, provide immediate access to the upper two sections. In addition, removable panels in the lower front and rear of the cubicle allow access to the tank inductor compartment.

6. Right Power Amplifier Cubicle

This cubicle contains the other side of the push-pull amplifier circuit. It is identical to the Left Power Amplifier Cubicle in construction and contents except that the arrangement is reversed for symmetry.

7. Equipment External to the Cubicles

The equipment external to the transmitter cubicles consists of the Switchgear Cubicle, the Power Amplifier and Modulator Rectox Rectifier, the Filter Capacitors and Reactor, the Main Rectifier Induction Regulator if used, the two Bus Induction Regulators, the Main Rectifier Plate Transformer, the three Distribution Bus Transformers, the Modulation Transformer and Reactor, the Blower and Control Box, the Auxiliary Audio Choke, the Modulation Coupling Capacitor, and the

Arc Interrupter Current Transformer-Rectifier. The design of the transmitter provides for control of this equipment from the transmitter cubicles or from a console in the transmitter room. No oil-cooled components are used, making it unnecessary to provide a fire-proof vault.

The Switchgear Cubicle houses the two DB-25 air breakers and associated control system. The cubicle is standard Westinghouse Metal-Enclosed Switchgear and will match other switchgear the purchaser might obtain from Westinghouse for other purposes. This cubicle is intended for installation near the power room, preferably in the wall of the room with the front panel exposed so that manual operation or inspection is possible without entering the room.

The main Rectifier Filter Capacitors and Reactor are intended for installation in the power room.

The Auxiliary Audio Choke is an air core inductor intended for mounting on the wall of the power room.

The Blower is a Sturtevant Silentvane horizontal bottom discharge unit, clockwise rotation. The blower is equipped with a 7-1/2 horsepower motor. Adjustable-pitch sheaves are provided to allow adjustment of blower speed to suit the particular air duct installation. The Blower is intended for installation outside the power room, discharging into the room through the two Rectox units. A Wall Mounting Control Box is supplied for the Blower.

The Current transformer-rectifier used in connection with the Antenna Arc Interrupter system is intended for connection in series with the lead to the antenna in the antenna tuning equipment. It may be wall or bracket mounted.

RECEIVING, HANDLING, AND STORAGE

Any obvious shortages or damage should be noted by the customer on the waybill and claim made to the transporation company immediately. It is imperative that when unpacked, the equipment be inspected mechanically and electrically and a concealed damage claim submitted within the time limit set by the carrier.

INSPECTION OF THE SHIPMENT

To assist in inspecting and identifying the equipment, the 50HG-2 Transmitter Packing List, which follows, should be used. Note that some of the master items, such as the transmitter cubicles, are shipped with the more fragile components removed. These components will be found separately boxed.

All boxes of the shipment will have stencilled on the outside surface the following information:

1. The box number.
2. Westinghouse style numbers, if applicable.
3. Description and assigned symbol number of units and separately packed components.

Uncrating should proceed as follows:

1. Begin by selecting box No. 1.
   a. Place it in a position near the selected permanent location for this unit.
   b. Unpack carefully.
   c. Move the unit into place using the section on Handling Procedure as a guide.
2. Select box No. 2, etc.

To further assist in the inventory, identification and assembly of all units and component parts, the following references are submitted:

1. Units of the complete transmitter listed in the INTRODUCTION.
2. Photographs.
3. Wiring Diagrams.

HANDLING PROCEDURE

1. Lifting and Skidding

Each of the 50HG-2 transmitter cubicles is separately crated and is provided with a standard skid base. This skid base permits the use of rollers and fork lift.

Eye bolts are provided in the top of each cubicle permitting the use of an "A" frame or other hoisting device for lifting. Care should be used to insure that the pull on the eye bolts is largely vertical and that there is little horizontal strain because of the danger of breaking the bolts or bending the cubicle frame. Never use a short sling.

2. Uncrating the Cubicles

After the crated cubicle has been rolled into place, remove the crating from the cubicle, leaving the skid base intact. Use care in the removal of the crating to prevent scratching the finish. Next remove the lag screws from the clamps which secure the cubicle to the skid base. From this point the procedure for installation is described in the section on INSTALLATION.

STORAGE

The 50HG-2 transmitter may be stored in a clean, dry, well ventilated room for an indefinite period provided that the gas pressure is maintained in gas filled capacitors.

PACKING LIST

This list only includes units of a standard 50HG-2 Transmitter. Any accessory units ordered such as Antenna Phasing Cubicle, Console, etc., will appear on the packing lists included with the shipment.

1. Method of Packing

Some of the components within the cubicles such as transformers, chokes, capacitors, and resistors are tied down or supported by bracing or blocking. The interlocks are tied down or removed from their mountings and tied down. The contactors and relays are tied down and their moving contacts secured firmly with tape or blocked with paper. The fluorescent lamps are removed from their sockets, packed separately and placed within the cubicle. The ceramic lead-in bowls are removed, packed separately and placed within the cubicle. Sets of door keys are tied to the front doors, door keepers are removed, packed separately, and placed in the cubicle.

The fragile components which cannot be properly supported within the cubicle are removed from the cubicle and packaged separately as indicated in the packing list below.

Box #1 Power Control Cubicle - style 1475118
Box #2 Exciter Cubicle - style 1474773
Box #3 Exciter Cubicle components

a. Six Metal Rectifier units

RX-101	RX-104
RX-102	RX-105
RX-103	RX-106

b. Two RF coils
L-109 - WL-813 RF plate tank coil
L-112 - WL-5736 RF plate tank coil

c. Three Capacitors
C-122 - WL-5736 neutralizing capacitor
C-127 - WL-5736 plate coupling
C-129 - WL-5736 plate tank capacitor

Box #4 Exciter Cubicle components

a. Two crystal oscillator units - style 1472593
b. Two oscillator crystals - the resonant frequency to be specified by the customer

Box #5 Modulator Cubicle - style 1474774
Box #6 Modulator Cubicle components

a. Two feedback divider assemblies consisting of 4 resistors in each assembly.
R-210-1 to R-210-4
R-212-1 to R-212-4
b. Two voltage feedback capacitors, C-207 and C-209.
c. Two parasitic chokes, RL-201 and RL-202
d. Four micarta air ducts

Box #7 Left Power Amplifier Cubicle - style 1475119
Box #8 Left Power Amplifier components

a. One metal rectifier unit - RX-301
b. One WL-5671 plate RF choke - L-304
c. One WL-5671 plate blocking capacitor - C-319
d. One WL-5671 grid blocking capacitor - C-316
e. One WL-5671 grid tank coil - L-301
f. One WL-5671 neutralizing blocking capacitor - C-318
g. Two WL-5671 grid parasitic suppressors - RL-302 and RL-303
h. Two micarta air ducts

Box #9 One WL-5671 Neutralizing Coil - L-303
Box #10 Center Power Amplifier Cubicle - style 1474775
Box #11 Center Power Amplifier components

a. One WL-5671 plate tank coil - L-401
b. One Load current ammeter - M-415

Box #12 Right Power Amplifier Cubicle - style 1475120
Box #13 Right Power Amplifier components

a. One metal rectifier unit - RX-501
b. One WL-5671 plate RF choke - L-504
c. One WL-5671 plate blocking capacitor - C-519
d. One WL-5671 grid blocking capacitor - C-516
e. One WL-5671 grid tank coil - L-501
f. One WL-5671 neutralizing blocking capacitor - C-518
g. Two WL-5671 grid parasitic suppressors - RL-502 and RL-503
h. Two micarta air ducts.

Box #14 One WL-5671 neutralizing coil - L-503
Box #15 Switchgear cubicle - style 1474865, including levering mechanism and 2 instruction books
Box #16 Switchgear Cubicle component - Type DB-25 breaker - S-2001
Box #17 Switchgear Cubicle component - Type DB-25 breaker - S-2002
Box #18 Filter Reactor - Dwg. 7822469
Box #19 One PA Rectox Rectifier - style 1474566
Box #20 One Modulator Rectox Rectifier - style 1474565
Box #21 One Auxiliary Audio Choke - style 1472317, symbol L-1502
Box #22 One set of Lefthand End Radius
Box #23 One set of Righthand End Radius
Box #24 One installation kit per Dwg. 7427705
Box #25 One audio coupling capacitor - style 1081020, symbol C-1502
Box #26 One RF current transformer-rectifier for antenna arc interrupter-style 1471694A
Box #27 One set of vacuum tubes consisting of:

Qty.	Type
4	WL-5736
4	WL-813
3	WL-807
2	WL-802
2	WL-VR-150
3	RCA 1V

Box #28, 29, 30, 31, Contain one each of the WL-5671 thoriated tungsten tubes
Box #36, 37, 38 One each of the three distribution bus transformers - style 1483783, symbols T-1502A, B, C
Box #39 One main rectifier plate transformer - Dwg. 50-D-5771, symbol T-1501
Box #40 One modulation transformer - style 1483785, symbol T-1503
Box #41 Filter Capacitor - style 1474519, symbol C-1503
Box #42 Filter Capacitor - style 1474519, symbol C-1504
Box #43 One each of two Distribution Bus Regulators, style 1486439, symbol YR-1301
Box #44 One each of two Distribution Bus Regulators, style 1486439, symbol YR-1302
Box #45 One modulation reactor - style 1453629, symbol L-1501
Box #46 One blower fan and housing assembly per Dwg. 7426385, symbol BM #1
Box #47 Line Starter - Dwg. 7426385, Pt. 10
Box #48 One 7-1/2 HP motor - S#1442202 Two R-150 Belts - Dwg. 7426385, Pt. 8
Box #49 One Vari-pitch Texrope drive - Dwg. 7426385, Pt. 6
Box #50 One Sheave "Magic-Grip" - Dwg. 7426385, Pt. 7
Box #51 One Motor Base "Texslide #3" - Dwg. 7426385, Pt. 9
Box #52 One each of the items listed below:

a. Station call letters
b. Nameplate S#1472812
c. RG-17/U cable - 60 ft.
d. RG-62/U cable - 70 ft.
e. One Audio Filter Capacitor S#1471665, symbol C-1501

INSTALLATION PLANNING

The 50HG-2 Transmitter has been designed for maximum installation flexibility to fit various situations. This section on installation planning is intended to assist the architect, station engineers and consultants, in planning the building layout and should NOT be considered an exact specification.

BUILDING LAYOUT

The building plans must include provisions for:

The Transmitter Cubicles
The External Components
The Cooling System
Cables and Conduits

These items are discussed below.

1. Transmitter Cubicles

A suggested equipment layout for a single floor installation appears on figure 27, and for a two floor installation in figure 28.

These figures illustrate the installation of the six transmitter cubicles and their related external equipment.

The cubicle construction of the transmitter provides adaptability to meet individual installation requirements, but it is preferable to install the cubicles in line. If it is necessary to install the cubicles in a different arrangement, however, Westinghouse will assist the purchaser in planning the installation.

Figure 36 and figure 37 illustrate in-line layouts for the six cubicles. The first figure shows the cubicles built into the wall, and the other shows the cubicles installed free-standing. In either case, appropriate end radii are supplied to provide a finished appearance to the transmitter. The installed length of the six cubicles is 289-1/2 inches and the end radii add 12 inches, making a total of 301-1/2 inches. The cubicles are all 54-1/4 inches deep and a minimum clearance of 60 inches should be allowed in front of and behind the cubicles.

A typical 50HG-2 Transmitter cubicle is shown on figure 35. All six cubicles are identical in general construction and the basic installation requirements are the same. The transmitter room floor should be designed to carry a minimum dead load of approximately 4000 pounds per cubicle, although none of the transmitter cubicles actually weigh that much. The floor should include two parallel "I" beams, 50 inches apart, with top faces level with the floor. The cubicles are set on these beams. After all the cubicles are in place and leveled, they are bolted together and the two end cubicles are bolted down to the "I" beams to prevent creepage. Note that the wooden blocks shown on figure 35 are to prevent either the drill or the tap from contacting concrete.

2. The External Components

The equipment external to the six transmitter cubicles is illustrated on figure 33. All of the items on this figure are individual units and installation is mostly a matter of placement and electrical interconnection. However, it is necessary to install the Rectox Units directly in the main air stream.

The remaining power components should be installed in the power room, with the Switchgear Cubicle built into the wall and its front panel available from outside the room.

A suggested layout for these components is shown on figure 27 and figure 28.

3. The Cooling System

The basic air supply system is illustrated on figure 39. For a two floor layout, the supply air duct is the power room and for a single floor layout, it is a concrete trench built into the floor. A 26 by 26 inch hole in the floor beneath each cubicle allows the air to flow into the cubicles. See the Transmitter Floor Plan, figure 29.

The cubicles are constructed to direct the cooling air properly through the cubicles and out through the exhaust grills. An exhaust air duct with a cross-section area of at least 12 square feet is required above the cubicles. This duct should be equipped to allow for direct exhaust or for recirculation of air. A Typical Air Exhaust Duct is shown in figure 38. Recirculation of the air may be provided to assist in heating of the building in cool weather.

Two Blowers are installed so that either may be used to supply the cooling air in case a spare blower is purchased. Air Filters for use with these blowers may be installed directly at the intake to the blowers or in the walls of the building, depending on the situation. If desired, a Precipitron electronic air cleaner may also be used in connection with the air supply system. The Blower Outline showing overall dimensions appears on figure 34.

The Rectox Units must be installed in the air stream from the Blowers. These units are constructed to facilitate such installation, the frames themselves actually forming part of the air duct. It is not necessary to provide any direct cooling for the other components in the power room, but allowance should be made for convection air circulation as in the single floor installation.

4. Cables and Conduits

The cable and conduit runs appear on the Power Room Layout figure 31 (Two Floor) and figure 30 (One Floor). These figures illustrate in a general way the cross wiring of the external power equipment. In a two floor plan, two floor openings, in addition to those provided for the cooling system should be provided, directly beneath the transmitter proper. Other openings are required when a control desk and an audio rack are used with the transmitter; see the Transmitter Floor Plan and Power Room Layout on figure 29 and figure 31.

In a single floor installation, two troughs for high voltage conductors and one trough for power and control wires are required. See Power Room Layout (one floor) on figure 30.

INSTALLATION

The basic installation plan for the 50HG-2 Transmitter includes two centers of placement of the transmitter components. One is the transmitter room, where the transmitter cubicles are installed, and the other is the power room where the equipment external to the transmitter cubicles is installed.

TRANSMITTER INTERCONNECTIONS

1. The complete interconnection wiring information appears on figures 42 and 43. Figure 42 lists point-to-point wiring between cubicles and between cubicles and the power room. Figure 43 shows point-to-point wiring for power room components.

2. The types of wires and lugs and their electrical ratings appear on the last sheet of figure 42. Only items so marked in the figure are supplied as part of the transmitter.

a. The wires and lugs shown on figure 42 are suggested types only. If these are not available or not convenient to use, a satisfactory equivalent may be substituted.

b. Other materials, not listed on figure 42 but required for installation are:

(1) Cable clamps and brackets
(2) Conduit and conduit brackets
(3) House breaker box
(4) Hardware

TRANSMITTER CUBICLES

The transmitter proper consists of six cubicles. Additional cubicles may be added when necessary for directional antenna arrays. Figure 35 (Typical Cubicle) shows all important dimensions and general constructional details of the cubicles. It should, however, only be used to supplement the layout drawings. These cubicles house the major electronic elements of the transmitter as well as all the low voltage supplies, supervisory control circuits and transmitter controls.

The transmitter is generally installed in conjunction with an operating console, as well as racks containing the audio frequency and measuring equipment. For suggested arrangement of the cubicles with the transmitter room, please turn to <u>Building Layout</u> of this instruction book. Proceed to install the transmitter as follows:

1. Place each cubicle in its permanent position by carefully following instructions under <u>Handling Procedure</u> of this instruction book.

2. Align and level all cubicles on the floor rails.

3. Bolt all cubicles together securely by means of 1/2"-13 studs, washers and nuts supplied in the Installation Kit. Make sure of good electrical contact between cubicles.

4. Mark hold-down bolt holes in first and last cubicle.

5. Move first and last cubicles back after removing bolts from sides. Drill and tap 1/2" x 13 holes in the floor rail.

6. Replace cubicles; align and level and bolt cubicles together tightly, making sure of good electrical contact between cubicles. Bolt end cubicles down with two inch 1/2"-13 bolts and washers.

At this time the caulking should be done to prevent air leakage. With a caulking gun, apply compound around all the inside and accessible outside edges of the base of each cubicle. The inside may be reached through the air opening in the floor beneath cubicles. This completes the cubicle installation.

7. Install two RG-17/U coaxial cables to connect the RF driver terminals located on the Exciter Cubicle with the RF input terminals on the Power Amplifier cubicles. The four cable plugs for the RG-17/U cable are shipped assembled to the panel terminations mounted on the top of the cubicles. Figure 44 and figure 45 show RG-17/U wiring and termination respectively. In order to preserve circuit balance, the RG-17/U cables must be cut to the same length.

8. Install two .375 OD hard-drawn copper tube leads to connect the audio driver terminals (two porcelain feed-through bowls) located on top of the Exciter Cubicle with the audio input terminals (located on top of the Modulator Cubicle). Figure 44 shows the audio driver connection between Exciter and Modulator.

EXTERNAL POWER EQUIPMENT

The Auxiliary Power Equipment shown on figure 33 is installed in the power room adjacent to the transmitter room.

For suggested arrangements of the Auxiliary Power Equipment within the power room, refer to the Auxiliary Components under INSTALLATION PLANNING.

Proceed to install the Auxiliary Power Equipment as follows:

1. The Switchgear Cubicle houses the two DB-25 Air Breakers and associated control system. This cubicle is intended for installation near the power room, preferably in the wall of the room with the front panel exposed and accessible from outside.

2. The two Rectox Frames house the metal rectifiers for the power amplifier and modulator supplies. They are intended for installation in the air stream, serving as part of the air duct. Clearance shall be provided for the spark gaps mounted on top of the frame.

3. The two filter capacitors and the filter reactor should be mounted adjacent to the rectox frames and with at least one foot of clearance on all sides.

4. The Main Rectifier Induction Voltage Regulator, if used, should be installed with clearances of at least two feet from the top and the sides which mount the primary relay, De-ion switch and potential transformer.

5. The Distribution Bus Induction Voltage Regulators should be installed with clearances of at least one foot on all sides.

6. The Main Rectifier Plate Transformer, and the Modulation Transformer and Modulation Reactor are floor-mounted. Access to these units is through the front and rear panels and clearances should be provided accordingly.

7. The three Distribution Bus Transformers are floor-mounted adjacent to the bus regulators. At least 18" of clearance should be provided about these units.

8. The Auxiliary Audio Choke is an air core inductor intended for wall mounting adjacent to the Modulation Reactor.

9. The Modulation Coupling Capacitor may be floor-mounted (terminals up) near the Modulation Transformer, or wall-mounted on a special bracket (bracket is not supplied).

10. The Audio Filter Capacitor is mounted on top of the Modulation Transformer. It is connected to and mounted on secondary terminal X-1 and a ceramic standoff insulator supplied in the Installation Kit.

11. Install all copper tubing conductors using figure 43 as a reference.

   a. The Power Room Layout, figure 30 for a one floor building, and figure 31 for a two floor building, may be used as a reference for the copper tubing conduction layout.

GROUND SYSTEM

Install the transmitter ground strap using figure 43 as a reference.

1. The transmitter cubicle ground strap is placed in the wire trough and runs from cubicle #1 to cubicle #6.

This ground strap runs along the inside surface of the rear "I" beam. It is fastened to the center of the "I" beam in each cubicle base using a 1/2"-13 bolt. The Exciter Cubicle base is then grounded to the transmitter ground system.

2. Each unit of external equipment is grounded to the cubicle ground strap and thus returned to the transmitter ground system.

INTERLOCKS

1. Electrical

Each cubicle is equipped with interlock switches. Additional switches in the air duct, power room, doors to vaults, etc., should be connected into the transmitter control circuit as shown on figure 49, so that any interruption of the interlocking series will remove power from the transmitter.

2. Mechanical

In addition to electrical interlocking, the power room can be protected from entry by a mechanical key interlocking system. Inspection of the Switchgear will disclose two keys marked #RE-1130. These keys, removable only after the switches are locked in their "off" position, can be used to gain entry into the power room, which should be provided with two identical locks so that both switchgear keys are required to gain admittance.

It would be desirable for the air tunnel trap door to be included in this interlock system. See attached copy of "R. and I. E. Kirk Catalog" for suggestions. All door locks other than the two on the Switchgear should be supplied by the customer. To obtain locks using the keys supplied in the Switchgear, it is necessary to supply R. and I. E. Co. with three items of information: (1) Neg. #4708179, (2) Key #1130, (3) Type of locks selected as listed in the Kirk Catalogue. A duplicate set of keys is necessary in case the first set is misplaced, but it is recommended that the duplicate set be kept behind non-removable glass so that breakage is necessary to obtain them. A word of warning at this time: Defeating the key interlock or electrical interlock system is dangerous. THE PURPOSE OF THESE SYSTEMS IS TO PROTECT LIFE.

COOLING SYSTEM

1. Ducts

After the transmitter is bolted down in its final location, the exhaust air duct can be installed. A typical installation is shown on figure 38. If sound-proof duct lining is used, it must be of fire-proof material. The duct work should be extended to all locations requiring heat and should be equipped with automatic or manually controlled registers. See figure 39, Basic Air Supply System.

For discharge of the heated air to the outside, a ventilator in the roof or ventilators on two sides of the building should be provided to take advantage of the prevailing winds. Self-closing shutters to prevent back-draft are extremely important to prevent back pressure from reducing the flow of cooling air to a dangerous level. Screening should be provided to prevent entry of small animals and birds.

2. Air Returns

An unrestricted air return circuit to the blowers should be planned for normal recirculation. This may be in the form of gratings in the floor, doors, walls or a combination of gratings and filters so arranged as to disperse the flow of air and reduce the velocity. Care should be taken to see that the total back resistance pressure of the return circuit is not excessive for the volume of air handled, (approximately 12,000 CFM). The exhaust duct should not present more than 1/4" water gauge pressure drop.

3. Air Requirements

Normal air requirement for the 50HG-2 Transmitter at sea level in the ambient range +5° to +45°C, is approximately 12,000 CFM at a resistance pressure of 2" water gauge. The fan speed for this delivery is 570 RPM (4.6 HP). If necessary, the fan speed can be regulated between 460 RPM and 875 RPM by means of the "Vari-Pitch" sheave. The oil level indicators on the bearings should be installed and the bearings filled to proper level with a good quality oil (SAE 10). Check frequently for the first week after filling to be sure that the fan bearing cups maintain a safe oil level.

4. Blower

The Blower supplied with the transmitter is a Sturtevant "Silentvane," size 90 shown on figure 34. Make certain the Blower is mounted on a level surface.

5. Motor

The motor supplied is Westinghouse Type CPS "Life-line" with standard NEMA frame No. 284. The electrical characteristics are 7-1/2 HP, three phase, 50/60 cycles, 220/440 volts with medium starting torque. The slide base is an Allis-Chalmers "Texslide No. 3." Some slipping of the belts will be noticed upon starting. This is a normal condition and helps to limit the motor starting current.

6. Sheaves and Belts

The motor is equipped with an Allis-Chalmers "Vari-Pitch" wide-range, two groove sheave allowing a variation from 5-1/4 inch pitch diameter to 10 inch pitch diameter. The Blower has a fixed, two groove sheave of 20 inch pitch diameter. Belts for the above are of a special section to allow for the wide range of speed variation and are known as R-150 "Texrope." A word of caution when replacing belts; always replace both belts, since a new belt will have a shorter circumference than a used one.

7. Starter

The motor starter is a combination switch (with magnetic trip overload protection) and contactor (with thermal trip overload protection). Connections to the starter should be made as shown on figure 43. It is recommended that the starter be installed within sight of the blower motor.

8. Filters

Some means of cleaning the circulated air should be employed. This may be in the form of spun glass filters or the highly efficient Westinghouse Precipitron. In many cases both are used. The Precipitron is used to clean air brought in from the outside and the spun glass filters are used to clean the recirculated air.

The recommendation of Owens-Corning to filter 12,000 cfm of air is to use 15 of their #2, 20" x 20" "Dust Stop" filters. This allows each filter to pass 800 cfm and thus maintain maximum cleaning efficiency. The average resistance of the #2 filter when clean is .13" water gauge. (This drop doubles when they are stacked double.) A loss of more than .15" water gauge for the inlet is not recommended.

The Westinghouse District Office has among its personnel a specialist in Precipitron installation and filter problems. He will be glad to give assistance and make recommendations.

HEATING FACILITIES

Approximately 50 kw is available for use in heating the transmitter building, when the transmitter is in full power operation.

INITIAL ADJUSTMENT AND TESTS

Before proceeding with these tests, the following should be observed:

1. Transmitter installation should have been completed according to the section on RECEIVING, HANDLING, AND STORAGE and the section on INSTALLATION of this book.

2. Make a thorough mechanical inspection of the transmitter installation, noting particularly that good wiring practice is used throughout. Check all wires to make sure that the lugs have been properly applied. Burndy-type lugs depend entirely upon the success of the clamping operation for electrical continuity, therefore it is imperative that the proper size lug is properly installed.

3. Check mechanical operation of all doors to make sure that the latches are functioning properly, and that the mechanical and electrical interlocks which depend upon door operation have been installed in their proper places and have been adjusted for positive action.

4. Check the mechanical operation of all relays and make sure that all traces of packing, blocks, twine, tape, wires, etc., have been removed.

5. Remove VR-150, 802, 807, and 813 tubes from their sockets. Disconnect filament leads from the 5736 and 5671 tubes.

6. Make sure that all switches and breakers are off and that the 460 volt, three phase, incoming line is deenergized.

GROUNDS AND SHORT CIRCUITS

1. Open fuses F-2001, F-2002, F-2003, F-2006, F-2007 in Switchgear Cubicle and test 460 volt lines for short circuits and grounds. Use megger (500 volts d-c).

2. Replace fuses, check 460 volt line for grounds.

3. Remove two primary line wires from Distribution Bus Transformers, T-1502, A, B, C. Check for short circuits and grounds. Replace wires.

4. If a Main Rectifier Regulator has been purchased, disconnect leads No. 1 and No. 3 from Main Regulator YR-1201, two leads from primary of Main Rectifier Plate Transformer T-1501, and one fuse from potential transformer on Regulator YR-1201. Check lines for short circuits and grounds. Replace connections.

5. Remove ground from secondary of Distribution Transformer T-1502-B and remove two incoming bus wires from TS-20 in the Power Control Cubicle. Remove fuse F-1C from tube hour meter M-7. Check both ways for shorts and grounds on all wires of bus. Check only for grounds in Distribution Transformer direction.

6. Replace fuse and wires in Power Control Cubicle, but do not replace ground on Distribution Transformer secondary.

7. a. Connect an ohmmeter between ground and a distribution bus wire, then close in sequence the power control De-ion switches shown below:

S-1, LEFT PA FILAMENT NO. 1
S-2, LEFT PA FILAMENT NO. 2
S-3, RIGHT PA FILAMENT NO. 1
S-4, RIGHT PA FILAMENT NO. 2
S-5, LEFT MODULATOR FILAMENT NO. 1
S-6, RIGHT MODULATOR FILAMENT NO. 2
S-7, LEFT MODULATOR FILAMENT NO. 3
S-8, RIGHT MODULATOR FILAMENT NO. 4
S-10, PANEL LIGHTS
S-11, TRANSMITTER CONTROL BUS
S-12, EXCITER FILAMENTS
S-13, AUDIO BIAS
S-14, RF BIAS
S-15, 400 VOLT SUPPLY
S-16, 1500 VOLT - 3000 VOLT SUPPLY
S-22, BUS REGULATOR

No ground should appear.

7. b. If a Main Rectifier Regulator has been purchased, turn on VRS-1201 on the Main Regulator. Operate AUTO/MANUAL, LOWER/RAISE switches S-19 and S-20 in the Power Control Cubicle and VOLTAGE CONTROL SELECTOR and MANUAL VOLTAGE CONTROL switches S-411 and S-412 in the Center Power Amplifier Cubicle. No ground should appear.

8. Close manually, in sequence, the DN magnetic contactors K-37 to K-40 in the Power Control Cubicle. No ground should appear.

9. Remove ground from secondary of switchgear control transformer (T-2005) and check for grounds. No ground should appear. Replace lead.

10. Open TRANSMITTER CONTROL BUS switch and observe 27.5 ohms d-c resistance between Power Control terminals No. 61 and No. 73 with all cubicle doors open.

11. Measure (with ohmmeter or bridge using less than 10 volt battery) the resistance at terminals of the following Rectox units. (Do not remove Rectox from circuit, since this is primarily a check of the associated circuit and not of the Rectox Units.) The resistance should be approximately as indicated.

Unit	Term.	Res.	Term.	Res.
RX-101	a-c	20 ohms	d-c	10,700 ohms
RX-102	a-c	140 ohms	d-c	7,600 ohms
RX-103	a-c	140 ohms	d-c	7,600 ohms
RX-104	a-c	70 ohms	d-c	3,600 ohms
RX-105	a-c	70 ohms	d-c	3,580 ohms
RX-106	a-c	20 ohms	d-c	850 ohms
RX-1	a-c	8 ohms	d-c	30,000 (With Exciter and Power Control ground switches open)
RX-301	a-c	19 ohms	d-c	800 ohms
RX-501	a-c	19 ohms	d-c	800 ohms

12. Measure insulation resistance, using potential not less than 500 volts d-c, of high voltage conductors in power room.

a. Conductors from T-1501 to both high voltage rectox units.
b. Conductors from high voltage rectox units to filter capacitors and reactor.
c. Conductors from filter units to Modulation Transformer and Modulation Reactor.
d. Conductors from Modulator and Power Amplifier to Modulation Transformer and to Audio Auxiliary Choke. Do not disconnect leads from transmitter. Doors to Modulator and Power Amplifier cubicles must be closed.
e. Investigate any of above, a to d readings, if less than 50 megohms.
f. Connect automatic capacitor shorting switches on the three filter capacitors to the voltage bus with No. 28 bare copper wire. Bend the springs up so ends are level with the high voltage terminals. (Note: This fuse wire is supplied in the Installation Kit.)

SWITCHGEAR ADJUSTMENTS

Before application of power the two type DB-25 circuit breakers S-2001 and S-2002, mounted in the Switchgear Enclosure should be withdrawn part way out of the enclosure using the extension rails and levering handle.

Inspect the two breakers with the aid of the inspection list furnished on page 7 of I.B. 35-225-1. Check the overcurrent tripping devices for proper settings as follows:

1. Long time delay setting

S-2001	100% of rated current
S-2002	80% of rated current

2. Instantaneous settings

S-2001	1000% of rated current
S-2002	1000% of rated current

The above adjustments are normally accomplished at the factory but should be checked prior to the application of power to the equipment. For details of adjustment, consult I.B. 35-225-1 pages 15 through 18.

RELAY SETTINGS

1. Set overload relays as follows, and using battery, rheostat, and ammeter, check operating point by application of test leads to relay coil terminals. Do not remove shunting resistors.

Symbol	Description	Scale Setting	Operating Point
K-9	1500/3000 Volt	5.5 amp 6.7	4.5 to 5.5 amp 5.6
K-11	Modulator Rectifier	9.5 amp 11.4	8.5 to 9.5 amp 9.5
K-12	Power Amplifier Rectifier	11.5 amp 14	11.0 to 12.0 amp 12. MAX
K-105	400 Volt	0.4 amp 6	0.45 to 0.65 amp .65
K-106	813 RF	0.6 amp 75	0.5 to 0.7 amp .7
K-107	Left 5736 RF	1.4 amp 1.6	1.05 to 1.35 amp 1.42
K-108	Right 5736 RF	1.4 amp 1.6	1.05 to 1.35 amp 1.43
K-110	Left 813 Audio	0.15 amp .16	0.14 to 0.16 amp
K-111	Right 813 Audio	0.15 amp .16	0.14 to 0.16 amp
K-114	Left 5736 Audio	0.25 amp .3	0.5 to 0.7 amp
K-115	Right 5736 Audio	0.25 amp .3	0.5 to 0.7 amp
K-201	Left Modulator	3.5 amp 4	4.2 to 4.8 amp 4.9
K-202	Right Modulator	3.5 amp 3.1	4.2 to 4.8 amp 4.9
K-301	Left Power Amplifier	3.0 amp 3.8	4.4 to 4.8 amp 5.
K-501	Right Power Amplifier	3.0 amp 3.9	4.4 to 4.8 amp 5.

2. Set bias undervoltage relays:

Symbol	Description	Scale Setting
K-109	Exciter	90 volts
K-112	Left Audio Driver	50 volts
K-113	Right Audio Driver	50 volts
K-203	Left Modulator	90 volts
K-204	Right Modulator	90 volts
K-302	Left Power Amplifier	60 volts
K-502	Right Power Amplifier	60 volts

2.5
9.0 || 2.5
1.5

GAS FILLED CAPACITORS

Capacitors which are identified with symbols C-129, C-320, C-517 and C-520 are Lapp gas-filled, variable capacitors.

Observe the following precautions when handling these capacitors, (also refer to Lapp Bulletin 266 in the SUPPLEMENT section of this instruction book):

1. When first received:
   a. Check for possible damages.
   b. Check gauge pressure. This should be between 50 and 65 psi.
   c. Measure safety gap spacing and record for future reference.
   d. Check gauge pressure frequently to make no leaks.

3/16" small
13/16" large

2. Before installation:
   a. If gauge pressure is between 50 and 65, add oil pumped dry nitrogen to 150.
   b. If gauge pressure is below 50, add Freon gas (F-12) to 65 and then add oil pumped dry nitrogen to 150.
   c. Check safety gap spacing.

3. After installation:
   a. Inspect periodically to see that the proper gauge pressure (150 ±20) is maintained.
   b. If gauge pressure is less than 85, drain to 2.5 and refill to 65 with Freon (F-12) and then to 150 with oil pumped dry nitrogen.
   c. If gauge pressure is 85 or more, refill to 150 with oil pumped dry nitrogen.
   d. Keep ceramic bowl clean and dry.

4. Storage
   a. See that the gauge pressure is between 100 and 150 so that the gaskets will be held in proper position to prevent leakage.

RF COMPONENT SETTINGS

The following information is to be used as a guide in adjusting the Type 50HG-2 Transmitter for operation on a specific carrier frequency. At frequencies for which a choice of adjustments exists, either will be suitable.

1. Crystal Oscillator, Type FA
   a. L-102
      540 to 650 KC - connect tap 6 to tap 5
      650 to 840 KC - connect tap 6 to tap 4
      840 to 1300 KC - connect tap 6 to tap 3
      1300 to 1600 KC - connect tap 6 to tap 2
   b. L-103
      540 to 650 KC - connect plate to 1, output to 2
      650 to 840 KC - connect plate to 2, output to 3
      840 to 1000 KC - connect plate to 2, output to 4
      1000 to 1300 KC - connect plate to 3, output to 4
      1300 to 1600 KC - connect plate to 4, output to 4

2. 807 Buffer Amplifier
   a. L-105
      540 to 660 KC - use all sections
      660 to 808 KC - short out one section (nearest panel)
      808 to 985 KC - short out two sections (nearest panel)
      985 to 1300 KC - short out two sections (nearest panel)
      1300 to 1600 KC - short out three sections (nearest panel)

Change Grid tap to increase Grid Drive

3. 813 RF Plate Tank
   a. L-109
      540 to 660 KC - use all (62) turns
      660 to 800 KC - short out 7 turns on each end
      800 to 900 KC - short out 11 turns on each end
      900 to 1020 KC - short out 15 turns on each end
      1020 to 1300 KC - short out 19 turns on each end
      1300 to 1600 KC - short out 23 turns on each end
   b. L-109 - Grid tap and neutralizing tap
      540 to 660 KC - 17 turns above and below center tap
      660 to 800 KC - 15 turns above and below center tap
      800 to 900 KC - 13 turns above and below center tap
      900 to 1000 KC - 11 turns above and below center tap
      1000 to 1100 KC - 9 turns above and below center tap
      1100 to 1300 KC - 7 turns above and below center tap
      1300 to 1400 KC - 6 turns above and below center tap
      1400 to 1600 KC - 5 turns above and below center tap

4. 5736 Plate Tank
   a. L-112 - Tap location
      540 to 600 KC - 13-3/4 turns from ground
      600 to 660 KC - 12-3/4 turns from ground
      660 to 800 KC - 12-3/4 turns from ground
      800 to 1000 KC - 12-3/4 turns from ground
      1000 to 1300 KC - 11-3/4 turns from ground
      1300 to 1500 KC - 10-3/4 turns from ground
      1500 to 1600 KC - 8-3/4 turns from ground
   b. C-129-A
      540 to 600 KC - use 4 padders 560 $\mu\mu f$ each
      600 to 660 KC - use 3 padders 560 $\mu\mu f$ each
      660 to 800 KC - use 2 padders 560 $\mu\mu f$ each
      800 to 1000 KC - use 1 padder 560 $\mu\mu f$ each
      1000 to 1600 KC - none

5. Left and Right Power Amplifier Grid Circuit
   a. L-301 or L-501
      540 to 600 KC - use all turns
      600 to 660 KC - short out 2 turns
      660 to 800 KC - short out 7 turns
      800 to 1000 KC - short out 13 turns
      1000 to 1300 KC - short out 15 turns
      1300 to 1600 KC - short out 18 turns

6. Left and Right Power Amplifier Neutralizing Circuit
   a. L-303 and L-503 - See Power Amplifier Neutralization
      540 to 660 KC - total turns 196
      660 to 1000 KC - total turns 156
      1000 to 1600 KC - total turns 96

7. Power Amplifier Plate Tank
   a. L-401-A
      540 to 750 KC - use all turns
      750 to 800 KC - short out one turn each end of coil
      800 to 1000 KC - short out two turns each end of coil
      1000 to 1200 KC - short out three turns each end of coil
      1200 to 1500 KC - short out four turns each end of coil
      1500 to 1600 KC - short out five turns each end of coil
   b. C-320-A and C-520-A
      540 to 800 KC - one 450 $\mu\mu f$, 45 KV Capacitor

POWER-ON ADJUSTMENTS

WARNING

THE USE OF HIGH VOLTAGES IS NECESSARY FOR THE OPERATION OF THE ELECTRONIC EQUIPMENT COVERED BY THESE INSTRUCTIONS. WHILE ALL PRACTICAL SAFETY PRECAUTIONS HAVE BEEN INCORPORATED IN THE DESIGN OF THIS EQUIPMENT, THEY ARE NOT INFALLIBLE; THEREFORE, ALL PRECAUTIONARY MEASURES MUST BE CAREFULLY OBSERVED BY THE OPERATING PERSONNEL DURING THE OPERATION, INSPECTION AND MAINTENANCE OF THE EQUIPMENT. SEE WARNING IN THE FRONT OF THIS BOOK.

POWER LINE VOLTAGE

Apply 460 volts a-c to Switchgear. All De-ion switches should be off and all control switches turned to left (if no duplicate controls have been connected). Observe that the line voltage meter reads 460 volts, and the line current meters reads zero.

BLOWERS

Turn on as follows:

1. Turn S-30 (BLOWER CONTROL) to BLOWER ONLY position.

2. Turn S-29 (BLOWER SELECTOR) to No. 1 position.

3. Close S-9 (SWITCHGEAR CONTROL BUS).

4. Turn S-28 (BUS BREAKER) on. Observe:
   a. Indicator I-40 (BUS BREAKER SWITCH ON) lights.
   b. Blower No. 1 starts; check direction of rotation.

If not same as arrow on blower housing, reverse two leads on blower motor.

   c. After Blower No. 1 comes up to normal speed, S-515 (air flow interlock) operates allowing I-36 (BLOWER NO. 1 ON) to light.

5. If a spare blower has been purchased, turn BLOWER SELECTOR to NO. 2 position. Observe: Blower No. 2 starts; check direction of rotation. I-41 (BLOWER NO. 2) lights.

AIR VELOCITY

1. Measure air velocity at following points using an integrating vane-type anemometer such as the four-inch diameter "CENCO" anemometer, (Central Scientific Co., Chicago, Ill. Cat. No. 78605).

Measurements on the power tubes should be the average of maximum readings around the tube with the instrument held horizontal just above the radiator fins and midway between the glass bulb and the outside edge of the radiator. The Rectox units must be installed, all tubes in tube sockets, all cubicle doors must be closed, and exhaust ducts in normal condition when measurements are taken.

Location	Component	Minimum Velocity, Fpm	
Power Control	RX-1	1000	
Exciter	RX-104	800	
Modulator	Each WL-5671	1000	1100
Left Power Amplifier	Each WL-5671	1000	1025
Left Power Amplifier	RX-301	800	
Right Power Amplifier	Each WL-5671	1000	1100
Right Power Amplifier	RX-501	800	800

2. Remove one 5736 tube from its socket on the left side of the Exciter and measure air velocity to be 800 fpm minimum. Replace tube and remove one 5736 from right side and measure air velocity to be 800 fpm minimum. 2000 FPM

3. Orient the air nozzles in the Modulator, Left Power Amplifier and Right Power Amplifier cubicles so that air is directed on the 5671 tube filament seals.

4. If necessary, change speed of Blowers by adjusting "Vari-Pitch" sheave or install baffles to meet above minimum air requirements.

DISTRIBUTION BUS

Check that primary switch positions on T-1502-A, B, C are all on position 3. Positions 1 and 5 are ±5 percent and positions 2 and 4 are ±2-1/2 percent. Switches are mounted on transformers, under top cover plates.

1. Turn BLOWER CONTROL to TRANSMITTER AND BLOWER position. Observe:
   a. The Distribution Bus Breaker closes. (Do not allow breaker to "pump." If abnormal operation is encountered, see Switchgear Instruction Book I.B. 35-225-1 in SUPPLEMENT Section.)
   b. I-35 (BUS BREAKER ON) lights.
   c. M-4 (BUS VOLTAGE) indicates 230 volts on each of the three phases selected by S-18 (BUS METERS PHASE SELECTOR). Note that if the phase voltages are not in balance, throw S-19 (BUS REGULATOR SELECTOR CONTROL) to MANUAL position; throw S-22 (BUS REGULATOR) to its ON position; hold S-20 (BUS REGULATOR MANUAL CONTROL) in its LOWER position until both regulators have reached their lower limit positions and all three phases are balanced. Next, hold S-20 in its RAISE position until all three phases show 230 volts.
   d. With S-19 in AUTOMATIC position, note that the bus voltages on each of the three phases are equal (230 volts). See Regulator Instruction Book 5521-A for adjustment of regulator relays in case the three phases are unbalanced or not 230 volts.

FILAMENT VOLTAGES

1. Throw S-12 (EXCITER FILAMENTS) to ON position. Observe:
   a. K-8 (Exciter filament undervoltage) timing relay begins to operate and should close after a 22-second delay, lighting I-42 (EXCITER FILAMENT NORMAL VOLTAGE) indicator. Note that K-8 should be adjusted to close in 22 seconds and drop out in 5 seconds. See Instruction Leaflet 41-291D in SUPPLEMENTS Section of this book.
   b. The Exciter filament transformers should be energized.

2. Voltages at the filament terminals of the following tube sockets: (bus voltage 230 volts)

	Without Tubes	With Tubes	
Audio WL-807	6.3 to 6.6 volts	6.1 to 6.3 volts	6.3
RF WL-807	6.3 to 6.6 volts	6.1 to 6.3 volts	6.2
Audio WL-813	10.0 to 10.4 volts	9.7 to 10.3 volts	10.0
RF WL-813	10.0 to 10.4 volts	9.7 to 10.3 volts	10.0

3. Voltages at all 5736 filament connectors:

	Filaments Not Connected	Filaments Connected	
Audio WL-5736	5.9 to 6.5 volts	5.7 to 6.3 volts	5.8
RF WL-5736	5.9 to 6.5 volts	5.7 to 6.3 volts	5.7

4. Modulator and Power Amplifier filament voltages.
   a. Make sure that filament connectors are not touching filament terminals of 5671 tubes in Modulator, Left Power Amplifier, Right Power Amplifier.

LPA 9.5
RPA 10.5

(1) Turn ON all filaments in Modulator, Left Power Amplifier and Right Power Amplifier.
(2) Observe, using filament voltmeter selector switch on each cubicle, that each voltage is 10 to 11 volts.
(3) Try combinations of Power Amplifier Filament Switches, S-1, 2, 3, 4. Check voltages to be same as above.
(4) Turn Bus Breaker OFF and connect all 5671 filaments.
(5) Repeat (1), (2), (3) above, and observe each filament voltage to be between 9.6 and 10.2 volts. (Bus voltage 230 volts on all three phases.) Using an accurate laboratory-type voltmeter, measure voltage at filaments of the 5671 tubes. Adjust the indication on M-202, M-301, M-501 to be the same as the laboratory-type voltmeter (adjust zero set screw). Do this after the set has been checked and operated long enough for voltmeters to have reached operating temperature.

EXCITER BIAS AND PLATE VOLTAGES

Adjust Bus Voltage to be 230 volts.

1. Audio Bias
   Close S-13 (AUDIO BIAS). Turn on S-31 (AUDIO BIAS). Observe:
   a. I-43 (AUDIO BIAS SWITCH ON) lights, (amber).
   b. K-37 (audio bias contactor) operates.
   c. M-111 (LEFT 5736 AUDIO DRIVER BIAS), 130 volts - adjusted by R-119.
   d. M-112 (RIGHT 5736 AUDIO DRIVER BIAS), 130 volts - adjusted by R-120.
   e. M-116 (LEFT MODULATOR BIAS), 330 volts - adjusted by S-108.
   f. M-117 (RIGHT MODULATOR BIAS), 330 volts - adjusted by S-109.
   g. The following undervoltage relays operated, and bias ON indicators light.
      K-112, I-38, Power Control AUDIO BIAS ON (red)
      K-113, I-403, Center Power Amplifier AUDIO BIASES ON (green)
      K-203, K-204, I-202, Modulator BIAS (green)

2. RF Bias

Close S-14 (RF BIAS). Turn on S-32 (RF BIAS). Observe:

a. I-44 (RF BIAS SWITCH ON), (amber).
b. K-38, RF bias contactor operates.
c. M-302 (LEFT PA GRID VOLTS), 340 to 360 volts.
d. M-502 (RIGHT PA GRID VOLTS), 340 to 360 volts.
e. K-109 (exciter bias undervoltage) closes, I-39 (RF BIAS ON), (red) and I-404 (RF BIASES ON), (green) light.
f. K-302 (left power amplifier bias undervoltage) closes, I-302 (BIAS), (green) lights.
g. K-502 (right power amplifier bias undervoltage) closes, I-502 (BIAS), (green) lights.
h. Using a d-c voltmeter, observe 300 to 400 volts negative from RF 5736 tube grids to ground.

3. 400 Volt Supply

Close S-15 (400 VOLT SUPPLY) on Power Control Panel. Turn on S-103, (400 VOLT SUPPLY) switch on Exciter Control Panel. Observe:

a. I-105 (amber) lights. (SWITCH ON).
b. K-39 closes - contactor, 400-volt supply.
c. I-106 (red) lights - (POWER ON).
d. M-118 (400 VOLT RECTIFIER) indicates between 440 and 460 volts.
14 ma e. M-101 (OSCILLATOR CATHODE CURRENT) indicates between 10 and 14 milliamperes. Note that as the oscillator is tuned through resonance by adjusting C-105, that the 802 cathode current goes through a sharp dip, a gradual rise and then a sharp rise.
48 f. M-102 (807 RF BUFFER CATHODE CURRENT) indicates between 35 and 55 ma. Tune to minimum with C-112 (plate tank capacitor).
? 22 g. M-103 (813 RF AMPLIFIER TOTAL GRID CURRENT) indicates between 14 and 18 ma.

4. 1500 Volt Supply

Put S-110 in OPERATE and S-111 in TUNE and put S-113 in OPEN position. Close S-16 (1500 VOLT - 3000 VOLT SUPPLY) in Power Control. Turn on S-104 (1500-3000 VOLT RECTIFIER) on Exciter Control Panel. Observe:

a. I-107 (green) lights (SWITCH ON).
b. K-40 closes - contactor, 1500-3000 volt supply.
c. I-108 (red) lights - (POWER ON) and K-104 operates 807 and 813 screen interlock relay).
d. Using S-106 (813 RF AMPLIFIER PLATE TUNING), tune for maximum reading on M-108 (1500 VOLT RECTIFIER).

RF DRIVER NEUTRALIZATION

1. Turn off 1500-3000 VOLT RECTIFIER and couple a wavemeter, or some other RF indicating device to the RF 5736 plate tank (L-112). A suggested method is to use link coupling, with one 6" turn on each end of link, and place the wavemeter outside the cubicle.

2. Remove cable plugs (RG-17/U from sockets on top of cubicle.

3. Turn on 1500-3000 VOLT RECTIFIER and adjust S-107 (5736 RF DRIVER PLATE TUNING) for maximum indication on wavemeter.

4. Readjust 813 RF AMPLIFIER PLATE TUNING for maximum indication on wavemeter.

5. Adjust neutralizing capacitor (C-122) for minimum indication on wavemeter. (A piece of cord may be wrapped around the sleeve of C-122 to permit adjustment from outside the cubicle.)

6. Place S-111 in OPERATE position and repeat 3, 4, and 5 above.

MAIN RECTIFIER REGULATOR OPERATION

When a Main Rectifier Regulator (YR-1201) is supplied with 50HG-2 equipment, power wiring should be according to figure 43 and control circuit wiring according to figure 42.

1. With S-421 (MAIN RECTIFIER CONTROL) in the off position, YR-1201 has run down to minimum position and the DELTA-WYE contactors are deenergized. No power is applied through the switchgear breaker, S-2002.

2. With switch S-421 in the "TUNE" position, power is applied to the primary of T-1501 through the WYE contactor. The regulator will automatically run up to a predetermined voltage when S-411 (REGULATOR CONTROL SELECTOR) is in the "AUTOMATIC" position.

With S-411 in the "MANUAL" position, the regulator is controlled by S-412 (MANUAL VOLTAGE CONTROL) and any desired voltage in the range 6 to 10 kv approx. may be obtained.

3. With switch S-421 in the "ON" position, power is applied to the primary of T-1501 through the "DELTA" contactors. If S-411 is in the "AUTOMATIC" position when going from "TUNE" to "ON", the regulator will have reached its "HIGH LIMIT" and the increase in voltage is brought about by the change in transformer primary connections from WYE to DELTA. If S-411 is in the "MANUAL" position when S-421 is placed in the "ON" position, any desired voltage in the range 9 kv to 12 kv approx. may be obtained.

MAIN RECTIFIER REGULATOR ADJUSTMENTS (IF USED)

1. Remove conductors from primary terminals of T-1501 (Main Rectifier Plate Transformer).

2. Connect secondary links on Main Rectifier Plate Transformer from No. 4 to No. 6 on all three phases.

3. Place S-411 (REGULATOR CONTROL SELECTOR) in MANUAL position.

4. Release brake on YR-1201 (Main Rectifier Induction Voltage Regulator).

5. By hand, rotate regulator to full LOWER position (full counterclockwise on regulator LOWER-RAISE dial). Observe:

    I-407 (LOW LIMIT) indicator on Center
    Power Amplifier Control Panel lights.

6. Rotate regulator to full RAISE position (full clockwise on regulator LOWER-RAISE dial). Observe:

    I-408 (HIGH LIMIT) indicator on Center
    Power Amplifier Control Panel lights.

7. Rotate regulator to mid-range (zero on LOWER-RAISE dial).

8. Set brake on regulator.

9. Block the undervoltage relay on the primary relay panel of regulator in the closed position. This can be done by inserting insulating material between the righthand contact (as seen from the front) and the movable contact, and then screwing up the adjustments on the contacts until the movable contact is firmly against the lefthand contact of the undervoltage relay.

10. Close VRS-1201 (De-ion breaker mounted on side of regulator).
    a. If motor runs the regulator toward RAISE, immediately open breaker and interchange two leads from the regulator motor. (Terminals for the motor are under the limit switch cover.)
    b. Close breaker and allow motor to run regulator down to lower limit and stop.

11. Turn S-421 (MAIN RECTIFIER CONTROL) ON. Observe:
    a. I-406 (green) lights - (SWITCH ON).
    b. K-1601 and K-1602 (Modulator bleeder contactors on Rectox Frame) operate.
    c. S-2002 (Main Rectifier Breaker in Switchgear) closes.
    d. I-203 (PLATE), I-303 (PLATE), I-405 (MAIN RECTIFIER POWER ON), I-503 (PLATE) (all red) light on Modulator, Left Power Amplifier, Center Power Amplifier, and Right Power Amplifier, respectively.
    e. Determine that three phase output voltage of Main Rectifier Regulator is between 350 and 380 and that all three phase voltages are equal.

12. Operate S-412 (MANUAL VOLTAGE CONTROL) and determine that regulator runs in proper direction.

13. Turn MAIN RECTIFIER CONTROL off and observe that regulator runs down to lower limit stops.

14. Turn MAIN RECTIFIER CONTROL on and S-411 (VOLTAGE CONTROL SELECTOR) to AUTOMATIC and observe that regulator setting is under control of R-417 (AUTOMATIC VOLTAGE CONTROL).

MAIN RECTIFIER POWER ADJUSTMENTS

1. Remove conductors from primary terminals of T-1501 (Main Rectifier Plate Transformer).

2. Connect secondary links of Main Rectifier Plate Transformer from No. 4 to No. 6 on all three phases.

3. Turn S-421 (Main Rectifier Control) to the TUNE position. Observe:
    a. I-406 (green) lights - (SWITCH ON).
    b. K-1601, K-1602 (bleeder contactors in Rectox Frame) operate.
    c. K-1503 in High Voltage Transformer operates connecting primaries in Wye.
    d. S-2002 (Main Rectifier Breaker in switchgear) closes.
    e. I-203 (PLATE), I-303 (PLATE), I-405 (MAIN RECTIFIER POWER ON), I-503 (PLATE), (all red) light on Modulator, Left Power Amplifier, Center Power Amplifier, and Right Power Amplifier, respectively.

4. Repeat 3 above except turn S-421 to the ON position and in (c) K-1501 and K-1502 should close in sequence connecting the Transformer primaries in Delta.

FINAL TUNE-UP

1. Replace primary leads on Main Rectifier Plate Transformer.

2. Protective gap settings:
    a. Set the protective gap on the Modulator Reactor to 0.2 inch. A number 8 or 13/64 straight shank twist drill may be used as a gauge. Set the protective gaps on the Modulation Transformer to 0.15 inch each. A No. 25 or 5/32 straight shank twist drill may be used as a gauge. These are initial settings. If sparking of the gaps occurs during program operation, each gap may be opened up an additional .05 inch.
    b. Set the two protective ball gap assemblies in the Rectox Frame to 1/16inch each

3. Set up for audio input level, response, distortion and modulation measurements as follows:
   a. Obtain sample of carrier for modulation monitor and distortion analyzer from two separate lines each connected across a portion of the end ring on the PA inductor L-401.
   b. Using a Western Electric Type 111-C (or equivalent) repeat coil for isolation between a 500 ohm attenuator and the input of the transmitter, read level in dbm with volume indicator meter on the audio oscillator side of the attenuator. This applies to all audio input level and audio response measurements.

4. Turn MAIN RECTIFIER CONTROL to tune. Power Amplifier plate volts should be approximately 8.1 kv. Tune Power Amplifier for minimum plate current indicated on M-402 (TOTAL PA PLATE CURRENT).
   a. Observe:
      (1) M-415 (LOAD CURRENT) 10.6 to 11.0 amperes RF (230 ohm load).
      (2) M-304, M-413 (LEFT POWER AMPLIFIER PLATE CURRENT) 1.7 to 1.8 amperes.
      (3) M-504, M-414 (RIGHT POWER AMPLIFIER PLATE CURRENT) 1.7 to 1.8 amperes.
      (4) M-203 (MODULATOR PLATE VOLTS) 9.7 to 10 kv.
   b. Adjust C-101 in the Type FA Crystal Oscillators for correct carrier operating frequency. The shaft of C-101 (screwdriver adjustment) is accessible through holes in the RF door of the Exciter. The range of C-101 is approximately ±30 cycles.
   c. Reduce MODULATOR BIAS until the tubes draw 0.1 amperes plate current each.
   d. Apply 1000 cycle tone to transmitter input at a level of about -14 dbm in order to produce 50 percent modulation of the carrier.
   e. Allow transmitter to run at this level for 15 minutes. During this period an occasional Modulator or Power Amplifier plate overload may occur with no apparent reason. If no other abnormal indications are encountered, it may be assumed that the interruptions are "gas flashes" in the WL-5671 tubes.
   f. At the end of the 15 minute run, shut down the transmitter completely, including blowers. Inspect and feel all components for indications of abnormal operation or heating. Inspect and feel metal rectifiers, including all stacks of the Modulator and Power Amplifier Rectox Units.

NO

5. If no overloads occurred in e. above, switch main rectifier control to ON and readjust MODULATOR BIAS so that tubes draw 0.2 amperes each with modulation.
   a. Modulate 50 percent with 100 cycle tone for 15 minutes. Repeat f. above. If more than one gas flash occurs in a 10 minute period, the run must be extended until the gas "cleans up." Note that with all feedback disconnected, the carrier envelope as seen on an oscilloscope will be considerably distorted. At 11.5 kv on M-401 (POWER AMPLIFIER PLATE VOLTS), observe:
      (1) LOAD CURRENT 14.7 amp. RF (230 ohm load). Operate S-405 (OUTPUT COUPLING) as required to give 50 kw output.
      (2) LEFT POWER AMPLIFIER PLATE CURRENT 2.55 amp maximum, and equal to Right Power Amplifier plate current.
      (3) RIGHT POWER AMPLIFIER PLATE CURRENT equal to Left Power Amplifier plate current.

      Note: The plate currents for (2), (3) above must be obtained with equal (or within 3 percent of average) capacitance in C-320 and C-520. Check capacities after tuning to maximum plate efficiency.

      (4) M-402 (TOTAL PLATE CURRENT) 5.1 amp maximum.
      (5) M-203 (MODULATOR PLATE VOLTS) 13.4 to 13.8 kv.
      (6) M-201 (LEFT MODULATOR PLATE CURRENT), M-204 (RIGHT MODULATOR PLATE CURRENT) 0.2 amp each. Operate S-108 and S-109 (LEFT AND RIGHT MODULATOR BIAS) switches on Exciter control panel to give 0.2 amp Modulator plate current each.
      (7) M-404 (TOTAL TRANSMITTER INPUT POWER) 98.5 to 103.5 kw.

b. Apply 1000 cps sine tone to the input of the transmitter to give 85 percent modulation. Observe:
   (1) Modulator plate currents do not differ from each other by more than 0.2 amps.
c. Repeat (b) except use 50 cps sine tone modulation.
d. Repeat (b) except use 7500 cps sine tone modulation.
e. Input level for 50 percent modulation at 1000 cps should be between -12 and -14 dbm.

6. Shut down all power and bias supplies and:
   a. Reconnect wire to TS-125 terminal 325 (audio relay removed in Low Level Audio Adjustments, 807 Stage).
   b. Reconnect wires TS-126, terminal 340, and terminal 342. Remove grounds from terminals 340 and 342.

7. Turn on transmitter, observe same conditions as in 5a above.
   a. Apply 1000 cycle sine tone to the input of the transmitter at an input level of +8.6 dbm. Adjust voltage feedback potentiometers R-1117 and R-1118 until Modulator plate currents are equal at 85 percent modulation. Observe that:
   (1) The noise level is better than 60 db below 100 percent modulation.
   (2) The modulation capability is at least one hundred percent from 50 to 7500 cycles.
   (3) The frequency response from 30 to 10,000 cycles is uniform within ±1 db.
   (4) The distortion is less than 3 percent up to 95 percent modulation from 50 to 7500 cycles.
   (5) The carrier shift is less than 5 percent for 100 percent modulation at 1000 cycles.

ANTENNA ARC INTERRUPTER ADJUSTMENTS

1. Disconnect lead from Center Power Amplifier TS-408, terminal 114 and from the tower tuning RF Current Transformer-Rectifier Unit.
   a. Measure capacitance to ground of the above lead.
   b. Obtain fixed paper or mica capacitor, 600 volt rating, within 10 percent of above measured value and connect the capacitor between terminals 359 and 362 on TS-414 in the Center Power Amplifier.

2. Replace leads removed in 1 above. Note: If station does not employ pattern change, place permanent jumper between terminals 111 and 112 of TS-408.

3. Remove Antenna Arc Interrupter Unit from Center Power Amplifier.
   a. Turn ARRAY BALANCE, ANTENNA BALANCE, and LINE BALANCE controls full counterclockwise.
   b. Connect Interrupter Unit to Center Power Amplifier by means of the extension cable supplied.
   c. Turn on transmitter (50 kw carrier).
   d. Turn S-409 (OFF-CALIBRATE-OPERATE) to CALIBRATE.

4. With d-c voltmeter of 1/4 megohm or more resistance, observe 75 to 100 volts across R-1405 (LINE BALANCE) and across R-1403 (ANTENNA BALANCE). The two voltages must be of same polarity. If not, reverse output leads on tower tuning RF Current transformer-rectifier. If voltages are not between 75 and 100 volts, adjust tap switches on RF Current transformer-rectifier Units to bring them within the above range.

5. Observe:
   a. Clockwise rotation of R-1405 (LINE BALANCE CONTROL) causes M-1401 (BALANCE INDICATOR) to deflect, and that with S-1401 (METER SHUNT) button depressed, a deflection of 300 microamperes causes K-1401 (sensitive relay) to close, which closes K-1402 and lights J-401 (ANTENNA SYSTEM UNBALANCE).

b. Similarly, deflecting the BALANCE INDICATOR 300 microamperes in the opposite direction by turning ANTENNA BALANCE CONTROL, should cause the same operations as in a. above.
c. If station employs pattern change, switch ANTENNA ARRAY to DIRECTIONAL, and note action similar to above with R-1404 (ARRAY BALANCE).
d. Increase sensitivity by turning all controls clockwise, keeping BALANCE INDICATOR near zero.

6. Turn OFF-CALIBRATE-OPERATE switch to OPERATE and observe that a 300 microampere unbalance causes momentary interruption of the carrier and lights I-26 (ANTENNA ARC-OVER). Note that if the unbalance is done deliberately by turning one of the controls, the transmitter will be keyed on and off at a rapid rate which may cause one or more overloads to operate if allowed to continue for more than about one second. In normal operation, the cause of an unbalance is removed by momentary interruption of the carrier.

NOISE, FEEDBACK, DISTORTION, AND RESPONSE

NOISE

1. Power Amplifier

Carrier noise is caused mainly by a-c heating of the Power Amplifier filaments. It is minimized in the 50HG-2 by:

a. Operating the Left Power Amplifier filaments and Right Power Amplifier filaments in quadrature.
b. Current feedback.
c. Adequate grid drive.
d. Symmetry of the Power Amplifier - (circuit balance).

With normal meter indications as listed in the Section on MAINTENANCE, Normal Meter Readings with the Modulator tube plates connected together, the carrier hum should be better than 60 db below 100 percent modulation. With Modulator tubes darkened and with the plates not connected together, the carrier hum should be better than 60 db below 100 percent modulation.

2. Modulator

Modulator noise is caused by a-c heating of the tube filaments, and is minimized b

a. In-phase operation of filaments and out-of-phase operation of plates (push-pull).
b. Symmetry of Modulator circuit (plate current balance, uniformity of tubes).
c. Voltage feedback.

With Modulator grids connected together, the carrier noise should be better than 54 db below 100 percent modulation.

3. Exciter

a. RF Amplifier: The RF amplifiers in the Exciter operate Class C, and do not contribute appreciable hum.
b. 5736 Cathode Follower Audio Stage: The large amount of inherent inverse feedback provided by the cathode follower circuit suppresses hum originating within this st
c. 813 Audio Stage: Filament hum is reduced by negative feedback within the stage by the use of a cathode resistor. The hum measured between an 813 plate and ground with the modulator tubes dark, should be less than 3 volts rms.
d. 807 Audio Stage: Very little carrier noise should be contributed by this stage. The tubes, however, must have no loose elements or heater-cathode leakage. A cathode resistor provides negative feedback.

POWER SUPPLY RIPPLE VOLTAGES

With a 60 cycle supply and normal operating loads, the ripple voltages should be approximately as shown below:

Left 5736 Audio Bias	0.02 volts rms
Right 5736 Audio Bias	0.02 volts rms
Left Modulator Bias	0.03 volts rms
Right Modulator Bias	0.03 volts rms
400 Volt Supply	0.04 volts rms
Exciter RF Bias	0.12 volts rms
1500 Volt Supply	0.70 volts rms
3000 Volt Supply	1.2 volts rms
Left Power Amplifier Bias Supply	0.10 volts rms
Right Power Amplifier Bias Supply	0.10 volts rms
Modulator Plate Supply (0.4 amp load)	10 volts rms
Power Amplifier Plate Supply (5.0 amp load)	100 volts rms (out of rectifier)

VOLTAGE FEEDBACK

Voltage feedback is most effective at frequencies greater than 400 cycles. Voltage feedback is used to reduce noise and distortion appearing at the plates of the modulator tubes.

Enough feedback is used at the hum frequencies to bring the hum output of the Modulators well below the power amplifier filament hum.

CURRENT FEEDBACK

Current feedback is most effective at frequencies below 400 cycles. The change from voltage to current feedback in the feedback loop is accomplished by a cross-over network such that flat overall frequency response within the audio system is maintained, eliminating the need for equalizing.

Current feedback also eliminates instability in the audio system such as may be caused by heavy low frequency modulation (below 30 cps).

Turntable rumble, program amplifier "thumps," antenna arcs are familiar examples of low frequency phenomena which cause audio instability and overloads.

This audio stability is accomplished by taking the sample of current feedback from the primary side of the modulation transformer. Then in the event of heavy low frequency modulation, the magnetizing current which tends to saturate the transformer and cause overloads is limited by the feedback loop.

DISTORTION

1. In a correctly adjusted transmitter, the chief reasons for distortion are:
   a. Shift of Modulator plate supply voltage with modulation level. The effect of the Modulator plate voltage change is minimized by utilizing the increase in driver cathode current to change the operating bias on the modulator tubes.
   b. Modulator driver regulation.

Each of the above reasons cause "symmetrical" or even-order harmonic distortion since the same effect occurs during each half cycle. The first (a) may be seen at medium audio frequencies on the modulation envelope as a slight departure from a sine wave at the abscissa. The second (b) is evidenced as a slight flattening of sine wave peaks.

2. If the two sides of the audio system do not have the same gain, "non-symmetrical" distortion will be produced as evidenced by inequality between positive and negative modulation peaks. Distortion from this source is minimized by symmetry of circuit components and by proper set-up of the audio system to compensate for non-uniformity of tubes.

3. Insufficient emission capability of the Power Amplifier tubes can cause distortion due to flattening of positive modulation peaks.

FREQUENCY RESPONSE

The frequency response between 30 and 10,000 cycles is controlled mainly (1) by the characteristics of the voltage and current feedback divided networks, (2) by the "step circuit" network consisting of C-163 and R-143 or C-164 and R-144 for high frequencies and R-145 and C-1105 or R-146 and C-1106 for low frequencies of the grid of the second audio stage.

The input level in dbm required to produce 50 percent modulation in a representative 50HG-2 is as follows:

Frequency	Feedback Connected	Current and Voltage Feedback Disconnected
30 cycles	+5.9 dbm	- 3.8 dbm
50 cycles	+5.4 dbm	- 7.8 dbm
100 cycles	+5.5 dbm	-10.5 dbm
200 cycles	+5.8 dbm	-12 dbm
400 cycles	+5.4 dbm	-12.1 dbm
1000 cycles	+4.8 dbm	-12.1 dbm
2000 cycles	+4.4 dbm	-11.6 dbm
4000 cycles	+4.0 dbm	-10 dbm
5000 cycles	+4.0 dbm	- 9 dbm
7500 cycles	+4.0 dbm	- 6.5 dbm
10000 cycles	+5.0 dbm	- 4.2 dbm

CONTROL CIRCUITS

FUNDAMENTAL CONTROL SCHEMATIC DIAGRAM

The Fundamental Control Schematic, figure 47, should be used as a reference in following the operation of the control circuits. Information pertinent to this diagram follows:

1. All switches are shown in the OFF position. All power is off.

2. All relays and contactors are shown deenergized. A normally closed contact is designated by a diagonal line through the contact.

3. All door and enclosure interlock switches are shown in the "door open," or "enclosure open" position.

4. The air interlock switch, S-515, is open.

5. Reference numbers that appear on coils, contacts, switches, etc., also appear on the same component terminals or are terminal board numbers in the wiring diagrams. This makes it possible to correlate points on the control schematic with terminals or terminal board connections in the transmitter cubicles themselves.

THE TURN-ON SEQUENCE

With all switches on the upper Power Control Panel turned ON except SWITCHGEAR CONTROL BUS, TRANSMITTER CONTROL BUS, and the filament switches for the spare Modulator and Power Amplifier Tubes, the turn-on sequence is as follows:

S-9 SWITCHGEAR CONTROL BUS
S-30 BLOWER CONTROL (This will normally be left in the TRANSMITTER AND BLOWER position)
S-28 BUS BREAKER
S-11 TRANSMITTER CONTROL BUS
S-31 AUDIO BIAS
S-32 RF BIAS
S-103 400 VOLT RECTIFIER
S-104 1500-3000 VOLT RECTIFIER
S-410 MAIN RECTIFIER CONTROL

The manner in which the above sequence is maintained can be followed on the Fundamental Control Schematic, figure 47. This is facilitated by the dotted lines which connect each relay or contactor coil to all of its contacts.

ACTION ON SUSTAINED FAULT

The sequence is as follows:

With S-27 in AUTOMATIC position, assume that K-301, L PA overload has operated due to excessive plate current.

1. K-16, Main Master overload operates.

2. K-7, Main Rectifier Breaker Auxiliary, is deenergized.

3. K-7 normally closed contacts energize trip coil of S-2002, the Main Rectifier Breaker.

4. S-2002 opens.

5. S-2002 normally closed contact energizes K-2014 (MG-6 in Switchgear Cubicle).

6. K-2014 normally open contact energizes K-47, Stepping Switch Auxiliary No. 1.

7. K-47 normally open contact energizes step coil of K-13, stepping switch and K-13 advances one step.

8. K-13 normally open contact closes.

9. K-4, Time Delay, starts.

10. Removal of power by S-2002 will remove the overload and allow K-301 to drop out.

11. K-16 opens, closing K-7, energizing the breaker pull-in coil "CC" in the Switchgear. When breaker is nearly closed, a normally open breaker auxiliary contact energizes the "anti-pump" relay K-2008, which in turn opens the circuit to the pull-in coil "CC" which no longer needs to be energized since the breaker latches in mechanically. With the breaker closed, the Main Rectifier is again connected and the transmitter is returned to operation. The function of switches S-2010 and S-2011 is to allow the breaker toggle mechanism to reset before the closing coil is re-energized. This is accomplished by keeping K-2008 energized through switch S-2013 until the closing coil plunger reaches the bottom of its travel, thus opening switch S-2012 and allowing the closing coil to be energized.

12. Application of power again operates overload relay K-301 if the fault condition is still present and the above sequence (1 to 11) is repeated (K-13 advancing one step each time) until the arms on K-13 reach the fourth contact. Then:

13. K-16 is locked in by its own normally open contact, thus holding the Main Rectifier off.

14. K-4 continues to run until it closes, energizing K-5.

15. K-5, Time Delay Auxiliary, normally closed contact opens K-13 step coil, and K-5 normally open contact energizes K-13 release coil.

16. K-13 resets and the entire sequence listed above is repeated until stopped by the operator.

17. The operator may stop the sequence by turning off the Main Rectifier, or any switch ahead of it in the turn-on sequence, or by switching S-27 to MANUAL.

NOTE

A sustained fault in the 1500/3000 Volt Supply causes a similar performance, with the supply held off when the stepping relay reaches the fourth contact. (S-410 must be closed and S-27 in AUTOMATIC for the 1500/3000 Volt Supply to operate the step sequence.) Note that an overload on the 400 Volt Supply will cause K-13 to step up, but will not shut down the supply. That must be done with S-103 or some switch ahead of it in turn-on sequence.

SUPERVISORY RELAY TEST POSITION

Socket X-20 is provided in the Power Control Cubicle for use as a test position for the supervisory system relays. As can be seen from the Fundamental Control Schematic, figure 47, a relay plugged into X-20 will be energized, closing both normally open contacts and causing I-32 (SUPERVISORY RELAY TEST) to light, the relay is working properly.

SUPERVISORY SEARCH RELAY

As a special supervisory search relay, K-1 may be employed to detect erratic operation of enclosure interlocks, air switch, undervoltage relays or other circuits not equipped with supervisory relays and indicator lights. Terminals of K-1 and I-31 (SEARCH RELAY) appear on TS-2, terminals 13 to 20, at the rear of the Power Control Cubicle where they are conveniently accessible and may be connected to other circuits as desired by the station engineer.

OUTAGE CLOCKS

The OUTAGE TIME and OUTAGE DURATION clocks on the Power Control Panel are set as follows:

1. With Transmitter in operation, set the OUTAGE TIME clock to correct time and start it by pressing the RESET button below it.

2. Set the OUTAGE DURATION clock at 12. The clock will run with the transmitter in operation as long as the RESET button is pressed, thus making it possible to set the second hand accurately.

Operation of the clocks can be followed on the Control Schematic, figure 47. Briefly, whenever the Main Rectifier Breaker S-2002 trips, the OUTAGE TIME clock stops, the OUTAGE DURATION clock starts and I-25 (CARRIER INTERRUPTION) lights.

FILAMENT UNDERVOLTAGE RELAY K-8

The operation of K-8 is as follows:

1. K-8 begins a timing cycle when the exciter filament circuit is turned on.

2. After approximately 22 seconds, depending on the voltage slider setting, (see I. L. 41-291-D in the Supplement Section) the normally open contact closes, lighting I-42 (EXCITER FILAMENTS NORMAL VOLTAGE) and "latching-in" relay K-46, the Filament Delay Auxiliary.

3. An interruption in supply voltage will cause the normally open contact to open and after a delay of approximately 8 seconds (depending on the time lever setting of K-8) the normally closed contact to close.

Note that reapplication of power before the 8 seconds have expired will return the transmitter to the air without delay.

BUS BREAKER S-2001

The operation of the Bus Breaker is as follows:

1. With switches S-28 and S-30 closed and series interlocks closed, relay K-3, Bus Breaker Auxiliary, is energized.

2. The normally open contacts of K-3 close, energizing the "pull-in" coil "CC."

3. When the breaker is nearly closed, a normally open breaker auxiliary contact energizes and seals in the "anti-pump" relay K-2004 which in turn opens the circuit to the "pull-in" coil "CC" which no longer needs to be energized since the breaker latches in mechanically. Switches S-2010 and S-2011 function the same as switches S-2012 and S-2013 in the high voltage breaker S-2002.

4. With the breaker closed, the normally open contact in series with the trip coil "T" of S-2001 closes, but the trip coil receives no energy until K-3 becomes deenergized. When this occurs, the breaker is returned to its original "off" position.

5. Note that the breaker will follow relay K-3 off and on; however, the presence of K-2004 in the circuit prevents "pumping" of the breaker due to tripping from a-c overloads or undervoltage. It also prevents the breaker from coming back on automatically if it is manually tripped.

MAINTENANCE

SUGGESTED SCHEDULES

1. Daily

   a. Check pressure in all gas filled capacitors.
   b. Check and polish, if necessary, protective gaps on gas filled capacitors, on 5736 audio driver cathode chokes, on Modulation Transformer, on Modulation Reactor, and on Rectox units.
   c. Inspect fuse wires on high voltage capacitors in Filter.

2. Weekly

   a. Check operation of all control circuit devices, door interlocks, and other protective devices.
   b. Check air interlock as follows: With the distribution bus on, but with filaments off, open the Blower line starter breaker (shutting down blower). This should cause I-36 or I-41 light to go out and the distribution bus to be deenergized.
   c. Thoroughly clean interior and exterior of transmitter cubicles. Clean power equipment external parts with special attention to insulators.
   d. Inspect and oil Blower bearings. Use light machine oil, (SAE No. 10).

3. Monthly

   a. Inspect and, if necessary, clean contactors and relays in the transmitter cubicles. Take particular care to keep the contacts clean on K-3, K-7, and K-13 in the Power Control. Abrasives should not be used on silver contacts, because particles of the abrasives may become embedded in the contact surface. Cleaning the contact fingers and contact arcs of relay K-13 should be done with a soft rag saturated in carbon tetrachloride. After cleaning, remove all lint, and lubricate the contact fingers, bearing pins, and ratchets sparingly with a light mineral oil.
   b. Inspect and, if necessary, clean Main Rectifier and Distribution Bus Switchgear, Type DB-25. Refer to I.B. 35-225-1.
   c. Inspect, clean and lubricate Bus Regulators, also Main Rectifier Regulator if used. Refer to I.B. 5521-A.
   d. Inspect and, if necessary, tighten all electrical connections.
   e. Operate the spare Modulator and Power Amplifier tubes with reduced plate voltage and increase to full power in approximately 15 minutes. Check modulation capability with tone or program material.

4. Quarterly Schedule

   a. Lubricate the exposed parts of the motor operated tuning controls. The reduction gears are packed in grease and with normal usage will require no attention during the life of the equipment. Put a drop of light machine oil on the motor bearings once or twice a year.
   b. Metal rectifiers age slightly during the first several thousand hours of use resulting in a small decrease of output voltage. This decrease may be cancelled by changing the transformer primary taps of the 400 volt and RF bias supplies and by adjusting the controls of the audio bias supplies. Following this initial period, the rectifiers should be closely inspected regularly for evidence of overheating or corrosion. A casual inspection is usually unsatisfactory, because in practice first evidence of these effects usually shows up in individual cells rather than a general deterioration.
   c. The dry type power transformers may require cleaning to prevent clogging of the ventilating ducts if the air contains an excessive amount of dust or lint. If a dry type transformer gets wet, it must be removed from service and thoroughly dried.
   d. The air inlet filter cleaning schedule will depend on local air conditions. The condition of the filters may be determined by inspection or by checking the air flow through the transmitter as specified in the section on Air Velocity under the main heading POWER-ON ADJUSTMENTS. Any indication of a reduction in the normal flow of air should call for replacement or cleaning at once.

If a Precipitron, the Westinghouse Electronic Air Cleaner is used, little maintenance is required besides periodic washings according to instructions furnished with the equipment.

RECTOX RECTIFIERS

The following is a general discussion of the characteristics of rectox rectifiers.

1. Forward Aging

   a. A small increase in resistance to the flow of load current is normal. The resulting reduction in output voltage should not be more than about 5 percent over a period of years. Most rectifier transformers are provided with "aging" taps whereby the voltage can be increased after a year or so of operation. Thereafter no further adjustments should be necessary. A further indication of normal forward aging is a slight increase in output hum of three-phase full-wave rectifiers.

2. Reverse Aging

   a. Normal aging: The reverse resistance will decrease somewhat with age. This is normal and will have no appreciable effect on the rectifier operation.
   b. Effects of excessive reverse aging: If the aging in the reverse direction becomes excessive, the rectifier will overheat. The overheating may damage the cells, or may accelerate forward aging. An abnormal increase in reverse current may overload and damage the rectifier transformer.
   c. Indication of reverse aging: Excessive reverse aging may be detected from any of the effects listed in b. above. In addition, it is possible to measure directly the reverse current in any stack by following the procedure as set forth in paragraph 3 "Replacement of Rectifier Stacks."
   d. Allowable limits of reverse current: It is not possible to give the exact limits of reverse current which may be considered normal. The following general statements apply, however:
      (1) Using the original reverse current measurements supplied by the manufacturer as a standard, the current should not increase over four times this value as aging takes place.
      (2) The reverse current will increase with increasing temperature.
      (3) The reverse aging rate will be less with selenium than with copper oxide.

3. Replacement of Rectifier Stacks

The condition of selenium or copper oxide rectifiers can usually be determined by checking output d-c voltage and rms ripple voltage. A sudden increase in normal ripple with a simultaneous decrease in the output may be the fault of the rectifier and would warrant further investigation. A gradual decrease of approximately 5 percent in the output d-c voltage is to be expected from the normal aging of the rectifier. This also may result in some increase in hum due to some of the rectifiers aging more rapidly than others. If it is decided that the rectifier may be at fault, the following test should be made.

Ordinarily a faulty rectifier stack can be located by running the unit at full load for a short time and then immediately after shutting off the power, checking the temperature of the various rectifier stacks with a thermometer or with the hand. A faulty stack will usually be hotter than the rest. This stack should be disconnected and checked as follows:

Use a d-c power supply capable of supplying the current and voltage shown in the following chart. To check the forward rectifier resistance, connect the positive terminal of the d-c test supply to the negative terminal on the rectifier and the negative terminal of the test supply to the opposite end of the rectifier stack or center tap as noted in some cases. Adjust the test voltage to the proper value. The resulting forward current should be approximately as shown in the table. In checking the back resistance of the rectifier, connect the positive lead of the test supply to the positive rectifier stack terminal.

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DRAWING NO. 50-B-8600 SHEET 1 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ______

STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS
		EXC.						
B-101 *	Motor, 813 R. F. Plate Tuning Drive	Single Phase, 230 V. with capacitor and 1 R. P. M. Gear	Similar To KWC 2505	17	7619371 Pt.1	3	1	
B-102*	Motor, 5736 R. F. Plate Tuning Drive	Single phase, 230 V.A.C., 60 cy., 3 wire reversible motor with capacitor reducer 1120/1	Style 1473814	1	7619371 Pt.2	6	1	
B-103	Motor, 5736 Pl. Coupling	Same as B-102			7619371 Pt.3			
B-104	Motor, L. Mod., Bias Adj.	Same as B-101			7619371 Pt.4			
B-105	Motor, R. Mod., Bias Adj.	Same as B-101			7619371 Pt.5			
		L.P.A.						
B-301	Motor, grid tuning drive	Same as B-102			7619013 Pt.1			
B-302	Motor, plate tuning drive	Same as B-102			7619013 Pt.2			
		C.P.A.						
B-401	Motor, Ant.Coupling	Single phase, 230 V.A.C., 60 cy., 3 wire reversible motor with capacitor reducer 1080/1	Style 1473815	1	7619388 Pt.1	1	1	
		R.P.A.						
B-501	Same as B-301	Same as B-102			7619053 Pt.1			
B-502	Same as B-301	Same as B-102			7619053 Pt.2			
		AUXILIARY COMPONENTS						
B-1601*	Motor, Main #1 Blower	Westinghouse "Lifeline" motor type CSP, 3 phase, 50/60 cycle, 460 volts, 7-1/2 horsepower, type 284 frame.	Style 1442202	1	7426385 Pt.5	2		
B-1602	Motor, Main #2 Blower	Same as B-1601			7426385 Pt.5			
	Main Blower Drive	Wide range vari-pitch texrope drive, 2 groove R section texrope belts 5.250 to 10,000 pitch dia. bore for 1-1/4 dia. motor shaft: keyway 1/4 wide, 1/8 DP., 2-7/8 lg.		59	7426385 Pt.6	2		
	Sheave, Main companion	Magic grip companion sheave, 2 groove (R section texrope belts), 20 in. pitch dia. bore bushings to receive 2-3/16 shaft, keyway 1/2 wide 1/4 deep, 5 in. lg.		59	7426385 Pt.7	2		
	Drive belts, main blower	Type R-150 texrope belts	R-150	59	7426385 Pt.8	4	2	
BM-1601*	Blower, Main #1	Silentvane fan with oil indicators and extensions, size 90, design 10, arrangement 3, bottom horizontal discharge, clockwise rotation, single width single inlet.	#90	35	7426385 Pt.11	2		
BM-1602	Blower, Main #2	Same as BM-1601			7426385 Pt.11			

DRAWING NO. 50-B-8600 SHEET 2 OF 21 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P.C.						
B-1	Bell, outage warning	12-18 V. range, 50/60 cycle, with 4 in. bell.	560	47	7619416 Pt.1	1		
C-1*	Cap., 1500 V. rect. filter	15 MFD., 2000 VDC	Style 1363473	1	7619416 Pt.10	2	1	1
C-2	Cap., 1500 V. rectifier filter	Same as C-1			Pt.11			
C-3*	Cap., 3000 V. rectifier filter	8 MFD., 4000VDC	Style 1363485	1	Pt.12	4	1	1
C-4	Cap., 3000 V. rectifier filter	Same as C-3			Pt.13			
C-5	Cap., 3000 V. rectifier filter	Same as C-3			Pt.14			
C-6	Cap., 3000 V. rectifier filter	Same as C-3			Pt.15			
C-7*	Cap., power factor correcting	0.1 MFD., 7500 V.	S#1346581		Pt.16	3	1	
C-8	Cap., power factor correcting	Same as C-7			Pt.17			
C-9	Cap., power factor correcting	Same as C-7			Pt.18			
C-10	Cap., bus breaker time delay	150 MFD, 150 V,	#TVA-1422	60	7619416 Pt.9			
C-11	Cap., H.V. breaker time delay	Same as C-10			7619416 Pt.8			
		OSCILLATOR						
C-101	Cap., osc. freq. adj.	20 MMF., variable	MC-20-SX	18	7720527 Pt.1	1	1	
C-102*	Cap., osc. cathode by-pass	.047 MFD., 600 VDC	S#1353155	1	7720527 Pt.2	3	2	1
C-103	Cap., osc. pl. by-pass	Same as C-102			Pt.3			
C-104	Cap., osc. volt reg. by-pass	Same as C-102			Pt.4			
C-105	Cap., osc. screen grid	100 MMF., variable	APC-100	18	Pt.5	1	1	
C-106*	Cap., output coupling	470 MMF., 500 V	S#1353121	1	Pt.6	2	2	1
C-107	Cap., thermostat	Same as C-106			7720527 Pt.7			
		EXCITER						
C-109*	Cap., 807 cath. by-pass	.047 MFD., 600 VDC	S#1471517		7619371 Pt.13	6	2	1
C-110	Cap., 807 screen by-pass	Same as C-109			Pt.14			
C-111	Cap., 807 plate by-pass	Same as C-109			Pt.15			
C-112	Cap., 807 plate tank	465 MMF., variable, 3/8 in. shaft, screw driver slot	TC440-L	18	Pt.16	1	1	
C-113	Cap., 813 grid coupling	.0022 MFD., 2.5 KV., DC	S#1353150	1	Pt.17	1	1	1
C-114	Cap., 813 grid by-pass	Same as C-109			Pt.18			

C-320A
C-520A

DRAWING NO. 50-B-8600 SHEET 3 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
C-115	Cap., 813 fil. by-pass	Same as C-109			Pt.19			
C-116	Cap., 813 fil. by-pass	Same as C-109			Pt.20			
C-117	Cap., 813 screen by-pass	.047 MFD., 1.5 KV., DC	S#1471379	1	Pt.21	1	1	1
C-118	Cap., 813 plate by-pass	.0047 MFD., 2.5 KV., DC	S#1471506	1	Pt.22	1	1	1
C-119	Cap., 813 plate coupling	.0047 MFD., 3 KV., DC	S#1471368	1	Pt.23	1	1	1
C-120	Cap., 813 plate tank	335 MMF., per section	S#1474429	18	7619371 Pt.24	1	1	
C-120A	Cap., 813 pl. tank pad	390 MMF., 5 KV., DC	S#1471357	1	7619372 Pt.104	2	1	1
C-120B	Cap., 813 pl. tank pad	Same as C-120A			7619372 Pt.105			
C-121	Cap., 5736 grid by-pass	.01 MFD., 1.2 KV., DC	S#1471412	1	7619371 Pt.25	1	1	1
C-122	Cap., 5736 neuting	10-50 MMF., variable; 20 KV peak	Type At	50	Pt.26	1	1	1
C-123*	Cap., 5736 fil. by-pass	.1 MFD., 500 VDC	S#1471383	1	Pt.27	20	2	1
C-124	Cap., 5736 fil. by-pass	Same as C-123			Pt.28			
C-125	Cap., 5736 fil. by-pass	Same as C-123			Pt.29			
C-126	Cap., 5736 fil. by-pass	Same as C-123			Pt.30			
C-127*	Cap., 5736 pl. coupling	.0018 MFD., 10 KV., DC	S#1471588	1	Pt.31	2	1	1
C-128	Cap., 5736 pl. by-pass	Same as C-127			Pt.32			
C-129*	Cap., 5736 pl. tank	Lapp gas filled, variable, 250-1000 MMF., 12 KV., peak	Pt.3 7617959	1	Pt.33	2	1	
C-129A	Cap., 5736 pl. tank pad	Freq. sensitive item	Dwg. 7427828	1	7619372 Pt.106	1		
C-132*	Cap., 400 V. rect. filter	8 MFD., 600 VDC	S#1346527	1	7619371 Pt.36	26	4	2
C-133	Cap., 400 V. rect. filter	Same as C-132			Pt.37			
C-134	Cap., 400 V. rect. filter	Same as C-132			Pt.38			
C-135	Cap., 400 V. rect. filter	Same as C-132			Pt.39			
C-136	Cap., L.Speech bias rect. filter	Same as C-132			Pt.40			
C-137	Cap., L.Speech bias rect. filter	Same as C-132			Pt.41			
C-138	Cap., L.Speech bias rect. filter	Same as C-132			Pt.42			
C-139	Cap., L.Speech bias rect. filter	Same as C-132			Pt.43			
C-140	Cap., R.Speech bias rect. filter	Same as C-132			Pt.44			
C-141	Cap., R.Speech bias rect. filter	Same as C-132			Pt.45			
C-142	Cap., R.Speech bias rect. filter	Same as C-132			7619371 Pt.46			
C-143	Cap., R.Speech bias rect. filter	Same as C-132			7619371 Pt.47			
C-144*	Cap., L.Mod. bias rect. filter	8.0 MFD , 1 KV., DC	S#1346536	1	Pt.48	8	2	1
C-145	Cap., L.Mod. bias rect. filter	Same as C-144			Pt.49			
C-146	Cap., L.Mod. bias rect. filter	Same as C-144			Pt.50			

DRAWING NO. 50-B-8600 SHEET 4 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
C-147	Cap., L.mod. bias rect. filter	Same as C-144			Pt.51			
C-148	Cap., R.mod. bias rect. filter	Same as C-144			Pt.52			
C-149	Cap., R. Mod. bias rect. filter	Same as C-144			Pt.53			
C-150	Cap., R. Mod. bias rect. filter	Same as C-144			Pt.54			
C-151	Cap., R. Mod. bias rect. filter	Same as C-144			Pt.55			
C-152	Cap., Exc. rect. filter	Same as C-132			Pt.56			
C-153	Cap., Exc. rect. filter	Same as C-132			Pt.57			
C-154	Cap., Exc. rect. filter	Same as C-132			Pt.58			
C-155	Cap., Exc. rect. filter	Same as C-132			Pt.59			
C-156*	Cap., part of B-101	1.0 MFD., 220 V., A.C. used with type RWC 2505 Holtzer Cabot, single phase, 230 V. motor.	PC.NO. 100,295	17	Pt.60	3	2	1
C-157*	Cap., Part of B-102	1.0 MFD., ~~220 V., A.C.~~ used with type B-2259E-M-12 Bodine, single phase, 230 V. motor.	2100-1-1 ~~75C~~	7	7619372 Pt.61	7	2	1
C-158	Cap., part of B-103	Same as C-157			Pt.62			
C-159	Cap., part of B-104	Same as C-156			Pt.63			
C-160	Cap., part of B-105	Same as C-156			Pt.64			
C-161	Cap., 807 audio pl. by-pass	2.0 MFD., 2 KV., DC	S#1392032	1	Pt.65			
C-162*	Cap., 807 audio screen by-pass	2.0 MFD., 600 V., DC	S#1397267		Pt.66	4	5	2
C-163*	Cap., 807 L. audio pl. coupling	0.1 MFD., 2 KV., DC	S#1392028	1	Pt.67	2	2	1
C-164	Cap., 807 R. audio pl. coupling	Same as C-163			7619372 Pt.68			
C-166*	Cap., 813 audio plate by-pass	1.0 MFD., 4 KV., DC	S#1346572	1	7619372 Pt.70	4	3	1
C-167	Cap., 813 L. audio plate coupling	Same as C-166			Pt.71			
C-168	Cap., 813 R. audio plate coupling	Same as C-166			Pt.72			
C-172*	Cap., meter by-pass	.015 MFD., 600 V., DC	S#1471414	1	Pt.76	46	5	2
C-173	Same as C-172	Same as C-172			Pt.77			
C-174	Same as C-172	Same as C-172			Pt.78			
C-175	Same as C-172	Same as C-172			Pt.79			
C-176	Same as C-172	Same as C-172			Pt.80			
C-177	Same as C-172	Same as C-172			Pt.81			
C-178	Same as C-172	Same as C-172			Pt.82			
C-179	Same as C-172	Same as C-172			Pt.83			
C-180	Same as C-172	Same as C-172			Pt.84			
C-181	Same as C-172	Same as C-172			Pt.85			
C-182	Same as C-172	Same as C-172			Pt.86			
C-183	Same as C-172	Same as C-172			Pt.87			
C-184	Same as C-172	Same as C-172			Pt.88			
C-185	Same as C-172	Same as C-172			Pt.89			
C-186	Same as C-172	Same as C-172			Pt.90			
C-187	Same as C-172	Same as C-172			Pt.91			

DRAWING NO. 50-B-8600 SHEET 5 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ____
STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
C-188	Same as C-172	Same as C-172			Pt. 92			
C-189	Same as C-172	Same as C-172			Pt. 93			
C-190	Same as C-172	Same as C-172			Pt. 94			
C-191	Same as C-172	Same as C-172			Pt. 95			
C-192	Same as C-172	Same as C-172			Pt. 96			
C-193	Same as C-172	Same as C-172			Pt. 97			
C-194	Same as C-172	Same as C-172			Pt. 98			
C-195	Same as C-172	Same as C-172			Pt. 99			
C-196*	Cap., 813 L. audio fil. by-pass	50 MFD., 330 V., A.C.	KG-3500	12	Pt. 100	2	1	1
C-199*	Cap., 813 R. audio fil. by-pass	Same as C-196			Pt. 103			
C-1100	Cap., 807 aud. cathode by-pass	2200 MMF., 500 V., DC	S#1353127	1	Pt. 108	5	5	2
C-1101	Cap., 807 aud. fil. by-pass	Same as C-1100			Pt. 109			
C-1102	Cap., 807 aud. fil. by-pass	Same as C-1100			Pt. 110			
C-1105*	Cap., left audio step circuit	Nominal capacity 2200 MMFD., 500 VDC (used only in matched pair with C-1106)	2156 to 2242 MMFD. Select from S#1353127	1	Pt. 113	One matched pair	One matched pair	One matched pair
C-1106	Cap., right audio step circuit	Nominal capacity 2200 MMFD., 500 VDC (used only in matched pair with C-1105)	Matched within 11 MMFD. of C-1105 Select from S#1353127	1	Pt. 114			
C-1109	L. audio 813 screen by-pass	Same as C-162			7619372 Pt. 117			
C-1110	R. audio 813 screen by-pass	Same as C-162			7619372 Pt. 118			
C-1111	Cap., 1500 V., supply decoupling	1.0 MFD., 2 KV., DC	S#1392031		7619372 Pt. 119	1	1	
C-1116	Cap., 802 cathode by-pass	Same as C-1100			7619847 Pt. 586			
C-1117	Cap., 802 cathode by-pass	Same as C-1100			7619847 Pt. 587			
C-1118	Cap., audio 807 screen by-pass	Same as C-162			7619847 Pt. 588			
C-1119*	Capacitor-tuning switch S-109 by-pass	.1 MFD., 600 V., DCW	Type 689X	40	7619847 Pt. 589	4	5	2
C-1120	Capacitor-tuning switch S-109 by-pass	Same as C-1119			7619847 Pt. 590			
C-1121	Capacitor-tuning switch S-108 by-pass	Same as C-1119			7619847 Pt. 591			
C-1122	Capacitor-tuning switch S-108 by-pass	Same as C-1119			7619847 Pt. 592			
C-1123*	Audio 807 cathode by-pass	Capacitor .05 MFD., 400 volts	TM15-4	28	7619847 PT. 593	2	1	0
C-1124	Audio 807 cathode by-pass	Same as C-1123			7619847 PT. 594			
C-1125	Cap., audio by-pass	7 MFD., 330 VAC	KG 3070	12	7619847 PT. 595			
		MODULATOR						
C-201	Cap., meter by-pass	Same as C-172			7617688 Pt. 1			
~~C-202~~								
C-203	Cap., meter by-pass	Same as C-172			Pt. 3			
C-204	Cap., meter by-pass	Same as C-172			Pt. 4			
C-207*	Cap., L. vol., F. B.	.005 MFD., 25 KV.	S#1318089	1	Pt. 7	2	2	1
C-209	Cap., R. vol., F. B.	Same as C-207			Pt. 9			

DRAWINC NO. 50-B-8600 SHEET 6 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		MODULATOR (CONTINUED)						
~~C-212~~	~~CAPACITOR-RIGHT VOLTAGE F-B~~	~~SAME AS C-211~~			~~PT186~~			
C-213*	CAPACITOR-METER R. F. FILTER	470 MMF., 500 V., DC	S#1353121		PT 187	6	2	2
C-214	SAME AS C-213	SAME AS C-213			7620115 PT. 188			
C-215*	CAP., L-VOLT FEED-BACK	4 MFD., 600 VAC	3.9 TO 4.1 MFD. SELECT FROM S#1392004	1	7620115 PT. 189	2	1	1
C-216	CAP., R-VOLT FEED-BACK	SAME AS C-215			7620115 PT. 190			
		L.P.A.						
C-302	CAPACITOR-METER BY-PASS	SAME AS C-172			7619013 PT. 9			
C-303	CAPACITOR-METER BY-PASS	SAME AS C-172			7619013 PT. 10			
C-304	CAPACITOR-METER BY-PASS	SAME AS C-172			7619013 PT. 11			
C-305	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			7619013 PT. 12			
C-306	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			7619013 PT. 13			
C-307	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 14			
C-308	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 15			
C-309	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 16			
C-310	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 17			
C-311	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 18			
C-312	CAPACITOR-WL 5671 FILAMENT BY-PASS	SAME AS C-123			PT. 19			
C-313	CAPACITOR - PART OF WL-5671 GRID TANK CAP. DRIVE MOTOR B-301	SAME AS C-157			PT. 20			
C-314	CAPACITOR - PART OF WL-5671 PLATE CAP. DRIVE MOTOR B-302	SAME AS C-157			PT. 21			
C-315*	CAPACITOR-GRID BY-PASS	.0022 MFD., 5 KV	S#1471364	1	PT. 22	2	1	1
C-316*	CAPACITOR-GRID BLOCKING	.01 MFD., 5 KV	S#1471597		PT. 23	2	2	1
C-317*	CAPACITOR-GRID TUNING	SAME AS C-129			PT. 24			
C-317A*	CAPACITOR-GRID TUNING PAD	470 MMF., 20 KV	S#1471622		PT. 34	2	1	1
C-317B*	CAPACITOR-GRID TUNING PAD	FREQUENCY SENSITIVE ITEM	PT. 11 7427628	1	PT. 35			
C-318*	CAPACITOR-GRID BLOCKING	.001 MFD., 10 KV	S#1471585	1	PT. 25	2	1	1
C-319*	CAPACITOR-PLATE BLOCKING	.0018 MFD., 35 KV.	S#1472185	1	PT. 26	2	2	1
C-320	CAPACITOR - PLATE TUNING	105 AMPS., AT 1 MC. LAPP GAS FILLED CAPACITOR 310-1000 MMF., [illegible] KV. PEAK	PART 2 7617959	1	PT. 27	1	1	
C-320A*	CAPACITOR - PLATE TANK PAD	FREQUENCY SENSITIVE ITEM	PART 2 7427628	1	PT. 33			
C-321*	CAPACITOR - PLATE SUPPLY BY-PASS	100 MMF., 30 KV.	S#1471650	1	PT. 28	2	1	1

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		L.P.A. (CONTINUED)						
C-322	Capacitor - Left Power Amp. bias supply filter	Same as C-132			Pt.29			
C-323	Capacitor-Left Power Amp. bias supply filter	Same as C-132			Pt. 30			
C-324	Capacitor - Left Power Amp. bias supply filter	Same as C-132			Pt.31			
C-325	Capacitor - Left Power Amp. bias supply filter	Same as C-132			Pt.32			
C-326	Capacitor - meter R. F. filter	Same as C-213			Pt.37			
C-327	Capacitor - meter R. F. filter	Same as C-213			7619013 Pt.38			
		C.P.A.						
C-401	Capacitor - meter by-pass	Same as C-172			7619388 Pt.5			
C-402	Capacitor - meter by-pass	Same as C-172			Pt.6			
C-403	Capacitor - meter by-pass	Same as C-172			Pt.7			
C-407	Capacitor - meter by-pass	Same as C-172			Pt.11			
C-408	Capacitor - meter by-pass	Same as C-172			Pt.12			
C-409	Capacitor - meter by-pass	Same as C-172			Pt.13			
C-410	Capacitor -meter by-pass	Same as C-172			Pt.14			
C-411	Capacitor - part of main tank coil drive motor B-401	Same as C-157			Pt.15			
C-412	Capacitor - meter by-pass	Same as C-172			Pt.17			
C-413	Capacitor - meter by-pass	Same as C-172			Pt.18			
C-414	Capacitor - meter by-pass	Same as C-172			Pt.19			
C-415	Capacitor - meter by-pass	Same as C-172			Pt.20			
C-416	Capacitor - meter by-pass	Same as C-172			Pt.21			
C-417	Capacitor - meter by-pass	Same as C-172			Pt.22			
		R.P.A.						
C-502	Capacitor - meter by-pass	Same as C-172			7619053 Pt.9			
C-503	Capacitor - meter by-pass	Same as C-172			Pt.10			
C-504	Capacitor - meter by-pass	Same as C-172			Pt.11			
C-505	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt.12			

DRAWING NO. 50-B-8600 SHEET 8 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		R.P.A. (CONTINUED)						
C-506	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 13			
C-507	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 14			
C-508	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 15			
C-509	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 16			
C-510	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 17			
C-511	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 18			
C-512	Capacitor - WL-5671 filament by-pass	Same as C-123			Pt. 19			
C-513	Capacitor - part of WL-5671 grid tank cap. drive motor B-501	Same as C-157			Pt. 20			
C-514	Capacitor - part of WL-5671 grid tank cap. drive motor B-502	Same as C-157			Pt. 21			
C-515	Capacitor - WL-5671 grid by-pass cap.	Same as C-315			Pt. 22			
C-516	Capacitor - WL-5671 grid blocking cap.	Same as C-316			7619053 Pt. 23			
C-517	Capacitor - WL-5671 grid tuning	Lapp gas filled, variable 220-1000 MMF, 15 KV peak	Pt. 4 7617959		7619053 Pt. 24	1		
C-517A	Capacitor - Grid padder	Same as C-317A			Pt. 34			
C-517B	Capacitor - Grid padder	Same as C-317B			Pt. 35			
C-518	Capacitor - WL-5671 grid blocking	Same as C-318			Pt. 25			
C-519	Capacitor - WL-5671 plate blocking	Same as C-319			Pt. 26			
C-520	Capacitor - WL-5671 plate tuning	105 Amps. at 1 MC. Lapp gas filled capacitor 310-1000 MMF., 50 KV. peak	Pt. 1 7617959		Pt. 27			
C-521	Capacitor - WL-5671 D.C. plate supply by-pass	Same as C-321			Pt. 28			
C-522	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 29			
C-523	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 30			
C-524	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 31			
C-525	Capacitor - right power amp. grid bias supply filter	Same as C-132			Pt. 32			
C-525A	Capacitor - WL-5671 plate tank padder	Freq. Sensitive (Same as C-320A)	Pt. 3 7427628		Pt. 33			
C-526	Capacitor - meter, R. F. filter	Same as C-213			Pt. 37			
C-527	Capacitor - Meter, R. F. filter	Same as C-213			7619053 Pt. 38			

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: [illegible]	QUANTITY: [illegible]
		ANT. ARC-OVER						
C-1401	Capacitor - Filter	4 MFD., 100 V.	JAN-C-25 CP53B1EB-405K		7619585 Pt.1	2	1	
C-1402	Capacitor - Meter by-pass	Same as C-172			7619585 Pt.2			
		H. V. COMPONENTS						
C-1501	Capacitor - Audio filter	Mica Capacitor 2200 MMF., 20 KV., D.C.	S#1471665	1	7718801 Pt.39	1		
C-1502	Capacitor - Mod. trans. coupling	Type F. P., 4 MFD., 20 KV., D. C.	S#1081020	1	7426385 Pt.4	1	1	
C-1503*	Capacitor - Mod. H.V. rectifier filter	Type F. P. 70, 4 MFD., 15 KV., D. C.	S#1397282	1	50-B-8481 It.2	2	1	1
C-1504	Capacitor - Mod. H.V. Rectifier filter	Same as C-1503						
		P.C.						
F-1	Fuse Holder	Fuse block, 7 pole	356007	23	7619416 Pt.19	1		
F-1A*	Fuse, spare	250 V., 1 amp., "Littelfuse"	312001 -	23	Pt.20	7	35	17
F-1B	Fuse, bus voltmeter	Same as F-1A			Pt.21			
F-1C	Same as F-1B	Same as F-1A			Pt.22			
F-1D	Same as F-1B	Same as F-1A			Pt.23			
F-1E	Fuse, tube hour meter	Same as F-1A			Pt.24			
F-1F	Same as F-1E	Same as F-1A			Pt.25			
F-1G	Same as F-1A	Same as F-1A			7619416 Pt.26			
		EXC.						
F-101	Fuse Holder	Fuse block, type "S"	357003	23	7619373 Pt.168	2		
F-101A*	Fuse	Fuse, type 3AG, 1/2 amp.	312500	23	Pt.169	10	50	25
F-101B	Same as F-101A	Same as F-101A			Pt.170			
F-101C	Fuse, spare	Same as F-101A			7619373 Pt.171			
		C.P.A.						
F-401	Same as F-101	Same as F-101			7619388 Pt.57			
F-401A	Same as F-101A	Same as F-101A			Pt.58			
F-401B	Same as F-101B	Same as F-101A			Pt.59			
F-401C	Same as F-101C	Same as F-101A			7619388 Pt.60			

DRAWING NO. 50-B-8600 SHEET 10 OF 29 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT (QUANTITY)	RECOM'D SPARE PARTS LIST (QUANTITY)	MINIMUM SPARE PARTS LIST (QUANTITY)
		ANT. ARC-OVER						
F-1401	Fuse, A. C. Line	Same as F-101A			7619585 Pt. 6	-	-	-
F-1402	Same as F-1401	Same as F-101A			Pt. 7			
F-1403	Fuse, A. C. Line Spare	Same as F-101A			Pt. 8			
F-1404*	Fuse, Relay & Meter	250 V./1/200 amp.	361005	23	Pt. 9	2	10	5
F-1404A	Fuse, extr. post	Finger operated fuse retainer	372001	23	Pt. 10	2	2	1
F-1405	Same as F-1404	Same as F-1404			Pt. 11			
F-1405A	Same as F-1404A	Same as F-1404A			7619585 Pt. 12			
		SWITCHGEAR						
F-2001 F-2002 F-2003	Fuse-Potential trans. primary	Type BAL, 2 amp., current limiting fuse	S#1254953	1	~~PH-15590A Pt. 5~~ PH-23-A-339 PT.5	3	3	3
F-2004 F-2005	Fuse, potential trans. secondary	6 amp., 250 volts	~~37,168~~ 25,006	1	~~PH-15590A Pt. 8~~ PH-23-A-339 PT.8	2	2	2
F-2006 F-2007	Fuse, "GP" trans. primary	Type BAL, 5 amps., current limiting fuse	S#1254955	1	~~PH-15590A Pt. 6~~ PH-23-A-339 PT.6	2	2	2
		H.V. COMPONENTS						
	Fuse H.V. Capacitor used with C-1563 & C-1504	No. 28 tinned copped wire	PDS-2003-2.	1		4 FT.	10 FT.	10 FT.
		P. C.						
I-1*	Lamp, Panel illumination	8 watt daylight fluorescent min. Bi-pin	T-5	1	7619416 Pt. 30	18	9	5
I-1A*	Starter, for panel lamp	120 V., 50/60 cy., for 8 watt fluorescent lamp	FS-5	14	7619416 Pt. 31	18	6	3
I-1B*	Ballast, for panel lamp	120 V., 60 cy., for 8 watt fluorescent (SEE NOTE FOR 50 CY. OPERATION SH. 59).	89G435	14	Pt. 32	18	4	2
I-1D*	Filter, lamp interference	Line filter	TYPE + 216	61	Pt. 34	18	2	1
I-2 I-2A I-2B I-2D	Same as I-1 Same as I-1A Same as I-1B Same as I-1D				Pt. 35 Pt. 36 Pt. 37 Pt. 39			
I-3 I-3A I-3B I-3D	Same as I-1 Same as I-1A Same as I-1B Same as I-1D				Pt. 46 Pt. 41 Pt. 42 Pt. 44			

DRAWING NO. 50-B-8600 SHEET 11 OF ?? SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER — INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		P.C. (CONTINUED)						
1-4	Same as 1-1				Pt.45			
1-4A	Same as 1-1A				Pt.46			
1-4B	Same as 1-1B				Pt.47			
1-4D	Same as 1-1D				7619416 Pt.49			
1-5*	Indicator, 400 V. overload	Opalescent 25 V. rect. minilite	Receptacle Style - ~~1124158~~ 1589180 Bulb Style - 1124156 Lens Style - ~~1124155~~ 1615693	1	7619416 Pt.50	18	2	1
1-6	Ind., R.F. 813 O.L.	Same as 1-5			7619416 Pt.51			
1-7	Ind., L.Aud.813 O.L.	Same as 1-5			Pt.52			
1-8	Ind., R.Aud.813 O.L.	Same as 1-5			Pt.53			
1-9*	Indicator, P. C. interlock	Opalescent, 250 V., rect. minilite	Receptacle Style - ~~1124184~~ 1589187 Bulb Style - 1124156 Lens Style - ~~1124155~~ 1615693	1	Pt.54	14	2	1
1-10	Ind., Exc. Intlk.	Same as 1-9			Pt.55			
1-11	Ind., 1.5-3 KV., D.C., O.L.	Same as 1-5			Pt.56			
1-12	Ind., L. R.F.5736 O.L	Same as 1-5			Pt.57			
1-13	Ind., L.Aud.5736 O.L.	Same as 1-5			Pt.58			
1-14	Ind., R.Aud.5736 O.L.	Same as 1-5			Pt.59			
1-15	Ind., Mod. Intlk.	Same as 1-9			7619416 Pt.60			
1-16	Ind., L.P.A. Intlk.	Same as 1-9			7619417 Pt.61			
1-17	Ind., P.A. HV., D.C. O.L.	Same as 1-5			7619417 Pt.62			
1-18	Ind., R.R.F.5736 O.L.	Same as 1-5			Pt.63			
1-19	Ind., Mod. 1 or 3 O.L.	Same as 1-5			Pt.64			
1-20	Ind., Mod. 2 or 4 O.L	Same as 1-5			Pt.65			
1-21	Ind., C. P. A. Intlk.	Same as 1-9			Pt.66			
1-22	Ind., R.P.A. Intlk.	Same as 1-9			Pt.67			
1-23	Ind., Mod. H.V. D.C. O. L.	Same as 1-5			Pt.68			
1-24	Ind., L.P.A., O.L.	Same as 1-5			Pt.69			
1-25	Ind., Carrier Interr.	Same as 1-5			Pt.70			
1-26	Int., Ant. Arc-Over	Same as 1-5			Pt.71			
1-27	Ind., Rect.Frame Intlk.	Same as 1-9			Pt.72			
1-28	Ind., Aux.Frame Intlk	Same as 1-9			Pt.73			
1-29	Ind., A. C., O. L.	Same as 1-5			Pt.74			
1-30	Ind., R.P.A., O.L.	Same as 1-5			Pt.75			
1-31	Ind., Spare	Same as 1-9			Pt.76			
1-32	Ind., Spare	Same as 1-9			Pt.77			
1-33	Ind., Ant.Phas. Intlk.	Same as 1-9			Pt.78			
1-34	Ind., Spare	Same as 1-9			Pt.79			
1-35*	Ind., Breaker "ON"	Red, 250 V. rect. minilite	Receptacle Style - ~~1124184~~ 1589187 Bulb Style - 1124156	1	7619417 Pt.80	10	1	1

DRAWING NO. 50-B 8600 SHEET 12 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ____ STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		P. C. (CONTINUED)						
I-36	Ind., Blower #1 "ON"	Blue; 250 V. Rect. Minilite	Lens Style - ~~1124150~~ 1615688 Receptacle Style - ~~1124164~~ 1589187 Bulb Style - 1124156	1	7619417 Pt. 81	2	1	1
I-37*	Ind., Control Bus "ON"	Amber; 250 V. Rect. Minilite	Lens Style - ~~1124153~~ 1615691 Receptacle Style - ~~1124164~~ 1589187 Bulb Style - 1124156 Lens Style - ~~1124154~~ 1615692	1	Pt. 82	9	1	1
I-38	Ind., Audio Bias "ON"	Same as I-35			Pt. 83			
I-39	Ind., R.F. Bias "ON"	Same as I-35			Pt. 84			
I-40	Ind., Breaker Switch "ON"	Same as I-37			Pt. 85			
I-41	Ind., Blower #2 "ON"	Same as I-36			Pt. 86			
I-42*	Ind., Exit. Fil. Voltage Normal	Green; 250 V. Rect. Minilite	Receptacle Style - ~~1124164~~ 1589187 Bulb Style - 1124156 Lens Style - ~~1124131~~ 1615689	1	Pt. 87	11	1	1
I-43	Ind., Aud. Bias Switch "ON"	Same as I-42			Pt. 88			
I-44	Ind., R.F. Bias Switch "ON"	Same as I-42			7619417 Pt. 89			

DRAWING NO. 50-B-8600 SHEET 13 OF 31 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER						
1-101*	Ind., Osc. #1 Heater "ON"	Amber; 125 V. rectangular minilite	Receptacle Style - ~~1124161~~ 1589184 Bulb Style - 1124156 Lens Style - ~~1124154~~ 1615692	1	7619373 Pt.121	2	1	1
1-102A*	Ind., Osc. #1 Thermo-stat	Clear; 25 V. rectangular minilite	Receptacle Style - ~~1124158~~ 1589180 Lens Style - ~~1124152~~ 1615690	1	7619373 Pt.122	2	1	1
1-102B*	Lamp, neon, for 1-102A.		~~1124156~~ TYPE#5122	~~1~~ 23	7619373 Pt.123	2	2	1
1-103	Ind., Osc. 2 heater "ON"	Same as 1-101			7619373 Pt.124			
1-104A	Ind., Osc. 2 thermo-stat	Same as 1-102A.			7619373 Pt.125			
1-104B	Lamp, neon for 1-104A	Same as 1-102B.			7619373 Pt.126			
1-105	Ind., 400 V. rect. sw. "ON"	Same as 1-42			7619373 Pt.127			
1-106	Ind., 400 V. rect. power "ON"	Same as 1-35			7619373 Pt.128			
1-107	Ind., 1.5-3 KV. rect. sw. "ON"	Same as 1-42			7619373 Pt.129			
1-108	Ind., 1.5-3 KV. rect. power "ON"	Same as 1-35			7619373 Pt.130			
1-109	Same as 1-1				7619373 Pt.131			
1-109A	Same as 1-1A				7619373 Pt.132			
1-109B	Same as 1-1B				7619373 Pt.133			
1-109D	Same as 1-1D				7619373 Pt.135			
1-110	Same as 1-1				7619373 Pt.136			
1-110A	Same as 1-1A				7619373 Pt.137			
1-110B	Same as 1-1B				7619373 Pt.138			
1-110D	Same as 1-1D				7619373 Pt.140			
1-111	Same as 1-1				7619373 Pt.141			
1-111A	Same as 1-1A				7619373 Pt.142			
1-111B	Same as 1-1B				7319373 Pt.143			
1-111D	Same as 1-1D				7619373 Pt.145			
1-112	Same as 1-1				7619373 Pt.146			
1-112A	Same as 1-1A				7619373 Pt.147			
1-112B	Same as 1-1B				7619373 Pt.148			
1-112D	Same as 1-1D				7619373 Pt.150			
		MODULATOR						
1-201	Ind., Mod. L.Fil."ON"	Same as 1-37			7617688 Pt.11			
1-202	Ind., Mod. Bias "ON"	Same as 1-42			7617688 Pt.12			
1-203	Ind., Mod. Plate "ON"	Same as 1-35			7617688 Pt.13			

DRAWING NO. 50-B-8600 SHEET 14 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		MODULATOR (CONTINUED)						
1-204	Ind., Mod., R.Fil. "ON"	Same as 1-37			7617688 Pt.14			
1-205	Same as 1-1				7617688 Pt.15			
1-205A	Same as 1-1A				7617688 Pt.16			
1-205B	Same as 1-1B				7617688 Pt.17			
1-205D	Same as 1-1D				7617688 Pt.23			
1-206	Same as 1-1				7617688 Pt.19			
1-206A	Same as 1-1A				7617688 Pt.20			
1-206B	Same as 1-1B				7617688 Pt.21			
1-206D	Same as 1-1D				7617688 Pt.24			
		L.P.A.						
1-301	Ind. L.H. Fil. "ON"	Same as 1-37			7619013 Pt.45			
1-302	Ind. Bias "ON"	Same as 1-42			7619013 Pt.46			
1-303	Ind. Plate "ON"	Same as 1-35			7619013 Pt.47			
1-304	Ind. R.H. Fil. "ON"	Same as 1-37			7619013 Pt.48			
1-305	Same as 1-1				7619013 Pt.49			
1-305A	Same as 1-1A				7619013 Pt.50			
1-305B	Same as 1-1B				7619013 Pt.51			
1-305D	Same as 1-1D				7619013 Pt.57			
1-306	Same as 1-1				7619013 Pt.53			
1-306A	Same as 1-1A				7619013 Pt.54			
1-306B	Same as 1-1B				7619013 Pt.55			
1-306D	Same as 1-1D				7619013 Pt.58			
		C.P.A.						
1-401	Ind. Ant. Unbalance	Same as 1-9			7619388 Pt.26			
1-402	Ind. Ant. Arc Over "ON"	Same as 1-101			7619388 Pt.27			
1-403	Ind. Aud. Bias "ON"	Same as 1-42			7619388 Pt.28			
1-404	Ind. R.F. Bias "ON"	Same as 1-42			7619388 Pt.29			
1-405	Ind. P.A. Rectifier "ON"	Same as 1-35			7619388 Pt.30			
1-406	Ind. P.A. Rect. Switch "ON"	Same as 1-42			7619388 Pt.31			
1-407	Ind. Rect. Low Limit	Same as 1-9			7619388 Pt.32			
1-408	Ind. Rect. High Limit	Same as 1-35			7619388 Pt.33			
1-409	Same as 1-1				7619388 Pt.34			
1-409A	Same as 1-1A				7619388 Pt.35			
1-409B	Same as 1-1B				7619388 Pt.36			
1-409D	Same as 1-1D				7619388 Pt.38			
1-410	Same as 1-1				7619388 Pt.39			
1-410A	Same as 1-1A				7619388 Pt.40			
1-410B	Same as 1-1B				7619388 Pt.41			
1-410D	Same as 1-1D				7619388 Pt.43			
1-411	Same as 1-1				7619388 Pt.44			

DRAWING NO. 50-B-8600 SHEET 15 OF 57 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		C.P.A. (CONTINUED)						
1-411A	Same as 1-1A				7619388 Pt.45			
1-411B	Same as 1-1B				7619388 Pt.46			
1-411D	Same as 1-1D				7619388 Pt.48			
1-412	Same as 1-1				Pt.49			
1-412A	Same as 1-1A				Pt.50			
1-412B	Same as 1-1B				Pt.51			
1-412D	Same as 1-1D				7619388 Pt.53			
		R.P.A.						
1-501	Indicator, L. H. Filament "ON"	Same as 1-37			7619053 Pt.45			
1-502	Indicator, Bias "ON" Indicator	Same as 1-42			Pt.46			
1-503	Indicator, Plate "ON"	Same as 1-35			Pt.47			
1-504	Indicator, R. H. Filament "ON"	Same as 1-37			Pt.48			
1-505	Same as 1-1				Pt.49			
1-505A	Same as 1-1A				Pt.50			
1-505B	Same as 1-1B				Pt.51			
1-505D	Same as 1-1D				Pt.57			
1-506	Same as 1-1				Pt.53			
1-506A	Same as 1-1A				Pt.54			
1-506B	Same as 1-1B				Pt.55			
1-506D	Same as 1-1D				Pt.58			
		MINILITE PARTS						
	Bulbs, Minilite		Style - 1124156	1		65	32	32
	Lens, Minilite	Amber	Style - ~~1124154~~ 1615692	1		10	2	1
	Lens, Minilite	Clear	Style - ~~1124152~~ 1615690	1		2	1	1
	Lens, Minilite	Green	Style - ~~1124151~~ 1615689	1		11	3	1
	Lens, Minilite	Red	Style - ~~1124150~~ 1615688	1		10	2	1
	Lens, Minilite	Opalescent	Style - ~~1124155~~ 1615693	1		32	8	4
	Lens, Minilite	Blue	Style - ~~1124153~~ 1615691	1		2	1	1

DRAWING NO. 50-B-8600 SHEET 16 OF 54 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		P.C.						
J-1*	Receptacle, 117 V. A. C. Outlet	Plug 125 V., 15 amps.	5727	33	7619417 Pt.111	6		
		EXCITER						
J-101*	Receptacle, RG8/U	R. F. Coax. connector	83-1RTY	3	7720527 Pt.9	2		
J-102	Same as J-101				7619373 Pt.162			
J-103*	Receptacle, RG17/U	R. F. Coax. connector	G-1 7619445	1	7619373 Pt.163	2		
J-104	Same as J-103				7619373 Pt.164			
J-105*	Receptacle, osc.	Jack, 14 terminals	Pt.1 7724153	1	7619373 Pt.165	4	1	
J-106	Same as J-105				7619373 Pt.166			
J-107	Same as J-1				7619373 Pt.161			
		MODULATOR						
J-201	Same as J-1				7617688 Pt.26			
		L.P.A.						
J-301	Same as J-1				7619014 Pt.61			
		C.P.A.						
J-401	Same as J-1				7619389 Pt.65			
J-402	Receptacle, Ant. Arc.-Over	Same as J-105.			7619389 Pt.66			
J-403	Receptacle, Test Cable	Same as J-105			7619391 Pt.231			
J-404	Receptacle, Test Cable	Plug, 14 terminals	Pt.2 7724153	1	7619391 Pt.232			
		R.P.A.						
J-501	Same as J-1				7619054 Pt.61			

DRAWING NO. 50-B-8600 SHEET 17 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT ____

STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P. C.						
K-1*	Relay, spare aux.	Type SG-auxiliary relay, 230 V., 50/60 cy.	Style 1162957	1	7619418 Pt.121	8	1	
K-2	Relay, 3 KV. intlk. aux.	Same as K-1			7619418 Pt.122			
K-3	Relay, bus. breaker control	Same as K-1			7619418 Pt.123			
K-4	Relay, time delay	Type TK, timing relay, 230 V., 60 cy. (see note for 50 cycle operation on page 59.)	Style 1059954	1	7619418 Pt.124	1		
K-5	Relay, T. D. aux.	Same as K-1			7619418 Pt.125			
K-6	Relay, Bias aux.	Same as K-1			7619418 Pt.126			
K-7	Relay, H.B. Brkr. aux.	Same as K-1			7619418 Pt.127			
K-8	Relay, Excit. fil. U.V.	Type CV. voltage S.P.D.T. relay 230 V.	Style 1056487	1	7619418 Pt.128	1		
K-9	Relay, 3 KV., D.C. O.L.	Type SC current relay 2.0-8.0 amps. range (2 N. O. contacts)	Style 1096939	1	7619418 Pt.129	1		
K-10	Relay, A.C.O.L.Aux.	Same as K-1			7619418 Pt.130			
K-11*	Relay, H. V. Audio D.C. O.L.	Type SC current relay, 4-16 amp. range 2 N. O. contacts	Style 1096940		7619418 Pt.131	2		
K-12	Relay, H.V., R.F., D.C., O.L.	Same as K-11			7619418 Pt.132			
K-13	Relay, stepping	2 lever stepping relay 24, V., D.C.	RA74	4	7619418 Pt.133	1		
K-14*	Relay, 3 KV., master O. L.	Type MG-6 Aux. relay, 230 V., 60 cy. (see note for 50 cycle operation on page 59.).	Style 1163930	1	7619418 Pt.134	2		
K-15	Relay, 400 V., O. L. Aux. #1	Same as K-1			7619418 Pt.135			
K-16	Relay, main master O.L.L.	Same as K-14 (except contacts #1 and 2 assembled as break)			7619418 Pt.136			
K-17*	Relay, 400 V. O. L. Aux. #2	Type "SK" aux. O. L. D.P.D.T. relay, 24 V. D.C., 300 ohms coil. (2 form "C" contacts)	Type SK-5001	10	7619418 Pt.137	20	5	2
K-18	Relay, R.F. 813 O.L. Aux.	Same as K-17			7619418 Pt.138			
K-19	Relay, L. Aud. 813 O.L. Aux.	Same as K-17			7619418 Pt.139			
K-20	Relay, R.Aud., 813 L. Aux.	Same as K-17			7619418 Pt.140			
K-21	Relay, 3 KV., O.L. Aux.	Same as K-17			7619418 Pt.141			
K-22	Relay, L. RF, 5736 O.L. Aux.	Same as K-17			7619418 Pt.142			
K-23	Relay, L. Aud. 5736 O.L. Aux.	Same as K-17			7619418 Pt.143			
K-24	Relay, R. Aud. 5736 O.L. Aux.	Same as K-17			7619418 Pt.144			
K-25	Relay, R.F., H.V., D.C., O. L. Aux.	Same as K-17			7619418 Pt.145			
K-26	Relay, R. R.F. 5736 O.L. Aux.	Same as K-17			7619418 Pt.146			
K-27	Relay, Mod. #1 or #3 O.L. Aux.	Same as K-17			7619418 Pt.147			
K-28	Relay, Mod. #2 or #4 O.L. Aux.	Same as K-17			7619418 Pt.148			
K-29	Relay, Aud. H.V. D.C. O.L. Aux.	Same as K-17			7619418 Pt.149			
K-30	Relay, L.P.A., O.L. Aux.	Same as K-17			7619418 Pt.150			
K-31	Relay, Ant. Arc-over Aux.	Same as K-17			7619418 Pt.151			
K-32	Relay, A.C. O.L. Aux.	Same as K-17			7619418 Pt.152			

DRAWING NO. 50 B-8600 SHEET 18 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P.C. (CONTINUED)						
K-33	RELAY, R.P.A., O.L. AUX.	SAME AS K-17			7619418 PT.153			
K-34	RELAY, CARRIER INTER. AUX.	SAME AS K-17			7619418 PT.154			
K-35	RELAY, SPARE	SAME AS K-17			7619418 PT.155			
K-36	RELAY, SPARE	SAME AS K-17			7619418 PT.156			
K-37*	CONTACTOR, AUDIO BIAS	TYPE DN-00 10 AMP. CONTACTOR, 3 POLE N. O., 230 V., 60 CYCLES.	STYLE 1301694	1	7619418 PT.157	1		
K-38	CONTACTOR, R.F. BIAS	TYPE DN-00 10 AMP. CONTACTOR, 4 POLE N. O., 230 V., 60 CYCLES	STYLE 1190560	1	7619418 PT.158	1		
K-39	CONTACTOR, 400 V. SUPPLY	SAME AS K-37			7619418 PT.159			
K-40	CONTACTOR, 1.5-3 KV. SUPPLY	CLASS 15-825 N2 SIZE 2. TYPE N-240 45 AMP. CONTACTOR, 4 POLE N. O., 230 V., 60 CYCLES (SEE NOTE FOR 50 CYCLE OPERATION ON PAGE 59).	STYLE ~~1014691~~ 1614216	1	7619418 PT.160	1		
K-41*	RELAY, AUX. FRAMES INTLK.	TYPE SG AUX. RELAY, 230 V., 50/60 CY.	STYLE 1008540	1	7619418 PT.161	10	1	
K-42	RELAY, P.C. INTLK.	SAME AS K-41			7619418 PT.162			
K-43	RELAY, EXC. & MOD. INTLK.	SAME AS K-41			7619418 PT.163			
K-44	RELAY, L.P.A. INTLK.	SAME AS K-41			7619418 PT.164			
K-45	RELAY, C.P.A. & R.P.A. INTLK.	SAME AS K-41			7619418 PT.165			
K-46	RELAY, FIL. DELAY AUX.	TYPE MG-6 AUX. RELAY, 230 V., 60 CY. (SEE NOTE FOR 50 CYCLE OPERATION ON PAGE 59).	STYLE 1163957	1	7619418 PT.166	1		
K-47	RELAY, AUX. NO. 1 STEPPING	SAME AS K-41			7619418 PT.167			
K-48	RELAY, AUX. NO. 2 STEPPING	SAME AS K-41			7619418 PT.168			
K-49	RELAY, BUS BREAKER TIME DELAY	SAME AS K-41			7619418 PT.169			
K-50	RELAY, HV BREAKER TIME DELAY	SAME AS K-41			7619418 PT.174			
		EXCITER						
K-101	RELAY, AUDO INPUT SHORTING	SAME AS K-41			7619373 PT.172			
K-102	RELAY, OSC. SELECTOR	D.P.D.T. LATCHING RELAY, 24 V., D.C. COIL	SIMILAR TO 2759	37	7619373 PT.173	1		
K-103	RELAY, CARRIER INTER.	SAME AS K-41			7619373 PT.174			
K-104	RELAY, 807 & 813 AUDIO SCREEN INTLK.	SAME AS K-41			7619373 PT.175			
K-105*	RELAY, 400 V., D.C., O. L.	TYPE SC CURRENT RELAY, 0.25-1.0 AMP. RANGE	STYLE 1096937- (MODIFIED)	1	7619373 PT.176	2		
K-106	RELAY, 813 R.F., PL. O. L.	SAME AS K-105			7619373 PT.177			
K-107*	RELAY, L.5736, R.F. O.L.	TYPE SC CURRENT RELAY 0.5-2.0 AMP. RANGE	STYLE 1096937	1	7619373 PT.178	4		
K-108	RELAY, R.5736, R.F., PL. O. L.	SAME AS K-107			7619373 PT.179			
K-109*	RELAY, EXC. BIAS, U. V.	TYPE SV VOLTAGE RELAY, 50-150 V.D.C.	STYLE 1096958	1	7619373 PT.180	7		
K-110*	RELAY, L. AUDIO 813 PL. O. L.	TYPE SC CURRENT RELAY, 0.1-0.4 AMP. RANGE	STYLE 1096937- (MODIFIED)	1	7619374 PT.181	4		
K-111	RELAY, R. AUDIO 813 PL., O. L.	SAME AS K-110			7619374 PT.182			
K-112	RELAY, L. AUDIO BIAS, U. V.	SAME AS K.109			7619374 PT.183			

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO. ____

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
K-113	Relay, R. audio bias, U. V.	Same as K. 109			7619374 Pt. 184			
K-114	Relay, L. Audio 5736 Pl. O. L.	Same as K-110			7619374 Pt. 185			
K-115	Relay, R. audio 5736 Pl. O. L.	Same as K-110			7619374 Pt. 186			
		MODULATOR						
K-201*	Relay, Mod. L. Pl. O. L.	Type SC current relay 1-4 amp. range	Style 1096938	1	7617688 Pt. 28	4		
K-202	Relay, Mod. R. Pl. O. L.	Same as K-201			7617688 Pt. 29			
K-203	Relay, Mod. L. bias U. V.	Same as K-109			7617688 Pt. 30			
K-204	Relay, Mod. R. bias, U. V.	Same as K-109			7617688 Pt. 31			
		L.P.A.						
K-301	Relay, Pl. current O. L.	Same as K-201			7619014 Pt. 63			
K-302	Relay, Bias U.V.	Same as K-109			7619014 Pt. 64			
		R.P.A.						
K-501	Relay, Plate current, O. L.	Same as K-201			7619054 Pt. 63			
K-502	RELAY, BIAS UNDER VOLTAGE	SAME AS K-109			7619054 PT. 64			
		ANT. ARC-OVER						
K-1401	Relay, sensitive	Zero center type, sensitive relay contacts close at 300 microamps.	Surface Bakelite Model-534	31	7619585 Pt. 17	1		
K-1402	Relay, power	6 volt, D.P.D.T.	Model 712 Type 4	31	7619585 Pt. 18	1		
K-1601	Relay, H.V. Capacitor discharge	15 KV. D.C. rated S.P.D.T., 230 v.	PT-2 7720454	1	51-C-6168 Pt. 26	2		
K-1602	Relay, H.V. Capacitor discharge	Same as K-1601			51-C-6168 Pt. 27	2		

DRAWING NO. 50-B-8600 SHEET 20 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		SWITCHGEAR						
K-2004	RELAY, ANTI-PUMPING	TYPE "SG" RELAY - OPEN TYPE 2M42B CONTACTS 240VOLTS 50/60 CYCLE			PH-15590A ~~PT. 41~~ PH-23-A-339 PT.20			
K-2008	RELAY, ANTI-PUMPING	SAME AS K-2004						
K-2013	RELAY, A.C.OVERLOAD	SAME AS K-2004						
K-2014	RELAY-RECYCLING	TYPE MG-6 OPEN TYPE, SELF-RESET, WITH SIX NORMALLY OPEN CONTACTS, (SEE NOTE FOR 50 CYCLE OPERATION ON PAGE 59).	S#1163804	1	~~PH-15590A~~ PT.42 PH-23-A-339 PT.21	1		
	THE FOLLOWING PARTS ARE FOR THE TYPE SC-CURRENT RELAY S#-1096937, S#1096938, S#-1096939, S#-1096940, ALSO FOR TYPE SV-VOLTAGE RELAY S#-1096958.							
	OPERATING COIL FOR S#-1096937	0.5 TO 2.0 AMP. RANGE	S#1003396			2		
	OPERATING COIL FOR MODIFIED S#-1096937	0.1 TO 0.4 AMP. RANGE				4		
	OPERATING COILS FOR MODIFIED S#-1096937	0.25 TO 1 AMP. RANGE				2		
	OPERATING COIL FOR S#-1096938		S#1003397	1		4		
	OPERATING COIL FOR S#-1096939		S#1003398	1		1		
	OPERATING COIL FOR S#-1096940		S#1003399	1		2		
	OPERATING COIL FOR S#-1096958		S#1003406	1		7		
	STATIONARY CONTACTS FOR BOTH SC AND SV RELAYS		S#1097234	1		30	8	4
	MOVING CONTACTS FOR BOTH SC AND SV RELAYS		S#1055993	1		15	4	2
	THE FOLLOWING PARTS ARE FOR THE SG-AUX. RELAY S#1008540 AND S#-1162957.							
	OPERATING COIL		S#1008520	1		17	2	1
	MOVING CONTACTS AND ARM (L. HAND)		S#1008709	1		17	-	
	MOVING CONTACTS AND ARM (R. HAND)		S#1008710	1		17	-	
	STATIONARY MAKE CONTACTS FOR S#1008540		S#1008711	1		18	4	2
	STATIONARY MAKE CONTACTS FOR S#1162957		S#1102942	1		16	4	2
	STATIONARY BREAK CONTACTS FOR S#1162957		S#1102943	1		16	4	2
	THE FOLLOWING PARTS ARE FOR TYPE CV-VOLTAGE RELAY S#1056487.							
	ELECTROMAGNET COMPLETE		STYLE 1155134	1		1		
	STATIONARY CONTACT ASSEMBLY		STYLE 704825	1		1	1	1
	CONTACTOR SW. MOVING CONTACT ASSY. WITH SPRING AND SPRING ADJUSTOR		STYLE 1157609	1		1	1	1

DRAWING NO. 50-B-8600 SHEET 21 OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER
INPUT
STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
	THE FOLLOWING PARTS ARE FOR TYPE MG-6 MULTI-CONTACT AUX. RELAY S#1163930 AND S#1163957.							
	OPERATING COIL FOR S#1163930 & S#1163957	230 VOLTS, 60 CYCLES	STYLE 1269651	1		3		
	RESET COIL FOR S#1163957		STYLE 1269683	1		1		
	CONTACT FINGER WITH LEAD AND INS.		STYLE 1201021	1		3	1	1
	STATIONARY CONTACT ASSEMBLY		STYLE 1158609	1		3	1	1
	THE FOLLOWING PARTS ARE FOR TYPE DN-00 CONTACTORS, S#1301694 AND S#1190560.							
	OPERATING COIL		STYLE 1186538	1		3	1	
	SHADING COIL		STYLE 1072832	1		3	1	
	MOVING CONTACTS		STYLE 1040078	1	CAT. NO. 22-000	7	6	3
	STATIONARY CONTACTS		STYLE 1072845	1	CAT. NO. 22-000	14	6	3
	CONTACT SPRING		STYLE 1091161	1		3	1	1
	THE FOLLOWING PARTS ARE FOR TYPE N-240 CONTACTORS CLASS 15-825 N2 SIZE 2. S#1614216							
	OPERATING COIL	230 VOLTS, 60 CYCLES	STYLE 1470222	1		1	1	
	CONTACT SPRING		1314961	1		4	4	
	STATIONARY CONTACT		1314986	1		8	8	4
	MOVING CONTACT		1314985	1		4	4	2
	THE FOLLOWING PARTS ARE FOR TYPE K-1601 AND K-1602, HIGH VOLTAGE RELAY							
	CONTACT ASSEMBLY	H.V. MOVING ARM, TWO CONTACTS			7720454 PT.3	2	2	1
	CONTACT ASSEMBLY	H.V. STATIONARY ARM, FOUR CONTACTS			PT.4	2	2	1
	CONTACT ASSEMBLY	L.V. MOVING ARMS, TWO CONTACTS EACH			PT.5	2	2	1
	CONTACT ASSEMBLY	L.V. STATIONARY ARM, FOUR CONTACTS			7720454 PT.6	2	2	1

DRAWING NO. 50-B-8600 SHEET 22 OF 31 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		P.C.						
L-1*	Reactor, 1.5 KV. supply	4.5 H. filter reactor, 0.7 amps., 1.5 KV., D.C., 150 cy.	L-Spec. 453657	1	7619419 Pt.181	2	1	1
L-2	Reactor, 3 KV., D.C. supply	4.0 H. Filter reactor, 3. KV., D.C., 150 cy.	L-Spec. 453658	1	Pt.182	1	1	1
L-3	Same as L-1				7619419 Pt.183			
		EXCITER						
L-101	Choke, 802 osc. grid	Low level R.F. basketwound choke 900 T/.005 wire /5/8 dia.	G-1 7606743	1	7720527 Pt.11	1	1	1
L-102	Coil, 802 osc. screen grid tank	Low level R.F. tank coil	G-7 7607998	1	Pt.12	1	1	
L-103	Coil, 802 osc. plate tank	Low level R.F. tank coil	G-3 7607998	1	7720527 Pt.13	1	1	
L-105	Coil, 807 R.F. plate tank	Low level R.F. tank coil	G-1 7607036	1	7619374 Pt.198	1	1	
L-108	Choke, 813 R.F. plate	Low level R.F. choke	L-Spec. 453668		7619374 Pt.201	1	1	1
L-109	Coil, 813 R.F. plate tank	6.4 MH., 900 V., 400-1900 KC. low level R.F. tank coil	G-1 7619060		7619374 Pt.202	1		
L-110*	Choke, 5736 R.F.grid	Low level R.F. choke, 4.0 MH., 1300 V., 300-1800 KC.	L-Spec. 453659		7619374 Pt.203	3	2	1
L-111	Choke, 5736 R.F. plate	Low level R.F. choke 2.5 MH., 2.5 KV., 600-1200 KC.	L-Spec. 453666		7619374 Pt.204	1	1	
L-112	Coil, 5736 R.F. plate tank	25 UH., 2.5 KV., 600-1200 KC. low level R.F. tank coil	G-1 7425780		Pt.205	1		
L-113*	Reactor, 400 V., rectifier filter	10 henries, 50/60 cy., 500 V./0.3 amp. D.C.	L-Spec. 453647	1	Pt.206	12	2	1
L-114	Same as L-113	Same as L-113.			Pt.207			
L-115*	Reactor, L.speech bias rectifier filter	18 henries, 100 cy., 500 V./0.1 amp. D.C.	L-Spec. 453660	1	Pt.208	4	1	1
L-116	Same as L-115	Same as L-115			Pt.209			
L-117	Reactor, R.speech bias rectifier filter	Same as L-115			Pt.210			
L-118	Same as L-117	Same as L-115			7619374 Pt.211			
L-119	Reactor L. Mod. rectifier filter	Same as L-113.			Pt.212			
L-120	Same as L-119	Same as L-113			Pt.213			
L-121	Reactor, R. Mod. rectifier filter	Same as L-113			Pt.214			
L-122	Same as L-121	Same as L-113			Pt.215			
L-123	Reactor, Exc. bias rectifier filter	Same as L-113			Pt.216			
L-124	Same as L-123	Same as L-113			Pt.217			
L-128*	Choke, L. audio 5736 grid	150 henries, 30-10,000 cycles, 600 V. peak.	L-Spec. 453689	1	Pt.221	2	1	1
L-129	Choke, R. audio 5736 grid	Same as L-128			Pt.222			
L-130*	Choke, L. audio 5736 cathode	50 henries, 30-10,000 cycles, 500 V./ 0.2 amps.	L-Spec. 453664	1	Pt.223	2	1	1

DRAWING NO. 50-B-8600 SHEET 22 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
L-131	CHOKE, R. AUDIO 5736 CATHODE	SAME AS L-130			PT.224			
L-132	CHOKE LOW LEVEL AUDIO BIAS	SAME AS L-115			PT.225			
L-133	SAME AS L-132	SAME AS L-115			PT.226			
L-134	COIL, STATIC DRAIN	7 TURNS EACH SIDE OF C. T. ON CERAMIC COIL FORM	G-1 7724079	1	7619374 PT.227	1		
		MODULATOR						
L-201*	CHOKE, R. F. FILTER	2.5 MH., R.F. CHOKE	TYPE - R-100	56	7617688 PT. 33	6	2	2
L-202	SAME AS L-201				7617688 PT.34			
		L.P.A.						
L-301*	COIL, 5736 GRID TANK	AIR CORE	G-4 7606741	1	7619014 PT.69	2		
L-302	CHOKE, R.F. GRID	SAME AS L-110	~~SELECT FROM 7427628~~		PT.70			
L-303*	COIL, NEUTING	FREQ. SENSITIVE	SELECT FROM 7427628		PT.71	2	1	
L-304*	CHOKE, R.F. PLATE	CERAMIC WOUND	G-5 7707576	1	PT.72	2	1	1
L-305	REACTOR, BIAS SUPPLY	SAME AS L-113			PT.73			
L-306	SAME AS L-305	SAME AS L-113			PT.74			
L-308	SAME AS L-201	SAME AS L-201			PT.76			
L-309	SAME AS L-201	SAME AS L-201			7619014 PT.77			
		C.P.A.						
L-401A	COIL, PLATE TANK	AIR CORE VARIABLE COIL	G-1 7426170	1	7619389 PT.69	1		
L-401B	COIL, COUPLING	PART OF L-401A			PT.70			
		R.P.A.						
L-501	COIL, 5736 GRID TANK	SAME AS L-301			7619054 PT.69			
L-502	CHOKE, R.F. GRID	SAME AS L-110			PT.70			
L-503	COIL, NEUTRALIZING	SAME AS L-303			PT.71			
L-504	CHOKE, R.F. PLATE	SAME AS L-304			PT.72			
L-505	REACTOR, R.P.A. BIAS SUPPLY	SAME AS L-113			PT.73			
L-506	REACTOR, R.P.A. BIAS SUPPLY	SAME AS L-113			PT.74			

DRAWING NO. 50-B-8600- SHEET 24 OF 52 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		R.P.A. (CONTINUED)						
L-508	Choke, meter R.F. filter	Same as L-201			Pt. 76			
L-509	Choke, meter R.F. filter	Same as L-201			7619054 Pt. 77			
		H.V. COMPONENTS						
L-1503	REACTOR, MOD. FILTER	3.0 H., 1. 1/1.4 AMP. D.C. 15 KV., D.C.	LANS. DWG. NUMBER-KR-7822469	1	7619302 PT.28	1		
		H. V. COMPONENTS						
L-1501	Reactor, audio modulation	Dry type Hypersil 25 henries at .7 amps 7800 volts, 30-10,000 cycles, 40 KV. to ground insulation 55° rise at continuous full load	S#1453629	1	7718801 Pt. 15	1		
L-1502	Choke, auxiliary plate	30 millihenry	1472317	1	7718801 Pt. 38	1		
		POWER AMP. GRID TANK COIL ASSEMBLY COMPONENTS						
	Ring, L-301 and L-501 grid tank coil	Micarta ring 4" O.D. x 3-1/4" I.D.	Pt. 1 7407685	1	7407685 Pt. 1	4		
	Insulator, L-301 and L-501 GRID TANK COIL.	Isolantite spacing insulator 10-3/4" lg.	Pt. 4 7707530	1	7707530 Pt. 4	12	1	1
		POWER AMP. PLATE TANK COIL ASSEMBLY COMPONENTS						
	Ring, main plate tank coil, L-401	Aluminum end ring 25-3/4 O.D. x 15-1/2 I.D.	PTS-1 & 2 7619350	1	7619350 Pts. 1 & 2	2		
	Plate, main plate tank L-401	Mycalex end plate 18" lg. x 3" wide	Pts. 3&4 7619350	1	7619350 Pts. 3 & 4	2	1	1
	Insulator, main plate tank coil L-401	Isolantite, spacing insulator type L-4, white, glazed 26-1/2" lg.	Pt. 17 7607337	1	7607337 Pt. 17	8	2	1
		POWER CONTROL						
M-1	Meter, line current	Type KA-24, similar to S#1274677, except dial to be black with white lettering; for use with 300/5 amp. current transformer calibrated 0-300 amps full scale. Meter face window to be glass.	Similar To 1274677	1	7619419 Pt. 193	1		
M-2	Meter, line volt	Type KA-24, similar to S#1274678, except dial to be black with white lettering; for use with 4/1 potential transformer, calibrated 0-600 volts full scale. Meter face window to be glass.	Similar To 1274678	1	Pt. 194	1		
M-3	Meter, bus current	Type KA-24, similar to S#1274677, except dial to be black with white lettering; for use with 200/5 current transformer; calibrated 0-200 amperes full scale. Meter face window to be glass.	Similar To 1274677	1	Pt. 195	1		

QUANTITY

DRAWING NO. 50-B-8600 SHEET __ OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ______ STYLE NO. ______

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		POWER CONTROL (CONTINUED)						
M-4	Meter, bus volt	Type KA-24, similar to S#1274679, except dial to be black with white lettering; calibrated 0-300 volts full scale. Meter face window to be glass.	Similar To 1274679	1	7619419 Pt.196	1		
M-5	Clock, outage duration	(See note, for 50 cy. operation, on page 59). 115 V./60 cycle, 12 hour clock.	G-1 7620240	1	Pt.197	1		
M-6	Clock, Time of outage	(See note, for 50 cy. operation, on page 59.). 115 V./60 cycle, 12 hour clock.	G-2 7620240	1	Pt.198	1		
M-7	Meter, tube hour	Type RH-35, 240 V./60 cy. (See note for 50 cycles operation, on page 59).	S#1205874	1	7619419 Pt.199	1		
		EXCITER						
M-101*	Meter, osc. cathode current	Type RX-33, 0-30 MA., D.C.	S#1203597	1	7619374 Pt.237	4		
M-102*	Meter, 807 (R.F.) cathode current	Type RX-33, 0-100 MA., D.C.	S#1203602	1	Pt.236	3		
M-103	Meter, 813 (R.F.) grid current	Same as M-101			Pt.239			
M-104*	Meter, 813 (R.F.) cathode current	Type RX-33, 0-500 MA., D.C.	S#1203608	1	7619374 Pt.240	2		
M-105	Meter, 5736 (R.F.) grid current	Same as M-104			7619375 Pt.241			
M-106*	Meter, L. 5736 (R.F.) plate current	Type RX-33, 0-2 amps., D.C.	S#1203486	1	Pt.242	2		
M-107	Meter, R. 5736 (R.F.) plate current	Same as M-106			Pt.243			
M-108	Meter, 1.5 KV., rect.	Type RX-33, 1.0 MA., D.C. movement, similar to S#1203584, except dial calibrated 0-2 KV. and marked with "KV. D.C." supply with multiplier resistor S#1158215 and two mtgs. S#1202797.	Similar To 1203584	1	Pt.244	1		
M-109*	Meter, 813 (R.F.) plate tuning ind.	Type RX-33, 1.0 MA., D.C. movement, similar to S#1203584, except dial calibrated 0-100 and marked with "Position".	Similar To 1203584	1	Pt.245	2		
M-110	Meter, 5736 (R.F.) plate tuning ind.	Same as M-109			Pt.246			
M-111*	Meter, L. 5736 audio bias voltage	Type RX-33, 0-500 V., D.C., supply with multiplier resistor S#1158211 and two mountings S#1202797.	S#1203860	1	Pt.247	4		
M-112	Meter, R. 5736 audio bias voltage	Same as M-111			Pt.248			
M-113	Meter, 807 audio cathode current	Same as M-102			Pt. 249			
M-114	Meter, L. 813 audio cathode current	Same as M-102			Pt.250			
M-115	Meter, R. 813 audio cathode current	Same as M-102			Pt.251			
M-116	Meter, L. mod. bias voltage	Same as M-111			Pt.252			
M-117	Meter, R. mod. bias voltage	Same as M-111			Pt.253			
M-118	Meter, 400 V. rectifier	Type RX-33, 1.0 MA., D.C. movement, similar to S#1203584, except dial calibrated 0-750 and marked "Volts, D.C." supply with multiplier resistor style #1158212 and two mountings S#1202797.	Similar To S#1203584	1	Pt.254	1		
M-119	Meter, L. 5736 audio grid current	Same as M-101			Pt.255			
M-120	Meter, R. 5736 audio grid current	Same as M-101			Pt.256			

DRAWING NO. 50-B-8600 SHEET 26 OF __ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ___ STYLE NO. ___

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
M-121*	Meter, L. 5736 audio cathode current	Type KX-24, 0-0.5 amp., D. C. (special)	Similar To 1274651	1	Pt.257	2		
M-122	Meter, R. 5736 audio cathode current	Same as M-121			Pt.258			
M-123	Meter, 3 KV, rectifier voltage	Type KX-24, 1.0 MA., D.C. movement, dial calibrated 0-5000 and marked "Volts, D.C.".	Type KX-24	1	Pt.259	1		
M-124	Meter, 5736 R.F. total plate current	Type KX-24, 0-3 amp., D. C.	S#1274653	1	7619375 Pt.260	1		
		MODULATOR						
M-201*	Meter, Mod. L. plate current	Type KX-24, 0-5 amp., D. C.	S#1274654	1	7617688 Pt.36	4		
M-202*	Meter, Mod. filament voltage	Type KC-24, 0-20 volts, A.C. (rect. type) the deviation due to temperature change shall not exceed 0.6% of full scale for a 10° C change.	Type KC-24	1	Pt.37	3		
M-203	Meter, Mod. plate voltage	Type KX-24, 0-1 mil. movement, calibrated 0-20 KV.	Type KX-24	1	Pt.38	1		
M-204	Meter, Mod. R. plate current	Same as M-201			7617688 Pt.39			
		L.P.A.						
M-301	Meter, filament voltage	Same as M-202			7619014 Pt.82			
M-302*	Meter, grid voltage	Type KX-24, 1.0 MA., D.C. movement dial calibrated 0-2000 volts D.C. Use with external multiplier R-312. Dial to be black with white letters.	Type KX-24	1	Pt.83	2		
M-303*	Meter, grid current	Type KX-24, 0-1 amp., D.C.	S#1274651	1	Pt.84	2		
M-304	Meter, plate current	Same as M-201			7619014 Pt.85			
		C.P.A.						
M-401	Meter, P. A. plate voltage	Type KX-24, 1.0 MA., D.C. movement, calibrated 0-20 KV, for use with 10 megohm, sectional resistors S#1158223, dial to be black with white letters.	Type KX-24	1	7619389 Pt.79	1	1	1
M-402	Meter, total P.A. plate current	Type KX-24, 0-10 amps, D. C.; similar to S 1543906 except dial to be black with white letters. Minimum of 40 scale divisions.	Similar To ~~S#1274655~~ S#1543906	1	Pt.80	1	1	1

DRAWING NO. 50-B-8600 SHEET [illegible] OF [illegible] SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		C.P.A. (CONTINUED)						
M-403	Meter, output current	Type KX-24, 0-200 microampere movement, calibrated 0-50 as shown below; black dial with white letters; meter title to be "R.F. AMPERES".	Type KX-24	I	7619389 Pt.81	1		

SCALE INDICATION	MICROAMPERES
50	200
45	180
40	159.6
35	139.7
30	119.3
25	99.2
20	79.0
15	58.8
10	39.0
5	21.1
0	5.0

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
M-404	Meter, total trans. input watt.	3 phase, 3 wire, 5 amp., 120 volts wattmeter for use with 480/120 volt potential transformer and 300/5 amp. current transformer. Similar to S#1274688, except with black dial and white letters.	Similar to S#1274688	I	7619389 Pt.82	1		
M-405*	Meter, L.P.A. grid tuning	Type RX-35, style #1159687, except scale to be calibrated 0-100 with minimum of 50 divisions. Meter title to be "Position".	Similar To S#1159687	1	Pt.83	6		
M-406	Meter, R.P.A. grid tuning	Same as M-405.			Pt.84			
M-407*	Meter, L.P.A. grid current	Type RX-35, 0-1 amps., D.C.	S#1159169	1	Pt.85	2		
M-408	Meter, R.P.A. grid current	Same as M-407			Pt.86			
M-409	Meter, 5736 coupling	Same as M-405			Pt.87			
M-410	Meter, Ant. coupling	Same as M-405			Pt.88			
M-411	Meter, L.P.A. plate tuning	Same as M-405			Pt.89			
M-412	Meter, R.P.A. plate tuning	Same as M-405			Pt.90			
M-413*	Meter, L.P.A. plate current	Type RX-35, 0-5 amps., D.C. (Minimum of 40 div.)	S#1159175	1	Pt.91	2		
M-414	Meter, R.P.A. plate current	Same as M-413			Pt.92			
M-415	Meter, R.F. Output current	Type RT-37, 50 ampere R.F. ammeter, same as S#1160370, except with expanded scale, with 6 inch leads: supplied and calibrated with a 50 amp. external thermocouple S#878654. To mount on 3/32 inch thick steel panel. Meter title to be "R.F. AMPERES".	Similar To S#1160370	1	7619389 Pt.93	1	1	1
		R.P.A.						
M-501	Meter, filament volt	Same as M-301			7619054 Pt.82			
M-502	Meter, grid volt.	Same as M-302			Pt.83			
M-503	Meter, grid current	Same as M-303			Pt.84			
M-504	Meter, plate current	Same as M-304			7619054 Pt.85			
		ANT. ARC-OVER						
M-1401	Meter	500-0-500 microamp. scale	Type - RX-35	1	7619585 Pt.23	1		

DRAWING NO. 50-B-8600 SHEET 28 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER INPUT ________ STYLE NO. ________

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	PER UNIT	RECOM'D SPARE PARTS LIST	MINIMUM SPARE PARTS LIST
						QUANTITY		
		EXCITER						
P-101	Plug, osc. coax. connector	Male, screw type RG8/U connector	83-1AP	3	7720527 Pt. 15	1		
P-102*	Plug, osc. coax. connector	Male, screw type RG8/U connector	83-1SP	3	7619375 Pt.267	2		
P-103	Same as Pt. 102				7619375 Pt.268			
P-104*	Plug, osc. cable	Male plug, 14 terminals, ant. arc-over	Pt.2 7724153	1	7720527 Pt. 16	2		
P-1401	Plug, Ant. Arc-Over	Same as P-104.			7619585 Pt. 27			
		P. C.						
R-1	Res., 1.5 K.V. supply bleeder	50,000 ohms, 120 W.	JAN-R-26 RW11G503		7619419 Pt.216	1	2	1
R-2*	Res., 3 K.V. supply bleeder	16,000 ohms, 120 W.	JAN-R-26 RW11G163		7619419 Pt.217	3	2	1
R-3	Same as R-2				7619419 Pt.218			
R-4	Same as R-2				7619419 Pt.219			
R-9*	Resistor, voltage dropping; for rect. minilite	7100 ohms resistor to fit. Style 1124164 rect. minilite	Style 1124148	1	7619419 Pt.224	50	5	2
R-10	Same as R-9				7619419 Pt.225			
R-15	Same as R-9				7619419 Pt.230			
R-16	Same as R-9				7619419 Pt.231			
R-21	Same as R-9				7619419 Pt.236			
R-22	Same as R-9				7619419 Pt.237			
R-27	Same as R-9				7619420 Pt.242			
R-28	Same as R-9				7619420 Pt.243			
R-31	Same as R-9				7619420 Pt.246			
R-32	Same as R-9				7619420 Pt.247			
R-33	Same as R-9				7619420 Pt.248			
R-34	Same as R-9				7619420 Pt.249			
R-35	Same as R-9				7619420 Pt.250			
R-36	Same as R-9				7619420 Pt.251			
R-37	Same as R-9				7619420 Pt.251			
R-38	Same as R-9				7619420 Pt.252			
R-39	Same as R-9				7619420 Pt.253			
R-40	Same as R-9				7619420 Pt.254			
R-41	Same as R-9				7619420 Pt.255			
R-42	Same as R-9				7619420 Pt.256			
R-43	Same as R-9				7619420 Pt.257			
R-44	Same as R-9				7619420 Pt.258			
					7619420 Pt.259			
R-45	Res., K-9, D.C., O.L. relay shunt	10 ohms, 50 watts	JAN-R-26 RW12H100		7619420 Pt.260	1	2	1
R-46*	Res., K-11, D.C.,O.L. relay shunt	5 ohms, 50 watts	JAN-R-26 RW12H5R0		7619420 Pt.261	2	1	1
R-47	Res., K-12, D.C.,O.L. relay shunt	Same as R-46.			7619420 Pt.262			
R-48	Resistor, bus breaker time delay	1500 ohms, 50 watts	Cat.#0573	27	7619420 Pt.263			
R-49	Resistor, bus breaker time delay	10 ohms, 1 watt	S#1473752		7619420 Pt.264			
R-50	Resistor, H.V. breaker time delay	Same as R-48			7619420 Pt.265			
R-51	Resistor, H.V. breaker time delay	Same as R-49			7619420 Pt.266			

DRAWING NO. 50-8-8600 SHEET ___ OF ___ SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER						
R-101	Res., osc. grid	.22 megohm, 1 W.	S-1471204	1	7720527 Pt.17	1	5	2
R-102	Res., osc. cathode	400 ohms, 10 W.	10F	44	Pt.18	1		
R-103	Res., osc. volts divider	6000 ohms, 20 W.	20K	44	Pt.19	1		
R-104	Res., osc. volt divider	20,000 ohms, 10 W.	10F	44	Pt.20	1		
R-105	Res., ind. current limit	47,000 ohms, 1/2 W.	S-1471167	1	7720527 Pt.21	1	5	2
R-106	Res., R.F. 807 grid	15,000 ohms, 2 W.	S-1471266	1	7619375 Pt.271	1	5	2
R-107	Res., R.F. 807 cathode	200 ohms, 13 W.	JAN-R-26 RW20J201		Pt.272	1		
R-108	Res., R.F. 807 screen	0.1 meg., 2 W.	S-1471276		Pt.273	1	5	2
R-109	Res., R. F. 813 grid	5,000 ohms, 6 W.	JAN-R-26 RW15E502		Pt.274	1		
R-110*	Res., R.F. 813 grid suppressor	56 ohms, 1 W.	S-1471012		Pt.275	2	5	2
R-111	Same as R-110				Pt.276			
R-112*	Res., R.F. 813 cathode	500 ohms, 86 W.	JAN-R-26 RW12G501		Pt.277	2	2	1
R-113	Res., R. F., 813 screen divider	40,000 ohms, 20 W.	20F	46	Pt.278	1		
R-114	Res., R.F.813 screen divider	25,000 ohms, 120 W.	JAN-R-26 RW11G253		Pt.279	1	2	1
R-115*	Res., grid balancing	100 ohms, 50 W.	JAN-R-26 RW13G101		Pt.280	3	2	1
R-116	Res., grid balancing	Same as R-115			Pt.281			
R-117A	Res., R.F. Exc. bias	Same as R-112			Pt.282			
R-117B	Res., R.F. Exc. bias	310 ohms, 86 W.	JAN-R-26 RW12G311		Pt.283	1	2	1
R-119*	Pot., L. audio 5736 bias	10,000 ohms, 50 W.	1106-22	46	Pt.285	2	2	1
R-120	Pot., R. audio 5736 bias	Same as R-119			Pt.286			
R-121*	Res., L. Mod. bias	200 ohms, 90 W.	JAN-R-26 RW12G201		Pt.287	2	2	1
R-122A*	Res., L. Mod. bias	2500 ohms, 90 W.	JAN-R-26 RW12G252		Pt.288	4	2	1
R-122B	Same as R-122A	Same as R-122A			Pt.289			
R-124	Res., R. Mod. bias	Same as R-121			Pt.291			
R-125A	Res., R. Mod. bias	Same as R-122A			Pt.292			
R-125B	Same as R-125A	Same as R-122A			Pt.293			
R-126*	Res., M-123 shunt	.47 megohm, 1 W.	S-1471208	1	Pt.294	2	5	2
R-127	Res., M-108 shunt	Same as R-126			Pt.295			
R-128*	Pot., R.F. 813 plate tuning cal.	7500 ohms, 2 W., Linear Taper Pot.	~~JAN-R-19 RA15A1SA-752AK~~ Series 43 Type 43	44	Pt.296	8	2	1
R-129	Pot., R. F. 5736 plate tuning cal.	Same as R-128			Pt.297			
R-130	Pot., R. F. 813 plate tuning ind.	300 Ohms, ± 10%, 2 W.	Pt.8 7422247	1	7619375 Pt.298	1	2	1
R-131*	Pot., R.F. 5736 plate tuning ind.	250 ohms	~~JAN-R-19 RA25A1FG-251AK~~ Series 58 Type 58	44	7619375 Pt.299	7	2	1
R-132	Pot., R.F. 5736 plate coupling ind.	Same as R-131			7619375 Pt.300			
R-134*	Res., aud. input trans. load	Nominal resistance 33,000 ohms, 2 W. used only in matched pair with R-185.	29,700 to 36,300 ohms, select from S#1471270	1	7619376 Pt.302	One matched pair	One matched pair	One matched pair
R-135	Same as R-134	Nominal resistance 33,000 ohms, 2 W. (used only in matched pair with R-134)	Matched within 660 ohms of R134 select from S#1471270	1	7619376 Pt.303			

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PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER — INPUT — STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY: PER UNIT	QUANTITY: RECOM'D SPARE PARTS LIST	QUANTITY: MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
R-143*	Res., L. Audio 813 Grid	Nominal resistance 33,000 ohms, 2 W. (Used only in matched pair with R-144)	29,700 to 36,300 select from S#1471270	1	7619376 Pt.313	One matched pair	One matched pair	One matched pair
R-144	Res., R. Audio 813 Grid	Nominal resistance 33,000 ohms, 2 W. (Used only in matched pair with R-143)	Matched within 330 ohms of R-143 select from S#1471270	1	Pt.314			
R-145*	Res., L. Audio 813 Step Circuit	2200 ohms, 2 W., nominal resistance (Used only in matched pair with R-146)	1980 to 2420 ohms, select from S#1471256	1	Pt.315	One matched pair	One matched pair	One matched pair
R-146	Res., R. Audio 813 Step Circuit	Nominal resistance 2200 ohms, 2 W. (Used only in matched pair with R-145)	Matched within 44 ohms of R-145 select from S#1471256	1	Pt.316			
R-149A*	Res., L. Audio 813 Plate	Nominal resistance 20,000 ohms, 50 W.	Within ± 1/2% of nom. resistance JAN-R-26 RW13G203	1	Pt.319	2	2	1
R-149B*	Res., L. Audio 813 Plate	Nominal resistance 16,000 ohms, 50 W.	Within ± 1/2% of nom. resistance JAN-R-26 RW13G163	1	7619376 Pt.320			
R-150A	Res., R. Audio 813 Plate	Same as R-149A.			7619376 Pt.321			
R-150B	Res., R. Audio 813 Plate	Same as R-149B.			Pt.322			
R-151	Pot., L. Audio 813 Bias	Same as R-138.			Pt.323			
R-152	Pot., R. Audio 813 Bias	Same as R-138.			Pt.324			
R-153*	Res., L. Audio 5736 Grid	31,000 ohms, 35 W.	Type 4-1/8 T. Ferrule 312	46	Pt.325	2	2	1
R-154	Res., R. Audio 5736 Grid	Same as R-153.			Pt.326			
R-157	Same as R-9				Pt.329			
R-158	Same as R-9				Pt.330			
R-159	Same as R-9				Pt.331			
R-160	Same as R-9				Pt.332			
R-161	Same as R-9				Pt.333			
R-162	Same as R-9				Pt.334			
R-165*	Res., 1.5 KV. Rect.	10,000 ohms, 140 W.	JAN-R-26 RW10G103		Pt.337	5	2	1

DRAWING NO. 50-B-8600 SHEET 31 OF 59 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT

STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
R-166A	Res., 3 KV. Rect.	Same as R-165			Pt.338			
R-166B	Same as R-165				Pt.339			
R-166C	Same as R-165				Pt.340			
R-166D	Same as R-165				Pt.341			
R-167*	Res., M-108, Multi.		S#1158215	1	Pt.342	3		
R-168*	Res., M-116, Multi.		S#1158211	1	Pt.343	4		
R-169	Res., M-117, Multi.	Same as R-168			Pt.344			
R-170	Res., M-118, Multi.		S#1158212	1	Pt.345	1		
R-171	Res., M-123 Multi.		S#1158220	1	Pt.346	1		
R-175	Res., M-111 Multi.	Same as R-168			7619847 Pt.541			
R-176	Res., M-112 Multi.	Same as R-168			Pt.542			
R-177*	Res., L. Audio 5736 bias U. V. relay divider	3100 ohms, 20 W.	JAN-R-26 RW15G312		Pt.543	2	1	
R-178	Res., R. Audio 5736 bias U. V. relay divider	Same as R-177			Pt.544			
R-179	Res., L. Audio 5736 cathode	5,000 ohms, 50 W.	JAN-R-26 RW13G502		Pt.545	1	1	
R-180	Res., R. Audio 5736 cathode	Same as R-179			Pt.546			
R-184*	Res., L. Audio 813 screen	Nominal resistance 10,000 ohms, 2 watts (used only in matched pair with R-185)	9,000 to 11,000 ohms select from S#1471264		7619847 Pt.550	One matched pair	One matched pair	One matched pair
R-185	Res., R. Audio 813 screen	Nominal resistance 10,000 ohms, 2 watts (used only in matched pair with R-184)	Matched within 500 ohms of R-184 select from S#1471264		Pt.551			
R-186*	Res., L. Audio 813 cathode	1,600 ohms, 40 W.	JAN-R-26 RW14G162	1	Pt.552	2	1	1
R-187	Res., R. Audio 813 cathode	Same as R-186			Pt.553			
R-188*	Res., Audio 813 bias divider	16,000 ohms, 40 watts.	JAN-R-26 RW14G163-WL40W		Pt.554	1	1	
R-189*	Res., left audio 5736 O.L. relay coil shunt	33 ohms, ± 20%, 2 W.	JAN-R-11 RC40AE-330M		Pt.555	2	5	2
R-190	Res., right audio 5736 O.L. relay coil shunt	Same as R-189			Pt.556			
R-193*	Res., 807 screen suppressor	100 ohms, 1 watt.	S#1472447	1	Pt.559	2	5	1
R-194	Same as R-193	Same as R-193			Pt.560			
R-196	Res., R.F. 5736 grid suppressor	50 ohms, 37 W. globar	Type CX 1" x 4"	9	Pt.562	1	2	1
R-197*	Res., Audio 5736 grid suppressor	100 ohms, 2 W.	S#1471240	1	Pt.563	2	5	2
R-198	Same as R-197	Same as R-197			Pt.564			
R-199*	Res., Audio 807 screen shunting	330 ohms, 2 W	S#1471246	1	7619847 Pt.565	2	5	2
R-1105	Resistor - Audio 807 screen shunting	Same as R-199			7619847 Pt.571			
R-1106	Res., 1500 V. supply decoupling	5000 ohms, 40 W.	JAN-R-26 RW-14G502		PT. 572	1	1	
R-1107*	Resistor - Audio 807 screen	Nominal resistance 220,000 ohms, 2 W. (used only in matched pair with R-1108)	215,600 to 224,400 Select from S#1471280		PT. 573	One matched pair	One matched pair	One matched pair
R-1108	Res., Audio 807 screen	Nominal resistance 220,000 ohms, 2 W. (used only in matched pair with R-1107)	Matched within 1100 ohms of R-1107 select from S#1471280		PT. 574			

DRAWING NO. 50-B-8600 SHEET 32 OF 51 SHEETS

PARTS AND RECOMMENDED SPARE PARTS LIST

APPARATUS 50 HG-2 A. M. BROADCAST TRANSMITTER

INPUT STYLE NO.

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE OR CAT. NO.	MFR	WESTINGHOUSE DRAWING NO.	QUANTITY PER UNIT	QUANTITY RECOM'D SPARE PARTS LIST	QUANTITY MINIMUM SPARE PARTS LIST
		EXCITER (CONTINUED)						
R-1109*	Res., audio 807 plate load	10,000 ohms, 27 W.	JAN-R-26 RW13H103		7619847 Pt.575	4	2	0
R-1110	Res., audio 807 plate load	Same as R-1109.			Pt.576			
R-1111	Res., audio 807 plate load	Same as R-1109.			Pt.577			
R-1112	Res., audio 807 plate load	Same as R-1109.			Pt.578			
R-1113*	Res., audio 807 cathode	Nominal resistance 470 ohms, 2 W. (Used only in matched pair with R-1114).	465 to 475 ohms select from S#1471248		7619847 Pt.579	One matched pair	One matched pair	One matched pair
R-1114	Res., audio 807 cathode	Nominal resistance 470 ohms, 2 W. (Used only in matched pair with R-1113).	Matched within 5 ohms of R-1113 select from S#1471248		Pt.580		-	
R-1115	Hum Bucking Divider	25,000 ohms, 27 W.	JAN-R-26 RW13H253		55-A-8124 It.602	1		
R-1116	Hum Bucking Divider	1,000 ohms, 5 W.	S#1473357		It.603	1		
R-1117*	Pot. right voltage feedback control	5,000 ohms, 2 W.	Pt.19 7611594		It.604	1		
R-1118	Pot. left voltage feedback control	Same as R-1117			Pt.605			
R-1119*	Res., right audio feedback divider	Nominal resistance 18,000 ohms, 2 W. (Used only in matched pair with R-1120).	18,620 to 19,280 select from S#1473898		It.606	One matched pair	One matched pair	One matched pair
R-1120	Res., left audio feedback divider	Nominal resistance 18,000 ohms, 2 W. (Used only in matched pair with R-1119).	Matched within 900 ohms of R-1119 select from S#1473898		It.607			
		MODULATOR						
R-201	Same as R-9				7617688 Pt. 49			
R-202	Same as R-9				Pt. 50			
R-203	Same as R-9				Pt. 51			
R-204	Same as R-9				Pt. 52			
R-205*	Res., Mod. L. O.L. relay shunt	1.0 ohm, 50 W.	JAN-R-26 RW12H1R0		Pt. 53	4	2	1
R-206	Same as R-205				Pt. 54			
R-210-1	* Res., F.B. Divider	20,000 ohms, 120 W.	JAN-R-26 RW11G203		7617688 Pt. 58	26	5	2
R-210-2	Same as R-210-1				Pt. 59			
R-210-3	Same as R-210-1				Pt. 60			
R-210-4	Same as R-210-1				7617689 Pt. 61			
R-212-1	Same as R-210-1				Pt. 71			
R-212-2	Same as R-210-1				Pt. 72			
R-212-3	Same as R-210-1				Pt. 73			
R-212-4	Same as R-210-1				Pt. 74			
R-214*	Res., Mod. L. Pl. current limiting	Type "M" resistor, 25 ohms, 5.5 amps., continuous rating	S#1239114	1	7617689 Pt. 84	2	2	1
R-215	Same as R-214				Pt. 85			
R-217*	Res., Mod. L. Plate suppressor	15 ohms, ± 20%, 39 W., at 3W./Sq. In. "Globar"	Type - CX 1" x 4-1/2	9	Pt. 87	6	6	4
R-218	Same as R-217				Pt. 88			

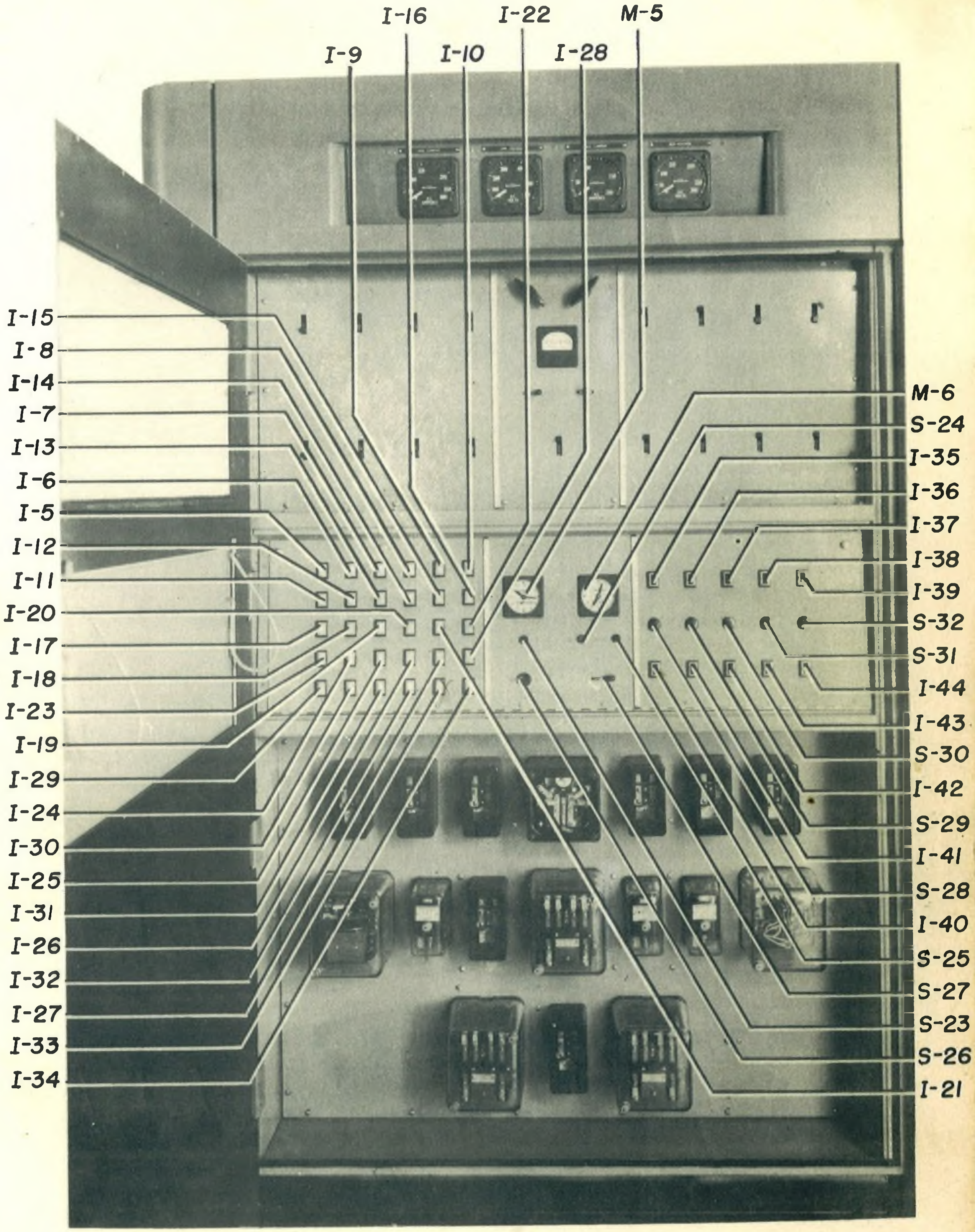


FIG. 1. Power Control Cubicle, Front View (Photo C-12107)

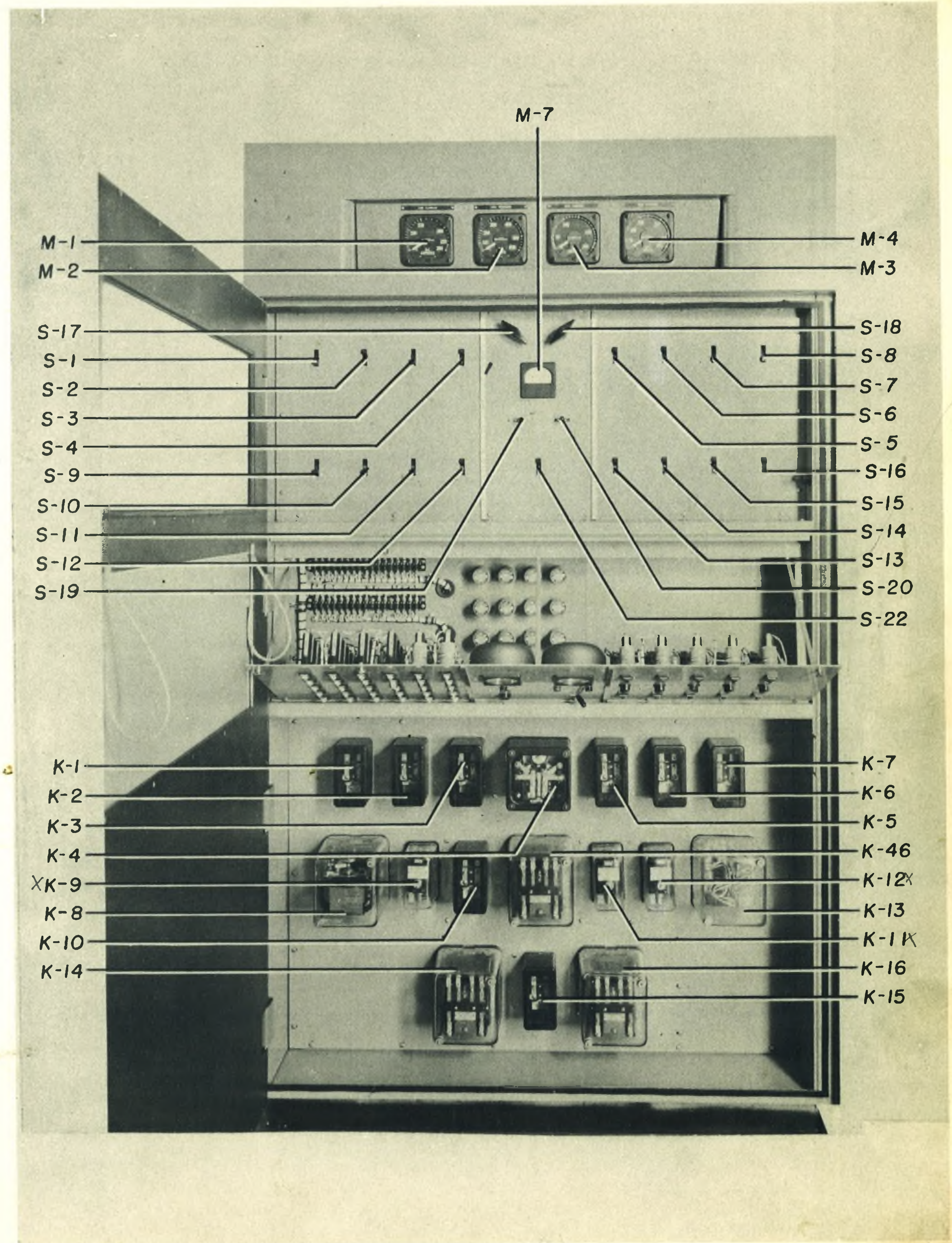


FIG. 2. Power Control Cubicle, Drop-Down Panel (Photo C-12108)

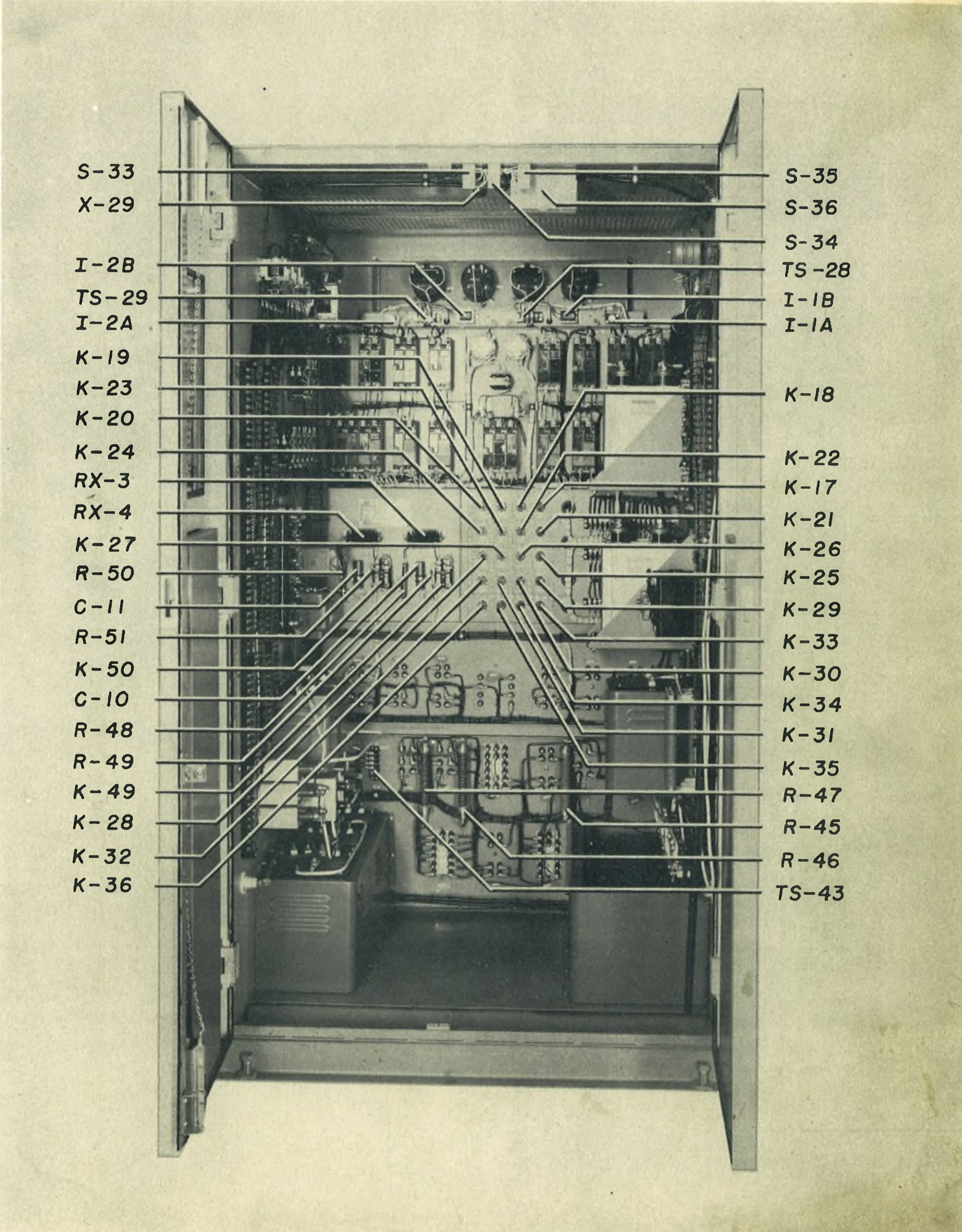


FIG. 3. Power Control Cubicle Interior (Photo C-20273)

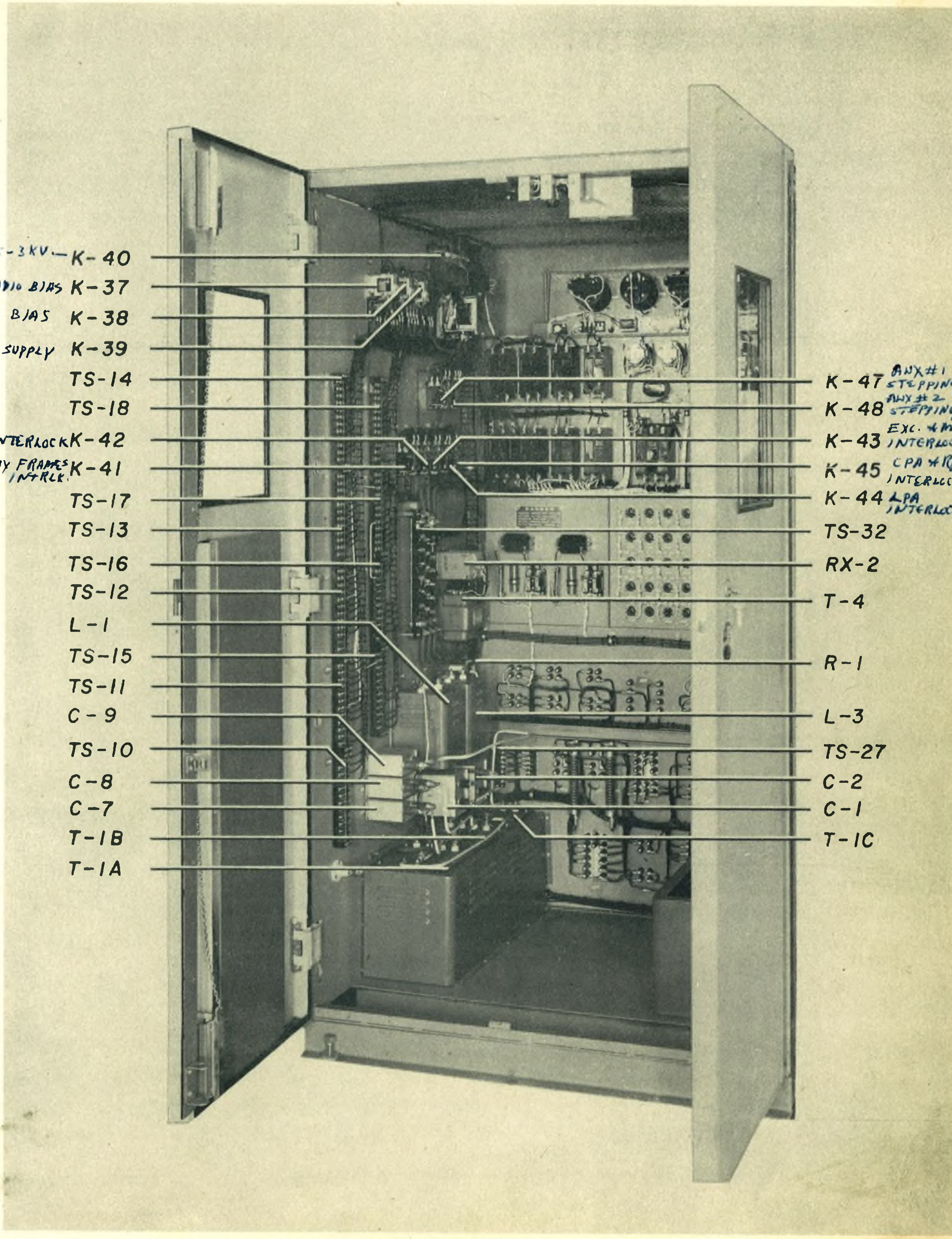


FIG. 4. Power Control Cubicle Interior (Photo C-20275)

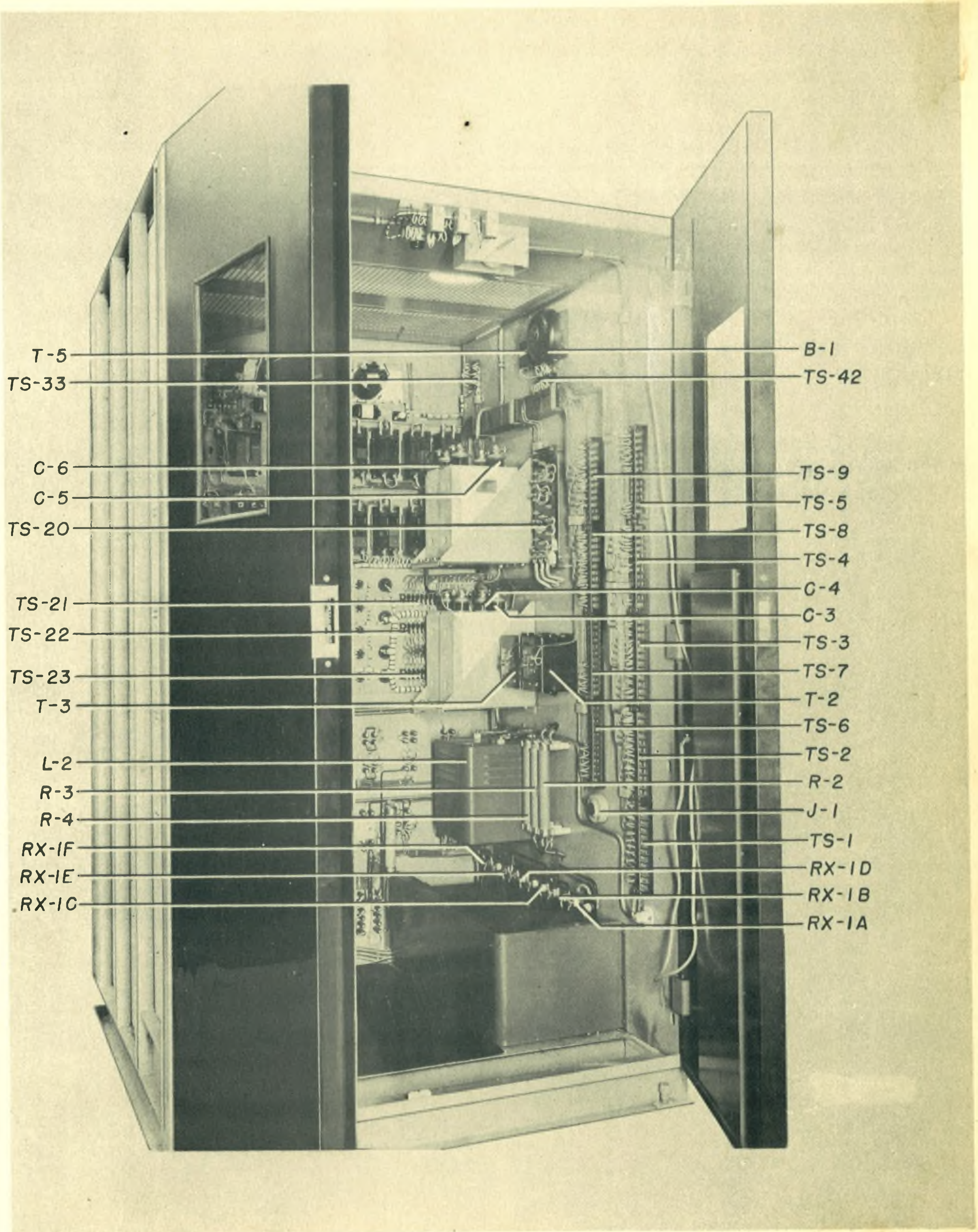


FIG. 5. Power Control Cubicle, Interior, Right Side View (Photo C-12113)

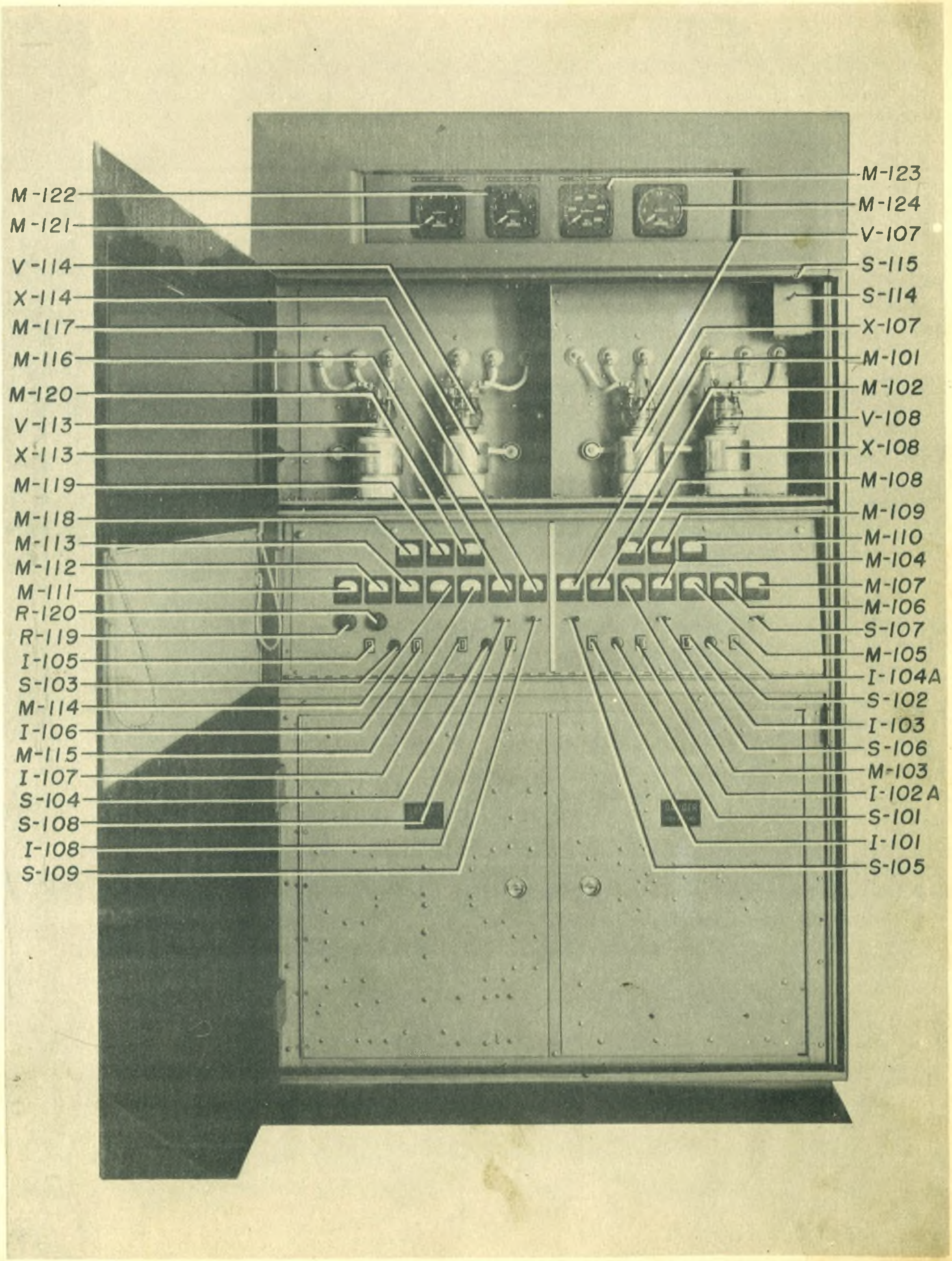


FIG. 6. Exciter Cubicle, Front View (Photo C-12115)

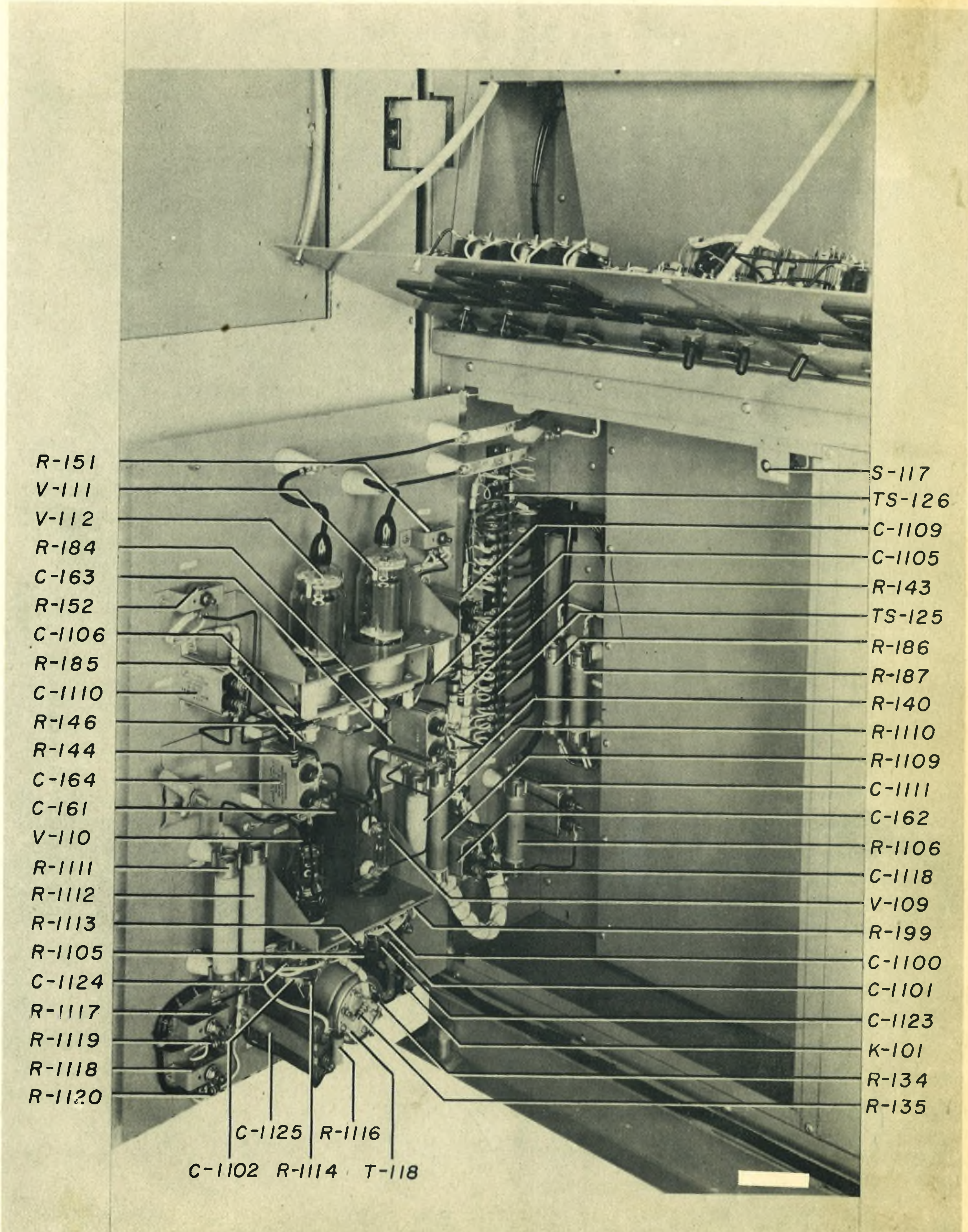


FIG. 7. Exciter Cubicle Audio Door (Photo C-20270)

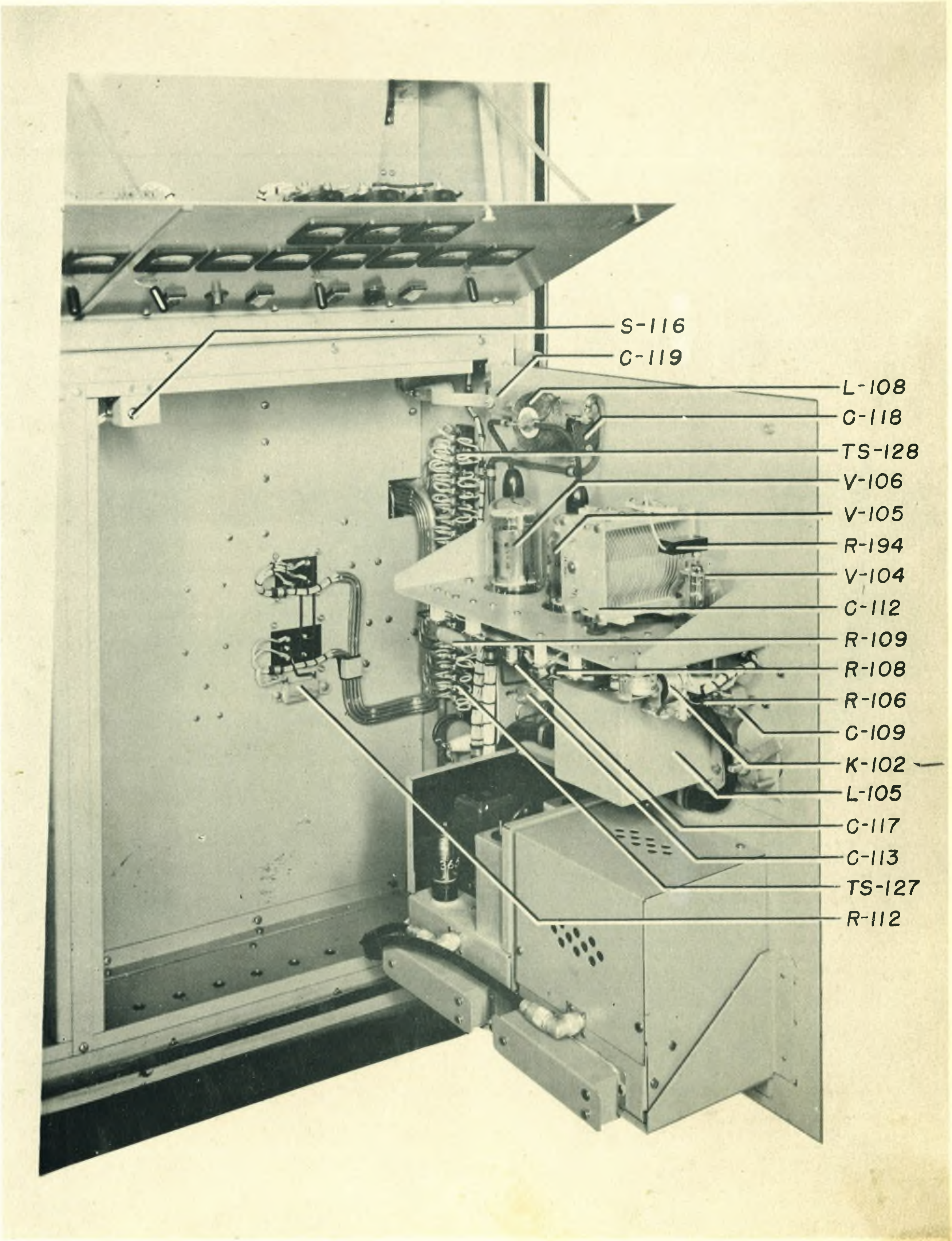


FIG. 8. Exciter Cubicle, Radio Door (Photo C-12118)

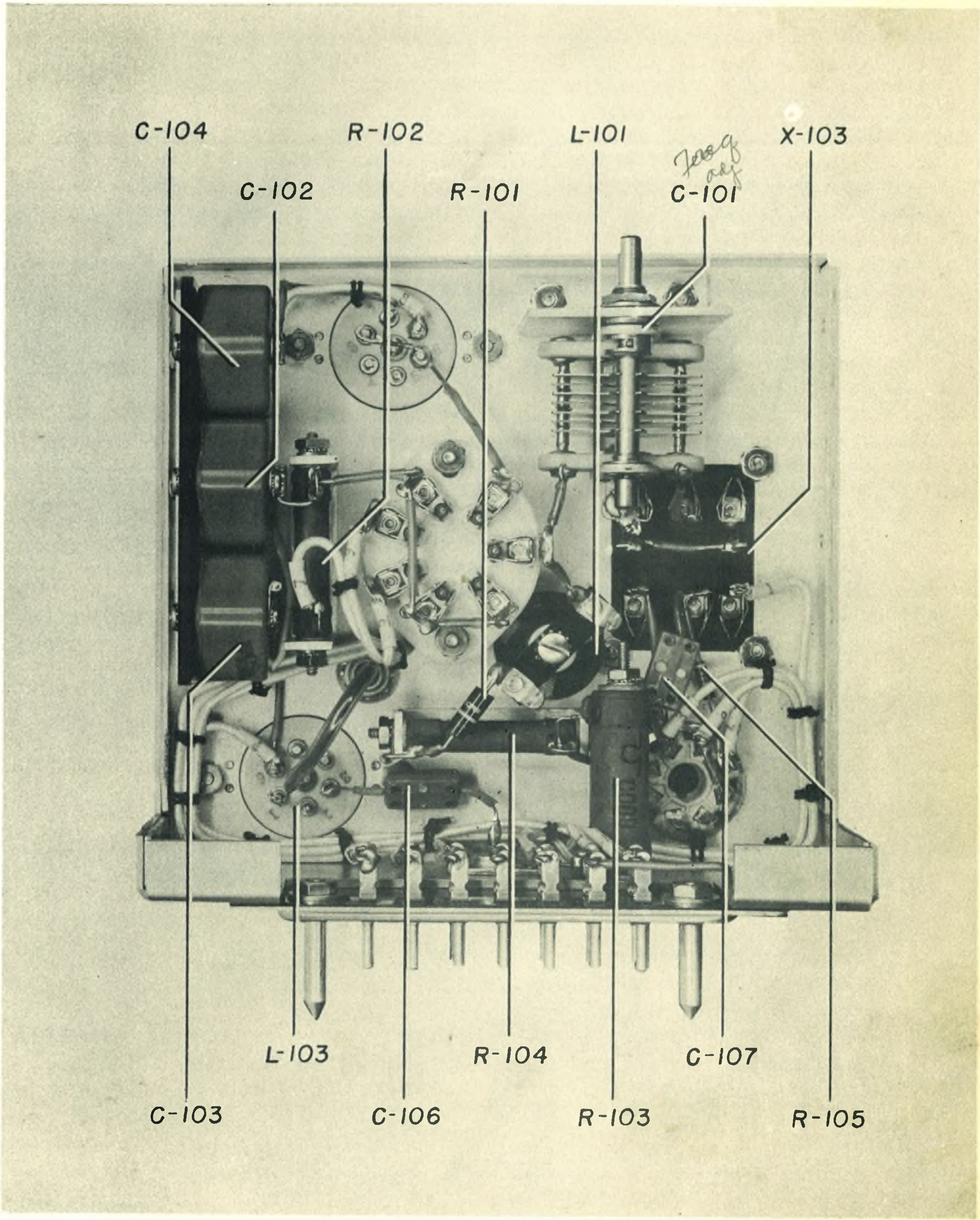


FIG. 9. Exciter Cubicle. Oscillator (Photo C-12098)

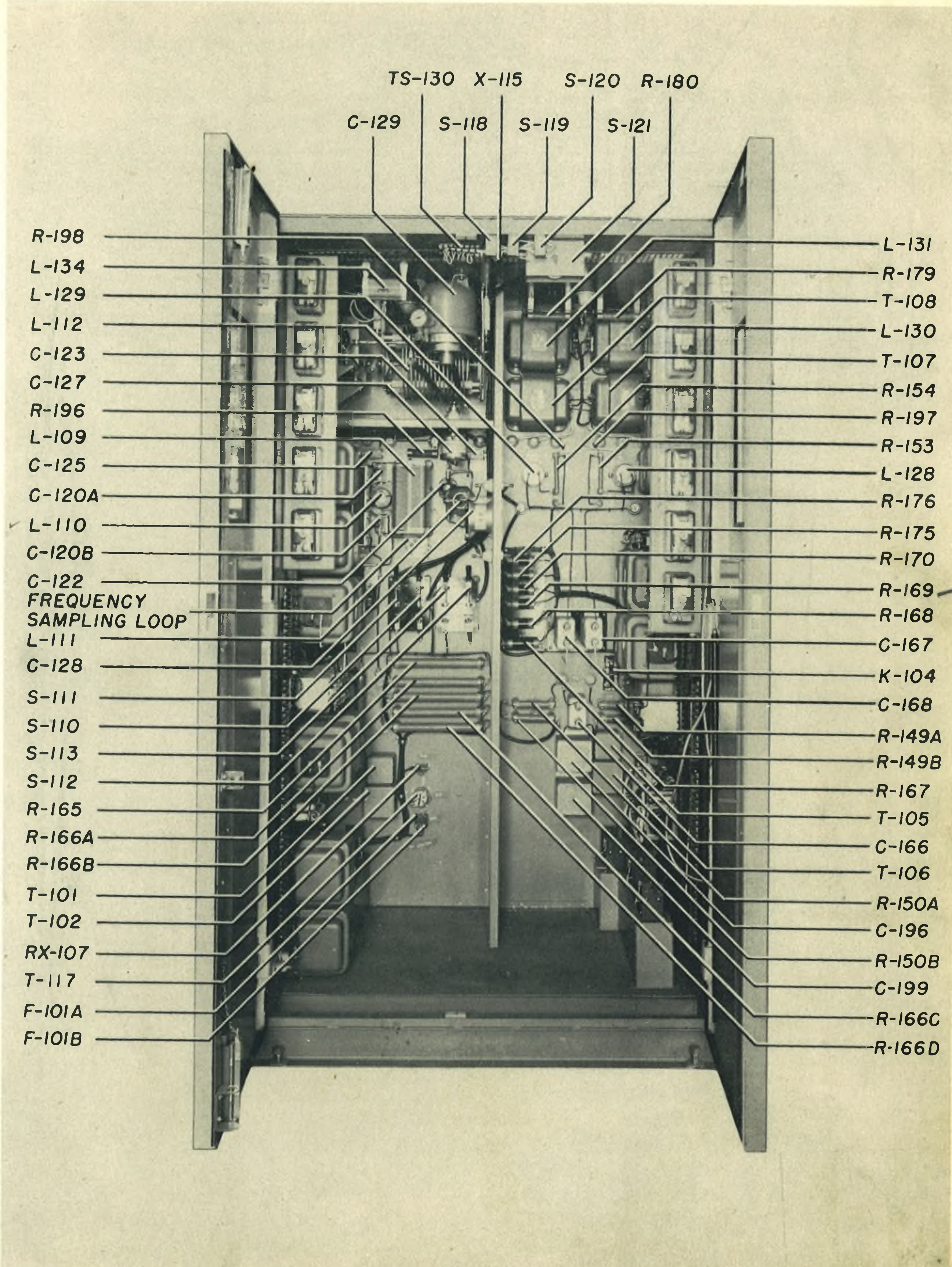


FIG. 10. Exciter Cubicle Interior (Photo C-20271)

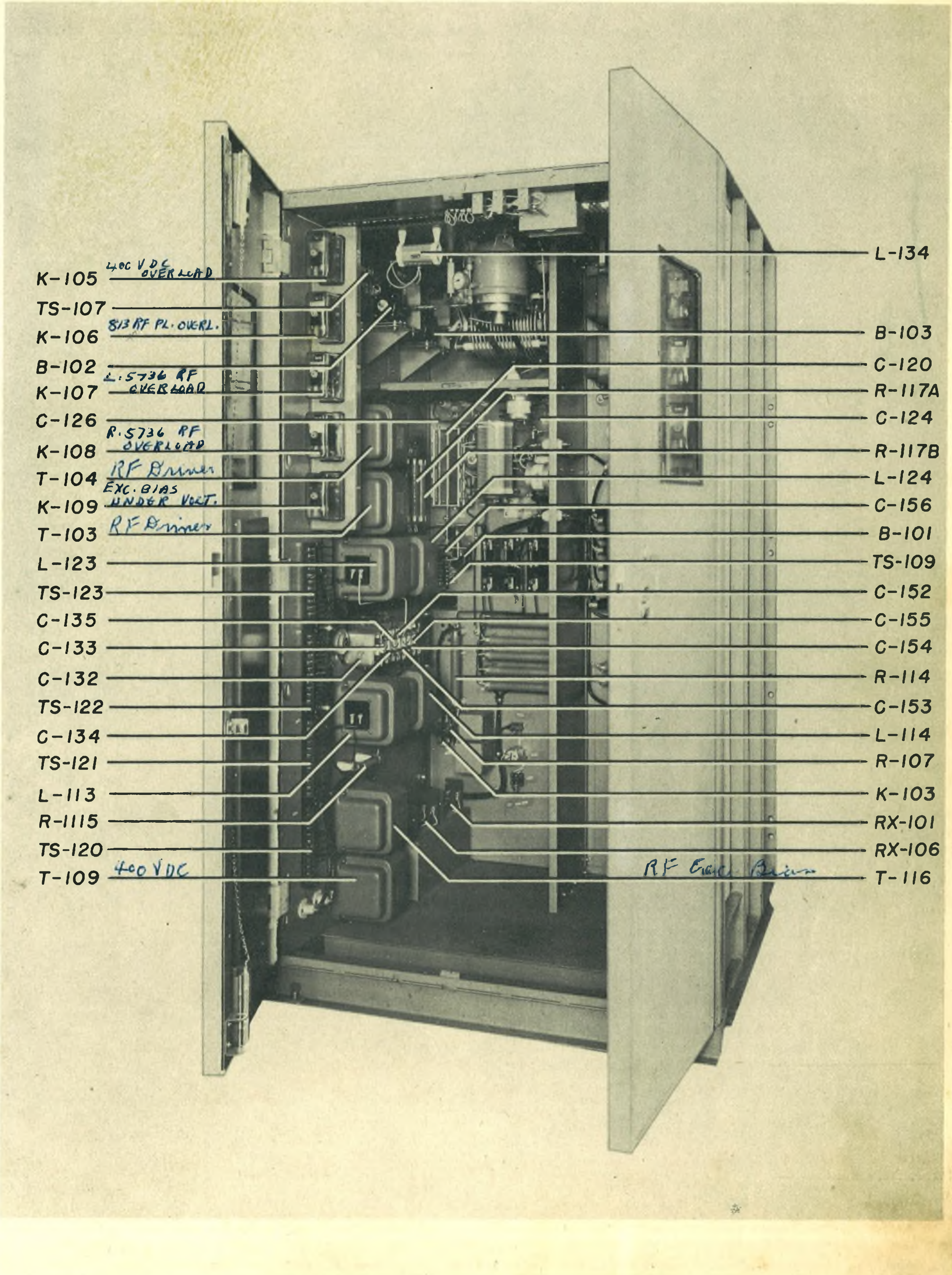


FIG. 11. Exciter Cubicle Interior, Left Side (Photo C-20267)

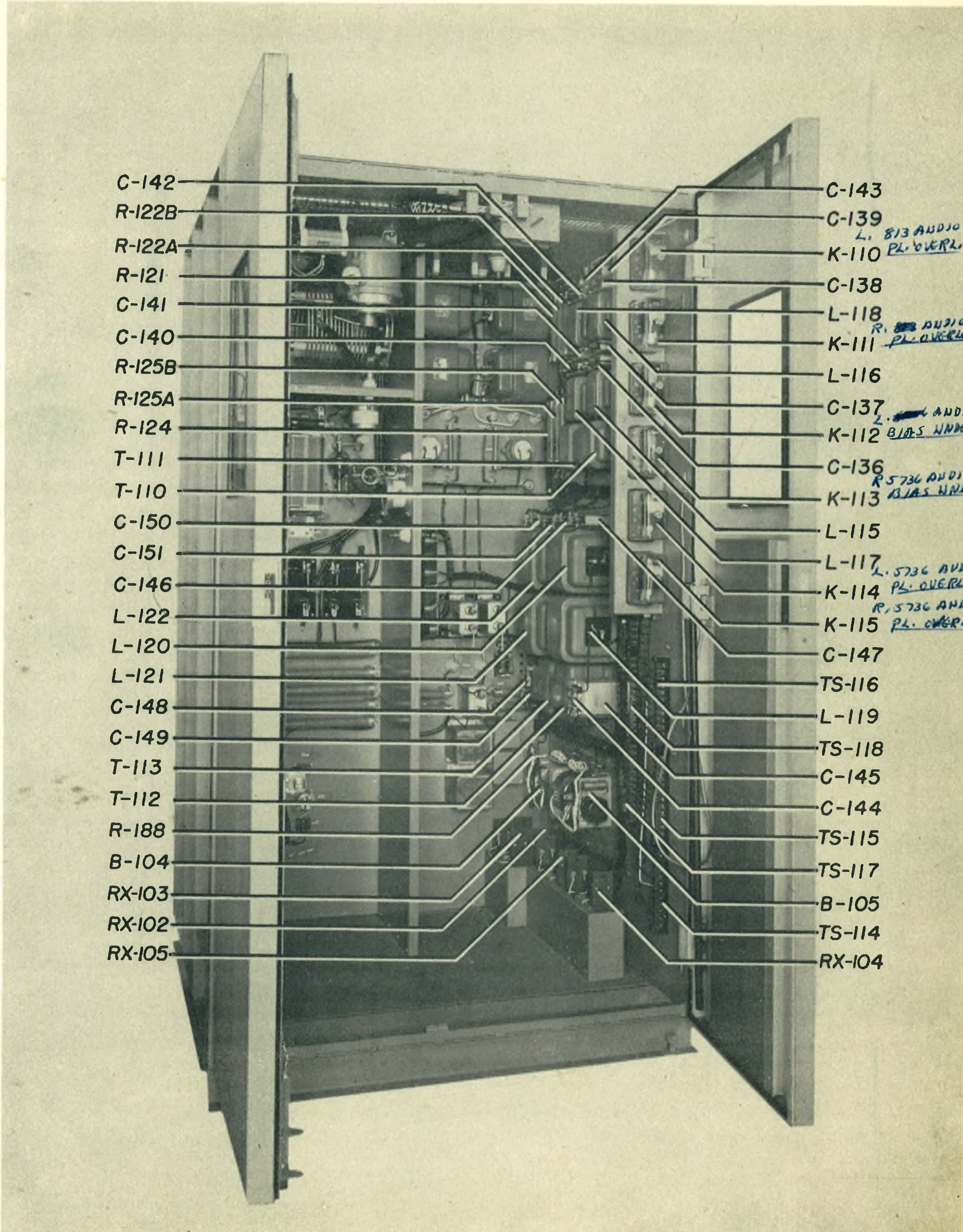


FIG. 12. Exciter Cubicle Interior, Right Side (Photo C-20269)

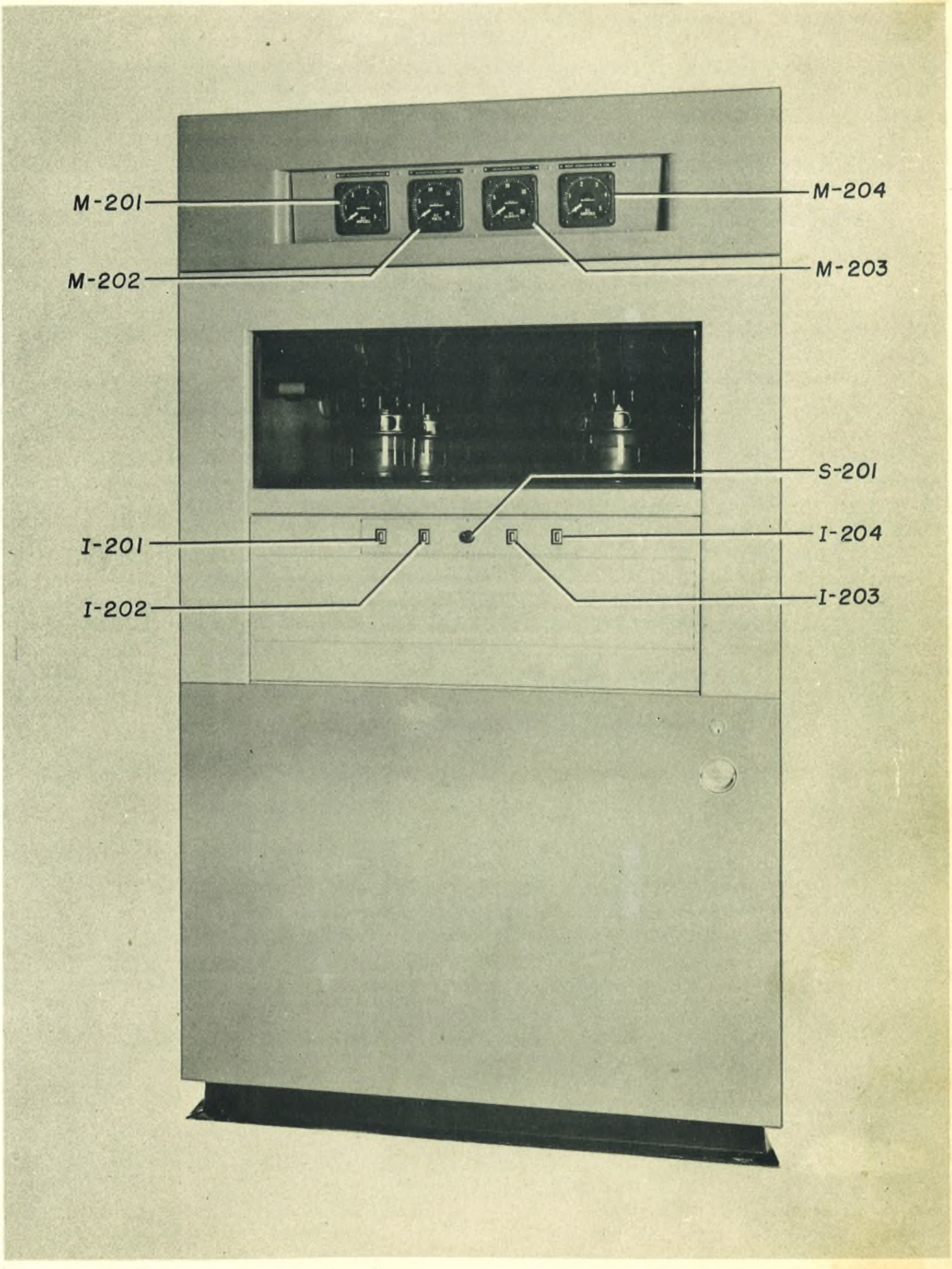


FIG. 13. Modulator Cubicle, Front View (Photo C-12123)

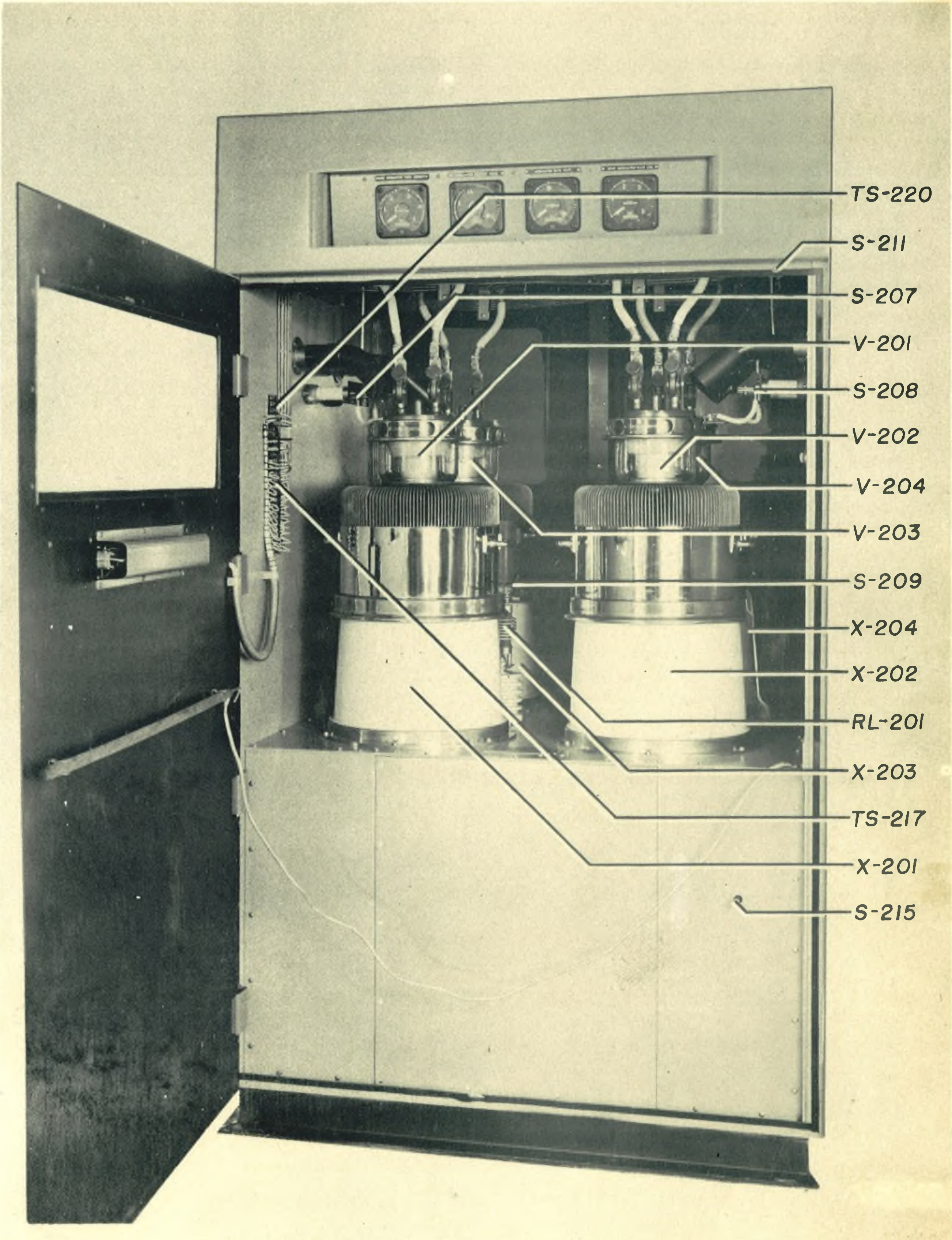


FIG. 14. Modulator Cubicle, Interior, Front View (Photo C-12124)

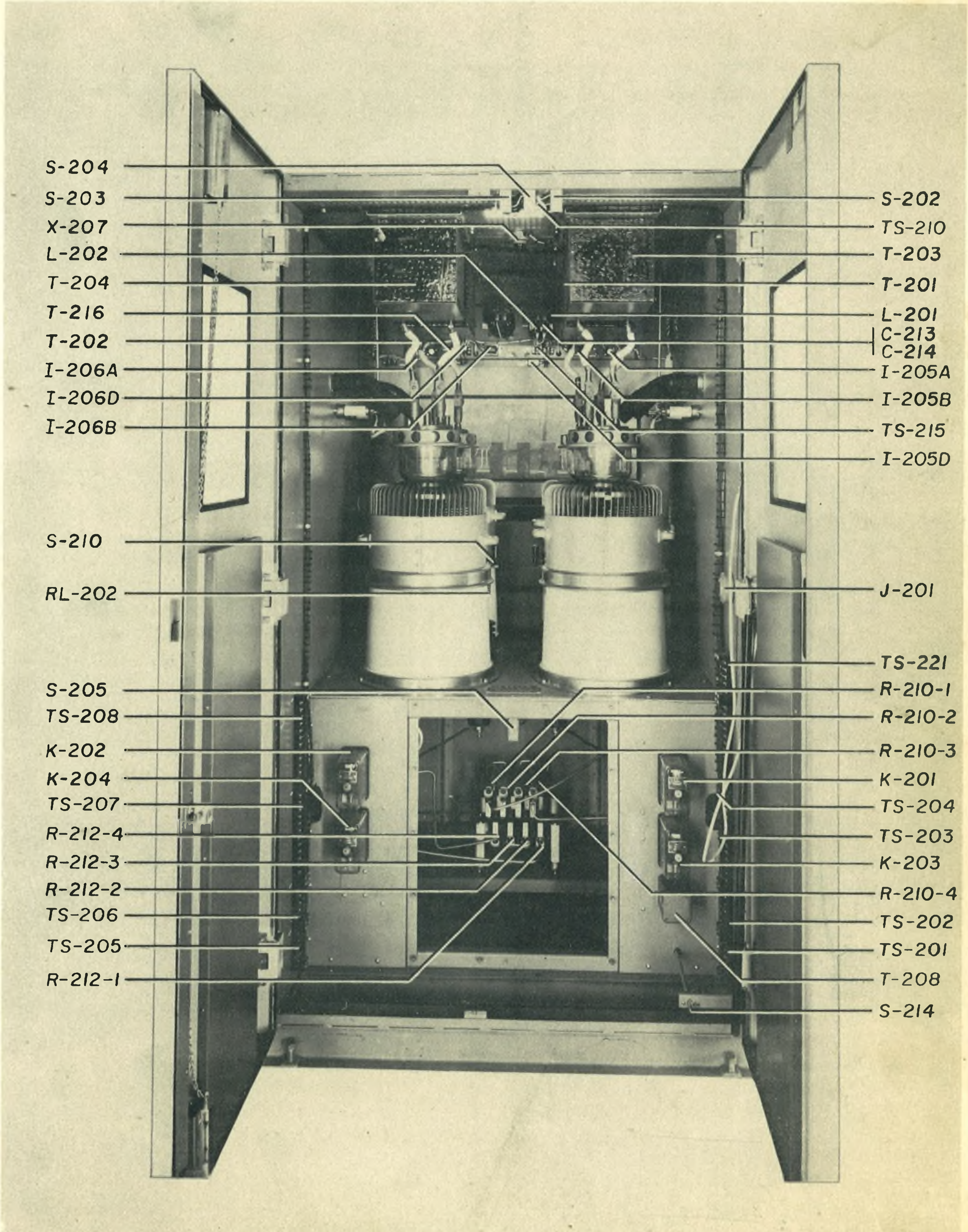


FIG. 15. Modulator Cubicle Interior (Photo C-20276)

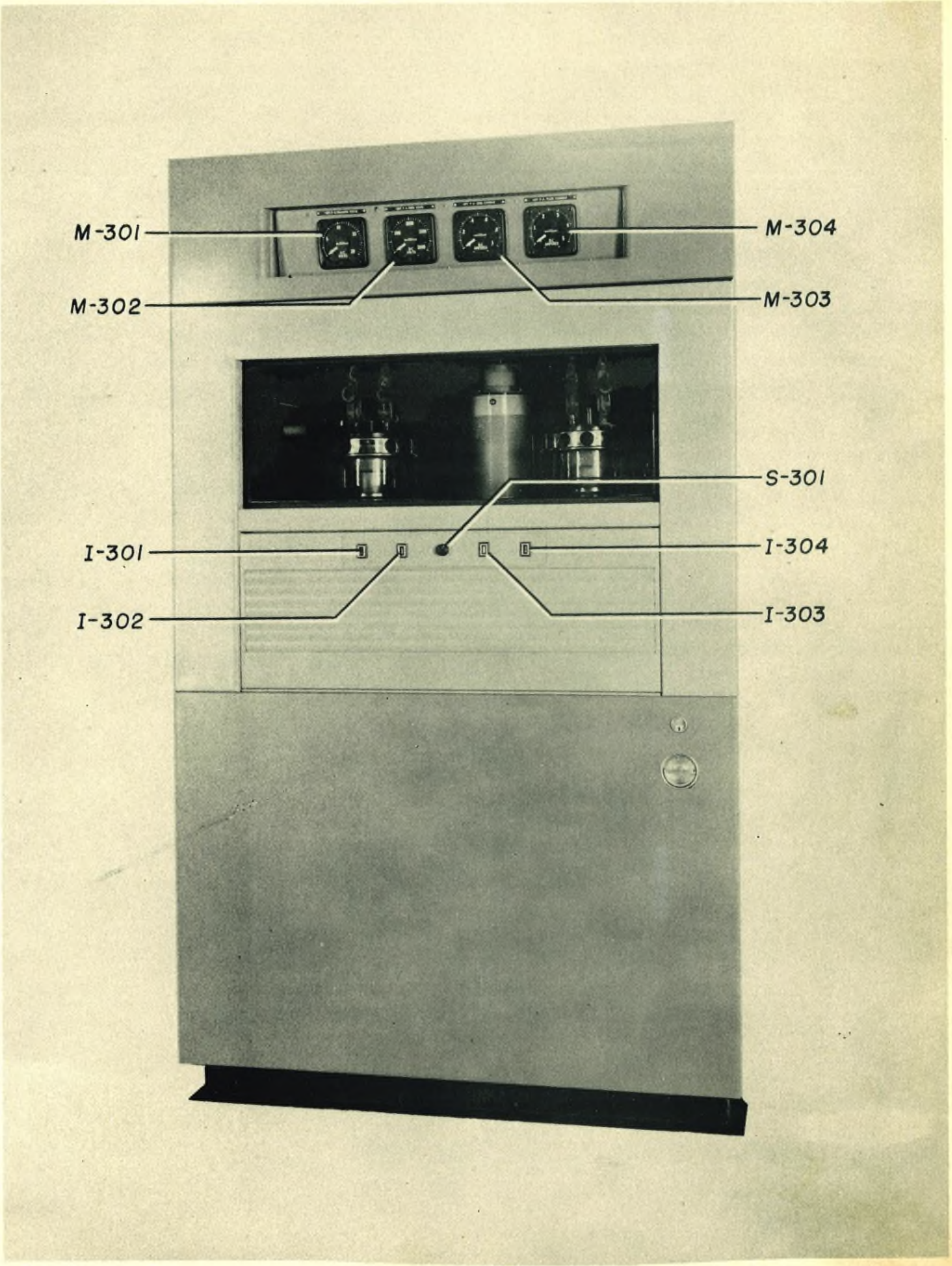


FIG. 16. Left Power Amplifier Cubicle, Front View (Photo C-12128)

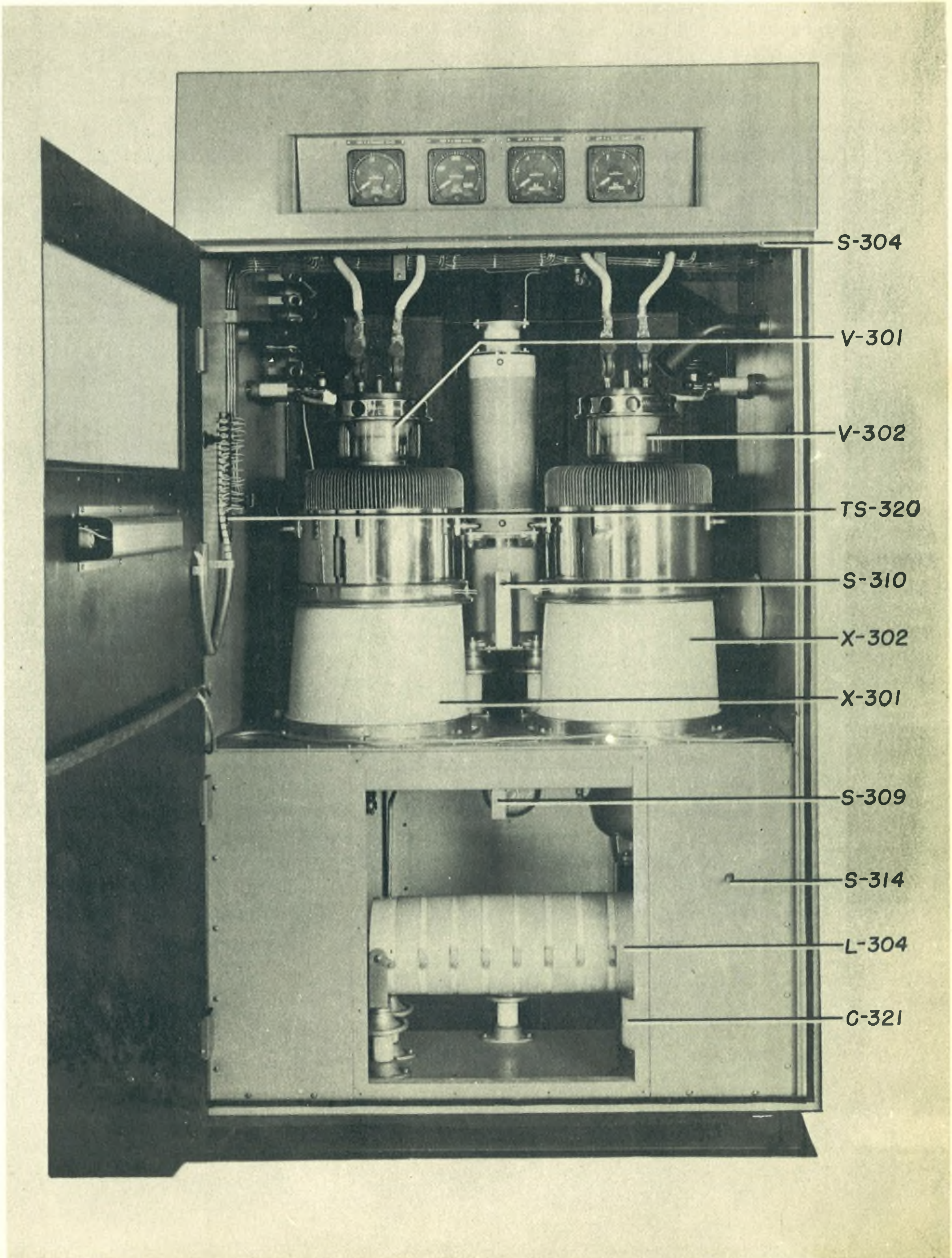


FIG. 17. Left Power Amplifier Cubicle, Interior, Front View (Photo C-12131)

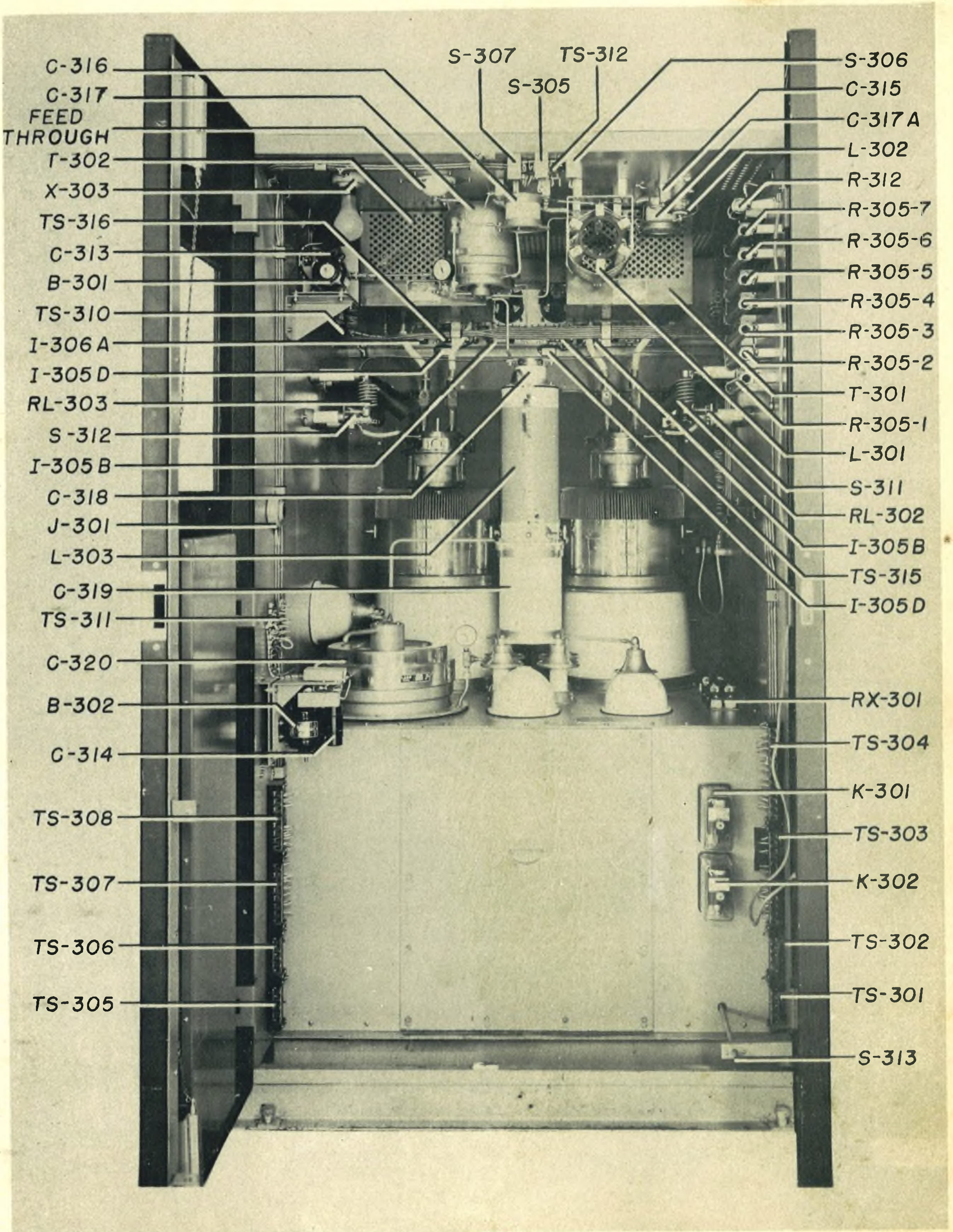


FIG. 18. Left Power Amplifier Cubicle, Interior (Photo C-12132)

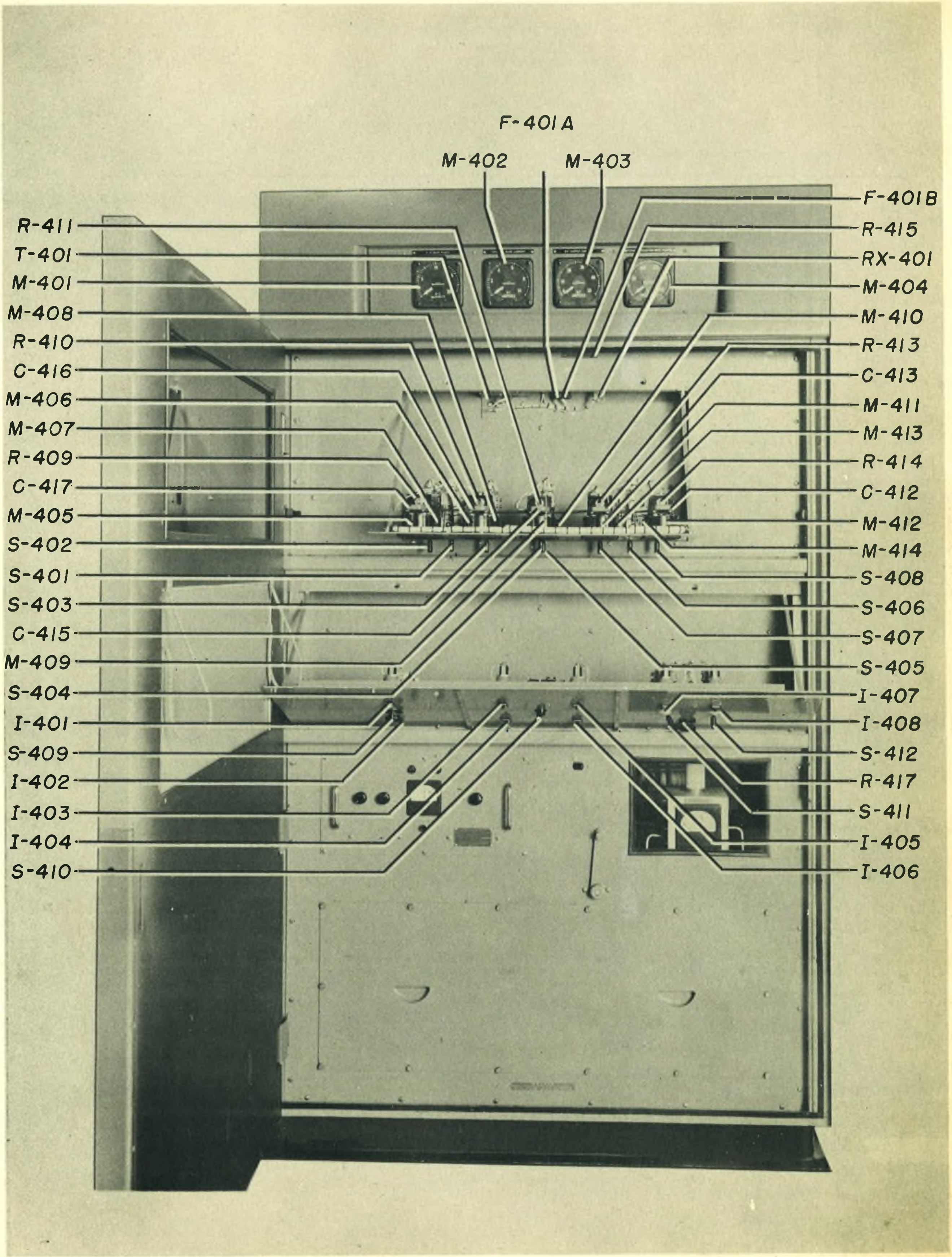


FIG. 19. Center Power Amplifier Cubicle, Front View (Photo C-12135)

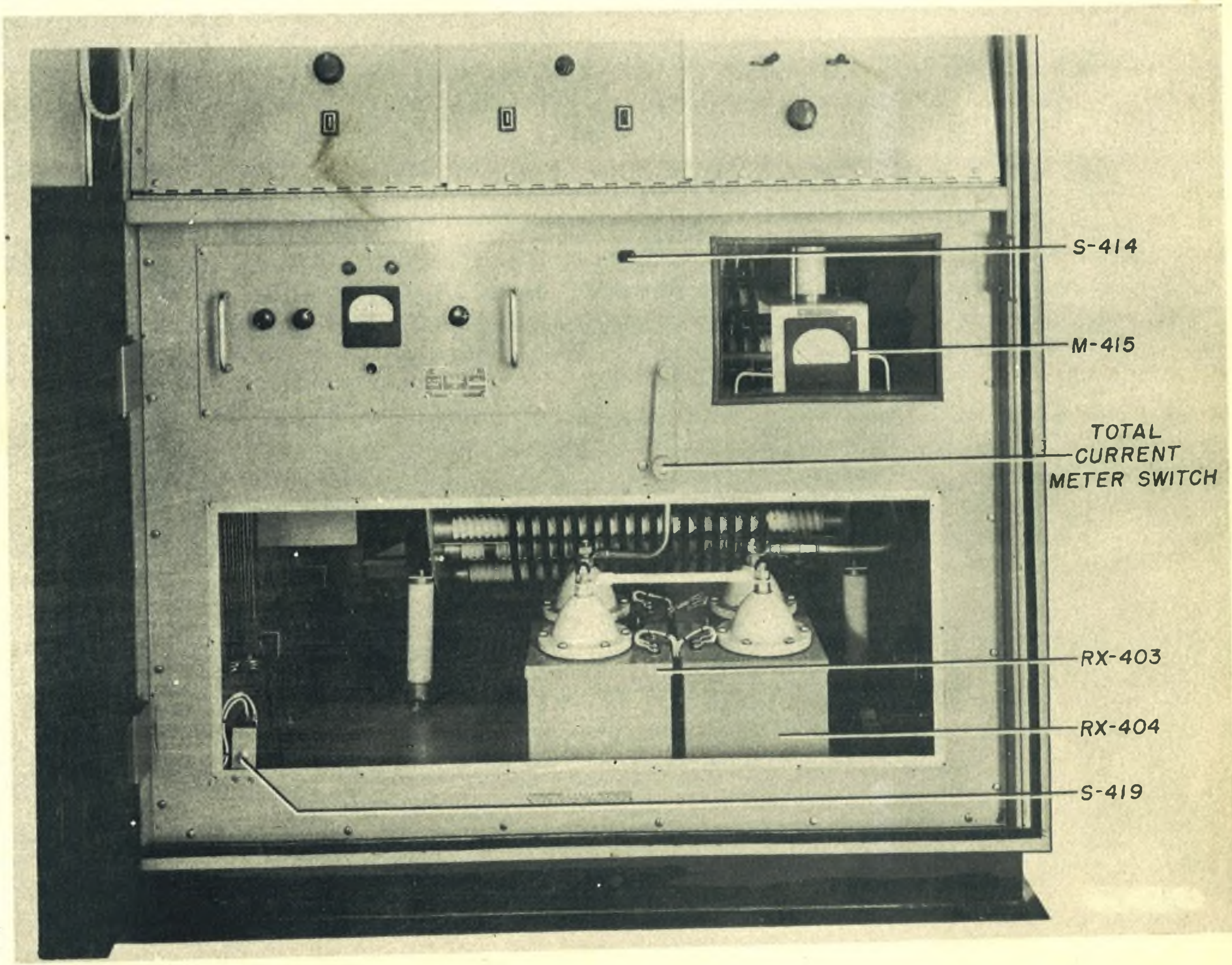


FIG. 20. Center Power Amplifier Cubicle, Lower Front View (Photo C-12136)

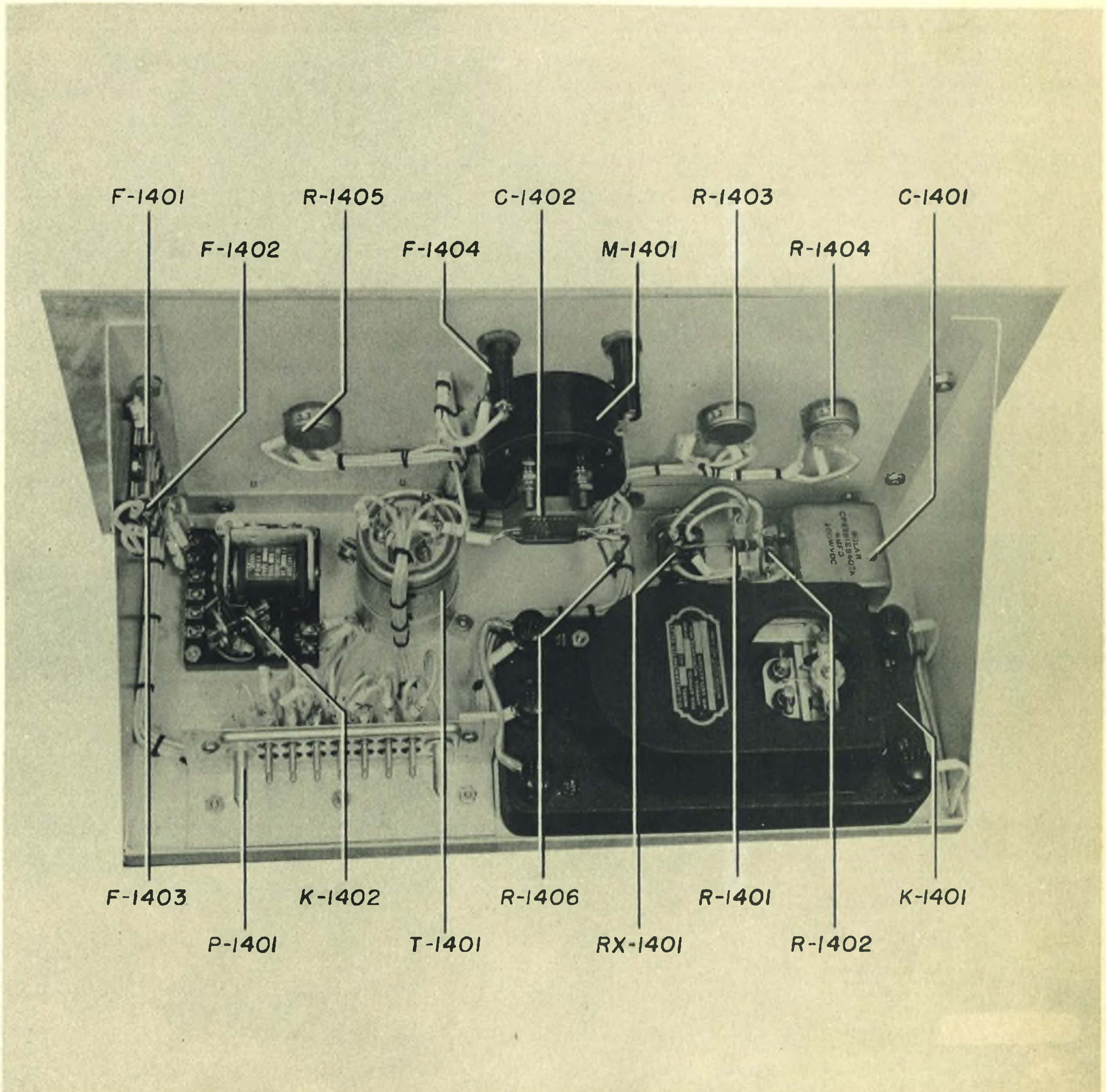


FIG. 21. Antenna Arc Interrupter Unit (Photo C-12104)

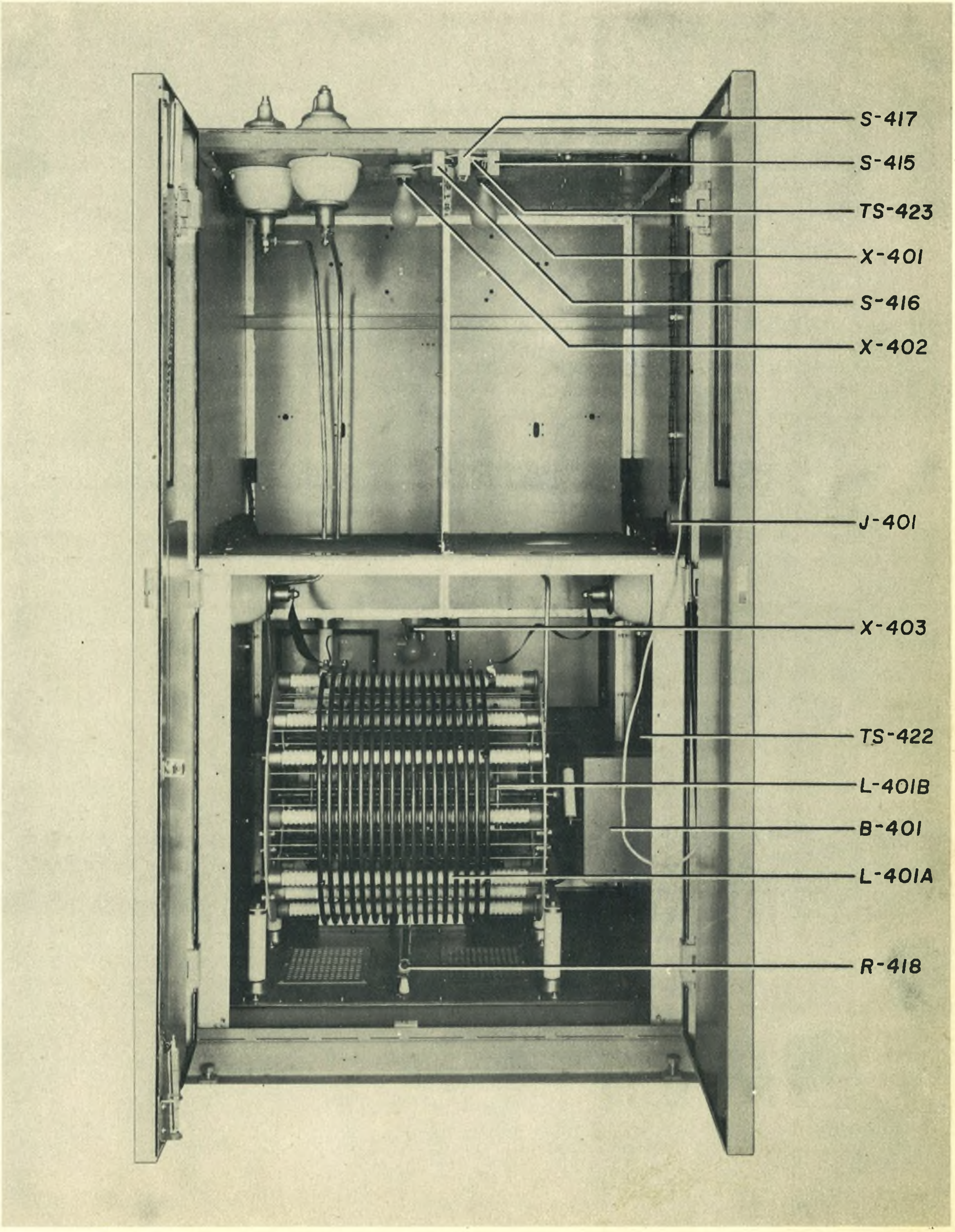


FIG. 22. Center Power Amplifier Cubicle Interior (Photo C-20278)

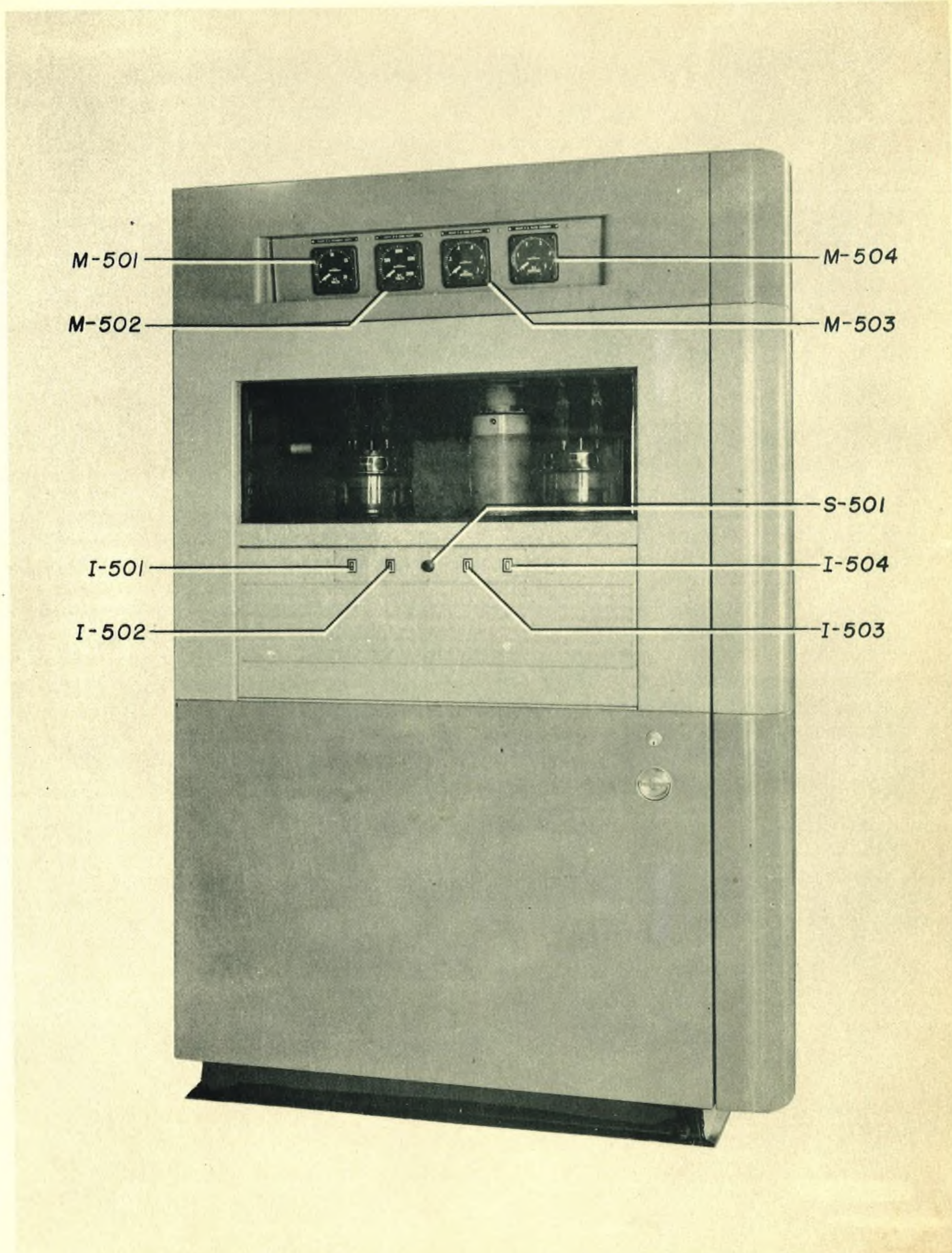


FIG. 23. Right Power Amplifier Cubicle, Front View (Photo C-12139)

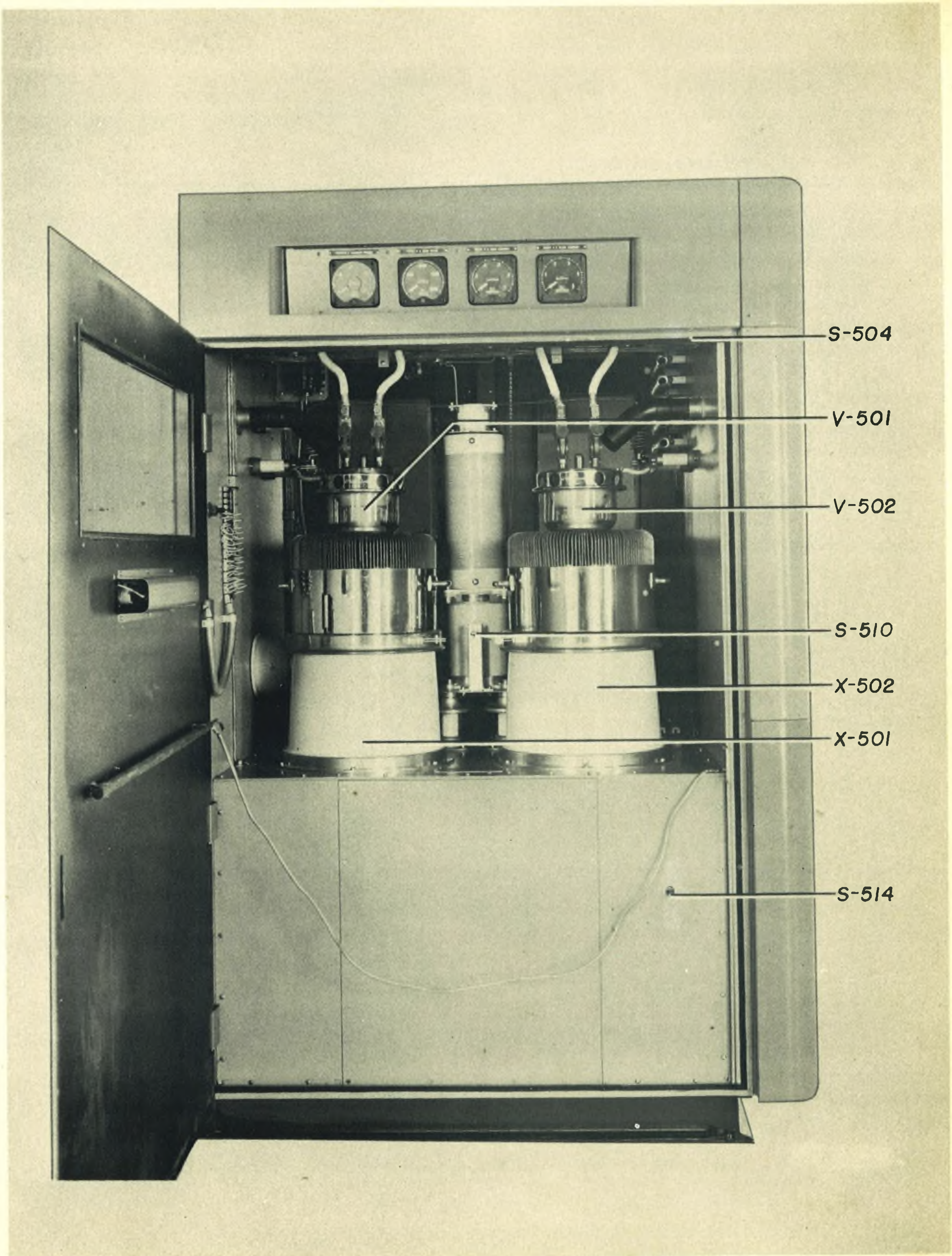


FIG. 24. Right Power Amplifier Cubicle, Interior, Front View (Photo C-12140)

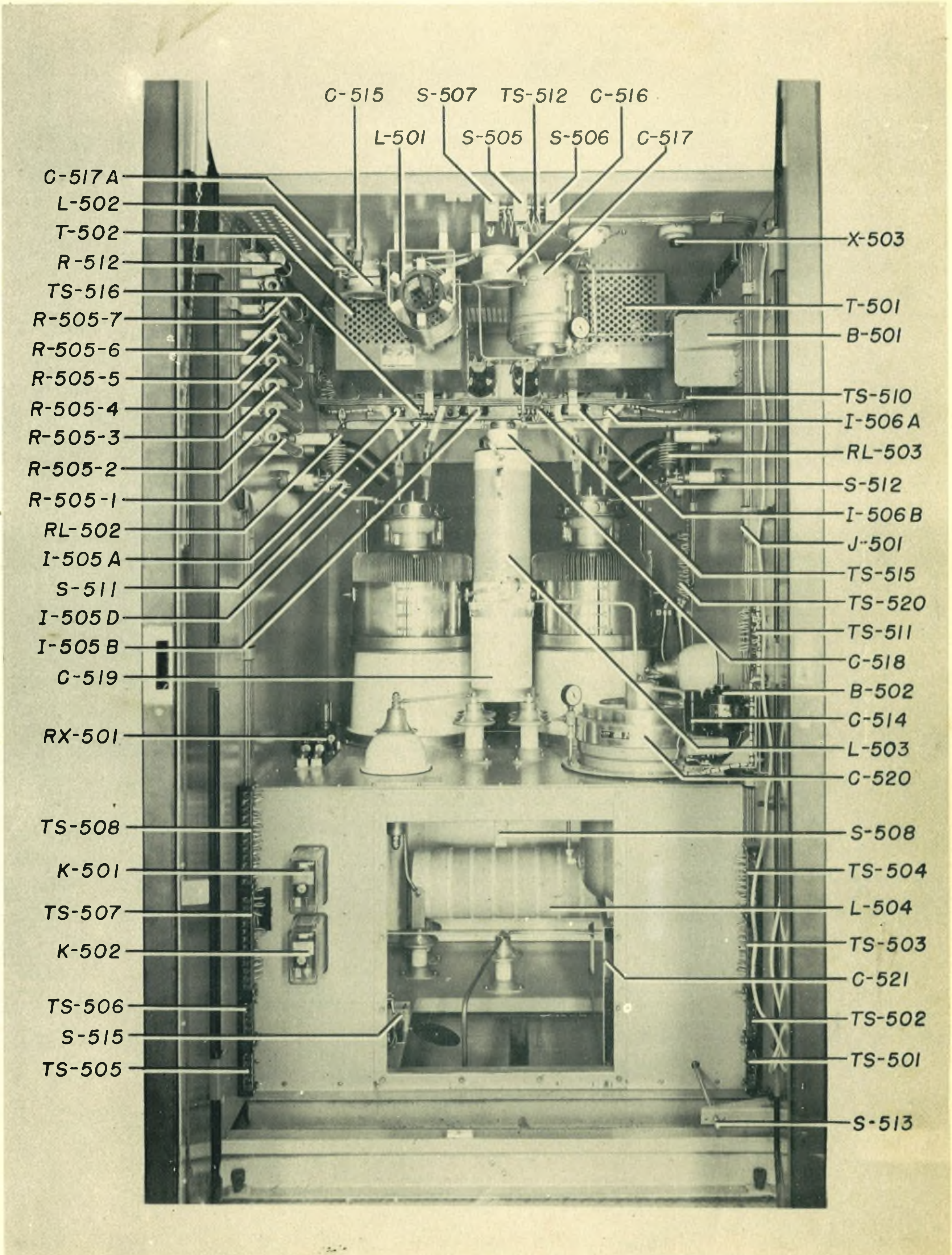


FIG. 25. Right Power Amplifier Cubicle, Interior View (Photo C-12141)

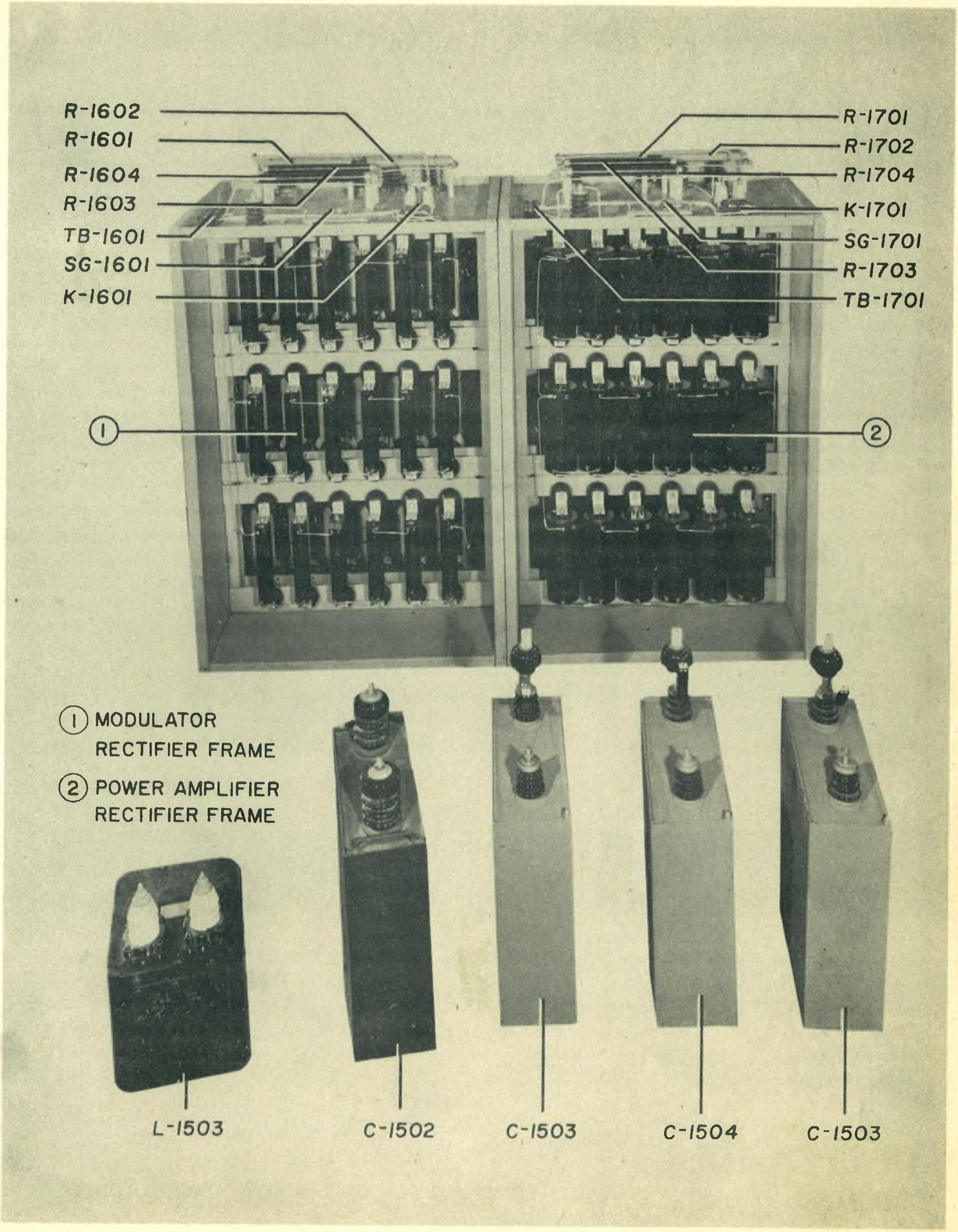


FIG. 26. Main Rectifier Components (Photo C-20409)

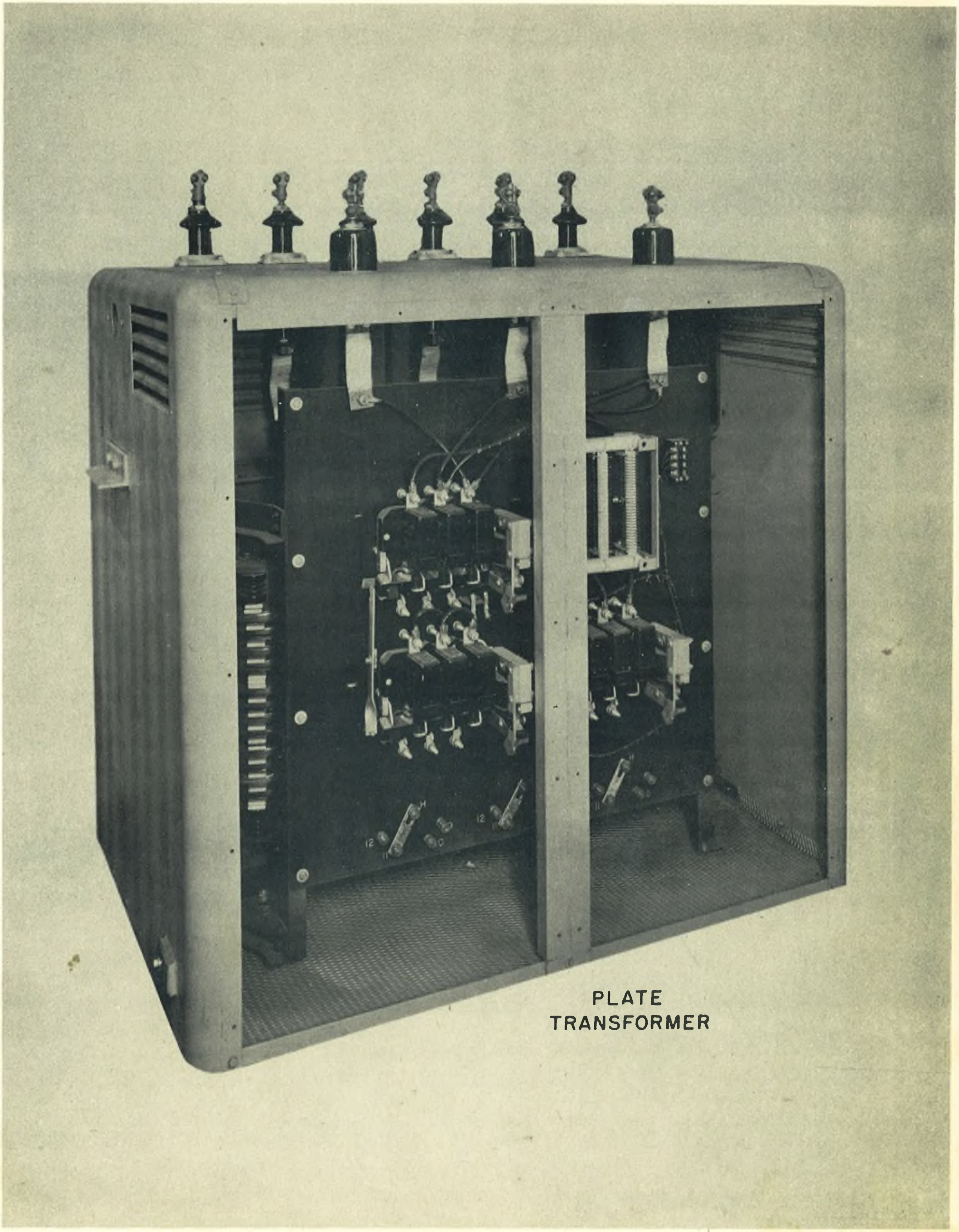
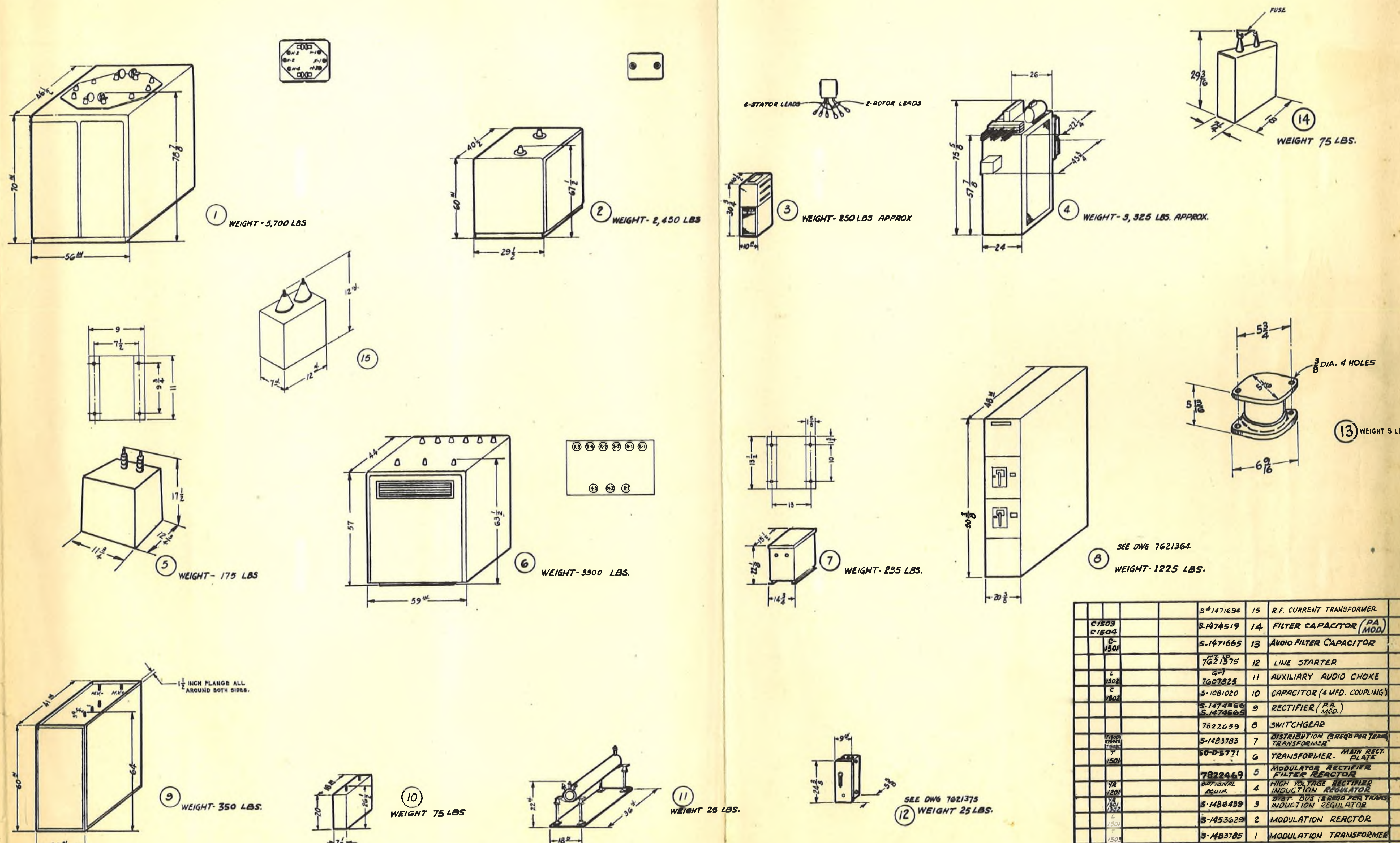
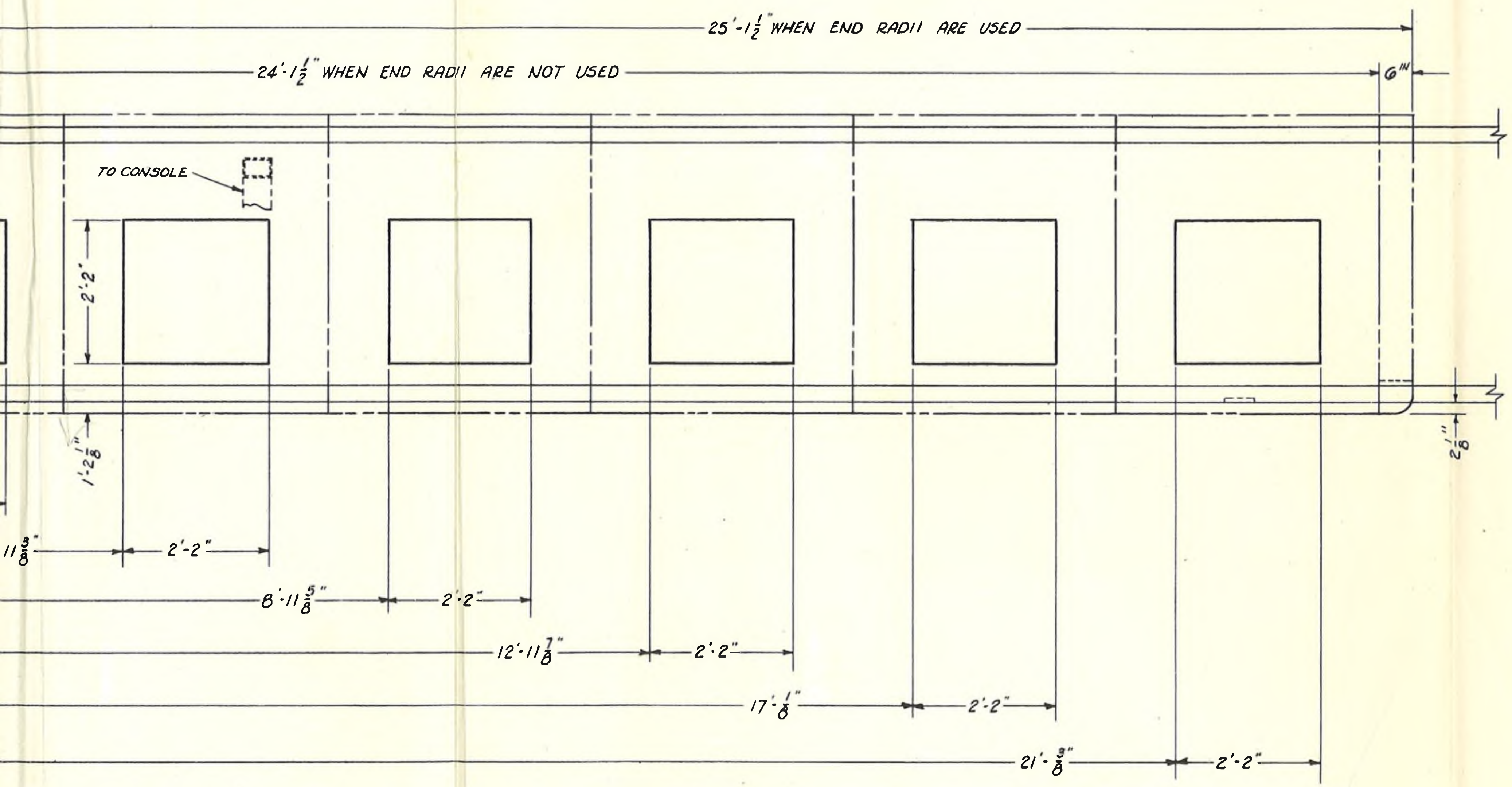


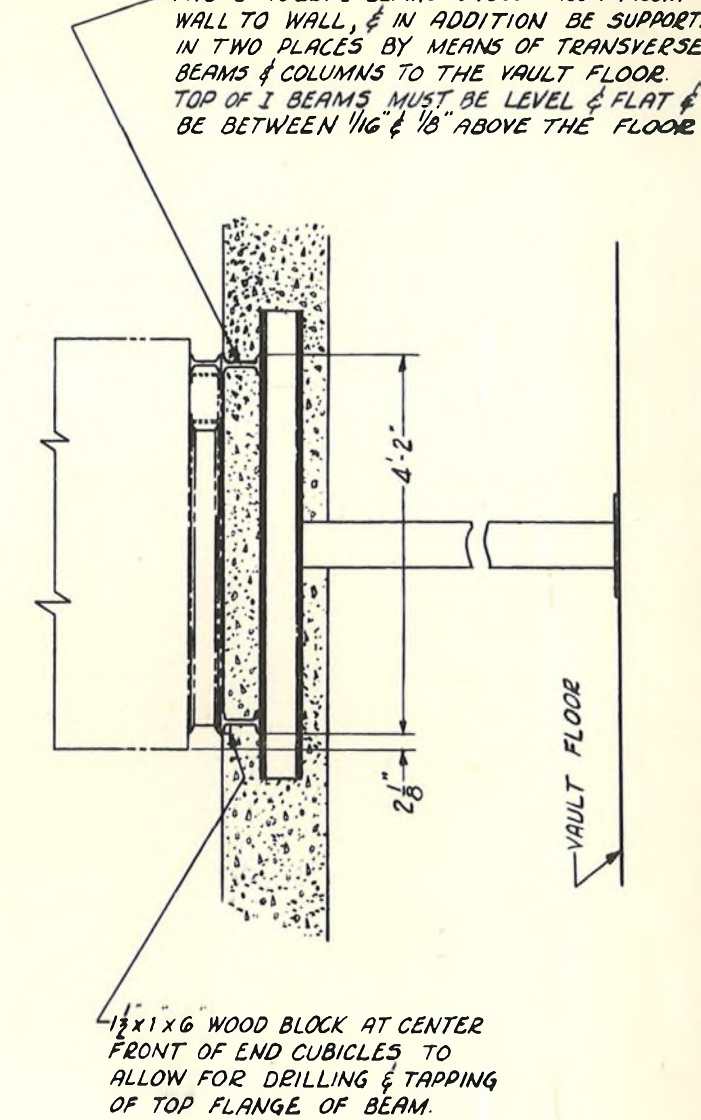
FIG. 26A. Main Rectifier Components (Photo C-20279)

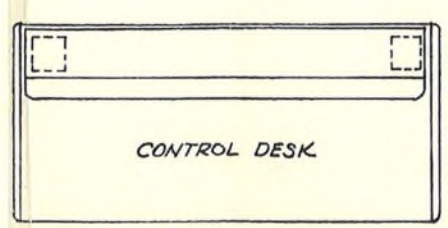


		SYMBOL	STYLE	MATERIAL	REFERENCE	PART	DESCRIPTION	[illegible]
					S-1471694	15	R.F. CURRENT TRANSFORMER	
	C1503 C1504				S-1474519	14	FILTER CAPACITOR (PA MOD)	
		C-1501			S-1471665	13	AUDIO FILTER CAPACITOR	
					PT. 10 7621375	12	LINE STARTER	
		L 1502			G-1 7607825	11	AUXILIARY AUDIO CHOKE	
		C 1502			S-1081020	10	CAPACITOR (4 MFD. COUPLING)	
					S-1474566 S-1474565	9	RECTIFIER (P.A. MOD.)	
					7822659	8	SWITCHGEAR	
		[illegible]			S-1483783	7	DISTRIBUTION (3 REQ'D PER TRANS) TRANSFORMER	
		T 1501			50-D-5771	6	TRANSFORMER - MAIN RECT. PLATE	
					7822469	5	MODULATOR RECTIFIER FILTER REACTOR	
		VR 1201			OPTIONAL EQUIP.	4	HIGH VOLTAGE RECTIFIER INDUCTION REGULATOR	
		VR 1301 1302			S-1486439	3	DIST. BUS (2 REQD PER TRANS) INDUCTION REGULATOR	
		L 1501			S-1453629	2	MODULATION REACTOR	
		T 1505			S-1483785	1	MODULATION TRANSFORMER	

FIG. 33. External Component Outline (Dwg. 55-A-8201)

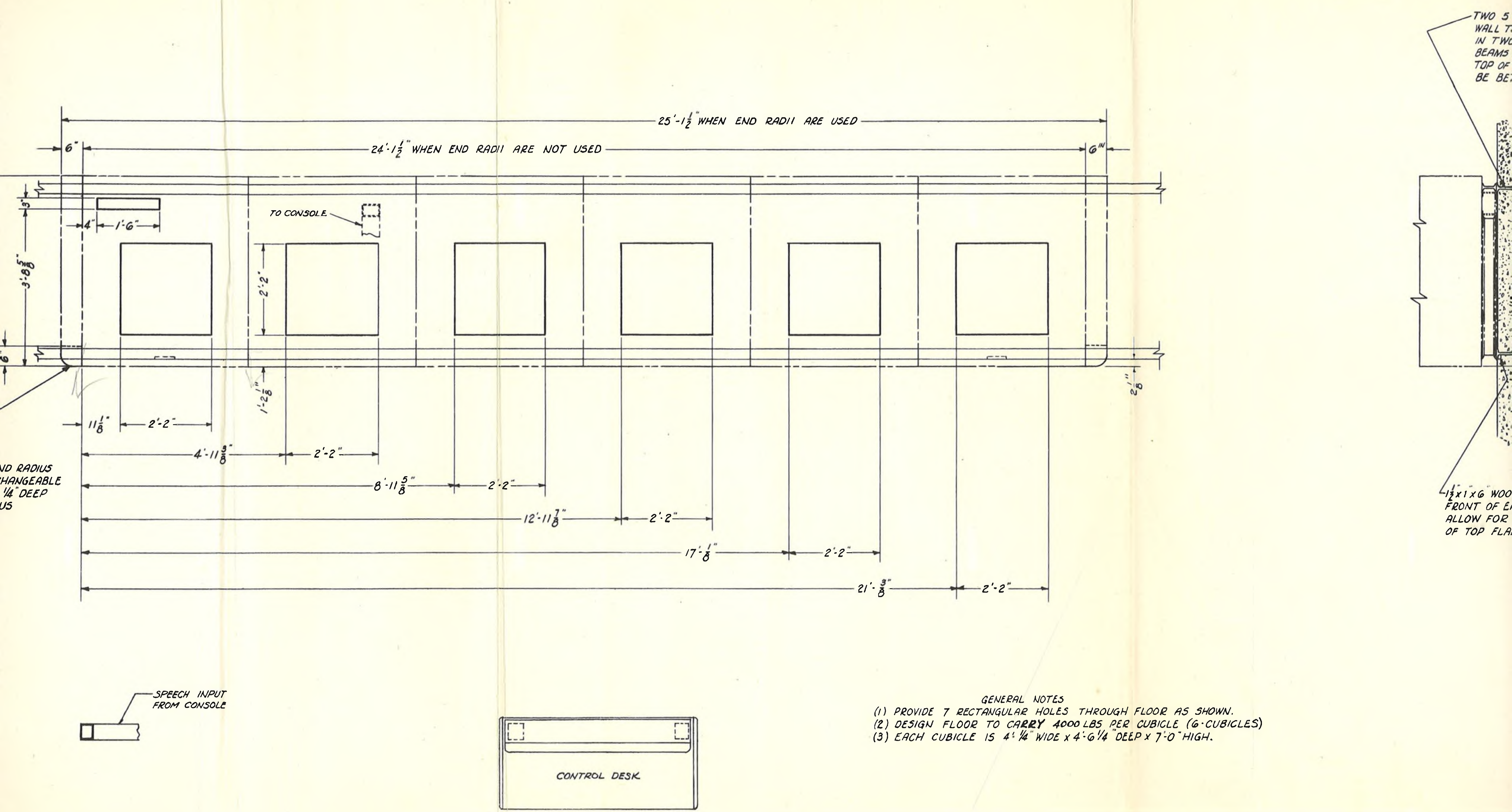






GENERAL NOTES
(1) PROVIDE 7 RECTANGULAR HOLES THROUGH FLOOR AS SHOWN.
(2) DESIGN FLOOR TO CARRY 4000 LBS PER CUBICLE (6-CUBICLES)
(3) EACH CUBICLE IS 4'-¼" WIDE x 4'-6¼" DEEP x 7'-0" HIGH.

FIG. 29. Transmitter Floor Plan (Dwg. 7621276)



GENERAL NOTES

(1) PROVIDE 7 RECTANGULAR HOLES THROUGH FLOOR AS SHOWN.
(2) DESIGN FLOOR TO CARRY 4000 LBS PER CUBICLE (6-CUBICLES)
(3) EACH CUBICLE IS 4'-1/4" WIDE x 4'-6 1/4" DEEP x 7'-0" HIGH.

FIG. 29. Transmitter Floor Plan (Dwg.

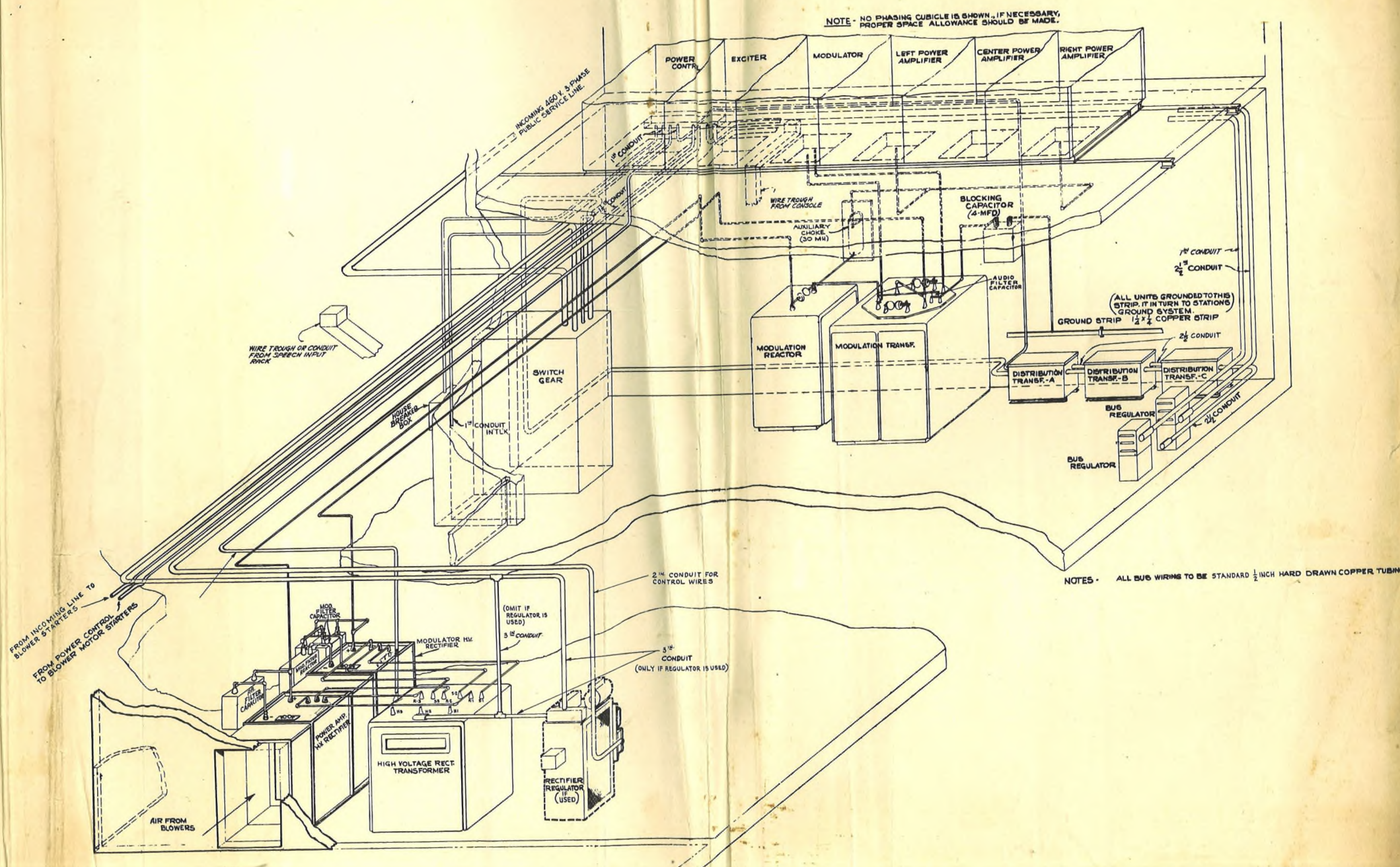


FIG. 31. Power Room Layout (Two Floor) (Dwg. 55-A-8214)

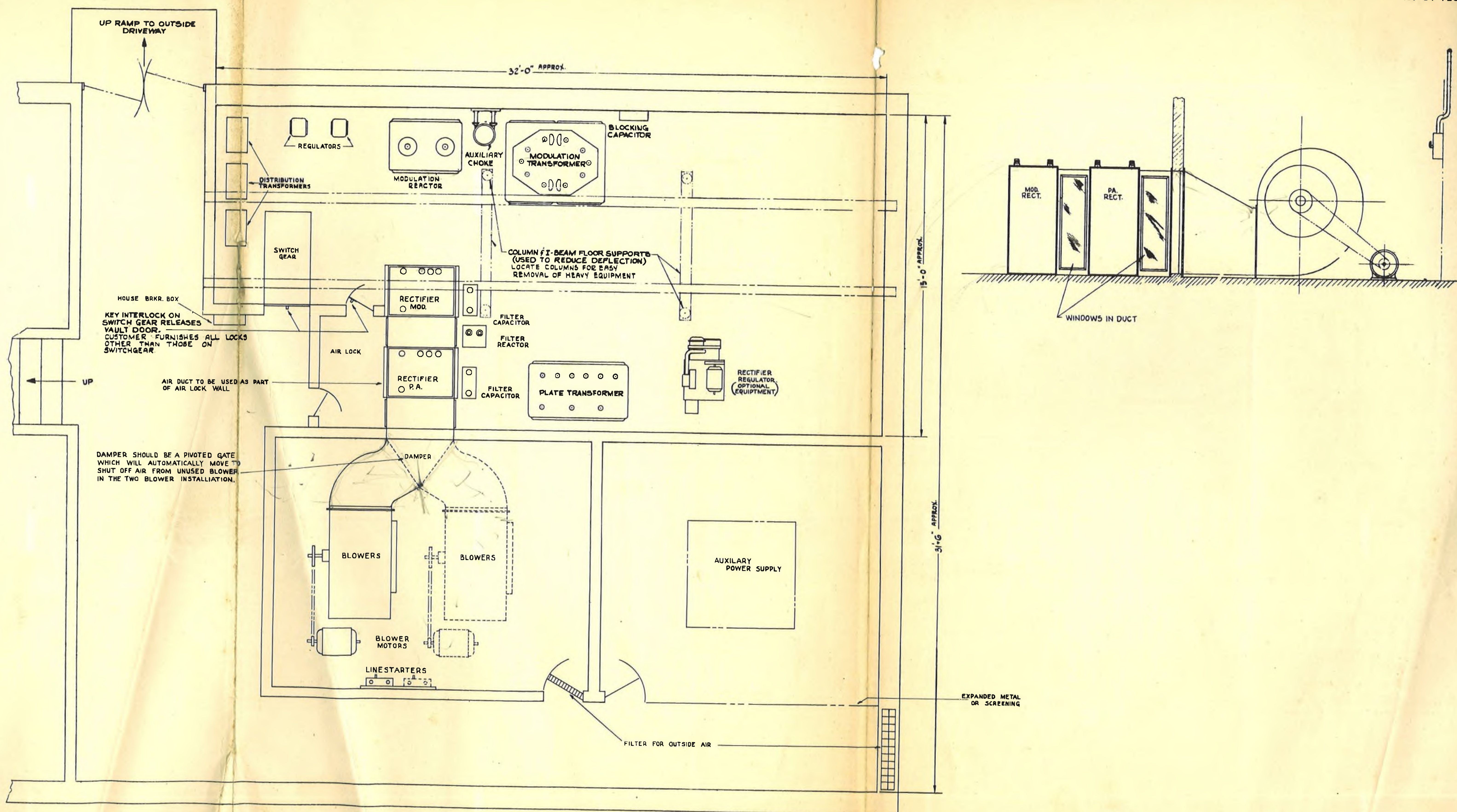
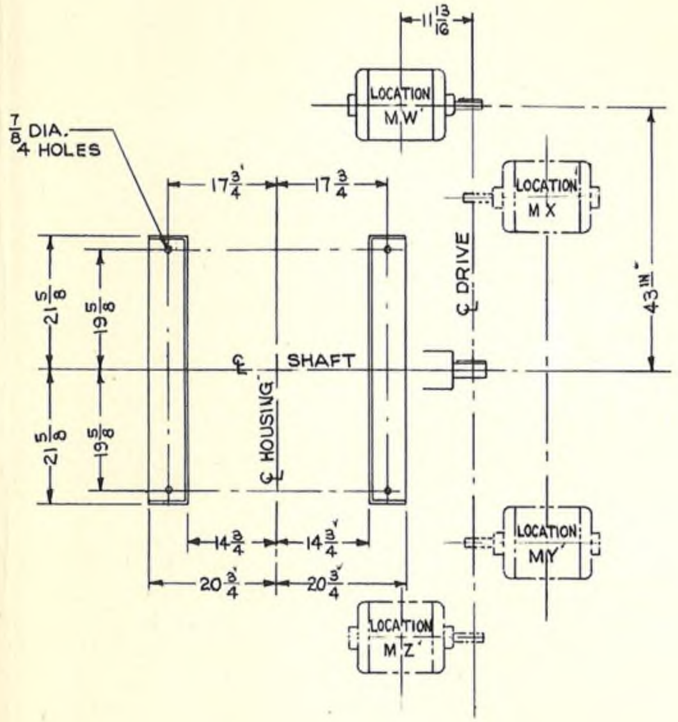
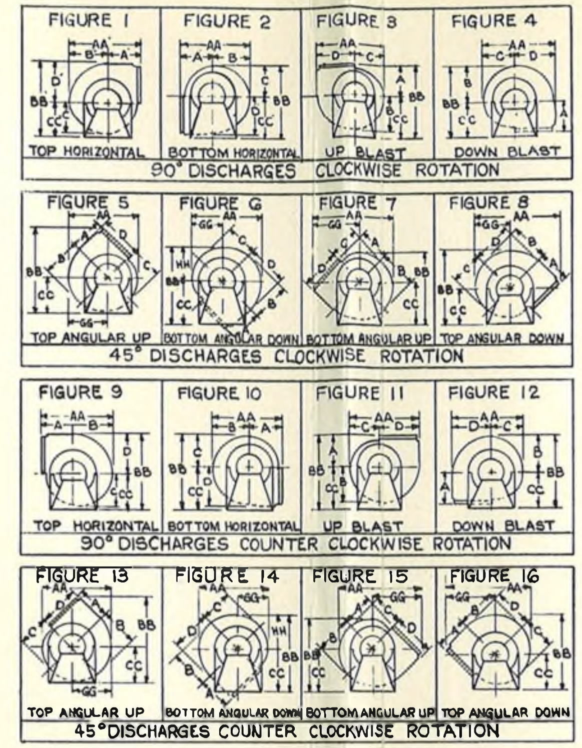


FIG. 32. Power Room Plan (Two Floor) (Dwg. 55-A-8189)



BASE PLAN

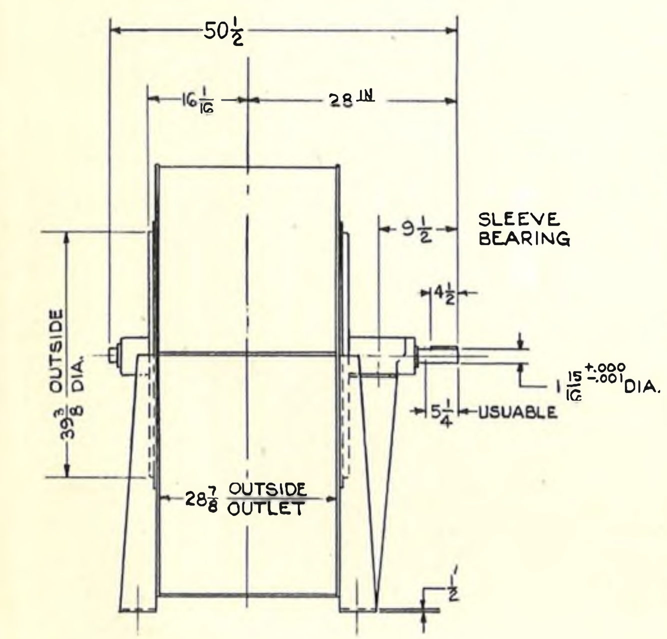


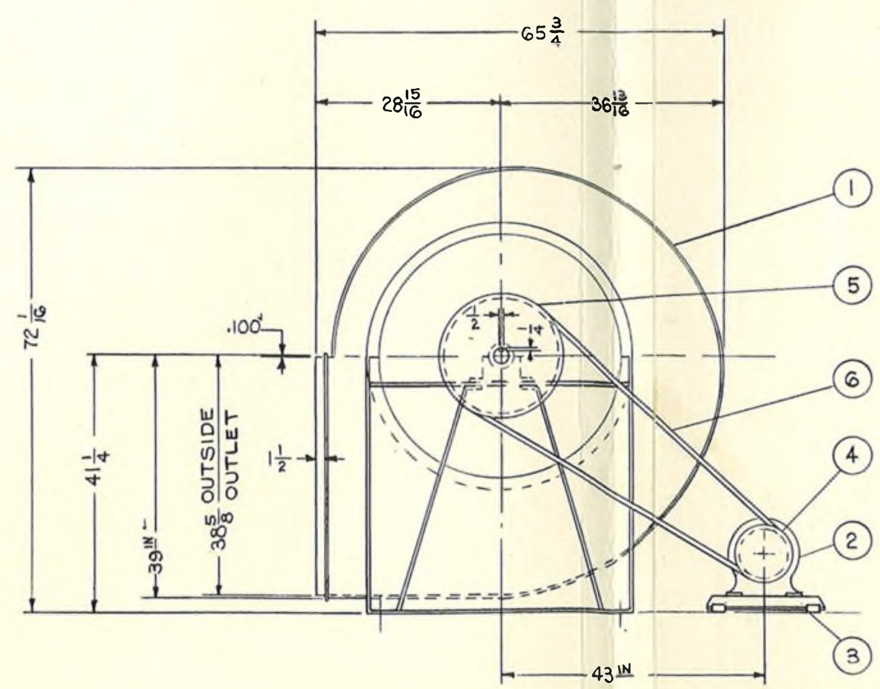
SCALE: NONE

SYM.	ITEM	DESCRIPTION - MATERIAL	PATT. NO. OR REF. DWG.	FINISH	STYLE NO.	GR.
*	1	BLOWER				
*	2	MOTOR				
*	3	MOTOR BASE				
*	4	SHEAVE				
*	5	SHEAVE				
*	6	BELT				

FAN SIZE	EFF. WHL. DIA.	FOR ALL DISCHARGES				FIG. 1 & 9			FIG. 2 & 10			FIG. 3 & 11			FIG. 4 & 12			FIG. 5 & 13				FIG. 6 & 14					FIG. 7 & 15				FIG. 8 & 16				NET WT. LBS.
		A	B	C	D	AA	BB	CC	AA	BB	CC	AA	BB	CC	AA	BB	CC	AA	BB	CC	GG	AA	BB	CC	GG	HH	AA	BB	CC	GG	AA	BB	CC	GG	
90	36 1/2	28 15/16	36 13/16	30 13/16	39	65 3/4	74	35	65 3/4	72 1/16	41 1/4	69 13/16	70 9/16	41 1/4	69 13/16	71 13/16	35	67 1/8	82 9/16	35	38 1/8	67 1/8	81 1/4	41 1/4	29	33 11/16	81 1/4	70 1/4	41 1/4	47 9/16	81 1/4	73 1/8	35	47 9/16	920

FIG. 4-8-1-5 ARE CONVERTIBLE AT 15° INCREMENTS FROM DOWN BLAST TO 45° TOP ANGULAR UP DISCHARGE BY ROTATING FAN HOUSING C.C.W.
FIG. 12-16-9-13 ARE CONVERTIBLE AT 15° INCREMENTS FROM DOWN BLAST TO 45° TOP ANGULAR UP DISCHARGE BY ROTATING FAN HOUSING C.W.
FIG. 2-6-7-3 ARE CONVERTIBLE AT 15° INCREMENTS FROM 75° BOTTOM ANGULAR DOWN TO 60° TOP ANGULAR UP DISCHARGE BY ROTATING FAN HOUSING C.W.
FIG. 14-10-15-11 ARE CONVERTIBLE AT 15° INCREMENTS FROM 75° BOTTOM ANGULAR DOWN TO 60° TOP ANGULAR UP DISCHARGE BY ROTATING FAN HOUSING C.C.W.
MOTOR LOCATION MW IS SHOWN ON ALL BLOWER ROOM INSTALLATION DWGS. FOR 50 HG-2 AND IS CONSIDERED TO BE STANDARD. IF ANY OTHER MOTOR LOCATION IS DESIRED, CONSULT WESTINGHOUSE ENGINEERING.





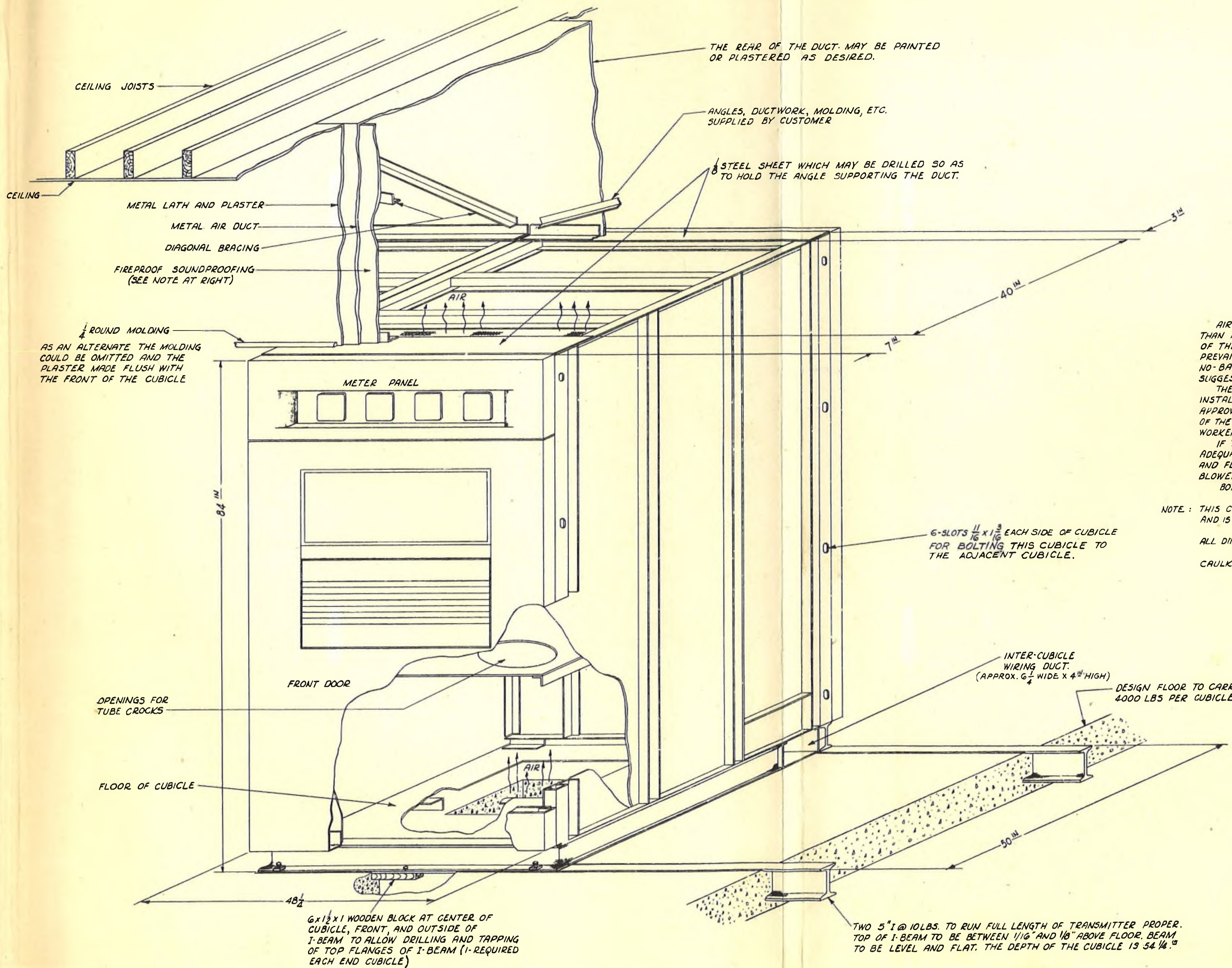
BOTTOM HORIZONTAL DISCHARGE SHOWN

SCALE: 1:16

* IT. 1
BLOWER ARRANGEMENT SHOWN IS
STURTEVANT DIVISION
WESTINGHOUSE ELECTRIC CORP.
DESIGN 10 CLASS I SIZE 90
ARRANGEMENT 3
SINGLE WIDTH SINGLE INLET
CLOCKWISE BOTTOM HORIZONTAL DISCHARGE
WEIGHT 920 LBS.

* NOTES
IT. 2 - MOTOR SHOWN IS WESTINGHOUSE 220-440 V., 3ϕ, 50/60~, 1750 R.P.M., FRAME NO. 284. - S#144220
IT. 3 - BASE SHOWN IS ALLIS CHALMERS TEXSLIDE MOTOR BASE NO. 3.
IT. 4 - SHEAVE SHOWN IS ALLIS CHALMERS VARI-PITCH TEXROPE DRIVE 5.250" TO 10.000" PITCH DIA., 2 GROOVE, R SECTION.
IT. 5 - SHEAVE SHOWN IS 20.0" PITCH DIA. FIXED COMPANION SHEAVE FOR WIDE RANGE VARI-PITCH SHEAVE.
IT. 6 - BELT SHOWN IS R-150 TEXROPE BELT (2 REQ'D).

FIG. 34. Blower Outline (Dwg. 55-A-3801)



AIR EXHAUST SHOULD BE AS DIRECT AS POSSIBLE AND NOT LESS THAN 12 SQ FT AREA. THE AIR SHOULD EXHAUST ON OPPOSITE SIDES OF THE BUILDING SO AS TO TAKE ADVANTAGE OF LEEWARD SIDE OF PREVAILING WINDS. AS AN ALTERNATE, A ROOF VENTILATOR OF THE NO-BACK DRAFT TYPE COULD BE USED IN LIEU OF THE PRECEDING SUGGESTION.

THE PROPERLY SOUND PROOFED EXHAUST DUCT SHOULD NOT BE INSTALLED UNTIL THE CUBICLES ARE IN PLACE. ONLY SOUND PROOFING APPROVED BY THE FIRE UNDERWRITERS SHOULD BE USED. THE FITTING OF THE DUCT TO THE CUBICLES SHOULD BE DONE BY LOCAL SHEETMETAL WORKERS.

IF THE AIR FROM THE TRANSMITTER IS USED TO HEAT THE BUILDING ADEQUATE AREA OF VENTS MUST BE MAINTAINED IN EXHAUST DUCT AND FLOOR TO ALLOW FREE PASSAGE OF AIR RETURN TO THE BLOWER INTAKE.

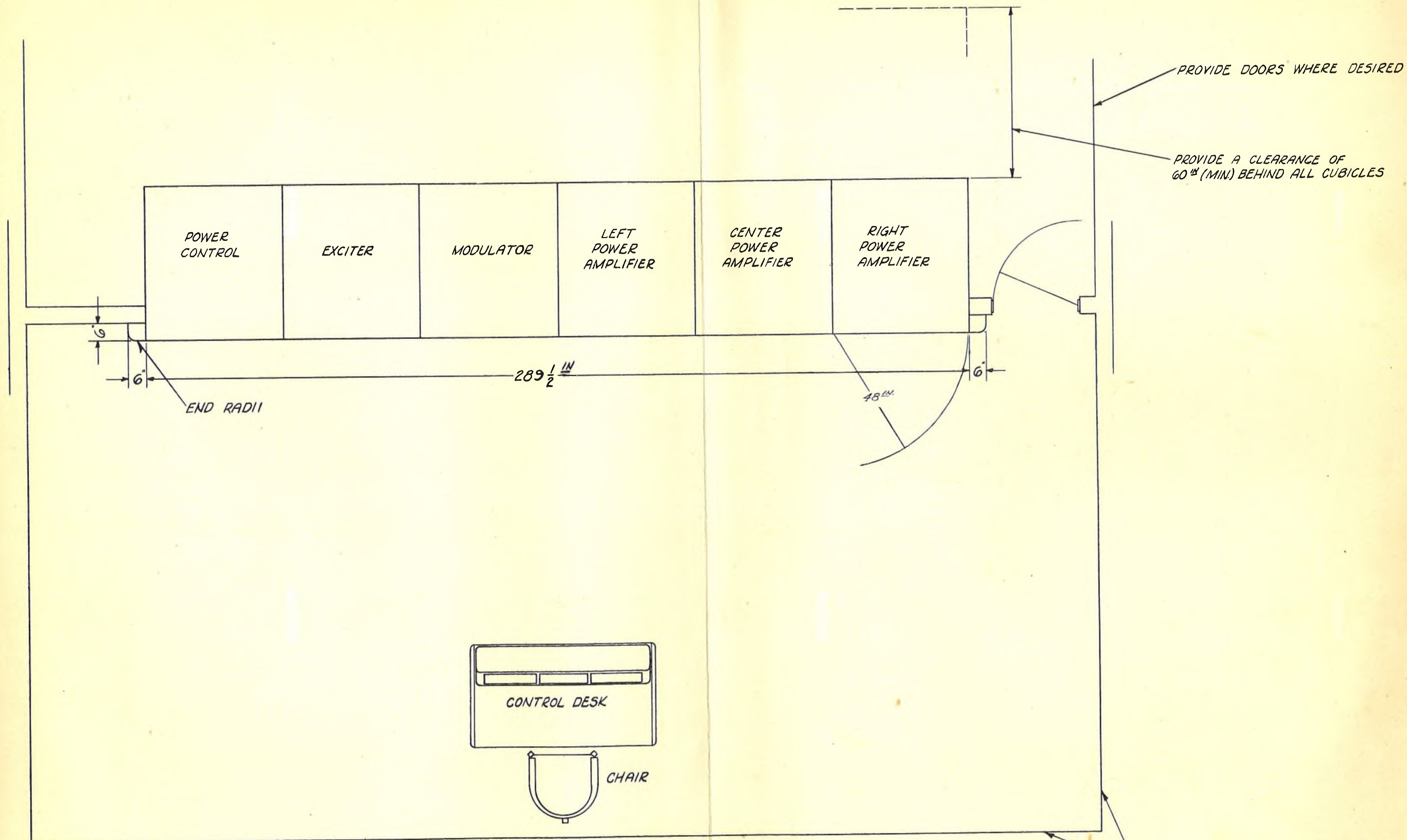
BOTTOM OF DUCT OPEN ENTIRE LENGTH OF TRANSMITTER

NOTE: THIS CUBICLE IS ACTUALLY THE RIGHT HAND POWER AMPLIFIER AND IS TYPICAL OF THE OTHER CUBICLES.

ALL DIMENSIONS ARE IN INCHES

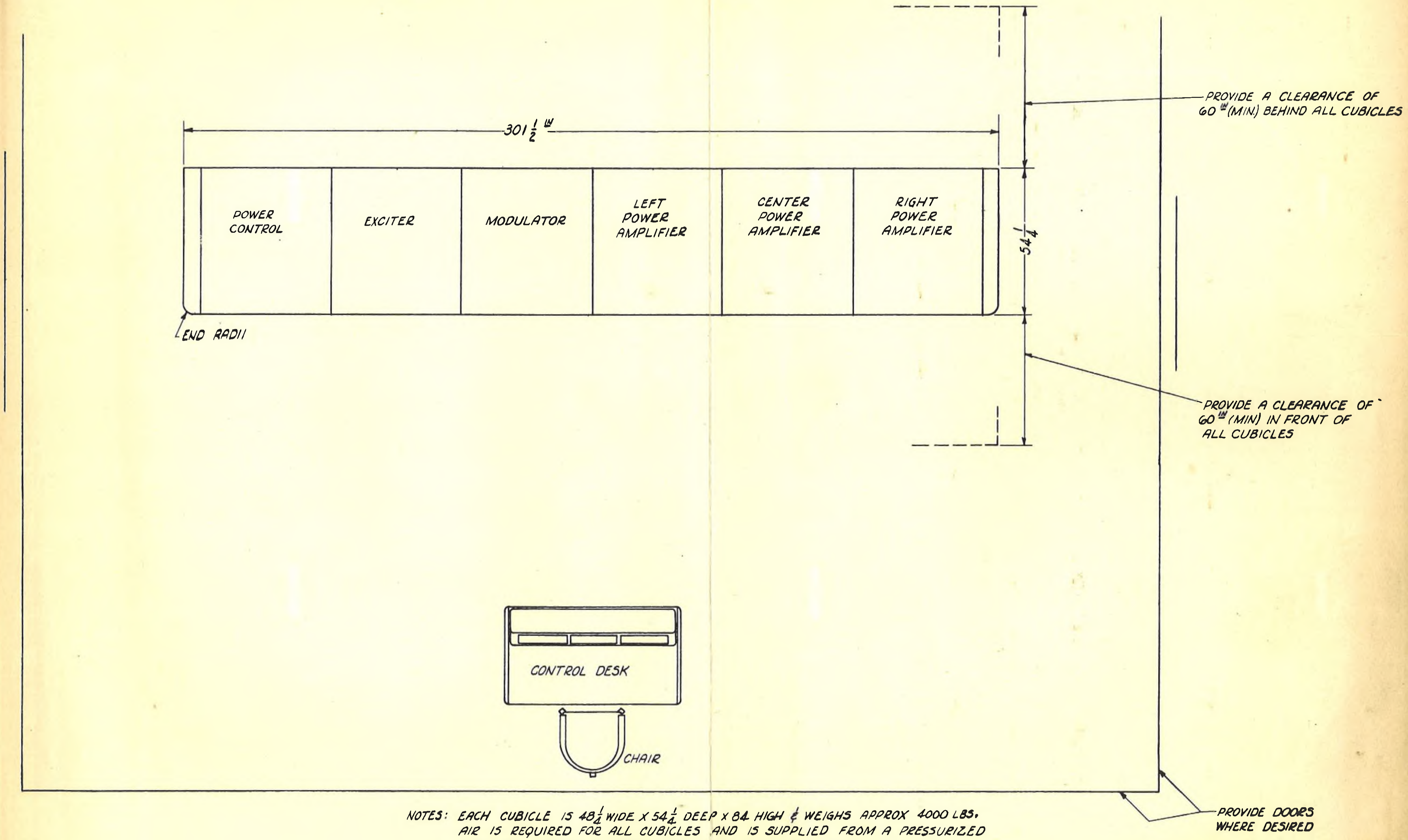
CAULKING: INSIDE SHOULD BE DONE BY REACHING THRU AIR HOLE; OUTSIDE, IN USUAL MANNER, ALL AROUND.

FIG. 35. Typical Cubicle (Dwg. 7621268)



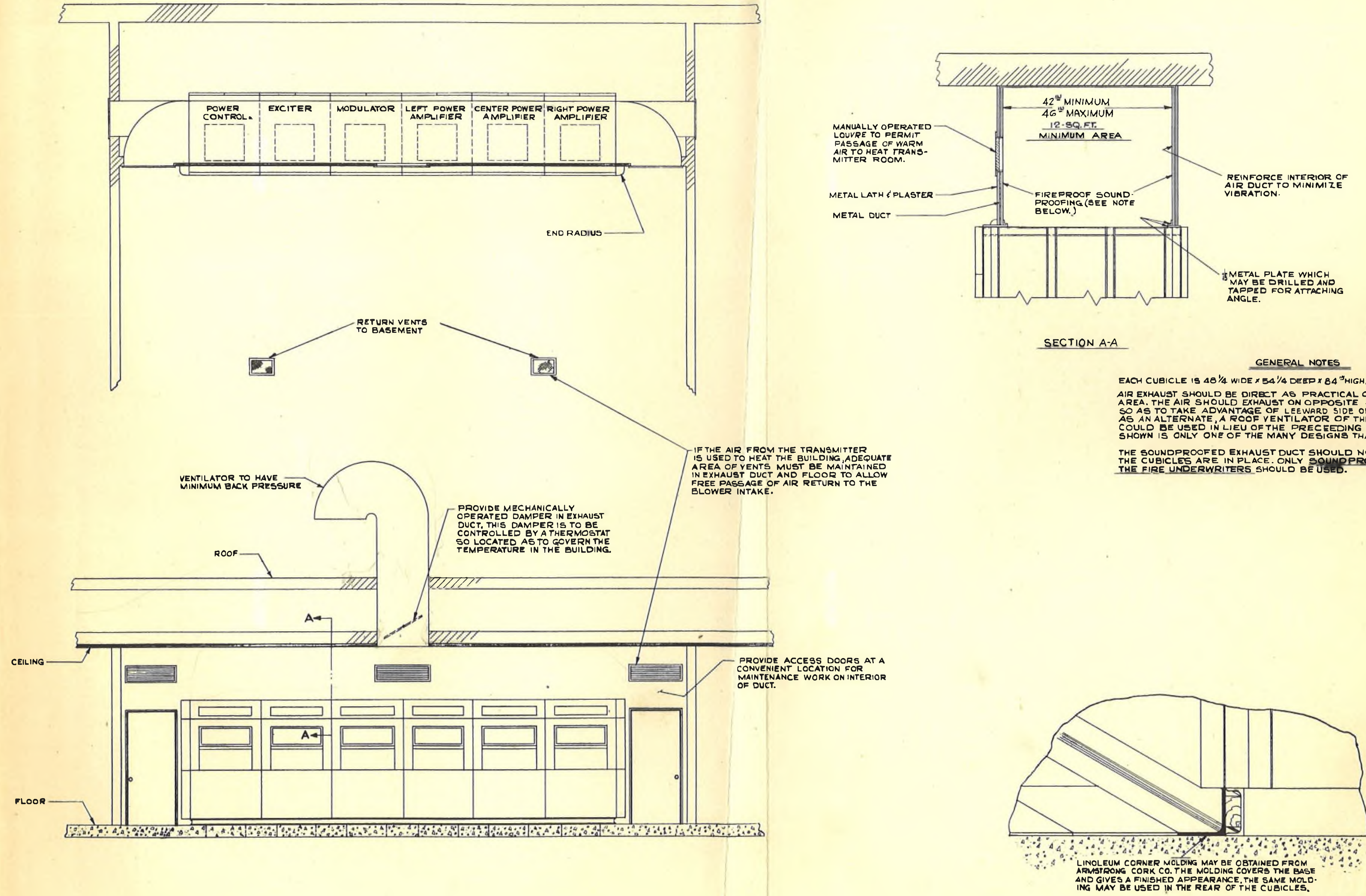
NOTES: EACH CUBICLE IS 48 1/4 WIDE x 54 1/4 DEEP x 84 HIGH & WEIGHS APPROX 4,000 LBS. AIR IS REQUIRED FOR ALL CUBICLES AND IS SUPPLIED FROM A PRESSURIZED ROOM OR TROUGH LEADING FROM SAME BELOW THE FLOOR. THE AIR TRAVELS THROUGH THE CUBICLES AND EXHAUSTS AT THE TOP THEREFORE EXHAUST DUCTS ARE NECESSARY & USUALLY EXTEND FROM THE TOP OF THE CUBICLE TO THE CEILING.

FIG. 36. Cubicle Layout—Inline (In a Wall) (Dwg. 7720597)



NOTES: EACH CUBICLE IS 48 1/4 WIDE X 54 1/4 DEEP X 84 HIGH & WEIGHS APPROX 4000 LBS. AIR IS REQUIRED FOR ALL CUBICLES AND IS SUPPLIED FROM A PRESSURIZED ROOM OR TROUGH LEADING FROM SAME BELOW THE FLOOR. THE AIR TRAVELS THROUGH THE CUBICLES AND EXHAUSTS AT THE TOP THEREFORE EXHAUST DUCTS ARE NECESSARY & USUALLY EXTEND FROM THE TOP OF THE CUBICLE TO THE CEILING.

FIG. 37. Cubicle Layout—Inline (Not Walled In) (Dwg. 7720598)



GENERAL NOTES

EACH CUBICLE IS 48 1/4 WIDE x 54 1/4 DEEP x 84" HIGH, WEIGHS APPROX. 4000 LBS.

AIR EXHAUST SHOULD BE DIRECT AS PRACTICAL OF NOT LESS THAN 12-SQ. FT. AREA. THE AIR SHOULD EXHAUST ON OPPOSITE SIDES OF THE BUILDING SO AS TO TAKE ADVANTAGE OF LEEWARD SIDE OF PREVAILING WINDS
AS AN ALTERNATE, A ROOF VENTILATOR OF THE NO-BACK DRAFT TYPE COULD BE USED IN LIEU OF THE PRECEEDING SUGGESTION. THE VENTILATOR SHOWN IS ONLY ONE OF THE MANY DESIGNS THAT MAY BE INSTALLED.

THE SOUNDPROOFED EXHAUST DUCT SHOULD NOT BE INSTALLED UNTIL THE CUBICLES ARE IN PLACE. ONLY SOUNDPROOFING APPROVED BY THE FIRE UNDERWRITERS SHOULD BE USED.

FIG. 38. Typical Air Exhaust Duct (Dwg. 7621270)

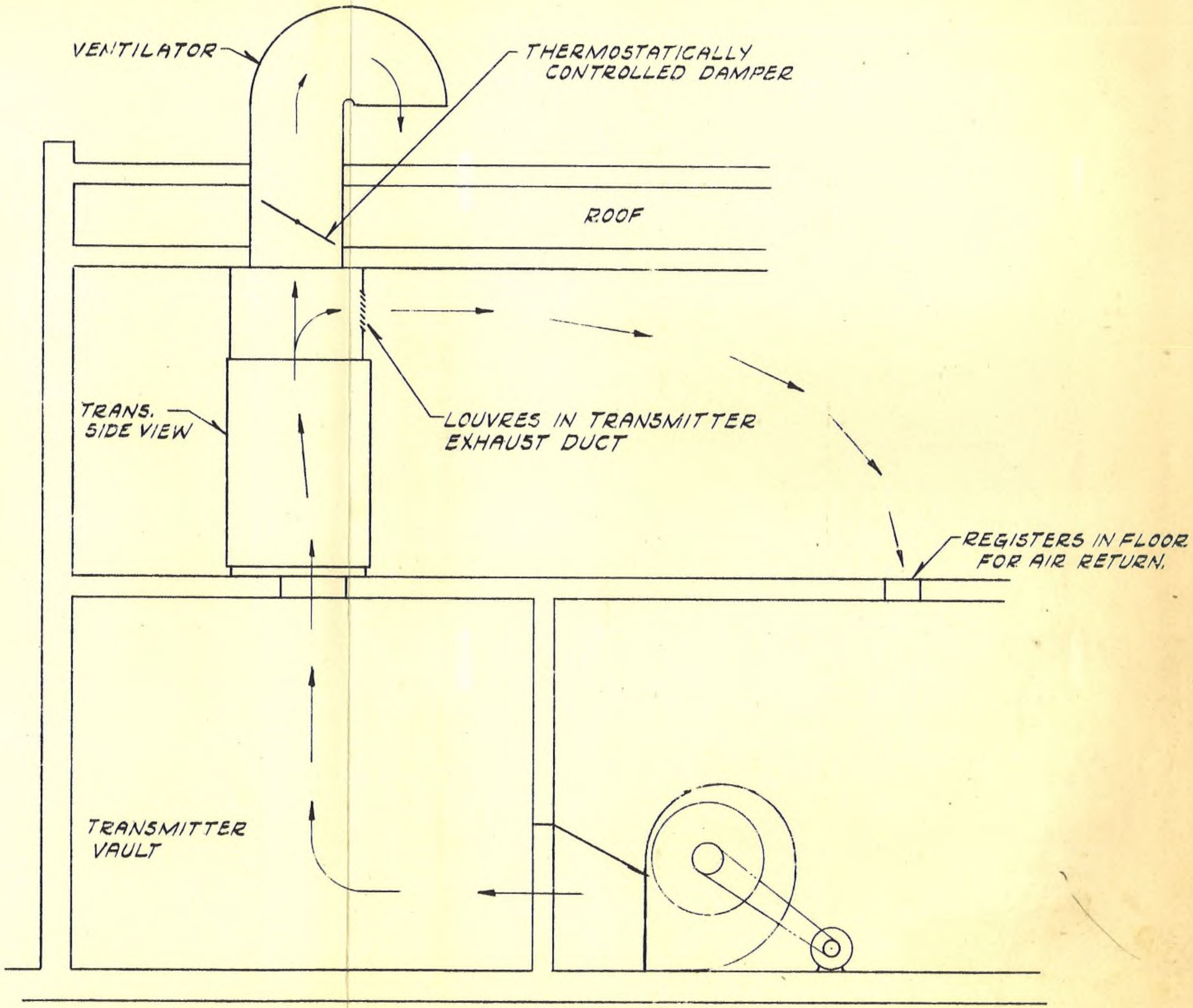
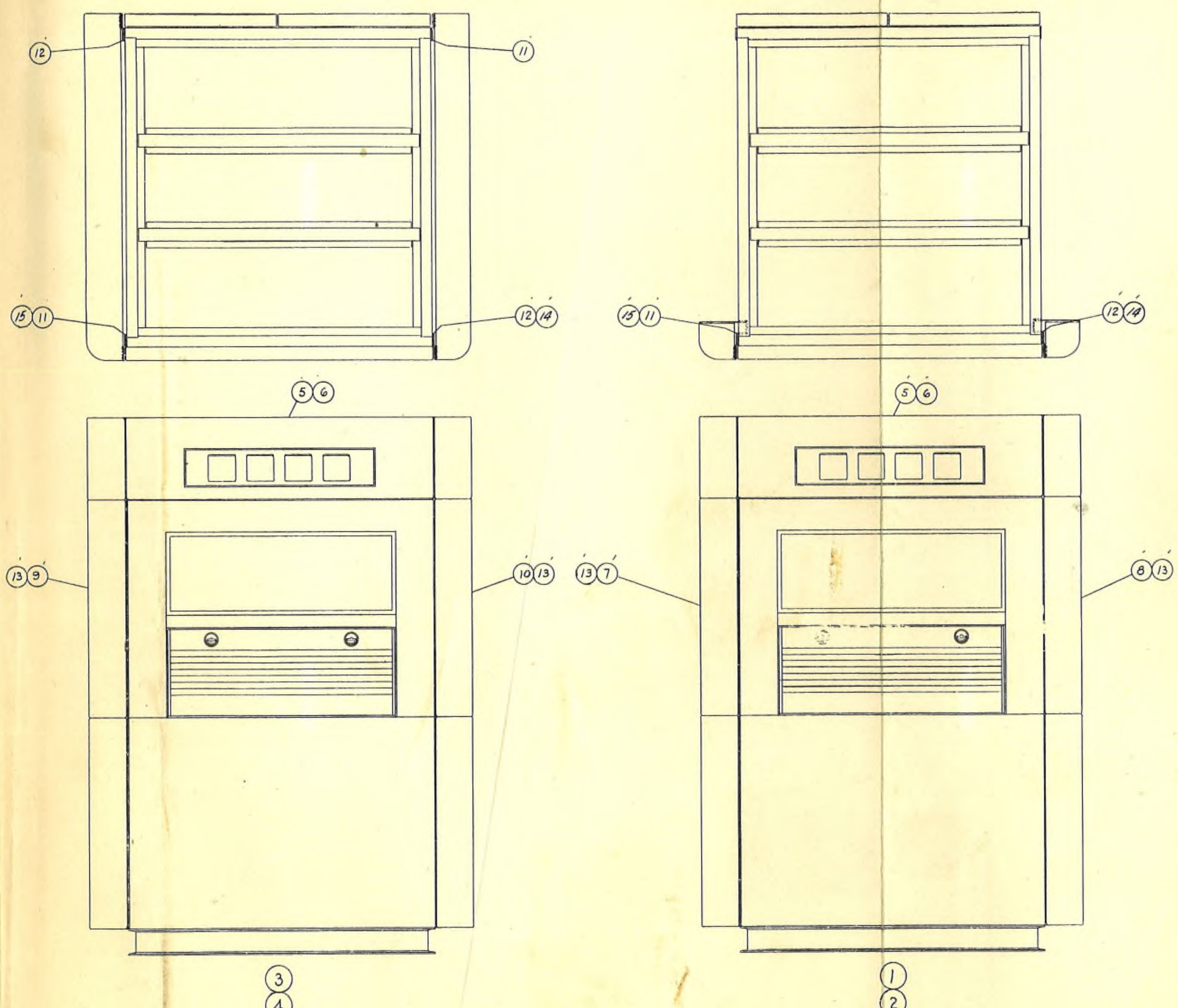


FIG. 39. Basic Air Supply System (Dwg. 7429905)

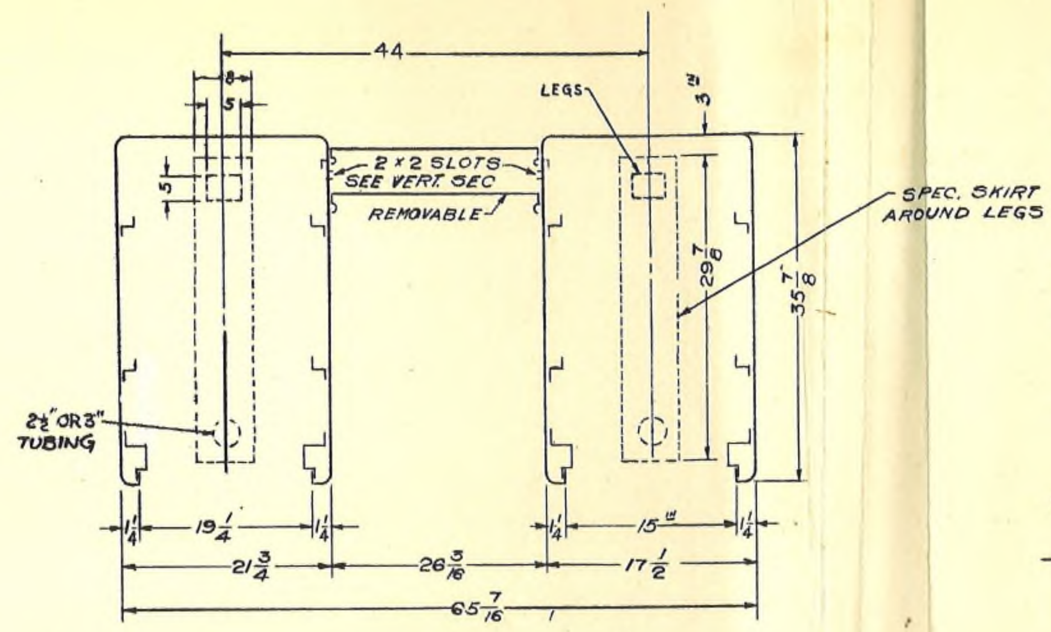
THIRD ANGLE PROJECTION
DIMENSIONS IN INCHES



NOTES:
PTS:-7, 8, 9 & 10 - USING PTS 11 & 12 AS TEMPLATES, AFTER ASSEMBLING THEM TO THE CUBICLE, DRILL AND TAP № 10-32 THDS. IN PTS-7, 8, 9 & 10, THEN ASSEMBLE USING PT. 13.
PTS.-11, 12, 14 & 15 ASSEMBLE TO SLOTS IN CORNER SUPPORTS OF CUBICLE.

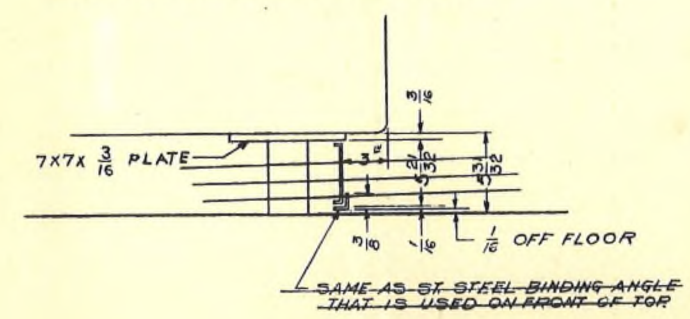
				SYMBOL	STYLE	MATERIAL	REFERENCE	PART	DESCRIPTION	FIN.
1	1		1				G-5 7619309	15	PLATE-LOWER L.H. (SEE NOTE)	
1	1	1					G-4 7619309	14	PLATE-LOWER R.H. (SEE NOTE)	
20	20	10	10			BRASS		13	SCREW- FLAT HEAD MACH. .190-32 x 3/8 LG.	
1	1	1					G-2 7619309	12	PLATE-UPPER R.H. (SEE NOTE)	
1	1		1				G-3 7619309	11	PLATE-UPPER L.H. (SEE NOTE)	
1							G-1 7619321	10	END RADII ASS'Y.-R.H. (SEE NOTE)	
	1						G-1 7619322	9	END RADII ASS'Y-L.H. (SEE NOTE)	
		1					G-1 7619301	8	END RADII ASSY.-R.H. (SEE NOTE)	
			1				G-1 7619313	7	END RADII ASS'Y.-L.H (SEE NOTE)	
X		X						6	CUBICLE-R.H. END	
	X		X					5	CUBICLE-L.H. END	
X								4	ASSEMBLY	
	X							3	ASSEMBLY	
		X						2	ASSEMBLY	
			X					1	ASSEMBLY	

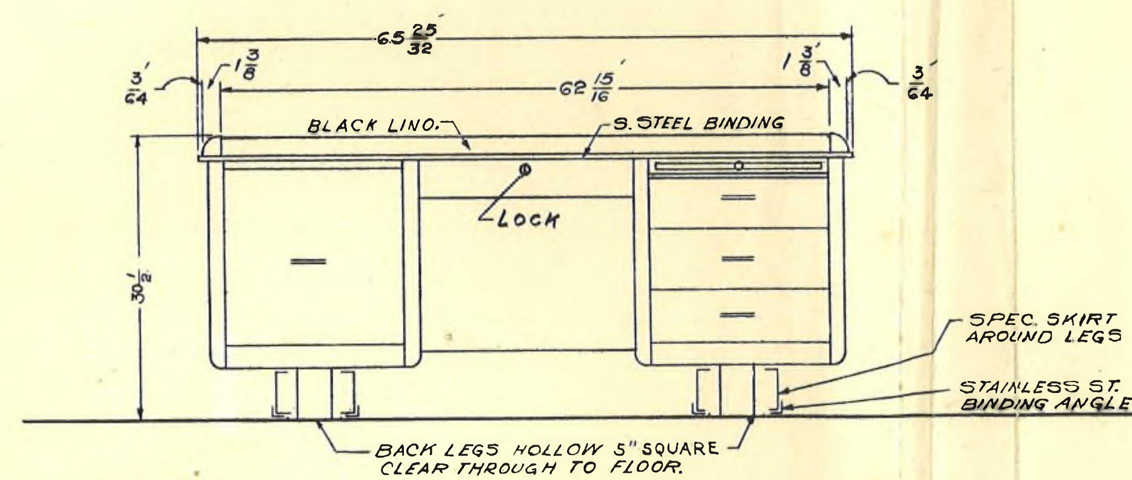
FIG. 40. End Radii Drawing (Dwg. 7619510)

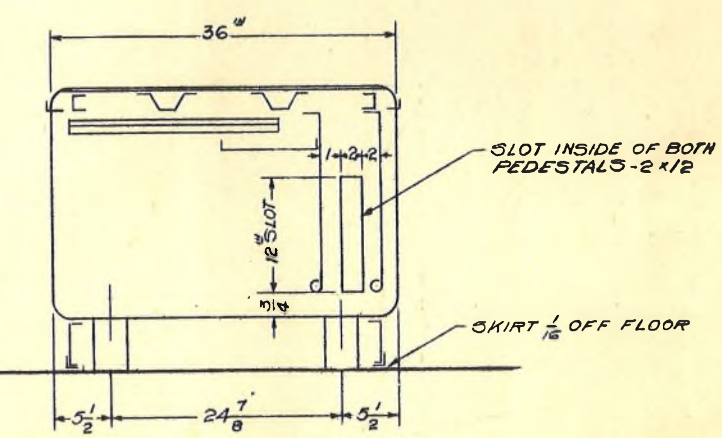


REAR LEGS TO BE 5" SQUARE METAL PIPES
FRONT LEGS TO BE $2\frac{1}{2}$" OR 3" TUBING

~~ELEV.(2) CONSISTS OF 1-1500A HARTER CHAIR-BLACK LEATHER FINISH TO MATCH DESK ELEV.(1) ORDERED BY BALTIMORE OFFICE.~~





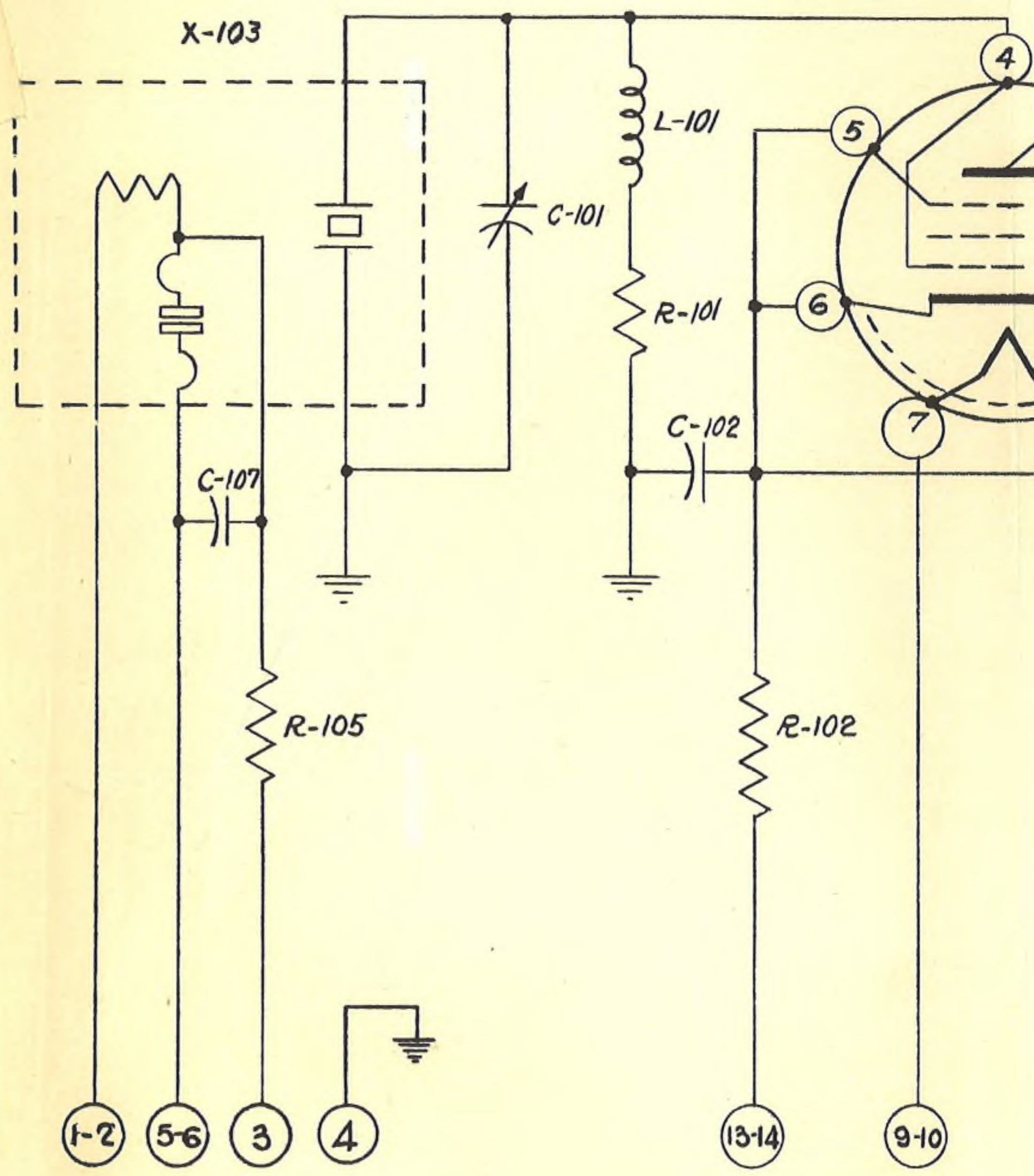


NOTES - PART-1
1. ELEV.(1)-1-SPECIAL; CONTAINING
ONE PEDESTAL TO HAVE STOW DAVIS MECHANISM COMPLETE WITH METAL PLATFORM, FINISH AS PER SPEC. OF DESK.
2. KNEE SPACE BOX DRAWER CLEAR 26¼ x 2½ x 22⅛
ZEE SLIDE SUSPENSION CONV. TRAY PK. LOCK TO LOCK ALL OTHER DRAWERS.
3. BOX DRAWERS CLEAR $13\frac{3}{16} \times 5\frac{27}{32} \times 24\frac{1}{8}$
EZ SLIDE SUSP.
4. FINISH PER PROCESS SPEC. 332-B

NOTES - PART-2
CHAIR - ORDER FROM YARRINGTON & JOHNS, INC.,
320-324, W. 24 ST. BALT. 11, MD, THEIR #1200 EXECUTIVE TYPE
DESK CHAIR UPHOLSTERED IN BLACK IMITATION LEATHER.
PAINTED SURFACES TO BE FINISHED Ⓦ SPEC. 332-B.

1					2	CHAIR SEE NOTES	
1					1	DESK - SEE NOTES	
	SYM BOL	NAVY TYPE NO.	MATERIAL	REFERENCE	PART	DESCRIPTION	FIN.
G-1	GROUP						

FIG. 41.- Desk (Dwg. 7715022)


X-103
L-101
C-101
R-101
C-102
C-107
R-105
R-102
4
5
6
7
1-2
5-6
3
4
13-14
9-10

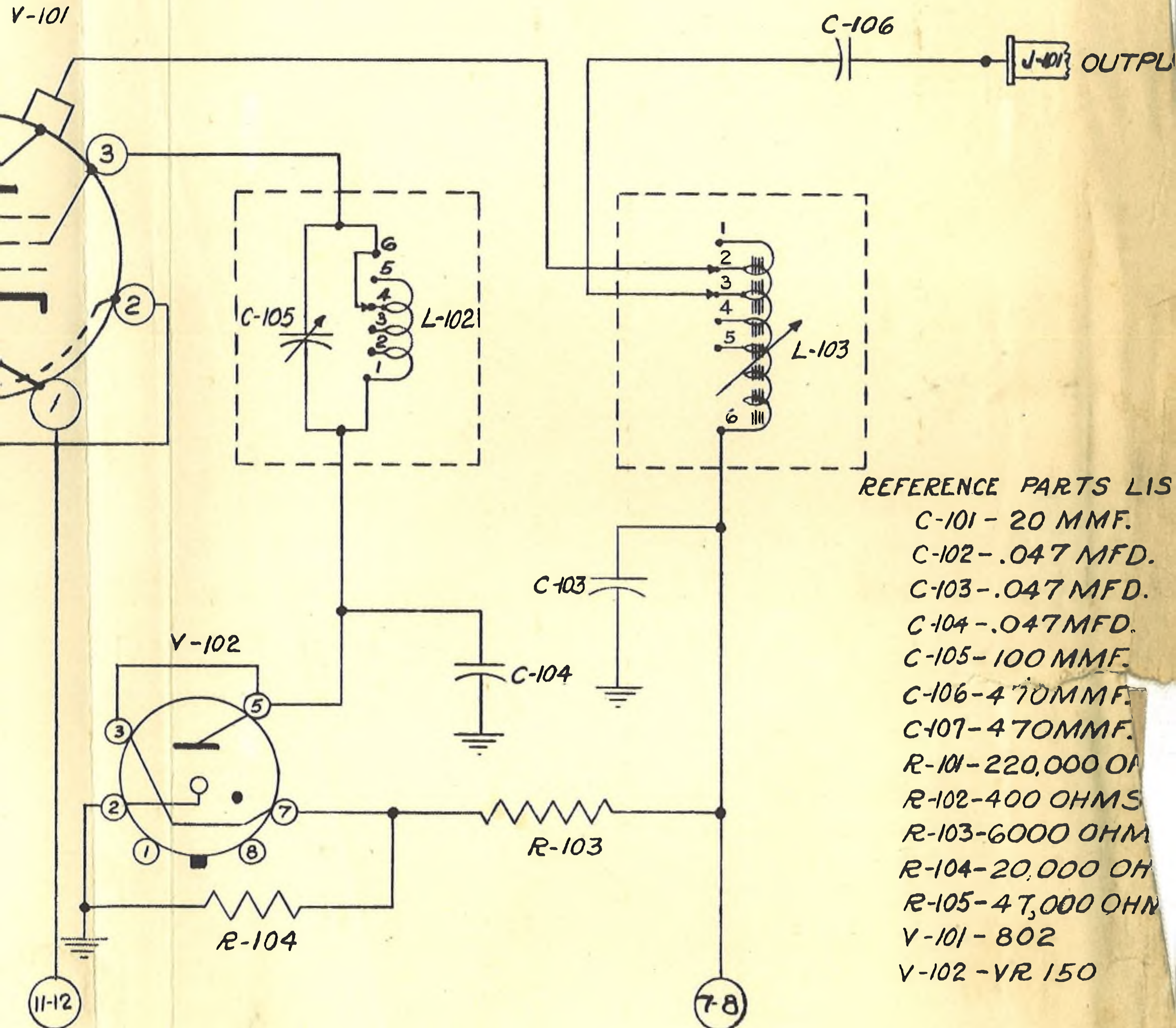


FIG. 61. Type FA Crystal Oscillator, Schematic Diagram (Dwg. 7425857)

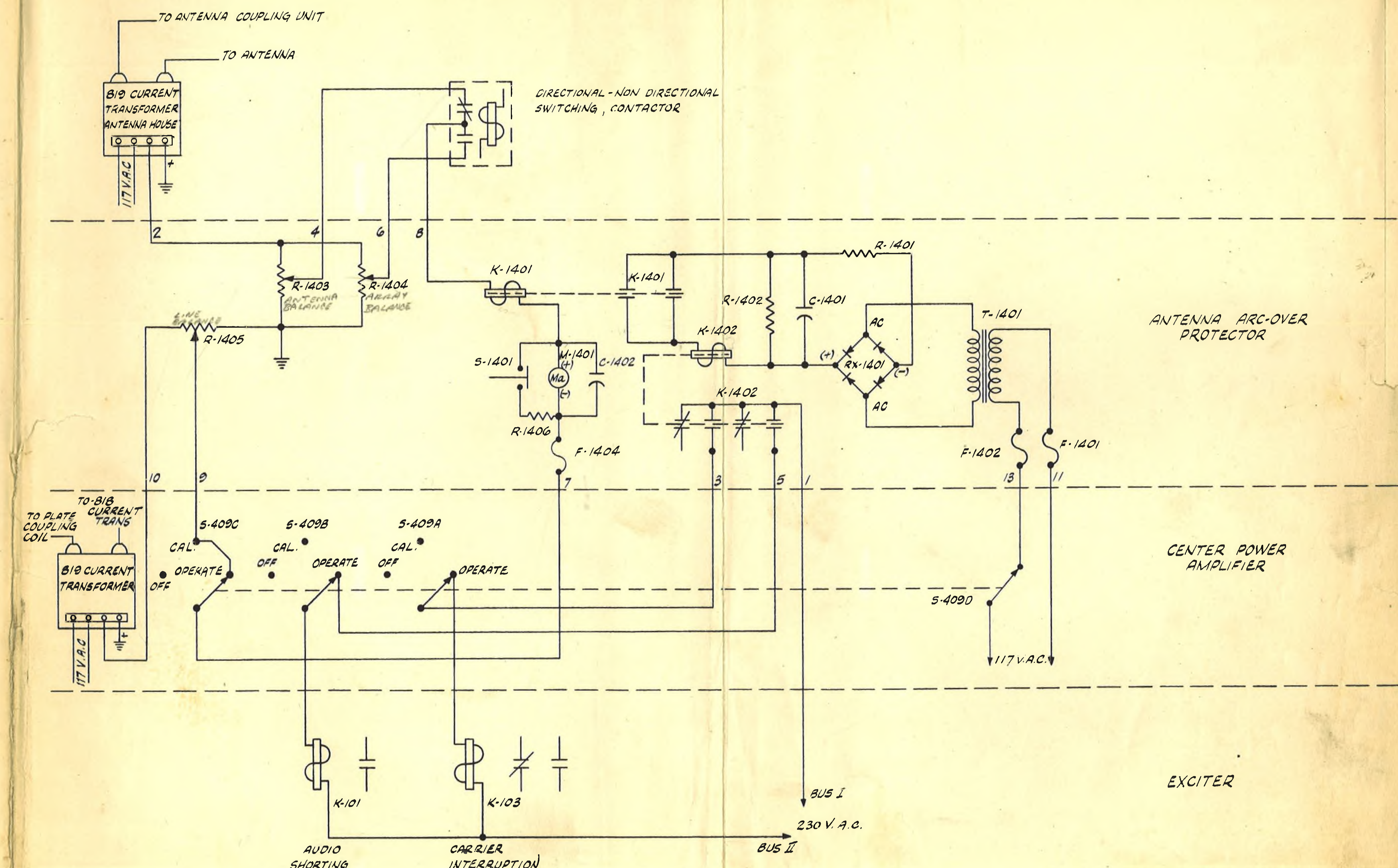
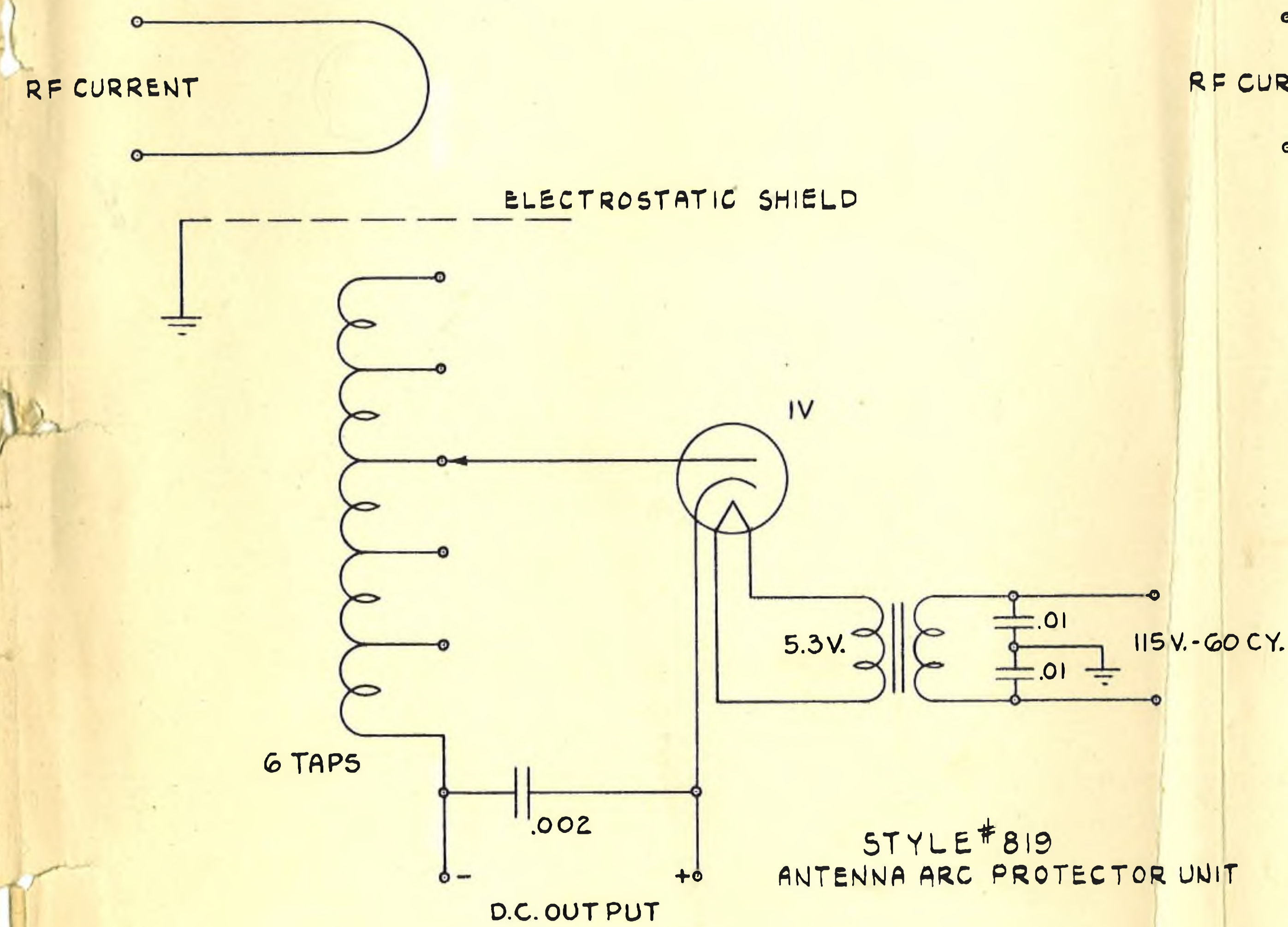
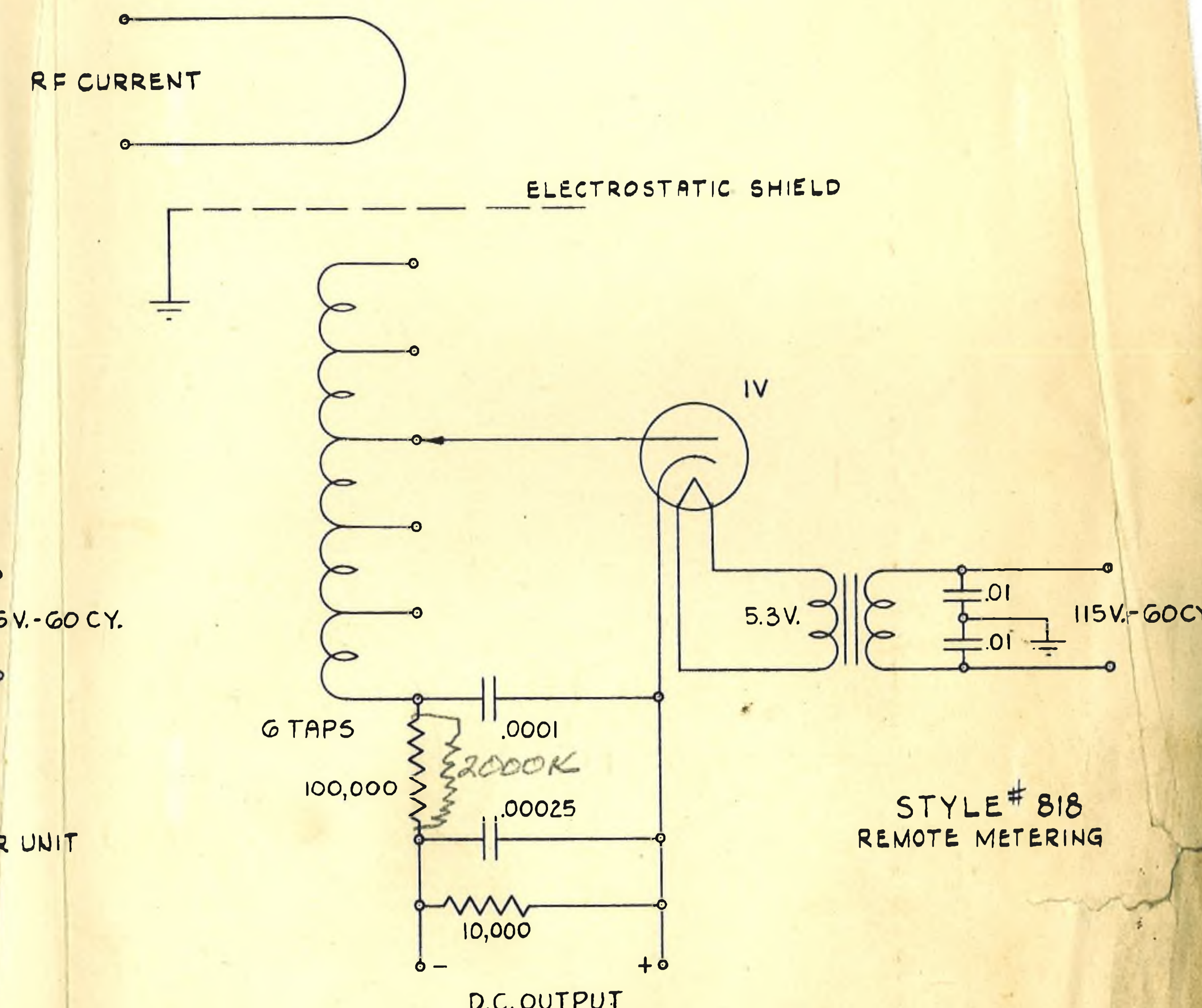


FIG. 62. Composite Diagram—Antenna Arc Interrupter Unit (Dwg. 7724452)

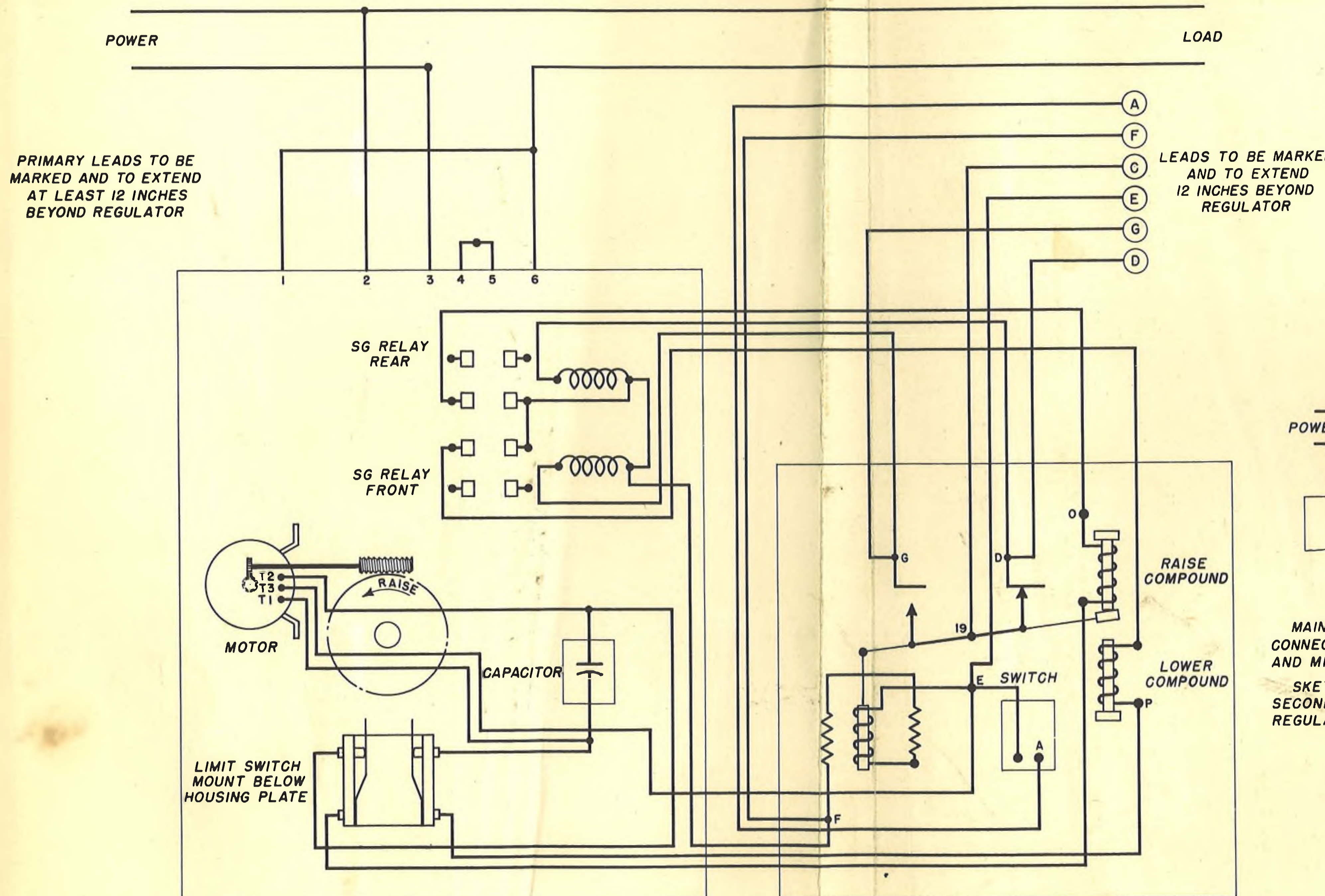




NOTE- TO INCREASE THE SENSITIVITY, THE PICKUP COIL CAN BE TRANSFERRED TO THE PRIMARY SIDE OF THE ELECTROSTATIC SHIELD.

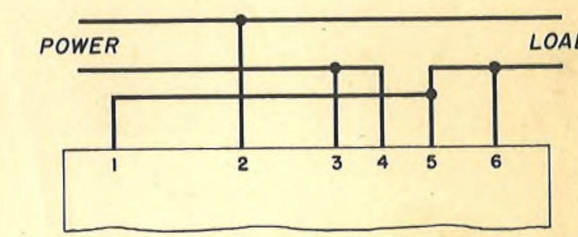
Change in resistor
made to use 1ma meter
Ba.

FIG. 63. RF Current Transformer-Rectifier (Dwg. 7432074)



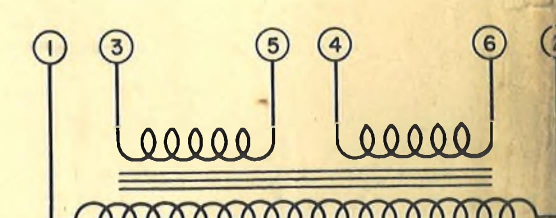
TOP VIEW

PRIMARY RELAY FRONT VIEW



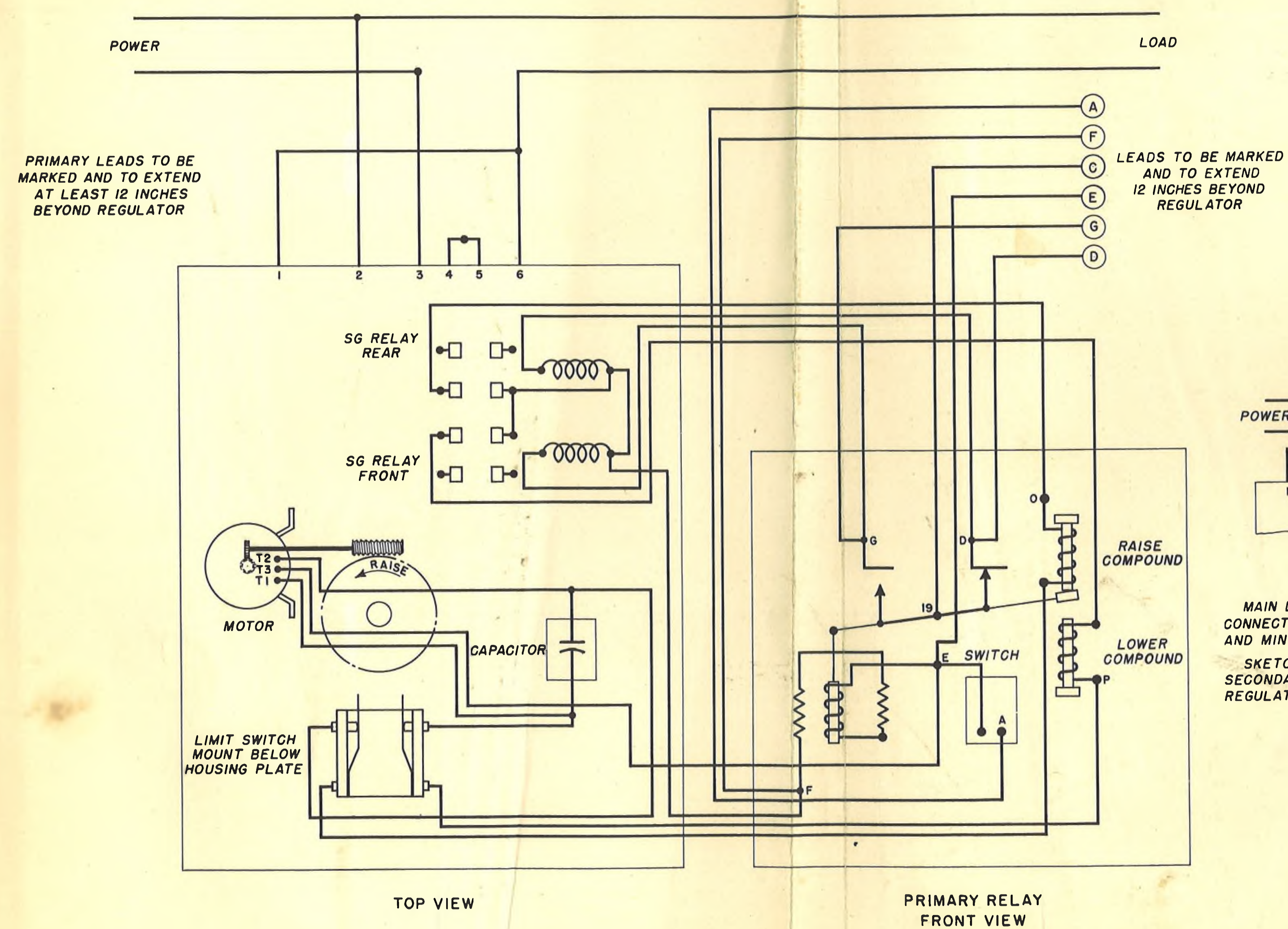
MAIN DIAGRAM SHOWS REGULATOR SECONDARY CONNECTED IN SERIES FOR MAXIMUM REGULATION AND MINIMUM CURRENT.

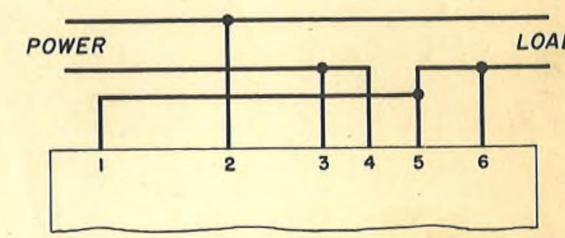
SKETCH RIGHT MAIN DIAGRAM SHOWS REGULATOR SECONDARY CONNECTED IN PARALLEL FOR MINIMUM REGULATION AND MAXIMUM CURRENT.



PRIMARY CIRCUIT INTERNAL CONNECTIONS

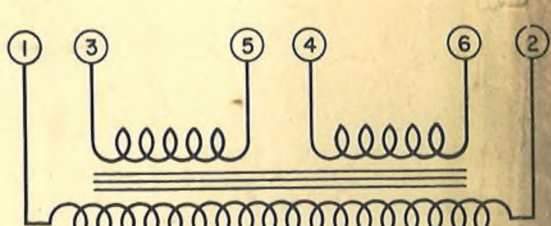
FIG. 58. Distribution Induction Regulator, Schematic Diagram (Dwg. 7718453)





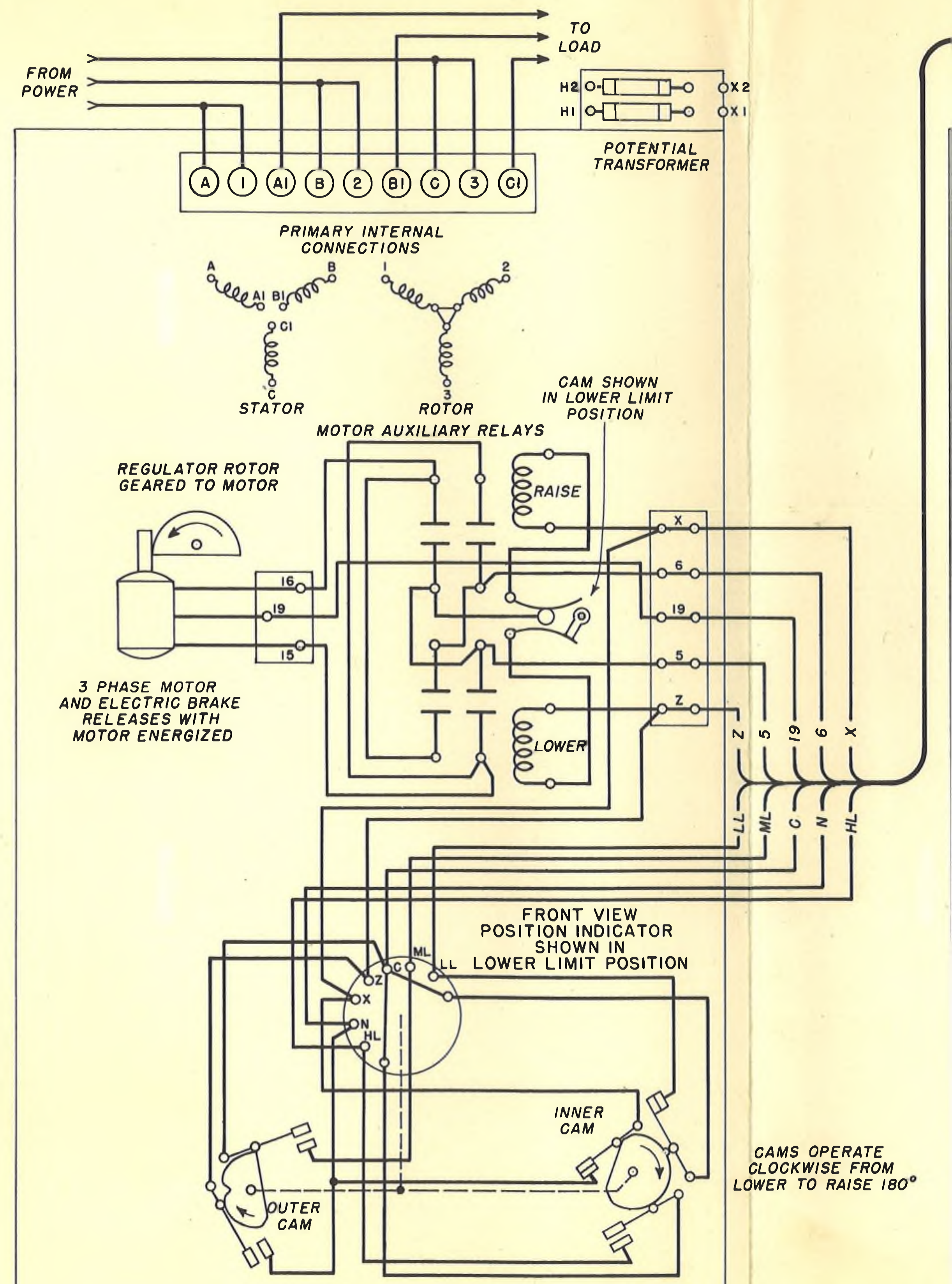
MAIN DIAGRAM SHOWS REGULATOR SECONDARY CONNECTED IN SERIES FOR MAXIMUM REGULATION AND MINIMUM CURRENT.

SKETCH RIGHT MAIN DIAGRAM SHOWS REGULATOR SECONDARY CONNECTED IN PARALLEL FOR MINIMUM REGULATION AND MAXIMUM CURRENT.



PRIMARY CIRCUIT INTERNAL CONNECTIONS

FIG. 58. Distribution Induction Regulator, Schematic Diagram (Dwg. 7718453)



TOP VIEW OF REGULATOR

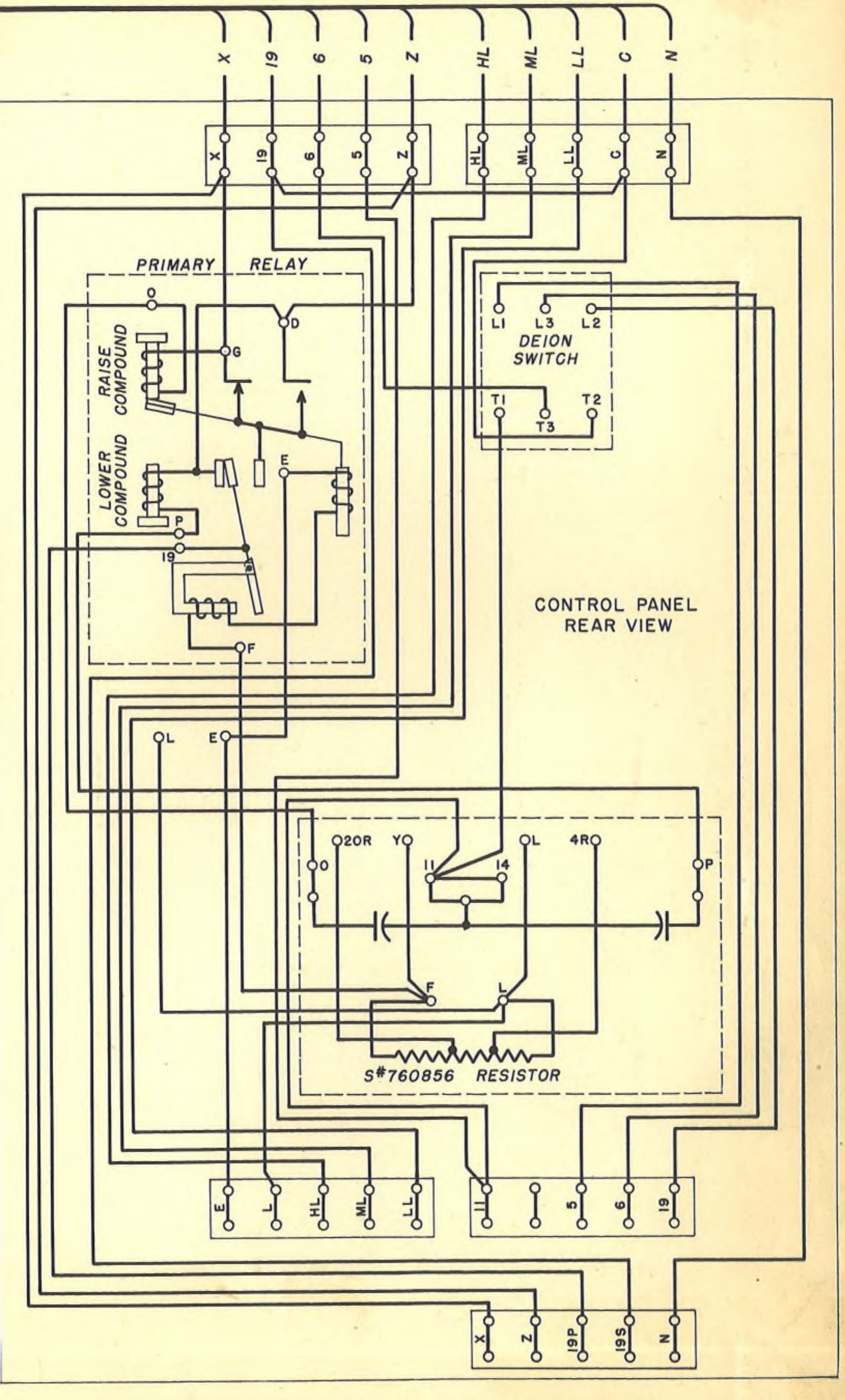
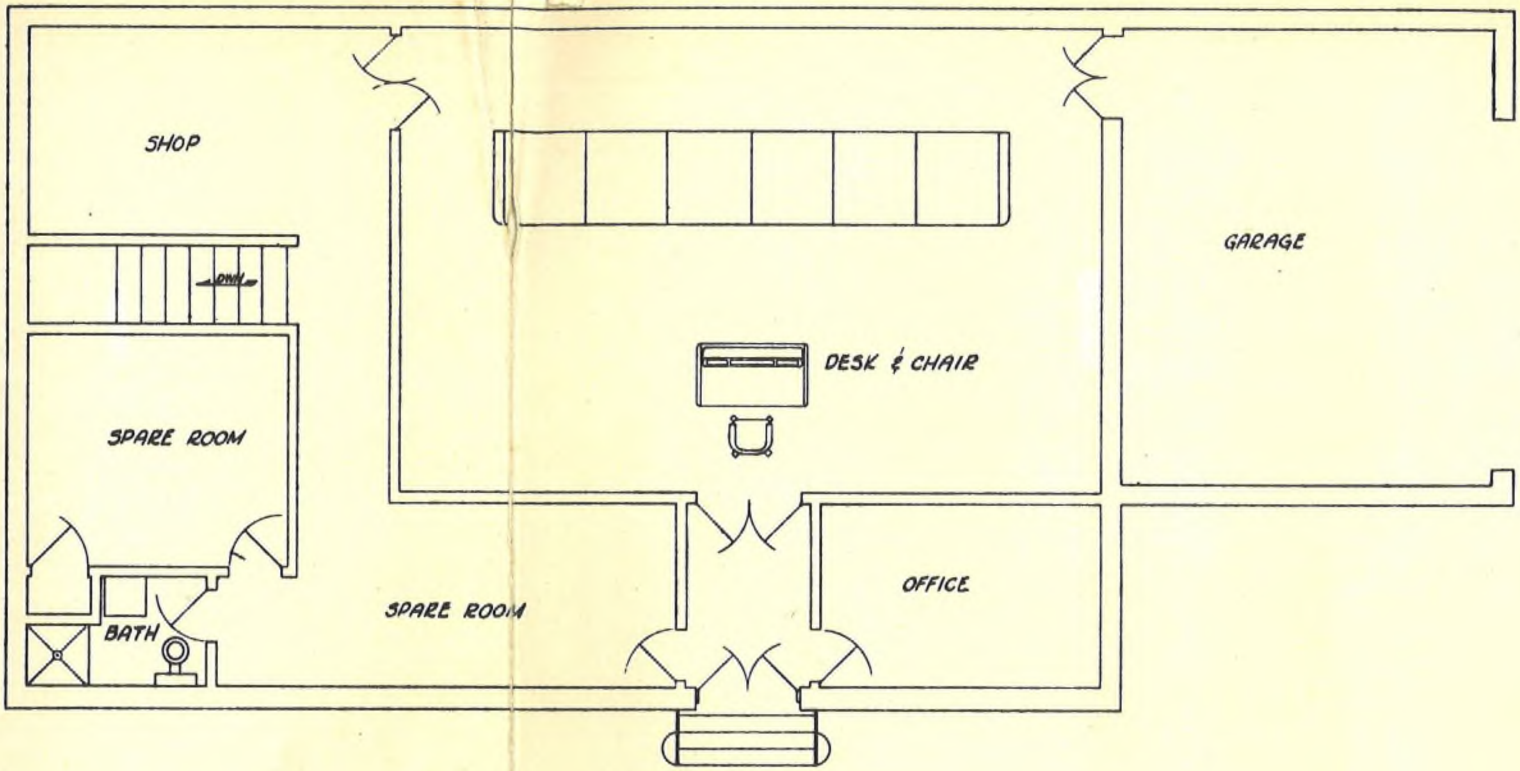
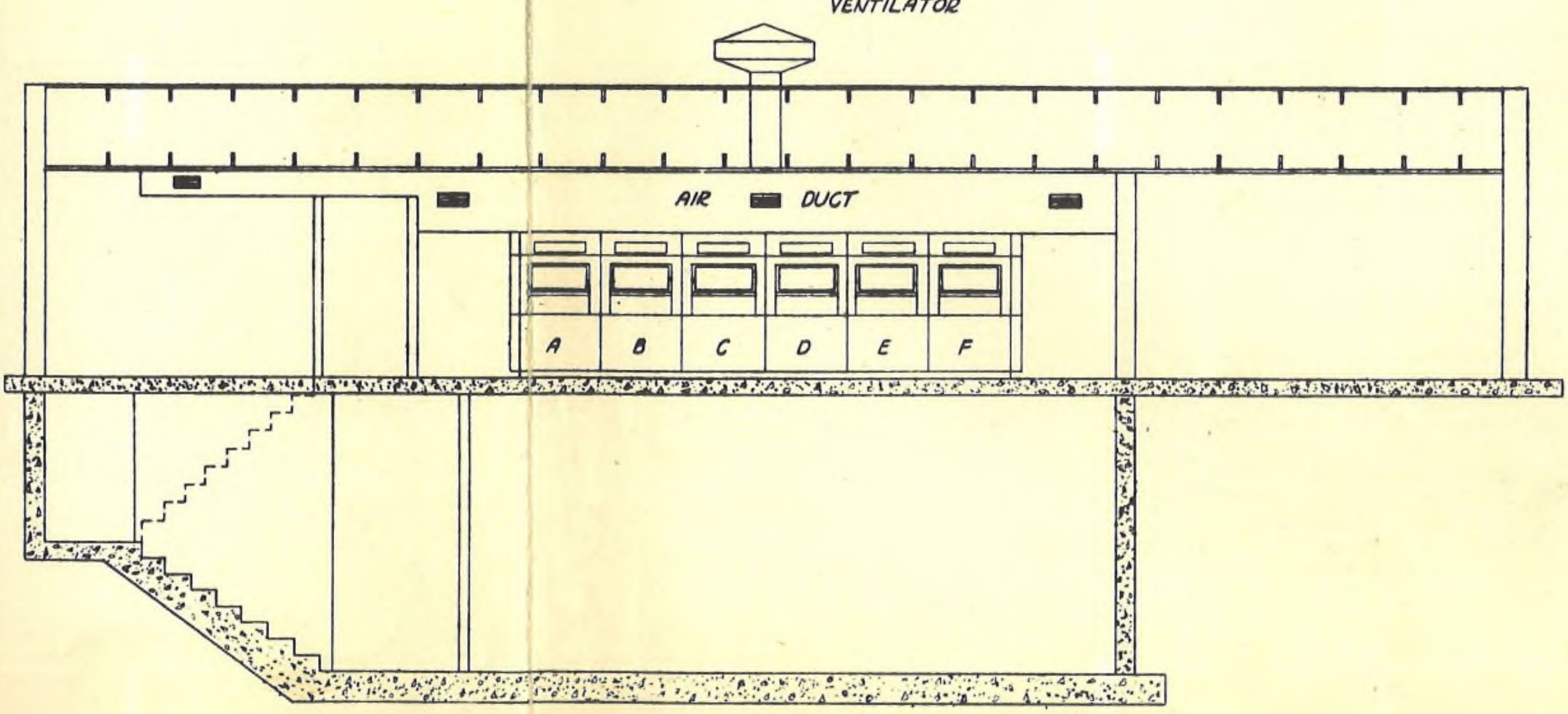
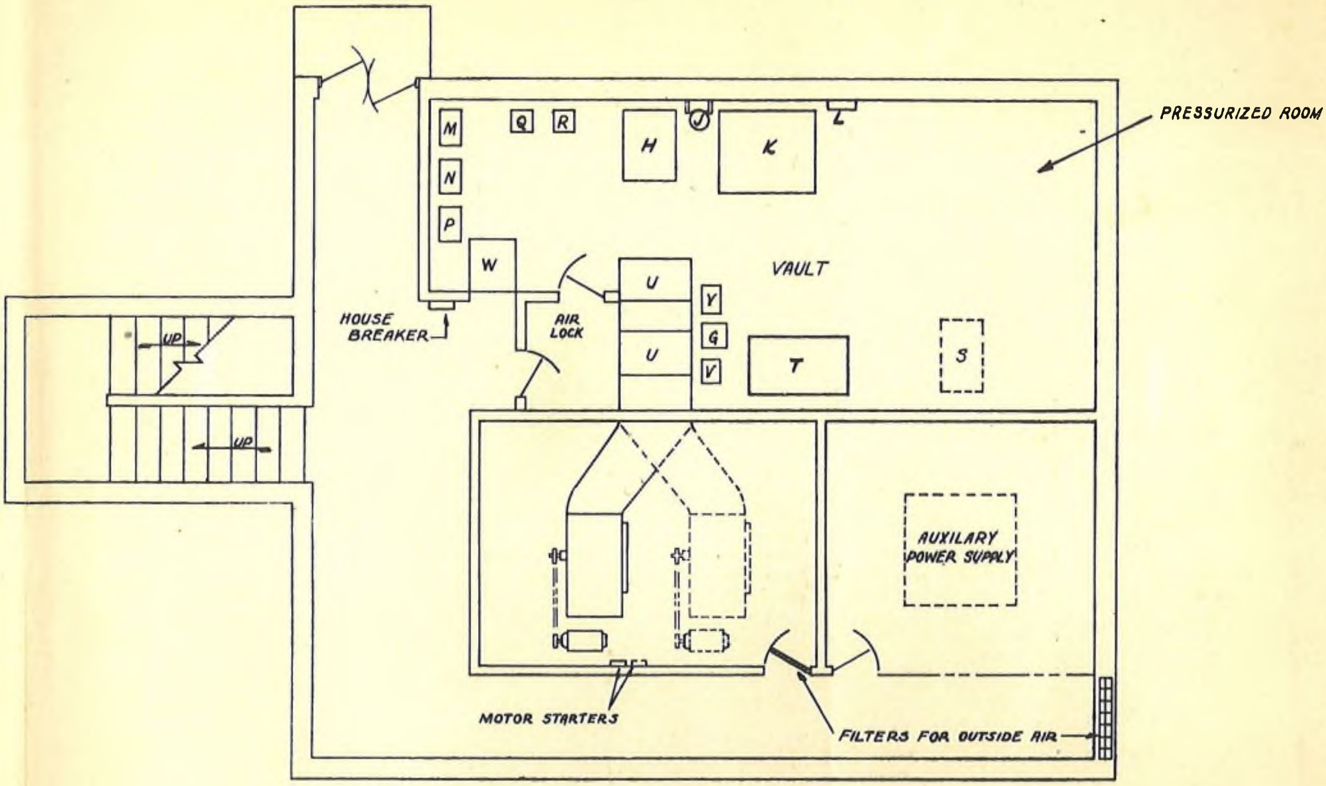


FIG. 59. Main Rectifier Regulator, Schematic Diagram (If Used) (Dwg. 7718452)


SHOP
DWN
SPARE ROOM
BATH
SPARE ROOM
DESK & CHAIR
OFFICE
GARAGE


VENTILATOR
AIR DUCT
A
B
C
D
E
F



A - POWER CONTROL
B - EXCITER
C - MODULATOR
D - LEFT POWER AMPLIFIER
E - CENTER POWER AMPLIFIER
F RIGHT POWER AMPLIFIER

SPACE FOR PHASING CUBICLE IS NOT SHOWN. IF PHASING CUBICLE IS USED, DUE ALLOWANCE SHOULD BE MADE.

G - FILTER REACTOR
H - MODULATION REACTOR
J - AUXILIARY AUDIO CHOKE
K - MODULATION TRANSFORMER.
L - COUPLING CAPACITOR
M - DISTRIBUTION TRANSFORMER
N - DISTRIBUTION TRANSFORMER
P - DISTRIBUTION TRANSFORMER
Q - DISTRIBUTION REGULATOR
R - DISTRIBUTION REGULATOR
S - RECTIFIER REGULATOR (OPTIONAL EQUIPMENT)
T - PLATE TRANSFORMER
U - RECTIFIER
V - FILTER CAPACITOR
W - SWITCH GEAR
X - AUXILIARY POWER SUPPLY

FIG. 28. Building Layout (Two Floor) (Dwg. 55-A-8335)