INTERCOMMUNICATING SYSTEMS
WEBSTER ELECTRIC TELETALK
1200-SERIES (LOW LEVEL)
MAINTENANCE

Contents — Page

1. GENERAL

1.01 This section covers the requirements and procedures for the maintenance of 1200-series Teletalk equipment.

1.02 Teletalk systems use commercial ac power and will not operate during a power failure.

2. SUPPLIES

The following supplies may be required for maintenance purposes:

Master Stations

S4901-8 Buzzer

211-15296-1 Cable, Panel to Junction Box, 30 conductor, approximately 7 feet

211-20122-1 Cable, Panel to Junction Box, 42 conductor, approximately 7 feet

211-15283-1 Cable, Panel to Junction Box, 54 conductor, approximately 7 feet

211-15230 Designation Card

211-15231 Designation-Card Cover

P8755-5 Fuse, one amp (AGC)

P-8914 Lamp, 6 volt, #44

Master Stations (Cont'd)

211-14909-1 Relay (Busy Signal and -14 Silencing Circuit)

211-15232 Speaker

211-15068 Switch (Talk-Listen)

6X4 Tube, Electron (Rectifier)

6AQ5 Tube, Electron (Power Output)

6AU6 Tube, Electron (Preamplifier)

211-15067 Volume Control and On-Off Switch (1/4 Megohm)

211-15050 Capacitor 50-10 UF, 350 volt

Zero-Level and Applique Units

211-25634 Capacitor 10-10 UF, 100 volt

211-21933 Potentiometer (Attenuator)

211-21671-1 Relay

211-24100 Transformer

211-18926 Selenium Rectifier

P-10695-1 Capacitor 50-30-10 UF, 150 volt (RM-B Only)

P-8914-1 Lamp 6 volt #47 (RM-B Only)

211-17479 Speaker (RM-B Only)

S6925 Switch, Call-In (RM-B Only)

35C5 Tube, Electron, Power-Output (RM-B Only)

12BA6 Tube, Electron, Preamp (RM-B Only)

211-14540 Volume Control and On-Off Switch (RM-B Only)

Speakers

S4682-1 Speaker (Part of 5G45)

S4975-2 Speaker (Part of 8C45-2)

3. MAINTENANCE TROUBLE-CLEARING PROCEDURES

3.01 When there is trouble in a system which has been properly installed (Section C70.912), the fault will usually be in one of the units rather than in the interstation wiring. If the fault is in the interstation wiring, it is easily traced because the units will usually operate properly on some branches of the system. Once a fault has been traced to some particular unit, it may sometimes be located by sight or smell (such as burned-out resistors and shorted transformers), but most faults must be traced by checking voltages and resistances.

3.02 When tracing a fault, always remember that the majority of amplifier troubles can be traced to faulty tubes. First check or replace the tubes with a set of good tubes.

Voltage Checks

3.03 Many faults in electronic equipment result from abnormal voltages or the production of abnormal voltages. The operating voltages at all necessary points in each circuit are given on the schematic diagram of the particular unit being tested. Unless otherwise specified, voltages listed on the diagrams are measured between the indicated point and ground. The voltage measurements obtained may not always agree exactly with the voltage specified on the schematic diagram because of variation in tubes and other circuit components. If the voltage reading obtained does not differ greatly from that specified, it is probable that the component in question is not defective.

3.04 Voltage readings taken when the amplifier is operating on a line voltage in excess of 117 volts will be slightly higher than those indicated on the schematic diagram. In general, voltage readings within 20 per cent of those shown on the diagram indicate that the parts being tested are satisfactory.

Resistance Checks

3.05 When a fault develops, its effect will frequently show as a change in resistance value. Most of the resistors used have a tolerance of at least 10 per cent. If the measured resistance of a particular resistor is 10 per cent more or 10 per cent less than its rated value, it would be considered normal. When a resistor is used whose value must be very close to its rated value, the necessary tolerance is stated.

Hum and Noise Troubles

3.06 Hum, noise, or other interference may be produced by medical apparatus, office equipment, motors, or poor wave form of the power supply. It may be picked up by the voice lines running from the speaker stations and amplified in the master station when the talk-listen switch is in the listen position. Defective tubes can also cause hum and noise.

3.07 Interstation voice lines must always be twisted pairs for minimum pickup of interference. The transposing effect obtained from the twisted pairs effectively cancels out hum or noise picked up by interstation wiring. Care should be taken that the cable does not ground to any pipe, conduit, or metal surface or by moisture due to leakage, as this will unbalance the cancelling effect of the twisted pair and may cause noise, hum, or crosstalk. In extremely noisy locations, where the noise is picked up by the interstation wiring, it may be necessary to install shielded pairs between the speaker station and the master station. Never use a single shielded wire; use two-wire shielded cable, grounding the shield at the master station only.

3.08 The source of interference caused by office equipment (such as electric typewriters or other equipment using automatic speed regulators) may cause a clicking noise. Such interference is usually easy to trace, since it will occur only when the interfering equipment is in operation. Filters for eliminating this interference are usually available from the manufacturer of the equipment.

3.09 It may be necessary to reverse the power plug of master stations and zero-level stations to determine the correct polarity for lowest hum level. The chassis connection in the terminal box should always be grounded to a water pipe or other good ground. This will help to reduce hum and noise.

High-Frequency Interference

3.10 When master stations or zero-level stations are installed near radio or other high-frequency transmitters, there is a possibility of interference.

3.11 This interference is caused by the input stage of the amplifier acting like the demodulator circuit in a radio set. To eliminate, add a resistor in the grid circuit of the 6AU6 tube. It should be between 25,000 and 100,000 ohms, depending on the strength of the interfering signal. However, the interference may be too strong for this resistor alone to eliminate it. A small capacitor, from 50 to 100 micromicrofarads can also be added from grid to cathode of the tube. See Figure 1.

3.12 Trouble Chart

TROUBLE	CAUSE	REMEDY
1. Pilot lamp and tubes do not light when switch is on	Power supply not on	Test power supply
	Defective switch on volume control	Check circuit with ohmmeter
	Open Fuse	Replace
2. Low volume	Defective tube	Replace
	Open capacitor across bias resistor on output tube (RM-B only)	Replace capacitor
3. Unit operates but with 60-cycle hum	Defective tube	Replace
	Open or leaky filter capacitor	Replace filter capacitor
	Ground or leak in voice wires in unit or in external wiring (hum occurs only when selector key is up)	Check from wire to chassis or ground with ohmmeter (resistance should be over 100,000 ohms)
4. Pilot light operates and tubes light but unit does not operate	Defective tubes	Replace
	"B" supply shorted or open	Check circuits for open with ohmmeter
	Open or shorted resistors	Check all voltages
	Loose or broken wiring	Check by visual inspection
5. Master-station unit operates properly on some stations but not on others	Open or short in interstation wiring	Check interstation wiring with ohmmeter
	Open contacts on selector switches	Check contacts on selector switches and clean with trichlorethylene

TROUBLE	CAUSE	REMEDY
6. Feed-back howl or hum	Acoustical feedback from nearby unit	Reduce volume
	Input wiring and output wiring too close	Separate them
	Open filter capacitor	Replace capacitor
7. Distortion and low volume	Open or leaky coupling capacitor	Replace capacitor
	Defective tube (exclusive of rectifier tube)	Replace
	Low "B"-supply voltage	Check the supply voltage with voltmeter
	Voice coil of speaker rubbing	Replace speaker
8. High-frequency interference	Nearby radio or high-frequency transmitter	See paragraph "High-Frequency Interference"
9. Inability of master to call RM-B over assigned selector switch	Relay in applique unit operated	Check electrolytic isolation capacitors in applique and RM-B for short or ground elsewhere on line. Check relay-contact adjustment.
	Relay in RM-B not operating properly	Check resistance of line. Check ground. Check relay-contact adjustment. Check selector-switch adjustment on master-station panel. Check relay voltage.
10. Inability of RM-B to call master station	Relay in applique unit not operating	Check resistance of line. Check relay-contact adjustment. Check voltage on relay. Check ground.
	Relay in RM-B not operated	Check relay-contact adjustment. Check voltages on relay. Check electrolytic isolation capacitors for shorts.
11. Low volume on zero level	Line potentiometer in RM-B or applique unit out of adjustment or defective	Readjust potentiometer or replace unit
	Open electrolytic isolation capacitors	Replace unit
12. Abnormally high volume on zero-level lines	Line potentiometer in RM-B or applique unit out of adjustment or defective	Readjust potentiometer or replace unit

TROUBLE	CAUSE	REMEDY
13. Hum on zero-level lines	Open electrolytic isolation capacitors	Replace unit
14. RM-B cannot call in to master station	Four or more RM-B units, connected to masters, have their call-in switches in listen position	Remove 6800 ohm resistor from call-in switch of RM-B units in annunciator systems only. In non-annunciator systems not more than three RM-B units should be left in the listen position.

DISASSEMBLY AND REASSEMBLY OF AMPLIFIER AND CABINET

WARNING

THE POWER SUPPLY USED IN THE OPERATION OF THIS EQUIPMENT IS 110- TO 125-VOLTS AC. THIS VOLTAGE IS DANGEROUS TO LIFE. THERE IS NO DANGER OF ELECTRICAL SHOCK AT ANY POINT IN THESE UNITS WHEN COMPLETELY ASSEMBLED IN NORMAL OPERATION. HOWEVER, WHEN THE CHASSIS IS OUT OF THE CABINET AND CONNECTED TO THE POWER SUPPLY, BE CAREFUL, AS HIGH VOLTAGES ARE PRESENT AT MANY POINTS ON THE BOTTOM OF THE CHASSIS.

Removal

3.13 To remove amplifier from cabinet:

(a) Remove volume knob and talk-listen lever using a 5/64-inch Allen-head wrench.

(b) Remove screws attaching the back panel to the cabinet.

(c) Remove screws from the bottom of the cabinet. Slide the amplifier out.

(d) Disconnect the plugs shown in Figure 2. Unsnap the two leads from the speaker.

(e) The key panel is removed by turning the latch (located at the top front of the panel) with a screwdriver. Tilt the top of the panel away from the cabinet using the bottom as a hinge.

Assembly

3.14 To install amplifier in the cabinet:

(a) Set the bottom of the key panel in the cabinet opening and swing upward until the latch can be engaged.

(b) Connect the plugs as shown in Figure 2. Be sure to place the red dot on the key panel plug adjacent to the red dot on the amplifier socket. Slide amplifier into cabinet. Fasten with screws through the bottom.

(c) Attach the back panel. Be sure cabling and power cord are through the right openings.

(d) Install knob and talk-listen lever.

Application

3.15 Teletalk amplifiers operate on alternating current only. Master stations are designed for "S"-circuit or "M"-circuit applications, or a combination of both. All standard models as shipped from the factory are wired for "M"-circuit operation with the last selector key wired for the speaker "call-in" feature. Annunciator models do not have a "call-in" selector key. The last selector key is wired for standard operation.

3.16 The 1200-series drawings show that "S"-circuit stations are connected to selector keys starting with switch No. 1 and up. The "M"-circuit stations, which include zero-level lines are connected consecutively to the last-numbered selector keys. The method of connecting and preparing a 1200-series unit for operation in a combination "M"- and "S"-circuit system, all "M"-circuit system, all "S"-circuit system, or any other type system is described in section C70.912.

3.17 For the operating features of the "M" and "S" circuit for both high level and zero level, refer to Section C70.911.00.

Selector Switches - Master Stations Only

3.18 The selector keys are made in banks of six. A bank must be replaced if one of the switches is defective or cannot be adjusted. To remove a switchbank from the panel, first take off the designation-card holder. Then the two mounting screws. If adjustment of the switch contacts is necessary, they should be adjusted so that a wiping action takes place. To clean the contacts, use a burnishing tool.

Talk-Listen Switch

3.19 The talk-listen switch has silver-alloy blades and contacts, and a long-life spring. The switch has three positions:

(UP) IDLE, (HORIZONTAL) LISTEN, and (DOWN) TALK (nonlocking)

Fuse

3.20 A fuse is provided to protect the amplifier circuits against tube failure or shorts. The fuse holder is mounted inside the master amplifier. See Figure 7. In case of amplifier failure, look first for a blown fuse. Replace only with a one-amp 250-volt, type AGC (old type 3AG) fuse.

Relay (Busy Light and Silencing) Master Stations Only

3.21 The relay is preadjusted. Since the relay is very sensitive, do not adjust it unless absolutely necessary. When it is properly adjusted there will be approximately 1/64 of an inch clearance between the contacts when it is not operated.

3.22 The relay on busy-signal models should be tested as follows:

(a) With the amplifier disconnected from the switch panel, the line voltage at 117-volts ac and the talk-listen switch in the idle position, the relay should operate.

(b) With the relay operated, place a 500-ohm resistor between the ground and one conductor of the green pair (No. 4 or No. 5 contact on the lower amplifier to panel socket). The relay should release and the pilot light go out.

3.23 On a master station having the -14 silencing circuit, a 1000-ohm resistor should be placed between the ground and one side of the "M"-circuit voice line (No. 3 or No. 4 on upper amplifier to panel socket). The relay should operate. Now, when the talk-listen switch is moved to the talk position or the resistor is removed, the relay should release.

Relay (Applique and Zero-Level Units)

3.24 To adjust contacts on this relay, the following procedure should be followed. With the armature held down tightly, the spacing between the lower contact and the moving contact should be approximately 0.015 inch. With the armature released, the spacing between the moving contact and upper contact should be approximately 0.010 inch. The tension in the moving contact should be such that the relay will operate from 31- to 35-volts dc and release from 17- to 20-volts dc.

Buzzer

3.25 In call-in or annunciator models, if the buzzer fails to operate, the following adjustment procedure should be used:

(a) On annunciator models place a resistor equal to the dc resistance of the longest annunciator circuit across an annunciator terminal and ground terminal in the terminal box. The resistance should not exceed 35 ohms.

(b) On speaker call-in models, place a resistor across the call-in terminals in the terminal box equal to the total of the dc resistance of the longest call-in line plus a resistor of 40 ohms (or a speaker from a 5G45R unit). Example: For a line resistance of 10 ohms, place a total of 50 ohms across the call-in terminals. If a speaker is available, connect it plus 10 ohms across the terminals. The maximum call-in <u>line</u> resistance should not exceed 35 ohms.

(c) With the Teletalk on, use long-nose pliers and carefully move the stationary buzzer contact ("A" with black wire connected to it in Figure 3) until the desired tone is obtained.

(d) If further adjustment is necessary, the position of the armature on the pole pieces ("B" in Figure 3) can be adjusted to obtain a desired tone. This adjustment may not be necessary since adjustment of the stationary contact "A" also adjusts the gap.

(e) When making adjustments, be careful not to damage the unit. If either the stationary contact or the armature is loose, intermittent operation will result.

3.26 All buzzers are carefully adjusted at the factory with the procedure outlined above. Adjustment may be necessary when the ac line voltage is lower than normal.

3.27 If the buzzer is to be removed from the set, note the connections in Figure 3.

3.28 On busy-signal models the pilot light also serves as a busy signal. It is controlled by a relay. When the unit is idle, it is energized and lights the pilot light. When the selector key on a busy line is operated, the relay is shorted out through the common resistors in the inter-station circuit. This causes the relay to release and open the circuit to the pilot light, indicating that the line selected is busy.

3.29 It does not work on zero-level lines.

3.30 If the pilot light goes out when a station is selected and it is known that this station is not busy, it indicates that the interstation wiring is grounded at some point, or that there is a ground in either the unit originating the call or the called unit. If the pilot light does not light, even when the unit is idle and the bulb is known to be good, the relay contacts may be either dirty or out of adjustment.

3.31 Operation of Busy Signal:

(a) The talk-listen switch must be in the idle position to determine if a station is busy.

(b) During a conversation, the busy-signal lamp will remain on when the talk-listen switch is operated in the talk and listen positions.

(c) When the master station is not in use, the talk-listen switch <u>must</u> be left in the idle position.

(d) A busy indication will be given if a speaker station being called is busy.

(e) Even if a master station is not a busy-signal model, it is wired so that a busy-signal indication is given when the unit is in use (talk and listen position), with exception of the 1200-14 model. The busy-signal feature and -14 silencing feature cannot be combined in the same system.

(f) On busy-signal models with handsets, the handset should be left on the switchhook when determining if a station is busy. When the handset is used in the idle position for talking with a master station, the lamp will go out and a busy indication will be given to any calling master station.

Call-In Models

3.32 The operating features of the call-in models for both high level and zero level are described in Section C70.911.00.

3.33 To check the call-in circuit of a master station, connect a resistor of 40 ohms plus the resistance of the call-in line being used (35 ohms maximum) across the call-in terminals of the terminal box. The call-in selector key should be in the normal position. If the buzzer does not operate properly, see Paragraph 3.25.

3.34 To check the call-in circuit of the applique and master unit, connect a 1500-ohm resistor from the "Y" terminal on the applique unit to the ground terminal. The relay should operate and the buzzer sound. The call-in selector key on the master should be in the normal position. For relay adjustment see Paragraph 3.24.

Annunciator Models

3.35 The following tests will help locate and remedy troubles in annunciator systems:

(a) Check operation of each annunciator circuit by connecting a maximum resistance of 35 ohms across the annunciator terminal and ground in the terminal box. The buzzer should sound and the annunciator plunger should be operated.

(b) If the plunger does not operate properly, check to be sure the end of the annunciator coil is flush with the end of the brass body and if the screw is turned all the way into the plunger. Also check for dirt in the brass tube. The screw must be removed from the plunger for disassembly. The coil should have a resistance of approximately 40 ohms.

(c) On zero-level applique units, be sure one of the call-in terminals is jumpered to the ground terminal. Connect a 1500-ohm resistor between the "Y" terminal and ground to operate the relay which should operate the proper annunciator plunger and cause the buzzer to buzz. For relay adjustment, see Paragraph 3.25.

Silencing Circuit Models (-14)

3.36 Master stations having the -14 silencing circuit include a sensitive relay, the same as the one used in the busy-signal models. When the talk-listen switch is in the listen position and a station-selector key is up, this relay is energized through the grounded center point of the 1000-ohm resistors across the line. It completes a circuit which grounds the audio circuit to silence the amplifier. When this ground is removed by removing the ground from the junction of the 1000-ohm resistors by pressing the reply-back button at the speaker, the relay is de-energized to place the amplifier back in service and permit the master station to listen to the speaker station (see 1200-14 series silencing-circuit schematic). It is impossible for a master station to listen in on speaker stations unless the reply-back button at the station is operated. When the talk-listen switch is placed in talk position, the relay is de-energized so the amplifier may call or talk to a speaker station.

3.37 The -14 silencing does not work with the RM-B speaker stations.

3.38 If the master station is able to monitor in the listen position when the reply-back button is not operated, the speaker station is not properly grounded, or the relay contacts are dirty or improperly adjusted. (See Paragraph 3.22.)

3.39 If the master station is unable to hear a reply when the reply-back key is operated, the interstation wiring is grounded at some point, or there is a ground in the master or speaker stations.

All-Call Models (-1)

3.40 These models have an additional switch which parallels all stations for a simultaneous call. It is a rotary switch constructed with silverplated-brass contacts and blades. On models furnished with a call-in key, the last selector key is not connected to the all-call switch. Two extra wires are provided on the all-call switch for connection to its voice pair whenever it is to be used as a station circuit.

3.41 When master stations are connected to all-call systems, their talk-listen switches must be left in idle if they are to hear the all call.

All-Call Paging (-18)

3.42 These models have an additional switch which simultaneously connects the output of the master station to the input of a separate amplifier, operates its B relay to energize the amplifier, and parallels the stations across the output of the amplifier. For reply-back from the stations, the all-call switch must be in the off position.

3.43 On zero-level circuits, the signal level from the paging amplifier to the applique "V" input terminals should not exceed 10 volts. This can be adjusted by reducing the output of the power amplifier to give the proper signal level.

Paging Model (-15)

3.44 The last selector switch (key with green dot) of the -15 master stations connects the output of the Teletalk to the input of the paging amplifier. It also closes the paging amplifier "B" - supply relay circuit. See 1200-15 schematic. These models are used to page a separate group of speakers not connected for two-way conversation.

3.45 For paging over telephone lines, the output of the master station has to be attenuated to zero level, then connected to the telephone line, which is, in turn, connected to a zero-level input on the paging amplifier. The output of this amplifier is connected to the speaker or speakers to be paged.

3.46 On -15 master stations, the next-to-last selector key is used for call in.

Handset Models (T)

3.47 When the handset is off the switchhook, its transmitter is connected across the input of the amplifier and the receiver is switched into the speaker-microphone circuit. A connection is also made which gives a busy indication to any calling master station. When using an "S"-circuit master station, you can put the talk-listen switch in idle position.

3.48 To remove the switchhook from its mounting, remove two screws from each end of the switchhook cover. See Figure 4 for contact adjustment.

3.49 To check the handset wiring, remove the connecting plug from the amplifier socket. Then remove the two screws fastening the switchhook to the side of the cabinet.

RM-B Station Unit

3.50 The above maintenance procedures apply to the RM-B units as well as the master stations, with the exception of the operating features, such as busy-signal, handset, etc.

3.51 To check the operation of the relay in the RM-B unit, connect a 1500-ohm resistor between the "Y" and "G" terminals with the call-in switch in the idle position. When this is done, the relay should release. When the resistor is removed, the relay should operate. For relay adjustment refer to Paragraph 3.24.

4. PICTURES AND DRAWINGS

4.01 The following drawings are attached:

4.02 Figures 10 to 20 are the schematics of the master stations. Figures 10 to 14 show the amplifier circuits. Figures 15 to 20 show the switch-panel wiring. Two figures are required to form a complete schematic for any master station.

Example: For a complete schematic of a 1212 master station, combine Figure 10 (1200 and 1200A Amplifier Circuit) and Figure 15 (1212 Switch-Panel Wiring).

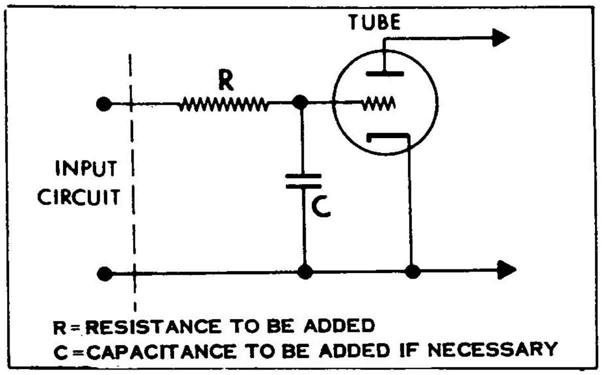


FIG. 1

Elimination of RF Interference

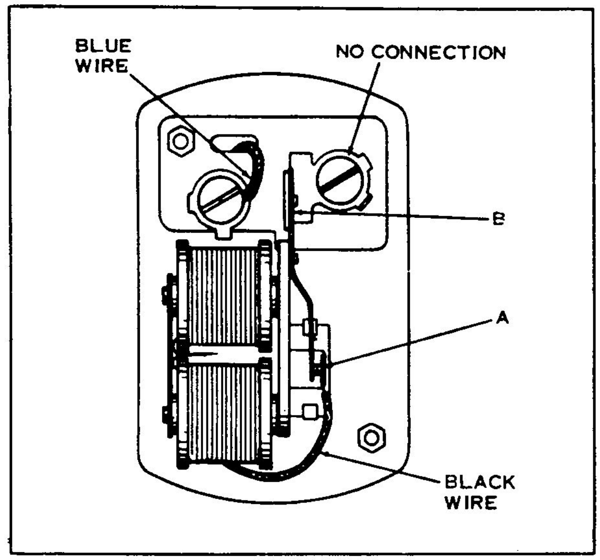


FIG. 3

1200-Series Buzzer

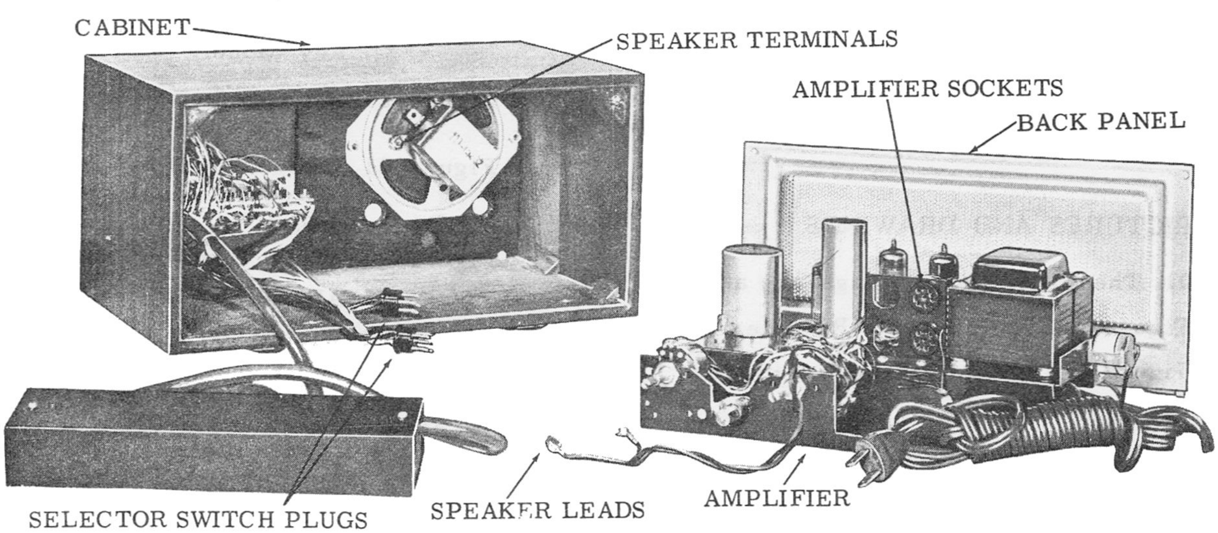


Figure 2. 1206 Disassembled

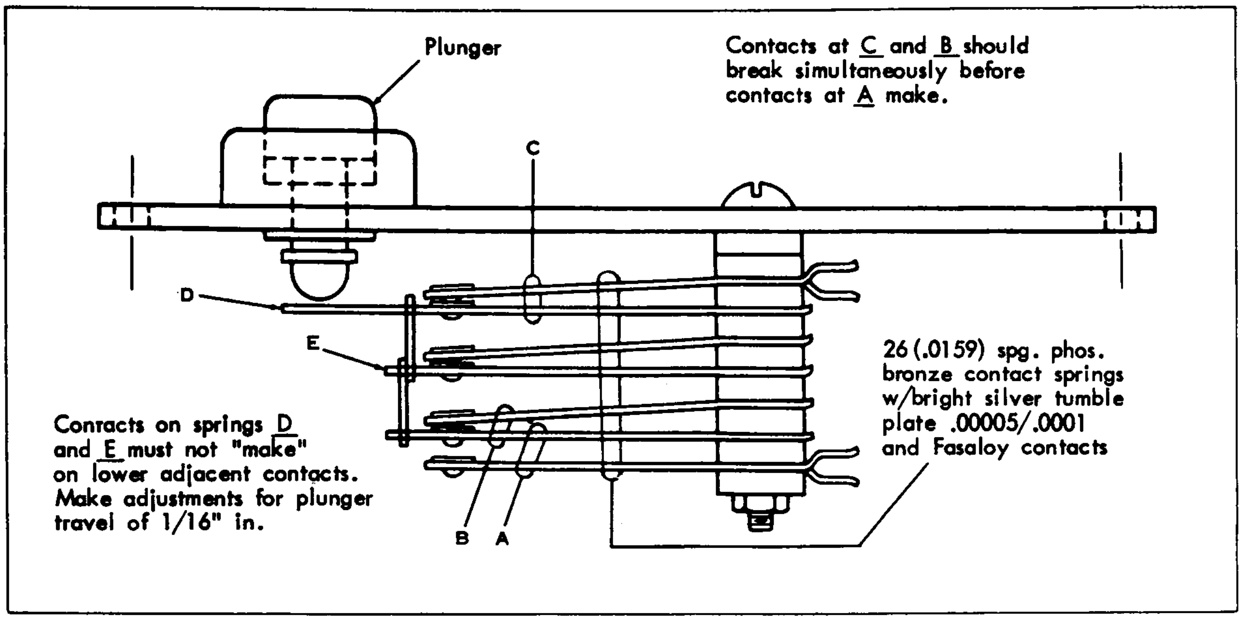


FIG. 4

Handset-Switch Adjustment

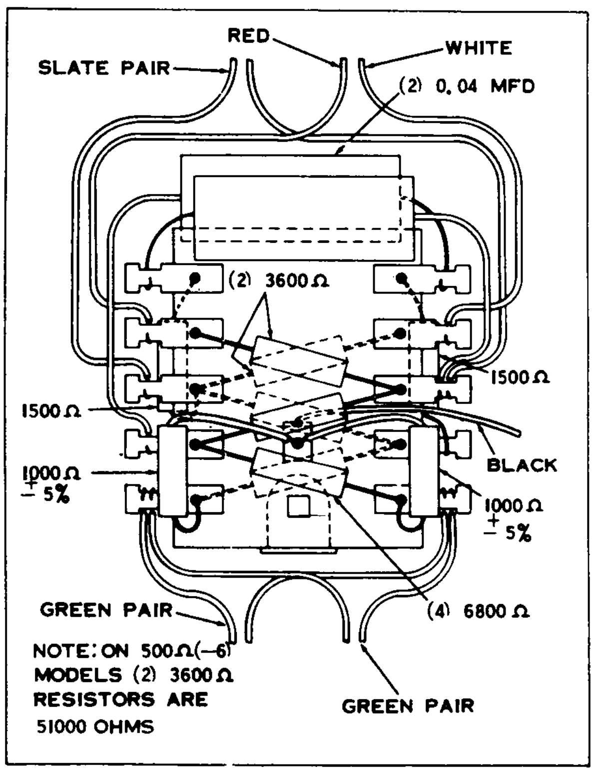


FIG. 5

Attenuating-Pad Connections

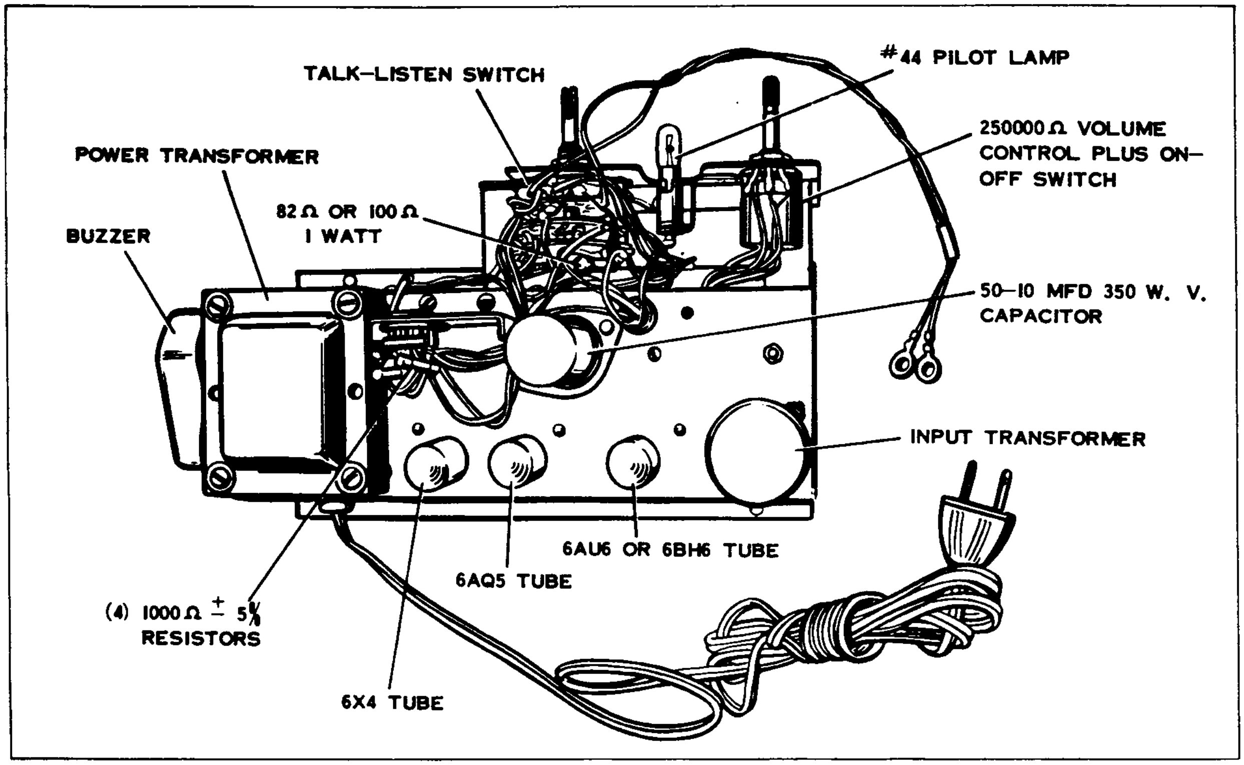
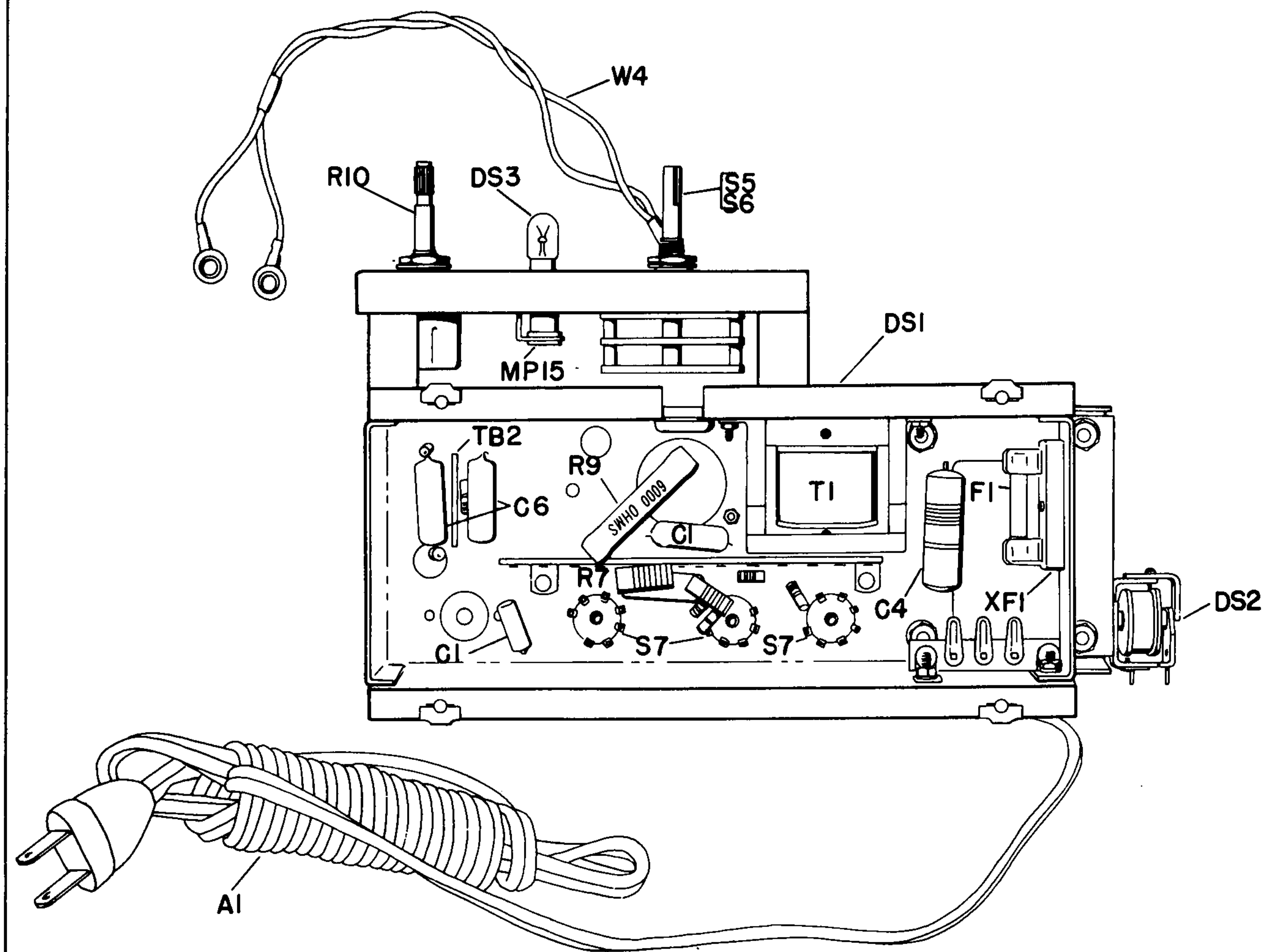


FIG. 6

Location of Components - Master-
Station Amplifier (Top View)



A1 - Power Cord	DS2 - Buzzer	R9 - Resistor	T1 - Transformer
C1 - Capacitor	DS3 - Lamp	R10 - Potentiometer	TB2 - Terminal Board
C4 - Capacitor	F1 - Fuse	S5 - Switch & Wire Assy	W4 - Lead Wire
C6 - Capacitor	MP15 - Bracket & Socket Assy	S6 - Switch	XF1 - Holder
DS1 - Amplifier	R7 - Resistor	S7 - Socket	

FIG. 7

Location of Components - Master Station Amplifier
(Bottom View)

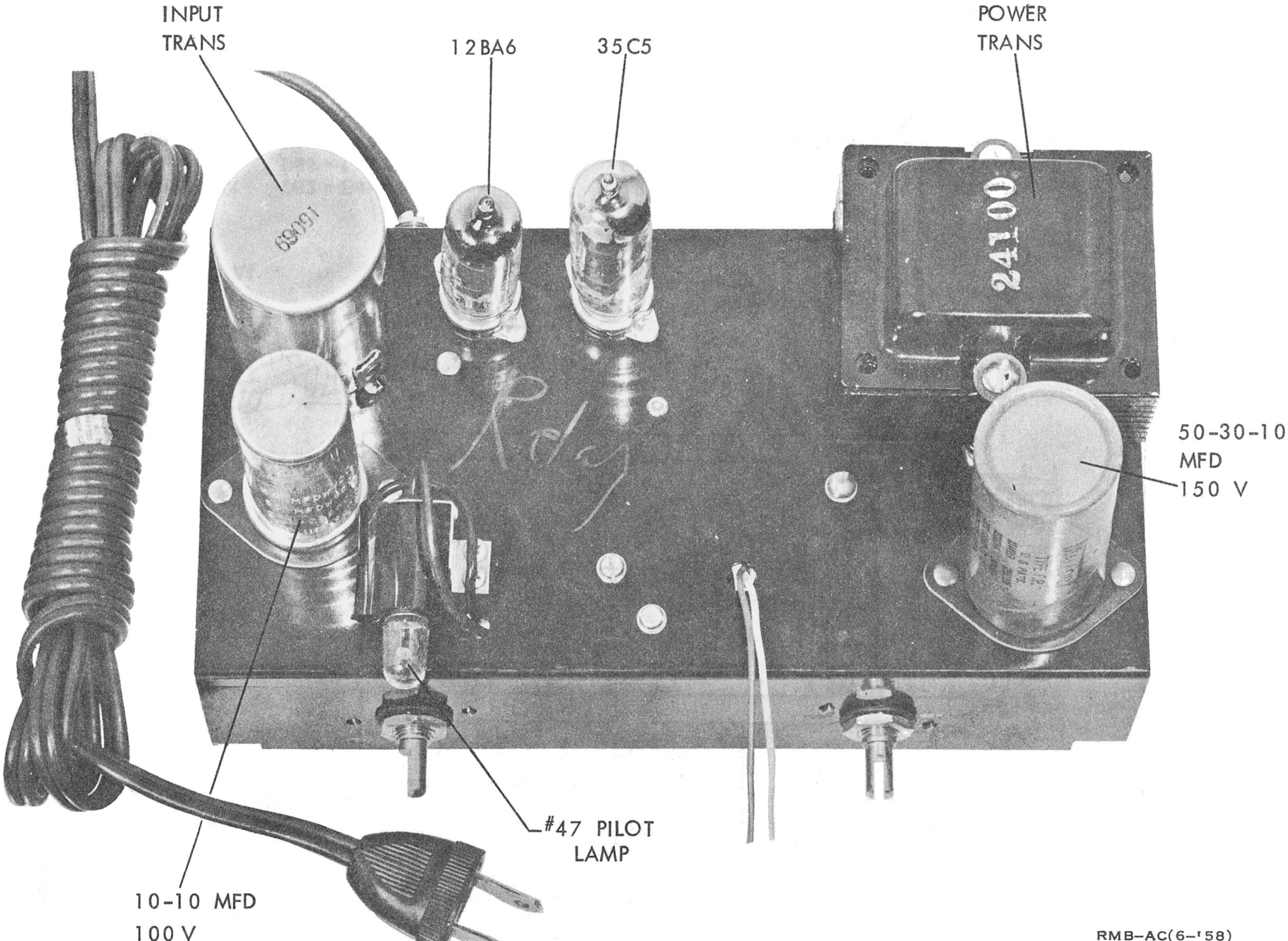


FIG. 8

Location of Components RM-B Amplifier
(Top View)

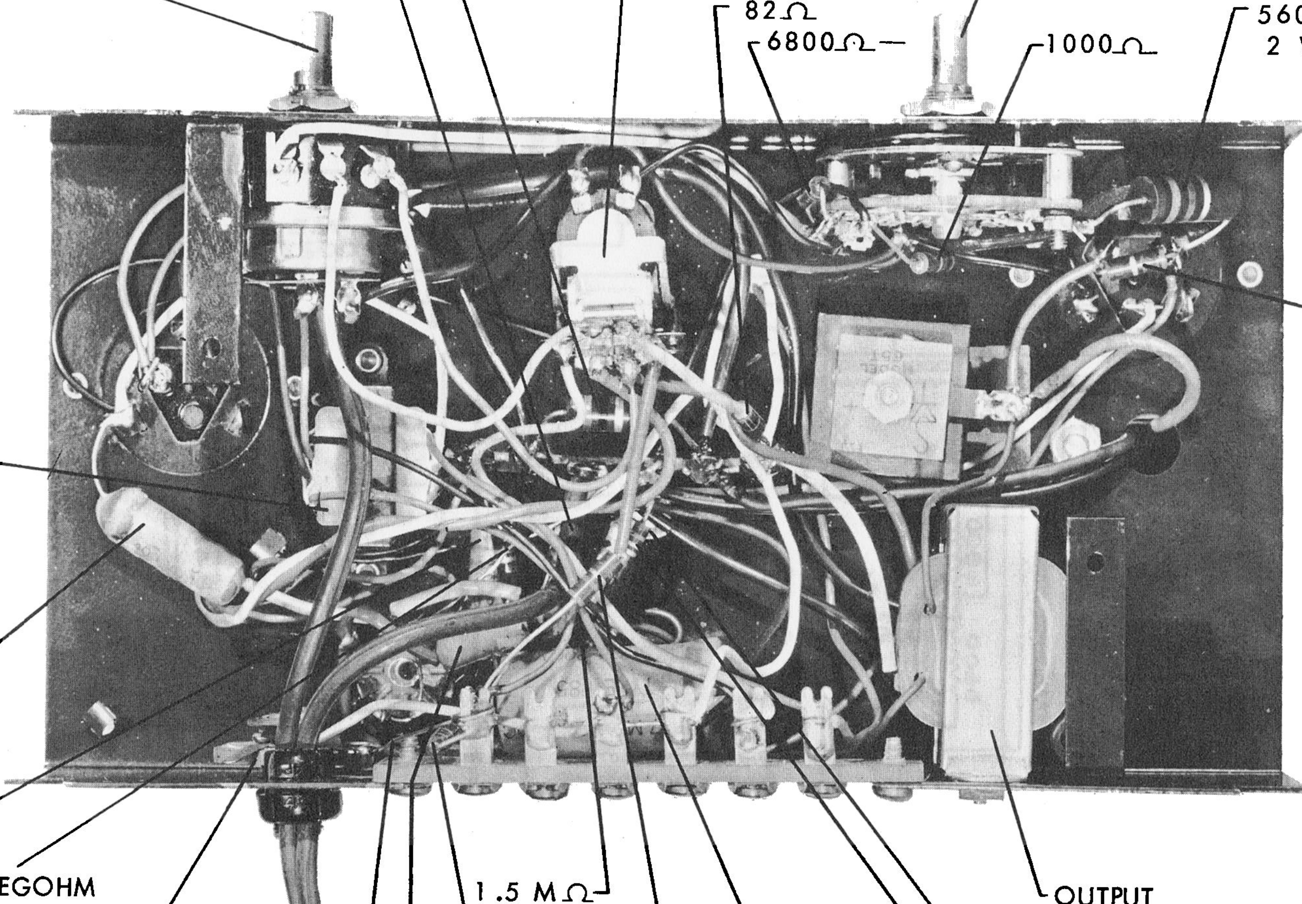


FIG. 9

Location of Components RM-B Amplifier
(Bottom View)

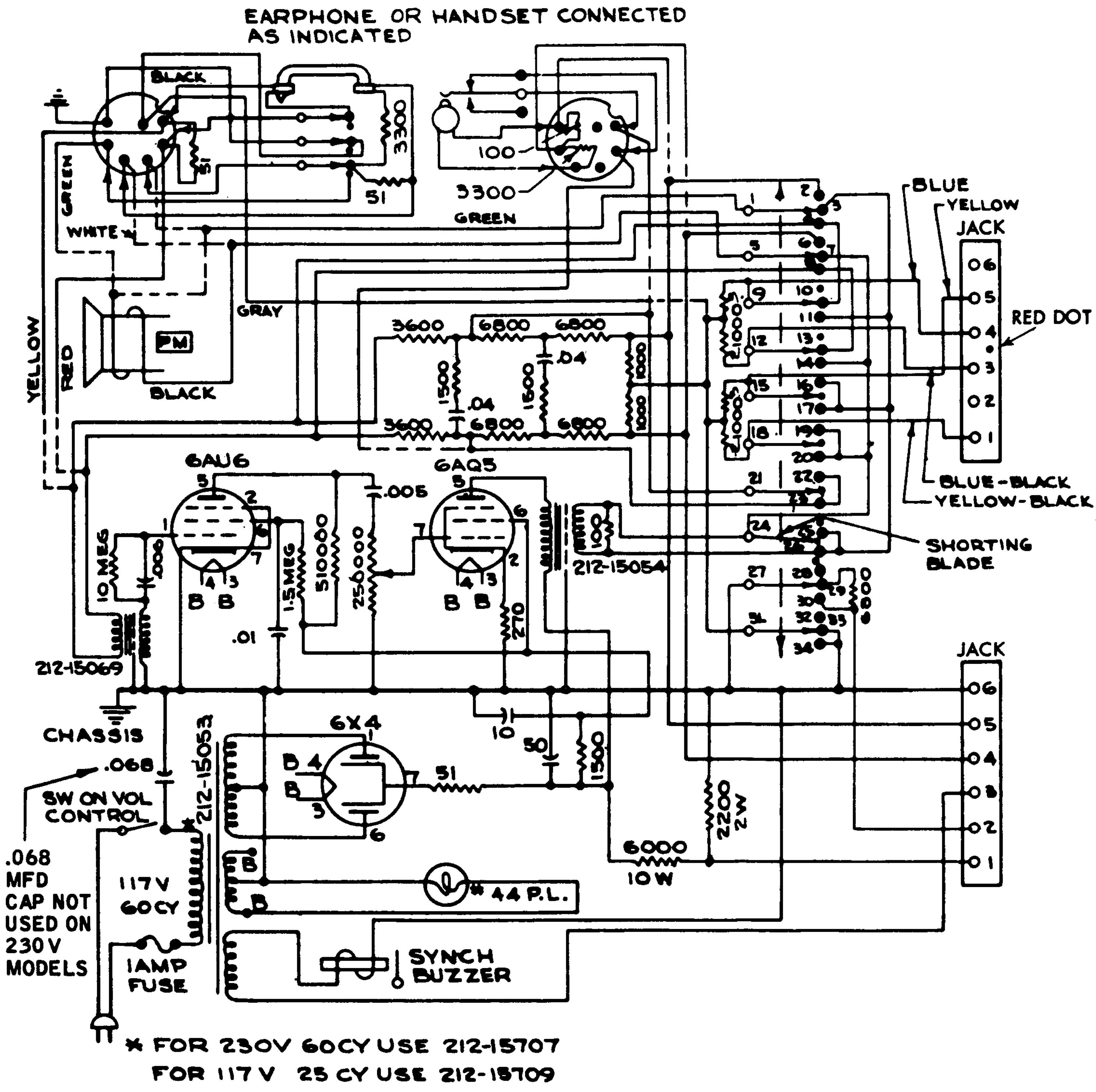
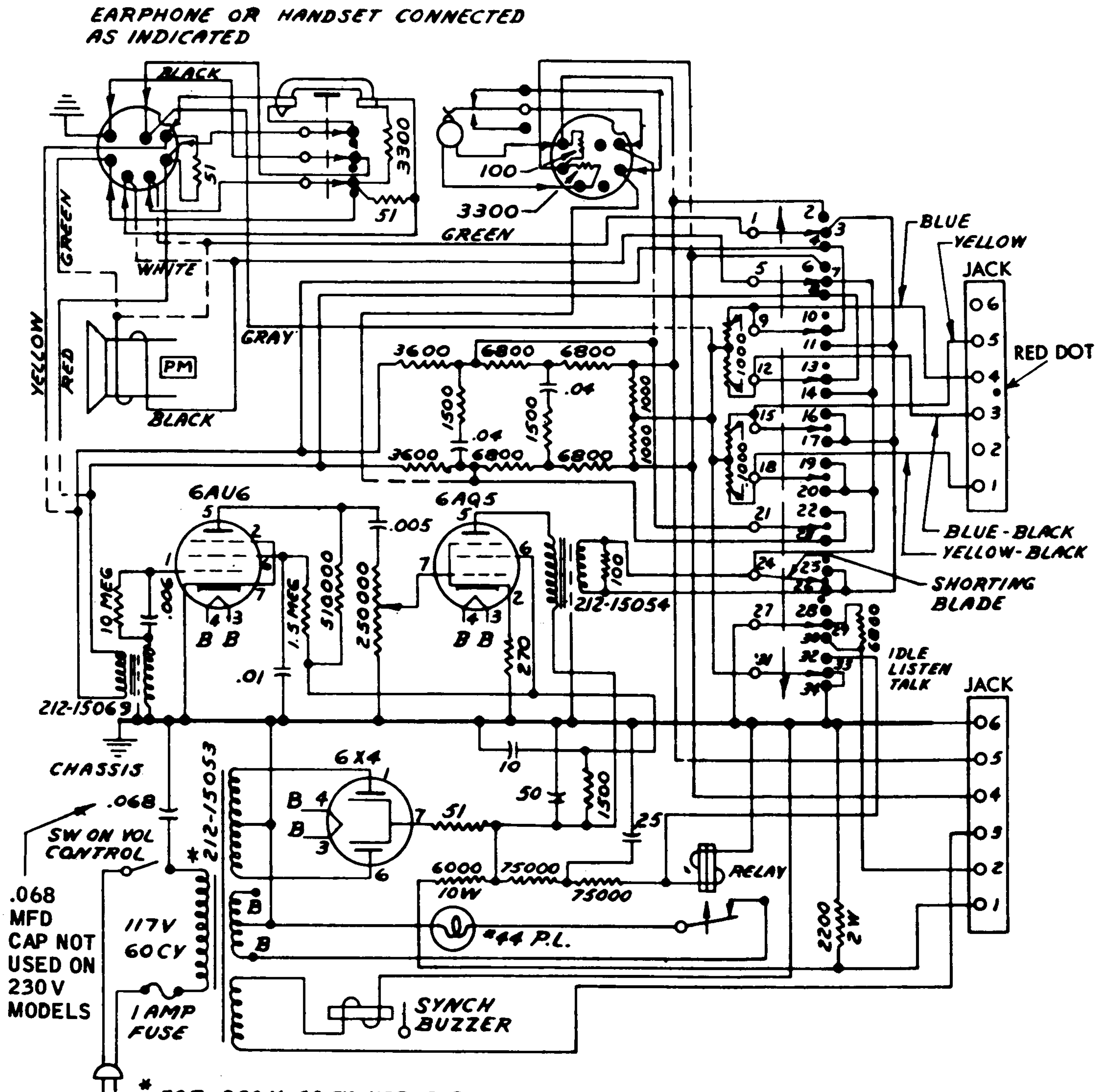


FIG. 10

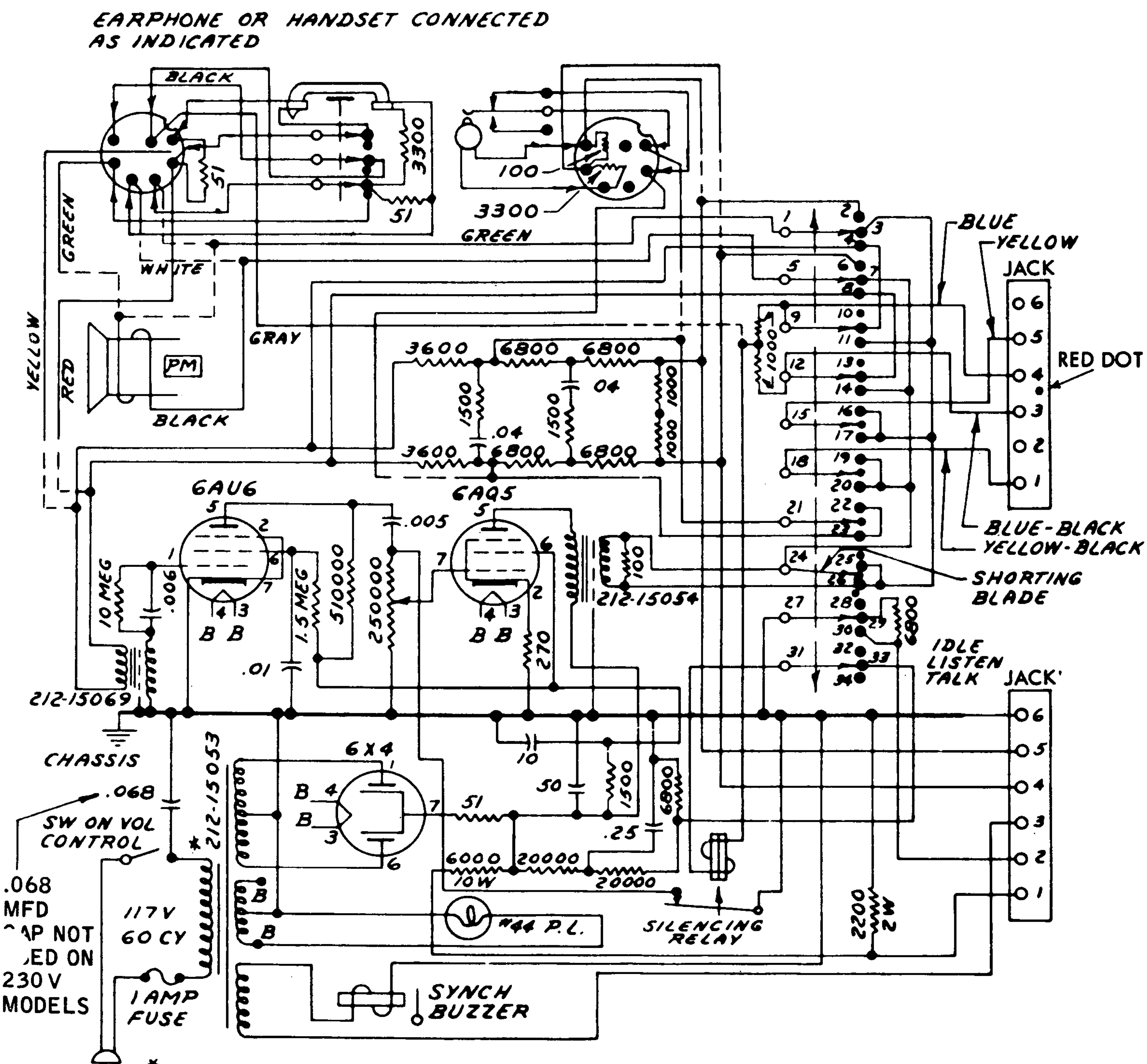
1200 & 1200A Amplifier Circuit



* FOR 230V 60CY USE 212-15707
FOR 117 V 25 CY USE 212-15709

FIG. 11

1200-L Amplifier Circuit
(Busy Model)



* FOR 230 V 60 CY USE 212-15707
FOR 117 V 25 CY USE 212-15709

FIG. 12

1200-14 Amplifier Circuit
(Silencing Model)

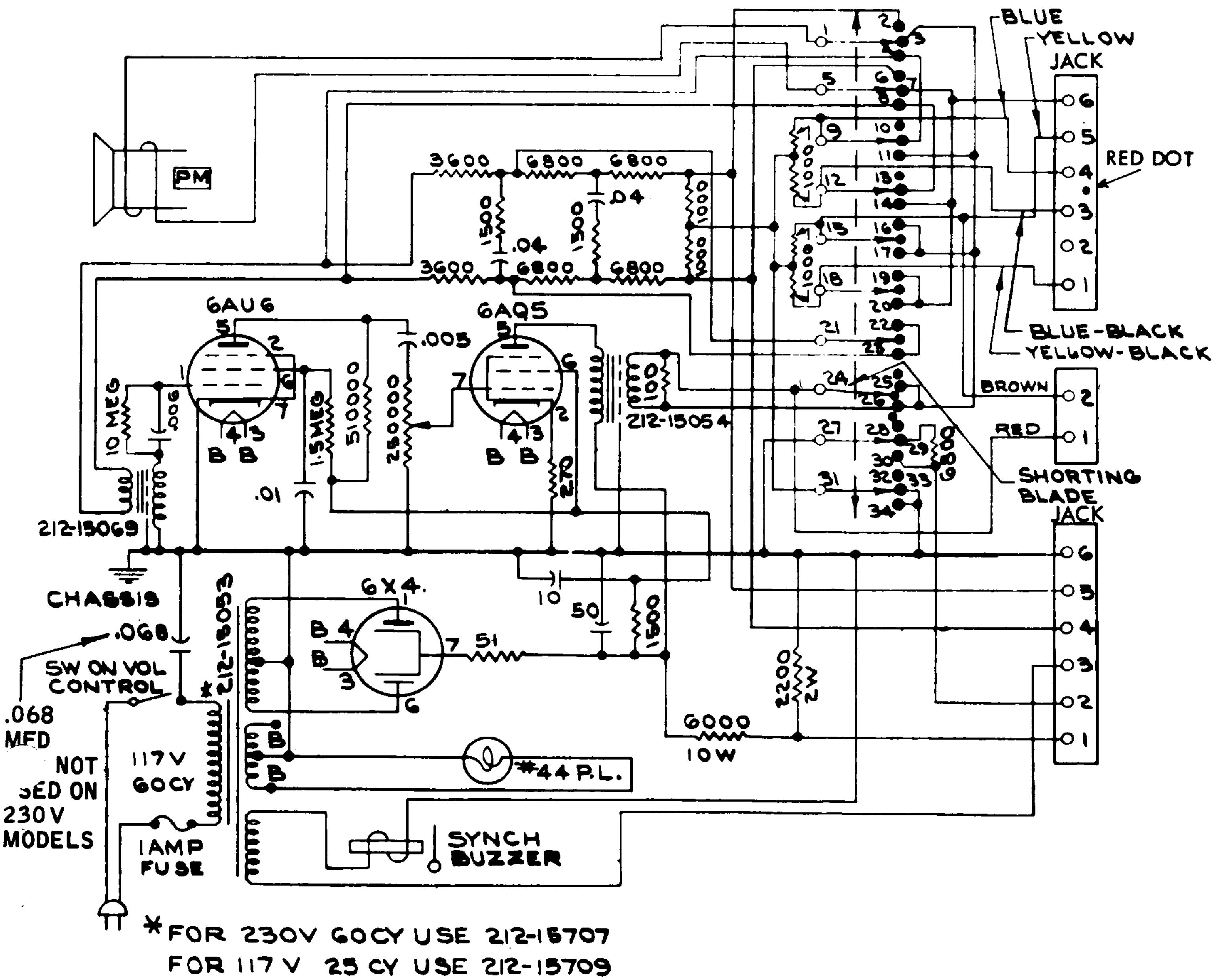


FIG. 13

1200-18 Amplifier Circuit
(All-Call Model with Booster Amplifier)

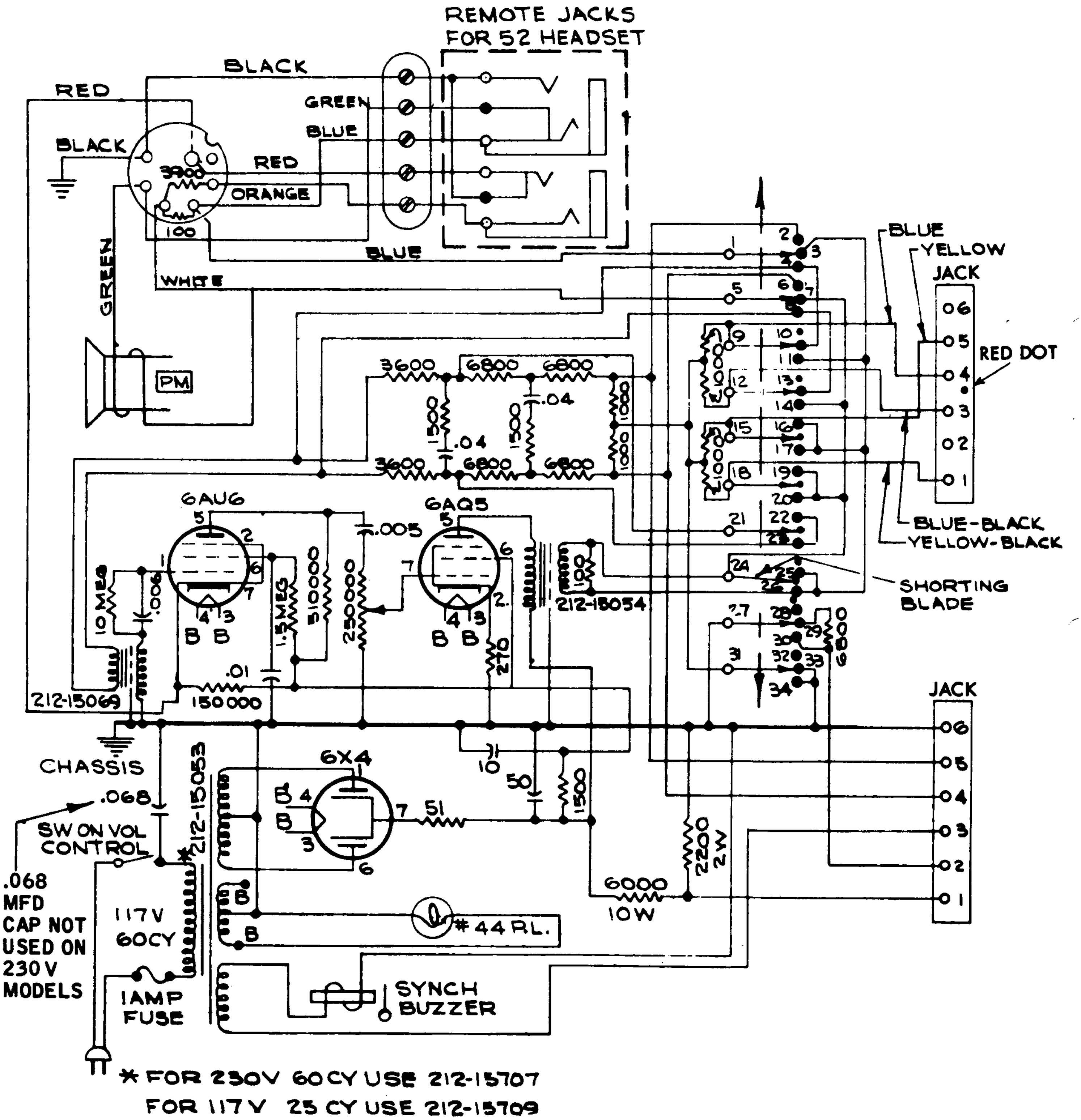


FIG. 14

1200-30 Amplifier Circuit
(Telephone-Headset Model)

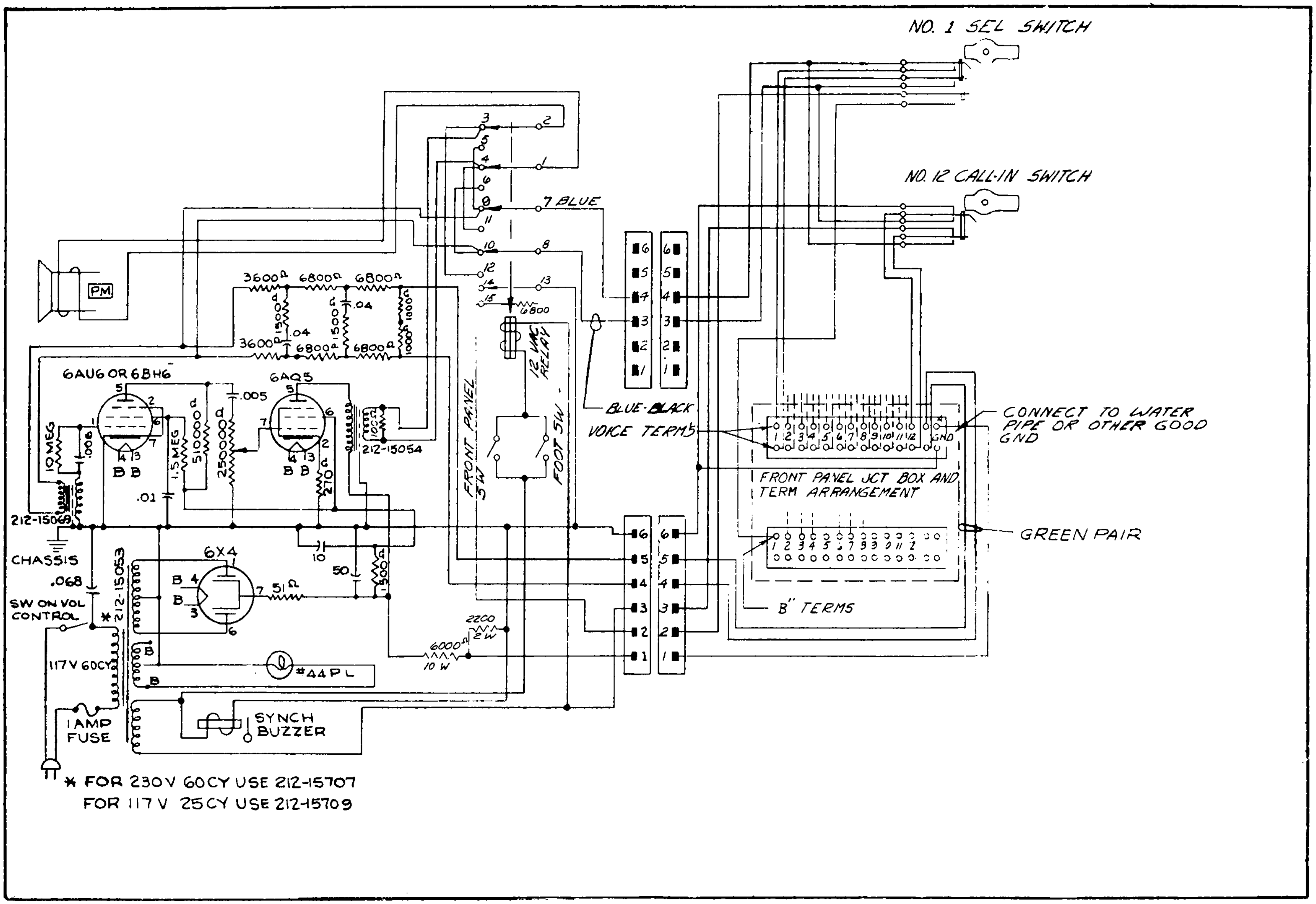


FIG. 15

1200-31 Amplifier Circuit
(Relay Operation of Talk-Listen Function)

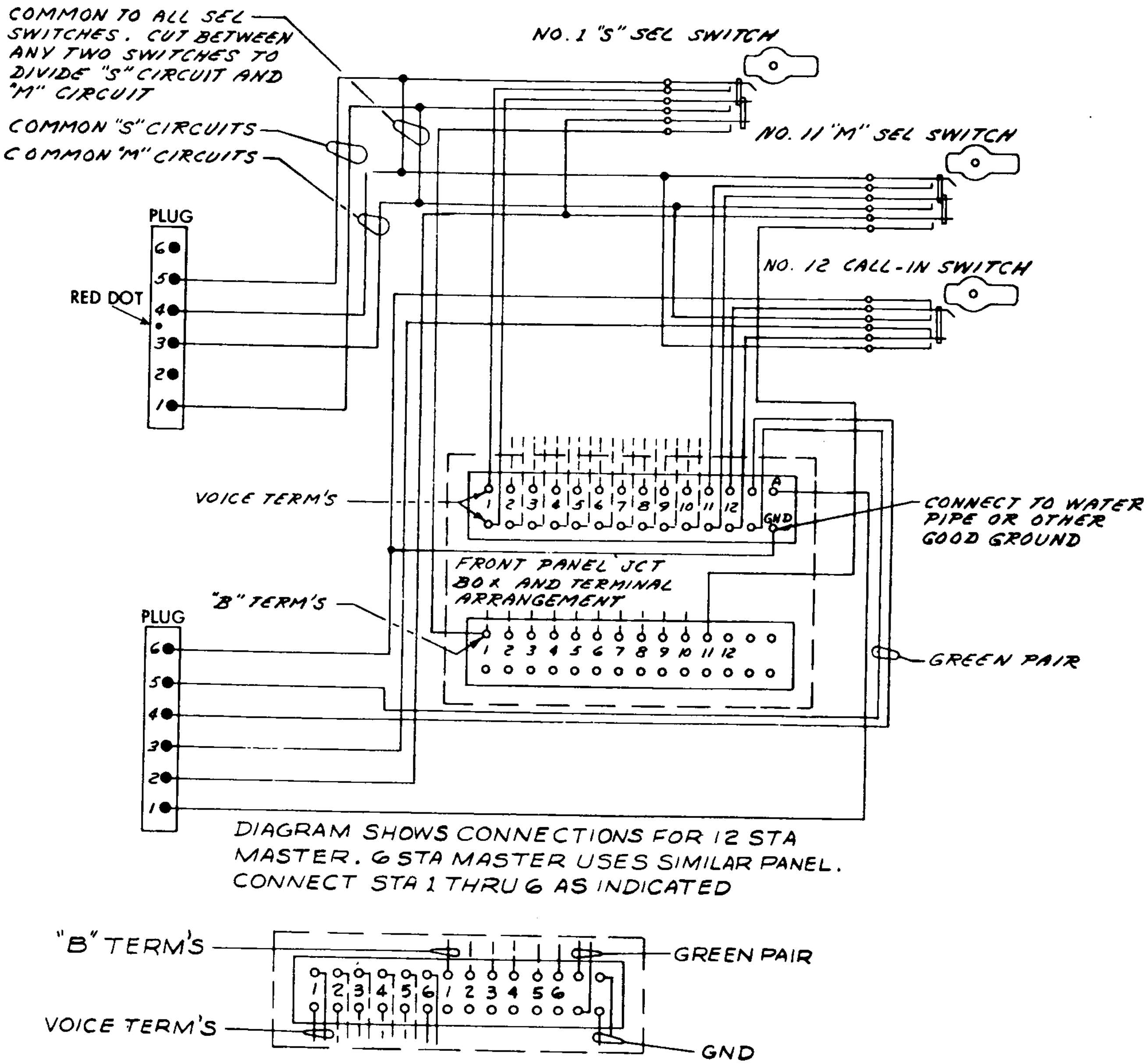


FIG. 16

1212 Switch-Panel Wiring
(6 or 12 Stations)

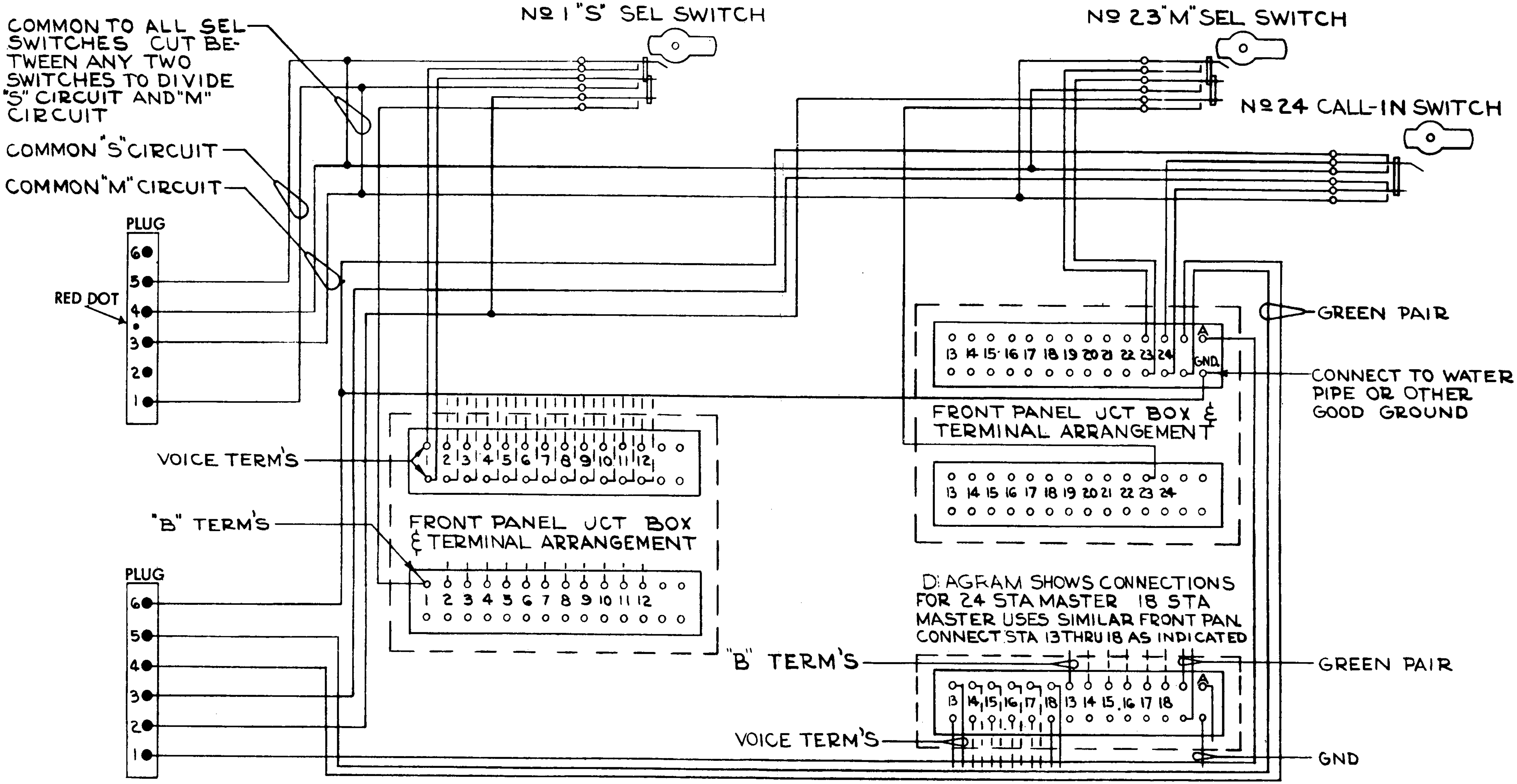


FIG. 17

1224 Switch-Panel Wiring
(18 or 24 Stations)

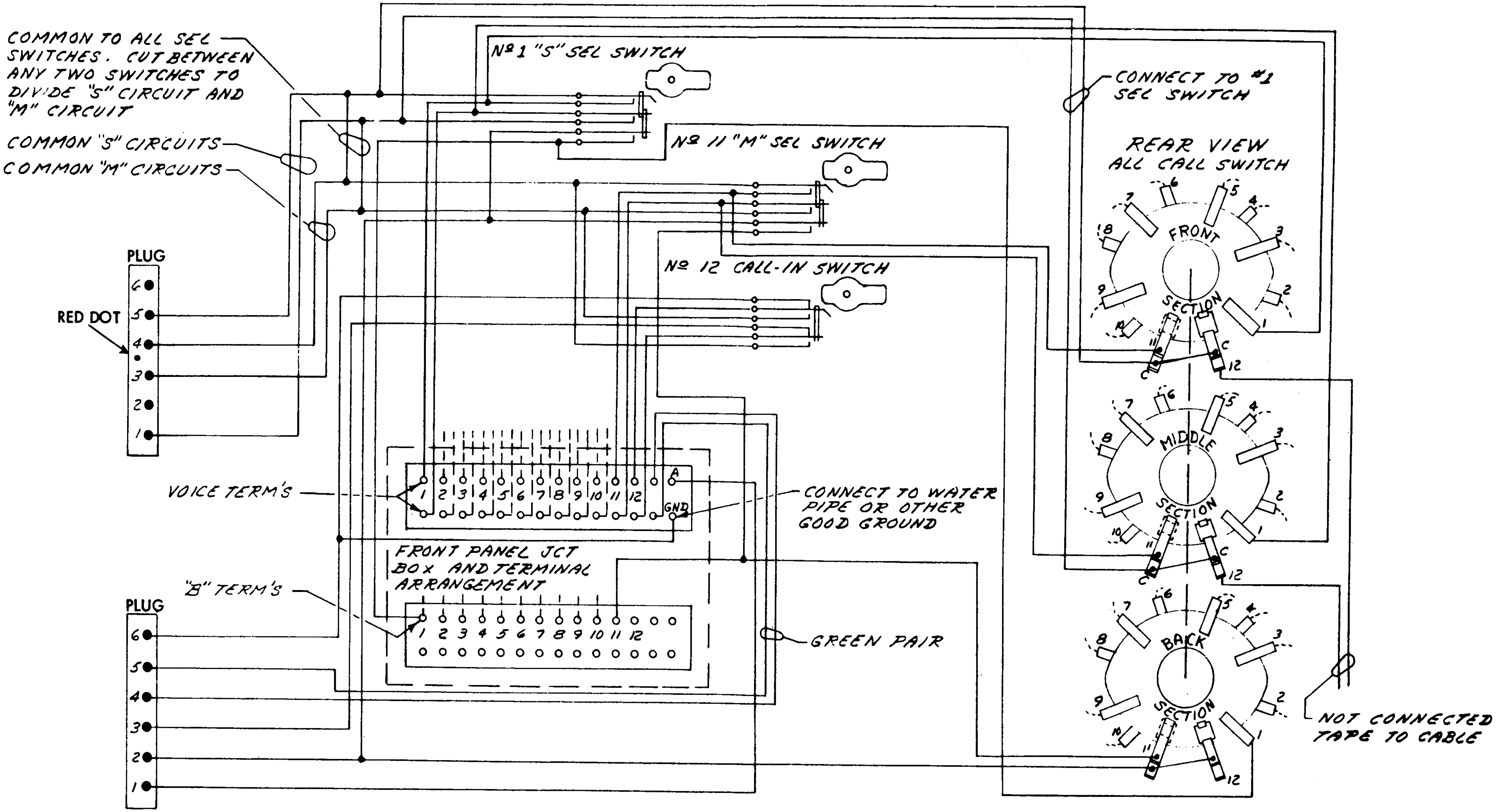


FIG. 18

1212-1 Switch-Panel Wiring
(All-Call Model)

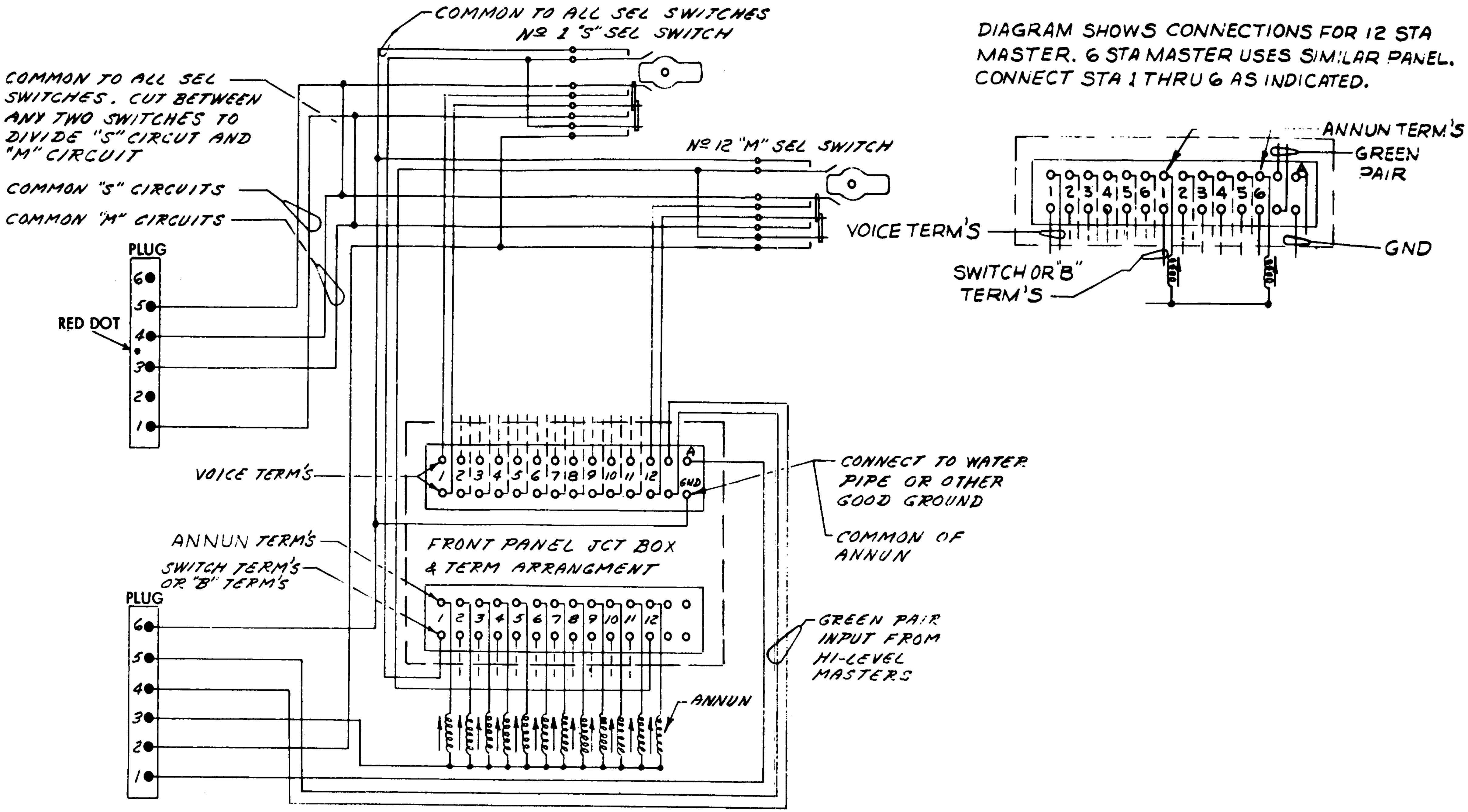


FIG. 19

1212A-3 Switch-Panel Wiring
(Annunciator & 3-Position Key Model)

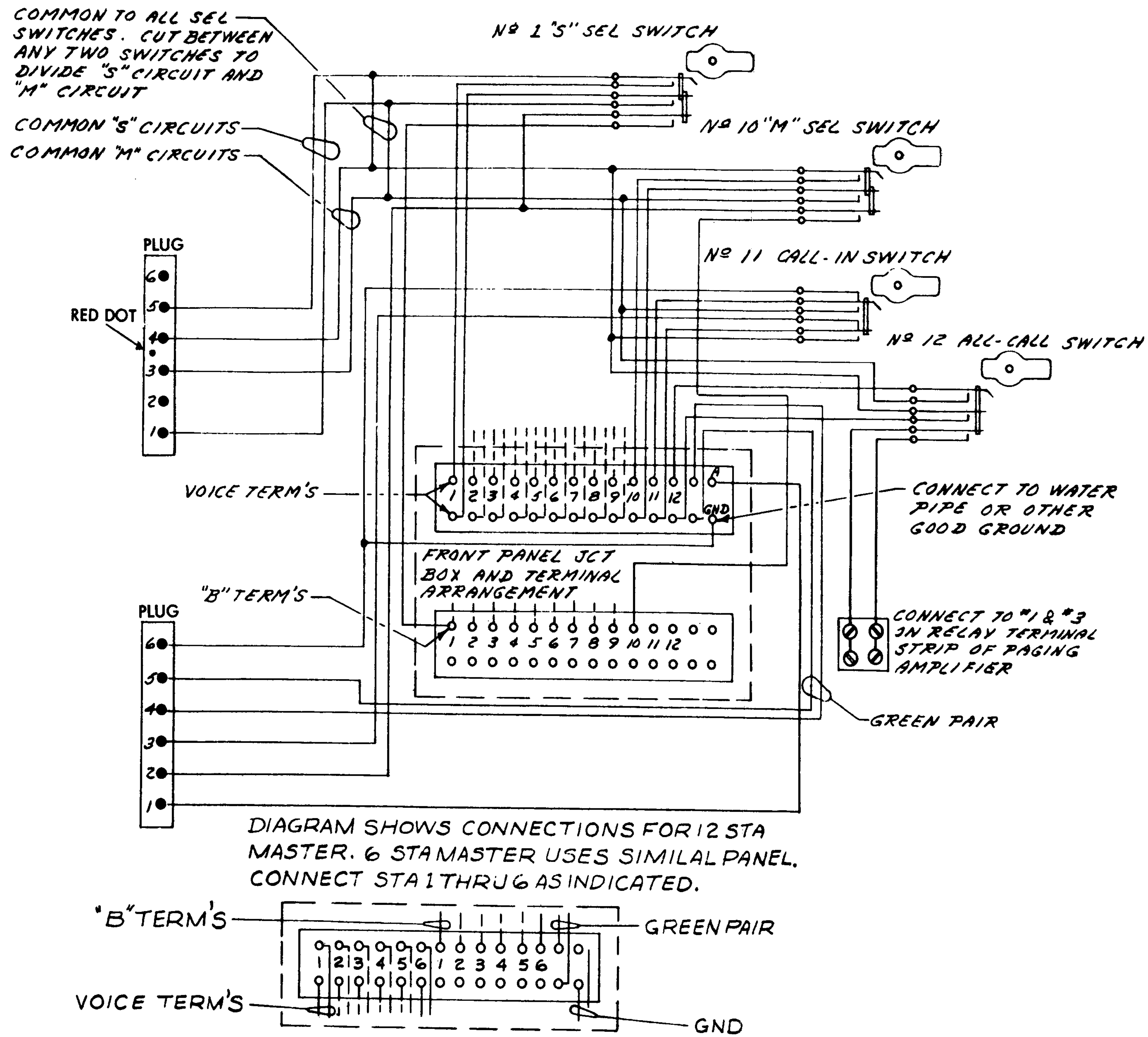


FIG. 20

1212-15 Switch-Panel Wiring
(Paging Model)

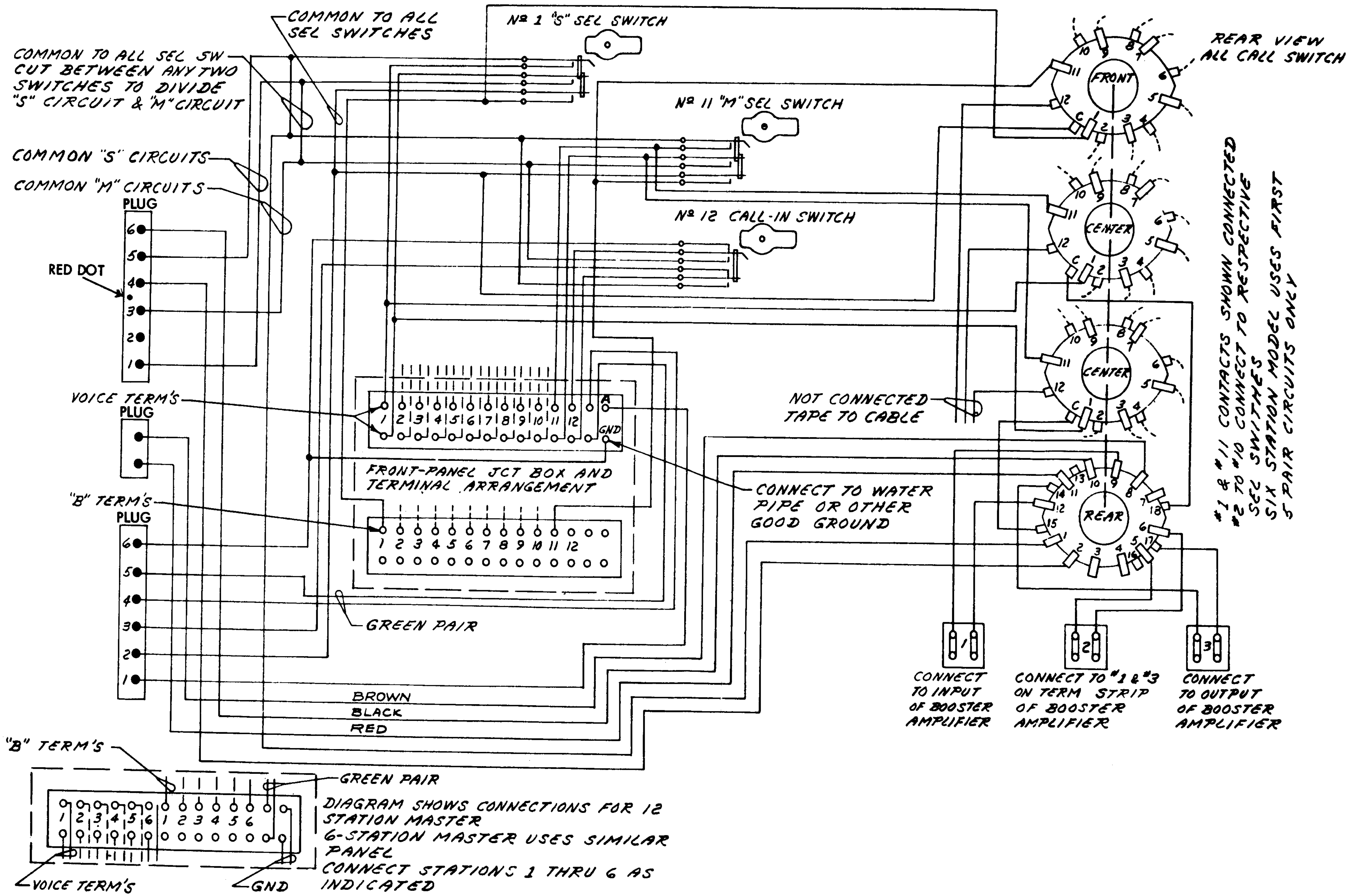


FIG. 21

1212-18 Switch-Panel Wiring
(All-Call Model With Booster Amplifier)

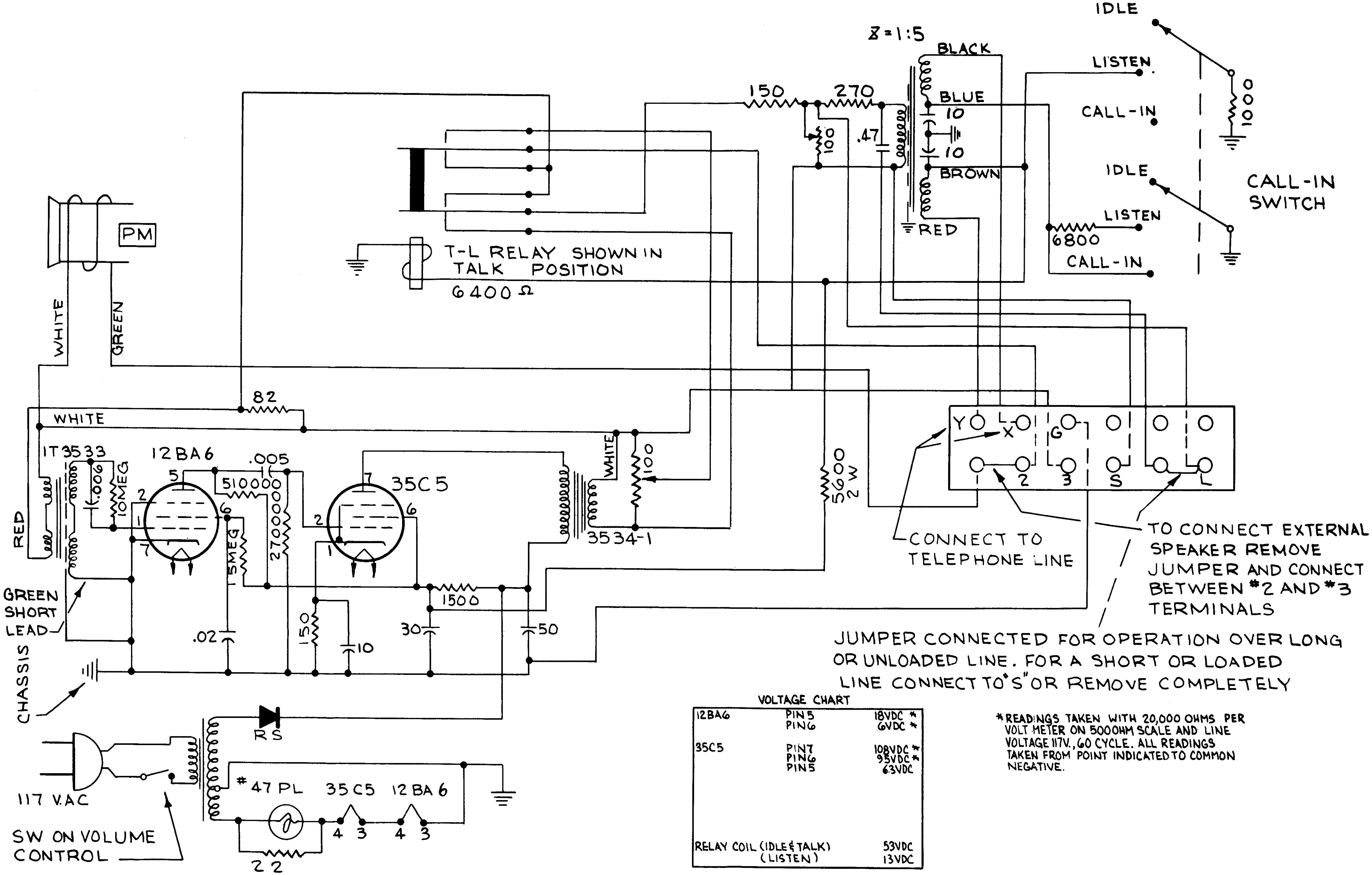


FIG. 22

RMB Zero-Level Speaker Station

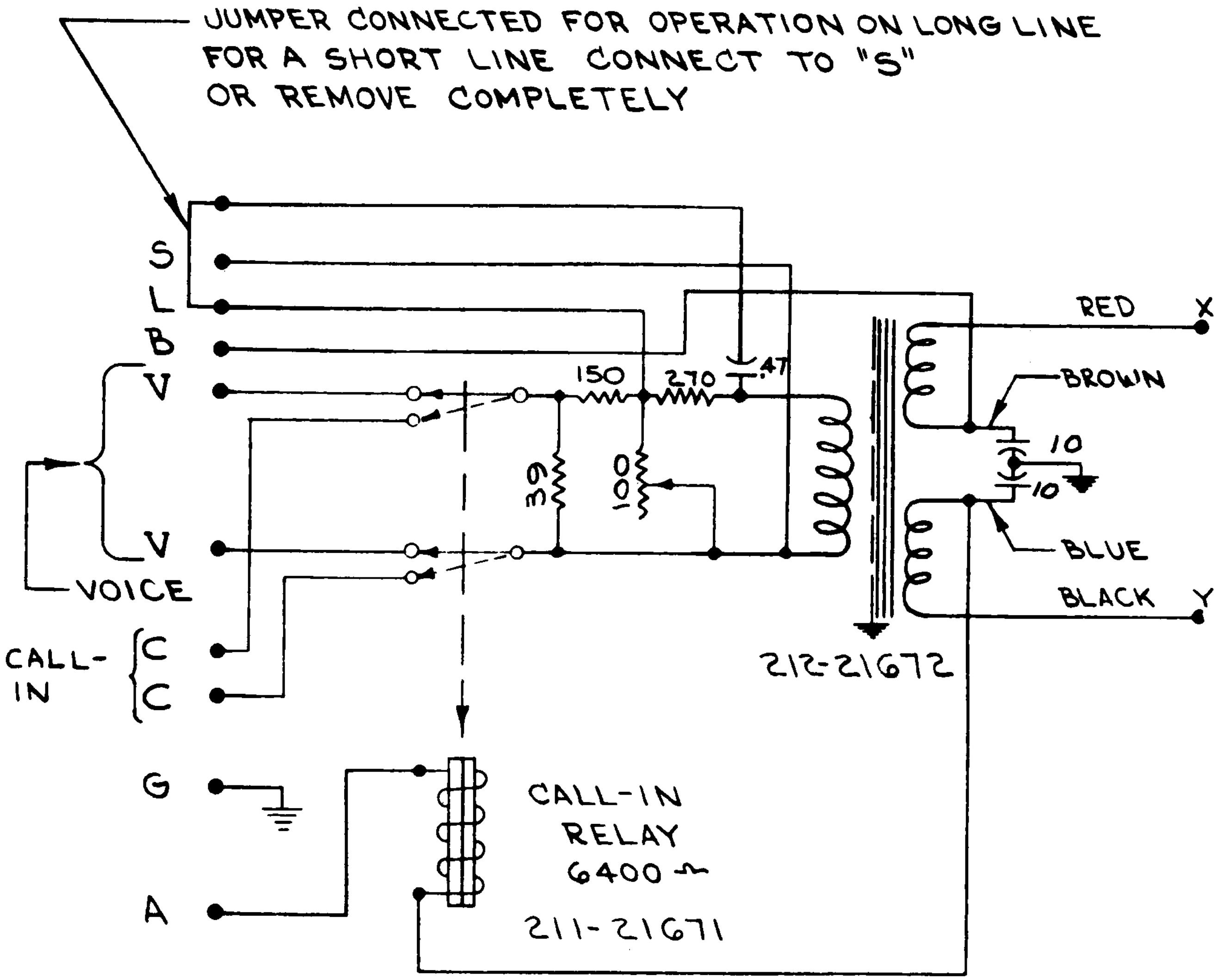


FIG. 23

AP-B Applique Unit

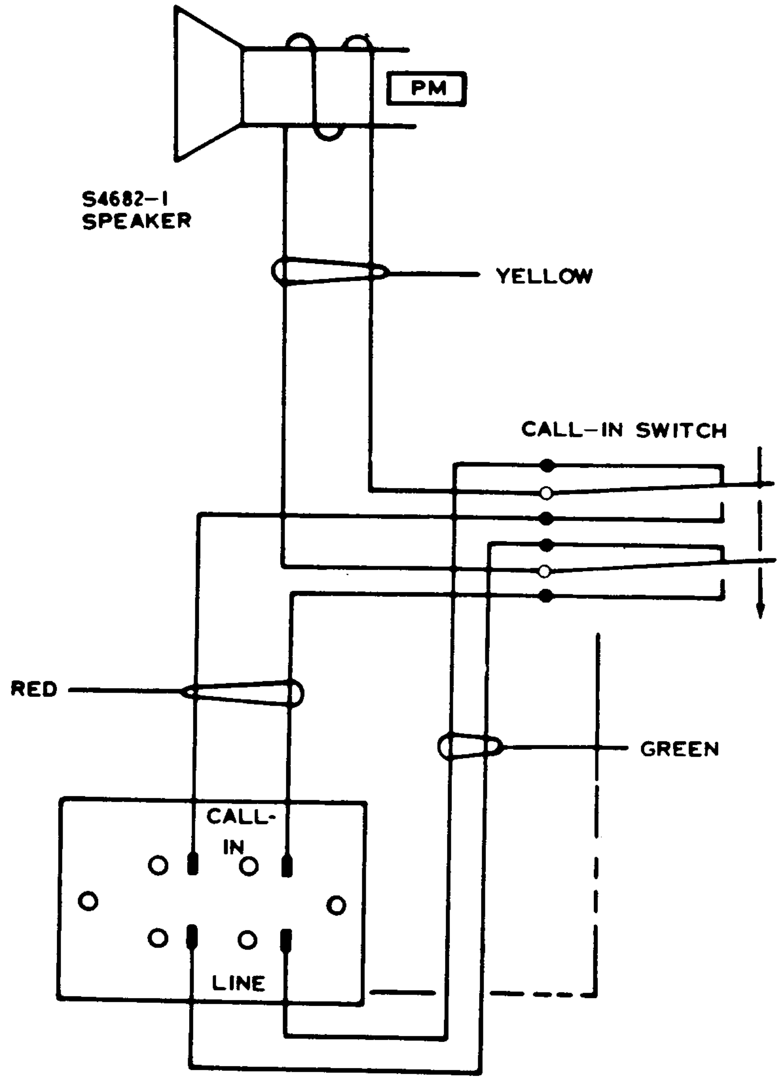


FIG. 24

Wiring For Call-In Speaker Stations