DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

TM 11-2572A
T.O. 31W1-2FI-101

INTERCOMMUNICATING STATIONS

LS–124B/FI, LS–124C/FI LS–125A/FI, LS–126A/FI LS–127A/FI, LS–128A/FI AND LS–128B/FI





DEPARTMENTS OF THE ARMY AND THE AIR FORCE

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*This manual supersedes TM 11–2572A, 1 October 1951, including C 1, 6 August 1952 and C 2, 6 September 1955.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual contains the information necessary to install, operate, maintain, and repair Intercommunicating Stations LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, LS–127A/FI, LS–128A/FI, and LS–128B/FI.

b. Throughout this manual, the term *master station* is used when referring to Intercommunicating Stations LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, LS–127A/FI, LS–128A/FI, or LS–128B/FI.

c. Forward all comments on this manual directly to Commanding Officer, The Signal Corps Publications Agency, Fort Monmouth, N. J.

2. Forms and Records

a. Unsatisfactory Equipment Reports.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to Commanding General, Signal Corps Engineering Laboratories, Fort Monmouth, N. J., AR 700–38.

(2) Fill out and forward DD Form 535 (Unsatisfactory Report) to Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 00–35D–54.

b. Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700–58 (Army); Navy Shipping Guide, Article 1850–4 (Navy); and AFR 71–4 (Air Force).

c. Preventive Maintenance Forms.

(1) DA Form 11–238 (Operator First Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar)) will be prepared in accordance with instructions on the back of the form (fig. 12).

(2) DA Form 11–239 (Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar)) will be prepared in accordance with instructions on the back of the form (fig. 13).

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. The master stations permit voice communication between two or more local points. They are designed for use in a multiple system, selective type intercommunicating (intercom) system where the loop resistance of the interstation connecting wires is less than 200 ohms.

b. The master stations can be used to select, call, and talk to any number of master or remote stations, individually or in combination, that may be connected in the same intercom system. When a system consists of one master station and a number of remote stations, the maximum number of stations available for selection is determined by the number of station selector switches (fig. 2 or 3) on the master station. When an intercom system consists of more than one master station regardless of whether there are remote stations, the maximum number of stations that can be selected from one of the master stations is one less than the number of station selector switches.

Note. A remote station is an intercommunicating station not containing master controls, for example, Intercommunicating Stations LS–130/FI and LS–130C/FI (TM 11–2572, Intercommunicating Stations LS–124/FI Through LS–130/FI (Webster Electric Models 206M–9, 212M, 212AM–3, 224M, 224AM–3, 5A45, and 5A45B); and Webster Electric Models 224AM–3–9 and 224M–9).

c. Annunciators and buzzers (annunciator signaling) are provided on some types of master stations; voice-type signaling is used on others. The annunciator provides a visual signal at the called master station and simultaneously identifies the calling station.

d. Figure 1 is a block diagram of a typical intercom system composed of two master stations (LS–126A/FI) and four remote stations. Either master station can communicate with all remote stations individually or simultaneously. The remote stations cannot communicate with each other.

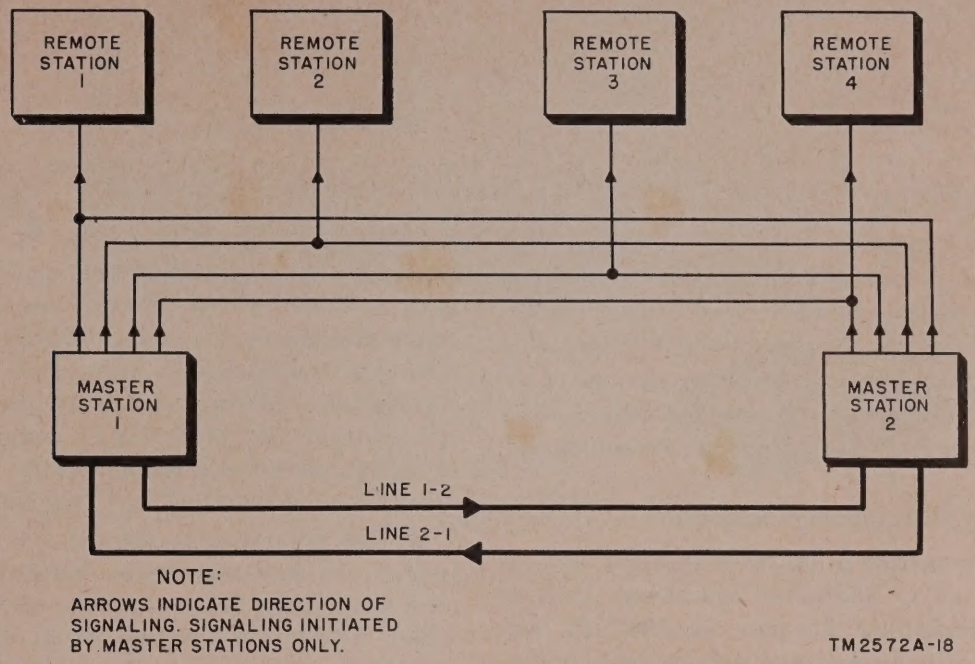


Figure 1. Typical intercommunicating system, block diagram.

4. Technical Characteristics

Note. All values listed below are approximate.

Input voltage	115 v, 50 to 60 cps.
Power Consumption:	
Talk-listen switch in talk or listen position	25 w (30 w for LS–125A/FI and LS–128B/FI).
Talk-listen switch in idle position	12 w (15 w for LS–128B/FI).
Power line fuse rating	1 amp.
Tube complement:	
Voltage amplifier (V1)	6SJ7 for LS–124B/FI, LS–124C/FI, and LS–128A/FI. 6SJ7GT for LS–125A/FI, LS–126A/FI, and LS–127A/FI. 6AU6 for LS–128B/FI.
Power amplifier (V2)	6V6GTY (6AQ5W for LS–128B/FI).
Rectifier (V3)	6X5WGT for LS–124B/FI, LS–124C/FI, and LS–128A/FI. 6X5GT for LS–125A/FI, LS–126A/FI, and LS–127A–FI. 6X4W for LS–128B/FI.
Maximum power applied to speaker-microphone	1 w.
Maximum power applied to line	2 w.
Amplifier frequency response	600 to 6,000 cps, flat within 6 db.
Input and output impedances	Optional, 50 to 500 ohms.
Speaker voice coil impedance	45 ohms.

Station capacity:

Equipment	Station capacity when connected in system with		Type signaling provid.d	
	No additional master stations	Additional master stations	Annunciator	Voice
LS–124B/FI	12	11		X
LS–124C/FI	12	11		X
LS–125A/FI	12	11	X	
LS–126A/FI	6	5		X
LS–127A/FI	24	23	X	
LS–128A/FI	24	23		X
LS–128B/FI	24	23		X

5. Description

The master stations (figs. 2–6) are housed in metal or wooden cabinets. The speaker-microphone (not visible on some equipments) is located on the left side of the front of the cabinet. Line connections are made in the junction boxes, which are in turn cabled to the rear of the equipment.

6. Additional Equipment Required

A system incorporating remote stations will require the use of additional equipment, such as Intercommunicating Stations LS–130C/FI and some type of low resistance wire or cable for interconnecting the master stations and remote stations. A line loop resistance of over 200 ohms is not desirable.

7. Differences in Models

a. Intercommunicating Stations LS–124B/FI and LS–124C/FI (fig. 3) are operationally the same and completely interchangeable. However, changes in wiring have been made and some of the electrical components are not interchangeable. In addition, the LS–124B/FI contains a three-winding input transformer and the LS–124C/FI contains a two-winding input transformer.

b. The LS–128A/FI (fig. 5) and LS–128B/FI (fig. 6) are interchangeable. However, physically and electrically, the two master stations are not alike. Except for the fuse cover, the talk-listen switch knob, and the volume control and on-off switch knob, no electrical or mechanical parts of the LS–128B/FI are interchangeable with any of the parts of the LS–128A/FI.

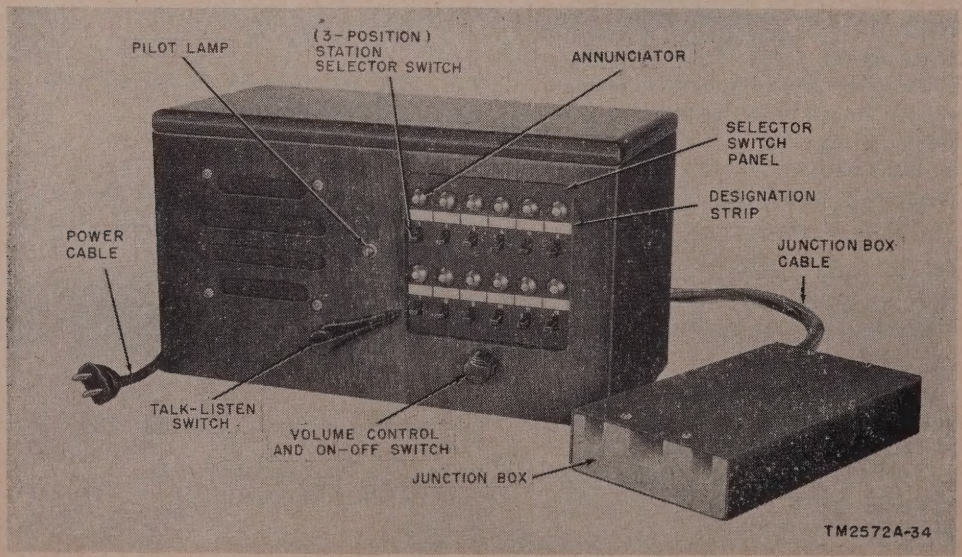


Figure 2. Intercommunicating Station LS–125A/FI.

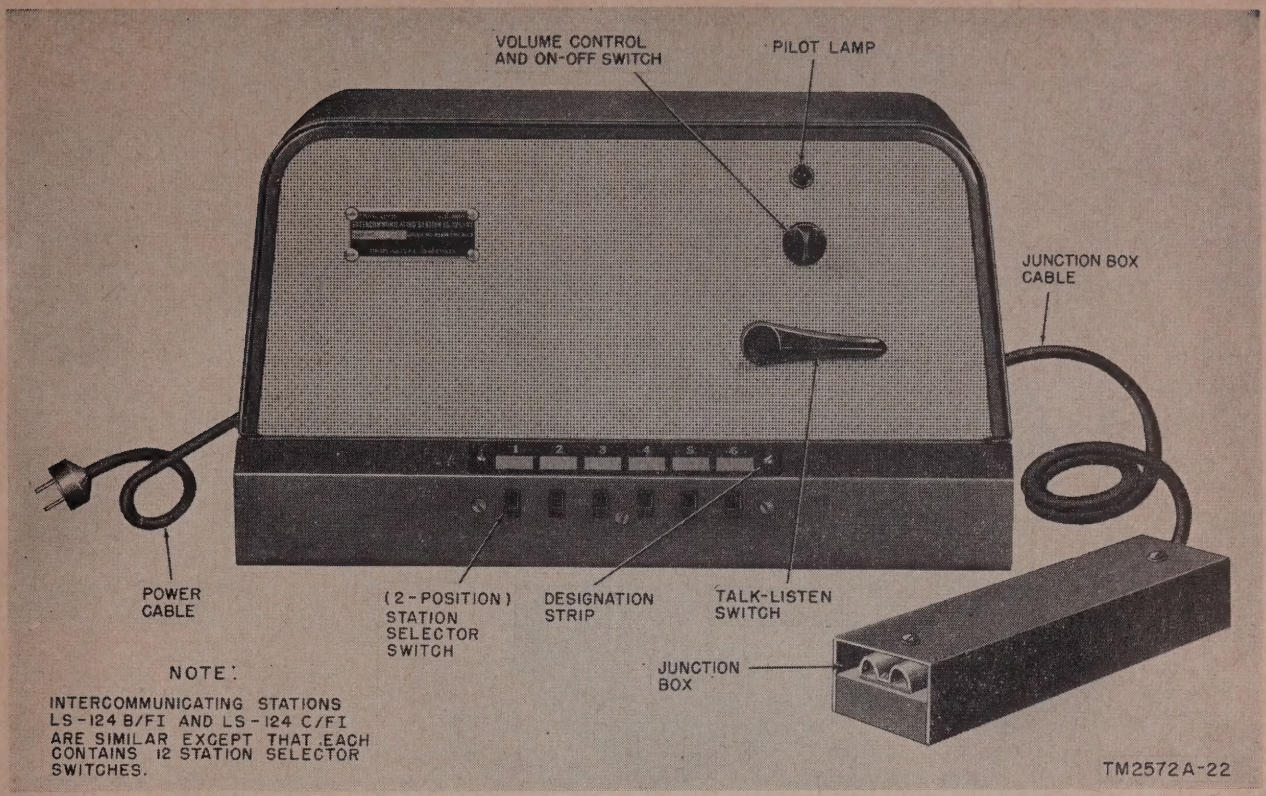


Figure 3. Intercommunicating Station LS–126A/FI, LS–124B/FI, or LS–124C/FI.

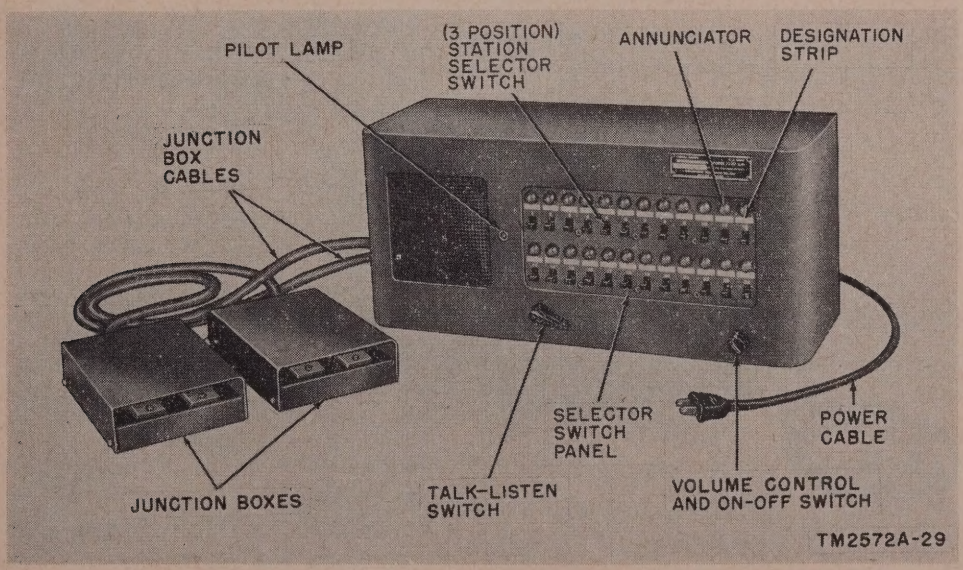


Figure 4. Intercommunicating Station LS–127A/FI.

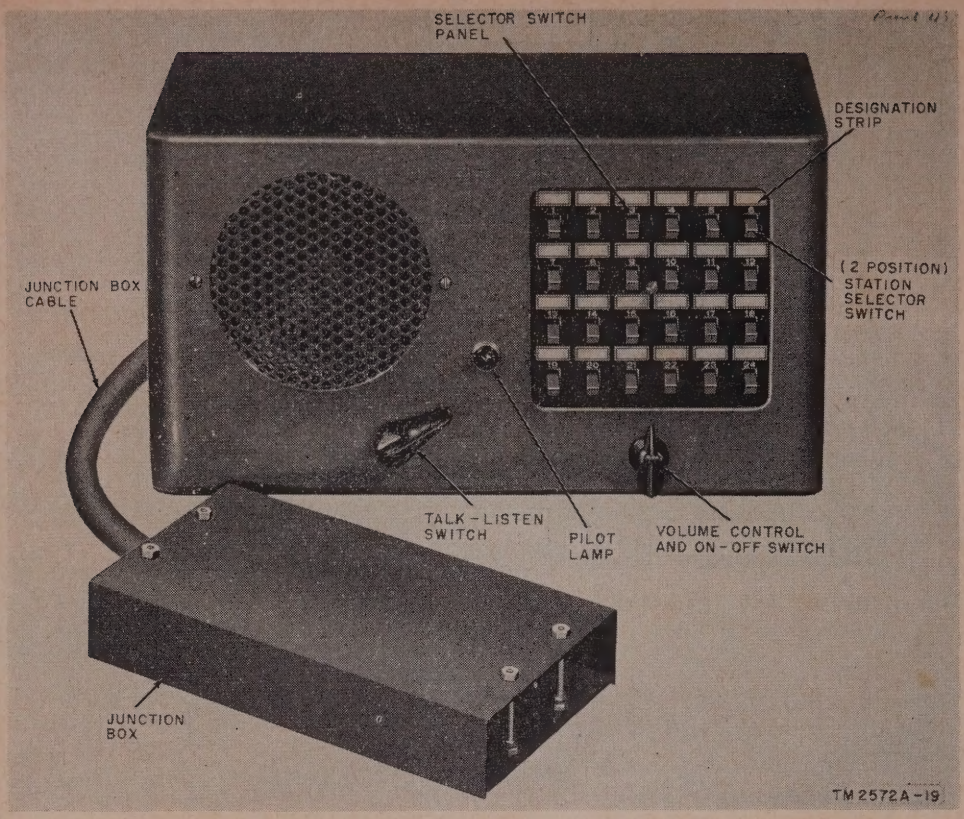


Figure 5. Intercommunicating Station LS–128A/FI.

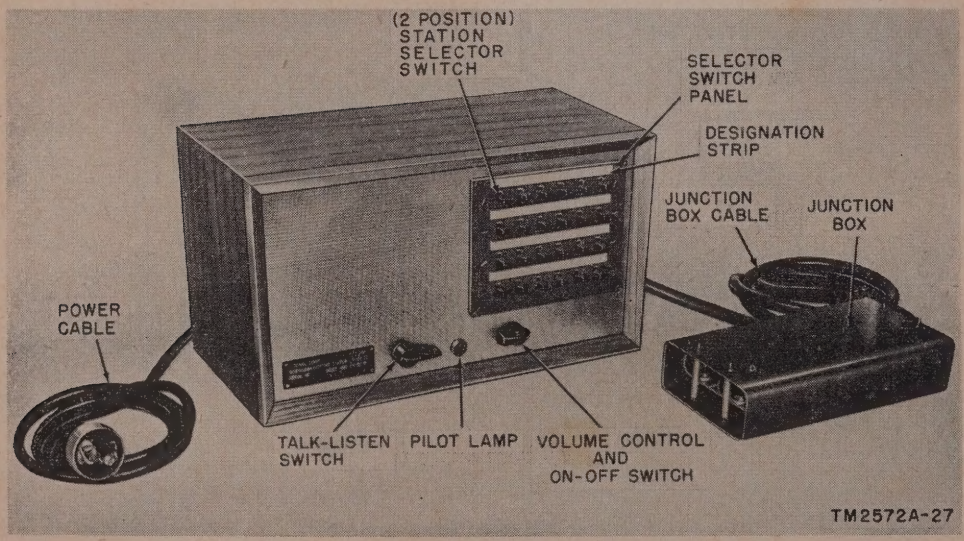


Figure 6. Intercommunicating Station LS–128B/FI.

CHAPTER 2
INSTALLATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

8. Siting

Master stations are designed for use in sheltered areas. They can be installed wherever adequate shelter is provided for the operating personnel and equipment. In a sheltered area, select a location such as a desk, table, or shelf where it is convenient for a person to speak into the speaker-microphone. Be sure that the controls can be reached easily and are not obstructed.

9. Unpacking

a. Packaging Data. The master station is packaged for domestic shipment as shown in figure 7. (In some cases, the outer corrugated carton and moisture-vaporproof barrier may not be used.) For export shipment, the waterproof case liner, wooden packing case and cover, and metal straps are used over the domestic pack.

b. Removing Contents. To unpack the export packing case, follow the procedures outlined in (1) through (5) below; for domestic packing, follow the procedures outlined in (3) through (5) below.

(1) Cut the metal strap and remove the cover from the wooden packing case. Use a nail puller to remove the nails.

(2) Open the waterproof case liner and remove the outer corrugated carton.

(3) Open the outer corrugated carton and moisture-vaporproof barrier.

(4) Remove the inner corrugated carton and cut the paper tape that secures the top flaps of the carton.

(5) Carefully remove the master station and technical manuals from the inner corrugated carton.

10. Checking

a. Check the contents of the shipping container against the master packing slip for completeness.

b. Place the equipment on a bench or table and inspect for damage incurred during shipment. Check controls for ease of operation. If trouble is encountered, refer to paragraph 26.

11. Installing Master Station

a. Place the master station on the selected site (par. 8).

b. Remove the back panel.

c. Remove the cover from the junction box. The LS–127A/FI, LS–128A/FI, and LS–128B/FI have two junction boxes; the covers must be removed from each junction box.

d. Secure the junction box base to a suitable surface, such as the side of a desk or a near-by wall. Four mounting holes are provided in the junction box base.

e. If not provided, cut pieces of thin white cardboard to fit the designation strips on the selector switch panel (figs. 2 through 6). Slip the pieces of cardboard into the designation strips beneath the station selector switches. Mark the station designations of the external stations on the cardboard strips.

12. Used or Reconditioned Equipment

a. Follow the instructions listed in paragraphs 9 and 10 for uncrating, unpacking, and checking the equipment.

b. Check used or reconditioned equipment for tags or other indications pertaining to changes in the wiring of the equipment. If any changes in wiring have been made, note them in this manual, preferably on the schematic diagram.

c. Install the master station as outlined in paragraph 11. Follow connection procedures in paragraphs 13 through 16.

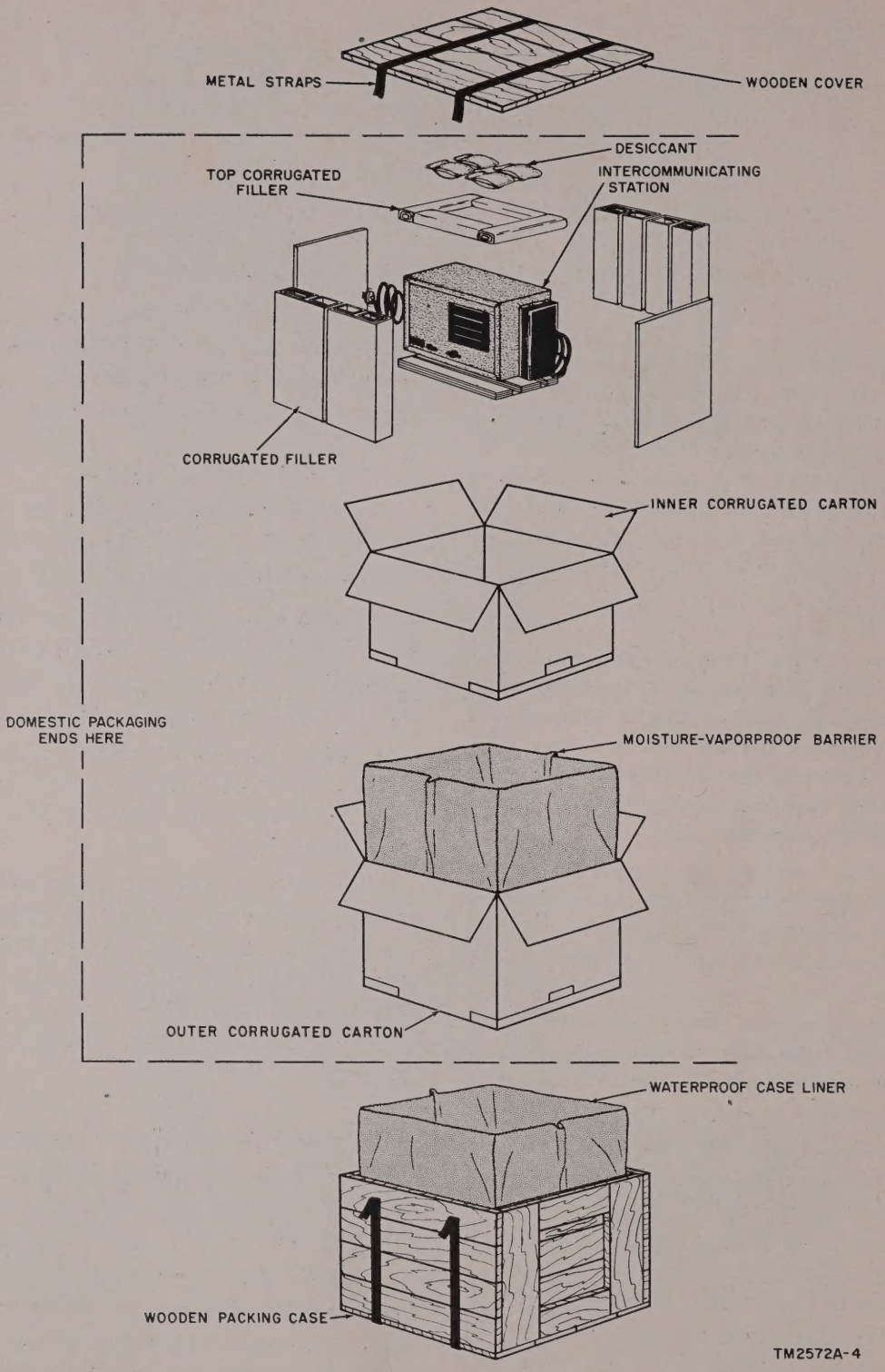


Figure 7. Typical packaging diagram of intercommunicating station.

Section II. CONNECTIONS

13. Preconnection Procedure

a. Station Numbering. Before interconnecting the equipment in an intercom system, assign consecutive station identification numbers, starting with number 1. Assign numbers first to the master stations, then to the remote stations. An example of a typical station numbering scheme is shown in figure 1.

b. Associating Line Terminals with Station Selector Switches. The station selector switches are permanently cabled to the line terminals on the voice and annunciator terminal boards. Except for the LS–128B/FI, the station selector switches are identified by number. On the LS–128B/FI (fig. 6), assign the same numbers to the station selector switches as those assigned on the LS–128A/FI (fig. 5). For most master stations, the terminal pairs in the junction box are numbered to correspond to the station selector switch number. If a particular master station does not contain a numbered terminal board, determine which pairs on the terminal board are connected to the station selector switches. Use Multimeter TS–352/U to make the check. Mark the station selector switch numbers near the corresponding line terminals on the terminal boards.

14. Connecting Stations

a. General.

(1) *Wire.* Use low resistance wire for all connections. A color coded cable, if available, is best for connections between master stations. A single pair of conductors is best for connections between a master station and a remote station. The loop resistance of the longest voice line should not exceed 200 ohms. The loop resistance of the annunciator lines should not exceed 30 ohms.

(2) *Reserving voice and annunciator line terminals.* Before interconnecting the stations and after all station numbers have been assigned, reserve the low numbered voice and annunciator terminal board line terminals (fig. 8) for master station connections. Reserve the higher numbered line terminals for remote station connections. The first reserved remote station line terminals will be the first pair of line terminals appearing after the last pair of line terminals reserved for master station connections.

b. Grounding. Connect the ground terminals on the voice terminal boards of all master stations in a system in parallel by using an insulated conductor. Connect the ground terminal at one of the master stations to a good earth ground. (For additional information on grounding procedures, refer to TM 11–676, Grounding Procedures and Protective Devices.)

c. Voice Lines to Master Stations.

(1) Connect the same numbered line terminals, reserved for master station connections, in parallel at the voice terminal board of each master station.

(2) Figure 8 shows an example of voice line connections between master stations. In this case, master station connections are made to line terminals numbered 1 through 4.

d. Voice Lines to Remote Stations.

(1) If the remote station is to be connected to more than one master station, connect the same numbered line terminals reserved for remote station connections in parallel at the voice terminal board of each master station. If the remote station is being connected to only one master station, omit this step.

(2) Connect a pair of insulated conductors from the appropriate line terminals on the voice terminal board of the nearest master station to the voice coil terminals of the remote station.

(3) Figure 8 also shows an example of remote station voice line connections. The remote stations in this example are connected to line terminals 5 through 12, which would be reserved for remote station connections when only 4 master stations are used in the system. In figure 8, remote station connections are made to lines instead of line terminals in some cases to indicate that these connections can be made to any voice terminal board on any master station.

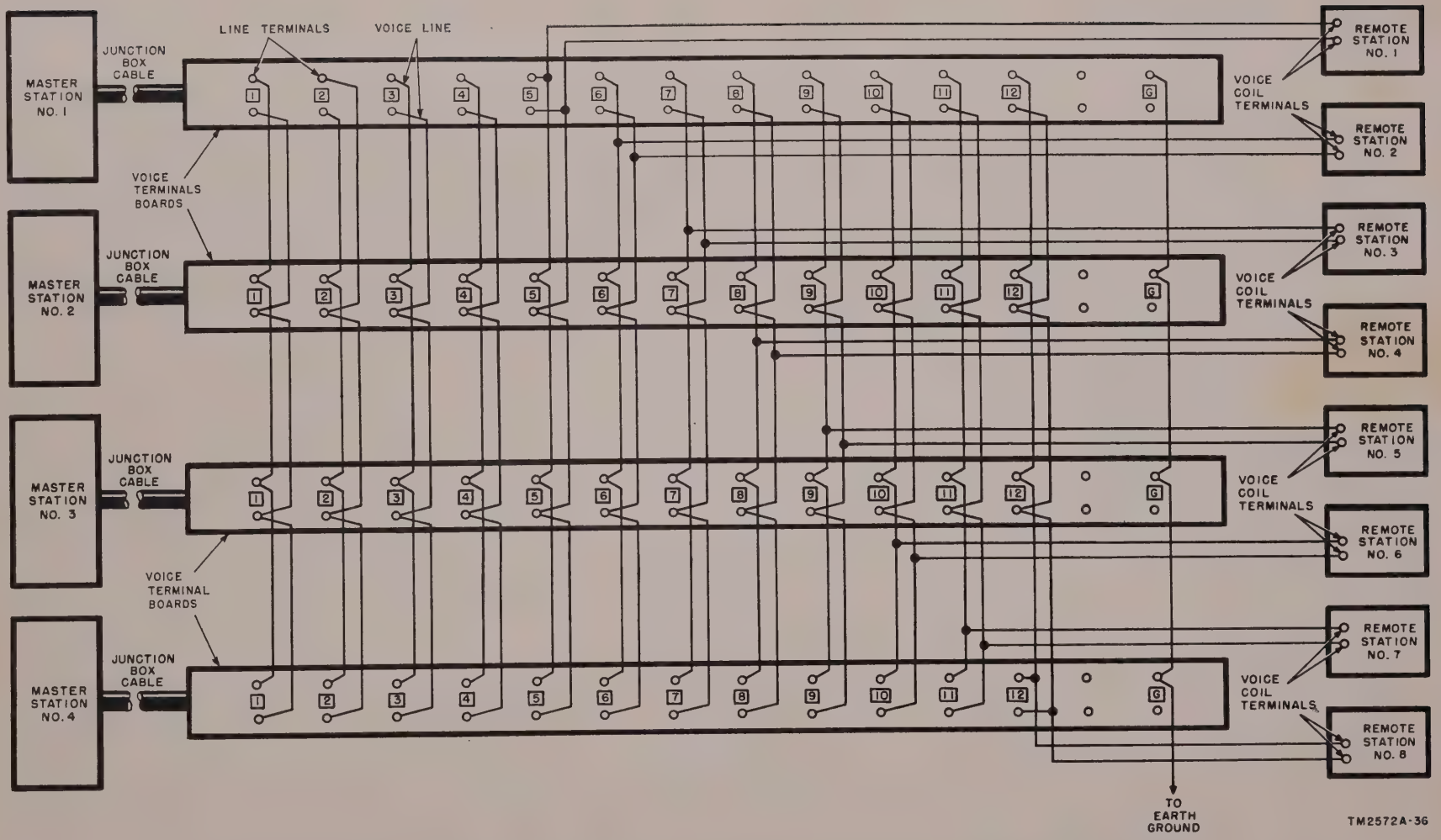


Figure 8. Typical voice terminal board connections on voice terminal board of 12-station master station.

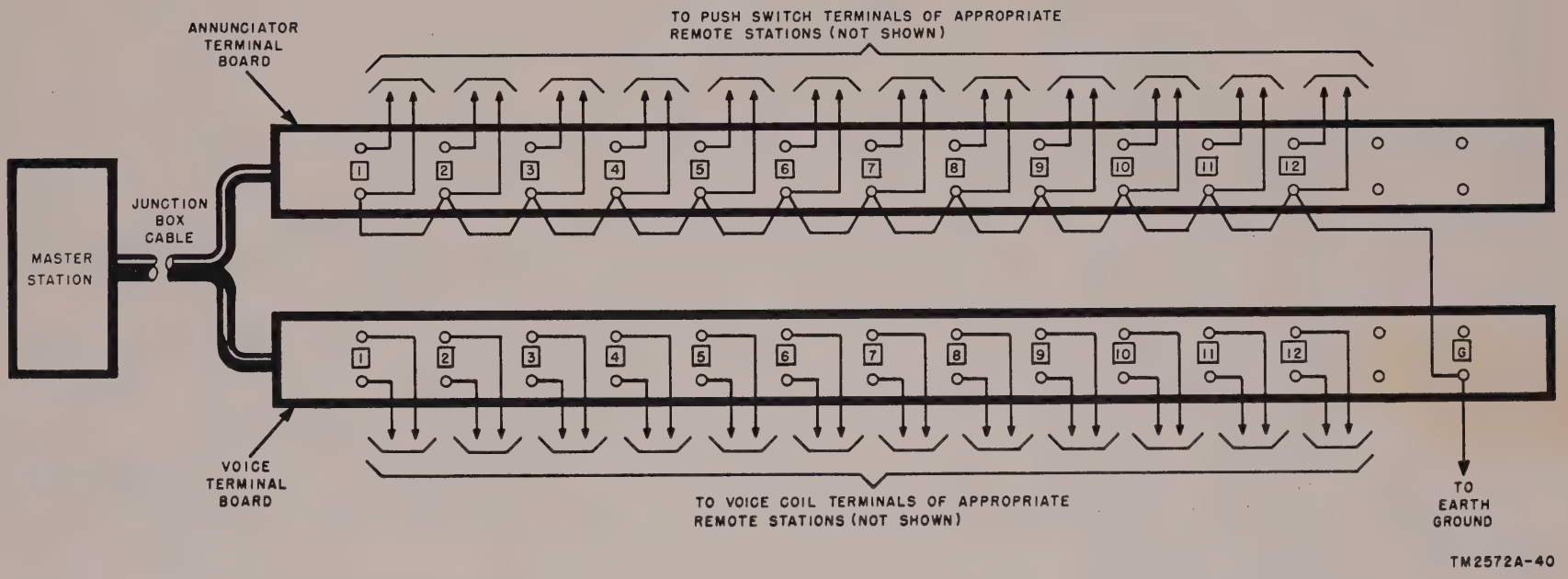


Figure 9. Typical remote station connections to voice and annunciator terminal boards of a 12-station master station.

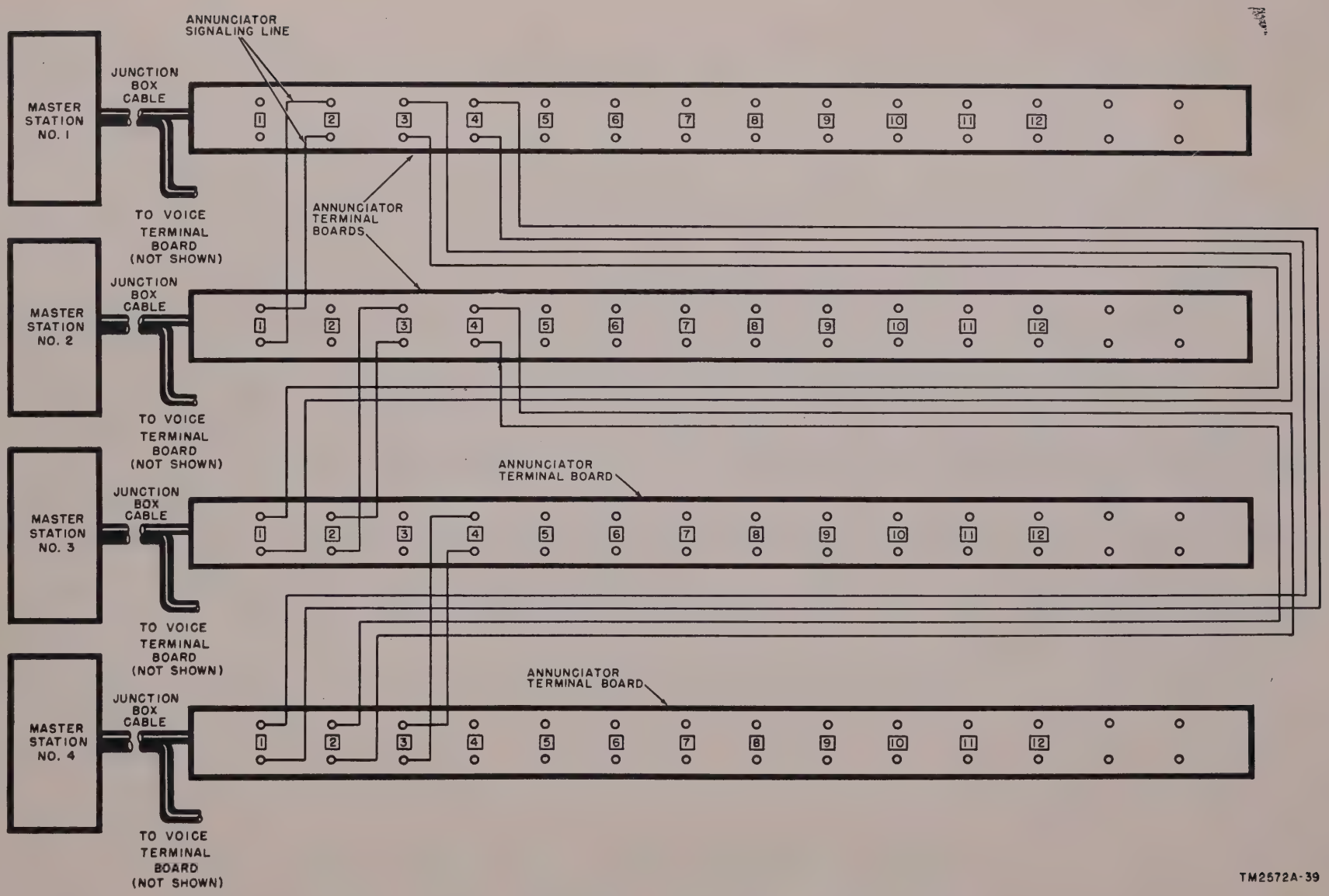


Figure 10. Typical annunciator terminal board conncetions on annunciator terminal board of 12-station master station.

If there is no need to communicate with a particular master station in a system, omit the parallel voice line connection to that master station.

e. Annunciator and Voice Line Connections to Push Switch Equipped Remote Stations.

Note. Annunciator connections from remote stations can be made to only one master station. Voice line connections, however, can be connected in parallel to additional master stations if desired (*d* above).

Annunciator and voice line connections are made at the voice and annunciator terminal boards of a master station as shown in figure 9. The number on the terminal board in this example corresponds with the station number assigned the remote station because other master stations are not connected in the system.

f. Annunciator Line Connections Between Master Stations (LS–125A/FI and LS–127A/FI).

(1) Connections are made to numbered line terminals on the annunciator terminal board of each master station. A numbered terminal on the annunciator terminal board is associated with each same numbered voice terminal board line terminal.

(2) Follow the pattern shown in figure 10 when connecting annunciator signaling lines. Each annunciator signaling line is reversed to insure proper operation of the annunciator.

Section III. PRELIMINARY ADJUSTMENTS AND CHECKS

15. Impedance Switch Adjustment

After all connections have been made at the master station, remove the chassis from the cabinet, determine the proper setting for the impedance switch, and set the impedance switch to either the 50- or 500-ohm position as explained below.

a. Removal of Chassis from Cabinet. To remove the chassis from the cabinet of the master station, follow the applicable procedures outlined in (1) or (2) below.

(1) *LS–124B/FI, LS–124C/FI, or LS–126A/FI.*

(*a*) Remove the seven screws that hold the back panel to the rear of the cabinet. Remove the back panel.

(*b*) Loosen the set screws on the volume control and off-on switch knob and the talk-listen switch knob. Pull the knobs from their shafts.

(*c*) Remove the seven screws that hold the bottom panel to the chassis. Remove the bottom panel.

(*d*) Remove the six retaining screws, located on the underside of the chassis, that fasten the cabinet to the top of the chassis. Remove the cabinet from the chassis (fig. 19).

(2) *LS–125A/FI, LS–127A/FI, LS–128A/FI, or LS–128B/FI.*

(*a*) Remove the screws that hold the back panel to the rear of the cabinet.

(*b*) Remove the machine screws from the underside of the cabinet.

(*c*) On the LS–128A/FI, remove the nut that secures the selector switch panel to the cabinet. This nut is located on the rear of the selector switch panel and can be reached through the rear of the cabinet. On the LS–125A/FI, remove the stop-block that holds the selector switch panel to the inside of the cabinet.

(*d*) Pull the chassis from the cabinet (fig. 25) far enough to reach the impedance switch. Two leads connect the chassis to the speaker-microphone. Be careful not to break or damage these leads.

b. Determining Impedance Switch Setting. When a master station is installed as a replacement, set the switch to the same setting as used in the station being replaced. When installing a new system, measure the loop resistance of the longest voice line connected to the master station. If the resistance is 50 ohms or less, set the impedance switch to the 50-ohm position; if the resistance is more than 50 ohms, set the switch to the 500-ohm position. Be sure all impedance switches in a system are operated to the same position.

c. Impedance Switch Location and Operation. Three types of impedance switches are used in master stations. To locate and operate the impedance switch, follow the applicable procedure outlined in (1), (2), or (3) below.

(1) *LS–128A/FI and LS–128B/FI.* These types of master stations contain a slide-type impedance switch designated S2 (figs. 28 and 30). To operate the switch to the 50-ohm position, push the switch to the left (as viewed from the rear); to operate the switch to the 500-ohm position, push it to the right.

(2) *LS–125A/FI and LS–127A/FI.* These types of master stations contain a screw driver control-type impedance switch designated S1 (figs. 22 and 26). To operate the switch to the 50-ohm position, turn it counterclockwise; to operate the switch to the 500-ohm position, turn it clockwise.

(3) *LS–124B/FI, LS–124C/FI, and LS–126A/FI.* These types of master stations contain knob-control impedance switches designated S1 (fig. 20). To operate the switch to the 50-ohm position, point the knob up; to operate the switch to the 500-ohm position, point the knob down.

16. Preoperational Procedure

a. Operate the home switch (par. 17) to the up position on master stations that use voice signaling and are connected in a system with other master stations. Mark HOME SWITCH on the designation strip associated with the appropriate station selector switch.

b. Insert the male power plug into a 115-volt, 60-cps, ac power source.

c. Use the equipment performance check list (par. 27) to be sure the equipment is in good working order after the installation and connections are completed.

CHAPTER 3
OPERATION

17. Controls

The following table lists the controls and instruments of master stations and their functions.

Control	Function
Station selector switch (figs. 2 and 3).	On master stations equipped with annunciators, these are three-position switches. Horizontal position: The circuit to the external station is disconnected. Down position: The annunciator at the external station is activated. Up position: The voice circuit to the external station is connected. On master stations not equipped with annunciators, these are two-position switches. Horizontal position, the circuit to the outlying station is disconnected. Up position, the voice circuit to the outlying station is connected.
Volume control and off-on switch (figs. 2 through 6).	Disconnects power to the station when in extreme clockwise position. Volume of sound is reduced by rotation in counterclockwise direction.
Talk-listen switch (fig. 11).	Idle position: Permits station user to receive calls originated by external master stations. Listen position: Permits station user to listen to incoming voice signal from another station when originating a call. Talk position: Permits station user to converse with externally connected station when originating a call.
Home switch	This is a functional name assigned to a station selector switch on master stations not equipped with annunciators. This switch bears the same station number as the master station on which it is located. *The switch must remain in the up position at all times.*
Pilot lamp (figs. 2–6)	When lighted, indicates that master station is turned on.
Annunciator (figs. 2 and 4).	Indicates incoming call from external station.

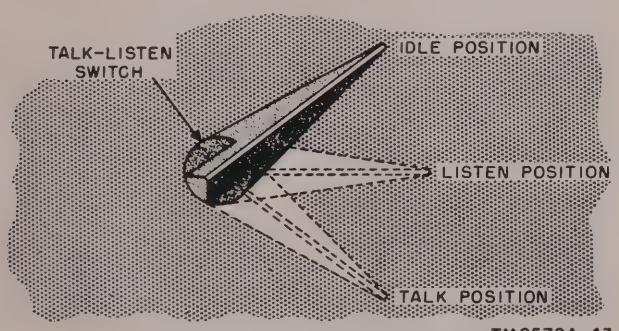


Figure 11. Talk-listen switch, operational view.

18. Starting Procedure

a. For master stations that use voice signaling, check the home switch to be sure it is in the up position. *Leave this switch in the up position at all times.*

b. Operate all station selector switches (except the home switch) to the off position.

c. Turn the volume control and on-off switch about one-eighth turn counterclockwise until a click is heard and the pilot lamp lights. Wait for about 2 minutes for the equipment to warm up before proceeding.

d. Operate the talk-listen switch to the idle position.

19. Operation with Remote Stations

a. Calling Remote Stations.

(1) Check the talk-listen switch to be sure that it is in the idle position (fig. 11).

(2) Operate the station selector switch, corresponding with remote station being called, to the on position and listen to be sure that the circuit is not in use.

(3) Turn the volume control and on-off switch full on (extreme clockwise position before shut off) and operate the talk-listen switch to the talk position.

(4) Hold the talk-listen switch in the talk position and speak in a normal voice from about 20 inches from the left front of the master station.

(5) Release the talk-listen switch and wait for an answer. The switch will spring back to the listen position.

(6) After the operator at the remote station answers the call, again move the talk-listen switch to the talk position and speak ((4) above).

(7) *Manipulate* the talk-listen switch for the duration of the call.

Note. The term *manipulate* is used throughout this manual to refer to the movement of the talk-listen switch to the talk position (fig. 11) when delivering a message and to the listen position when receiving a message.

(8) When the call is finished, operate the station selector switch to the off position and the talk-listen switch to the idle position.

b. Receiving Calls Initiated by Remote Stations.

Note. Remote stations cannot initiate calls unless they are equipped with push switches and connected to an annunciator-equipped master station (LS–125A/FI or LS–127A/FI).

(1) The incoming call is indicated at the master station by a buzzer and annunciator signal.

(2) When the buzzer sounds and one of the annunciator plungers slides part way out of the annunciator to indicate an incoming call, operate the station selector switch associated with the calling station to the on position. Restore the annunciator plunger to its original position.

(3) Operate the talk-listen switch to the talk position and acknowledge the call.

(4) To listen, release the talk-listen switch, so it returns to the listen position.

(5) Manipulate the talk-listen switch, as required, for the duration of the call.

(6) When the call is finished, operate the station selector switch to the off (horizontal) position and the talk-listen switch to the idle position.

20. Operation with Another Master Station

a. Calling Another Master Station.

(1) Check to be sure that the talk-listen switch is in the idle position and the volume control and on-off switch is turned full on. Push up the station selector switch of the station to be called and listen to be sure that the circuit is not in use. To signal the desired master station, follow the appropriate signaling procedure given in (2) in (3) below.

(2) If the master station is not equipped with annunciators, leave the station selector switch in the on position. Operate the talk-listen switch to the talk position and signal the operator of the called master station by speaking into the left-hand side of the master station in a normal voice.

(3) If the master station is equipped with annunciators, operate the station selector switch to the down position and hold it momentarily to operate the buzzer and annunciator at the other master station. Restore the station selector switch to the on position.

(4) Operate the talk-listen switch to the listen position.

(5) When the other master station acknowledges the call, move the talk-listen switch to the talk position and deliver the message. Adjust the volume control for a suitable sound level and manipulate the talk-listen switch for the duration of the call. The called master station must keep his talk-listen switch operated to the idle position.

(6) When the call is finished, restore the station selector switch to the off position and operate the talk-listen switch to the idle position.

b. Receiving Call from Master Station Equipped for Voice Signaling.

An incoming call is indicated by a voice signal. When the signal is heard, check to see that the

station selector switch is operated to the idle position. Acknowledge the call, but do not manipulate the talk-listen switch unless the voice signal is weak.

Note. If the voice signal is very weak, ask the operator of the other master station to increase the volume at his station. If a reply from the other operator indicates that his volume control and on-off switch is turned full on (extreme clockwise position before shut off), manipulate the talk-listen switch during the conversation.

c. Receiving Call from Master Station Equipped for Annunciator Signaling.

(1) Follow the procedures outlined in paragraph 19*b*(1) and (2).

(2) Check to see that the talk-listen switch is operated to the idle position and answer the call.

(3) When the call is finished, operate the station switch to the off position.

21. Conference Call

a. Check to see that the talk-listen switch is operated to the idle position. For the first of the series of stations to be called, operate the station selector switch to the on position. Be sure the circuit is not in use. If no other station is talking with the first station, continue with the steps outlined in *b*, *c*, and *d* below.

b. Operate the talk-listen switch to the talk position.

c. Signal the first station.

d. Tell the first station who is calling and to stand by for a conference call.

e. Repeat the steps outlined in *a*, *b*, *c*, and *d* above for all stations that are to be included in the conference.

f. After all stations have been called and are standing by, operate the talk-listen switch to the talk position and give the message.

g. If a reply is required from a particular master station, tell that station to reply, then operate the talk-listen switch to the idle position. (The talking stations must manipulate their talk-listen switches.)

h. If a reply is required from a remote station, tell the operator of that station to reply, then operate the talk-listen switch to the listen position.

i. After all conversations have been completed, operate all station selector switches to their off positions and the talk-listen switch to the idle position.

22. Stopping Procedure

a. Placing Station in Ready Condition. To prepare the master station so that it can receive incoming calls, proceed as follows:

(1) When the annunciator equipped master stations are connected to other annunciator equipped master stations, or to remote stations equipped with push switches for annunciator signaling, operate the talk-listen switch to the idle position. Be sure that all station selector switches are in the off position, and that the volume control and on-off switch is turned on. The pilot lamp will be lighted.

(2) When the master stations not equipped with annunciators are connected to other master stations not equipped with annunciators, operate the home switch to the up position. Operate the volume control and on-off switch and the talk-listen switch as described in (1) above.

b. Shutting Down Station. When the master station is not to be used for a period of time, such as overnight, turn off the power to the equipment. Turn the combination volume control and on-off switch clockwise until a click is heard and the pilot lamp is extinguished.

23. Operation Under Unusual Conditions

The operation of master stations may be difficult in regions where extreme cold, heat, moisture conditions, etc. prevail. Procedures for minimizing these effects are given below.

a. Operation in Extremely Cold Climates. Keep the equipment warm and dry and keep the tubes lighted constantly.

b. Operation in Warm, Damp Climates. Keep the equipment as free from moisture as possible.

c. Operation in Hot, Dry Climates. Protect the equipment from sand and dust. Make frequent preventive maintenance checks.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE

Organizational maintenance is defined as those maintenance procedures performed at first and second echelon. First echelon maintenance is operator's maintenance; second echelon maintenance is repairman's maintenance.

Section I. OPERATOR'S MAINTENANCE

24. Scope of Operator's Maintenance

Operator's maintenance of the master station consists of performing the preventive maintenance procedures given in paragraph 25 and checking the equipment using the equipment performance check list (par. 26) when trouble is suspected. Do not remove any parts from, or make any repairs to, the master station.

25. Operator's Preventive Maintenance

a. Use of DA Form 11–238 (fig. 12). DA Form 11–238 is a preventive maintenance check list to be used by the operator as directed by his commander. Items not checked by the operator or not applicable to the master station are lined out. References in the ITEM block in figure 12 are to paragraphs in this manual that contain additional maintenance information pertinent to the particular item.

b. Daily Checks. Before each operational day, perform the following preventive maintenance functions:

(1) Be sure the master station is positioned for convenient operation. The controls should be unobstructed.

(2) Use a clean dry cloth to wipe dirt and moisture from the cabinet and controls.

(3) Operate and restore each station selector switch, the talk-listen switch, and the volume control and on-off switch. Check for binding, scraping, and excessive looseness.

c. Weekly Checks.

(1) Inspect wooden cabinets for scratches and cracks. Inspect metal cabinets for scratches, chipped paint, rust, corrosion, and moisture. Check controls for chips, cracks, and nicks.

(2) Inspect the junction box cable and power cable for kinks, cuts, fraying, and deteriorated insulation. Straighten any cables that have become twisted. Twists in junction box cables can easily become kinks that will break the cabled conductors. Check the wiring, from external stations, in the junction box for frayed, cut, or deteriorated insulation.

26. Use of Equipment Performance Checklist

a. General. The equipment performance checklist (par. 27) will help the operator to determine whether trouble exists in the master station. The list gives the item to be checked, the conditions under which the item is checked, the action of the operator, and the normal indication provided by correct operation. To use this list, follow the items in numerical sequence.

b. Condition. This column indicates the operational or the trouble check to be made by the operator.

c. Action. The information given in this column indicates switch settings or physical actions made by operator to check for the normal indications listed in the last column. These actions are made only under the condition listed in the *Condition* column.

d. Normal Indications. This column lists the visible or audible signs that the operator should perceive when the item is checked. If the indications are not normal, the possibility of trouble exists and the repairman should be notified to determine and clear the trouble.

OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE	EQUIPMENT SERIAL NO.
INTERCOMMUNICATING STATIONS	

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; (X) Defect corrected.
NOTE: Strike out items not applicable.

DAILY

NO.	ITEM	CONDITION S	M	T	W	T	F	S
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT (~~receiver, transmitter, carrying cases~~, *wire and cable*, ~~microphones, tubes, spare parts~~, *technical manuals* ~~and accessories~~). PAR. 10	✓	✓					
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 25 b (1)	✓	✓					
3	CLEAN DIRT AND MOISTURE FROM ~~ANTENNA, MICROPHONE, HEADSETS, CHESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS~~, COMPONENT PANELS. PAR. 25b(2)	✓	✓					
4	~~INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, CRYSTALS, FUSES, CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS.~~							
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, ~~WORN OR CHIPPED GEARS, MISALIGNMENT~~, POSITIVE ACTION. PAR. 25b(3)	✓	✓					
6	CHECK FOR NORMAL OPERATION. PAR. 27	✓	✓					

WEEKLY

NO.	ITEM	CONDITION	NO.	ITEM	CONDITION
7	~~CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS.~~		13	~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.~~	
8	INSPECT CASES, ~~MOUNTINGS, ANTENNAS, TOWERS~~, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 25c(1)	✓	14	~~CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.~~	
9	INSPECT CORD, CABLE, WIRE, AND ~~SHOCK MOUNTS~~ FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 25c(2)	✓	15	~~INSPECT METERS FOR DAMAGED GLASS AND CASES.~~	
10	~~INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.~~		16	~~INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHER-PROOFING.~~	
11	~~INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.~~		17	~~CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.~~	
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, ~~JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWER STATS, RELAYS, SELSYNS, MOTORS, BLOWERS, CAPACITORS, GENERATORS, AND PILOT LIGHT ASSEMBLIES.~~ PAR. 25b(3)	✓	18	~~CHECK TERMINAL BOX COVERS FOR CRACKS, LEAKS, DAMAGED GASKETS, DIRT AND GREASE.~~	

19 IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.

DA FORM 1 MAY 51 11-238 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

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Figure 12. DA Form 11–238, prepared for use with master stations.

27. Equipment Performance Checklist

	Item No.	Item	Condition	Action	Normal indication
PREPARATORY	1	Power cord.	Supplying power for operation.	Plug into ac power receptacle.	Plug should not be loose in receptacle.
	2	Volume control and on-off switch.	Checking unit for off condition.	Turn to extreme clockwise position.	Pilot lamp is not lighted.
	3	Talk-listen switch.	Station in ready.	Set in idle position.	Switch should lock in idle position.
	4	Station selector switches.	Master stations without annunciators.	Set all switches, except home switch (par. 17) in horizontal (off) position.	Unless operator of external master station is calling, no voice signal is heard.
			Master stations with annunciators.	Set all switches in horizontal position.	Unless operator of external master station is signaling no annunciator signal is received.
START	5	Volume control and on-off switch.	Turning on master station.	Turn ¼ turn counterclockwise.	Pilot lamp is lighted and click is heard.
EQUIPMENT PERFORMANCE	6	Station selector switch.	Call to a selected remote station.	Operate selected switch to up position.	Switch should lock in up position.
	7	Talk-listen switch.	Call to a selected remote station.	Operate to talk position.	Switch will have to be held in talk position.
	8	Voice signal.	Calling remote station.	Speak into master station and request a reply.	Voice signal should be heard by operator of remote station.
	9	Talk-listen switch.	Receiving reply from remote station.	Operate to listen position.	Switch should lock in listen position. Voice signal from operator of remote station should be heard.
	10	Volume control and on-off switch.	Checking for loudness.	While operator of remote station is talking, vary volume control.	Volume should increase when volume control is rotated clockwise and decrease when operated counterclockwise.
	11[a]	Station selector switch.	Calling master stations not equipped with annunciators.	Perform actions listed in items 6 through 10.	
	12[a]	Talk-listen switch.	Checking idle position of switch when conversing with other master stations.	Ask operator of external master to manipulate (par. 19*a*) and operate switch to idle position.	It should be possible to converse with external master station without manipulating controls (par. 19*a*).
	13[b]	Station selector switch.	Signaling master stations equipped with annunciators.	Operate selected switch to down position momentarily and then place in up position.	Annunciator at selected master station should operate. Switch should not lock in down position but should lock in up position.

See references at end of table.

	Item No.	Item	Condition	Action	Normal indication
EQUIPMENT PERFORMANCE	14[b]	Talk-listen switch.	Awaiting answer from annunciator equipped master station.	Operate switch to listen position.	Reply from annunciator equipped master station should be heard.
	15[b]	Annunciator.	Checking incoming signal on annunciator equipped master stations.	Ask operator of called master station to signal and then operate talk-listen switch to idle position.	When operator of external master station signals, annunciator plunger should slide out. Conversation with the operator of external master station can be held without manipulation.
STOP	16	Volume control and on-off switch.	Checking for off condition.	Turn control to extreme clockwise position.	Pilot lamp is extinguished.

[a] Applicable only to master stations not equipped with annunciators.
[b] Applicable only to annunciator equipped master stations.

Section II. REPAIRMAN'S MAINTENANCE

28. Scope of Repairman's Maintenance

The scope of the duties performed by the unit repairman has been determined by the normally available tools, materials, test equipment, and replacement parts; and by the Military Occupational Speciality (Telephone Installer-Repairman) of the repairman. Preventive maintenance functions performed by the repairman are explained in paragraph 30; troubleshooting and repair procedures are provided in chapter 6.

29. Tool, Test Equipment, and Materials Required

The following tools, test equipment, and materials are not supplied as a part of the master stations, but are required for maintenance purposes.

a. Tool.

Tool Equipment TE–113.

b. Test Equipment.

Electron Tube Test Set TV–7/U (TM 11–5083).

Multimeter TS–352/U (TM 11–5527).

c. Materials.

Cleaning Compound (1-pint can, Signal Corps stock No. 6G236.5).

Lint–free cloth.

30. Repairman's Preventive Maintenance

a. Use of DA Form 11–239 (fig. 13). DA Form 11–239 is a preventive maintenance check list to be used by the repairman. Items not applicable to the master stations are line out. References in the ITEM block are to paragraphs in this manual that contain additional maintenance information pertinent to the particular item.

b. Monthly Checks.

(1) Remove the chassis (par. 15*a*) and inspect the pilot lamp, fuse, and tubes for proper seating. Do not withdraw the tubes from their sockets; check only for looseness.

(2) Check the controls to be sure that they are not loose in their mountings and that they operate with a positive degree of action without scraping or binding. Tighten all loose switches. Be sure that the impedance switch setting has not been changed.

(3) Inspect the cabinet, chassis, and junction box for scratches and moisture. In addition, inspect all metal surfaces for rust and corrosion.

(4) Inspect the power cable, junction box cable, chassis wiring, junction box wiring, and cabinet wiring (if any) for cuts, breaks, frayed or deteriorated insulation, kinks, and strain at the terminals. Inspect for twists (par. 25*c*(2)).

(5) Inspect all electrical parts for looseness.

SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT

RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT NOMENCLATURE: INTERCOMMUNICATING STATIONS

EQUIPMENT SERIAL NO.

LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; Ⓧ Defect corrected.
NOTE: Strike out items not applicable.

NO.	ITEM	CONDITION
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT ~~(receiver, transmitter, carrying cases, wire and cable, microphones, tubes, spare parts, technical manuals and accessories)~~. PAR. 10	✓
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 25b(1)	✓
3	CLEAN DIRT AND MOISTURE FROM ~~ANTENNA, MICROPHONE, HEADSETS, CHEESTSETS, KEYS, JACKS, PLUGS, TELEPHONES, CARRYING BAGS,~~ COMPONENT PANELS. PAR. 25b(2)	✓
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: TUBES, LAMPS, ~~CRYSTALS~~, FUSES, ~~CONNECTORS, VIBRATORS, PLUG-IN COILS AND RESISTORS~~. PAR. 30b(1)	✓
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, ~~WORN OR CHIPPED GEARS~~, MISALIGNMENT, POSITIVE ACTION. PAR. 30b(2)	✓
6	CHECK FOR NORMAL OPERATION. PAR. 27	✓
7	~~CLEAN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, RACK MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION LINES, WAVE GUIDES, AND CABLE CONNECTIONS.~~	
8	INSPECT CASES, ~~MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED~~ METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 30b(3)	✓
9	INSPECT CORD, CABLE, WIRE, ~~AND SHOCK MOUNTS~~ FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 30b(4)	✓
10	~~INSPECT ANTENNA FOR ECCENTRICITIES, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.~~	
11	~~INSPECT CANVAS ITEMS, LEATHER, AND CABLING FOR MILDEW, TEARS, AND FRAYING.~~	
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, ~~JACKS, CONNECTORS~~, ELECTRICAL TRANSFORMERS, ~~POWERSTATS, RELAYS, SOLENOIDS~~, MOTORS, ~~BLOWERS~~, CAPACITORS, ~~GENERATORS~~, AND PILOT LIGHT ASSEMBLIES. PAR. 30b(5)	✓
13	~~INSPECT STORAGE BATTERIES FOR DIRT, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED CASES.~~	
14	~~CLEAN AIR FILTERS, BRASS NAME PLATES, DIAL AND METER WINDOWS, JEWEL ASSEMBLIES.~~	
15	~~INSPECT METERS FOR DAMAGED GLASS AND CASES.~~	
16	~~INSPECT SHELTERS AND COVERS FOR ADEQUACY OF WEATHERPROOFING.~~	
17	~~CHECK ANTENNA GUY WIRES FOR LOOSENESS AND PROPER TENSION.~~	
18	CHECK TERMINAL BOX ~~COVERS~~ FOR CRACKS, ~~LEAKS, DAMAGED GASKETS~~, DIRT AND GREASE. PAR. 30b(6)	✓
19	ELECTRON TUBES - INSPECT FOR LOOSE ENVELOPES, ~~GAP CONNECTORS, CRACKED SOCKETS; INSUFFICIENT SOCKET SPRING TENSION;~~ CLEAN DUST AND DIRT CAREFULLY; ~~CHECK EMISSION OF RECTIFIER TYPE TUBES.~~ PAR. 30b(7)	✓
20	~~INSPECT FILM CUT-OUTS FOR LOOSE PARTS, DIRT, MISALIGNMENT AND CORROSION.~~	
21	INSPECT FIXED CAPACITORS FOR LEAKS, BULGES, AND DISCOLORATION. PAR. 30b(8)	✓
22	~~INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR LOOSE MOUNTINGS, BURNED, PITTED, CORRODED CONTACTS, MISALIGNMENT OF CONTACTS AND SPRINGS; INSUFFICIENT SPRING TENSION; BINDING OF PLUNGERS AND HINGE PARTS.~~	
23	~~INSPECT VARIABLE CAPACITORS FOR DIRT, MOISTURE, MISALIGNMENT OF PLATES, AND LOOSE MOUNTINGS.~~	
24	INSPECT RESISTORS, ~~BUSHINGS, AND INSULATORS,~~ FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE. PAR. 30b(9)	✓
25	~~INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR CORROSION, DIRT AND LOOSE CONTACTS.~~	
26	CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, ~~BLOWERS, RELAY CASES, AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE~~. PAR. 30b(2)	✓
27	INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS. PAR. 30b(6)	✓
28	~~CHECK SETTINGS OF ADJUSTABLE RELAYS.~~	
29	~~LUBRICATE EQUIPMENT IN ACCORDANCE WITH APPLICABLE DEPARTMENT OF THE ARMY LUBRICATION ORDER.~~	
30	~~INSPECT GENERATORS, AMPLIDYNES, DYNAMOTORS, FOR BRUSH WEAR, SPRING TENSION, ARCING, AND PITTING OF COMMUTATOR.~~	
31	CLEAN AND TIGHTEN CONNECTIONS AND MOUNTINGS FOR TRANSFORMERS, ~~CHOKES~~, POTENTIOMETERS, ~~AND RHEOSTATS~~. PAR. 30b(6)	✓
32	INSPECT TRANSFORMERS, ~~CHOKES~~, POTENTIOMETERS, ~~AND RHEOSTATS~~ FOR OVERHEATING ~~AND OIL LEAKAGE~~. PAR. 30b(10)	✓
33	~~BEFORE SHIPPING OR STORING - REMOVE BATTERIES.~~	
34	~~INSPECT CATHODE RAY TUBES FOR BURNT SCREEN SPOTS.~~	
35	~~INSPECT BATTERIES FOR SHORTS AND DEAD CELLS.~~	
36	~~INSPECT FOR LEAKING WATERPROOF GASKETS, WORN OR LOOSE PARTS.~~	
37	MOISTURE AND FUNGIPROOF. PAR. 30b(11)	✓
38	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.	

DA FORM 1 MAY 51 11-239 REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE. e6—18—84382-1

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Figure 13. DA Form 11–239, prepared for use with master stations.

(6) Inspect the terminal boards in the junction box for cracks, dirt, grease, and loose connections.

(7) Inspect the tubes to be sure that the envelopes are not loose or cracked. Inspect the tube socket for cracks.

(8) Inspect all capacitors for leaks, bulges, and discoloration. These symptoms will often indicate trouble in the unit.

(9) Check resistors for cracks, chipping, blistering, discoloration, and loose connections. Check connections for corrosion and dirt.

(10) Check the transformer mounting screws for looseness. Be sure that all connections are secure.

(11) If the unit has been moistureproofed and fungiproofed, check all connections for moisture-fungiproofing.

CHAPTER 5
THEORY

31. Circuit Differences

a. General. Fundamentally, the circuits of all the master stations are similar. If the theory of operation of one type of master station is understood, this knowledge can be adapted to the theory of other types of master station. The main differences between the various types of master stations are in the construction of the talk-listen switch, construction of the impedance switch, type of signaling circuit, and the station capacity. Negligible circuit differences exist between the power and amplifier circuits of the various master stations due to differences in transformers, resistances, tubes, and capacitors. The main circuit differences are discussed in general in *b* through *d* below.

b. Talk-Listen Switches. All talk-listen switches are rotary wafer-type switches (switching between idle, listen, and talking circuits), and are operationally the same. The main difference between the talk-listen switches of the various master stations is in the construction of the wafers and the wiring of the switches. The talk-listen switch wafers (S2) of the LS–124B/FI (fig. 35), LS–124C/FI (fig. 36), LS–125A/FI (fig. 37), LS–126A/FI (fig. 38), and LS–127A/FI (fig. 39) are schematically the same. However, the talk-listen switch wafers (S1) of the LS–128A/FI (fig. 40) and the LS–128B/FI (fig. 41) are different. The circuit and contacts which are closed in the talk, listen, and idle positions of each talk-listen switch are noted on the respective schematic diagram of each master station (figs. 35 through 41).

c. Impedance Switches. Two mechanical types of impedance switches are used on the master stations, rotary wafer-type switches (LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, and LS–127A/FI), and slide type switches (LS–128A/FI and LS–128B/FI). Both types of switches are used to select either the 50- or 500-ohm impedance winding of the amplifier input and output transformer for impedance matching purposes. The contacts which are closed in the 50- and 500-ohm positions of each impedance switch are noted on the respective schematic diagram for each master station (figs. 35–41).

d. Station Capacity. The differences in station capacity (par. 4) have little effect on the theory of operation of the master station. This is primarily a mechanical difference because either more or less line terminals are provided for connection purposes in the junction boxes of master stations having different line capacities. The chief electrical difference is the number of station selector switches connected in parallel on the station selector switch bank.

e. Signaling. Master stations having voice signaling facilities (par. 4) have two-position talk-listen switches (fig. 3) and use the talking circuit for signaling purposes. Master stations having annunciator signaling facilities (LS–128A/FI and LS–128B/FI only) contain an added annunciator signaling circuit and use a three-position talk-listen switch (fig. 2). A buzzer, an annunciator, an additional winding on the power transformer, and an annunciator terminal board are provided for completing the annunciator circuit (par. 37*b*). The annunciator circuit does not affect the other circuits in the master stations but is an added feature.

32. Transmission Circuits, LS–128B/FI

Note. Since the transmission circuits of all the master stations are similar, the transmission paths of the LS–128B/FI are representative of the transmission circuits of the other master stations. For details of the transmission circuits of a specific master station, refer to the appropriate schematic diagram (figs. 35 and 41).

a. Idle Circuit (fig. 14). With talk-listen switch S1 in the idle position, the amplifier circuit is disconnected, the B+ power supply is disconnected, and speaker-microphone LS1 is con-

nected through contacts of the talk-listen switch and impedance switch to the external master station. An amplified voice signal from an external master station is received at the line terminals on the voice terminal board of the master station. The voice signal passes through contacts of operated station selector switch S3, through switch segments and contacts of talk-listen switch S1, and contacts of impedance switch S2 (in the 50Z position), to speaker-microphone LS1. The outgoing signals originate in the speaker-microphone and pass through the idle circuit to the external master station. At the external master station, the voice signal is amplified and passed to the speaker-microphone.

b. Listen Circuit (fig. 15). With talk-listen switch S1 in the listen position, the amplifier is connected to the B+ power supply; the amplifier input is connected to the line from the external station; and the amplifier output is connected to the speaker-microphone. The unamplified voice signal from the external master or remote station enters the master station through line terminals of the voice terminal board. The path is completed through contacts of operated station selector switch S3, contacts of talk-listen switch S1, and contacts of impedance switch S2 to amplifier input transformer T1. The voice signal is amplified and passes through additional contacts of talk-listen switch S1 to speaker-microphone LS1.

c. Talk Circuit (fig. 16). With talk-listen switch S1 in the talk position, the B+ power supply is connected to the amplifier; the amplifier input is connected to the speaker-microphone, and the amplifier output is connected, through the voice line, to the external remote or master station. The voice signal originates at speaker-microphone LS1 and passes through contacts of talk-listen switch S1 to amplifier input transformer T1. The voice signal is amplified and passed through contacts of impedance switch S2, additional contacts of talk-listen switch S1, operated station selector switch S3, line terminals of the voice terminal board and voice line to the external remote or master station.

33. Impedance Matching
(figs. 35–41)

Note. The theory of impedance matching is the same for all the master stations. However, since the reference symbols for the impedance switches and the windings of the amplifier input and output transformers differ between the types of master stations, the impedance switch reference symbols are not used and the transformer windings are referred to as 50- and 500-ohm windings of input and output transformers T1 and

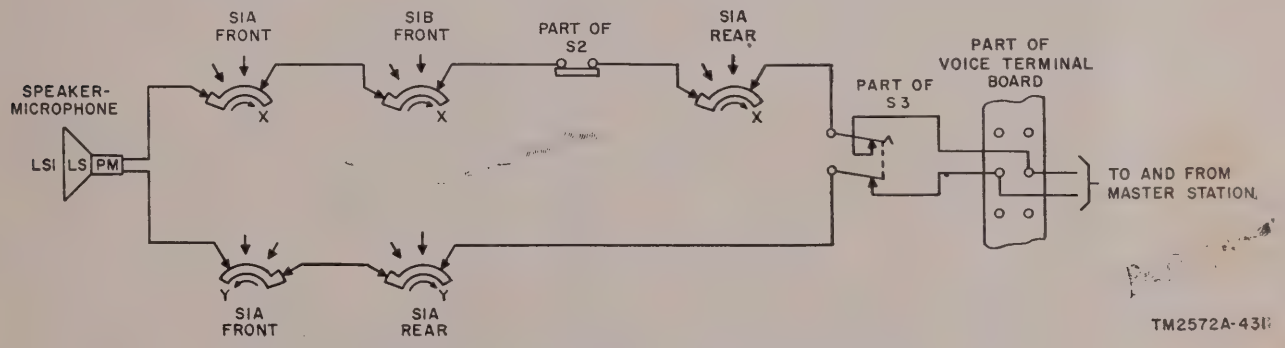


Figure 14. Idle circuit, LS–128B/FI, simplified schematic diagram.

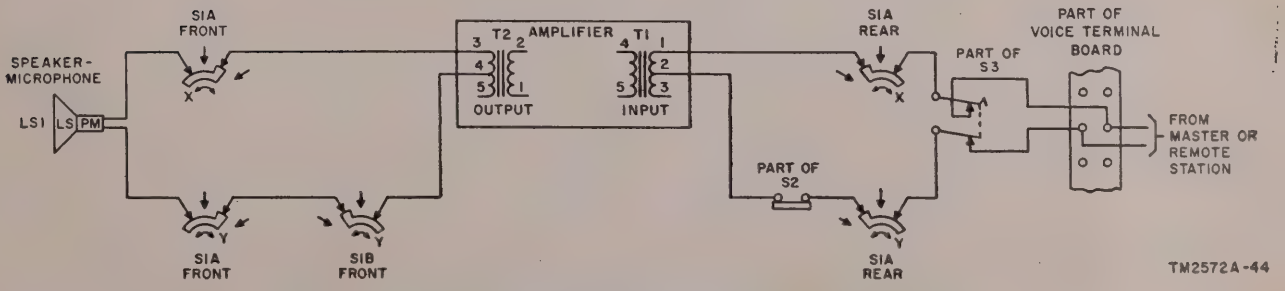


Figure 15. Listen circuit, LS–128B/FI, simplified schematic diagram.

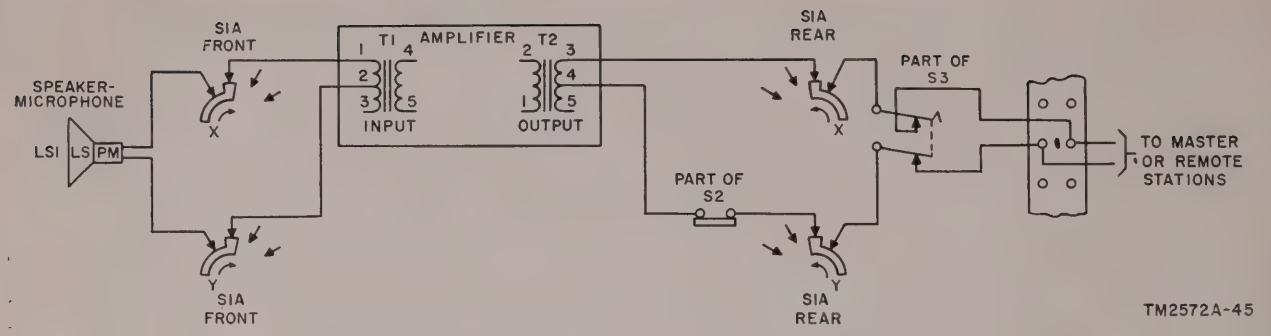


Figure 16. Talk circuit, LS–128/FI, simplified schematic diagram.

T2 respectively. The impedance switches and transformer impedances are indicated on the schematic diagram of each specific master station.

a. To insure a maximum transfer of energy between the interstation lines and the master station amplifier, the input and output impedances of the amplifier must be matched to the impedance of the lines. When a voice signal, weakened by transmission over a long line, is fed into an amplifier of low impedance, low volume and distortion will result. To meet the requirements of all intercommunication systems, the master stations each have a 2-position impedance switch which selects the correct number of turns of transformers T1 and T2 to present either 50- or 500-ohms impedance to the system.

b. The particular input winding of transformer T1 and output winding of transformer T2 connected in the circuit is determined by the position of the talk-listen switch and the setting of the impedance switch. The particular windings connected for use, for the various combinations of impedance and talk-listen switch positions are indicated in the chart below.

Impedance switch position	Talk-listen switch position	Transformer windings in use			
		T1		T2	
50	Listen		50-ohm		50-ohm
500		500-ohm			50-ohm
50	Talk		50-ohm		50-ohm
500			50-ohm	500-ohm	

34. Voltage Amplifier Circuit

a. Voltage Amplifier, LS–128A/FI and LS–128B/FI (figs. 40 and 41). The voice signal appearing across the selected primary of input transformer T1 is stepped up in the secondary winding and coupled to the control grid of voltage amplifier V1 by coupling capacitor C1. Bias voltage is developed by current flowing through grid resistor R7 since the cathode is connected directly to ground. Screen resistor R6 drops the B+ voltage to the proper value for the screen grid which is bypassed by capacitor C2 to provide more stability (degeneration) in the high-gain stage. B+ voltage is applied to the plate through contacts of switch S1B and plate load resistor R5. The amplified signal that appears across plate load resistor R5 is coupled to power amplifier V2 by coupling capacitor C3.

b. Voltage Amplifier, LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, and LS–127A/FI (figs. 35, 36, 37, 38, and 39). The voice signal appearing across the selected primary of input transformer T1 is stepped up in the secondary and impressed upon the control grid of voltage amplifier V1. Control grid current flows during the positive peaks of the alternating voice signal. Bias voltage is developed by current flowing through resistor R1 since the cathode is connected to ground. The voice signal is bypassed around resistor R1 by capacitor C1. Resistors R2 and R3 form a voltage dividing network and furnish the screen grid of V1 with the proper voltage. In addition, resistor R3 acts as a bleeder resistor for the B+ power supply. Capacitor C2 provides a bypass to ground for the screen grid to provide degeneration in the high-gain stage. B+ voltage is applied to the plate through contacts of switch S2 front and plate load resistor R4. The amplified signal that appears across

plate load resistor R4 is coupled to power amplifier V2 by coupling capacitor C3.

35. Power Amplifier Circuit

Note. Power amplifiers V2 in all master stations are similar. The information in this paragraph applies to the LS–128B/FI unless otherwise specified, and is typical of all master stations. For details of a particular master station, refer to the appropriate schematic diagram (figs. 35 through 41).

The output of voltage amplifier V1 (fig. 41) is coupled through capacitor C3 to the control grid of power amplifier V2. In the LS–128B/FI only, capacitor C3 is connected through contacts of talk-listen switch S1 (talk or listen contacts of S1B rear) to potentiometer R4 (volume control). In all other master stations, capacitor C3 is connected directly to the volume control (R4 in the LS–128A/FI and LS–128B/FI; R5 in all other master stations). Volume control R4 serves as a voltage divider and varies the signal applied to the control grid. The power amplifier is self-biased by resistor R3. The output, from the plate of power amplifier V2, is passed to the primary winding of output transformer T2 and coupled to the secondary winding. From the secondary of transformer T2, the signal passes through contacts of talk-listen switch S1 to speaker-microphone LS1 when talk-listen switch S1 is in the listen position, or to an external master or remote stations when talk-listen switch S1 is in the talk position.

36. Power Supply Circuit
(figs. 35–41)

a. Rectifier V3. Rectifier tube V3 in all master stations (type 6X4 in the LS–128B/FI and type 6X5 in all other master stations) is a conventional duodiode full-wave rectifier with a resistance-capacitance (RC) type filter on the output.

b. Power Transformer Input. When the power switch (S4 on the LS–128A/FI and LS–128B/FI; S3 on all other master stations) is closed, power is applied to the primary winding of power transformer T3 through fuse F1. Capacitor C8 on all master stations except the LS–128A/FI (fig. 40) acts as a filter capacitor and shunts line noise to ground. The LS–128A/FI contains no such filter capacitor.

c. Power Transformer Output.

(1) *Low voltage filament circuit winding.* The filament circuit winding steps down the 110- to 125-volt input voltage to 6.3 volts to provide heater voltage for the three tubes and operating voltage for the pilot lamp. One winding of the transformer is used on all master stations except the LS–128A/FI which has two windings; one winding supplies heater voltage for rectifier tube V3 only, and other winding supplies heater voltage for the voltage and power amplifiers (V1 and V2, respectively) plus operating voltage for pilot lamp E2.

(2) *Low voltage annunciator circuit winding (LS–125A/FI and LS–127A/FI only).* The annunciator circuit winding steps down the 110- to 125-volt input voltage to 12 volts in the LS–125A/FI and to 12.6 volts in the LS–127A/FI for operation of the annunciator circuits contained in these units. The other master stations do not have an annunciator circuit winding on power transformer T3.

(3) *High voltage winding.* The 110- to 125-volt input voltage is stepped up to 400 volts in the LS–124B/FI, LS–124C/FI, and LS–126A/FI; to 500 volts in the LS–125A/FI; to 480 volts in the LS–127A/FI; to 600 volts in the LS–128A/FI; and to 440 volts in the LS–128B/FI. The stepped-up output voltage of the high voltage winding is fed across the two plates of rectifier tube V3 for rectification. However, since the winding is center tapped and connected to ground, only one-half of the high voltage winding output is applied to each plate on alternate half-cycles of the alternating current.

d. Filter. On all master stations except the LS–128B/FI (fig. 41), where the rectifier cathode is connected directly to the filter, the rectified voltage from the cathode of rectifier V3 passes through contacts of the talk-listen switch, when positioned in either the talk or listen position to the RC filter which smooths the ripple voltage. In all master stations except the LS–128A/FI and LS–128B/FI, the filter is composed of resistor R7 and capacitors C5 and C6. In the LS–128A/FI, the filter is composed of resistor R8 and capacitors C4 and C5; the filter of the LS–128B/FI is composed of resistor R8 and three-section electrolytic capacitor C4.

37. Signaling Circuit

a. Voice Signaling Circuit. The voice signaling circuit of master stations not equipped with annunciators is the talk circuit (par. 32*c*), when signaling an external remote or master station; or the idle circuit (par. 32*a*), when receiving a signal from an external master station.

b. Annunciator Signaling Circuit.

(1) *General.* The annunciator signaling circuit of the LS–125A/FI and LS–127A/FI are similar. The following information ((2) and (3) below) applies to the LS–125A/FI (fig. 37), but is typical of the LS–127A/FI (fig. 39) annunciator circuit.

(2) *Signaling between master stations* (fig. 17). In called master station number 1, the 12-volt ac annunciator circuit winding of transformer T3 is connected through associated buzzer I 1 and an annunciator (solenoid) to a terminal on the annunciator terminal board. The circuit extends to master station number 2 through one conductor of the annunciator signaling line and terminates at contact 2 of station selector switch S4; contact 1 is connected to chassis ground. When S4 of master station number 2 is depressed, contacts 1 and 2 close to connect the circuit to ground on the chassis of master station number 2. The return circuit to the grounded annunciator circuit winding of master station number 1 is through the common ground connected between the voice terminal board and hence to the chassis of the two master stations. The buzzer sounds and the annunciator plunger protrudes from the panel at called master station number 1. When signaling between master stations, power for the signaling circuit is always supplied by the called master station.

(3) *Signaling between master and remote stations* (fig. 18). In all cases, a remote station is signaled from any of the master stations by voice signaling (*a* above). Remote stations can signal master stations *only* when the remote station is equipped with a push switch and when the master station is equipped for annunciator signaling. The annunciator circuit to a remote station equipped with a push switch, is from the 12-volt winding of power transformer T3, through buzzer I 1, and the annunciator to a right-hand terminal on the annunciator terminal board. The circuit is extended to the remote station through one conductor of the annunciator signaling line to the contacts of the push switch. When the push switch is operated, the contacts close and the return path is through the other conductor of the annunciator signaling line to the left-handed terminal on the annunciator terminal board and then to chassis ground at the voice terminal board. With the circuit complete, the buzzer and annunciator operate.

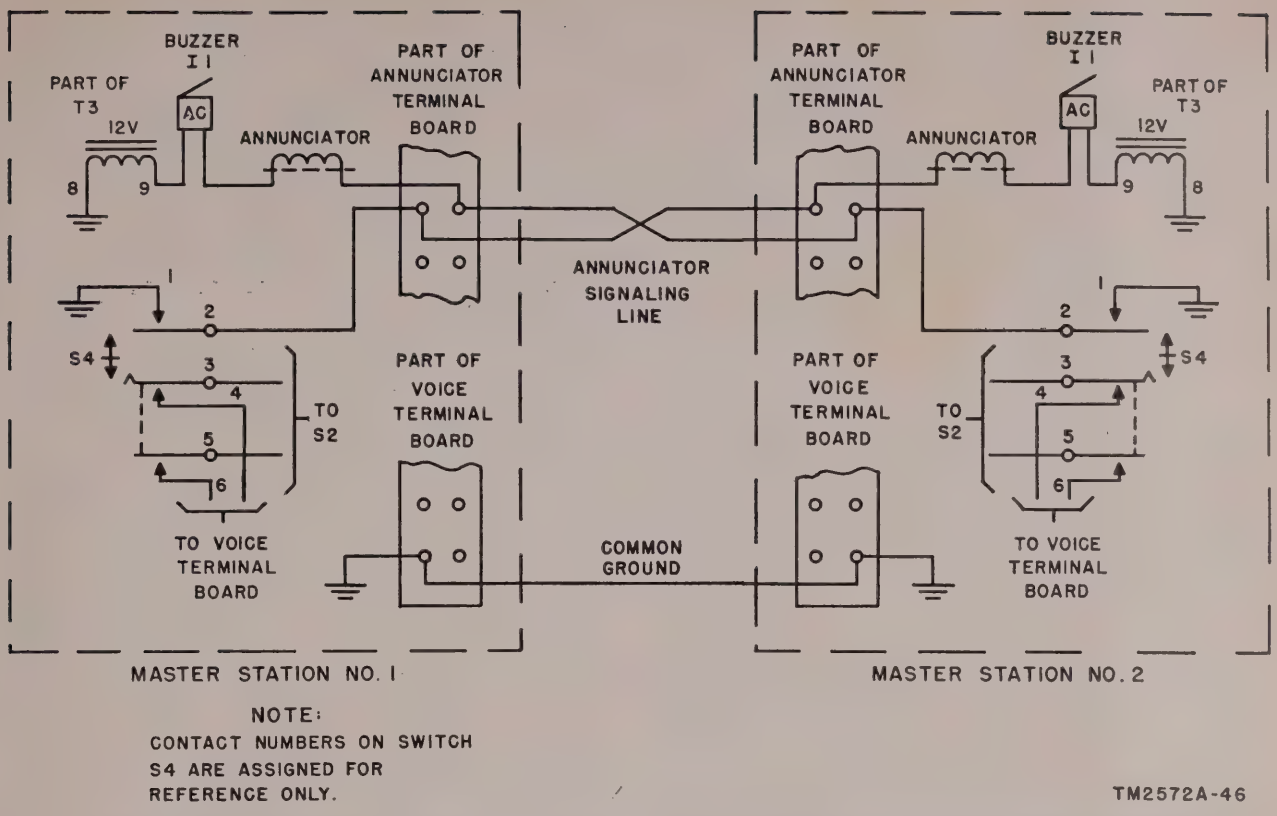


Figure 17. Intercommunicating Station LS–125A/FI, annunciator signaling circuit connected between two master stations, simplified schematic diagram.

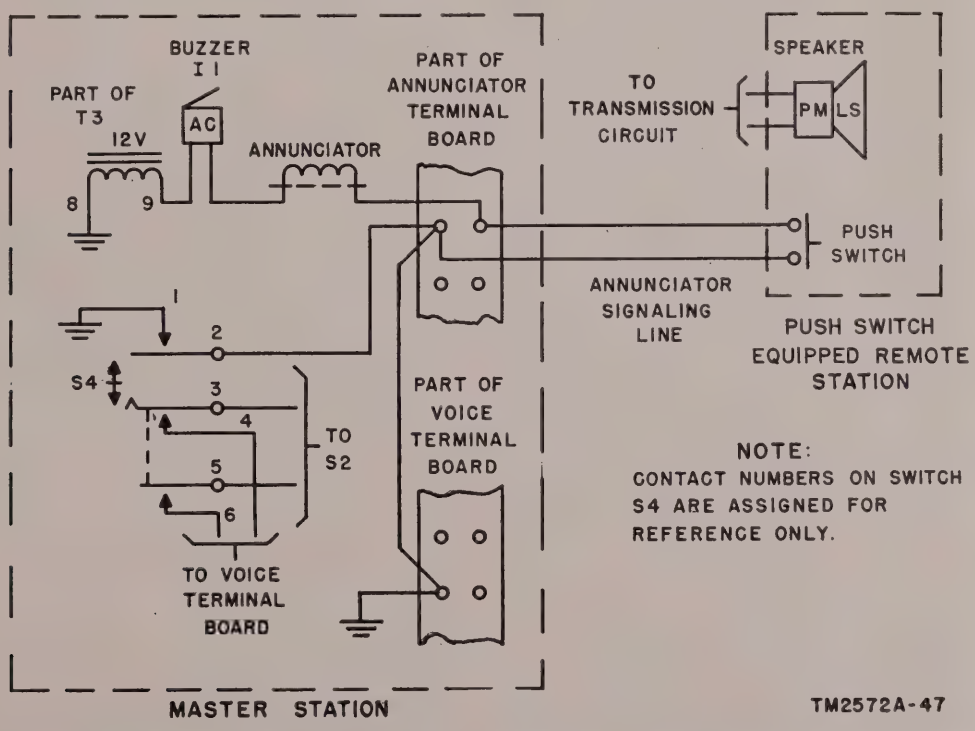


Figure 18. Intercommunicating Station LS–125A/FI, annunciator signaling circuit connected to remote station equipped with push switch, simplified schematic diagram.

CHAPTER 6
FIELD MAINTENANCE

Section I. TROUBLESHOOTING

38. Troubleshooting Procedures

a. General. The first step in servicing a faulty master station is to determine whether the trouble is internal or external. An external trouble is a trouble in the line or cable connected between stations or in the external remote stations (par. 40). An internal trouble is a trouble in the master station.

b. Line Faults. Trouble location in faulty interstation cables and lines is beyond the scope of this manual but is a common troubleshooting procedure. Open, shorted, and grounded conductors in circuits between stations are indicated by the inability of the operator to signal or converse with one or more external master or remote stations. To find trouble in paired interstation lines (drop wire, bridle wire, or inside house wire), refer to TM 11–468, Substation Maintenance. To locate line troubles in interstation cables, refer to TM 11–372, Telephone Cable Splicing.

c. Master Station Troubles. Listed below are a group of tests arranged to simplify and reduce unnecessary work and aid in tracing trouble to a particular part. Follow the procedures carefully in the order given:

(1) *Visual inspection.* Visual inspection (par. 39) will aid in locating visible troubles. Through this inspection alone, the repairman frequently may discover the trouble or determine the circuit in which the trouble exists. This inspection is valuable in avoiding additional damage, which might occur through improper servicing methods, and in forestalling future failures.

(2) *Checking for shorts.* If the visual inspection indicates the possibility of a short circuit, check the amplifier circuits for shorts (par. 43) before power is applied to the unit for the operational test ((3) below). Power applied to a shorted B+ circuit can cause damage to other circuit components.

(3) *Operational test.* Operational tests frequently indicate the general location of trouble. In many instances, the information gained will determine the exact nature of the fault. All symptoms must be interpreted in relation to one another. To perform an operational test on the master station, use the equipment performance check list (par. 27).

(4) *Voltage and resistance measurements.* Measurements of voltage and resistance (par. 45) are helpful in isolating a trouble after it has been determined that trouble exists in a particular component or circuit.

(5) *Troubleshooting chart.* The trouble symptoms listed in this chart (par. 47) will aid greatly in determining the type and location of a trouble.

(6) *Intermittent troubles.* In all these tests, the possibility of intermittent trouble conditions cannot be overlooked. If present, this type of trouble will sometimes appear if the equipment is tapped or jarred. It is also possible that intermittent line troubles will exist. A common trouble is a loose connection in the junction box. Check all wiring for loose connections by carefully applying a small amount of pressure to the suspected wire and components with an insulated tool.

39. Visual and Electrical Inspection

a. Fuses and Pilot Lamps. Common troubles are burned out fuses and pilot lamps. Before troubleshooting, make the following checks:

(1) Turn the master station on and check

the pilot lamp to see whether or not it is lighted. If the pilot lamp does not light, remove the fuse (par. 49) and test for continuity with Multimeter TS–352/U. If the fuse is good, replace it and see whether or not the tubes are lit. If the tubes are lit, check the pilot lamp ((2) below).

(2) To check the pilot lamp, remove it (par. 50, 51, or 52) and test for continuity with Multimeter TS–352/U. Replace faulty lamps.

b. Chassis Inspection. Remove the chassis from the master station (par. 15*a*). Check for loose connections. Inspect resistors and capacitors for discoloration and other signs of overheating. Inspect the wiring for indications of burned insulation ((3) below). These symptoms are good indications of the presence of short circuits. Before applying power to the amplifier, make the applicable checks and repairs indicated below if one of these symptoms is present:

(1) *Resistor test.* Remove the affected resistor. Check the MIL-STD resistor color code chart (fig. 34) for the resistance of the resistor. Measure the resistance with Multimeter TS–352/U. If the resistor does not meet the tolerances indicated, replace it with a new one. If overheating has obliterated the color code use the schematic diagram and replace with tolerance ±10 percent.

(2) *Capacitor test.* Remove one conductor of the capacitor suspected of being faulty from the circuit. Test for continuity with the TS–352/U with the ohmmeter adjusted to one of its lower scales (RX10 or RX100). The reading should be infinite. If the needle does not read infinity the capacitor is leaky and must be replaced. Capacitor color codes are shown in figure 33.

Note. The use of the capacitor test ((2) above) is adequate because of the allowable amplifier frequency response (par. 4).

Note. This test does not apply to the electrolytic filter capacitors (par. 43*b*(3)).

(3) Replace wiring having burned insulation. Inspect carefully the area of the burn to determine the cause of the trouble.

(4) Carefully resolder loose connections.

c. Station Selector Switch Panel. Check the station selector switches for broken or loose wiring; repair any wiring found defective. Check the contact springs to be sure that good contact is made and that the contact springs are not bent. Clean dirty contacts with Cleaning Compound and adjust faulty contact springs.

d. Junction Box Wiring. Inspect the wiring in the junction box for loose line terminal connections and junction box cable connections. Resolder loose wiring.

e. Junction Box Cable. Kinks in the junction box cable will cause broken conductors. If broken junction box cable conductors are suspected, check the conductors for continuity by moving the master station so that the station selector switch panel is near the junction box, and placing one test lead of the TS–352/U on the station selector switch end of each conductor and the other test lead on the junction box end of each conductor. A near zero reading on the ohmmeter indicates a good cable conductor.

40. Remote Station and Speaker-Microphone Troubleshooting

When a check for an external trouble reveals that the interstation line to a remote station is not in trouble, disconnect the line from the speaker-microphone at the remote station. Check the speaker-microphone for continuity with the TS–352/U. The reading on the ohms scale should be 40, ±5 ohms. A reading of less than 35 ohms indicates a short in the windings of the voice coil. An infinite reading indicates an open circuit. The speaker-microphone of a master station is also checked in this manner except that the leads from the chassis to the speaker-microphone, instead of the line wires, are disconnected.

41. Troubleshooting Data

The material supplied in this manual will aid in the rapid location of faults. Consult the following troubleshooting data:

Fig. or par. No.	Title
Fig. 14	Idle circuit, LS–128B/FI, simplified schematic diagram.
Fig. 15	Listen circuit, LS–128B/FI, simplified schematic diagram.
Fig. 16	Talk circuit, LS–128B/FI, simplified schematic diagram.

Fig. or par. No.	Title
Fig. 17	Intercommunicating Station LS–125A/FI, annunciator signaling circuit connected between two master stations, simplified schematic diagram.
Fig. 18	Intercommunicating Station LS–125A/FI, annunciator signaling circuit connected to remote station equipped with push switch, simplified schematic diagram.
Fig. 20	Intercommunicating Stations LS–124B/FI, LS–124C/FI, and LS–126A/FI, top view of chassis showing location of parts.
Fig. 21	Intercommunicating Stations LS–124B/FI and LS–124C/FI, bottom view of chassis showing location of parts.
Fig. 22	Intercommunicating Station LS–125A/FI, top view of chassis showing location of parts.
Fig. 23	Intercommunicating Station LS–125A/FI, bottom view of chassis and interior view of junction box showing location of parts.
Fig. 24	Intercommunicating Station LS–126A/FI, bottom view of chassis showing location of parts.
Fig. 26	Intercommunicating Station LS–127A/FI, top view of chassis showing location of parts.
Fig. 27	Intercommunicating Station LS–127A/FI, bottom view of chassis showing location of parts.
Fig. 28	Intercommunicating Station LS–128A/FI, top view of chassis showing location of parts.
Fig. 29	Intercommunicating Station LS–128A/FI, bottom view of chassis showing location of parts.
Fig. 30	Intercommunicating Station LS–128B/FI, top view of chassis showing location of parts.
Fig. 31	Intercommunicating Station LS–128B/FI, bottom view of chassis showing location of parts.
Fig. 32	Intercommunicating Station LS–128B/FI, interior view of cabinet showing location of station selector switches and speaker-microphone.
Fig. 33	MIL-STD capacitor color codes.
Fig. 34	MIL-STD resistor color codes.
Fig. 35	Intercommunicating Station LS–124B/FI, schematic diagram.
Fig. 36	Intercommunicating Station LS–124C/FI, schematic diagram.
Fig. 37	Intercommunicating Station LS–125A/FI, schematic diagram.
Fig. 38	Intercommunicating Station LS–126A/FI, schematic diagram.
Fig. 39	Intercommunicating Station LS–127A/FI, schematic diagram.
Fig. 40	Intercommunicating Station LS–128A/FI, schematic diagram.
Fig. 41	Intercommunicating Station LS–128B/FI, schematic diagram.

Fig. or par. No.	Title
Par. 27	Equipment performance check list.
Par. 38	Troubleshooting procedures.
Par. 39	Visual and electrical inspection.
Par. 40	Remote station and speaker-microphone troubleshooting.
Par. 42	Tube testing and replacement.
Par. 43	Checking for shorts.
Par. 44	Annunciator circuit troubleshooting (LS–125A/FI and LS–127A/FI only).
Par. 45	Voltage and resistance measurements.
Par. 46	Checking for excessive hum.
Par. 47	Troubleshooting chart.

42. Tube Testing and Replacement

a. Instrument Testing.

(1) When a tube defect is suspected, remove the tube and test it with Electron Tube Test Set TV–7/U. Remove the tube by exerting a straight steady pull. The tubes in the amplifiers of some of the master stations are covered with tube shields which must be removed before the tube can be pulled from its socket. In addition, some master stations use miniature tubes; others use standard size tubes.

Caution: *Do not rock or rotate* the top of a miniature tube when removing it from its socket; withdraw it carefully and *pull straight out.* The external pin and the wire lead sealed in the glass base are dissimilar metals which are butt-welded together where the pin appears to enter the glass. Rocking or rotating the tube causes bending which may break the weld or cause a high-resistance or intermittent open to develop at the joint.

(2) For tube location information, refer to the appropriate illustration (fig. 20, 22, 26, 28, or 30) showing the top view of the master station chassis.

b. Checking by Tube Substitution. When an Electron Tube Test Set TV–7/U (tube tester) is not available, replace a suspected tube with a new tube. If the amplifier remains inoperative, remove the new tube and put back the original tube. Repeat this procedure until the defective

tube is located. Do not discard the defective tube until it has been tested with the tube tester.

c. Discarding Tubes.

(1) Discard tubes when the tube testers show that tubes are defective. Tubes may also be discarded when the tube defect is obvious; for example, a broken envelope or filament.

(2) Do not discard tubes merely because they have been used for a specified length of time. Satisfactory operation in a circuit is the final proof of tube quality. The tube in use may work better than a new one.

(3) Do not discard tubes merely because they fall on or slightly above the minimum acceptable value when checked in the tube tester. A certain percentage of new tubes fall near the low end of their acceptable range of tube specification and therefore start their operational life at a value close to the tube tester *retention limit.* These tubes may provide satisfactory performance throughout a long period of operational life at this *near limit value.*

43. Checking for Shorts

a. Short circuits can occur externally in either the interstation lines and cable or internally within the master station. Shorts in interstation lines and cables will disrupt service to external remote or master sections. Shorts in master stations can occur in the junction box cable, station selector switch wiring, junction box wiring, and the amplifier.

b. A short circuit in either the B+ or filament circuits will sometimes be apparent by the arcing and smoking that occurs where the component is shorted to chassis ground. A short in the B+ circuit can cause other circuit components such as resistors to burn out because of the heavy current drain caused by the short. In many cases the short in the amplifier can be found by visual inspection (par. 39*b*). When the short is not revealed by visual inspection, the following method is suggested:

(1) Remove the chassis from the master station (par. 15*a*).

(2) Using the appropriate schematic diagram (figs. 35, 36, 37, 38, 39, 40 or 41) as a guide, check the circuit for continuity with Multimeter TS–352/U. Disconnect the leads to parallel circuit paths and measure the resistance of each circuit individually from chassis ground, if possible. A close approximation of the circuit resistance of each circuit path can be made by observing the values of the resistors on the schematic diagram and adding the resistances in a particular path. If the resistance through a particular resistor or a series of resistors measures lower than expected, the possibility of a short in that circuit exists. Perform individual resistance measurements of the components in the circuit under test.

(3) Check the master station electrolytic filter capacitor (filter capacitor) for shorts by disconnecting the B+ connections from the capacitor terminals without breaking contact with other connected wires. Apply power to the unit. If the short disappears, the filter capacitor is shorted and must be replaced. If the short is not cleared by this test, replace the capacitor connections and continue with the procedure described in (4) below. The filter capacitors for each master station are indicated in the chart below:

Master station	Filter capacitor
LS–124B/FI	
LS–124C/FI	
LS–125A/FI	C5 and C6
LS–126A/FI	
LS–127A/FI	
LS–128A/FI	C4 and C5
LS–128B/FI	C4 (sections A and C)

Note. When testing the filter capacitor for shorts, a noticeable increase in hum will result. This is not an indication of additional trouble.

(4) Sometimes a short in a circuit can be located by conducting voltage measurements of tube sockets in the amplifier circuit. This method should be used when a short is indicated in the amplifier circuit and all other methods fail ((2) and (3) above). *Power applied*

to a short circuit can cause damage to the rectifier tube. Voltage measurements for most of the master station amplifiers are provided in paragraph 45.

44. Annunciator Circuit Troubleshooting (LS–125A/FI and LS–127A/FI Only)

a. Buzzer. Failure to receive either a visual or an audible signal on an incoming call indicates trouble in the annunciator circuit. If the annunciator plunger operates but the buzzer does not sound, the buzzer is either out of adjustment or defective. When neither a buzzer signal or an annunciator signal is received, and open or shorted annunciator circuit is indicated. Use the TS–352/U and the appropriate schematic diagram (fig. 37 or 39) to conduct a continuity test on the circuit. The open or short could be internal in the master station or external on the interstation lines. Check the external wiring first.

b. Annunciator. When the buzzer sounds but the annunciator plunger does not operate, check for the following probable troubles:

(1) *Defective solenoid.* Check the resistance of a solenoid known to be in good condition. Measure the resistance of the suspected solenoid. A low resistance indicates a shorted winding. A high resistance indicates an open.

(2) *Low line voltage.* Check the line voltage with the TS–352/U and compare it with the voltage indicated on the appropriate schematic diagram (fig. 37 or 39). The annunciator circuit should function properly when the line voltage is within ±10 percent of the voltage shown.

(3) *High annunciator signaling line loop resistance.* Measure the line loop resistance of the signaling line. It should not exceed 30 ohms. (Sometimes poor splices in repaired lines will add excessive resistance to the line.)

c. Short. A simple test for a short is conducted by operating the station selector switch of the suspected circuit in the defective master station to the down position. If the annunciator and buzzer at the defective master station operate, and no signal is received by the called station, a short circuit is indicated.

45. Voltage and Resistance Measurements

a. Voltage Measurements. The following charts list the tube socket voltages for tubes V1, V2, and V3. All voltage readings are taken from ground with a 20,000-ohms-per-volt voltmeter such as the TS–352/U. Operate the talk-listen switch to the listen position before taking voltage readings.

(1) *LS–124B/FI, LS–124C/FI, LS–125A/FI and LS–126A/FI.*

Tube pin No.	Voltage reading (in dc volts unless otherwise specified)		
	V1	V2	V3
1	0	0	0
2	0	0	0
3	0	240	200 dc (250 dc, LS–125A/FI, only).
4	Not measured	235 Not measured	No pin 200 dc (250 dc,
5	0		LS–125A/FI, only).
6	14	No pin	No pin
7	6.3 (ac)	6.3 (ac)	6.3 (ac)
8	16	12	250

(2) *LS–128A/FI.*

Tube pin No.	Voltage reading (in dc volts unless otherwise specified)		
	V1	V2	V3
1	0	0	0
2	0	0	0
3	0	225	300 (ac)
4	Not measured	230	No pin
5	0	0	300 (ac)
6	0	No pin	No pin
7	6 (ac)	6 (ac)	6 (ac)
8	90	16	320

(3) *LS–128B/FI.*

Tube pin No.	Voltage reading (in dc volts unless otherwise specified)		
	V1	V2	V3
1	.8	1	220 (ac)
2	0	13	No connection
3	0	0	0
4	6.3 (ac)	6.3 (ac)	6.3 (ac)
5	57	218	No connection
6	30	220	220 (ac)
7	0	1	250

b. Resistance Measurements. The resistance measurements for the LS–124B/FI, LS–124C/FI, LS–125A/FI, and LS–127A/FI must be made by removing suspected resistors from the circuit and using the TS–352/U to measure resistance on an individual basis. The tube socket resistance measurements for the LS–128A/FI and LS–128B/FI are indicated in (1) and (2) below.

(1) *LS–128A/FI.*

Tube pin No.	Resistance readings[a] (in ohms unless otherwise specified)		
	V1	V2	V3
1	0	0	0
2	0	0	0
3	0	50K min	200
4	3.9 meg	50K	no pin
5	0	500K	200
6	50K	no pin	no pin
7	0	0	0
8	50K min	330	50K

[a] The measurements are made with the volume turned fully on and the power cable disconnected from the power supply. All resistance values are measured from chassis ground and in some instances include the resistance of filter capacitors C4 and C5.

(2) *LS–128B/FI.*

Tube pin No.	Resistance readings[a] (in ohms unless otherwise specified)		
	V1	V2	V3
1	10 meg	250K	180
2	0	270	No connection
3	0	0	0
4	0	0	0
5	[b]500K	[b]1,750	No connection
6	1.5 meg	[b]0	190
7	0	250K	[b]1,500

[a] The measurements are made with the volume turned fully on and the power cable disconnected from the power supply. All resistance values are measured from chassis ground.

[b] These resistance values are measured from filter capacitor C4.

46. Checking for Excessive Hum

a. General. Excessive hum in the master station can be caused by either external or internal sources. To determine whether the trouble is internal or external, restore all station selector switches (including the home switch) to the horizontal position and operate the talk-listen switch to the listen position. If the hum disappears, the trouble is external (*b* below); if the hum is still present, the trouble is internal (*c* below).

b. External Trouble. Hum from external sources can be caused by the interstation lines or cables running near power lines, flourescent fixtures, or other devices having a varying magnetic field. To locate and correct the trouble, proceed as follows:

(1) Operate the talk-listen switch to the listen position.

(2) Operate and restore each station selector switch. Note the station or stations from which excessive hum is detected.

(3) To locate the trouble, trace the faulty lines to determine where they pass near electrical lines or devices that are capable of inducing line noise. At each suspected trouble spot, remove the fasteners that attach the line to its support. Move the line at least 1 foot away from the suspected trouble spot. Check the hum; if there is a noticeable decrease in hum, reroute the line.

c. Internal Trouble. The most common causes of amplifier hum are listed below. Make the checks in the order given to locate the cause of the trouble.

(1) Locating a flourescent desk lamp near the speaker-microphone will sometimes cause a hum. To check for this trouble, turn off the lamp or move the master station to see whether the hum decreases.

(2) The position of the power plug in the power receptacle will sometimes cause hum in the master station. To check for this trouble, reverse the position of the power plug.

(3) A leaky, or open filter capacitor (par. 43*b*(3)) is a common cause of hum in the master station. To check the electrolytic filter capacitor, connect a spare in parallel with the suspected capacitor and turn on the master station. If the hum decreases, the capacitor is leaky and must be replaced (par. 53 or 54).

(4) Other possible causes of master station hum are loose grid connections of V1, resistors of decreased resistance in the amplifier and leaky capacitors in the first stage. To find these troubles use the inspection procedure outlined in paragraph 39.

47. Troubleshooting Chart

The following chart is supplied as an aid in locating troubles in the master stations and the interstation lines and cables. The chart lists the symptoms that the repairman observes, either audible or visual, while locating trouble. By following the chart in the order presented, trouble can be quickly located. If previous operational checks indicate the presence of one of the symptoms listed below, proceed with that step immediately. If no operational symptoms are known, proceed step by step through the chart to locate the trouble. All checks outlined in the chart are to be conducted with power applied to the unit except where resistance measurements are required.

Caution: If a short circuit is indicated, turn the master station off and check for a short circuit before proceeding with additional troubleshooting procedures.

Symptom	Probable cause	Correction
1. Unit turned on but pilot lamp does not light.	*a.* Master station not connected to ac power source.	*a.* Plug power cord into 115-volt ac power source.
	b. Open fuse F1.	*b.* Test and replace defective fuse (par. 39*a*(1)).
	c. Burned-out pilot lamp (E1 in LS–125A/FI, LS–127A/FI, LS–128B/FI; E2 in LS–124B/FI, LS–124C/FI, LS–126A/FI, and LS–128A/FI).	*c.* Test pilot lamp and replace if defective, par. 39*a*(2)).
2. Pilot lamp lights but master station is dead.	*a.* Defective rectifier tube V3.	*a.* Test tube V3; replace if defective (par. 42).
	b. Shorted filter capacitor (C5 and C6 in LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, and LS–127A/FI; C4 and C5 in LS–128A/FI; C4 (section A and C) in LS–128B/FI.	*b.* Check filter capacitor (par. 43*b* (3)) and replace if defective (par. 53 or 54).
	c. Defective voltage amplifier V1 or power amplifier V2.	*c.* Test tubes; replace if defective (par. 42).
	d. Defective speaker-microphone LS 1.	*d.* Replace defective speaker-microphone (par. 63 or 64).
	e. Defective talk-listen switch S2 (S1 on the LS–128A/FI and LS–128B/FI).	*e.* Check talk-listen switch for dirty or bent contacts. Replace if defective (par. 57 or 58).
	f. Open capacitor C3 or volume control R5 (R4 on LS–128A/FI and LS–128B/FI only).	*f.* Replace faulty capacitor of volume control (par. 55 or 56).
3. Noisy under all operating conditions.	*a.* Installed close to fluorescent fixture or other apparatus having strong magnetic field.	*a.* Relocate master station or troublesome apparatus (par. 46*c*(1)).
	b. Defective speaker-microphone.	*b.* Replace speaker-microphone (par. 63 or 64).
	c. Loose connections in master station lines.	*c.* Isolate trouble and make necessary repairs (par. 38*b*).
4. Noisy in talk and listen position of talk-listen switch.	*a.* Noisy tube (V1 or V2).	*a.* Check tubes V1 and V2. Replace if defective (par. 42*a*(2)).
	b. Corrosion or dirt on contacts of talk-listen switch S2 (S1 on LS–128A/FI and LS–128B/FI only).	*b.* Clean or replace talk-listen switch (par. 57 or 58).
5. Excessive hum.	*a.* Power plug reversed.	*a.* Reverse plug at ac power source.
	b. Defective tube.	*b.* Test all tubes and replace if defective (par. 42).

Symptom	Probable cause	Correction
	c. Open or leaky filter capacitors (C5 or C6 in LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, and LS–127A/FI; C4 and C5 in the LS–128A/FI; C4 (section A and C) in the LS–128B/FI).	*c.* Check filter capacitor (par. 46*c*(3)) and replace if defective (par. 53 or 54).
	d. Induction from adjacent power cables.	*d.* Check interstation lines and reroute if necessary (par. 38*b*).
6. Whistling or regeneration in talk or listen position of talk-listen switch.	*a.* Capacitor C2 open.	*a.* Replace capacitor.
	b. Leaky filter capacitors (C5 or C6 in LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, and LS–127A/FI; C4 and C5 in the LS–128A/FI; C4 (sections A and C) in the LS–128B/FI).	*b.* Check filter capacitors (par. 46*c*(3)) and replace if defective (par. 53 or 54).
7. Distortion and low volume in talk and listen position of talk-listen switch.	*a.* Defective voltage amplifier V1 or power amplifier V2.	*a.* Check tubes and replace if defective (par. 42).
	b. Capacitor C3 leaky.	*b.* Check capacitor and replace if defective (par. 39*b*(2)).
	c. Capacitor C1 open.	*c.* Check capacitor and replace if defective.
	d. Speaker voice coil loose and rubbing in air gap.	*d.* Center voice coil. Replace speaker-microphone (par. 63 or 64).
8. Buzzer or annunciator inoperative (LS–125A/FI and LS–127A/FI only).	*a.* Defective buzzer I 1.	*a.* Adjust or replace buzzer (par. 66).
	b. Defective annunciator coil.	*b.* Check annunciator (par. 44*b*(1)). Replace if defective (par. 67).
	c. Line loop resistance exceeds 30 ohms.	*c.* Check line loop resistance (par. 44*b*(3)).
	d. Trouble in annunciator signaling line.	*d.* Check line and make repairs (par. 38*b*).
9. Unable to signal called master station with annunciator signaling (LS–125A/FI and LS–127A/FI only).	*a.* Defective station selector switch S4.	*a.* Adjust or replace station selector switch (par. 60).
	b. Common ground lead open between master stations.	*b.* Check common ground lead for continuity and repair by splicing broken conductors.
	c. Annunciator circuit at called master station faulty.	*c.* Check annunciator circuit (par. 44).
10. Master station operative but no voice communication with one or more connected master or remote station.	*a.* Defective station selector switch S4 (S3 in LS–128A/FI and LS–128B/FI only).	*a.* Adjust or replace station selector switch (par. 59, 60 or 61).
	b. Trouble in voice line.	*b.* Check and repair line (par. 38*b*).
	c. Loose connection in junction box.	*c.* Check wiring. Resolder loose connections.
11. Communication possible only when talk-listen switch is in idle position and connected master station manipulates. No communication with remote stations.	*a.* Burned-out fuse F1.	*a.* Check and replace fuse (par. 39*a*).
	b. Defective talk-listen switch S2 (S1 on the LS–128A/FI and LS–128B/FI).	*b.* Check talk-listen switch and clean, adjust or replace as necessary (par. 57 or 58).
	c. Defective tube V1, V2, or V3.	*c.* Check tubes (par. 42). Replace defective tubes.
	d. Open circuit in amplifier circuit between input transformer T1 and output transformer T2.	*d.* Check amplifier circuit for continuity.

Symptom	Probable cause	Correction
12. Remote station receives distorted speech and low volume.	*a.* Defective speaker-microphone.	*a.* Check speaker-microphone and replace if defective (par. 63 or 64).
	b. Impedance switch S1 (S2 on LS–128A/FI and LS–128B/FI only) improperly positioned.	*b.* Check resistance of voice line (par. 15) and reset impedance switch.

Section II. REPAIRS

48. Parts Replacement

a. General. All resistors and most of the capacitors are readily accessable on the amplifier chassis and can be easily replaced by unsoldering the connections and replacing the part. The replacement of parts requiring disassembly procedures are explained in paragraphs 49 through 67.

b. Techniques. When replacing parts in the master stations, observe the following precautions and techniques:

(1) Before a part is unsoldered, note the position of the leads. If the part has a number of connections, tag each lead.

(2) When removing a part, be careful not to damage other leads or components by pushing or pulling them out of the way.

(3) Do not allow drops of solder to fall into contacts or other parts within the set; they may cause short circuits.

(4) Solder all joints carefully. A poorly soldered joint will cause faulty operation and may cause trouble that is difficult to locate.

(5) Before replacing any parts remove the power plug from the ac power source. Before touching a part, short it to chassis ground.

49. Replacing Fuse

a. The fuse (fig. 20, 22, 26, 28, or 30) for each master station is located on the rear of the chassis and is readily accessible without removing the back panel from the master station. Typical fuse locations are shown in figures 19 and 25, since the master station chassis are not shown removed from the cabinet.

b. To remove the fuse, turn the fuse holder cap counterclockwise until it is free; pull out the cap. In some of the master stations the fuse will come out with the cap and may be pulled free. In other master stations the fuse will remain in the fuse holder and can be easily grasped and pulled from the fuse holder.

c. Insert the new fuse and replace the fuse holder cap. Lock the fuse holder cap in place by turning it clockwise.

50. Replacing Pilot Lamp E2 (LS–124B/FI, LS–124C/FI, or LS–126A/FI)

a. Remove the back panel (par. 15*a*(1)).

b. Squeeze lamp bracket J1 (fig. 20) to free it from the hole. Pull the lamp bracket from the hole.

c. Remove the lamp from lamp bracket J1 and replace lamp E2.

d. Replace the lamp bracket in its mounting and the back panel on the master station.

51. Replacing Pilot Lamp E1 (LS–125A/FI, LS–127A/FI, or LS–128A/FI)

Pilot lamp E1 is shown in figure 22 for the LS–125A/FI, and in figure 26 for the LS–127A/FI; for the LS–128A/FI, E1 is not shown but is located in the same relative position as E1 in the LS–125A/FI (fig. 22). To replace the pilot lamp proceed as follows:

a. Remove the back panel from the master station (par. 15*a*(2)).

b. Carefully reach through the opening and grasp the pilot lamp.

c. Push the pilot lamp in toward the holder; turn the lamp ¼-turn counterclockwise and withdraw it from its mounting. Reverse this procedure to install the new pilot lamp.

d. Replace the back panel on the master station.

52. Replacing Pilot Lamp E1 in LS–128B/FI (fig. 31)

a. Remove the back panel and chassis from the

cabinet (par. 15*a*(2)). Disconnect the speaker-microphone.

b. Press in on the pilot lamp, turn it counterclockwise, and pull it out to remove the lamp.

c. Insert the new lamp in the holder, push it in, and turn it clockwise to lock it in its holder.

d. Reconnect the speaker-microphone and replace the chassis and back panel.

53. Replacing Filter Capacitor C4, C5, and C6 (LS–124B/FI, LS–124C/FI, LS–125A/FI, LS–126A/FI, or LS–127A/FI)

(fig. 20, 22, or 26)

a. Remove the back panel from the master station (par. 15).

b. Pull the filter capacitor from its socket. (On the LS–127A/FI (fig. 26), a retaining ring holds the filter capacitor in place; this retaining ring must be released from the rod to free the capacitor.)

c. Insert the new capacitor in the socket.

d. Replace the back panel.

54. Replacing Filter Capacitor (C4 and C5 in LS–128A/FI, or C4 in the LS–128B/FI)

(fig. 28 or 30)

a. Remove the back panel and chassis from the cabinet (par. 15*a*(2)). Disconnect the speaker-microphone.

b. Tag and unsolder the leads connected to the capacitor terminals on the bottom of the chassis. The LS–128A/FI has three leads connected (fig. 29). The LS–128B/FI has four leads and resistor R8 connected to its terminals (fig. 31).

c. Loosen the screw on the capacitor clamp and remove the capacitor from the chassis.

d. Insert the new capacitor and tighten the clamp. Position the new capacitor in the same position as the old capacitor.

e. Connect and resolder the leads removed in *b* above. (When repairing the LS–128B/FI, be sure to replace resistor R8.)

f. Reconnect the speaker-microphone and replace the chassis and back panel by reversing the procedure given in paragraph 15*a*(2).

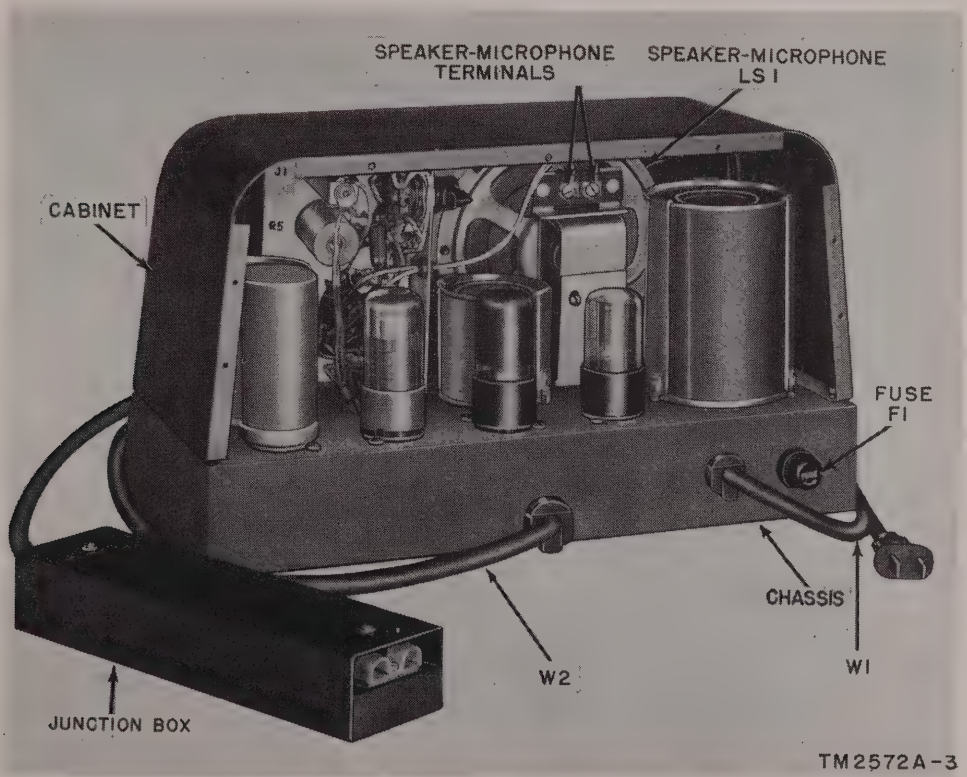


Figure 19. Intercommunicating Stations LS–124B/FI, LS–124C/FI, and LS–126A/FI, rear view with back panel removed.

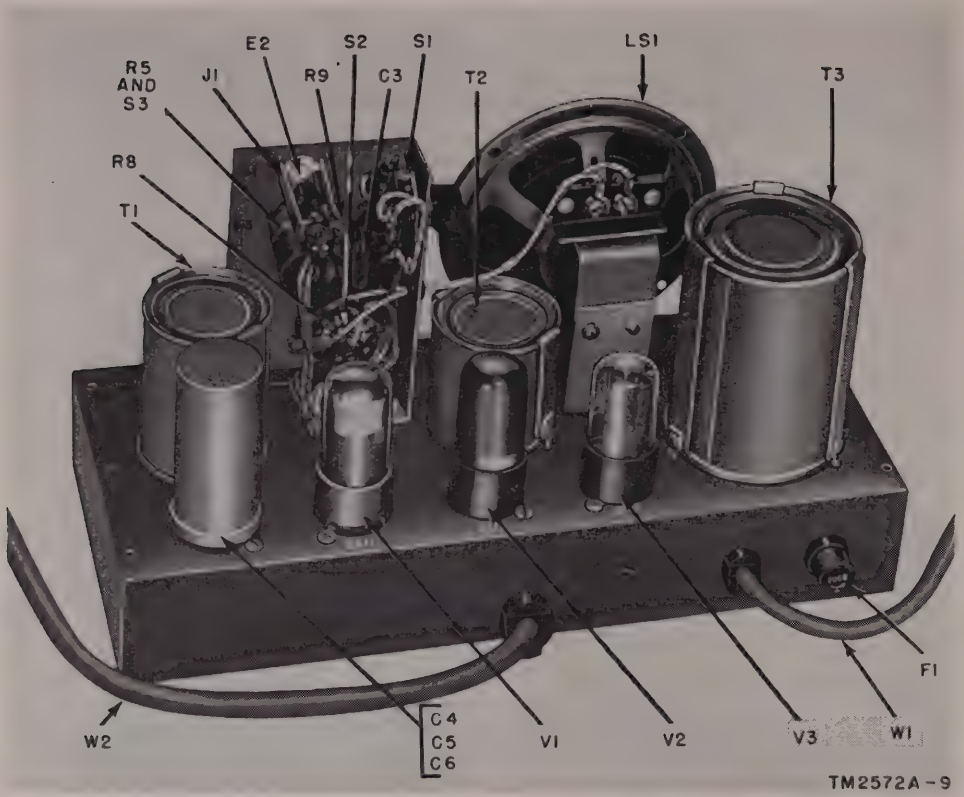


Figure 20. Intercommunciating Stations LS–124B/FI, LS–124C–FI, and LS–126A/FI, top view of chassis showing location of parts.

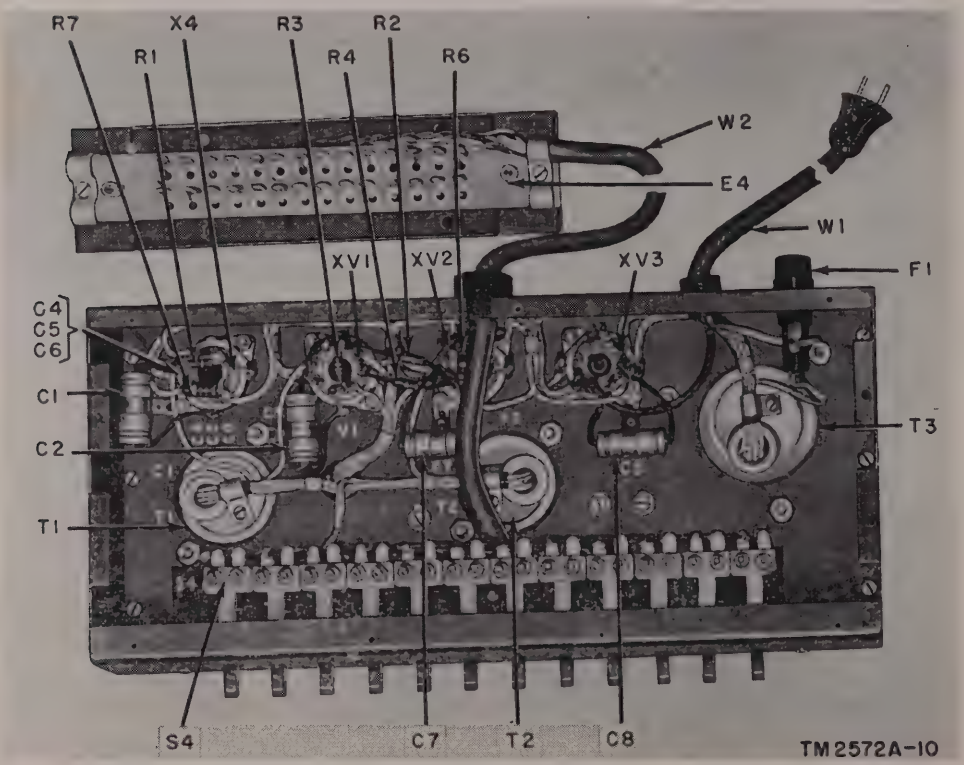


Figure 21. Intercommunicating Stations LS–124B/FI and LS–124C/FI, bottom view of chassis showing location of parts.

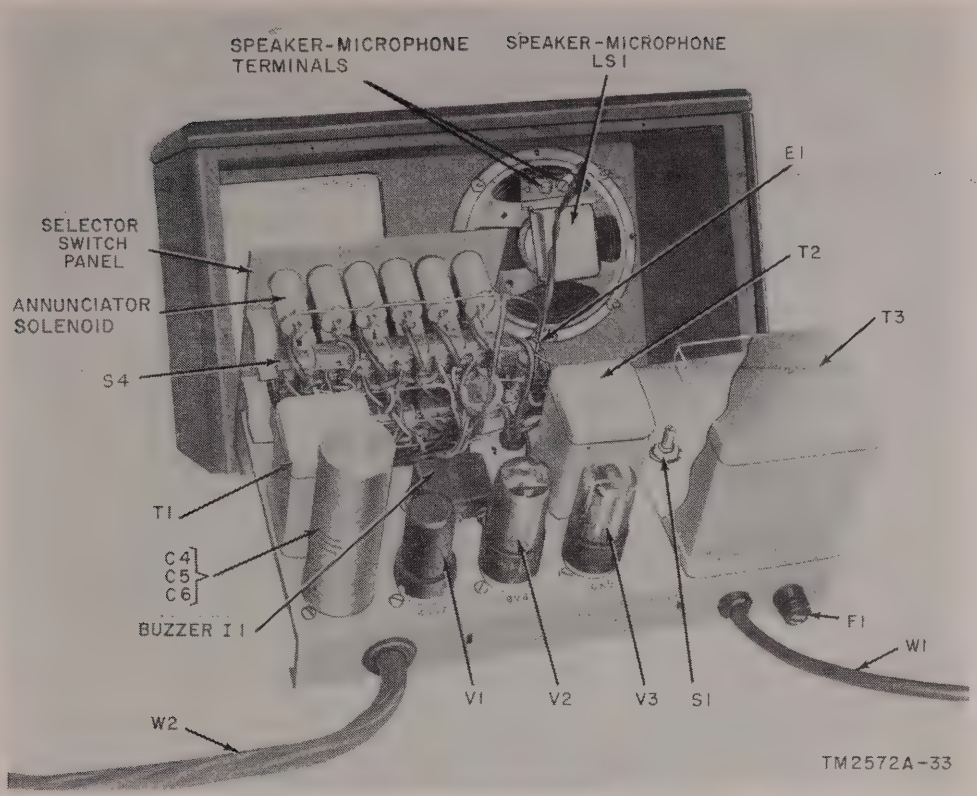


Figure 22. Intercommunicating Station LS–125A/FI, top view of chassis showing location of parts.

55. Replacing Volume Control R5 and On-Off Switch S3 (LS–124B/FI, LS–124C/FI and LS–126A/FI)

(fig. 20)

a. Remove the back panel, bottom panel, and cabinet (par. 15*a*(1)) from the chassis.

b. Move pilot lamp bracket J1 and pilot lamp E1 out of the way (par. 50*b*).

c. Remove the switch cover from the volume control and tag leads if necessary.

d. Unsolder and remove the leads from the control.

e. Remove the mounting nut and lockwasher from the shaft of the control.

f. Remove the control and replace it with a new one.

g. Replace the lockwasher and mounting nut and tighten them securely.

h. Push the leads through the hole in the rear of the switch cover. Connect the leads to their terminals and solder the connection.

i. Snap the switch cover over the volume control and on-off switch.

j. Replace the cabinet, bottom panel, back panel, and control knobs by reversing the procedure outlined in paragraph 15*a*(1).

56. Replacing Volume Control and On-Off Switch (LS–125A/FI, LS–127A/FI, LS–128A/FI and LS–128B/FI)

Note. The reference symbols for the volume control and on-off switches of the LS–125A/FI (fig. 23) and the LS–127A/FI (fig. 27) are R5 and S3. The reference symbols for the volume control and on-off switches of the LS–128A/FI (fig. 29) and the LS–128B/FI (fig. 31) are R4 and S4.

a. Remove the chassis from the cabinet (par. 15*a*(2)) and disconnect the leads to speaker-microphone.

b. Unsolder and remove the leads from the control.

c. Proceed as follows to change the control in the chassis:

(1) *On the LS–125A/FI, only,* remove from the bottom of the selector switch panel the four screws that hold the selector switch panel to the chassis. Remove the

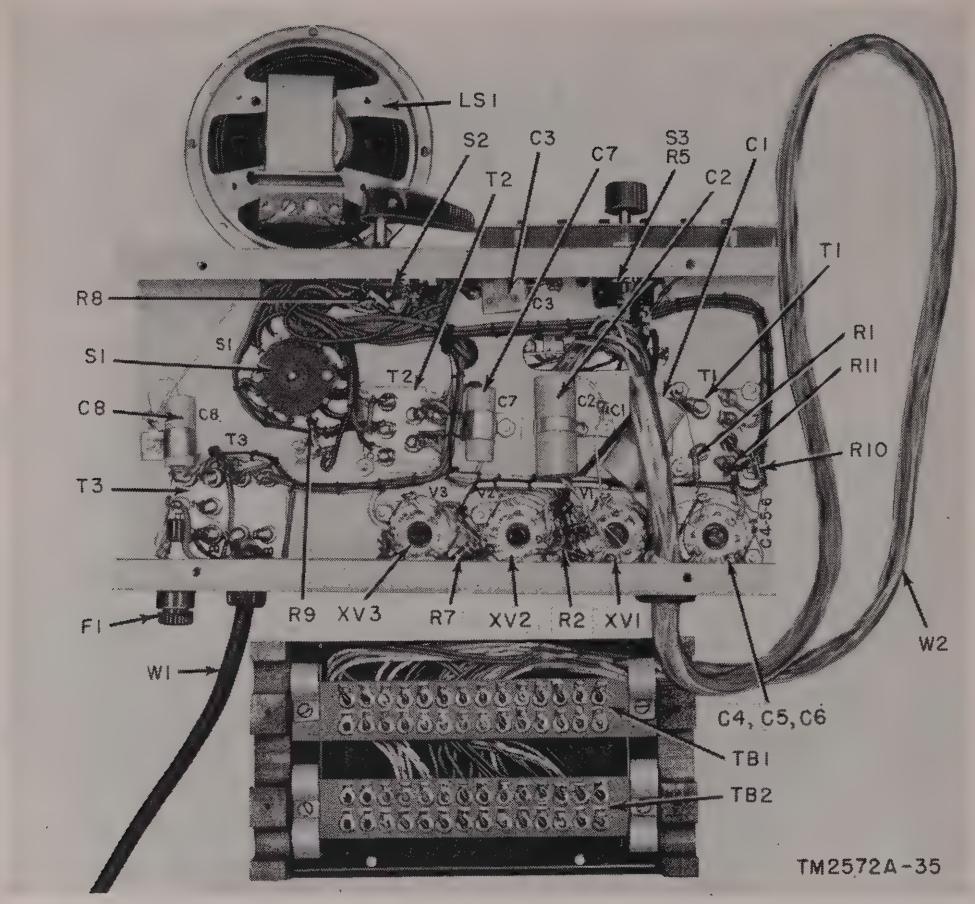


Figure 23. Intercommunicating Station LS–125A/FI, bottom view of chassis and interior view of junction box showing location of parts.

exposed mounting nut and lockwasher and slide the control out of the chassis. Install the new volume control; replace the mounting nut and lockwasher. Tighten the nut. Replace the station selector panel using the four screws.

(2) *On the LS–127A/FI, LS–128A/FI, and LS–128B/FI,* the volume control is changed in the same manner as the volume control for the LS–125A/FI ((1) above) except removal and replacement of the selector switch panel is not necessary.

d. Connect the leads to the control terminals nd securely solder the connections.

e. Reconnect the two leads to the speaker-microhone terminals and replace the chassis in the abinet by reversing the procedure given in paraaph 15*a*(2).

57. Replacing Talk-Listen Switch S2 (LS–124B/FI, LS–124C/FI, and LS–126A/FI)

(fig. 20)

a. Remove the back panel, bottom panel, and cabinet (par. 15*a*(1)) from the chassis.

b. Remove filter capacitors C4, C5, and C6 (par. 53) and tubes V1 and V2 from their sockets to provide work space.

c. Remove the mounting nut and lockwasher from the talk-listen switch. Push the switch shaft through the hole and pull up gently on the switch to extend the leads to their limit. *Tag the leads.*

d. Unsolder the leads and resolder them to the terminals of the new switch. To minimize error, remove one lead at a time and solder it immediately to the corresponding terminal of the new switch. Continue in this manner until all leads have been transferred.

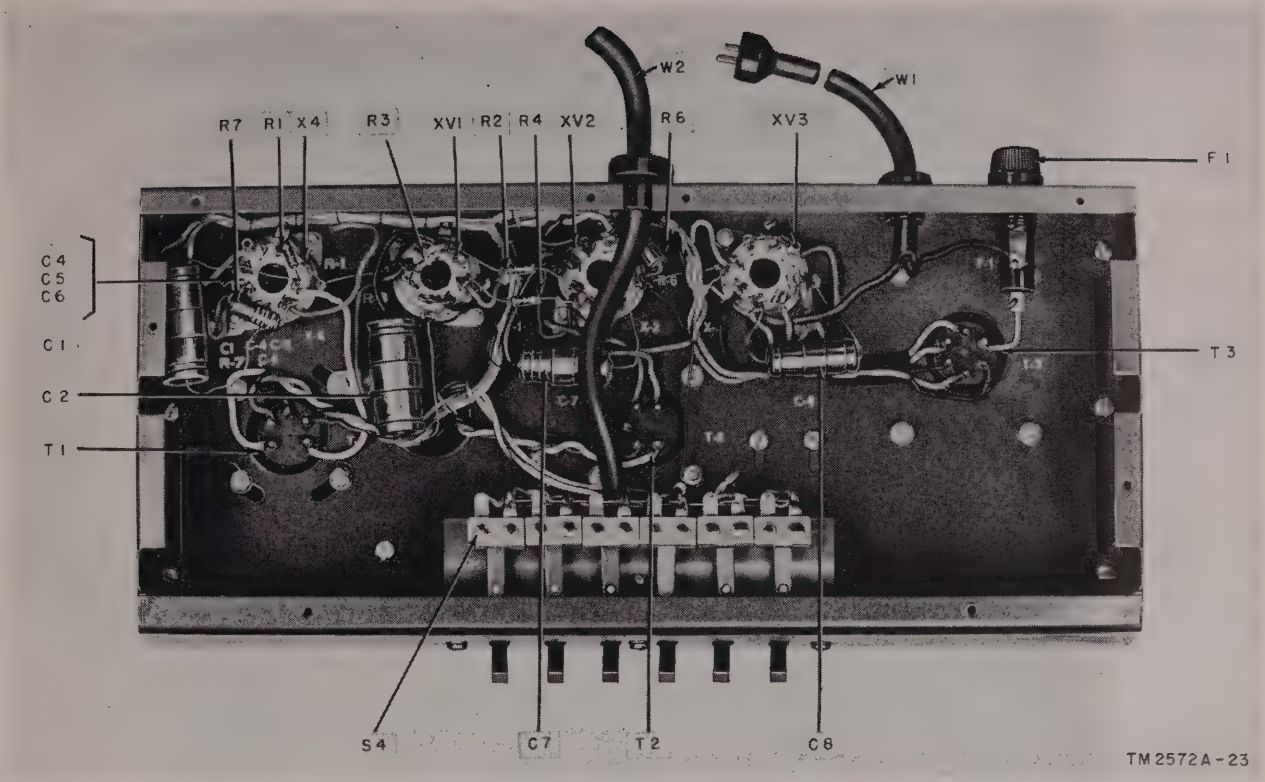


Figure 24. Intercommunicating Station LS–126A/FI, bottom view of chassis showing location of parts.

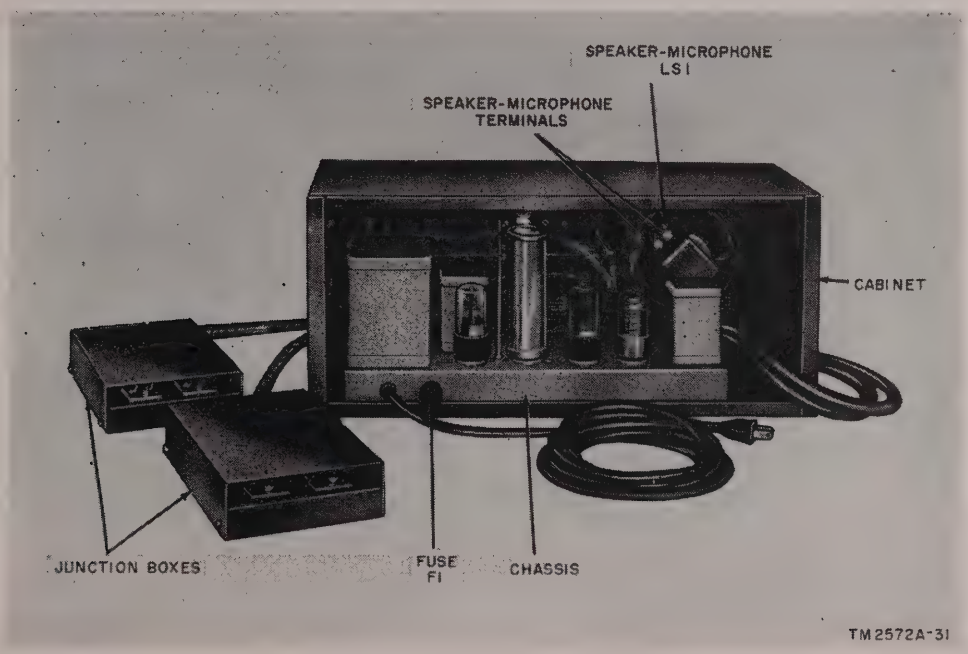


Figure 25. Intercommuncating Station LS–127A/FI, rear view with back panel removed.

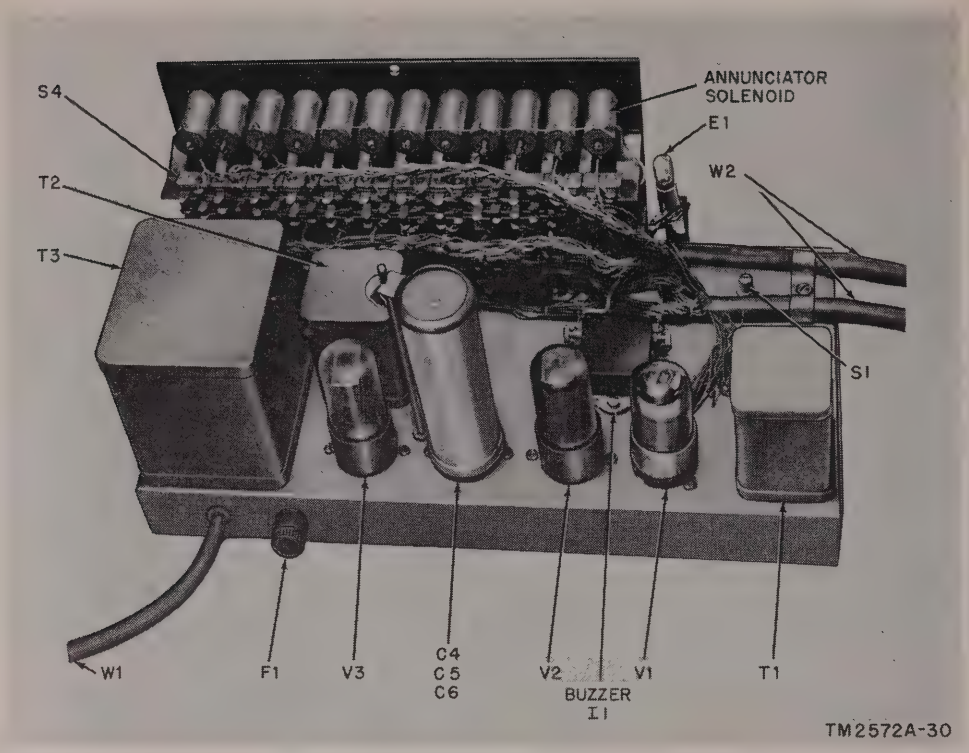


Figure 26. Intercommunicating Station LS–127A/FI, top view of chassis showing location of parts.

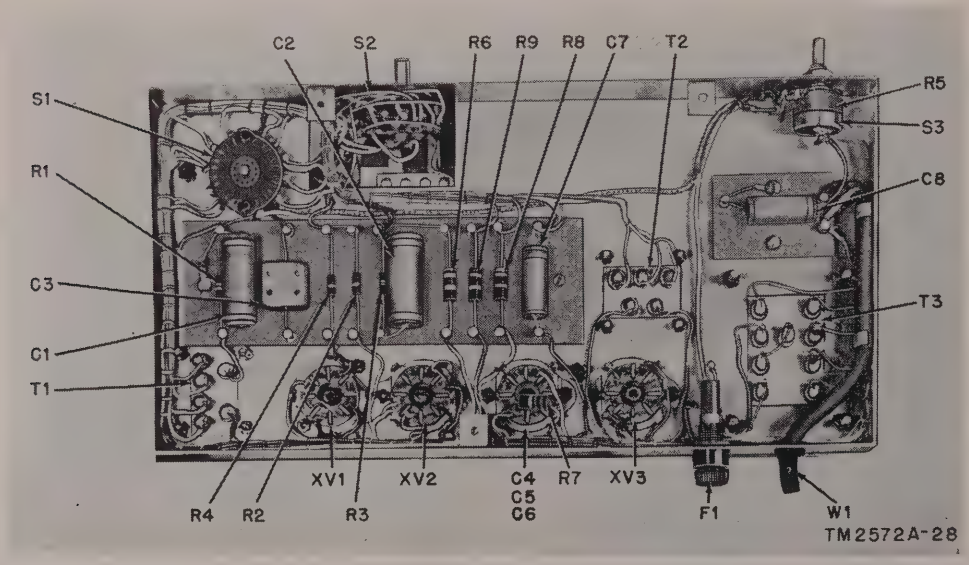


Figure 27. Intercommunicating Station LS–127A/FI, bottom view of chassis showing location of parts.

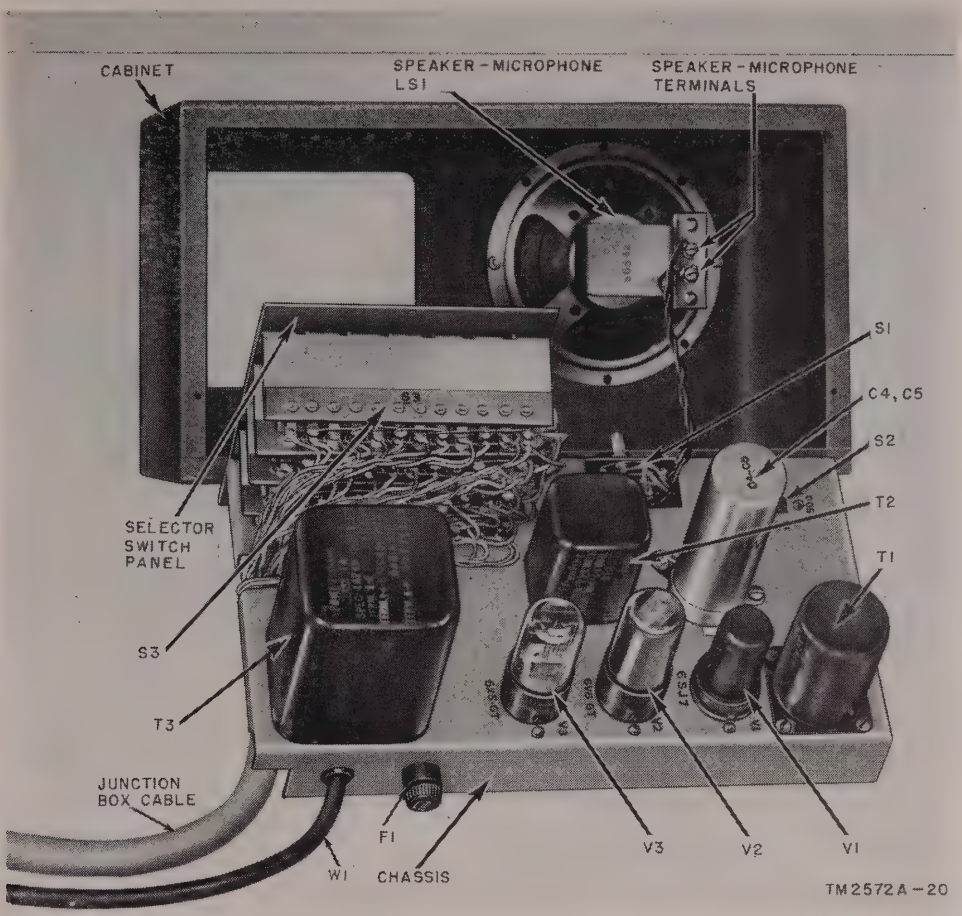


Figure 28. Intercommunicating Station LS–128A/FI, top view of chassis showing location of parts.

e. Insert the switch shaft through the mounting hole and replace the lockwasher and mounting nut. Tighten the nut securely.

f. Carefully examine all soldered connections on the switch. Pull gently on each lead to detect cold-soldered connections. Look for drops of solder between switch lugs and on the chassis. Remove any excess solder found.

g. Replace the filter capacitor and tubes (*b* above).

h. Replace the cabinet, bottom panel, back panel, and control knobs by reversing the procedure given in paragraph 15*a*(1).

58. Replacing Talk-Listen Switch (S2, LS–125A/FI and LS–127A/FI or S1, LS–128A/FI and LS–128B/FI)

To replace talk-listen S2 in the LS–125A/FI (fig. 23) or in the LS–127A/FI (fig. 27), or talk-listen switch S1 in the LS–128A/FI (fig. 29) or in the LS–128B/FI (fig. 31), proceed as follows:

a. Remove the chassis from the cabinet (par. 15*a*(2)). Disconect the speaker-microphone leads.

b. Replace the talk-listen switch using the procedure outlined in paragraph 57*c* through *f*.

c. Reconnect the speaker-microphone leads and replace the chassis in the cabinet by reversing the procedure outlined in paragraph 15*a*(2).

59. Replacing Selector Switch Bank S4 (LS–124B/FI, LS–124C/FI, and LS–126A/FI)

a. Remove the back panel, bottom panel, and cabinet (par. 15*a*(1)) from the chassis.

b. Remove the screws that hold the selector switch bank to the chassis (five screws from the LS–124B/FI and LS–124C/FI (fig. 20) and three screws from the LS–126A/FI (fig. 24)).

c. Pull the switch bank away from the chassis and remove the cable clamp.

d. Tag the wires and then unsolder them from the back of the station selector switches.

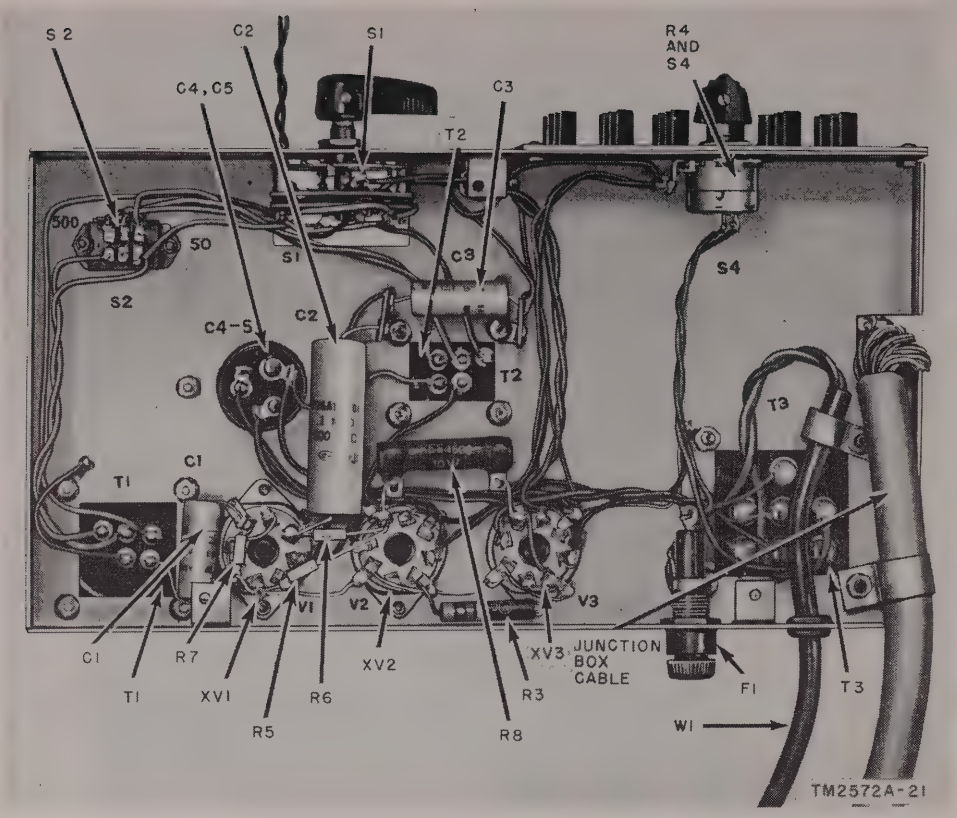


Figure 29. Intercommunicating Station LS–128A/FI, bottom view of chassis showing location of parts.

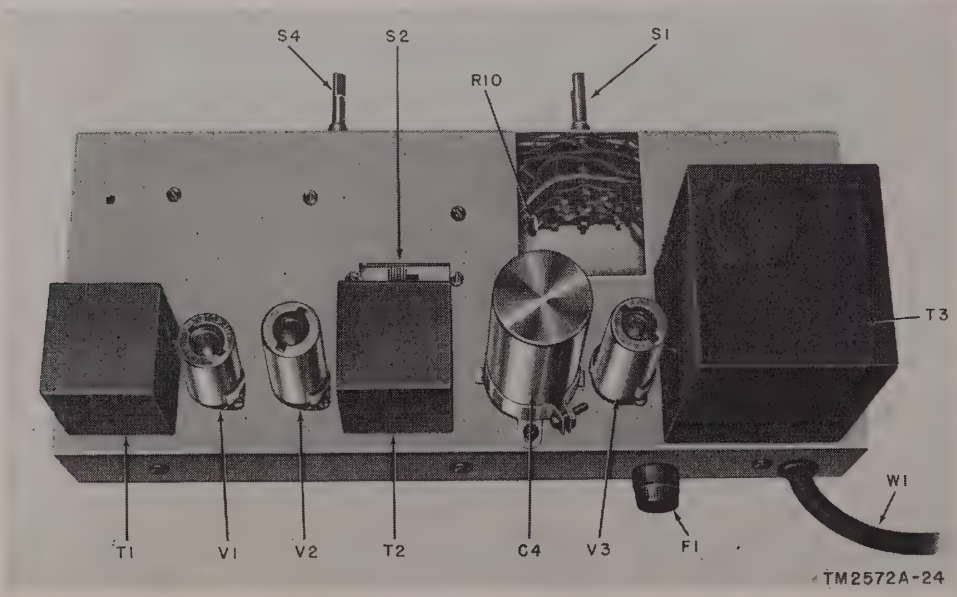


Figure 30. Intercommunicating Station LS–128B/FI, top view of chassis showing location of parts.

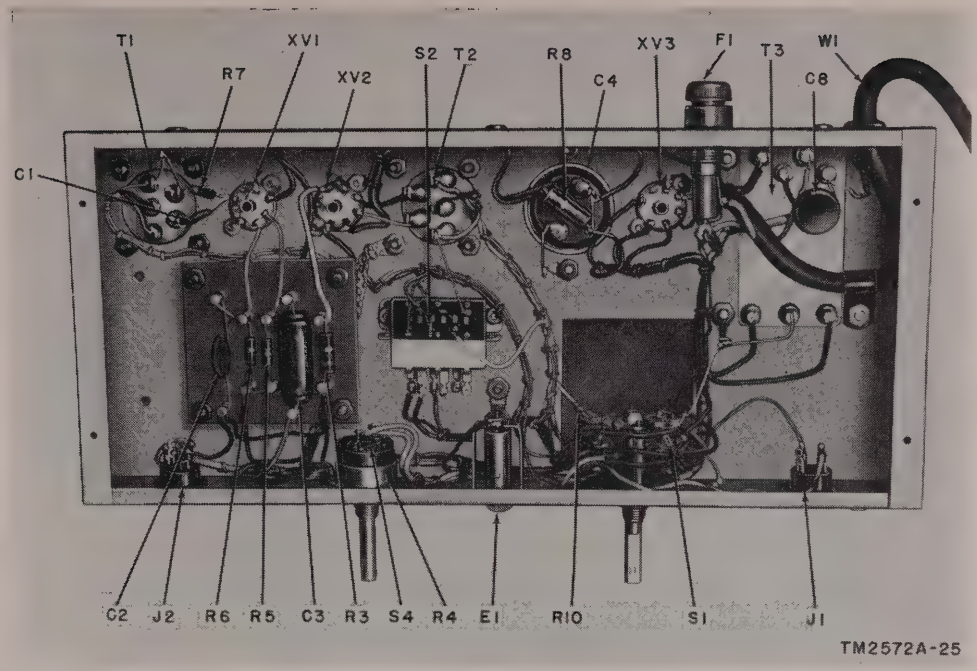


Figure 31. Intercommunicating Station LS–128B/FI, bottom view of chassis showing location of parts.

e. Check the new switch to be certain that the common straps between switches are in place. If the switches are not strapped, use the faulty switch as a guide and strap the proper contacts with No. 20 bare tinned wire.

f. Connect and resolder the leads to the rear of the station selector switches on the new selector switch bank.

g. Secure the junction box cable to the chassis with the cable clamp.

h. Insert the station selector switches through the holes in the chassis and secure the switch bank to the chassis with the screws removed in *b* above.

i. Check for drops of solder and cold-soldered joints (par. 57*f*).

j. Replace the cabinet, bottom panel, back panel, and control knobs by reversing the procedure outlined in paragraph 15*a*(1).

60. Replacing Selector Switch Bank in LS–125A/FI, LS–127A/FI, and LS–128A/FI

To replace selector switch bank S4 in the LS–125A/FI (fig. 22) or the LS–127A/FI (fig. 26) or selector switch bank S3 in the LS–128A/FI (fig. 28), proceed as follows:

a. Remove the chassis from the cabinet (par. 15*a*(2)). Disconnect the two leads to the speaker-microphone.

b. Remove the screws that fasten the selector switch panel to the chassis.

c. Pull the switch panel away from the chassis and remove the cable clamp.

d. Remove the screws that fasten the selector switch bank to the selector switch panel. Pull out the defective selector switch bank.

e. Tag and unsolder the leads from defective station selector switch bank. Move the defective selector switch bank as far away as the leads will allow from other good banks so that the chance of spattering solder on the other banks is minimized.

f. Resolder the leads to the new bank.

g. Check for cold-soldered joints and drops of solder that may have fallen between spring contacts (par. 57*f*).

h. Mount the selector switch bank on the selector switch panel and tighten the screws.

i. Replace the cable clamp and selector switch panel on the chassis.

j. Connect the leads to the speaker-microphone and replace the chassis in the cabinet by reversing the procedure given in paragraph 15*a*(2).

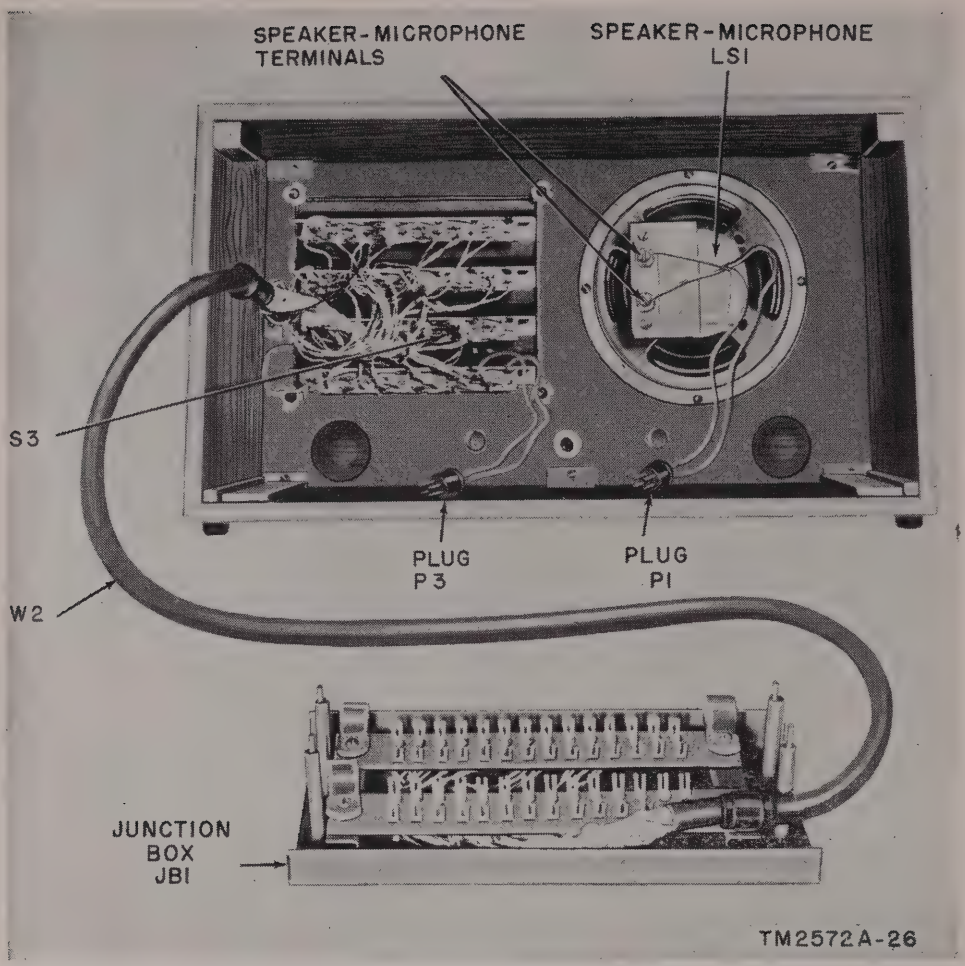


Figure 32. Intercommunicating Station LS–128B/FI, interior view of cabinet showing location of station selector switches S3 and speaker-microphone LS1.

61. Replacing Selector Switch Bank S3 in LS–128B/FI

(fig. 32)

To replace a bank of station selector switches S3, proceed as follows:

a. Remove the back panel and chassis from the cabinet (par. 15*a*(2)). Disconnect plugs P1 and P3 from the chassis and set the chassis aside.

b. Remove the clamp that holds the junction box cable in the cabinet.

c. Remove the four bolts that hold the selector switch panel to the front panel.

d. Pull the selector switch panel forward and turn it so that it will pass through the opening in the cabinet. Remove the selector switch panel from the rear of the cabinet and set the cabinet aside.

e. Carefully tag and unsolder the leads from the rear of the station selector switches.

f. Remove the selector switch bank from the selector switch panel by removing the three screws that hold it in place.

g. Check the new selector switch bank to be sure it is properly strapped with No. 20 bare tinned wire and solder the leads to the terminals of the selector switches.

h. Check for cold-soldered joints (par. 57*f*) and drops of solder on the rear of the selector switches.

i. Install the wired selector switch bank on the rear of the selector switch panel with the three screws that hold it in place.

j. Push the selector switch panel through the cabinet opening from the rear and set it in place

on the cabinet. Replace and tighten the four bolts and nuts that hold the selector switch panel to the cabinet.

k. Replace the clamp that holds the junction box cable to the cabinet.

l. Reconnect plugs P1 and P3 in the same manner as they were disconnected in *a* above.

m. Replace the chassis in the cabinet by reversing the procedure outlined in paragraph 15*a*(2).

62. Replacing Transformers T1, T2, and T3

a. Remove the chassis (par. 15*a*).

b. Tag and unsolder the leads from the bottom of the transformer. Top and bottom views of all transformers used in each master station are illustrated in figures 20 and 21 (LS–124B/FI and LS–124C/FI), 22 and 23 (LS–125A/FI), 20 and 24 (LS–126A/FI), 26 and 27 (LS–127A/FI), 28 and 29 (LS–128A/FI); and 30 and 31 (LS–128B/FI).

c. Remove the nuts that secure the transformer to the chassis and replace the transformer.

d. Resolder the leads to the transformer.

e. Replace the chassis and back panel (par. 15*a*).

63. Replacing Speaker-Microphone LS1 (LS–124B/FI, LS–124C/FI, and LS–126A/FI) (fig. 20)

a. Remove the back panel, bottom panel, and cabinet from the chassis (par. 15*a*(1)).

b. Disconnect the two leads from the speaker-microphone voice coil terminals.

c. Remove the two mounting screws that fasten the speaker-microphone magnet frame to the bracket on the chassis. Lift out the speaker-microphone.

d. Place the new speaker-microphone in position so that the two mounting holes in the bracket on the chassis line up with the two threaded holes in the speaker-microphone magnet frame. Replace the two mounting screws.

e. Reconnect the two leads to the speaker-microphone.

f. Replace the cabinet, bottom panel, and back panel by reversing the procedure outlined in paragraph 15*a*(1).

64. Replacing Speaker-Microphone LS1 (LS–125A/FI, LS–127A/FI, LS–128A/FI, and LS–128B/FI)

a. Remove the chassis from the cabinet (par. 15*a*(2)).

b. Disconnect the leads from the speaker-microphone (fig. 22, 25, 28, or 32) at the voice coil terminals.

c. Remove the bolts and nuts (or wood screws) that secure the speaker-microphone to the cabinet and lift out the speaker-microphone.

d. Replace the new speaker-microphone in the same position as that occupied by the defective one. The position for the speaker-microphones in each type of master station are illustrated in figures 22 (LS–125A/FI), 25 (LS–127A/FI), 28 (LS–128A/FI), and 32 (LS–128B/FI). Secure the speaker-microphone to the cabinet with the bolts and nuts (or wood screws) removed in *c* above.

e. Reconnect the leads to the speaker-microphone terminals.

f. Replace the chassis in the cabinet by reversing the procedure outlined in paragraph 15*a*(2).

65. Replacing Power Cable W1

a. Remove the chassis from the cabinet (par. 15*a*).

b. Unsolder and disconnect the black and white power cable leads from their terminals on the bottom of the chassis. To observe power cable W1 connections, refer to figure 21 for the LS–124B/FI and LS–124C/FI, figure 23 for the LS–125A/FI, figure 24 for the LS–126A/FI, figure 27 for the LS–127A/FI, figure 29 for the LS–128A/FI, and figure 31 for the LS–128B/FI.

c. Remove the cable clamp, if used, and pull the power cable and grommet from the chassis. Remove the grommet from the defective power cable and replace it on the new power cable.

d. Replace the new cable and grommet in the chassis and fasten it with the cable clamp, if used.

e. Connect and solder the conductors of the power cable to the terminals from which they were removed in *b* above.

f. Replace the chassis by reversing the appropriate chassis removal procedure (par. 15*a*(1) or (2)).

66. Replacing Buzzer I 1 (LS–125A/FI and LS–127A/FI only)

a. Remove the chassis from the cabinet (par. 15*a*(2).

b. Tag and disconnect the buzzer wiring.

c. Remove the mounting screws from the buzzer and lift the buzzer from the chassis. Buzzer I 1 for the LS–125A/FI and LS–127A/FI is illustrated in figures 22 and 26 respectively.

d. Place the new buzzer in position and secure it to the chassis with the buzzer mounting screws.

e. Connect the leads to the proper buzzer terminals as indicated by the tags.

f. Replace the chassis in the cabinet by reversing the procedure outlined in paragraph 15*a*(2).

67. Replacing Annunciator Solenoid (LS–125A/FI and LS–127A/FI only)

a. Remove the chassis from the cabinet (par. 15*a*(2)) and disconnect the speaker-microphone wiring.

b. Remove the selector switch panel from the chassis (par. 60*b*).

c. Remove the retaining screw from the back of the plunger in the defective annunciator solenoid. The annunciator solenoids for the LS–125A/FI and LS–127A/FI are shown in figures 22 and 26 respectively. Remove the plunger from the front of the solenoid.

d. Unsolder the leads from the solenoid.

e. Remove the knurled mounting nut from the front of the selector switch panel that holds the defective annunciator solenoid in place on the panel.

f. Install a new annunciator solenoid in the same position as that occupied by the defective solenoid removed in *e* above. Replace the knurled nut and fingertighten.

g. Replace the plunger from the front panel end of the solenoid and the retaining screw from the back end of the annunciator solenoid.

h. Replace the selector switch panel on the chassis (par. 60*i*).

i. Reconnect the speaker-microphone and replace the chassis in the cabinet by reversing the procedure outlined in paragraph 15*a*(2).

Section III. FINAL TESTING

68. General

This section is intended as a guide determining whether or not a repaired unit will operate satisfactorily. Repaired master stations meeting the minimum requirements outlined in paragraphs 69 and 70 will operate satisfactorily under normal operating conditions.

69. Mechanical Inspection

a. Check the security of all soldered connections.

b. See that all tubes are firmly seated in their sockets.

c. See that resistor and capacitor leads clear adjacent terminals or lugs.

d. Look for drops of solder between terminals and switch contacts.

e. Check for frayed wires and for sharp points of solder penetrating wire insulation.

f. Check all mounting screws to be sure they are tight.

g. See that all cable clamps fits snugly over the cables.

h. Examine the cone of the speaker-microphone for tears; check connections.

i. Check transformer mountings to be sure they are tight.

j. Be sure that the set screws in the talk-listen switch and the volume control and on-off switch are making firm contact with the flat portion of their respective shafts. On the LS–124B/FI, LS–124C/FI, and LS–126A/FI check the set screw in the impedance switch lever.

k. Check the action of all controls for positive response to knob rotation and action.

70. Electrical Test

a. Turn the master station on and listen for excessive hum in the listen position of the talk-listen switch.

b. Check for line noise. Reversing the ac plug in the ac power source will often cause a decrease in hum.

c. See that the pilot lamp lights when the master station is turned on.

d. Connect the master station to other master stations and perform an operational check (par. 27). The connected master stations may be used for remote station tests by leaving the talk-listen switch of the connected master station in the idle position. If the repaired unit is to be reconnected in a system other stations in the system can be used to operationally check the repaired unit.

71. Annunciator and Buzzer Test (LS–125A/FI and LS–127A/FI only)

A simple operational check of the annunciator and buzzer in a repaired unit can be made as follows:

a. Remove the covers from the junction boxes.

b. Connect a wire across the first pair of annunciator line terminals on the annunciator terminal board.

c. Depress the first station selector switch. The buzzer should sound and the annunciator plunger should protrude from the panel.

d. Repeat the operations in *b* and *c* above for each of other station positions until all the annunciators have been checked.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

72. Disassembly of Master Stations

a. Disconnect the ac power cord from the ac outlet.

b. Disconnect all of the interstation wires from the junction box.

c. Remove the screws securing the junction box to the desk or other support.

73. Repacking Master Stations for Shipment

a. Use the original packing, if available, and reverse the unpacking instructions given in paragraph 9 to repack the master stations. General packing information is usually available at depots.

b. Pack the master stations securely to prevent damage during transit; pad the equipment to minimize the effects of severe jolting. Be sure the equipment is protected from inclement weather.

74. Methods of Destruction

To prevent the enemy from using or salvaging the master stations, use any or all methods listed below to destroy the equipment. Destroy the equipment only upon order of the commander.

a. Smash. Smash the cabinet, controls, tubes, coils, switches, capacitors, and transformers; use sledges, axes, crow bars, or heavy tools.

b. Cut. Cut cables and wiring; use axes, handaxes, or machettes.

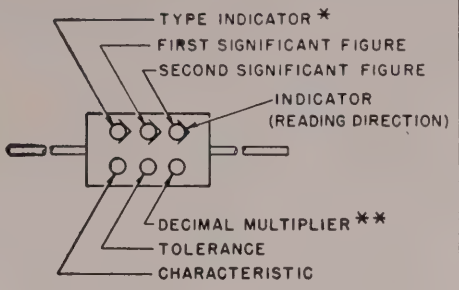
c. Burn. Burn cords and manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panels and chassis.

e. Explosives. If explosives are necessary, use firearms, grenades, or TNT.

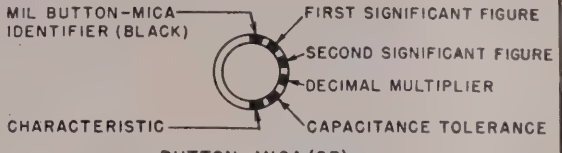
f. Disposal. Bury or scatter the destroyed parts in slit trenches, fox holes, or other holes, or throw them into deep bodies of water.

CAPACITOR COLOR CODE MARKING
(MIL-STD CAPACITORS)

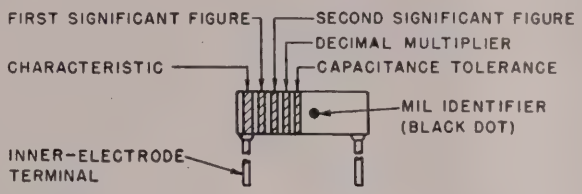


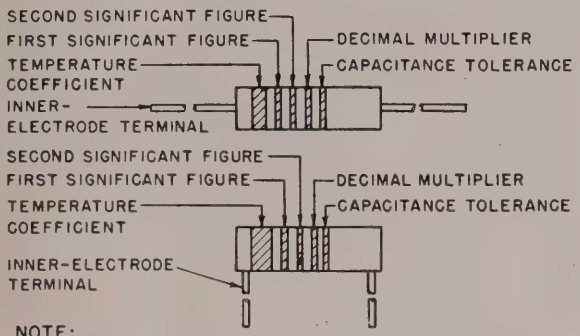
* BLACK DOT: MICA DIELECTRIC
SILVER DOT: PAPER DIELECTRIC
** INDICATES NUMBER OF ZEROS ON PAPER TYPE.

MICA (CM) AND PAPER (CN)



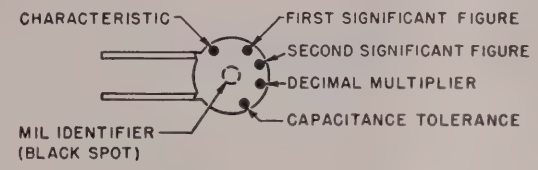
BUTTON-MICA (CB)





NOTE:
SPOTS MAY BE USED INSTEAD OF BANDS; TEMPERATURE COEFFICIENT MARKING IS LARGER.

CERAMIC-TEMPERATURE COMPENSATING (CC)



NOTES:
1. SPOTS MAY BE USED ON TUBULAR CAPACITORS; CHARACTERISTIC SPOT IS LARGER AND MIL IDENTIFIER IS ON SIDE DIAMETRICALLY OPPOSITE COLOR SPOTS.
2. MIL IDENTIFIER OF DISK TYPE IS ON REVERSE SIDE; CHARACTERISTIC SPOT IS LARGER OR SPACE BETWEEN CHARACTERISTIC AND TOLERANCE SPOTS IS THREE TIMES SPACE BETWEEN ADJACENT SPOTS.
3. TOLERANCE: YELLOW, +100%, −20%.

CERAMIC-GENERAL PURPOSE (CK)

CAPACITOR COLOR CODE

COLOR	SIG FIG.	MULTIPLIER		CHARACTERISTIC[1]				TOLERANCE [2]					TEMPERATURE COEFFICIENT (UUF/UF/°C)
		DECIMAL	NUMBER OF ZEROS	CM	CN	CB	CK	CM	CN	CB	CC		
											OVER 10UUF	10UUF OR LESS	CC
BLACK	0	1	NONE		A			20	20	20	20	2	ZERO
BROWN	1	10	1	B	E	B	W				1		−30
RED	2	100	2	C	H		X	2		2	2		−80
ORANGE	3	1,000	3	D	J	D			30				−150
YELLOW	4	10,000	4	E	P								−220
GREEN	5		5	F	R						5	0.5	−330
BLUE	6		6		S								−470
PURPLE (VIOLET)	7		7		T	W							−750
GRAY	8		8			X						0.25	+30
WHITE	9		9								10	1	−330(±500) [3]
GOLD		0.1						5		5			+100
SILVER		0.01						10	10	10			

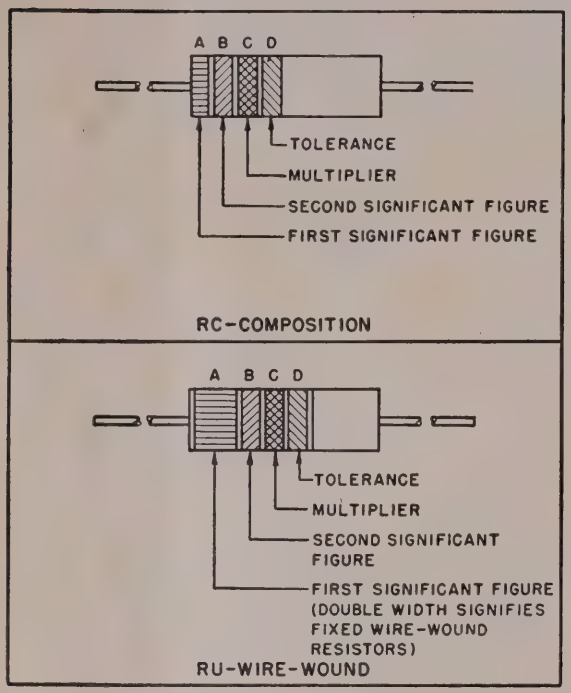
1. LETTERS ARE IN TYPE DESIGNATIONS GIVEN IN MIL-C SPECIFICATIONS.
2. IN PERCENT, EXCEPT IN UUF FOR CC-TYPE CAPACITORS OF 10 UUF OR LESS.
3. INTENDED FOR USE IN CIRCUITS NOT REQUIRING COMPENSATION.

STD-CI

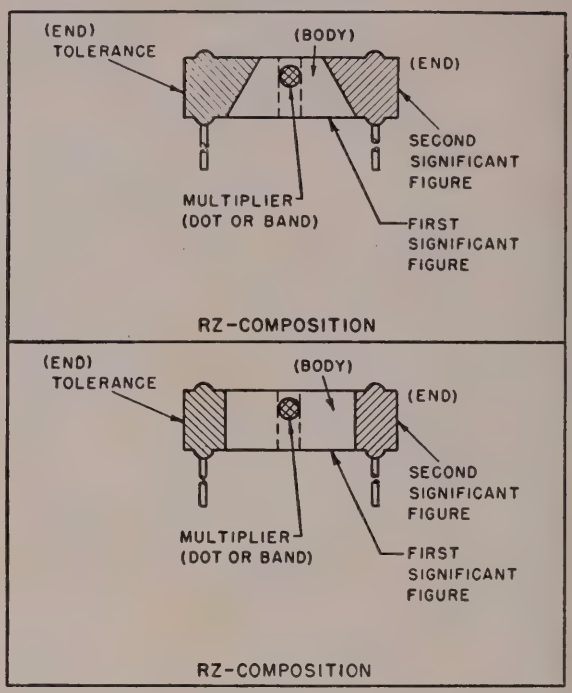
Figure 33. Capacitor color codes.

RESISTOR COLOR CODE MARKING
(MIL-STD RESISTORS)

AXIAL-LEAD RESISTORS (INSULATED)



RADIAL-LEAD RESISTORS (UNINSULATED)



RESISTOR COLOR CODE

BAND A OR BODY*		BAND B OR END*		BAND C OR DOT OR BAND*		BAND D OR END*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1	BODY	± 20
BROWN	1	BROWN	1	BROWN	10	SILVER	± 10
RED	2	RED	2	RED	100	GOLD	± 5
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000		
GREEN	5	GREEN	5	GREEN	100,000		
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	GOLD	0.1		
WHITE	9	WHITE	9	SILVER	0.01		

*FOR WIRE-WOUND-TYPE RESISTORS, BAND A SHALL BE DOUBLE-WIDTH. WHEN BODY COLOR IS THE SAME AS THE DOT (OR BAND) OR END COLOR, THE COLORS ARE DIFFERENTIATED BY SHADE, GLOSS, OR OTHER MEANS.

EXAMPLES (BAND MARKING):
10 OHMS ±20 PERCENT: BROWN BAND A; BLACK BAND B; BLACK BAND C; NO BAND D.
4.7 OHMS ±5 PERCENT: YELLOW BAND A; PURPLE BAND B; GOLD BAND C; GOLD BAND D.

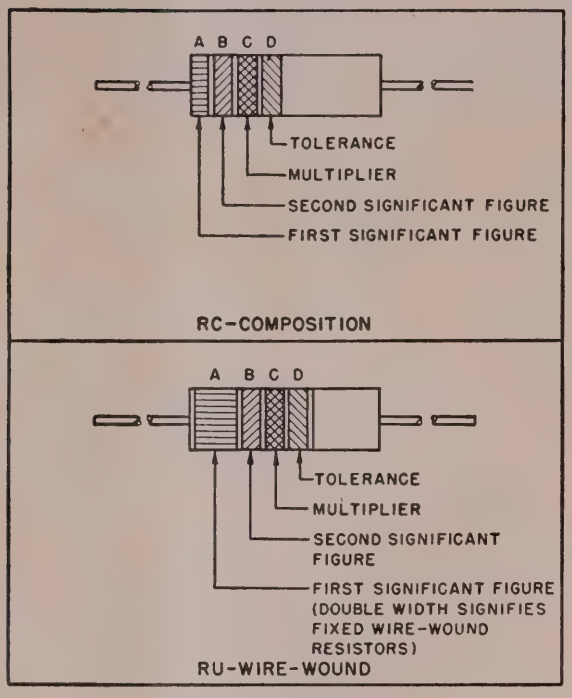
EXAMPLES (BODY MARKING):
10 OHMS ±20 PERCENT: BROWN BODY; BLACK END; BLACK DOT OR BAND; BODY COLOR ON TOLERANCE END.
3,000 OHMS ±10 PERCENT: ORANGE BODY, BLACK END; RED DOT OR BAND; SILVER END.

STD-R1

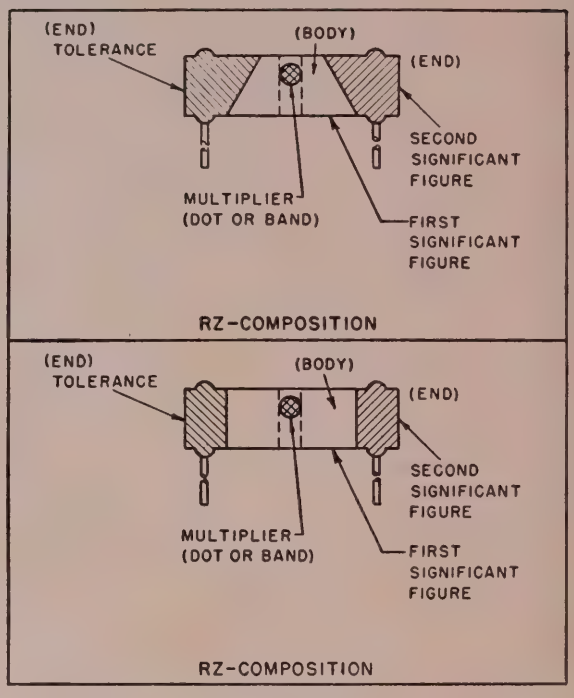
Figure 34. Resistor color codes.

RESISTOR COLOR CODE MARKING
(MIL-STD RESISTORS)

AXIAL-LEAD RESISTORS (INSULATED)



RADIAL-LEAD RESISTORS (UNINSULATED)



RESISTOR COLOR CODE

BAND A OR BODY*		BAND B OR END*		BAND C OR DOT OR BAND*		BAND D OR END*	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)
BLACK	0	BLACK	0	BLACK	1	BODY	± 20
BROWN	1	BROWN	1	BROWN	10	SILVER	± 10
RED	2	RED	2	RED	100	GOLD	± 5
ORANGE	3	ORANGE	3	ORANGE	1,000		
YELLOW	4	YELLOW	4	YELLOW	10,000		
GREEN	5	GREEN	5	GREEN	100,000		
BLUE	6	BLUE	6	BLUE	1,000,000		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7				
GRAY	8	GRAY	8	GOLD	0.1		
WHITE	9	WHITE	9	SILVER	0.01		

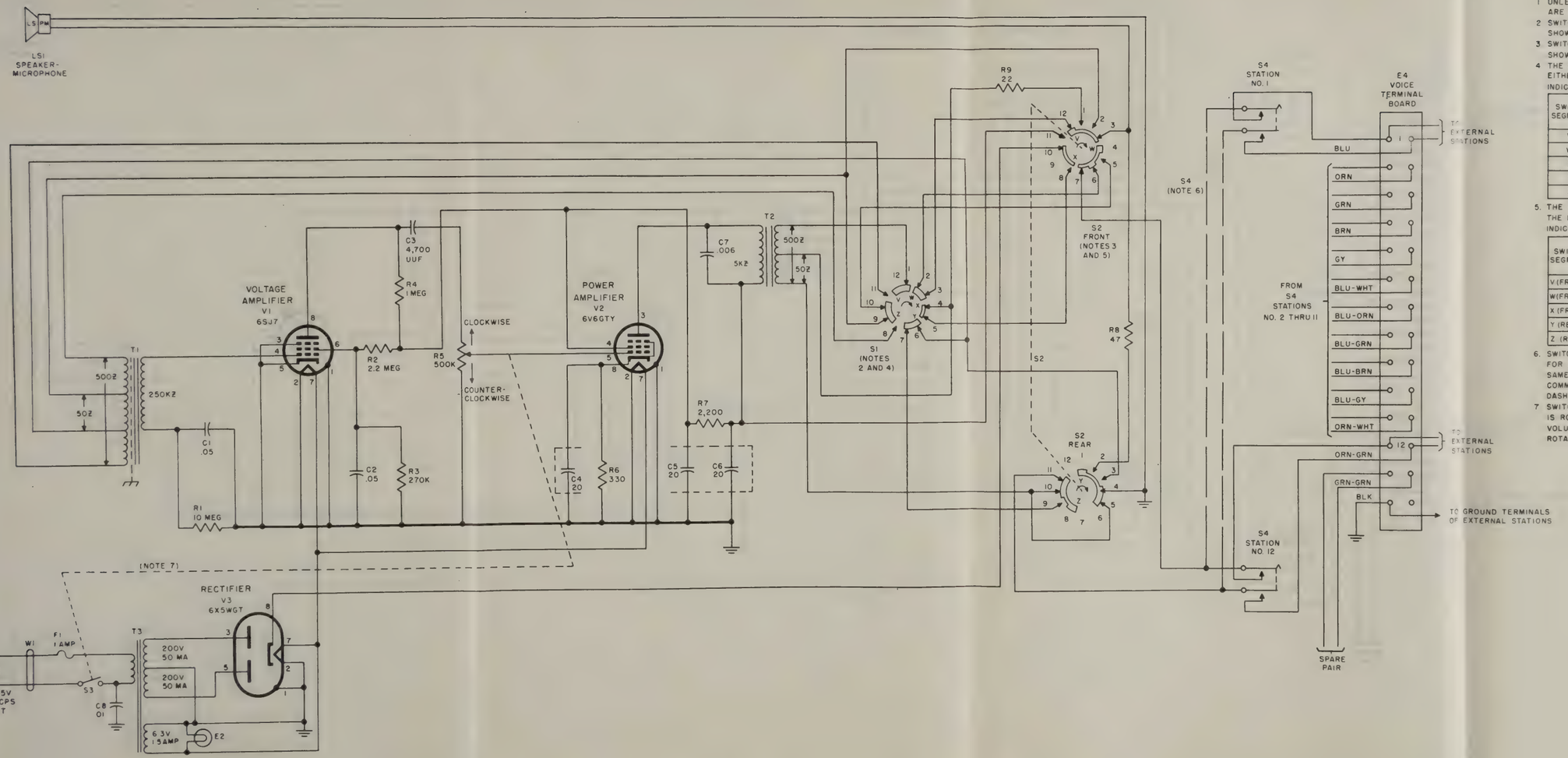
*FOR WIRE-WOUND-TYPE RESISTORS, BAND A SHALL BE DOUBLE-WIDTH. WHEN BODY COLOR IS THE SAME AS THE DOT (OR BAND) OR END COLOR, THE COLORS ARE DIFFERENTIATED BY SHADE, GLOSS, OR OTHER MEANS.

EXAMPLES (BAND MARKING):
10 OHMS ±20 PERCENT: BROWN BAND A; BLACK BAND B; BLACK BAND C; NO BAND D.
4.7 OHMS ±5 PERCENT: YELLOW BAND A; PURPLE BAND B; GOLD BAND C; GOLD BAND D.

EXAMPLES (BODY MARKING):
10 OHMS ±20 PERCENT: BROWN BODY; BLACK END; BLACK DOT OR BAND; BODY COLOR ON TOLERANCE END.
3,000 OHMS ±10 PERCENT: ORANGE BODY, BLACK END; RED DOT OR BAND; SILVER END.

STD-R1

Figure 34. Resistor color codes.



NOTES:

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
2. SWITCH S1 IS VIEWED FROM KNOB END AND IS SHOWN IN 50Z POSITION.
3. SWITCH S2 IS VIEWED FROM KNOB END AND IS SHOWN IN IDLE POSITION.
4. THE CLOSED CONTACTS FOR SWITCH S1, IN EITHER THE 50 OR 500Z POSITION, ARE INDICATED IN THE CHART BELOW:

SWITCH SEGMENT	CLOSED CONTACTS	
	50Z POSITION	500Z POSITION
V	1 ONLY	1,2
W	2,3	3,4
X	4,5	5 ONLY
Y	6,7	7,8
Z	9,10	10,11

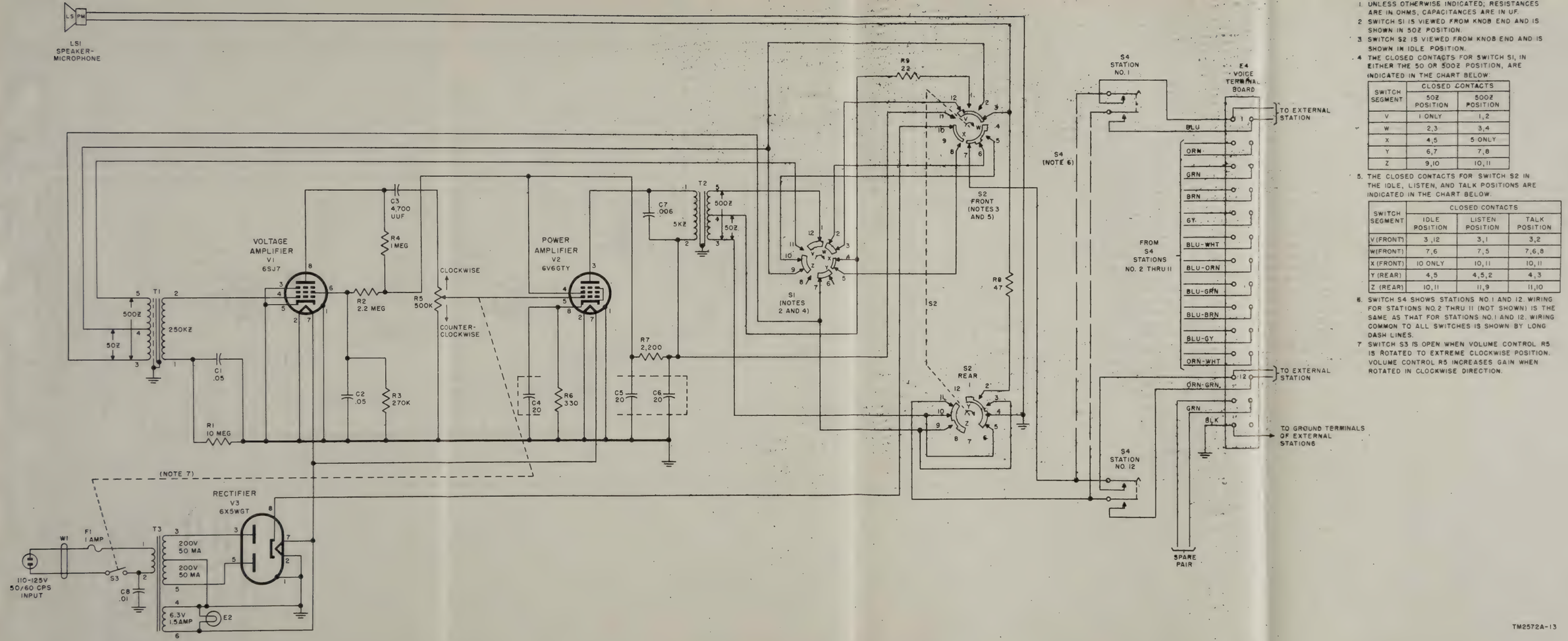
5. THE CLOSED CONTACTS FOR SWITCH S2 IN THE IDLE, LISTEN, AND TALK POSITIONS ARE INDICATED IN THE CHART BELOW:

SWITCH SEGMENT	CLOSED CONTACTS		
	IDLE POSITION	LISTEN POSITION	TALK POSITION
V (FRONT)	3,12	3,1	3,2
W (FRONT)	7,6	7,5	7,6,8
X (FRONT)	10 ONLY	10,11	10,11
Y (REAR)	4,5	4,5,2	4,3
Z (REAR)	10,11	11,9	11,10

6. SWITCH S4 SHOWS STATIONS NO 1 AND 12 WIRING FOR STATIONS NO 2 THRU 11 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO 1 AND 12. WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASH LINES.
7. SWITCH S3 IS OPEN WHEN VOLUME CONTROL R5 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R5 INCREASES GAIN WHEN ROTATED IN CLOCKWISE DIRECTION.

TM2572A-6

Figure 35. Intercommunicating Station LS–124B/FI, schematic diagram.



1. UNLESS OTHERWISE INDICATED; RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
2. SWITCH S1 IS VIEWED FROM KNOB END AND IS SHOWN IN 50Z POSITION.
3. SWITCH S2 IS VIEWED FROM KNOB END AND IS SHOWN IN IDLE POSITION.
4. THE CLOSED CONTACTS FOR SWITCH S1, IN EITHER THE 50 OR 500Z POSITION, ARE INDICATED IN THE CHART BELOW:

SWITCH SEGMENT	CLOSED CONTACTS	
	50Z POSITION	500Z POSITION
V	1 ONLY	1,2
W	2,3	3,4
X	4,5	5 ONLY
Y	6,7	7,8
Z	9,10	10,11

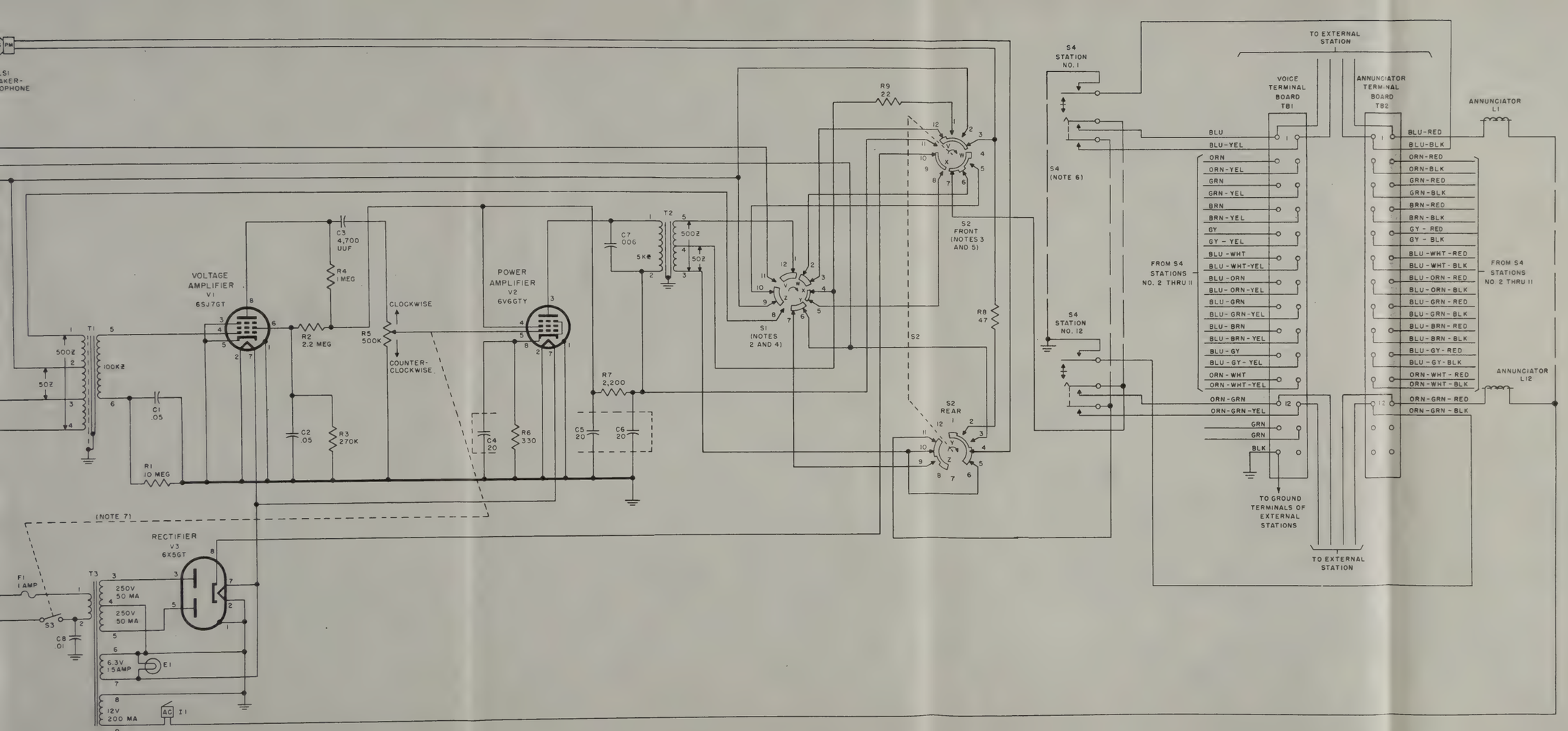
5. THE CLOSED CONTACTS FOR SWITCH S2 IN THE IDLE, LISTEN, AND TALK POSITIONS ARE INDICATED IN THE CHART BELOW.

SWITCH SEGMENT	CLOSED CONTACTS		
	IDLE POSITION	LISTEN POSITION	TALK POSITION
V (FRONT)	3,12	3,1	3,2
W (FRONT)	7,6	7,5	7,6,8
X (FRONT)	10 ONLY	10,11	10,11
Y (REAR)	4,5	4,5,2	4,3
Z (REAR)	10,11	11,9	11,10

6. SWITCH S4 SHOWS STATIONS NO. 1 AND 12. WIRING FOR STATIONS NO. 2 THRU 11 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO. 1 AND 12. WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASH LINES.
7. SWITCH S3 IS OPEN WHEN VOLUME CONTROL R5 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R5 INCREASES GAIN WHEN ROTATED IN CLOCKWISE DIRECTION.

TM2572A-13

Figure 36. Intercommunicating Station LS–12AC/FI, schematic diagram.



NOTES

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
2. SWITCH S1 IS VIEWED FROM KNOB END AND IS SHOWN IN 50Z POSITION.
3. SWITCH S2 IS VIEWED FROM KNOB END AND IS SHOWN IN IDLE POSITION.
4. THE CLOSED CONTACTS FOR SWITCH S1, IN EITHER THE 50 OR 500Z POSITION, ARE INDICATED IN THE CHART BELOW.

SWITCH SEGMENT	CLOSED CONTACTS	
	50Z POSITION	500Z POSITION
V	1 ONLY	1,2
W	2,3	3,4
X	4,5	5 ONLY
Y	6,7	7,8
Z	9,10	10,11

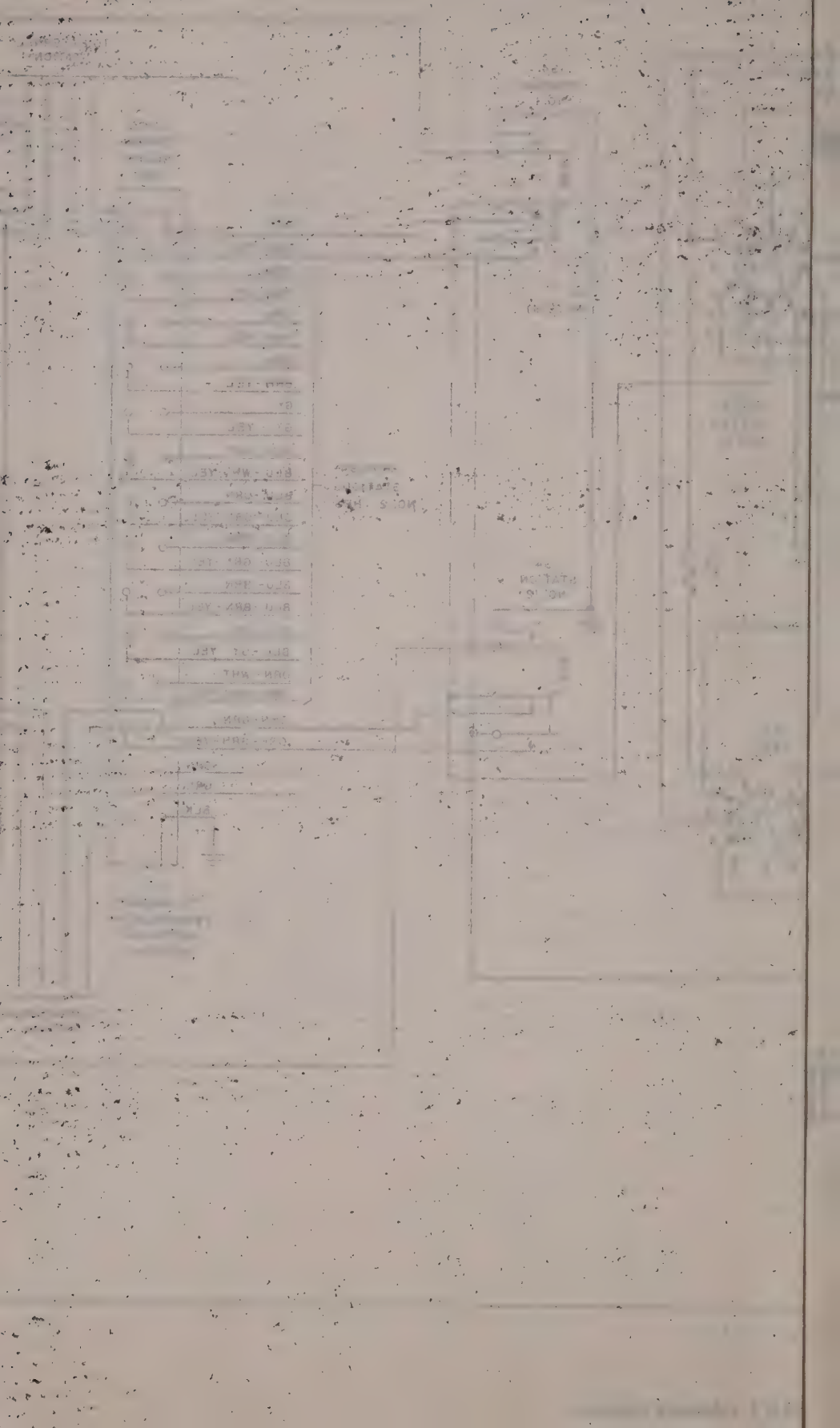
5. THE CLOSED CONTACTS FOR SWITCH S2 IN THE IDLE, LISTEN, AND TALK POSITIONS ARE INDICATED IN THE CHART BELOW.

SWITCH SEGMENT	CLOSED CONTACTS		
	IDLE POSITION	LISTEN POSITION	TALK POSITION
W (FRONT)	3,12	3,1	3,2
W (FRONT)	7,6	7,5	7,6,8
X (FRONT)	10 ONLY	10,11	10,11
Y (REAR)	4,5	4,5,2	4,3
Z (REAR)	10,11	11,9	11,10

6. SWITCH S4 SHOWS STATIONS NO 1 AND 12 WIRING FOR STATIONS NO 2 THRU 11 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO 1 AND 12. WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASH LINES.
7. SWITCH S3 IS OPEN WHEN VOLUME CONTROL R5 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R5 INCREASES GAIN WHEN ROTATED IN CLOCKWISE DIRECTION.

TM2572A-14

Figure 37. Intercommunicating Station LS-125A/FI, schematic diagram.



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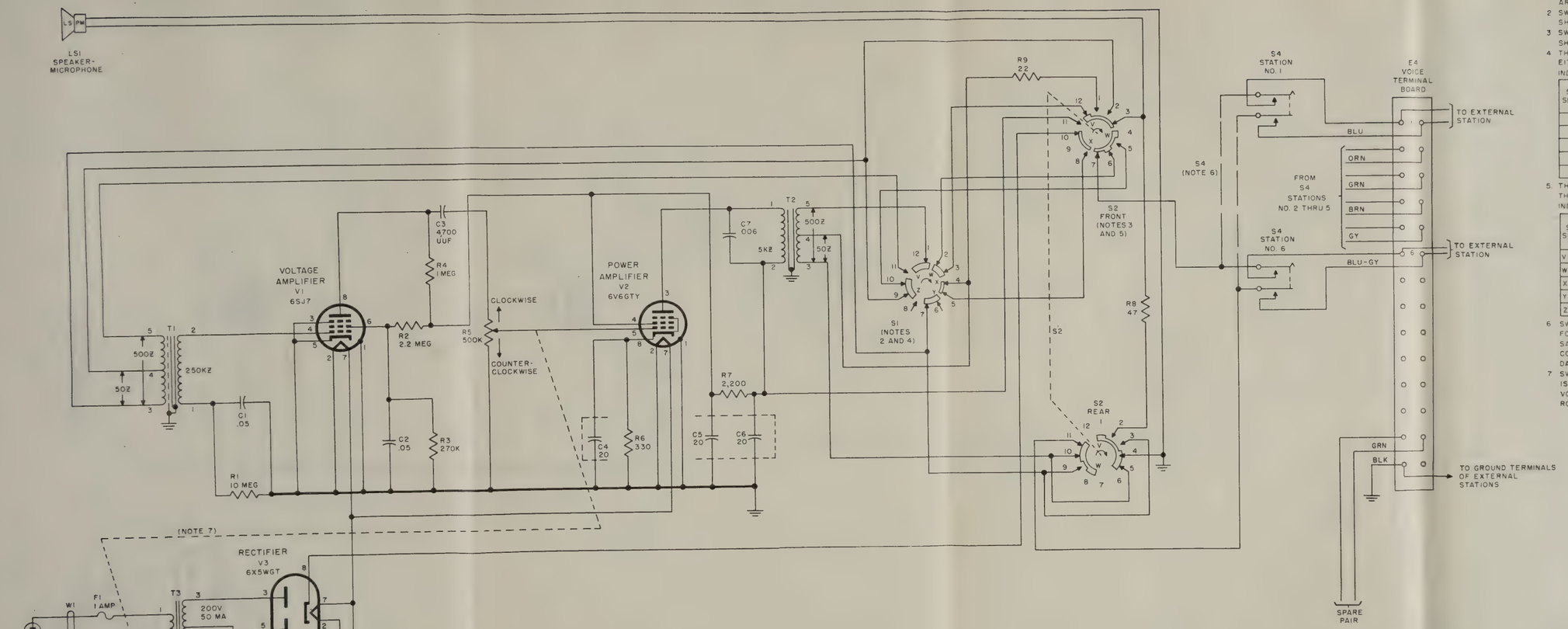


Figure 38. Intercommunicating Station LS–126A/FI, schematic diagram.

NOTES

1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF
2. SWITCH S1 IS VIEWED FROM KNOB END AND IS SHOWN IN 50Ω POSITION.
3. SWITCH S2 IS VIEWED FROM KNOB END AND IS SHOWN IN IDLE POSITION.
4. THE CLOSED CONTACTS FOR SWITCH S1, IN EITHER THE 50 OR 500Ω POSITION, ARE INDICATED IN THE CHART BELOW:

SWITCH SEGMENT	CLOSED CONTACTS	
	50Ω POSITION	500Ω POSITION
V	1 ONLY	1,2
W	2,3	3,4
X	4,5	5 ONLY
Y	6,7	7,8
Z	9,10	10,11

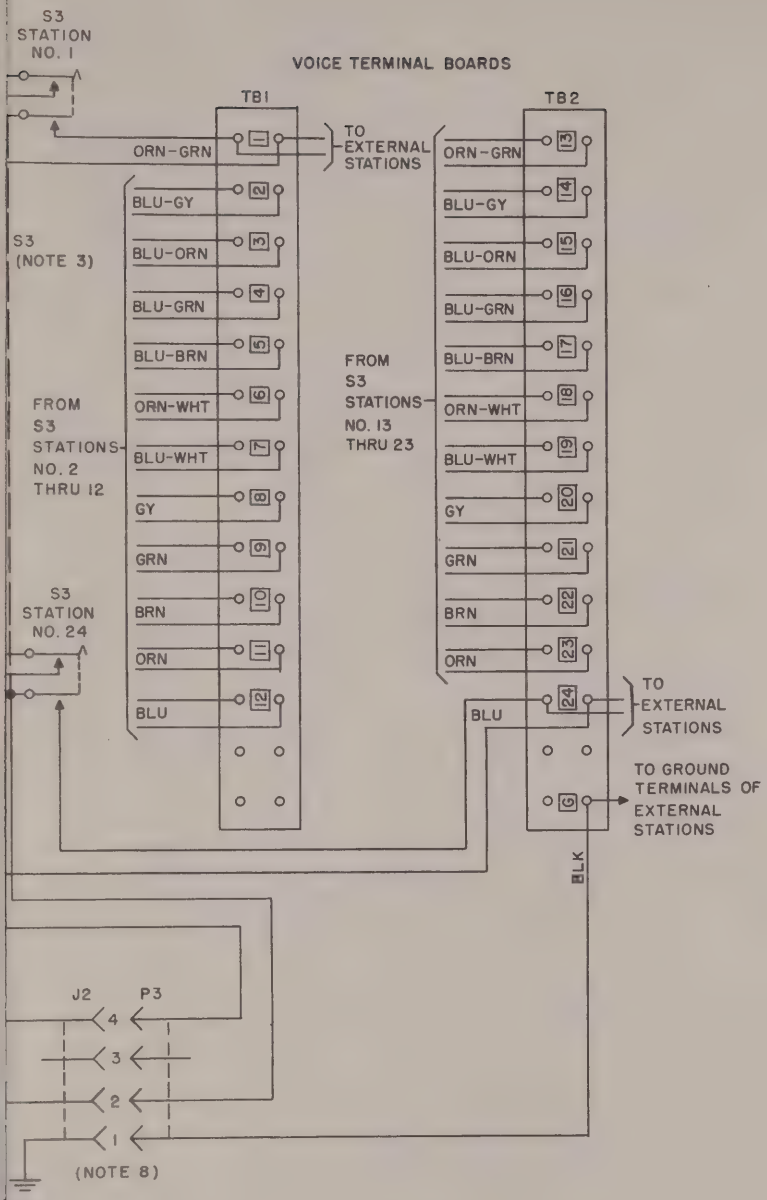
5. THE CLOSED CONTACTS FOR SWITCH S2 IN THE IDLE, LISTEN, AND TALK POSITIONS ARE INDICATED IN THE CHART BELOW.

SWITCH SEGMENT	CLOSED CONTACTS		
	IDLE POSITION	LISTEN POSITION	TALK POSITION
V (FRONT)	3,12	3,1	3,2
W (FRONT)	7,6	7,5	7,6,8
X (FRONT)	10 ONLY	10,11	10,11
Y (REAR)	4,5	4,5,2	4,3
Z (REAR)	10,11	11,9	11,10

6. SWITCH S4 SHOWS STATIONS NO 1 AND 6 WIRING FOR STATIONS NO 2 THRU 5 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO 1 AND 6 WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASH LINES.
7. SWITCH S3 IS OPEN WHEN VOLUME CONTROL R5 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R5 INCREASES GAIN WHEN ROTATED IN CLOCKWISE DIRECTION.

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S3
STATION
NO. 1
VOICE TERMINAL BOARDS
TB1
TB2
ORN-GRN
TO
EXTERNAL
STATIONS
BLU-GY
BLU-ORN
BLU-GRN
BLU-BRN
ORN-WHT
BLU-WHT
GY
GRN
BRN
ORN
BLU
S3
(NOTE 3)
FROM
S3
STATIONS
NO. 2
THRU 12
FROM
S3
STATIONS
NO. 13
THRU 23
S3
STATION
NO. 24
TO
EXTERNAL
STATIONS
TO GROUND
TERMINALS OF
EXTERNAL
STATIONS
BLK
J2
P3
4
3
2
1
(NOTE 8)

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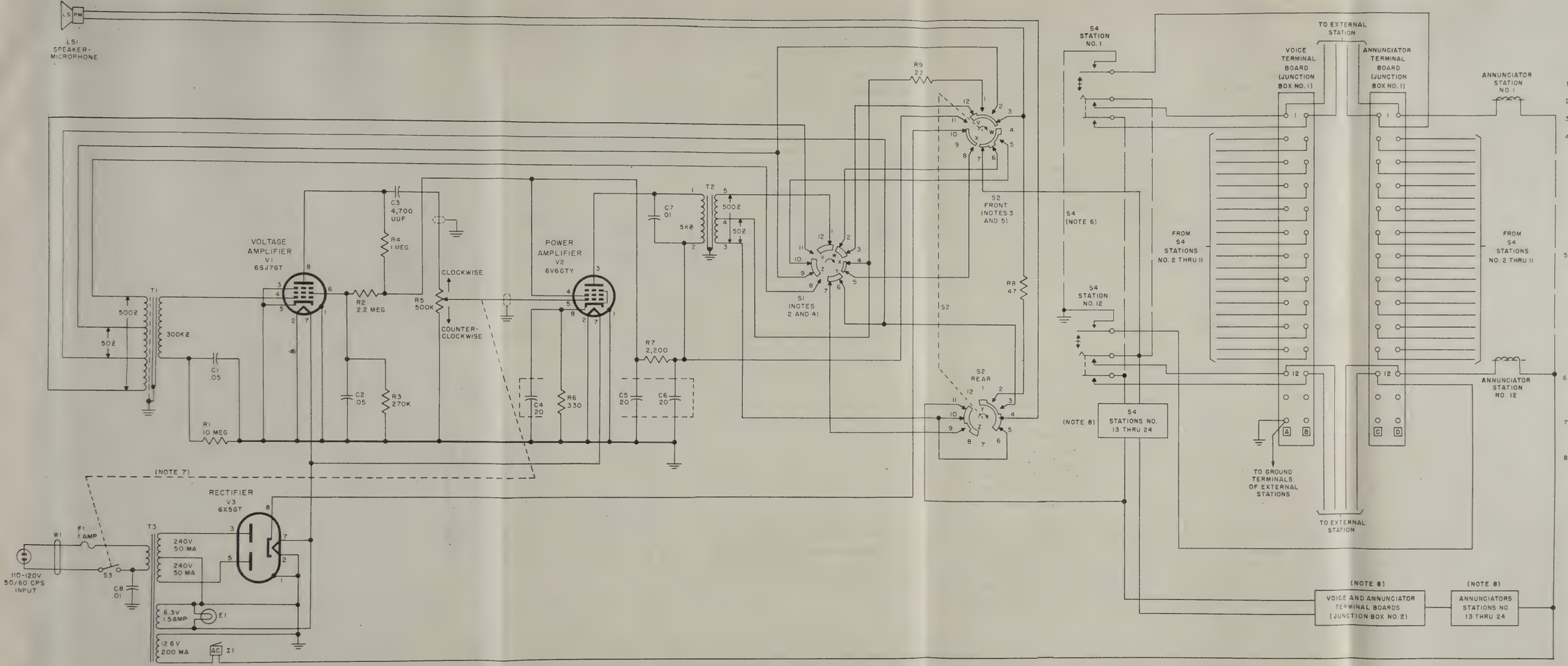


Figure 39. Intercommunicating Station LS–127A/F1, schematic diagram.

NOTES

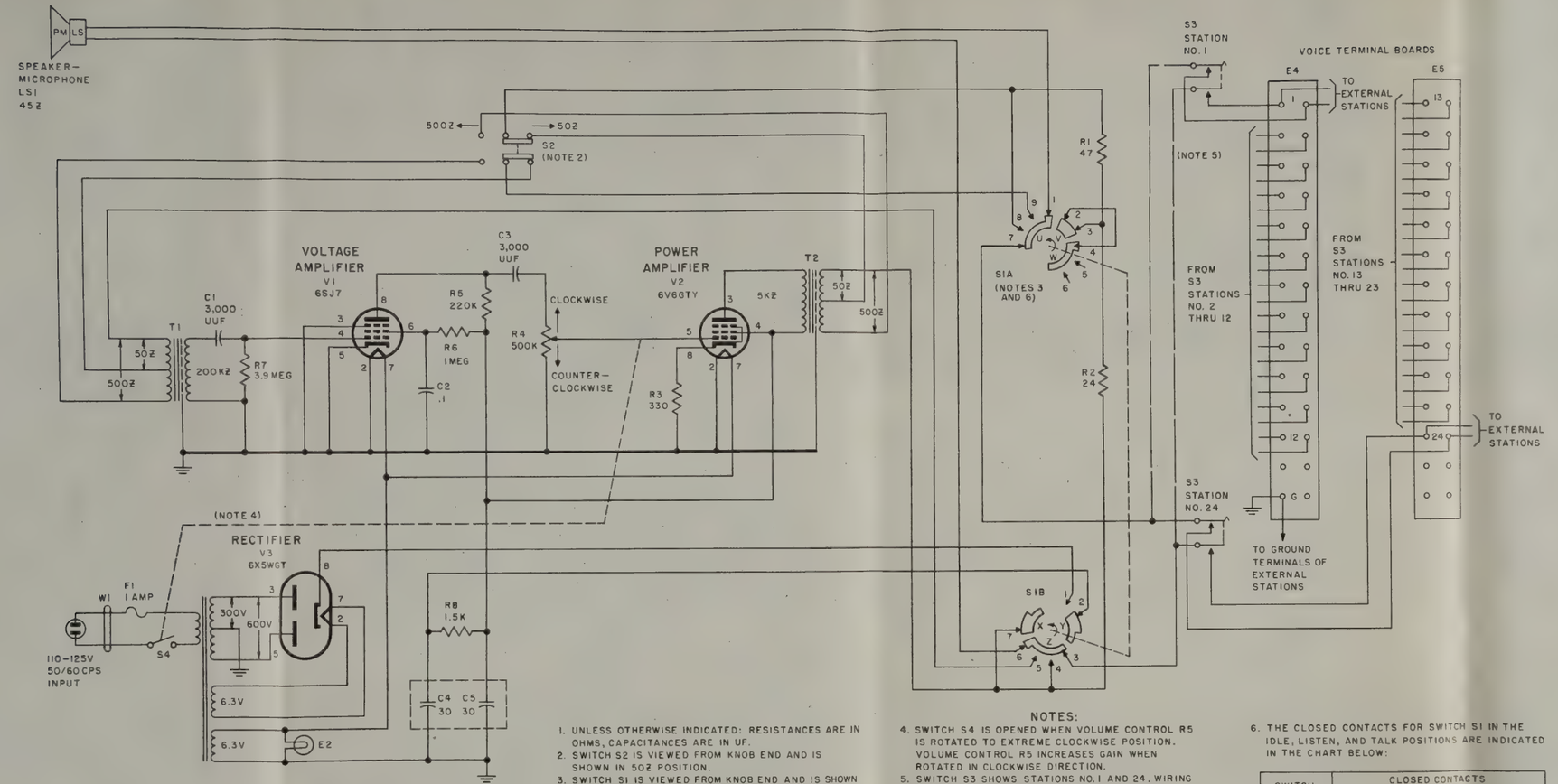
1. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF
2. SWITCH S1 IS VIEWED FROM KNOB END AND IS SHOWN IN 50Z POSITION
3. SWITCH S2 IS VIEWED FROM KNOB END AND IS SHOWN IN IDLE POSITION
4. THE CLOSED CONTACTS FOR SWITCH S1, IN EITHER THE 50 OR 500Z POSITION, ARE INDICATED IN THE CHART BELOW

SWITCH SEGMENT	CLOSED CONTACTS	
	50Z POSITION	500Z POSITION
V	1, ONLY	1, 2
W	2, 3	3, 4
X	4, 5	5 ONLY
Y	6, 7	7, 8
Z	9, 10	10, 11

5. THE CLOSED CONTACTS FOR SWITCH S2 IN THE IDLE, LISTEN, AND TALK POSITIONS ARE INDICATED IN THE CHART BELOW.

SWITCH SEGMENT	CLOSED CONTACTS		
	IDLE POSITION	LISTEN POSITION	TALK POSITION
V (FRONT)	3, 12	3, 1	3, 2
W (FRONT)	7, 6	7, 5	7, 6, 8
X (FRONT)	10 ONLY	9, 10	10, 11
Y (REAR)	4, 5	4, 5, 2	4, 3
Z (REAR)	10, 11	11, 9	11, 10

6. SWITCH S4 SHOWS STATIONS NO 1 AND 12 WIRING FOR STATIONS NO 2 THRU 11 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO 1 AND 12. WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASH LINES.
7. SWITCH S3 IS OPEN WHEN VOLUME CONTROL R5 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R5 INCREASES GAIN WHEN ROTATED IN CLOCKWISE DIRECTION.
8. CONNECTIONS TO VOICE AND ANNUNCIATOR TERMINAL BOARDS (JUNCTION BOX NO. 2), S4 (STATIONS NO. 13 THRU 24), AND ANNUNCIATORS (STATIONS NO 13 THRU 24 (NOT SHOWN) ARE IDENTICAL TO THOSE SHOWN FOR STATIONS NO. 1 THRU 12.



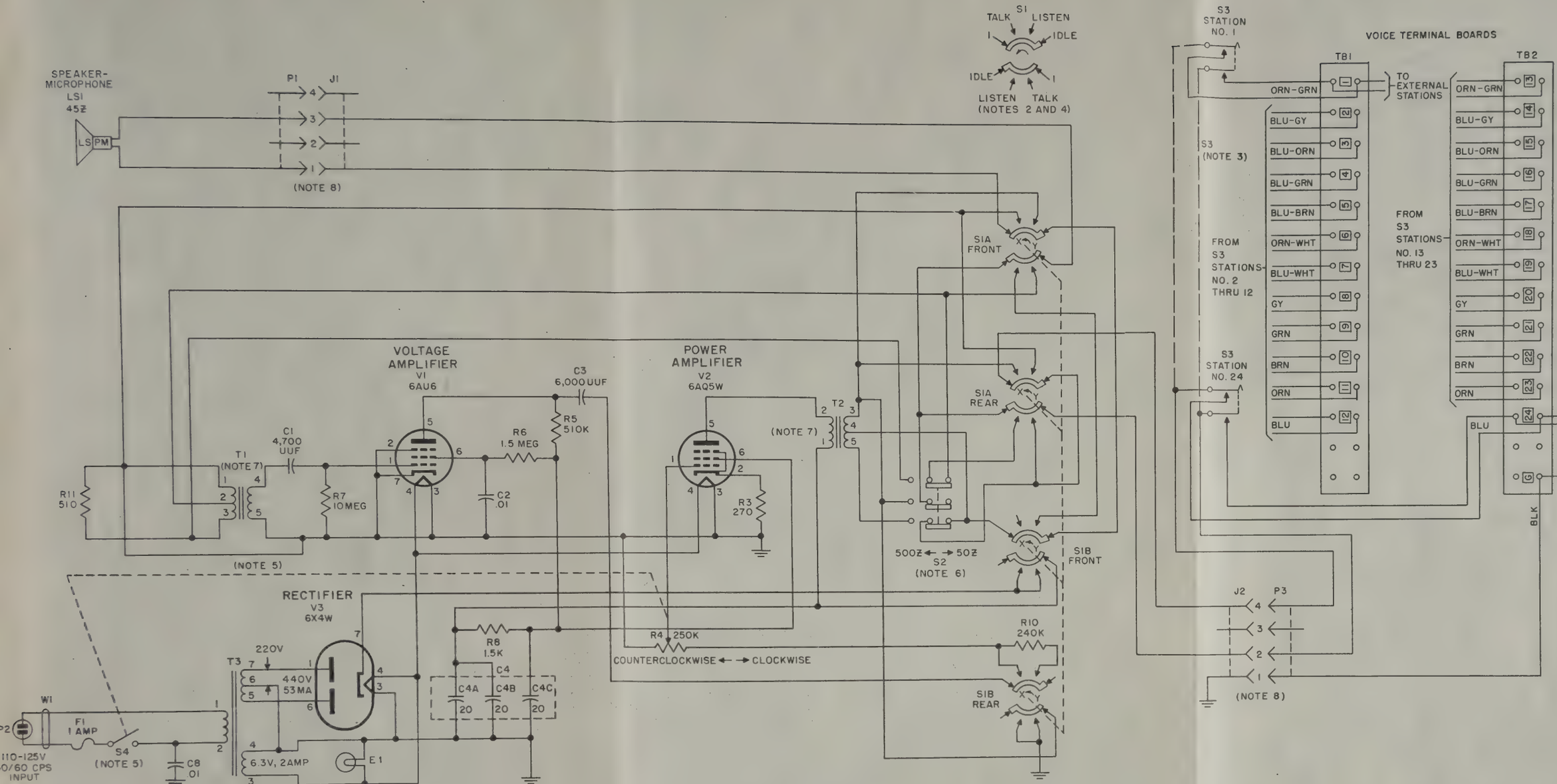
NOTES:

1. UNLESS OTHERWISE INDICATED: RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
2. SWITCH S2 IS VIEWED FROM KNOB END AND IS SHOWN IN 50Z POSITION.
3. SWITCH S1 IS VIEWED FROM KNOB END AND IS SHOWN IN IDLE POSITION. SIA IS NEAREST TO THE KNOB.
4. SWITCH S4 IS OPENED WHEN VOLUME CONTROL R5 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R5 INCREASES GAIN WHEN ROTATED IN CLOCKWISE DIRECTION.
5. SWITCH S3 SHOWS STATIONS NO. 1 AND 24. WIRING FOR STATIONS NO. 2 THROUGH 23 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO. 1 AND 24. WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASHED LINES.
6. THE CLOSED CONTACTS FOR SWITCH S1 IN THE IDLE, LISTEN, AND TALK POSITIONS ARE INDICATED IN THE CHART BELOW:

SWITCH SEGMENTS	CLOSED CONTACTS		
	IDLE POSITION	LISTEN POSITION	TALK POSITION
U (A)	1,7	7,9	7,8
V (A)	2,3	1,2	1,9
W (A)	4 ONLY	3,4	2,4
X (B)	7 ONLY	6,7	5,6
Y (B)	2 ONLY	1,2	1,2
Z (B)	3,6	3,5	3,4

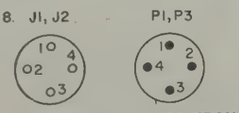
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Figure 40. Intercommunicating Station LS–128A/FI, schematic diagram.



NOTES:

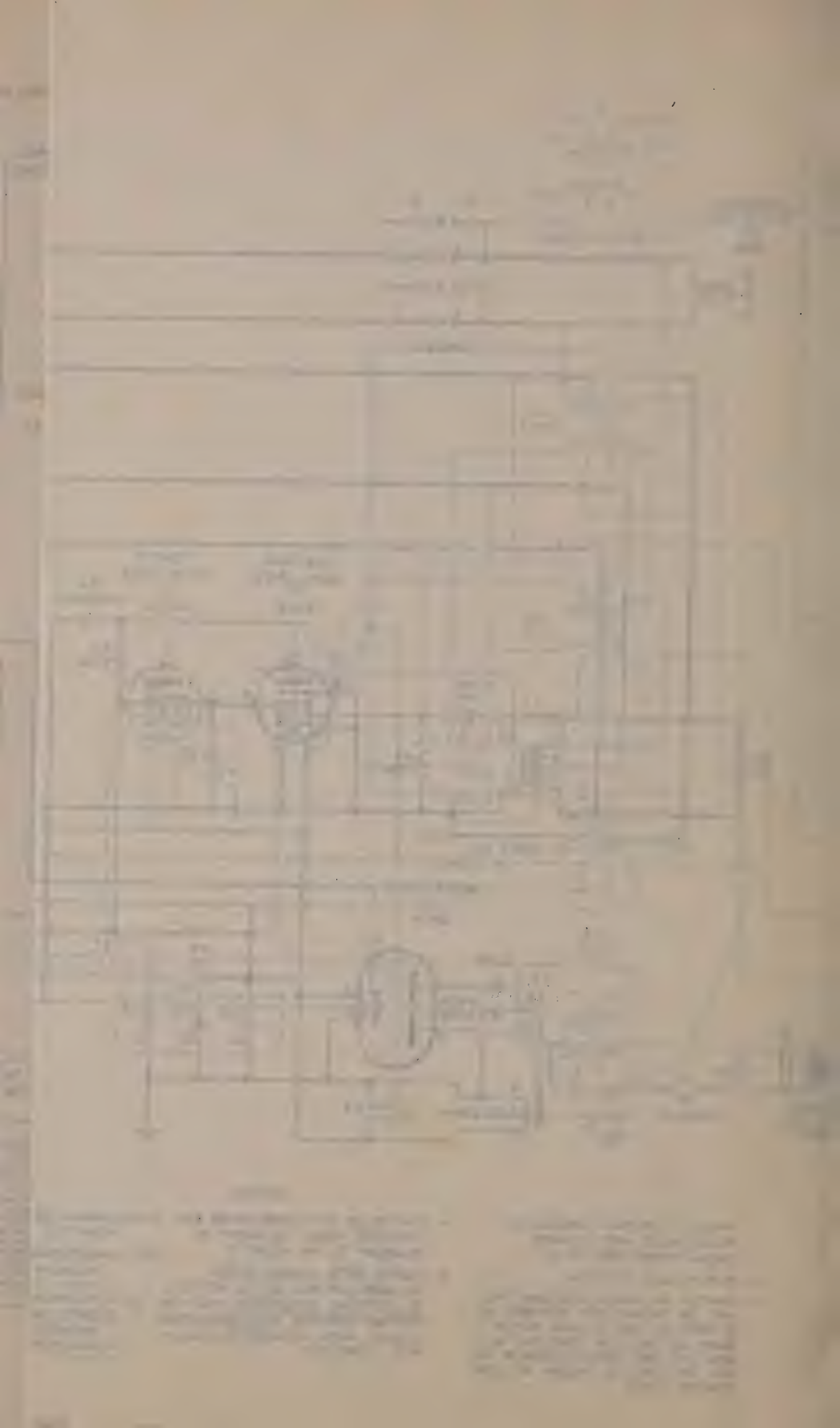
1. UNLESS OTHERWISE INDICATED: RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN UF.
2. S1 IS IN IDLE POSITION.
3. SWITCH S3 SHOWS STATIONS NO. 1 AND 24. WIRING FOR STATIONS NO. 2 THRU 23 (NOT SHOWN) IS THE SAME AS THAT FOR STATIONS NO. 1 AND 24. THE WIRING COMMON TO ALL SWITCHES IS SHOWN BY LONG DASHED LINES.
4. SWITCH S1 IS VIEWED FROM END OPPOSITE KNOB. S1A FRONT IS NEAREST TO THE KNOB.
5. SWITCH S4 IS OPENED WHEN VOLUME CONTROL R4 IS ROTATED TO EXTREME CLOCKWISE POSITION. VOLUME CONTROL R4 INCREASES VOLUME WHEN ROTATED IN CLOCKWISE DIRECTION.
6. SWITCH S2 IS SHOWN IN 50Z POSITION.
7. INPUT TRANSFORMER T1 DATA:
   PRIMARY 1-2=50Z
   1-3=500Z
   SECONDARY 4-5=200KZ
   OUTPUT TRANSFORMER T2 DATA:
   PRIMARY 1-2=5KZ
   SECONDARY 3-4=50Z
   3-5=500Z
8. J1, J2 P1, P3



CONNECTORS VIEWED FROM FRONT.

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Figure 41. Intercommunicating Station LS-128B/FI, schematic diagram.



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Replacing:		
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Buzzer I 1	66	50
Pilot lamp E1	51	38
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LS–125A/FI, LS–127A/FI, and LS–128A/FI.	51	38
LS–128B/FI	52	38
Power cable W1	65	49
Selector switch bank:		
LS–124B/FI, LS–124C/FI, and LS–126A/FI.	59	45
LS–125A/FI, LS–127A/FI, and LS–128A/FI.	60	47
LS–128B/FI	61	48
Speaker-microphone LS1:		
LS–124B/FI, LS–124C/FI, and LS–126A/FI.	63	49
LS–125A/FI, LS–127A/FI, LS–128A/FI, and LS–128B/FI.	64	49
Talk-listen switch S1:		
LS–125A/FI, LS–127A/FI, LS–128A/FI and LS–128B/FI.	58	45
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LS–124B/FI, LS–124C/FI, and LS–126A/FI.	57	42
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[AG 676.3 (11 July 56)]

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For explanation of abbreviations used, see SR 320–50–1.

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