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11-5089

TM 11-5089

TO 31W1-2FI-211

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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GOVERNMENT DOCUMENTS

INTERCOMMUNICATION STATIONS

LS-200/FI, LS-201/FI
LS-202/FI, AND
LS-125B/FI

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pages from Changes 1,2,3,4,6,7,and 8.

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DEPARTMENT OF THE ARMY

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WARNING
DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working on the 440-volt
and 220-volt plate and power supply circuits,
or on the 115-volt line connections.

DON'T TAKE CHANCES!

TAGO 1000-A, A.M.

TECHNICAL MANUAL

INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI
AND
INTERCOMMUNICATING STATIONS LS-125B/FI AND LS-127B/FI

TM 11-5089 }
CHANGES No. 1 }

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., 14 February 1956

TM 11-5089/TO 31W1-2F1-211, 29 August 1955, is changed as follows:

The title of the manual is changed to read:
Intercommunication Stations LS-200/FI, LS-201/
FI, LS-202/FI, and Intercommunicating Stations
LS-125B/FI and LS-127B/FI.

The following information changes TM 11-5089
so that the manual also applies to the following
equipments:

Nomenclature	Order No.	Serial No.
Intercommunicating Sta- tion LS-127B/FI.	29855-Phila-55	1 through 62

Page 3, Chapter 1. Add the following note at
the beginning of chapter 1:

Note. Intercommunicating Station LS-127B/FI pro-
cured on Order No. 29855-Phila-55 is similar to Inter-
communication Station LS-202/FI except for reference
symbol assignment, color code of wiring, and the omission
of the handset from LS-127B/FI. The reference symbol
assignment and color cord of wiring for LS-127B/FI are
identical with the reference symbol assignment and color
code of wiring for LS-125B/FI bearing Order No. 7541-
Phila-54 and No. 19088-Phila-55, covered in this manual.
All information in this technical manual applies equally to
Intercommunicating Station LS-127B/FI unless otherwise
specified.

Change "LS-125B/FI" to read: Intercommuni-
cating Stations LS-125B/FI and LS-127B/FI in
the following places in the manual:

Condensed Operating Instructions (TM 5089-
45). Line 5.

Page 3, paragraph 1a. Line 4.

Page 3, paragraph 1c. Line 4.

Page 4, paragraph 6. Heading.

Page 10, paragraph 13a. Line 6.

Add "and LS-127B/FI" after "LS-125B/FI"
in the following places in the manual:

Condensed Operating Instructions (TM 5089-
46). Line 17.

Page 21, Note 1. Line 2.

Page 26, Note. Line 2.

Page 34, Note. Lines 2 and 4.

Page 43, Note 3. Lines 2 and 3.

Add "and LS-127B/FI" after "LS-202/FI" in
the following places in the manual:

Page 4, paragraph 3c. Line 2.

Page 4, paragraph 6a. Line 2.

Page 6, figure 5. Caption.

Page 7, paragraph 10c. Line 3.

Page 10, paragraph 13b. Line 7.

Page 11, figure 9. Note 3. Line 1.

Page 12, figure 10. Note 4. Line 1.

Page 13, figure 11. Note 3. Line 1.

Page 15, figure 12. Note 4. Line 1.

Page 16, paragraph 17a. Last line.

Page 16, paragraph 17b(2). Line 6.

Page 18, figure 15. Caption.

Change "Intercommunication Stations LS-201/
FI and LS-125B/FI" to read:

Intercommunication Station LS-201/FI and
Intercommunicating Station LS-125B/FI in the
following places in the manual:

Page 3, paragraph 1c. Lines 4 and 5.

Page 3, paragraph 3c. Lines 3 and 4.

Change "Intercommunication Station LS-125B/
FI" to read:

Intercommunicating Station LS-125B/FI in the
following places in the manual:

Page 6, figure 6. Caption.

Page 58, figure 37. Caption.

Figure 40. (Fold-out). Caption.

Page 4, paragraph 5c. Add the following data to the chart at the bottom of the page:

Equipment	Type of shipment	Weight (lb.)	Width (in.)	Depth (in.)	Volume (cu ft.)	Weight (lb.)
LS-127B/FI.....	Domestic.....	13	25½	9	1.9	28
	Export.....	14	26½	10	2.3	31

Page 5, paragraph 6a. Line 2. Change "b, c, d, and e below" to read: b, c, d, e, and f below.

Page 5, paragraph 6

f. (Added) The LS-127B/FI is similar to the LS-202/FI except that it is not equipped with a handset. Instructions in the manual pertaining to the LS-202/FI are equally applicable to the LS-127B/FI, except those instructions explaining the use of the handset.

Page 6, figure 5. Make the following changes in figure 5:

Change the caption to read: Intercommunication Station LS-202/FI and Intercommunicating Station LS-127B/FI.

Add the following note:

NOTE. THE LS-127B/FI DOES NOT CONTAIN A HANDSET OR CRADLE ASSEMBLY.

Page 16, paragraph 17b(2). Delete the last sentence and substitute the following: On equipments bearing Order No. 7541-Phila-54, 19988-Phila-55, or 29855-Phila-55, remove the red and black conductors.

Page 23, paragraph 26. Change the heading to read: Conference Call in Systems Not Having Privacy Feature

Page 24.

26.1. Conference Call in Systems Having Privacy Feature (Added)

a. Call each station individually, using the procedure described in paragraph 25c.

b. As each called station answers, inform the operator that a conference call is being initiated. Ask the called station operator to operate the talk-listen switch to the idle position (fig. 18) and stand by.

c. After all stations to be included in the conference have been contacted, provide the first

called station with the identity of the other called station or stations, and request him to set the station selector switch, of any one of the identified stations, in the up position. (Each station selector switch is marked with the identity of the station connected to it.) Inform the first called station operator that this switch must remain in the up position for the duration of the conference.

d. When all stations are standing by, press the talk-listen switch to the talk position (fig. 18) and deliver the message.

e. If a reply is required from a particular station, tell that station operator to deliver the reply; then set the talk-listen switch in the idle position (fig. 18).

f. At the completion of the conference call, restore all station selector switches to their off (horizontal) positions. Set the talk-listen switch in the idle position.

Page 28, paragraph 32. Make the following changes in paragraph 32:

Line 6. After "Multimeter TS-352/U", add the following: Test Set TS-190/U.

Line 7. Delete "Carbon tetrachloride" and substitute: Cleaning Compound (Federal stock No. 7930-395-9542).

Page 28, paragraph 34b(2). Make the following changes in paragraph 34b(2):

Line 2. Delete "carbon tetrachloride" and substitute: Cleaning Compound.

Delete the entire "Caution" notice and substitute the following:

Warning: Prolonged breathing of cleaning compound fumes is dangerous. Make sure that adequate ventilation is provided. Cleaning compound is flammable; do not use near a flame.

Page 31, paragraph 39b. Add the following at the end of subparagraph b:

The controls on the LS-127B/FI are the same

as the controls on the LS-202/FI except that no handset is provided with the LS-127B/FI.

Page 43, chapter 6. Note 3. Change the first sentence to read: The information in this chapter is applicable to the LS-125B/FI and LS-127B/FI, which are almost identical with the LS-201/FI and LS-202/FI, respectively.

Page 44, paragraph 57. In the chart at the bottom of the page, delete "Test Set TS-190/U" from the "Test equipment" column and "TM 11-468" from the "Technical manual" column.

Page 54, paragraph 73. Change the first sentence to read:

The following test equipment is required for final testing of Intecommunication Stations LS-200/FI, LS-201/FI, LS-202/FI; and Intercommunicating Stations LS-125B/FI and LS-127B/FI.

Figure 35 (fold-out). Make the following changes to figure 35:

Change the caption to read: Intercommunicating Stations LS-125B/FI and LS-127B/FI, schematic diagram.

Add the following to "NOTES":

8. ON THE LS-127B/FI, SWITCH BANK INCLUDES 24 STATION SELECTOR SWITCHES (STATIONS NO. 1 THRU 24). THE LS-127B/FI ALSO CONTAINS TWO ADDITIONAL TERMINAL BOARDS (VOICE (TB5) AND ANN. (TB6)) NUMBERED 13 THRU 25. SWITCH BANK 84, STATION [AG 413.43 (10 Feb 56)]

NO. 24, IS CONNECTED TO TERMINALS 24 ON TB5 AND TB6. THE PRIVACY LINE, PINS 2 AND 3 OF PLUG P3, IS CONNECTED TO TERMINALS NUMBERED 25 ON TB5.

Page 59, figure 41. Change the caption to read: Intercommunicating Stations LS-125B/FI (Order No. 7541-Phila-54 and No. 19988-Phila-55) and LS-127B/FI, chassis wiring diagram.

Figure 42 (fold-out). Make the following changes to figure 42: Change the caption to read: Intercommunicating Stations LS-125B/FI (Order No. 7541-Phila-54 and No. 19988-Phila-55) and LS-127B/FI, cabinet wiring diagram.

Add the following to "NOTES":

5. THE LS-127B/FI IS WIRED THE SAME AS SHOWN HERE EXCEPT THAT TWO BANKS OF 12 SWITCHES AND TWO JUNCTION BOXES (JB1 AND JB2) ARE USED. THERE IS AN ADDITIONAL BLACK LEAD FROM THE SWITCH FOR STATION 24, PIN 1, TO THE TERMINAL MARKED G IN THE SECOND JUNCTION BOX JB2. THE CONNECTIONS BETWEEN EACH BANK OF 12 SWITCHES ARE THE SAME AS THE CONNECTIONS BETWEEN EACH BANK OF 6 SWITCHES SHOWN HERE. STATIONS 13 TO 24 ARE WIRED THE SAME AS STATIONS 1 TO 12 EXCEPT THAT PINS 2 AND 3 OF PLUG P3 ARE WIRED TO TERMINALS 25 OF TERMINAL BOARD TB5 IN JUNCTION BOX JB2, AND TERMINALS 13 ON TERMINAL BOARD TB2 ARE NOT USED.

By Order of *Walter M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

JOHN A. KLEIN,
Major General, United States Army,
The Adjutant General.

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Sch (25)
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Gen Depot (None)
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11-16R, Hq & Hq Co, Sig Bn,
Corps or Abn Corps (2)
11-57R, Armd Sig Co (2)
11-127R, Sig Depot Co (2)
11-128R, Sig Depot Co (2)
11-500R (AA-AE) Sig Svc Org (2)
11-557C, Abn Sig Co (2)
11-567R, Sig Base Maint Co (2)
11-592R, Hq & Hq Co, Sig Base
Depot (2)
11-597R, Sig Base Depot Co (2)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

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

012-008

INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI, LS-126B/FI
AND
INTERCOMMUNICATING STATIONS LS-125B/FI AND LS-127B/FI

TM 11-5089
TO 31W1-2FI-241
CHANGES No. 2

TM 11-5089/TO 31W1-2FI-241, 29 August 1955, is changed as follows, so that the manual applies also to the following equipment:

<i>Nomenclature</i>	<i>Order No.</i>
Intercommunication STATION LS-126B/FI.	38651-Phila-56

Change the title of the manual to: INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI, LS-126B/FI AND INTERCOMMUNICATING STATIONS LS-125B/FI and LS-127B/FI.

Note. The parenthetical reference to previous changes (example: p. 1, C 1) indicates that pertinent material was published in C 1.

Add "and LS-126B/FI" after "LS-202/FI" in the following places:

Front page, Condensed operating instructions, line 5.

Page 3, paragraph 1a, line 4.

Page 3, paragraph 1c, line 3.

Page 4, paragraph 6, paragraph heading.

Page 54, paragraph 73, line 3 (p. 3, C 1).

Add "and LS-126B/FI" after "LS-200/FI" in the following places:

Page 3, paragraph 3c, line 1.

Page 11, figure 9, note 2.

Page 13, figure 11, note 2.

Add "and 35.1" after "figs. 34 and 35" in the following places:

Page 34, paragraph 47, line 10.

Page 41, paragraph 50a, line 11.

Page 41, paragraph 52a, line 2.

Page 48, paragraph 54, line 5.

Page 3, chapter 1 (p. 1, C 1). Change the word "Note" to: Notes. Number the existing note "1" and add the following:

2. Intercommunication Station LS-126B/FI is similar to Intercommunicating Station LS-125B/FI except that the LS-126B/FI has no provisions for annunciator signaling and contains only 6 station selector switches instead of 12. Except

DEPARTMENTS OF THE ARMY AND
THE AIR FORCE

WASHINGTON 25, D. C., 26 August 1957

for information covering the handset and annunciators, information in this manual applies to the LS-126B/FI unless otherwise specified.

Page 4, paragraph 5c (p. 2, C 1). Add the following to the chart at the bottom of the page:

Equipment	Type of Shipment	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Weight (lb)
LS-126B/FI	Domestic...	13	21	9	1.3	20
	Export.....	14	22	10	1.6	25

Page 4, paragraph 6. Make the following changes:

a. line 3. Change "and LS-125B/FI (fig. 6)" to: LS-125B/FI (fig. 6) and LS-126B/FI (fig. 6.1).

a, last line (p. 2, C 1). Change the last line to: Each intercom set is described individually in b through g below.

f (p. 2, C 1). Add the following:

g. (Added) The LS-126B/FI (fig. 6.1) is similar in appearance to the LS-200/FI except that it is not equipped with annunciators or a handset. Instructions in this manual pertaining to the LS-200/FI are equally applicable to the LS-126B/FI except those which explain the use of the handset or annunciators.

Page 16, paragraph 17a. After the last sentence, add: Refer to figure 37.1 when cutting jumpers on the LS-126B/FI. Cut the jumpers on the LS-126B/FI only when another master station is connected into the system.

Page 21, chapter 3. Delete note 1 and substitute:

1. The operation of all the intercom sets described in this manual is the same except as follows:

- a. When operating the LS-125B/FI or LS-127B/FI disregard procedures concerning the handset.

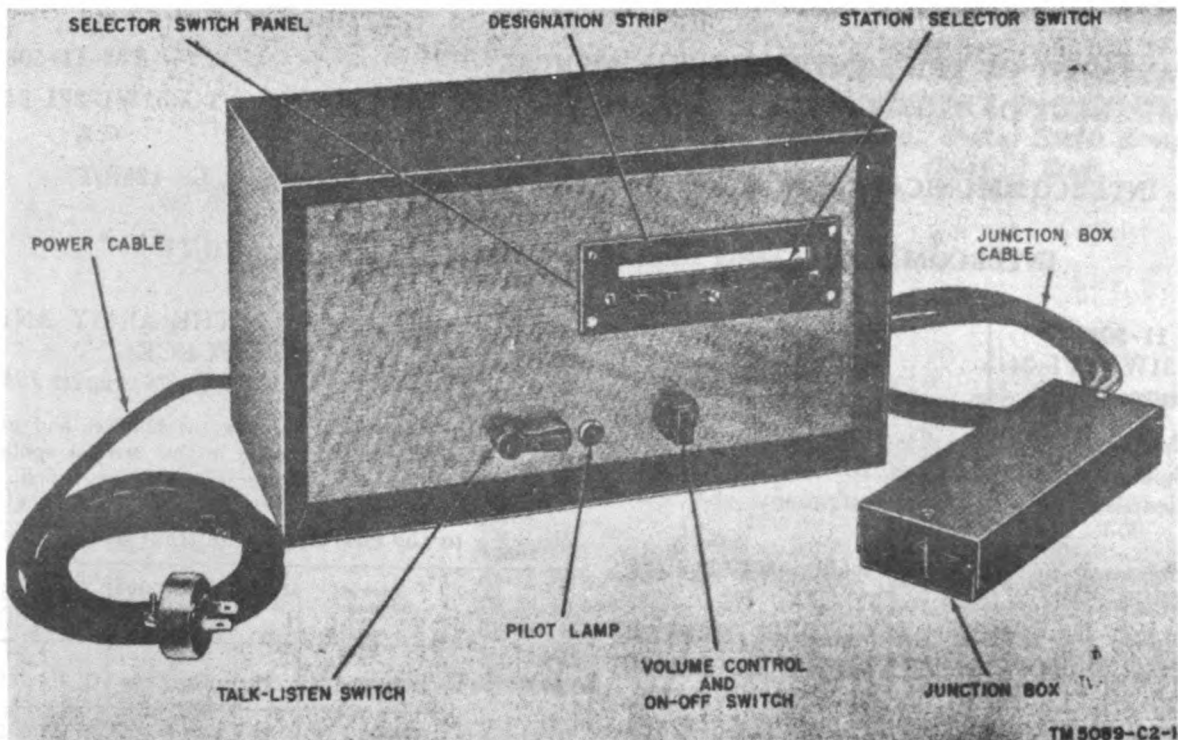


Figure 6.1. (Added) Intercommunication Station LS-126B/FI.

- b. When operating the LS-126B/FI, disregard procedures concerning the operation of the annunciators, handset, and the nonlocking position of the station selector switch.

Page 26, chapter 4, note. After the last sentence, add: These maintenance instructions are also applicable to the LS-126B/FI, except for the information and procedures pertaining to the annunciators and handset.

Page 31, paragraph 39b (page 2, C 1). After the last sentence, add the following: The control information in paragraph 40 applies equally to Intercommunication Station LS-126B/FI, except that no handset, buzzer, or annunciators are provided on the equipment.

Page 34, chapter 5, note. After the last sentence, add the following: This information and figures 23 through 27 are also applicable to the LS-126B/FI, except for the reference symbols, which are the same as those for the LS-125B/FI, and the information pertaining to the handset, annunciator, and buzzer circuits.

Page 43, chapter 6, notes. Add note 4:

4. The information in this chapter is also applicable to the LS-126B/FI. Reference symbols shown in parentheses per-

tain to the LS-126B/FI, except for those pertaining to the handset, buzzer, or annunciator components. The wiring for the LS-126B/FI is different from the other intercom sets and is shown in figures 37.1 (chassis wiring diagram) and 40.1 (cabinet wiring diagram).

Page 44, paragraph 56, chart. Make the following changes: Change the information for figure 35 to read: Intercommunicating Stations LS-125B/FI and LS-127B/FI, overall schematic diagram; Intercommunication Station LS-126B/FI partial schematic diagram A.

Add the following to the chart:

Fig.	Par.	Description
35.1	-----	Intercommunication Station LS-126B/FI, partial schematic diagram B.
37.1	-----	Intercommunication Station LS-126B/FI, chassis wiring diagram.
40.1	-----	Intercommunication Station LS-126B/FI, cabinet wiring diagram.

Figure 35 (fold-out) (page 3, C 1). Make the following changes: Change the caption to: Intercommunicating Stations LS-125B/FI and LS-127B/FI, overall schematic diagram; and Inter-

communication Station LS-126B/FI, partial schematic diagram A.

Add the following to the notes:

9. THIS SCHEMATIC DIAGRAM IS APPLICABLE TO THE LS-126B/FI

ONLY WHEN THE EXTREME RIGHT-HAND END IS COVERED BY AND MATCHED WITH; LS-126B/FI PARTIAL SCHEMATIC DIAGRAM A.

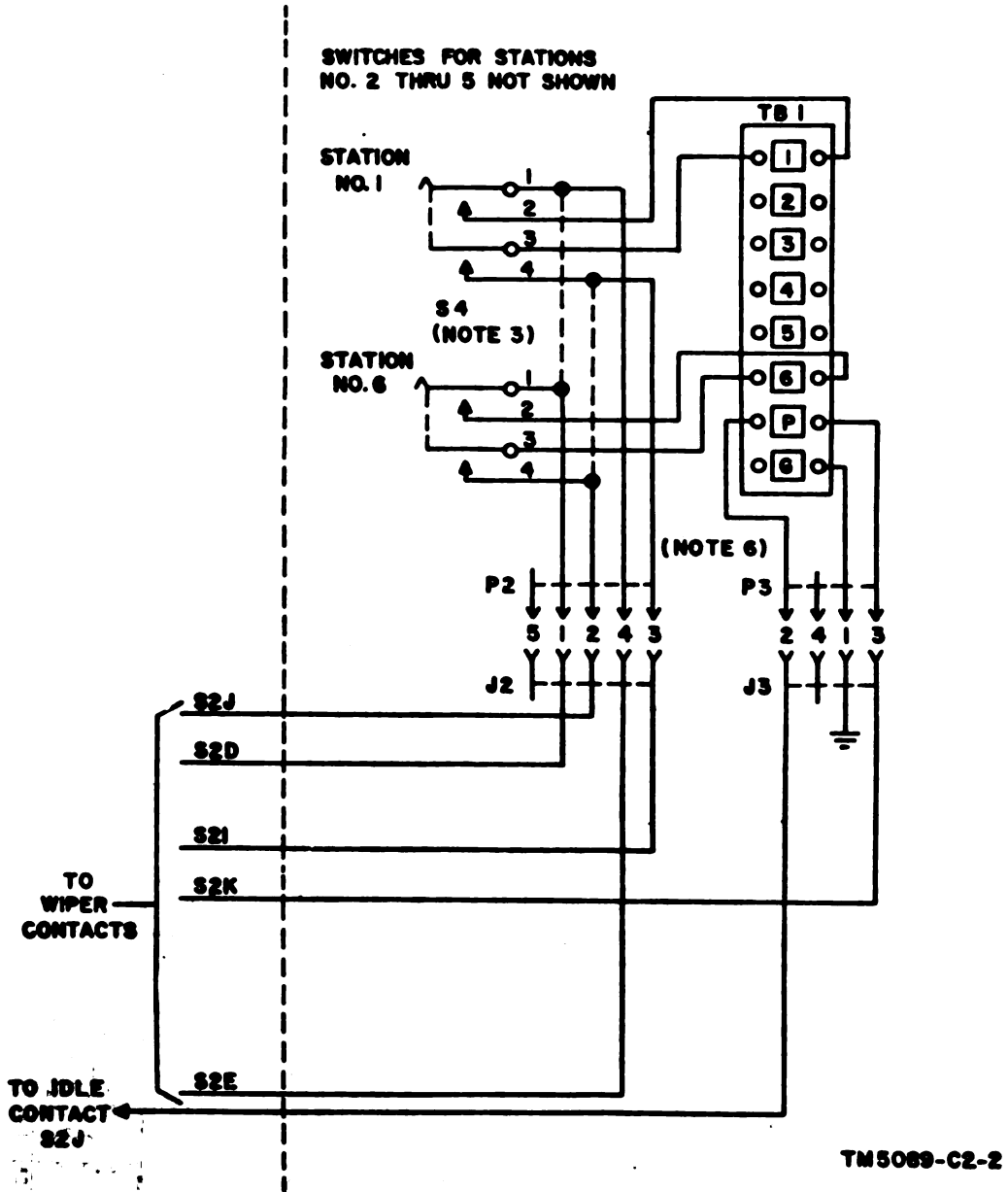
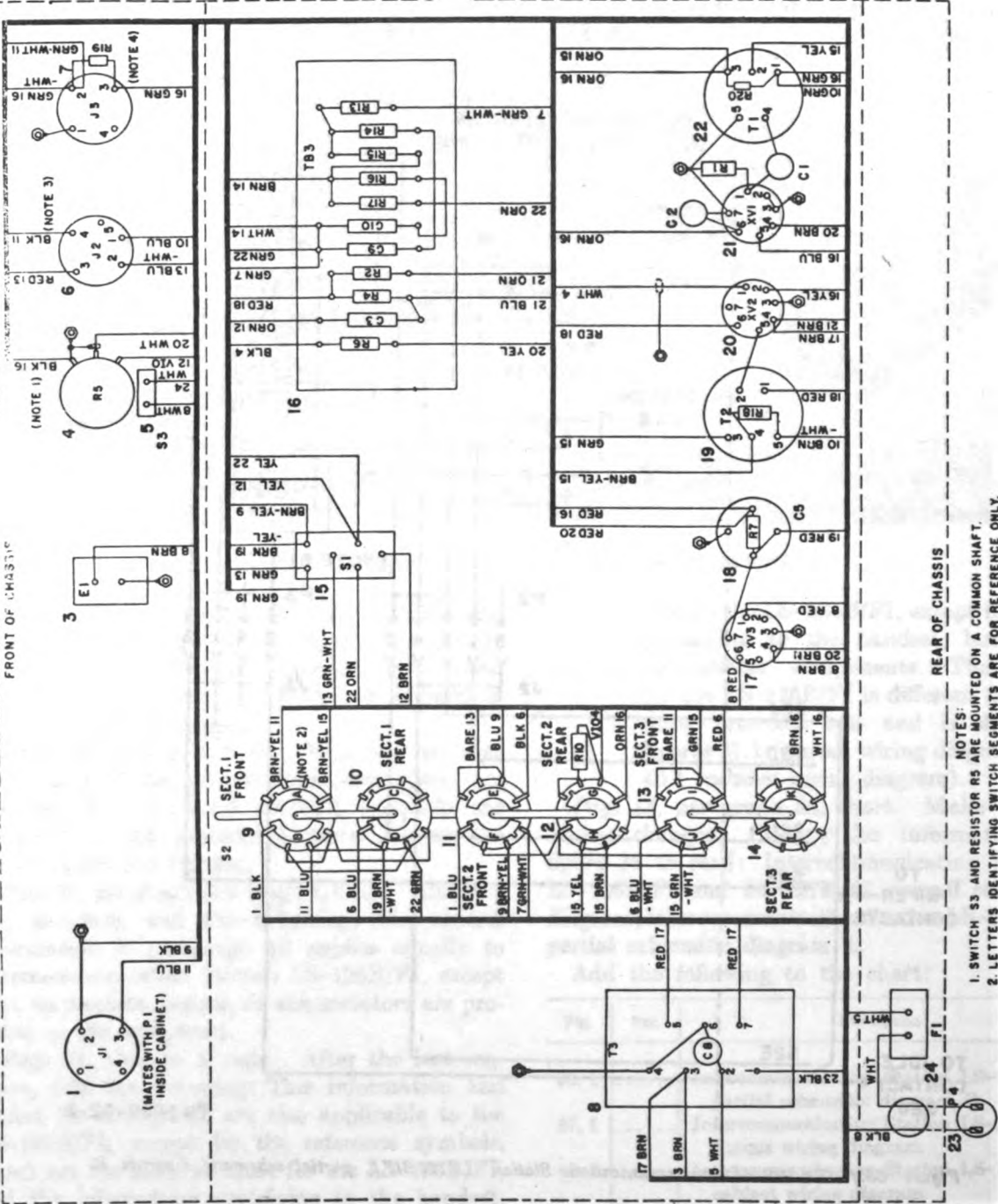
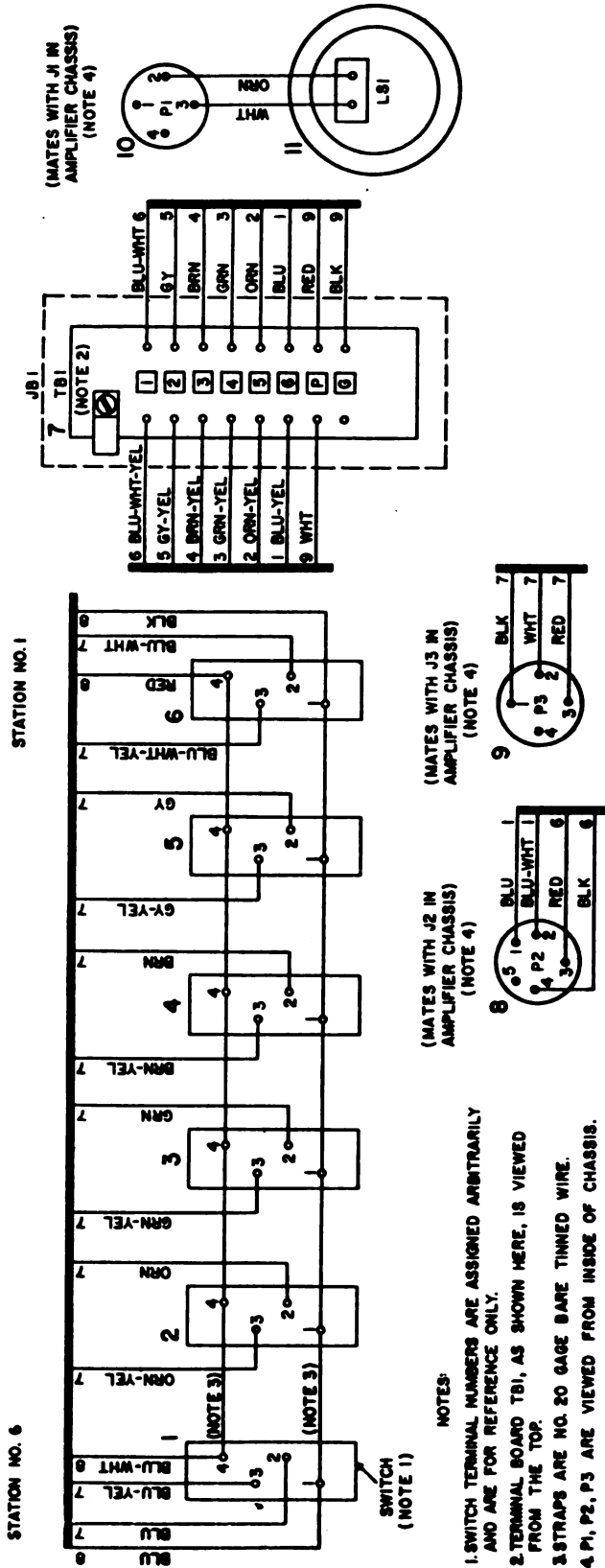


Figure 35.1. (Added) Intercommunication Station LS126B/FI, partial schematic diagram B.



TN5009-C2-3

Figure 37.1. (Added) Intercommunication Station LS-148B/F1, chassis wiring diagram.



TM 5089-C2-4

Figure 40.1. (Added) Intercommunication Station I.S.-128B/F/I, cabinet wiring diagram.

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

MAXWELL D. TAYLOR,
*General, United States Army,
Chief of Staff.*

OFFICIAL:

HERBERT M. JONES,
*Major General, United States Army;
The Adjutant General.*

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OS Maj Comd	AFIP	USA Elet PG	11-592
MDW	AMS	Sig Fld Maint Shops	11-597
Armies	Watertown Arsenal	Sig Lab	

NG: State AG; units—same as Active Army

USAR: None.

For explanation of abbreviations used, see AR 320-50.

INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI, LS-126B/FI, LS-124D/FI
AND INTERCOMMUNICATING STATIONS LS-125B/FI AND LS-127B/FI

TM 11-5089
TO 31W1-2FI-241
CHANGES No. 3

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D. C., 6 February 1958

TM 11-5089/TO 31W1-2FI-241, 29 August 1955, is changed as follows:

The following information changes TM 11-5089/TO 31W1-2FI-241 so that the manual applies also to the following equipments:

Nomenclature	Order No.
Intercommunication Station LS-124D/FI.	52478-Phila-58
Intercommunicating Stations LS-125B/FI and LS-127B/FI.	51088-Phila-57

Change the title of the manual to: INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI, LS-126B/FI, LS-124D/FI, AND INTERCOMMUNICATING STATIONS LS-125B/FI AND LS-127B/FI.

Change "and LS-126B/FI" to "LS-126B/FI and LS-125D/FI" in the following places in the manual:

Front page: Condensed operating instructions, line 5 (page 1, C 2).

Page 3, paragraph 1a, line 4 (page 1, C 2).

Page 3, paragraph 1c, line 3 (page 1, C 2).

Page 4, paragraph 6, heading (page 1, C 2).

Page 54, paragraph 73, line 3 (page 1, C 2).

Change "Intercommunication Station LS-200/FI and LS-126B/FI" to "Intercommunication Stations LS-200/FI, LS-126B/FI, and LS-124D/FI" in the following places in the manual:

Page 3, paragraph 3c, line 1 (page 1, C 2).

Page 11, figure 9, note 2 (page 1, C 2).

Page 13, figure 11, note 2 (page 1, C 2).

Add "and LS-124D/FI" after "LS-126B/FI" in the following places in the manual:

Page 26, chapter 4, note (page 2, C 2).

Page 34, chapter 5, note, last sentence (page 2, C 2).

Page 3, chapter 1, note 1, second sentence (page 1, C 1). Change "cord" to read: code.

Page 3, chapter 1 (page 1, C 2).

Note 3 (Added). Intercommunication Station LS-124D/FI is similar to Intercommunication Station

LS-126B/FI except that the LS-124D/FI contains 12 stations instead of 6. Except for information covering the handset and annunciators, information in this manual applies to the LS-124D/FI unless otherwise specified.

Page 3, paragraph 2.

b. (Superseded) Fill out and forward DA Form 468, Unsatisfactory Equipment Report, to Commanding Officer, U. S. Army Signal Equipment Support Agency, Fort Monmouth, N. J., as prescribed in AR 700-38.

c. (Superseded) Fill out and forward AFTO Form 29, Unsatisfactory Report, to Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AFTO 00-35D-54.

Page 4, paragraph 5c. Add the following data to the chart at the bottom of the page:

Equipment	Type of shipment	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Weight (lb)
LS-124D/FI.	Domestic	13	21	9	1.3	20
	Export	14	22	10	1.6	25

Page 4, paragraph 6 (page 1, C 2). Make the following changes:

a, line 3. Change "and LS-126B/FI (fig. 6.1)" to: LS-126B/FI (fig. 6.1) and LS-124D/FI (fig. 6.2).

a, last line (page 1, C 2). Change "g" to: *h.* *g* (page 1, C 2).

h. (Added) The LS-124D/FI (fig. 6.2) is similar in appearance to the LS-125B/FI except that it is not equipped with annunciators. Instructions in this manual pertaining to the LS-125B/FI are equally applicable to the LS-124D/FI except those which explain the use of the annunciators and the nonlocking position of the station selector switch.

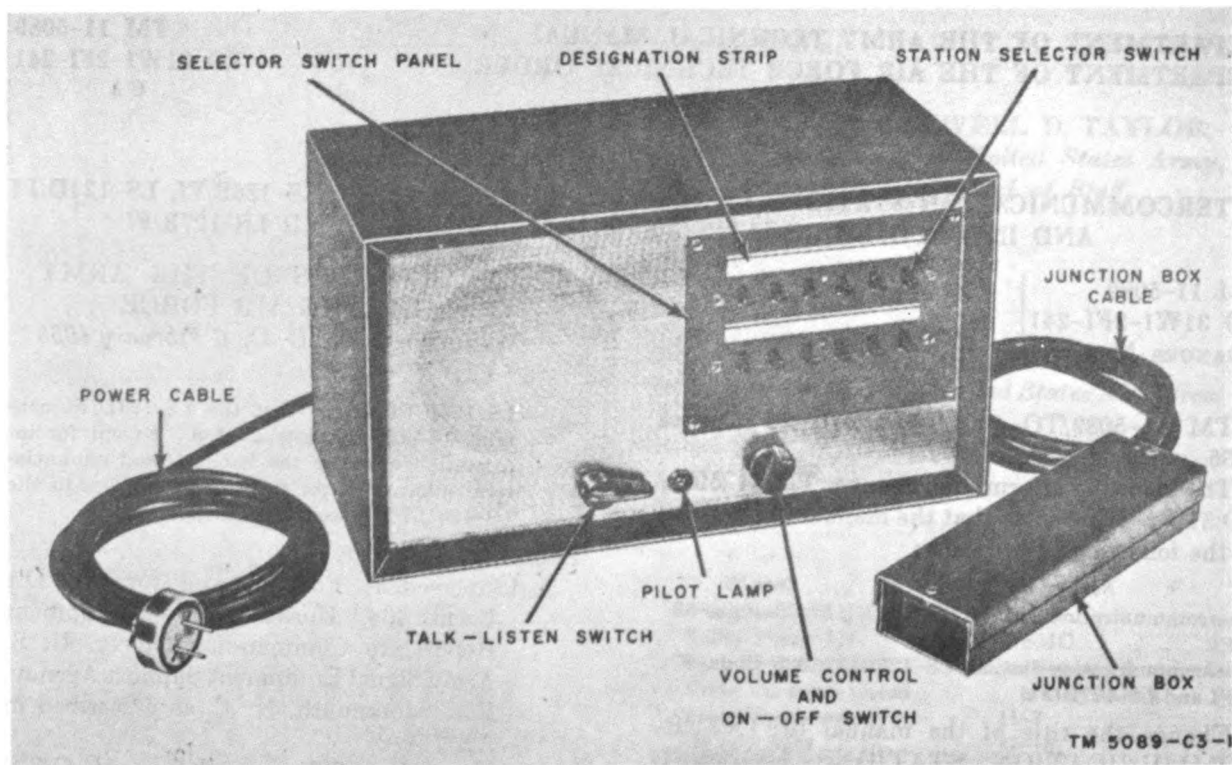


Figure 6.2. (Added) Intercommunication Station LS-124D/FI.

Page 16, paragraph 17a (page 1, C 2). Delete the last two sentences and substitute: Refer to figure 40.1 when cutting jumpers on the LS-126B/FI or the LS-124D/FI. Cut jumpers on the LS-126B/FI and the LS-124D/FI only when another master station is connected in the system.

Page 21, chapter 8, note 1b (page 2, C 2). After "LS-126B/FI," add: or the LS-124D/FI.

Page 31, paragraph 39b, last sentence (page 2, C 2). Change "Intercommunication Station LS-126B/FI" to: **Intercommunication Stations LS-200/FI, LS-126B/FI, and LS-124D/FI.**

Page 43, chapter 6, note 4 (page 2, C 2). After "LS-126B/FI," in three places, add: and the LS-124D/FI.

Page 44, paragraph 56, chart (page 2, C 2). Add: "and LS-124D/FI" after "LS-126B/FI" in "Description" column for figures 35, 35.1, 37.1, and 40.1, and in each change word "Station" to "Stations".

Page 45, figure 28. Add an asterisk (*) by

"1.5 Meg." at pin 6 of the 6AU6 VOLTAGE AMPLIFIER.

Figure 35 (fold-out). Make the following changes:

On output transformer T2, change terminal 5 to terminal 3, and terminal 3 to terminal 5.

Delete the caption (page 2, C 2) and substitute: Intercommunicating Stations LS-125B/FI and LS-127B/FI, overall schematic diagram; and Intercommunication Stations LS-126B/FI, and LS-124D/FI, partial schematic diagram A.

Delete note 9 (page 3, C 2) and substitute:

9. THIS SCHEMATIC DIAGRAM IS APPLICABLE TO THE LS-126B/FI OR THE LS-124D/FI ONLY WHEN THE EXTREME RIGHT-HAND END IS COVERED BY AND MATCHED WITH LS-126B/FI AND LS-124D/FI, PARTIAL SCHEMATIC DIAGRAM B.

Figure 35.1 (page 3, C 2). Make the following changes:

In upper center area of the illustration, delete the notation "SWITCHES FOR STATIONS NO. 2 THRU 5 NOT SHOWN" and substitute: SWITCHES FOR STATIONS NO. 2 THRU 5 IN LS-126B/FI AND STATIONS NO. 7 THRU 12 IN LS-124D/FI ARE NOT SHOWN.

Delete the caption and substitute: Intercommunication Stations LS-126B/FI and LS-124D/FI.

Page 58, figure 37. Make the following changes:

Draw a line connecting capacitor C8 to terminal 4 of Transformer T3.

Delete the caption and substitute: Intercommunicating Stations LS-125B/FI (Orders No. 37891-Phila-53 and 51088-Phila-57) and LS-127B/FI (Order No. 51088-Phila-57).

Note 3. (Added) UNITS BEARING ORDER NO. 51088-PHILA-57 USE RG-5 SHIELDED COAXIAL CABLE TO CONNECT TUBE V2, PIN 7 TO THE CENTER LUG OF RESISTOR R5.

Figure 37.1 (page 4, C 2). Delete the caption and substitute:

Intercommunication Stations LS-126B/FI and LS-124D/FI.

[AG 413.43 (22 Jan 58)]

Figure 40 (fold-out). Make the following changes:

Delete the caption and substitute: Intercommunicating Stations LS-125B/FI (Order No. 37891-Phila-53), LS-125B/FI and LS-127B/FI (Order No. 51088-Phila-57).

Note 5. (Added) THE LS-127B/FI (ORDER NO. 51088-PHILA-57) IS WIRED THE SAME AS SHOWN HERE WITH THE FOLLOWING EXCEPTIONS: TWO BANKS OF 12 SWITCHES AND TWO JUNCTION BOXES (JB1 AND JB2) ARE USED. JB2 CONTAINS THE ANNUNCIATOR TERMINAL BOARD (ANN.) TB4, MARKED 13 THROUGH 24, AND THE VOICE TERMINAL BOARD (VOICE) TB5, MARKED 13 THROUGH 25 & G. PINS 2 AND 3 OF PLUG P3 ARE WIRED TO TERMINALS 25 OF TB5 IN JB2, AND TERMINALS 13 ON TB2 IN JB1 ARE NOT USED. THERE IS AN ADDITIONAL BLACK LEAD FROM PIN 1 OF THE SWITCH FOR STATION 24 CONNECTED TO THE LOWER OF THE TERMINAL PAIR MARKED G ON TB5 IN JB2.

Figure 40.1 (page 5, C 2). Make the following changes:

Delete the caption and substitute: Intercommunication Stations LS-126B/FI and LS-124D/FI.

Add the following to Note 1: ON THE LS-124D/FI, SWITCHES FOR STATIONS 7 THRU 12 ARE NOT SHOWN.

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

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Chief of Staff, United States Air Force.

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AMS
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USA Sig Equip Sup Agcy

Benicia Arsenal
Picatinny Arsenal
Watertown Arsenal
Fitzsimons AH
Madigan AH
Valley Forge AH
Mil Dist
JBUSMC
Units organized under following
TOE's:
11-7
11-15
11-16
11-57
11-127
11-128
11-500 (AA-AE)
11-557
11-587
11-592
11-597

NG: State AG; units—same as Active Army.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI, LS-124D/FI, LS-126B/FI,
AND LS-138/FI AND INTERCOMMUNICATING STATIONS LS-125B/FI AND LS-127B/FI

TM 11-5089
TO 31W1-2FI-241
CHANGES No. 4

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., 24 May 1960

TM 11-5089/TO 31W1-2FI-241, 29 August 1955, is changed as indicated so that the manual also applies to the following equipment:

Nomenclature	Order No.	Serial No.
Intercommunicating Station LS-125B/FI.	4699-PP-60	1 through 250
Intercommunication Station LS-138/FI.	4699-PP-60	1 through 15

Change the title of the manual to: INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI, LS-124D/FI, LS-126B/FI, AND LS-138/FI AND INTERCOMMUNICATING STATIONS LS-125B/FI AND LS-127B/FI.

Page 3, chapter 1 (page 1 of C 3), note. After note "3", add the following:

Note 4 (Added). Intercommunicating Station LS-125B/FI bearing Order No. 4699-PP-60 is identical with LS-125B/FI equipments bearing Orders No. 7541-Phila-54 and 19988-Phila-55. Intercommunication Station LS-138/FI is the same as LS-125B/FI equipments bearing Orders No. 7541-Phila-54 and 19988-Phila-55 except for the input power supply circuit. Information in this manual pertaining to the LS-125B/FI also applies to the LS-138/FI unless otherwise specified.

Page 4, paragraph 4, line 1. Change the first item to—

Input voltage (nominal):
LS-200/FI, LS-201/FI, LS-202/FI,
LS-124D/FI, LS-125B/FI, LS-
126B/FI, and LS-127B/FI..... 115 vac.
LS-138/FI..... Selective; 115 or
230 vac.

Page 19.

19. Connecting Power
(Superseded)

a. LS-138/FI. The LS-138/FI will operate from either a 115-volt or a 230-volt ac, 60-cps power source. Apply power as follows:

- (1) Set the voltage selector switch to 115V or 230V, as determined by the available power source. The voltage selector switch is located on the right hand side of the impedance switch (fig. 16).
- (2) Insert the male power plug into the power receptacle.

b. Other Intercom Sets. Insert the male power plug into a 115-volt, 60-cps, ac power receptacle.

Page 41, paragraph 51. Add the following note below the paragraph heading:

Note. The theory of operation of the power supply circuit for the LS-138/FI is identical with that described below except that the transformer terminal designations are changed as shown in figure 35.2, and switch 85 has been added to permit the primary winding to be supplied from either 115 or 230 volts ac.

Figure 35 (fold-out). Make the following changes:

Delete the caption (page 2 of C 3) and substitute: Intercommunicating Stations LS-125B/FI and LS-127B/FI, overall schematic diagram; and Intercommunication Stations LS-124D/FI, LS-126B, and LS-138/FI, partial schematic diagram A.

Add the following to the notes:

10. THIS SCHEMATIC DIAGRAM IS APPLICABLE TO THE LS-138/FI ONLY WHEN TRANSFORMER T3 AND ITS INPUT CIRCUIT IS REPLACED BY INTERCOMMUNICATION STATION LS-138/FI, PARTIAL SCHEMATIC DIAGRAM C.

Figure 35.1 (page 3 of C 2) caption (page 3 of C 3). Add the following to the caption: partial schematic diagram B.

Page 59, figure 41. Make the following changes:

Delete the caption (page 3 of C 1) and substitute: Intercommunicating Stations LS-125B/FI (Orders No. 7541-Phila-54 and 19988-Phila-55) and LS-127B/FI, overall chassis wiring diagram; and Intercommunication Station LS-138/FI, partial chassis wiring diagram A.

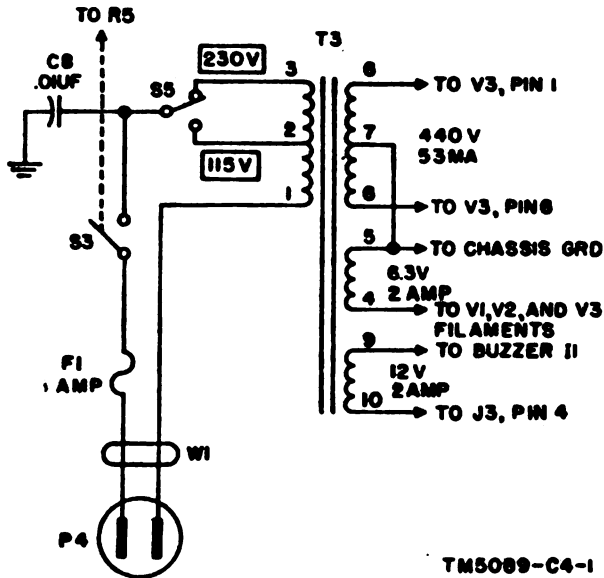


Figure 35.2. (Added) Intercommunication Station LS-138/FI, partial schematic diagram C.

Add the following to the notes:

- THIS WIRING DIAGRAM IS APPLICABLE TO THE LS-138/FI ONLY WHEN STATION NUMBER 8 IS REPLACED WITH INTERCOMMUNICATION STATION LS-138/FI, PARTIAL CHASSIS WIRING DIAGRAM B.

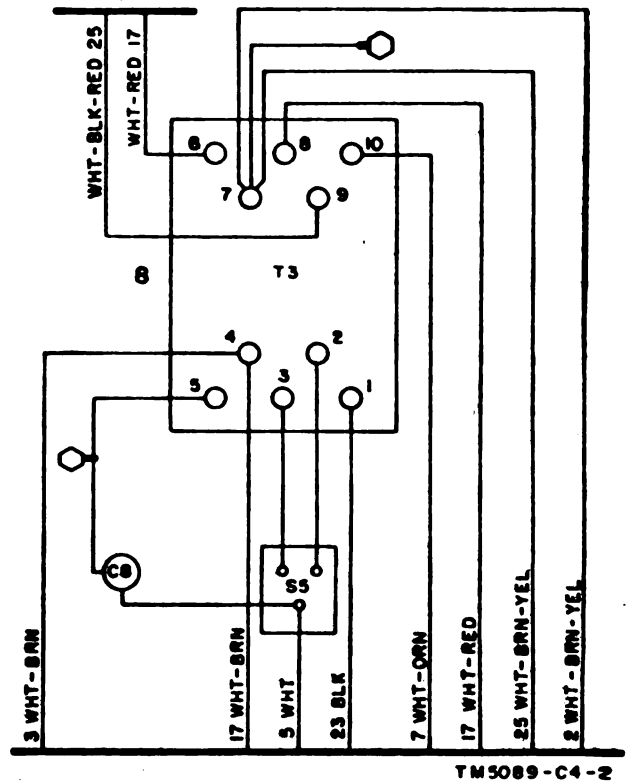


Figure 41.1. (Added) Intercommunication Station LS-138/FI, partial chassis wiring diagram B.

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

L. L. LEMNITZER,
*General, United States Army,
Chief of Staff.*

OFFICIAL:

R. V. LEE,
*Major General, United States Army,
The Adjutant General.*

THOMAS D. WHITE,
Chief of Staff, United States Air Force.

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MDW (1)	11-57 (2)	32-56 (2)
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AFIP (1)	11-117 (2)	

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanations of abbreviations used, see AR 320-50.

TECHNICAL MANUAL

INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI,
LS-124D/FI, LS-126B/FI, AND LS-138/FI AND INTERCOMMUNICATING
STATIONS LS-125/FI, LS-125A/FI, LS-125B/FI, AND LS-127B/FI

TM 11-5089 }
CHANGES NO. 6 }

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 17 September 1963

TM 11-5089, 29 August 1955, is changed as follows

Note. The parenthetical reference to previous changes (example; "page 6 of C 5") indicates that pertinent material was published in that change.

Page 3. Add paragraph 1.1 after paragraph 1.

1.1. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are any new editions, changes, or additional publications pertaining to your equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc) and the latest changes to and revisions of each equipment publication.

Delete paragraph 2 (page 1 of C 5) and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms

and records in accordance with the instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army) NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen, or typewriter. The original and one copy will be forwarded direct to: Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SEIMS-MP, Fort Monmouth, N.J. One information copy will be furnished to the individual's immediate supervisor (e.g., officer, noncommissioned officer, supervisor, etc).

Page 26. Delete section I and substitute

Section I. OPERATOR'S PREVENTIVE MAINTENANCE

32. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the intercom sets are listed below together with a reference to the paragraphs covering the specific maintenance function.

a. Daily preventive maintenance checks and services (par. 35).

b. Weekly preventive maintenance checks and services (par. 36).

33. Operator's Preventive Maintenance

Preventive maintenance is the systematic care, inspection, and servicing of the equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 35 and 36 cover routine systematic care and cleaning essential to the proper upkeep and operation of the equipment.

b. Preventive Maintenance. The preventive maintenance checks and services chart (pars. 35 and 36) outline functions to be performed at the specific intervals indicated. These checks and serviceable condition (in good general (physical) and in good operating condition). To assist the operator in maintaining combat serviceability, the charts indicate what to

check, how to check, and what the normal conditions are; the references column lists the illustrations, paragraphs, and other manuals that contain supplementary information. If the defect cannot be remedied by the operator, higher echelon maintenance is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

34. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services on the intercom set are required on a daily and weekly basis.

a. Paragraph 35 specifies checks and services that must be performed daily and under the special conditions listed below:

- (1) After the equipment is initially installed.
- (2) When the equipment is reinstalled after removal for any reason.
- (3) At least once a week if the equipment is maintained in a standby condition.

b. Paragraph 36 specifies additional checks and services that must be performed once each week.

35. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	End item equipment	Inspect equipment for completeness. All running spare parts must be on hand or on valid requisitions.	TM 11-5830-210-12P, TM 11-5830-211-12P, and TM 11-5830-217-12P.
2	Cabinet exterior	Warning: Cleaning compound is flammable and its fumes are toxic. Do not use near a flame and provide adequate ventilation. Inspect for cleanliness. Remove loose dust and dirt with a clean, lint-free cloth. Remove other dirt with a cloth dampened (not wet) with cleaning compound. Wipe surface with a clean, lint-free cloth.	None. Figs. 3 through 6.2.
3	Pilot lamp	While making operating checks, (item 5) check for burned-out pilot lamp.	Figs. 3 through 6.2.

Sequence No.	Item	Procedure	References
4	Knobs and switches ...	While making operating checks, (item 5) observe that mechanical action of each knob and switch is smooth and free of external and internal binding.	Figs. 3 through 6.2.
5	Operation	Check equipment operation	Para. 22 through 27 and 36.1.

36. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Wooden cabinet exterior and junction box.	Inspect wooden exterior for varnish scratches, chips, or other blemishes. Refer equipment to higher echelon for refinishing. Inspect junction box and handset holder for cracks, paint chips, rust or corrosion. Refer equipment to higher echelon for refinishing.	Figs. 3 through 6.2.
2	Power cable, junction box cable, and handset cable.	Inspect cables for cracks, cuts, kinks, frays, or other signs of deterioration.	Figs. 3 through 6.2.
3	Fuse and fuseholder ...	Inspect fuseholder for cracks, looseness, or other signs of damage. Inspect fuse for proper size and rating.	Figs. 3 through 6.2.
4	Handset	Inspect handset for cracks or other damage.	Figs. 3 through 5.
5	External wiring to junction box.	Inspect wiring for frays, loose, or broken connections.	Figs. 3 through 6.2.

Add paragraph 36.1 after paragraph 36.

36.1. Operational Checks

Turn on the intercom set and listen for excessive hum with the talk-listen switch in the listen position. Be sure that the pilot lamp is lighted. Listen for line noise; if an excessive amount of line noise is present, reverse the line cord plug connection. Push up and return each

station selector switch in sequence and listen for hum and noise present on each line circuit. If noise or hum is present, record the number of the noisy line for repair. Position the volume control knob to check the variation in volume of the sound from other stations. Have each station call and check the annunciator and buzzer circuits as each station calls in.

Page 27. Delete figure 19.

Page 28. Delete figure 20.

Page 29. Delete section II and substitute:

Section II. SECOND ECHELON MAINTENANCE INSTRUCTIONS

37. Scope of Second Echelon Maintenance

The maintenance duties assigned to second echelon maintenance personnel are

listed below together with a reference to the paragraph covering the specific maintenance function. The duties assigned require the tools and test equipment listed

in paragraph 38.

- a. Quarterly preventive maintenance checks and services (par. 38.3).
- b. Visual inspection (par. 42).
- c. Fuse replacement (par. 43).
- d. Tube replacement (par. 44).
- e. Troubleshooting (equipment performance checklist) (pars. 45 and 46).
- f. Touchup painting (par. 38.2).

38. Tools, Test Equipment, and Materials Required

Tool Equipment TE-41.
 Test Set Electron Tube TV-7/V.
 Multimeter AN/URM-105.

Sandpaper #000.

Brush, paint.

Paint, (applicable type).

Lint-free cloth.

Cleaning Compound (Federal Stock No. 7930-395-9542).

38.1. Preventive Maintenance (Second Echelon)

38.3. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cabinet interior and chassis.	<p>Warning: Cleaning compound is flammable and its fumes are toxic. Do not use near a flame and provide adequate ventilation.</p> <p>Inspect cabinet interior and chassis for loose dust and dirt. Remove loose dust and dirt with a dry, lint-free cloth. Remove other dirt with a cloth dampened (not wet) with cleaning compound. Wipe surface with a clean, lint-free cloth.</p>	<p>None.</p> <p>Figs. 29 through 32.</p>
2	Speaker-microphone .	Inspect speaker-microphone for torn, cracked, or loose cone.	Fig. 32.
3	Electron tubes and other pluckout parts.	Inspect seating of electron tubes and other pluck-out parts.	Figs. 29 through 32.
4	Mountings and panel screws.	Inspect for proper tightness	Figs. 29 through 32.
5	Interior wiring and components.	Inspect for open, shorted, loose, burned components or wiring.	Figs. 29 through 32.

a. Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in a serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance at second echelon level are made at quarterly intervals unless otherwise directed by the commanding officer. The preventive maintenance checks and services should be scheduled concurrently with the periodic service schedule of the other equipments in the system.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

38.2. Touchup Painting

Clean rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect if from further corrosion. Refer to applicable cleaning and refinishing practices specified in TM 9-213.

Sequence No.	Item	Procedure	Reference
6	Terminal boards.....	Inspect for cracked, loose or broken sections.	Figs. 30
7	Publications	Check to see that all publications are complete, serviceable, and current.	DA Pam 310-4
8	Modifications	Check DA Pam 310-4 to determine if new applicable MWO's have been published. All urgent MWO's must be applied immediately. All routine MWO's must be scheduled.	DA Pam 310-4 and TM 38-750.

Page 53, paragraph 71, line 2. Delete TM 9-2851 and substitute: TM 9-213.

Page 56, appendixes I and II (pages 2

and 7 of C 5). Change to appendixes II and III respectively, and add the following before appendix II.

APPENDIX

REFERENCES

The following is a list of applicable references available to maintenance personnel of the intercom sets.

AR 70-10	Research and Development (General): Army Materiel Testing.
AR 320-5	Military Terms, Abbreviations and Symbols: Dictionary of United States Army Terms.
AR 320-50	Military Terms, Abbreviations and Symbols: Authorized Abbreviations and Symbols: Authorized Abbreviations and Brevity Code.
AR 750-5	Maintenance of Supplies and Equipment: Organizational, Policies and Responsibilities for Maintenance Operations.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
DA Pam 310-21	Military Publications: Index of Supply Manuals Signal Corps.
TM 9-213	Painting Instructions for Field Use.
TM 11-2684	Audio Oscillators TS-312/FSM-1, TS-312A/FSM-1, and TS-382/U, and Signal Generator TS-312B/FSM-1.
TM 11-5830-210-12P	Operator's and Organizational Maintenance Repair Parts and Special Tools Lists and Maintenance Allocation Chart for Intercommunicating Station LS-126/FI; LS-126A, B/FI.
TM 11-5830-210-35P	Field and Depot Maintenance Repair Parts and Special Tools List for Intercommunicating Station LS-126/FI; LS-126A, B/FI.
TM 11-5830-211-12P	Operator's and Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Intercommunicating Stations LS-124/FI, LS-124A/FI, LS-124B/FI, LS-124C/FI, and LS-124D/FI.
TM 11-5830-211-35P	Field and Depot Maintenance Repair Parts and Special Tools List for Intercommunicating Stations LS-124/FI, LS-124A/FI, LS-124B/FI, LS-124C/FI, and LS-124D/FI.

TM 11-5830-212-12P **Operator's and Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Intercommunicating Station LS-127/FI, LS-127A/FI, B/FI.**

TM 11-5830-212-35P **Field and Depot Maintenance Repair Parts and Special Tools List for Intercommunicating Station LS-127/FI, LS-127A/FI, B/FI.**

TM 11-5830-213-20P **Organizational Maintenance Repair Parts and Special Tools List: Intercommunicating Station LS-125/FI, LS-125A/FI, LS-125B/FI, and Intercommunication Station LS-138/FI.**

TM 11-5830-213-35P **Field and Depot Maintenance Repair Parts and Special Tools List: Intercommunicating Stations LS-125/FI, LS-125A/FI, LS-125B/FI, and Intercommunication Station LS-138/FI.**

TM 11-6625-203-12 **Operator's and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U.**

TM 11-6625-261-12 **Operator's and Organizational Maintenance Manual: Audio Oscillators TS-382A/U, TS-382B/U, TS-382D/U, TS-382E/U, and TS-382F/U.**

TM 11-6625-274-12 **Operator and Organizational Maintenance Manual: Test Sets, Electron Tube TV-7/U, TV-7A/U, TV-7B/U, TV-7B/U, and TV-7D/U.**

TM 11-6625-316-12 **Test Sets Electron Tube TV-2/U, TV-2A/U, TV-2B/U, TV-2C/U.**

TM 11-6625-320-12 **Operator's and Organizational Maintenance Manual: Voltmeters, Meter ME-30A/U Voltmeters, Electronic ME-30B/U and ME-30C/U.**

TM 38-750 **The Army Record System and Procedures.**

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

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Charleston Army Dep (5)
Louisville Army Dep (5)
Granite City Army Dep (2)
USACECDA (1)

USA Elct Rsch & Dev Actv (13)
White Sands
USA Elct Rsch & Dev Actv (2)
Fort Huachuca
POE (1)
Trans Tml Comd (1)
Army Tml (1)
USAOSA (1)
AMS (1)
ARAMC (1)
AFIP (1)
Army Pictorial Cen (2)
USA Mob Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
Sig Fld Maint Shops (3)
AAF (CONUS) (5)
Frankford Arsenal (5)
Raritan Arsenal (5)
Watertown Arsenal (5)
1st GM Bde (5)
USWACC (5)
BGH (5)
MGH (5)
WBGH (5)
VFGH (5)
FGH (5)
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11-16 11-597
11-57 12-7
11-97 32-52
11-98 32-56
11-117
11-155
11-157
11-500 (AA-AE) (4)
11-557
11-587

NG State AG (3).

USAR: None.

For explanation of abbreviations used, see AR 320-50.

**INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI,
LS-124D/FI, LS-126B/FI AND LS-138/FI AND INTERCOMMUNICATING
STATIONS LS-125/FI, LS-125A/FI, LS-125B/FI, AND LS-127B/FI**

CHANGE

No. 7

**HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 14 January 1964**

TM 11-5089, 29 August 1955, is changed as follows:

(As changed by C 5, 4 Jan 61.) Change the title of the manual as shown above.

Notes. The parenthetical reference to previous changes (example: "page 5 of C 6") indicates that pertinent material was published in that change.

Page 56, (page 5 of C 6). Make the following changes:

After "appendix" add: I.

Delete TM 11-5830-210-12P, TM 11-5830-211-12P, and TM 11-5830-212-12P in their entirety and substitute:

TM 11-5830-210-20P Organizational Maintenance Repair Parts and Special Tools List: LS-126/FI, LS-

126A/FI, and LS-126-B/FI.

TM 11-5830-211-20P Organizational Maintenance Repair Parts and Special Tools List: Interconnecting Stations LS-124/FI, LS-124A/FI, LS-124B/FI, LS-124C/FI, and LS-124D/FI.

TM 11-5830-212-20P Organizational Maintenance Repair Parts and Special Tools List: LS-127/FI, LS-127A/FI, LS-127B/FI and LS-127C/FI.

* This change supersedes C 5, 4 January 1961, and so much of TM 11-5830-211-12P, 15 April 1959, TM 11-5830-210-12P, 1 May 1959, and TM 11-5830-217-12P, 19 June 1959, as pertains to first echelon items and maintenance allocation and so much of Department of the Army Supply Manual SIG 7 & 8 LS-128/FI, 15 July 1958, SIG 7 & 8 LS-200/FI, 10 July 1957, SIG 7 & 8 LS-201/FI, 24 June 1957, and SIG 7 & 8 LS-202/FI, 21 June 1957 including C 1, 1 November 1957, as pertains to first echelon items.

Appendixes II and III, (page 5 of C 6).

Delete appendixes II and III and substitute:

APPENDIX II

MAINTENANCE ALLOCATION

Section 1. INTRODUCTION

1. General

a. This appendix assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

- (1) *Part or component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and the subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.
- (2) *Maintenance function.* This column indicates the various maintenance functions allocated to the echelons.
 - (a) *Service.* To clean, to preserve, and to replenish lubricants.
 - (b) *Adjust.* To regulate periodically to prevent malfunction.
 - (c) *Inspect.* To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.
 - (d) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(e) *Replace.* To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.

(f) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

(g) *Align.* To adjust two or more components of an electrical system so that their functions are properly synchronized.

(h) *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(i) *Overhaul.* To restore an item to completely serviceable condition as prescribed by serviceability standards. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

(j) *Rebuild.* To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life ex-

pectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications and subsequent reassembly of the item.

- (3) *1st, 2d, 3d, 4th and 5th echelons.* The symbol X indicates the echelon responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelon marked by X are authorized to perform the indicated operation.
- (4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

- (5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding column.

c. Columns in the allocation of tools for maintenance functions are as follows:

- (1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.
- (2) *1st, 2d, 3d, 4th, and 5th echelon.* The dagger (†) indicates the echelons normally allocated the facility.
- (3) *Tool code.* This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment.

SECTION 11. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	ECHO					TOOLS REQUIRED	REMARKS
		1	2	3	4	5		
INTERCOMMUNICATION STATIONS LS-1288/F1;LS-128C/F1; LS-136/F1;LS-3CC/F1;LS-3CJ/F1;LS-3C3/F1;AND INTERCOMMUNICATING STATIONS LS-128/F1;LS-128A/F1; LS-126/F1;LS-124A,B/F1;LS-127/F1;LS-127A,B,C/F1; LS-126/F1;LS-128a,B/F1;LS-124/F1;LS-124A,B,C,D/F1	service inspect test	x	x	x			9 9 3,6 2,4,6	Continuity, voltage and resistance tests. Distortion, voltage and resistance measurements, Final testing. Tool Code 8 replaces Tool Code 6 in 8th column only. Replace tubes, knobs, pluckout items. All repairs.
	repair overhaul			x			1,2,4,6,JC 9 7,8 7,8	

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

PART OR COMPONENT	FUNCTION					TOOL CODE	REMARKS
	1	2	3	4	5		
AUDIO OSCILLATOR, TS-362/U			†			1	
MULTIMETER, AM/URM-106		†				2	
MULTIMETER, TS-362/U			†			3	
TOOL EQUIPMENT, TK-115/U			†			4	
TOOL KIT, TK-67/U				†		5	

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

a. This appendix lists items supplied for initial operation. The list includes material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

b. Columns are as follows:

- (1) *Federal stock number.* This column lists the 11-digit Federal stock number.
- (2) *Designation by model.* Not used.
- (3) *Description.* Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

(4) *Unit of issue.* The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(5) *Expendability.* Nonexpendable items are indicated by NX. Expendable items are not annotated.

(6) *Quantity authorized.* Under "Items Comprising an Operable Equipment", the column lists the quantity of items supplied for the initial operation of the equipment.

(7) *Illustrations.* Not used.

2. Cannibalization

The LS-130/FI, LS-120A/FI, LS-130B/FI, and LS-130C/FI will not be maintained above third echelon. When unrepairable at third echelon the equipment will be retained for cannibalization.

SECTION II FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DENOMINATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5030-513-1501		<p>GROUP I</p> <p>18-124/71 A, B, C, D</p> <p>TELECOMMUNICATING STATIONS 18-124/71, 18-124A/71, 18-124B/71, 18-124C/71 and 18-124D/71</p> <p>TELECOMMUNICATING STATIONS 18-124/71, 18-124A, 71, 18-124B/71, 18-124C/71 and 18-124D/71</p> <p>ITEMS COMPRISING AIR OPERABLE EQUIPMENT</p> <p>TECHNICAL MANUAL TM 11-5089</p> <p>NUMEROUS SPARE ITEMS</p> <p>No parts authorized for stockage at first echelon</p>		XX	1		
5030-168-0126		<p>GROUP II</p> <p>18-125/71, A, B, C, 18-136/71</p> <p>TELECOMMUNICATING STATIONS 18-125/71; 18-125A/71, 18-125B/71, 18-125C/71, 18-136/71</p> <p>TELECOMMUNICATING STATIONS 18-125/71, 18-125A/71, 18-125B/71, 18-125C/71</p> <p>TELECOMMUNICATING STATION 18-136/71</p> <p>ITEMS COMPRISING AIR OPERABLE EQUIPMENT</p> <p>TECHNICAL MANUAL TM 11-5089</p> <p>NUMEROUS SPARE ITEMS</p> <p>No items authorized for stockage at first echelon</p>		XX XX	1		
5030-168-0056		<p>GROUP III</p> <p>18-126/71, A, B</p> <p>TELECOMMUNICATING STATIONS 18-126/71, 18-126A/71; 18-126B/71</p> <p>TELECOMMUNICATING STATIONS 18-126/71, 18-126A/71, 18-126B/71</p> <p>ITEMS COMPRISING AIR OPERABLE EQUIPMENT</p> <p>TECHNICAL MANUAL: TM 11-5089</p>		XX	1		

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
		INTERCOMMUNICATING STATION (continued)					
		RUNNING SPARE ITEMS					
		NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON					
		GROUP IV					
		LS-127/PI A,B,C					
5830-162-8169		INTERCOMMUNICATING STATIONS LS-127/PI; LS-127A/PI, LS-127B/PI; LS-127C/PI		NX			
5830-503-2690		INTERCOMMUNICATING STATIONS LS-127/PI, LS127A/PI		NX			
		INTERCOMMUNICATING STATIONS LS-127B/PI, LS-127C/PI					
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
		TECHNICAL MANUAL TM 11-5089			1		
		RUNNING SPARES					
		NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON					
		GROUP V					
		LS-128/PI, A, B					
		INTERCOMMUNICATING STATIONS LS-128/PI, LS-128A, LS-128B/PI					
5830-162-8170		INTERCOMMUNICATING STATIONS LS-128/PI, LS-128A/PI, LS-128B/PI		NX			
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
		TECHNICAL MANUAL TM 11-5089					
		RUNNING SPARE ITEMS					
		NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON					
		GROUP VI					
		LS-130/PI, A, B, C					
		INTERCOMMUNICATION STATIONS LS-130/PI, LS-130A/PI, LS-130B/PI, LS-130C/PI			1		

INTERCOMMUNICATING STATION

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5830-222-1663		INTERCOMMUNICATING STATION (continued) INTERCOMMUNICATION STATIONS LS-130/PI, LS-130A/PI, LS-130B/PI, LS-130C/PI		NX			
ORD THRU AGC		ITEMS COMPRISING AN OPERABLE EQUIPMENT TECHNICAL MANUAL TM 11-5089 RUNNING SPARE ITEMS NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON GROUP VII LS-200/PI			1		
5830-503-2691		INTERCOMMUNICATION STATION LS-200/PI INTERCOMMUNICATION STATION LS-200/PI		NX			
ORD THRU AGC		ITEMS COMPRISING AN OPERABLE EQUIPMENT TECHNICAL MANUAL TM 11-5089 RUNNING SPARE ITEMS NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON GROUP VIII LS-201/PI			1		
5830-521-0542		INTERCOMMUNICATION STATION LS-201/PI INTERCOMMUNICATION STATION LS-201/PI		NX			
ORD THRU AGC		ITEMS COMPRISING AN OPERABLE EQUIPMENT TECHNICAL MANUAL TM 11-5089 RUNNING SPARE ITEMS NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON GROUP IX LS-202/PI			1		
		INTERCOMMUNICATION STATION LS-202/PI					

INTERCOMMUNICATING STATION

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	BIP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5830-503-2692		INTERCOMMUNICATING STATION (continued)					
ORD THRU AGC		INTERCOMMUNICATION STATION LS-202/PI ITEMS COMPRISING AN OPERABLE EQUIPMENT TECHNICAL MANUAL TM 11-5089 RUNNING SPARE ITEMS NO PARTS AUTHORIZED FOR STOCKAGE AT FIRST ECHELON		IX	1		

INTERCOMMUNICATING STATION

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNOB (1)
CSigO (7)
CoFT (1)
CofEngrs (1)
TSG (1)
CofSpts (1)
USAMC (5)
USCONARC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (3)
OS Base Comd (2)
LOGCOMD (2)
USAECOM (7)
USAWECOM (5)
USAMICOM (4)
USA Trans Tml Comd (1)
USASCC (4)
USASMCOM (2)
USAECDA (1)
USACBRDA (1)
USACECDA (1)
USACECDA (Monmouth Ofc) (1)
USAMSCDA (1)
USAOCDA (1)
USAQMCDA (1)
USATCDA (1)
USAADCDA (1)
USAARMCD (1)
USAAVNCDA (1)
USASWCDA (1)
USAAARTYCD (1)
USA Elct Mat Agcy (3)
USASA (2)
USATC AD (2)
USATC Armor (2)
USATC Engr (2)
USATC Inf (2)
USATC (5)
WRAMC (2)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Trans Rech Comd (5)
USASA Fid Sta. (5)
USASA Gp (5)
USASA Bn (5)
USASA Det (5)
MDW (1)

Chicago Proc Dist (1)
AMS (1)
Army Dep (2) except
 Charleston (5)
 Granite City (5)
 Louisville (5)
 Lexington (12)
 Sacramento (28)
 Tobyhanna (12)
 Ft Worth (8)
 Letterkenny (5)
GENDEP (OS) (2)
Sig Sec, GENDEP (5)
Sig Dep (OS) (12)
Armies (2)
Corps (2)
USA Corps (3)
Frankford Arsenal (5)
Watertown Arsenal (5)
QMRECEN (5)
Arlington Hall Sta (5)
Mil Men (Chile, Ecuador) (5)
USASCC Det (5)
Svc Colleges (2)
Br Svc Sch (2)
US Army Tml (1)
POE (1)
Sig Fid Maint Shops (3)
USA Elct RD Actv (White Sands) (13)
USAERDL Trp Comd (10)
Instl (2) except
 Ft Monmouth (63)
 Ft Hancock (4)
 Ft Gordon (5)
 Ft Huachuca (10)
WEMR (5)
1st QM Bde (5)
USWACC (5)
QMCIAP (5)
BAMC (5)
AAF (CONUS) (5)
MGH (5)
FGH (5)
WBGH (5)
LGH (5)
VFGH (5)
USASATSA (5)
USA Sig Comm Scty Agcy (5)

USAINYCA (5)
USAERDL (5)
USATTC (5)
Units org under fol TOE:—3 ea. UNOINDC
11-7
11-16
11-57
11-97
11-98
11-117

11-155
11-157
11-500 (AA-AE) (4)
11-557
11-557
11-582
11-557
12-7
32-52
32-56

NG: State AG (3); units—none.

USAR: None.

For explanation of abbreviations used, see AR 326-50.

CHANGE }
No. 8 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 26 April 1974

**INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI,
LS-124D/FI, LS-126B/FI, AND LS-138/FI AND INTERCOMMUNICATING
STATIONS LS-125/FI, LS-125A/FI, LS-125B/FI, AND LS-127B/FI**

TM 11-5089/TO 31W1-2F1-211, 29 August 1955, is changed as follows:

Page 3. Delete paragraph 1.1 and substitute:

1.1. Indexes of Publications

a. *DA Pam 310-4*. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

b. *DA Pam 310-7*. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment. Delete paragraph 2 and substitute.

2. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment*. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. *Report of Packaging and Handling Deficiencies*. Fill out and forward DD Form 6 (Report of

Packaging and Handling Deficiencies) as prescribed in AR 700-58/NAVSUP Pub 378/AFR 71-4/MCO P4030.29, and DSAR 4145.8.

c. *Discrepancy in Shipment Report (DISREP) (SF 361)*. Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33/AFM 75-18/MCO P4610.19A, and DSAR 4500.15.

2.1. Reporting of Equipment Publication Improvements

Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command; ATTN: AMSEL-MA-C, Fort Monmouth, NJ 07703.

Page 56. Delete appendix III.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

Active Army:

USASA (2)
CNGB (1)
ACSC-E (2)
Dir of Trans (1)
COE (1)
TSG (1)
USAARENBD (1)
USAMB (10)
AMC (1)
TRADOC (2)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMDS (3)
MICOM (2)
TECOM (2)
USACC Comm Cen-CONUS (2)
AAF (1)
Armies (2)
USACC (4)
MDW (1)
Corps (2)
HISA (18)
Svc Colleges (1)
USASESS (5)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAIES (2)
USAINTC (3)
WRAMC (1)

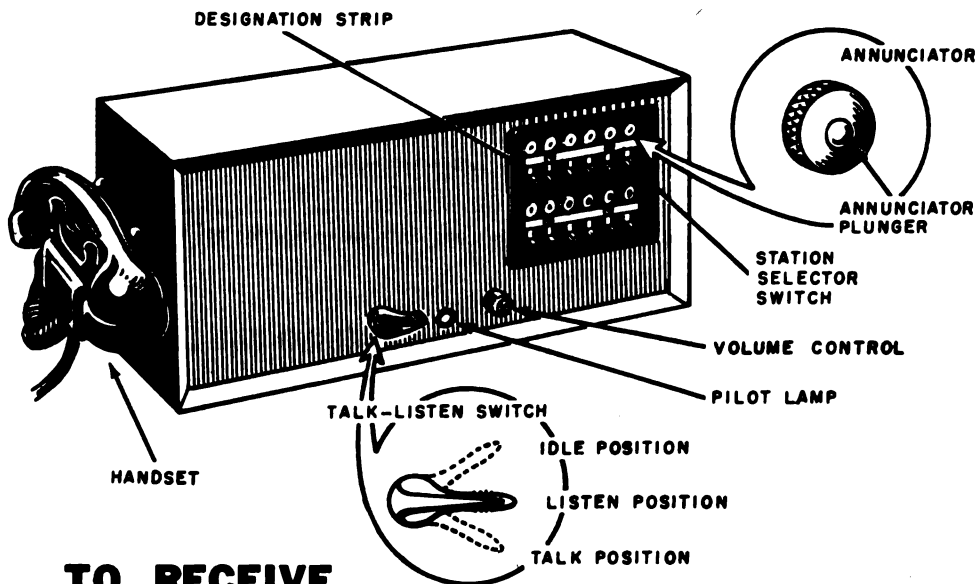
ATS (1)
Instl (2) except
Fort Gordon (10)
Fort Huachuca (10)
WSMR (1)
Fort Carson (5)
Army Depot (2) except
LBAD (14)
SAAD (30)
TOAD (14)
ATAD (10)
USA Dep (2)
Sig Sec USA Dep (2)
Sig Dep (2)
Sig Dep (2)
Sig FLDMS (1)
USAERDAA (1)
USAERDAW (1)
MAAG (1)
USARMIS (1)
Units org under fol TOE:
(1 copy each unit)
11-16
11-97
11-98
11-117
11-302
11-500(AA-AC)
12-7
23-134
23-136
32-52
79-56

NG: None

USAR: None

For explanation of abbreviations used, see AR 310-50.

CONDENSED OPERATING INSTRUCTIONS FOR INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI (SHOWN), LS-202/FI, AND LS-125B/FI



TO RECEIVE

1. Turn volume control 1/4 turn counterclockwise until a click is heard and pilot lamp glows. Wait a minute for the tubes to warm up.
2. Move station selector switch, located below protruding plunger, to up position. (If voice signal is heard instead of annunciator signal, omit this step.)
3. Operate talk-listen switch to listen position.
4. Adjust volume control until loudness of sound is suitable.

TO SEND

5. Before sending, push up station selector switch of station to be called and listen to make sure that line is not in use. Stations are identified on designation strip above station selector switches.
6. Operate and hold talk-listen switch in talk position.
7. Position mouth within 20-inches of front, left-side of cabinet; speak clearly and distinctly.
8. When finished talking, release talk-listen switch and await on answer.

TN5089-45

TO SIGNAL

9. Make sure line is not in use (step 5).
10. When signaling stations *not* equipped with annunciators, proceed as follows:
 - a. Push up station selector switch of station to be called.
 - b. Operate talk-listen switch to talk position. Call into speaker-microphone as described in step 7.
 - c. Release talk-listen switch and await an answer.
 - d. If there is no answer, using this method, it can be assumed that the station is not equipped for voice-type signaling. In this case, proceed with step 11.
11. When signaling stations equipped with annunciators, proceed as follows:
 - a. Operate talk-listen switch to listen position.
 - b. Push down on station selector switch for station to be called and hold it in this position momentarily.
 - c. Release station selector switch; push it to the up position and await answer.

TO USE HANDSET (NOT APPLICABLE TO THE LS-125 B/FI)

12. Use handset in the same manner as a telephone handset. Lifting handset from its cradle cuts off the speaker-microphone.
13. Operate intercom set as previously described.

AFTER CALL

14. Move talk-listen switch to idle position.
15. Restore station selector switch to off (horizontal) position. (Replace handset, if used.)

TO TURN SET OFF

16. Turn volume control clockwise until a click is heard and pilot lamp is extinguished.

**INTERCOMMUNICATION STATIONS LS-200/FI, LS-201/FI, LS-202/FI,
 AND LS-125B/FI**

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II. Connections.....	12-18	9
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TM5089-2C

Figure 1. Intercommunication Station LS-202/F1, operational view.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

a. This manual contains the information necessary to install, operate, maintain, and repair Intercommunication Stations LS-200/FI, LS-201/FI, LS-202/FI, and LS-125B/FI.

• b. Condensed operating instructions are provided at the end of the operation chapter (ch. 3).

c. Throughout this manual, the term *intercom sets* will be used to identify Intercommunication Stations LS-200/FI, LS-201/FI, LS-202/FI, and LS-125B/FI. Intercommunication Stations LS-201/FI and LS-125B/FI are identical except that the LS-201/FI contains a handset. A reference to LS-201/FI will apply equally to the LS-125B/FI except where otherwise specified.

d. Forward all comments on this manual to the Commanding Officer, Signal Corps Publications Agency, Fort Monmouth, N. J., ATTN: Standards Division.

2. Forms and Records

The following forms will be used for reporting unsatisfactory conditions of Army equipment and when performing preventive maintenance:

a. DD Form 6, Report of Damaged or Improper

Shipment, will be filled out and forwarded as prescribed in SR-745-45-5 (Army); Navy Shipping Guide, Article 1850-4 (Navy); or AFR 71-4 (Air Force).

b. DA Form 468, Unsatisfactory Equipment Report, will be filled out and forwarded to the Office of the Chief Signal Officer as prescribed in SR-700-45-5.

c. DD Form 535, Unsatisfactory Report, will be filled out and forwarded to Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio, as prescribed in SR 700-45-5 and AF TO 00-35D-54.

d. DA Form 11-238, Operator First Echelon Maintenance Checklist for Signal Corps Equipment (Radio Communication, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form (fig. 19).

e. DA Form 11-239, Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Radio Communications, Direction Finding, Carrier, Radar), will be prepared in accordance with instructions on the back of the form (fig. 20).

f. Use other forms and records as authorized.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. The intercom sets (par. 6) are sets which permit voice communication between two or more local points. Annunciators are provided for signaling between these points. Master controls are provided for controlling communication. An intercommunicating station containing master controls is called a master station. An intercommunicating station *not* containing master controls is called a remote station.

b. The intercom sets are arranged to provide a privacy feature which enables the users of two master stations to carry on a private conversation using either the speaker-microphone or a handset. The privacy feature is used only when all master stations in the system have the privacy feature.

c. Intercommunication Station LS-200/FI can be used to control a maximum of six stations (either master or remote). Intercommunication Stations LS-201/FI and LS-125B/FI can be used to control

a maximum of 12 stations (either master or remote). Intercommunication Station LS-202/FI can be used to control a maximum of 24 stations (either master or remote). Figure 2 is a block diagram of a typical intercom system. All master stations can communicate with each other and with remote stations 4 through 8. In addition, master station 1 can communicate with remote stations 9 and 10. Remote stations 4, 5, 6, 7, and 8 can communicate with all master stations. Remote stations 9 and 10 can communicate only with master station 1.

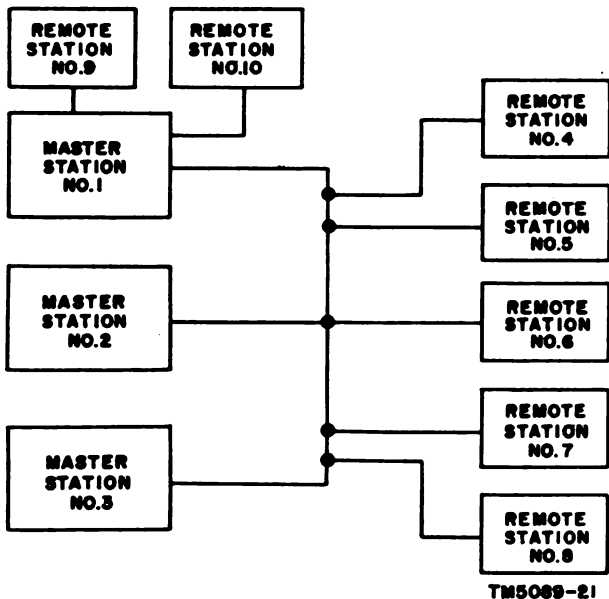


Figure 2. Typical system block diagram.

4. Technical Characteristics

Input voltage.....105 to 125 volts ac.
 Input frequency.....60 cycles per second.
 Power consumed.....30 watts (talk-listen switch S2 in idle, listen, or talk position).
 Power line fuse.....1 ampere.

Tubes (number and function).....One 6AU6 voltage amplifier (V101).
 One 6AQ5 power output (V102).
 One 6X4W rectifier (V103).
 Maximum power fed to speaker....2 watts.
 Maximum power fed to line.....2 watts.
 Amplifier frequency response.....Flat, ± 5 decibels, 300 to 6,000 cps.
 Input and output impedance.....50 or 500 ohms.
 Speaker voice-coil impedance.....45 ohms.

5. Packaging Data

a. *Domestic.* The intercom set is cushioned with corrugated fillers and tissue paper and placed in a corrugated carton. The carton is then sealed with gummed paper tape.

b. *Export.* For export shipment, the domestic package is inclosed in a moisture-vaporproof barrier, placed in a waterproof carton, and sealed with waterproof tape.

c. *Dimension and Weight.* The size, weight, and volume of domestic and export packing cases, packed for shipment, are indicated in the chart below. For detailed instructions concerning packing and unpacking, refer to paragraph 9.

6. Description of LS-200/FI, LS-201/FI, LS-202/FI, and LS-125B/FI

a. Intercommunication Stations LS-200/FI (fig. 3), LS-201/FI (fig. 4), LS-202/FI (fig. 5), and LS-125B/FI (fig. 6) all are contained in wooden cabinets that mount the controls and components necessary for the operation of the units. A telephone handset and hookswitch housing are mounted on the left side of the cabinet of the LS-200/FI, LS-201/FI, and LS-202/FI *only*. All operational controls are mounted on the front panel. A power cable is connected to the rear of the cabinet. Junction boxes are connected to the rear of the cabinet

Equipment	Type of Shipment	Height (in.)	Width (in.)	Depth (in.)	Volume (cu ft)	Weight (lb)
LS-200/FI.....	Domestic.....	13	24	9	1.6	22
	Export.....	14	25	10	2.0	27
LS-201/FI.....	Domestic.....	13	24	9	1.6	24
	Export.....	14	25	10	2.0	29
LS-202/FI.....	Domestic.....	13	28	9	1.9	28
	Export.....	14	29	10	2.3	33
LS-125B/FI.....	Domestic.....	13	21	9	1.3	22
	Export.....	14	22	10	1.6	27

by junction box cables. Each equipment is described individually in *b*, *c*, *d*, and *e* below.

b. The LS-200/FI (fig. 3) has a junction box separate from the cabinet but electrically connected by a junction box cable. Six station selector switches and six annunciators are mounted on the selector switch panel which is located on the right hand side of the front panel. A talk-listen switch, pilot lamp, and a combination volume control and on-off switch are mounted on the lower center of the front panel.

c. The LS-201/FI (fig. 4) has a selector switch panel with 12 station selector switches and 12 annunciators located on the right hand side of the

front panel. In all other respects, it is identical with the LS-200/FI (*b* above).

d. The LS-202/FI (fig. 5) has two junction boxes and two junction box cables. The selector switch panel contains 24 station selector switches and annunciators; otherwise, the LS-202/FI is the same as the equipments described in *b* and *c* above.

e. The LS-125B/FI (fig. 6) is identical with the LS-201/FI (*b* above) except that it is not equipped with a handset. All of the instructions in the manual pertaining to the LS-201/FI apply equally to the LS-125B/FI except those explaining the use of the handset.

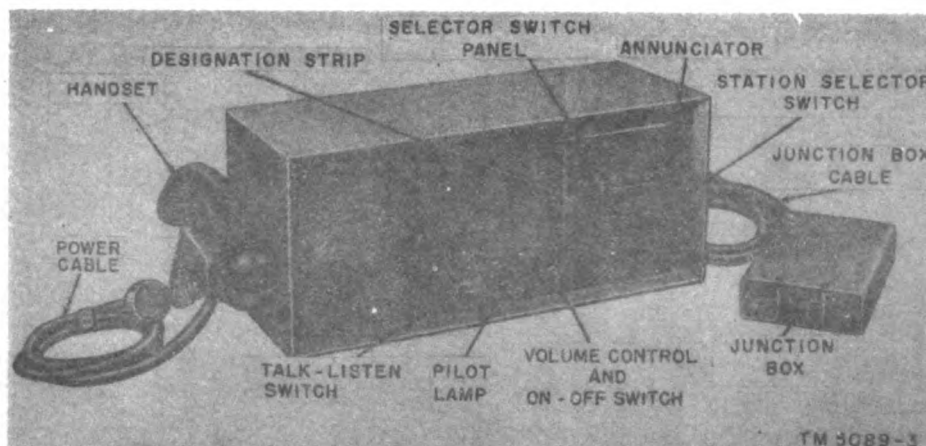


Figure 3. Intercommunication Station LS-200/FI.

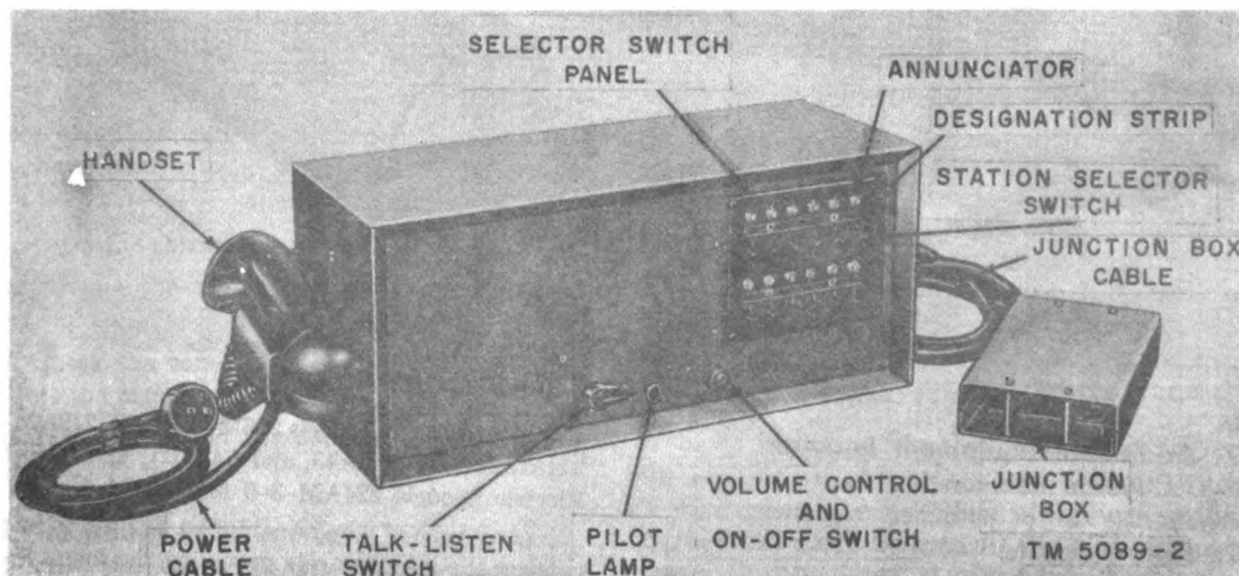


Figure 4. Intercommunication Station LS-201/FI.

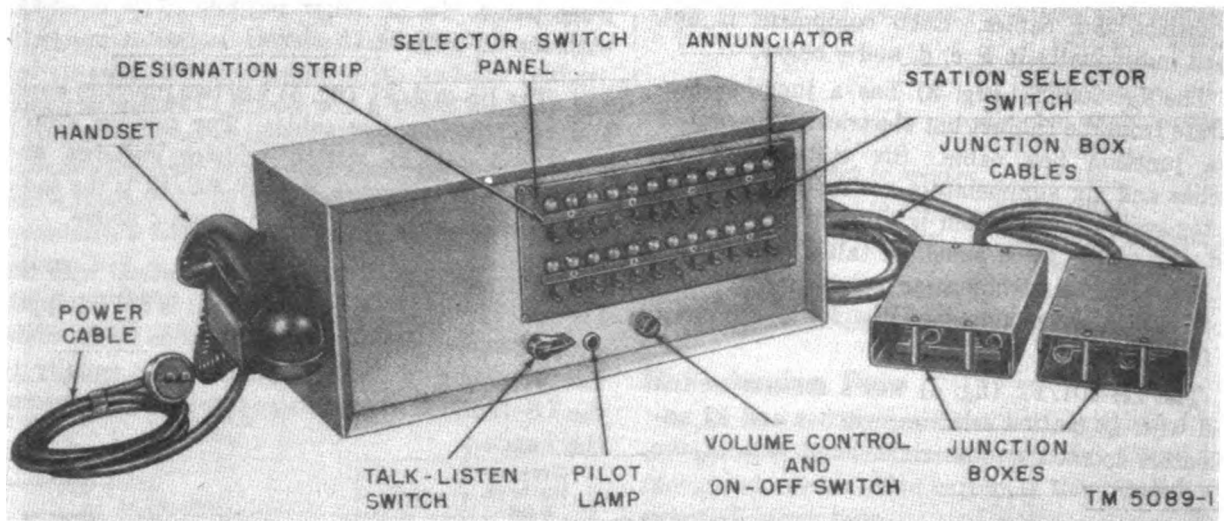


Figure 5. Intercommunication Station LS-202/FI.

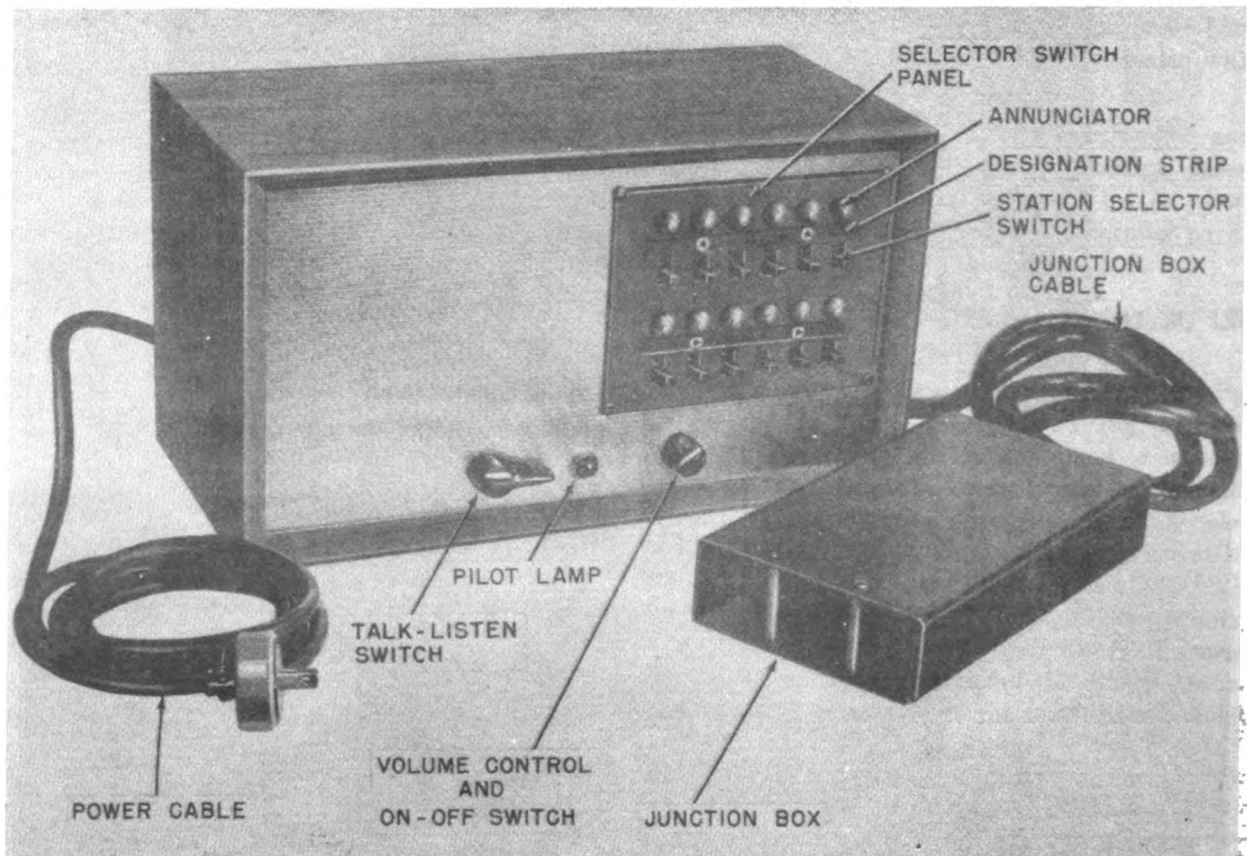


Figure 6. Intercommunication Station LS-125B/FI.

7. Additional Equipment Required

a. A system incorporating remote stations will require the use of additional equipment such as Intercommunicating Station LS-130C/FI. This type remote station is covered in 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.

b. Any type of wire or cable can be used to interconnect the intercom sets providing the loop resistance is relatively low.

CHAPTER 2

INSTALLATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

8. Siting

The intercom sets can be installed wherever adequate shelter is provided for the equipment and operating personnel. Select a location such as a desk, table, or shelf where it is convenient for a person to talk into the speaker-microphone or use the handset, and where the controls are not obstructed.

9. Uncrating, Unpacking, and Checking New Equipment (fig. 7)

The intercom sets may be received in either an export packing case or a domestic packing case. To unpack the export packing case, perform the steps outlined in *a* through *g* below. When unpacking equipment which is packaged for domestic shipment, omit the step described in *b* and *c* below.

a. Place the packing case as near the operating position as is convenient.

b. Cut or remove the waterproof tape and open the waterproof carton.

c. Open the moisture-vaporproof barrier which incloses the corrugated carton. Remove the corrugated carton from the inside of the waterproof carton and moisture-vaporproof barrier.

d. Open the corrugated carton.

e. Remove the technical manual and equipment from the corrugated carton.

f. Check the contents of the shipping container against the master packing slip.

g. Inspect the unit for damage incurred during shipment.

10. Installing Intercom Set

a. Place the unit on the desk, table, or shelf which has been selected as its site.

b. Remove the back panel from the cabinet by unscrewing and removing the five screws that hold it in place.

c. Remove the cover of the junction box (fig. 4) (two covers on the two junction boxes for the LS-202/FI) by removing the four screws from the top of the junction box cover. These screws secure the cover to the cover retaining studs (fig. 8).

d. Attach the junction box base (fig. 8) to a suitable surface, such as the side of a desk or a nearby wall. Secure the junction box to the surface with four wood screws. Mounting holes for the wood screws are located next to the terminal boards on the inside edge of the junction box base (fig. 8).

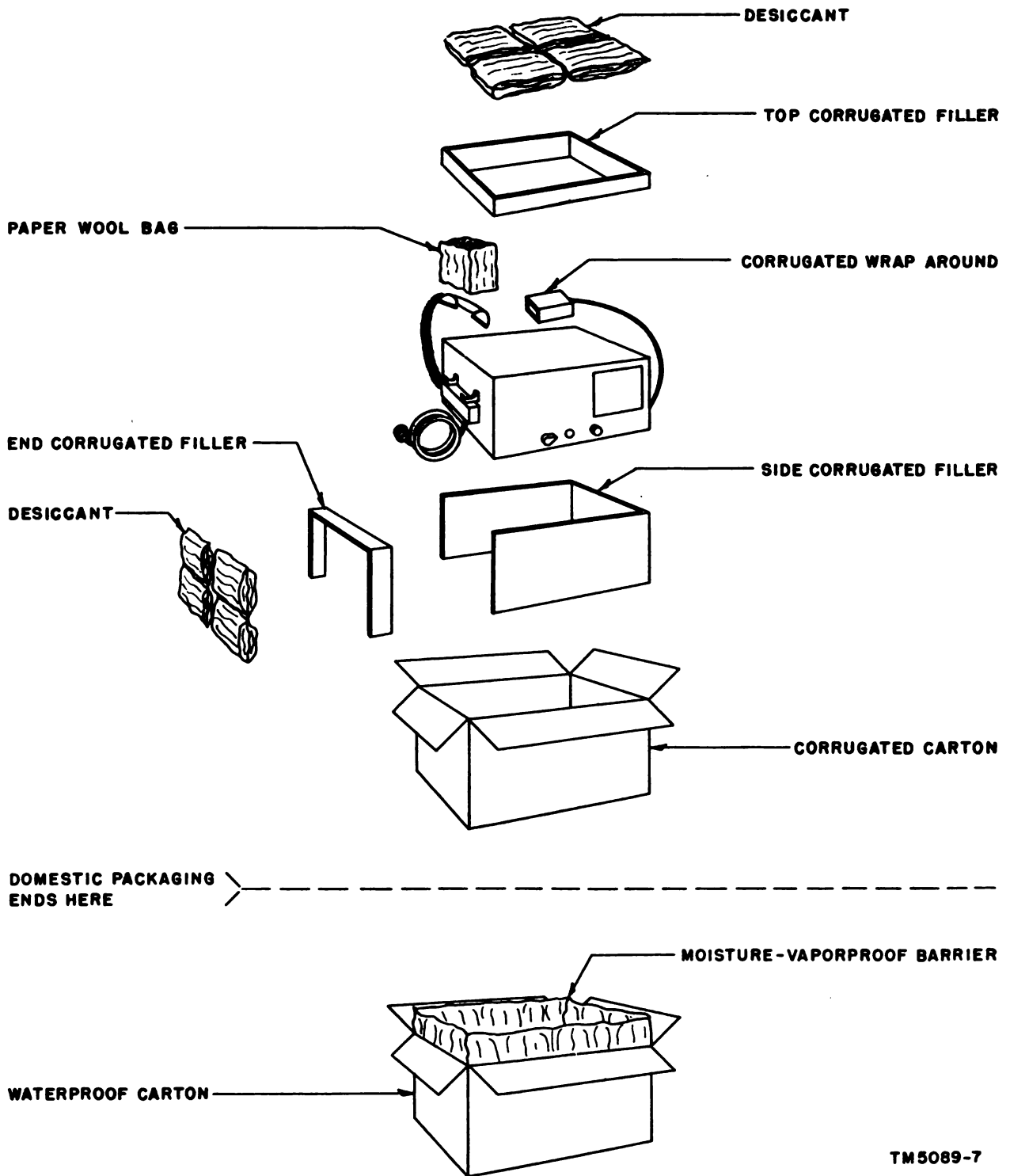
e. Cut a piece of white cardboard so that it will fit into the designation strip (figs. 3-6) on the selector switch panel. Slip the cardboard into the designation strip. Mark the station designations on the cardboard strip under the appropriate annunciator and station selector switch.

11. Used or Reconditioned Equipment

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

b. Check the used or reconditioned equipment for tags or other indications pertaining to changes in the wiring of the equipment. If any changes in wiring (excepting cut jumpers) have been made, note them in this manual, preferably on the schematic and wiring diagrams.

c. Check the rear of the station selector switch panel to determine whether any of the jumpers (fig. 8) have been cut or removed. If any of the jumpers (fig. 8) across terminal 1, 3, or 6 have been cut or removed, replace the jumpers.



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Figure 7. Intercom sets, packaging diagram.

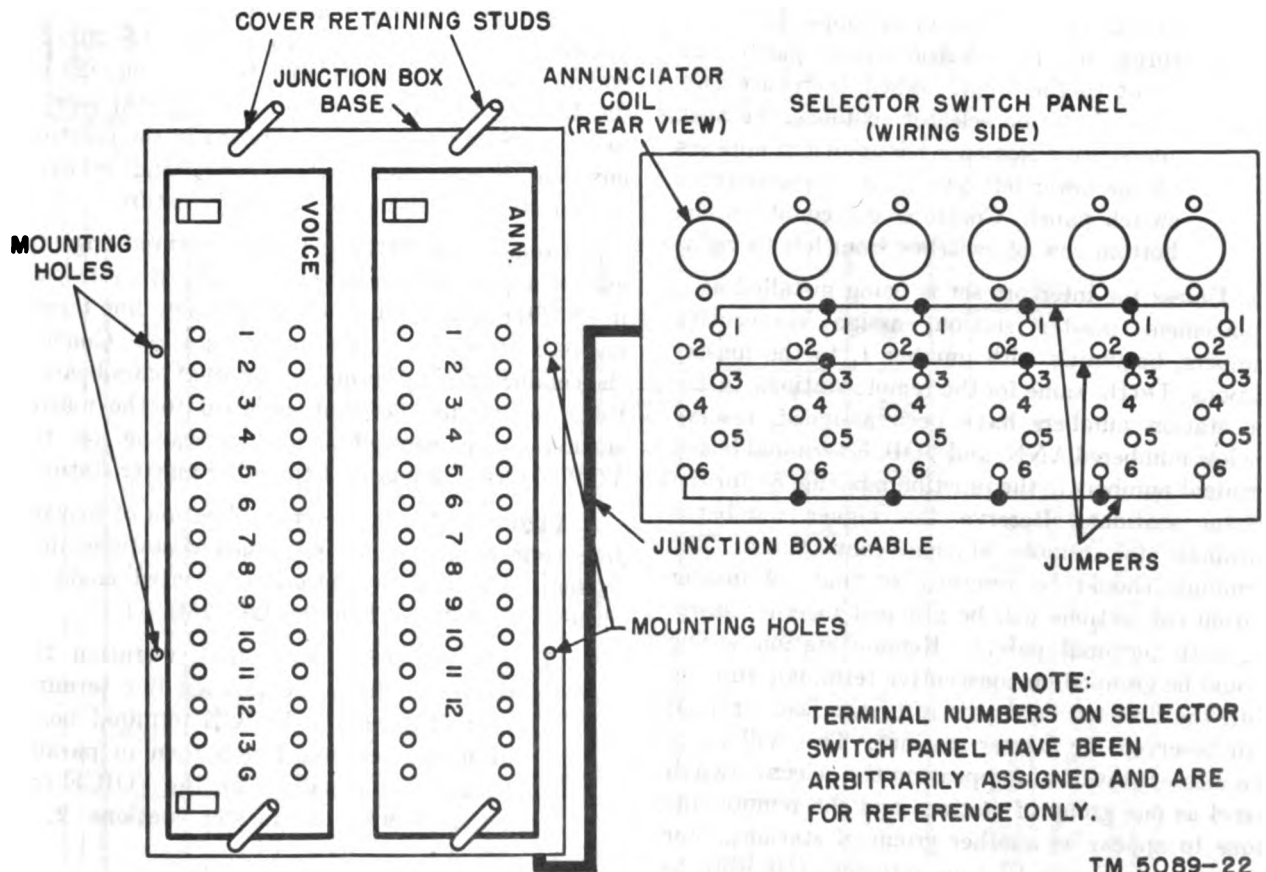


Figure 8. Junction box base and wiring side of selector switch panel for the LS-200/F1.

Section II. CONNECTIONS

12. General

a. Before starting to make any connections, determine whether or not the privacy feature in the intercom sets is to be used. Next, associate the terminals in the junction box with the station selector switches in the selector switch panel (b below); then reserve terminal pairs on the VOICE terminal board for the remote and master stations as indicated in c below. When making connections, be sure to solder all connections.

b. The VOICE and ANN. terminal boards are located in the junction boxes of the intercom sets and are permanently connected, through the junction box cable, to the station selector switches and annunciators located on the selector switch panel (fig. 8).

- (1) The station selector switches and annunciators are not numbered. Each numbered terminal pair on the VOICE terminal board (except the privacy line terminal

pair, par. 13a) is permanently wired to a station selector switch on the selector switch panel (figs. 3-6). Each terminal pair on the ANN. terminal board is similarly wired to the annunciators. A station selector switch is associated with the annunciator directly above it. VOICE terminal board terminal pair 1 is connected to a station selector switch that is located directly below an annunciator which is permanently connected to terminal pair 1 on the ANN. terminal board. Any numbered terminal pair on the ANN. terminal board is the associated annunciator terminal pair for the same numbered terminal pair appearing on the VOICE terminal board.

- (2) To determine to which station selector switch or annunciator a particular pair of terminals is connected, count the selector

switches by starting in the upper left hand corner of the selector switch panel and count to the right. When there are two rows of station selector switches, the next consecutive station selector switch appears on the lower left hand side of the selector switch panel. Continue the count on the bottom row of switches from left to right.

c. Unless the intercom set is being installed as a replacement master station, assign consecutive numbers, beginning with number 1, to the master stations. Do the same for the remote stations. After the station numbers have been assigned, reserve the low numbered ANN. and VOICE terminal board terminal numbers in the junction box (fig. 8) for the master stations. Reserve the higher numbered terminals for remote station connections. The terminals should be reserved so that all master station connections will be grouped together starting with terminal pair 1. Remote station wiring should be grouped on consecutive terminals starting with the first terminal pair after the last terminal pair reserved for master stations. This will cause the master stations to appear on the selector switch panel as one group of stations and the remote stations to appear as another group of stations. For example, if LS-200/FI type intercom sets were to be used as master stations and 3 master and 3 remote stations were to be connected, terminal pairs 1 through 3 on the ANN. and VOICE terminal boards located in the junction boxes of the master stations would be reserved for master station connections and terminal pairs 4 through 6 would be reserved for remote station connections.

13. Privacy (Voice) Line Connections

a. The following instructions for making connections to obtain the privacy line feature (b-d below) are applicable *only* when *all* master (control) stations used in a system are provided with the privacy feature. Intercommunication Stations LS-200/FI, LS-201/FI, LS-202/FI, and LS-125B/FI have the privacy feature. *Do not use* the privacy feature connections when any of the master stations covered by TM 11-2572 or TM 11-2572A, Intercommunicating Stations LS-124B/FI, LS-124C/FI, and LS-128A/FI, are connected as master stations in the system, since these master stations do not have the privacy feature.

b. The privacy (voice) line terminates at the master station to which it has been assigned on the privacy line terminal pair. The privacy line ter-

minimal pair is designated as terminal pair 7 on the LS-200/FI, terminal pair 13 on the LS-201/FI and LS-125B/FI (fig. 9), and terminal pair 25 on the LS-202/FI. The privacy line terminal pair is found on the VOICE terminal board in the junction box and is used only when connecting between master stations having the privacy feature.

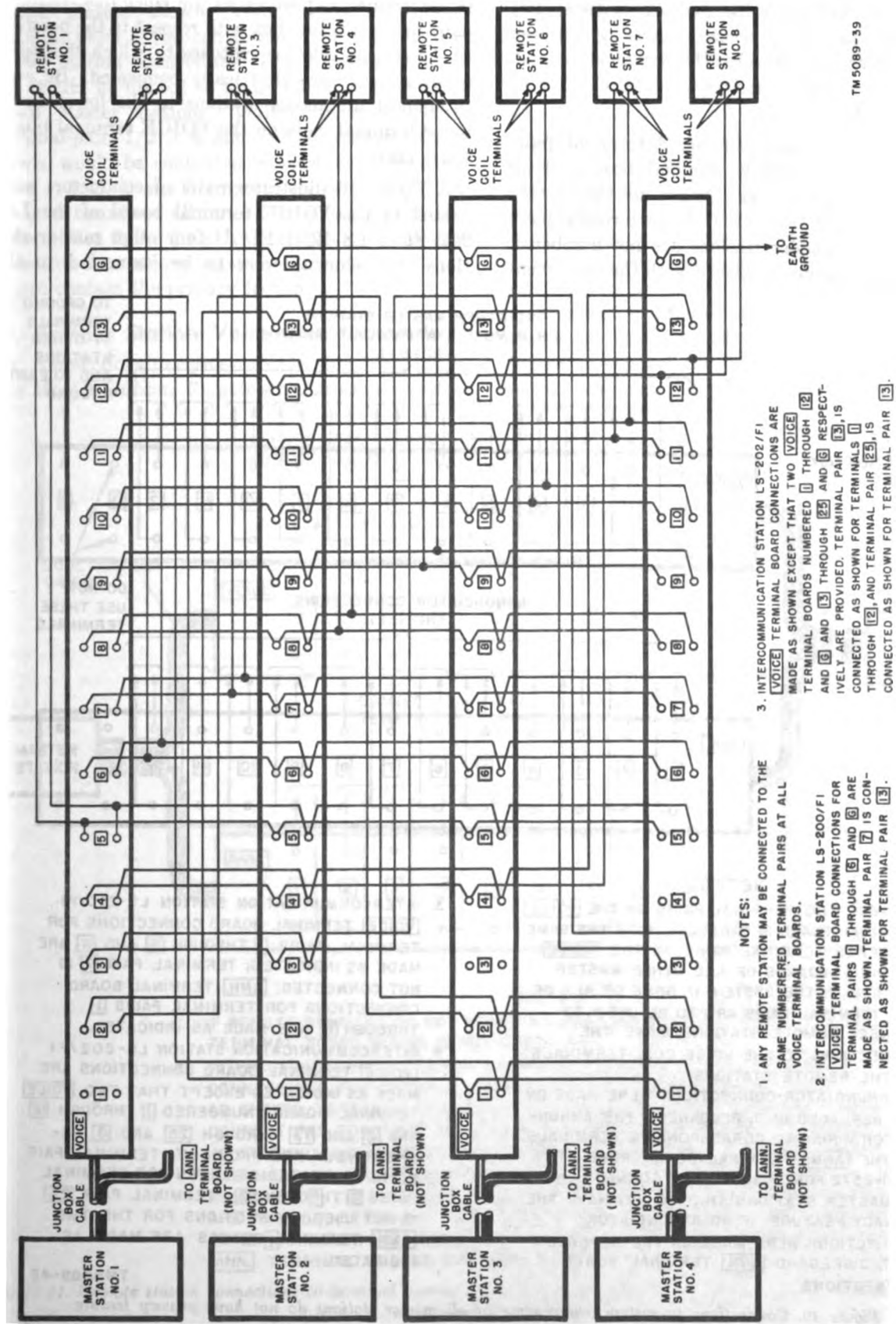
c. Connect the privacy line by terminating one end of a pair of conductors (usually a cable pair in an interstation cable) on the privacy line terminal pair (b above) of one master station. Connect the conductors, in parallel, to terminal pairs bearing the same number as that assigned to the master station being connected and appearing on the VOICE terminal board of the other master stations.

d. Figure 9 illustrates one application of privacy line connections using four master stations in a system. The master stations illustrated could be either the LS-201/FI or the LS-125B/FI.

- (1) The privacy line for master station 1 is connected from the privacy line terminal pair (13) on the VOICE terminal board of master station 1 and then in parallel with terminal pairs 1 on the VOICE terminal boards of master stations 2, 3, and 4.
- (2) The privacy line for master station 2 is connected to the privacy line terminal pair (13) on the VOICE terminal board of master station 2 and then in parallel with terminal pairs 2 of master stations 1, 3, and 4.
- (3) Similarly, the privacy line from terminal pair 13 of master station 3 is connected in parallel with VOICE terminal pairs 3 of the other master stations. Thus, a pattern for privacy line connections is established. With this pattern in mind, a fifth master station could be added to the system. The master station would be numbered 5, and the privacy line would be connected from terminal pair 13 on the VOICE terminal board of master station 5 and then in parallel with terminal pairs 5 on the VOICE terminal boards of master stations 1, 2, 3, and 4.

14. Voice Line Connections Between Master Stations Without Privacy Feature

a. The voice line connections described in the following subparagraphs are made to master sta-



- NOTES:
1. ANY REMOTE STATION MAY BE CONNECTED TO THE SAME NUMBERED TERMINAL PAIRS AT ALL VOICE TERMINAL BOARDS.
 2. INTERCOMMUNICATION STATION LS-200/F1 TERMINAL BOARD CONNECTIONS FOR TERMINAL PAIRS 1 THROUGH 6 AND 8 ARE MADE AS SHOWN. TERMINAL PAIR 7 IS CONNECTED AS SHOWN. TERMINAL PAIR 13 IS CONNECTED AS SHOWN FOR TERMINAL PAIR 13.
 3. INTERCOMMUNICATION STATION LS-202/F1 [VOICE] TERMINAL BOARD CONNECTIONS ARE MADE AS SHOWN EXCEPT THAT TWO [VOICE] TERMINAL BOARDS NUMBERED 1 THROUGH 12 AND 6 AND 13 THROUGH 25 AND 6 RESPECTIVELY ARE PROVIDED. TERMINAL PAIR 13, IS CONNECTED AS SHOWN FOR TERMINALS 1 THROUGH 12, AND TERMINAL PAIR 25, IS CONNECTED AS SHOWN FOR TERMINAL PAIR 13.

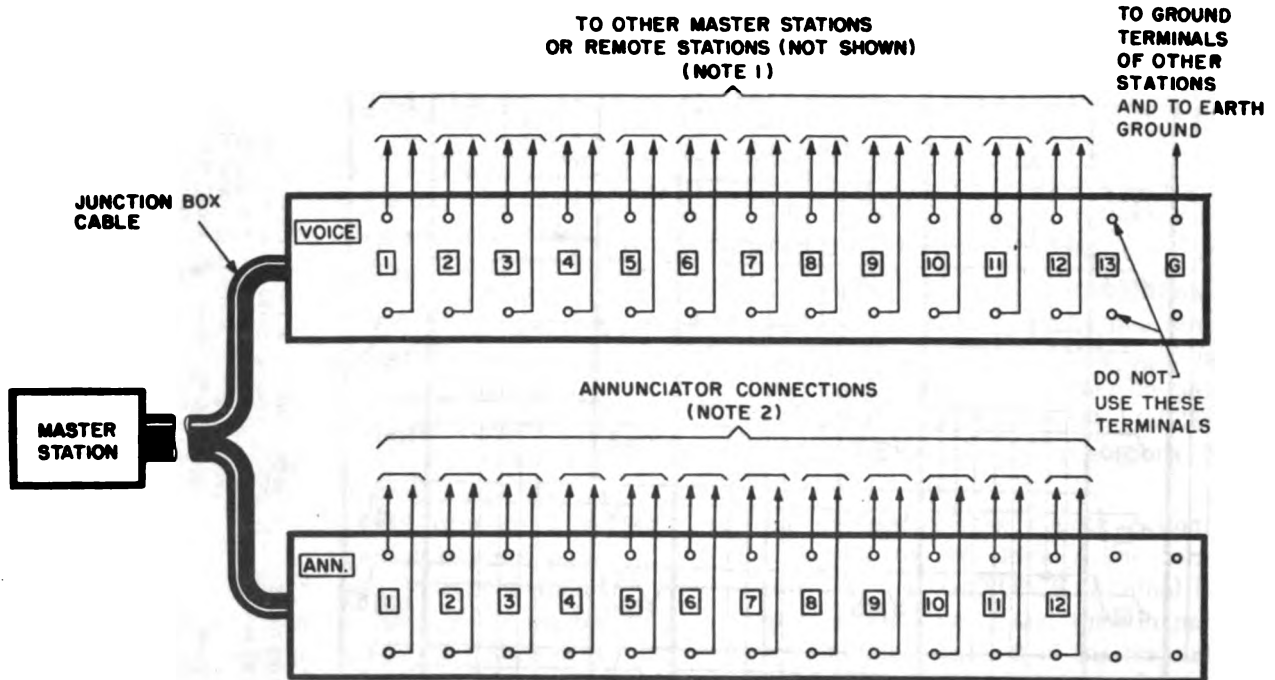
Figure 9. VOICE terminal board connections, primary line and remote stations.

tions that do not have the privacy feature. Use these connections *only* when connecting between the intercom sets, described in this technical manual, and master stations described in TM 11-2572 or TM 11-2572A.

b. Connect the same numbered terminal pairs appearing on the VOICE terminal boards of all master stations in parallel. Do not use the privacy line terminal pairs (par. 13b). If the terminal pairs of some of the master stations are not numbered, refer to the literature furnished with the equipment

to determine the position of the voice line terminal pairs in the junction box with respect to the position of the station selector switches to which the voice terminal pairs are electrically connected. Be sure to connect all master stations to the lower numbered terminal pairs on the VOICE terminal board (par. 12c).

c. Figure 10 illustrates pairs of conductors connected to the VOICE terminal board of the LS-201/FI or LS-125B/FI. If four other master stations (not shown) were to be connected to the



NOTES:

1. CONNECT THE TERMINAL PAIRS ON THE **VOICE** TERMINAL BOARD IN PARALLEL WITH THE SAME NUMBERED TERMINAL PAIRS ON THE **VOICE** TERMINAL BOARDS OF ALL OTHER MASTER STATIONS IN THE SYSTEM. IF SOME OR ALL OF THE TERMINAL PAIRS ARE TO BE USED TO CONNECT REMOTE STATIONS, MAKE THE CONNECTIONS TO THE VOICE COIL TERMINALS OF THE REMOTE STATIONS.
2. IF ANNUNCIATOR CONNECTIONS WERE MADE ON THE REPLACED UNIT, RECONNECT THE ANNUNCIATOR WIRING TO CORRESPONDING TERMINALS ON THE **ANN.** TERMINAL BOARD. REFER TO TM 11-2572 FOR ANNUNCIATOR CONNECTIONS TO MASTER STATIONS THAT DO NOT HAVE THE PRIVACY FEATURE. IF NO ANNUNCIATOR CONNECTIONS WERE MADE ON THE REPLACED UNIT, DISREGARD **ANN.** TERMINAL BOARD CONNECTIONS.
3. INTERCOMMUNICATION STATION LS-200/FI **VOICE** TERMINAL BOARD CONNECTIONS FOR TERMINAL PAIRS 1 THROUGH 6 AND 6 ARE MADE AS INDICATED; TERMINAL PAIR 7 IS NOT CONNECTED. **ANN.** TERMINAL BOARD CONNECTIONS FOR TERMINAL PAIRS 1 THROUGH 6 ARE MADE AS INDICATED.
4. INTERCOMMUNICATION STATION LS-202/FI **VOICE** TERMINAL BOARD CONNECTIONS ARE MADE AS INDICATED EXCEPT THAT TWO **VOICE** TERMINAL BOARDS NUMBERED 1 THROUGH 12 AND 6 AND 13 THROUGH 25 AND 6 RESPECTIVELY ARE PROVIDED; TERMINAL PAIR 13 IS CONNECTED AS SHOWN FOR TERMINAL PAIRS 1 THROUGH 12; TERMINAL PAIR 25 IS NOT USED. CONNECTIONS FOR THE TWO **ANN.** TERMINAL BOARDS ARE MADE AS INDICATED.

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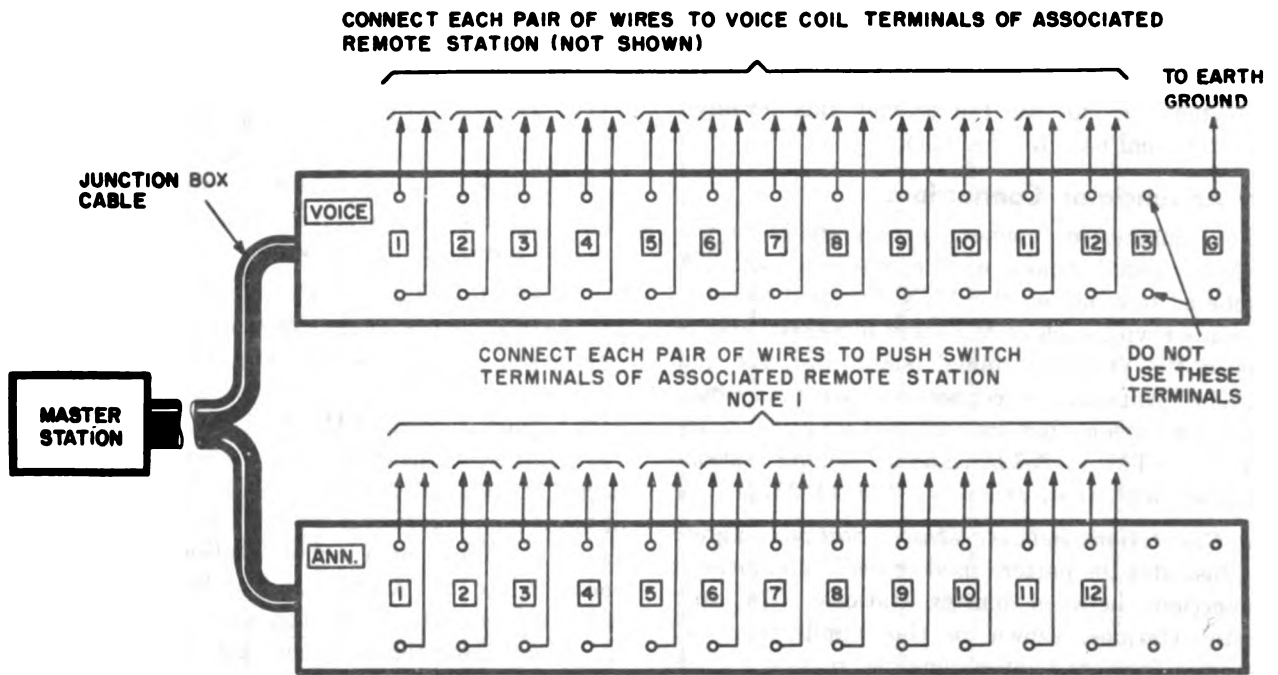
Figure 10. Connections to system where some or all master stations do not have privacy feature.

master station shown, VOICE terminal board terminal pairs 1 through 5 would be reserved for master station connections. Five pairs of conductors would be needed to make the connections between master stations. VOICE terminal board terminal pairs 1, 2, 3, 4, and 5 on the master station shown, would be connected in parallel to terminal pairs 1, 2, 3, 4, and 5 respectively on the VOICE terminal boards of all other master stations in the system. Use figure 10 as an example when making voice line connections between master stations that do not contain the privacy feature.

15. Remote Station Voice Line Connections

a. *Connections to System Containing More Than One Master Station.* Remote stations are connected

in parallel with the terminal pairs reserved for them on the VOICE terminal boards of the master stations. The line between the remote station and the master station may be connected in the junction box of the nearest master station. Figure 9 illustrates one application of remote station connections to the VOICE terminal board terminal pairs of four master stations. In this application, VOICE terminal board terminal pairs 5 through 12 have been reserved for remote station connections. Remote station 1 is connected to terminal pair 5 on the VOICE terminal board of master station 1. Terminal pairs 5 of all master station VOICE terminal boards are then connected in parallel. If it were desired to connect the remote station to only one master station, the parallel connection to the



NOTES:

1. IF REMOTE STATIONS DO NOT CONTAIN PUSH SWITCHES, THE **ANN.** TERMINAL BOARD WIRING IS NOT USED.
2. INTERCOMMUNICATION STATION LS-200/F1 **VOICE** TERMINAL BOARD CONNECTIONS FOR TERMINAL PAIRS 1 THROUGH 6 AND 8 ARE MADE AS SHOWN; TERMINAL PAIR 7 IS NOT CONNECTED. **ANN.** TERMINAL BOARD CONNECTIONS FOR TERMINAL PAIRS 1 THROUGH 6 ARE MADE AS SHOWN.
3. INTERCOMMUNICATION STATION LS-202/F1 **VOICE** TERMINAL BOARD CONNECTIONS ARE MADE AS SHOWN EXCEPT THAT TWO **VOICE** TERMINAL BOARDS NUMBERED 1 THROUGH 12 AND 8 AND 13 THROUGH 25 AND 9 RESPECTIVELY ARE PROVIDED; TERMINAL PAIR 13 IS CONNECTED AS SHOWN FOR TERMINAL PAIRS 1 THROUGH 12; TERMINAL PAIR 25 IS NOT USED. CONNECTIONS TO THE **ANN.** TERMINAL BOARDS ARE MADE AS SHOWN.

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Figure 11. Remote station connections to terminal boards of master station, system containing remote stations connected to one master station.

VOICE terminal boards of the other master stations would not be made. This establishes a pattern for connecting remote stations in a system containing more than one master station. Follow this pattern when making this type connection.

b. Connections in System Containing One Master Station and Two or More Remote Stations. Figure 11 illustrates the VOICE terminal board connections for the LS-201/FI or LS-125B/FI. Connect the two-conductor voice line between the voice coil terminals of the remote station and the selected VOICE terminal board terminal pair. In a system where only one master station is used, the first remote station is connected to VOICE terminal board terminal pair 1. The second remote station is connected to VOICE terminal board terminal pair 2; subsequent connections are made consecutively to the numbered terminals of the VOICE terminal board until all remote stations have been connected. *Do not* use the privacy line terminal pair (terminal pair 13 (fig. 11)).

16. Annunciator Connections

The annunciator connections are made to the ANN. terminal board of the intercom sets. A numbered terminal on the ANN. terminal board is associated with each of the same numbered terminals on the VOICE terminal board (par. 12*b* and fig. 11). Annunciator connections are made only to master stations that are equipped for annunciator signaling (TM 11-2572A) and to remote stations equipped with push switches (TM 11-2572).

a. Connections Between Master Stations. Figure 12 illustrates the pattern used to make annunciator connections between master stations. The four master stations, shown in this application and equipped for annunciator signaling, require the use of ANN. terminal board terminal pairs 1 through 4 on the four master stations. Note, however, that the ANN. terminal pair that is numbered the same as the attached master station is vacant on the ANN. terminal board of each master station. To establish the pattern for these connections, master station 1 is used as an example. Follow this pattern when making annunciator connections between master stations. The ANN. terminal board connections to the ANN. terminal boards of 2, 3, and 4 (fig. 12) master stations are as follows:

- (1) Terminal pair 1 is vacant.
- (2) The top terminal of terminal pair 2 is connected to the bottom terminal pair 1 at

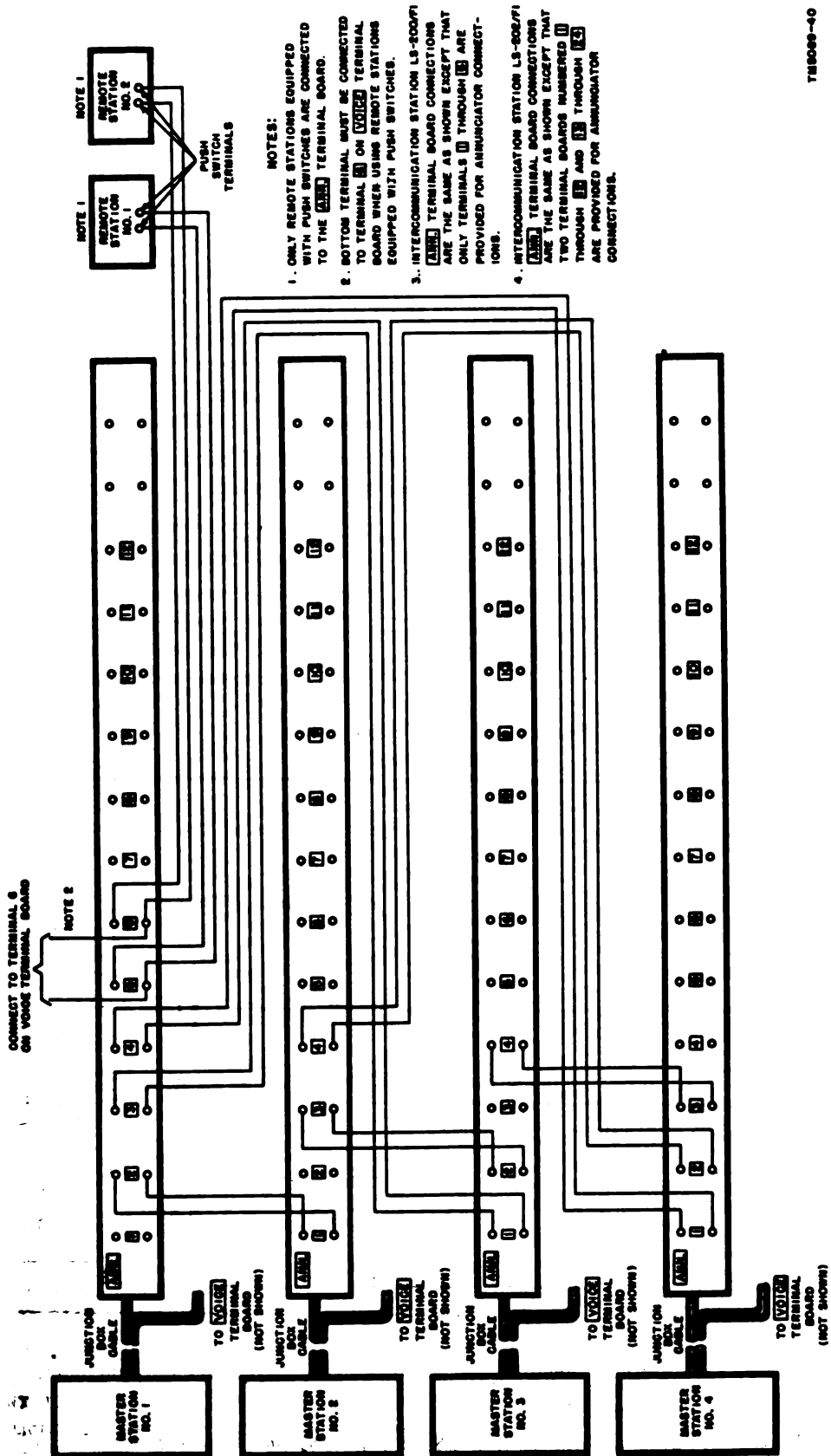
master station 2, and the bottom terminal of terminal pair 2 (master station 1) is connected to the top terminal of terminal pair 1 at master station 2.

- (3) The top terminal of terminal pair 3, master station 1, is connected to the bottom terminal of terminal pair 1 at master station 3. The bottom terminal of terminal 3, master station 1, is connected to the top terminal of terminal pair 1 at master station 3.
- (4) The top terminal of terminal pair 4, master station 1, is connected to the bottom terminal of terminal pair 1 at master station 4. The bottom terminal of terminal pair 4, master station 1, is connected to the top terminal of terminal pair 1 at master station 4.
- (5) This same pattern would be followed if more master stations were to be connected to this system. In this application, ANN. terminal board terminal pairs 5 and 6 are connected to remote station push switch terminals (*b* below).

b. Connections Between Remote Stations and One Master Station. Annunciator connections from a master station to a remote station (fig. 12) are made only when the remote station is equipped with a push switch (TM 11-2572). Although the voice coil terminals of a remote station may be connected in parallel with the VOICE terminal boards of more than one master station (par. 15), the push switch terminals of a remote station can only be connected to the ANN. terminal board of one of these master stations. To connect a remote station for annunciator signaling, connect the push switch terminals of the remote station to the ANN. terminal board terminal pair that is numbered the same as the VOICE terminal board terminal pair which was previously connected to the voice coil terminals of the same remote station (par. 15). Connect a conductor from the bottom terminal of the same ANN. terminal pair to the G (ground) terminal on the VOICE terminal board, located in the same junction box as the ANN. terminal board.

17. Cutting Jumpers

a. General. Two of the three jumpers located on rear of the selector switch panel (figs. 13-15) must be cut to separate the master stations containing the privacy feature from the remote stations, and



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Figure 18. ANN. terminal board connections, LS-901/FI or LS-195B/FI.

for proper functioning of the intercom set. Remove the chassis from the cabinet to gain unobstructed access to the wiring side of the selector switch panel. Loosen the set screws on the volume control and the talk-listen switch knobs and pull the knobs from their shafts. Loosen and remove the four chassis retaining screws from the bottom of the cabinet. Pull the chassis out of the cabinet, but do not disconnect the plugs. Sufficient slack has been left in the plug wiring so that the chassis can be removed without disconnecting the plugs. Determine the type of system that is being used with the intercom set and follow the jumper cutting instructions provided for that type of system. The jumper cutting procedure for each system is outlined in *b*, *c*, and *d* below. Refer to figure 13 when cutting jumpers on the LS-200/FI, figure 14 when cutting jumpers on the LS-201/FI or LS-125B/FI, and figure 15 when cutting jumpers on the LS-202/FI.

b. All Master Station System.

- (1) *Privacy feature not used.* Unsolder and remove the black and red conductors from terminals 3 and 6 at station 1 for any of the intercom sets being installed (figs. 13-15).

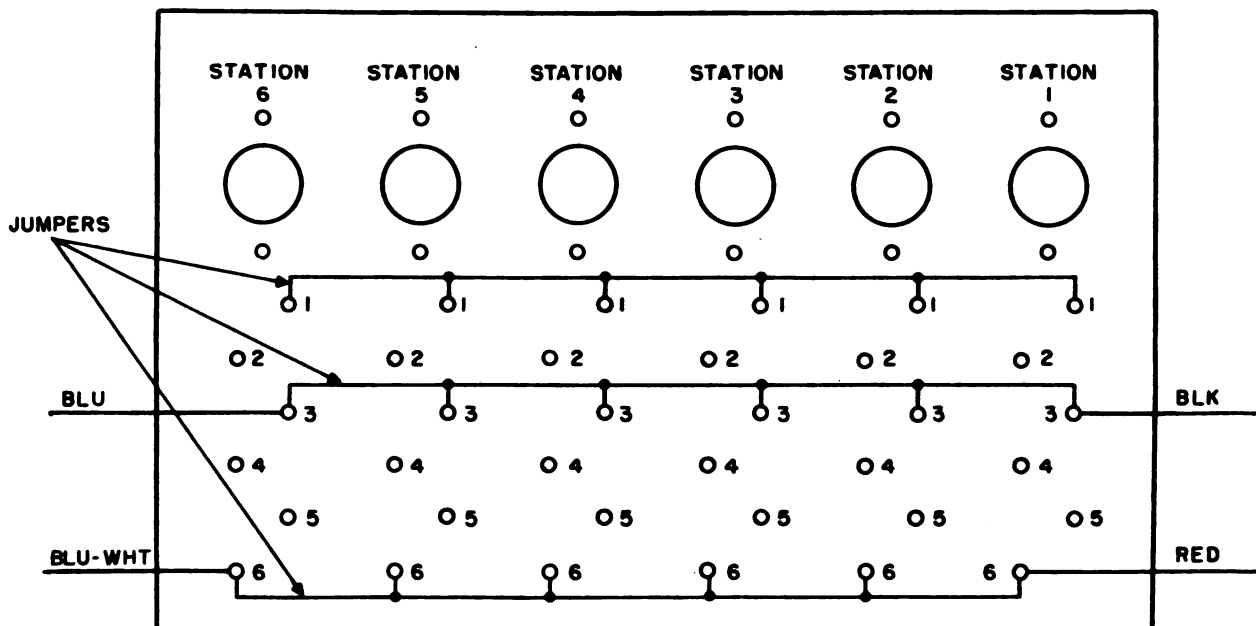
- (2) *Privacy feature used.* Unsolder and remove the two junction box cable connections from terminals 3 and 6 at station number 6 on the LS-200/FI, station number 12 on the LS-201/FI, and LS-125B/FI, and station number 24 on the LS-202/FI. On equipments bearing Order Nos. 4725-Phila-52, 38246-Phila-53, and 37891-Phila-53, remove the blue and blue-white conductors. On equipments bearing Order Nos. 7541-Phila-54 and 19988-Phila-55, remove the red and black conductors.

c. System With Only Remote Stations Connected to One Master Station. Disconnect and remove the black and red conductors from terminals 3 and 6 at station 1 (figs. 13-15).

d. System With More Than One Master Station and Remote Stations.

- (1) *Privacy feature not used.* Use the jumper cutting procedure described in *b*(2) above.
- (2) *Privacy feature used.* Figures 13, 14, and 15 show three jumpers connected to the rear of the selector switch panel. The jumper connected between terminals 1 of

**SELECTOR SWITCH PANEL
(REAR VIEW)**

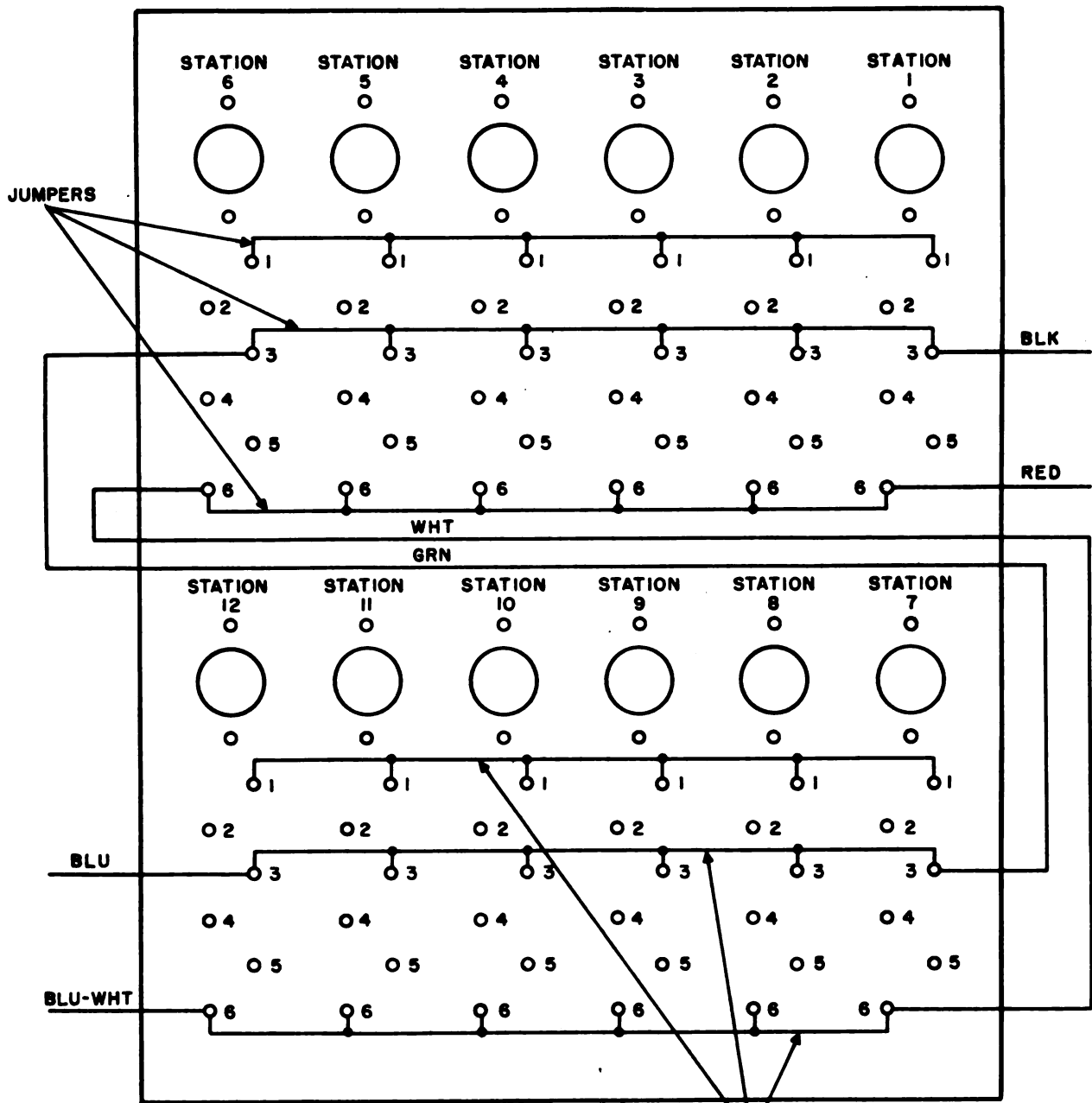


NOTE:
STATION NUMBERS AND TERMINAL
NUMBERS ARE ASSIGNED ARBITRARILY
AND ARE FOR REFERENCE ONLY.

TM 5089-36

Figure 13. Selector switch panel of LS-200/FI, wiring side showing jumpers.

**SELECTOR SWITCH PANEL
(REAR VIEW)**



NOTE:
STATION NUMBERS AND TERMINAL
NUMBERS ARE ASSIGNED ARBITRARILY
AND ARE FOR REFERENCE ONLY.

JUMPERS

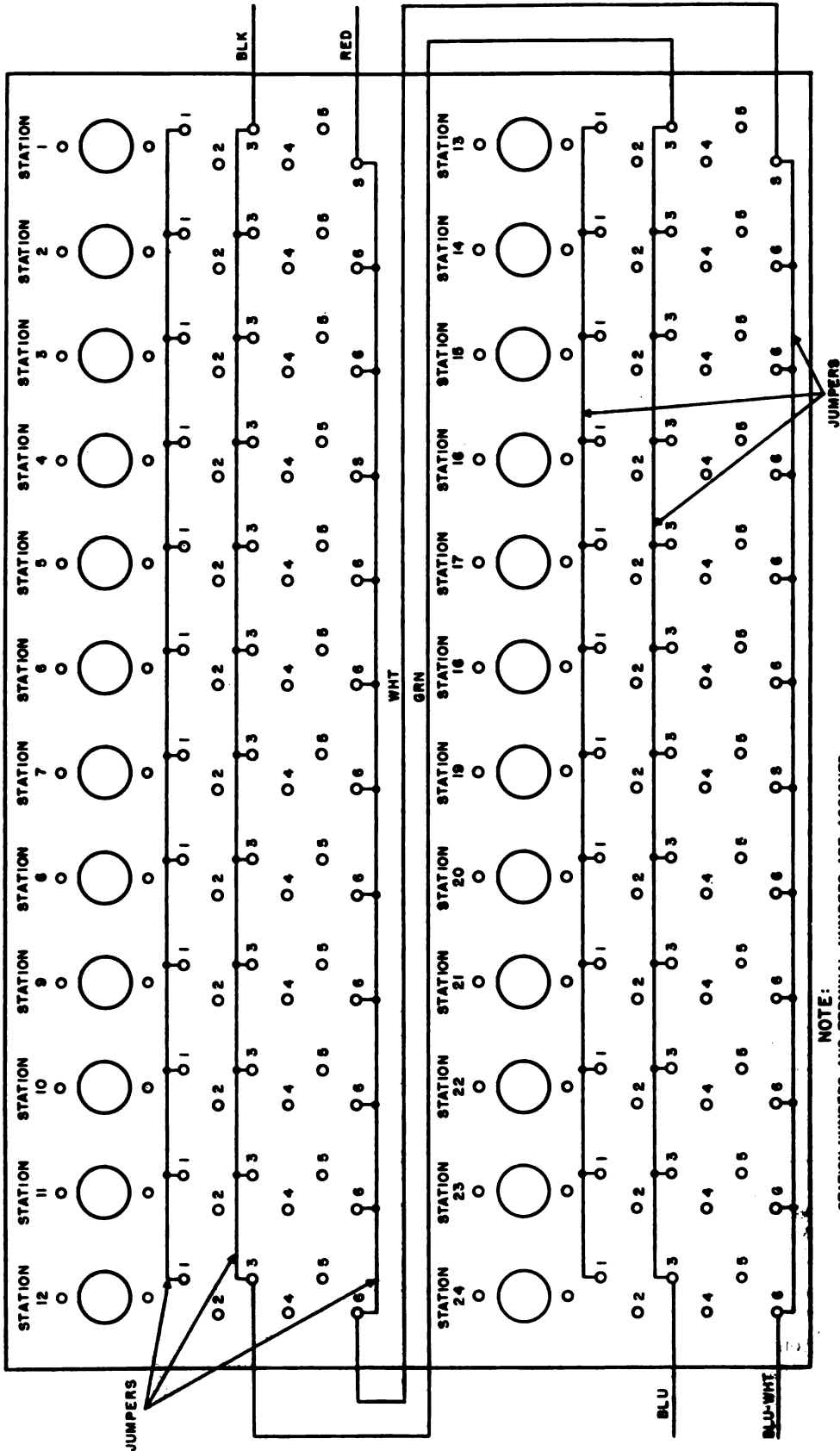
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Figure 14. Selector switch panel of LS-201/FI and LS-125B/FI, wiring side showing jumpers.

the various stations is *never* cut. The first step in cutting jumpers is to determine the place to cut the jumpers. Determine the station number that represents the last master station appearance on the selector

switch panel. The next station number on the selector switch panel should represent the first remote station appearance. The jumpers should be cut between these two station numbers. Cut the jumpers con-

SELECTOR SWITCH PANEL
(REAR VIEW)



NOTE:
STATION NUMBERS AND TERMINAL NUMBERS ARE ASSIGNED
ARBITRARILY AND ARE FOR REFERENCE ONLY.

Figure 15. Selector switch panel of LS-902/FI, wiring side showing jumpers.

TM 5089-38

necting terminals 3 and terminals 6 between the last station number assigned to a master station and the first station number assigned to a remote station.

Note. After the jumpers have been cut, replace the chassis in the cabinet but *do not* secure the chassis retaining screws because it may be necessary to move the chassis slightly to set the impedance switch (par. 20).

18. Grounding

Ground all master stations by connecting an insulated conductor between the G (ground) termi-

nals (figs. 8-11), located on the VOICE terminal board in the junction box, of all master stations in the system. Connect the G terminal of *one* of the master stations to earth ground by connecting an additional conductor from the G terminal on the VOICE terminal to an earth ground such as a water pipe, radiator, or ground rod. For further information on grounding procedures, refer to TM 11-676, Grounding Procedures and Protective Devices.

Caution: Ground only one master station to an earth ground.

Section III. PREOPERATIONAL PROCEDURE

Note. Personnel performing the procedures described in this section should be familiar with the use of the controls and with the operating procedures described in paragraphs 22 through 31.

19. General

a. The procedures outlined in *b* below and in paragraphs 20 and 21 must be performed before the intercom sets can be used for the routine operation described in paragraphs 22 through 31.

b. Connect power to the equipment by inserting

the male power plug into a 115-volt, 60-cycle, alternating-current (ac) power source.

20. Impedance Switch Setting

a. Location and Positioning. The two-position impedance switch is mounted on the top middle of the chassis of the audio amplifier (fig. 16). When

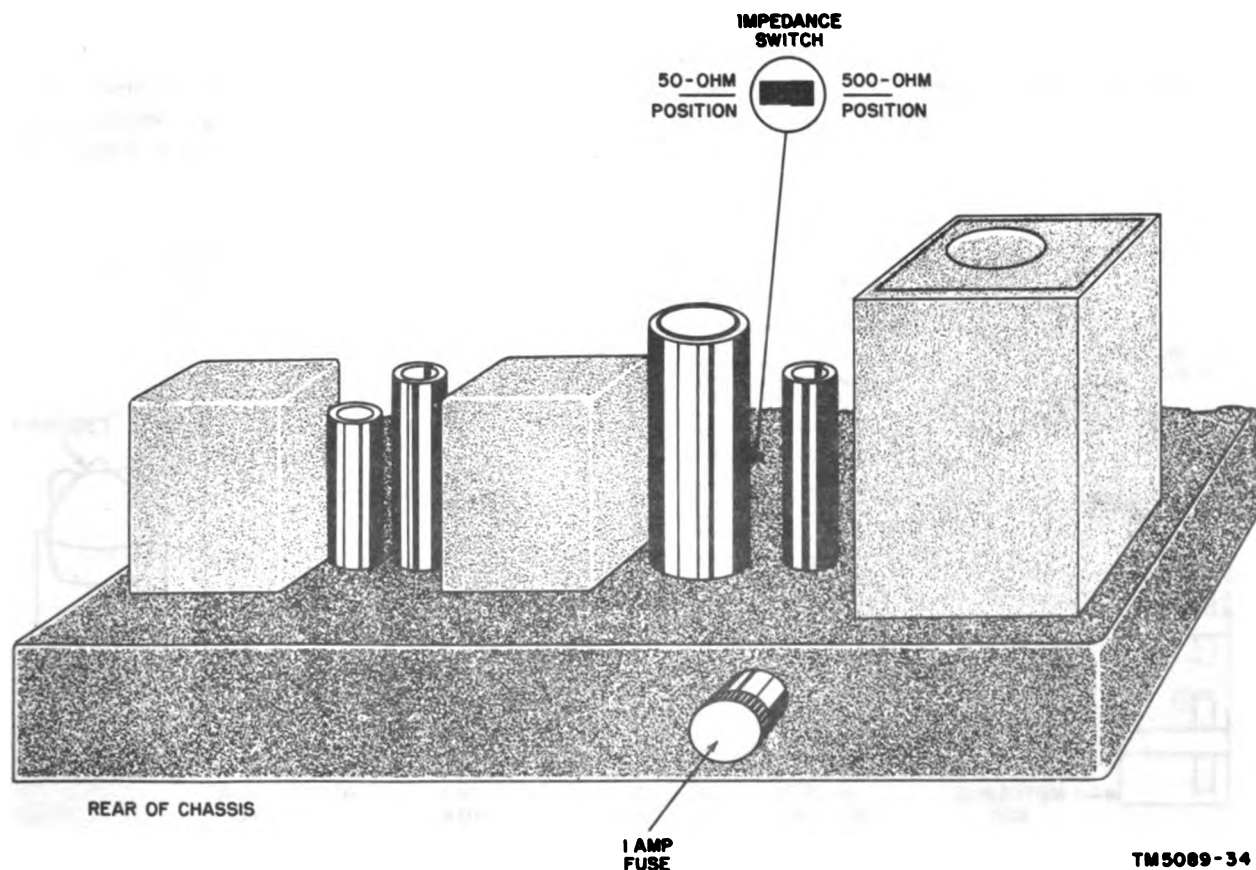


Figure 16. Chassis showing impedance switch location and positions.

the master station is viewed from the rear, the impedance switch may be set to either of the two switch positions as follows:

- (1) To set the switch in the 50-ohm position, move it to the left.
- (2) To set the switch in the 500-ohm position, move it to the right.

b. Replacement in Established System without Privacy Feature. Determine whether the impedance switch of the replaced unit is set at 50 or 500 ohms. Set the impedance switch of the new unit at the same position.

c. Installation in System Having Privacy Feature. Talk and listen to the farthest remote station. If the voice level is low with the volume control set at maximum and the impedance switch set at 50 ohms, change the impedance switch to the 500-ohm position. If the voice level returns to normal, leave the switch at the 500-ohm position.

21. Preoperational Testing

Check the equipment to see that it is in good working condition after the installation is finished.

Use the equipment performance checklist (par. 46) as a guide. Perform each check (items 1 through 10) in the order given. After the equipment has been thoroughly checked, replace and secure the chassis and back panel as follows:

a. Push the chassis back into the cabinet. Line up the screw holes in the chassis with the four screw holes in the bottom of the cabinet. Replace the four chassis retaining screws. Replace the knobs on the proper shafts and tighten the set screws.

b. Place the back panel on the back of the cabinet with the four panel cutouts toward the bottom of the cabinet. Place the junction box cables, fuse holder, and power cable in their respective panel cutouts. (The proper panel cutout is easily determined by the position of the part on the rear of the cabinet or chassis with relation to the position of the panel cutout.) Secure the top of the back panel to the cabinet with two wood screws in each corner. Secure the bottom of the back panel with the three machine screws inserted through the holes provided. Tighten all screws securely.

CHAPTER 3

OPERATION

Section I. OPERATION UNDER USUAL CONDITIONS

Notes:

1. The operation of all of the intercom sets described in this manual is the same except that operational procedure concerning the handset should be disregarded when operating the LS-125B/FI.
2. Condensed operating instructions are provided at the end of this chapter

22. Starting Procedure

- a. Check the station selector switches to see that all switches are in the off (horizontal) position.
- b. Turn the set on by turning the volume control and on-off switch (fig. 17) $\frac{1}{4}$ turn counterclockwise until a click is heard. The pilot lamp will light. Allow a short time for the set to warm up.
- c. Move the talk-listen switch to the idle position (fig. 18).
- d. When all master stations in a system have annunciators (fig. 17), all station selector switches are placed in the off (horizontal) position. When

the other master stations do not have annunciators, move the home switch to the up position. (The home switch is the station selector switch assigned the same number as that of the master station.) *Leave the home switch in the up position at all times.*

- e. When the intercom sets are used with master stations that do not have the privacy feature, follow the operating procedure given in paragraph 24. When the equipment is used in a system where all master stations have the privacy feature, follow the operating procedure given in paragraph 25. Whether or not a master station has the privacy feature, does not affect the operation of the remote station.

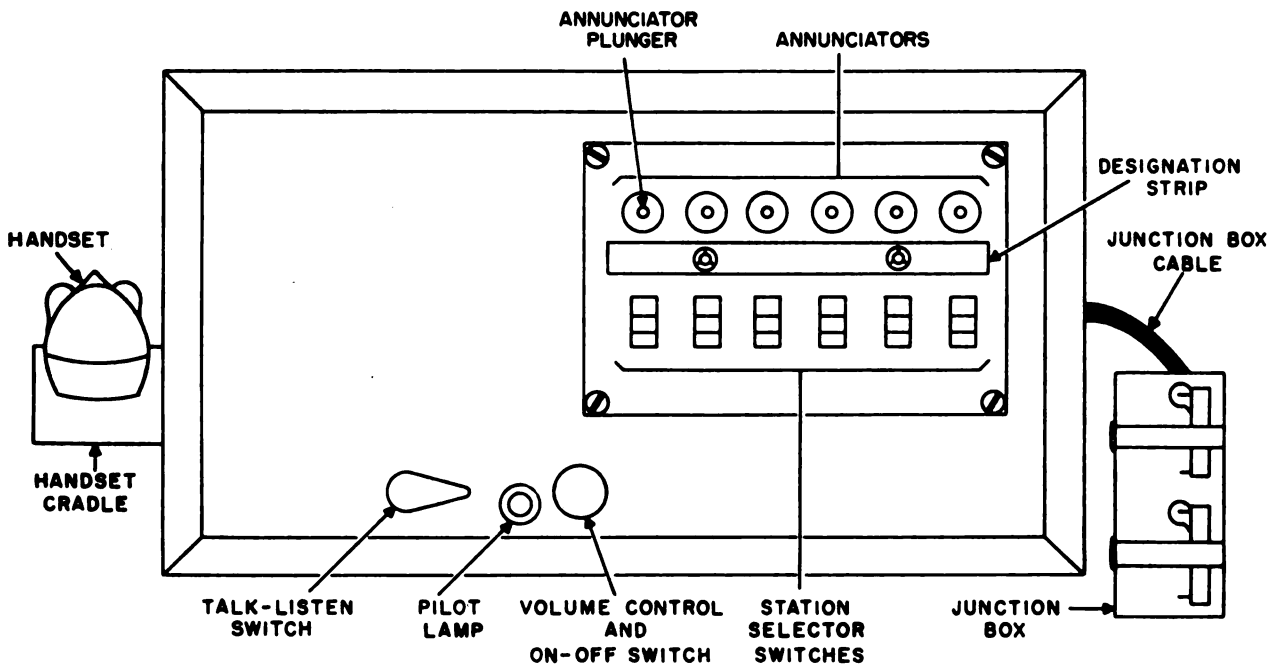


Figure 17. Intercommunication Station LS-200/FI, showing controls.

TM 5089-24

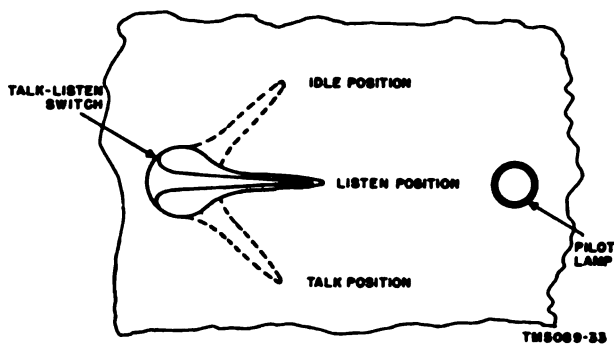


Figure 18. Talk-listen switch, showing the three operating positions.

23. Operation with Remote Stations

a. Calling Remote Station. With the talk-listen switch (fig. 18) in the idle position, push up the station selector switch of the remote station to be called, and listen. If no other station is talking to the desired remote station, proceed as follows:

- (1) With the volume control and on-off switch (fig. 17) turned full on (extreme clockwise position before shutoff), operate the talk-listen switch to the talk position (fig. 18) and hold it at this position.
- (2) Talk in a normal voice with the mouth approximately 20 inches from the left front of the master station.
- (3) Release the talk-listen switch and wait for an answer. When the talk-listen switch is released, it will spring back to the listen position.
- (4) When the remote station answers the call, again move the talk-listen switch to the talk position and deliver the message.
- (5) To listen, repeat the procedure outlined in (3) above.
- (6) When the call is finished, move the station selector switch to the off (horizontal) position. Move the talk-listen switch to the idle position.

b. Receiving Calls from Remote Stations. Calls can be received only from remote stations equipped with annunciator buttons. An incoming call will be indicated at the master station by a buzzer and an annunciator signal. To answer such a call, proceed as follows:

- (1) When the buzzer sounds and one of the annunciator plungers slides part way out

of the receptacle, push up the station selector switch mounted directly below the protruding annunciator plunger.

- (2) Press the talk-listen switch down to the talk position and acknowledge the call (a(2) above). Push the annunciator plunger back into its receptacle.
- (3) To listen, release the talk-listen switch, which will spring back to the listen position.
- (4) When the call is finished, proceed as described in a(6) above.

24. Operation in System Not Having Privacy Feature

a. Calling Master Station without Privacy Feature. When the intercom sets are connected in a system where other master stations do not have the privacy feature, proceed as follows to call another master station:

- (1) With the talk-listen switch (fig. 18) in the idle position, push up the desired station selector switch and listen. If no other station is talking to the desired master station, use one of the following signaling procedures ((2) or (3) below).
- (2) If the system has annunciator signaling, press the desired station selector switch to the down position to operate the buzzer and annunciator at the other master station. Hold the station selector switch in the down position momentarily; then return the switch to the up position.
- (3) If the system does not have annunciator signaling, leave the station selector switch in the up position. With the talk-listen switch in the talk position, call the other master station; use the proper talking procedure (par. 23a(2)).
- (4) Release the talk-listen switch and wait for an answer (par. 23a(3)).
- (5) Talk and listen to the called master station as explained in paragraph 23a(4) and (5). The handset may be used in place of the speaker-microphone if desired.
- (6) When the call is finished, proceed as described in paragraph 23a(6).

b. Receiving Call from Master Station without Privacy Feature. If annunciator signaling is used,

an incoming call will be indicated by the buzzer and the annunciator plunger (fig. 17). If annunciator signaling is not used, the call will be heard on the speaker of the master station. In either case, no control by the operator is necessary. Be sure the talk-listen switch (fig. 18) is in the idle position and answer the call; use the proper talking procedure (par. 23a(2)). If the annunciator plunger is protruding from the selector switch panel, push it back into its receptacle.

25. Operation in System Having Privacy Feature

a. Calling Master Station with Privacy Feature (Using Handset).

- (1) Lift the handset from the cradle. The handset is operated in the same manner as a telephone handset.
- (2) Press the desired station selector switch (fig. 17) down to signal the called master station.
- (3) Hold the station selector switch in this position for a short time; then move it to the up position.
- (4) Check the talk-listen switch to be sure it is in the idle position (fig. 18) and wait for an answer.
- (5) When the called station answers, proceed in the same manner as with a telephone conversation. No further control is necessary.
- (6) When the call is finished, replace the handset on the cradle and restore the station selector switch to the off position.

b. *Receiving Call from Master Station with Privacy Feature (Using Handset).* When a call comes in from another master station that has the privacy feature, the buzzer will sound and an annunciator plunger will slide out. Answer the call in the following manner:

- (1) Check the talk-listen switch to be sure it is in the idle position (fig. 18) and push the station selector switch (below the protruding annunciator) to the up position. Restore the annunciator plunger.
- (2) Answer the call by picking up the handset and speaking into the mouthpiece.
- (3) Proceed with the call as outlined in a(5) and (6) above.

c. Calling Master Station with Privacy Feature (Using Speaker-Microphone).

- (1) Press the desired station selector switch down to signal the called master station.
- (2) Hold the station selector switch in this position for a short time; move it to the up position.
- (3) Press the talk-listen switch down to the listen position (fig. 18) and await an answer.
- (4) When the called station answers, move the talk-listen switch to the talk position and deliver the message using the proper talking procedure (par. 23a(2)). The talk-listen switch must be held in the talk position while talking.
- (5) To listen, release the talk-listen switch and it will spring back to the listen position.
- (6) When the call is finished, move the station selector switch to the off (horizontal) position. Operate the talk-listen switch to the idle position.

d. *Receiving Call from Master Station with Privacy Feature (Using Speaker-Microphone).* When a call comes in from another master station that has the privacy feature, the buzzer will sound and an annunciator plunger will slide out. Answer the call in the following manner:

- (1) Check the talk-listen switch to be sure it is in the idle position (fig. 18) and push the station selector switch (below the protruding annunciator plunger) to the up position. Restore the annunciator plunger.
- (2) Move the talk-listen switch to the talk position and acknowledge the call by speaking into the speaker-microphone. Hold the talk-listen switch in this position while speaking.
- (3) Release the talk-listen switch and it will spring back to the listen position; receive the incoming message.
- (4) When the call is finished, move the station selector switch to the off (horizontal) position. Move the talk-listen switch to the idle position.

26. Conference Call

a. Check the talk-listen switch to be sure it is in the idle position. Push up the station selector switch

for the first of the series of stations to be called and listen. If no other station is talking with the first station, continue with the steps outlined in *b* and *c* below.

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

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

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

e. After all stations have been called and are standing by, press the talk-listen switch to the talk position (fig. 18) and give the message.

f. If a reply is required from a particular station, tell that station to go ahead, then release the talk-listen switch which will spring back to the listen position.

g. After all conversations have been completed, return all station selector switches to their off (horizontal) positions and the talk-listen switch to the idle position.

27. 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 intercom sets are connected to other master stations that are provided with annunciator signaling facilities or to remote stations equipped with push buttons for annunciator signaling, move the talk-listen switch to the idle position. Be sure that all station selector switches are in their off (horizontal) positions and the volume control and on-off switch is turned on so that the pilot lamp glows.
- (2) When the intercom sets are connected to other master stations not equipped for annunciator signaling, move the home switch (par. 22*d*) to the up position. Set the volume control and on-off switch and the talk-listen switch as described in (1) above.

b. Shutting Down Station. When the intercom set 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.

Section II. OPERATION UNDER UNUSUAL CONDITIONS

28. General

The operation of the intercom sets may be difficult in regions where extreme cold, heat, moisture, sand conditions, etc., prevail. Procedures for minimizing the effect of these unusual operating conditions are outlined in the following paragraphs.

29. Operation in Arctic Climates

Subzero temperatures and climatic conditions associated with cold weather affect the efficient operation of the equipment. Instructions and precautions for operation under such adverse conditions follow:

a. Keep the equipment warm and dry. Keep the filaments of the vacuum tubes lighted constantly; locate the equipment where there is no danger of a cold draft striking the glass tubes when a door is opened. A sudden draft of cold air is often sufficient to shatter the glass envelope of a heated tube. If the shelter is constructed so that this precaution

is impossible, place a blanket or some other barrier between the source of draft and the equipment.

b. Heavy coatings of frost may gather on the mouthpiece of the handset in extremely cold weather when the handset is used in a cold room. The breath will cause frost to form in the small holes of the cap and will affect the volume. If moisture condenses within the receiver, it may freeze and impede the actuation of the diaphragm. When this happens, remove the bakelite cap and remove the ice and wipe any moisture from the receiver.

30. Operation in Tropical Climates

When operated in tropical climates, intercom sets may be installed in tents, huts, or, when necessary, in underground dugouts. When equipment is installed below ground and when it is set up in swampy areas, it is subjected to more acute moisture conditions than those that are normal in the tropics. Ventilation is usually very poor, and the high relative humidity causes condensation to form

on the equipment whenever the temperature becomes lower than the surrounding air. To minimize this condition, place lighted electric bulbs near the equipment.

31. Operation in Desert Climates

a. The main problem that arises with equipment operation in desert areas is the large amount of sand, dust, or dirt that enters moving parts such as switches and controls. The ideal preventive precaution is to house the equipment in a dustproof shelter. Since such a building is not always available and would require air conditioning, the next best precaution is to make the building in which the equipment is located as dustproof as possible with available material. Hang wet sacking over the

windows and doors, cover the inside walls with heavy paper, and secure the side walls of tents with sand to prevent their flapping in the wind.

b. Never tie power cords, signal cords, or other wiring connections to either the inside or the outside of tents. Desert areas are subject to sudden wind squalls which may jerk the connections loose or break the lines.

c. Keep the equipment as free from dust as possible. Make frequent preventive maintenance checks.

d. The drastic fall in temperature at night may cause condensation on the equipment. For protection, cover it with a tarpaulin or similar material.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

Section I. PREVENTIVE MAINTENANCE SERVICES

Note. The organizational maintenance instructions contained in this chapter apply equally to the LS-200/FI, LS-201/FI, and LS-202/FI. These instructions also pertain to the LS-125B/FI except that any maintenance procedures for the handset are not applicable.

32. Tools, Test Equipment, and Materials Required

The following tools, test equipment, and materials are not furnished as parts of the intercom sets. They are required for organizational maintenance and should be made available.

Tool Equipment TE-113
Multimeter TS-352/U
Carbon tetrachloride
Solvent, Dry Cleaning (SD)

33. Definition of Preventive Maintenance

Preventive maintenance is work performed on equipment (usually when the equipment is not in use) to keep it in good working order so that breakdowns and needless interruptions in service will be kept to a minimum. Preventive maintenance differs from troubleshooting and repair since its prime object is to prevent certain avoidable troubles from occurring.

34. General Preventive Maintenance Techniques

Most preventive maintenance techniques pertain to specific areas of preventive maintenance, such as inspecting specific parts, and are covered thoroughly in later sections. However, the following general instructions should be helpful.

- a. Use No. 000 sandpaper to remove corrosion.
- b. Use a clean, dry, lint-free cloth or a dry brush for cleaning.
 - (1) If necessary, except for electrical contacts, moisten the cloth or brush with solvent (SD); then wipe them dry with a dry cloth.

- (2) Clean electrical contacts with a cloth moistened with carbon tetrachloride; then wipe them dry with a dry cloth.

Caution: Repeated contact of carbon tetrachloride with the skin or prolonged breathing of the fumes is dangerous. See that adequate ventilation is provided.

- c. If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch to remove dust from inaccessible places; be careful, however, or mechanical damage from the air blast may result.

35. Use of Preventive Maintenance Forms (figs. 19 and 20)

a. The decision as to which items on DA Forms 11-238 and 11-239 are applicable to this equipment is a tactical decision to be made in the case of first echelon maintenance by the communication officer/ chief or his designated representative, and in the case of second and third echelon maintenance, by the individual making the inspection. Instructions for the use of each form appear on the reverse side of the form.

b. References in the item block refer to paragraphs in text which contain required, detailed, or additional maintenance information.

36. Performing Preventive Maintenance

- a. *Daily.*
 - (1) *Cleaning.* Clean all external surfaces such as the cabinet, selector switch panel, handset, pilot lamp jewel, control knobs, and switches. Use a dry brush or clean, dry lint-free cloth for dusting. When dirt cannot be easily removed by simple dusting,

OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR									
<i>INSTRUCTIONS: See other side</i>									
EQUIPMENT NOMENCLATURE INTERCOMMUNICATION STATION LS-200/F1					EQUIPMENT SERIAL NO.				
LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; ① 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 (<i>receiver, transmitter, connecting-cables, wire and cable, microphones, tubes, spares-parts, technical manuals and accessories</i>). PAR. 9 f								
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 9								
3	CLEAN DIRT AND MOISTURE FROM <i>ANTENNAS, MICROPHONES, HEADSETS, SWITCHES, KEYS, HAND-PISTOLS, TELEPHONES, BATTERIES, AND</i> COMPONENT PANELS. PAR. 34								
4	INSPECT SEATING OF READILY ACCESSIBLE "PLUCK-OUT" ITEMS: <i>TUBES, JAMES, CRISTALS, FUSES, CONNECTORS, WIRING, AND</i> PLUG-IN COILS AND RESISTORS. PAR. 43								
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, <i>WORN OR DAMAGED GEAR, MISALIGNMENT,</i> POSITIVE ACTION. PAR. 36 G(3)								
6	CHECK FOR NORMAL OPERATION. PAR. 22								
WEEKLY									
NO.	ITEM	COND- ITION	NO	ITEM	COND- ITION				
7	OPEN AND TIGHTEN EXTERIOR OF COMPONENTS AND CASES, MOUNTS, SHOCK MOUNTS, ANTENNA MOUNTS, COAXIAL TRANSMISSION, WAVE GUIDE, AND CABLE CONNECTIONS.		13	INSPECT OPERATOR DIFFERENTIALS FOR OIL, LOOSE TERMINALS, ELECTROLYTE LEVEL AND SPECIFIC GRAVITY, AND DAMAGED GAGES.					
8	INSPECT CASES, MOUNTINGS, ANTENNAS, TOWERS, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 34		14	CLEAN AIR FILTERS, BRASS NAME PLATES, PISTON AND UPPER BANDS, JEWEL ASSEMBLIES. PAR. 34					
9	INSPECT CORDS, CABLE, WIRE, AND SHOCK MOUNTS FOR CUTS, BREAKS, FRAYING, DETERIORATION, KINKS, AND STRAIN. PAR. 36 b		15	INSPECT WIPERS FOR DAMAGED GLASS AND GASKETS.					
10	INSPECT ANTENNA FOR ECCENTRICITY, CORROSION, LOOSE FIT, DAMAGED INSULATORS AND REFLECTORS.		16	INSPECT SHELVES AND COVERS FOR ABSENCE OF DEBRIS-TRAPPING.					
11	INSPECT ANTENNA TENS, LEADERS, AND CABLES FOR HILDS, BEANS, AND FRAYING.		17	CHECK ANTENNA BUT WIRES FOR LOOSENESS AND PROPER TENSION.					
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, KNOBS, FRAYS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWER CORDS, RELAYS, COILS, WIPERS, GASKETS, CAPACITORS, CON-TRACTORS, AND PILOT LIGHT ASSEMBLIES. PAR. 36 G		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 11-238
1 MAY 51

REPLACES DA AGO FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

Figure 19. DA Form 11-238.

TM 5089-10

SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
RADIO COMMUNICATION, DIRECTION FINDING, CARRIER, RADAR

INSTRUCTIONS: See other side

EQUIPMENT IDENTIFICATION

EQUIPMENT SERIAL NO.

INTERCOMMUNICATION STATION LS-200/F1

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

NO.	ITEM	NO.	ITEM
1	COMPLETENESS AND GENERAL CONDITION OF EQUIPMENT (receiver, transmitter, generator, wire and cable, connections, tubes, components, technical manuals and accessories). PAR. 9f	19	ELECTRON TUBES - INSPECT FOR LOOSE ENVELOPES, OVERTHEATING, CRACKED SOCKETS; INSUFFICIENT SOCKET SPRING TENSION; CLEAN DUST AND DIRT CAREFULLY; CHECK EMISSION OF RECEIVER TYPE TUBES. PAR. 24
2	LOCATION AND INSTALLATION SUITABLE FOR NORMAL OPERATION. PAR. 8	20	INSPECT PULL-OUT SWTS FOR LOOSE PARTS, DIRT, WETNESS AND CORROSION
3	CLEAN DIRT AND MOISTURE FROM SWITCHES, TERMINALS, CONTACTS, KEYS, JACKS, PLUGS, CONNECTORS, COMPONENT PHASES. PAR. 34	21	INSPECT FIXED CAPACITORS FOR LEAKS, BULGES, AND DISCOLORATION. PAR. 36 c (2)
4	INSPECT SEATING OF READILY ACCESSIBLE "PULL-OUT" ITEMS: TUBES, LAMPS, SWITCHES, FUSES, CONNECTORS, COMPONENTS AND RESISTORS. PAR. 33, 44	22	INSPECT PULL-OUT SWITCHES FOR LOOSE PARTS, DIRT, WETNESS AND CORROSION; FITTED SWITCHES FOR WETNESS AND CORROSION; INSUFFICIENT SPRING TENSION; DIRT AND MOISTURE ON SWITCHES
5	INSPECT CONTROLS FOR BINDING, SCRAPING, EXCESSIVE LOOSENESS, OR OTHER DEFECTS; ADJUSTMENT, POSITIVE ACTION. PAR. 40	23	INSPECT VARIABLE CAPACITORS FOR DIRT, MOISTURE, WETNESS AND CORROSION
6	CHECK FOR NORMAL OPERATION. PAR. 36 c (3)	24	INSPECT RESISTORS, BUSHINGS, AND INSULATORS, FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE. PAR. 36 c (2)
7	CHECK AND TIGHTEN CONNECTIONS OF COMPONENTS AND CABLES; CHECK FOR CORROSION AND DAMAGED TERMINALS AND CONNECTIONS.	25	INSPECT TERMINALS OF LARGE FIXED CAPACITORS AND RESISTORS FOR CORROSION, DIRT AND LOOSE CONTACTS. PAR. 36 b (2)
8	INSPECT CASES, ENCLOSURES, OPENINGS, HOLES, AND EXPOSED METAL SURFACES, FOR RUST, CORROSION, AND MOISTURE. PAR. 34	26	CLEAN AND TIGHTEN SWITCHES, TERMINAL BLOCKS, POWERBY GROUPS AND INTERIORS OF CHASSIS AND CABINETS NOT READILY ACCESSIBLE. PAR. 36 c
9	INSPECT GROUND, CABLE, WIRE, AND CABLES FOR CUTS, BREAKS, FRAYING, DETRIORATION, KINKS, AND STRAIN. PAR. 36 b	27	INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS. PAR. 36 b (2)
10	INSPECT SWITCHES FOR CORROSION, CRACKS, LOOSE PARTS, DAMAGED TERMINALS AND CONNECTIONS.	28	CHECK SETTINGS OF RECEIVER
11	INSPECT CABLES, WIRES, LEADERS, AND CABLES FOR CUTS, BREAKS, AND FRAYING.	29	REPAIRS EQUIPMENT TO CONFORM WITH APPLICABLE REQUIREMENTS OF THE ARMY REGULATIONS
12	INSPECT FOR LOOSENESS OF ACCESSIBLE ITEMS: SWITCHES, HOLES, JACKS, CONNECTORS, ELECTRICAL TRANSFORMERS, POWERSTATS, GROUPS, POWERBY GROUPS, POWERSTATS, CAPACITORS, GENERATORS, AND PULP LIGHT ASSEMBLIES. PAR. 36 c	30	INSPECT GENERATORS, ELECTRICAL TRANSFORMERS, POWERBY GROUPS, POWERSTATS, AND FITTING OF COMPONENTS
13	INSPECT SPARK GAP SETTINGS FOR DIRT, LOOSE TERMINALS, EXCESSIVE LEVEL AND PROPER GAP SETTING, AND DAMAGED GROUPS.	31	CLEAN AND TIGHTEN CONNECTIONS AND MOUNTINGS FOR TRANSFORMERS, CHOKES, POWERBY GROUPS, AND RHEOSTATS. PAR. 34
14	CLEAN AND TIGHTEN BRASS NAME PLATES, CABLES AND OTHER GROUPS, JEWEL ASSEMBLIES. PAR. 34	32	INSPECT TRANSFORMERS, CHOKES, POWERBY GROUPS, AND RHEOSTATS FOR OVERHEATING AND OIL-LEAKAGE. PAR. 36 c
15	INSPECT GROUPS FOR DAMAGED CABLES AND GROUPS.	33	REMOVE DAMAGED OR EXCESSIVE REMOVE DIFFERENT
16	INSPECT GROUPS AND CABLES FOR SECURITY OF ENCLOSURES AND CONNECTIONS.	34	INSPECT BATTERIES FOR DIRT, CORROSION, DRYING.
17	CHECK TERMINALS FOR LOOSENESS AND PROPER TIGHTENING.	35	INSPECT BATTERIES FOR SHORTS AND OVERCHARGE.
18	CHECK TERMINALS FOR CORROSION, CRACKS, LOOSE CONTACTS, DIRT AND MOISTURE.	36	INSPECT FOR DAMAGED ELECTRICAL BATTERIES, WIRE OR CABLE PARTS.
		37	MOISTURE AND FUNGUS PROOF. PAR. 37 b
38	IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.		

DA FORM 11-239 1 MAY 51

REPLACES DA 460 FORM 419, 1 DEC 50, WHICH IS OBSOLETE.

16-4480-1

Figure 20. DA Form 11-239.

TM5089-11

moisten the cloth or brush with solvent (SD); clean; and then wipe dry with a dry cloth.

- (2) *Inspecting external parts.* Carefully inspect the cabinet for scratches and cracks. Inspect the handset, handset cradle, control knobs, selector switch panel, back panel, and station selector switches for chips, cracks, and nicks. Report any deficiencies to a higher maintenance authority.
- (3) *Checking controls.* Check the volume control and on-off switch and the talk-listen switch by operating the switches to their various positions (par. 22). Check for looseness and binding. Check the station selector switch for looseness and positive action by operating each switch to the up position where the switch should lock. When operated to the down position, the station selector switch should not lock but should spring back to the horizontal position upon release. Report all troubles to a higher maintenance authority.

b. Weekly. Perform the daily preventive maintenance (a above) and in addition carefully inspect the junction box cables and power cable for kinks, cuts, fraying, and deteriorated insulation. Straighten any cables that have become twisted. Twists in cable can easily become kinks that will break the cabled conductors. Check wires from other stations to be sure the wires are not loose and the insulation is not frayed, cut, or deteriorated.

c. Monthly. Perform the daily and weekly preventive maintenance (a and b above) and then remove the chassis from the cabinet (par. 62a-e) and make the following checks.

- (1) *Checking chassis and cabinet wiring.* Check the cabinet cabling and the chassis wiring for fraying and deteriorated insulation. On the chassis, see that capacitor or resistor leads do not touch the wrong terminals or lugs. Check for loose connections at terminal boards and on resistor, capacitor, and transformer terminals. Use Multimeter TS-352/U (TM 11-5527) to check for open conductors.
- (2) *Electrical inspection.* Inspect fixed capacitors for leaks, bulges, and discoloration. Inspect resistors and insulators for cracks, chips, blistering, and discoloration. Check terminal boards for loose connections, cracks, and breaks. Inspect transformers for overheating and leakage of potting compound. Replace or repair any defective parts. After a thorough inspection has been completed, replace the chassis in the cabinet (par. 62j-l).
- (3) *Operational checks.* Turn the intercom set on and listen for excessive hum with the talk-listen switch in the listen position. Be sure the pilot lamp is lit. Check for line noise and reverse the ac power plug if too much line noise is present. Push up one station selector switch at a time and check for hum or noise in each line circuit. If noise is heard, make a note of the number of the noisy line for future repair. Rotate the volume control knob to check the variation in volume of the sound from other stations. Have each station call and check the annunciator and buzzer circuits as each station calls in. Use the troubleshooting chart (par. 60) to locate any trouble present in the intercom set.

Section II. WEATHERPROOFING

37. Weatherproofing and Lubrication

a. General. Signal Corps equipment, when operated under severe climatic conditions such as prevail in tropical, arctic, and desert regions, requires special treatment and maintenance. Fungus growth, insects, dust, corrosion, salt spray, excessive moisture, and extreme temperatures are harmful to most materials.

b. Tropical Maintenance. A special moistureproofing and fungiproofing treatment has been

devised which, if properly applied, provides a reasonable degree of protection. This treatment is explained in TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, and TB SIG 72, Tropical Maintenance of Ground Signal Equipment.

c. Arctic Maintenance. Special precautions necessary to prevent poor performance or total operational failure of equipment in extremely low temperatures are explained in TB SIG 66, Winter Maintenance of Signal Equipment and TB SIG 219,

Operation of Signal Equipment at Low Temperatures.

d. *Desert Maintenance.* Special precautions necessary to prevent equipment failure in areas subject to extremely high temperatures, low humidity, and excessive sand and dust are explained in TB SIG 75, Desert Maintenance of Ground Signal Equipment.

e. *Lubrication.* No lubrication is necessary for this equipment.

38. Painting

Complete refinishing is a function of organizations engaged in reconditioning equipment. Do not

attempt to refinish a case at lower maintenance levels unless absolutely necessary. Use No. 000 sandpaper to clean the area around the scratches down to the bare wood. Wash off residue with solvent (SD) and revarnish the bared surface. Apply varnish with a soft bristle brush. Varnish used will be authorized and consistent with existing regulations.

Caution: Do not use steel wool to clean the surface. Minute particles frequently enter the case and cause harmful internal shorting or grounding of circuits.

Section III. CONTROLS

39. General

a. This section locates and describes the use of the controls that are provided for the proper

operation of the intercom sets. Careless operation or improper setting of controls can cause damage to electronic equipment. For this reason,

40. Controls and Control Functions

(figs. 16 and 17)

Control	Function
Volume control and on-off switch.....	Volume control: adjusts volume of sound heard at loudspeaker or receiver in handset. On-off switch: when turned on, connects primary of power transformer to ac power source which powers the amplifier and the buzzer circuit.
Talk-listen switch.....	Idle (up) position: permits station user to receive calls and to communicate with another master station having privacy feature. Listen (horizontal) position: permits station user to listen to incoming call. Talk (down, nonlocking) position: permits station user to talk to another station.
Station selector switch.....	Up position: connects local station to another station whose number appears above the switch. Horizontal position: disconnects local station from the station whose number appears above the switch. Down position: signals station whose number appears above the switch, by causing the annunciator plunger at that station to move forward and the buzzer to sound.
Annunciator.....	Plunger in annunciator moves forward and remains extended from panel to provide a visual signal when another station is calling.
Handset cradle.....	Handset on cradle: hookswitch is down, disconnecting handset from circuit and connecting speaker-microphone into circuit. Handset off cradle: hookswitch is up, connecting handset into circuit and disconnecting speaker-microphone from circuit.
Handset.....	Used to communicate with another station when the handset is off the cradle.
Speaker-microphone.....	Used to communicate with another station when handset is on the cradle.
Impedance switch.....	Impedance switch is used to match the impedance of remote stations to that of the master station to insure a maximum transfer of energy. In 50-ohm position: 50-ohm input winding of the input transformer and 50-ohm output winding of the output transformer are used. In 500-ohm position: 500-ohm input winding of the input transformer and 500-ohm output winding of the output transformer are used.

it is important to know the function of every control.

b. The control information in paragraph 40 applies equally to Intercommunication Stations LS-200/FI, LS-201/FI, and LS-202/FI. The only difference in the controls on these three intercom

sets is that each contains a different number of station selector switches and a different number of annunciators (par. 6b-d). The controls on the LS-125B/FI are the same as the controls on the LS-201/FI except that no handset is provided with the LS-125B/FI (par. 6e).

Section IV. TROUBLESHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

41. Extent of Instructions

a. Troubleshooting at an organizational level is limited to the localizing of defective parts that are readily replaceable (tubes, fuses, power cable, etc.). If the fault can be determined by organizational procedures, either corrective measures or the need for repair at a field maintenance level is indicated. If the fault cannot be determined through organizational procedures, reference is made to the necessary field maintenance instructions.

b. The techniques that are utilized for organizational troubleshooting include visual inspection, operational tests, tube tests, and simple continuity checks. The material is presented in the order that an organizational repairman would normally use in servicing a defective intercom set. When the procedures indicated are not sufficient to determine the source of trouble, troubleshooting at a field maintenance level will be required.

42. Visual Inspection

a. When failure is encountered and the cause is not immediately apparent, check as many of the items listed in b below as is practicable before starting a systematic operational check of the equipment. Do not, however, disassemble the set for a complete inspection without some knowledge of the operational symptoms. If possible, obtain information from the operator of the equipment regarding performance at the time trouble occurred.

b. Complete or partial failure of the intercom set often may be caused by one or more of the following faults:

- (1) Worn, broken, or disconnected cords or plugs.
- (2) Burned-out fuse.
- (3) Broken or loose wires in chassis and junction box.
- (4) Defective tubes.
- (5) Overheated capacitors.

(6) Burned insulation and resistors.

(7) Improper positioning of operating controls.

(8) Poor connections in junction box.

43. Fuse Location and Replacement

a. A burned-out fuse is one of the more common troubles encountered in troubleshooting this equipment. The 1-ampere fuse is located on the rear of the amplifier chassis (fig. 21). If fuse trouble is suspected, remove the fuse by removing the fuse cap and extracting the fuse with the fingers.

b. Inspect the fuse by holding it up to the light and observing the fuse wire. If the fuse wire inside of the glass envelope is not broken, the fuse is good. If the fuse wire is broken or burned through, the fuse must be replaced. When difficulty arises in determining visually whether or not the fuse is burned out, use Multimeter TS-352/U (TM 11-5527) to check the fuse for continuity.

c. When a fuse requires replacing, use a 1-ampere 250-volt fuse as a replacement.

Caution: Do not use fuses with current ratings of more than 1 ampere. Improper fusing can cause severe damage to this equipment.

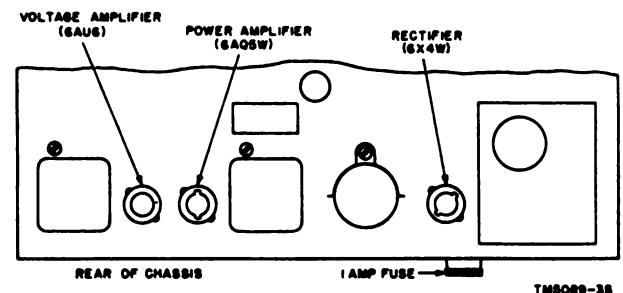


Figure 21. Amplifier chassis, fuse and tube location.

44. Electron Tube Replacement Procedure

Note. Electron tubes are often needlessly discarded as faulty. The procedures described in this paragraph assist the repairman in the determination of defective tubes.

a. *Preliminary Examination.* Before attempting the removal of the electron tubes, check the follow-

ing items of maintenance to determine the condition of the intercom set:

- (1) Inspect all cabling, connections, and the general condition of the wiring.
- (2) Inspect capacitors and resistors for discoloration or other signs of overheating.
- (3) Isolate the trouble, if possible, to a particular section of the equipment.
- (4) Turn on the amplifier to see whether or not all the tubes light. If one tube does not light, it is suspected of being faulty.

b. *Electron Tube Substitution.* Use the following procedure to find faulty tubes when a tube tester is not available:

- (1) Remove the tube shields and replace the suspected tubes, one at a time, with new tubes until all three tubes (fig. 21) have been replaced. Note the sockets from which the original tubes were removed. If the equipment becomes operative during this process, discard the last tube removed.

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

- (2) Reinsert the remaining original tubes, one at a time, in the original sockets. If equipment failure occurs during this process, discard the last original tube. *Do not leave a new tube in a socket if the equipment operates satisfactorily with the original tube.*
- (3) If the trouble is not found by this method, *reinsert the original tubes in their original sockets* before forwarding the defective equipment to a higher maintenance authority.

c. *Discarding Tubes.*

- (1) *Discard tubes* when a test has been made with a tube tester or other instrument

showing that the tube is defective. Some tube defects are obvious and are easily detected; for example, the glass envelope may be broken, the filament open, or a connecting prong broken.

- (2) *Do not discard tubes* merely because the tubes 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.* It has behind it a history of satisfactory performance whereas the new tube has no reputation as an individual entity.
- (3) *Do not discard tubes* merely because they fall on or slightly above the minimum acceptability value when checked in a tube tester. It must be recognized that a certain percentage of new tubes fall near the low end of the acceptability range of the tube specification and, therefore, start their operational life at a value fairly close to the tube tester's *retention limit*. These tubes may provide satisfactory performance throughout a long period of operational life at this *near limit* value.

45. Troubleshooting by Using Equipment Performance Checklist

a. *General.* The equipment performance checklist (par. 46) will help the operator to locate trouble in the equipment. The list gives the item to be checked, the conditions under which the item is checked, the normal indications and tolerances of the correct operation, and the corrective measures that can be taken by the operator. *To use this list, follow the items in numerical sequence.*

b. *Action or Condition.* For some items, the information given in the action or condition column consists of various switch and control settings under which the item is to be checked. For other items, it represents an action that must be taken to check the normal indication given in the normal indications column.

c. *Normal Indications.* The normal indications listed include the visible and audible signs that the operator should see when he checks the items. If the indications are not normal, the operator should apply the recommended corrective measures.

d. *Corrective Measures.* In a few cases, the nature of the possible abnormal indications permits immediate localization of trouble to a particular

part, so that the corrective measure indicates the specific part to be repaired or replaced. In most cases, however, the possible abnormal indications provide only for sectionalization of the trouble to a particular unit or group of parts. In these latter

cases, the corrective measures call for the performance of additional testing procedures to localize the trouble. When the procedure referred to is beyond the scope of organizational personnel, troubleshooting at a field maintenance level is required.

46. Equipment Performance Checklist

Unit	No.	Item	Action or condition	Normal indication	Corrective measures
PREPARATORY	1	Power cord.....	Plug into socket of ac power source.		
	2	Volume control.....	Set at extreme clockwise position (off).		
	3	Talk-listen switch.....	Set at idle position.		
	4	Station selector switches.....	All in horizontal positions.		
	5	Impedance switch.....	Set at 50 or 500 in accordance with impedance of other units in system.		
	6	Handset.....	Set on cradle.		
START	7	Volume control and on-off switch.	Turn to extreme counterclockwise position.	Pilot lamp lights and click is heard.	Check fuse on rear chassis. Check pilot lamp. Check power cord.
START	8	Station selector switch.....	Set lever of switch number assigned to unit at up position.	Switch should lock in up position	Check power transformer. Refer to higher maintenance authority. Repair or replace switch. Refer to higher maintenance authority.
PERFORMANCE EQUIPMENT	9	Talk-listen switch.....	Set at listen position.....	Some line noise and hum heard.	Check switch refer to higher maintenance authority. Check tubes (par. 44). Check resistors and capacitors for a bad component. Refer to higher maintenance authority.
STOP	10	Volume control and on-off switch.	Set at extreme clockwise position.	Pilot lamp goes out.	Check switch for a short. Refer to higher maintenance authority.

CHAPTER 5

THEORY

Note. The theory in this chapter applies equally to the LS-200/FI, LS-201/FI, and LS-202/FI. This information and figures 23 through 27 are equally applicable to the LS-125B/FI except that the reference symbols for the identical parts are different and any information pertaining to the handset is not applicable. Reference symbols shown in parenthesis are for the LS-125B/FI.

47. Block Diagram

The intercom sets provide communication with other master stations that do not have the privacy feature, other master stations that do have the privacy feature, and remote stations. The signal paths for the three positions of the talk-listen switch are shown in the block diagram (fig. 22) and are described in *a* through *c* below. The arrows indicate the direction of the signal in the circuit. For complete circuit details, refer to the overall schematic diagrams (figs. 34 and 35).

a. Idle Position of Talk-Listen Switch (A, fig. 22).

- (1) *Using handset.* In the idle position of the talk-listen switch, the handset can only be used to converse with other master stations that contain the privacy feature. Incoming audio signals are amplified by the amplifier of the distant calling master station having the privacy feature, and go directly to the handset receiver. Outgoing audio signals leave the transmitter, pass through the amplifier, and station selector switch, to the distant master station having the privacy feature.
- (2) *Using speaker-microphone.* In the idle position of the talk-listen switch, the speaker-microphone is only to be used when receiving a call from master stations not containing the privacy feature. The audio signal is amplified by the amplifier of the distant calling master station.

b. Listen Position of Talk-Listen Switch (B, fig. 22). In this position of the talk-listen switch, the use of either the handset or the speaker-microphone for receiving incoming audio signals is optional; when one is used the circuit to the other is broken.

Incoming audio signals from stations not having the privacy feature pass through the station selector switch and the amplifier to the handset or the speaker-microphone. When listening to stations that have the privacy feature, the incoming audio signals pass through the 500-ohm pad and the amplifier to the handset or speaker-microphone.

c. Talk Position of Talk-Listen Switch (C, fig. 22). In this position of the talk-listen switch, either the speaker-microphone or the handset may be used for transmitting. The audio signals from either the speaker-microphone or the handset pass through the amplifier and the station selector switch to either stations having privacy feature or stations *not* having privacy feature, depending upon which station selector switch is operated.

48. Transmission and Signaling Circuits

The master station has three basic transmission circuits (idle, listen, and talk) and a signaling circuit with a buzzer and an annunciator.

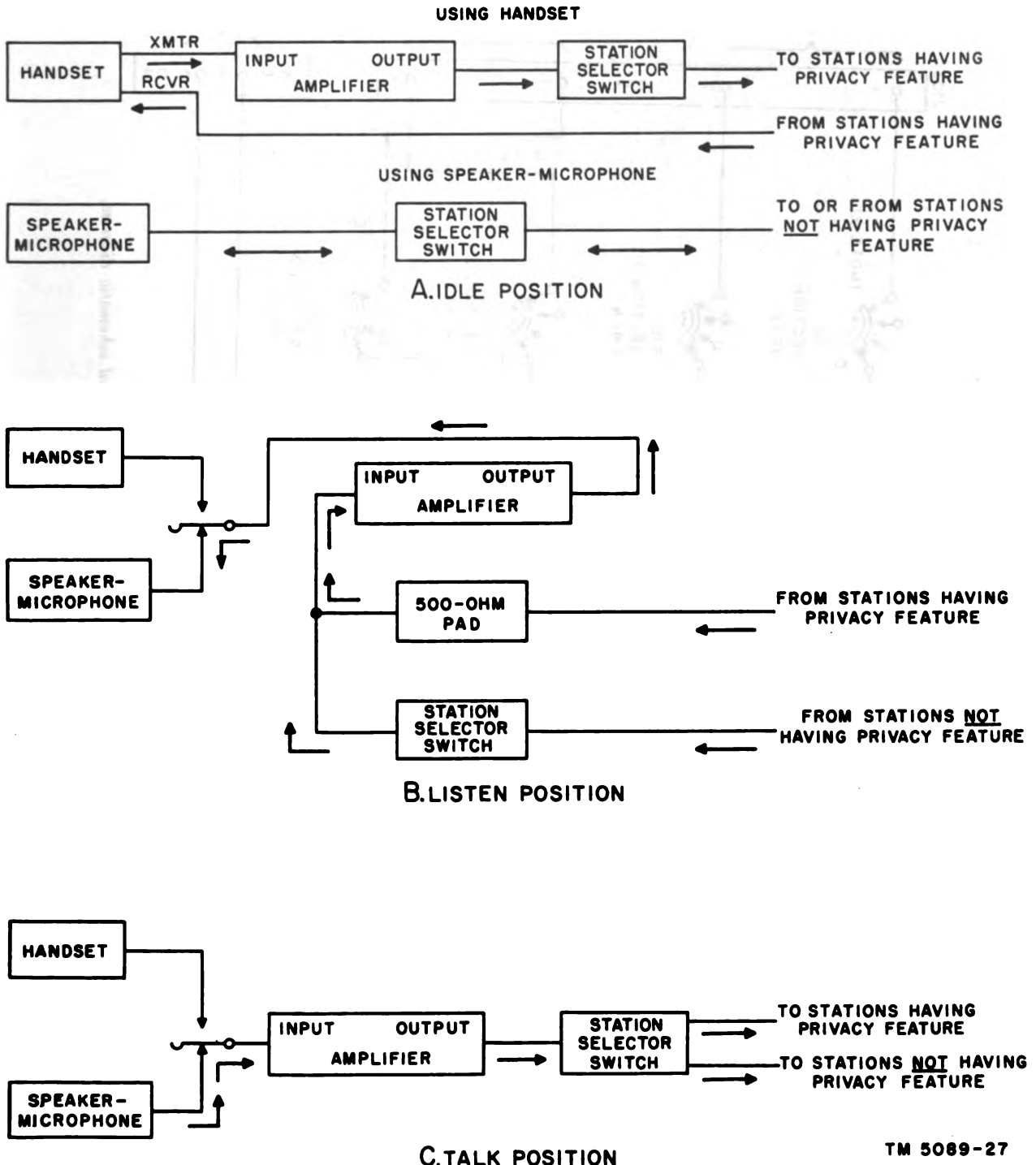
a. Idle Circuit (fig. 23).

- (1) Signals from master stations *not* having the privacy feature enter the unit at terminals 1 and 2 of jack J103 (J2). The path from terminal 1 is through sections D and B of switch S101 (S2), the speaker-microphone coil, hookswitch S105, and sections F and J of switch S101 (S2) to terminal 2 of jack J103 (J2) to complete the circuit.
- (2) Stations using the privacy feature must use the handset instead of the speaker-microphone to converse in the idle position of the talk-listen switch. The audio signal paths from the handset are described in (a) and (b) below.

(a) Incoming audio signals enter the master station at terminals 2 and 3 of jack J104 (J3). The path from terminal 3 is through section B of switch S101 (S2), to the handset receiver, through hook-switch S105, terminal 3 of jack J101

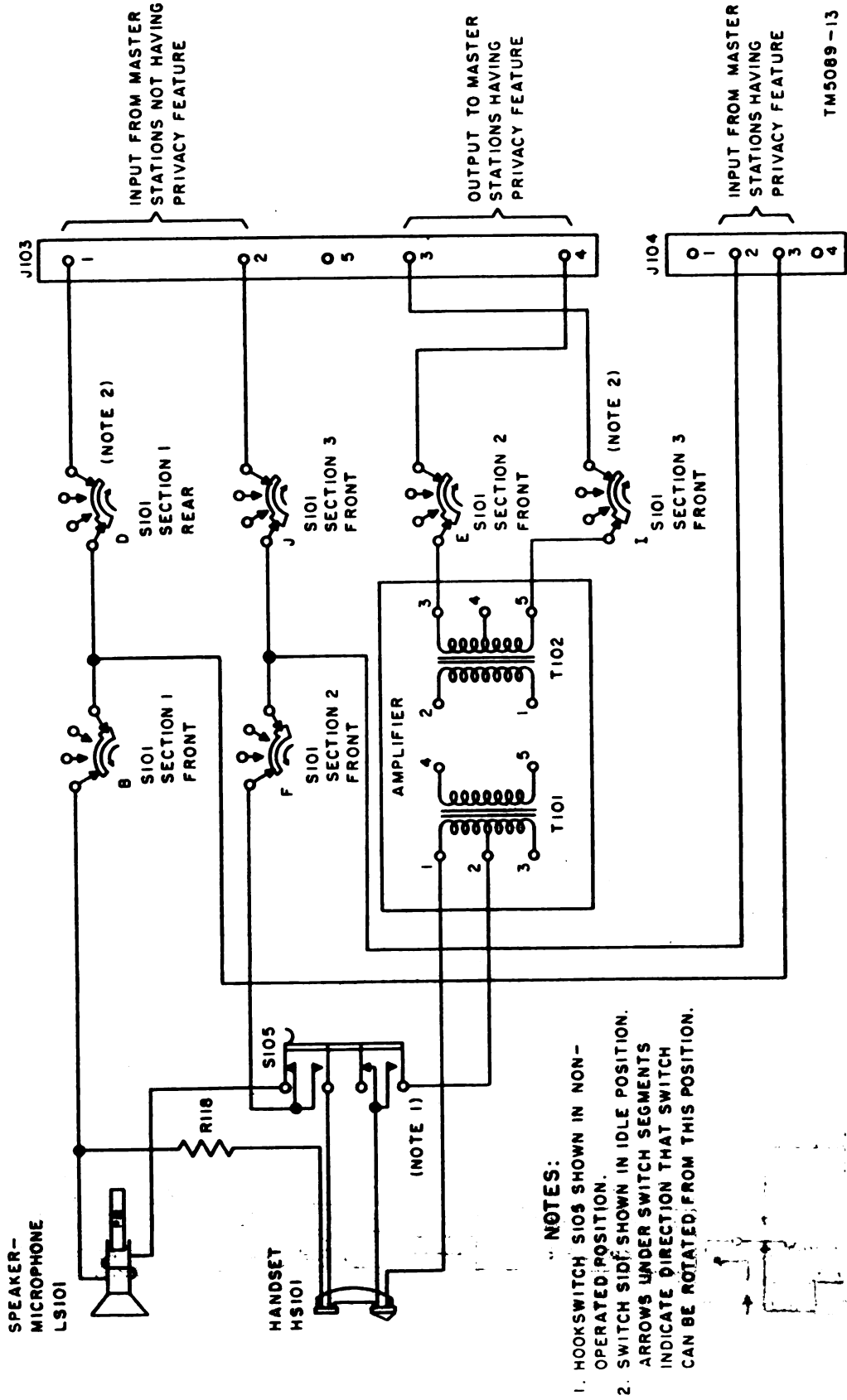
(J4), and section F of switch S101 (S2) to terminal 2 of jack J104 (J3) to complete the circuits.

(b) Outgoing audio signals from the handset transmitter go to 50-ohm terminals 1 and 2 of input transformer T101 (T1).



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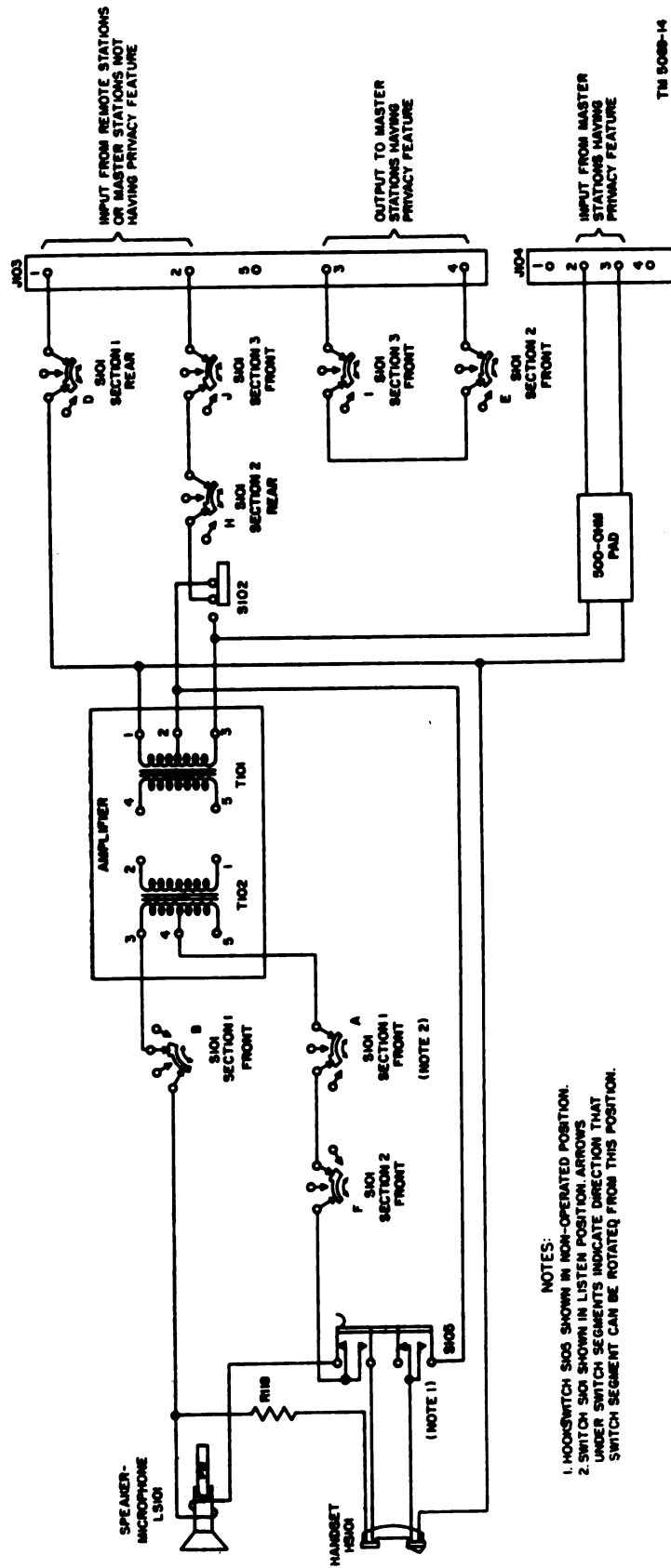
Figure 22. Intercom sets showing circuit paths for various positions of talk-listen switch, block diagram.



- NOTES:
1. HOOKSWITCH S105 SHOWN IN NON-OPERATED POSITION.
 2. SWITCH S101 SHOWN IN IDLE POSITION. ARROWS UNDER SWITCH SEGMENTS INDICATE DIRECTION THAT SWITCH CAN BE ROTATED FROM THIS POSITION.

Figure 23. Idle circuit, showing active circuit, partial schematic diagram.

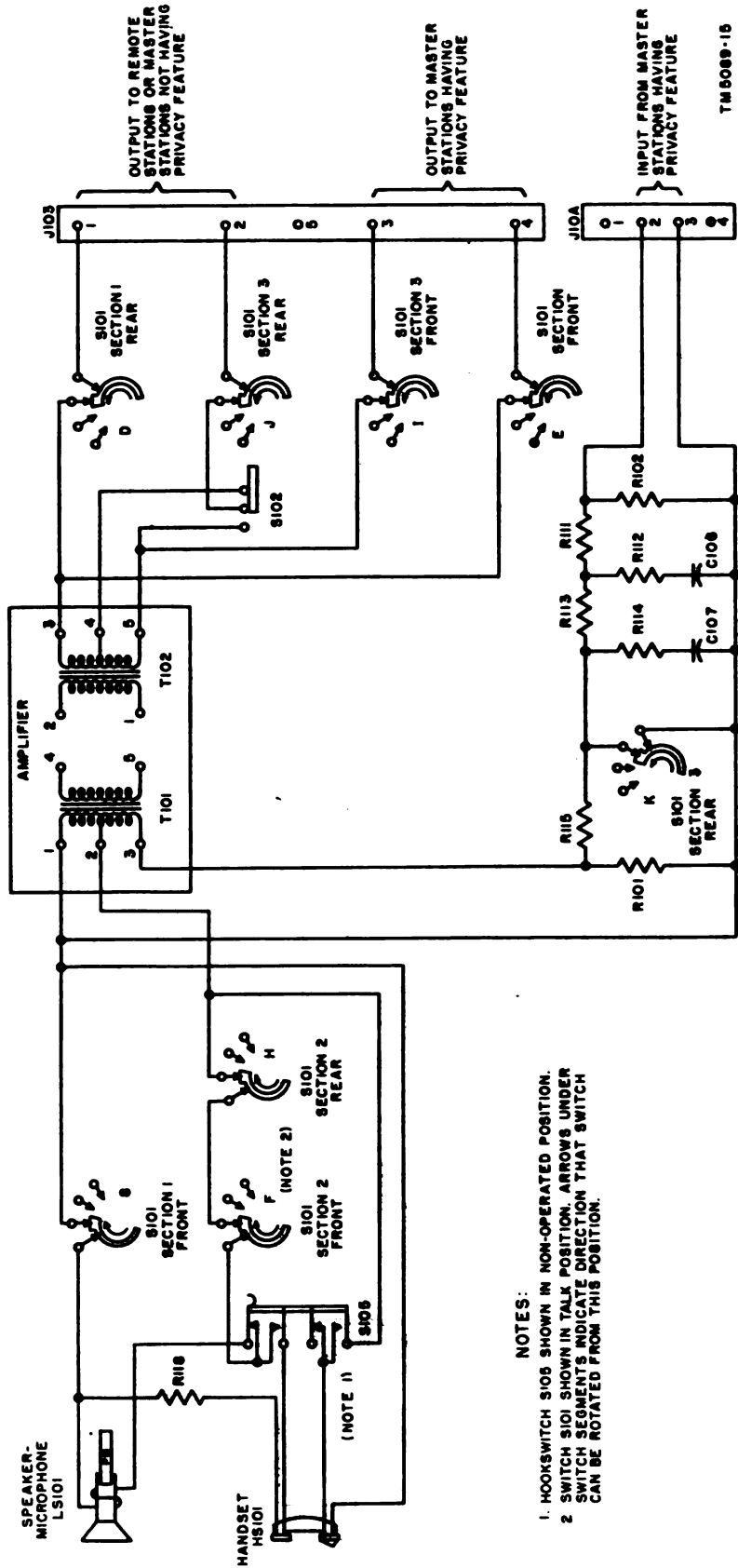
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- NOTES:
1. HOOKSWITCH SK05 SHOWN IN NON-OPERATED POSITION.
 2. SWITCH S101 SHOWN IN LISTEN POSITION. ARROWS UNDER SWITCH SEGMENTS INDICATE DIRECTION THAT SWITCH SEGMENT CAN BE ROTATED FROM THIS POSITION.

Figure 24. Listen circuit, showing active circuit, partial schematic diagram.

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- NOTES:
1. HOOKSWITCH S105 SHOWN IN NON-OPERATED POSITION.
 2. SWITCH S101 SHOWN IN TALK POSITION. ARROWS UNDER SWITCH SEGMENTS INDICATE DIRECTION THAT SWITCH CAN BE ROTATED FROM THIS POSITION.

Figure 25. Talk circuit, showing active circuit, partial schematic diagram.

The output of the amplifier passes through sections E and I of switch S101 (S2) to terminals 3 and 4 of jack J103 (J2).

b. Listen Circuit (fig. 24).

- (1) Audio signals from master stations *not* having the privacy feature or remote stations enter the unit at terminals 1 and 2 of jack J103 (J2). The path from terminal 1 is through section D of switch S101, the primary (terminals 1 and 2) of input transformer T101 (T1), impedance switch S102 (S1), and sections H and J of switch S101 (S2) to terminal 2 of jack J103 (J2) to complete the circuit. The signal is induced into the secondary of transformer T101 (T1) and passes on to the amplifier. The amplifier increases the strength of the audio signal. The output of the amplifier appears at the secondary (terminals 3 and 4) of transformer T102 (T2). The signal at terminal 3 of transformer T102 (T2) passes through section B of switch S101 (S2), the coil of the speaker-microphone, hookswitch S105, and sections F and A of switch S101 (S2) to terminal 4 of transformer T102 (T2) to complete the circuit.
- (2) An amplified signal from a station having the privacy feature enters the unit at terminals 2 and 3 of jack J104 (J3). From these terminals, the amplified audio signal goes directly to the 500-ohm pad which is connected across the 500-ohm winding (terminals 1 and 3) of input transformer T101 (T1). The 500-ohm pad attenuates the signal and passes it on to the amplifier. The amplifier reamplifies the attenuated audio signal and passes it on to the primary (terminals 1 and 2) of transformer T102 (T2) where the signal is induced into the secondary (terminals 3 and 4) of transformer T102 (T2). The signal path from transformer T102 (T2) to the speaker-microphone coil is the same as outlined in (1) above.

c. Talking Circuit (fig. 25).

- (1) If the speaker-microphone is used, the signal originates at the speaker-microphone coil. The audio signal from one side of the coil passes through hookswitch S105, sections F and H of switch S101 (S2) to

terminal 2 of transformer T101 (T1), through the 2-1 winding of transformer T101 (T1), out of terminal 2 of transformer T101 (T1), through section B of switch S101 (S2), and back to the other side of the speaker-microphone coil. The signal passes to the amplifier where it is amplified. The output then appears across the secondary winding of transformer T102 (T2).

- (a) For stations having the privacy feature, the audio signal at the secondary of transformer T102 (T2) goes to terminals 3 and 4 of jack J103 (J2) through sections E and I of switch S101 (S2).
 - (b) For stations *not* having the privacy feature, the audio signal at the secondary of transformer T102 (T2) goes to terminals 1 and 2 of jack J103 (J2) through impedance switch S102 and sections J and D of switch S101 (S2).
- (2) Normally, the handset transmitter is not used in the talk position although it is connected directly across terminals 1 and 2 of input transformer T101 (T1). In case the transmitter is used, the signal path is the same as outlined in (1) above.
 - (3) Section K of switch S101 puts a short circuit across the 500-ohm pad so that a third station with the privacy feature cannot interfere while two stations having the privacy feature are conversing.

d. Buzzer and Annunciator. The buzzer and annunciator are used to indicate when another station is calling. When the station selector switch at the calling station is pressed down, the right terminal of terminal board TB101 (TB1) is grounded through the calling station to complete the path for the 12-volt winding of transformer T103 (T3) (figs. 34 and 35), through buzzer I 101 (I 1) and the annunciator coil. This causes the buzzer to sound and the annunciator plunger to protrude from the front panel indicating which station is calling.

49. Voltage Amplifier (fig. 26)

The voltage amplifier consists of amplifier tube V101 (V1) and the circuit elements associated with this tube.

- a. The input to transformer T101 (T1) originates at speaker-microphone LS101 (LS1), or at handset

HS101 when this master station is talking; at another master station or remote station according to the position of talk-listen switch S101 (S2) and station selector bank S104 (S4), when this station is listening. The voice-frequency voltages are stepped up in transformer T101 (T1), amplified by pentode-type voltage amplifier V101 (V1) and fed to power amplifier V102 (V2).

b. In the idle and talk positions, the input from one of the sources described in *a* above, connects to the 50- or 500-ohm taps of transformer T101 (T1). The input is stepped up and the voltage appearing across the secondary is coupled to the control grid (pin 1) of voltage amplifier V101 (V1) by coupling capacitor C101 (C1). Bias voltage is developed by the current flowing through grid resistor R105 (R1) since the cathode (pin 7) is connected to ground. Screen resistor R106 (R2) drops the B+ voltage to the proper value for the screen grid (pin 6) which is bypassed to ground by capacitor C102 (C2) to provide more stability (degeneration) in the high-gain stage. B+ potential is applied to the plate (pin 5) through plate load resistor R107 (R4). The amplified signal that appears across load re-

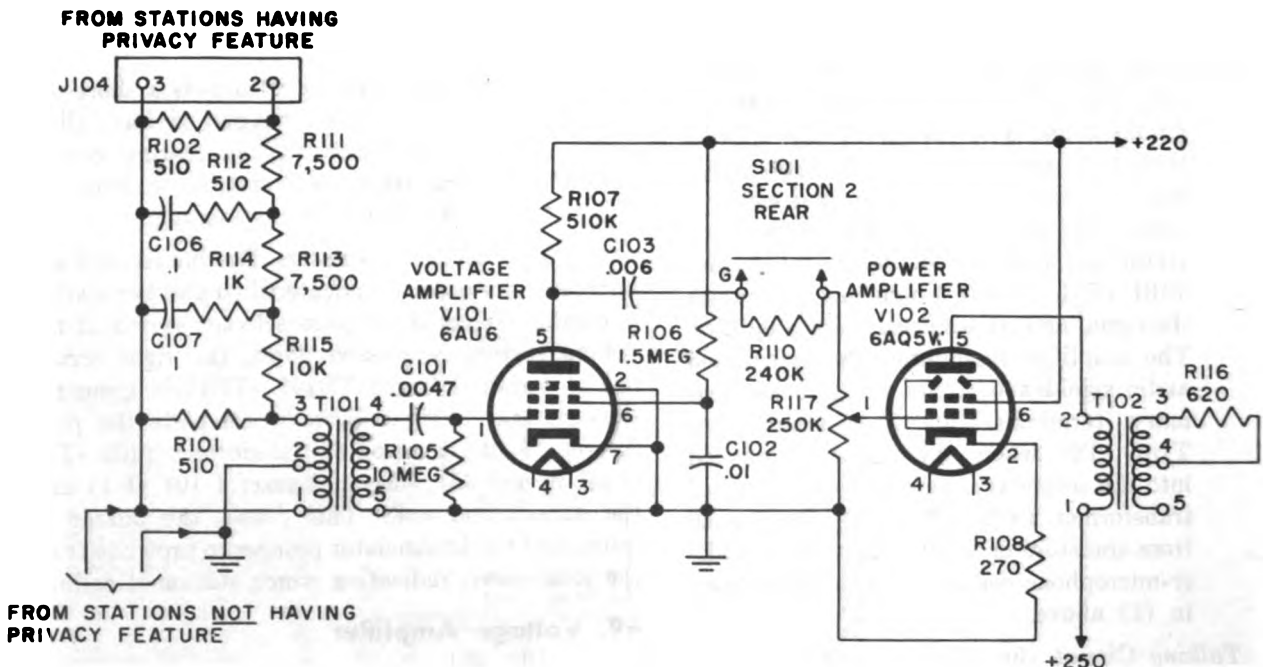
sistor R107 (R4) is coupled to power amplifier V102 (V2) by coupling capacitor C103 (C3) through section G of talk-listen switch S101 (S2).

c. In the listen position, stations having the privacy feature are connected to the input of the 500-ohm equalizer-attenuator pad. The attenuation is almost equal to the gain of the amplifier to keep the incoming signal from overloading the amplifier. In addition, the gain characteristic of the pad and amplifier keeps the overall response comparatively flat over the audio-frequency range. The output of the pad is across the 500-ohm input of transformer T101 (T1).

50. Power Amplifier (fig. 26)

The power amplifier circuit consists of amplifier tube V102 (V2) and the circuit elements associated with this tube.

a. The amplified signal from V101 is coupled to the control grid (pin 1) of V102 (V2) and appears across audio level potentiometer (gain control) R117 (R5). The audio level at the speaker is controlled by adjusting the amount of signal that



NOTE:
SEGMENT G OF SWITCH S101 IS CLOSED ONLY IN THE TALK POSITION OF TALK-LISTEN SWITCH.

Figure 26. Amplifier, schematic diagram.

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appears at the grid. The audio frequencies are amplified by power amplifier V102 (V2) and the increased signal that appears across the output of transformer T102 (T2) is fed to speaker LS101 (LS1), handset HS101, or to one of the outgoing lines (figs. 34 and 35), depending on the position of talk-listen switch S101 (S2).

b. In the idle and listen positions, voltage dropping resistor R110 (R10) forms a voltage divider with audio level potentiometer R117 (R5). In the talk position, resistor R110 (R10) is cut out of the circuit by section G of switch S101 (S2). The tube is self-biased by the voltage drop across cathode resistor R108 (R6). The screen grid (pin 6) is connected directly to B+. A slightly higher potential is applied to the plate (pin 5) through the primary of transformer T102 (T2) since it is connected to the rectifier filter capacitor C105 (C5) (fig. 27). Load resistor R116 (R18) (fig. 26), across the 50-ohm output of transformer T102 (T2), is used in conjunction with impedance switch S102 (S1) for impedance matching.

51. Power Supply (fig. 27)

a. The rectifier tube V103 (V3) is a conventional full-wave rectifier with a resistance-capacitance (RC) type filter on the output. The ac input voltage is stepped up in transformer T103 and rectified by duodiode full-wave rectifier tube type 6X4W, V103 (V3).

b. When the volume control and on-off switch is turned counterclockwise from its extreme clockwise position, switch S103 (S3) is closed and power is applied to the primary of transformer T103 (T3) through fuse F101 (F1).

- (1) The primary (115-volt) input voltage is stepped up to 440 volts in the high-voltage secondary winding (terminals 5 and 7). The secondary is center-tapped at terminal 6 and connected to ground so that one-half of the 440-volt secondary voltage (220 volts) is applied to each plate (pins 1 and 6) of V103 (V3) on alternate half-cycles. The rectified voltage from the cathode (pin 7) of V103 (V3) is connected to an RC pi-filter, consisting of resistor R104 (R7) and capacitor C105 (C5), which smooths the ripple voltage. Sections A and B of filter capacitor C105 (C5) act as the input filter capacitor. They charge

on the positive half-cycle and tend to remain charged since they must discharge through filter resistor R104 (R7). Section C of filter capacitor C105 (C5) acts as the output filter capacitor. It tends to by-pass any ripple voltage that still remains.

- (2) Another secondary winding (terminals 3 and 4) applies 6.3 volts to the paralleled filaments of the three tubes. Pin 3 of each tube and terminal 4 of this winding connect to ground. Terminal 3 of this winding connects to pin 4 of each tube. Pilot lamp E101 (E1), across this winding, lights when switch S103 (S3) is closed, indicating that power is being applied to the unit.
- (3) A third secondary winding (terminals 8 and 9) applies 12 volts to buzzer I 101 (I 1) and the annunciators. The circuit is completed when the station selector switch at the calling station is operated to the annunciator signaling position.

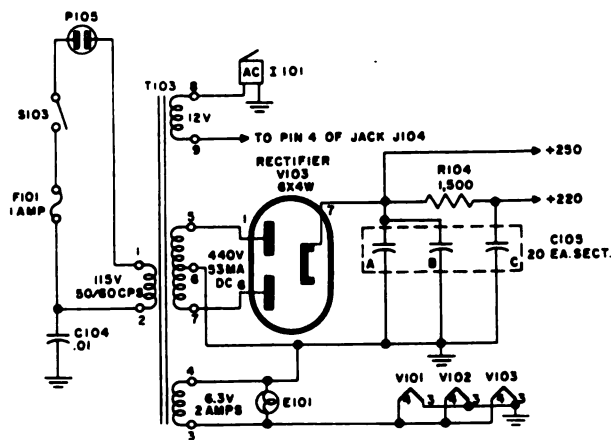


Figure 27. Power supply, schematic diagram.

52. Speaker-Microphone

a. Speaker-microphone LS101 (LS1) (figs. 34 and 35) converts electrical energy into sound energy when it is used as a speaker. The current that flows through the coil attached to the speaker causes the coil and cone to vibrate at an audio rate in the field of the permanent magnet. This creates sound waves that have the same frequency as the current in the coil.

b. The speaker-microphone converts sound energy into electrical energy when it is used as a microphone. The sound waves cause the cone and coil to vibrate. As the coil vibrates at an audio rate, the lines of force in the field of the permanent

magnet induce audio electrical currents of the same frequency in the coil.

53. Handset

a. The receiver in handset HS101 (fig. 34) converts electrical energy into sound energy. The electrical current that flows through the receiver coil varies the field strength of the permanent magnet which causes the diaphragm to move at an audio rate. This sets up sound waves.

b. The transmitter in the handset is similar in construction to the receiver described in *a* above and converts sound energy into electrical energy. The sound waves cause the diaphragm to vibrate in the field of the permanent magnet. This varies the field strength of the magnet whose lines of force induce alternating audio electrical currents in the transmitter coil.

54. Pad, 500-ohm

The 500-ohm pad for the intercom sets consists of resistors R101 (R20), R102 (R19), R111 (R13), R112 (R14), R113 (R15), R114 (R16), and R115 (R17) and capacitors C106 (C9) and C107 (C10) (figs. 34 and 35). The 500-ohm pad is used when two master stations with the privacy feature are conversing, using the talk and listen positions of switch S101 (S2). In this application, both amplifiers are in the circuit and the listening station receives an amplified signal which, if not reduced, would overload the amplifier of the listening station. The 500-ohm pad is designed so that it attenuates the incoming signal by an amount which is almost equal to the gain of the amplifier at the listening station. This reduces the incoming signal to the proper level and prevents the amplifier at the listening station from becoming overloaded.

CHAPTER 6

FIELD MAINTENANCE

Notes.

1. This chapter contains information for field maintenance. The amount of repair that can be performed by units having field maintenance responsibility is limited only by the tools and test equipment available and by the skill of the repairman.

2. The field maintenance information in this chapter applies equally to the LS-200/FI, LS-201/FI, and LS-202/FI. The only differences between these units are the number of station selector switches mounted on the selector switch panel (figs. 3, 4, and 5).

3. The information in this chapter is applicable to the LS-125B/FI, which is almost identical to the LS-201/FI. The differences are that the LS-125B/FI does not have a handset and the reference symbols are different. Reference symbols shown in parenthesis are for the LS-125B/FI.

Section I. TROUBLESHOOTING AT FIELD MAINTENANCE LEVEL

Warning: When servicing this equipment, be extremely careful of the high voltages present. Keep one hand in the pocket when measuring socket voltages with the test probe. Before touching any part *after the voltage is shut off*, short the part to chassis ground.

55. Troubleshooting Procedures

a. General. The first step in servicing a defective unit is to *localize* the fault. *Localization* means tracing the fault to the *major component or circuit* responsible for the faulty operation of the set. The second step is to *isolate* the fault. *Isolation* means tracing the fault to the *defective part* responsible for the abnormal condition. Some faults such as burned-out resistors, radio-frequency arcing, and shorted transformers often can be located by sight, smell, and hearing. The majority of faults, however, must be isolated by checking voltages and resistances.

b. Component Localization and Isolation. The tests listed below aid in localizing and isolating the source of trouble. To be effective and prevent further damage to the equipment, follow the procedure in the order given. First, trouble should be localized to a single stage or circuit. The trouble then may be isolated within that stage or circuit by appropriate voltage and resistance measurements and continuity tests. The service procedure is summarized as follows:

- (1) *Visual inspection.* Through visual inspection (par. 42), the repairman frequently may discover the trouble or determine the

stage in which the trouble exists. This inspection is valuable in avoiding additional damage to the equipment which might occur through improper servicing methods and in forestalling future failures.

- (2) *Input resistance measurements.* These measurements (par. 42) prevent further damage to the equipment from possible short circuits.
- (3) *Operational test.* The operational test (par. 46) is important because it frequently indicates the general location of trouble. In many instances, the information gained will determine the exact nature of the fault. In order to utilize this information fully, all symptoms must be interpreted in relation to one another.
- (4) *Troubleshooting chart.* The trouble symptoms listed in this chart (par. 60) will aid greatly in localizing trouble.
- (5) *Intermittent troubles.* In all these tests, the possibility of intermittent troubles should not be overlooked. If present, this type of trouble often may be made to appear by gently tapping or jarring the set. It is possible that the trouble is not

in the equipment but in some other external source. Check the external power source and the connections between stations.

56. Troubleshooting Data

The material in this manual will be of great value in the rapid location of faults. Consult the following references that contain troubleshooting information.

Caution: Always check the circuit label, since the schematic diagram in the manual may not include circuit changes made during equipment production.

58. Checking Filament and B+ Circuits for Shorts (fig. 28)

a. A short circuit in the B+ circuit will disable the amplifier. If the equipment is operated with a short circuit, other circuit components may be damaged because of the increased current flow. To check these troubles without the danger of causing more damage to the amplifier, a resistance check should be made; refer to the tube socket voltage and resistance diagram and the short-circuit tests chart (b below).

Caution: Disconnect the amplifier from the ac

Fig.	Par.	Description
22		Intercom sets showing circuit paths for various positions of talk-listen switch, block diagram.
26		Amplifier, schematic diagram.
27		Power supply, schematic diagram.
28		Tube socket voltage and resistance diagram.
29		Intercommunication Stations LS-200/FI, LS-201/FI, and LS-202/FI, chassis top view showing location of parts).
30		Intercommunication Stations LS-200/FI, LS-201/FI, and LS-202/FI, chassis bottom view showing location of parts).
31		Intercommunication Station LS-201/FI, rear view of cabinet with back panel removed.
34		Intercommunication Station LS-201/FI, schematic diagram.
35		Intercommunication Station LS-125B/FI, schematic diagram.
36		Intercommunication Stations LS-200/FI, LS-201/FI, and LS-202/FI, chassis wiring diagram.
37		Intercommunication Station LS-125B/FI (Order No. 37891-Phila.-53), chassis wiring diagram.
38		Intercommunication Station LS-200/FI, cabinet wiring diagram.
39		Intercommunication Stations LS-201/FI and LS-202/FI, cabinet wiring diagram.
40		Intercommunication Station LS-125B/FI (Order No. 37891-Phila.-53), cabinet wiring diagram.
	46	Equipment performance checklist.
	59	Localizing troubles.
	60	Troubleshooting chart.
	61	Direct-current resistances of transformers and coils.

57. Test Equipment Required for Troubleshooting

The chart below lists the test equipment required for troubleshooting and the associated technical manual.

power source before making resistance measurements.

b. Make the resistance measurements indicated in the following chart. If abnormal results are obtained, make the isolation checks indicated. When

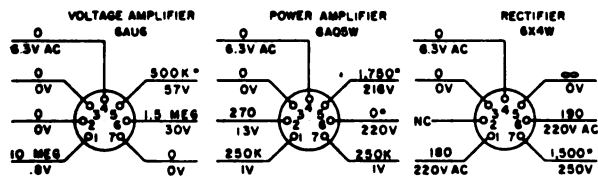
Test equipment	Technical manual
Electron Tube Test Set TV-7/U.....	TM 11-5083
or	
Electron Tube Test Set TV-2/U.....	TM 11-2661
Multimeter TS-352/U.....	TM 11-5527
Test Set TS-190/U.....	TM 11-468

the faulty part is found, clear the trouble before applying power to the unit.

handset, or the speaker-microphone. In some cases, only one of the localizing procedures will be neces-

Short-circuit tests

Point of measurement	Normal indication	Isolation procedure
Between pin 7 of tube socket XV103 (XV3) and ground.	Resistance reading of approximately 500,000 ohms.	Reading of zero or less than 1,500 ohms indicates tube V103 (V3) is shorted or section A or B of capacitor C105 (C5) is faulty.
Between pin 6 of tube socket XV101 (XV1) and ground.	Infinity.....	If resistance is zero, check to see if screen grid of tube V101 (V1) is shorted to cathode or if capacitor C102 (C2) is short-circuited. If resistance is low, check for leakage in capacitor C102 (C2).
Between pin 5 of tube socket XV101 (XV1) and ground.	Resistance reading of approximately 1 megohm.	If resistance is zero, check tube V101 (V1) for a short circuit between plate and suppressor grid. If resistance is infinity, check resistor R102 (R19) for an open. If resistance is approximately 500,000 ohms, check all sections of capacitor C105 (C5) for a short circuit.
Between pin 5 of tube socket XV102 (XV2) and ground.	Resistance reading of 500,000 ohms.	If resistance is zero, check tube V102 (V2) for short circuit between plate and cathode. If resistance is infinity, check the primary of transformer T102 (T2) for an open circuit. If resistance is low, check all sections of capacitor C105 (C5) for a short circuit.



NOTES:

- VOLTAGE READINGS TAKEN WITH SWITCH S101 IN TALK POSITION.
- ALL D-C VOLTAGE MEASUREMENTS TAKEN WITH 20,000 OHMS-PER-VOLT METER.
- RESISTANCE MEASUREMENTS MADE WITH EQUIPMENT SHUT DOWN AND VOLUME CONTROL FULL ON. ALL MEASUREMENTS MADE TO CHASSIS EXCEPT THOSE FOLLOWED BY AN * WHICH ARE MADE TO CAPACITOR C105C.
- RESISTANCE VALUES SHOWN ABOVE LINE AND VOLTAGE VALUES SHOWN BELOW LINE.

TM 5089-17

Figure 28. Tube socket voltage and resistance diagram.

59. Localizing Troubles

a. General. Procedures are outlined in the troubleshooting chart (par. 60) for localizing troubles in the interstation cables, the talk-listen switch, the amplifier chassis (figs. 29 and 30), the

sary to locate the trouble, and in other cases several of the procedures may be required.

b. Use of Chart. The troubleshooting chart supplements the operational checks given in the equipment performance checklist (par. 46). If previous operational checks have resulted in reference to a particular step of this chart, proceed with the referenced step. If no operational symptoms are known, begin at step 1 and proceed step by step through the chart to locate the trouble.

Caution: If operational symptoms are not known, or they indicate the possibility of short circuits, make the short-circuit checks described in paragraph 58 before applying power to the unit.

c. Conditions for Tests. All checks outlined in the chart are to be conducted with the power applied to the unit except when resistance measurements are required.

60. Troubleshooting Chart

Symptom	Probable cause	Corrections
1. Volume control and on-off switch is turned counterclockwise but pilot lamp does not light.	Unit not connected to ac power source.	Plug power cord W101 (W1) into 115-volt ac power source.
	Fuse F101 (F1) is open.....	Replace defective fuse (par. 43).
	Open winding on transformer T103 (T3).	Check transformer winding. Replace transformer if defective (par. 61).
2. Pilot lamp lights but master station is dead.	Burned-out pilot lamp.....	Check pilot lamp. Replace if defective (par. 63).
	Defective rectifier tube V103 (V3).	Test rectifier tube. Replace if defective (par. 44).
	Defective filter capacitor C105 (C5).	Check all sections of capacitor C105 (C5). Replace capacitor if any section is defective (par. 62).
	Defective voltage amplifier tube V101 (V1) or power amplifier tube V102 (V2).	Test both tubes. Replace the defective tube or both tubes if found defective (par. 44).
	Defective resistor or capacitor in amplifier circuit.	Check voltage and resistance measurements on tube socket XV101 (XV1) and XV102 (XV2) (par. 58).
3. Unable to signal called station when using annunciator signaling.	Defective loudspeaker LS101 (LS1).	Check speaker-microphone. Replace defective part (par. 68).
	Defective station selector switch S101 (S2).	Check selector switch. Adjust or repair defective part. Replace switch if defective (par. 67).
	Common ground lead open between stations.	Connect another lead of the interstation cable between the grounds of the two stations.
4. Buzzer does not sound.....	Trouble in annunciator at called station.	Notify called station to check annunciator circuit, and make necessary repairs.
	Defective 12-volt winding on transformer T103 (T3).	Check 12-volt winding on the transformer. Check wiring for continuity; make repairs to wiring. Replace transformer if defective (par. 69).
5. Annunciator does not operate.....	Defective buzzer.....	Check buzzer. Replace if defective.
	Defective annunciator.....	Check annunciator. Replace if defective (par. 66).
6. When talk-listen switch is in the idle position and the station selector switch of another master station with the privacy feature is in the up position, using the handset, neither station can receive other (LS-200/FI, LS-201/FI, and LS-202/FI only).	Trouble located at calling station.	Notify calling station to check annunciator signaling circuit, and to make necessary repairs.
	Open resistor R118 or R119.....	Check resistors. Replace if defective.
	Defective hookswitch S105.....	Check hookswitch. Replace if defective.
	Defective wiring in plug P101 (P6) or jack J101 (J4).	Check and repair defective wiring. Replace plug or jack if defective.
	Defective handset transmitter.....	Check handset transmitter. Replace if defective.
7. Same condition as in item 6 except that master station under test can receive transmission, but distant master station cannot.	Defective hookswitch S105.....	Check hookswitch. Replace if defective.
	Defective handset receiver.....	Check receiver. Replace if defective.
8. Same condition as in item 6 except that distant master station can receive transmission, but master station under test cannot.	Defective interstation cable.....	Check cable for continuity. Make repairs or replacement where necessary.
	Poor junction box connection.....	Check all wiring. Tighten or resolder where necessary.
	Defective station selector switch S104 (S4).	Check station selector switch. Repair or replace if defective (par. 67).

Symptom	Probable cause	Corrections
9. With talk-listen switch lever in talk position, place station selector switch of remote station in up position. Talk into speaker-microphone. Remote station does not receive.	Defective speaker-microphone....	Check speaker-microphone. Replace if defective (par. 68).
	Defective station selector switch S104 (S4).	Check station selector switch. Repair or replace if defective (par. 67).
	Defective interstation cable between stations.	Check cable for continuity. Make repairs or replacement where necessary.
	Poor junction box connection.....	Check all wiring. Tighten or resolder where necessary.
10. When talk-listen switch S101 (S2) is in listen position, remote station cannot be heard.	Defective talk-listen switch S101 (S2) when in talk position.	Check talk-listen switch. Repair switch or replace if defective (par. 65).
	Defective talk-listen switch S101 (S2) when in listen position.	Check contacts and wiring (figs. 36 and 37). Adjust or make necessary repairs. Replace switch if defective (par. 65).
11. Noisy under all operating conditions.....	Defective speaker-microphone LS101 (LS1).	Check speaker-microphone. Repair or replace if defective (par. 68).
	Interference from other apparatus.	Isolate and refer to responsible unit for clearing.
	Loose connections master station lines.	Isolate trouble and make required repairs.
12. Excessive hum under all operating conditions.	Power plug P105 (P4) reversed....	Reverse plug at ac power source.
	Defective tube.....	Check all tubes. Replace any tube that does not test up to required standard (par. 44).
13. Distortion and low volume in talk or listen position.	Capacitor C105 (C5), A, B, or C section open.	Check all sections of capacitor C105 (C5). Replace capacitor if any section is open or defective (par. 62).
	Defective V101 (V1) or V102 (V2) amplifier tubes.	Check tubes. Replace if defective (par. 44). Inspect tube sockets for poor contact.
	Capacitor C103 (C3) leaky.....	Check capacitor. Replace if defective.
14. Some remote stations receive distorted speech and low volume.	Speaker voice coil loose and rubbing against side of air gap.	Center voice coil. Replace speaker-microphone if necessary (par. 68).
	Impedance switch S102 (S1) not set for the correct impedance.	Determine correct impedance and reset switch S102 (S1) (par. 20).
15. Whistling or regeneration in talk and listen position.	Capacitor C102 (C2) open.....	Check capacitor. Replace if defective.
	Capacitor C105 (C5) below rated value.	Check all sections of the capacitor. Replace the capacitor if any section measures below rated value (par. 62).

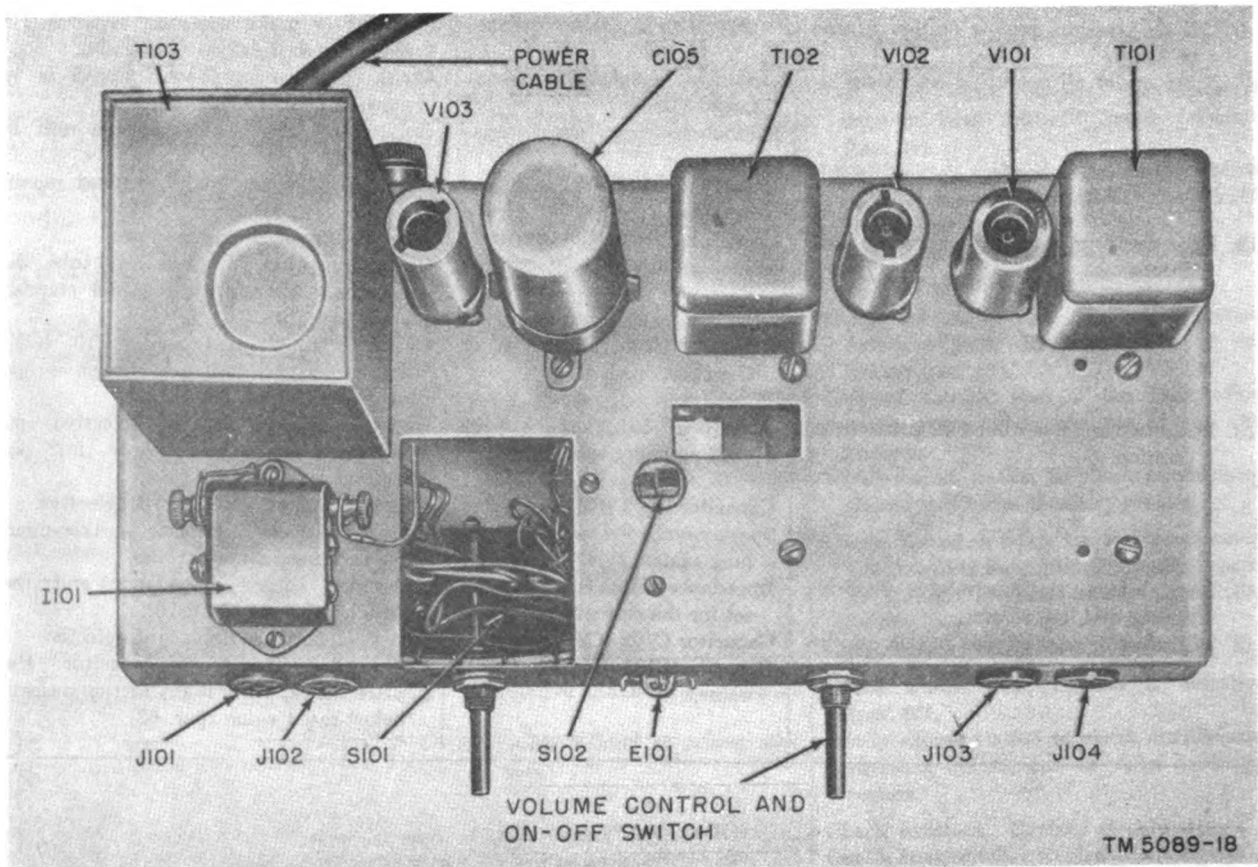


Figure 29. Intercommunication Stations LS-200/F1, LS-201/F1, and LS-202/F1, chassis top view.

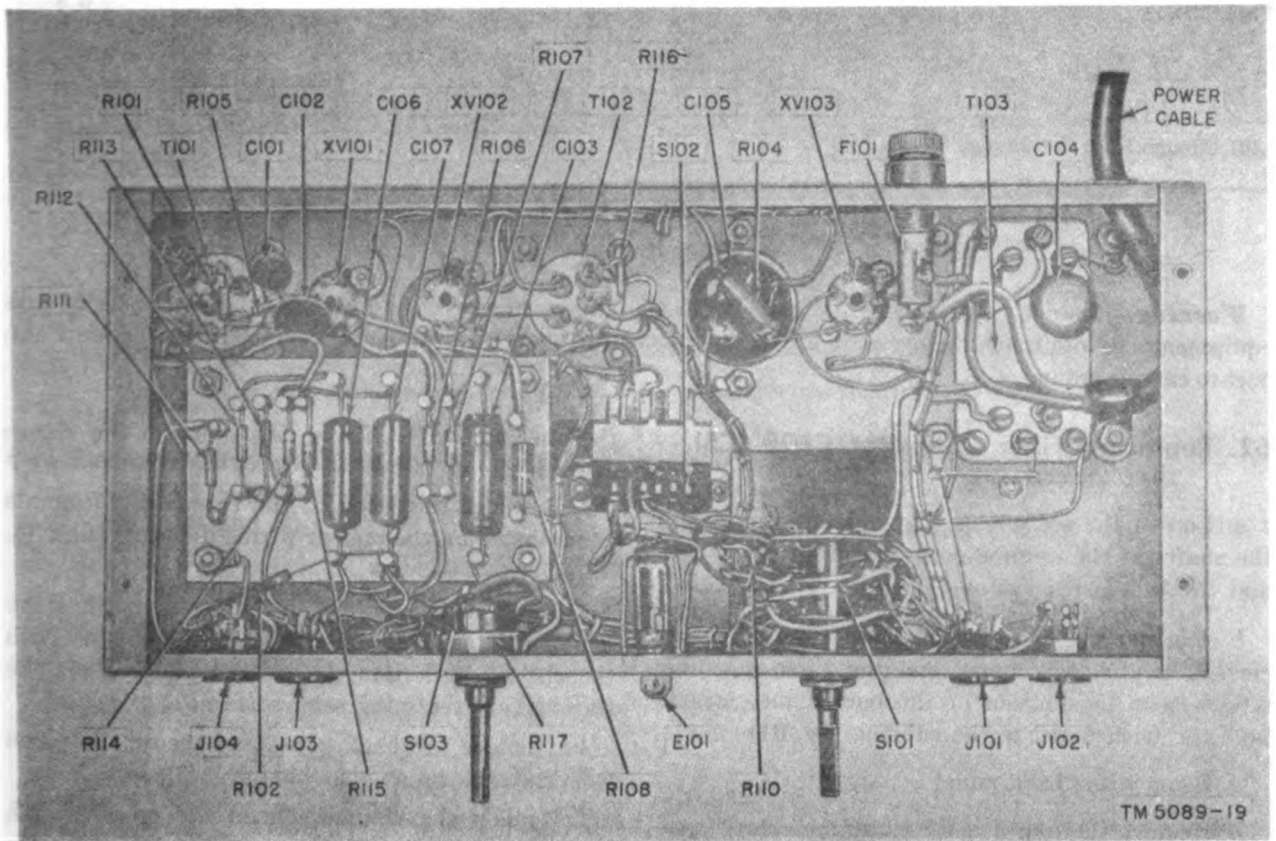


Figure 30. Intercommunication Stations LS-200/F1, LS-201/F1, and LS-202/F1, chassis bottom view.

61. Direct-Current Resistances of Transformers and Coils

The direct-current resistance of the transformer windings and the coils in the unit are listed below:

Transformer or coil	Terminals	Ohms
T101 (T1)	1-2	2
	1-3	6.4
	4-5	800
T102 (T2)	1-2	175
	3-4	16.5
	3-5	65
T103 (T3)	1-2	6.8
	3-4	.2
	5-7	270
	8-9	.5
L101 through L112 (L1 through L12)		30

Section II. REPAIRS

Warning: Remove power plug P105 (P4) from the ac power source before replacing any parts in this equipment. Before touching any part in the equipment *after the plug has been removed*, short circuit the part to chassis ground.

62. Replacing Filter Capacitor C105 (C5) (figs. 29 and 30)

a. Loosen the set screws that hold the knobs on the shafts at the volume control and on-off switch and the talk-listen switch.

b. Remove the two wood screws from the top corners of the back panel and the three machine screws near the bottom of the back panel, which hold the back panel to the cabinet (fig. 31).

c. Remove the back panel.

d. Remove the four chassis retaining screws from the bottom of the cabinet.

e. Remove the chassis from the cabinet and disconnect plugs P101 (P5), P102 (P1), P103 (P2), and P104 (P3) (fig. 32) from jacks J101 (J4), J102 (J1), J103 (J2), and J104 (J3), respectively.

f. Tag and unsolder the resistor R104 (R7) and leads connected to the capacitor C105 (C5) terminals (fig. 30).

g. Loosen the screw that holds the clamp around the capacitor and remove the capacitor from the chassis.

h. Place the new capacitor in the same position as

the one removed. Tighten the screw in the clamp around the capacitor.

i. Resolder the leads to the capacitor terminals as indicated on the tags or wiring diagram (figs. 36, 37, or 41).

j. Reconnect the plugs to the jacks in the same manner as they were disconnected in *e* above. Push the chassis back into the cabinet and replace the four chassis retaining screws (fig. 31).

k. Replace the back panel and secure the panel with the five screws that hold it in place.

l. Replace the volume control and on-off switch knob and the talk-listen switch lever. Tighten the set screws.

63. Replacing Pilot Lamp E101 (E1) (fig. 29)

a. Remove the back panel and chassis from the cabinet (par. 62a through *e*).

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

c. Insert the new lamp in the lamp socket. Push in and turn clockwise, then release the lamp and allow it to lock itself in place.

d. Replace the chassis and the back panel as described in paragraph 62j through *l*.

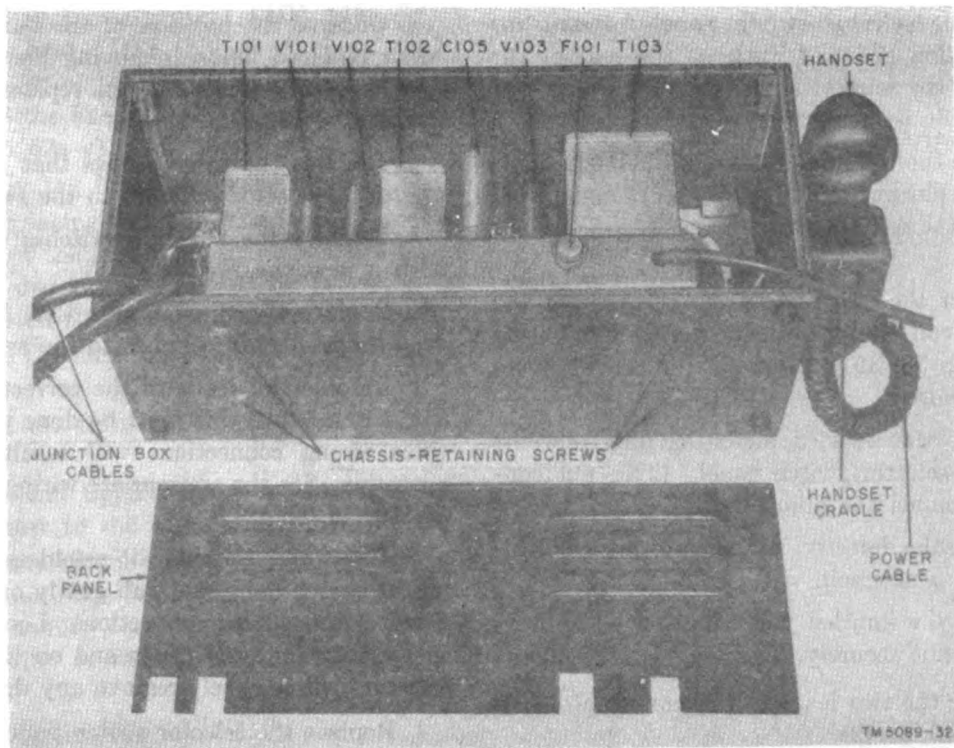


Figure 31. Intercommunication Station LS-202/FI, rear view of cabinet with back panel removed.

64. Replacing Volume Control R117 (R5) and On-Off Switch S103 (S3) (figs. 29 and 30)

- a. Remove the back panel and chassis from the cabinet (par. 62a-e).
- b. Remove the mounting nut and lockwasher from the shaft of the switch.
- c. Carefully tag and unsolder all leads from the switch.
- d. Remove the old switch and replace it with a new one.
- e. Replace the lockwasher and mounting nut. Tighten the nut securely.
- f. Resolder the leads to the switch terminals as indicated on the tags or wiring diagram (fig. 36, 37, or 41).
- g. Replace the chassis and back panel as described in paragraph 62j through l.

65. Replacing Talk-Listen Switch S101 (S2) (figs. 29 and 30)

- a. Remove the back panel and chassis from the cabinet (par. 62a-e).
- b. Remove the mounting nut and lock washer from the shaft of the switch.

c. Carefully tag and unsolder all leads from the switch.

d. Remove the old switch and replace it with a new one.

e. Replace the lockwasher and mounting nut. Tighten the nut securely.

f. Resolder the leads to the switch terminals as indicated on the tags and the wiring diagram (fig. 36, 37, or 41).

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

h. Replace the chassis and back panel as described in paragraph 62j through l.

66. Replacing Annunciator Coils L101 (L1) through L112 (L12)

a. Remove the back panel and chassis from the cabinet (par. 62a-e).

b. Remove the bracket that holds the junction box cable to the cabinet.

c. Remove the four bolts and nuts that hold the selector switch S104 (S4) (fig. 32) to the front panel.

d. Pull the selector switch panel forward far enough to allow room to work on the rear of the switch. Lay the selector switch panel down so that the wiring side is facing upward.

e. Remove the retaining nut from the back of the annunciator plunger and remove the plunger from the front of the selector switch panel (fig. 3, 4, 5, or 6).

f. Unsolder the two leads from the rear of the annunciator coil. Refer to the proper cabinet wiring diagram (fig. 38, 39, 40, or 42) for the intercom set being repaired.

g. Remove the knurled mounting nut from the front of the selector switch panel. (This nut contains the annunciator plunger.)

h. Remove the defective annunciator coil and replace it with a new coil.

i. Replace the knurled mounting nut (*g* above). Tighten the nut securely.

j. Resolder the two leads to the annunciator coil (fig. 38, 39, 40, or 42).

k. Replace the annunciator plunger by pushing it in from the front of the annunciator. Secure the plunger by attaching the retaining nut to the plunger from the rear of the selector switch panel.

l. Replace the selector switch panel on the front panel of the cabinet. Replace and tighten the four bolts and nuts that hold it in place.

m. Replace the bracket that holds the junction box cable to the inside of the cabinet.

n. Replace the chassis and back panel as described in paragraph 62j through l.

67. Replacing Station Selector Switch Bank

a. Remove the back panel and chassis from the cabinet (par. 62a-e).

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

c. Remove the four bolts and nuts that hold the selector switch panel to the front panel (fig. 32).

d. Pull the selector switch panel forward far enough to allow room to work on the rear of the panel, and lay it down so that the rear of the panel is facing upward.

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

f. Observe the position of the bank of switches being replaced before removing them, so that the new bank of switches may be replaced in the same position.

g. Remove the three screws that hold the bank of station selector switches to the switch plate.

h. Remove the bank of switches and replace it with a new one.

i. Replace the three screws that hold the bank of station selector switches to the switch plate.

j. Resolder all leads to the correct terminals on the switch bank; this must be done very carefully, since wrong connections will result in incorrect operation. See the appropriate wiring diagram (fig. 38, 39, 40, or 42).

k. Carefully examine all resoldered connections on the switch bank and pull gently on each wire to detect cold-soldered connections. Look for drops of solder between switch lugs and on the rear of the selector switch panel; remove any drops found.

l. Replace the selector switch panel on the front panel of the cabinet. Replace and tighten the four bolts and nuts that hold it in place.

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

n. Replace the chassis and back panel as described in paragraph 62j through l.

68. Replacing Speaker-Microphone LS101 (LS1) (fig. 32)

a. Remove the back panel and the chassis from the cabinet (par. 62a-e).

b. Remove the four screws that hold the speaker-microphone to the front panel of the cabinet.

c. Remove the speaker-microphone.

d. Remove the two screws that connect the two leads from plug P102 (P1) to the defective speaker-microphone. Remove the two leads and connect them to the new speaker-microphone.

e. Place the new speaker-microphone in the correct position in the cabinet.

f. Replace and tighten the four screws that hold the speaker-microphone to the front panel.

g. Replace the chassis and back panel as described in paragraph 62j through l.

69. Replacing Transformers T101 (T1), T102 (T2), and T103 (T3) (figs. 29 and 30)

- a. Remove the back panel and chassis from the cabinet (par. 62a-e).
- b. Carefully tag the transformer leads.
- c. When replacing an audio transformer, unsolder and disconnect the leads. When replacing a power transformer, disconnect the leads by loosening the nuts that fasten the leads to the transformer.
- d. Remove the nuts that hold the transformer to the chassis.
- e. Remove the transformer and replace it with a new one.
- f. Replace and tighten the four nuts that hold the transformer to the chassis.
- g. Resolder all leads to the correct terminals on the transformer (fig. 36, 37, or 41); this must be done very carefully, since wrong connections will result in faulty operation and may damage the equipment.

70. Replacing Power Cable (fig. 30)

- a. Remove the back panel and chassis from the cabinet (par. 62a-e).
- b. Unsolder the black and white power cable leads from the terminals under the chassis (fig. 36, 37, or 41). Immediately after unsoldering each lead, tag the terminals from which these leads were unsoldered.
- c. Loosen the clamp that holds the power cable to the chassis.
- d. Remove the power cable through the hole in the rear of the chassis and insert a new power cable.
- e. Place the new power cable in the clamp and tighten the clamp.
- f. Resolder the black and white leads to the correct terminals (fig. 36, 37, or 41).
- g. Replace the chassis and back panel (par. 62j-l).

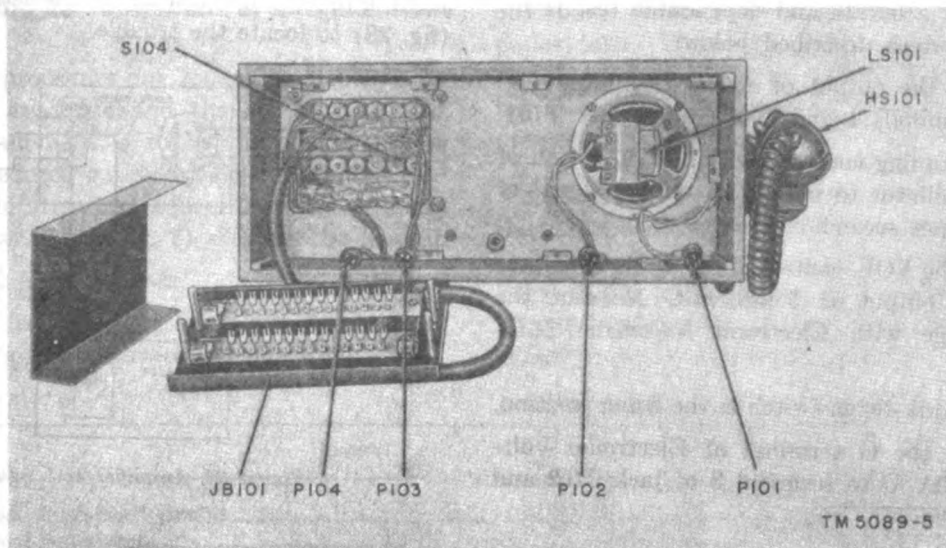


Figure 32. Intercommunication Station LS-201/FI, showing rear view of cabinet.

- h. Carefully examine all resoldered connections on the transformer and pull gently on each wire to detect any cold-soldered connections.
- i. Replace the chassis and back panel (par. 62j-l).

71. Refinishing

Instructions for refinishing badly marred panels on exterior cabinets are given in TM 9-2851, Painting Instructions for Field Use. Use only authorized refinishing materials.

Section III. FINAL TESTING

72. General

This section is intended as a guide to be used in determining whether or not a repaired unit will

operate satisfactorily. The minimum test requirements outlined in paragraph 74 may be performed by qualified maintenance personnel with the proper

test equipment. All repaired equipment meeting the requirements given in this section will furnish satisfactory operation.

73. Test Equipment Required for Final Testing

The following test equipment is required for final testing of Intercommunication Stations LS-200/FI, LS-201/FI, LS-125B/FI, and LS-202/FI:

Test equipment	Technical manual
Audio Oscillator TS-382/U.....	TM 11-2684
Electronic Voltmeter ME-30A/U.....	
Electron Tube Test Set TV-2/U.....	TM 11-2661

74. Amplifier Test (fig. 33)

An ear test for sound volume and tone quality is the usual procedure for determining approximate amplifier gain and frequency response. However, where a more accurate and dependable test is required, proceed as described below.

a. Connect the output of Audio Oscillator TS-382/U to terminals 1 and 3 of transformer T101.

b. Set the tuning control and RANGE switch of the audio oscillator to obtain an output signal of 1,000 cycles per second.

c. Adjust the VOL. control of the audio oscillator to obtain an output of .5 millivolt. Measure the output voltage with Electronic Voltmeter ME-30A/U.

d. Set the talk-listen switch in the listen position.

e. Connect the G terminal of Electronic Voltmeter ME-30A/U to terminal 3 of jack J102 and

the OUTPUT terminal of the ME-30A/U to terminal 2 of jack J102.

f. Connect the speaker-microphone voice coil terminals to terminals 2 and 3 of jack J102.

g. Set the impedance switch at 50 ohms.

h. Turn on the amplifier and set the volume control at maximum. Turn on all test equipment and allow the equipment to warm up.

i. The ME-30A/U should indicate at least 1 volt. If the output voltage of the amplifier is less than .8 volt, the equipment does not meet the best performance specifications and troubleshooting is required.

j. Refer to the troubleshooting chart (par. 60) and the tube socket voltage and resistance diagram (fig. 28) to locate the trouble.

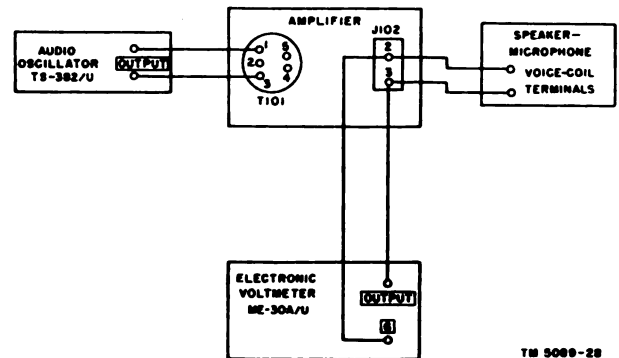


Figure 33. Amplifier test setup.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

75. Disassembly

The following instructions are recommended as a guide for preparing the intercom sets for transportation and storage:

- a. Remove the power plug from the ac outlet.
- b. Disconnect all wiring from the VOICE and ANN. terminal boards in the junction box.

76. Repacking for Shipment or Limited Storage

The exact procedure for repacking depends on the material available and the conditions under which the equipment is to be shipped or stored. Use the procedures outlined below whenever possible. The information concerning the original packaging (par. 9 and fig. 7) will also be helpful.

a. Material Requirements.

- (1) The following materials are required for packaging the intercom sets:

b. *Packaging.* Secure the junction box to the top of the intercom set by tying or by taping with water-resistant pressure-sensitive tape. Tie the handset to the cradle; wrap the handset and cradle assembly in flexible corrugated paper and seal with gummed paper tape. Cushion the intercom set on all surfaces with pads fabricated from flexible corrugated paper in such a manner that shocks normally encountered in handling and transit will be absorbed. Secure the cushioning with gummed paper tape. Wrap the entire cushioned unit in flexible corrugated paper, making a snug conforming wrap. Seal all closures with water-resistant pressure-sensitive tape.

c. *Packing.* Pack the packaged intercom set in the nailed wooden box. Fabricate the box to fit the contents snugly and line it with a waterproof case liner. Place the package in the wooden box and fill voids with pads of flexible corrugated paper. When properly cushioned, nail the top onto the

Material	Quantity
Paper, corrugated, single-faced, flexible.....	32 sq ft
Barrier, waterproof material.....	18 sq ft
Tape, gummed paper.....	8 ft
Tape, pressure-sensitive.....	18 ft
Strapping, flat steel.....	12 ft
Wooden shipping box.....	1 ea

- (2) Detailed dimensional data for the wooden box is as follows:

box. Use flat steel strapping around boxes intended for intertheater shipment.

Box size (in.)	Board feet	Cubic feet	Packed weight (lb)
30 x 15 x 12.....	14	2.9	60

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

77. General

The demolition procedures outlined in paragraph 78 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the proper authority.

78. Methods of Destruction

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

b. Cut. Cut cords and wiring; use axes, hand-axes, or machetes.

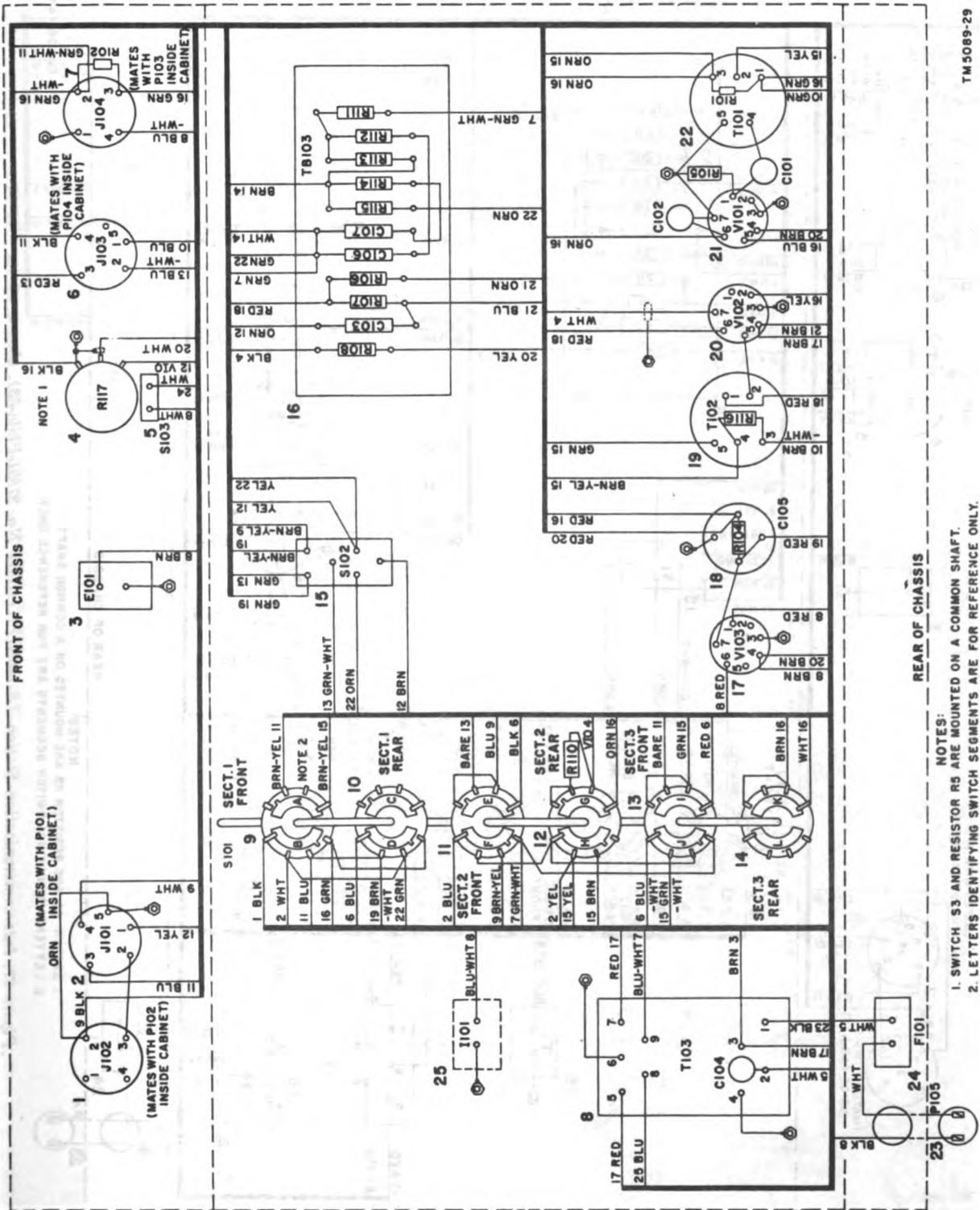
c. Burn. Burn cords and manuals; use gasoline, kerosene, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panels and chassis.

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

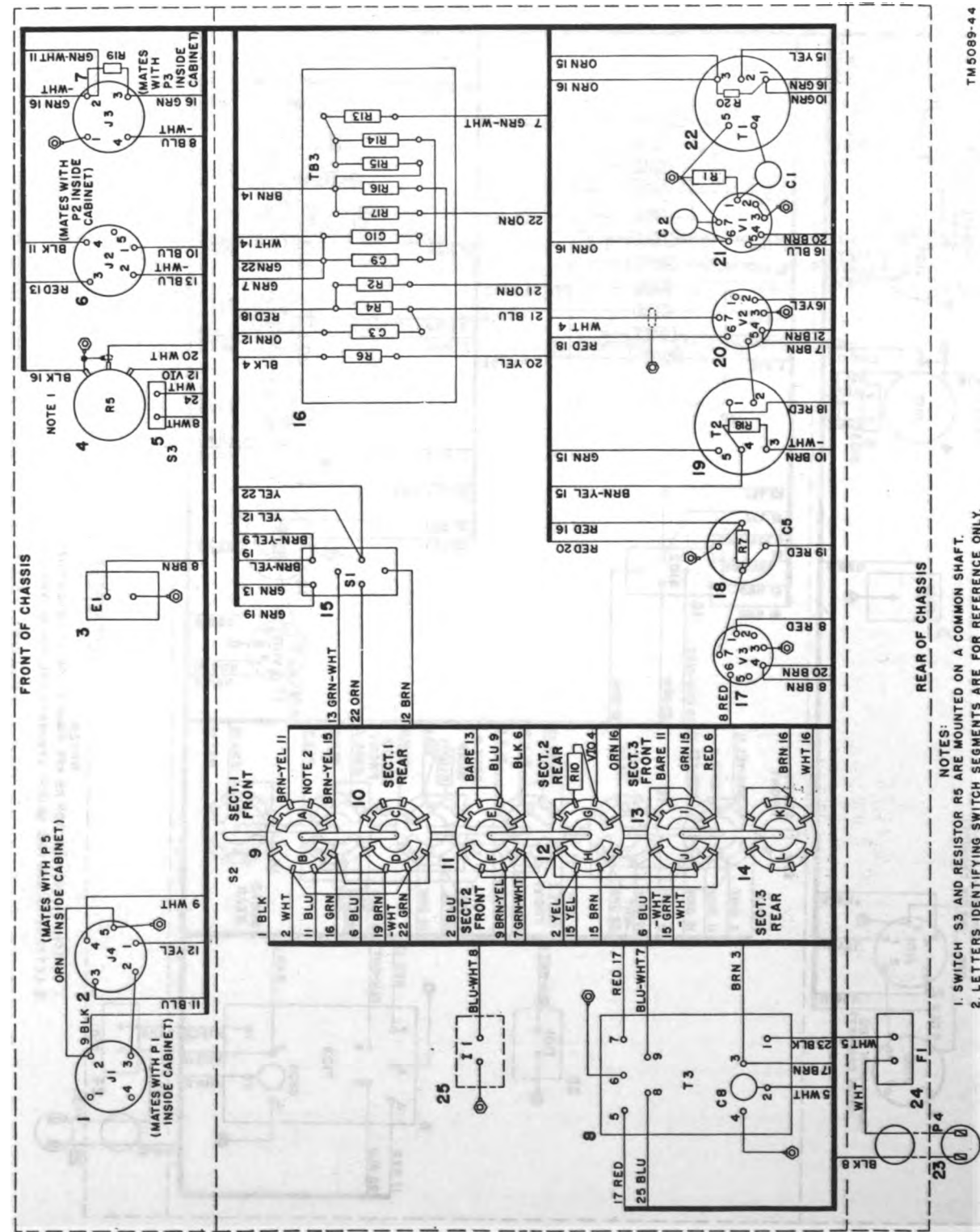
f. Disposal. Bury or scatter the destroyed parts in slit trenches, foxholes, or other holes, or throw them into streams.

g. Destroy. Destroy everything.



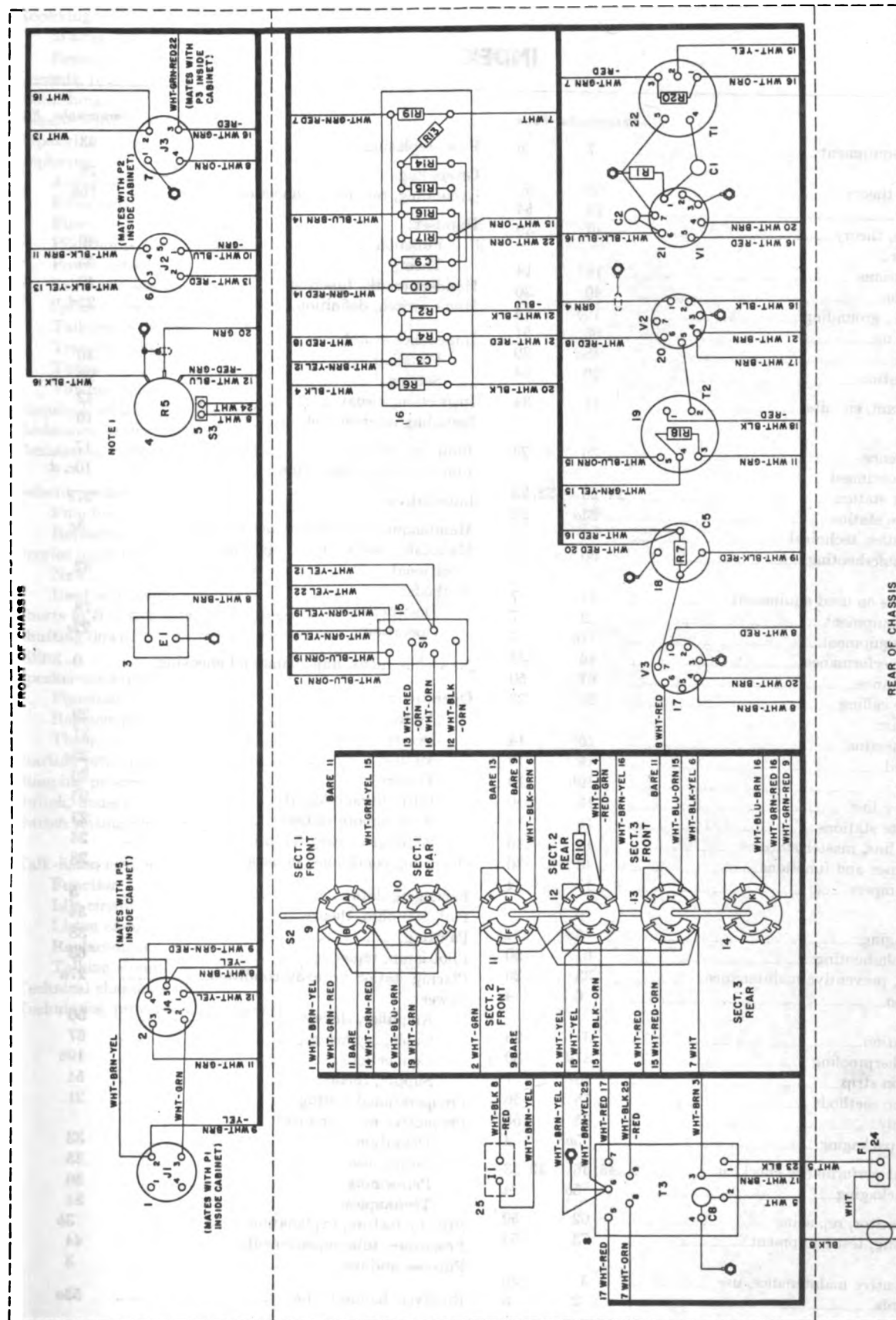
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Figure 36. Intercommunication Stations LS-800/FI, LS-801/FI, and LS-802/FI, chassis wiring diagram.



- NOTES:
1. SWITCH S3 AND RESISTOR R5 ARE MOUNTED ON A COMMON SHAFT.
 2. LETTERS IDENTIFYING SWITCH SEGMENTS ARE FOR REFERENCE ONLY.

Figure 57. Intercommunication Station LS-125B/FI (Order No. 57891-Phila-58), chassis wiring diagram.



REAR OF CHASSIS

NOTES:
 1. SWITCH S3 AND RESISTOR R5 ARE MOUNTED ON A COMMON SHAFT.
 2. LETTERS IDENTIFYING SWITCH SEGMENTS ARE FOR REFERENCE ONLY.

Figure 41. Intercommunication Station LS-155B/FI (Orders No. 7541-Phila-54 and 19988-Phila-55), chassis wiring diagram.

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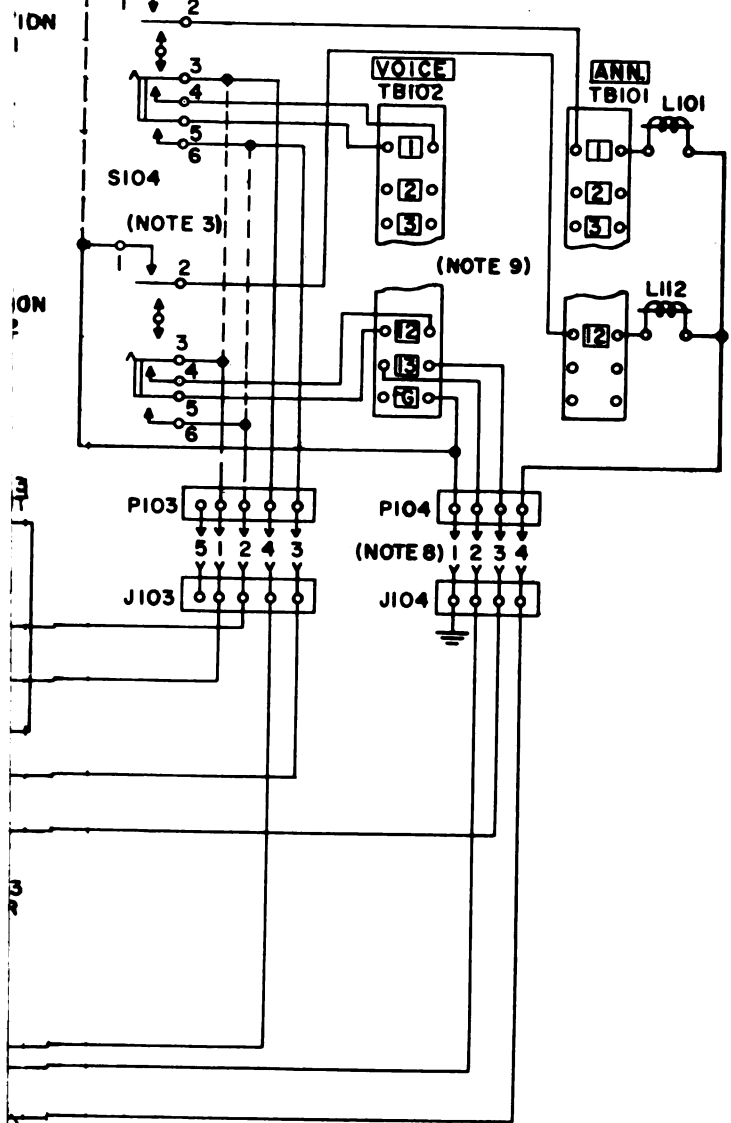
USAR: None.

Unless otherwise noted, distribution applies to CONUS and overseas.

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

PLUGS FOR STATIONS
2 THRU 11 NOT SHOWN.

(NOTE 4)



WITH HANDSET ON CRADLE.

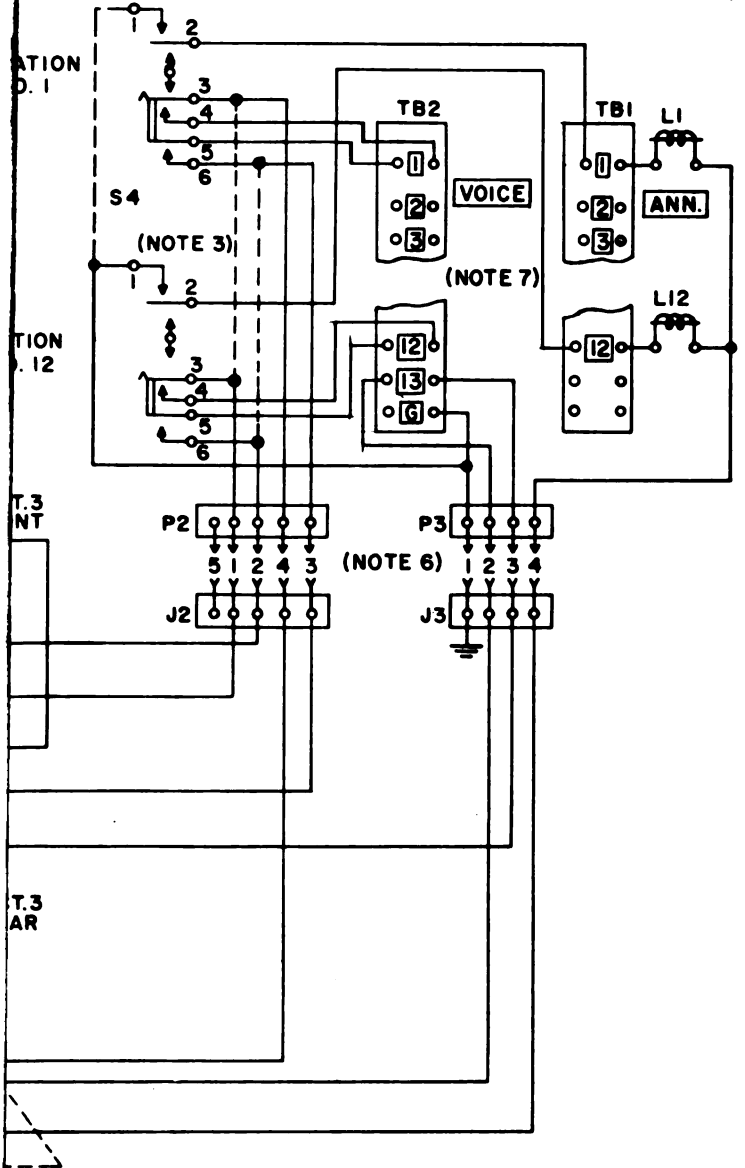
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11 ON TERMINAL BOARDS
NOT SHOWN.

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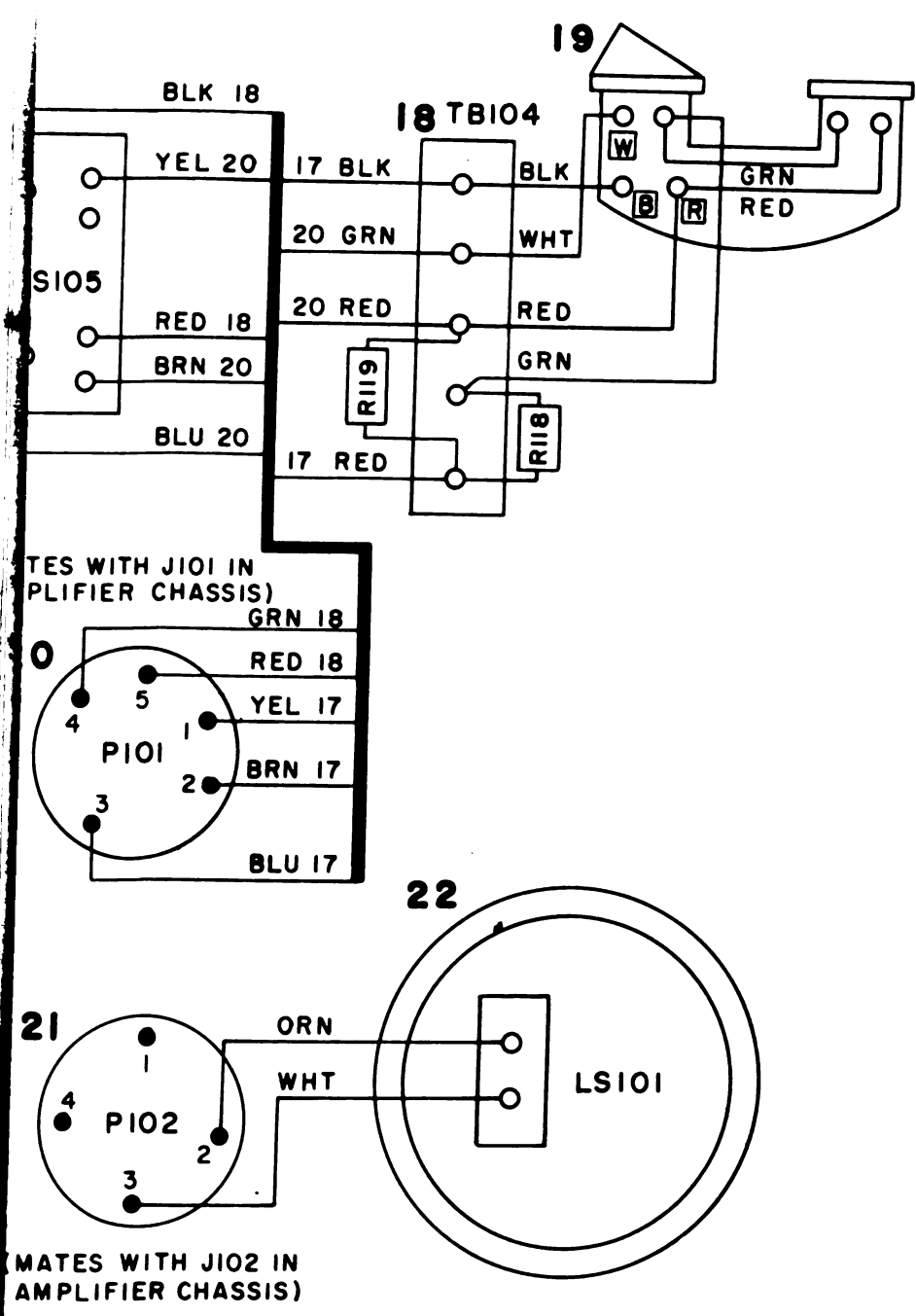
Figure 34. Intercommunication Station LS-201/PI, schematic diagram.

SWITCHES FOR STATIONS
2 THRU 11 NOT SHOWN.



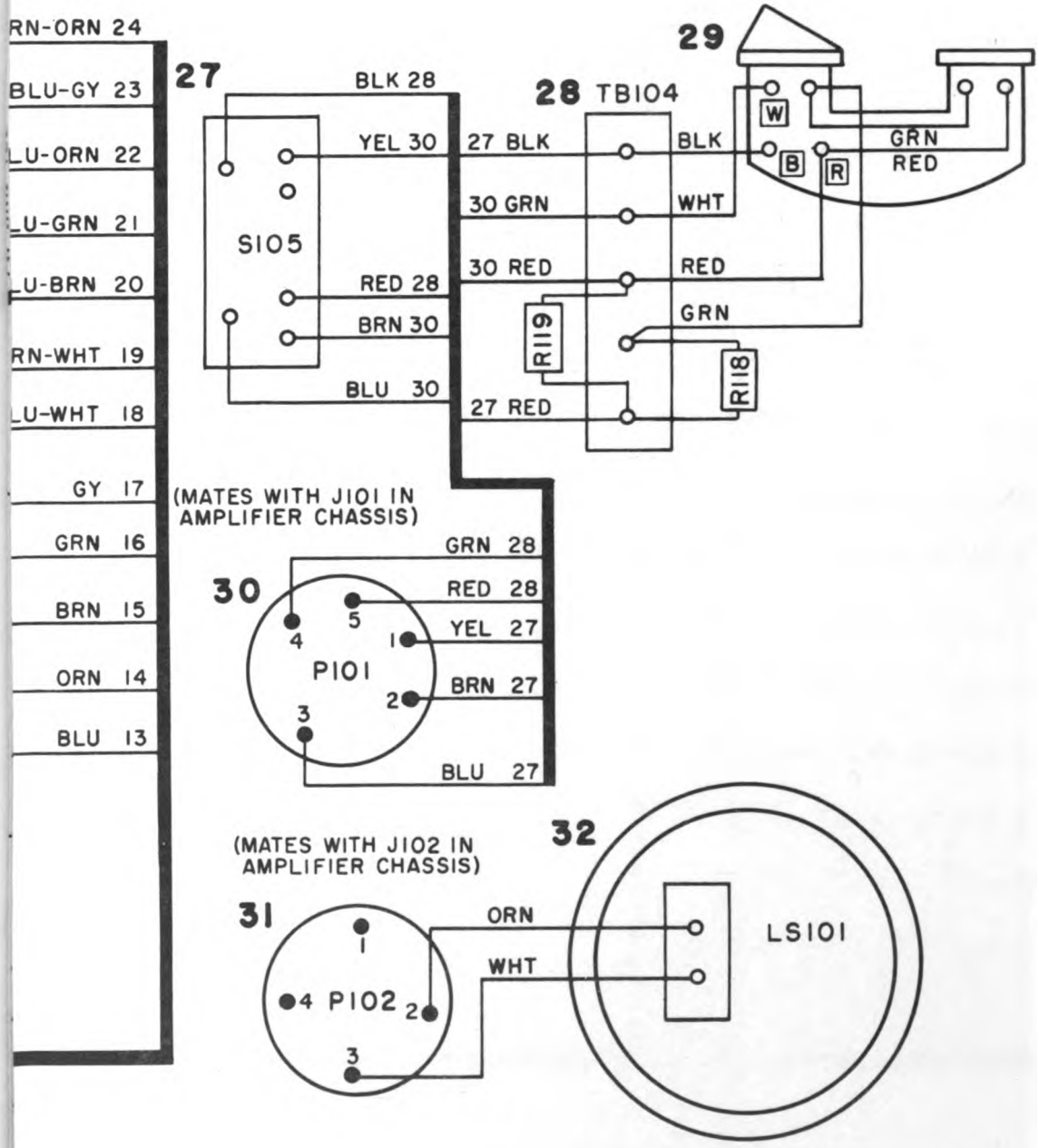
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Figure 35. Intercommunication Station LS-125B/F1, schematic diagram.



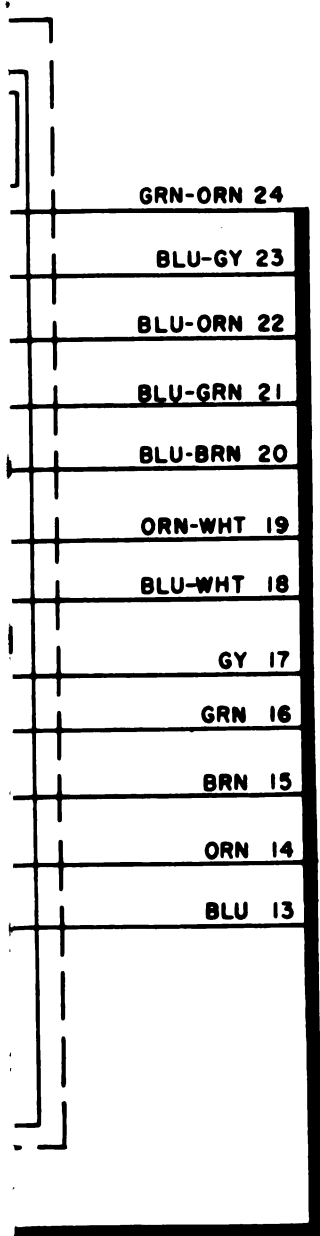
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Figure 38. Intercommunication Station LS-200/FI, cabinet wiring diagram.

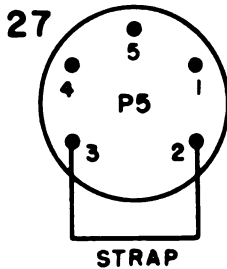


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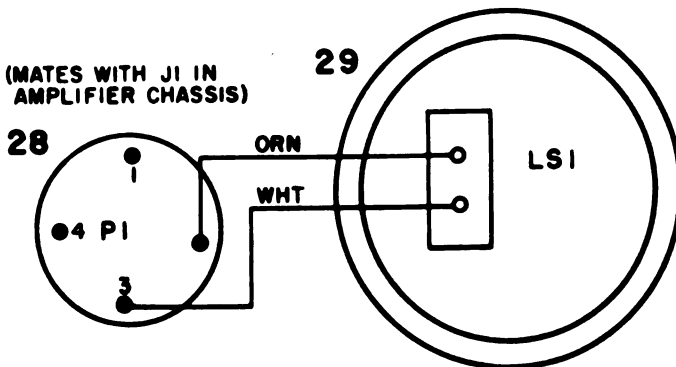
Figure 39. Intercommunication Stations LS-201/FI and LS-202/FI, cabinet wiring diagram.



(MATES WITH J4 IN AMPLIFIER CHASSIS)

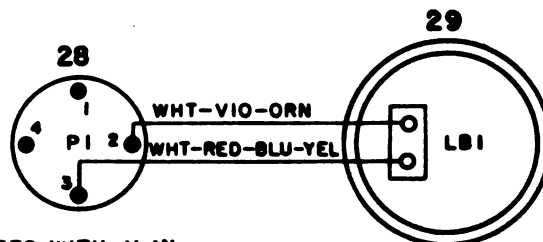
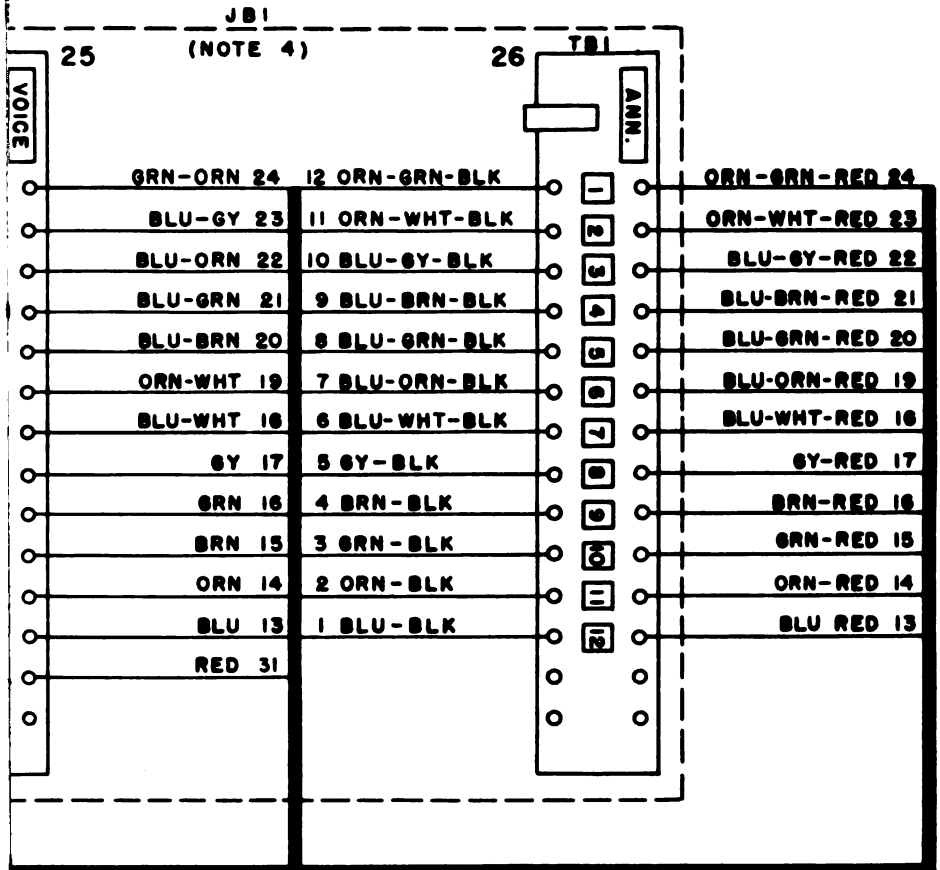


(MATES WITH J1 IN AMPLIFIER CHASSIS)



TM 5089-43

Figure 40. Intercommunication Station LS-125B/FI (Order No. 37891-Phila-53), cabinet wiring diagram.



(MATES WITH J1 IN
AMPLIFIER CHASSIS)

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ion LS-125B/FI (Orders No. 7541-Phila-54 and 19988-Phila-55), cabinet wiring diagram.

