

TECHNICAL MANUAL

**OPERATOR'S AND UNIT
MAINTENANCE MANUAL**

**SWITCHBOARDS,
TELEPHONE, MANUAL
SB-22/PT
(NSN 5805-00-257-3602)
AND
SB-22A/PT
(NSN 5805-00-715-6171)
(INCLUDING TONE)
SIGNALING ADAPTER
TA-977/PT
(NSN 5805-01-040-9653))**

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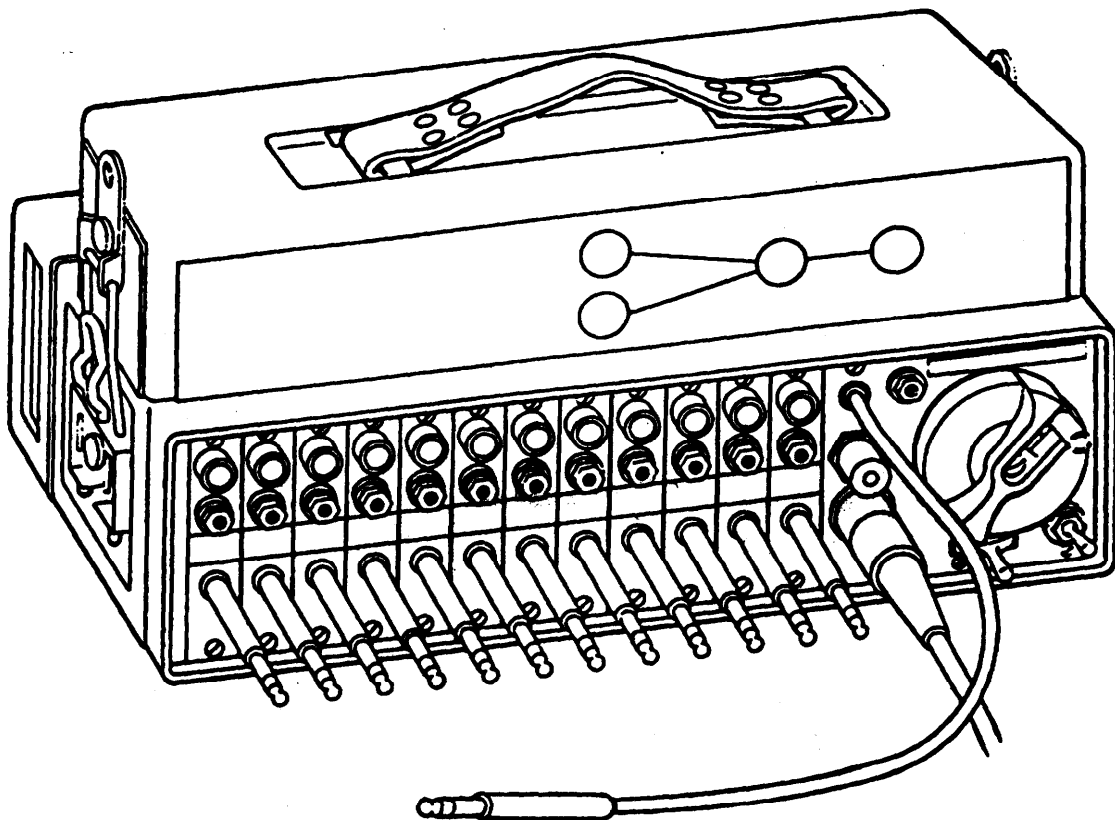
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HEADQUARTERS, DEPARTMENT OF THE ARMY
15 JUNE 1990

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**5****SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK****1****DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL****2****IF POSSIBLE, TURN OFF THE ELECTRICAL POWER****3****IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL****4****SEND FOR HELP AS SOON AS POSSIBLE****5****AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION**

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TECHNICAL MANUAL

No. 11-5805-262-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 June 1990

Operator's and Unit Maintenance Manual

**SWITCHBOARDS, TELEPHONE MANUAL
SB-22/PT (NSN 5805-00257-3502) AND
SB-22A/PT (NSN 5805-00-715-6171)
(INCLUDING TONE SIGNALING ADAPTER TA-977/PT
(NSN 5805-01-040-9853))**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ME-PS, Fort Monmouth, New Jersey 07703-5000. In either case, a reply will be furnished direct to you.

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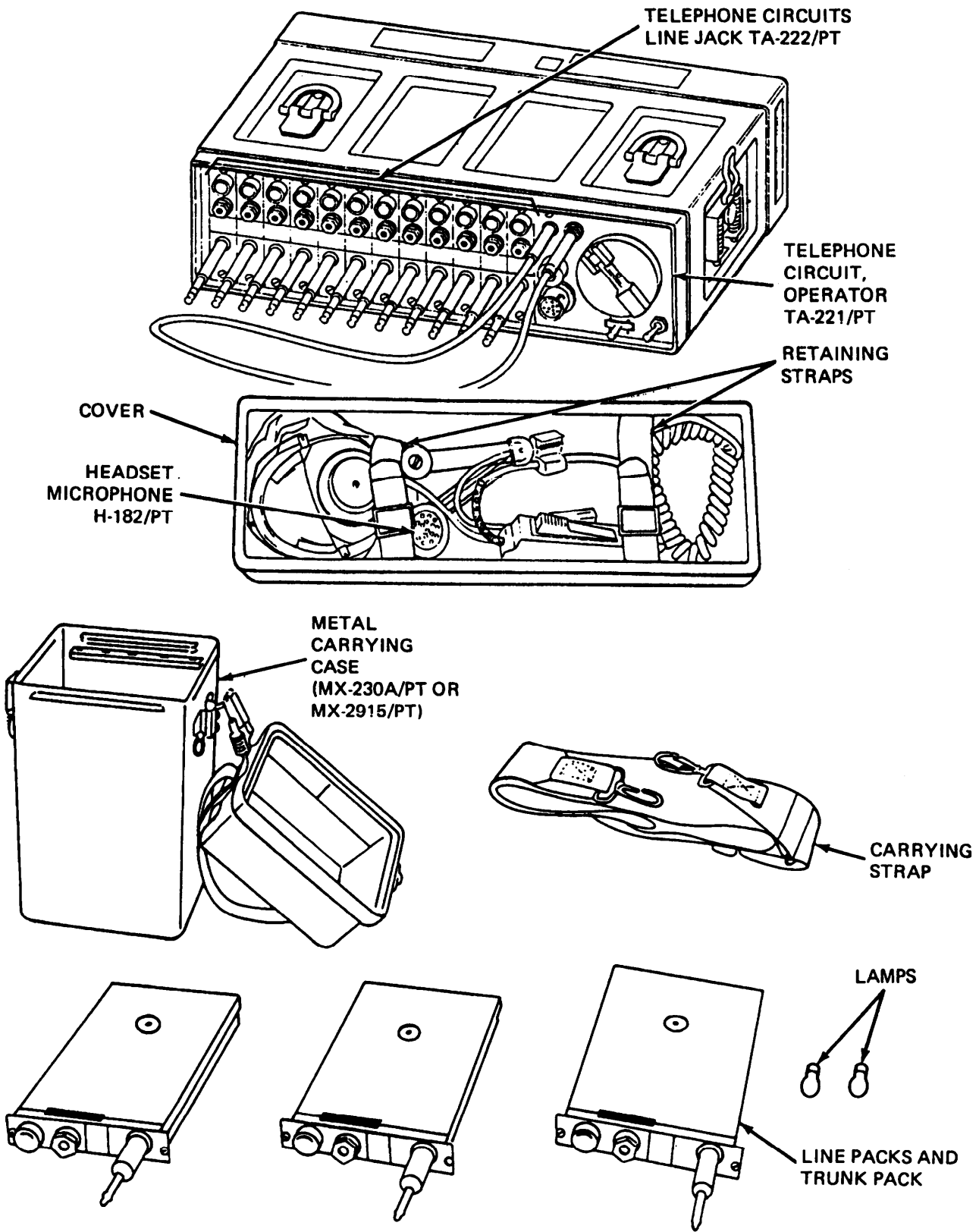
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HOW TO USE THIS MANUAL

This manual is designed to help you keep your switchboard in good operating condition. The front cover index is provided for quick reference to important information. There is also an index located in the final pages for use in locating specific items of information.

Warning pages are located in the front of this manual. There are other cautions and warnings also located throughout the manual. You should learn the cautions and warnings before performing any operations or maintenance on the equipment.

Paragraphs in this manual are numbered by chapter and order of appearance within a chapter. A subject index appears at the beginning of each chapter listing sections that are included in that chapter. A more specific subject index is located at the beginning of each section to help you find the exact paragraph you are looking for.



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Figure 1-1. Switchboard, Telephone, Manual SB-22/PT and SB-22 A/PT and Accessory Kit, MX-230A/PT and MX-2915/PT.

CHAPTER 1

INTRODUCTION

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General Information	I	1-1
Equipment Description and Data	II	1-3
Technical Principles of Operation.	III	1-10

Section 1. GENERAL INFORMATION

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1-1. Scope

- a. This manual describes Switchboards, Telephone, Manual SB-22/PT and SB-22A/PT (figure 1-1) and contains instructions for their installation, operation, maintenance, troubleshooting, repair, shipment and demolition. Operation and repair of Tone Signaling Adapter TA-977/PT is also covered.
- b. Switchboards SB-22/PT and SB-22A/PT use one of two accessory kits, MX-230A/PT or MX-2915/PT.
- c. References are provided in appendix A, and the maintenance allocation chart is provided in appendix B.

1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes or additional Publications pertaining to the equipment.

1-3. Maintenance Forms, Records, and Reports

- a. *Reports of Maintenance and Unsatisfactory Equipment.* Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update.
- b. *Reporting of Item and Packaging Discrepancies.* Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

c. Transportation Discrepancy Report (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4. Reporting Equipment Improvement Recommendations (EIR)

If your Switchboard SB-22/PT or SB-22A/PT needs improvement let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-MA-D, Fort Monmouth, New Jersey 07703-5000. We'll send you a reply.

1-5. Administrative Storage

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment for limited storage are covered in paragraphs 4-21 and 4-22.

1-6. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-7. Nomenclature Cross-Reference List

The following is a listing of common equipment names used in this manual and their official nomenclature.

Common Name	Official Nomenclature
Switchboard	Switchboard, Telephone, Manual SB-22/PT or SB-22JVPT
Line pack	Telephone Circuit, Line Pack TA-222/PT
Operator's pack	Telephone Circuit, Operator's TA-221/PT
Headset	Headset-Microphone H-182/PT
Trunk pack	Telephone Circuit, Trunk Pack TA-328/PT
Accessory Kit	Accessory Kit MX-230A/PT, MX-2915/PT
Tone signaling adapter	Tone Signaling Adapter TA-977/PT
Field telephone	Telephone Set TA-312/PT

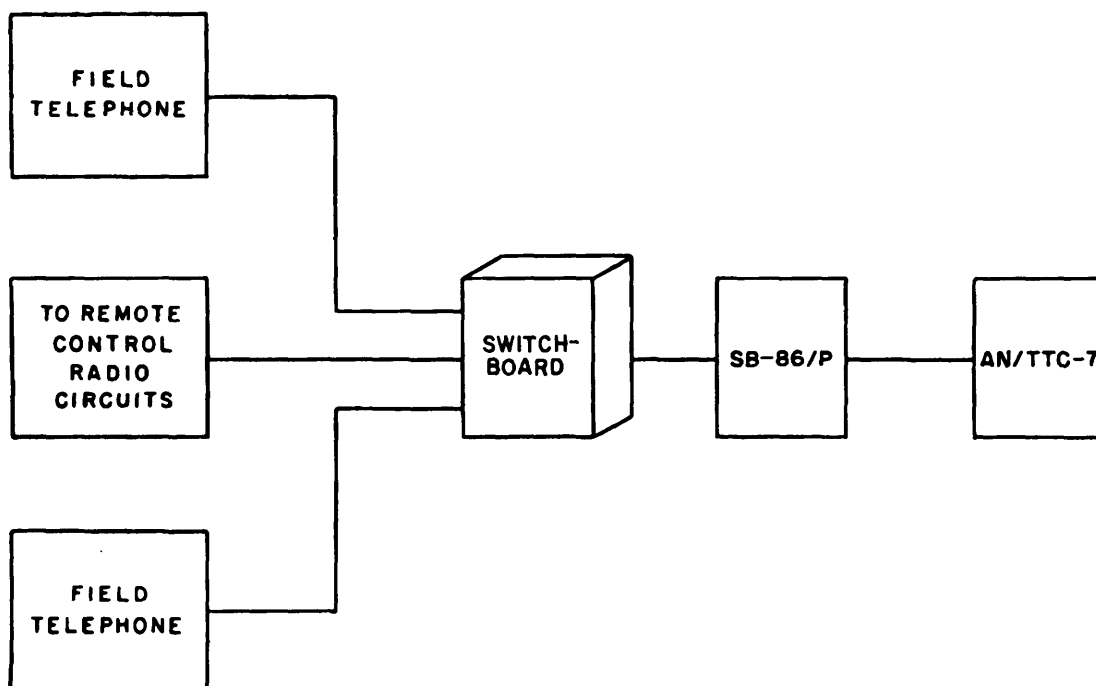
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1-8. Equipment Characteristics, Capabilities and Features

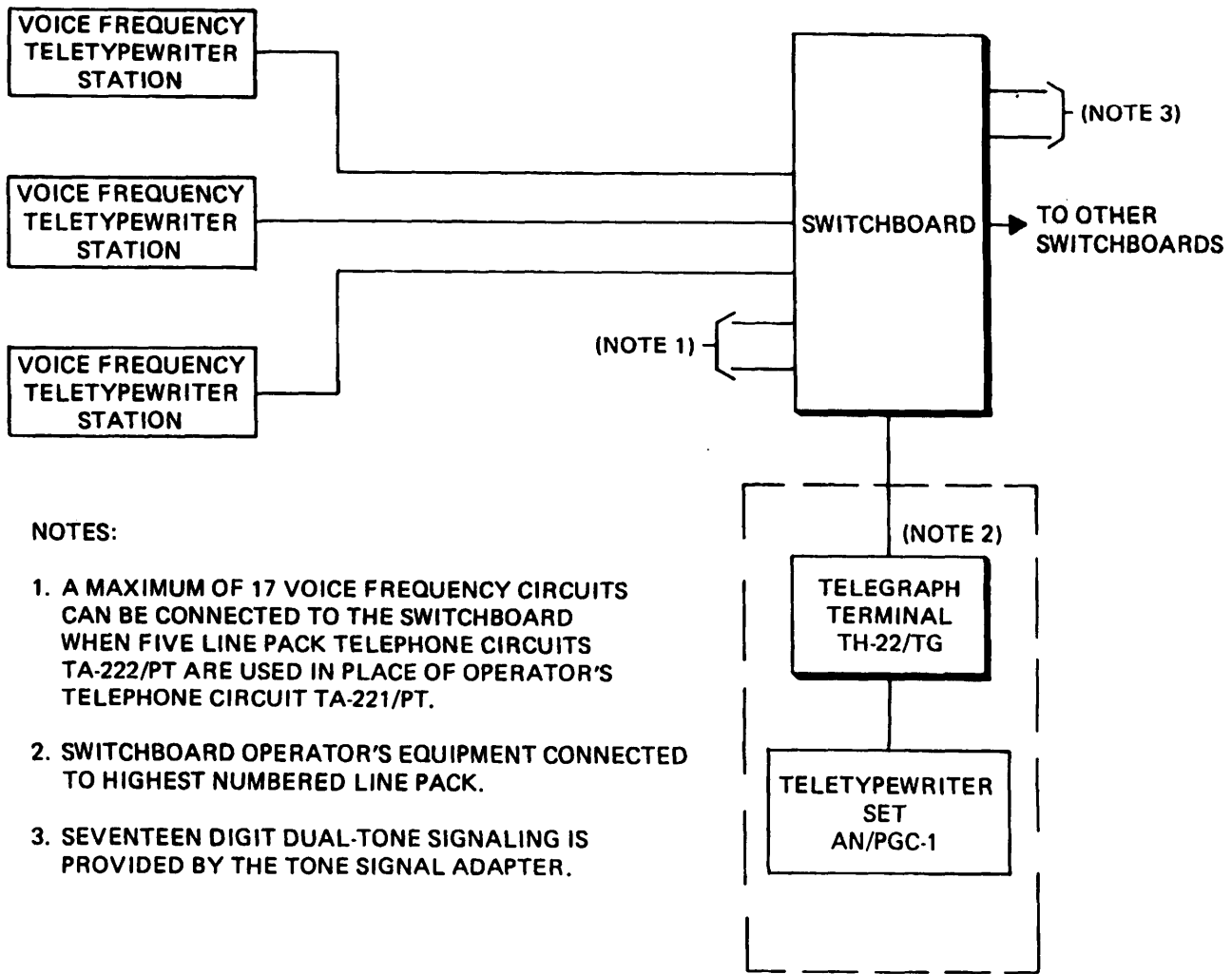
a. *Switchboard.* The switchboard normally provides facilities for interconnecting up to 12 voice frequency (VF) circuits through a combination of line and/or trunk packs. (This capability can be expanded to 17 circuits by removing the operator's pack from the switchboard case and installing five additional line and or trunk packs in its place.) These circuits can be telephone circuits to field telephones or to distant switchboards, remote controlled radio circuits, or teletypewriter circuits. (A teletypewriter circuit is a telephone or radio circuit to a station where a teletypewriter is available.) Figure 1-2 shows a typical use of the switchboard in a local battery telephone and remote controlled radio system. Figure 1-3 shows atypical use of the switchboard in a VF teletypewriter system.

The SB-22A/PT is supplied with eleven line packs and one trunk pack installed, with an additional trunk pack and two line packs in the accessory kit. The SB-22/PT is supplied with 12 line packs, with an additional three line packs in the accessory kit. However, any combination of line and trunk packs can be used with both switchboards.



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Figure 1-2. Local Battery Telephone Circuits and Remote Controlled Radio Circuits Using the Switchboard.



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Figure 1-3. VF Teletypewriter Circuits Using the Switchboard.

The SB-22/PT and SB-22A/PT are manual switchboards. The operator and the subscribers must each generate a ringing signal manually, using the hand ringing generator, when signaling the other.

The switchboard may be a component of a local battery (LB) telephone system, a common battery (CB) telephone system, or a common battery signaling (CBS) telephone system. In LB operation, the switchboard batteries provide the power to generate the operator's ringing signal and to transmit voice frequencies. If the SB-22/PT or SB-22A/PT is linked to an automatic central switchboard, it is part of a CB or CBS system. However, while the automatic switchboard supplies ringing and voice frequency transmission power for itself and its own subscribers, it does not power any manual switchboards in the system. Therefore, the SB-22/PT and SB-22A/PT and its subscribers always operate in LB mode.

Protection from lightning is provided by a lightning arrestor installed on each line or trunk, in addition to protection provided by grounding.

b. Tone Signaling Adapter. The tone signaling adapter provides an analog switchboard, such as SB-22/PT or SB-22A/PT, with an optional method of interfacing with a digital switchboard, by providing dual-tone signaling over a trunk line. When the SB-22A/PT operator uses the tone signaling adapter to dial the number of a digital switchboard subscriber, the transmission bypasses the distant switchboard operator and rings the called party directly. No communication between the two operators is necessary. When connected to an SB-22/PT or an SB-22A/PT, the tone signaling adapter is normally used to signal switchboard SB-3614/T and Automatic Telephone Central Office AN/TCC-38.

c. Headset. (figure 1-4) The operator's headset enables the operator to communicate with switchboard subscribers and to monitor calls connected through the switchboard. The headset is made up of the following components:

(1) *Earphone and earcup assembly.* This assembly consists of Receiver Element TA-235, a high-impact plastic earcup, a two-conductor terminal block and cover plate, and a soft rubber ear cushion.

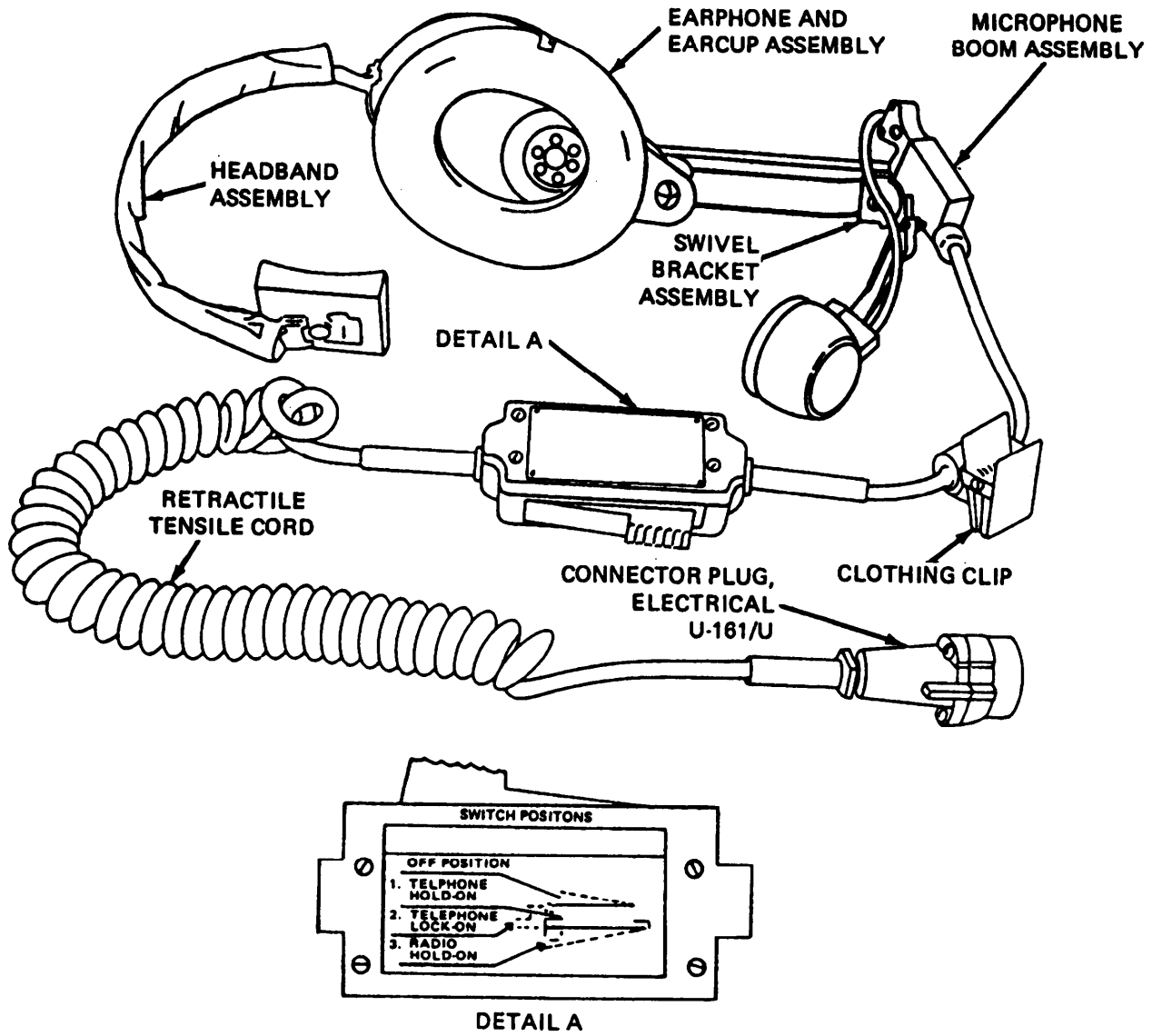
(2) *Boom microphone assembly.* This assembly consists of a high-impact plastic boom case containing a carbon microphone element, a ball and socket device, a wire loop, and a swivel bracket assembly.

(3) *Switching assembly.* This assembly consists of a push-to-talk lever and bar-actuated switch housed in a high-impact plastic case, a cover, and a clothing clip.

(4) *Headband assembly.* The adjustable, flexible headband assembly consists of a tubular plastic-covered headband, a fold-away earphone adjusting assembly, and a cushion adjusting assembly.

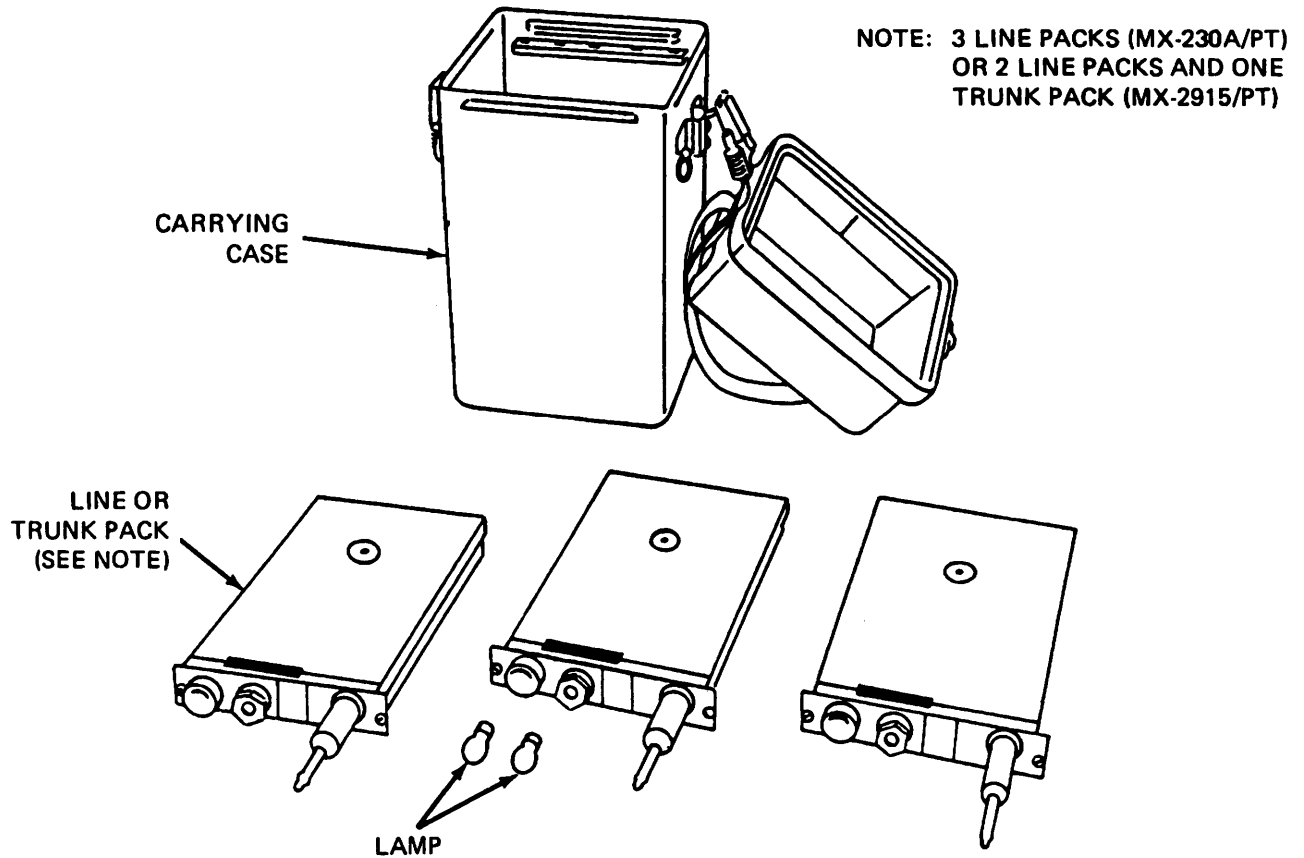
(5) *Cord assembly.* The cord assembly consists of a two-conductor straight cord with stay cords and solderless connectors, and a seven-conductor retractile tensile cord with stay cords and solderless connectors on one end and Connector Plug, Electrical U-161/U on the other end.

d. Accessory Kits. Accessory Kit MX-230A/PT contains three spare line packs (TA-222/PT), two lamps (GE PN 1490), and an aluminum carrying case. Accessory Kit MX-2915/PT contains two spare line packs (TA-222/PT), one spare trunk pack (TA-326/PT), two lamps (GE PN 1490), and an aluminum carrying case. Either of these accessory kits can be used with both switchboard models. Accessory Kit MX-230/PT is an obsolete kit. The contents of the MX-230/PT were identical to the contents of the MX-230A/PT except that it contained a canvas carrying bag and strap instead of the aluminum carrying case. Accessory Kits MX-230A/PT and MX-2915/PT are shown in figure 1-5.



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Figure 1-4. Headset-Microphone H-182/PT.



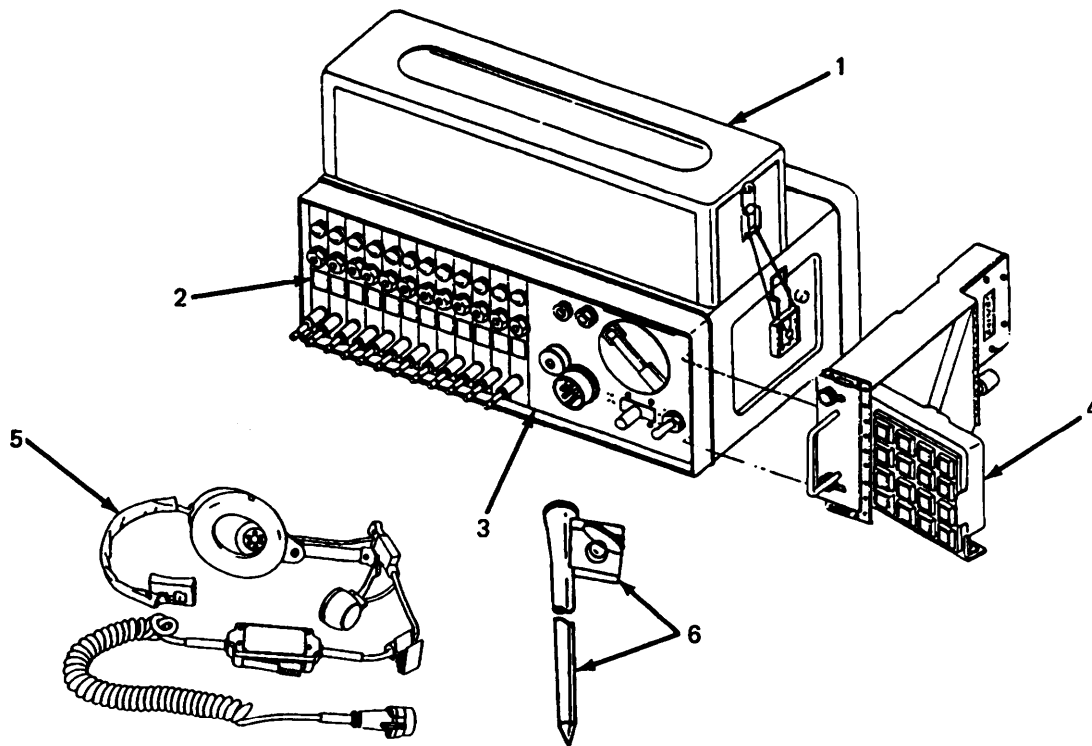
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Figure 1-5. Accessory Kits MX-230 NPT and MX-2915/PT

1-9. Location and Description of Major Components (figure 1-6)

Item	Description
1. Cover	Provides storage and carrying space for headset. Fastens to top of switchboard in operating position.
2. Line/Trunk packs	Provides connection point on switchboard for subscriber to communicate with operator and other subscribers, and a call signal indicator to alert operator when subscriber is ringing switchboard. Line packs and trunk packs look identical. Only the trunk label on the trunk pack can be used to tell them apart. The only difference between a line pack and a trunk pack is that the trunk pack has two capacitors that increase ringing voltage. Normally, a trunk pack is used to interconnect two switchboards, where distance may require a stronger signal.

Item	Description
3. Operator's pack	Allows operator to connect headset and plug into line and trunk packs for communication and call-monitoring, to generate a ringing signal to the called party and to ring back the calling party, to select a visual or audio alarm, and to illuminate the face of the switchboard during blackout conditions.
4. Tone Signaling Adapter	Fastens to the side of the switchboard. Has a 16-key keyset for sending calls to SB-3614 and AMCC-38 subscribers. Keyset module is hinged to housing and folds into housing for storage. Unit is stored in accessory kit when not in use.
5. Headset	Plugs into operator's pack to allow operator to communicate with subscribers and monitor calls. Stored in switchboard cover when not in use.
6. Ground Rod	Ground Rod MX-148/G is not issued as a component of the switchboard and must be ordered separately. Used with ground strap from rear of switchboard.



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Fig. 1-6. Major Switchboard Components.

1-10. Differences Between Models

a. The SB-22A/PT is equipped with a permanent ground strap fastened to the rear of the switchboard. The SB-22/PT has, instead of the ground strap, an extra binding post for fastening a length of ground wire from the switchboard to the ground rod. Use extreme caution when operating or grounding an SB-22/PT that has not been modified.

b. Older models of the switchboard have metal cases. Later models were made with plastic cases.

c. Both the SB-22/PT and the SB-22A/PT maybe equipped with any of the following hand ringing generators: G-41/PT, G-42/PT or G-42A/PT. These generators are identical in size and operating characteristics and are interchangeable with each other. However, the internal components are different and are not interchangeable.

1-11. Equipment Data

a. *Switchboard*¹.

Height	5-1/4 in. (13.3 cm)
Depth	12-1/2 in. (32.3cm)
Width	16 in. (40.6 cm)
Weight	30 lbs. (13.6 kg)
Power requirements	
Headset	3 VDC (two Batteries BA-30 or BA-3030/U)
Night alarm	3 VDC (two Batteries BA-30 or BA-3030/U)

b. *Tone Signaling Adapter.*

Height4 in. (10.2 cm)
Depth7 in.(17.8 cm)
Width	1-3/4 in.(4.45 cm)
Power requirements	9 VDC (one Battery BA-90)

c. *Accessory Kit MX-230A/PT.*

Height	9-7/8 in. (2500 cm)
Depth	5-3/8in.(13.7 cm)
Width	5-1/2 in (14.0 cm)
Weight	4.9 lbs. (2.2k9)

d. *Accessory Kit MX-2915/PT*

Height	9-7/8 in. (25cm)
Depth	5-3/8 in. (13.7cm)
Width	5-1/4 in. (13.3 cm)
Weight	4.9 lbs. (2.2k9)

¹Includes model with plastic case.

1-12. Additional Equipment

The equipment listed in a. and b. below is required when the switchboard is used to provide the service indicated. The equipment listed inc. below will assist the switchboard operator when the calling rate is high. The equipment must be requisitioned separately through normal supply channels.

a. Telephone and Remote Controlled Radio Circuits. Four batteries (BA-30 or BA-3030/U) are required to provide direct current (dc) for the night alarm and headset.. Aground rod, such as Ground Rod MX-146/G is required to ground the switchboard. (Refer to paragraph 4-14 for radio circuit installation instructions. Refer to paragraph 2-13 for NRI operating instructions.)

b. VF Teletypewriter Circuits. Telegraph Terminal TH-22/TG and a teletypewriter set are required if the switchboard is to be used to interconnect VF teletypewriter circuits.

c. Power Ringing. An external source of ringing current, such as Converter M-22 or M-22A, Power Supply PP-990/G, Interrupter PE-250, or Static Ringing Generator TA-248/TT or TA-246A/TT, is required if power ringing is to be used on the switchboard. In addition, ten batteries BA-200 are required if Power Supply PP-990/G is to be operated on battery power. If a PP-990/G is to be operated as a plug-in unit, Power Supply PP-2953()/U and Cable Assembly CX-4721/VRC are required. Refer to paragraph 4-16 for power ringing equipment installation instructions. Refer to paragraph 2-22 for operating instructions.

1-13. Safety, Care and Handling

When installing the switchboard in rain or lightning, provide shelter for the equipment.

Throughout this manual are warnings, cautions and notes designed to protect personnel and equipment. Learn the warnings on the warning page before attempting to install, operate or perform maintenance on the equipment, and observe all warnings and cautions as you come upon them in the text. When using auxiliary equipment with the switchboard, learn the applicable warnings and cautions as outlined in the technical manuals pertaining to that equipment.

Section III. TECHNICAL PRINCIPLES OF OPERATION

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Component Principles of Operation	1-15	1-11

1-14. System Principles of Operation

The system provides a means for interconnecting field telephones either directly through a shared switchboard, or indirectly through a trunk circuit or a radio circuit to a distant switchboard. Calls are normally transmitted by electrical signal through land telephone lines connected to binding posts on the rear of the switchboard. The switchboard can also be used for net radio interface (NRI) operation. When a remote control radio is connected to a line pack, the switchboard and its subscribers can communicate by radio signal with another radio or another NRI equipped switchboard when landlines do not exist.

When connected to the switchboard, Tone Signaling Adapter TA-977/PT enhances the interfacing capabilities of the switchboard by establishing a voice path between analog and digital telephone systems. This function is optional. The tone signaling adapter allows the SB-22/PT or SB-22A/PT operator to dial a digital system subscriber directly, without the aid of the distant switchboard operator. Without the tone signaling adapter, the SB-22/PT operator transmits the call by ringing the distant operator and requesting the desired party.

The switchboard can be part of a local battery (LB), a common battery (CB), or a common battery signaling (CBS) system. In order to be part of a CB or a CBS system, the SB-22/PT or SB-22A/PT must be connected to an automatic switchboard. However, regardless of the mode of operation of the other system components, the SB-22/PT or SB-22A/PT always operates in LB mode, supplying its own power to generate a ringing signal and to transmit voice frequencies.

1-15. Component Principles of Operation

a. Line Pack. The line pack is used to connect the switchboard to a field telephone or to a distant switchboard. The line pack is equipped with a jack, a line cord and a call signal indicator. The jack enables the operator to answer a call by plugging in the operator's cord, or to extend a call from another line by plugging in the cord of the other line. The line cord enables the operator to extend an incoming call on the line pack to the circuit of the requested party. The line signal indicator turns white when the subscriber rings the switchboard to place a call or to alert the operator that the call is over. At all other times, the indicator will be black.

b. Trunk Pack. The trunk pack is identical to the line pack except that the trunk pack contains two capacitors to increase ringing voltage. The trunk pack is used to connect the switchboard to a distant switchboard where distance may require the stronger signal. Each trunk pack contains a jack, a line cord and a call signal indicator. The trunk pack operates the same way as the line pack. Line and trunk packs are identical in appearance except that trunk packs bear the label "trunk". (See para 1-9, item 2.)

c. Operator's Pack. The operator's pack enables the operator to answer incoming calls and to extend or monitor calls placed through the switchboard. The telephone receptacle provides a connection point for the operator to plug in the headset. When the VIS/OFF/AUD switch is set at VIS or AUD, a light or buzzer will be activated, alerting the operator that a call has been placed to the switchboard. When the operator removes his cord from the operator's jack and inserts it in the jack of the caller's circuit, communication is established between the operator and the caller. The operator uses the hand ringing generator to send a 20 Hz ringing signal to the called party. The RING BACK-PWR RING FWD switch is a spring-biased switch that, in its normal resting position, directs the ring to the called party. When operated to the RING BACK position, it directs the ringing signal back toward the caller. When operated to the PWR RING FWD position, it directs an externally generated source of ringing current to the called party. When the operator's cord is not in use, inserting the cord's plug into the operator's jack will disconnect the headset batteries, thus preventing excessive battery drainage. The NA-IN-LITE OUT switch illuminates the switchboard when pulled out, and provides a visual light alarm to signal incoming calls when the switch is pushed in and the VIS/OFF/AUD switch is set to VIS. When the NA-IN-LITE OUT switch is used for switchboard illumination, the visual alarm capability is disabled.

d. Tone Signaling Adapter. The Tone Signaling Adapter is a signal converter designed to enable the analog SB-22/PT or SB-22A/PT to communicate with the digital SB-3614/TT and Automatic Telephone Central Office AN/TCC-38. In addition to establishing a voice path between the two different types of telephones, the tone signaling adapter generates the dual-tone multifrequency (DTMF) tones required to activate the automatic telephone central office switching functions. These tones are generated at specific frequencies and are sent and received over the telephone wire signal pairs. The sealed keyset contains 16 pushbutton keys. Each key is represented by a different frequency signal tone.

e. Terminal Binding Posts. The terminal binding posts are used to make the electrical connections, using WD-1/TT OR WD-1A/TT wire, that link the switchboard to its subscribers and to auxiliary equipment used in conjunction with the switchboard.

f. Battery Case. The battery case holds four BA-30 or BA-3030/U batteries. Two of these batteries provide power for the night alarm and two provide power for the headset.

g. Headset. The headset allows the operator to communicate with subscribers or to monitor calls when plugged into the operator's pack receptacle. The push-to-talk switch has four positions. The first (raised) position is the off position. The second is the partially depressed position which is used for momentary communication or for monitoring. The third position, used for continuous communication or monitoring is achieved by pushing the lever forward from the second position to lock it in the partially depressed position. The fourth position is the fully depressed position, used for activating a radio when operating in a net radio interface system.

CHAPTER 2

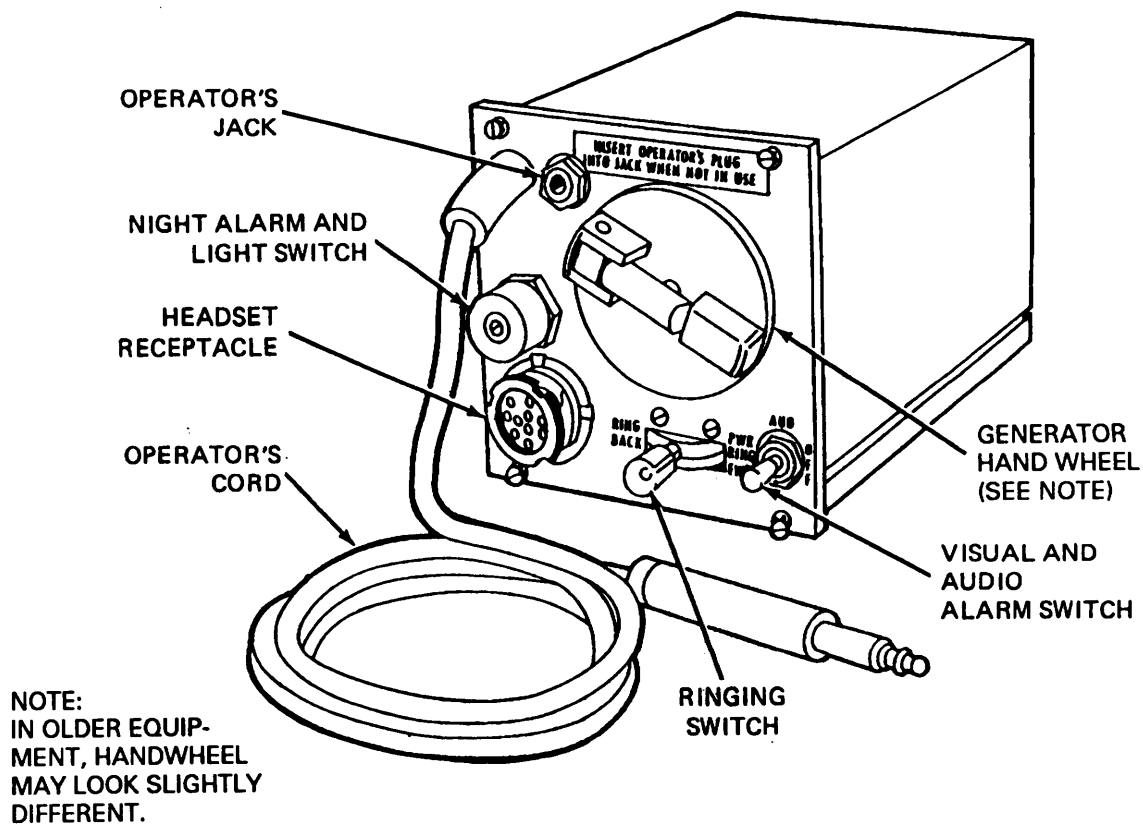
OPERATING INSTRUCTIONS

Subject	Section	Page
Description and Use of Operator's Controls and Indicators	I	2-1
Operator's PMCS	II	2-3
Operation Under Usual Conditions	III	2-6
Operation Under Unusual Conditions	IV	2-33

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

Subject	Para	Page
Operator's Pack Controls and Indicators	2-1	2-1
Tone Signaling Adapter Controls and Indicators	2-1	2-2

2-1. Operator's Pack Controls and Indicators (figure 2-1)

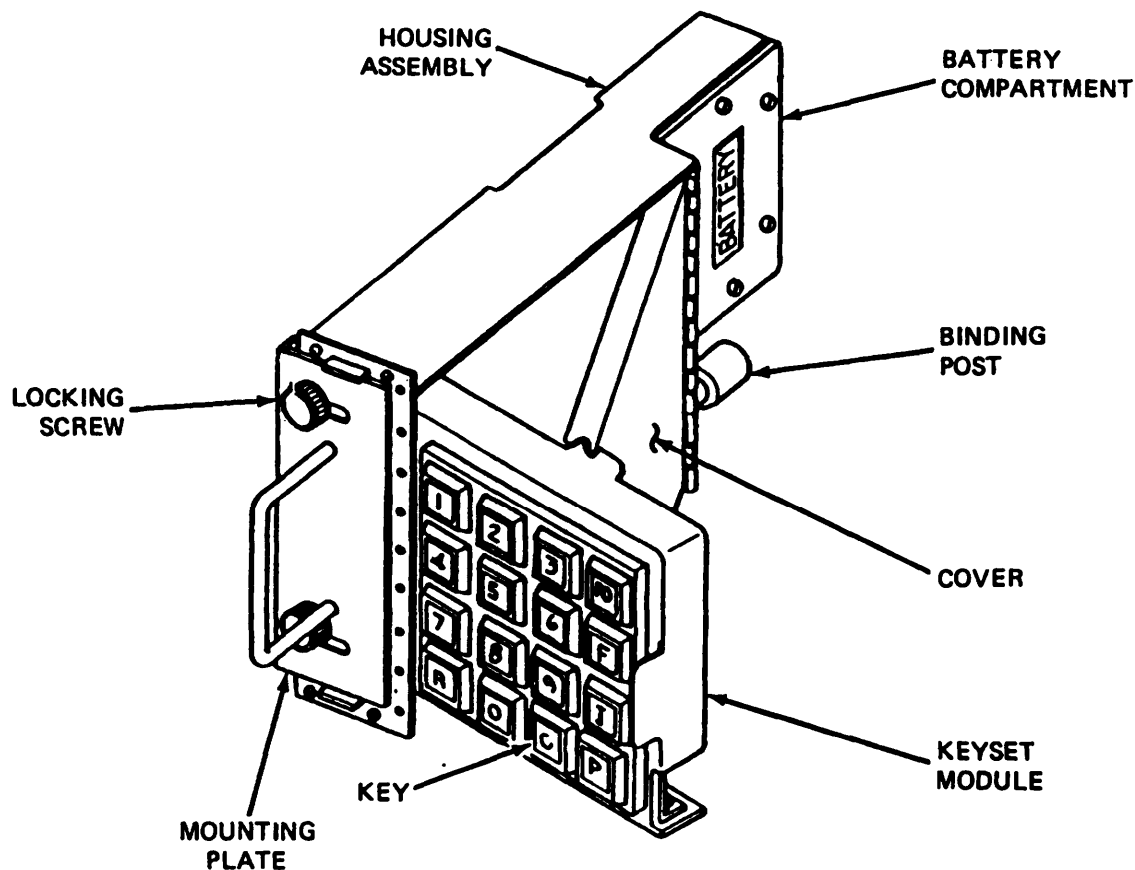


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Figure 2-1. Operator's Pack Controls and Indicators.

1. Operator's Jack. Disconnects the headset battery when the operator's cord plug is inserted.
2. Night Alarm and Light Switch. NA-IN - Permits the lamp to be used as a silent alarm when switch is pushed in. LITE-OUT - Lights the lamp to illuminate the switchboard when switch is pulled out. Degree of switchboard illumination can be controlled by rotation of switch. Full counterclockwise rotation provides maximum illumination.
3. Headset Receptacle. The location where the headset connector is plugged in.
4. Operator's Cord and Plug Connects Operator's circuit to the line or trunk pack.
5. Ringing Switch. In RING BACK position, connects ringing current to caller's line. In PWR RING FWD position, connects ringing current to called party's line when an external source of ringing current is in use. When switch is not operated to either RING BACK or PWR RING FWD position, ringing current is automatically connected to called party's line when ringing signal is generated manually by operator.
6. Visual and Audio Alarm Switch. OFF disconnects the alarm circuit. VIS connects the lamp to the alarm circuit. AUD connects a buzzer to the alarm circuit.
7. Hand Ringing Generator. Used in conjunction with ringing switch to contact calling or called parties.

2-2. Tone Signaling Adapter Controls and Indicators (figure 2-2)



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Figure 2-2. Tone Signal Adapter Controls and Indicators.

1. Locking Screw (2). Used to hold and adjust mounting plate which attaches to switchboard.
2. Binding Posts (2). Connected by wire to EMG-OPR binding posts on the switchboard.
3. Key (16). Used to dial trunk line subscriber numbers in the same manner as a commercial touchtone telephone. Key functions are as follows:

- | | |
|---------------------|----------------|
| FO - Flash Override | c - Conference |
| F - Flash | o - Operator |
| I - Immediate | R - Routine |
| P - Priority | |

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Subject	Para	Page
General	2-3	2-3
Purpose of PMCS Table	2-4	2-3
Explanation of Columns	2-5	2-3

2-3. General

In order to be sure the switchboard is always ready for use, it must be inspected at specific intervals so that defects may be found and corrected before they result in serious damage or failure. Routine checks such as equipment inventory, cleaning, dusting and washing, checking for frayed cables, dirt, grease, corrosion, chips, cracks, loose or missing hardware, stowing items not used, and covering unused receptacles-are not listed as PMCS items. These are things that you should do anytime you see they must be done.

Perform your monthly (M) PMCS once each month. All PMCS checks and services for this equipment are to be done monthly.

If your equipment does not perform as required, notify higher level of maintenance. Report any malfunctions or failures on the proper DA Form 2404 or refer to DA Pam 738-750.

2-4. Purpose of PMCS Table

Your Preventive Maintenance Checks and Services table lists the tasks required to keep your equipment in good operating condition.

2-5. Explanation of Columns

- a. *Item Number.* The item number is to be used as a source number for the TM number column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, when recording PMCS results.
- b. *Item To Be Inspected.* This column lists the components that require inspection.
- c. *Procedures.* This column lists the faults to check for and procedures to follow.
- d. *Equipment Is Not Ready/Available If:* This column tells you when and why your equipment cannot be used.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS).

Item No.	Interval	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Item is Not Ready/Available If:
	M			
1	•	Completeness	Check that equipment is complete.	
2	•	External surfaces	Inspect external surfaces for general condition. Make sure painted surfaces are free of bare spots, rust and corrosion.	
3	•	Installation	Check that equipment is properly installed and grounded.	Not properly installed or grounded.
4	•	Switchboard case	a. Inspect for damaged latches. b. Inspect cover for damaged or missing carrying strap or headset retaining straps.	
5	•	Operator's pack	a. Inspect cord for excessive wear, dry rot, broken insulation. b. Inspect hand ringing generator for smooth action, firmly mounted handle. c. Check night alarm/night light switch, RING BACK-PWR RING FWD switch and AUD/OFF/VIS switch for smooth and positive action.	Broken cord. Generator fails to produce ringing signal.
6	•	Line and trunk packs	a. Inspect cords for excessive wear, dry rot, broken insulation, smooth and full retraction b. Inspect plugs and jacks for dirt, grease, corrosion, cracks, bends, wear, loose fitting. c. Inspect for loose or missing captive screws.	
7	•	Electrical connections	a. Check for correct wiring connections. b. Check for broken or frayed wires. c. Check binding post springs for firm action. Clean connections.	
8	•	Batteries, battery case	a. Make sure batteries are clean and dry with no signs of leaking or swelling. b. Inspect battery case for damage and for missing end caps.	

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (cont).

Item No,	Interval	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Item is Not Ready/Available If:
	M			
9	•	Battery, clamps spring contacts	<ul style="list-style-type: none"> a. Make sure clamps and spring contacts are firmly mounted. b. Check for firm spring action. Clamps should snap firmly over battery case. c. Clean contacts. 	
10	•	Ground rod	<ul style="list-style-type: none"> a. Make sure ground rod is firmly embedded in ground. b. Make sure ground terminal is in good condition. 	Ground rod is missing or damaged.
11	•	Ground strap (SB-22A/PT)	Inspect for corrosion, broken or frayed insulation, broken wires.	Ground strap is missing or damaged.
12	•	Operational checks	Conduct an operational test of line/trunk packs, operator's pack, headset and tone signal adapter. (Refer to Chapter 4 installation checks.)	<ul style="list-style-type: none"> a. 7 or more line/trunk signal indicators fail to turn white with incoming call. b. 7 or more signal indicators fail to turn black when operator's cord is plugged into line/trunk jack. c. 7 or more line/trunk packs fail to establish two-way communication. d. Line/trunk pack does not accept signal (ring) generated by operator. e. Trunk pack fails to produce ringing signal. f. Tone signal adapter fails to produce tone signal.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS) (cont).

Item No.	Interval	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	Item is Not Ready/Available if:
	M			
		Emergency Operator's Check	a. Connect a field phone to a known good telephone circuit. b. Connect another field phone to binding post 15 (emergency operator) located at rear of switchboard. c. Take operator's plug from operator's jack and insert it into jack of known good telephone circuit. d. Establish communications between both telephones by ringing one phone and conducting a communications check.	If communications cannot be established. Generator fails to produce ringing current.
13	•	Publications	Make sure all pertinent publications are available, complete and in usable condition.	
14	•	MWO'S	Make sure all URGENT modification work orders have been applied.	

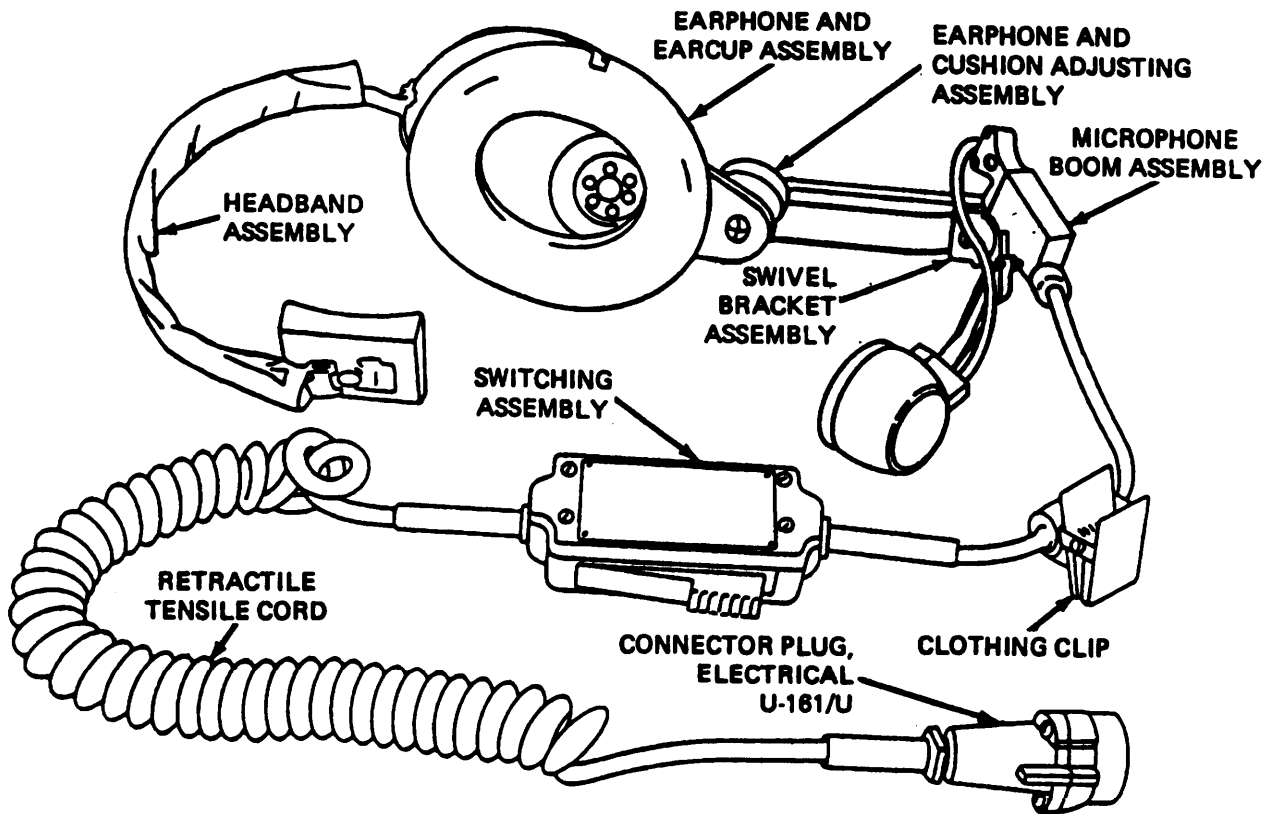
Section III. OPERATION UNDER USUAL CONDITIONS

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2-6. Preliminary Operating Procedures

a. Put on headset and connect it to switchboard as follows: (figure 2-3)

- (1) Extend fold-away earphone adjusting assembly and cushion adjusting assembly as far as possible.
- (2) Place headband assembly on head.
- (3) Hold earphone and earcup assembly in place over ear and press down on crown of headband to slide headband assembly smoothly into position.
- (4) Position cushion adjusting assembly for maximum degree of comfort.
- (5) Readjust both assemblies (steps (3) and (4)) for maximum comfort.
- (6) Loosen tension nut on swivel bracket assembly.
- (7) Must microphone boom assembly so that microphone is approximately one-half inch from lips.
- (8) Tighten tension nut (step (6)) on swivel bracket assembly. Be careful not to overtighten.
- (9) Insert Connector Plug, Electrical U-161/U into headset receptacle on switchboard and slowly rotate connector clockwise with a steady forward pressure.
- (10) When guide pins of connector are in proper grooves, connector will move forward and seat itself.
- (11) Twist knurled part of connector to the right and pull sharply to set connector.
- (12) Clip assembly to front of your shirt.



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Figure 2-3. Connecting and Adjusting Headset

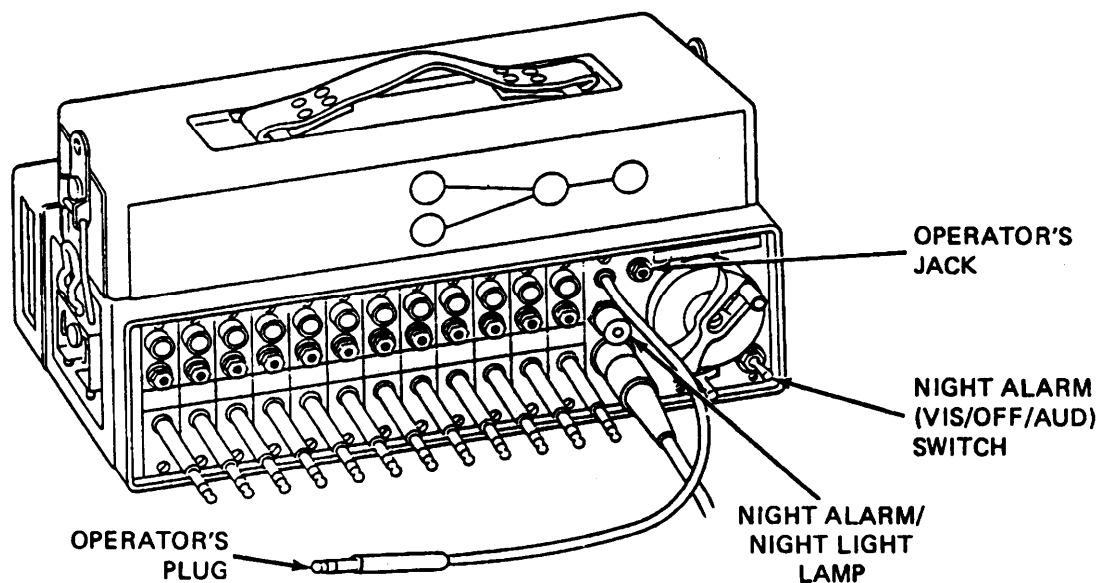
b. If operator must leave switchboard, set VIS/OFF/AUD alarm switch as follows: (figure 2-4)

- (1) Operate night alarm switch to VIS when a silent alarm is required.
- (2) Operate night alarm switch to AUD when an audible alarm is required.
- (3) Operate visual and audio alarm switch to OFF when an alarm is not required.

c. If switchboard is being operated in darkness, pull out law cap (figure 2-4) to turn lamp on. Illuminating lamp cannot be used for night alarm and switchboard illumination at the same time.

d. Insert plug of the operator's cord into operator's jack on operator's pack (figure 2-4).

e. Operate push-to-talk lever on headset and leave it in the monitoring position (position 2).



EL8ZE060

Figure 2-4. Setting Alarm Selection Switch and Night Alarm/Night Light Switch.

2-7. Connecting Local Calls

CAUTION

Be very careful to prevent cords and plugs from coming in contact with ground when operating switchboard. Carefully wipe cord and plug with a clean, dry cloth if they accidentally drop onto the ground.

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Answering Caller. (figure 2-5)

(1) Watch signals on front of line packs. When caller signals switchboard, line signal turns from black to white.

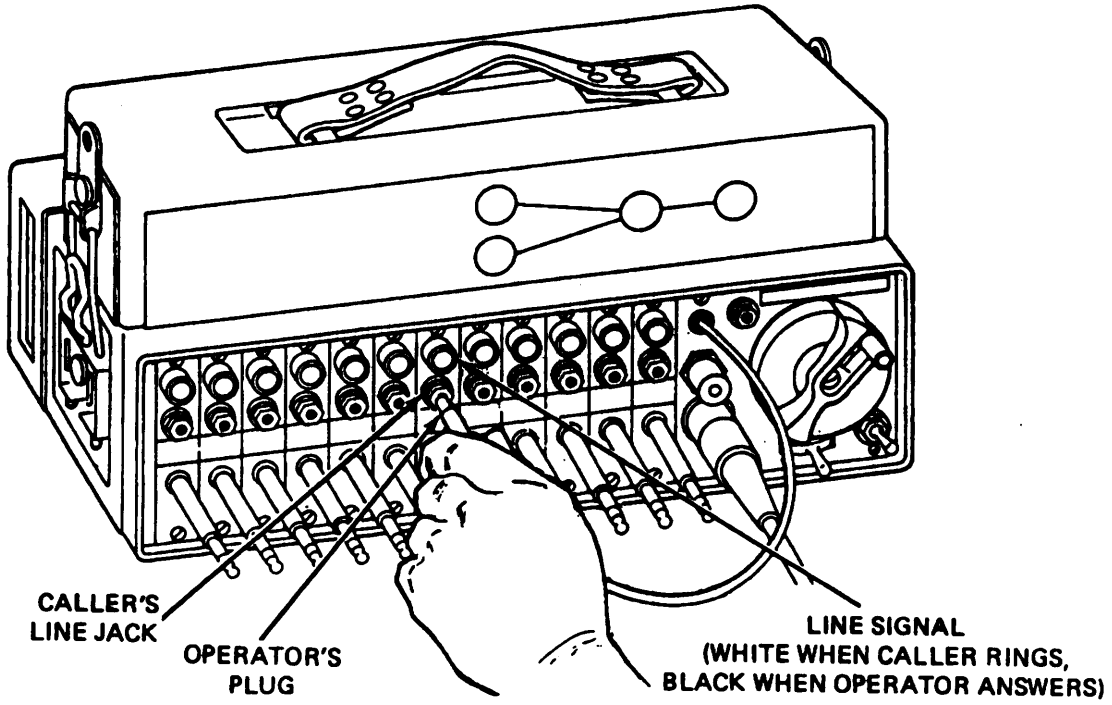
(2) Remove plug of operator's cord from operator's jack and insert it into jack of caller's line pack. Caller's line signal should return to black.

(3) Obtain called party's name or number from caller. Use standard operating procedures.

b. Connecting Caller to Called Party. (figure 2-6)

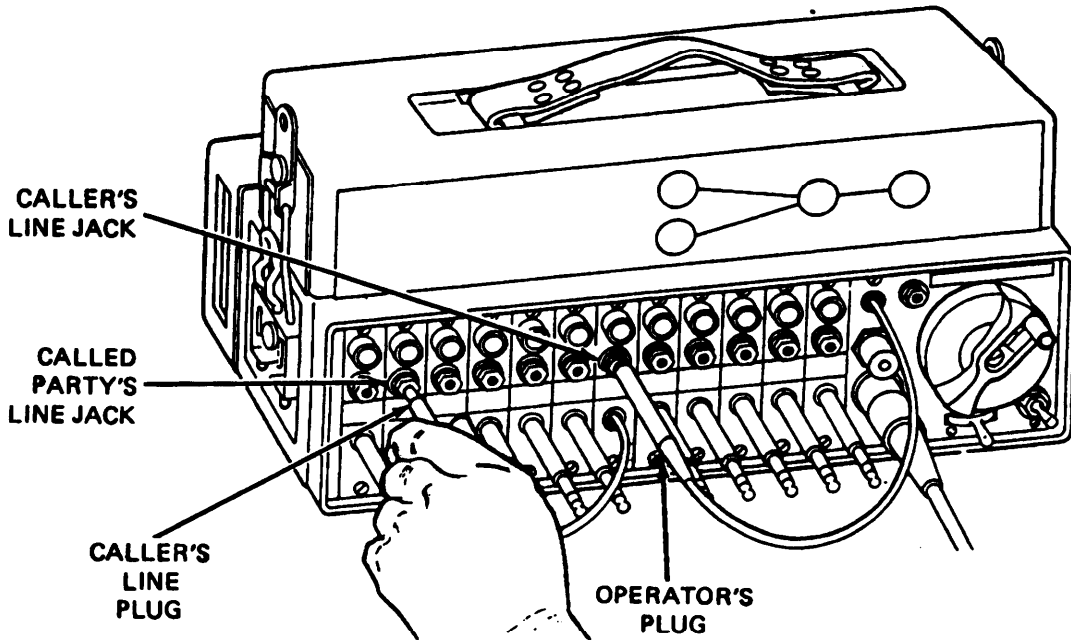
(1) Pull out cord on caller's line pack.

(2) Insert caller's plug into called party's line jack.



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Figure 2-5. Answering Caller (Local Subscriber).



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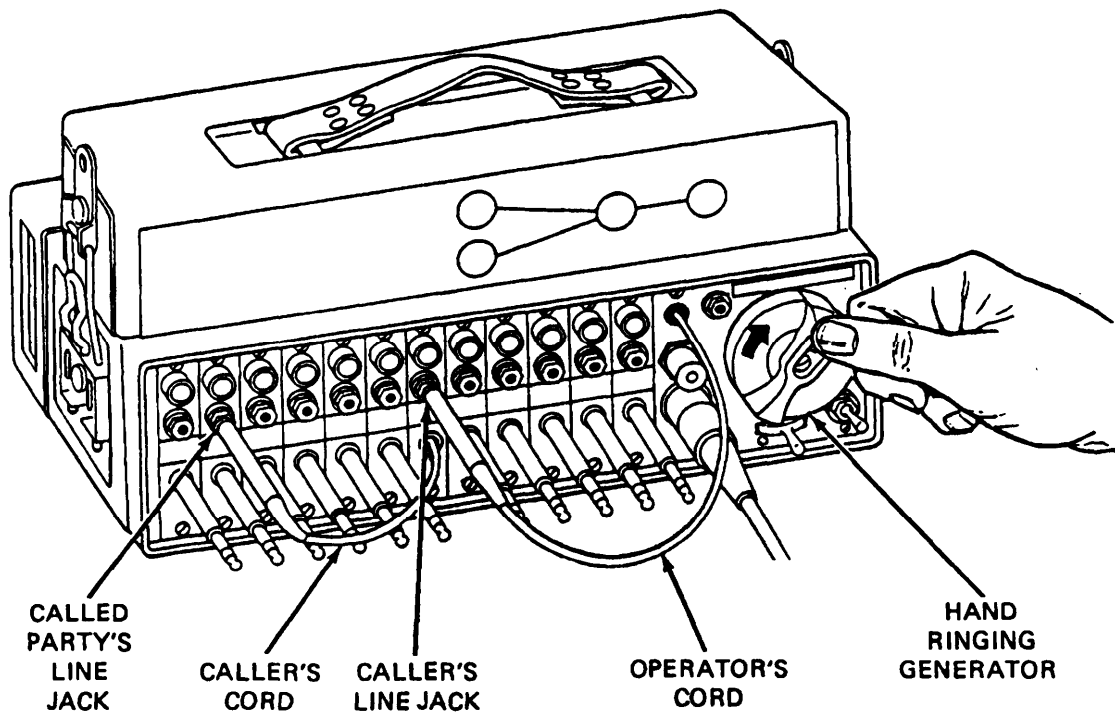
Figure 2-6. Connecting Caller to Called Party (Local Subscriber).

c. *Signaling Called Party.* (figure 2-7)

(1) Turn hand ringing generator for approximately two seconds. Do not operate RING BACK-PWR RING FWD switch to either position.

(2) Wait for called party to answer. If party does not answer, ring again. Allow eight seconds between rings for party to answer. Repeat once more, if necessary.

(3) After called party answers, remove operator's plug from called party's jack and insert it into operator's jack.



EL8ZE063

Figure 2-7. *Signaling Called Party (Local Subscriber).*

d. *Challenging Ring-Off Signal.* If LB operation, when the caller and called party finish talking, the caller will ring off by cranking the hand generator on the field telephone. The ring-off signal will cause the caller's line signal to turn white. In CB or CBS operation the operator will not receive a ring-off signal. Operator must challenge the line to determine if call is ended. Follow the procedure below to challenge a line:

(1) Remove operator's plug from operator's jack and insert it into jack of caller's line pack. Caller's line signal should return to black.

(2) Ask parties if they have finished.

(3) If no answer is heard, disconnect circuit.

(4) Remove operator's plug from the caller's jack and insert it into operator's jack.

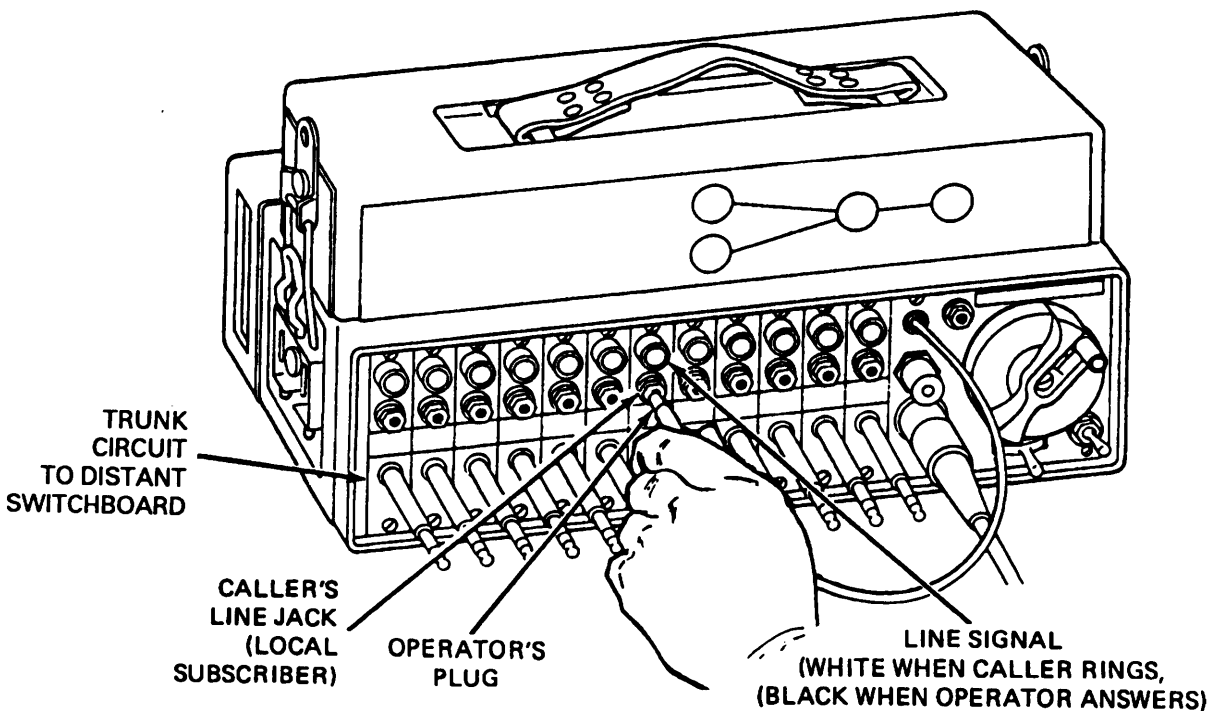
2-8. Connecting Outgoing Trunk calls

CAUTION

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Answering Caller. (figure 2-8)

- (1) Watch signals on front of line packs. When caller signals switchboard, line signal turns white.
- (2) Remove operator's cord from operator's jack and insert it into jack of caller's line pack. Caller's line signal should return to black.
- (3) Obtain name or number of desired party. Use standard operating procedures.



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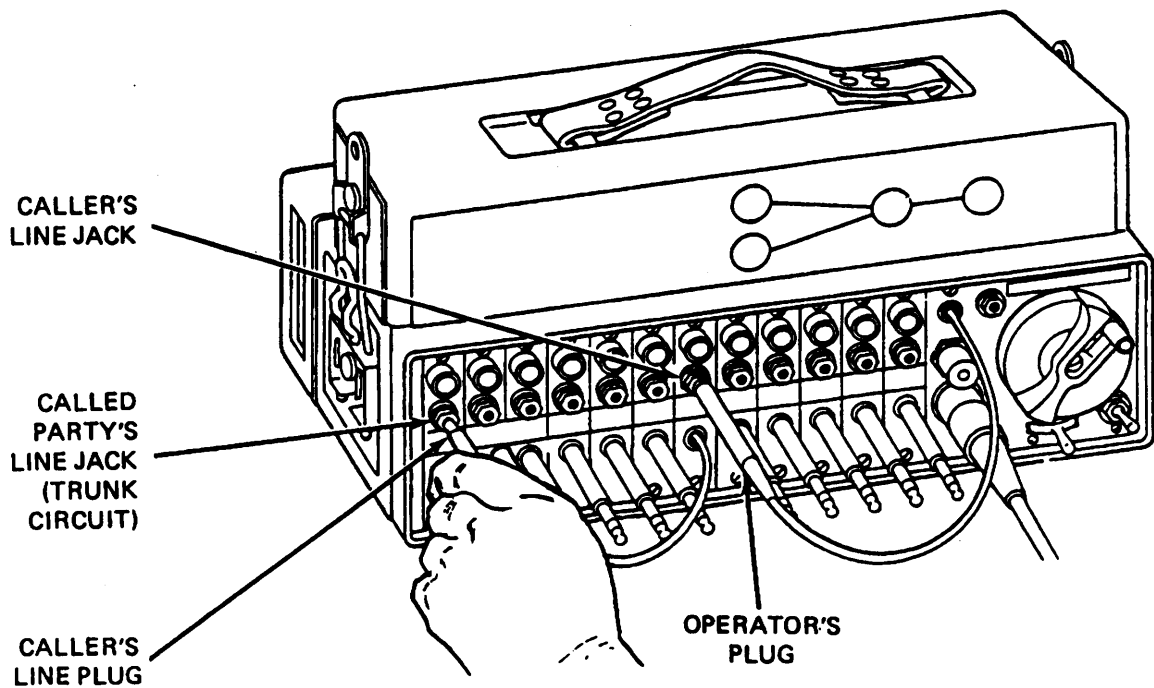
Fig. 2-8. Answering Caller.

b. Extending Call to Distant Switchboard. (figure 2-9) When a caller wants to talk to a party connected to a distant switchboard, proceed as follows:

NOTE

Distant switchboard may be connected to your switchboard through either a line pack or a trunk pack. Both types of connections are called "trunk lines" or "trunk circuits". operating instructions are the same for both.

- (1) Pull out cord on caller's line pack.
- (2) Insert caller's plug into jack of trunk to distant switchboard.



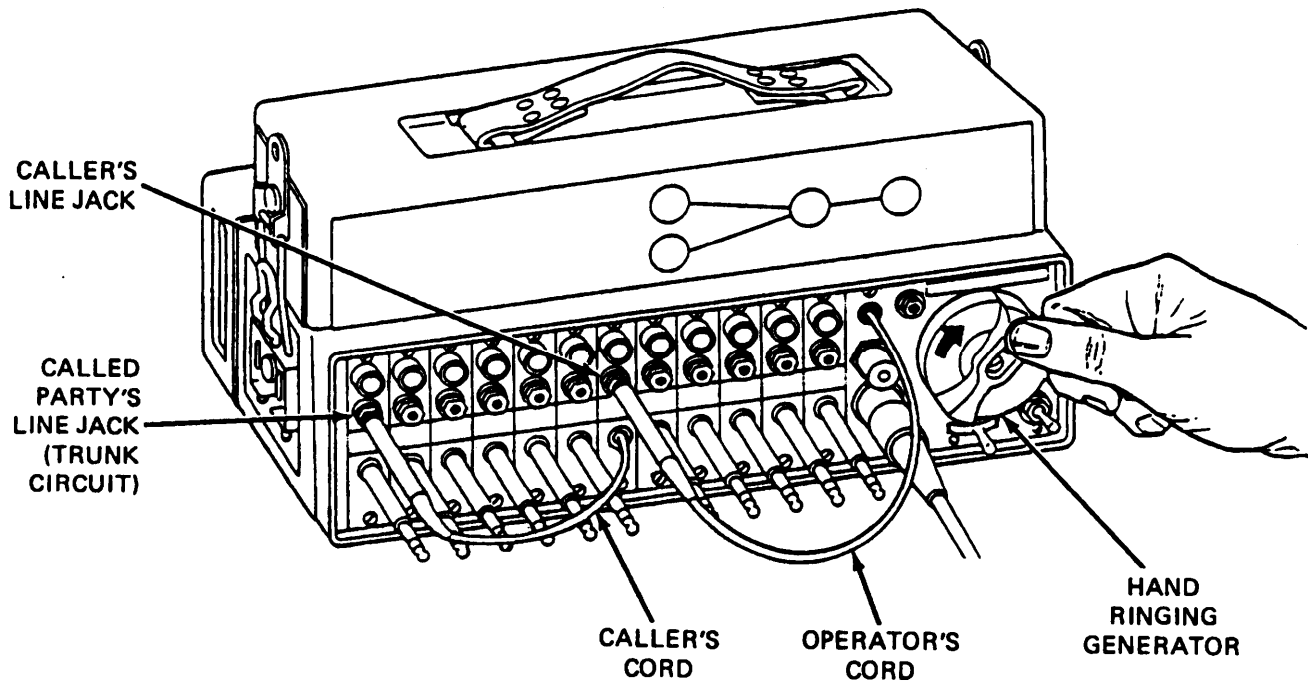
EL8ZE065

Figure 2-9. Extending Call To Distant Switchboard.

c. Signaling Called Party. (figure 2-10)

(1) Turn hand ringing generator four seconds to signal distant operator. Ring for four seconds when signaling another manual switchboard. Ring for two seconds when signaling an automatic switchboard. (If you ring an automatic switchboard for more than two continuous seconds, you will automatically ring off.) Do not operate RING BACK-PWR FWD switch to either position.

(2) Wait for distant operator to answer. Caller is now connected to distant switchboard. Remove operator's plug from caller's line jack and insert it into operator's jack.



EL8ZE066

Figure 2-10. Signaling Called Party Through Trunk Circuit.

d. *Challenging Ring-Off Signal.* When the caller and called party finish talking, the caller will ring off. The ring-off signal will cause the caller's line signal to turn white. Challenge the line as follows:

NOTE

If the called party was connected to an automatic switchboard, the distant switchboard will automatically send a ring-off signal to the SB-22/PT or SB-22A/PT when the called party goes on hook.

- (1) Remove operator's plug from operator's jack and insert it into caller's jack.
- (2) Ask parties if they have finished.

NOTE

If called party was connected to an automatic switchboard, omit step (3). When called party goes on hook, an automatic ring-off signal is sent to his operator.

- (3) Turn hand ringing generator four seconds to signal distant operator. Do not wait for distant operator to answer. Remove caller's plug from trunk jack and let it retract into its line pack.
- (4) Remove operator's plug from caller's jack and insert it into operator's jack.

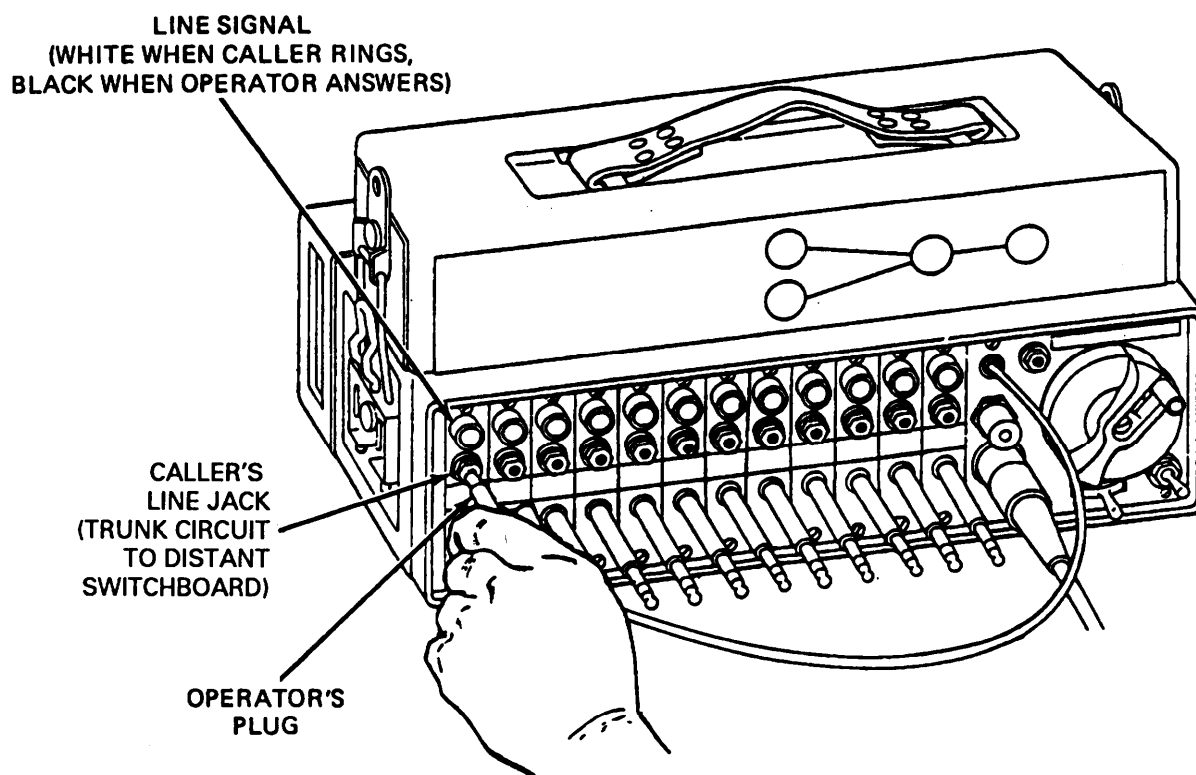
2-9. Connecting Incoming Trunk Calls

CAUTION

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Answering Incoming Trunk Call. (figure 2-11)

- (1) Watch signals on front of switchboard. When caller signals switchboard, line signal turns white.
- (2) Remove operator's plug from operator's jack and insert it into jack of caller's trunk line.
- (3) Identify yourself and obtain name or number of desired party.



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Figure 2-11. Answering Caller. (Trunk Circuit).

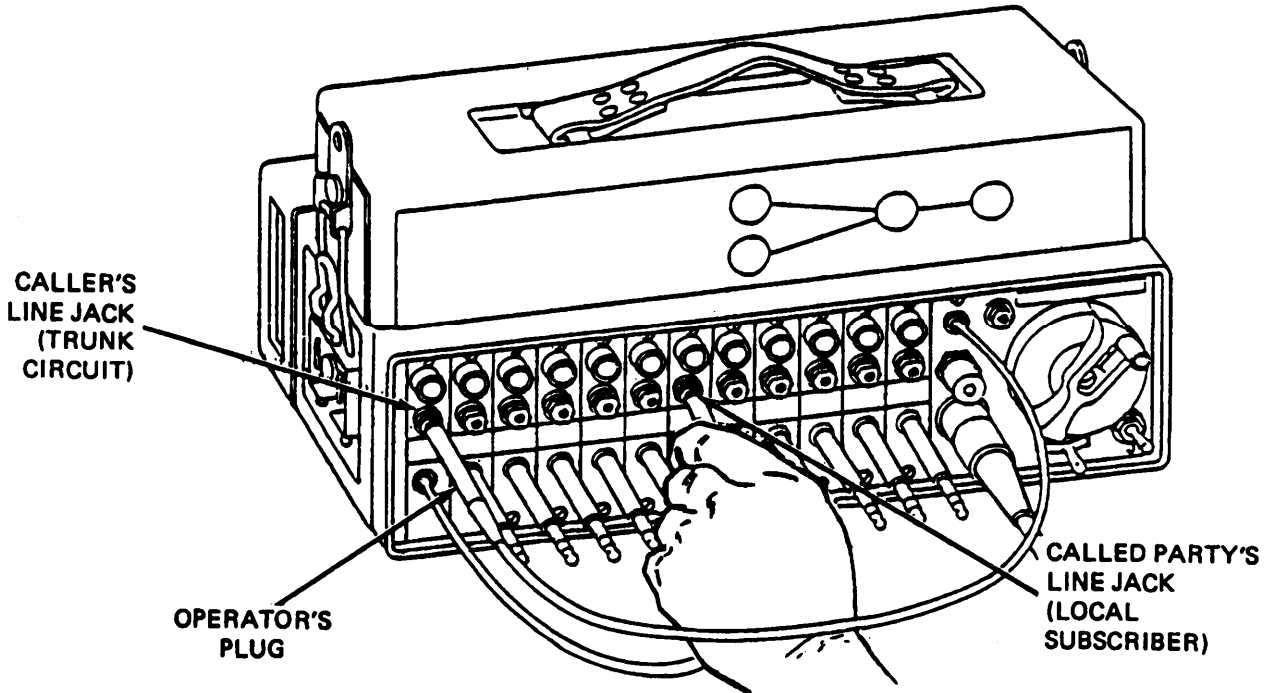
b. *Connecting Trunk to Called Party.* (figure 2-12)

- (1) Pull out cord on caller's line or trunk pack.

NOTE

If called party is also on a trunk circuit, extend call as described in paragraph 2-8. Use procedure below when called party is a local subscriber.

- (2) Insert caller's plug into called party's line jack.



EL8ZE068

Figure 2-12. *Connecting Caller (Trunk Circuit) to Called Party (Local Subscriber).*

c. *Signaling Called Party.* (figure 2-13)

NOTE

If called party is also on a trunk circuit, extend call as described in paragraph 2-8. If called party, is a local subscriber, extend call as described below.

- (1) In LB operation only, turn hand ringing generator for approximately two seconds. Do not operate RING BACK-PWR RING FWD switch to either position.
- (2) Wait for called party to answer. If party does not answer, ring again. Allow eight seconds between rings. Repeat once more, if necessary.
- (3) After called party answers, remove operator's cord from line jack and insert it into operator's jack.

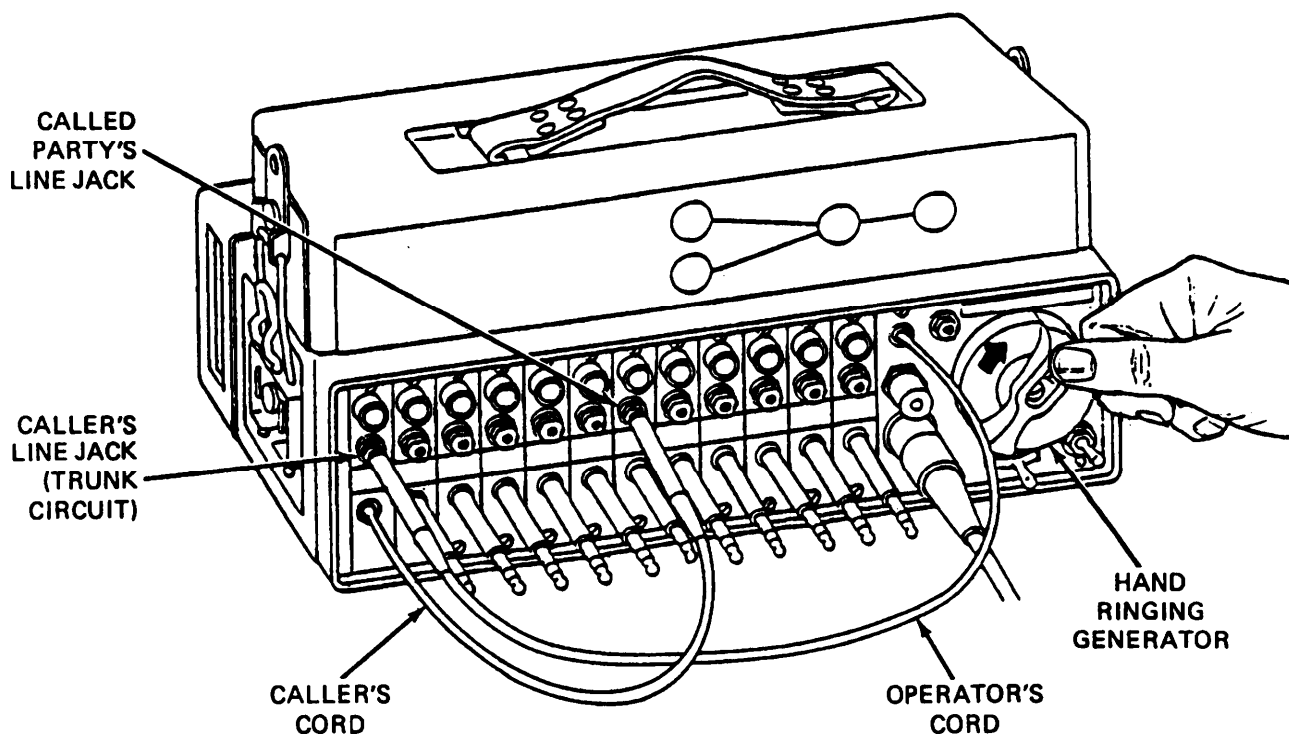


Figure 2-13. Signaling Called Party.

d. *Disconnecting Incoming Trunk Call.* When the caller rings off, the trunk circuit's line signal will turn white. Challenge the line as follows:

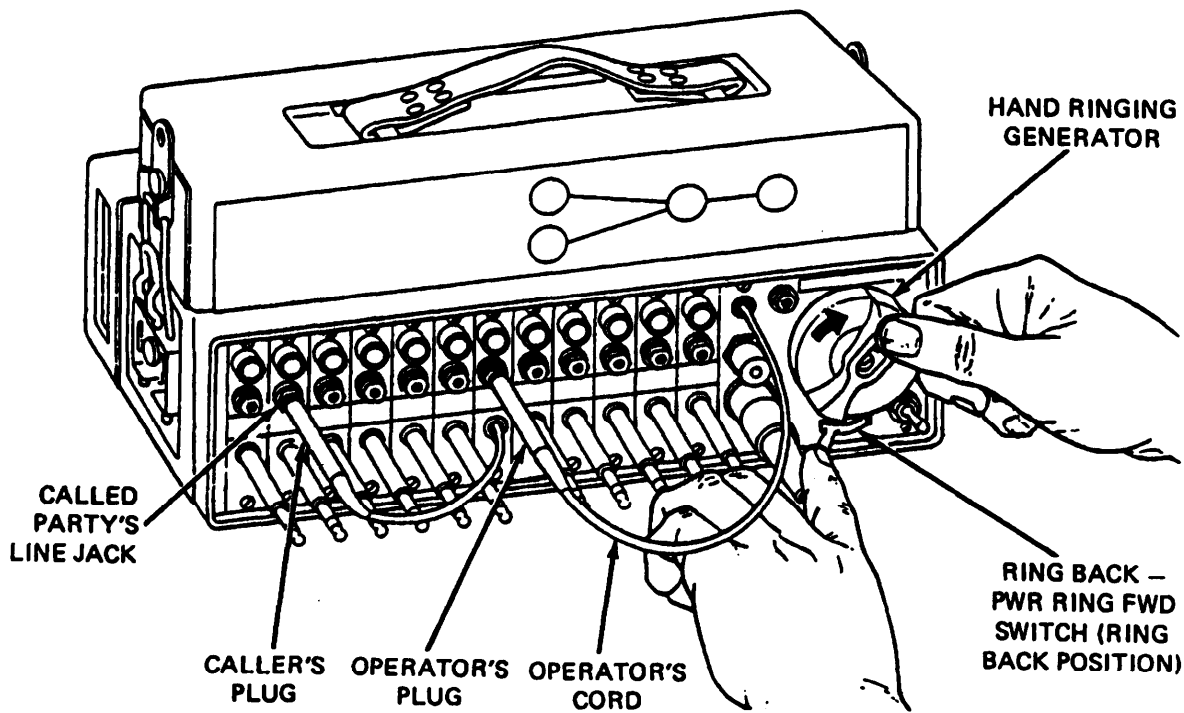
- (1) Remove operator's plug from operator's jack and insert it into caller's jack.
- (2) Ask parties if they have finished.
- (3) Remove plug from called party's jack and let it retract into its line pack. Remove operator's cord from trunk jack and insert it into operator's jack.

2-10. Recall Procedure, Local Calls

If the caller fails to reach the called party, or if the caller hangs up before the call is connected, or if the call is disconnected before the conversation is completed, reconnect calling and called parties as follows when the call is completed through a line pack:

a. *Signaling Caller with Ring Back.* (figure 2-14)

- (1) Remove plug of operator's cord from operator's jack on operator's pack and insert it into caller's jack.
- (2) Operate RING BACK-PWR RING FWD switch to RING BACK.
- (3) Turn hand ringing generator rapidly for approximately two seconds. Repeat twice if necessary. Allow eight seconds between rings.



EL8ZE070

Figure 2-14. Ringing Back Local Caller.

b. Signaling Called Party.

- (1) Insert caller's line plug into called party's line jack.
- (2) Operate hand ringing generator rapidly approximately two seconds. Repeat twice if necessary. Allow eight seconds between rings.
- (3) When both parties are connected, remove plug of operator's cord from caller's jack and insert it into operator's jack on operator's pack.

2-11. Recall Procedures, Trunk Calls

a. Manual Switchboard Setup. When the trunk circuit is connected to another manual switchboard, recall procedures are the same as recall procedures for local calls (paragraph 2-10) except that the distant switchboard operator must signal the distant party.

b. Automatic Switchboard Setup. When the trunk circuit is connected to an automatic switchboard, recall procedures are the same as recall procedures for local calls (paragraph 2-10) only when the caller is the SB-22/PT or SB-22A/PT subscriber. If the caller is the automatic switchboard subscriber, recall cannot be accomplished. In order to reconnect the two parties, the call must be disconnected, then reconnected as described in paragraphs 2-8 and 2-9.

2-12. Connecting Conference Calls

CAUTION

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Request for Conference Call. When the operator answers a call, the caller will tell the operator that a conference call is required. Proceed as follows:

- (1) Write down caller's name and number and identify it as caller.
- (2) Ask caller who is to be included in conference.
- (3) Write down each party's name and number. Make sure you note which is caller and which are called parties.

NOTE

When party requesting conference call is on a trunk circuit to an automatic switchboard, omit step (4). Caller must wait on the line while all other parties are contacted, since operator cannot ring back an automatic switchboard.

- (4) Inform caller that he will be called back as soon as all parties are on the line.

b. Signaling Called Parties. (figure 2-15) Signal each party to be included in conference as follows:

- (1) Insert operator's plug into line jack of first party.
- (2) Operate RING BACK-PWR RING FWD switch to RING BACK and turn hand ringing generator for approximately two seconds.
- (3) Tell called party to standby for a conference call.
- (4) Remove operator's plug from line jack and insert caller's plug into first called party's line jack.
- (5) Insert operator's plug into line jack of second party.
- (6) Operate RING BACK-PWR RING FWD switch to RING BACK and turn hand ringing generator. Inform second party to standby for a conference call.
- (7) Remove operator's plug from second party's line jack and insert plug of first party's circuit into second party's line jack.
- (8) Repeat steps (1) through (7) for all other parties to be included in conference call.
- (9) Insert operator's cord into line jack of party requesting conference call.

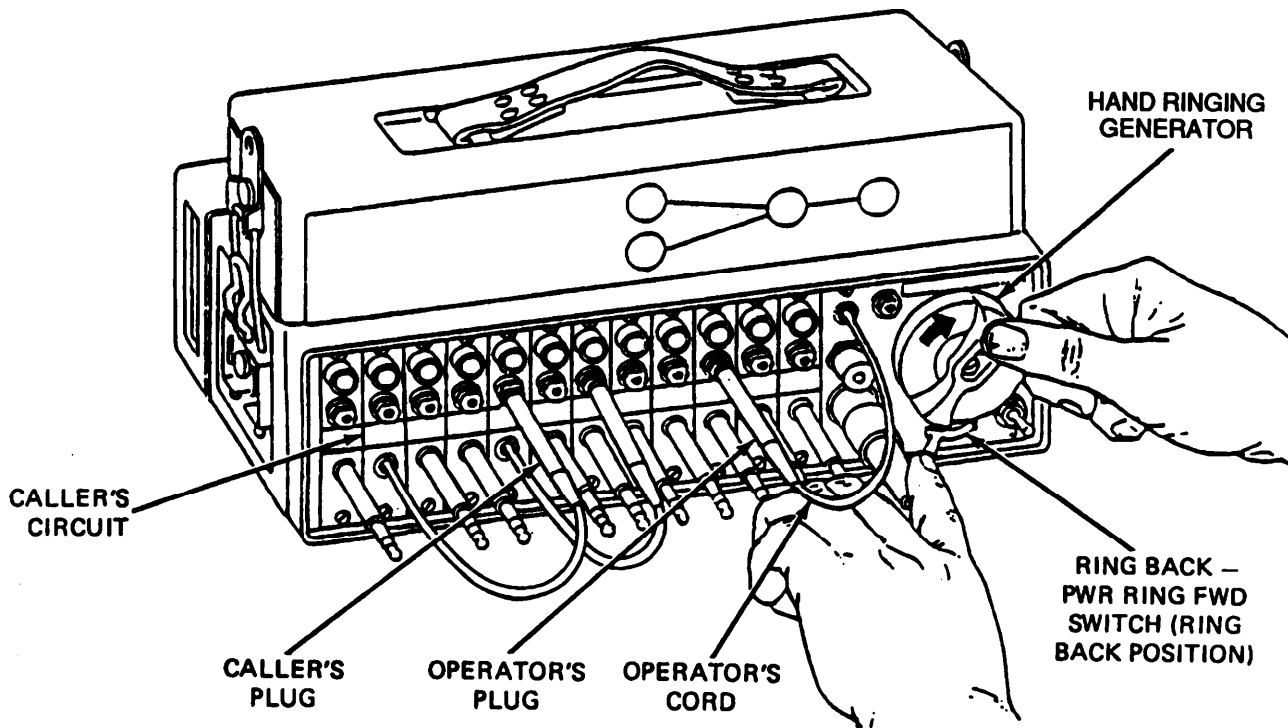
NOTE

When caller is on a trunk circuit to an automatic switchboard pack, omit step (10).

(10) Operate RING BACK-PWR RING FWD switch to RING BACK and turn hand ringing generator for approximately two seconds.

(11) Inform caller that all parties to be included in conference are on the line.

(12) Remove operator's plug from line jack and insert it into operator's jack.



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Figure 2-15. Connecting Conference Call.

c. Disconnecting Conference Call.

(1) When conference call is finished, caller will ring off and signal on caller's line will turn white.

(2) Remove operator's plug from operator's jack and insert it into caller's jack. Ask parties if they have finished.

(3) Remove line plugs from jacks and allow them to retract into their respective line packs. Remove operator's plug from caller's jack and insert it into operator's jack.

2-13. Net Radio Interface (NRI)

The switchboard can be used to transmit and receive remote controlled radio calls when a radio circuit is connected to the switchboard. In addition to the radio set (receiver) (such as AN/VRC-46) connected to the switchboard, completing radio calls requires a local (such as AN/GRC-39/2329) and a remote (such as AN/GRC-39/2328).

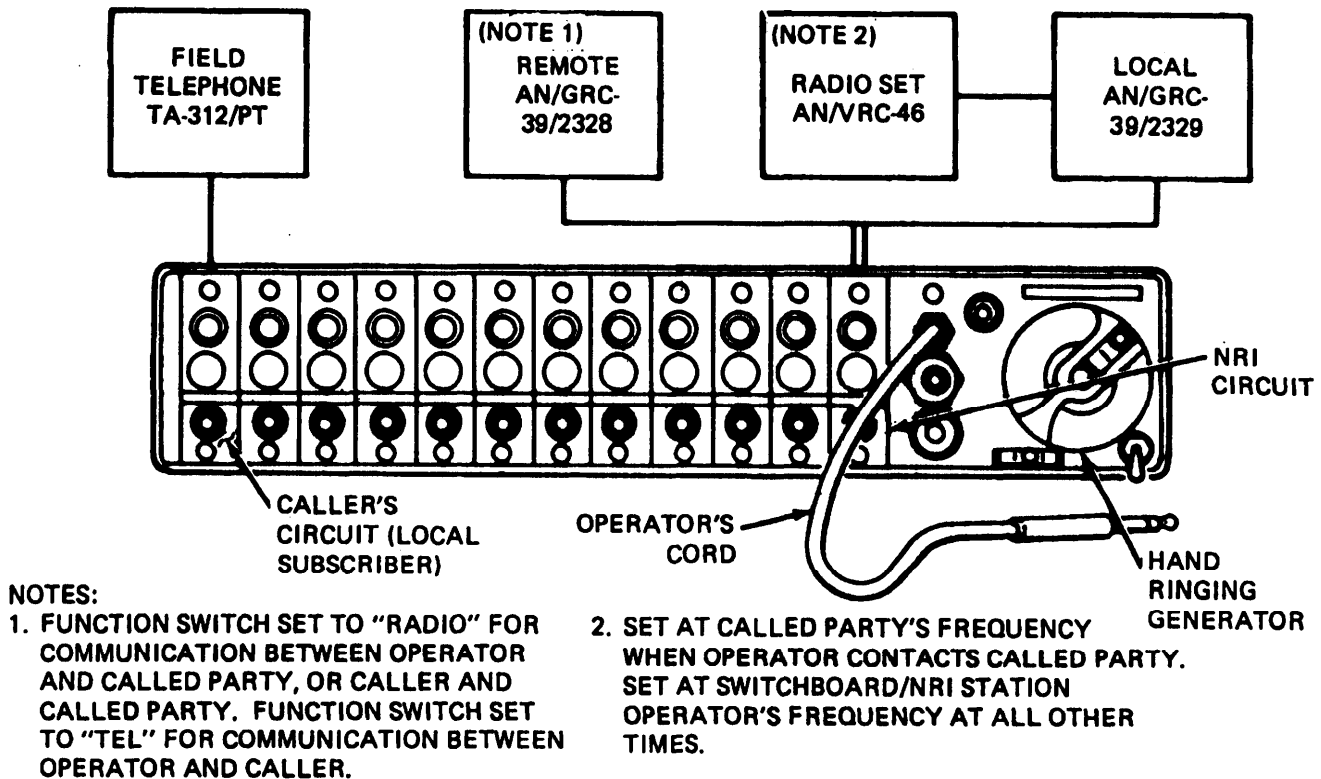
CAUTION

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Connecting Outgoing Calls. (figure 2-16)

- (1) Respond to switchboard subscriber and ask caller for phone number of desired party on NRI circuit.
- (2) Tell caller to stand by. Disconnect from caller.
- (3) Look up call signs of caller and called party, and frequency of desired station.
- (4) Adjust frequency on radio set to desired frequency.
- (5) Insert plug of operator's cord into jack of NRI circuit.
- (6) Set function switch on remote to RADIO and operate push-to-talk switch on headset to RADIO TRANSMISSION position.
- (7) When called party responds, tell called party to call you back on your frequency. Release push-to-talk switch.
- (8) Adjust radio to your NRI frequency.
- (9) When called party calls, set function switch on remote to TEL. Insert plug of NRI circuit into jack of caller's line pack and turn hand ringing generator.
- (10) When caller responds, inform caller that desired party is on line. Tell caller to wait 5 seconds.
- (11) Set function switch on remote to RADIO.
- (12) Remove operator's plug from NRI circuit and return it to operator's jack.

b. Disconnecting Outgoing Calls. When radio set is no longer being keyed, disconnect all plugs. Operator may also monitor call with headset to determine if call is over, or watch for call light to go out.



EL8ZE120

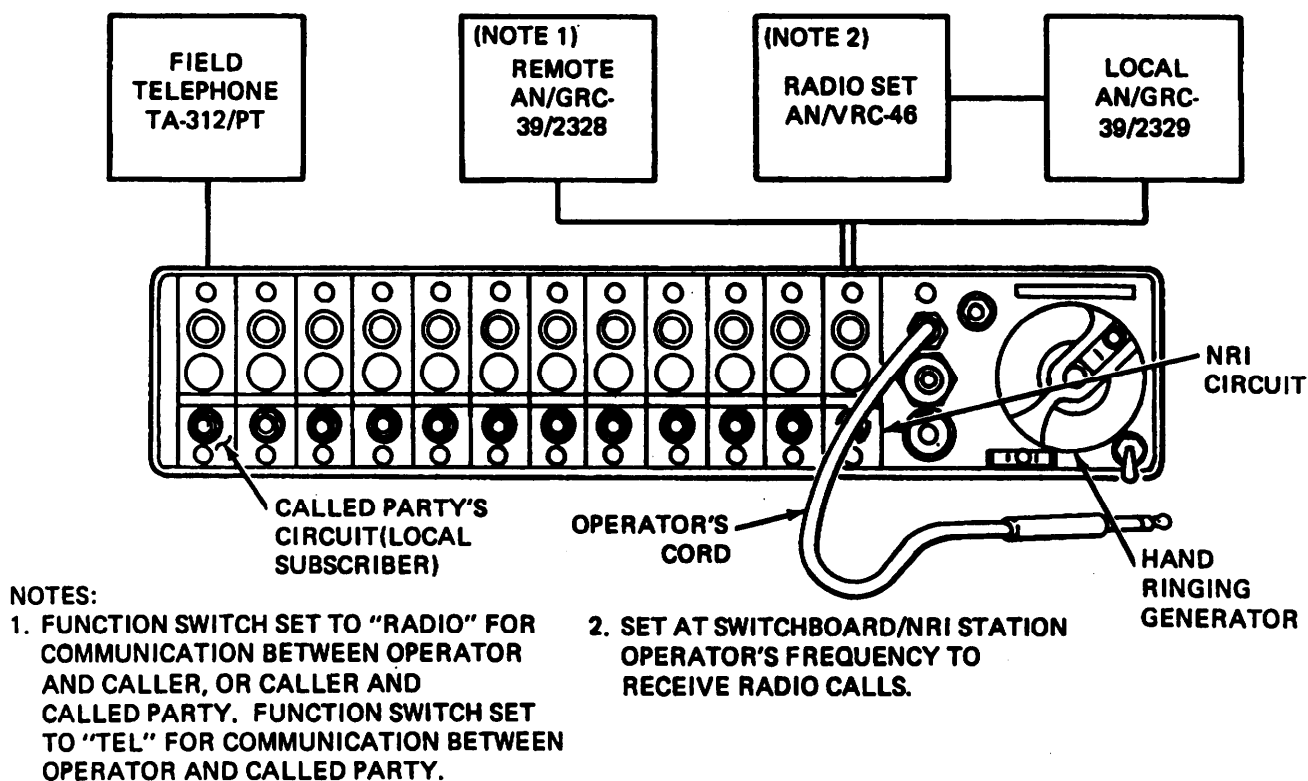
Figure 2-16. Connecting Outgoing NRI Calls.

c. Connecting Incoming Calls. (figure 2-17)

NOTE

Radio set must be set at NRI frequency in order to receive radio calls. Switch on remote can be set in any position for communication between NRI operator (switchboard operator) and radio operator.

- (1) When caller is heard through operator's radio set, insert operator's plug into jack of NRI circuit and identify yourself.
- (2) Caller will give number of desired party.
- (3) Set function switch on remote to TEL position.
- (4) Insert plug of NRI circuit into jack of called party's line pack, and turn hand ringing generator.
- (5) When called party answers, inform called party that he has an incoming radio call. Tell called party to use strict radio/telephone procedures at all times.
- (6) Tell called party to stand by.
- (7) Set function switch on remote to RADIO and inform caller that he may proceed with the call.
- (8) Disconnect operator's cord from NRI circuit and insert into operator's jack.



EL6ZE121

Figure 2-17. Connecting Incoming NRI Calls.

d. *Disconnecting Incoming Calls.* When radio set is no longer being keyed, disconnect all plugs. Operator may also monitor call with headset to determine if call is over, or watch for call light to go out.

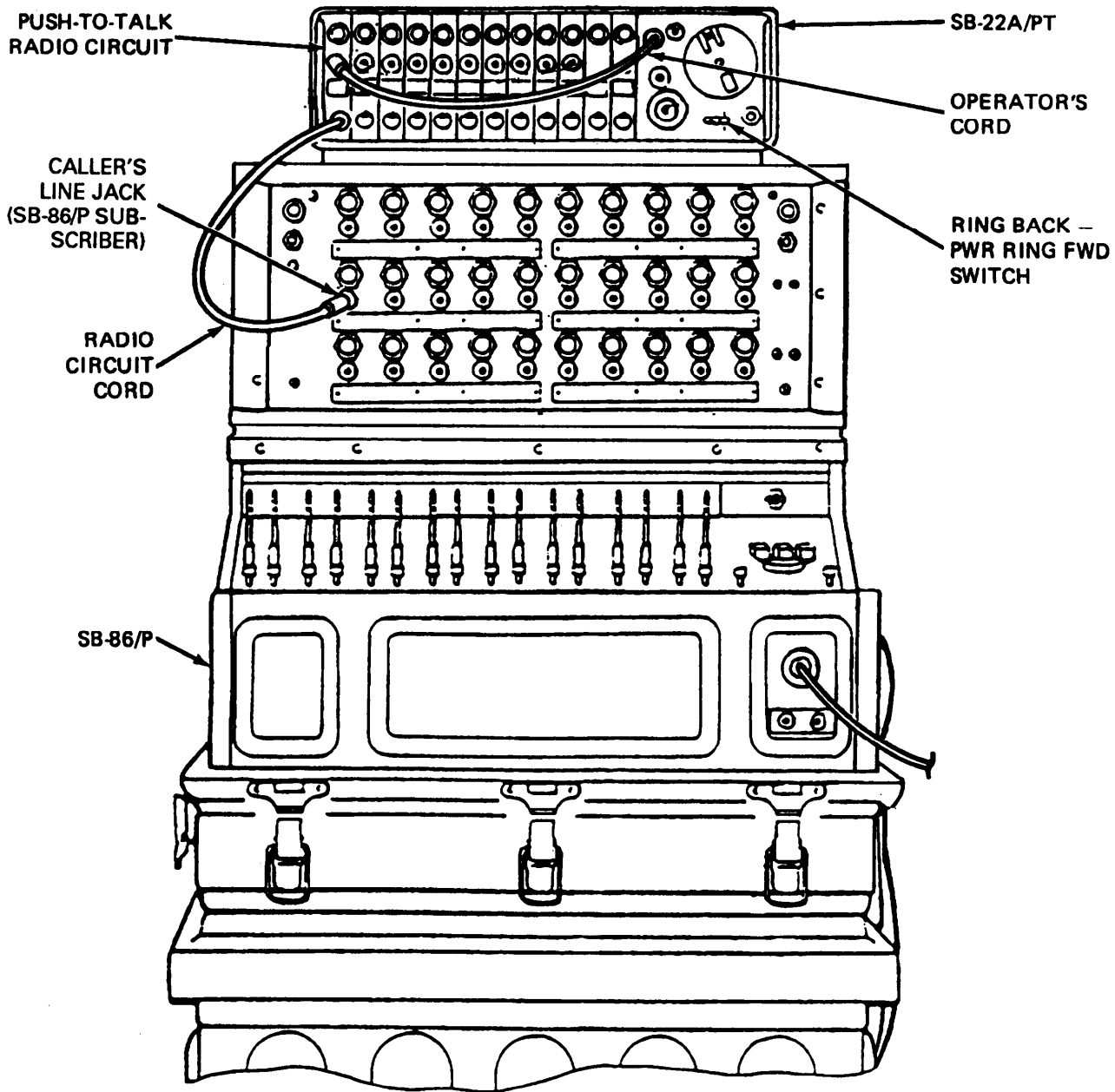
e. *Connecting Two Telephones Using NRI.* A telephone subscriber of one NRI station can communicate with a telephone subscriber of a second NRI station via radio when no land lines exist. Use the procedures described in 2-13.a or 2-13.c, as applicable, to connect the telephone subscriber with the distant NRI station switchboard.

2-14. Connecting NRI Calls Using Switchboard and SB-86/P

Radio calls do not require the use of Manual Switchboard SB-86/P. However, the net radio interfacing capabilities of the SB-22/PT or SB-22A/PT can be enhanced by connecting an SB-86/P, as described in paragraph 4-13, by expanding the number of telephone subscribers with access to the NRI station.

a. *Connecting Outgoing Calls.* (figure 2-18) When a party connected to the SB-88/P requires the use of the push-to-talk radio circuit on the SB-22/PT or SB-22A/PT switchboard, proceed as follows:

- (1) Respond to SB-86/P caller.
- (2) Inform caller that push-to-talk radio circuit is being used.
- (3) Remove operator's cord from caller's jack on SB-88/P.
- (4) Pull out plug of switchboard line pack cord connected to the push-to-talk radio circuit and insert it into caller's jack.



EL8ZE072

Figure 2-18. Connecting Outgoing Radio Calls Using Switchboard and SB-8WP.

- (5) Insert plug of operator's cord into switchboard line pack being used for radio circuit.
- (6) Push RING BACK-PWR RING FWD switch to RING BACK.
- (7) When net radio interface equipment operator answers, remove plug of operator's cord from the jack of switchboard line pack and insert it in operator's jack.

b. Disconnecting Outgoing Calls.

(1) When the parties have finished talking caller will ring off, and line signal of switchboard's radio circuit line pack will turn white. Insert plug of operator's cord into jack of radio circuit line pack and challenge the circuit.

(2) If no one answers, disconnect line pack cord and operator's cord. Return operator's cord plug to operator's jack.

b. Connecting Incoming Calls. (figure 2-19) Use the following procedure to extend calls received from a push-to-talk radio circuit connected to the switchboard.

(1) Insert plug of operator's cord into jack associated with line signal indicating an incoming call from a push-to-talk radio circuit.

(2) Answer incoming call.

(3) Insert plug of caller's cord into called party's jack on SB-86/P.

(4) Operate RING BACK-PWR RING FWD switch on switchboard to PWR RING FWD.

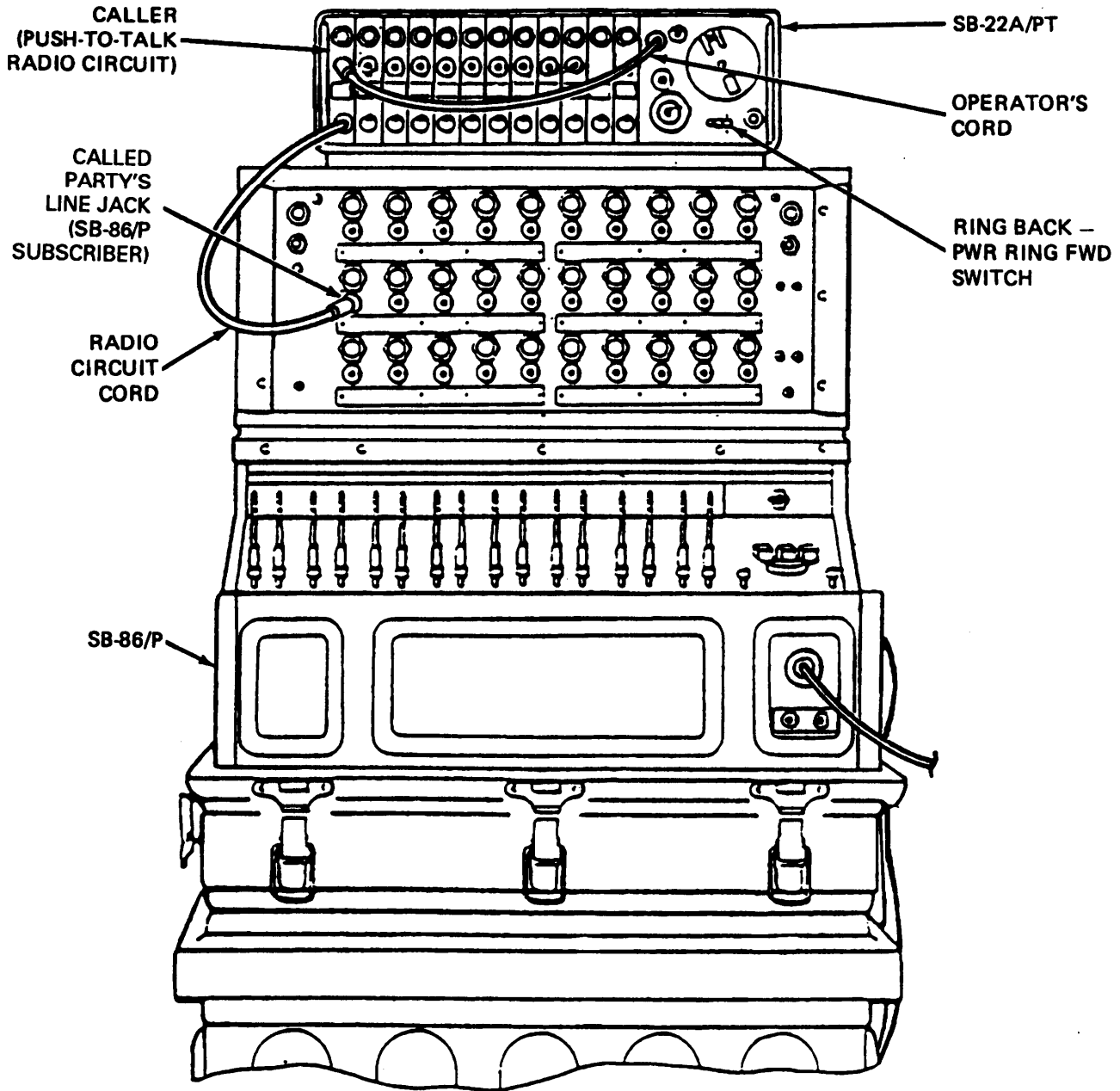
(5) Inform called party that push-to-talk radio circuit is being used.

(6) Remove plug of operator's cord from called party's jack on SB-WP and return it to operator's jack on switchboard.

b. Disconnecting Incoming Calls.

(1) When parties have finished talking, caller will ring off and line signal of switchboards radio circuit line will turn white. Insert plug of operator's cord into jack of radio circuit line pack and challenge circuit.

(2) If no one answers, disconnect line pack cord and operator's cord. Return operator's cord to operator's jack.



EL8ZE073

Figure 2-19. Connecting Incoming Radio Calls Using Switchboard and SB-86/P.

2-15. Connecting Outgoing Trunk Calls to Automatic Switchboard SB-3614/TT Using Tone Signaling Adapter.

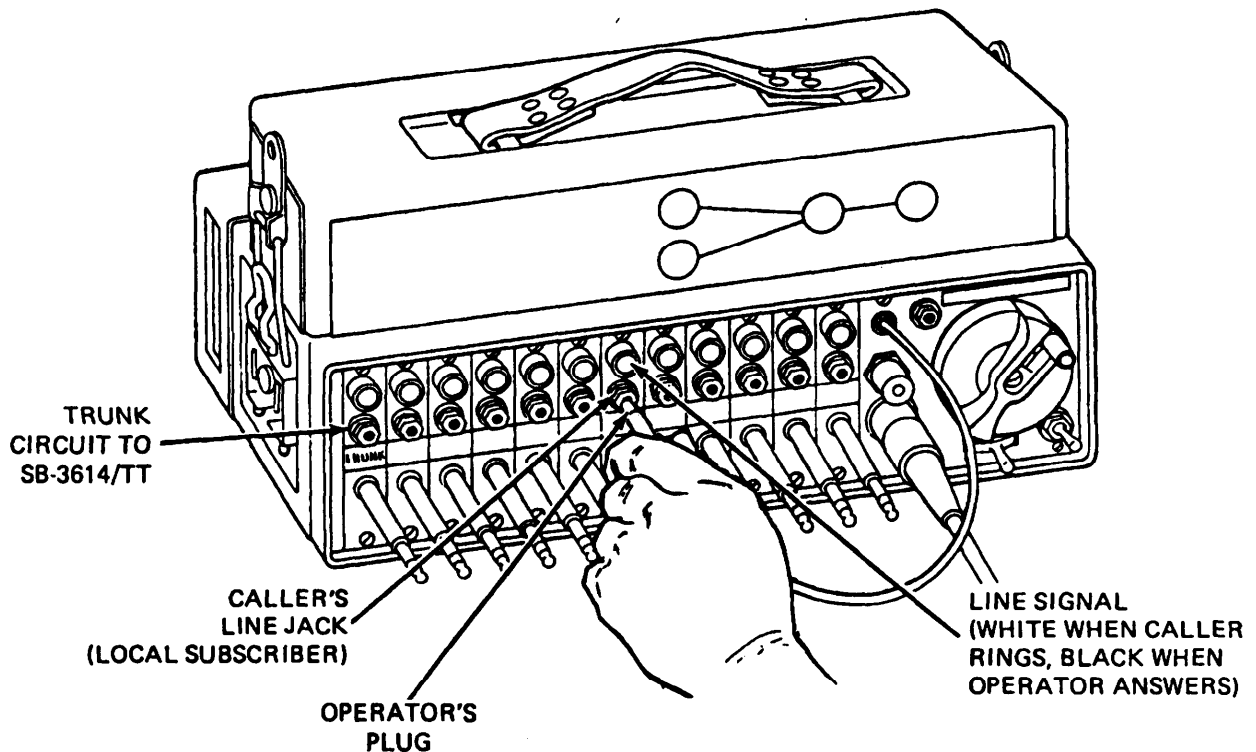
The tone signaling adapter is not required for connecting trunk calls to Manual Switchboard SB-3614/TT. However, when used, it expedites the connection process by allowing the SB-22/PT or SB-22A/PT operator to dial the desired party directly, without the intervention of the SB-3614/TT operator. When a tone signaling adapter is not available, calls may be passed on to the SB-3614/TT using the standard trunk call procedures described in paragraph 2-8.

CAUTION

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Answering Caller. (figure 2-20)

- (1) Watch signals on front of line packs. When caller signals switchboard, line signal turns white.
- (2) Insert plug of operator's cord into jack of caller's line pack. Line signal should return to black.
- (3) Obtain name and number of Switchboard SB-3614/TT subscriber that caller wishes to contact.



EL8ZE074

Figure 2-20. Answering Caller.

b. Connecting Caller to Called Party. (figure 2-21)

(1) Pull out cord on caller's line pack and insert plug into SB-361/TT trunk jack.

(2) Turn hand ringing generator to signal SB-3614/TT operator. Do not operate RING BACK - PWR RING FWD switch to either position.

(3) When SB-3614/TT receives signal from switchboard, operator will connect dial tone.

NOTE

Switchboard operator and caller will both hear dial tone.

(4) Using keyset on tone signaling adapter, dial number of party being called. SB-3614/TT will transmit ring to called party.

NOTE

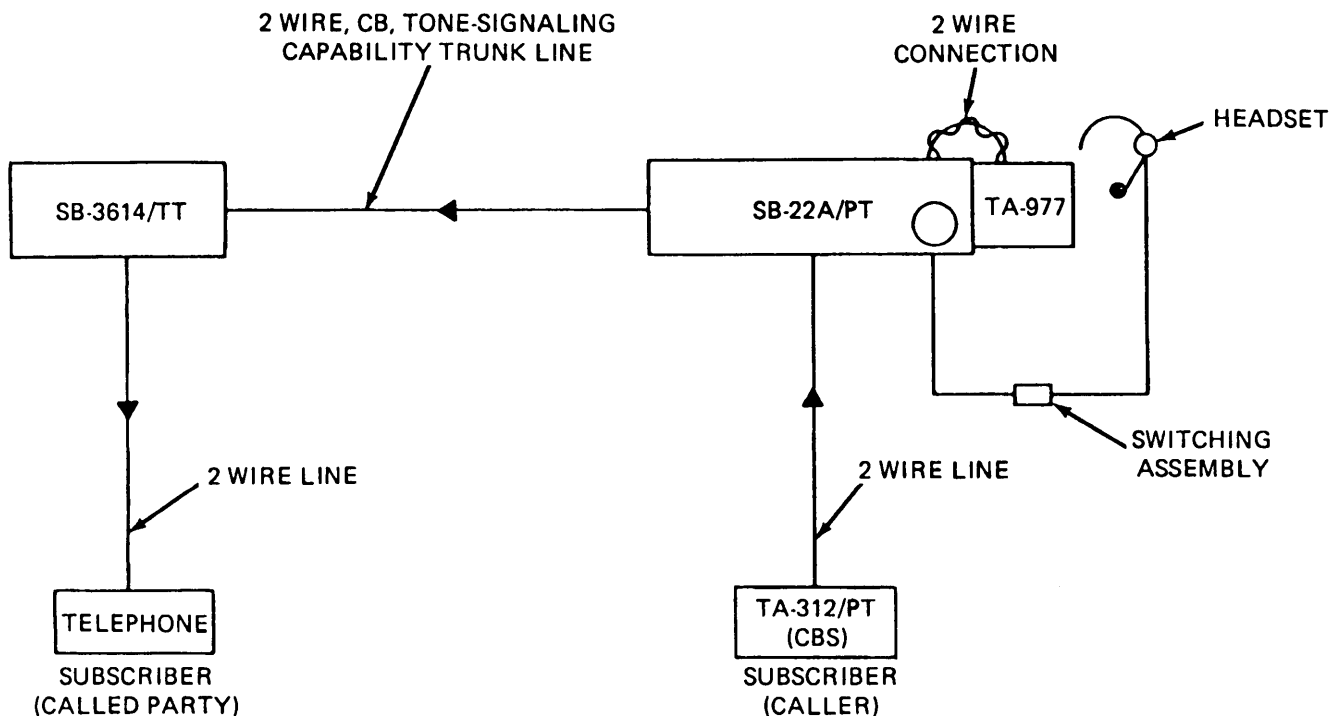
Switchboard operator and caller will both hear ring. If line is busy, both will hear busy signal.

(5) When called party answers, remove plug of operator's cord from caller's jack and return it to operator's jack.

b. Disconnecting Call. The call is completed by either by party hanging up. If the caller goes on hook first, the caller will ring off and the caller's line signal will turn white. If the called party goes on hook first, the SB-3614/TT will send a ring-off signal to the switchboard. Respond as follows:

(1) Insert operator's plug into caller's jack. Line signal on caller's line pack will turn black.

(2) Ask if parties have finished. If no one answers, disconnect caller's plug from called party's line jack and let cord retract into line pack. Return operator's plug to operator's jack.



EL8ZE075

Figure 2-21. Connections for Outgoing Trunk Call to SB-3614/TT Using Tone Signaling Adapter.

2-16. Connecting Incoming Trunk Calls from Automatic Switchboard SB-3614/TT Using Tone Signaling Adapter

The tone signaling adapter is not used when extending incoming calls from an SB-3614/TT subscriber to an SB-22/PT or SB-22A/PT subscriber. All incoming trunk calls are connected as described in paragraph 2-9.

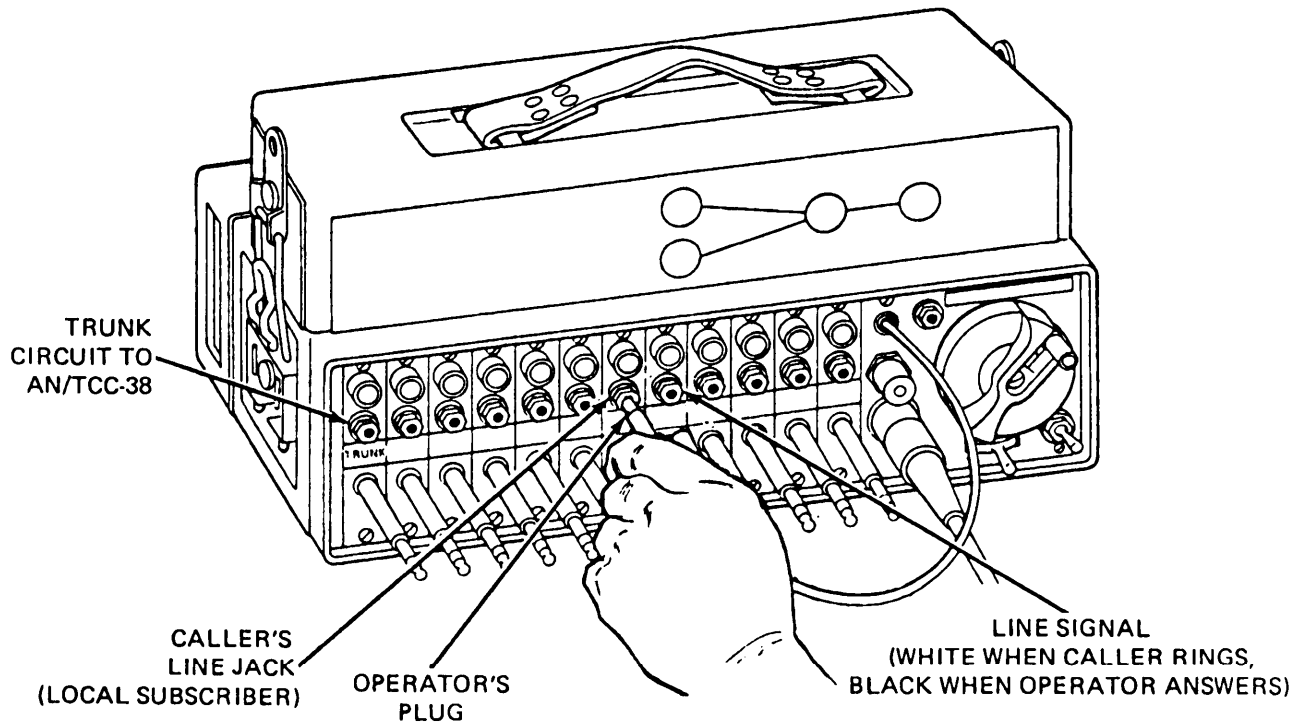
2-17. Connecting Outgoing Trunk Calls to Automatic Telephone Central Office AN/TCC-38 Using Tone Signaling Adapter

CAUTION

Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. Answering Caller. (figure 2-22)

- (1) Watch signals on front of switchboard. When caller signals switchboard, line signal turns white.
- (2) Remove operator's plug from operator's jack and insert it into jack of caller's line pack. Caller's line signal will return to black.
- (3) Obtain name and number of AN/TCC-38 subscriber that caller wishes to contact.



EL8ZE078

Figure 2-22. Answering Caller.

b. Connecting Caller to Called Party. (figure 2-23)

- (1) Pull out cord on caller's line pack and insert plug into jack of AN/TCC-38 circuit.
- (2) Hold headset assembly push-to-talk switch lever in momentary radio transmission position. This simulates a DC closure.
- (3) When AN/TCC-38 receives signal from switchboard, operator will connect dial tone.

NOTE

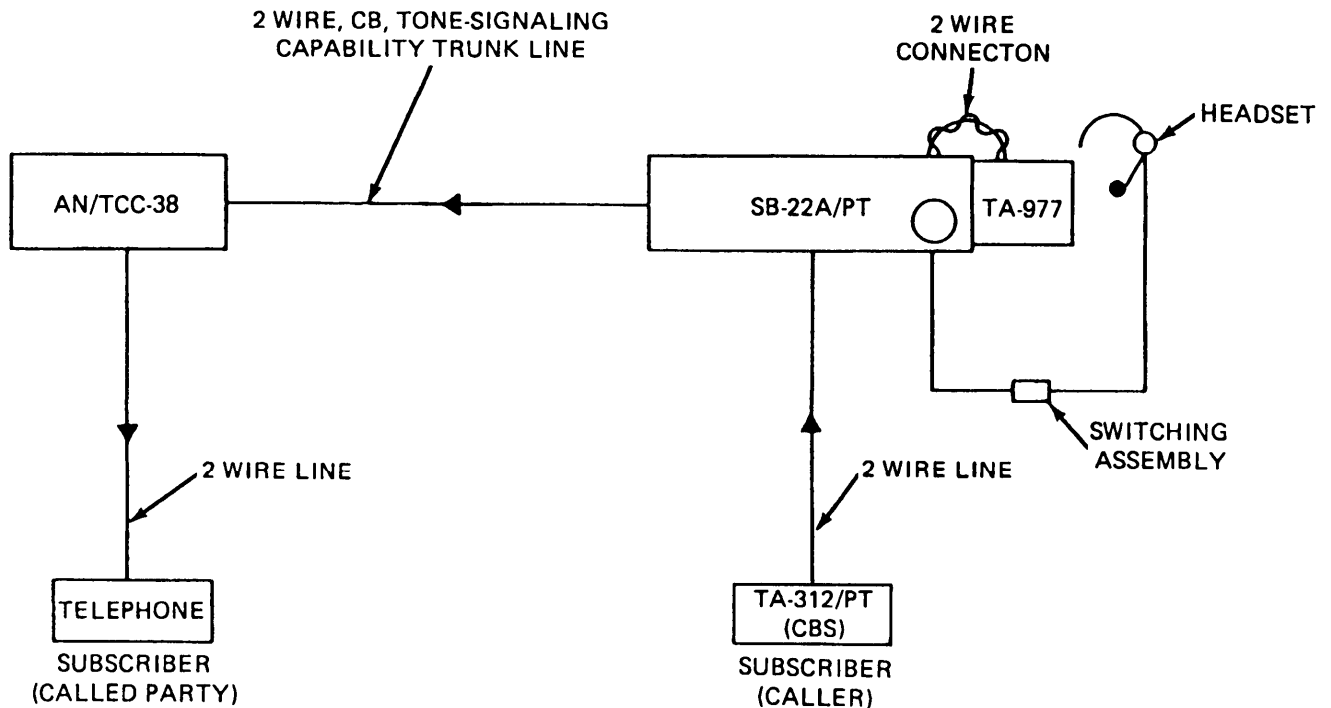
Switchboard operator and caller will both hear dial tone.

- (4) Use keyset on tone signaling adapter to dial number of AN/TCC-38 subscriber that caller wishes to contact.

NOTE

If line is busy, switchboard operator and caller will both hear busy signal.

- (5) When called party answers, release push-to-talk lever (return to OFF position). Remove operator's plug from caller's jack and return it to operator's jack.



EL8ZE079

Figure 2-23. Connecting Outgoing Trunk Calls to AN/TCC-38.

c. *Disconnecting Call.* When the call is finished, both parties go on hook. The caller will ring off and the caller's line signal will turn white. Respond as follows:

(1) Insert operator's plug into caller's jack. Caller's line signal will turn black.

(2) Ask if parties are finished. If no one answers, disconnect caller's plug from AN/TCC-38 trunk jack, and return operator's plug to operator's jack.

2-18. Connecting Incoming Trunk Calls from Automatic Telephone Central Office AN/TCC-38

CAUTION

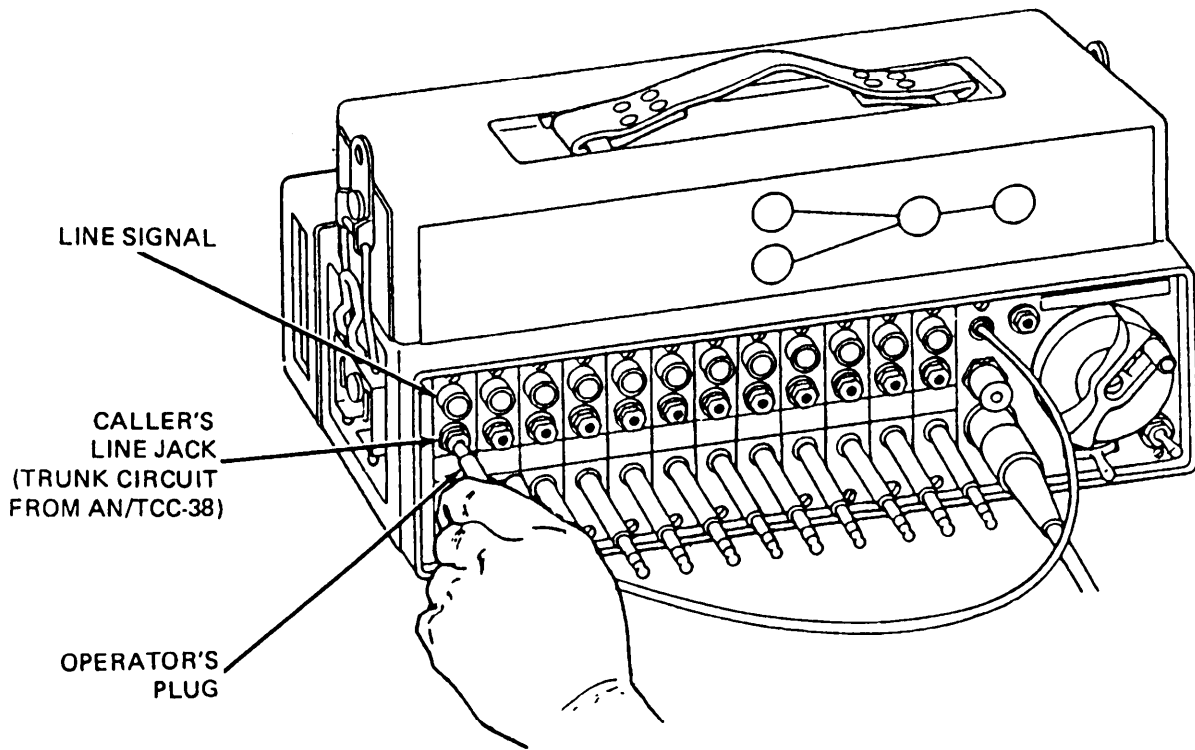
Always return push-to-talk switch on headset to OFF position when not in use. Leaving switch keyed will drain batteries.

a. *Answering homing Call.* (figure 2-24) When the caller (AN/TCC-38 subscriber) goes off hook, receives a dial tone, then dials the number for the trunk line connected to the switchboard, the caller's line signal will turn white. Respond as follows:

(1) Remove operator's plug from operator's jack and insert it into caller's trunk jack.

(2) Hold switching assembly push-to-talk lever in momentary radio transmission position.

(3) Identify yourself and obtain name and number of party being called.



EL8ZE080

Figure 2-24. Answering Caller (AN/TCC-38 Subscriber).

b. Connecting Caller to Called Party. (figure 2-25)

(1) With push-to-talk lever still in momentary radio transmission position, pull out cord of callers' trunk pack and insert it into called party's jack.

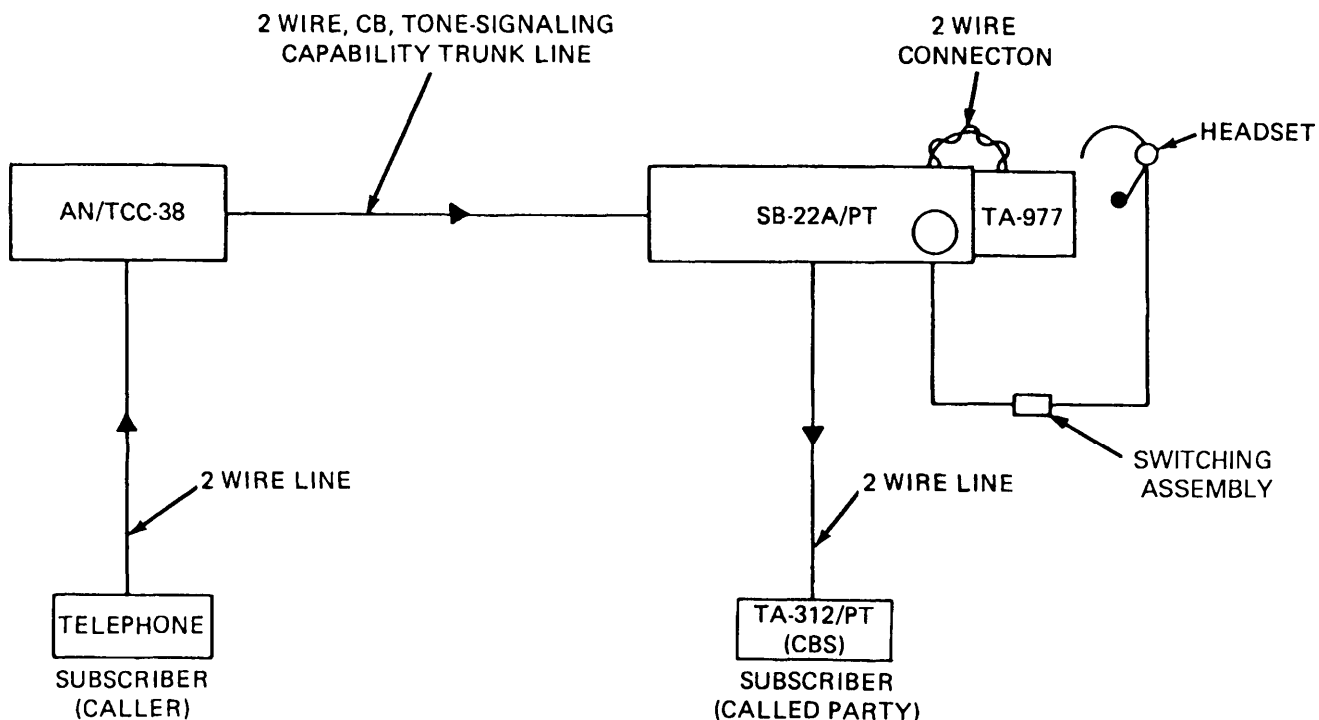
NOTE

If called party is also on a trunk circuit, extend call as described in paragraph 2-8 or 2-15, as applicable. If called party is local subscriber, connect call as described in steps (2) through (4) below. Keep push-to-talk lever in momentary radio transmission position until call is connected.

(2) Turn hand ringing generator for approximately two seconds. Do not operate RING BACK-PWR FWD switch to either position.

(3) Wait for called party to answer. If party does not answer, ring again. Allow eight seconds between rings. Repeat once more if necessary.

(4) When called party answers, release push-to-talk lever (return it to OFF position), and return operator's plug to operator's jack.



EL8ZE081

Figure 2-25. Connections for Incoming Trunk Call from AN/TCC-38.

c. *Disconnecting Call.* When the call is completed, the called party will send a ring-off signal to the switchboard, and the called party's line signal will turn white. Respond as follows:

- (1) Insert operator's plug into called party's jack. Line signal will return to black.
- (2) Ask if parties have finished. If no one answers, disconnect caller's line cord from trunk jack, and return operator's plug to operator's jack.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

Subject	Para	Page
General	2-19	2-34
Connection of Emergency Operator's Set	2-20	2-34
Operation Using Field Telephone for Operator's Set	2-21	2-34
Operation Using External Source of Ringing Current	2-22	2-35
Connection of Emergency Battery Supply	2-23	2-35
Emergency Operation Without Batteries	2-24	2-36

2-19. General

Operation of the switchboard maybe difficult in regions where extreme heat, cold, moisture and adverse weather conditions prevail. Procedures for minimizing these effects are given below.

a. Operation in Extremely Cold Climates. Keep the equipment warm and dry. Do not bend the cords sharply and do not release the cords so they retract rapidly and cause the plugs to strike the front of the line packs.

b. Operation in Warm, Damp Climates. Keep the equipment as dry as possible. Wipe the equipment with clean, dry, lint-free cloth to prevent moisture from accumulating.

c. Operation in Hot, Dry Climates. Protect the equipment from sand and dust. Check the equipment frequently. Keep the equipment clean.

2-20. Connection Of Emergency Operators Set (figure 2-26)

If the headset is damaged so that it cannot be used, a field telephone maybe used for emergency operation. Follow the procedure below to connect the field telephone to the switchboard.

- a. Disconnect headset from operator's pack.
- b. Secure field telephone to switchboard so that it is convenient to operator.
- c. Connect one end of a short piece of wire WD-1/TT or WD-1A/TT to line binding posts on field telephone.
- d. Connect other end of wire to EMG OPR binding post at rear of switchboard.

2-21. Operation Using Field Telephone for Operator's Set

To use a field telephone in place of the headset, be sure it is connected to the switchboard as explained in paragraph 2-20. Operate the switchboard as explained in paragraphs 2-7 through 2-14. Use the handset of the field telephone instead of the headset. Follow the procedure below when operating the switchboard with the field telephone.

- a. Hold receiver against ear with transmitter positioned in front of lips.
- b. Depress PUSH-TO-TALK switch on side of handset handle to talk to caller or called party.

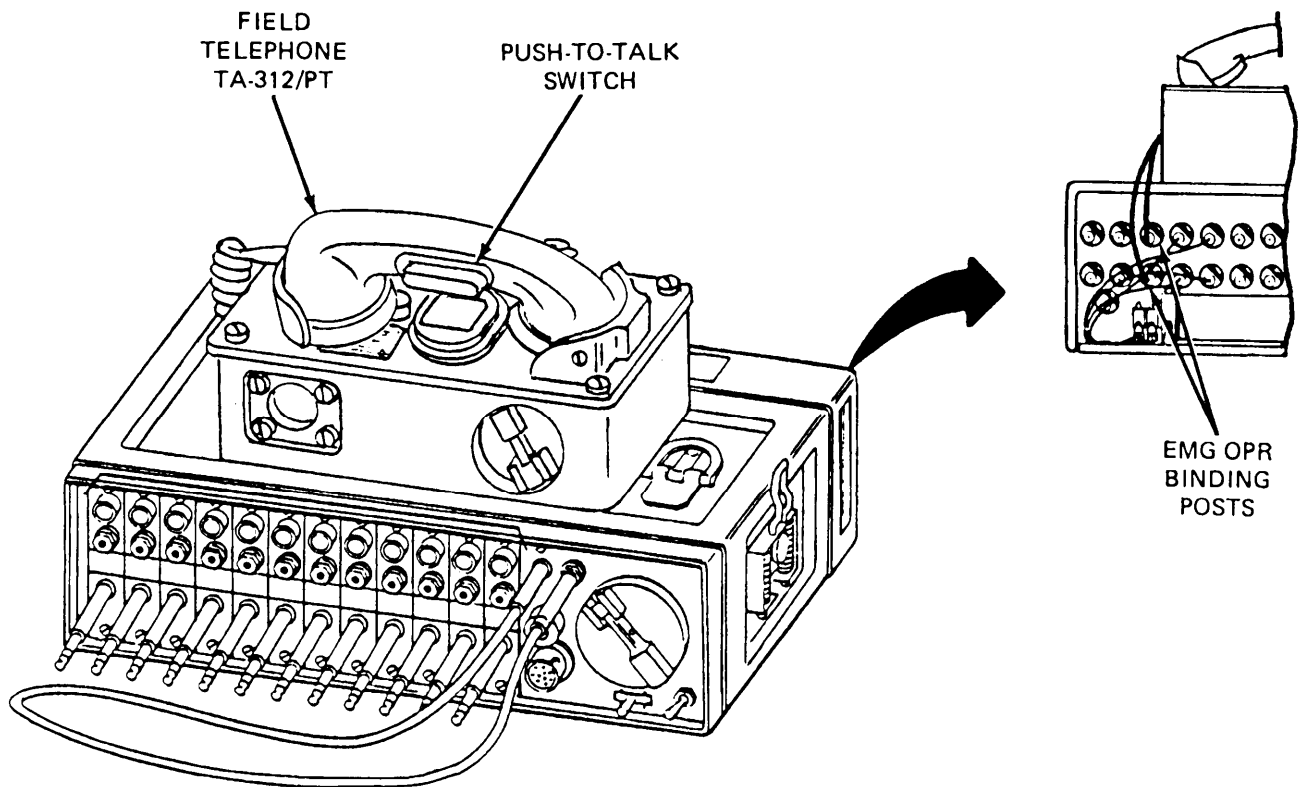


Figure 2-26. Using Field Telephone for Emergency Operator's Set.

2-22. Operation Using External Source of Ringing Current

An external source of ringing current may be used to assist the operator when the calling rate is high, by eliminating use of the operator's hand ringing generator. When power ringing equipment is connected to the switchboard, the switchboard is operated as described in paragraphs 2-7 through 2-14 except that signaling the called party or distant switchboard is accomplished by operating the RING BACK - PWR RING FWD switch to RING BACK instead of by turning the hand ringing generator. Refer to paragraph 1-12 for a list of power ringing equipment that may be used with the switchboard. Refer to paragraph 4-16 for installation instructions.

CAUTION

Do not use hand ringing generator at any time when power ringing equipment is connected to switchboard.

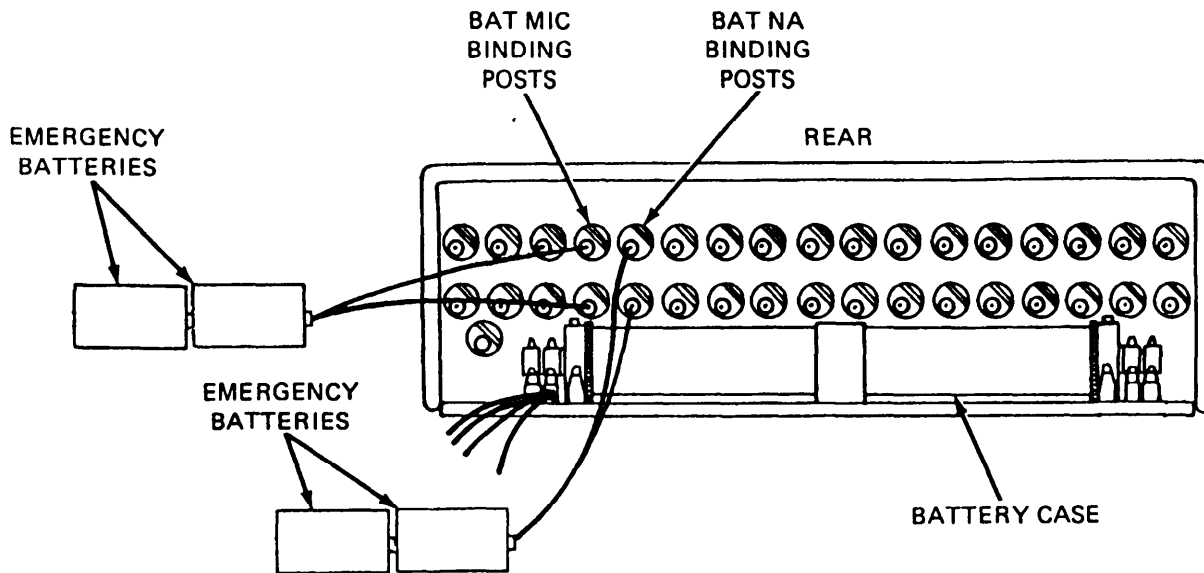
2-23. Connection of Emergency Battery Supply (figure 2-27)

If Batteries BA-30 or BA-3030/U are not available, follow the procedure below to provide the necessary direct current to operate the switchboard.

CAUTION

Do not connect more than 6 volts to the switchboard.

- a. Select four dry cell batteries, such as battery BA-23.
- b. Connect two of the batteries in series to provide 3 volts. Use any available method to maintain contact between batteries.
- c. Repeat step b. for the other two batteries.
- d. Disconnect wires from BAT NA and BAT MIC binding post at rear of switchboard.
- e. Wire one of the 3-volt battery pairs to BAT MIC binding posts.
- f. Wire the other 3-volt battery pair to BAT NA binding posts.



EL8ZE083

Figure 2-27. Connecting Emergency Battery Supply.

2-24. Emergency Operation Without Batteries

If no batteries are available, the earpiece amplifier in the headset can be used as a microphone to transmit voice messages for a distance of four miles (maximum).

CHAPTER 3

OPERATOR MAINTENANCE

Subject	Section	Page
Troubleshooting	I	3-1
Maintenance Procedures	II	3-3

Section I. TROUBLESHOOTING

Subject	Para	Page
General	3-1	3-1
Troubleshooting Table	3-2	3-1

3-1. General

Troubleshooting at the operator level is done in response to problems or malfunctions noted while operating the equipment, or while performing PMCS. Fault isolation is limited to those components which may be repaired or replaced at the operator level.

3-2. Troubleshooting Table

Table 4-1 lists the common malfunctions that you may find during operation or maintenance of the switchboard. Each malfunction is followed by a list of tests or inspections and corrective actions. These tests or inspections and corrective actions should be performed in the order listed. This manual cannot list all malfunctions that may occur. If you encounter a malfunction that is not listed or that cannot be corrected by the listed corrective actions, notify your supervisor.

NOTE

Tag faulty equipment with fault and conditions under which fault was detected.

Table 3-1. Switchboard Troubleshooting.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. COMMUNICATION CANNOT BE ESTABLISHED.

- Step 1. Check wiring for open lines or connections.
 Repair breaks or connections.
- Step 2. Check subscriber for inoperative field telephone.
 Replace defective field telephone.

Table 3-1. Switchboard Troubleshooting (cont).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
	<p>Step 3. Switch circuit connection to a known good line or trunk pack. Replace line or trunk pack (para 3-8).</p> <p>Step 4. Plug headset into a field telephone TA-312/PT and check for two-way communication, or replace headset with a known good headset.</p> <p>a. Replace inoperative headset if problem is corrected.</p> <p>b. Replace operator's pack.</p>	
2. LINE SIGNAL STAYS BLACK OR FLUTTERS WHEN CALL IS RECEIVED, COMMUNICATION ALREADY ESTABLISHED.		<p>Switch circuit to a known good line or trunk pack. Replace line or trunk pack (para 3-8).</p>
3. LINE SIGNAL STAYS WHITE WHEN OPERATOR'S PLUG IS IN JACK.		<p>Switch circuit to a known good line or trunk pack. Replace line or trunk pack (para 3-8).</p>
4. OPERATOR'S PACK FAILS TO GENERATE A RINGING SIGNAL A1 CALLED OR CALLING PARTY'S TELEPHONE.		<p>Attempt to ring through using hand ringing generator. Replace operator's pack (para 3-7).</p>
5. NIGHT LIGHT FAILS TO ILLUMINATE SWITCHBOARD OR NIGHT ALARM FAILS TO OPERATE VISUAL (VIS) SIGNAL.		
	<p>Step 1. Check condition of spring contacts,</p> <p>a. Clean contacts.</p> <p>b. Squeeze arms of spring contacts lightly together to assure good contact with batteries.</p> <p>c. Notify higher level of maintenance if spring contacts require replacement.</p> <p>Step 2. Check batteries.</p> <p>Replace batteries (para 3-5).</p> <p>Step 3. Check lamp.</p> <p>Replace lamp (para 3-6).</p> <p>Step 4. Check operator's pack.</p> <p>Replace operator's pack (para 3-7).</p>	

Table 3-1. Switchboard Troubleshooting (cont).

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. NIGHT ALARM FAILS TO OPERATE AUDIO (AUD) SIGNAL.		
	Step 1. Check condition of spring contacts.	a. Clean contacts. b. Squeeze arms of spring contacts lightly together to assure good contact with batteries. c. Notify higher level of maintenance if spring contacts require replacement.
	Step 2. Check batteries.	Replace batteries (para 3-5).
	Step 3. Check operator's pack.	Replace operator's pack (para 3-7).
7. NO SIDETONE IN HEADSET WHEN PUSH-TO-TALK SWITCH IS OPERATED AND OPERATOR'S PLUG IS REMOVED FROM OPERATOR'S JACK.		
	Step 1. Check contacts on headset connector.	Clean contacts.
	Step 2. Check condition of spring contacts.	a. Clean contacts. b. Squeeze arms of spring contacts lightly together to assure good contact with batteries. c. Notify higher level of maintenance if spring contacts require replacement.
	Step 3. Check batteries.	Replace batteries (para 3-5).
	Step 4. Check operator's pack.	Replace operator's pack (para 3-7).
	Step 5. Plug headset into field telephone TA-312/PT and check for two-way communication, or substitute a known good headset.	a. Replace defective headset if problem is corrected. b. Replace operator's pack (para 3-7).

Section II. MAINTENANCE PROCEDURES

Subject	Para	Page
General	3-3	3-4
Cleaning	3-4	3-4
Batteries	3-5	3-6
Line and Trunk Packs	3-6	3-9
Night Alarm/Night Light	3-7	3-10
Operator's Pack	3-8	3-12

3-3. General

The maintenance duties assigned to the operator of the switchboard require Tool Kit TE-33, or equivalent. Replacement parts for operator maintenance can be found in the accessory kit or are listed in appendix D.

3-4. Cleaning

Inspect the exteriors of the switchboard, the headset and the tone signaling adapter. The exterior surfaces should be clean, free of dust, dirt, grease and fungus. Clean components as follows:

- a. Remove dust and loose dirt with a clean soft cloth.

WARNING

Fumes of trichlorotrifluoroethane are poisonous. Provide adequate ventilation whenever you use trichlorotrifluoroethane. Do not use solvent near heat or open flame. Trichlorotrifluoroethane will not burn, but heat changes the gas into poisonous, irritating fumes. DO NOT breathe the fumes or vapors. Trichlorotrifluoroethane dissolves natural skin oils. Do not get the solvent on your skin. Use gloves, sleeves and an apron which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

- b. Remove grease, fungus and ground-in dirt from the cases using a cloth dampened with trichlorotrifluoroethane, or any all-purpose liquid cleaner.

CAUTION

Be careful when cleaning plugs and jacks. Dust and dirt forced into jacks will cause malfunctions.

- c. Remove dust and dirt from plugs and jacks with a brush. Do not use crocus cloth, emery or other such abrasive materials.

- d. Clean front panels, switch handles, keys and generator crank. Use a soft, clean cloth. If it is difficult to remove dirt, dampen the cloth with water and mild soap to make cleaning more effective.

- e. Clean rust and corrosion from metal surfaces by lightly sanding with fine sandpaper. Brush two thin coats of paint on the bare metal to protect from further corrosion. Refer to applicable cleaning and refinishing practices specified in TM 43-0139.

3-5. Batteries

This task covers: a. Switchboard battery replacement b. Tone signaling adapter battery replacement

INITIAL SETUP

<i>Tools</i>	<i>Materials/Parts</i>
Tool Kit TE-33	Four batteries BA-30 or BA-3030/U One battery BA-90

a. Switchboard Battery Replacement. (figure 3-1)

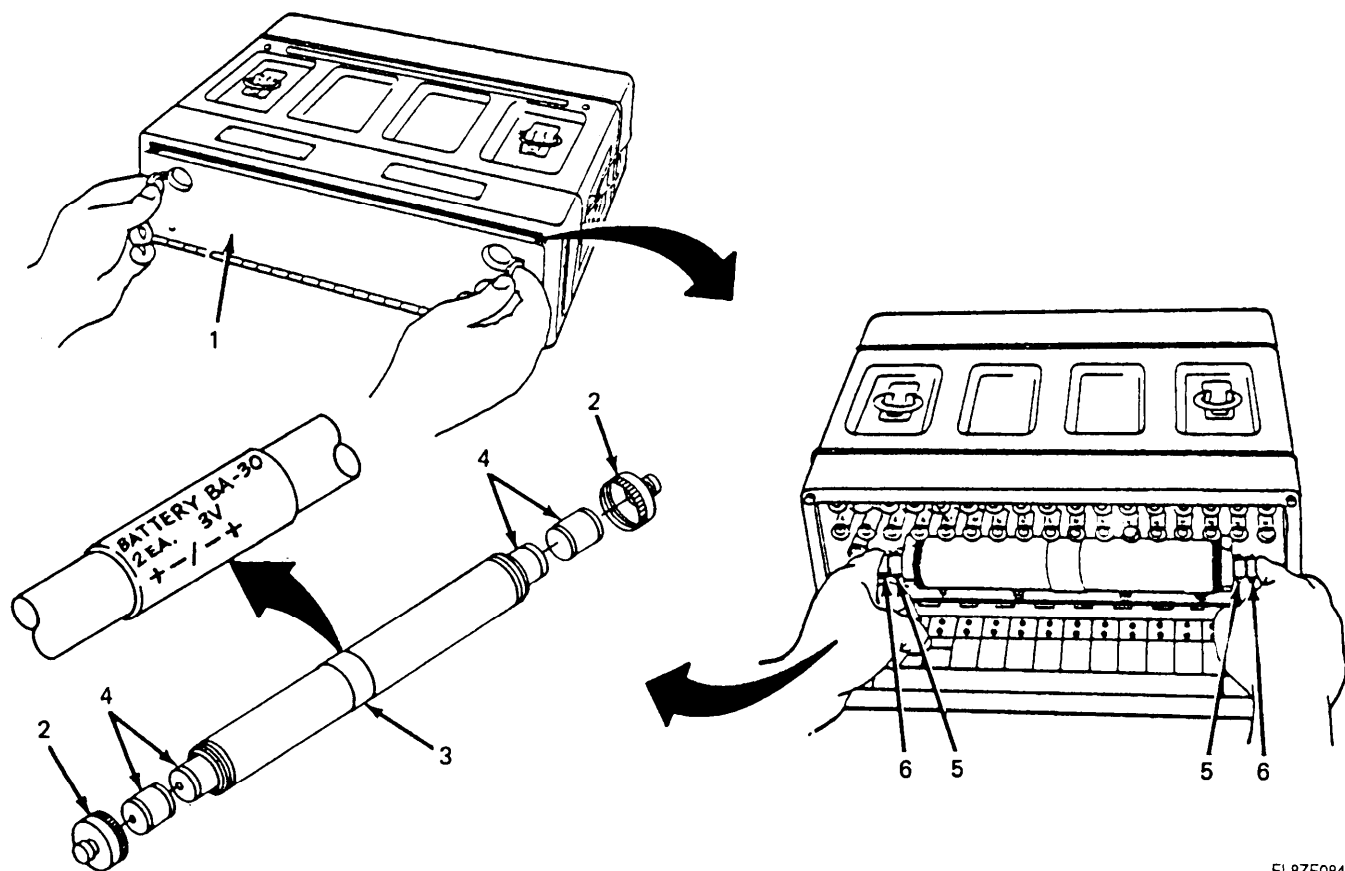
- (1) Open rear door (1) of switchboard.
- (2) Place index fingers on ends of end caps (2) of battery case (3).
- (3) Roll battery case (3) out evenly with index fingers.
- (4) Remove end caps (2).
- (5) Remove two batteries (4) from each end.
- (6) Slide two new batteries, BA-30 (4), into each end of battery case (3). Make sure positive ends of batteries are facing open ends of battery case.

CAUTION

Do not screw end caps onto battery case too tightly, or battery case or end caps maybe damaged.

(7) Press battery case into clamps (5) and spring contacts (6). Be careful not to damage spring contacts. Make sure arms of spring contacts hold battery case (3) firmly. Make sure end caps (2) make good contact with spring contacts.

- (8) Close rear door (1).



EL8ZE084

Figure 3-1. Switchboard Battery Replacement.

3-5. Batteries (cont)

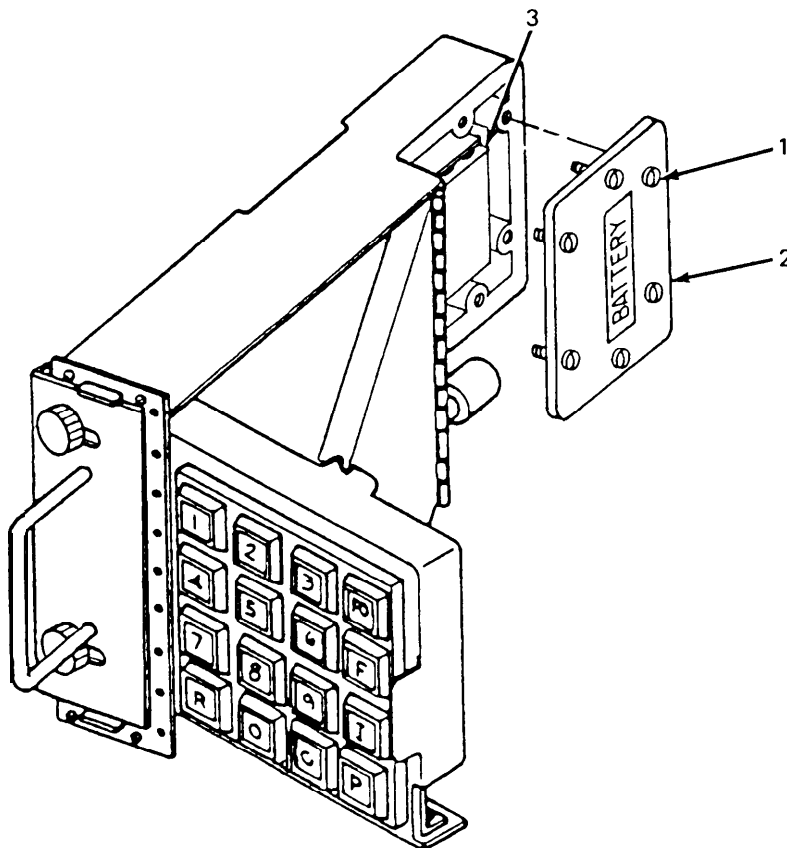
b. Tone Signaling Adapter Battery Replacement. (figure 3-2)

- (1) Loosen six captive screws (1) holding cover (2) onto battery compartment.
- (2) Remove battery (3).

NOTE

Battery clip has a keyed design which prevents improper battery connections.

- (3) Install new battery BA-90 (3).
- (4) Position cover (2) on battery compartment and tighten six captive screws(1).



EL&ZE085

Figure 3-2. Tone Signaling Adapter Battery Replacement.

3-6. Line and Trunk Packs

This task covers: Replacement

Tools

Tool Kit TE-33

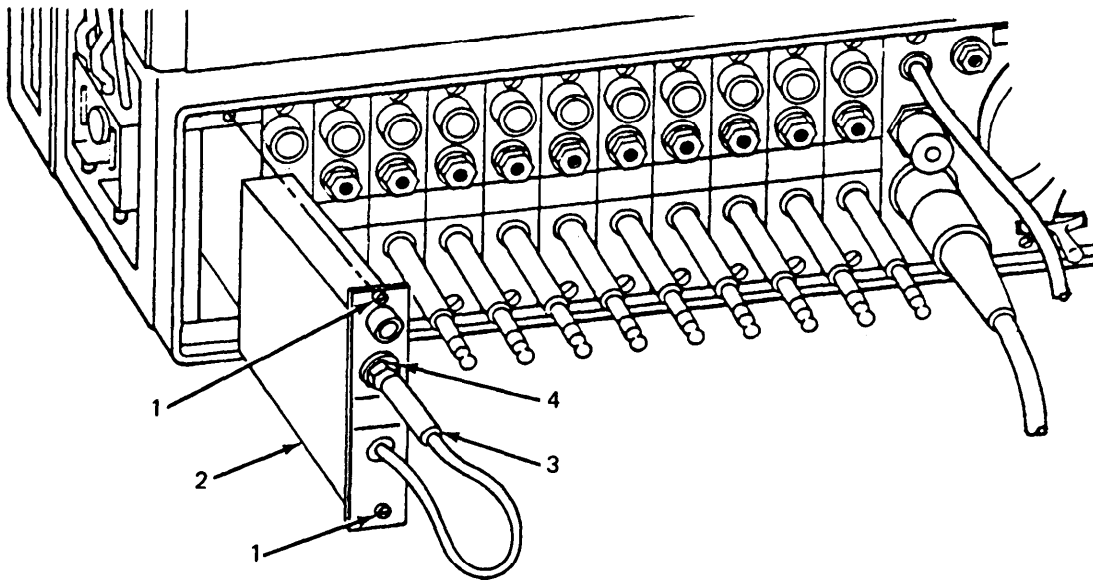
Material/Parts

Line pack TA-222/PT or
Trunk pack TA-326/PT

Replacement. (figure 3-3)

- (1) Loosen two captive screws (1) located at top and bottom of line or trunk pack (2).
- (2) Pull out line cord and insert plug (3) into jack (4).
- (3) Grasp plug (3) and pull pack (2) straight out of switchboard case. Be careful not to bend plug.
- (4) Remove plug (3) from jack (4).
- (5) Insert plug (3) of new line or trunk pack (2) into jack (4).
- (6) Align pack (2) with space in switchboard case. Grasp plug (3) and slide pack into case. Do not force pack into case.

Tighten captive screws (1).



EL8ZE088

Figure 3-3. Line and Trunk Pack Replacement.

3-7. Night Alarm/Night Light Switch

This task covers: Lamp replacement

INITIAL SETUP

Materials/Parts

Lamp (NSN 6240-00-196-4501)

Replacement. (figure 3-4)

- (1) Pull NA-IN/LITE-OUT switch to LITE-OUT position.

CAUTION

Do not use any tools to remove knob from switchboard.

- (2) Turn knob (1) counterclockwise to unscrew it from mounting.
- (3) Push in on lamp (2) and turn it about one-quarter turn counterclockwise. Slide lamp out of lampholder.
- (4) Slide new lamp (2) into lampholder. Be sure to align lugs on lamp with grooves in lampholder.
- (5) Push lamp (2) in and turn it clockwise to lock it in lampholder.
- (6) Screw NA-IN/LITE-OUT knob (1) onto mounting. Make knob hand tight.
- (7) Check light to be sure it lights when switch is pulled out, and goes out when switch is pushed in.

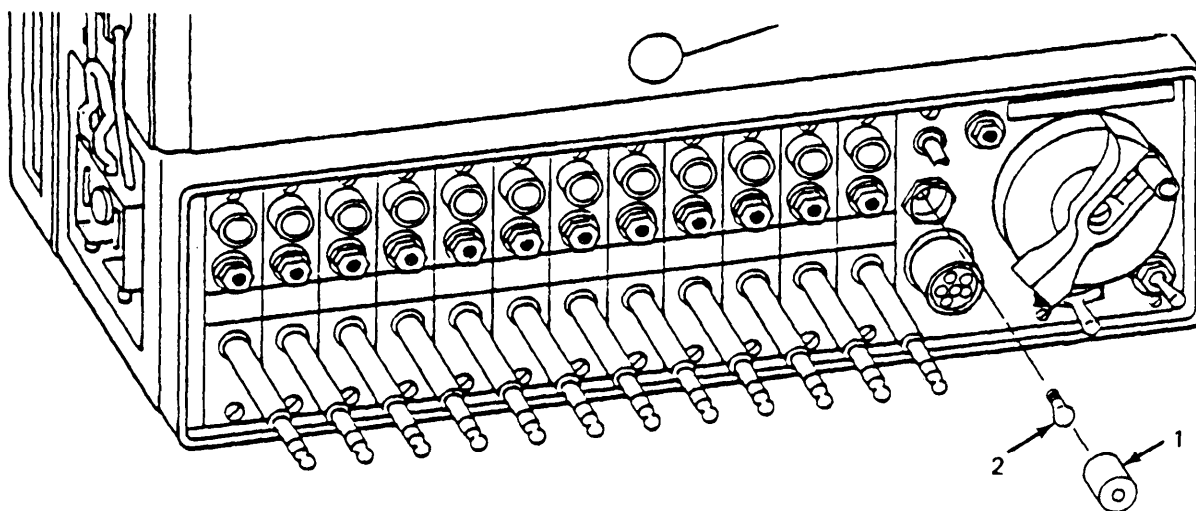


Figure 3-4. Night Alarm/Night Light Switch Lamp Replacement.

EL8ZE086

3-8. Operator's Pack

This task covers: Replacement

INITIAL SETUP

<i>Tools</i>	<i>Materials/Parts</i>
Tool Kit TE-33	Operator's pack TA-221/PT

Replacement. (figure 3-5)

- (1) Loosen four captive screws (1) on front of operator's pack (2).
- (2) Plug headset connector (3) into its receptacle (4) on front of operator's pack (2).
- (3) Grasp headset connector (3) and pull operator's pack (2) out of switchboard case.

CAUTION

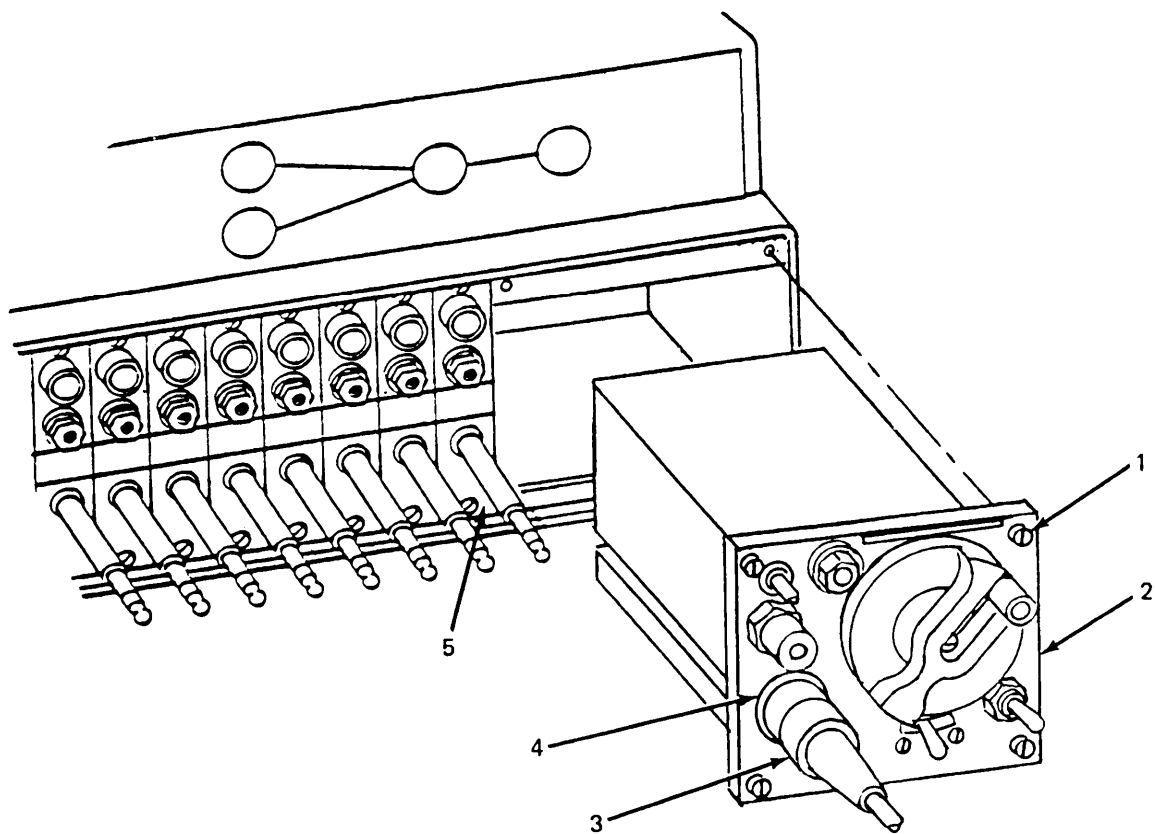
Be sure to pull operator's pack straight out of switchboard case to avoid damaging connectors at rear of operator's pack.

- (4) If operator's pack (2) does not come out easily, remove line pack (5) adjacent to operator's pack first (paragraph 3-6).
- (5) Inspect inside of switchboard case for damage that may affect installation of new operator's pack (2).
- (6) Disconnect headset connector (3) from defective operator's pack (2) and plug it into receptacle (4) on new operator's pack.

CAUTION

Do not force operator's pack into switchboard case.

- (7) Grasp connector (3) and slide operator's pack (2) into switchboard case.
- (8) Tighten four captive screws (1).
- (9) If a line pack (5) was removed, install line pack (paragraph 3-6).



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Figure 3-5. Operator's Pack Replacement.

CHAPTER 4

UNIT MAINTENANCE

Subject	Section	Page
Repair Parts, Tools, TMDE and Support Equipment	I	4-1
Service Upon Receipt	II	4-2
Unit Preventive Maintenance Checks and Services	III	4-31
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Section I. REPAIR PARTS, TOOLS, TMDE AND SUPPORT EQUIPMENT

Subject	Para	Page
Common Tools	4-1	4-1
Special Tools, TMDE and Support Equipment	4-2	4-1
Repair Parts	4-3	4-1

4-1. Common Tools

A list of common tools and toolkits required for unit level maintenance is given in section III of appendix B, Maintenance Allocation.

4-2. Special Tools, TMDE and Support Equipment

There are no special tools or equipment needed to maintain the switchboard and related equipment.

4-3. Repair Parts

Repair parts for unit level maintenance of the headset are listed and illustrated in TM 11-5965-283-20P.

Section II. SERVICE UPON RECEIPT

Subject	Para	Page
Unpacking	4-4	4-2
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Installing One Switchboard	4-8	4-13
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Grounding Procedures	4-10	4-17
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4-4. Unpacking

When packed for export shipment, the components of the switchboard are packed as shown in figure 4-1 below. When packed for domestic shipment, the switchboard is sealed in cartons and packed in one nailed wooden box (figure 4-1). Dimensions of packed equipment are given in table 4-1 below.

Table 4-1. Packed Equipment Dimensions.

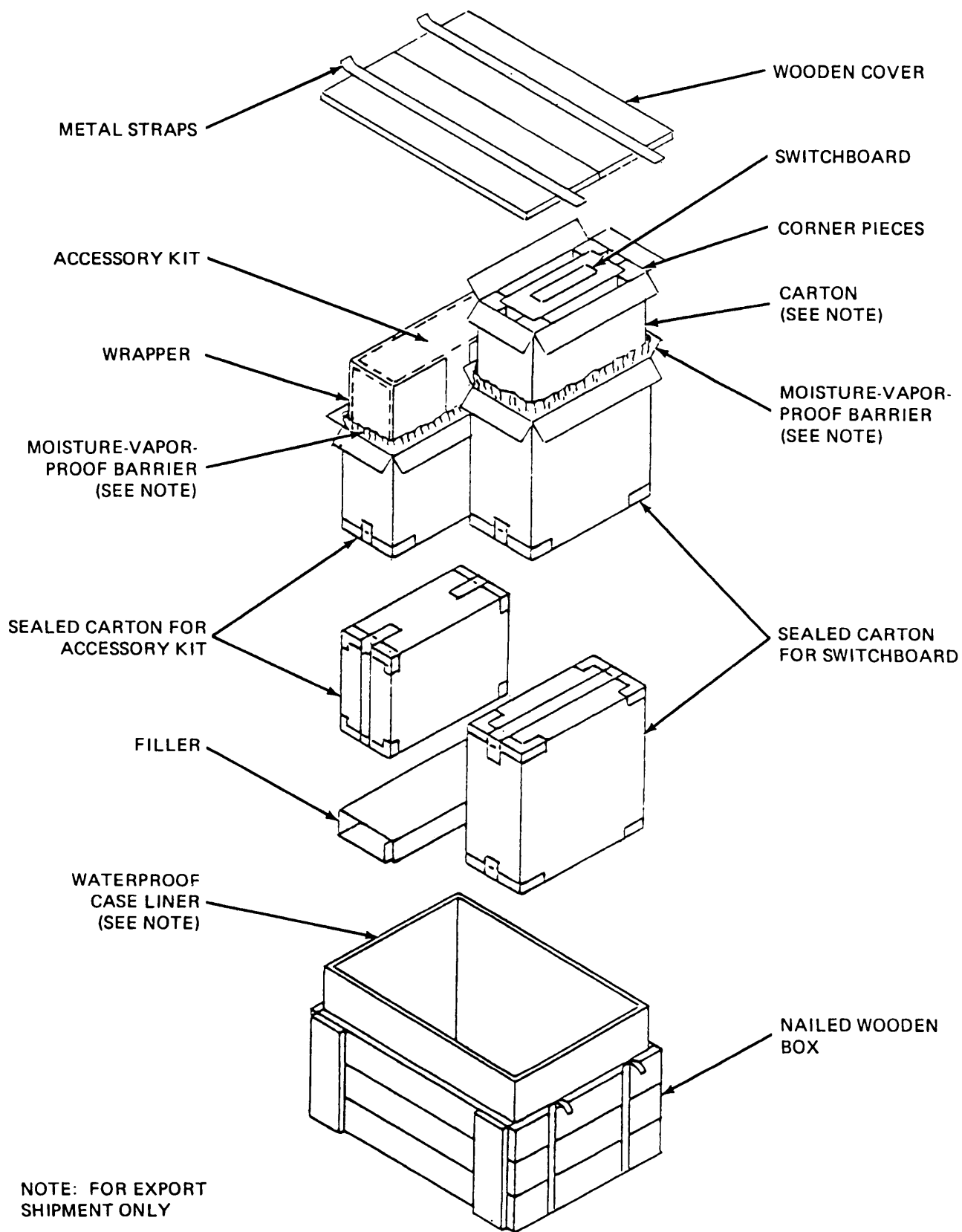
Outside Dimensions (in.)	Volume (cu ft)	Unit Weight	Contents
9 1/2 x 28 1/2 x 16 1/2	2.6	58	Switchboard, Telephone, Manual SB-22/PT, with Accessory Kit MX-230A/PT.
9 1/2 x 28 1/2 x 16 1/2	2.6	58	Switchboard, Telephone, Manual SB-22A/PT, with Accessory Kit MX-2915/PT.

NOTE

Whenever possible, retain packing materials for repackaging equipment when required, for shipment or storage.

a. Removing Equipment from Export Packing. (figure 4-1)

- (1) Place nailed wooden box on floor or other flat surface.



EL8ZE089

Figure 4-1. Unpacking Switchboard Components.

WARNING

The steel banding used in packaging of switchboard has sharp edges. Care should be taken when cutting and handling banding to avoid injury to personnel.

- (2) Cut metal straps and bend them back to prevent injury to personnel.
- (3) Pull nails from wooden cover and lift cover from nailed wooden box.
- (4) Cut waterproof case liner and lift sealed cartons for switchboard and accessory kit from nailed box.
- (5) Open sealed carton and moisture-vapor proof barrier containing switchboard. Remove carton from inside moisture-vaporproof barrier.
- (6) Open carton and remove switchboard.
- (7) Open sealed carton for accessory kit and moisture-vapor proof barrier and remove accessory kit.

b. Removing Equipment from Domestic Packaging. (figure 4-1)

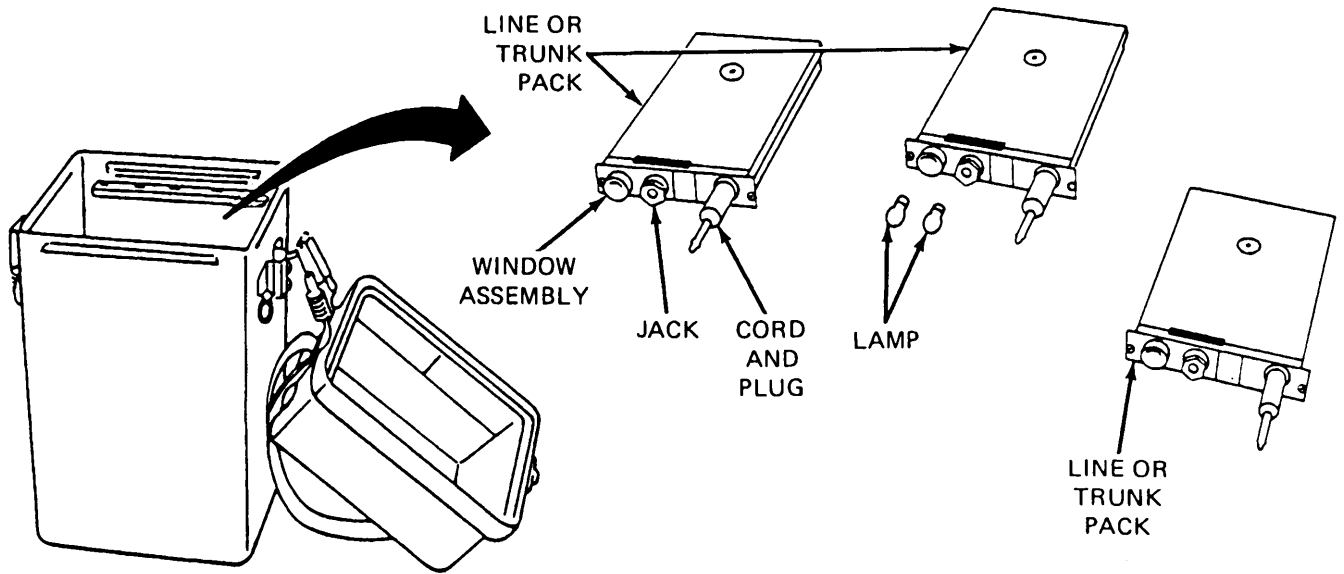
- (1) Place nailed wooden box on floor or other flat surface:
- (2) Pull nails from wooden cover and lift it from nailed wooden box.
- (3) Open sealed carton for switchboard and remove switchboard.
- (4) Open sealed carton for accessory kit and remove accessory kit.

4-5. Inspection

Check the equipment against the packing list. If no packing list accompanies the equipment, use the components of end item list (COEIL) (appendix C) to check the equipment that was packed. Follow the procedures below to check for damage incurred during shipment.

a. Check contents of accessory kit (figure 4-2) as follows:

- (1) Remove line and trunk packs and two lamps from carrying case.
- (2) Check each line pack and trunk pack (if supplied) for dented cases, damaged cords and plugs, broken or missing window assemblies, and damaged jacks.
- (3) Check lamps to be sure they are not broken.

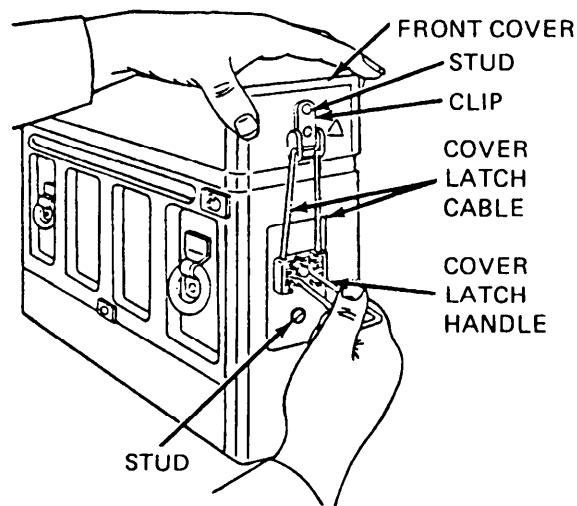


EL8ZE090

Figure 4-2. Inspecting Accessory Kit.

b. Remove front cover from switchboard and check face of switchboard as follows:

- (1) Place switchboard on a table or other flat surface.
- (2) Lift each cover latch handle off its stud (figure 4-3).
- (3) Turn cover latch handles one-half turn so that cover latch cable is loose.
- (4) Remove each clip from studs on front cover. Remove front cover from switchboard.



EL8ZE091

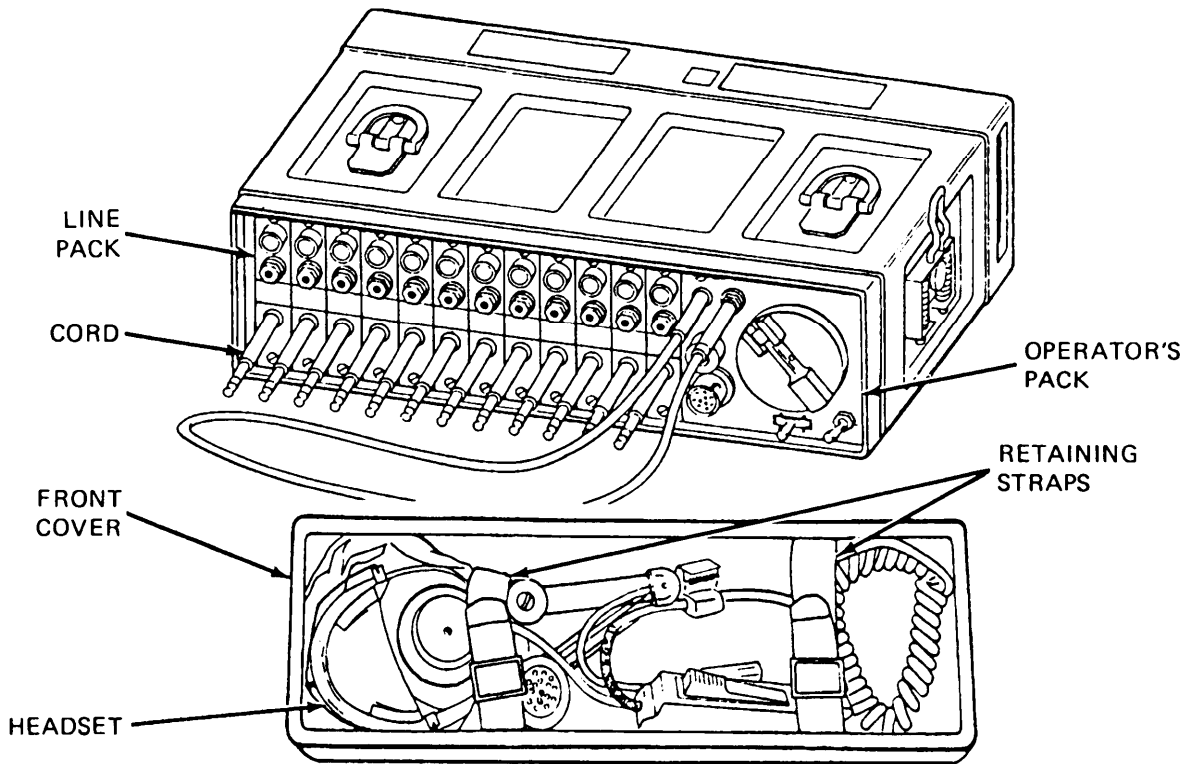
Figure 4-3. Removing Front Cover From Switchboard.

(5) Check headset inside front cover to be sure it is not damaged. Check retaining straps inside front cover to be sure they are not cut or broken (figure 4-4).

(6) Check each line pack to be sure none of the controls have been damaged. Pull each cord out of line pack and check to see that it retracts properly.

(7) Check operator's pack to be sure that none of the controls have been damaged during shipment.

(8) Replace front cover.



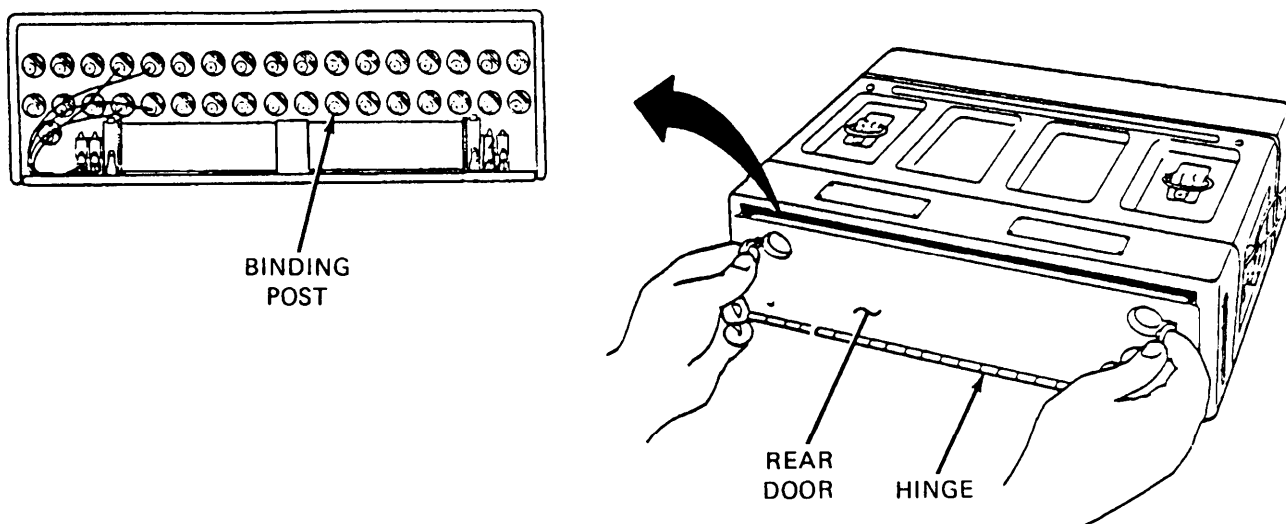
EL8ZE092

Figure 4-4. Inspecting Cover and Face of Switchboard.

c. Open rear door of switchboard (figure 4-5). Make sure door swings free on its hinges. Check all of the binding posts in rear compartment of switchboard to be sure that none have been damaged during shipment. Close rear door.

d. Check exterior of switchboard to be sure that switchboard case has not been damaged during shipment.

e. If equipment is used or reconditioned, check equipment for tags or other markings that may indicate a modification of equipment.



EL8ZE094

Figure 4-5. Inspecting Rear of Switchboard.

4-6. Preinstallation Checks

Before installing and connecting the switchboard, perform the procedure given in a. through d. below, as applicable.

WARNING

Do not perform preinstallation checks until switchboard is grounded.

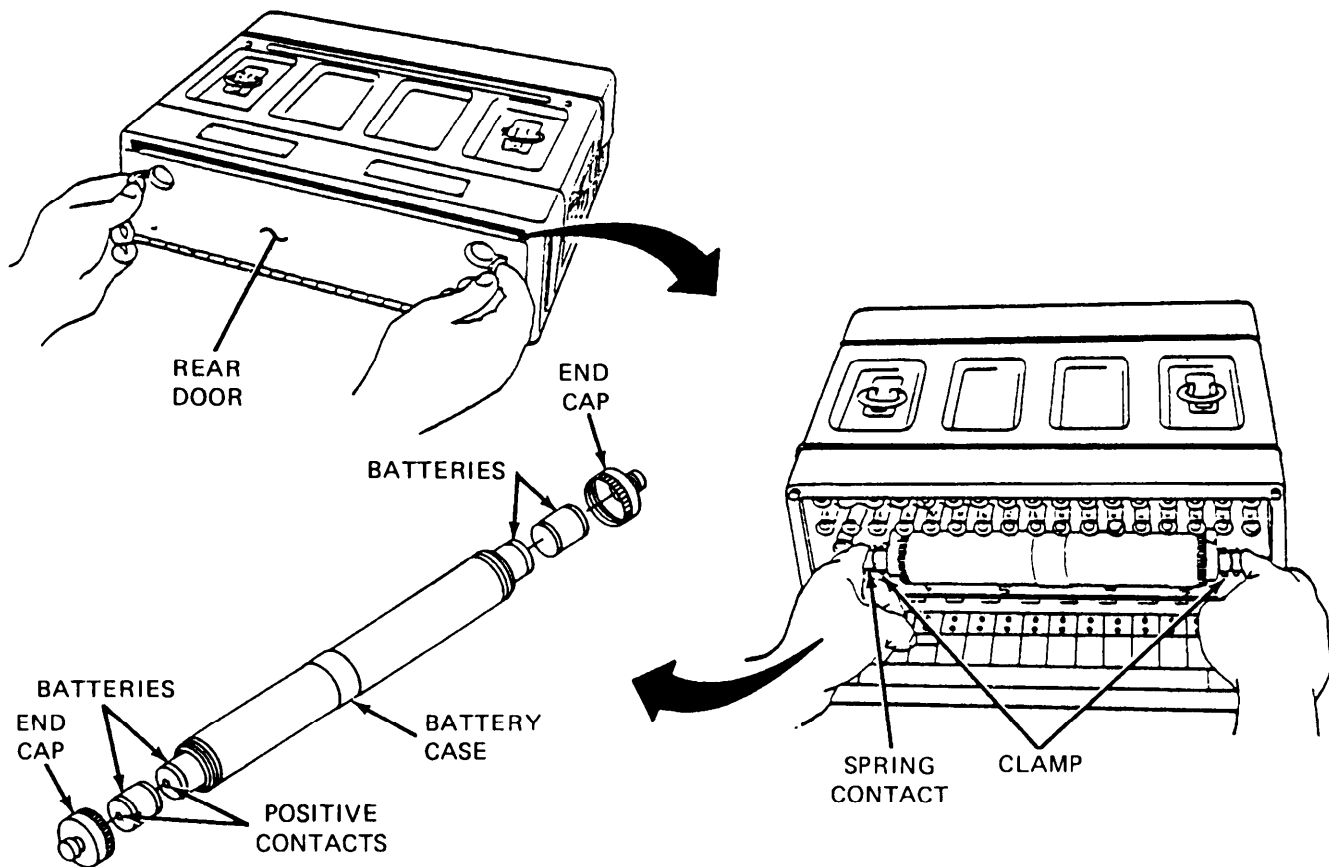
a. Installing Batteries. (figure 4-6)

- (1) Open rear door of switchboard (paragraph 4-5.d).
- (2) Place index fingers on ends of battery case.
- (3) Roll battery case out evenly with index fingers.
- (4) Remove end caps and install two batteries BA-30 or BA-3030/U in each end of battery case. Make sure positive ends of batteries are facing open ends of battery case.
- (5) Replace the two end caps.

CAUTION

Do not screw end caps onto battery case too tightly or battery case or end caps may be damaged.

- (6) Press battery case into retaining springs and spring contacts. Be careful not to damage spring contacts. Make sure arms of spring contacts hold case firmly and end caps make good contact with spring contacts.



EL8ZE094

Figure 4-6. Installing Batteries in Battery Case.

b. Inspecting Line and Trunk Packs – Series Method. (figure 4-7)

NOTE

The procedures below apply to any combination of line and trunk packs.

- (1) Connect a section of wire WD-1/TT or WD-1A/TT (about two feet), with about one inch of insulation stripped off ends, between line binding posts of a field telephone and binding posts associated with line or trunk pack in first position.
- (2) Connect headset to operator's pack.
- (3) Turn hand ringing generator on field telephone. Line signal on first pack should turn white.
- (4) Insert operator's plug into jack of first line/trunk pack. Line signal should turn black.
- (5) Operate RING BACK - PWR RING FWD switch on operator's pack to RING BACK and turn hand ringing generator on operator's pack. Field telephone should ring.
- (6) Key push-to-talk switch on headset and verify that two-way communication is possible.

- (7) Remove operator's plug from jack of first line/trunk pack.
- (8) Insert plug of second line/trunk pack into jack of first line/trunk pack.
- (9) Turn hand ringing generator on field telephone. Line signal on second line/trunk pack should turn white.
- (10) Insert operator's plug into jack of second line/trunk pack. Line signal should turn black.
- (11) Operate RING BACK - PWR RING FWD switch on operator's pack to RING BACK and turn hand ringing generator on operator's pack. Field telephone should ring.
- (12) Key push-to-talk switch on headset and verify that two-way communication is possible.
- (13) Remove operator's plug from jack of second line/trunk pack and insert plug of second line/trunk pack into jack of third line/trunk pack. Repeat steps (2) through (5).
- (14) Repeat for each succeeding line/trunk pack. Field telephone must remain connected to first position line pack throughout test.

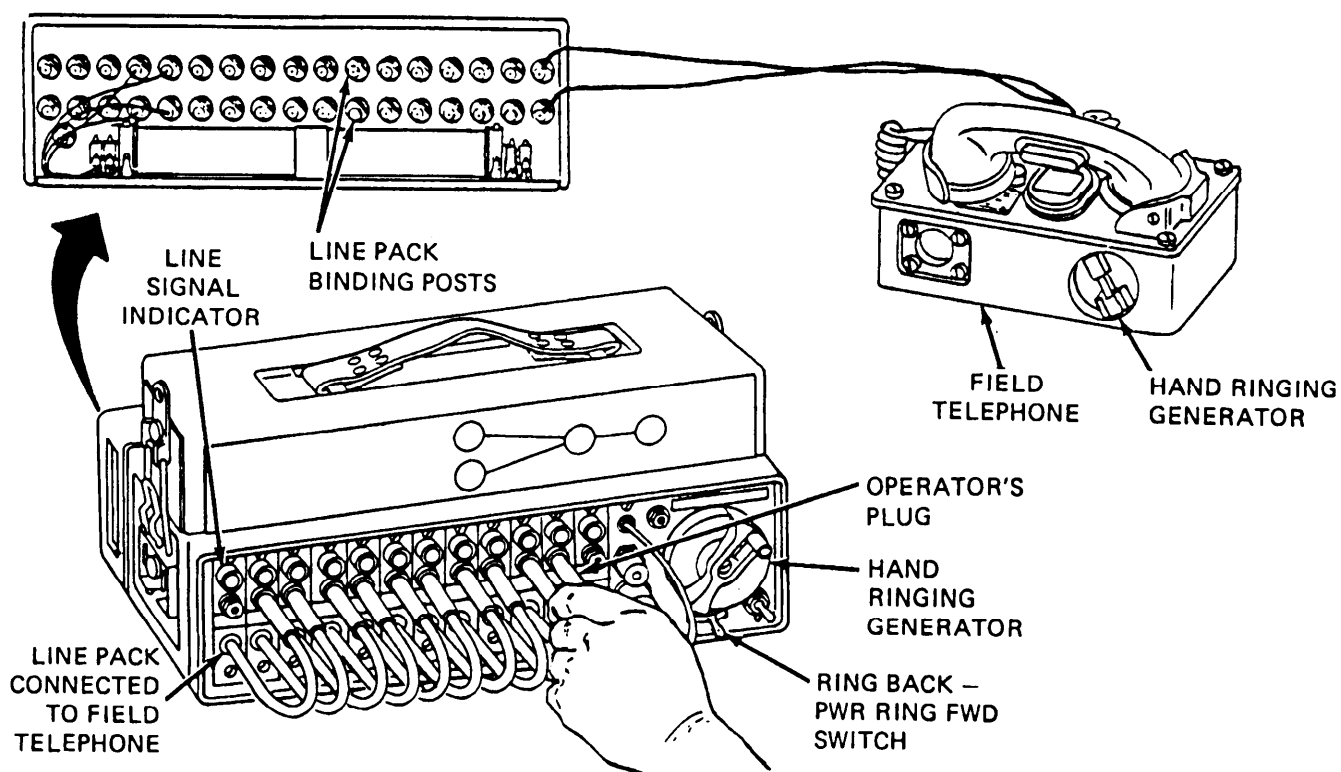


Figure 4-7. Testing Line and Trunk Packs in Series.

c. *Inspecting Line and Trunk Packs – Individual Pack Method.* (figure 4-8) As an alternative to the series testing method described above, each line or trunk pack can be tested individually. When testing a full set of line and trunk packs, this method is slower and, therefore, not preferred.

(1) Connect a section of wire WD-1/TT or WD-1A/TT between line binding posts of a field telephone and binding posts of line or trunk pack to be checked.

(2) Connect headset to operator's pack.

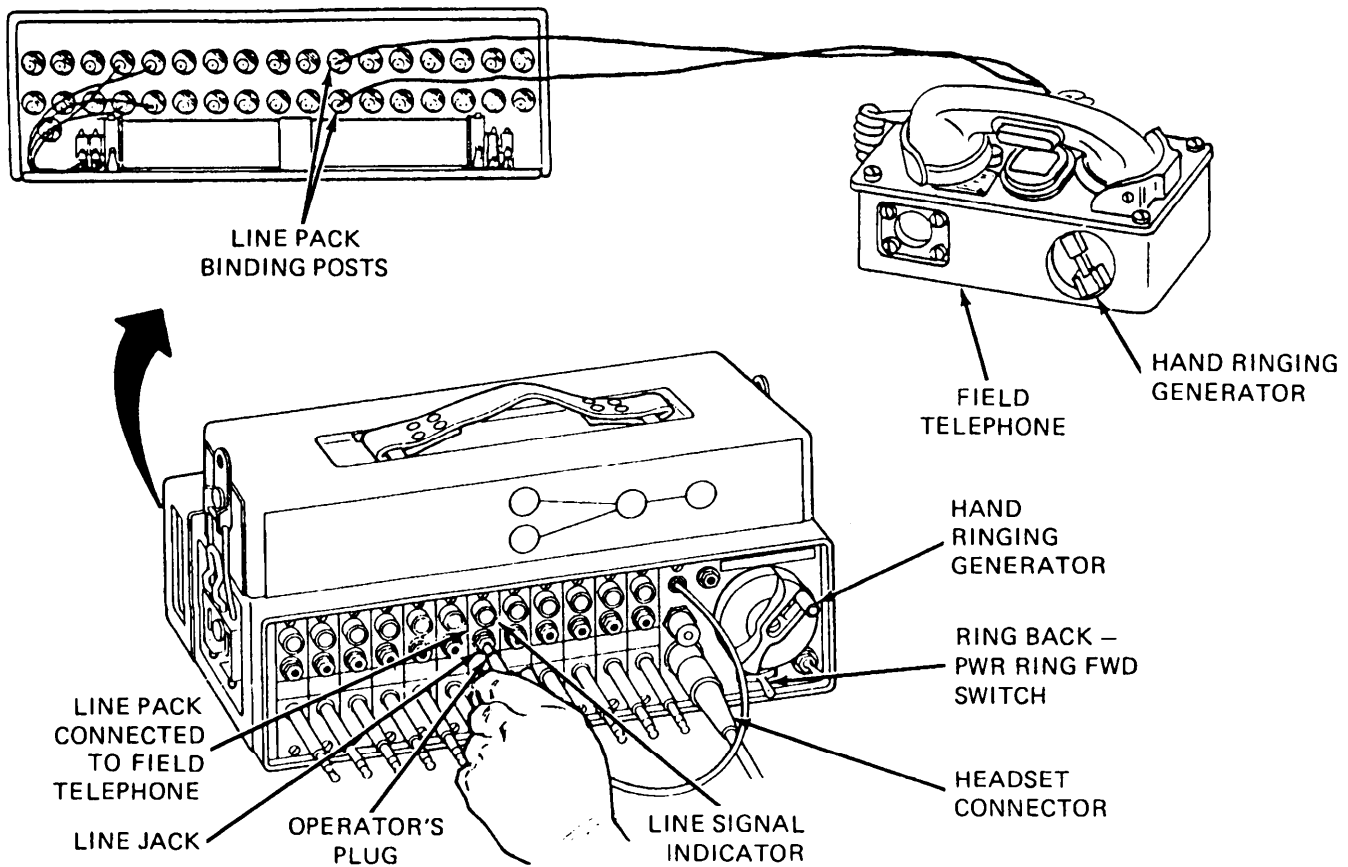
(3) Turn hand ringing generator on field telephone. Line signal on line/trunk pack under test should turn white.

(4) Insert operator's plug into line jack. Line signal should turn black.

(5) Operate RING BACK - PWR RING FWD switch to RING BACK and turn hand ringing generator on operator's pack. Field telephone should ring.

(6) Key push-to-talk switch on headset and verify that two-way communication is possible.

(7) Repeat steps (1) through (6) for each line and trunk pack being tested. Note that field telephone connections must be moved for each pack being tested.



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Figure 4-8. Testing Line and Trunk Packs Individually.

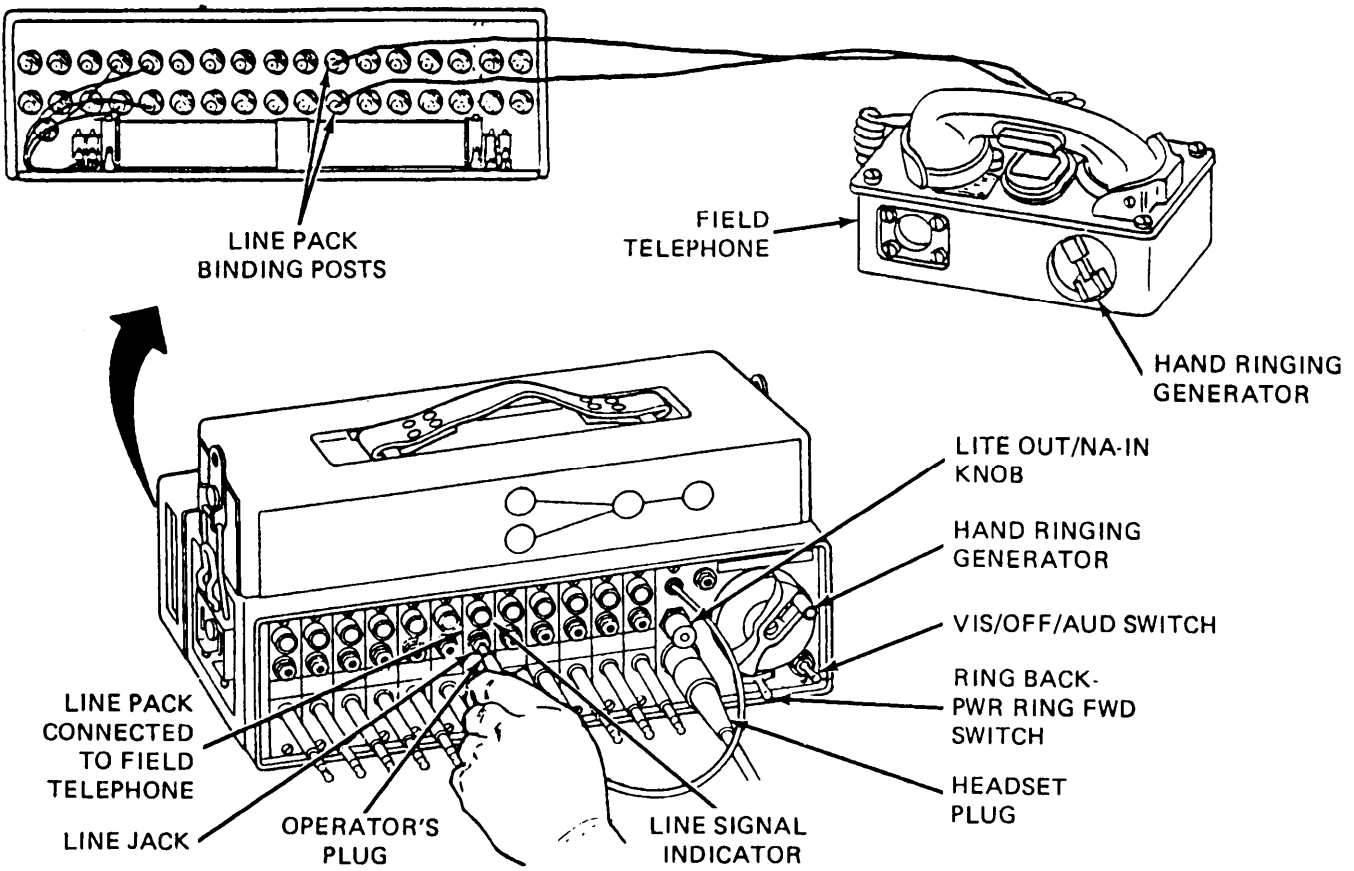
d. *Inspecting Operator's Pack.* (figure 4-9)

- (1) Connect a field telephone to a line pack (paragraph 4-6.b).
- (2) Operate VIS/OFF/AUD switch to VIS.
- (3) Operate hand ringing generator on field telephone. When line signal indicator on line pack turns from black to white, night alarm/night light (NA-IN/LITE-OUT) switch on operator's pack should light.
- (4) Operate VIS/OFF/AUD switch to AUD.
- (5) Operate hand ringing generator on field telephone. When line signal indicator in line pack turns from black to white, night alarm buzzer should sound.
- (6) Insert plug of operator's cord into jack on line pack. When line signal returns to black (A, figure 4-9), buzzer should stop.
- (7) Push RING BACK-PWR RING FWD switch to RING BACK and turn hand ringing generator on operator's pack. Ringer in field telephone should sound.
- (8) Remove operator's plug from jack of line pack connected to field telephone. Insert operator's plug into jack of another line pack. Insert plug of cord on second line pack into jack of line pack connected to field telephone (B, figure 4-9).
- (9) Turn hand ringing generator on operator's pack. Ringer in field telephone should sound.
- (10) Remove both plugs from jacks and insert plug of operator's cord into jack on operator's pack.
- (11) Pull out LITE-OUT/NA-IN knob. Lamp should light.
- (12) Push LITE-OUT/NA-IN knob into its original position. Lamp should be extinguished.

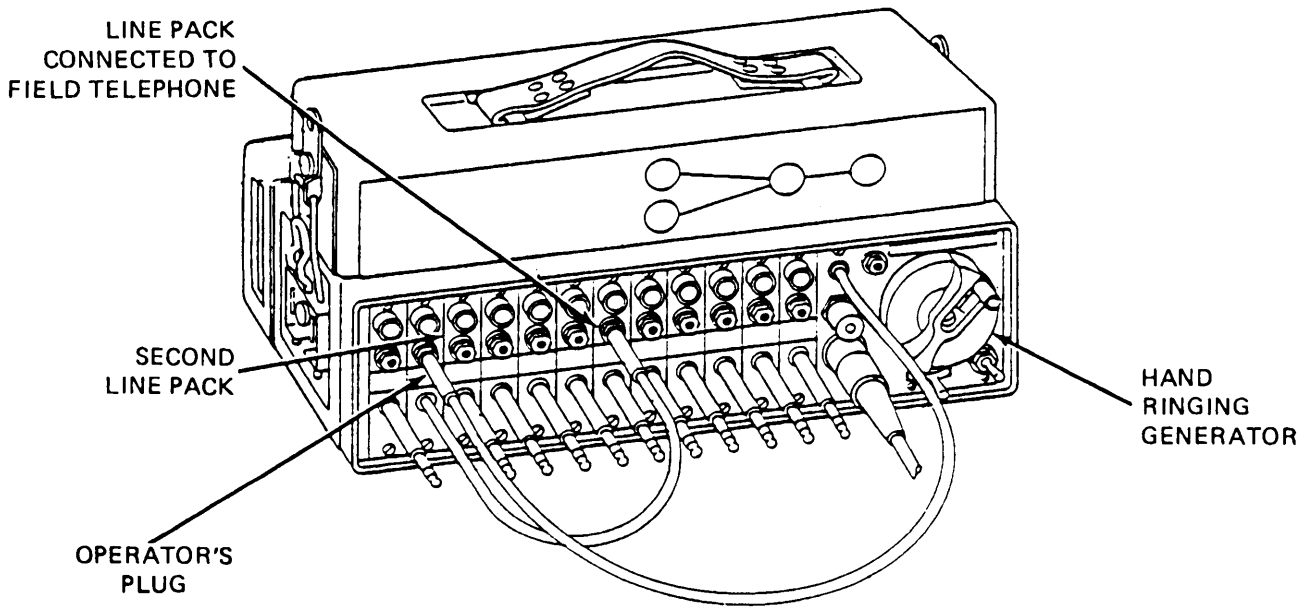
4-7. **Siting**

The switchboard must be protected from dampness, dust, dirt, ice, and snow. If possible, during subfreezing temperatures, the switchboard should be located in a heated shelter. The switchboard may be installed in a foxhole, bunker, or building.

The switchboard should be located centrally with respect to the line and trunk circuits terminated on the switchboard.



A



B

EL&ZE097

Figure 4-9. Testing Operator's Pack.

4-8. Installing One Switchboard (figure 4-10)**CAUTION**

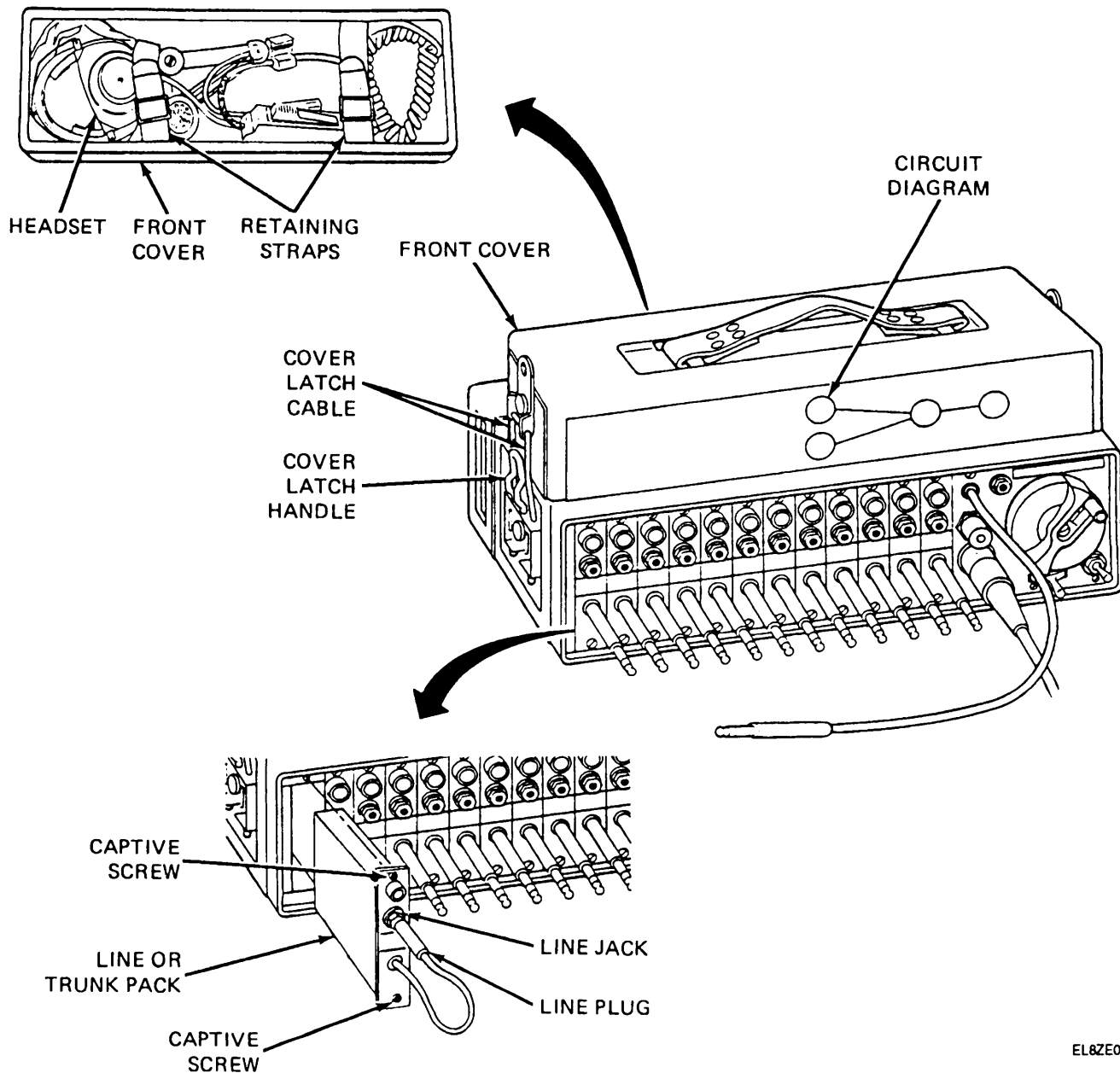
When installing switchboard, do not lay it on bare ground. Lay switchboard on a shelter-half, poncho, or other canvas cover. During inclement weather, fold edges of cover back over switchboard after it has been installed to keep it from getting wet.

- a. Select a flat surface, such as a table, packing box, or a ledge in a foxhole.
- b. Lay switchboard on its side so that nameplate is facing up.
- c. Release front cover latch on each end of switchboard and remove front cover from switchboard.
- d. Loosen retaining straps inside front cover and remove headset.
- e. Place cover on top of switchboard (yellow side forward) and secure it in place with latches. Yellow side will be used to draw circuit diagram.

NOTE

Switchboard will be delivered to your unit with 12 line packs installed (SB-22/PT) or 11 line packs and one trunk pack installed (SB-22A/PT). Any line pack may be replaced with a trunk pack. Switchboard can operate with any combination of line and trunk packs. A trunk pack may be installed in any position. However, for convenience, it is best to install trunk pack in first or last position.

- f. Install trunk pack in place of a line pack as follows:
 - (1) Unscrew captive screws on line pack no. 1 or no. 12.
 - (2) Insert plug of cord into jack of line pack.
 - (3) Grasp plug and pull line pack out of switchboard case. Be sure to pull line pack straight out to avoid bending plug or jack.
 - (4) Insert plug of cord into jack on trunk pack.
 - (5) Slide trunk pack into switchboard case and tighten captive screws.
 - (6) Remove plug from jack and mark trunk pack to indicate trunk destination.
- g. Ground switchboard (paragraph 4-10).



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Figure 4-10. Installing One Switchboard.

4-9. Installing Two Switchboards

- a. Install first switchboard as described in paragraph 4-8, but do not place cover on top of switchboard.
- b. Remove cover from second switchboard. Do not remove headset from inside of cover.
- c. Remove operator's pack from second switchboard as follows: (figure 4-11)
 - (1) Unscrew captive screw located in each corner of front of operator's pack.
 - (2) Connect headset connector to receptacle on operator's pack.

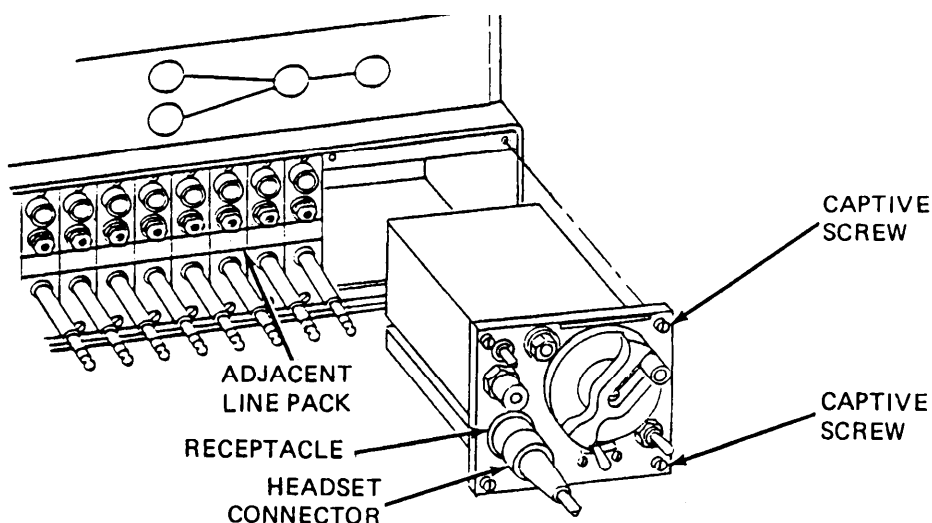
CAUTION

Be sure to pull operator's pack straight out to avoid damaging connectors at rear of operator's pack.

NOTE

On new equipment, operator's pack maybe difficult to remove. If necessary, remove line pack adjacent to operator's pack before removing operator's pack.

- (3) Grasp headset connector and pull operator's pack from switchboard case.

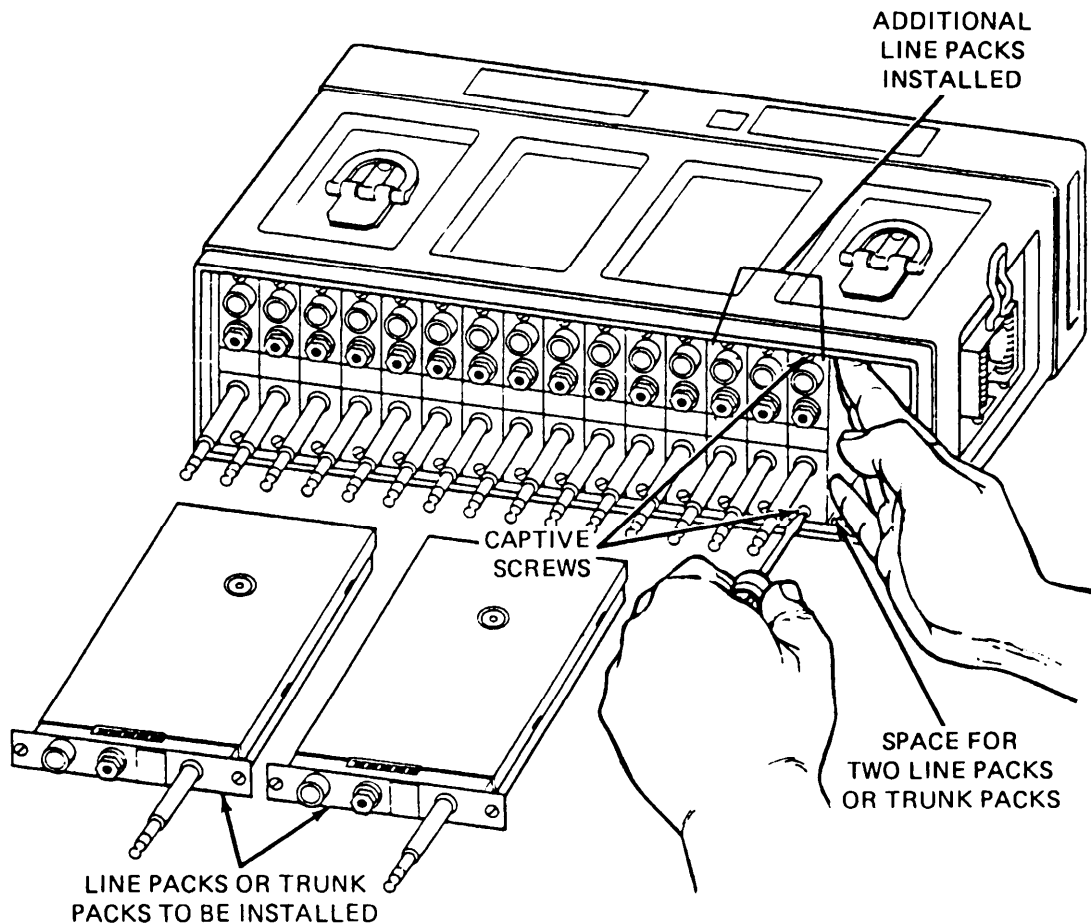


EL8ZE099

Figure 4-11. Removing Operator's Pack.

d. Install five line packs or trunk packs from accessory kits in place of operator's pack, as follows: (figure 4-12)

- (1) Pull out cord on one line or trunk pack and insert plug in jack.
- (2) Grasp plug and slide line or trunk pack into switchboard case beside line pack no. 12. Be sure receptacle at rear of pack is aligned with plug at back of switchboard.
- (3) Push line pack into switchboard case until captive screws at top and bottom of pack seat against switchboard case.
- (4) Screw captive screws into tapped holes. Be careful not to break or strip screws by overtightening.
- (5) Install four additional packs as explained in steps (1) through (4).



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Figure 4-12. Installing Additional Line Packs.

e. Position second switchboard on top of first switchboard (figure 4-13). Be sure front and sides of switchboards are in line.

f. Secure one front cover on top of second (upper) switchboard with cover latches of second switchboard (figure 4-13).

g. Secure second switchboard to first switchboard with cover latches of first switchboard (figure 4-13).

h. Make the following electrical connections:

(1) Disconnect the two blue and two red wires from BAT NA and BAT MIC bindings posts (figure 4-21) in second switchboard.

(2) Connect a short piece of WD-1/TT or WD-1A/TT wire between NA terminal of each switchboard.

i. Ground switchboard (paragraph 4-10).

NOTE

When stacked (interconnected) operation of switchboards is no longer required, remove jumper wire between NA terminals and reconnect two red and two blue wires to BAT NA and BAT MIC binding posts of second (upper) switchboard.

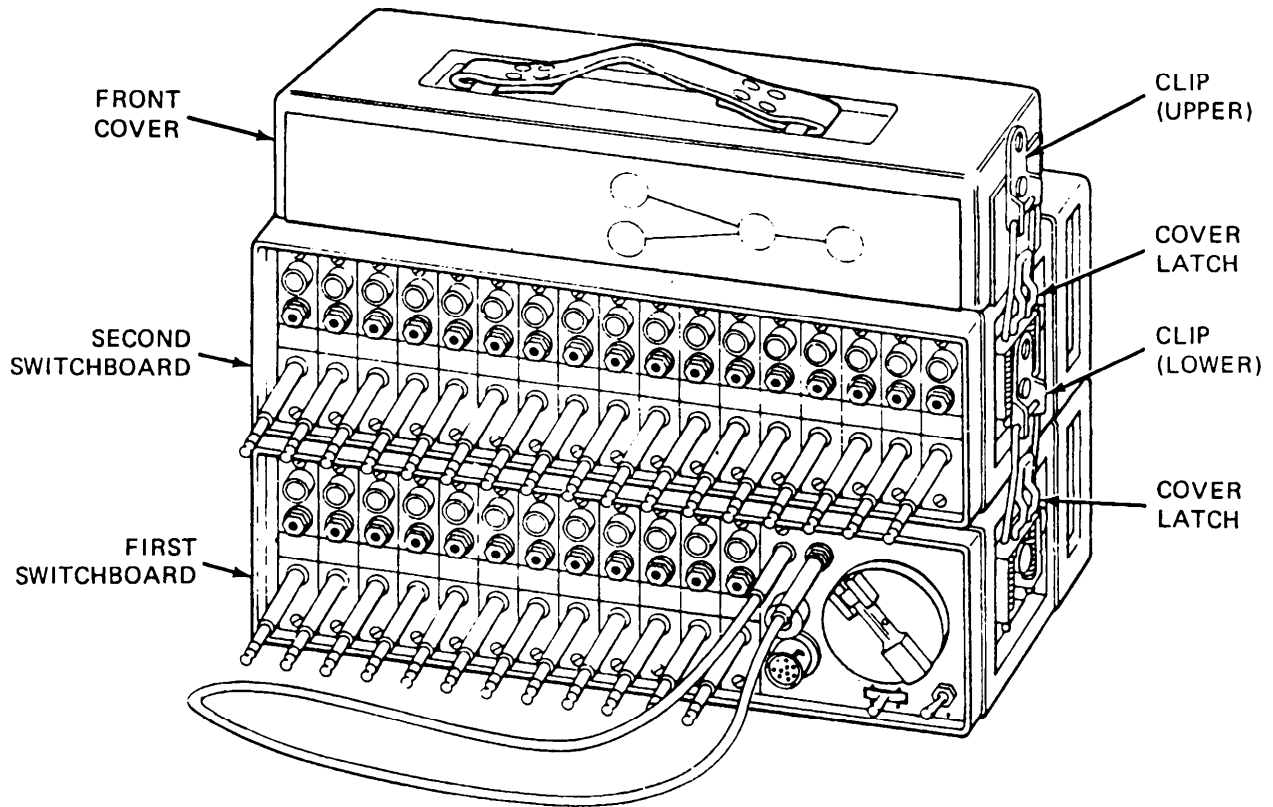


Figure 4-13. Installation Arrangement for Two Switchboards.

4-10. Grounding Procedures

NOTE

When two switchboards are used in stacked operation (paragraph 4-9), each switchboard must be grounded separately as described below.

a. Scoop out a small hole, about 6 inches deep, at selected grounding site as close as possible to switchboard.

NOTE

Driving in ground rod at an angle may facilitate removal.

b. Drive ground rod into hole until approximately 3 inches remain above ground.

WARNING

Be extremely careful when grounding switchboard, especially when grounding SB-22/PT. Death from electric shock can result if proper precautions are not observed.

c. When grounding SB-22A/PT, run ground strap from rear of switchboard to ground rod. When grounding SB-22/PT, connect a length of wire WD-1/TT or WD-1A/TT to GND binding post on rear of switchboard. (Make sure wire is long enough to reach ground rod.)

d. Connect free end of ground strap or wire to ground rod. Insure that connection point is clean and there is a good electrical connection.

4-11. Installing Tone Signaling Adapter (figure 4-14)

a. Remove tone signaling adapter from accessory kit.

NOTE

The battery clip has a keyed design which prevents improper battery connections.

b. Remove battery compartment cover and install one battery BA-90 in battery compartment. Replace cover and tighten captive screws.

c. Loosen two locking screws on front of tone signaling adapter several turns and slide mounting plate out.

d. Hold tone signaling adapter in right hand. Place catch plate over and slightly behind stud on right side of switchboard.

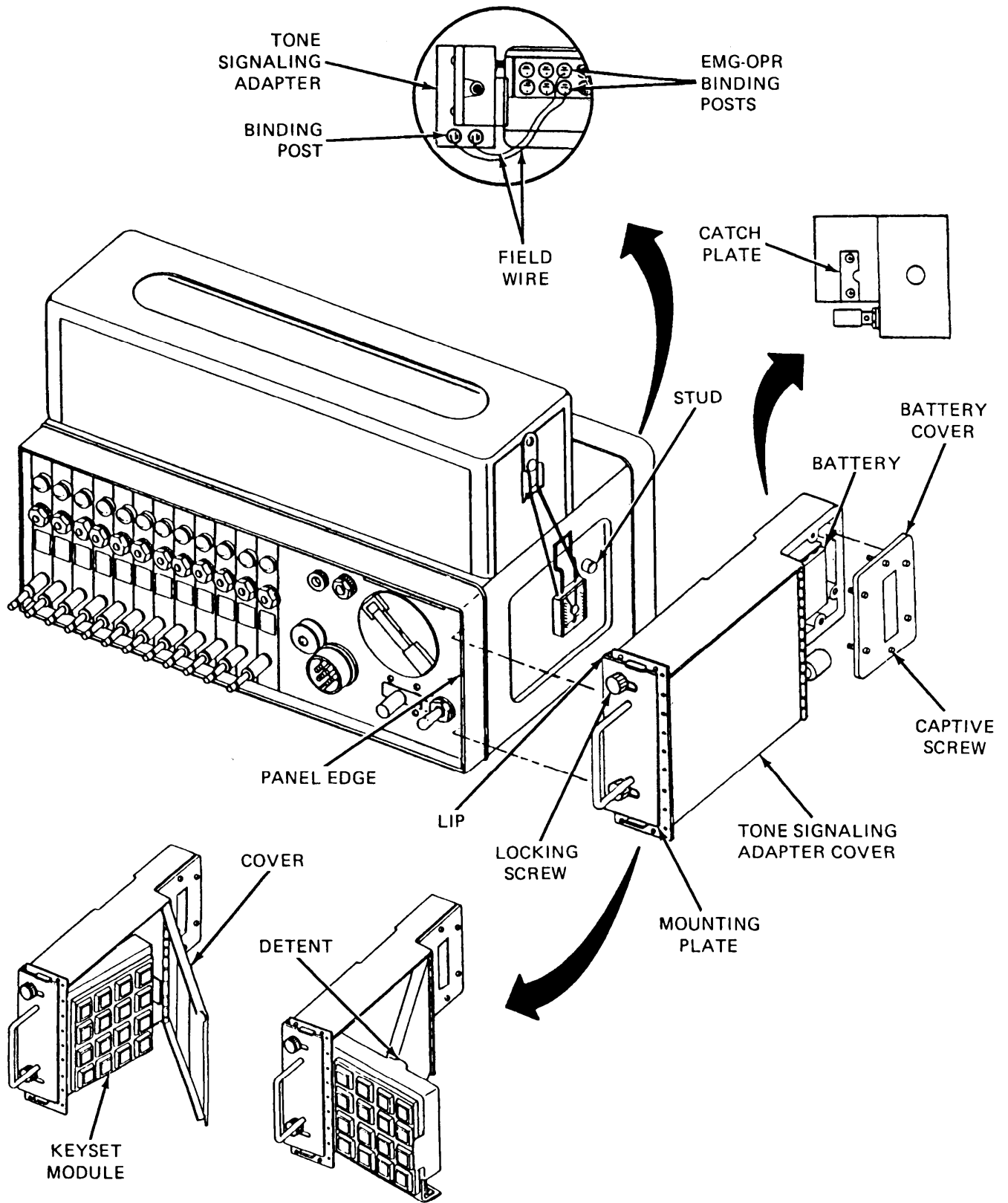
e. Slide tone signaling adapter forward so that catch plate grips edge of stud on switchboard and, at the same time, place lip of mounting plate over panel edge on switchboard case.

f. Press tone signaling adapter against side of switchboard. Position mounting plate with hand pressure and tighten locking screws.

g. Open tone signaling adapter cover and swing out keyset module.

h. Set end of cover into detent on back of keyset module.

i. Connect a short length of field wire between the two binding posts on tone signaling adapter and EMG OPR binding posts on rear of switchboard.



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Figure 4-14. Installing Tone Signaling Adapter.

4-12. Telephone Line and Trunk Connection (figure 4-15)

Terminate each subscriber line or trunk circuit as it is brought to the switchboard as follows:

WARNING

Always ground switchboard before hooking up field wire. Be careful when using switchboard during storms. Lightning may pose a shock hazard.

NOTE

Each line wire consists of two conductors. Each line circuit on switchboard has two binding posts (arranged vertically), one for each conductor. Make sure both conductors are connected to binding posts in the same circuit.

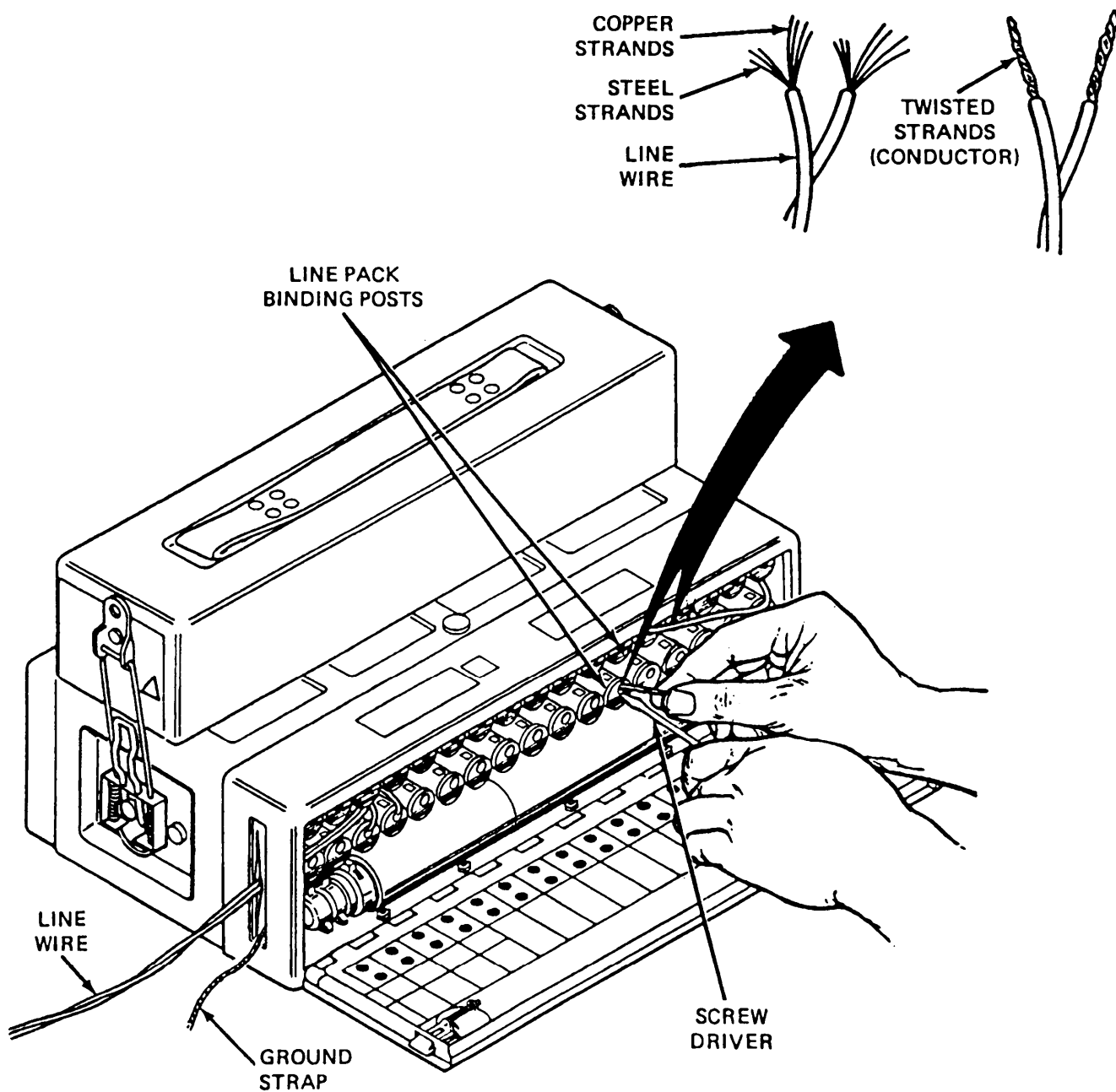
When connecting a trunk circuit, be sure to connect conductors to trunk pack binding posts.

- a. Remove about one inch of insulation from each conductor.
- b. Separate copper strands from steel strands in each conductor.
- c. Wrap copper strands around steel strands in each conductor.
- d. Fold about six inches of wire back and pass loop through slit in rubber gasket on side of switchboard.
- e. Pull on loop until end of wire is pulled through rubber gasket. Pull enough wire through gasket to reach desired line pack binding post. Knot wire inside switchboard case to keep wire from pulling back out.

NOTE

If a screwdriver is not available, binding post can be pushed in with a finger tip.

- f. Place tip of a screwdriver in slot of one of the binding posts and push on binding post.
- g. Slide bare end of one conductor into hole in binding post.
- h. Remove screwdriver from slot in binding post. Binding post will spring out and conductor should be firmly clamped. Pull gently on conductor to be sure it is clamped firmly in binding post.
- i. Repeat steps f through h for other conductor.
- j. Press wire into space between rows of binding posts and pull excess slack out of switchboard through slit in rubber gasket to provide a drop loop in line wire.



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Figure 4-15. Connecting Subscriber Line to Switchboard.

CAUTION

Do not use ballpoint pen or magic marker on line pack designation strip. Use only grease pencil or soft lead pencil so it can be removed.

- k. Record line number in space provided on rear door and on designation strip on front of line or trunk pack.

4-13. Interconnecting Switchboard and SB-86/P

The switchboard and the SB-86/P can be used together to terminate both landlines and remote control radio circuits. In this type of operation, the radio is connected by wire to the switchboard and permits communication by radio transmission with another radio or another switchboard equipped for net radio interface, when landlines do not exist. Connect the radio circuit as described in paragraph 4-14. Interconnect the switchboard and the SB-86/P as follows:

a. Positioning Switchboard and SB-86/P. (figure 4-16)

- (1) Lift log plate from top of the SB-86/P and position switchboard on top of top jack field section.
- (2) Hook cover latch cable under front catches on jack field section. Tighten cover latches by turning cover latch handles one-half turn.
- (3) Connect headset to headset receptacle on front of SB-86/P and operate push-to-talk lever to third position (continuous telephone transmission).

b. Connecting Switchboard to SB-86/P. (figure 4-17)

- (1) Connect EMG OPR binding posts at rear of switchboard to EMG OPR binding posts on front of SB-86/P.
- (2) Connect GEN POWER RING binding post at rear of switchboard to EXT GEN binding post at rear of operator's pack on SB-86/P.
- (3) Connect one of the START POWER RING binding posts on switchboard to ST VIB binding post on SB-86/P, and connect the other START POWER RING binding post to the +24V binding post on SB-86/P.

4-14. Connecting Remote Control Radio Circuit

Connect the radio to the switchboard as follows: (figure 4-18)

WARNING

Always ground switchboard before hooking up field wire. Be careful when using switchboard during storms. Lightning may pose a shock hazard.

NOTE

Field wire connecting radio to switchboard has two conductors. Each line circuit on switchboard has two binding posts (arranged vertically). Make sure conductors are connected to binding posts in same circuit.

- a.* Remove about one inch of insulation from each conductor.
- b.* Separate copper strands from steel strands in each conductor and wrap copper strands around steel strands in each conductor.

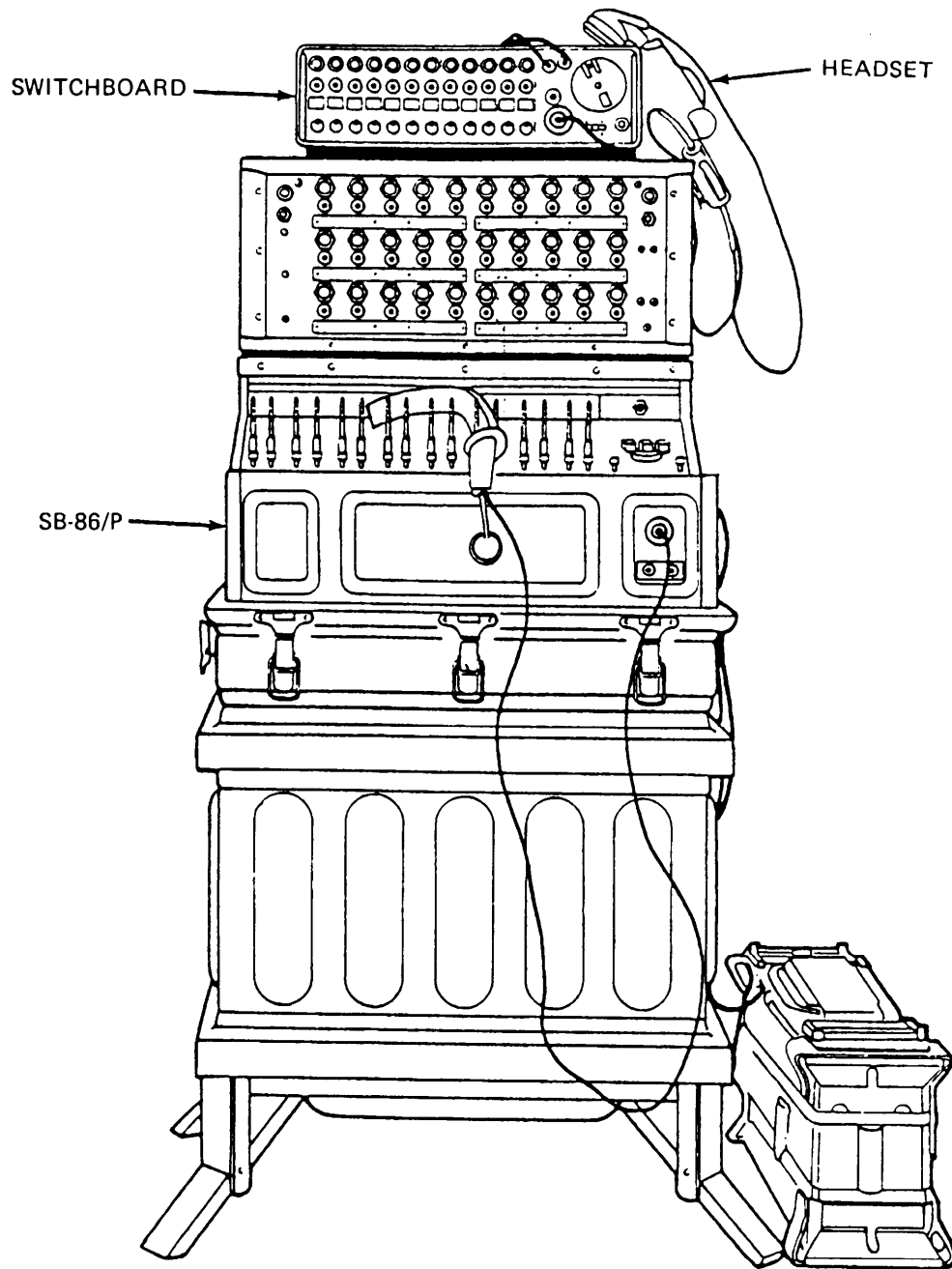
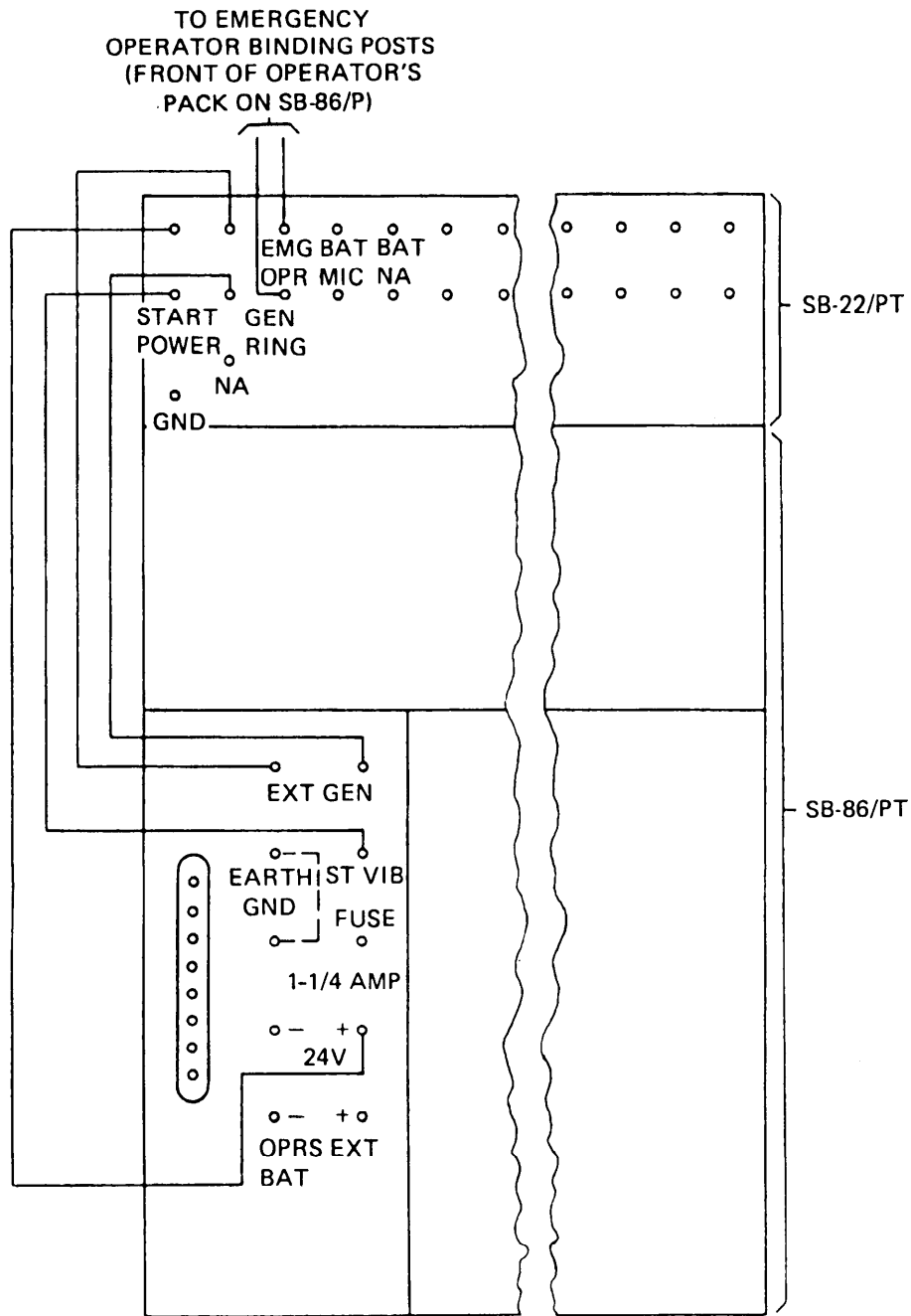


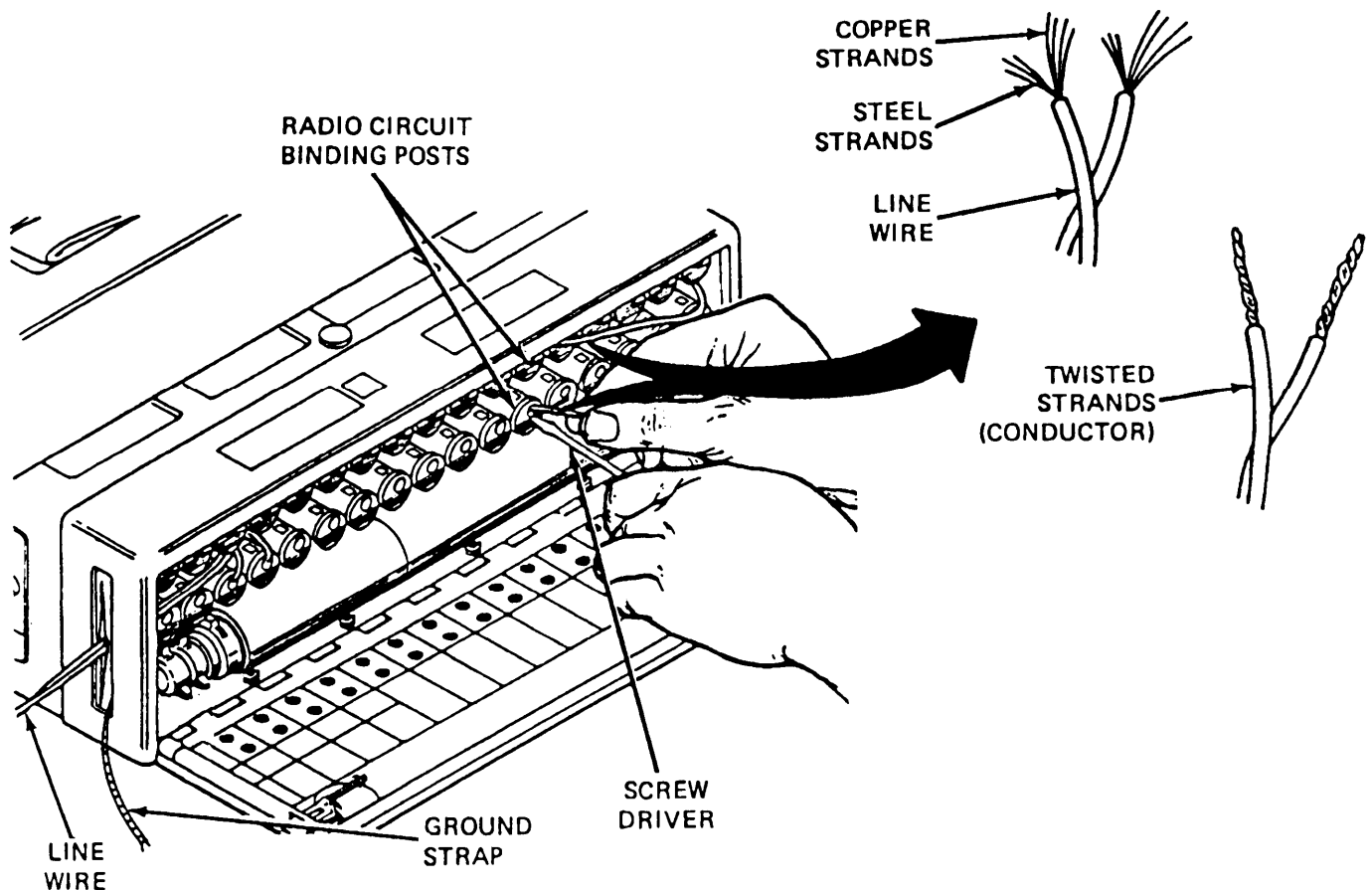
Figure 4-16. Switchboard and SB-86/P.

EL8ZE104



EL&ZE105

Figure 4-17. Connection Diagram for Switchboard and SB-86/P Operation.



EL8ZE106

Figure 4-18. Connecting Remote Control Radio Circuit.

c. Loop end of wire and pass loop through slit in rubber gasket on side of switchboard.

d. Pull enough wire through gasket to reach binding posts of line pack selected for radio circuit. Knot wire inside switchboard to keep wire from pulling back out.

NOTE

If a screwdriver is not available, binding post can be pushed in with a finger tip.

e. Place tip of a screwdriver in slot of one of the binding posts and push on binding post.

f. Slide bare end of one conductor into hole in binding post.

g. Remove screwdriver from slot in binding post. Binding post will spring out and conductor should be firmly clamped. Pull gently on conductor to be sure it is clamped firmly in binding post.

h. Repeat steps e through g for other conductor.

i. Check line signal indicator. If signal indicator has turned white, insert operator's cord into associated jack and remove it immediately. If signal turns white again, remove both conductors from binding posts, reverse conductor positions and reconnect them (steps e through g). Check signal indicator again.

CAUTION

Remote radio circuits must be correctly terminated on switchboard to prevent radio from operating continuously.

NOTE

Make sure radio line is connected to binding posts of line pack designated as radio circuit.

4-15. Teletypewriter Operation Connections

NOTE

A teletypewriter line is a telephone line to a subscriber telephone station where a teletypewriter is also available. Additional teletypewriter lines may be installed, if required, as described in paragraph 4-9.

a. Connecting Lines and Trunks.

(1) Connect each teletypewriter line to a separate pair of binding posts at rear of switchboard (paragraph 4-12).

CAUTION

Do not use ballpoint pen or magic marker on line pack designation strip. Use only grease pencil or soft lead pencil so it can be removed.

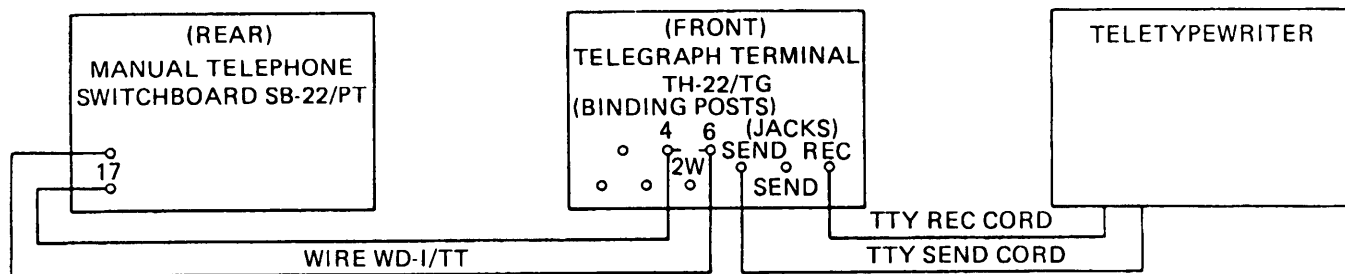
(2) Record line designation in space provided for each teletypewriter line on front of line pack and on inside of rear cover of switchboard.

b. Connecting Telegraph Terminal TH-22/TG and Teletypewriter Set. The TH-22/TG and a teletypewriter are used by the operator to answer teletypewriter calls on the switchboard. Follow the procedure below to connect the TH-22/TG and teletypewriter (figure 4-19) to the switchboard.

(1) Connect a piece of WD-1/TT or WD-1A/TT to line binding posts of highest numbered line pack.

(2) Connect other end of wire to binding posts (2W-4WR) on Telegraph Terminal TH-22/TG. (Refer to TM 11-5805-356-12 for additional information concerning TH-22/TG.)

(3) Connect teletypewriter to TH-22/TG. Refer to technical manual for teletypewriter being used.



EL8ZE107

Figure 4-19. Connecting Telegraph Terminal TH-22/TG and Teletypewriter.

4-16. Installing External Source of Ringing Current

a. *Connecting Static Ringing Generator TA-248/TT or TA-248A/TT.* (figure 4-20) Static Ringing Generator TA-248A/TT is similar to the TA-248/TT except for the fusing arrangement and method of mounting. Refer to TM 11-5805-298-15 for additional information concerning the TA-248/TT and TA-248A/TT. Connect as follows:

CAUTION

Observe polarity on conductors when connecting wires to switchboard binding posts.

(1) Connect power output cord of static ringing generator to GEN POWER RING binding posts (binding posts number 16). Connect black (negative) lead to top binding post and white (positive) lead to bottom binding post.

(2) Plug static ringing generator power input cord into a 115 VAC 60 Hz outlet.

b. *Connecting Battery Powered Power Supply PP-990/G.* (figure 4-21) when operated on battery power, the PP-990/G uses ten batteries BA-200. Refer to TM 11-5805-304-14 for additional information concerning the PP-990/G. Connect as follows:

CAUTION

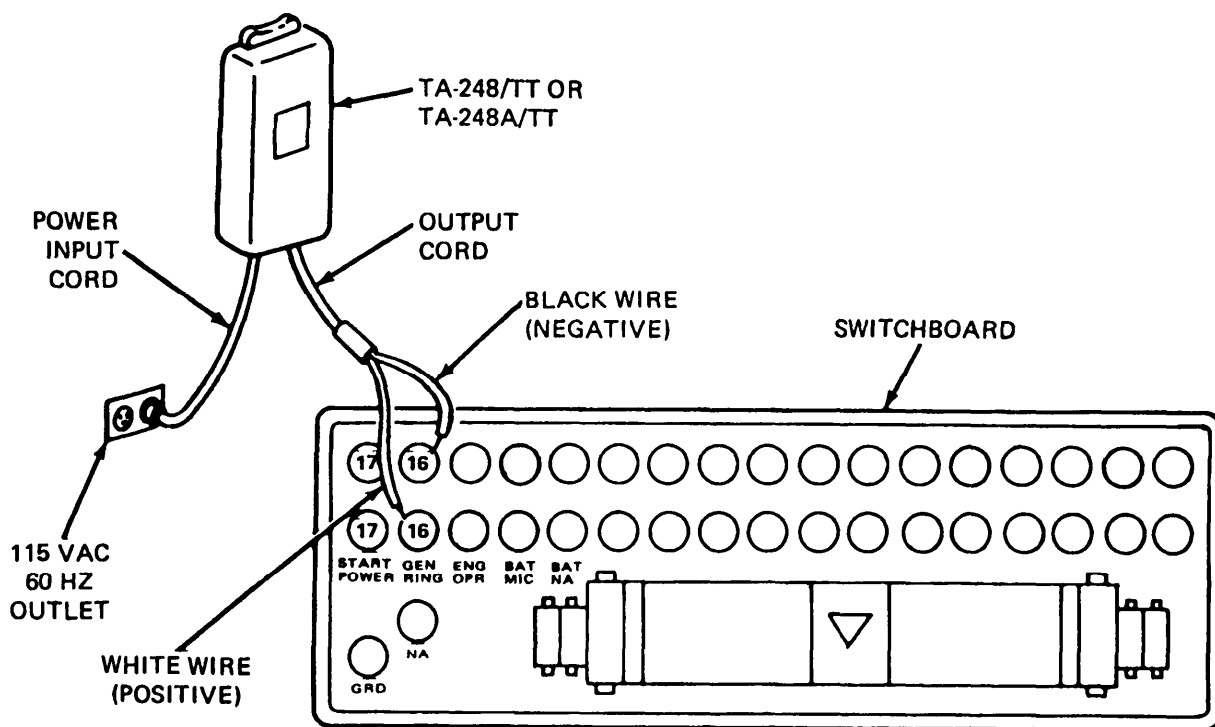
Operate BATT switch on PP-990/G to EXT position when connecting or disconnecting wires to prevent fuses from blowing out.

Observe polarity on conductors when connecting wires to switchboard binding posts.

(1) Using wire WD-1/TT or WD-1 A/TT, connect RING SUP binding posts on PP-990/G to GEN POWER RING binding posts (binding posts number 16) on switchboard as shown in figure 4-21,

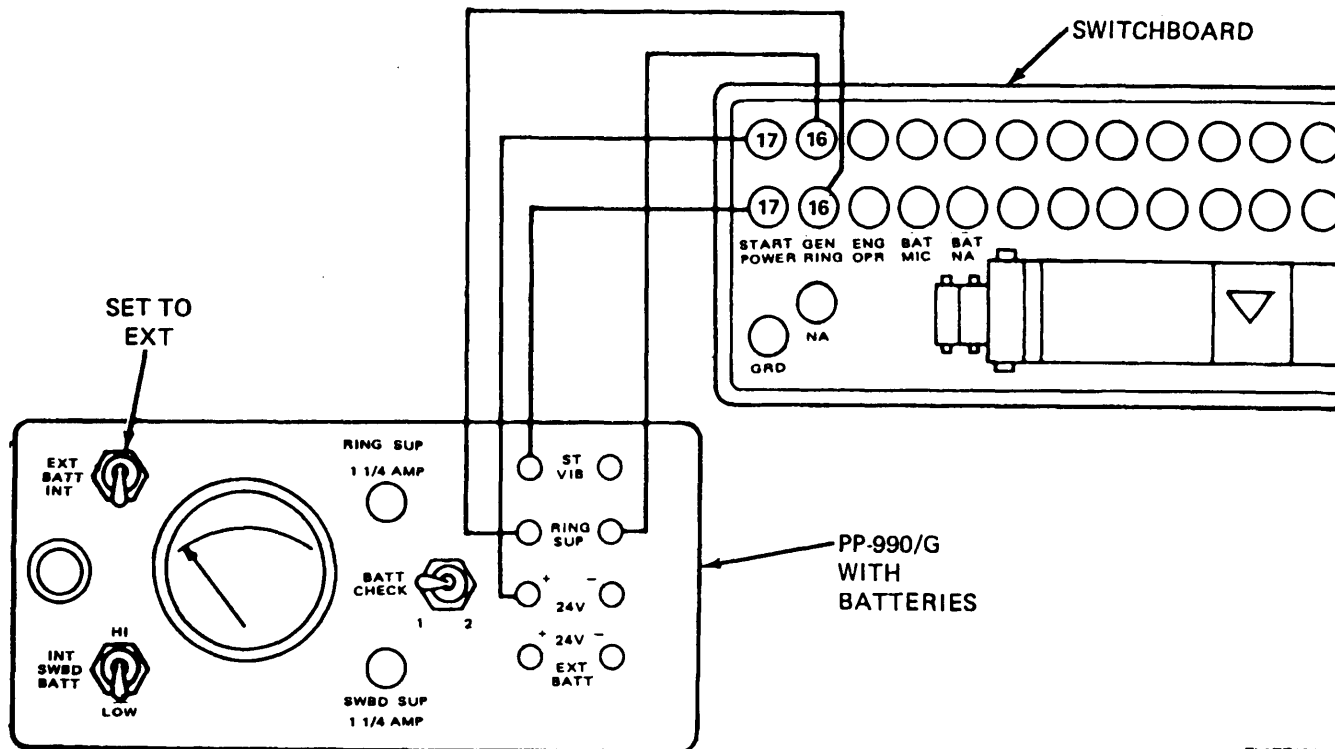
(2) Using wire WD-1/TT or WD-1A/TT, connect ST VIB binding post on PP-990/G to bottom START POWER binding post (number 17) on switchboard.

(3) Using wire WD-1/TT or WD-1A/TT, connect +24V binding post on PP-990/G to top START POWER binding post (number 17) on switchboard. .



EL8ZE123

Figure 4-20. Connecting Static Ringing Generator TA-248/TT or TA-248A/TT to Switchboard



EL8ZE124

Figure 4-21. Connecting Battery Power Supply PP-990/G to Switchboard.

c. *Connecting Power Supply PP-990/G and Power Supply PP-2953()/U.* (figure 4-22) When the PP-990/G is operated as a plug-in unit, it must be used together with Power Supply PP-2953/U, PP-2953A/U, PP-2953B/U or PP-2953C/U. The PP-2953/U and PP-2953A/U use fuses. The PP-2953B/U and PP-2953C/U use circuit breakers. The installation procedures described below are the same for all four models. Refer to TM 11-5805-304-14 for additional information concerning the PP-990/G. Refer to TM 11-6130-233-12 for additional information concerning the PP-2953()/U. Operation using the PP-990/G and PP-2953()/U requires one cable assembly CX-4524/U (packed with PP-2953()/U) and one cable assembly CX-4721/VRC. Connect equipment as follows:

WARNING

Make sure VOLTAGE SELECTOR switch on PP-2953()/U is in correct position before turning power switch to ON. 230 VAC operating voltage applied while VOLTAGE SELECTOR switch is set at 115V 50-60 400 Hz position may result in serious injury to personnel or serious damage to equipment.

CAUTION

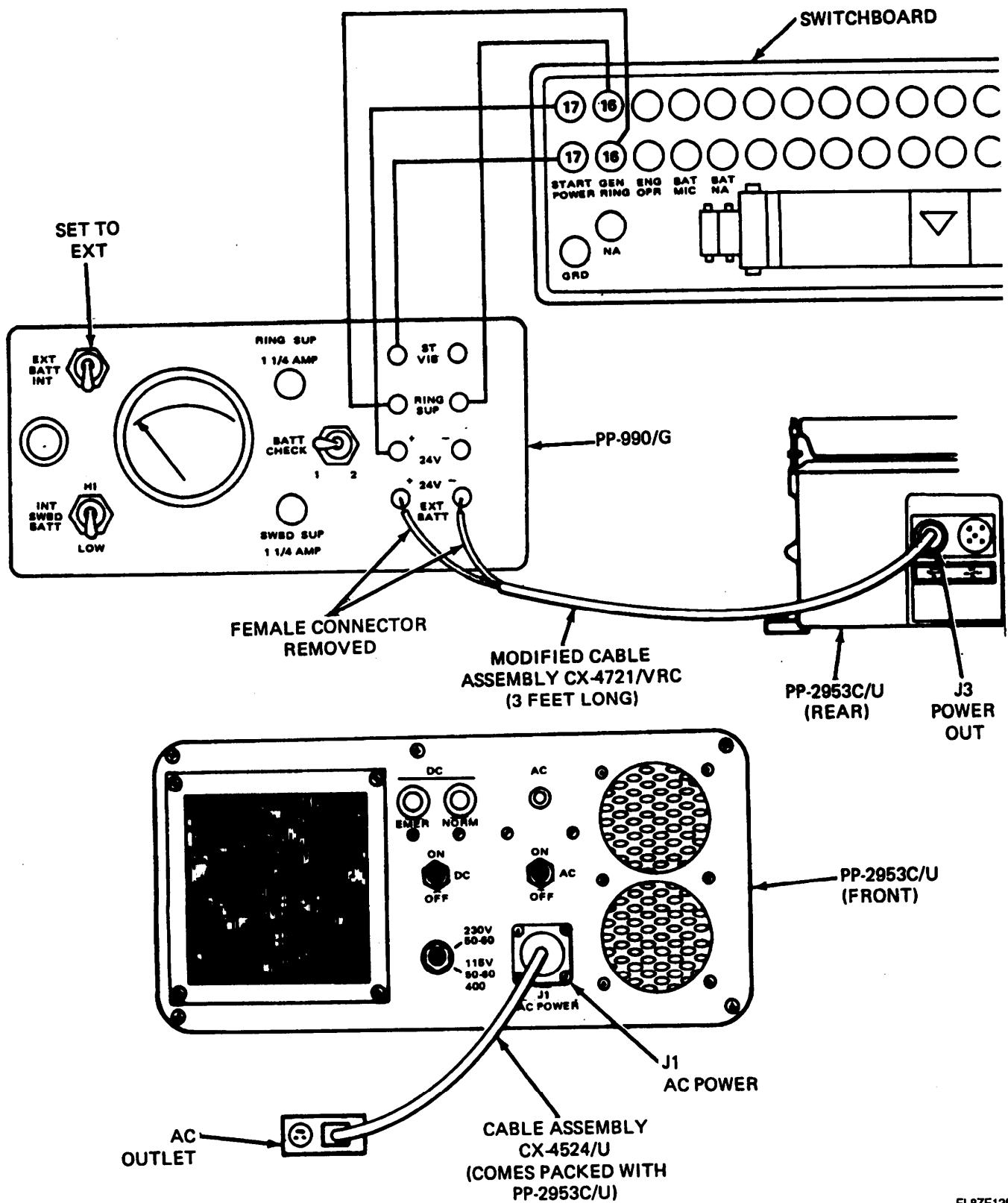
Operate BATT switch on PP-990/G to EXT position when connecting or disconnecting wires to prevent fuses from blowing out.

Observe polarity on conductors when connecting wires to switchboard binding posts.

NOTE

Cable assembly CX-4721/VRC is used to interconnect PP-990/G and PP-2753()/U. When positioning equipment for interconnection, observe that cable is only three feet long.

- (1) Modify cable CX-4721/VRC by removing female connector and exposing bare wire.
- (2) Plug remaining (male) connector on CX-2741/VRC into J3 POWER OUT on rear of PP-2953()/U.
- (3) Connect cable assembly CX-2741/VRC positive (white/red) leads to EXT BAIT +24V binding post on PP-990/G. Connect cable assembly negative (black/green) leads to EXT BATT-24V binding post on PP-990/G.
- (4) Connect cable assembly CX-4524/U between J1 AC POWER on PP-2953()/U and an AC outlet.
- (5) Connect PP-990/G to switchboard as described in paragraph 4-16.b.

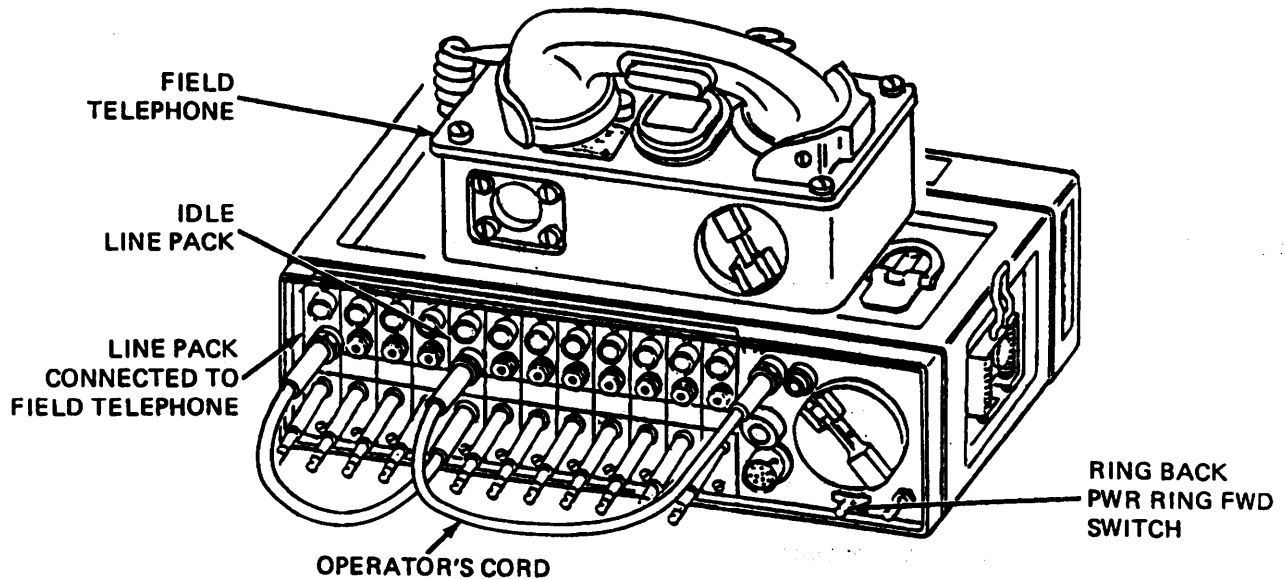


EL8ZE125

Figure 4-22. Connecting Power Supply PP-990/G and Power Supply PP-2953C/U to Switchboard.

d. *Checking Power Ringing Function.* (figure 4-23)

- (1) Turn on power ringing equipment.
- (2) Insert operator's plug into jack of an idle line pack.
- (3) Insert plug on cord of idle line pack into jack of a line pack connected to a field telephone.
- (4) Operate RING BACK - PWR RING FWD switch on operator's pack to PWR RING FWD. Field telephone should ring.



EL8ZE108

Figure 4-23. Testing Power Ringing Function.

Section III. UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-17. General

There are no preventive maintenance checks or services assigned to unit level maintenance. Refer to table 2-1 for operator PMCS applicable to the switchboard. Operator PMCS should be performed upon receipt of the switchboard.

Section IV. TROUBLESHOOTING PROCEDURES

4-18. General

Unit level troubleshooting is essentially the same as operator level troubleshooting. Refer to table 3-1 for operator troubleshooting information.

Section V. MAINTENANCE PROCEDURES

Subject	Para	Page
Headset	4-19	4-32
Trunk and Line Packs	4-20	4-36
Spring Contacts	4-21	4-38

4-19. Headset

This tasks covers: a. Replacement of earphone element b. Replacement of microphone element

INITIAL SETUP

Tools

Materials/Parts

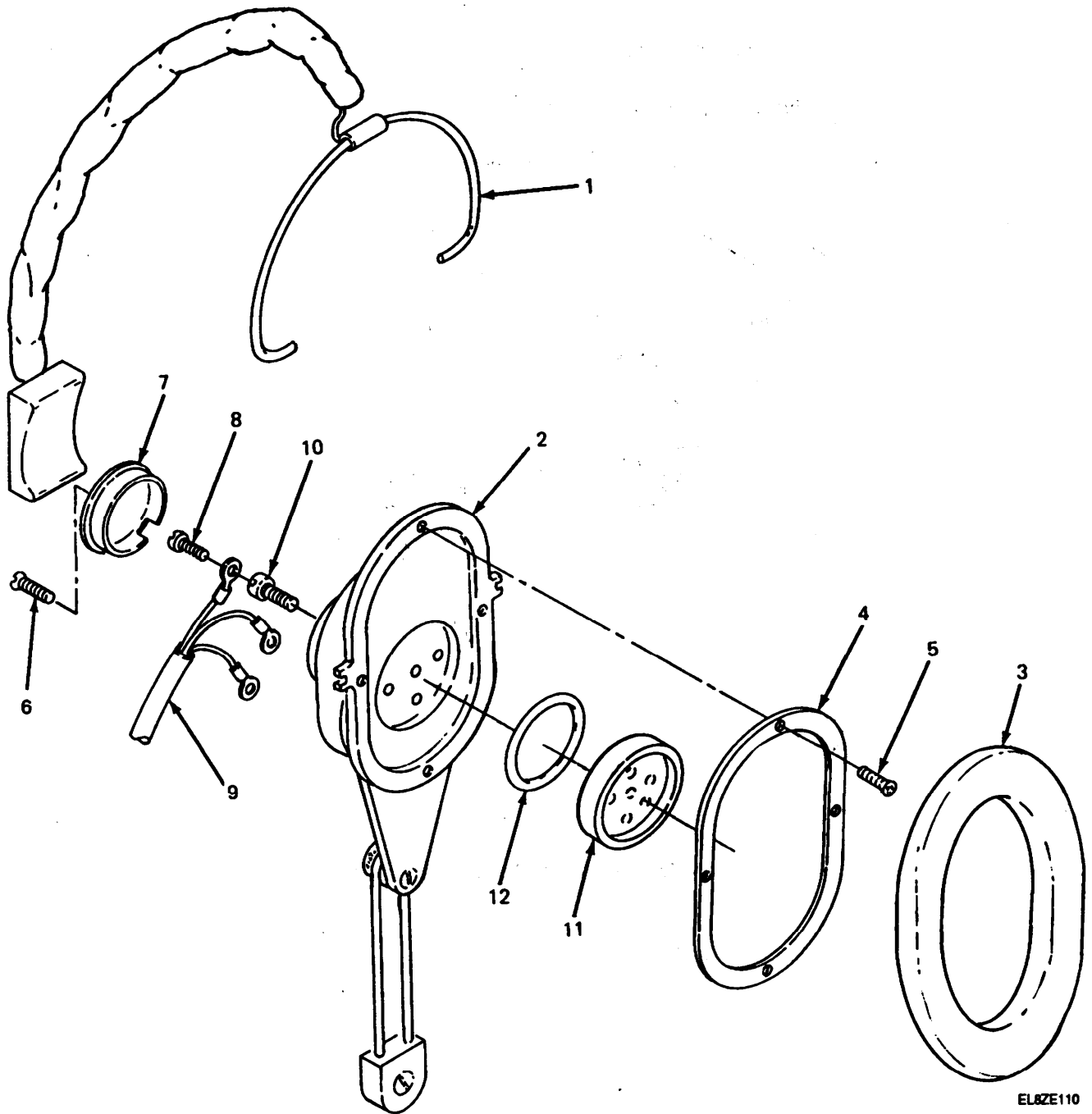
Tool Kit TE-33

As required (refer to TM 11-5965-283-20P)

a. Replacement of Earphone Element. (figure 4-24)

- (1) Pull out one side of cradle (1) from earphone cup assembly (2) and remove cradle.
- (2) Lift off one part of cushion (3) from retainer plate (4).
- (3) Peel cushion (3) off earcup assembly (2).
- (4) Unscrew four screws (5) and remove retainer plate (4) from earphone cup assembly (2).
- (5) Remove earcup mounting screw(6) and remove earcup cover (7).
- (6) Unscrew two terminal screws (8) and carefully remove cord (9) from rear of earphone cup assembly (2).
- (7) Remove two terminal binding posts (10), together with their O-rings, from earphone cup assembly (2).
- (8) Hold earcup in one hand and tap gently but firmly against palm of other hand until the earphone element (11) falls free. Remove and discard O-ring (12).
- (9) Place eaphone element (11) and O-ring (12) in earcup, taking care to position holes for terminal binding posts (10).
- (10) Screw two terminal binding posts (10) with their O-rings into earphone cup assembly (2).
- (11) Place two terminal screws (8) in their terminals on cord (9) and screw them into terminal binding posts (10). Insure that ground terminal is positioned correctly over remaining mounting hole.
- (12) Place earcup mounting screw (6) in earcup cover (7) and fasten earcup cover.

- (13) Place retainer plate (4) on earphone cup assembly (2). Install four screws (5) that hold retainer plate to earphone assembly.
- (14) Fit cushion (3) onto retainer plate (4).
- (15) Place cradle (1) on earphone cup assembly (2).



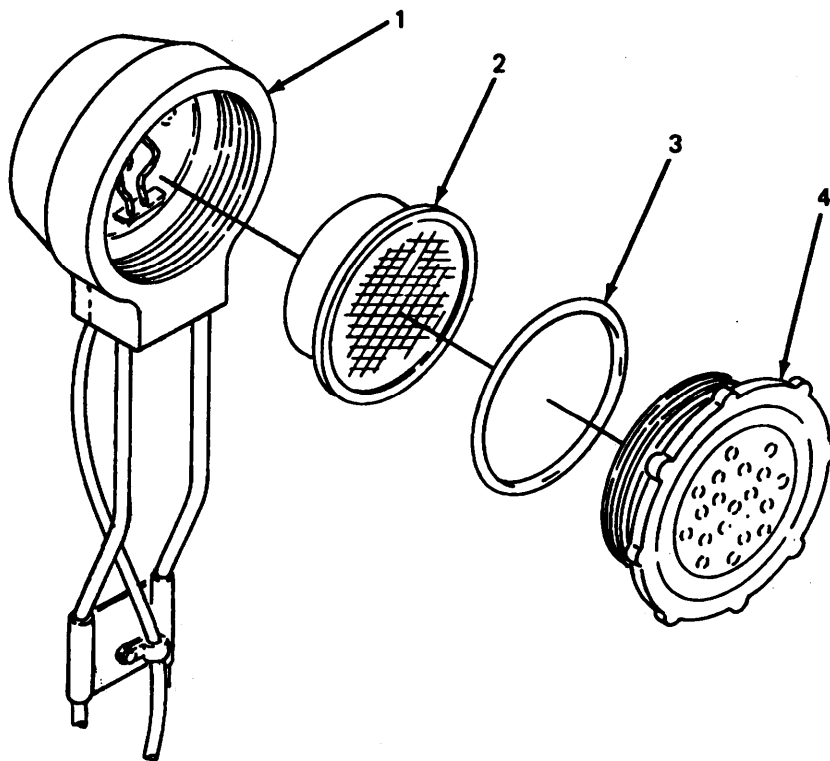
EL&ZE110

Figure 4-24. Replacing Earphone Element.

4-19. Headset (cont)

b. Replacement of Microphone Element. (figure 4-25)

- (1) Remove microphone mouthpiece (1) by turning mouthpiece counterclockwise.
- (2) Remove microphone element (2) from microphone case (3) and remove O-ring (4) from microphone element.
- (3) Replace O-ring (4) on microphone element (2).
- (4) Insert microphone element (2) in microphone case (3).
- (5) Screw microphone mouthpiece (1) clockwise onto microphone case (3).



EL&ZE109

Figure 4-25. Replacing Microphone Element.

4-20. Trunk and Line Packs

This task covers: a. Replacement of window assembly b. Replacement of designation strip

INITIAL SET UP

Materials/Parts

Window Assembly (NSN 6210-00-284-0389)
Designation strip (NSN 9905-00-839-1679)
Solvent (appendix E, item 1)

a. Replacement of Window Assembly. (figure 4-26)

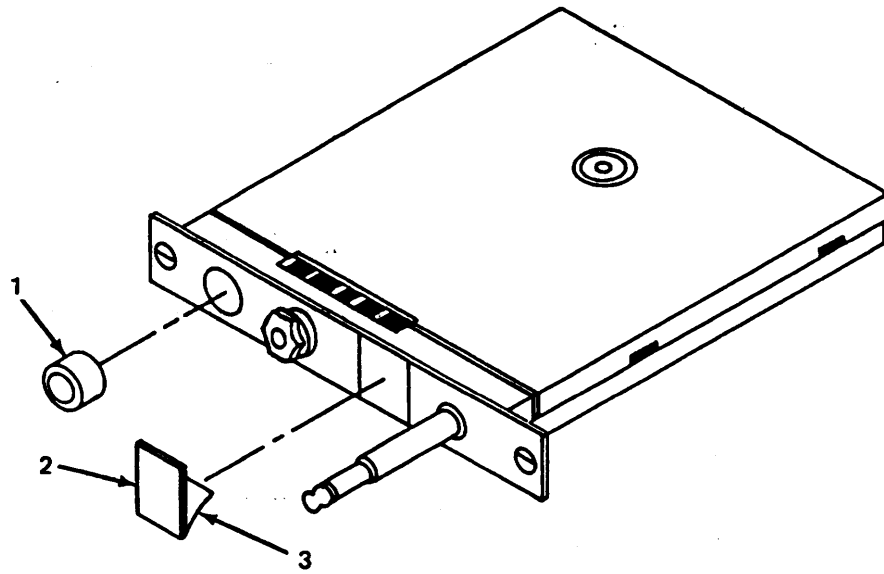
- (1) Unscrew window assembly (1) from signal indicator on front of line or trunk pack.
- (2) Install new window assembly (1). Do not overtighten.

b. Replacement of Designation Strip. (figure 4-26)

WARNING

Fumes of Trichlorotrifluoroethane are poisonous. Provide adequate ventilation whenever you use trichlorotrifluoroethane. Do not use solvent near heat or open flame. Trichlorotrifluoroethane will not burn, but heat changes the gas into poisonous, irritating fumes. Do not breathe the fumes or vapors. Trichlorotrifluoroethane dissolves natural skin oils. Do not get solvent on your skin. Use gloves, sleeves and an apron which the solvent cannot penetrate. If solvent is taken internally, consult a physician immediately.

- (1) Peel designation strip (2) off front of line or trunk pack. Remove all adhesive residue. Use solvent if necessary.
- (2) Peel away protective backing (3) on new designation strip (2).
- (3) Position new designation strip (2) on front of line or trunk pack and press firmly in place.



EL&ZE111

Figure 4-26. Replacing Window Assembly and Designation Strip.

4-21. Spring Contacts (Spring Clips)

This task covers: Replacement

INITIAL SETUP

Tools

Tool Kit TE-33

Equipment Condition

Battery case removed (para 3-5a)

Materials/Parts

Spring Clips (NSN 5999-00-643-7667)

Replacement. (figure 4-27)

(1) Remove screw (1) mounting red or blue wire (2) to terminal (3) on spring clip (4), and remove wire from spring clip.

(2) Remove screw (5) and lockwasher (6) fastening spring clip (4) to interior of switchboard case (7) and remove spring clip.

(3) Position new spring clip (4) on interior of switchboard case (7) and fasten with screw (1).

(4) Position wire (2) on spring clip terminal (3) and fasten with screw (1).

NOTE

FOLLOW-ON MAINTENANCE: Install battery case (para 3-5a).

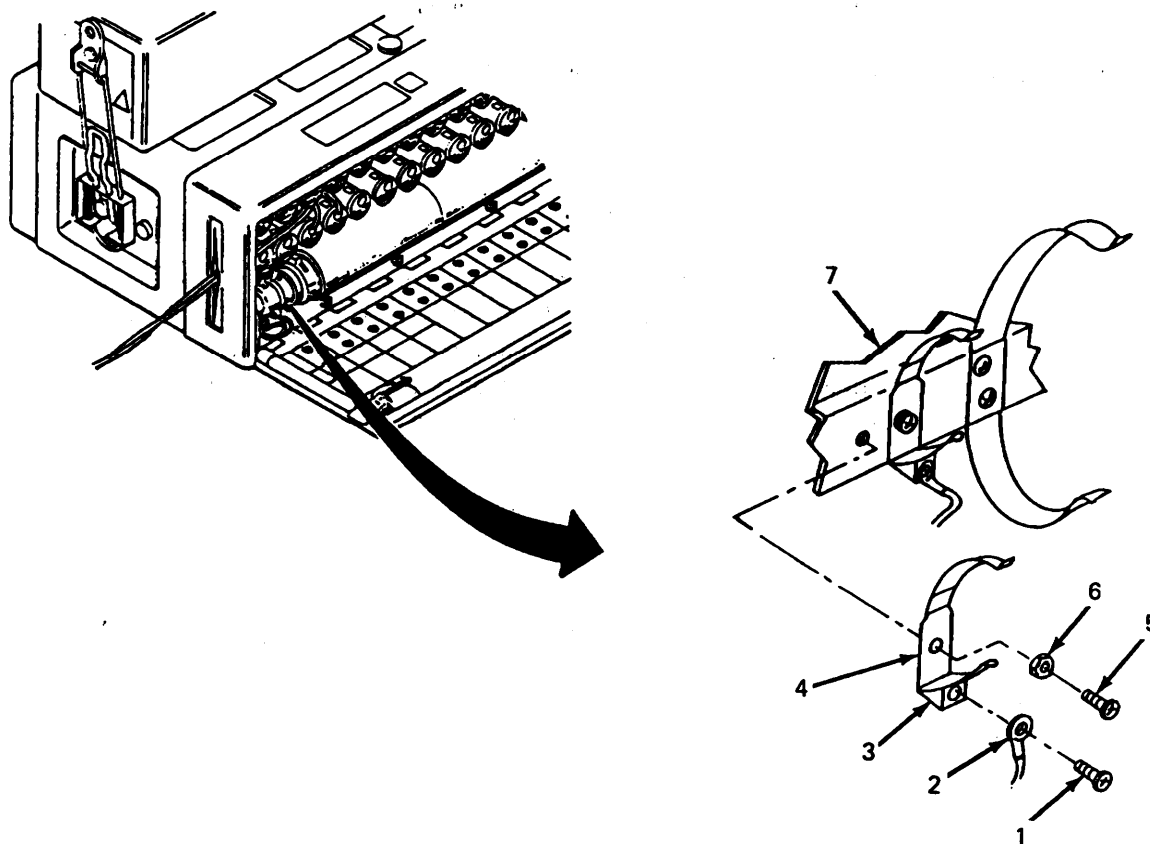


Figure 4-27. Replacing Spring Contacts (Spring Clips).

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

Subject	Para	Page
Disassembly	4-22	4-39
Packing for Shipment or Limited Storage	4-23	4-40

4-22. Disassembly

- a. If tone signal adapter is mounted, remove, disassemble and pack it in accordance with paragraph 4-22.d.
- b. Open rear door of switchboard and disconnect line wires and ground strap from binding posts.
- c. Remove battery case and remove all batteries (para 3-5.a). Replace battery case in rear compartment.
- d. Close rear door. Set switchboard upright on rear door.
- e. Disconnect headset from operator's pack and place it in switchboard front cover. Strap it in position with retaining straps.

- f. Remove operator's plug from operator's jack and lay cord on line packs.
- g. Fold handle on hand ringing generator handwheel into wheel.
- h. Position front cover over line/trunk packs and latch in place.

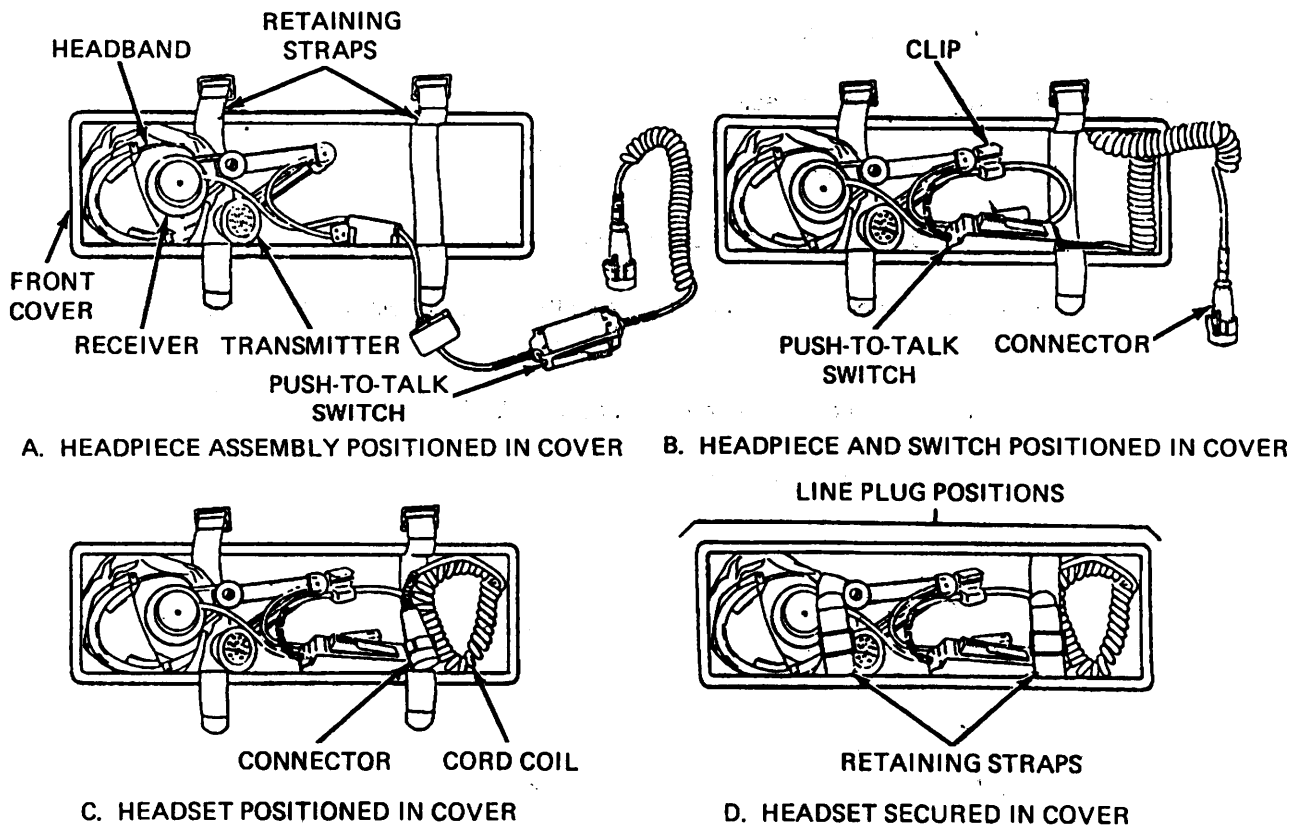
4-23. Packing for Shipment or Limited Storage

Packing methods will vary according to the materials available and the condition under which the equipment is to be shipped or stored. The equipment shall be repacked as closely as possible to the way in which it was originally packed. (Refer to paragraph 4-4 and figure 4-1 for packaging information and for export and domestic shipment requirements.) Follow the procedures described below as closely as possible. If the original packing materials were not saved, use the materials listed in table 4-2. National stock numbers for the items in table 4-2 can be found in SB-38-100.

Table 4-2. Packing Materials.

Materials	Quantity
Corrugated cardboard	23 sq ft
Waterproof paper	23 sq ft
Waterproof tape	30 running ft
Moisture-vaporproof barrier	12 sq ft
Nailed wood box	9 1/2 x 28 1/2 x 16 1/2
Steel strap, 1/2 inch	14 running ft

a. *Stowing Headset.* Disconnect the headset plug from the operator's pack receptacle and pack the headset inside the switchboard front cover as shown in figure 4-28.



EL&ZE113

Figure 4-28. Stowing Headset.

b. *Stowing Tone Signaling Adapter.* (figure 4-29)

- (1) Remove any field wire used in connections.
- (2) Remove edge of cover from detent in rear of keyset module. Swing to open position.
- (3) Return keyset module to closed position (folded back into housing).
- (4) Loosen locking screws and pull out mounting plate so that tone signaling adapter can be moved away from switchboard.
- (5) Remove battery compartment cover and remove battery BA-90. Replace cover.
- (6) Store tone signaling adapter in accessory kit.

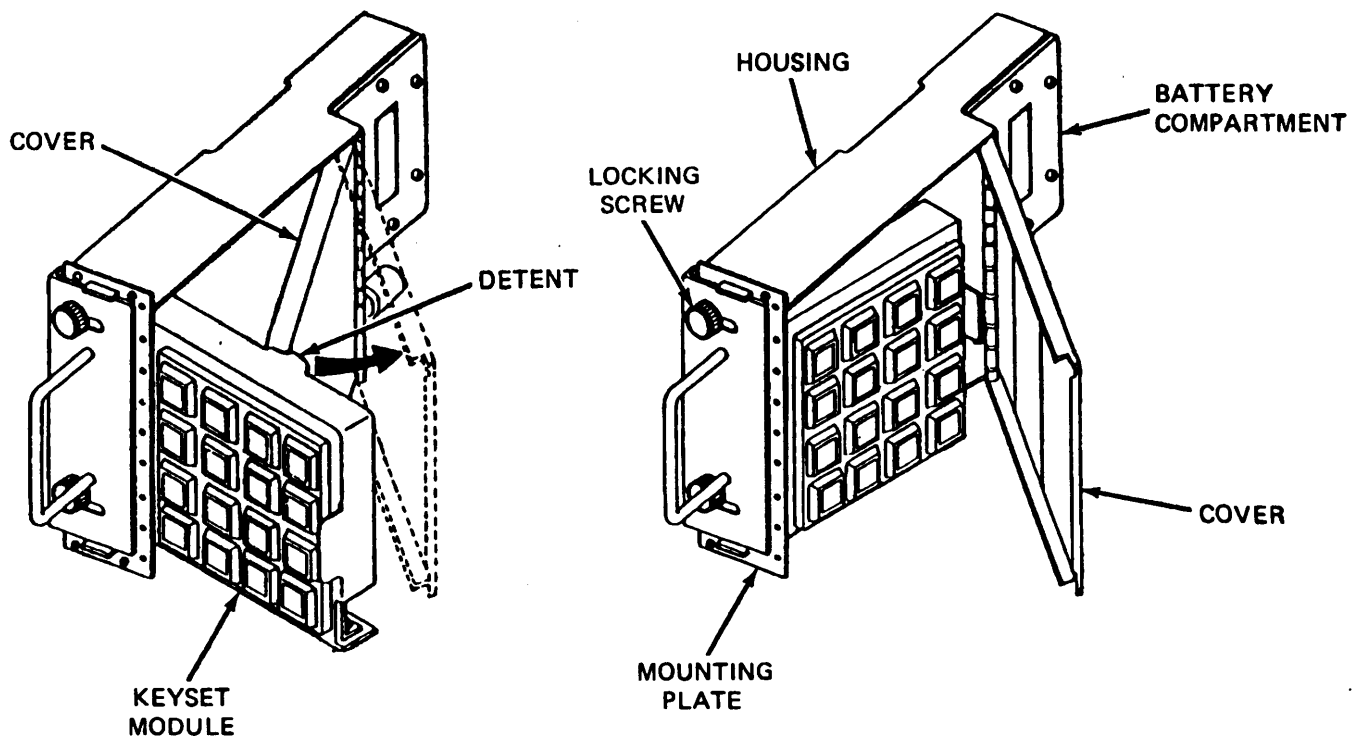


Figure 4-29. *Stowing Tone Signaling Adapter.*

c. Packing.

- (1) Wrap switchboard and accessory kit in waterproof paper and seal package with waterproof tape.
- (2) Wrap switchboard and accessory kit in corrugated cardboard and seal package with waterproof tape.
- (3) Line wooden box with moisture-vaporproof barrier.
- (4) Place switchboard and accessory kit in nailed wooden box.
- (5) Place cover on nailed wooden box and secure it in place with nails.

WARNING

The steel banding used in packing switchboard has sharp edges. Care should be taken when cutting and handling banding to avoid injury to personnel.

- (6) Wrap steel straps around box and secure them in accordance with recommended procedures.

APPENDIX A

REFERENCES

- Consolidated Index of Army Publications and Blank Forms DA Pam 25-30
- The Army Maintenance Management System (TAMMS) DA Pam 738-750
- FSC Class 6135; Dry Battery Supply Data SB11-6
-
- Field Instructions for Painting and Preserving Electronics Command Equipment
Including Camouflage Pattern Painting of Electrical Equipment Shelters TB 43-0118
- Manual Telephone Switchboard SB-86/P; Installation and Operation
(NSN 5805-00-503-2660) TM 11-2134
- Central Office, Telephone, Manual, AN/TTC-7 (NSN 5805-00-395-9422) and
AN/TTC-7A (NSN 5805-00-820-9549); Telephone Central Office Group, Manual,
AN/GRA-14(V) (NSN 5805-00-892-1081) and Telephone Circuit Trunk Relay,
TA-276/TTC (NSN 5805-00-503-3347). TM 11-2146
- Operator and Organizational Maintenance Manual: Telephone Set, TA-312/PT
(NSN 5805-00-0012) TM 11-5805-201-12
- Organizational Maintenance Repair Parts and Special Tools Lists for Telephone
Set TA-312/PT (NSN 5805-00-543-0012) TM 11-5805-201-20P
- Organizational Maintenance Repair Parts and Special Tools Lists for
Switchboards, Telephone, Manual SB-22/PT (NSN 5805-00-257-3602)
and SB-22A/PT (NSN 5805-00-715-6171) TM 11-5805-262-20P
- Operator's, Organizational, Direct Support, General Support and Depot Maintenance
Manual: Generators, Ringing, Static TA-248/TT and TA-248A/TT
(NSN 5805-00-503-1482) TM 11-5805-298-15
- Organizational, Direct Support, and General Support Maintenance Repair Parts and
Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools):
Generators, Ringing, Static TA-248/TT and TA-24A/TT (NSN 5805-00-503-1482) . . . TM 11-5805-298-24P
- Operator and Organizational Maintenance Manual (Including Repair Parts and
Special Tools Lists): Terminal, Telegraph-Telephone AN/TCC-29
(NSN 5805-00-902-3087) (Including Terminal, Telegraph TH-22/TG
(NSN 5805-00-907-8300) and Converter, Telegraph-Telephone Signal CV-425/U
(NSN 5805-00-985-9088) TM 11-5805-356-12

TM 11-5805-262-12

Operator's and Organizational Maintenance Manual for Automatic Telephone
Central Offices AN/TCC-38(V)1 (NSN 5805-00-186-0681) and AN/TCC-38(V)2
(NSN 0505-186-0640) TM 11-5805-628-12

Organizational Maintenance Repair Parts and Special Tools Lists for Automatic
Telephone Central Offices, AN/TTC-38(V)1 (NSN 5805-00-186-0681) and
AN/TCC-38(V)2 (NSN 5805-00-186-0640) TM 11-5805-628-20P

Operator's and Organizational Maintenance Manual for Switch board,
Telephone SB-3614(V)TT (NSN S5805-01-032-1694) TM 11-5805-695-12

Organizational Maintenance Repair Parts and Special Tools Lists: Switchboard,
Telephone SB-3614(V)TT (NSN 5805-01 -032-1694) TM 11-5805-695-20P

Operator's, Organizational, Direct Support, General Support and Depot
Maintenance Manual (Including Repair Parts and Special Tools Lists):
Headset-Microphone H-182/PT (NSN 5965-00-069- 8885) TM 11-5965-283-15

Organizational Maintenance Repair Parts and Special Tools Lists for
Headset-Microphone H-182/PT (NSN 5805-00-069-8885) TM 11-5965-283-20P

Operator's and Organizational Maintenance Manual: Power Supplies, PP-2953/U,
PP-2953A/U, PP-2953B/U and PP-2953C/U (NSN 6130-00-985-7899) TM 11-6130-233-12

Procedures for Destruction of Electronics Materiel to Prevent Enemy Use
(Electronic Command) TM 750-244-2

Manual Telephone Switchboard SB-86/P, Installation and Operation TM 11-5805-304-14

APPENDIX B

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B1. General

This appendix provides a summary of the maintenance operations for SB-22/PT OR SB-22A/PT and TA-977/PT. It authorizes levels of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix maybe used as an aid in planning maintenance operations.

B-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to

restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

B-3. Column Entries

a. Column 1. Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2. Components/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3. Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for the purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4. Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate "work time" figures will be shown for each level. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Unit

F - Direct Support
H - General Support

D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (Sect. III and IV)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Level. The codes in this column indicate the maintenance level allocated for the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool follow by the Federal Supply Code for manufacturers (5 digit) in parentheses.

B-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in sections II and V.

**Section II. MAINTENANCE ALLOCATION CHART
FOR
SWITCHBOARDS, TELEPHONE, MANUAL SB-22/PT AND SB-22A/PT**

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	SWITCHBOARDS, TELEPHONE, MANUAL SB-22/PT AND SB-22A/PT	Inspect	0.2						A
		Service	0.2						A
		Test				0.5			
		Repair			1.0			2,12	B
		Overhaul					4.0	2 thru 12	B
01	TELEPHONE CIRCUIT, OPERATOR'S TA-221/PT	Replace	0.3						
		Test			0.3				
		Repair			0.5			2	
		Repair		0.1					
02	TELEPHONE CIRCUIT, LINE TA-222/PT	Replace	0.3						
		Test			0.3				
		Repair		1.0					
		Repair			0.5				
03	HEADSET- MICROPHONE H-182/PT	Inspect	0.1						C
		Repair		0.5				1	D
		Repair			0.5			2	E
04	ACCESSORY KIT MX-230A/PT								
0401	CASE	Inspect		0.1					
		Service		0.1					
		Repair			0.5			2	
0402	TELEPHONE CIRCUIT, LINE TA-222/PT								G
05	ACCESSORY KIT MX-2915/PT								
0501	TELEPHONE CIRCUIT, LINE TA-222/PT								G

**Section II. MAINTENANCE ALLOCATION CHART
FOR
SWITCHBOARDS, TELEPHONE, MANUAL SB-22/PT AND SB-22A/PT**

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
0502	TELEPHONE CIRCUIT, TRUNK TA-326/PT	Replace Test Repair Repair	0.3	0.1	0.3 0.5			2	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
SWITCHBOARDS, TELEPHONE, MANUAL SB-22/PT AND SB-22A/PT

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	Tool Kit TE-33	5180-00-408-1859	
2	F,H,D	Tool Kit, Electronic Equipment TK-105/G	5180-00-610-8177	
3	H,D	Telephone Test Set AN/PTM-6	6625-00-229-1048	
4	H,D	Test Set 1-181(*)	6625-00-229-1042	
5	H,D	Multimeter, 3 1/2 Digit AN/PM-45	6625-01-139-2512	
6	H,D	Test Set, Transmission AN/USM-485	6625-01-205-6492	
7	H,D	Canvas Repair Kit		
8	D	Power Supply PP-990/G	6130-00-547-1030	
9	D	Telephone Set TA-312/PT	5805-00-543-0012	
10	D	Multimeter, 4 1/2 Digit AN/USM 486	6625-01-145-2430	
11	D	Test Set TS-1775/U	6625-00-064-6096	
12	F,D	Tool Kit, Telegraph TK-141/GT	5180-00-227-6399	

Section IV. REMARKS
FOR
SWITCHBOARDS, TELEPHONE, MANUAL SB-22/PT AND SB-22A/PT

REFERENCE CODE	REMARKS
A	Exterior and Battery Retainer.
B	Use spring tension gage to adjust spring contacts.
C	See TM 11-5965-283-15.
D	Repair by replacing earphone and microphone elements.
E	Repair by replacing connector plug and switch.
F	Repair canvas.
G	See group 02.

Section V. MAINTENANCE ALLOCATION CHART
FOR
TONE SIGNALING ADAPTER TA-977/PT

(1) GROUP NUMBER	(2) COMPONENT/ ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	TONE SIGNALING ADAPTER TA-977/PT	Inspect Test Test Test Repair Replace	0.1	0.1 0.1	0.2 0.1		1.0	1 1, 2 1 thru 10 1,10 1,10	A B C D

Section VI. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
TONE SIGNALING ADAPTER TA-977/PT

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O,F,H,D	Multimeter, 3 1/2 Digit AN/PMS-45	6625-01-139-2512	
2	F	Telephone Set TA-312/PT	5805-00-543-0012	
3	D	Multimeter, 4 1/2 Digit AN/USM-486	6625-01-145-2430	
4	D	Universal Frequency Counter AN/USM-459	6625-01-061-8928	
5	D	Oscilloscope, 100 MHz AN/USM-488	6625-01-187-7847	
6	D	Analyzer, Distortion TS-4084/G	6625-01-217-0054	
7	D	Multimeter, 5 1/2 Digit AN/GSM-64D	6625-01-221-9367	
8	D	Transformer UTC 0-30	5950-00-087-1046	
9	D	Ringng Generator G-42A/PT	5805-00-503-1469	
10	D	Tool Kit, Electronic Equipment TK-105/G	5180-00-610-8177	
11	D	Gage, Spring Tension	6635-00-918-2788	
12	D	Tool Kit, Electronic Equipment TK-141/GT		

**Section VII. REMARKS
FOR
TONE SIGNALING ADAPTER TA-977/PT**

REFERENCE CODE	REMARKS
A	Equipment operation, test battery.
B	Go/no-go with TA-312/PT.
C	Depot acceptance testing.
D	Repair by replacement of battery.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. Scope

This appendix lists components of end item and basic issue items for the SB-22/PT and SB-22A/PT Manual Switchboards to help you inventory items required for safe and efficient operation.

C-2. General

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the switchboard in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the switchboard during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

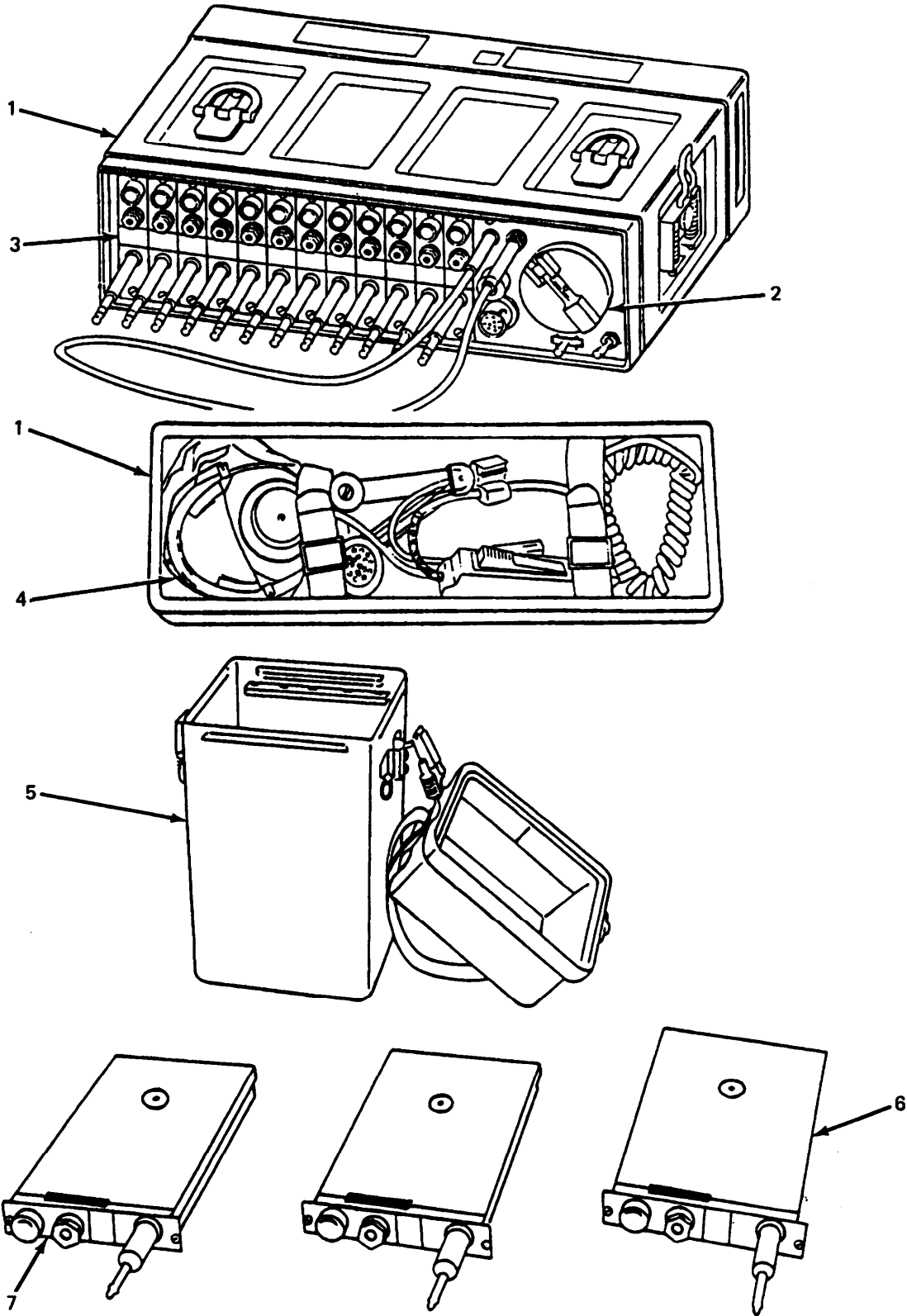
b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

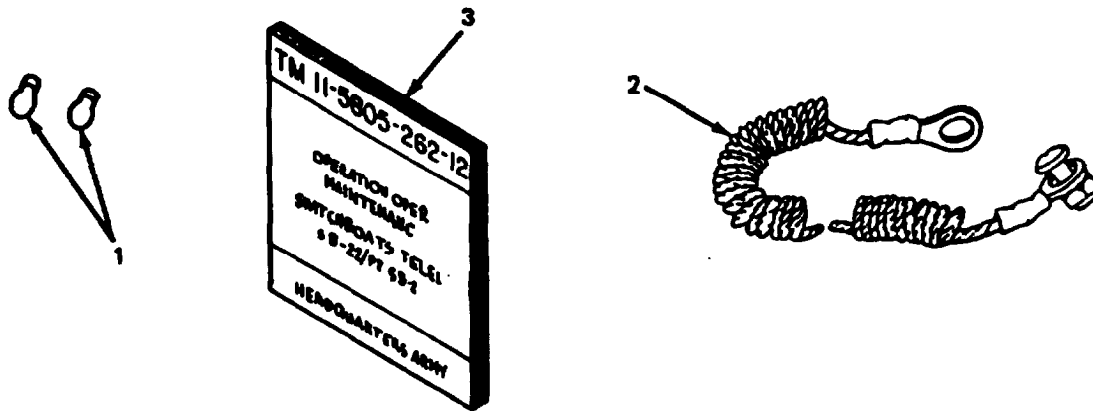
e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM



(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1	5805-00-257-3602	Switchboard, Manual SB-22/PT (80058)		ea	1
	5805-00-715-6171	Switchboard, Manual SB-22A/PT (80058)		ea	1
		Consisting of			
2	5805-00-503-3341	Telephone Circuit, Operator TA-221/PT (80058)		ea	1
3	5805-00-503-3337	Telephone Circuit, Line TA-222/PT (80058)		ea	12
4	5965-01-205-6249	Headset-Microphone H-182/PT (80058)		ea	1
5	5805-00-356-2693	Accessory Kit MX-230A/PT (80063) Containing:		ea	1
6	5805-00-503-3337	Telephone Circuit, Line TA-222/PT (80058)		ea	3
		or			
5	5805-00-799-3225	Accessory Kit MX-2915/PT (80063) Containing:		ea	1
6	5805-00-503-3337	Telephone Circuit, Line TA-222/PT (80058)		ea	2
		and			
	5805-00-715-6175	Telephone Circuit, Trunk TA-326/PT (80056)		ea	1

Section III. BASIC ISSUE ITEMS



ELAZE116

(1) Illus Number	(2) National Stock Number	(3) Description FSCM and Part Number	Usable On Code	(4) U/M	(5) Qty Rqr
1	6240-00-196-4501	Lamp, Incandescent 1490 (24446)		ea	2
2	5805-01-163-8867	Ground Strap 3020-11 (5M581)		ea	1
3		Technical Manual TM 11-5805-262-12/ TO 31W1-2PT-361			

NOTE: Item 1 stored in accessory kit.

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. Scope

This appendix lists additional items you are authorized for the support of the switchboard.

D-2. General

This list identifies items that do not have to accompany the switchboard and that do not have to be turned in with it. These items are all authorized to you by CRA, MTOE, TDA, or JTA.

D-3. Explanation Of Listing

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA, or JTA) which authorizes the item(s) to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description Part Number and FSCM Usable on Code	(3) Unit of Meas	(4) Qty Auth
5805-01-040-9633	Adapter, Tone Signaling TA-977/PT (80063)	ea	1
6135-00-120-1020	Battery BA-30 (09477)	ea	4
6135-00-930-0030	Battery BA-3030/U	ea	4
6135-00-850-3177	Battery BA-90 (83740)	ea	1
5975-00-224-5260	Ground Rod MX-1481G (80062)	ea	1

APPENDIX E

EXPENDABLE/DURABLE SUPPLIES AND MATERIAL

Section I. INTRODUCTION

E-1 . Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the switchboard. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. Explanation of Columns

a. Column (1) - Item Number. This number is assigned to the entry in the listing.

b. Column (2)- Level. This column identifies the lowest level of maintenance that requires the listed item.

(enter as applicable)

- C - Operator
- O - Unit Maintenance

c. Column (3) - National Stock Number. This the National Stock Number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name, and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the pad number.

e. Column (5)- Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS

(1) Item Number	(2) Level	(3) National Stock Number	(4) Description	(5) U/M
	O	6850-00-105-3084	Trichlorotrifluoroethane	pt
	O	7930-00-249-8036	Detergent, General Purpose	cn
	O		Paint, MIL-C-46168	qt
	O		Glue	btl
	O		Sandpaper No. 0000	sh

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DATE SENT 10 July 1975

PUBLICATION NUMBER TM 11-5840-340-12	PUBLICATION DATE 23 Jan 74	PUBLICATION TITLE Radar Set AN/PRC-76
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BE EXACT. PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
2-25	2-28			<p>Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°.</p> <p>REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.</p>
3-10	3-3		3-1	<p>Item 5, Function column. Change "2 db" to "3db."</p> <p>REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.</p>
5-6	5-8			<p>Add new step f.1 to read, "Replace cover plate removed in step e.1, above."</p> <p>REASON: To replace the cover plate.</p>
		F03		<p>Zone C 3. On J1-2, change "+24 VDC to "+5 VDC."</p> <p>REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.</p>

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---	----------------------------------	--

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	

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