

TACTICAL TELEPHONES

Subcourse Number SS0441

EDITION A

United States Army Signal Center and Fort Gordon
Fort Gordon, Georgia 30905-5200

8 Credit Hours

Edition Date: September 1994

SUBCOURSE OVERVIEW

This subcourse is designed to teach you the installation and operation procedures for tactical telephones. This information will be useful to you if you are in a signal unit supporting another unit; a signal battalion within a division that is equipped with mobile subscriber equipment (MSE); or a signal unit supporting echelons above corps.

There are no prerequisites for this subcourse.

This subcourse reflects the doctrine which was current at the time it was prepared. In your own work situation, always refer to the latest official publications.

Unless otherwise stated, the masculine gender of singular pronouns is used to refer to both men and women.

TERMINAL LEARNING OBJECTIVE

ACTION: You will learn the procedures to install telephone sets TA-312/PT, TA-341()/TT, TA-838()/TT, TA-954/TT, TA-1035/TT; terminal equipment TD-1233/TT and TD-1234/TT. You will also learn how to perform maintenance on telephone set TA-838()/TT and complete DA Form 2404.

CONDITION: If you do not have access to the equipment, you only need this subcourse. If available, you will need telephone sets TA-312/PT, TA-341()/TT, TA-838()/TT, TA-954/TT, TA-1035/TT; terminal equipment TD-1233/TT, TD-1234/TT; gloves; TL-13A; telephone cable WD-1()/TT, WF-16/U; test set TS-3647/G; CX-11230()/G; preset stub pole or tree; desk ground rod; ground strap; rubber mallet; power cable; screwdriver and a training area.

STANDARD: Upon completion of this subcourse, you will know the procedures for installing telephone sets TA-312/PT, TA-341()/TT, TA-838()/TT, TA-954/TT, TA-1035/TT; and multiplexer TD-1233/TT and multiplexer-combiner TD-1234/TT. You must achieve 70 percent on the written examination to receive credit for this subcourse.

WARNING

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment, and who is competent in administering first aid. When the technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground the equipment prior to connection to a power source.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazards of current flowing through vital organs of the body.

Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.

For artificial respiration, refer to FM 21-11.

Do not lay, place, or throw field wire on or near power lines or transformers. Dangerous high voltages exist at these structures and death or severe shock may result from contact between the field wire and power lines.

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GRADING AND CERTIFICATION INSTRUCTIONS

Examination: This subcourse contains a multiple-choice examination covering the material in the two lessons. After studying the lessons and working through the practical exercises, complete the examination. Mark your answers in the subcourse booklet, then transfer them to the ACCP examination response sheet. Completely mark out the lettered oval which corresponds to your selection (A, B, C, or D). Use a number 2 lead pencil to mark your responses. When you have completed the ACCP examination response sheet, mail it in the preaddressed envelope you received with this subcourse. You will receive your examination score in the mail. You will receive eight credit hours for successful completion of this examination.

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LESSON 1

INSTALL A TACTICAL TELEPHONE

Critical Tasks: 113-600-1003,
113-600-1012, 113-600-1016,
113-600-1017, 113-588-1096

OVERVIEW

LESSON DESCRIPTION:

In this lesson, you will learn how to install tactical telephones. This is a very important part of your job. The persons who will use these instruments expect them to be in good operating condition and be connected to the right equipment to provide them the necessary service.

TERMINAL LEARNING OBJECTIVE:

- ACTION:** You will learn the procedures to install a tactical telephone.
- CONDITION:** If you do not have access to the equipment, you only need this subcourse. If available, you will need telephone sets TA-312/PT, TA-341()/TT, TA-838()/TT, TA-954/TT; digital nonsecure voice terminal (DNVT) TA-1035/TT; multiplexer TD-1233/TT, multiplexer-combiner TD-1234/TT, junction box J-1077A/U; telephone cable WD-1()/TT; WF-16/U; TL-13A; gloves; rubber mallet; ground rod; ground strap; power cord; CX-11230()/G; test set TS-3647/G; and a training area.
- STANDARD:** Upon completion of this subcourse, you will know the procedures for installing telephones and the multiplexer or multiplexer-combiner.
- REFERENCES:** The material contained in this lesson was derived from TM 11-5805-201-12, TM 11-5805-384-12, TM 11-5805-650-12, TM 11-5805-735-12, TM 11-6110-201-12P, TM 11-5805-761-12&P, TM 11-5805-703-12, TM 11-5805-706-12, TM 11-5805-707-12, DA Pam 738-750, and DA Pam 25-30.

INTRODUCTION

Commanders and staff require fast communications on a personal level as often as it is available. In garrison, there is no problem since everyone has a telephone on his desk. However, when the unit goes to a tactical situation in the field, they desire the same fast communications that were available in garrison.

That is where the wire systems installer comes in. It is his duty to install tactical telephones from a priority list that permits the commander and his staff to have the same type communications as was available in garrison.

There is a need for point-to-point communications for some and for others there is a need to communicate with many different people at different times. The different types of telephones we have available in the unit will provide this service when it is required.

There are many tactical telephones that will accomplish this. Some of them are telephone sets TA-312/PT, TA-341()/TT, TA-838()/TT, TA-954/TT, and DNV T TA-1035/U. Some or all of these instruments may be in your unit.

In addition, there are different means of getting the signal from the telephone to the distant person. Some will be connected through a switchboard, some will be connected through intermediate equipment prior to a switchboard, and some will be multiplexed in an effort to reduce the number of wire lines that must be put in to extend these instruments.

Within this subcourse, we are going to be discussing telephone installation and maintenance. We will also be discussing some of the other equipment needed to get the signal from the telephone set to wherever it must go. Where the wires are identified as green or brown it is recommended you color them for your full and comprehensive understanding of the technical material.

PART A - TELEPHONE SET TA-312/PT

1. The TA-312/PT is an old telephone, but is very reliable and will provide many hours of uninterrupted use when it is installed properly and not abused. We will be discussing characteristics, installation, and operation.
2. The TA-312/PT is a 2-wire, battery-operated field telephone. It may be used in a simple point-to-point voice frequency wire communication line or any 2-wire ringdown subscriber position of a telephone communication system.

3. Technical characteristics:
- a. Voltage requirement..... 3 volts DC
 - b. Frequency range.....300 to 3200 Hz
 - c. Signaling:
 - Frequency.....20 Hz
 - Voltage generated90 to 100 volts
 - d. Station-to-station distance:
 - WD-1()/TT 14 wet and 22 dry miles
4. All connections and operating controls of the TA-312/PT are located on the panel assembly and housing. The handcrank (part of generator, ringing, hand G-42A/PT) for generating the ringdown signal is located on the side of the housing. Connector, receptacle U-79/U allows connection of handset-headset H-144()/U for use in place of the H-60/PT. (See Figure 1-1.)

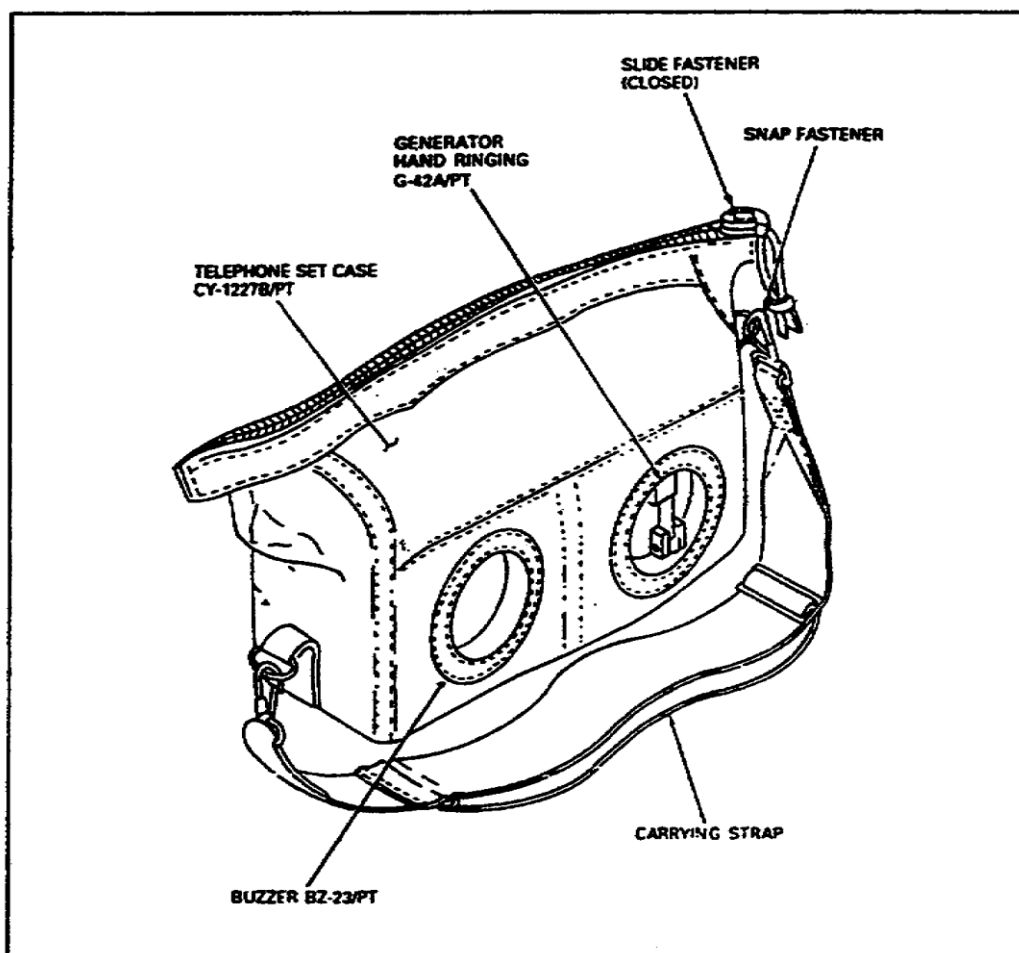


Figure 1-1. Telephone set TA-312/PT, case closed.

5. Two batteries BA-30 or BA-3030 or an external 3-volt DC source are required. The external source must be connected to the battery (BAT) binding posts. (See Figure 1-2.)

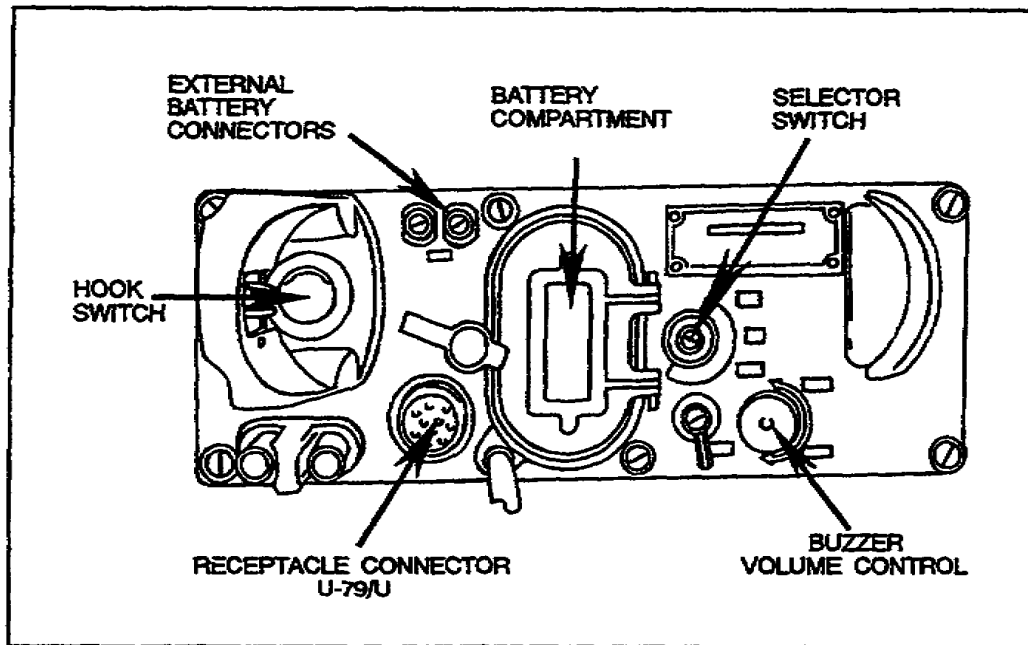


Figure 1-2. Telephone set TA-312/PT, controls and indicators.

6. Installation. The telephone may be used as a desk phone, or it may be mounted vertically on a tree, pole, or other support.

a. Use as a desk set. Unbuckle the carrying case retaining strap and remove the housing assembly from the carrying case. Store the carrying case for later use. Place the telephone in a convenient location on the desk.

b. Installation on a tree or pole. Unhook the end of the carrying strap on the BZ-23/PT end of the carrying case. Adjust the carrying strap to a length equal to the distance around the support. For a thin support, adjust it to go two times around the support. Place the TA-312/PT against the support with the LINE 1-2 binding posts at the top. Wrap the carrying strap around the support and secure the free end to the upper ring on the carrying case. Wrap a length of WD-1()/TT around the support and through the lower loop of the carrying case; tie it securely in place.

c. Use a screwdriver to set the SELECTOR switch to the proper position for the service being used.

d. To connect the WD-1()/TT. Strip approximately 1 inch of insulation from the ends of the two wires in the line. Be sure the wire is clean of any residue. Fold back the stripped wires about one-half inch from the end. Push down one of the LINE 1-2 binding posts. Insert the bare end of one wire into the binding post slot and release the post. Check to see that the wire is securely clamped. Repeat the procedure with the other wire in the other post.

e. Battery installation. If you are going to use an external battery, be sure to check the battery compartment and remove any batteries that are in it. Connect a 3-volt battery source to the BAT binding posts on the panel. If you are going to use internal batteries, open the battery compartment by turning the battery compartment latch clockwise. Insert one battery with the positive terminal up and one battery with the positive terminal down. Close the compartment and turn the latch counterclockwise to lock the cover closed (See Figure 1-2.)

7. Deicing screen. In cold climates, install the deicing screen to prevent the operator's breath from freezing on the transmitter. Place the screen in position over the front of the transmitter cap. Use your finger or the blade of a screwdriver to press evenly around the rim of the screen and seat it firmly in the slot around the face of the transmitter cap. To remove the deicing screen when not needed, insert the blade of a screwdriver in the slot in the transmitter cap. Pry up the screen with a twisting motion. Store the screen in the carrying case between the case and the side of the housing opposite the buzzer.

8. Installation of the off-hook lamp assembly. (See Table 1-1 for controls and indicators and their specific functions.)

NOTES: The security lamp is to alert personnel that handset H-60/PT is not seated properly in its retaining brackets leaving the line open. The lamp is for use only in sensitive areas; it is not to be installed on every telephone set in the field.

Remove the panel screw nearest the LINE binding posts. Secure the off-hook lamp assembly to the panel with this screw, keeping the lamp portion of the attachment snuggled near the telephone cradle. Run the lead of the off-hook lamp assembly around the handset retaining bracket and connect its two terminals to the BAT binding posts on the panel.

9. Buzzer BZ-23/PT adjustment. Contact a distant party or the switchboard and ask them to ring on the line. Adjust the LOUD-LOW control to the desired volume. The fully clockwise position of the control is the maximum LOUD position.

10. Connecting handset-headset H-144()/U. Connect handset-headset H-144()/U by connecting the plug on the H-144()/U to the connector receptacle U-79/U on the panel of the TA-312/PT. Leave the H-60/PT in the retaining cradle while the H-144()/U is connected.

11. Initiating a call (CB and CBS operation using H-60/PT). Place the INT-EXT switch to INT. Remove the H-60/PT from its retaining cradle and wait for the switchboard operator to answer. For CBS operation, press the PRESS-TO-TALK switch to TALK and release it when listening. For CB operation, do not use the PRESS-TO-TALK switch. When the call is terminated, replace the H-60/PT in its retaining cradle.

a. CB and CBS operation using H-144()/U. Make sure the H-60/PT is seated firmly in the retaining cradle. Operate the INT-EXT switch to EXT and wait for the operator to answer. For CBS operation, press the PRESS-TO-TALK switch to TALK and release it to listen. For CB operation, the PRESS-TO-TALK switch is not used. When the call is terminated, place the INT-EXT switch to INT.

Table 1-1. Controls and indicators.

CONTROL OR INDICATOR	FUNCTION
HOOKSWITCH	Connects H-60/PT to line during operation. Switch is operated when H-60/PT is removed from retaining cradle and is open when H-60/PT is in retaining cradle.
SELECTOR switch	Connects internal circuits of TA-312/PT for the particular type of service to be used. CB.....Common battery operation LB.....Local battery operation CBS....Common battery signaling (local battery for voice)
EXT-INT switch	Permits selection of H-144()/U in place of H-60/PT. EXT.....Selects H-144()/U (H-60/PT inoperative) INT.....Selects H-60/PT (H-144()/U inoperative)
LOUD-LOW control	Adjusts the BZ-23/PT volume.
Handcrank	When turned, operates G-42A/PT for signaling in LB operation.
BZ-23/PT	Provides audible indication of incoming call or disconnect.

b. LB operation using H-60/PT. Place the INT-EXT switch to INT. Make sure the H-60/PT is seated firmly in the retaining cradle. Turn the handcrank rapidly a few turns. Remove the H-60/PT from the retaining cradle and wait for the operator or called party to answer. Press the PRESS-TO-TALK switch to TALK and release it to listen. When the call is terminated, replace the H-60/PT in the retaining cradle and turn the handcrank rapidly a few turns. This will signal the switchboard that the call has been completed.

c. LB operation using H-144()/U. Make sure the H-60/PT is firmly seated in the retaining cradle. Place the INT-EXT switch to EXT and turn the handcrank rapidly for a few turns. Wait for the called party or the switchboard to answer. Press the PRESS-TO-TALK switch to TALK and release it to listen. When the call is terminated, release the PRESS-TO-TALK switch and turn the handcrank rapidly a few turns. This will signal the switchboard that the call has been completed.

12. Answering calls. When the BZ-23/PT sounds, remove the H-60/PT from the retaining cradle. For LB or CBS operation, press the PRESS-TO-TALK switch to TALK and release it to listen. For CB operation, it is not necessary to operate the PRESS-TO-TALK switch. When the call is terminated, replace the H-60/PT in the retaining cradle. After LB operation, turn the handcrank rapidly a few turns to signal the switchboard that the call has been completed.

NOTE: If using the H-144()/U, make sure the H-60/PT is seated firmly in the retaining cradle. When the buzzer sounds, place the INT-EXT switch to EXT. For LB or CBS operation, press the PRESS-TO-TALK switch to answer and release it to listen. For CB operation it is not necessary to operate the PRESS-TO-TALK switch to answer. When the call is terminated, release the PRESS-TO-TALK switch. After CB or CBS operation operate the INT-EXT switch to INT. After LB operation, turn the handcrank rapidly a few turns to signal the switchboard that the call is completed.

13. Operating under unusual conditions.

a. Extreme cold reduces battery voltage, decreases the efficiency of the transmitter and receiver, and makes the H-60/PT and H-144()/U cords and other rubber parts stiff and brittle. Protect the TA-312/PT as much as possible. If the TA-312/PT must be kept outdoors in the extreme cold, install batteries BA-3030 in place of the BA-30s, or keep an extra set of BA-30s in your pocket to keep them warm. The extra batteries may be used to replace batteries affected by the cold. Make sure the deicing screen is installed. Handle the TA-312/PT carefully to avoid breaking or cracking the rubber parts.

b. Hot dry climates expose the TA-312/PT to damage from dirt, dust, and the effects of strong sunlight. Protect the TA-312/PT from these elements. Clean and dust the equipment frequently. When the TA-312/PT is not in use, close the slide fastener to keep out dust and dirt.

c. Warm, damp climates expose the TA-312/PT to damage from fungus and moisture. Wipe the exterior with a clean, lint-free cloth.

d. Emergency power operation. If no battery supply is available, it is possible to transmit for approximately 4 miles by using the receiver element as a sound-powered transmitter element. Speak directly into the receiver element, then listen while the distant party is transmitting.

14. Now you should be able to install a telephone set TA-312/PT on a pole or tree for LB operation.

PART B - TELEPHONE SET TA-341()/TT

15. Telephone set TA-341()/TT is a 4-wire, pushbutton, desk type telephone that is used primarily indoors. It should be in a building or inside a tent. It must be protected from the weather.

16. The voltage requirements for this telephone is 4.4 to 6.4 volts DC. This is provided by batteries BA-42 or BA-3042. They are installed in the telephone base in the compartment between the two controls marked RINGER VOLUME and the MODE SELECTOR switch. The battery that is next to the RINGER VOLUME control has the positive terminal up. The next battery has the positive terminal down, then up, and finally down. When the batteries are in position, you must close the compartment door and secure it with a screwdriver. (See Figure 1-3.)

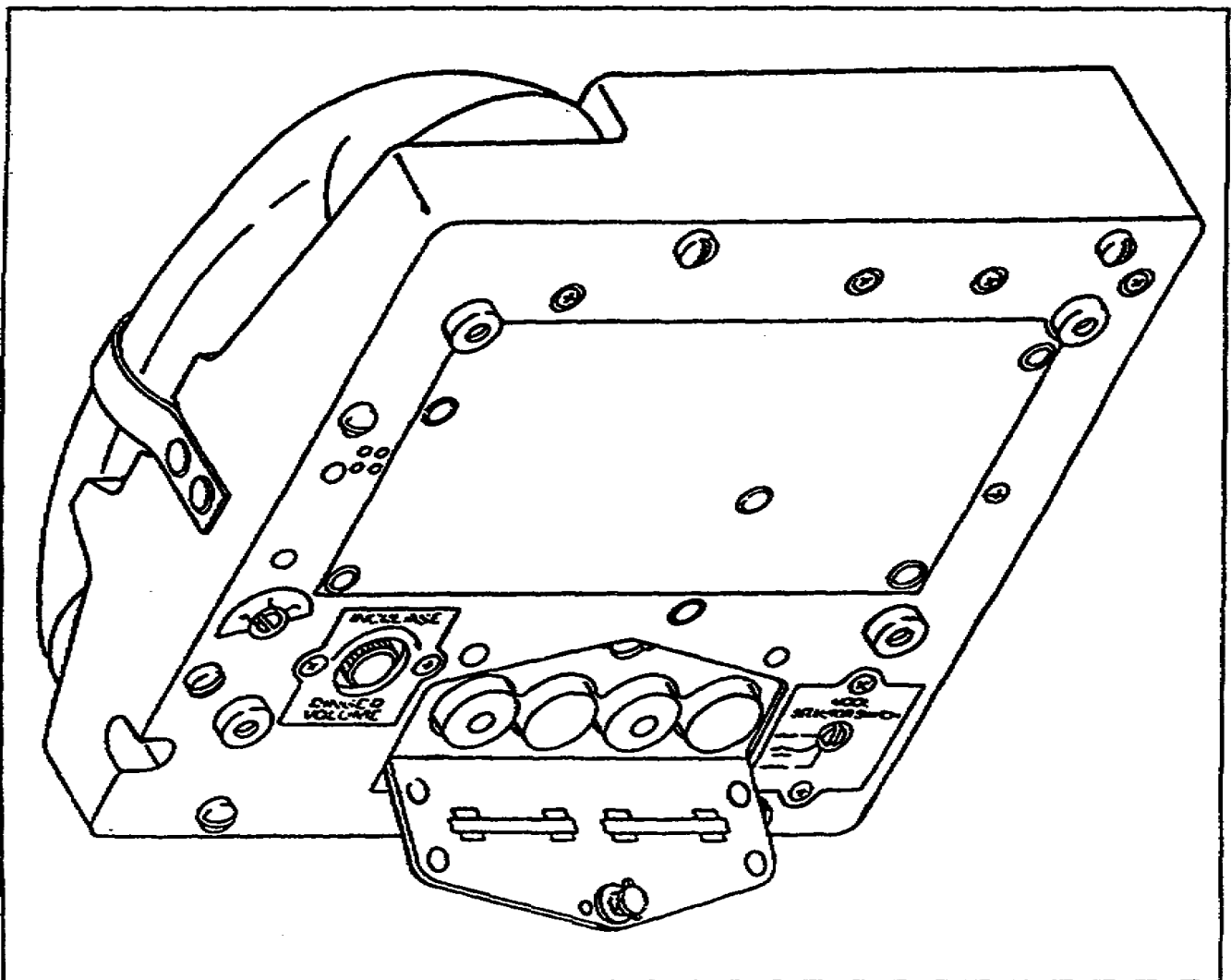


Figure 1-3. Battery compartment and installation.

17. This telephone works in five different operating modes as shown in Table 1-2.

Table 1-2. TA-341()/TT operating modes.

MODE	MODE SELECTOR SWITCH	LB/CB SWITCH	REMARKS
POINT-TO-POINT	POINT-TO-POINT	LB	For direct connection of two telephones.
DC SUPERVISION LOCAL BATTERY	DC SUPV	LB	For connection to a switching facility using DC signaling. The telephone set operates on internal batteries.
AC SUPERVISION LOCAL BATTERY	AC SUPV	LB	For connections to a switching facility using AC signaling. The telephone set operates on internal batteries.
DC SUPERVISION COMMON BATTERY	DC SUPV	DC/CB	For connection to a switching facility using DC signaling. The telephone set is powered from the switching facility.
AC SUPERVISION COMMON BATTERY	AC SUPV	AC/CB	For connection to a switching facility using AC signaling. The telephone set is powered from the switching facility.

18. There are three controls that must be set to have the telephone set work correctly.

a. The LOCAL BATTERY/COMMON BATTERY (LB/CB) switch and the MODE switch we have just discussed.

b. The third switch is the RINGER VOLUME control. This controls the loudness of the ringer, not the volume at which you hear the distant party.

c. Other items of interest on the telephone are:

- Handset Connected to the telephone set and used to transmit and receive message.
- HOOKSWITCH When the handset is placed in the cradle, the HOOKSWITCH disconnects the telephone from the switchboard or distant party.
- Keysender pad When connected to a switching facility, it is used to dial the distant party.
- Retaining strap Used to secure the handset in the cradle when transporting or storing the telephone set.

19. Preinstallation checks. Set the LB/CB and MODE switch to the proper position. For our use, we will install a telephone for point-to-point operation. Install the batteries in the telephone as discussed in paragraph 16, then place the LB/CB switch in the LB position. The MODE switch is placed in the AC SUPERVISION position. Now, if you pick up the handset, little or no sidetone can be heard in the receiver when you speak into the microphone. When you press each key on the keysender pad, there is little or no tone heard in the receiver. Switch the LB/CB switch to point-to-point. Speak into the microphone and a tone should be heard. If you press each key on the keysender pad, you will hear a tone that is lower than the previous one. Place the handset on the cradle. Using a flat-tip screwdriver, connect a resistor 1000 ohms between the red and black terminals on the connector block and another to the green and yellow terminals (See Figure 1-4.)

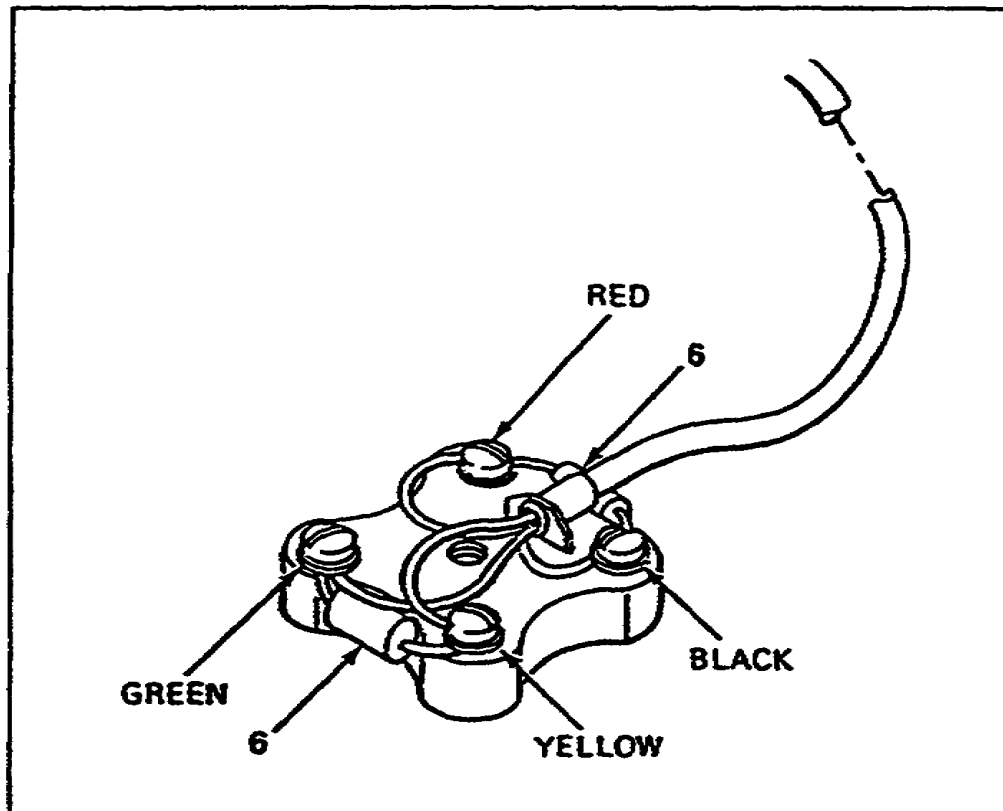


Figure 1-4. Resistor connection.

20. Setting up for point-to-point operation. Remove the resistors from the connector block. It is now time to connect the WF-16/U telephone cable to the terminal block. You must remove one inch of insulation from each of the four wires to prepare them for connecting to the C42 block.

a. Connect the two brown wires to the R and Y terminals of the connector block. This is the receive (RCV) side of the telephone set. Connect the two green wires to the G and B terminals of the connector block. This is the transmit (XMIT) side.

b. If you were to go to the other end of the WF-16/U and connect the WF-16/U to the second telephone, you would have to connect the wires the opposite of what you did before--green wires to R and Y terminals and brown wires to G and B terminals. (See Figures 1-5 and 1-6.)

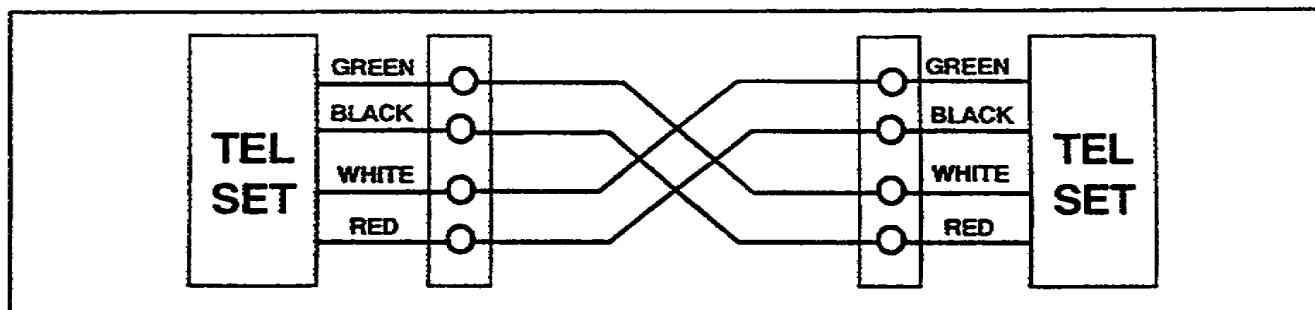


Figure 1-5. Cabling diagram for point-to-point operation.

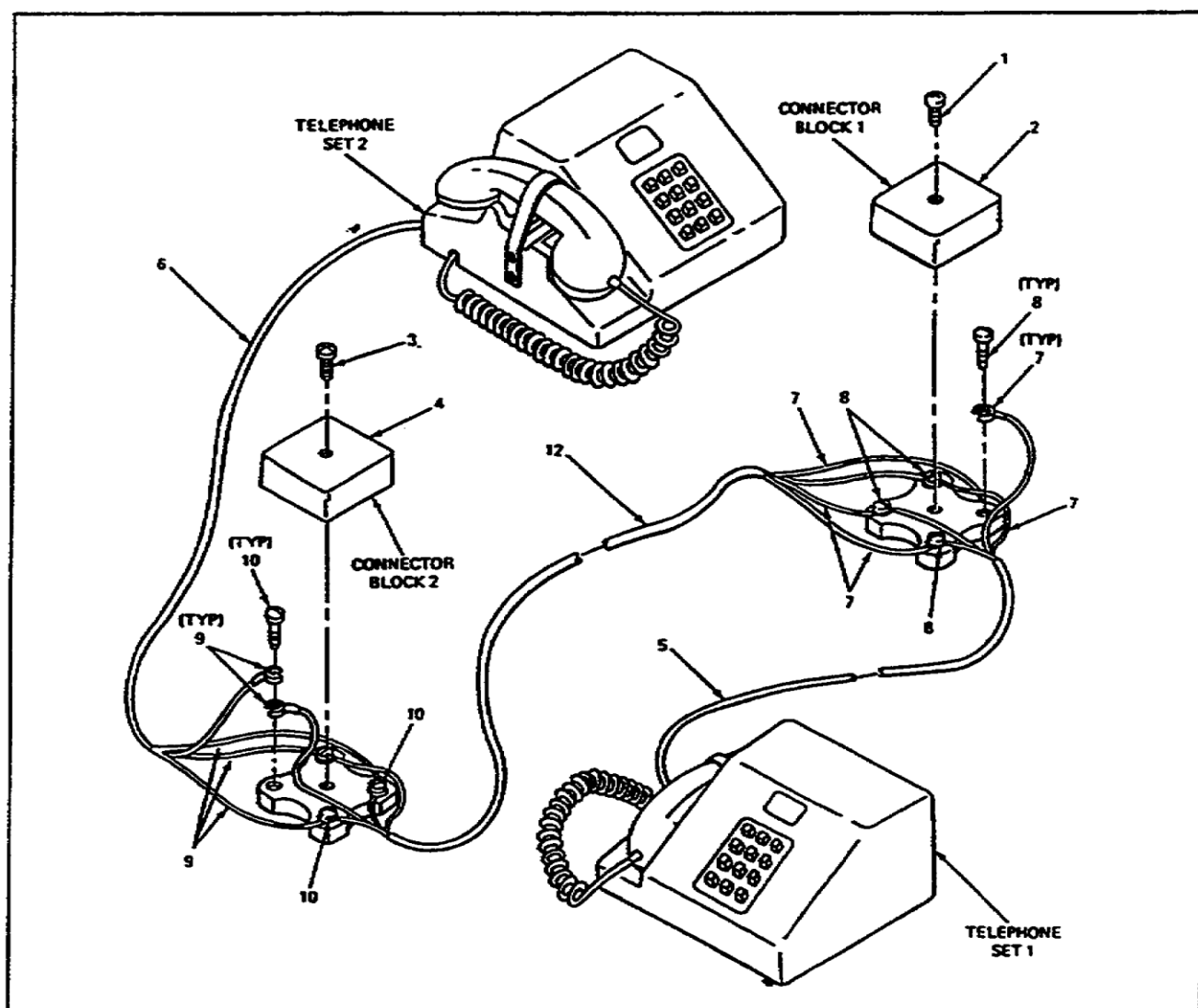


Figure 1-6. Cabling illustration for point-to-point operation.

c. Ensure both telephones have the MODE SELECTOR switch in POINT-TO-POINT and the BATTERY switch to LB.

d. Point-to-point operation. Lift the handset of either telephone. The other telephone should ring one time and the CALL indicator should light. If there is no answer, press down the HOOKSWITCH and release it to send another ring. Once the party answers, you can have a two-way conversation. When you finish, just place the handset in the cradle being sure to place the handset on the HOOKSWITCH to clear it.

21. Operating with a switching facility. In order for the telephone to operate with a switching facility, you must know if the system is working DC or AC. Then you must set the MODE SELECTOR switch and the LB/CB switch to their proper positions. In addition, WF-16/U telephone cable must be connected, usually to a J-1077A/U, to get the signal to the facility. You would connect the green conductors to the G and B terminals on the C42 connector block and to pair 1 of the J-1077A/U. You would have to connect the brown conductors to the R and Y terminals of the C42 block and to pair 2 of the J-1077A/U. Odd pair transmits, even pair receives.

a. An incoming call is signaled by the normal series of tone and silence. The type of call is determined by the rates of tone and silence. A routine call has two seconds of tone followed by four seconds of silence. Any priority call has one second of tone and one second of silence. The visual ring indicator lights at the same rate as the tone. Simply lift the handset and have your conversation. Be sure to place the handset back in the cradle on the HOOKSWITCH to release the line.

b. An outgoing call is rather easy. Remove the handset from the cradle and listen for the dial tone. Press and release the numbered keys on the keysender pad, one at a time, for the number being called. If a mistake is made, press and release the HOOKSWITCH and try again. Listen for a ringback or busy signal. If a busy signal is heard, replace the handset on the cradle and try again later.

c. When assistance or information is required, an operator can be called using the following procedure. Pick up the handset and listen for the dial tone. Press and release the 0 (zero) key on the keysender pad. Listen for a ringback or a busy signal. If the operator answers, obtain your information. If the operator connects you to another person and you need more assistance, use the R key. Press and hold the R key until a recall response is heard. Release the key and wait for the operator to answer the recall. There will not be a ringback or busy signal for an operator recall.

d. Priority calling. To make a priority call or precedence call, the following procedure is used. Pick up the handset and listen for a dial tone. Press and release the R key on the keysender pad. Press and release a numbered key corresponding to these priority levels:

Key 1.....PRIORITY
Key 2.....IMMEDIATE
Key 3.....FLASH
Key 4.....FLASH OVERRIDE

Continue with the normal calling sequence by pressing and releasing the numbered keys for the number being called.

NOTES: If you try to make a higher priority call than is assigned to you, the switching facility will automatically reduce the priority to your assigned level.

Use of priority calling can break in on a conversation already in progress. If a priority call is placed to a person making a ROUTINE or lower level priority call, the person called will first hear a two-second, low pitched, dual tone. The other person will hear a single, high-pitched tone. The old connection will be broken and the priority caller will be connected to the desired person.

If a priority call is placed when all available trunk lines are busy, a lower priority trunk line will be freed for the priority call. Both callers on that trunk line will hear a high pitched tone before being disconnected.

22. Conference calls. To make conference calls use the following procedure.

a. Broadcast conference. Pick up the handset and listen for the dial tone. If priority calling is wanted, press the R key and a priority digit. Press and release the C key. Listen for the dial tone. Press digit keys for the number that has been previously assigned to the conference.

b. Progressive conference. Pick up the handset and listen for the dial tone. If priority calling is wanted, press the R key and a priority digit. Press and release the C key. Listen for the dial tone. Press the digit keys for the number of the first person. If the person does not answer or the line is busy, press the R key to release the number. When each person answers, repeat this procedure for each additional person. A maximum of four people may be called.

c. Meet-Me conference. Pick up the handset and listen for the dial tone. At the assigned time, press the digit keys for the assigned number.

d. Preprogrammed conference. Pick up the handset and listen for the dial tone. If priority calling is wanted, press the R key and a priority digit. Press the digit keys for the number assigned to the conference. Press and release the C key. Wait for everyone to answer. Release any unanswered or busy number by pressing the R key for one second and releasing.

23. Special operations when used with AN/TTC-38 switching facility. The AN/TTC-38 switching facility has the capability for special trunk services and information calls. Procedures to access the special trunks are provided. To place an informal call, you merely call the specified number.

a. Pick up the handset and listen for the dial tone. If priority calling is wanted, press the R key and a priority digit. Press and release the R key. Press and release a numbered key corresponding to the special trunks.

Key 5.....SF commercial trunk
Key 6.....Wideband trunk
Key 9.....Defense Switched Network (DSN)

b. Press keys for the desired number.

24. Extension service is available with this telephone. The first and succeeding telephones, up to a maximum of four, are connected to the man line in the same manner as the original. (See Figure 1-7.)

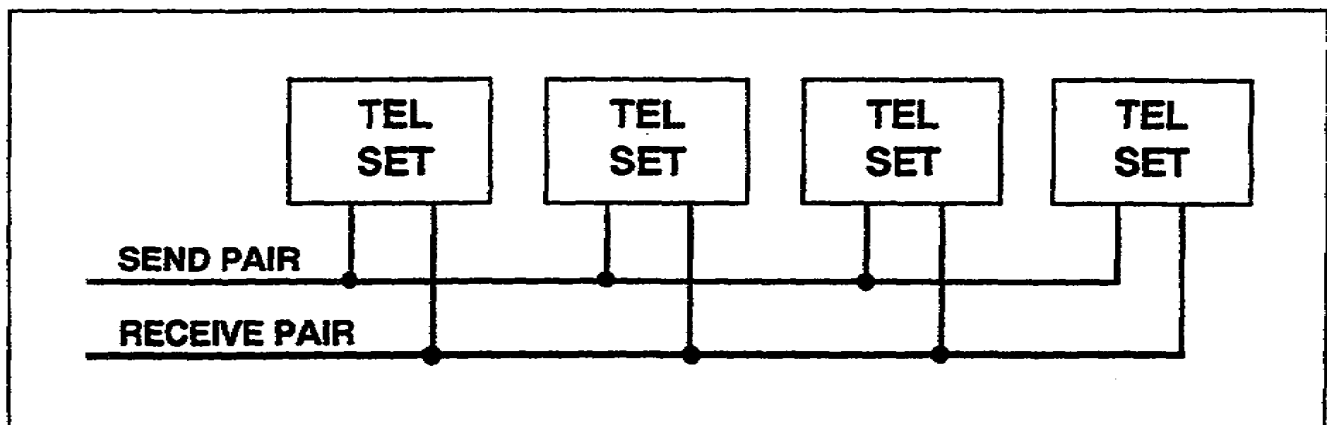


Figure 1-7. Cabling for extension operation.

PART C - TELEPHONE SET TA-838()/TT

25. This is a 4-wire tactical telephone capable of 2-wire operation that can be used in mobile subscriber equipment (MSE) units and units equipped with digital group multiplexer (DGM) equipment. It is a ruggedized, solid-state field telephone. It can be used as a desk telephone or installed vertically.

26. List of abbreviations and glossary.

- AC/CB Switchboard provides AC supervision and common battery power for the telephone set.
- AC/LB Switchboard provides AC supervision, Telephone set gets power from its own local batteries.
- DC/CB Switchboard provides DC supervision and common battery power for the telephone set.
- DC/LB Switchboard provides DC supervision. Telephone set gets power from its own local batteries.
- DTMF Dual-tone multifrequency signaling. Each key on the keysender pad produces a different tone.
- Key C The conference key
- Key F FLASH priority
- Key FO FLASH OVERRIDE priority
- Key I IMMEDIATE priority
- Key P PRIORITY
- Key R Will recall the operator during a call or the line release key during a conference call when used with an AN/TTC-38(V). When used with an SB-3614(V)/TT, it has the same function as the P key.

27. **Equipment data.**

- a. Transmission frequency range: 300 to 3500 Hz.
- b. Distance ranges with DC supervision: The telephone set is located less than 4 miles from the switchboard.
- c. Distance ranges with AC supervision: The telephone set can be located more than 4 miles from the switchboard.
- d. Battery power for arctic operations: Four each BA-3042/U.
- e. Battery power for all other operations: Four each BA-42/U.
- f. Weight: 6.5 pounds.

28. Operator controls, indicators, and receptacles.

a. Binding posts. The two XMIT binding posts are color-coded black and marked with 2W. The two RCV binding posts are color-coded red. (See Figure 1-8.)

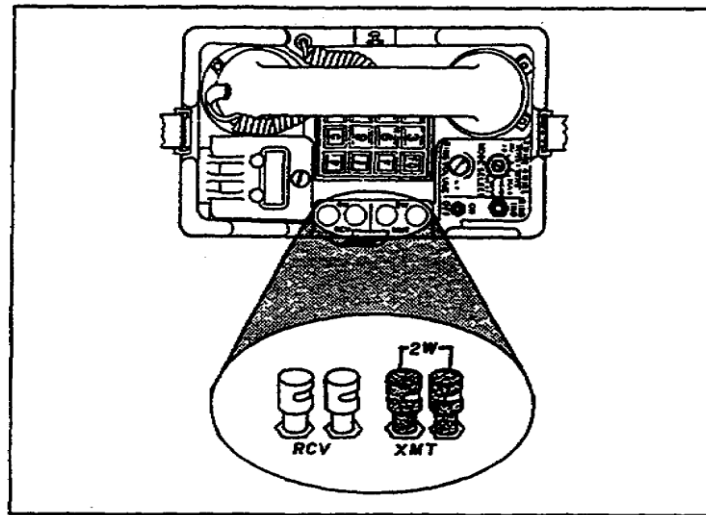


Figure 1-8. Binding posts.

b. The wires connected to the binding posts must be clearly identified at all times. The wires may be tagged, color-coded, or identified as directed by the team chief.

CAUTION

Do not attempt any wire connections if the wires are not clearly identified.
Ask your team chief for instructions if you have any questions.

c. For 4-wire operation, the pair of wires identified FROM RECEIVE are connected to the XMIT binding post.

d. The pair of wires identified FROM SEND are connected to the RCV binding posts. (See Figure 1-9.)

e. For 2-wire operation, the send/receive pair of wires are connected to the XMIT binding posts. No wires are connected to the RCV binding posts. (See Figure 1-10.)

f. The LED RING indicator lamp is controlled by the ON-OFF switch and will glow when a ringing signal is received. (See Figure 1-11.)

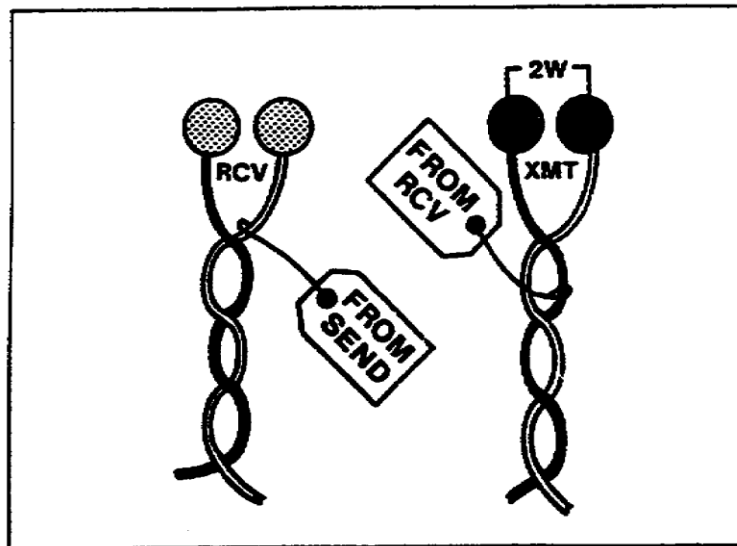


Figure 1-9. Four-wire identification.

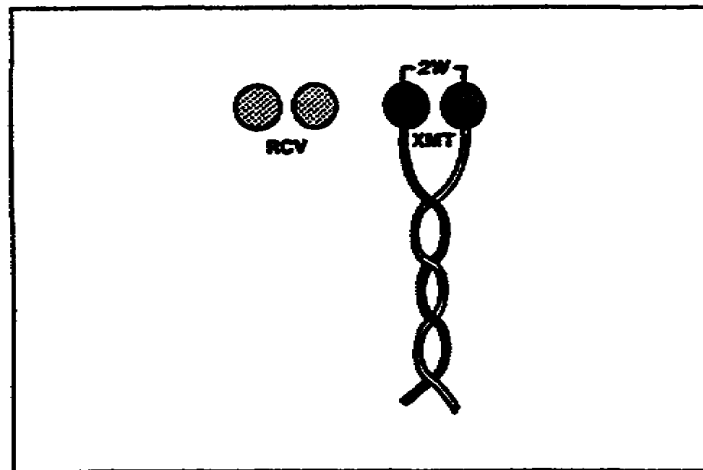


Figure 1-10. Two-wire identification.

- g. The ON position of the ON-OFF LED switch will allow the LED RING indicator lamp to glow when a ringing signal is received; OFF will disconnect the lamp. (See Figure 1-11.)
- h. The RING VOLUME control controls the volume of the tone ringer. (See Figure 1-11.)
- i. Tone ringer. Gives off an audible signal when a ringing signal is received. Located on the right side of the telephone set.

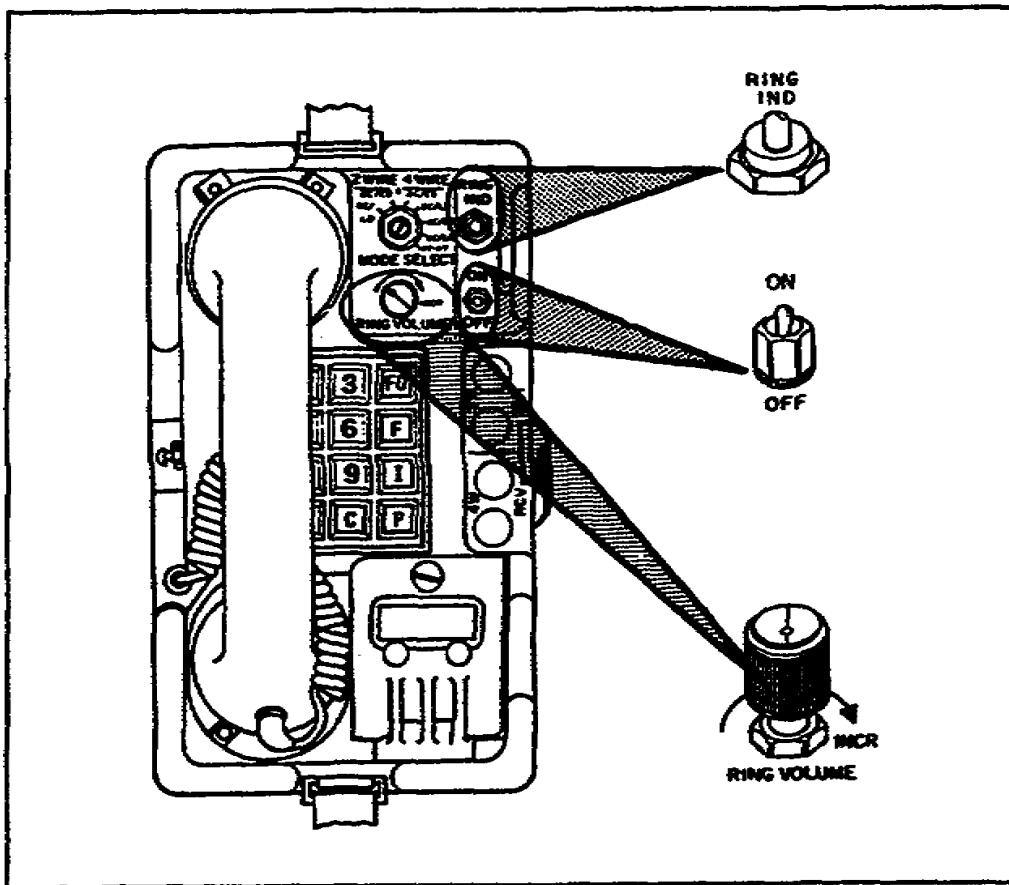


Figure 1-11. Ringer controls.

j. Handset and HOOKSWITCH. The handset is attached to the telephone set by a retractable cord. When the handset is not in use (on-hook), it is placed on top of the HOOKSWITCH and the HOOKSWITCH plunger is pressed down. The telephone set ringer circuits are now connected to receive a ringing signal (See Figure 1-12.) When the handset is lifted off the HOOKSWITCH (off-hook), the ringer circuits are disconnected and the telephone set sends an off-hook signal to the distant equipment switchboard or telephone set). (See Figure 1-13.)

k. When the handset is placed on the HOOKSWITCH (on-hook) after a call is completed, the telephone set sends an on-hook signal to the distant equipment and the ringer circuits are connected.

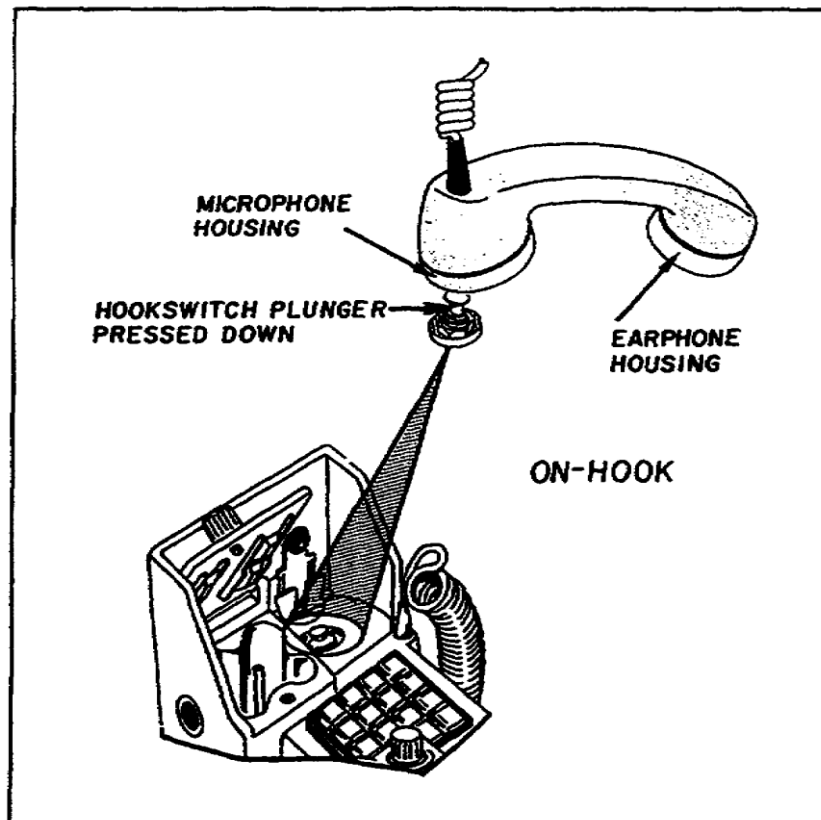


Figure 1-12. Handset (on-hook).

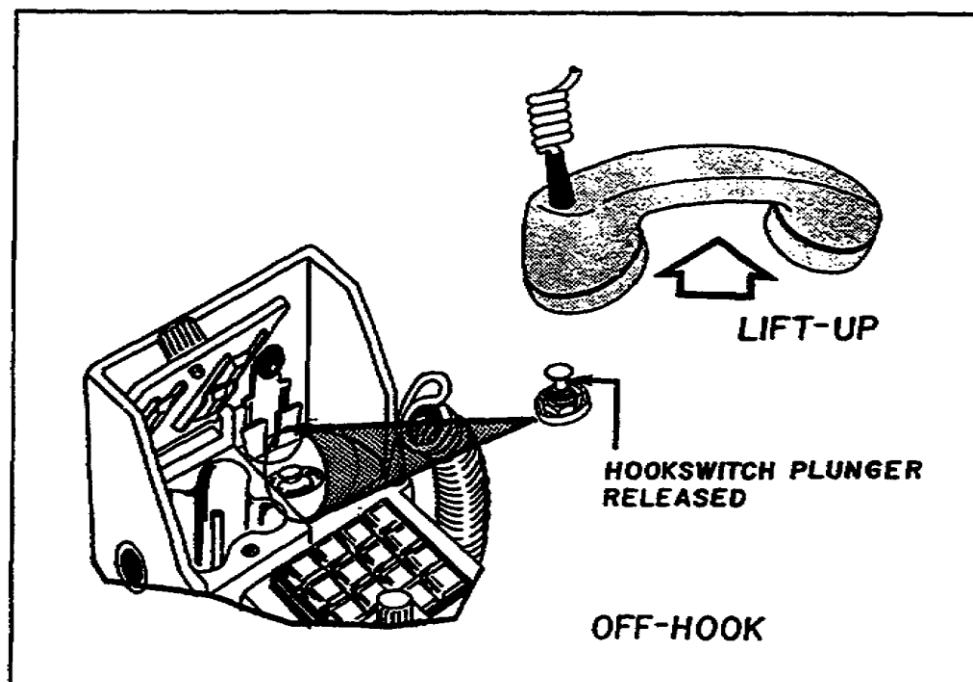


Figure 1-13. Handset (off-hook).

29. Battery installation. With the telephone sitting on a desk or level area with the binding posts to the right the battery compartment is in the right rear position of the telephone as you look down on it.

a. To insert batteries, the compartment must be opened and checked for foreign matter. To open the compartment, turn the thumbscrew counterclockwise and lift the cover. (See Figure 1-14.)

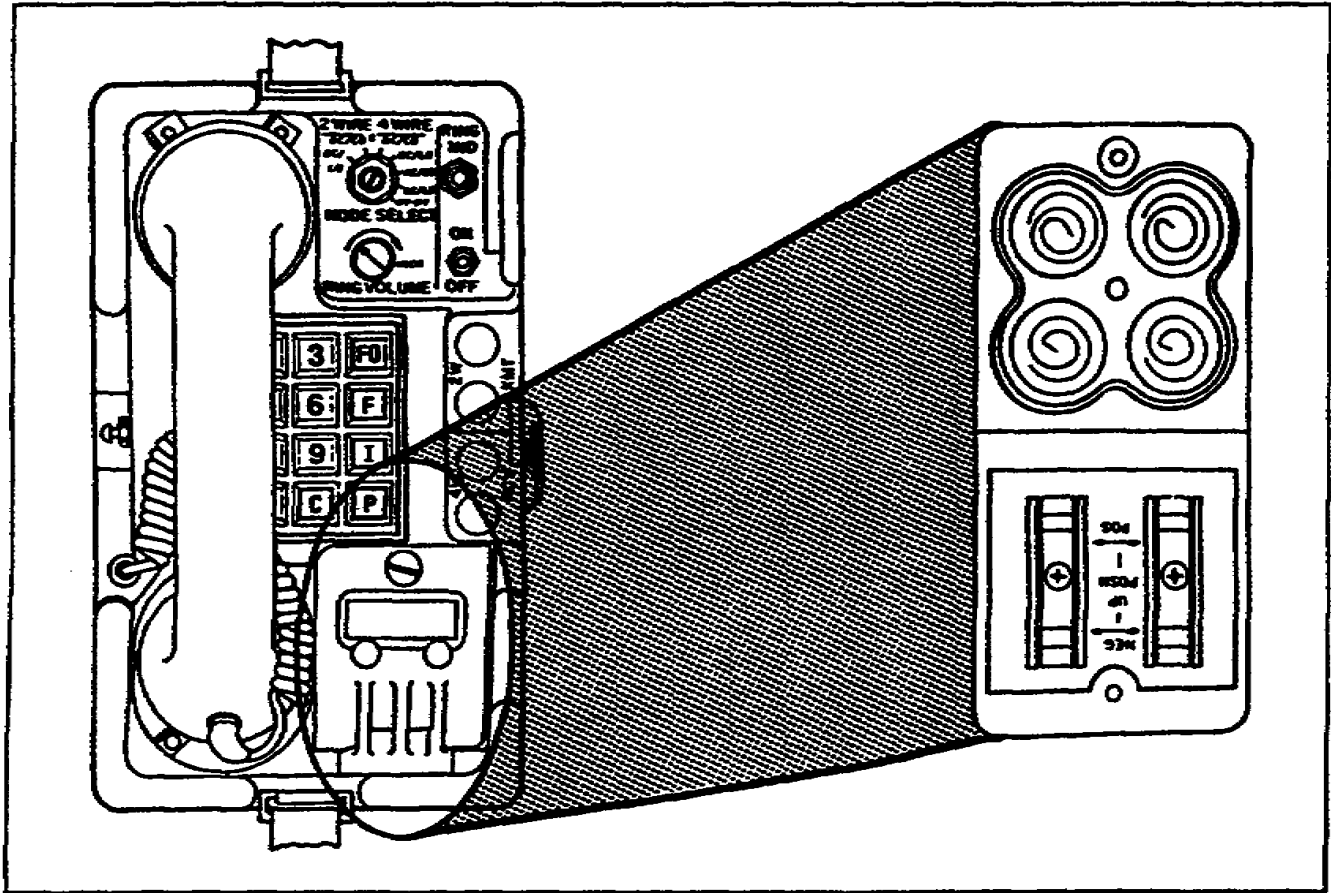


Figure 1-14. Battery compartment cover.

b. Polarity of batteries is important. Check the cells before inserting to forego any problems. The top of the cell with the button on it is the positive (+) and the bottom of the cell that is flat is the negative (-). (See Figure 1-15.) Insert the batteries in the compartment as shown in Figure 1-16.

c. Visually double check the polarity of the four cells. Carefully close the battery compartment cover and lock it. Do this by turning the thumbscrew clockwise.

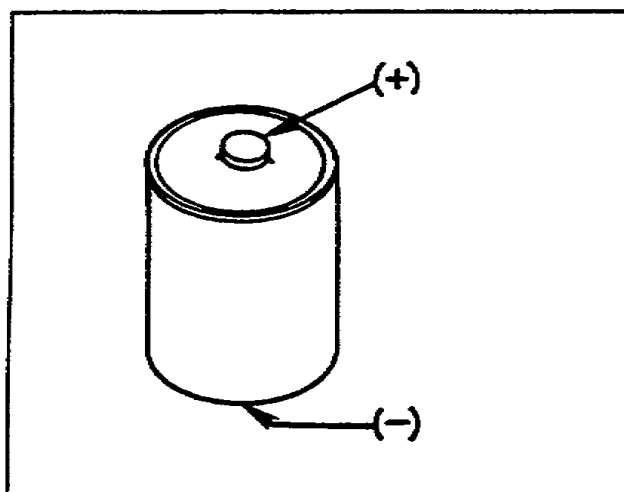


Figure 1-15. Battery cell.

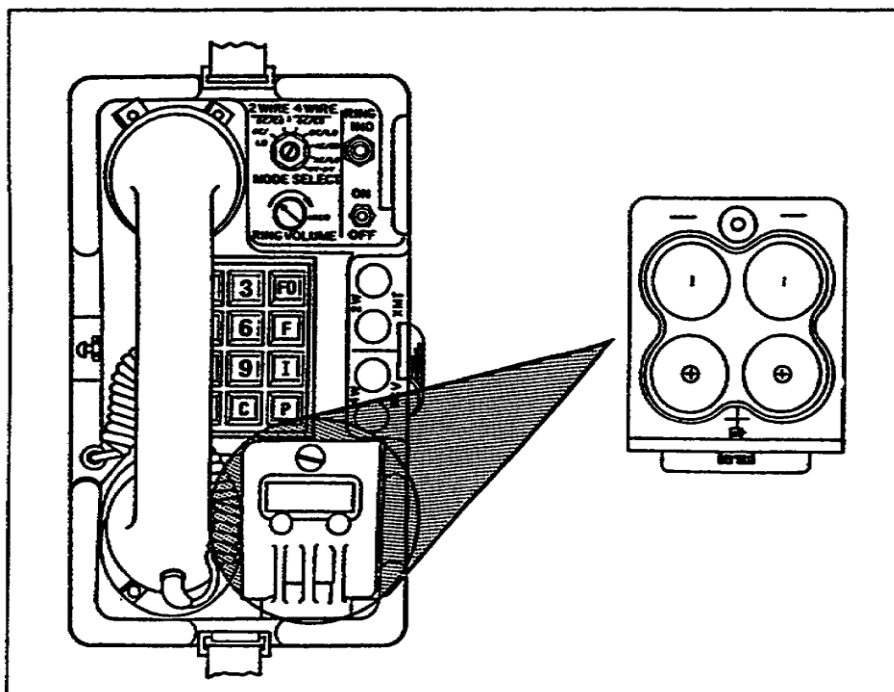


Figure 1-16. Battery compartment.

30. Preinstallation check. This check is made without wire connections to the telephone set.

- a. Set the MODE SELECT switch to AC/LB. Use a screwdriver or a coin. (See Figure 1-17.)

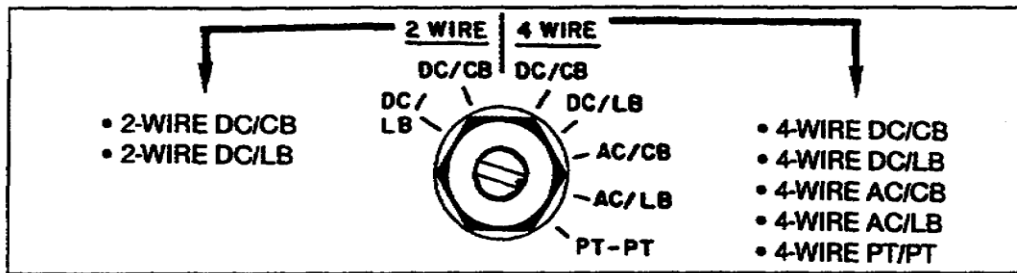


Figure 1-17. MODE SELECT switch.

b. Unlatch the tie-down strap and lift the handset off-hook. Speak into the microphone and listen for sidetone. You should hear very low level sidetone or no sidetone at all. Press each of the 16 keys on the keysender pad one at a time. The sound level (if any) of each key tone should be very low. Place the handset on-hook.

c. Set the MODE SELECT switch to PT-PT. Lift the handset off-hook and speak into the microphone. Wait at least four seconds before speaking. Listen for the sidetone level. It should be normal sidetone. Press each of the 16 keys on the keysender pad one at a time. The sound level of each key tone you hear should be a little lower than the sidetone level of your voice. Place the handset on-hook.

d. Press each binding post until its slot is visible and place one 1000-ohm resistor between one XMIT (black) binding post and one RCV (red) binding post. Release the binding post to secure the resistor. Then place another 1000-ohm resistor between the other XMT and RCV binding posts. (See Figure 1-18.)

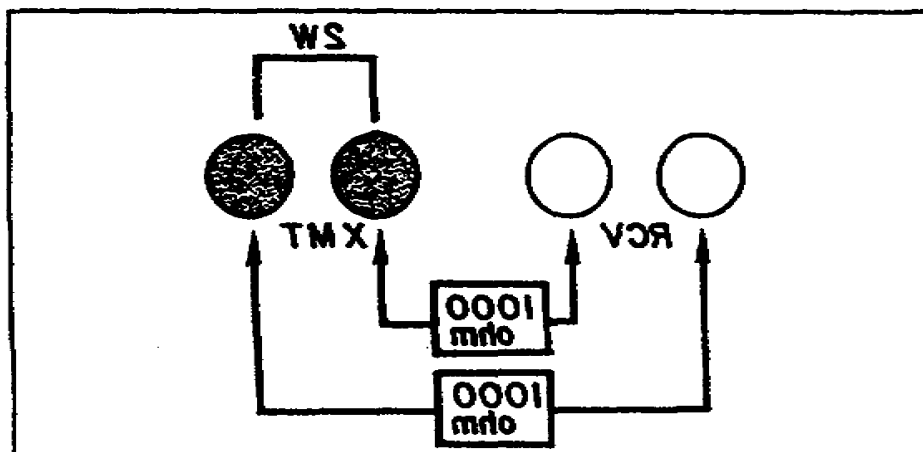


Figure 1-18. Resistor connection.

e. Lift the handset off-hook and speak into the microphone. Listen for the sidetone level. Your voice sidetone (if any) should be lower than the level before. Press each of the 16 keys on the keysender pad. The sound level (if any) should be louder than the level you heard before. Place the handset on-hook. Depress the binding posts and remove the resistors.

31. Preparation for desk use. Loosen the carrying sling by moving the slide buckles. Unhook the strap and place the sling out of the way. Unsnap the tie-down strap. Adjust its length with the slide buckle so the strap can reach under the case. Place the strap under the case and snap it into place. Lift the handset and place the handset retaining spring in the latched position. Squeeze the sides of the spring and move it back behind the two tabs. Release the pressure to keep the spring latched behind the two tabs. When latched, the spring cannot hold the handset. (See Figure 1-19.) Place the handset on-hook.

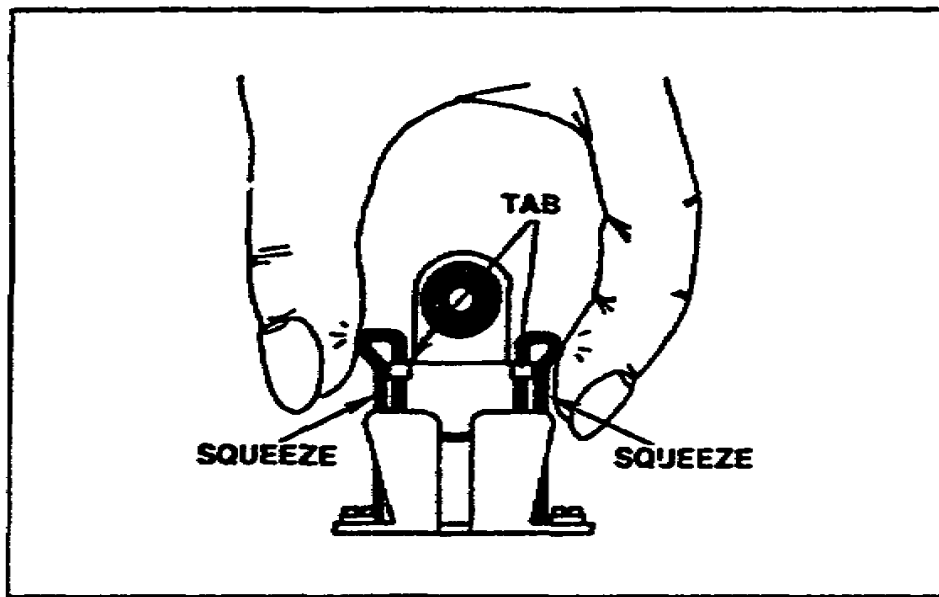


Figure 1-19. Spring latched.

32. Preparation for vertical mounting of the telephone set. Loosen and lengthen the carrying sling. Loosen and unsnap the handset tie-down strap. Lift up the handset off-hook. Place it under the telephone set and snap it into place. Check the handset retaining spring to ensure it is in the unlatched position. It should be forward past the tabs. (See Figure 1-20.) Use the carrying sling to secure the telephone set to a pole or tree. Place handset on hook.

33. Switchboard operation.

a. SB-3614. Set the RING VOLUME control to midrange. Make sure the MODE SELECT switch is set to 2-WIRE DC/CB. Lift the handset off-hook and listen for the dial tone. Then dial 0. You should hear a switchboard ringback tone that pulses every two seconds. When the operator answers, ask for a ringback. Hang up the handset. When the phone rings, adjust the VOLUME control and then talk to the operator to ensure proper operation.

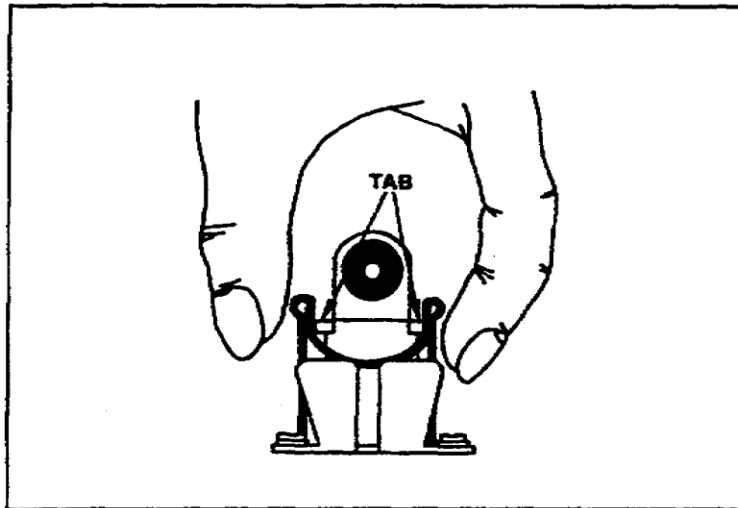


Figure 1-20. Spring unlatched.

b. AN/TTC-38. Set the RING VOLUME control to midpoint. Set the MODE SELECT switch to 4-WIRE AC/CB. Take handset off-hook. Listen for the dial tone. Press 9 and the tone should stop. Now press keys 5, 1, and C. Hang up the handset. Your phone should ring. Adjust the RING VOLUME control if necessary. Go off-hook and listen for the dial tone. When you get the dial tone, hang up the phone and you are ready for operation.

34. Four-wire extension service.

a. One or more extension sets may be connected as shown in Figure 1-21. All XMITs are connected together and all RCVs are connected together. This applies to all extensions connected to the main line of the telephone.

b. Make sure the MODE SELECT switch on each telephone set is set to the same position. Fill in each station card with the assigned number. Make sure each telephone set has batteries if 4-WIRE DC/LB or 4-WIRE AC/LB modes are used. Remember, only the last extension to go on-hook will disconnect the line.

35. Now get a telephone set TA-838()/TT, some WF-16/U or enough WD-1()/TT, and install the telephone set to be used in a point-to-point operation.

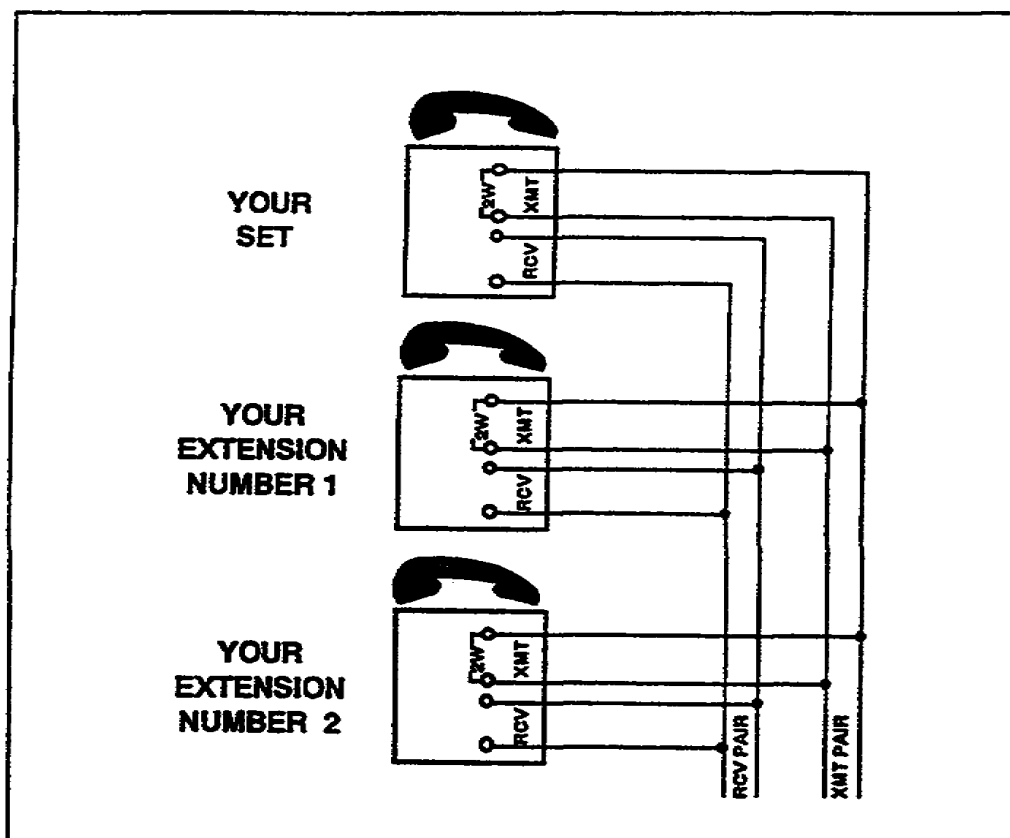


Figure 1-21. Extension service.

PART D - TELEPHONE SET TA-954/TT

36. Purpose and use. The DNV T TA-954/TT is a 4-wire telephone set which transmits and receives conditioned diphase-modulated digital voice and loop signaling at the rate of 16 or 32 kilobits per second (kbs). Selection of the 16 or 32 kb/s is accomplished by the use of a switch alongside the binding posts.

37. Function and interface. The DNV T operates from a common battery voltage of +24 to +56 volt appearing on the 4-wire lines. The DNV T contains built-in protection from nuclear high energy electromagnetic pulses (EMP) and lightning. The DNV T includes an audio interface, analog-to-digital/digital-to-analog (A-D/D-A) conversion, loop interface, signaling and supervision, power and control. It directly interfaces with specific digital equipment.

38. Installation.

a. Mounting. The DNVT has rubber feet for desktop mounting and D-rings affixed to the case side for vertical mounting to a tree or pole. Mounting may be accomplished by the use of rope, wire, or straps. Secure one end to the left side D-ring. Hold the DNVT in the desired mounting position. Feed the rope, wire, or strap through the top right side D-ring; tighten and secure. (See Figure 1-22.)

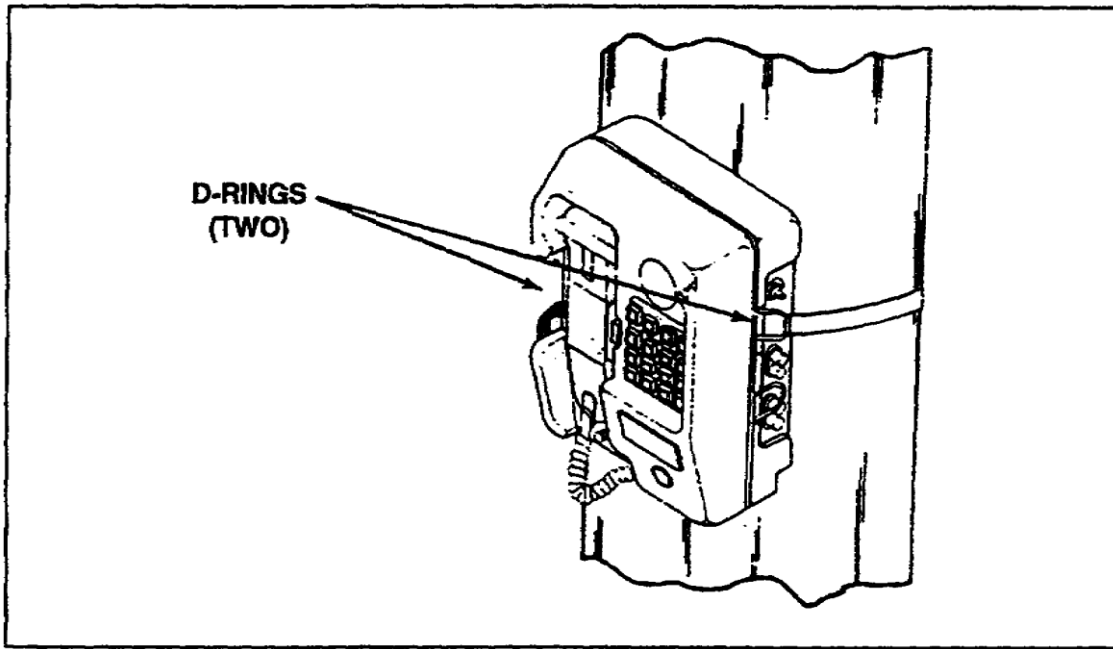


Figure 1-22. DNVT vertical mounting details.

b. Bit rate selection. Use a screwdriver to set the switch to the 16 or 32 kb/s RATE position.

WARNING

Voltages as high as +56 may be encountered at the transmit and receive pairs of the field wire/cable. Use extreme caution when making connections.

c. Field wire connection. Insert the wire/cable WF-16/U through the lower right D-ring for strain relief. Prepare the wire/cable by removing 1/2 inch of insulation from the wire. Strip 1/2 inch more and pull it to the end of the wire. Cut off 1/4 inch of the end of the wire. Connect the field wire/cable by pushing the end of the proper binding post, insert the wire end into the opening of the binding post, and release the binding post. (See Figure 1-23.)

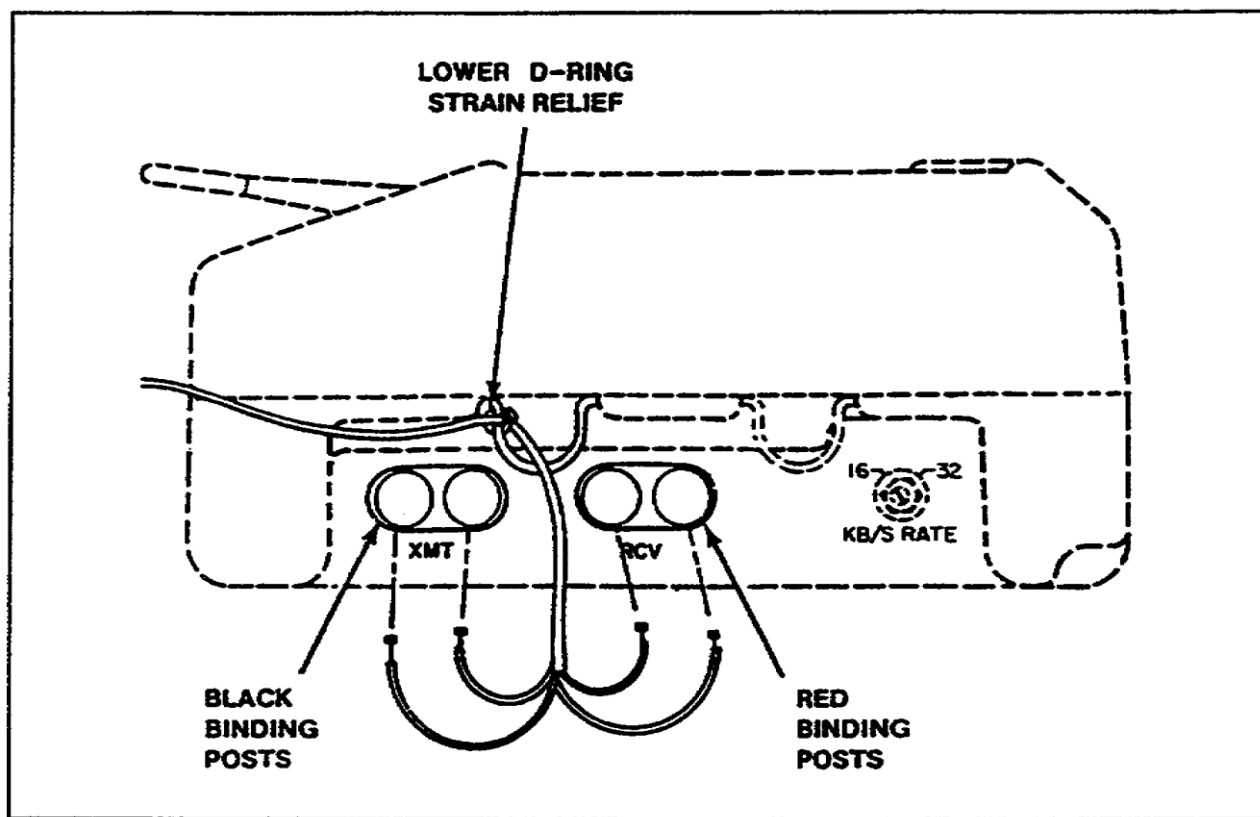


Figure 1-23. DNVT field wire/cable connections.

39. Operation. The operation of this instrument is similar to the telephone set TA-838/TT.

a. Differences. Some TA-954/TT DNVTs have an H-350/U handset. This handset can be used normal by just speaking and listening. If desired, press the PUSH-TO-NRI switch to key the radio and speak; release to listen. For users with H-250/U handset, press the PUSH-TO-TALK switch to speak and release to listen.

b. Completion of call. Replace handset in cradle. Ensure the handset is under cradle bar and RING/OFF-HOOK indicator light is off.

c. Types of operation. In addition to the normal operation of the TA-954/TT, the operator can make use of the following types of calls:

- Outgoing conference call
- Incoming conference call
- Outgoing precedence call
- Incoming precedence call

PART E - TELEPHONE SET TA-1035/U

40. This telephone is very similar to the TA-954/TT. As a prime subscriber terminal, the TA-1035/U provides full-duplex, conditioned diphase digital voice and loop signaling information with wire, and mobile access equipment. It also provides supervisory, clock, plain text, and voltage reference signals with data devices. The TA-1035/U provides a data port for interfacing the SST and AN/UXC-7 data devices to the MSE network. The TA-1035/U operates in a COMMON BATTERY power mode, deriving its power from the switch line termination circuit. (See Figure 1-24.)

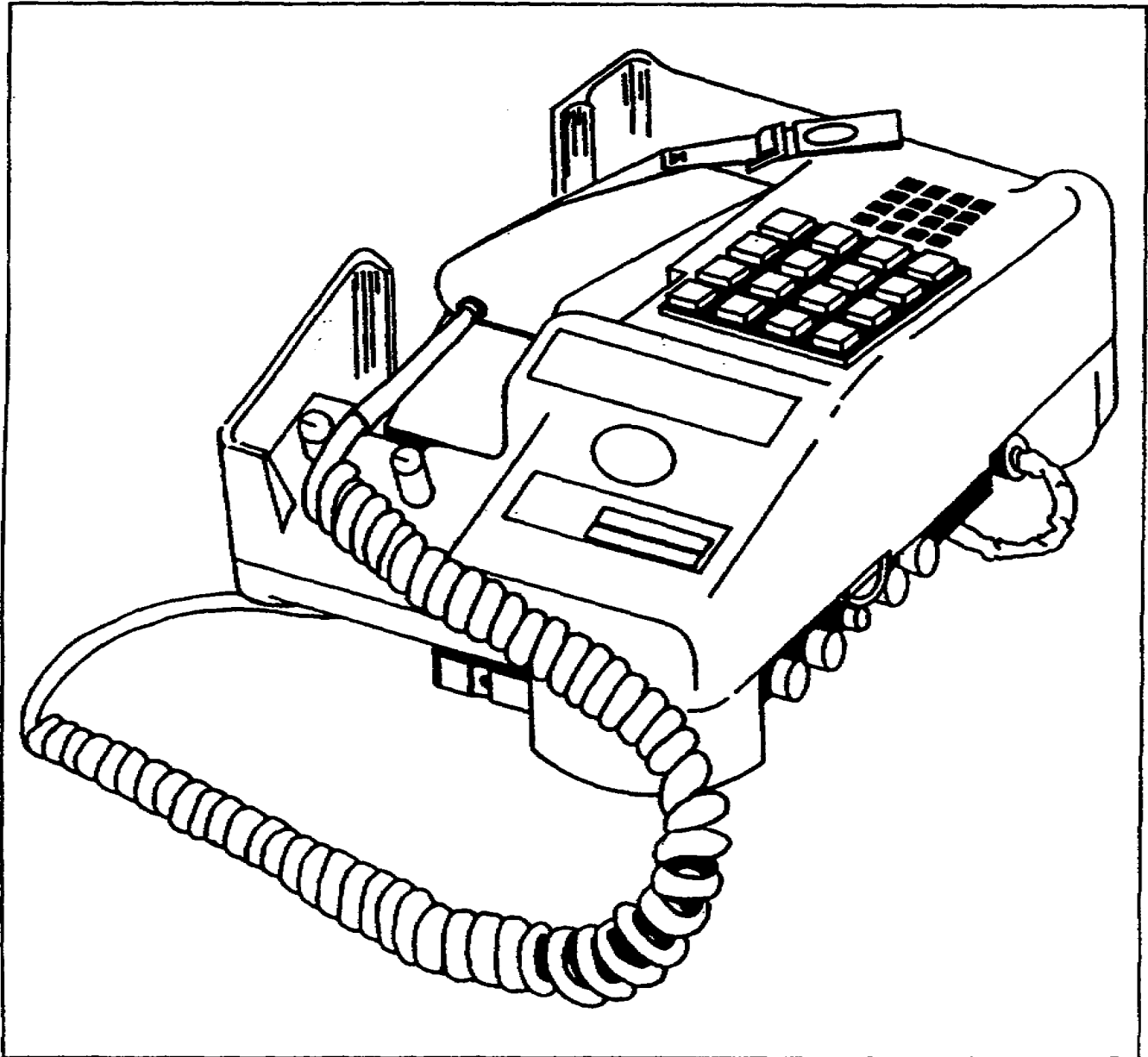


Figure 1-24. TA-1035/U telephone digital nonsecure voice.

41. Technical characteristics:

- Power requirement 48 V DC
- Power consumption:
 - Off-hook (Powered up) 1.5 W (maximum)
 - On-hook (Powered down) 300 mW (maximum)
- NSN: 5805-01-246-6826 (\$12,572.00)
- TM 11-5805-761-12

**PART F - MULTIPLEXER TD-1233/TT AND
MULTIPLEXER-COMBINER TD-1234/TT**

42. One terminal you might have to install prior to the installation of the telephone sets is a J-1077A/U. This junction box has terminals inside for 26 pairs of wires. To connect a 4-wire telephone you would connect the transmit wires to the odd terminals (1, 3, 5, 7, and so forth) and the receive pairs to the even terminals (2, 4, 6, 8, and so forth). However, you do not want to split the installation. If you are installing a telephone set TA-838()/TT, you would put the transmit wires to terminals 1 and the receive wires to terminals 2. Then the next telephone would go transmit to 3 and receive to 4. Do this until you have installed 12 4-wire telephones. The other terminals are to be used by the installer for troubleshooting or to replace a bad pair. The J-1077A/U is normally used with multiple subscriber equipment. (See Figure 1-25.)

43. Another terminal or terminals you might have to install before installation of a telephone set are the TD-1233/TT and the TD-1234/TT. These two pieces of equipment go with DGM equipment. (See Figures 1-26, 1-27, 1-28, and 1-29 to view the equipment front and back. You must be familiar with both sides.)

44. Installation of TD-1233/TT or TD-1234/TT.

a. First we must discuss SAFETY (to the installer and to the equipment).

(1) Remove all jewelry, to include rings, watches, neck chains, and identification tags. Place the jewelry in a pocket or another secure place. Failure to do so could cause severe burns or injury to the installer.

(2) The equipment must be properly grounded prior to connecting power cables, transmission cables, and telephone wires. Failure to do so could damage the equipment and very possibly jolt the installer with an electrical shock.

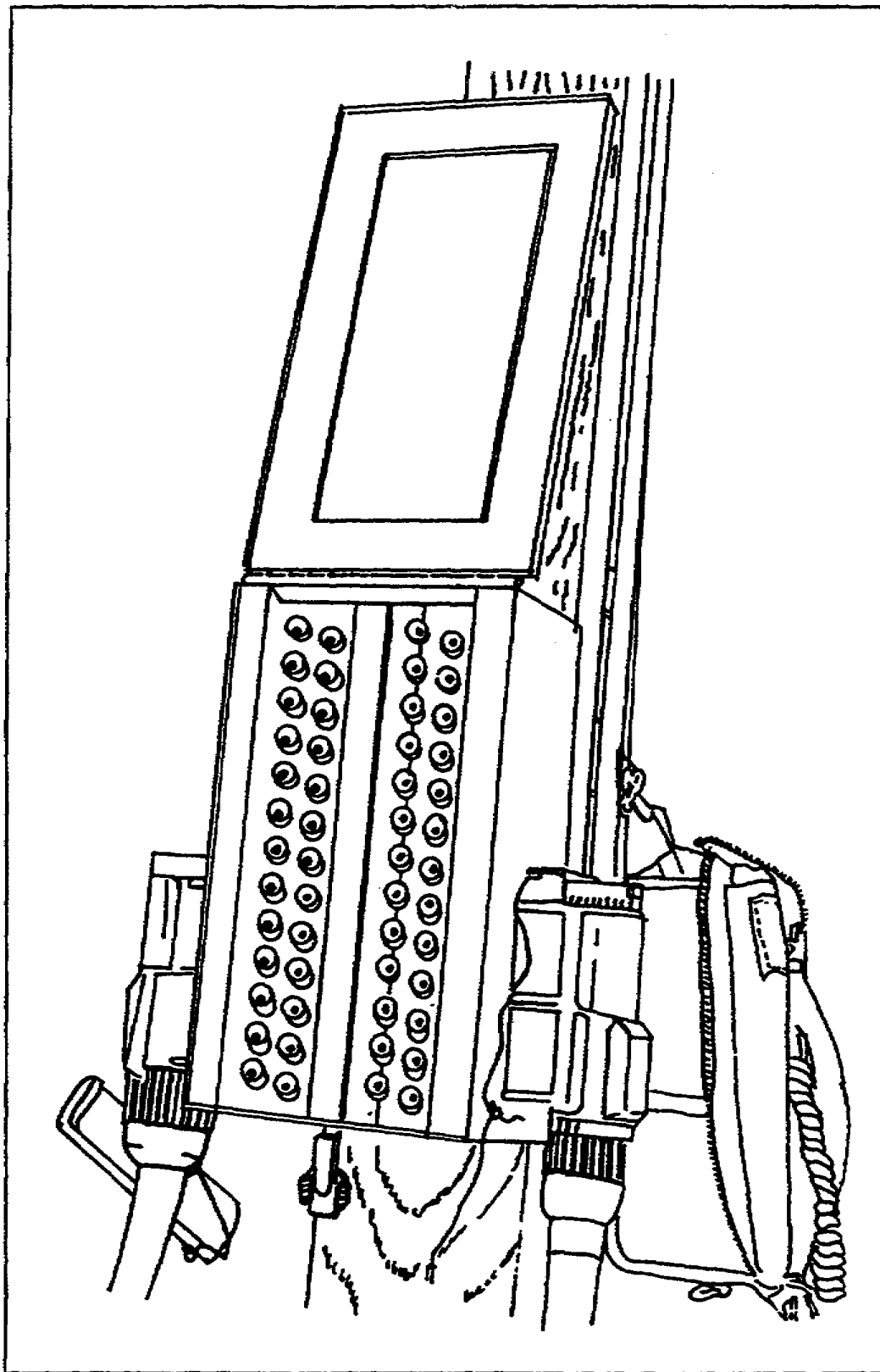


Figure 1-25. J-1077A/U

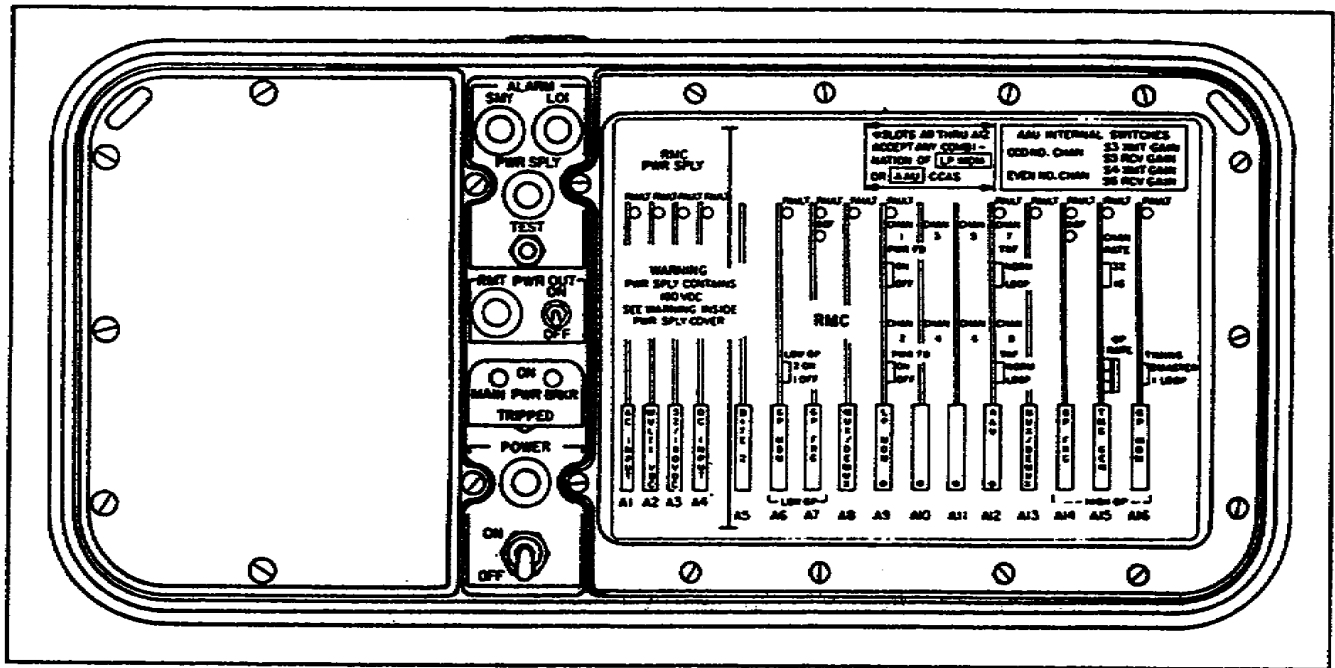


Figure 1-26. TD-1234/TT (front).

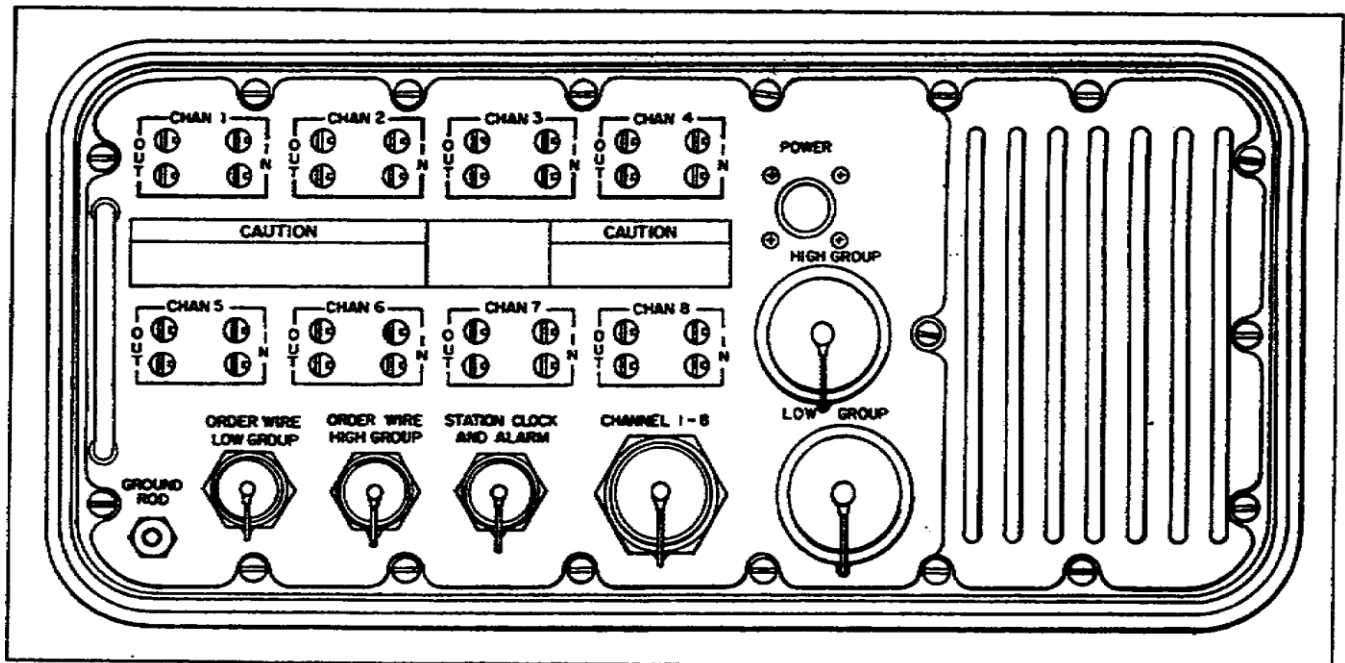


Figure 1-27. TD-1234/TT (rear).

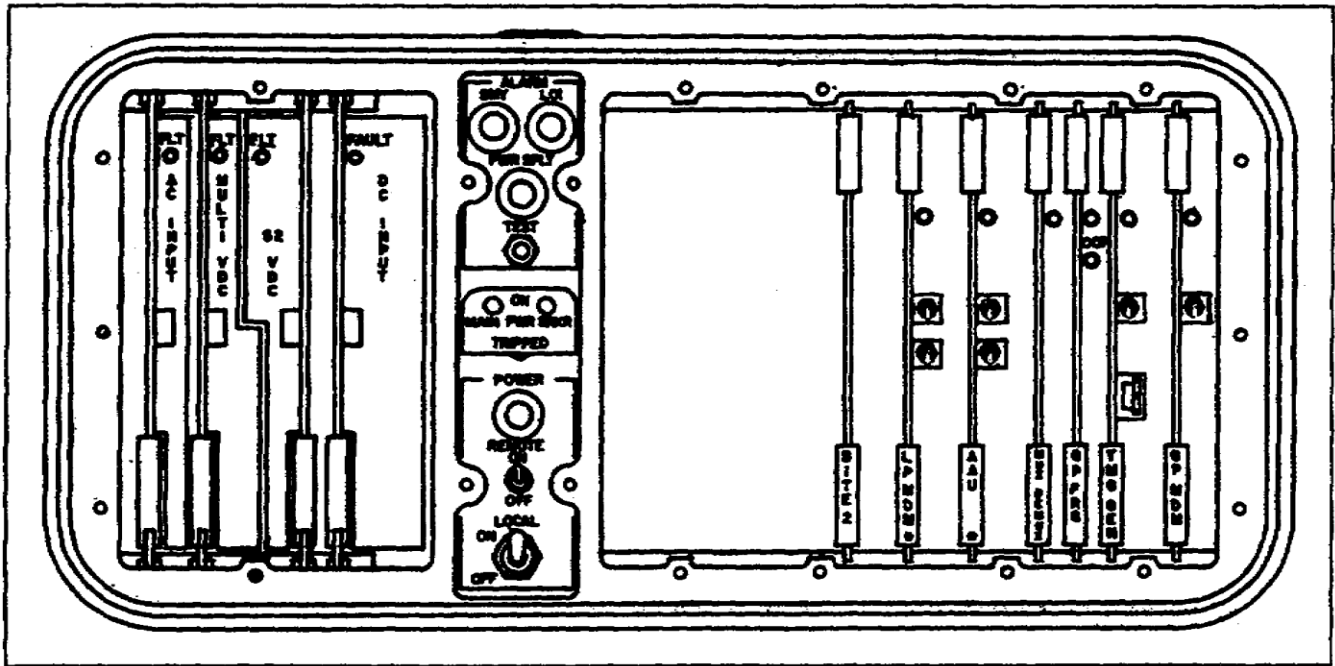


Figure 1-28. TD-1233/TT (front).

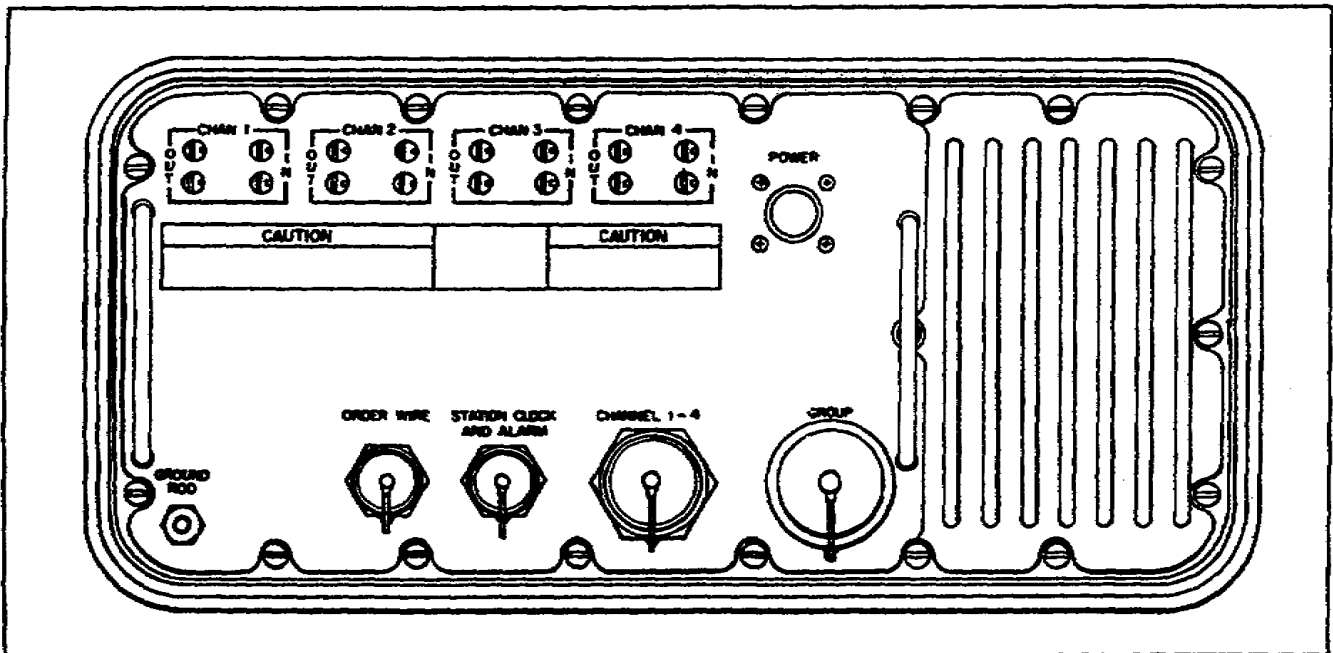


Figure 1-29. TD-1233/TT (rear).

(3) Static discharge from the installer can damage the components located inside the equipment on the circuit card assemblies (CCAs). Then the equipment will not work. If there is no spare equipment, the mission cannot be accomplished.

b. Ensure the right equipment is available. To install a TD-1234/TT at the maximum distance from the AN/TRC-173, eight 1/4-mile reels of CX-11230A/G are needed. That will provide a distance of 2 miles. A source of power, power cable, and plug is also needed. The equipment does not get its power from the CX-11230A/G. Ensure the ground rod, ground cable, and a hammer or mallet are available, and don't forget to protect the eyes with goggles. Ensure there is at least 1/4 mile of WF-16/U telephone cable to go from the TD-1233/TT to the 4-wire telephone. Any 4-wire telephone TA-838()/TT, TA-954/TT, or TA-341/TT will work on this equipment. The TL-13 is needed to prepare the wire ends to fit into the TD-1234/TT and the telephone.

45. In the old days, the Army used large switchboards in an area and all telephones were wired through it. Now the units are dispersed and only a few telephones go into an area. The TD-1234/TT will permit the use of up to eight telephones. The TD-1234/TT will accept the signal from the telephone and mix it or multiplex it to be technical, and send all signals out as one signal to the van where it is sent on its way.

46. The TD-1234/TT will also provide remote power to another piece of equipment-the TD-1233/TT. This unit can handle four telephones at one time and can be placed up to 2 miles from the TD-1234/TT. The telephones can also be up to 1/4 mile from the TD-1233/TT.

47. Both units, the TD-1233/TT and TD-1234/TT, will provide the installer with an analog order wire system. Using the test set telephone TS-3647/G, the installer can then troubleshoot the system from the TD-1233/TT all the way back to the van.

48. The TD-1234/TT requires 115 V AC. It has an internal power supply to change it to the proper operating voltages needed for the circuit cards. It also has another power supply to provide the remote voltage needed for the TD-1233/TT. The TD-1233/TT will operate on voltages of 28 V DC or 180 V DC.

49. The front panel controls are used to turn the unit on and to let the installer know when there is a problem. There is an ALARM SMY indicator, ALARM LOI indicator, ALARM POWER SUPPLY indicator, ALARM TEST pushbutton, a main POWER BREAKER circuit breaker, a power lamp, a REMOTE POWER OUT ON/OFF toggle switch, power ON/OFF toggle switch, and a REMOTE POWER OUT indicator.

50. There are up to 16 circuit cards inside that do all the work. They provide power, remote power, and process the telephone signals. In positions A9 through A12, you can interchange the cards. If you are installing digital telephones such as TA-954/TT or KY-68, you need a loop modem (LP MDM) card. If you are installing a TA-341/TT or a TA-838()/TT, you need an analog applique unit (AAU) circuit card. You can mix or match the cards depending on the telephone. (See Figure 1-30 for circuit card locations. Note that positions A9 through A12 can handle two telephones that are the same.)

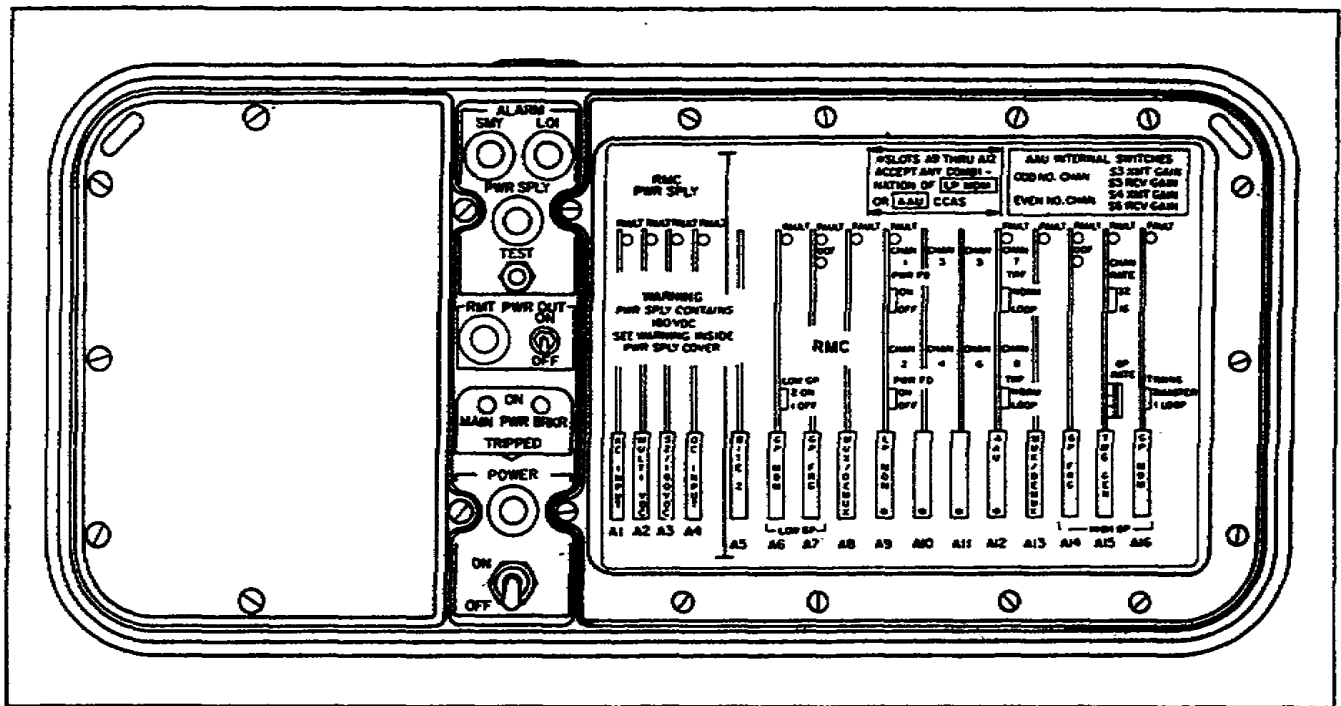


Figure 1-30. Circuit card location.

51. Operational requirements.

- a. Ground the equipment immediately.
- b. Ensure all switches are off.
- c. Connect the CX-11230A/G to the rear of the TD-1234/TT. It is connected to HIGH GROUP if going to the next unit or to the terminal AN/TRC-173. It is connected to LOW GROUP if it is going down to another TD-1234/TT or a TD-1233/TT. (See Figure 1-27.)
- d. Collect power to the TD-1234/TT. Place main POWER switch in the ON position. The power lamp lights. After a 5-second warmup, all alarm lamps should be off.
- e. Connect the TS-3647/G and test the order wire system. It is connected to the ORDER WIRE HIGH GROUP if it is going to the AN/TRC-173, or to the ORDER WIRE LOW GROUP if it is going down to another TD-1234/TT or TD-1233/TT.
- f. Perform a built-in test equipment (BITE) test. Press and release the ALARM TEST switch. All fault and alarm lamps on the front panel and on CCAs A6 through A16 are operational.
- g. If a fault is detected, turn the main POWER switch to OFF. Reset the CCA. Turn the main POWER switch to ON. If the fault is not resolved by resetting the CCAs, you should replace the entire unit.

h. If the unit is completely operational, use WF-16/U and connect a telephone set to the proper position; turn on the switch on that circuit card and place a call. Be sure to connect the wires to the telephone first.

i. When you connect the WF-16/U to the rear of the TD-1234/TT or the TD-1233/TT, the wires are reversed. Push in on the connector; place the end of the wire in the slot, be sure it is snugly in place. If you connected the wires to the OUT connector, then you must place the other end of those wires in the RECEIVE connectors on the telephone. Wires connected to the IN connectors must be connected to the TRANSMIT connectors on the telephone. Go around to the front of the TD-1234/TT, look at CCA in position A9 if you connected the wires to CHAN 1 and turn the switch on the top to the ON position. If no telephone is connected to a CHAN connector, the switch on the CCA must be in the OFF position (See Figures 1-31, 1-32, and 1-33.)

NOTE: If the CCA in A9 is an AAU, the switch should be in NORMAL. If the CCA in A9 is an LP MDM, you would turn the switch to ON.

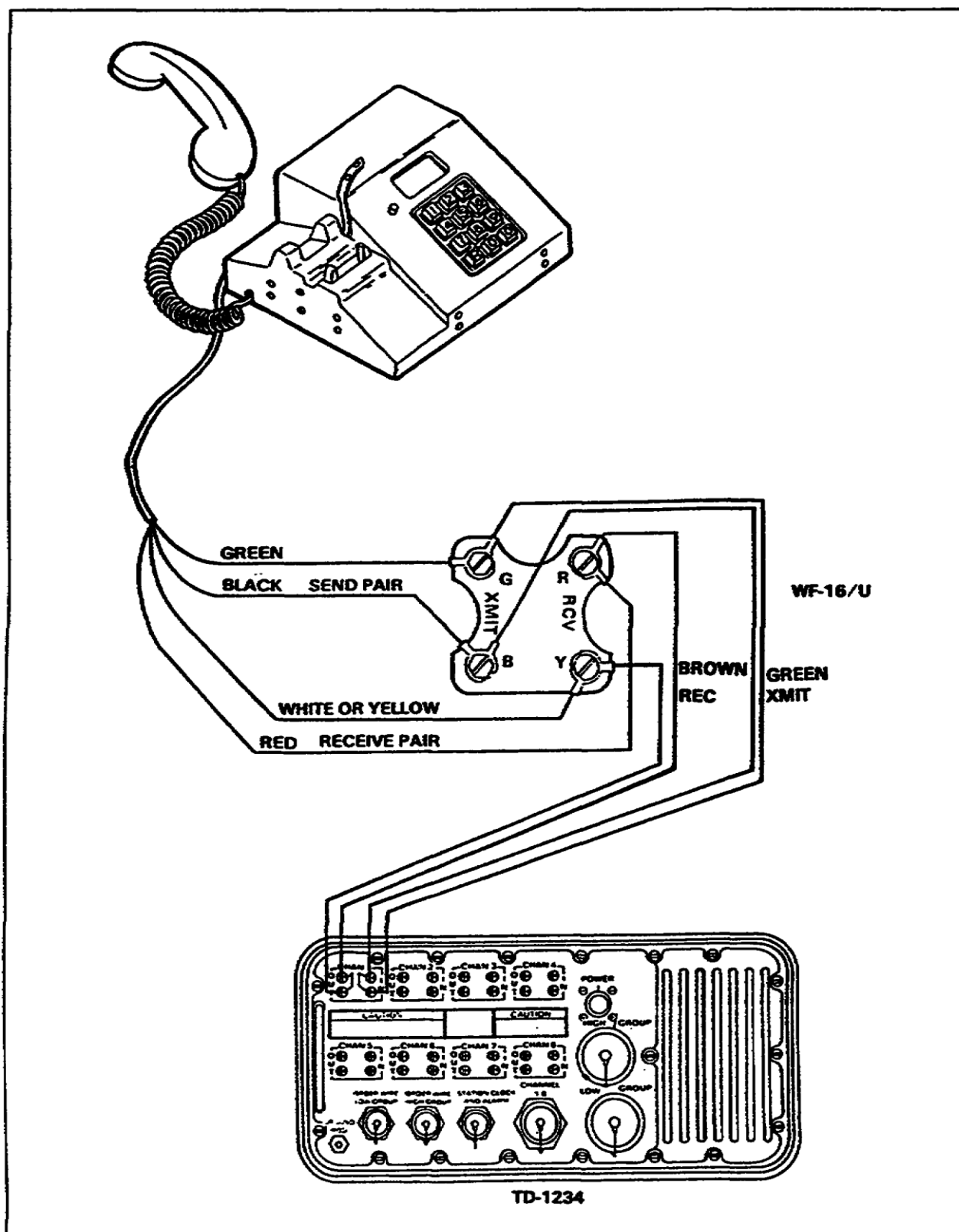


Figure 1-31. TA-341()/TT DGM installation.

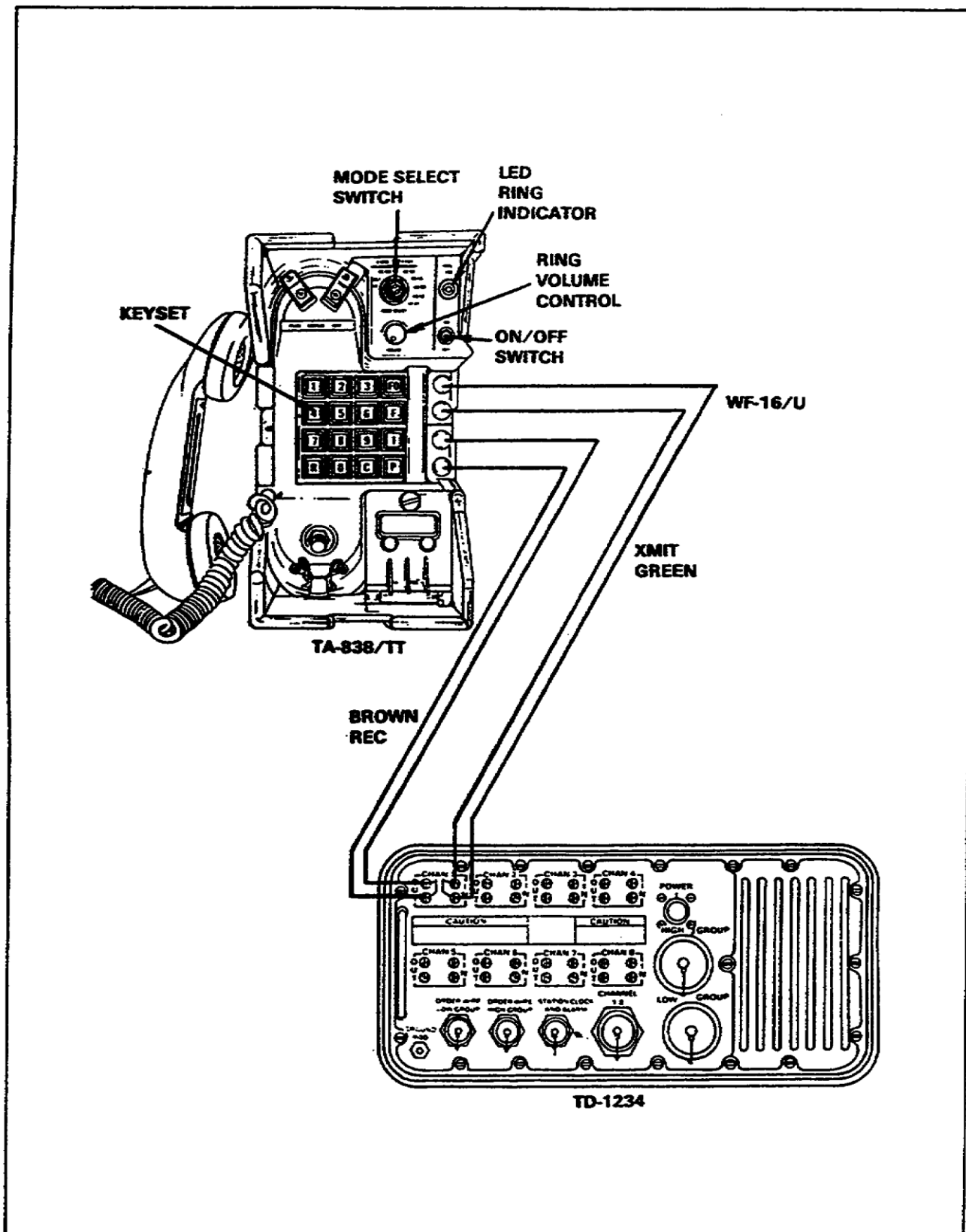


Figure 1-32. TA-838()/TT DGM installation.

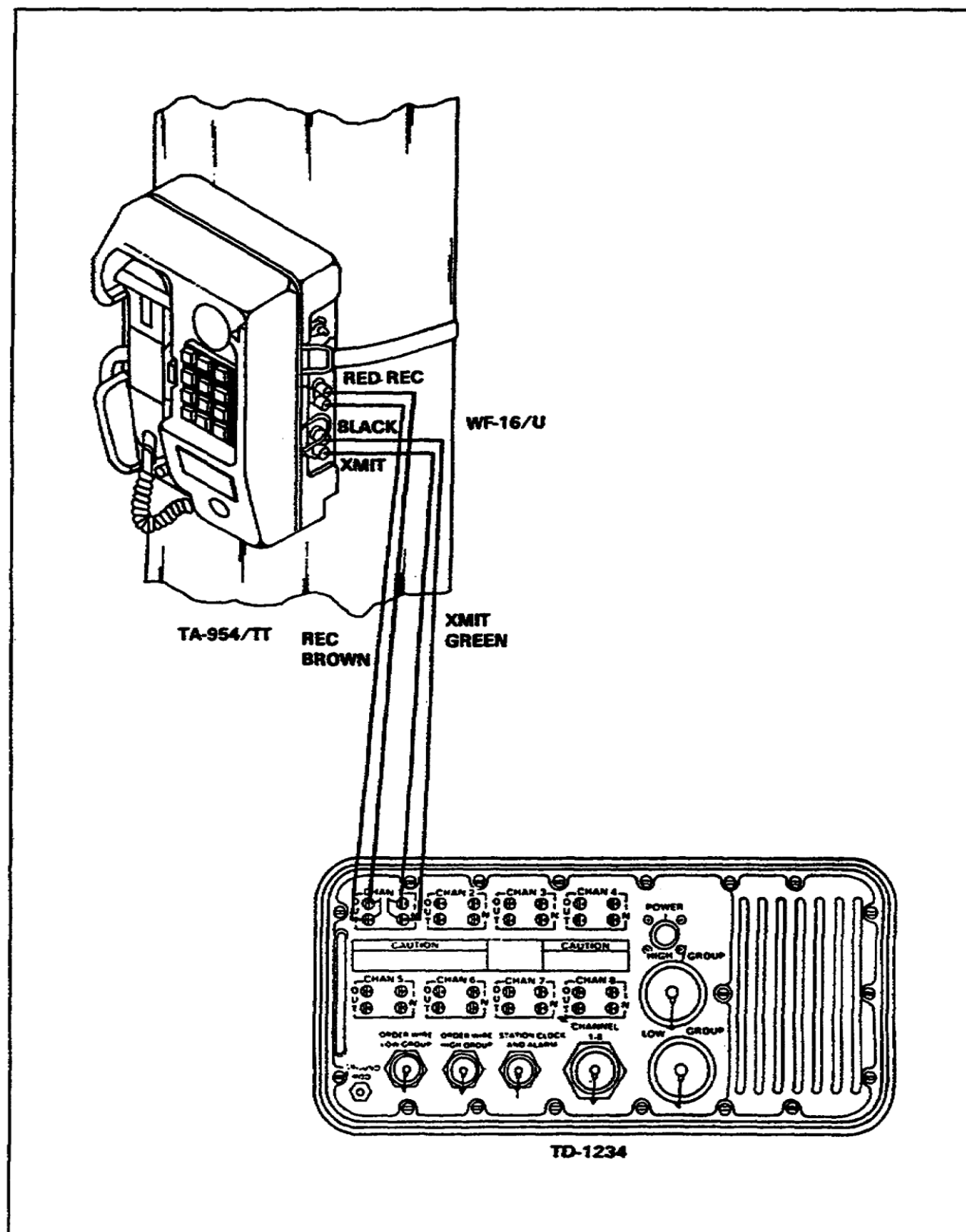


Figure 1-33. TA-954/TT DGM installation.

52. Now you know what must be done to make the TD-1234/TT operational. If you have access to the equipment needed, install the CX-11230A/G, the TD-1234/TT, WF-16/U, and a telephone. Don't forget to make an order wire check on the TS-3647/G.

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LESSON 1

PRACTICE EXERCISE

The following items will test your grasp of the material covered in this lesson. There is only one correct answer for each item. When you complete the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. What type batteries does telephone set TA-312/PT use?
 - A. BA-20
 - B. BA-2030
 - C. BA-3020
 - D. BA-30
2. In what mode of operations must you use the PRESS-TO-TALK switch on telephone set TA-312/PT?
 - A. LB, CB
 - B. LB, CBS
 - C. CB, CBS
3. How much insulation is removed from the wire before connecting it to the telephone?
 - A. 1/4 inch
 - B. 1/2 inch
 - C. 3/4 inch
 - D. 1 inch
4. Is it possible to operate the telephone set TA-312/PT without batteries?
 - A. Yes
 - B. No
5. Where is the deicing screen installed?
 - A. Outside the transmitter
 - B. Inside the transmitter
 - C. Outside the receiver
 - D. Inside the receiver

6. What is the purpose of the HOOKSWITCH
- A. Connects the H-144()/U to the line
 - B. Connects the H-60/PT to the line
 - C. Connects to the distant party
 - D. Connects to a switchboard
7. In performing the preinstallation check, to which terminals do you connect the 1000-ohm resistors?
- A. R-B, G-Y
 - B. B-G, R-Y
 - C. G-Y, R-G
8. When operating in the POINT-TO-POINT mode, in which position is the LB/CB switch?
- A. AC/CB
 - B. DC/CB
 - C. LB
9. Which terminals on the C42 connector block are the transmit terminals?
- A. R and Y
 - B. Y and B
 - C. B and R
 - D. B and G
10. How many extensions may be installed using the TA-341?
- A. Four
 - B. Five
 - C. Six
 - D. Seven
11. Which key on the keysender pad is designated IMMEDIATE?
- A. 1
 - B. 2
 - C. 3
 - D. 4

12. How do you reach the operator for assistance?
- A. 0
 - B. 12
 - C. 110
 - D. 111
13. Which battery is used with the TA-341/TT?
- A. BA-30
 - B. BA-32
 - C. BA-40
 - D. BA-42
14. What is the purpose of the R key?
- A. To recall the operator
 - B. To recall the last party
 - C. To recall a conference
 - D. To make a ROUTINE call
15. Which pair of wires are the transit wires on telephone cable WF-16/U?
- A. Yellow
 - B. Red
 - C. Green
 - D. Brown
16. The MODE SELECT switch is in DC/LB. From what source does the telephone get its power?
- A. Another instrument
 - B. Internal batteries
 - C. The line
 - D. Switchboard
17. You have two extensions installed on the line. When will the line be considered on-hook?
- A. When all instruments are in use
 - B. When all instruments are not in use
 - C. When one instrument is in use
 - D. When the mainline and extensions are in use

18. The telephone is installed in a vertical position. You are checking the batteries. Which batteries should have the negatives on the top?
- A. The ones on the bottom
 - B. The ones on the left
 - C. The ones on the right
 - D. The ones on the top
19. How many positions are on the MODE SELECT switch?
- A. Two
 - B. Four
 - C. Six
 - D. Seven
20. What type batteries does the TA-838()/TT use?
- A. BA-30
 - B. BA-32
 - C. BA-40
 - D. BA-42
21. Where are the wires connected for 2-wire operation?
- A. To XMIT
 - B. To RCV
 - C. One to XMIT and one to RCV
22. What is the value of the resistors needed to check the TA-838()/TT?
- A. 100 ohms
 - B. 500 ohms
 - C. 1000 ohms
 - D. 1500 ohms
23. The telephone set is located less than 4 miles from the switchboard. Which type of supervision can be used?
- A. AC
 - B. DC
 - C. LB
 - D. DTMF

24. Why would the user use the R key?
- A. For redialing the last number
 - B. For recalling the operator
 - C. For redialing a previous number
 - D. For entering a most often dialed number
25. To perform a preinstallation check on the TA-838()/TT, the MODE SELECT switch must be properly set. To which position should you set it?
- A. 2-W DC/LB
 - B. 4-W DC/LB
 - C. 4-W AC/CB
 - D. 4-W AC/LB
26. What type signal does the TA-954/TT transmit and receive?
- A. Amplitude modulated
 - B. Conditioned diphase-modulated
 - C. Frequency modulated
 - D. Single sideband
27. What is the source of power for the DNVVT?
- A. BA-30
 - B. BA-42
 - C. Common battery
 - D. Local power source
28. What type wire is used to connect the TA-954/TT?
- A. WF-1()/TT
 - B. WF-16/U
 - C. W-104
 - D. W-108
29. With what type equipment does the TA-954/TT interface?
- A. Analog
 - B. PCM
 - C. Digital
 - D. FM

30. How many terminal connections for 2-wire telephones are in the J-1077A/U?
- A. 8
 - B. 13
 - C. 26
 - D. 52
31. What is the power requirement for the TA-1035/U?
- A. 12 V DC
 - B. 24 V DC
 - C. 36 V DC
 - D. 48 V DC
32. How many channels are available on the TD-1234/TT?
- A. 2
 - B. 4
 - C. 8
 - D. 16
33. To which CCA in the TD-1234/TT would you turn on the power if you connected a telephone TA-954/TT to channel 5?
- A. A9
 - B. A10
 - C. A11
 - D. A12
34. What is the power requirement for a TD-1234/TT?
- A. 28 V DC
 - B. 115 V AC
 - C. 115 V DC
 - D. 180 V DC
35. What safety procedure must you do first when installing a TD-1234/TT?
- A. Connect the power cable
 - B. Connect the CX-11230A/G
 - C. Ensure all switches are off
 - D. Ground the equipment

36. What is the maximum distance from an AN/TRC-173 to a TD-1234/TT?
- A. 2 miles
 - B. 1 mile
 - C. 1/2 mile
 - D. 1/4 mile
37. How many channels are available on the TD-1233/TT?
- A. 2
 - B. 4
 - C. 8
 - D. 16

LESSON 1

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

<u>Item</u>	<u>Correct Answer and Feedback</u>
1.	D. BA-30 (page 1-4, para 5)
2.	B. LB, CBS (page 1-7, para 12)
3.	D. 1 inch (page 1-4, para 6d)
4.	A. Yes (page 1-7, para 13d)
5.	A. Outside the transmitter (page 1-5, para 7)
6.	B. Connects the H-60/PT to the line (page 1-6, Table 1-1)
7.	A. R-B, G-Y (page 1-10, para 19)
8.	C. LB (page 1-9, Table 1-2)
9.	D. B and G (page 1-10, para 20a)
10.	A. Four (page 1-14, para 24)
11.	B. 2 (page 1-13, para 21d)
12.	A. 0 (page 1-12, para 21c)
13.	D. BA-42 (page 1-8, para 16)
14.	A. To recall the operator (page 1-12, para 21c)
15.	C. Green (page 1-10, para 20a)
16.	B. Internal batteries (page 1-9, Table 1-2)
17.	B. When all instruments are not in use (page 1-24, para 34b)
18.	D. The ones on the top (page 1-21, Figure 1-16)
19.	D. Seven (page 1-22, Figure 1-17)
20.	D. BA-42 (page 1-15, para 27e)

<u>Item</u>	<u>Correct Answer and Feedback</u>
21.	A. To XMIT (page 1-16, para 28e)
22.	C. 1000 ohms (page 1-22, para 30d)
23.	B. DC (page 1-15, para 27b)
24.	B. For recalling the operator (page 1-15, para 26)
25.	D. 4-W AC/LB (page 1-22, para 30a)
26.	B. Conditioned diphas-modulated (page 1-25, para 36)
27.	C. Common battery (page 1-25, para 37)
28.	B. WF-16/U (page 1-26, para 38c)
29.	C. Digital (page 1-25, para 37)
30.	C. 26 (page 1-29, para 42 and page 1-30, Figure 1-25)
31.	D. 48 V DC (page 1-29, page 41)
32.	C. 8 (page 1-31, Figure 1-27)
33.	C. All (page 1-34, Figure 1-30)
34.	B. 115 V AC (page 1-33, para 48)
35.	D. Ground the equipment (page 1-29, para 44a(2))
36.	A. 2 miles (page 1-33, para 44b)
37.	B. 4 (page 1-32, Figure 1-29)

LESSON 2

MAINTENANCE

Critical Tasks: 113-588-3021
113-600-3020

OVERVIEW

LESSON DESCRIPTION:

In this lesson, you will learn to perform unit level maintenance on a tactical telephone and the multiplexer-combiner TD-1234/TT.

TERMINAL LEARNING OBJECTIVES:

- ACTION:** The student will perform unit level maintenance on tactical telephone TA-838()/TT.
- CONDITION:** If you do not have access to the equipment, you only need this subcourse. If available, you will need telephone set TA-838()/TT (two each), batteries BA-42 (eight each), TE-33, WF-16/U, soft lint-free cloth, dust brush, pencil, DA Form 2404, DA Pam 738-750, and a training area.
- STANDARD:** Upon completion of this subcourse, you will know how to perform unit level maintenance on a TA-838()/TT and complete DA Form 2404.
- ACTION:** The student will perform unit level maintenance on a multiplexer-combiner TD-1234/TT and complete a DA Form 2404.
- CONDITION:** If you do not have access to the equipment, you only need this subcourse. If available, you will need DA Form 2404, TD-1234/TT, DA Pam 738-750, soft lint-free cloth, dust brush, pencil, and a training area.
- STANDARD:** Upon completion of this subcourse, you will know how to perform maintenance on the multiplexer TD-1233/TT and the multiplexer-combiner TD-1234/TT.
- REFERENCES:** The material contained in this lesson was derived from TM 11-5805-650-12 and TM 11-5805-707-12.

INTRODUCTION

Telephones and associated equipment, as used daily, will get dirty and sometimes worn badly. Unit level maintenance is performed to keep the equipment in top condition. Failure to properly maintain the equipment will mean it may not be ready when you must install it.

PART A - UNIT LEVEL MAINTENANCE ON TACTICAL TELEPHONES

1. The maintenance allocation chart in TM 11-5805-650-12 indicates that the unit maintainer can inspect, service, install, replace, test and repair certain items on the telephone. Those items and the items in the operator/crew preventive maintenance checks and services (PMCS) chart will be discussed. (See Figure 2-1.)

2. First we will look at each item on the chart. The letters B, D, A, W, and M have a definite meaning. They are--

- B Before operation
- D During operation
- A After operation
- W Weekly maintenance
- M Monthly maintenance

3. Figure 2-1, item number 1 shows that the binding posts are being checked. This is important because if the binding posts do not hold the wires securely, there is a good possibility that communications will not be possible. Be sure to also check that each binding post has a rubber cover on it. This is to protect the operator from electrical shock.

4. Item number 2 shows the battery compartment being checked. There should be no foreign matter in the compartment. The contacts should be shiny clean and the springs should have some bounce to them. Corrosion is a bad element to find in the battery compartment. It means someone forgot to remove the batteries after the last time the telephone was used. Be sure the thumb knob works smoothly.

5. Item number 3 shows the handset and the cord fastened to it are being checked. It should not be twisted and should still have the spring inside working, causing the cord to retract. The cord should show no signs of wear, cracks, or frays. The handset must be checked for cracks. The cover on the transmitter and ear piece are on finger-tight and the holes are clean.

6. Item number 4 shows the carrying sling and tie-down strap are being checked. There should be no signs of wear or fraying, snaps or latches are firmly in place, and metal connectors and ends are clean and in place. Also make sure that where the sling and strap are attached to the telephone, the screws are tight and the connectors are working.
7. Item number 5 requires an operational check on the telephone. It is easiest to check this with another telephone. Make sure the buzzer works, the ring indicator lights, and you can talk and hear on the telephone.
8. Item number 6 requires a check in DA Pam 25-30 to see if any modifications are due on the telephone.
9. Once you have performed the maintenance on the telephone, you must then make a record of the work you did. To do this, you need to use DA Form 2404. If you are unsure on how to fill in the heading of the form, refer to DA Pam 738-750.

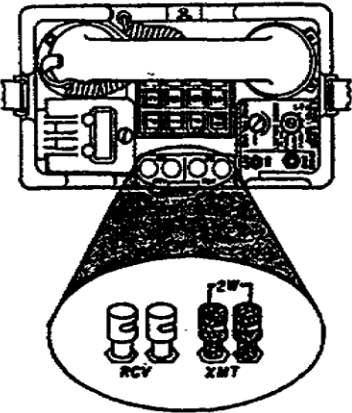
ITEM NO.	INTERVAL					ITEMS TO BE INSPECTED	PROCEDURES	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
1	•		•			BINDING POSTS	CHECK FOR: • PROPER HOLDING ACTION • LOOSENESS 	ANY BINDING POSTS CANNOT HOLD A WIRE

Figure 2-1. Operator/crew preventative maintenance checks and services.

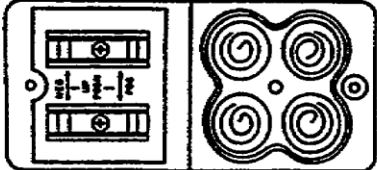
ITEM NO.	INTERVAL					ITEMS TO BE INSPECTED	PROCEDURES	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
2	•		•	•		BATTERY COMPARTMENT AND COVER	REMOVE BATTERIES AND CHECK TO SEE THAT: • CONTACTS ARE NOT CORRODED OR LOOSE; INSERT BATTERIES • MAKE SURE COVER CLOSES SECURELY  CAUTION REMOVE THE BATTERIES IF THE TELEPHONE SET IS TO BE STORED OR TO CHECK SPRING CONTACTS	BATTERIES CANNOT BE HELD IN PLACE

Figure 2-1. Operator/crew preventive maintenance checks and services (continued).

ITEM NO.	INTERVAL					ITEMS TO BE INSPECTED	PROCEDURES	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
3	•		•			HANDSET AND RETRACTILE CORD	CHECK FOR: • CRACKED HANDSET • MISSING MICROPHONE OR EARPIECE • FRAYED OR DAMAGED RETRACTILE CORD • LATCH ACTION OF THE HANDSET RETAINING SPRING	HANDSET CANNOT BE USED FOR COMMUNICATIONS

Figure 2-1. Operator/crew preventive maintenance checks and services (continued).

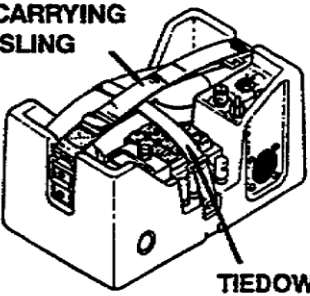
ITEM NO.	INTERVAL					ITEMS TO BE INSPECTED	PROCEDURES	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
4	•		•			CARRYING SLING AND TIEDOWN STRAP	CHECK FOR: • FRAYED STRAPS • PROPER LATCH ACTION 	

Figure 2-1. Operator/crew preventive maintenance checks and services (continued).

ITEM NO.	INTERVAL					ITEMS TO BE INSPECTED	PROCEDURES	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B	D	A	W	M			
5		•				OPERATIONAL CAPABILITIES	WHEN USING THE TELEPHONE SET, CHECK TO SEE THAT IT OPERATES PROPERLY	PHONE DOES NOT WORK WHEN PROPERLY CONNECTED
6					•	URGENT MWO'S	YOU MUST CHECK WITH C-E ORG MAINTENANCE ONCE A MONTH TO MAKE SURE ALL URGENT MODIFICATION WORK ORDERS (MWO'S) HAVE BEEN DONE ON THE TELEPHONE SET	C-E ORG MAINTENANCE TELLS YOU THAT ONE OR MORE URGENT MWO'S HAVE NOT BEEN DONE TO YOUR EQUIPMENT

Figure 2-1. Operator/crew preventive maintenance checks and services (continued).

PART B - UNIT LEVEL MAINTENANCE ON TELEPHONE TERMINALS

10. Unit level maintenance starts with the operator of the equipment. The operator installs the equipment and connects the telephones. When the equipment doesn't perform as expected, the operator tests the equipment to determine what went wrong. So operator maintenance is a must.

11. Operator maintenance for the multiplexer-combiner is performed on a weekly basis. (TM 11-5805-707-12 identifies the maintenance that is to be performed.)

12. PMCS is performed to ensure the equipment is mission ready and to keep serious problems from suddenly happening. PMCS should be performed weekly if--

- a. You are the assigned operator and have not operated the item since the last weekly PMCS.
- b. You are operating the equipment for the first time.

NOTES: Use your PMCS chart to get the number for the TM Item Number column of DA Form 2404 when recording results of PMCS. (See Figure 2-2.)

If the equipment must be in operation all the time, check and service those items that can be checked and serviced without disrupting operation. Make the complete checks and services when the equipment can be shut down or when order wire channels are available.

- c. You would perform **before** maintenance prior to installation.

13. Routine checks are not listed as PMCS and should be performed as the need arises. Some routine checks are--

- Cleaning
- Washing
- Dusting
- Checking for frayed cables
- Storing items not in use
- Covering unused receptacles
- Checking for loose nuts, bolts, and screws

14. Following are two charts that will provide a clear understanding of your PMCS responsibilities. (See Figures 2-2 and 2-3.)

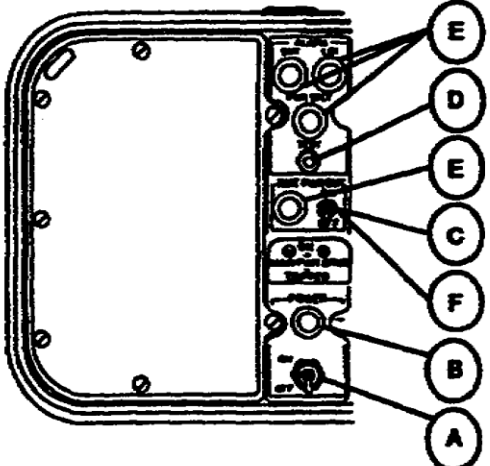
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	W			
1	●	PMC BITE TEST	 (A) Set POWER ON/OFF switch to ON (B) POWER lamp lights (C) Set REMOTE PWR OUT ON/OFF switch to OFF (D) Press and release ALARM TEST switch (E) ALARM (SMY, PWR SPLY, and LOI) lamps light (F) Set REMOTE PWR OUT ON/OFF switch back to the position needed for normal equipment operation	POWER lamp does not light Any one of the lamps does not light

Figure 2-2. Operator PMCS chart (TD-1233/TT).

15. Organizational PMCS will most likely be performed by the installer. In Figure 2-3, you will notice that the organizational maintenance is the same. So you should familiarize yourself with both charts to ensure you know the required maintenance for the multiplexer-combiner TD-1234/TT. The same maintenance will be required for the multiplexer TD-1233/TT.

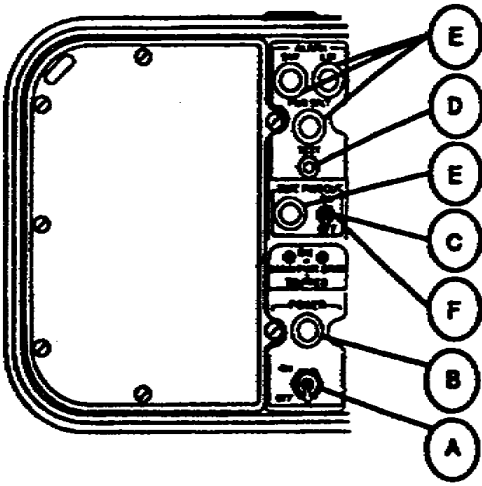
ITEM NO.	INTERVAL	ITEM TO BE INSPECTED	PROCEDURES CHECK AND HAVE REPAIRED OR ADJUSTED AS NECESSARY	FOR READINESS REPORTING, EQUIPMENT IS NOT READY/ AVAILABLE IF:
	B			
1	●	POWER ON	 (A) Set POWER ON/OFF switch to ON (B) POWER lamp lights	
2	●	BITE Test	(C) Set REMOTE PWR OUT ON/OFF switch to OFF (D) Press and release ALARM TEST switch (E) ALARM (SMY, PWR SPLY, and LOI) lamps light (F) Set REMOTE PWR OUT ON/OFF switch back to the position needed for normal equipment operation	

Figure 2-3. Organizational PMCS chart (TD-1233/TT).

16. If you have access to the equipment needed, perform both operator and organizational PMCS on a multiplexer-combiner TD-1234/TT.

LESSON 2

PRACTICE EXERCISE

The following items will test your grasp of the material covered. in this lesson. There is only one correct answer for each item. When you complete the exercise, check your answers with the answer key that follows. If you answer any item incorrectly, study again that part of the lesson which contains the portion involved.

1. The unit maintainer performs maintenance on the assigned equipment. Where does he get the information on when to perform maintenance?
 - A. Maintenance allocation chart
 - B. Maintenance authorization chart
 - C. PMCS chart
 - D. Troubleshooting chart
2. Which publication will identify modification for the equipment?
 - A. DA Pam 25-30
 - B. DA Pam 25-310
 - C. DA Pam 30-25
 - D. DA Pam 310-4
3. Which manual would you find the PMCS chart for the TD-1234/TT?
 - A. TM 11-5805-707-12
 - B. TM 11-5805-707-10
 - C. TM 11-5850-707-12
 - D. TM 11-5850-707-10
4. Which is identified as a routine check?
 - A. Alarms
 - B. Lamps
 - C. Receptacles
 - D. Switches
5. Upon completion of maintenance, an operational check is usually required. Which item on the PMCS chart for the TA-838()/TT requires this check?
 - A. 3
 - B. 4
 - C. 5
 - D. 6

6. All maintenance checks and services are performed. On what document do you record this information?
- A. DA Form 2404
 - B. DA Form 2405
 - C. DA Form 2407
 - D. DA Form 2409
7. Which publication will provide information on the completion of maintenance forms?
- A. DA Pam 738-750
 - B. DA Pam 738-760
 - C. DA Pam 750-738
 - D. DA Pam 760-738

LESSON 2

PRACTICE EXERCISE

ANSWER KEY AND FEEDBACK

<u>Item</u>	<u>Correct Answer and Feedback</u>
1.	C. PMCS chart (page 2-2, para 1)
2.	A. DA Pam 25-30 (page 2-3, para 8)
3.	A. TM 11-5805-707-12 (page 2-9, para 11)
4.	C. Receptacles (page 2-9, para 13)
5.	C. 5 (page 2-3, para 7)
6.	A. DA Form 2404 (page 2-3, para 9)
7.	A. DA Pam 738-750 (page 2-3, para 9)