

DEPARTMENT OF THE ARMY
TECHNICAL MANUAL

TM 11-337

DEPARTMENT OF THE AIR
FORCE TECHNICAL ORDER

TO 16-35TA43-5

**TELEPHONE
SET
TA-43/PT**

*DEPARTMENTS OF THE ARMY AND THE AIR FORCE
JULY 1954*

TAGO 272B—Jul



Figure 1. Telephone set TA-43/PT.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

This manual is published for the use of all concerned. It contains information on the installation, operation, maintenance, theory of operation, and repair of Telephone Set TA-43/PT.

2. Forms and Records

The following forms will be used for reporting unsatisfactory conditions of army equipment and in performing preventive maintenance.

a. DD Form 6, Report of Damaged or Improper Shipment, will be filled out and forwarded as prescribed in SR 745-45-5 (Army), Navy Shipping Guide, Article 1850-4, and AFR 71-4 (Air Force).

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

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

d. DA Form 11-240, Operator First Echelon Maintenance Check List for Signal Corps Equipment (Telephone Set), will be prepared in accordance with instructions on the back of the form (par. 35).

e. DA Form 11-241, Second and Third Echelon Maintenance Check List for Signal Corps Equipment (Telephone Set), will be prepared in accordance with instructions on the back of the form (par. 35).

f. Use other forms and records as authorized.

5. Technical Characteristics

a. Types of circuits in the set are as shown below.

Circuit selector switch setting	Type of service
CB	Common battery talk and common battery signaling.
LB	Local battery talk and hand ringing generator signaling.
CBS	Local battery talk and common battery signaling.

b. The special features of Telephone Set TA-43/PT are shown below.

Altitude limits	Will operate above 10,000 feet and during descent from 1,500 feet as rapid as 50 feet per second.
Water protection	Splashproof: may be immersed in shallow water for short periods of time.
Gun blast protection	Transmitter and receiver elements can withstand severe acoustic shock.
Temperature limits:	
Storage (without batteries)	-80° F. to +160° F.
Operation	-40° F. to +131° F.
Transmission frequency range	300 cps to 3,200 cps.

c. The maximum distance for efficient operation between two Telephone Sets TA-43/PT depends primarily on the type of conductors used. The table below lists the line description, type or gage of wire, and transmission range (miles). This table may be used to approximate operational distances between two Telephone Sets TA-43/PT.

Line description	Type or gage	Transmission range (miles)	
		Wet	Dry
Field wire	WD-1/TT	14	22
Field wire	WD-14/TT	Loaded 14	Nonloaded 22
Spiral-4 cable	CC-358	48	
Spiral-4 cable	CC-368		27
Spiral-4 cable	CX-1065/G	50	29
5 pair cable	CX-162/G		23
Lead covered cable	19 gage		30
Lead covered cable	22 gage		20
Lead covered cable	24 gage		15
Open wire lines	W-2 #14 AWG copper		230
Open wire lines	W-74 #12 AWG copper		520

Note. The transmission ranges in this table are from station to station. Intermediate switchboards do not increase these limits.

6. Packaging Data

(fig. 3)

Telephone Sets TA-43/PT are individually packed in a corrugated fiberboard carton which is sealed with waterproof tape. A corrugated fiberboard liner is packed around the telephone set. One fiberboard pad below and two fiberboard pads above prevent the telephone set from shifting inside the carton.

a. When packed for export, 10 of the individually packed telephone sets are packed in a wooden shipping box. The wooden shipping box is lined with a waterproof paper and banded with steel straps.

b. When packed for domestic shipment, four of the individually packed telephone sets are packed in a fiberboard packing box.

c. Handset H-60/PT is wrapped in a cushioning material and placed in the brackets before the telephone set is packed for shipment. An instruction sheet, packaged in a waterproof envelope, is placed inside the carrying case and the slide fastener is closed before it is packed in the individual carton.

Packing method	Items per box	Height (in.)	Width (in.)	Length (in.)	Volume (cu ft)	Weight (lb)
Unpacked (in carrying case)	-----	4	7	11	.18	9.5
Packaged:						
Individual -----	1	5 $\frac{3}{8}$	9	13	.36	10
Domestic -----	4	10 $\frac{1}{4}$	13 $\frac{1}{2}$	21 $\frac{3}{4}$	1.74	42
Export -----	10	14 $\frac{1}{2}$	21 $\frac{1}{2}$	30	5.41	130

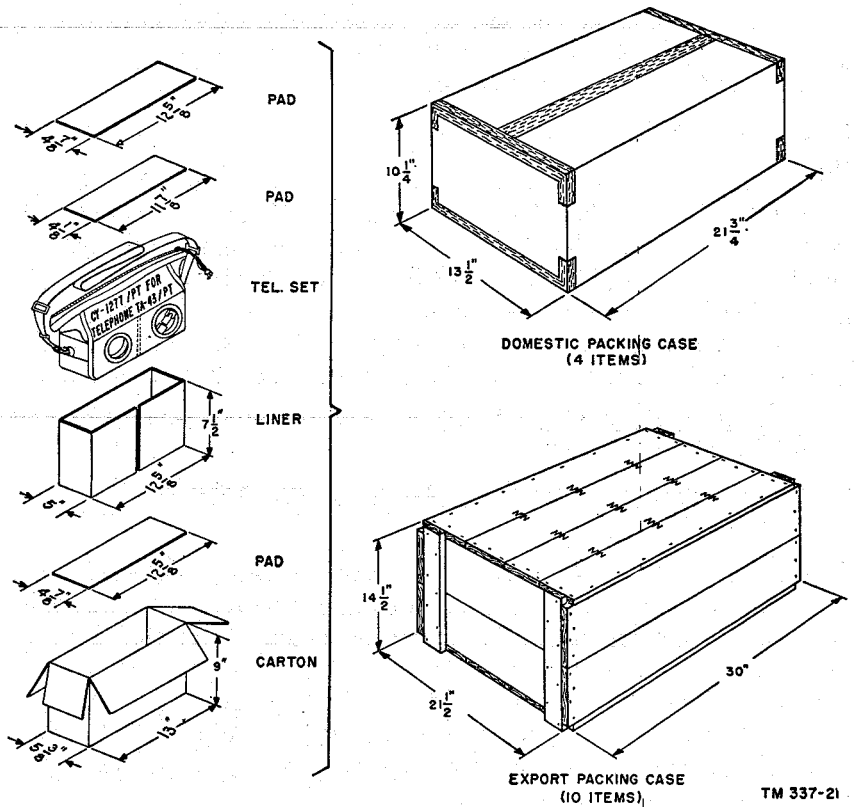


Figure 3. Packaging diagram for telephone set TA-43/PT.

7. Table of Major Components

Component	Height (in.)	Width (in.)	Length (in.)	Weight (lb.)
Handset H-60/PT	2	2	7	1.5
Panel and housing assembly	2.5	6	10	7
Telephone Set Case CY-1277/PT.	4	7	11	1

Note. This list is for general information only. See appropriate publications for information pertaining to requisition of spare parts.

8. Description of Handset H-60/PT

Handset H-60/PT contains a dull-finished, black plastic handle with convenient mounting spaces for the transmitter, receiver, and press-to-talk switch. The receiver end of the handle is shaped

so that it will fit under a standard field helmet. Terminals are provided inside the transmitter compartment for connecting the coiled handset cord to the handset. A de-icing screen is provided to prevent ice from forming on the transmitter when the handset is used in subfreezing temperatures.

9. Panel and Housing Assembly

The panel and housing assembly contains all of the circuit components and wiring for the telephone. The underside of the panel (cover) is used to mount all of the components except the hand ringing generator, mounted in the side of the housing. The upperside of the panel is used to mount all of the controls required for the operation of the telephone set. A bracket is mounted at each end of the panel to hold the handset when it is not in use. All of the openings in the panel and the housing are gasketed and the assembly is submersionproof.

10. Description of Telephone Set Case CY-1277/PT

(fig. 4)

Telephone Set Case CY-1277/PT (carrying case) is a reinforced canvas case, used to protect the telephone set while it is in use and to carry the set when it is being transported. It is closed by a slide fastener across the top. Two openings are provided in the side of the case; one provides access to the hand ringing generator and the other permits access to the buzzer diaphragm. Canvas loops are sewed to the bottom of the case for mounting the telephone on a tree or pole.

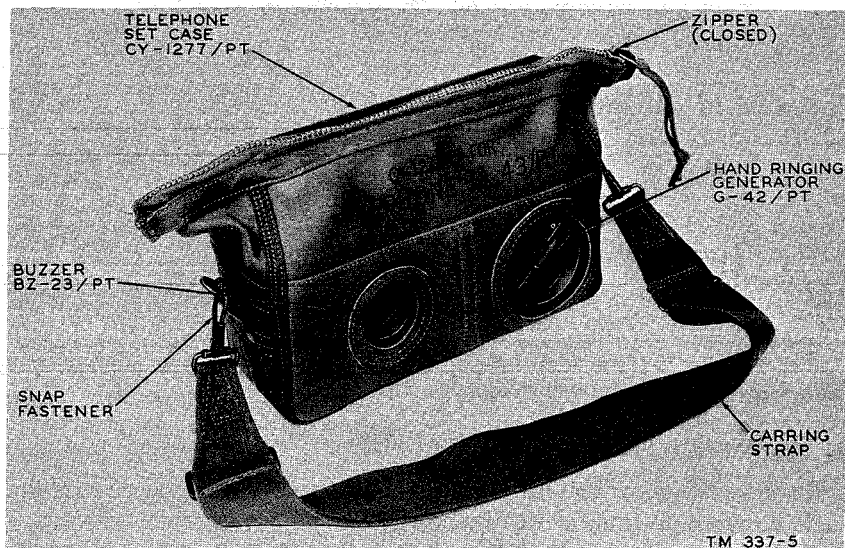


Figure 4. Telephone set TA-43/PT, case closed.

11. Description of Minor Components

Item	Fig. ref.	Description
Hand Ringing Generator G-42/PT	4	Provides 20-cps signaling current.
Buzzer BZ-23/PT	4	Provides audible incoming signal.
Impedence Matching Network CU-350/PT	4	Houses circuit components.
Line switch.....	4	Connects telephone to line.
CB-LB-CBS switch.....	3	3-position rotary switch for circuit selection.
Electrical Cord Assembly CX-2151/U	2	7-conductor, retractile handset cord.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

12. Unpacking and Checking New Equipment

a. Export Shipment (fig. 3). To unpack the export packed telephone sets follow the instructions in (1) through (7) below.

- (1) Cut and remove the metal strapping if the box is strapped.
- (2) Remove the nails from the lid with a nail puller, and lift the lid.
- (3) Cut or tear the top from the waterproof liner inside the wooden box.
- (4) Remove the individually packed telephone sets from the box.
- (5) Cut or tear the sealing tape on the top of the individual corrugated fiberboard container and open the top flaps.
- (6) Remove the two pads from the top of the telephone set.
- (7) Remove the telephone set from the container and check it as described in paragraph 13.

b. Domestic Shipment (fig. 3) To unpack the domestic packed telephone sets, open the top flaps of the packing box by cutting or tearing the sealing tape. To complete the unpacking of the TA-43/PT, refer to *a*(4) through (7) above.

13. Preinstallation Checks

(fig. 5)

a. Open the carrying case by sliding the fastener to the end of its run. Remove the handset from its packing. Fold the top of the case down around the housing to expose the handset and panel, without obstructing the generator and buzzer openings on the side of the housing.

b. Install two batteries BA-30 as described in (1) through (4) below.

- (1) Loosen the retaining strap that secures the panel and housing assembly.

- (2) Unlatch and open the battery compartment cover.
- (3) Insert one battery with its center terminal down, and the other battery with its center terminal up.
- (4) Close and latch the battery compartment cover, then refasten the retaining strap (fig. 2).

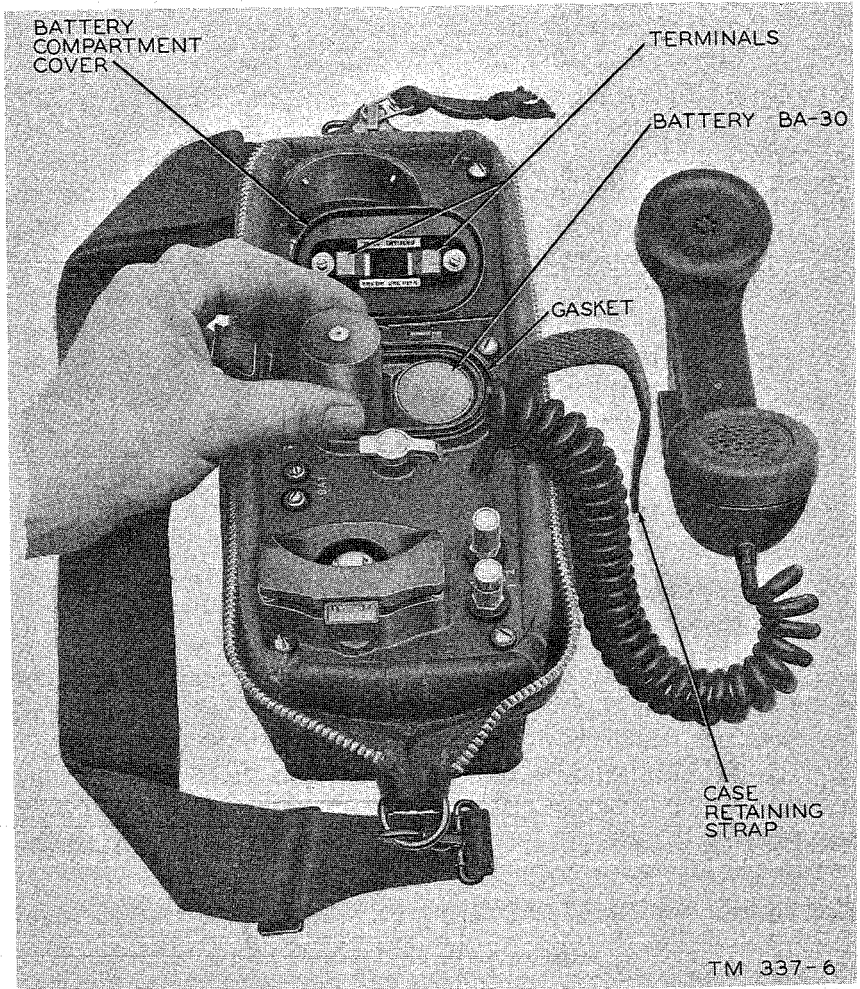


Figure 5. Installing batteries in battery compartment.

- c. Check the telephone set for serviceability as described in (1) through (4) below.
 - (1) With the circuit selector switch set at CB, listen to the receiver while turning the hand generator crank. At low speeds, a series of clicks should be heard. At higher speeds, receiver sidetone should be heard when blowing across or speaking into the transmitter. Operating the line switch (fig. 2) eliminates the sidetone and reduces

the turning force required to turn the generator crank by removing the electrical load on the generator.

- (2) With the circuit selector switch set at LB, push the handset press-to-talk switch (fig. 2). Receiver sidetone should be heard when blowing across or speaking into the transmitter. Releasing the press-to-talk switch eliminates the sidetone and also reduces the turning force required to turn the generator crank.
- (3) With the circuit selector switch set at CBS, repeat the checks for the LB circuit ((2) above). Operating the handset press-to-talk switch should not affect the operation of the generator, but depressing the line switch should reduce the turning force required to turn the generator crank.
- (4) With the handset mounted in the retaining brackets, connect the line terminals to the corresponding terminals of another telephone set or an equivalent source of signaling power. The buzzer of the telephone set should respond to the signaling power of the other set or power source. The volume should vary from a low buzz to a loud signal as the buzzer volume control knob is turned from LOW to LOUD.

14. Installation (fig. 1)

The telephone may be used as a desk set, or it may be mounted vertically on a tree, pole, or other support in a location that gives the most protection from the weather. When used as a desk set, the TA-43/PT should be placed flat with the panel on top. This assures proper operation of the line switch. When the set is mounted vertically, the line terminals must be at the top so the handset brackets will support the handset.

a. Install the TA-43/PT on a tree, pole, or other vertical support as described in (1) through (4) below.

- (1) Disengage the end of the carrying strap from the ring farthest from the line binding posts.
- (2) Adjust the strap to the proper length.
- (3) Place the telephone against the support at a convenient height and wrap the carrying strap around the support and secure it (fig. 1).
- (4) Insert a piece of field wire through the lower loop on the back of the carrying case and tie it securely around the support.

b. Remove the insulation from the incoming pair of wires and connect to binding posts marked LINE 1 and 2 as described in (1) through (5) below.

- (1) Remove approximately 1 inch of insulation from each of the wires.
- (2) Fold the skinned portion of the wires back one-half of an inch.
- (3) Push down the spring-loaded binding post marked LINE 1 and insert the folded bare skinner of one wire into the slot in the binding post.
- (4) Release the binding post to allow the wire to be securely clamped.
- (5) Repeat the procedure described in (3) and (4) above to connect the other wire to binding post LINE 2.

c. Make the proper circuit selection for common battery, local battery, or common battery signaling with local battery talking by adjusting the circuit selector switch. When the circuit selector switch is in the LB or CBS positions, install two Batteries BA-30 properly poled (one up and one down) in the battery compartment to provide transmission current.

15. Service Upon Receipt of Used or Reconditioned Equipment

a. Follow the instructions in paragraph 12 for unpacking and checking equipment.

b. Check the controls for positive action.

c. Perform the installation procedures in paragraphs 13 and 14.

Section II. CONTROLS

Note. The various controls and instruments for the proper operation of the equipment are described, located, and illustrated in this section. It also gives the operator enough information to operate the controls.

16. Panel and Housing Assembly

(fig. 6)

Item	Fig. ref.	Function
CB-LB-CBS circuit selector switch	2	In CB position, common battery talk and signaling. In LB position, local battery talk and hand generator signaling. In CBS position, LB talk and common battery signaling.
	2	
	2	
LOUD-LOW buzzer volume control knob		To increase or decrease buzzer volume.
Line switch		In normal position connects telephone to line. When depressed disconnects telephone from line.

17. Handset H-60/PT

The press-to-talk switch is used when the circuit selector switch is in the LB or CBS position. The switch closes a circuit through the transmitter and Batteries BA-30 that provide transmission current.

Section III. OPERATION UNDER USUAL CONDITIONS

18. General

The method of operation for the TA-43/PT differs with the setting of the circuit selector switch. Operating personnel should become familiar with the instructions in paragraphs 19 through 22 for the various types of service.

19. Outgoing Calls

a. CB Operation. Remove the handset from the retaining brackets and wait for the switchboard operator to answer; then proceed with the message. It is not necessary to operate the hand ringing generator.

b. LB Operation. Operate the generator crank rapidly for a short time. Remove the handset and listen for the called party to answer. Depress the press-to-talk switch and proceed with the message. The press-to-talk switch may be operated throughout the conversation but it is not required when listening only. Release the press-to-talk switch when listening; this will extend the life of the batteries.

c. CBS Operation. Remove the handset from the retaining brackets and wait for the switchboard operator to answer, then complete the call. It is not necessary to operate the hand generator.

20. Incoming Calls

The procedure for answering incoming calls is the same for all types of service. Ringing current on the line from a switchboard or another station will operate the buzzer. To answer the call remove the handset from the retaining brackets and complete the call.

21. Disconnect Procedure

a. The telephone user must ring off when LB service is provided. To ring off, replace the handset in the brackets to operate the line switch and turn the hand generator.

b. When *all calls* are completed be sure that the handset is replaced in the retaining brackets. This depresses the line switch and removes the telephone circuit from the line, leaving only the buzzer across the line awaiting the next incoming signal. *If the line switch is not depressed by the handset, the buzzer may not operate on the next incoming call.*

22. Operation of Radio Remote Control Equipment

The LB circuit can be used to control the operation of a radio set connected by wire to the telephone set. A direct current (dc) telephone line current, supplied from an auxiliary source, operates a relay at the radio set. This relay switches the radio set to talking (transmitting) condition from the listening (receiving) condition, corresponding to the operation of the press-to-talk switch.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

23. General

Operation of Telephone Set TA-43/PT may be difficult in regions where extreme cold, heat, humidity, moisture, sand, and other unusual conditions prevail. Paragraphs 24 through 30 provide instructions for minimizing the effects of these conditions.

24. Operation in Arctic Climates

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

- a. Handle the equipment carefully.
- b. Keep the equipment warm and dry, if possible, and in a shelter.
- c. If the de-icing screen has been removed from the transmitter install it on the transmitter with the entire membrane exposed. Push the screen into the groove provided by applying pressure to the rim of the screen only. Avoid any distortion of the membrane. If no screen is available, cover the transmitter with a handkerchief or other clean cloth after first removing any ice or other foreign substance.
- d. At temperatures below -40° F. the handset cord and other rubber parts of the telephone become stiff and difficult to handle. Be careful when handling these parts at low temperatures to prevent cracking or other damage.

e. If the batteries fail at low temperatures, substitute a battery with screw-type terminals connected to the external battery connections. Keep the substitute batteries in one of the operator's inside pockets to keep them warm.

25. Operation in Tropical Climates

The TA-43/PT may be operated in a tropical climate where moisture conditions are very acute. High relative humidity causes condensation of moisture on the equipment whenever the temperature of the equipment is lower than that of the surrounding air. Try to minimize the effect of this condition as much as possible.

26. Operation in Desert Climates

a. In desert climates where sand, dirt, and wind prevail, keep the TA-43/PT as free from dust and grit as possible.

b. Keep the slide fastener closed when the equipment is not in use.

c. Do not secure the incoming line to the wall of a tent. Desert areas are subject to sudden wind squalls that may loosen the connections or break the line.

d. Make frequent battery checks.

27. Operation at High Altitudes

The waterproof air valves provide pressure equalization for all critical components of the telephone set. At extreme altitudes, the transmission characteristics of the transmitter and receiver elements may change appreciably, but speech will continue to be intelligible.

28. Operation in Noisy Areas

When the TA-43/PT is being used in a noisy area, speak directly into the transmitter in a loud clear voice. For CB operation, cover the transmitter with one hand while listening to the distant party. For LB or CBS operation, release the press-to-talk switch when listening to the distant party. Covering the transmitter or releasing the press-to-talk switch reduces or completely eliminates sidetone; this makes it much easier to hear the incoming message.

29. Operation on Long Telephone Loops

The LB and CBS circuits provide better transmission over a long loop than the CB circuit. When the TA-43/PT is used on

a long CB circuit and the transmission is noticeably affected, change the circuit selector switch to CBS and install batteries (fig. 2 and 3).

30. Emergency Operation (Sound Power)

If no battery supply is available, emergency transmission can be obtained over short distances (less than 4 miles) by using the receiver element as a sound powered transmitter element. Use the following procedure for this operation:

- a.* Signal by means of the hand generator.
- b.* Remove the handset and speak directly into the receiver; then listen while the distant party is transmitting.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. PREVENTIVE MAINTENANCE SERVICES

31. General

The tools and materials listed in paragraph 32 are required for organizational maintenance of the TA-43/PT. The chart gives the description of the tool or material and the Signal Corps stock number.

32. Tools and Materials

Description	Signal Corps stock No.
Knife TL-29	6Q60229
Pliers TL-13	6R4513
Pouch CS-34	6R6534
Cloth, clean, lint-free	6Z1989
Solvent, Dry Cleaning (SD)	*51-S-4385-1

* Quartermaster stock number.

33. Definition of Preventive Maintenance

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

34. General Preventive Maintenance Techniques

- a. If available, use No. 0000 sandpaper to remove corrosion.
- b. Use a clean, dry, lint-free cloth or a dry brush for cleaning.
 - (1) If necessary, except for electrical contacts, moisten or brush with solvent (SD); then wipe the parts with a cloth.

- (2) Clean electrical contacts with a toothpick moistened with carbon tetrachloride if available. Never touch switch contacts with the fingers.

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

- c. If available, dry compressed air may be used at a line pressure not exceeding 60 pounds per square inch (psi) to remove dust from inaccessible places; be careful not to direct the air blast toward parts that may be damaged from the air blast.

- d. For further information on preventive maintenance techniques, refer to TB SIG 123, Preventive Maintenance Practices for Ground Signal Equipment.

35. Use of Preventive Maintenance Forms

(figs. 6 and 7)

- a. The decision as to which items on DA Forms 11/240 and 11-241 are applicable to Telephone Set TA-43/PT is a tactical decision to be made in case of first echelon maintenance by the communications officer/chief or his designated representative, and in the case of second or third echelon maintenance, by the individual making the inspection. Instructions for the use of each form appear on the reverse side of the form.

- b. Circled items in figures 6 and 7 are partially or totally applicable to Telephone Set TA-43/PT. References in the ITEM column refer to paragraphs in the text that contain additional maintenance information.

**OPERATOR FIRST ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
TELEPHONE SET**

EQUIPMENT NOMENCLATURE		INSTRUCTIONS: See other aids		EQUIPMENT SERIAL NO.				
TELEPHONE SET TA-43/PT								
LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; X Adjustment, repair or replacement required; ⊕ Defect corrected.								
NOTE: Strike out items not applicable.								
DAILY								
NO.	ITEM	CONDITION						
		S	M	T	W	T	F	S
①	INSPECT CORDS FOR KINKS, FRAYING, CUTS, BREAKS. (Outdoor use). PAR. 36 a (2)							
②	INSPECT EXTERIOR CONNECTIONS FOR SNUG FIT AND GOOD CONTACT. (Outdoor use). PAR. 36 a (4)							
③	CLEAN CORDS, CASES, HANDSET, AND BATTERY COMPARTMENT OF MOISTURE, DIRT, URINE, BATTERY ACID, MILDEW, CORROSION. (Outdoor use). PAR. 36 b (11)							
④	INSPECT FOR SECURE MOUNTING STRAPS. (Outdoor use). PAR. 36 b (10)							
⑤	INSPECT BATTERY COMPARTMENT FOR CORROSION, GOOD BATTERIES, BROKEN OR MISSING SPRINGS, BATTERY ACID. (Local battery use). PAR. 36 b (11)							
⑥	OPERATE THE TELEPHONE AND CHECK FOR PROPER RINGING AND TALKING. PAR. 36 a (1)							
7	INSPECT VACUUM TUBES FOR LIGHTED FILAMENTS AND SECURE MOUNTING. (Amplifier type).							
WEEKLY								
NO.	ITEM	NO.	ITEM	COND.				
				S	T			
⑧	INSPECT CORDS FOR KINKS, FRAYING, CUTS, BREAKS. (Indoor use). PAR. 36 a (2)	⑧	INSPECT HANDSET FOR CHIPS, CRACKS, LOOSE CAPS OR CAPSULES, DIRT, GREASE, MOISTURE. PAR. 36 a (6)					
⑨	INSPECT EXTERIOR CONNECTIONS FOR SNUG FIT AND GOOD CONTACT. (Indoor use). PAR. 36 a (4)	⑨	INSPECT SNAP FASTENER ON CASE. (Outdoor use).					
⑩	CLEAN CORDS, BATTERY COMPARTMENT, EXTERIOR OF CASE, HOUSING, DIAL, HANDSET. (Indoor use). PAR. 36 b (8)	⑩	INSPECT LEATHER AND CANVAS ITEMS FOR MILDEW, TEARS, AND FRAYING. PAR. 36 b (10)					
⑪	INSPECT EXTERIOR FOR CHIPS, CRACKS, CORROSION, RUST, MOISTURE, MILDEW, DIRT, GREASE, BROKEN OR MISSING GENERATOR HANDLE. PAR. 36 b (6)	⑪	INSPECT TELEPHONE SET FOR COMPLETENESS - CORDS, DIALS, HANDSET, BATTERIES, GENERATORS, TUBES, CARRYING CASES, ACCESSORIES, TECHNICAL MANUALS, RUNNING SPARE PARTS. PAR. 36 b (7)					
⑫	TIGHTEN LOOSE ASSEMBLY AND MOUNTING HARDWARE. PAR. 36 b (1)	⑫	INSPECT FOR PROPER INSTALLATION IN COOL, DRY PLACE. PAR. 36 b (3)					
⑬	INSPECT MARKINGS FOR LEGIBILITY, CORROSION. PAR. 36 b (9)							
19 IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.								

DA FORM 11-240
1 MAY 51

REPLACES DA AGO FORM 439, 1 DEC 50, WHICH IS OBSOLETE.

TM 337-8

Figure 6. DA Form 11-240.

**SECOND AND THIRD ECHELON MAINTENANCE CHECK LIST FOR SIGNAL CORPS EQUIPMENT
TELEPHONE SET**

EQUIPMENT NOMENCLATURE TELEPHONE SET TA-43/PT		INSTRUCTIONS: See other side	EQUIPMENT SERIAL NO.
<p>LEGEND FOR MARKING CONDITIONS: ✓ Satisfactory; I Adjustment, repair or replacement required; ⊕ Defect corrected. N/A: Strike out items not applicable.</p>			
NO.	ITEM	NO.	ITEM
1	INSPECT CORDS FOR KINKS, FRAYING, CUTS, BREAKS. (Outdoor use). PAR. 36 a (2)	17	INSPECT TELEPHONE SET FOR COMPLETENESS - CORDS, DIALS, HANDSET, BATTERIES, GENERATORS, TUBES, CARRYING CASES, ACCESSORIES, TECHNICAL MANUALS, RUNNING SPARE PARTS. PAR. 36 b (7)
2	INSPECT EXTERIOR CONNECTIONS FOR SNUG FIT AND GOOD CONTACT. (Outdoor use). PAR. 36 a (4)	18	INSPECT FOR PROPER INSTALLATION IN COOL, DRY PLACE.
3	CLEAN CORDS, CASES, HANDSET, AND BATTERY COMPARTMENT OF MOISTURE, DIRT, GRIME, BATTERY ACID, MILDew, CORROSION. (Outdoor use). PAR. 36 b (8)	19	INSPECT CORDS AND LINE TERMINALS FOR FRAYING, BREAKS, CUTS, PROPER CONNECTIONS FOR CB OR LB OPERATION. PAR. 36 b (6)
4	INSPECT FOR SECURE MOUNTING STRAPS. (Outdoor use). PAR. 36 b (10)	20	CLEAN INTERIORS OF TELEPHONE HOUSINGS, CHASSIS, CARRYING CASES, BATTERY COMPARTMENTS OF ALL CORROSION, MOISTURE, MILDew, RUST, EXCESS SOLDER, DIRT, GRIME, GREASE.
5	INSPECT BATTERY COMPARTMENT FOR CORROSION, GOOD BATTERIES, BROKEN OR MISSING SPRINGS, BATTERY ACID. (Local battery sets). PAR. 36 b (11)	21	INSPECT INTERIOR WIRING AND CONNECTIONS FOR GOOD CONTACT, BREAKS, CUTS, FRAYING. PAR. 36 c (2)
6	OPERATE THE TELEPHONE AND CHECK FOR PROPER RINGING AND TALKING. PAR. 36 a (1)	22	INSPECT GENERATOR FOR WORN OR CHIPPED GEARS, LOOSE SCREWS, WORN RUBBER, BROKEN CONTACT SPRINGS. (Local battery sets). PAR. 36 c (8)
7	INSPECT VACUUM TUBES FOR LIGHTED FILAMENTS AND SECURE MOUNTING. (Amplifier type).	23	BURNISH GENERATOR CONTACTS AND ADJUST SPRINGS. (Local battery sets).
8	INSPECT CORDS FOR KINKS, FRAYING, CUTS, BREAKS. (Indoor use). PAR. 36 a (2)	24	TIGHTEN ALL LOOSE ASSEMBLY AND MOUNTING SCREWS. PAR. 36 b (1)
9	INSPECT EXTERIOR CONNECTIONS FOR SNUG FIT AND GOOD CONTACT. (Indoor use). PAR. 36 a (4)	25	INSPECT HOOK SWITCHES, CANDLE SWITCHES, HANDSET BUTTERFLY SWITCH AND CONTROL SWITCHES FOR POSITIVE ACTION AND GOOD CONTACT. PAR. 36 a (7)
10	CLEAN CORDS, BATTERY COMPARTMENT, EXTERIOR OF CASE, HOUSING, DIAL, HANDSET. (Indoor use). PAR. 36 b (8)	26	INSPECT VACUUM TUBES FOR SECURE MOUNTING, VISIBLE DAMAGE, AND LIGHTED FILAMENT. (Amplifier type).
11	INSPECT EXTERIOR FOR CHIPS, CRACKS, CORROSION, RUST, MOISTURE, MILDew, DIRT, GREASE, BROKEN OR MISSING GENERATOR HANDLE. PAR. 36 b (4)	27	INSPECT PLUGS AND JACKS FOR SNUG FIT AND GOOD CONTACT.
12	TIGHTEN LOOSE ASSEMBLY AND MOUNTING HARDWARE. PAR. 36 b (1)	28	CLEAN PLUGS AND JACKS OF RUST, MOISTURE, DIRT, GRIME, AND GREASE.
13	INSPECT MARKINGS FOR LEGIBILITY, CORROSION. PAR. 36 b (9)	29	INSPECT RELAYS FOR POSITIVE ACTION AND GOOD CONTACT.
14	INSPECT HANDSET FOR CHIPS, CRACKS, LOOSE CAPS OR CARTRIDGES, DIRT, GREASE, MOISTURE. PAR. 36 b (4)	30	CLEAN SWITCHES AND RELAYS OF DIRT, DUST AND MOISTURE. PAR. 36 c (3)
15	INSPECT SNAP FASTENER ON CASE. (Outdoor use). PAR. 36 b (10)	31	CLEAN AND TIGHTEN ALL TERMINAL CONNECTIONS. PAR. 36 c (4)
16	INSPECT LEATHER AND CANVAS ITEMS FOR MILDew, TEARS, AND FRAYING. PAR. 36 b (10)	32	LUBRICATE THE EQUIPMENT USING THE LATEST DEPARTMENT OF THE ARMY LUBRICATION ORDER.
		33	INSPECT THE TELEPHONE SET FOR PROPER MOISTURE AND FUNGUS PROOFING. PAR. 36 c (1)
<p>34 IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION.</p>			

DA FORM 11-241
MAY 51

REPLACES DA AGO FORM 429, 1 DEC 50, WHICH IS OBSOLETE

g-12-4422-1

Figure 7. DA Form 11-241.

TM 337-9

36. Performing Preventive Maintenance

A suggested schedule of preventive maintenance for the TA-43/PT is given in *a* through *c* below. The operations indicated should be performed by organizational personnel at the intervals indicated unless those intervals are changed by the local commander.

a. Daily.

- (1) Check for proper operation of the telephone.
- (2) Inspect the handset cord for cuts, kinks, breaks, or fraying.
- (3) Check the generator operating handwheel and crank for ease of operation.
- (4) Check the line binding post connections.
- (5) Inspect the buzzer diaphragm for dents or other damage.
- (6) Check the receiver and transmitter caps for tightness.
- (7) Inspect the line switch and the press-to-talk switch for ease of operation.
- (8) Inspect the handset retaining springs for proper spring tension.

b. Weekly.

- (1) Inspect all accessible screws for tightness.
- (2) Inspect all gaskets for tightness or damage.
- (3) Check installation site for maximum protection of the TA-43/PT.
- (4) Check the handset for chips, cracks, or other damage.
- (5) Check the spring-loaded binding posts for positive spring action.
- (6) Check the panel and housing assembly for scratches, cracks, dents, or other damage.
- (7) Check for completeness and general condition of the telephone, handset, and carrying case.
- (8) Remove dirt, dust, grease, and moisture from the exterior of the carrying case, panel and housing assembly, and the handset.
- (9) Inspect all markings for legibility and cleanliness.
- (10) Inspect the carrying case and strap for tears, rips, broken or bent snap fasteners, broken or missing snap rings.
- (11) Inspect the battery compartment for corrosion, broken or bent contacts or loose cover or cover latch.

- (12) Check the circuit selector switch for ease of operation and positive detent action.

c. Monthly.

- (1) Inspect moistureproofing and fungiproofing for general condition. Whenever a loose connection is soldered or a break in the protective coating is found, it should be moistureproofed and fungiproofed. Apply the varnish with a small brush.
- (2) Check the local wiring for damaged insulation. Repair the damaged insulation with electrical tape and dress the wiring.
- (3) Check all switches for dust, dirt, or grease.
- (4) Check all screw-type terminal connections for tightness.
- (5) Check for loose soldered connections.
- (6) Check the hand ringing generator for worn or damaged parts.

Section II. LUBRICATION AND WEATHERPROOFING

37. Lubrication

All moving parts of the TA-43/PT have been lubricated by the manufacturer. No further lubrication is required.

38. Weatherproofing

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

b. Tropical Maintenance. A special moistureproofing and fungiproofing treatment has been devised, which, if properly applied, provides a reasonable degree of protection. Refer to TB SIG 13, Moistureproofing and Fungiproofing Signal Corps Equipment, and TB SIG 72, Tropical Maintenance of Signal Corps Equipment.

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

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

Section III. TROUBLESHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

39. General

The troubleshooting and repair work that can be performed at the organizational maintenance level (operators and repairmen) is limited in scope by the tools, test equipment, replacement parts issued, and by the existing tactical situation. Accordingly, troubleshooting is based on the performance of the equipment and the use of the senses in determining such troubles as broken leads, burned-out resistors, etc. Paragraphs 40 through 42 will help in determining a faulty component.

40. Visual Inspection

The faults that can be detected by the senses and corrected by personnel of the using organization are listed in *a* through *j* below.

a. The handset cord, in both its extended and coiled positions, should show no evidence of cuts or other damage that may render the set inoperative.

b. The receiver and transmitter caps should securely clamp their respective elements in the handset handle; the grid holes in the caps and the air valve recesses in the handle should not be obstructed; the handset handle should not be cracked or damaged; and the press-to-talk switch should operate freely.

c. Be sure the proper batteries are installed; the contacts in the battery compartment should not be corroded or damaged, the external battery terminals should not be shorted or grounded to the panel. Replace defective batteries.

d. The spring-loaded binding posts should be clean and free of corrosion. When released, the spring should return the binding posts to normal.

e. The line switch should operate freely when pushed down or released by the handset.

f. The circuit selector switch should be easily adjustable with a screwdriver. A positive detent action should be apparent at each position.

g. The buzzer diaphragm should not be dented, damaged, or obstructed. Check the loudness control knob for ease of adjustment from LOW to LOUD positions.

h. The generator crank should turn freely. The folded handle should be easy to move to the operating position.

i. The panel and housing assembly should not be dented or deformed. The handset retaining brackets should hold the handset securely with the telephone mounted vertically (fig. 1) and should not prevent its removal. The assembly screws or gasket seals should not be loose or missing.

j. The carrying case should not obstruct the use or functioning of the telephone set.

41. Troubleshooting, Using Equipment Performance Check List

a. *General.* The equipment performance check list (par. 42) will help to locate trouble in the equipment. The list gives the item to be checked, the normal indications and tolerances of correct operation, and the corrective measures to be taken by the operator. To use this list, follow the items in numerical sequence.

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

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

d. *Corrective Measures.* The corrective measures listed are those the operator can apply without turning the equipment in for repairs. A reference in the table to chapter 5 indicates that troubleshooting by an experienced repairman is necessary. If the equipment is completely inoperative or if the recommended corrective measures do not yield results, troubleshooting at field level is required. However, if the tactical situation requires that communication be maintained, and if the set is not completely inoperative, the operator must keep the set in operation as long as it is possible to do so.

42. Equipment Performance Check List

Item No.	Item	Action or condition	Normal indications	Corrective measures
1	Line terminals..... Batteries BA-30....	Incoming lines connected. Two batteries properly installed.	Tight connection to binding posts LINE 1 and LINE 2. Two Batteries BA-30 installed; one with center terminal up, one with center terminal down. Switch operates properly with positive detent action.	Tighten connections. Reinstall batteries.
3	Circuit selector switch.	Turn switch to LB, CB, or CBS as required for test.		Repair or replace switch (ch. 5).
4	Signaling circuit (LB).	Turn hand ringing generator.	Called telephone buzzer operates or drop at local battery switchboard falls.	Replace line switch (ch. 5). Replace hand ringing generator (ch. 5). Replace impedance-matching network (ch. 5).
5	Signaling circuit (CB and CBS).	Lift handset from line switch.	Lamp lights on CB switchboard and switchboard operator answers.	Repair or replace line switch (ch. 5). Repair or replace circuit selector switch (ch. 5).
6	Transmission circuit on LB or CBS.	Press-to-talk switch operated. Talk to distant party.	Party operating test telephone hears transmission loud and clear.	Replace transmitter element. Replace Press-to-talk switch. Repair or replace handset cord. Repair or replace line switch (ch. 5). Repair or replace circuit selector switch (ch. 5). Repair wiring in housing assembly (ch. 5). Replace impedance-matching network (ch. 5).

PREPARATORY

START

PERFORMANCE

EQUIPMENT PERFORMANCE

Item No.	Item	Action or condition	Normal indications	Corrective measures
7	Transmission circuit (CB).	Talk to operator on CB.	Switchboard operator hears transmission loud and clear.	<p>Replace transmitter element.</p> <p>Repair or replace handset cord.</p> <p>Tighten connections inside the housing assembly.</p> <p>Repair or replace line switch (ch. 5).</p> <p>Repair or replace circuit selector switch. (ch. 5).</p> <p>Repair wiring inside housing assembly (ch. 5).</p> <p>Replace impedance matching network (ch. 5).</p>
8	Receiving circuit.	Listen for incoming transmission signal.	Transmission heard at telephone being tested.	<p>Replace receiver element.</p> <p>Replace varistor CR3.</p> <p>Repair or replace handset cord.</p> <p>Tighten connections in handset.</p> <p>Tighten connections inside the housing assembly.</p> <p>Repair or replace line switch. Repair or replace circuit selector switch. (ch. 5).</p> <p>Repair wiring inside housing assembly (ch. 5).</p>

CHAPTER 4

THEORY

Section I. THEORY OF COMPONENTS

43. General

Telephone Set TA-43/PT is designed for use with any manual common battery or local battery field telephone system. The theory of the components of the telephone set are described in paragraphs 44 through 48 and the theory of operation is discussed in paragraphs 49 and 50. Figure 17 is the schematic diagram and figure 18 is the wiring diagram for the TA-43/PT.

44. Telephone Receiver Element TA-235/PT (fig. 8)

a. The permanent magnet receiver element converts voice currents received over the telephone line into an audible signal. The moving system or diaphragm is divided into two parts: a central dome of a lightweight plastic material that is moved to create sound waves and a ring of magnetic material attached to the outer edge of the dome. The ring is driven by the magnetic forces and drives the dome. The dome moves in one piece, resulting in a large effective diaphragm area. The increase in effective area and the reduction in diaphragm weight results in an increase in receiver efficiency and frequency response. The receiver also has a low acoustic coupling impedance that provides a more uniform acoustic output when the receiver is not held tightly against the ear.

b. The metal ring of the diaphragm assembly is located in an air gap between two different parts of the permanent magnet. The flux of each part of the magnet is adjusted during manufacture. This adjustment also protects the magnet against normal demagnetizing influences during service.

c. The receiver frequency response is essentially uniform from 300 to 3,500 cycles per second (cps). To reduce acoustic interference due to power line frequencies (60 cps and its harmonics), a small hole at the center of the diaphragm provides a low frequency cutoff filter characteristic.

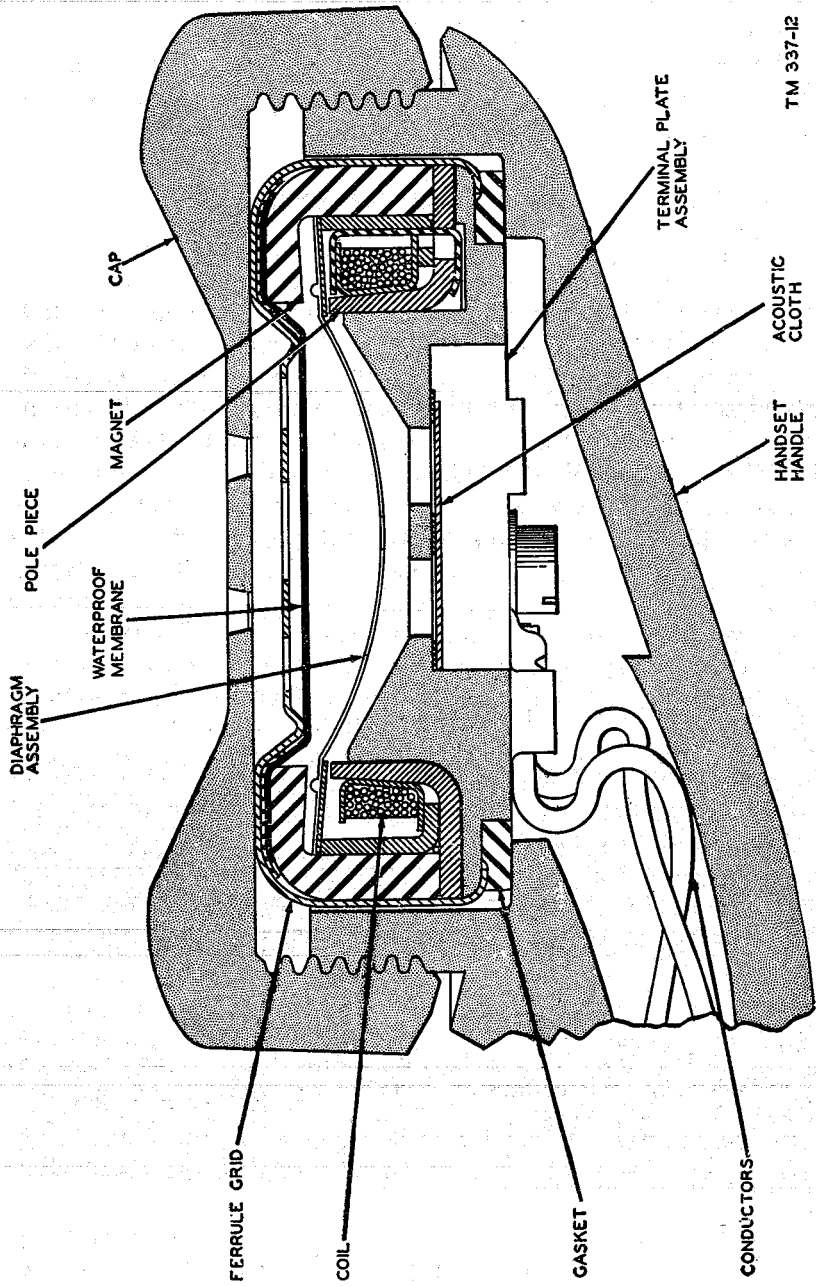


Figure 8. Telephone receiver element TA-235/PT, cutaway view.

d. The front of the receiver is protected by a thin waterproof membrane between the grid and diaphragm. A rubber gasket on the rear of the receiver provides a water seal in the handset assembly.

e. The varistor CR3 shunts the receiver element and minimizes clicks in the receiver and protects the receiver against demagnetization.

45. Telephone Transmitter Element TA-117/PT

(fig. 9)

a. The carbon-type transmitter element converts sound into voice currents, which are then conducted over the telephone line. An improved type of carbon granule provides a long service life. The operating stability of the transmitter under various circuit and temperature conditions has been improved by making the diaphragm and its clamping ring from an alloy having a low coefficient of thermal expansion. When battery current flows through the carbon granules, considerable heat is evolved. This heats the diaphragm and results in diaphragm distortion. This distortion directly effects transmission efficiency. These heating effects differ for common battery and local battery circuits because of the available battery voltages and the total circuit resistance. However, this transmitter element operates satisfactorily in either type of circuit and under extreme changes in atmospheric temperature.

b. The frequency response range of the transmitter is similar to that of the receiver. A plastic cup behind the transmitter provides terminal contacts and also serves to acoustically isolate the transmitter and receiver elements in the handset assembly (fig. 15). A .006 microfarad (uf) capacitor shunts the transmitter element to reduce interference caused by radio frequency currents.

c. The front of the diaphragm is protected by a waterproof membrane beneath the grid. The diaphragm has a small hole through it. A rubber gasket around the transmitter element provides a water seal in the handle and holds the terminal cup to the transmitter. A metal ring is cemented to the front of the gasket to provide a slip surface when clamping the transmitter cap.

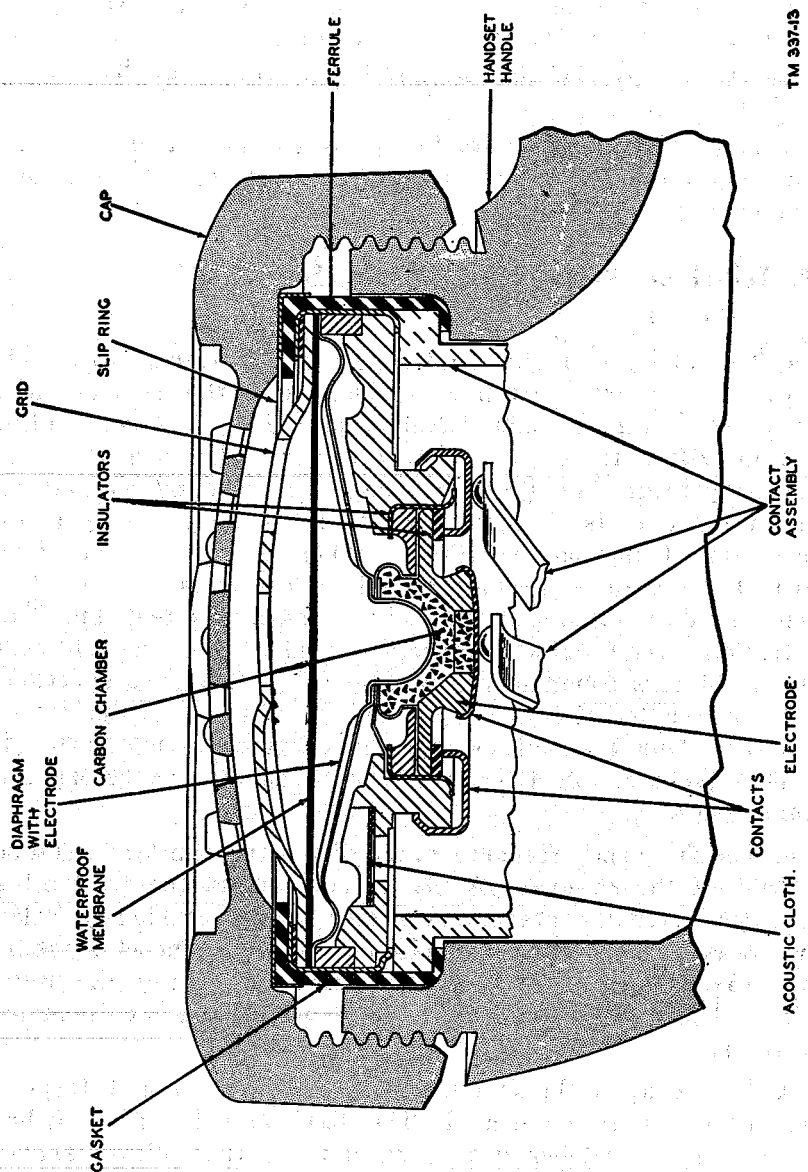


Figure 9. Transmitter element TA-117/PT, cutaway view.

46. Buzzer BZ-23/PT

(fig. 10)

The buzzer consists of a magnetic motor element operating a bar-type armature at a nominal frequency of 20 cycles. One end of the armature mounts a stiff wire support with a clapper ball at its end. The clapper ball strikes a circular diaphragm in the form of a flat bottomed cup. The resonant frequency of the diaphragm and cup is approximately 2,400 cps, and most of the acoustic output of the buzzer signal occurs in a 500-cycle band centered about this frequency. The acoustic output is a loud, high-pitched signal that can be readily recognized under marginal listening conditions and is not dependent on the high-frequency hearing sensitivity of the listener. Signal volume is controlled by mechanically limiting the armature motion. When the clapper ball no longer can strike the plate, the signal characteristics change to a low volume buzz. The signal cannot be turned off entirely.

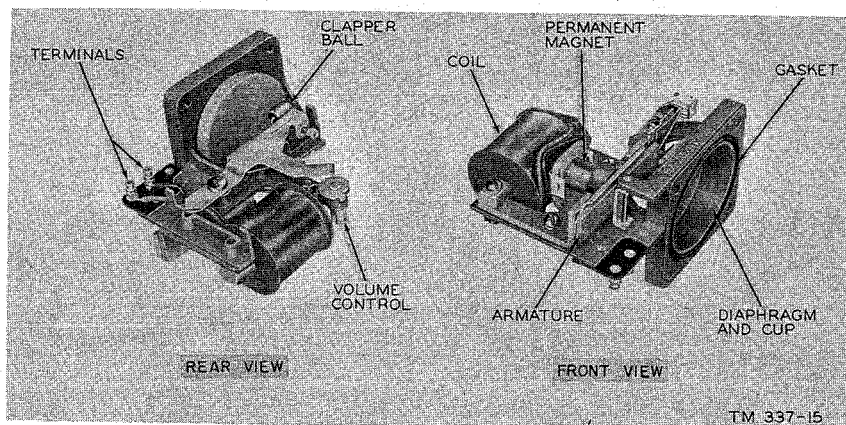


Figure 10. Buzzer BZ-23/PT.

47. Hand Ringing Generator G-42/PT

(fig. 11)

The ringing generator consists of a permanent magnet armature (rotor) with coils mounted on a laminated field (stator). No commutator is used. The rotor is operated at 1,200 revolutions per minute (rpm) by means of an external crank handle through a 6 to 1 gear reduction train. At a crank speed of 200 rpm, the generator delivers approximately 100 volts at 20 cycles. A centri-

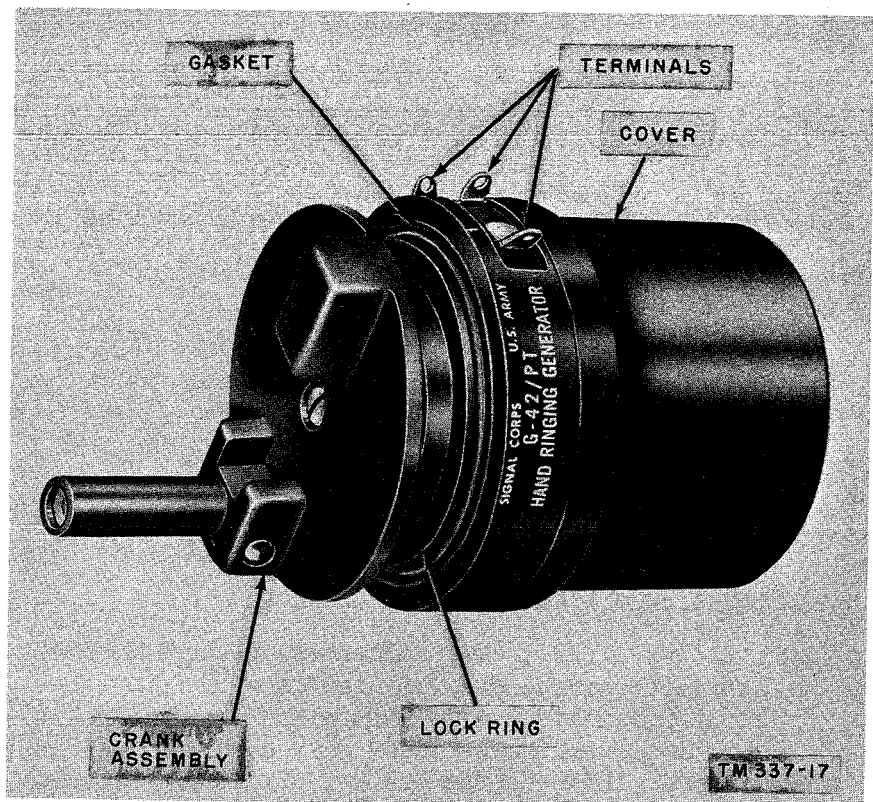


Figure 11. Hand ringing generator G-42/PT.

fugally operated transfer contact switch connects the generator output voltage to the line when the crank is turned at about 140 rpm. This switch also opens the buzzer circuit and removes its shunting effect.

48. Impedance Matching Network CU-350/PT (fig. 12)

a. The impedance-matching network contains all coils, resistors, and capacitors. They are assembled and sealed hermetically in a common metal container. Twelve solder-type terminals provide electrical connections to the circuits. The network assembly is mechanically rugged; it is waterproof, and it is not affected by temperatures within the limits specified in paragraph 5b. The metallized paper capacitors are selfhealing. Reasonable power dissipation margins are provided in all coils and resistors.

b. The network housing contains the following circuit elements:

Component	Circuit function
Induction coil.....	Impedance-matching circuits.
Local battery talk coil	Keeps voice currents out of the battery in LB and CBS circuits.
Hold coil.....	Signals CB switchboard on CBS circuits.
Resistor L: 22 ohms..	CB transmitter circuit.
N: 22 ohms..	LB and CBS line circuit.
B: 100 ohms..	Network equalizer circuit.
G: 200 ohms..	Transmitter (CR1) equalizer circuit.
Capacitor K: .02 uf...	Rf bypass for CR1.
D: .81 uf...	Rf bypass for CR2.
M: .81 uf...	Dc blocking for LB and CBS circuits.
P: 1 uf...	Dc blocking for buzzer.
F: 2 uf...	Dc blocking and network equalizer.
Varistor CR1.....	Transmitter voltage equalizer.
CR2.....	Receiver voltage equalizer.

- (1) The induction coil with its three windings on a laminated magnetic core is the basic element of the impedance-matching network. One winding matches the transmitter impedance, another matches the receiver impedance, and the third matches the line impedance. Together, they form an antisidetone circuit, the functioning of which is shown in figure 13. Transmitter voice current, indicated by the broken arrows, flows through coils A and H in opposite directions and, thus, does not induce a current in coil C. Current does not flow through the receiver. Voice current from the telephone line, however, passes through coils A and H in the same direction, as indicated by the solid arrows, and induces a current in coil C. Maximum current flows through the receiver, and the transmitter shunts coil H. The balancing network (fig. 17) consists of a 2-uf capacitor, a 100-ohm resistor, and receiver circuit equalizer CR2. This circuit maintains the impedance characteristics of the matching network and, thus, the sidetone balance, over a wide frequency range. For local battery service, the basic telephone circuit is not altered except as required to provide battery supply for the transmitter element (fig. 14).

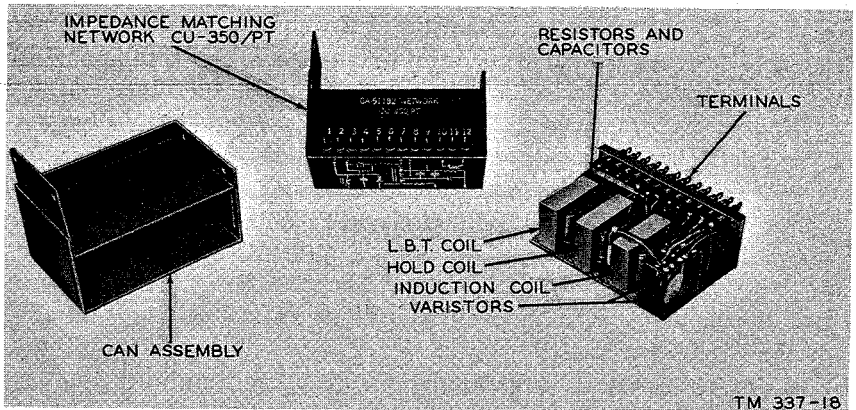


Figure 12. Impedance matching network CU-350/PT.

- (2) The local battery talk (LBT) coil is a high impedance coil with 8.5 ohms dc resistance. This coil, placed in series with the local battery, prevents voice currents from flowing through the battery, thereby reducing the voice frequency power loss.
- (3) The hold coil is a high ac impedance coil with 50 ohms dc resistance. This coil provides a dc signaling path through the TA-43/PT when the circuit selector switch is set at CBS.
- (4) Varistors CR1 and CR2 control the transmission characteristics of the CB circuit. The varistors have a high dc resistance when a low voltage is applied across them, and the resistance decreases as the voltage across them increases. The function of CR1 is described in (a) below and the function of CR2 is described in (b) below.
 - (a) Varistor CR1 and a 200-ohm resistor shunt the telephone set. Normally, on short loops, the common battery supplies a relatively high dc voltage to the set and to the transmitter element. This causes the transmission level to increase considerably. However, because the voltage across the set is limited by the varistor circuit, a relatively small increase in level results. On longer loops, the terminal voltage is less, the shunting effect of the varistor decreases, and the resulting transmitter current provides essentially the normal transmission level. On extremely long loops, the varistor has no control on the transmission level. The .02-uf capacitor shunts varistor CR1 to reduce effects of radio frequency currents. Varistor CR1 is used only in the CB circuit.

(b) Low resistance varistor CR2 shunts the transmitter and receiver elements and affects the transmission levels of both. When the transmitter terminal voltage is high, the resistance of varistor CR2 decreases. This causes induction coil winding H (fig. 17) to shunt the transmitter circuit, and the 2-uf capacitor to shunt the receiver circuit. When the transmitter terminal voltage is low, varistor CR2 has very little effect on transmission. This varistor is not removed during circuit changes, but its effect in the LB and CBS circuit is negligible. The .81-uf capacitor shunts varistor CR2 to reduce the effects of radio frequency currents.

(5) The 1-uf capacitor, in series with the buzzer winding, prevents the dc line current from flowing through the buzzer circuit. It also forms a series resonant circuit at 20 cps providing a low impedance path to the signaling current.

c. The three basic antisidetone transmission circuits (fig. 13) function identically, except for the transmitter battery supply and the method of operating supervisory signals. The line switch (fig. 2) disconnects the transmission circuits when the telephone set is not in use. The high alternating current (ac) impedance of the buzzer circuit minimizes transmission loss when the set is used.

Section II. CIRCUIT ANALYSIS

49. Signaling

(fig. 17)

a. *Incoming.* The 20 S ringing current from a distant source operates the buzzer in the TA-43/PT over the following path: from binding post LINE 1 through contacts 3-2 on the centrifugal switch of the G-42/PT to terminal 1 on the terminal strip, through the buzzer to capacitor P in the impedance-matching network; from capacitor P to binding post LINE 2. This operates the buzzer, signaling the local telephone user.

b. *Signaling Local Battery Switchboard.* When a call is placed to a local battery switchboard or a distant telephone, the hand generator crank is turned before lifting the handset. As the generator crank is turned, the centrifugal switch operates connecting the generator to the line. The 20 S ringing current flows from terminal 1 on the generator to binding post LINE 2 through the line and the apparatus being signaled and back to

binding post LINE 1; to terminal 3 on the generator through the operated contacts of the centrifugal switch and back to the generator. The 20 S ringing current operates the device that indicates an incoming call at the local battery switchboard or causes the signaling device in a distant telephone to operate.

c. Signaling Common Battery Switchboard. When the TA-43/PT is connected to a common battery switchboard, the operator is signaled by lifting the handset from the brackets, releasing the line switch. The circuit closed by the line switch is as follows: Battery from the switchboard to binding post LINE 1 flows through contacts 5-6 of the line switch to terminal 8 on the impedance-matching network, through winding A of the induction coil to terminal 10 of the impedance-matching network, then through the transmitter unit to terminal 11 of the impedance-matching network. The current then flows through resistor L, terminal 6 of the impedance-matching network, contact 3 of S1 (rear), contact 1 of S1 (front), to ground at the switchboard over binding post LINE 2. This causes the lamp at the switchboard to light.

d. Common Battery Signaling (CBS). When signaling the switchboard operator, the circuit is as follows: Battery on binding post LINE 1 flows through contacts 5-6 of the line switch through terminal 8 on the impedance-matching network, through the A winding of the induction coil, terminal 10 of the impedance matching network, through contacts 9-11 of S1 (rear) to terminal 4 of the network; from terminal No. 4 of the network through the hold coil (J), through terminal 5 of the network to ground at the switchboard through the binding post LINE 2. The hold coil (J) provides a medium resistance dc path for signaling the CB switchboard but prevents shunting voice currents by a high impedance to voice frequency ac.

50. Transmission

(fig. 17)

a. Transmitting.

- (1) *Common battery.* Direct current is supplied to the transmitter in the TA-43/PT from the common battery central office over the circuit described in paragraph 49c. This current is changed to voice currents by the action of the transmitter. Resistor G and varistor CR1 provide protection for the transmitter against high voltages. They also limit the current through the transmitter to obtain the same transmission level when the set is changed from LB to CB. Capacitor K provides a low

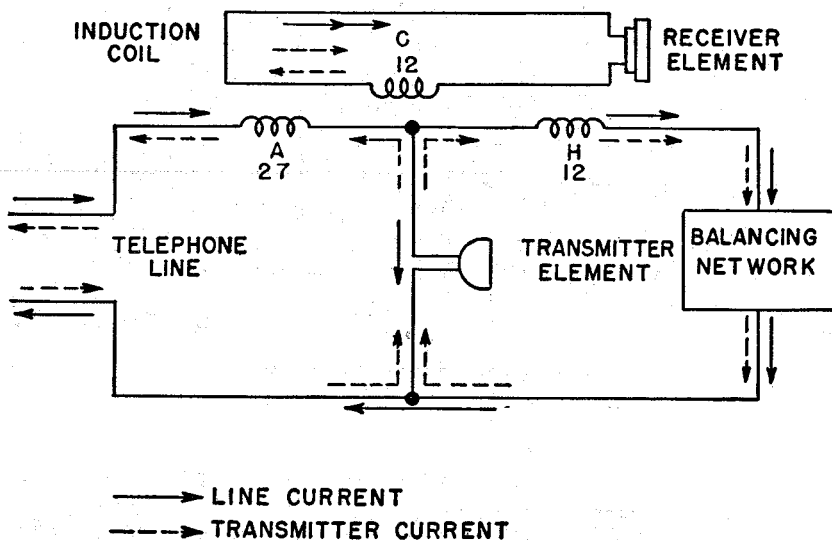
impedance shunt path for radio frequency signals, thereby eliminating them from the transmitter circuit of the TA-43/PT.

- (2) *Local battery.* With the circuit selector switch in the LB position, current is supplied to the transmitter from the negative battery terminal through contacts 3-4 of the line switch through terminal 2 on the impedance matching network, through coil E (LBT), terminal 3 on the impedance matching network, through contact 10 of S1 (front), through contact 9 S1 (rear), through the transmitter element, and through the press-to-talk switch to the positive battery terminal. Coil E (LBT) has a low dc resistance and a high impedance to voice frequency; this permits dc to be supplied to the transmitter but prevents shunting the voice currents through the battery. The voice current path is as follows: from one side of the transmitter element through contacts 4-3 S1 (rear), capacitor M, resistor N, to binding LINE 2, through the distant telephone and back to binding post LINE 1. From binding post LINE 1, the return path is through contacts 5-6 of the line switch, terminal 8 on the impedance-matching network, winding A, through terminal 10 of the impedance-matching network to the transmitter.
- (3) *Common battery signaling.* The circuit for battery feed and transmitting is the same as the LB circuit ((2) above).

b. Receiving. The receiving circuit in the TA-43/PT is the same for all selector switch settings; that is, from one side of the receiver element through terminal 9 of the impedance-matching network, winding C of the induction coil, resistor B, terminal 7 of the network, and back to the other side of the receiver element. This circuit is coupled electrically to the transmission circuit through windings A and H of the induction coil.

c. Antisidetone. The transmitter, receiver, induction coil, capacitor D, and resistor L are connected in an antisidetone circuit that reduces the sidetone heard in the receiver. The antisidetone circuit with the circuit selector switch set in the CB position is as follows: from one side of the transmitter through terminal 10 on the impedance-matching network to capacitor D; from capacitor D through winding H of the induction coil, resistor L, terminal 11 of the impedance-matching network, and back to the other side of the transmitter. When used on LB or CBS, the circuit is the same as for the CB position, except from

winding H of the induction coil the path is through contacts 3-4 of S1 (rear) to the transmitter element. Figure 13 is a schematic diagram of the antisidetone circuit. The incoming voice currents (solid arrows) induced from windings A and H of the induction coil aid in winding C of the induction coil; the locally transmitted voice currents (dotted arrows) are induced from winding A in one direction and winding H in the opposite direction with a tendency to cancel in winding C.

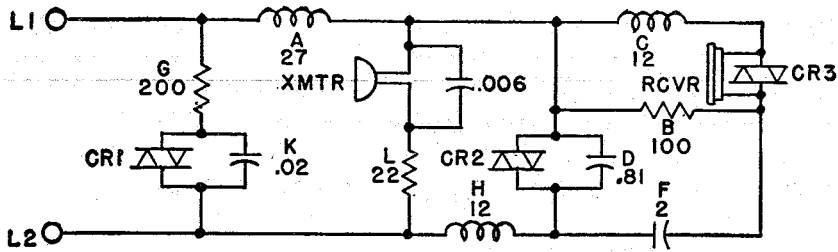


NOTE:

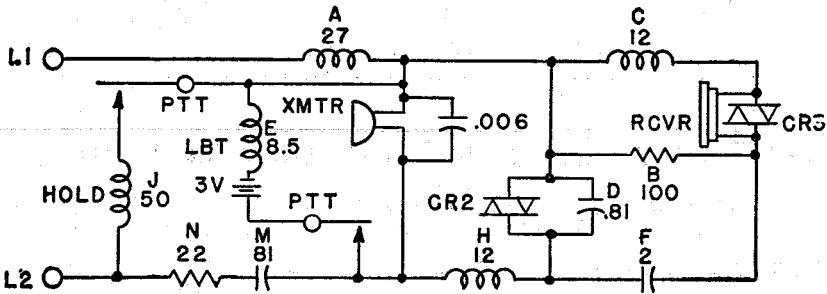
COIL VALUES ARE IN OHMS.

TM 337-19

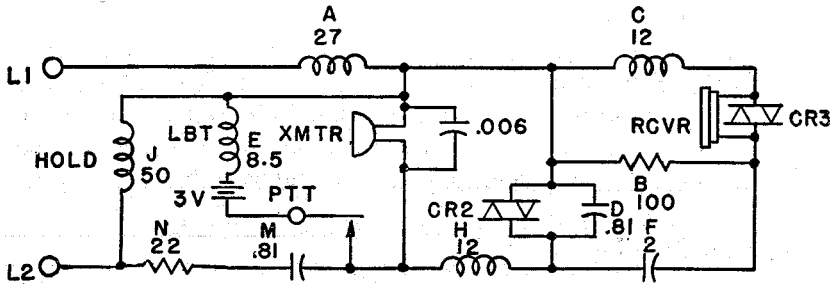
Figure 13. Antisidetone network, functional diagram.



A.COMMON BATTERY CIRCUIT



B.LOCAL BATTERY CIRCUIT



C.LOCAL BATTERY TALK, COMMON BATTERY SIGNALING CIRCUIT

NOTES:

- 1. PTT IS THE HANDSET PRESS-TO-TALK SWITCH.
- 2. RESISTORS AND COIL WINDINGS ARE IN OHMS, CAPACITORS ARE IN UF.

TM.337-11

Figure 14. Telephone set TA-43/PT, transmission circuits, schematic.

CHAPTER 5

FIELD MAINTENANCE INSTRUCTIONS

Note. This chapter contains information for field maintenance of Telephone Set TA-43/PT. The amount of repair that can be performed by units having field maintenance responsibility is limited only by tools and test equipment available and by the skill of the repairman.

Section I. TROUBLESHOOTING AT FIELD MAINTENANCE LEVEL

51. Troubleshooting Procedures

The first step in servicing defective equipment is to sectionalize the fault. Sectionalization means tracing the fault to the major component or circuit responsible for abnormal operation of the equipment. The second step is to localize the fault. Localization means tracing the fault to the defective part. Some faults, such as burned-out resistors, arcing, or shorted induction coils can be located by smell or hearing. The majority of faults must be localized, however, by checking voltages and resistances.

52. Troubleshooting Data

The material supplied in this manual will help in the rapid location of faults. Consult figures 17 and 18 for troubleshooting data.

53. Test Equipment Required for Troubleshooting

The test equipment required for troubleshooting the TA-43/PT is listed below. Technical manuals associated with the test equipment also are listed.

Test equipment	Technical manuals
Multimeter TS-352/U.....	TM 11-5527
Test Set I-142, I-142A, and I-142B....	TM 11-2062

54. General Precautions

Whenever the equipment is being serviced, observe the following precautions carefully. Failure to observe these precautions may result in further damage to the equipment.

a. Do not operate the press-to-talk switch when not transmitting. This will shorten the life of the batteries.

b. Careless replacement of parts often makes new faults inevitable. Note the following points carefully:

- (1) Before a part is unsoldered, note the position of the leads connected to it. If the part has a number of leads and terminals, tag each lead so it may be replaced easily and correctly.
- (2) Be careful not to damage other leads by pulling or pushing them out of the way. This is particularly important in used or old equipment since the insulation deteriorates with age.
- (3) Do not allow drops of solder to fall into the equipment. They may cause short circuits or other troubles.
- (4) A carelessly soldered connection may create a new fault that is hard to locate. It is very important to make well-soldered joints.
- (5) When a part is replaced in the equipment, it must be replaced exactly as the original. Give particular attention to proper tightening of mounting screws and terminal screws.

55. Operational Tests

The following tests generally require no special test equipment and may serve to identify the defective component. When trouble is indicated, follow the procedures described in the trouble-shooting chart (par. 56).

a. *CB Circuit.* Listen to the receiver while turning the generator crank. At low speeds, a clicking sound should be heard. At higher speeds, receiver sidetone should be heard when blowing across or speaking into the transmitter. Depress the line switch (fig. 2) to eliminate the sidetone and reduce the torque required to turn the generator crank.

b. *LB Circuit.* Depress the handset press-to-talk switch (fig. 2). Sidetone should be heard when blowing in the transmitter. Release the press-to-talk switch to eliminate the sidetone. Turn the hand ringing generator while operating and releasing the press-to-talk switch. Additional torque is required to turn the

hand ringing generator when the press-to-talk switch is depressed. This will electrically test the batteries, transmitter and receiver elements, all contacts of the press-to-talk switch, all contacts of the line switch, the generator switch, the hold coil, the LBT coil, and the continuity of the entire LB circuit.

c. CBS Circuit. Repeat the tests for the LB circuit (*b* above). Operation of the press-to-talk switch should not affect the operation of the generator, but depressing the line switch reduces the torque required to turn the generator.

d. Buzzer Circuit. With the handset mounted in the retaining brackets (fig. 2), connect the telephone set being tested to another telephone set known to be in operating condition. Operate the hand ringing generator of the test telephone. The buzzer should operate and the volume should vary as the volume control knob in the telephone set being tested is rotated clockwise from the LOW position to the LOUD position. The function of the entire buzzer circuit is tested with this test.

e. Overall Set Test. Use the two telephones connected together (*d* above). Install new Batteries BA-30 in each of the telephone sets and adjust both circuit selector switches for LB or CBS. Complete a two-way conversation between the two telephone sets. When talking at approximately the same loudness from each of the two telephone sets, the output at each handset should be about the same acoustic level. This is a simple method that can be used to test the efficiency of the transmitter and receiver elements.

56. Troubleshooting Chart

The troubleshooting chart indicates the symptoms of probable troubles and suggests corrective remedies. When making some of the checks, it is necessary to partially disassemble the telephone set. Follow the procedures described in paragraphs 58 through 62, and use the equipment described in paragraph 32 as required. All testing done with a telephone or test instrument must be done with equipment known to be in perfect operating condition.

Symptom	Probable trouble	Correction
Cannot transmit or receive	<p>Line terminals not making contact</p> <p>Damaged handset cord</p> <p>Defective circuit selector Switch</p> <p>Defective circuit selector</p> <p>Loose connections on terminal strip.</p> <p>Loose connections on impedance-matching network.</p> <p>Defective wiring in housing assembly.</p> <p>Defective centrifugal switch on hand ringing generator.</p> <p>Defective impedance-matching network.</p> <p>Defective batteries.</p> <p>Defective press-to-talk switch.</p> <p>Damaged handset cord</p> <p>Defective transmitter unit.</p> <p>Loose connection in transmitter compartment of handset.</p>	<p>Clean incoming line wire.</p> <p>Repair or replace line terminal.</p> <p>Repair or replace handset cord.</p> <p>Readjust, repair, or replace line switch.</p> <p>Repair or replace circuit selector switch.</p> <p>Tighten loose connections.</p> <p>Resolder loose connections.</p>
Cannot transmit with selector switch in LB or CBS position.	<p>Defective wiring in housing assembly.</p> <p>Defective centrifugal switch on hand ringing generator.</p> <p>Defective impedance-matching network.</p> <p>Defective batteries.</p> <p>Defective press-to-talk switch.</p> <p>Damaged handset cord</p> <p>Defective transmitter unit.</p> <p>Loose connection in transmitter compartment of handset.</p>	<p>Repair wiring.</p> <p>Replace hand ringing generator.</p> <p>Replace impedance-matching network.</p> <p>Replace batteries.</p> <p>Replace press-to-talk switch.</p> <p>Repair or replace handset cord.</p> <p>Replace transmitter unit.</p> <p>Tighten all connections.</p>
Cannot transmit with selector switch in CB position.	<p>Defective .006-uf capacitor</p> <p>Defective line switch</p> <p>Loose connection at terminal strip.</p> <p>Loose or broken connection at battery terminals.</p> <p>Defective wiring in housing assembly.</p> <p>Defective impedance-matching network.</p> <p>Damaged handset cord</p> <p>Defective .006-uf capacitor</p> <p>Loose connection at terminal strip.</p> <p>Defective circuit selector switch.</p> <p>Defective line switch.</p>	<p>Replace capacitor.</p> <p>Readjust, repair, or replace line switch.</p> <p>Tighten all connections.</p> <p>Tighten or repair connection.</p> <p>Repair wiring.</p> <p>Replace impedance-matching network.</p> <p>Repair or replace handset cord.</p> <p>Replace capacitor.</p> <p>Tighten all connections.</p> <p>Repair or replace circuit selector switch.</p> <p>Repair or replace line switch.</p>

57. Additional Troubleshooting Information

For additional troubleshooting information, consult the chart below. This chart shows the reactance between the terminals on the impedance-matching network.

Terminal No.	Component	Reactance
1-5	Ringer blocking capacitor	1 uf.
2-3	LBT coil	8.5 ohms.
4-5	Hold coil	50 ohms.
5-6	Capacitor M and resistor N	.81 uf in series with 22 ohms.
6-11	Resistor L	22 ohms.
6-10	Winding H of induction coil and varistor CR2	Coil 12 ohms plus varistor 80 ohms at 1 ampere.
6-7		
7-8	Winding H of induction coil and capacitor F.	Coil 12 ohms in series with capacitor 2 uf.
7-9	Winding A of induction coil and resistor B.	Coil 27 ohms plus resistor 100 ohms.
7-10	Winding C of induction coil and resistor B.	Coil 12 ohms plus resistor 100 ohms.
8-9	Resistor B	100 ohms.
8-10	Windings A and C of induction coil	39 ohms.
8-12	Winding A of induction coil	27 ohms.
	Resistor G in series with varistor CR1	Resistor G 200 ohms plus varistor CR1 220 ohms at 1 ampere.

Section II. REPAIRS

58. General

Step-by-step procedures for disassembling Telephone Set TA-43/PT are given in this section. When disassembling or reassembling the telephone set, or any component, be careful to avoid further damage. Do not attempt repairs unless the tools are in good condition. Use all tools with extreme caution to prevent further damage due to slippage. When making soldered connections, be careful to prevent burning the insulation or damaging the adjacent connections. When reassembling the TA-43/PT, be sure that all parts and screws are replaced in their proper places.

Caution: Do not use acid soldering flux on this equipment.

59. Disassembly of Handset H-60/PT

(fig. 15)

a. *Telephone Receiver Element TA-235/PT.* Unscrew the receiver cap (counterclockwise) and remove it from the handle.

The cap normally is hand tightened during assembly and should be removable with a firm hand grip.

- (1) Hold the handset cap side down. Gently tap the handle as required to remove the receiver element.
- (2) Disconnect the electrical connections at the receiver terminals with a screwdriver. The position of the cord tips with respect to the terminals is controlled by molded projections on the terminal detail.
- (3) During reassembly, be sure that the rubber gasket is in place, that the molded projections on the terminal detail are toward the handle recess opening, and that no conductor lead is pinched under the gasket as the receiver cap is tightened.

b. Telephone Transmitter Element TA-117/PT. Unscrew the transmitter cap (counterclockwise) and remove it from the handle. The cap normally is hand tightened during assembly and should be removable with a firm hand grip.

- (1) Hold the handset cap side down. Gently tap the handle as required to remove the transmitter element assembly.
- (2) Disconnect the electrical connections at the terminals on the cup with a screwdriver. The position of the cord tips with respect to the terminals is controlled by the molded projections on the terminal detail.
- (3) By removing the terminal screws entirely, the .006-uf capacitor assembly can be removed from the cup.
- (4) Remove the contact assembly from the transmitter element by slipping the edge out from under the rubber gasket.
- (5) Remove the rubber gasket from the transmitter element. The metal slip ring normally cemented to the front of the gasket may become loosened. Do not lose it.
- (6) During reassembly, be sure that the gasket is in place at all points, that the slip ring is properly positioned, and that no conductor lead is pinched under the gasket as the transmitter cap is tightened.

c. De-Icing Screen. Remove the de-icing screen from the transmitter cap by inserting a thin tool, such as a knife blade, into the notch provided in the transmitter cap, and pry the screen from its slot. Be careful when removing the screen to avoid damaging the transmitter cap or the screen.

d. Switch Assembly SA-129/PT. Remove the two screws from the plate, then lift the switch assembly out of the cavity in the handle.

- (1) Disconnect the three electrical connections at the terminals on the switch with a screwdriver. The fourth (white) terminal is soldered at the switch, and the lead may be removed by loosening the transmitter cup (white) terminal (b (2) above).
- (2) Remove the rubber switch cover.

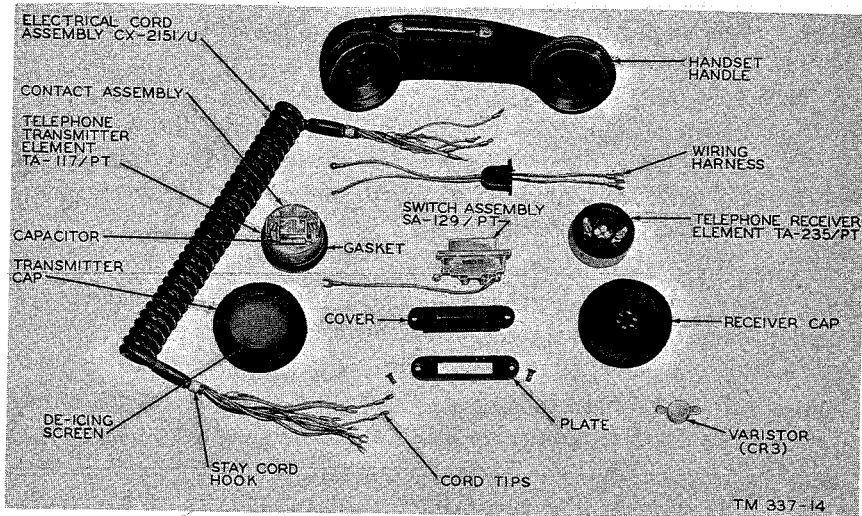


Figure 15. Components of handset H-60/PT.

e. Electrical Cord Assembly CX-2151/U. Remove the transmitter element (b above) and the switch assembly (d above). Loosen the two terminal screws in the transmitter handle cavity and remove the cord tips. Loosen the screw that holds the stay cord hook; be careful not to damage any of the cord conductors. Be sure all internal connections are free, then remove the cord from the handle by carefully pulling and twisting the cord grommet. Loosen the other end of the cord in accordance with paragraph 62d.

f. Varistor CR3. Loosen the terminals and stay cord hook or remove the cord assembly (e above). Remove the two terminal screws in the transmitter cavity. Varistor CR3 may now be lifted out of its recess.

g. Wiring Harness. The wiring harness can be removed after removing the receiver element (a above), and the transmitter element (b above), and by loosening the cord terminal screws (e above). Pull both leads from the receiver cavity. The molded rubber barrier on the leads, which serves to block acoustically the handle opening between the transmitter and receiver cavities, may resist removal. If necessary, lubricate the barrier with water.

Caution: Proper atmospheric pressure equalization for the receiver element requires a slight air leakage past the rubber barrier. Therefore, in reassembly, do not apply vaseline or a similar lubricant to the barrier, or pull it too far into the handle.

h. Waterproof Air Valves. The waterproof air valves are cemented into the cavities and cannot be removed without damage.

60. Disassembly of Panel and Housing Assembly (fig. 16)

Rubber water seal gaskets are provided around all assembly screws, between the panel and housing details, between the buzzer diaphragm and housing, and at all other external openings. Avoid damage to these seals during any disassembly or reassembly.

a. Loosen the carrying case retaining strap (fig. 2) and remove the case.

b. Remove the four assembly screws that secure the buzzer to the housing and then remove the six assembly screws on the face of the panel (fig. 16).

c. Lift the panel off the housing; be careful not to damage the leads to the ringing generator (fig. 16). All internal components now are exposed.

61. Disassembly of Hand Ringing Generator G-42/PT (fig. 16)

a. Unsolder the three leads to the generator terminals.

b. Remove the screw and lockwasher that hold the generator crank assembly on the shaft. Remove the crank assembly.

c. Unscrew and remove the nut that secures the generator to the housing.

d. Remove the two screws and the metal strap at the rear of the generator mounting in the housing (fig. 16). Lift the generator from the housing. The spacer detail, including the three waterproof air valves, is a separate part of the telephone and can be removed at this time.

e. Unscrew and remove the back cover of the generator. This exposes the centrifugal switch contact assembly. The gasket between the back cover and the generator frame provides a waterproof seal.

f. Unsolder and tag the five conductors on the switch assembly. Remove the four mounting screws and the fiber switch mounting plate. The centrifugal governor type mechanism that operates the switch contacts then will be exposed.

g. Remove the nylon switch button at the center of the mechanism. Carefully force the two weights apart and remove the screw with the prong extension. Remove the centrifugal switch sub-assembly from the generator shaft and further disassemble as required.

h. Remove the two main assembly screws. If the front end plate, stator, and rear end plate do not have position markers, mark them with chalk, crayon, or pencil to make replacement of the main assembly screws easier. Slide the rear end plate off the rotor shaft. Remove the rotor and the stator as a unit from the front end plate; be careful not to damage the coil or leads. *The stator prevents demagnetization of the rotor.*

i. To replace the gear train in the G-42/PT, disassemble the generator as follows:

- (1) Screw one of the main assembly screws into the front end plate and tap it gently with a 4-ounce hammer until the gear case comes loose.
- (2) Remove the gear assembly from the inside of the gear case by lifting it from its stud.
- (3) Remove the spur gear and shaft by placing a small drift-pin against the shaft on the outside of the front cover and pushing the shaft to the inside.
- (4) Replace any of the disassembled parts that are worn or damaged. Lubricate parts with Grease, Aircraft and Instruments (GL), and reassemble the hand ringing generator by reversing the procedure for disassembly.

62. Disassembly of Panel Components

(figs. 2 and 16).

The components mounted on the panel can be removed for repair or replacement. The step-by-step procedure for removing each of the components is described in *a* through *h* below.

a. Battery Compartment. Remove the two screws on the inside of the cover (fig. 16) to remove the contact strip. Remove the nut on the underside of the battery compartment to free the bottom contact springs. Be careful not to damage the insulator strip which is not removed. Remove the nut holding the cover latch to remove the latch assembly.

b. Buzzer BZ-23/PT. Unsolder the leads at the buzzer terminals. Remove the small wire coupling pin that fastens the volume control shaft to the flexible coupling detail and remove the buzzer from the panel.

Note. When reinstalling the buzzer on the panel, substitute a small cotter pin for the small wire coupling pin.

- (1) To remove the coil and core from the frame, remove the two assembly screws.

Caution: Do not loosen the two screws that hold the pole plate to the frame, because any change in the position of the pole plate will change the operating characteristics of the buzzer.

- (2) The diaphragm is removed from the buzzer frame by driving the two pins from the rear of the assembly. Use the same pins when reassembling the buzzer.
- (3) To remove the volume control knob, loosen the setscrew.
- (4) Release the snap ring on the volume control shaft to remove it from the volume control shaft bearing.
- (5) Remove the volume control shaft bearing assembly by loosening the locknut with a wrench of the proper size.

c. Circuit Selector Switch. Remove the buzzer (*b* above) and remove the impedance-matching network mounting screws and lay the network aside. Remove the nut on the front panel and lift the switch off the panel. Observe the method of keying the switch to the panel. Unsolder the leads, and disassemble the switch as required. Observe the position of the leads on the switch to be sure that they are placed in the proper place when reassembled.

d. Electrical Cord Assembly CX-2151/U. Remove all cord conductors from the terminal board, loosen the screw holding the stay cord hook, and remove the cord from the panel by carefully pulling and twisting the grommet on the end of the cord. Loosen the other end of the cord in accordance with paragraph 59e.

e. External Battery Connections. Remove the nut from the underside of the panel, and push the terminal out of the panel. The terminal is keyed to the panel.

f. Line Switch. Remove the two screws that hold the flat restoring spring, the three screws that hold the switch button assembly, the snap ring on the shaft, the shaft, and the rubber diaphragm assembly from the bearing. Unsolder the leads and disassemble the spring contact pile-up as required.

g. Line Terminals. Unsolder the leads to the terminals, remove the nut and push the terminal out of the panel. The terminal bushing is keyed to the panel.

h. Impedance Matching Network CU-350/PT. Tag and unsolder all leads to the network. Remove the small wire coupling pin from the volume control shaft on the buzzer and move the buzzer aside. Remove the four mounting screws and lift the network from the panel.

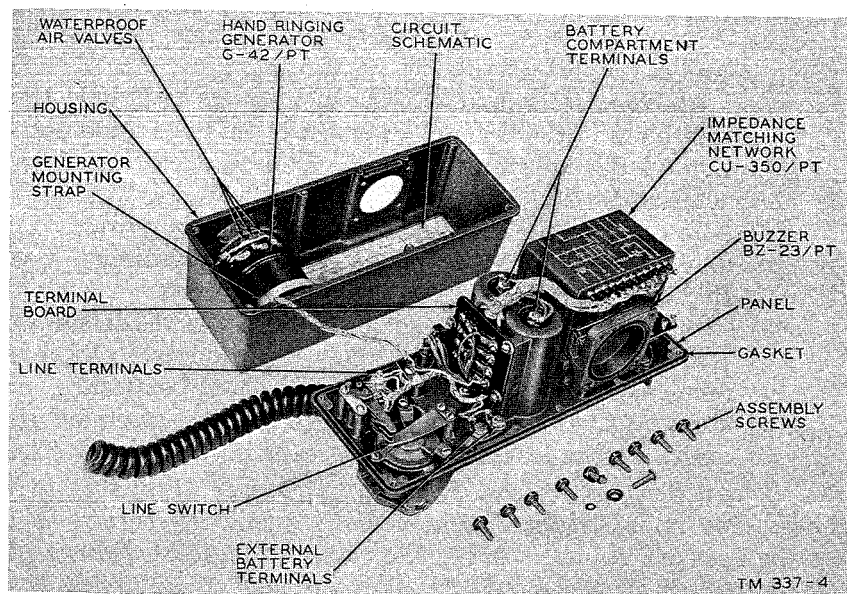


Figure 16. Telephone set TA-43/PT, panel removed.

Section III. LUBRICATION DURING REPAIR

63. General

Telephone Set TA-43/PT is lubricated during manufacture. However, during repair affecting particular parts, lubrication should be applied in accordance with *a* through *d* below.

a. The lubricant and points to be lubricated must be clean and free of sand, grit, or dirt.

b. Generally, parts should be cleaned with Solvent, Dry Cleaning (SD) before lubrication (par. 34*b*). Carbon tetrachloride will be used as a cleaning fluid *only* where inflammable solvents cannot be used because of fire hazards, and for cleaning electrical contacts, including switch contacts.

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

c. Use Oil, Lubricating, Preservative, Special (PL Special) where a light machine oil is indicated (par. 64). The oil must not interfere with the operation of the part at a temperature of -40° F.

d. Use a small stick or No. 20 AWG bare wire to apply one drop of lubricating oil to the specified location of parts (par 64).

Caution: Apply oil only to those locations which require lubrication.

64. Lubrication of Parts

a. *Buzzer BZ-23/PT.* Apply one drop of light lubricating oil to the loudness control knob shaft bearing.

b. *Hand Ringing Generator G-42/PT.* Apply one drop of light lubricating oil to the bearings at each end of the rotor. For lubrication of the main crankshaft and gear train, use grease (GL).

c. *Other Parts.* Apply one drop of light lubricating oil to other parts as follows:

Part	Point to be lubricated
Circuit selector switch.....	Shaft bearing.
Line switch.....	Plunger shaft bearing.
Line terminals.....	Spring-loaded cap of each terminal.

Section IV. REFINISHING

65. General

When the finish on the panel or housing has been badly scarred or damaged, prevent corrosion by touching up bared surfaces. Complete refinishing is preferable to a large number of touchup spots.

66. Repainting

a. Use No. 000 sandpaper to clean the surface; obtain a bright, smooth finish.

Caution: Do not use steel wool. Minute particles may enter the case and cause subsequent short-circuiting or grounding of the circuits.

b. Remove corrosion, dirt, and grease, by cleaning with solvent (SD). In severe cases, it may be necessary to use solvent (SD) and sandpaper to complete the preparation for painting.

c. The paint used will be authorized and consistent with existing regulations.

Section V. FINAL TESTING

67. General

These tests are used to determine the quality of repaired telephone sets. The test procedures described in paragraph 69

may be performed by maintenance personnel with adequate test equipment and the necessary skills.

68. Equipment Required for Final Testing

Tests must be made with Test Set I-142. (The set must be adjusted and maintained in accordance with TM 11-2062, Test Sets I-142, I-142A, and I-142B). All connections must be made at the line terminals of Telephone Set TA-43/PT.

69. Final Test Requirements

After the telephone set has been repaired and before it is repacked (par. 71), it must meet the following requirements.

- a. *Screws.* All assembly and mounting screws must be tight.
- b. *Handset Brackets.* The handset retaining brackets must be capable of holding the handset when the telephone set is in the vertical position (fig. 1).
- c. *Switches.* The line switch and the handset press-to-talk switch must operate and restore freely. The circuit selector switch must be easy to adjust with a screwdriver and have a positive detent action at each position.
- d. *Water Seals.* Water must not enter the sealed cavities, either past the gaskets or through the waterproof air valves, when the telephone set is immersed in water to a depth of 2 feet for 5 minutes.
- e. *Generator Test.* Test the generator in accordance with paragraph 29, TM 11-2062. With the line switch depressed, turn the generator crank at approximately 200 rpm; the deflection of meter M1 should be to the right of 0 db.
- f. *Buzzer Test.* Test the buzzer in accordance with paragraph 30, TM 11-2062. With the line switch depressed, set control D5 to position 1, operate key 4 to RINGER, key 6 to CKT, and turn the test set generator crank at the speed required to produce a sustained audible signal. The deflection of meter M1 should be to the left of 0 db for all positions of the buzzer loudness control knob. In the LOW volume position, the clapper should not strike the buzzer diaphragm.

g. *Insulation Resistance.* Test the insulation resistance in accordance with paragraph 31, TM 11-2062. The deflection of meter M1 should be to the left of -6 db.

h. *Transmitter Circuit Tests.* Connect the telephone set LINE terminals to J1-J2 jack on Test Set I 142. Set control D1 at 5.

D3 at 2, operate key 8 to TRANS and the equalizer to the OUT position. Precondition and locate the transmitter element in accordance with paragraph 24b(1) and (2), TM 11-2062, then complete the tests for the specified telephone set circuit as follows:

- (1) *CB circuit.* Operate key 1 and key 2 to STA and depress key 9. The reading of meter M1 should be to the right of -7 db. There should be no output when the line switch is depressed.
- (2) *LB and CBS circuits.* Depress the handset press-to-talk switch, then depress key 9. The reading of meter M1 should be to the right of -2 db. There should be no output when the press-to-talk switch is released.

i. Receiver Circuit Tests. Connect the telephone set LINE terminals to L1-L2 jack on Test Set I-142. Set control D2 at 3, D4 at 6, operate key 2 to RCT, key 8 to REC and the equalizer to the OUT position. Locate the receiver element in accordance with paragraph 24c(1), TM 11-2062. With the telephone set adjusted for the CB circuit, depress key 9. The reading of meter M1 should be to the right of 0 db.

CHAPTER 6

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

70. Disassembly

To disassemble the telephone set for shipment or storage, proceed as follows:

a. Remove field line connections and both batteries from the battery compartment.

b. Mount the handset inside the case with enough cushioning material to prevent it from shifting during shipment.

c. Fold the case over the handset and close the zipper.

Note. The set and case should be dry and clean before packing.

71. Repacking for Shipment or Limited Storage

To repack the telephone set for shipment or storage, use the original shipping container (par. 6) or a suitable substitute. Reverse the unpacking instructions (par. 12).

72. Methods of Destruction

The demolition procedure given below will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon order of the commander.

a. Smash. Smash the handset, switches, housing assembly, buzzer diaphragm, and battery compartment; use sledges, axes, pickaxes, hammers, crowbars, or other heavy tools.

b. Cut. Cut all cords, cables, and wiring; use axes, handaxes, or machetes.

c. Burn. Burn cords, wiring, generator, handset, impedance-matching network, and technical manuals; use gasoline, kerosine, oil, flame throwers, or incendiary grenades.

d. Bend. Bend panel and housing assembly.

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

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

g. Destroy. Destroy everything.

INDEX

	<i>Paragraph</i>	<i>Page</i>
Additional troubleshooting information -----	57	46
Antisidetone, circuit analysis -----	50c	38
Application, system -----	4	4
Arctic climate, operation -----	24	15
Batteries, installing -----	13b	10
Buzzer BZ-23/PT:		
Final test requirements -----	69f	54
Lubrication -----	64a	53
Theory -----	46	32
Buzzer circuit, operational test -----	55d	42
Calls incoming -----	20	14
Carrying Case CY-1277/PT, description -----	10	8
CB circuit:		
Circuit analysis, transmitting -----	50a(1)	37
Operational test -----	55a	42
Signaling CB switchboard -----	49c	37
CBS circuit:		
Circuit analysis:		
Signaling CB switchboard -----	49d	37
Transmission -----	50a(3)	37
Operation -----	19c	14
Chart, troubleshooting -----	56	43
Check:		
Preinstallation -----	13c	11
Preventive maintenance:		
Daily -----	36a	22
Monthly -----	36c	23
Weekly -----	36b	22
Check list:		
Equipment performance -----	42	26
Using equipment performance -----	41	25
Circuit analysis:		
Antisidetone -----	50c	38
Buzzer circuit -----	49a	36
CB circuit:		
Signaling CB switchboard -----	49c	37
Transmitting -----	50a(1)	37
CBS circuit:		
Signaling CB switchboard -----	49d	37
Transmitting -----	50a(3)	38
LB Circuit:		
Signaling LB switchboard -----	49b	36
Transmitting -----	50a(2)	38
Receiving -----	50b	38
Circuit elements, Impedance Matching Network CU-350/U -----	48b	36
Circuit selector switch, lubrication -----	64c	53
Components, major -----	7	7

	<i>Paragraph</i>	<i>Page</i>
Connecting incoming lines.....	14 <i>b</i>	12
Control panel, description.....	9	8
Controls, Handset H-60/PT.....	17	14
Daily check, preventive maintenance.....	36 <i>a</i>	22
Data, troubleshooting.....	52	41
Definition of preventive maintenance.....	33	18
Description:		
Control panel.....	9	8
Handset H-60/PT.....	8	7
Panel and housing assembly.....	9	8
Desert:		
Operation.....	26	16
Weatherproofing.....	38 <i>d</i>	23
Destruction, method.....	72	56
Disassembly:		
For packing.....	70	56
Handset H-60/PT.....	59	16
Panel and housing assembly.....	60	49
Disconnect procedure.....	21	14
Domestic packed Telephone Set TA-43/PT, unpacking.....	12 <i>b</i>	10
Emergency operation.....	30	17
Equipment performance check list.....	42	26
Equipment performance check list, use.....	41	25
Equipment test.....	53	41
Export packed Telephone Set TA-43/PT, unpacking.....	12 <i>a</i>	10
Final test requirement.....	68, 69	54
Forms and records.....	2	3
Generator, Hand Ringing G-42/PT:		
Final test requirements.....	69 <i>e</i>	54
Lubrication.....	64 <i>b</i>	53
Theory.....	47	32
Handset brackets, final test requirements.....	69 <i>b</i>	54
Handset H-60/PT:		
Controls.....	17	14
Description.....	7	7
Disassembly.....	59	46
Minor components.....	11	9
High altitude operation.....	27	16
Impedance Matching Network CU-350/PT:		
Circuit elements.....	48 <i>b</i>	34
Theory.....	48 <i>a</i>	33
Incoming calls.....	20	14
Incoming lines, connecting.....	14 <i>b</i>	13
Incoming signal, circuit analysis.....	48 <i>a</i>	33
Information, additional, troubleshooting.....	57	46
Inspection, visual.....	40	24
Installation, Telephone Set TA-43/PT.....	14	12
Installing batteries.....	13 <i>b</i>	10
Insulation resistance, final test requirement.....	69 <i>g</i>	54

	<i>Paragraph</i>	<i>Page</i>
LB circuit, operational test -----	55b	42
LB operation:		
Circuit analysis, transmission -----	50a(2)	38
Outgoing calls -----	19b	14
Receiving -----	50b	38
Line switch, lubrication -----	64c	53
Line terminals, lubrication -----	64c	53
Long loop, operation -----	29	16
Lubricants, types -----	63c	52
Lubrication:		
Buzzer BZ-23/PT -----	64a	53
Circuit selector switch -----	64c	53
Hand Ringing Generator G-42/PT -----	64b	53
Preparation -----	63b	52
Telephone Set TA-43/PT -----	37	23
Maintenance:		
Forms, preventive, use -----	35	19
Preventive:		
Daily check -----	36a	22
Definition -----	33	18
Monthly check -----	36c	23
Techniques -----	34	18
Weekly check -----	36b	22
Major components -----	7	7
Materials, tools -----	32	18
Method of destruction -----	72	56
Minor components -----	11	9
Network, impedance matching, theory -----	48a	33
Noisy area, operation -----	28	16
Operation:		
Arctic climates -----	24	15
Desert climates -----	26	16
Emergency -----	30	17
High altitudes -----	27	16
Long loops -----	29	16
Noisy areas -----	28	16
Radio remote control -----	22	15
Tropical climates -----	25	16
Usual conditions, outgoing calls -----	19	14
Operational test -----	55	42
Packaging data -----	6	6
Packing, disassembly -----	70	56
Panel and housing assembly:		
Controls -----	16	13
Description -----	8	7
Disassembly -----	60	49
Minor components -----	11b	9
Performance checklist, equipment -----	42	26
Precautions -----	54	42
Preinstallation checks -----	13c	11

	<i>Paragraph</i>	<i>Page</i>
Preparation for lubrication	63b	52
Preventive maintenance:		
Daily checks	36a	22
Definition	33	18
Forms	35	19
Monthly check	36c	23
Techniques	34	18
Weekly checks	36b	22
Procedure, troubleshooting	51	41
Radio remote control operation	22	15
Ranges, transmission	3c	4
Receiver:		
Final test requirement	69i	55
Element, theory	44	28
Receiving circuit analysis	50b	38
Records, forms	2	3
Repacking for shipment or storage	71	56
Repainting	66	53
Ringling off	21a	14
Seals, water, final test requirements	69d	54
Service of used or reconditioned equipment	15	13
Shipment or storage, repacking	71	56
Signaling CB switchboard	49	36
Signaling LB switchboard, circuit analysis	49	36
Storage or shipment, repacking	71	56
Switches, final test requirements	68c	54
System application	4	4
Technical characteristics	5	5
Techniques, maintenance, preventive	34	18
Test equipment	53	41
Test requirements, final	68, 69	54
Theory:		
Buzzer BZ-23/PT	46	32
Hand Ringing Generator G-42/PT	47	32
Impedance Matching Network CU-350/PT	48a	33
Receiver element	44	28
Transmitter element	45	30
Tools and material	32	18
Transmission circuit analysis	50	37
Transmission circuits, impedance matching network	48c	36
Transmission ranges	3c	4
Transmitter:		
Circuit, final test requirement	69h	54
Element, theory	45	30
Tropical climate:		
Operation	25	16
Weatherproofing	38b	23
Troubleshooting:		
Chart	56	43
Data	52	41

Troubleshooting—Continued

	<i>Paragraph</i>	<i>Page</i>
Information, additional -----	57	46
Procedures -----	51	41
Types of lubricants -----	63c	52
Unpacking -----	12	10
Visual inspection -----	40	24
Water seals, final test requirement -----	69d	54
Weatherproofing -----	38	23
Weekly check, preventive maintenance -----	36b	22

[AG 413.42 (23 Jun 54)]

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

M. B. RIDGWAY,
General, United States Army,
Chief of Staff.

OFFICIAL:

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

OFFICIAL: N. F. TWINING,
Chief of Staff, United States Air Force.

K. E. THIEBAUD,
Colonel, United States Air Force,
Air Adjutant General.

DISTRIBUTION:

Active Army:

Tec Svc, DA (1)
Tec Svc Bd (1)
AFF (5)
AFF Bd (incl ea Test Sec) (1)
Army AA Comd (2)
OS Maj Comd (5)
OS Base Comd (5)
Log Comd (5)
MDW (2)
Armies (5)
Corps (2)
Tng Div (2)
Ft & Cp (2)
Gen & Br Svc Sch (5)
SigC Sch (25)
Gen Depots (2)
SigC Sec, Gen Depots (10)
Sig C Depots (20)
POE (2)
Os Sup Agencies (2)
SigC Fld Maint Shops (3)
SigC Lab (5)
Mil Dist (1)

Units organized under following T/O&E:

11-127, Sig Rep Co (2)
11-128A, Sig Depot Co (2)
11-500A (AA-AE); Sig Admin Team (2)
11-587, Sig Base Maint Co (2)
11-592, Hq & Hy Co, Sig Base Depot (2)
11-597, Sig Base Depot Co (2)

NG: Same as Active Army except allowance is one copy for each unit.

USAR: None.

Unless otherwise noted, distribution applies to CONUS and overseas.
For explanation of abbreviations used, see SR 320-50-1.

TM 11-337/TO 16-35TA43-5 TELEPHONE SET TA-43/PT-1954