

OPERATOR MANUAL

**DIGITAL MESSAGE
ENTRY DEVICE**

TMD-326

AUGUST 1979

OPERATOR MANUAL

DIGITAL MESSAGE ENTRY DEVICE TMD-326

	Paragraph	Page
CHAPTER 1 - INTRODUCTION		
Scope.....	1-1	1-1
Purpose and Use	1-2	1-1
Technical Characteristics	1-3	1-1
General Description	1-4	1-2
Description of Minor Components.....	1-5	1-2
Description of Optional Accessories.....	1-6	1-2
CHAPTER 2 - INSTALLATION		
Unpacking and Inspection	2-1	2-1
Battery Installation	2-2	2-1
Installation with PRC Radio Set	2-3	2-1
Installation with VRC Radion Set	2-4	2-1
CHAPTER 3 - OPERATING INSTRUCTIONS		
Message Device TMD-326, Controls, Indicators and Connectors	3-1	3-1
Operating Procedure.....	3-2	3-2
To Receive Messages.....	3-3	3-2
Format Contained in Program Memory.....	3-4	3-2
To Fill Out a Format and Transmit	3-5	3-3
To Transmit Free Text.....	3-6	3-5
CHAPTER 4 - OPERATOR'S MAINTENANCE INSTRUCTIONS		
Scope of Maintenance	4-1	4-1
Preventive Maintenance	4-2	4-1
Preventive Maintenance Service and Inspection Periods	4-3	4-1
Operator's Daily Preventive Maintenance Checks and Services Chart	4-4	4-2
Operator's Weekly Preventive Maintenance Checks and Services Chart	4-5	4-2
Cleaning	4-6	4-3
Visual Inspection	4-7	4-3
Operational Checklist.....	4-8	4-3
	Paragraph	Page
Printout of Messages via Teletypewriter	3-7	3-5
Error Detection in Received Messages	3-8	3-5



Figure 1-1. DMED TMD-326 in use.

CHAPTER 1

INTRODUCTION

1-1. Scope

a. This manual describes Digital Entry Message Device TMD-326 and covers its installation, operation, and operator's maintenance.

1-2. Purpose and Use.

a. Digital message entry device TMD-326 is a hand-held device for transmission and reception of high-speed alphanumeric, digital bursts via military tactical HF, VHF, AND UHF radio sets. Individual bursts may contain as many as 16 nine-character sentences. Extreme high-speed and message brevity permit a great number of communications over short periods, largely immunizes transmissions against noise and jamming, and makes the transmitter virtually impossible to locate.

b. The TMD-326 is designed for use by forward artillery and air observers, advance and reconnaissance units, and commando units operating behind enemy lines. It also may be used in rescue missions, anti-aircraft batteries, ECM units, and wherever high-speed, accurate communication is required.

1-3. Technical Characteristics

Transmission Rate	75, 150 and 600 bps (options)
Display	A sentence may contain 9 characters (letters or numbers)

Message Length	Up to 16 sentences
Type of Modulation ..	Coherent FSK (internal modem)
Bit Error Ratio with 12 dB SNR	5×10^{-4}
Compatibility	HF, VHF AND UHF radio sets
Audio Output	1.4 mV into 150- ohm load
Audio Input	0.1 to 3 V from radio set
Power Source	7.2 Vdc NiCd battery
Operating temperature range	-40° to $+55^{\circ}$ C
Moisture, Vibration, Bounce, and Shock	Per MIL-STD- 810C
Elevation	
Operating	10,000 feet-above- sea-level
Non-operating ...	50,000 feet-above- sea-level
Water resistance....	Withstands immersion into 3 feet of water for minimum of 2 hours
Current Consumption Standby	100 mA (display off)

Operating	420 mA
Dimensions (cm).....	5.2 H x 21.0 L x 10.5 W
Weight	1.67 kg with battery

1-4. General Description

The TMD-326 is an alphanumeric message device used with HF, VHF and UHF tactical radios to provide digital, high-speed burst communications. The keyboard consists of 9 message keys, 4 control keys, and 3 shift keys. Each of the 9 message keys may have two fixed formats, depending on customer specifications. The caps on the message keys show the names of the formats available. The unit has a selective-address capability to limit message reception to a specific unit or units. Direct computer access for command/control application is also provided.

1-5. Description of Minor Components

a. Nickel-cadmium battery 6T-133, (catalog number 3690502). The 6T-133 is a rechargeable battery which provides a nominal 7.2 Vdc.

b. Audio cable CX-326/A, (catalog number 3609202). Cable CX-326/A connects the TMD-326 to the radio set.

c. Carrying pouch CW-326, (catalog number 3609201). The pouch is attached to the operator's combat belt to enable easy transport of the TMD-326 when not in use. It is also used when the TMD-326 is stored or shipped.

1-6. Description of Optional Accessories

a. Mount/Power Supply TMD-328. The TMD-328 is a vehicular mount and external power supply for the DMED TMD-326, which also serves as a connection box for the optional accessories described below.

Mount/Power Supply TMD-328 can accommodate two NiCd batteries for recharging.

b. Printer TMD-330. This unit provides a copy of all messages transmitted and received by the DMED TMD-326. The TMD-330 has an internal AC/DC converter. It is connected to the DMED TMD-326 through the Mount/Power Supply TMD-328.

c. Interface Box IB-326. The interface box provides the circuits necessary to use the DMED TMD-326 with a printer other than TMD-330. Cable CX-326/C (catalog number 3609209) connects the interface box either to the DMED TMD-326 or to the Mount/Power Supply TMD-328.

d. Cable CX-326/D (catalog number 3609211). This cable connects DMED TMD-326 to the Power Supply TMD-328.



Figure 2-1. Installation of TMD-326 with PRC Radio Set .

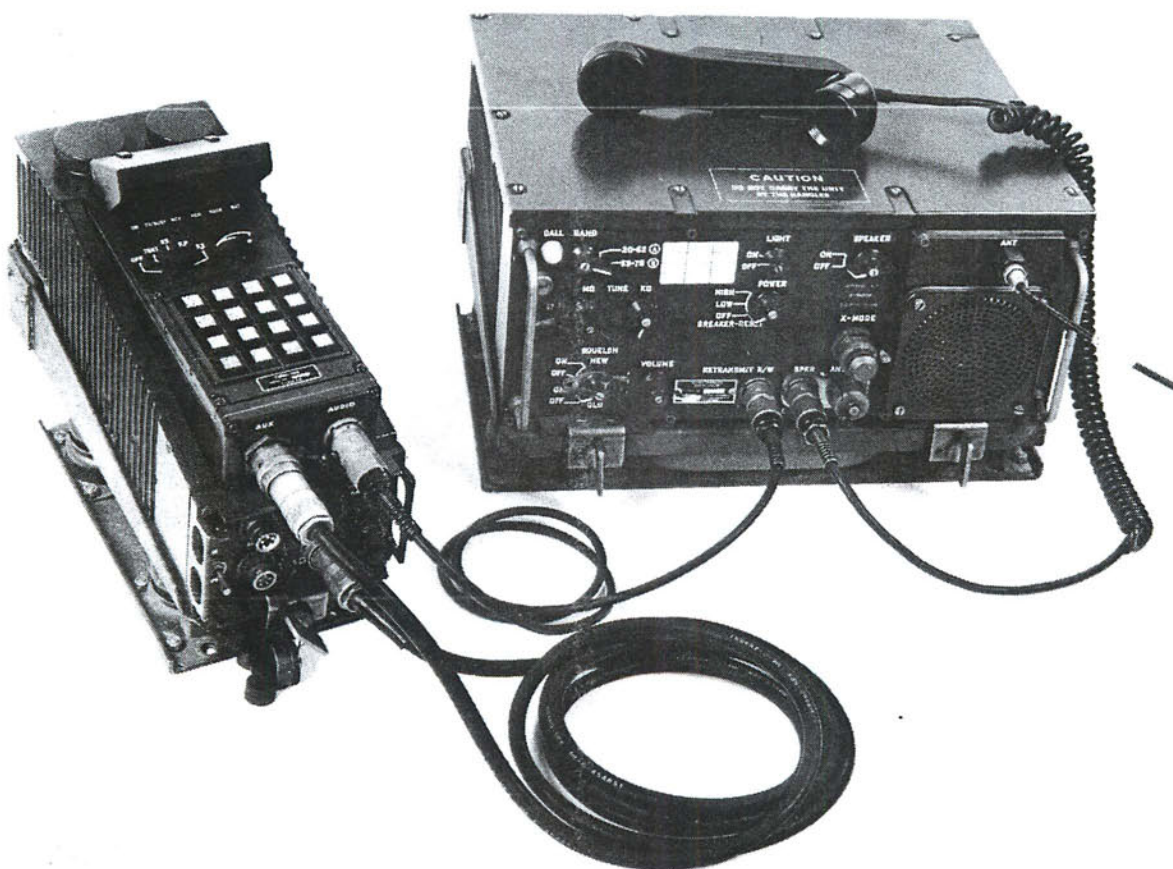


Figure 2-2. Installation of TMD-326 with VRC Radio Set .

CHAPTER 2

INSTALLATION

2-1. Unpacking and Inspection

a. Unpacking. Remove package and packing materials from shipping container. Open canvas pouch and remove equipment.

b. Inspection. Compare the received equipment to the items listed in the shipping list. Visually inspect each item for damage. If a part is missing or if there is obvious damage, report findings according to established procedures.

2-2. Battery Installation. Unscrew and remove TMD-326 battery compartment cap. Insert fully charged battery, positive (+) end first, into the battery compartment. Screw on and tighten the battery compartment cap.

2-3. Installation with PRC Radio Set. (fig. 2-1)

Connect audio cable CX-326/A to the TMD-326 AUDIO connector and to the radio set audio connector.

2-4. Installation with VRC Radio Set. (fig. 2-2)

Mount the TMD-326 on Mount/Power Supply TMD-328 and interconnect the TMD-326 and the radio set as described above.

Connect cable CX-326/D to the AUX connector of the TMD-326, and to the TMD connector on the Mount/Power Supply TMD-328. Connect the Mount/Power Supply to the vehicular battery with cable CX-4721 VRC.

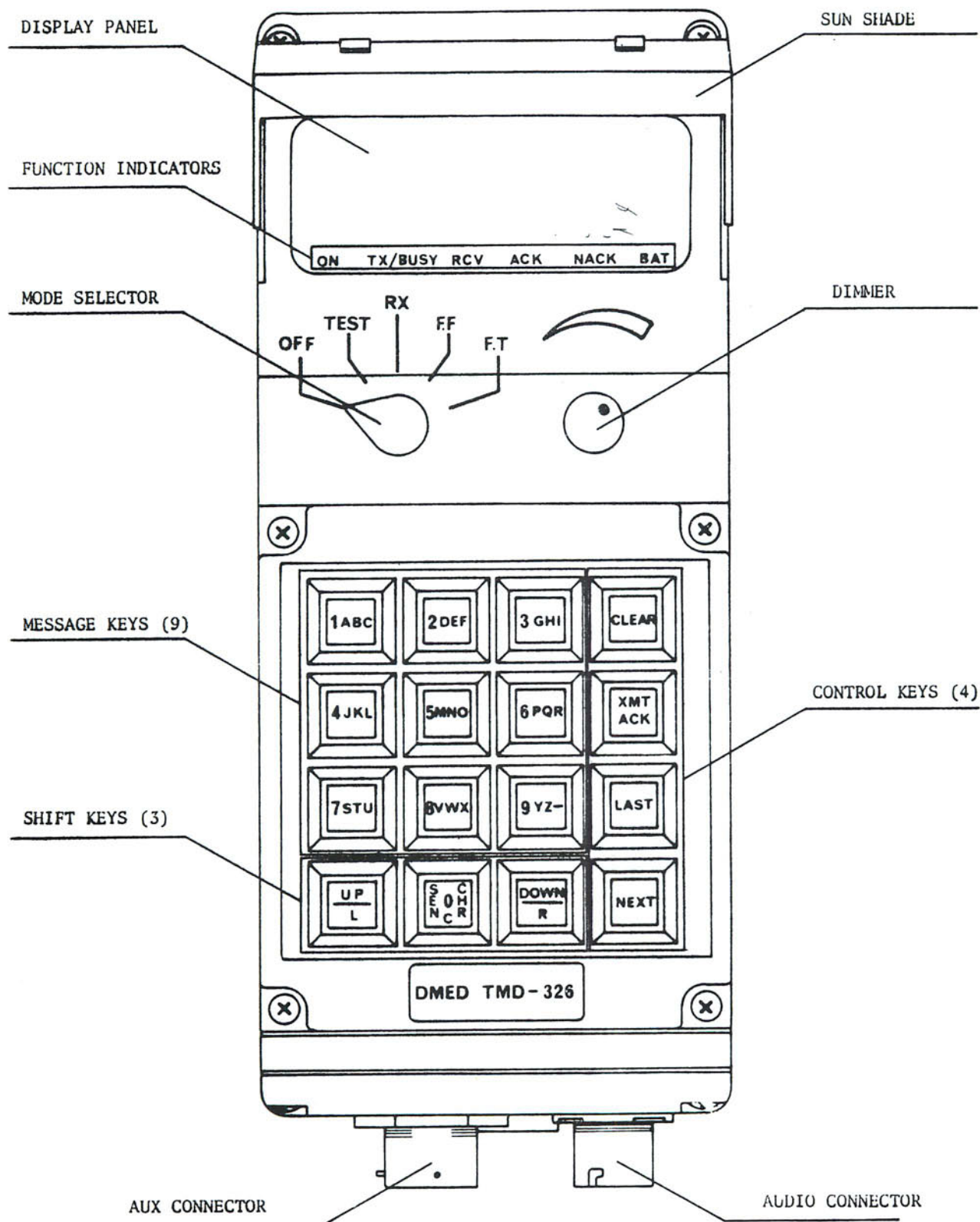


Figure 3-1. DMED TMD-326, front panel.

CHAPTER 3

OPERATING INSTRUCTIONS

3-1. Message Device TMD-326, Controls, Indicators and Connectors

(Fig. 3-1)

Control, indicator, or connector	Function												
Display Panel													
Sentence display	Up to 9 characters (letters or numbers)												
Function indications:													
ON	Power on												
TX/BUSY	(Steady light) Transmission in progress.												
	(Flashing) RF channel engaged.												
RCV	(Flashing) Incoming message received.												
ACK	(Steady Light) Automatic acknowledgement received.												
	(Flashing) Manual acknowledgement received.												
NACK	(Flashing) Transmitted message not acknowledged due to malfunction.												
LOW BAT	Power Supply insufficient												
Mode selector	<table> <tr> <th>Sw. Pos.</th><th>Action</th></tr> <tr> <td>OFF</td><td>Turns off power</td></tr> <tr> <td>TEST</td><td>Permits self-test of equipment</td></tr> <tr> <td>RX</td><td>Enables functions involving receive memory</td></tr> <tr> <td>F. F</td><td>Permits format selection</td></tr> <tr> <td>F. T</td><td>Permits free text composition</td></tr> </table>	Sw. Pos.	Action	OFF	Turns off power	TEST	Permits self-test of equipment	RX	Enables functions involving receive memory	F. F	Permits format selection	F. T	Permits free text composition
Sw. Pos.	Action												
OFF	Turns off power												
TEST	Permits self-test of equipment												
RX	Enables functions involving receive memory												
F. F	Permits format selection												
F. T	Permits free text composition												
Dimmer	Controls display brightness												
Message keys	The 9 message keys permit access to numbers, letters and formats. NOTE: The digit zero is obtained by pressing SEN/C/CHR twice.												
Control keys:													
CLEAR	Clears receive or transmit memory.												
XMT/ACK	<ul style="list-style-type: none"> a. In RX mode: transmits acknowledgement of receipt of message. b. In F. F or F. T mode: transmits message stored in transmit memory. 												
LAST	Displays previous sentence from receive or transmit memory.												
NEXT	Displays next sentence from receive or transmit memory.												
Shift Keys:													
DOWN/R	<ul style="list-style-type: none"> a. In F. F mode: <ul style="list-style-type: none"> i selects lower format on message keys. ii selects right-hand letter on message keys. b. In F. T mode: selects right-hand letter on message keys. 												
UP/L	<ul style="list-style-type: none"> a. In F. F. mode: <ul style="list-style-type: none"> i selects upper format on message keys. ii selects left-hand letter on message keys. b. In F. T mode: selects left-hand letter on message keys. 												
SEN/C/CHR	<ul style="list-style-type: none"> a. In F. T mode: <ul style="list-style-type: none"> i selects middle letter in alphabetics group on message keys. ii enters digit 0 by pressing twice. b. In F. F mode: enters digit 0 by pressing twice. c. After pressing UP/L, deletes displayed sentence. d. After pressing DOWN/R, deletes last character in display 												
Auxiliary connector	Provides connection for Power Supply TMD-328.												
Audio connector	Provides connection for Radio Set												
Buzzer	Actuated when DMED is switched on and when a message is received.												

3-2. Operating Procedure

a. Set the mode selector to TEST. The ON indication on the display panel will illuminate, and a buzzer will sound for three seconds.

b. Set the dimmer and sunshade at midrange; readjust for desired brightness of display.

c. Choose one of the following operating modes:

- (1) RX - to receive (para. 3-3).
- (2) F. F - to fill out a format and transmit (para. 3-5).
- (3) F. T - to compose and transmit free test (para. 3-6).

3-3. To Receive Messages

Incoming messages enter the receive memory irrespective of the position of the mode selector. Whenever the RCV indicator flashes and buzzer sounds, proceed as follows:

a. Set mode selector to RX, and read the sentence displayed.

b. Press NEXT to recall the next sentence from the receive memory.

c. Repeat step b until the whole message has been read.

d. Press XMT/ACK, thereby acknowledging receipt of message.

e. Press CLEAR, thereby enabling a new message to be received.

3-4. Format Contained in Program Memory

Formats are customer tailored and preset in the program memory by the manufacturer. The DMED which was issued with this manual has the formats shown in Table 3-1. Each format may have up to 16 non-erasable captions. Each caption may be filled out by the operator to make a sentence of up to nine characters.

Table 3-1. The Formats Available in This DMED

Location	UP, 1	DOWN, 1	UP, 2	DOWN, 2	UP, 3	DOWN, 3	UP, 4	DOWN, 4	UP, 5
Name of Format	Z	O	P	R	Y	REF	ZNN	BCT	FR
Caption 1	DT	DT	DT	DT	DT	DTO	REF	QSL	DAY
Caption 2	GR	GR	GR	GR	GR	GR	DTO	QSL	TIME
Caption 3	-	-	-	-	-	INT	GR	QSL	FR
Caption 4	-	-	-	-	-	IMLAB	-	QSL	IND
Caption 5	-	-	-	-	-	IMIAA	-	QSL	CARD
Caption 6	-	-	-	-	-	IMIFM	-	QSL	CANC
Caption 7	-	-	-	-	-	TO	-	QSL	READ
Caption 8	-	-	-	-	-	IMI	-	ZGN	FOR
Caption 9	-	-	-	-	-	IMI	-	ZUA	FR
Caption 10	-	-	-	-	-	IMI	-	FR	ZHA
Caption 11	-	-	-	-	-	VERIFY	-	-	ZHB
Caption 12	-	-	-	-	-	-	-	-	-
Caption 13	-	-	-	-	-	-	-	-	-
Caption 14	-	-	-	-	-	-	-	-	-
Caption 15	-	-	-	-	-	-	-	-	-
Caption 16	-	-	-	-	-	-	-	-	-

Table 3-1. The Formats Available in This DMED (continued)

Location	DOWN, 5	UP, 6	DOWN, 6	UP, 7	DOWN, 7	UP, 8	DOWN, 8	UP, 9	DOWN, 9
Name of Format	SVC	METEO	NU1	NU23	CH1	CH3	FOLL	QRK	SKW
Caption 1	QSA	VIS	NUM	NUM	NUM	NUM	DTO	DTO	DT
Caption 2	QTC	PLF	AZ	DTO	AZ	DTO	GR	GR	DT
Caption 3	QRV	WIND	DTO	GZ	DTO	COR	-	-	GZ
Caption 4	QRM	AZ	F-B	TYPE	COR	TYPE	-	-	TYPE
Caption 5	QRN	RAIN	GZ	P-KT	TYPE	N	-	-	MSD 1
Caption 6	ZTI	FOG	TYPE	NU3	NBRE	E	-	-	MSD 2
Caption 7	QRX	SNOW	5MIN	NUM	WIND	S	-	-	MSD 3
Caption 8	ZKF	TEMP	10MIN	DTO	DIR	W	-	-	LSD
Caption 9	QLQ	QNT	-	GZ	ATM	RAY	-	-	LGIS
Caption 10	ZHA	-	-	LGIS	-	WIND	-	-	RGIS
Caption 11	ZHB	-	-	RGIS	-	DIR	-	-	WIND
Caption 12	ZGN	-	-	WIND	-	ZONE	-	-	ZONE 1
Caption 13	QRO	-	-	ZONE 1	-	-	-	-	ZONE 2
Caption 14	QSW	-	-	-	-	-	-	-	RNU
Caption 15	-	-	-	-	-	-	-	-	-
Caption 16	-	-	-	-	-	-	-	-	-

3-5. To Fill Out a Format and Transmit

a. To transfer a format from program memory to transmit memory, find the location of the desired format from the table above, (or from the caps on the message keys) and press the appropriate keys.

b. Operation is best described by means of an example: let us suppose that the operator must fill out the format named ZNN with the text shown in Table 3-2.

Table 3-2 Filling Out a Format

Format Caption	Text to be added
REF	HQ
DTO	-
GR	50

c. In order to fill out the format ZNN with the text shown above, perform the steps given below:

Step	Action	Indication
1	Set mode selector to F. F	ON illuminates and buzzer sounds for 3 seconds
2	Press CLEAR	-
3	Press UP/L and 4	Display reads ZNN
4	Press NEXT	Display reads REF
5	Press SEN/C/CHR and 3	Display reads REF H
6	Press SEN/C/CHR and 6	Display reads REF HQ
7	Press NEXT	Display reads DTO
8	Press NEXT	Display reads GR
9	Press key 5	Display reads GR 5
10	Press SEN/C/CHR twice	Display reads GR 50
11	Press XMT	TX indicator illuminates until transmission is completed.
12	Observe display	ACK indicator illuminates indicating that message was received.

NOTE: The message will not be transmitted exactly as shown in Table 3-2; since no text was added to caption DTO, it will not be transmitted.

3-6. To Transmit Free Text

a. Operation is best described by means of an example: in order to transmit the sentence "Fire 3", perform the steps given below:

Step	Action	Indication
1	Set mode selector to F. T	ON illuminates and buzzer sounds for 3 seconds.
2	Press CLEAR	-
3	Press DOWN/R and 2	Display reads F
4	Press DOWN/R and 3	Display reads FI
5	Press DOWN/R and 6	Display reads FIR
6	Press SEN/C/CHR and 2	Display reads FIRE
7	Press key 3	Display reads FIRE 3
8	Press XMT	TX indicator illuminates until transmission is completed. ACK indicator illuminates, indicating that message was received.

b. To transmit more than one sentence:

- (1) After the first sentence appears on the display (i. e. after step (7) above), press NEXT key.
- (2) Enter second sentence and press NEXT key.
- (3) Proceed as above until a maximum of 16 sentences have been completed.
- (4) Press XMT key; the TX lamp will illuminate until transmission is completed.

c. To make deletions:

- (1) To delete the last character displayed, press DOWN/R and SEN/C/CHR.
- (2) To delete the sentence displayed, press UP/L and SEN/C/CHR.

NOTE: In fixed format mode, these deletions clear only the text entered by operator: the format caption is not erased.

3-7. Printout of Messages via Teletypewriter

Incoming messages may be automatically printed on a teletypewriter via Interface Box IB-326. The procedure for obtaining a hard copy of these messages is as follows:

- a. Connect the IB-326 to the TMD-326 using cable CX-326C.
- b. Connect the printer to the IB-326 and connect both of them to the ac power line.
- c. Set the IB-326 switch to ON.
- d. Set the mode selector of the TMD-326 to RX.
- e. Messages received by the radio equipment connected to the TMD will now be automatically printed on the printer.
- f. Each message is automatically cleared from the TMD's receive memory, thereby enabling a new message to be received.

3-8. Error Detection in Received Messages

The TMD-326 has the capability to detect erroneous characters in the received message. These characters are displayed as "?".

When the receiving TMD is connected to a printer, the word "ERROR" will be printed as the headline of the erroneous message.

CHAPTER 4

OPERATOR'S MAINTENANCE INSTRUCTIONS

4-1. Scope of Maintenance

The maintenance duties assigned to the operator of the TMD-326 are listed below, together with a reference to the paragraphs covering the specific maintenance functions. The duties assigned do not require tools or test equipment.

- a. Preventive maintenance (para 4-2).
- b. Visual inspection (para 4-7).
- c. Operational check (para 4-8).
- d. Replacement of the battery (para 2-2).
- e. Cleaning (para 4-6).

4-2. Preventive Maintenance

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

a. Systematic Care. The procedures given in paragraph 4-4 and 4-5 cover systematic care essential to proper upkeep and operation of the equipment. The cleaning operations (para 4-6) should be performed once a day. If the equipment is not used daily, the cleaning operations must be performed before operation of the equipment, after any shutdown, or once a week while the equipment is kept in standby condition. The other items must be checked before the equipment is placed in operation after a shutdown, during operation, or after it is turned

off, as specified in the applicable paragraph.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 4-4 and 4-5) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are.

4-3. Preventive Maintenance Services and Inspection Periods

a. Maintenance service and inspection of the TMD-326 are required on a daily and weekly basis. Paragraph 4-4 and 4-5 specify the items to be inspected and serviced. In addition to the routine services and inspection, the equipment should be reinspected and serviced immediately before going on a mission and as soon after the completion of the mission as possible.

b. Paragraph 4-5 specifies preventive maintenance service checks and services that must be performed once each week. If the equipment is being maintained in a standby condition, the daily (para 4-4) and the weekly (para 4-5) services and inspections should be accomplished concurrently.

4-4. Operator's Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure
1	Completeness	Check to see that the equipment is complete (para 1-4).
2	Exterior surfaces	Remove dust, dirt, and moisture from display window and equipment surfaces (para 4-6).
3	Controls	a. Check all controls for looseness and other damage. b. During operational check (sequence No. 5 below), check to see that the mechanical action of each control is smooth, and free from external and internal binding.
4	Battery	Inspect for leakage, corrosion, and swelling.
5	TMD-326 performance	Perform the steps in the operational checklist (para 4-8).

4-5. Operator's Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure
1	Cables	Inspect the cord for fraying, cuts, kinks, and broken insulation.
2	Canvas items	Inspect for mildew and tears.
3	Connectors	Inspect for damage, loose fit, and corrosion.

4-6. Cleaning

Inspect the exterior of the TMD-326. The exterior surfaces should be free of dirt, grease, and fungus.

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

b. Remove grease, fungus, and ground-in dirt from the case; use a cloth dampened with clean water.

c. Remove dust and other dirt from plugs and receptacles.

d. Clean the panel and control knobs; use a soft, clean cloth. If dirt is difficult to remove, dampen the cloth with mild soap and water.

4-7. Visual Inspection

a. When the equipment fails to operate properly, check the following items:

- (1) Switches and controls for incorrect setting (para 3-2).

- (2) Cables for loose connection (para 2-3, 2-4).

- (3) Battery for being too weak to operate the TMD-326; check by substitution.

b. If the above checks do not locate the trouble, proceed to the operational checklist (para 4-8).

4-8. Operational Checklist

a. General. The operational checklist will help the operator locate the trouble quickly. Use the corrective measures to repair the equipment. If the measures suggested do not restore normal operation, troubleshooting is required at a higher maintenance category. Report what corrective measures were taken and how the equipment performed at the time of failure.

b. Procedure. Connect the TMD-326 to the radio set and switch on radio set. Perform the steps given in c below in the order given. Observe the operation of the TMD-326 and perform any corrective measure given.

c. Checklist for DMED TMD-326

Step	Action	Normal Indication	Corrective Action
1	Set mode selector to TEST	ON indicator illuminates. BUZZER sounds for 3 seconds.	a. Check battery polarity and that contacts are clean. b. Insert fully charged battery. c. Check battery cap spring for breaks. d. Turn mode selector to OFF, then back to TEST.
2	Press NEXT key	All indicators, except BAT illuminate for approximately 2 seconds; TEST then appears on display.	a. Turn brightness control fully clockwise. b. Repeat step 1.
3	Press NEXT key.	TX indicator illuminates while the word TEST is transmitted and received via the radio. RCV indicator illuminates and buzzer is heard.	a. Check that audio cable is secure and not broken. b. Transmit using only the radio set. Check that sidetone of radio set is OK.
4	Press NEXT key.	RCV indicator extinguishes and display reads OK. Note: If TMD-326 is faulty display reads ERROR.	a. Perform corrective action as in previous step. b. Send to higher maintenance level.

d. Checklist for Interface Box IB-326

Step	Action	Normal Indication	Corrective Measure
1	Connect Interface Box IB-326 to the ac line. Connect cable CX-326 between the TMD-326 and the IB-326. Set the IB-326 switch to ON.	The ON indicator of the IB-326 illuminates	a. Check power line connection. b. Check the fuse. Replace if necessary.
2	Remove battery from the TMD-326, and set mode selector to TEST.	The ON indicator of TMD-326 illuminates.	a. Check that cable CX-326/C is secure and not broken. b. Check TMD-326 operation with battery c. Higher maintenance category is required.
3	Switch off the TMD-326 and the IB-326. Connect a printer to IB-326 and to the ac power line.	The printer runs free.	a. Check connection to the power line. b. Check the printer fuse.
4	Set the IB-326 switch to ON. Set the TMD-326 Mode selector to TEST.	The printer operation is silenced (ready to accept data).	Check connection between the printer and IB-326, and between the TMD-326 and IB-326.
5	Connect the TMD-326 to a radio set and proceed according to TMD-326 operational checklist above.	When NEXT is pressed, printer prints TEST; TMD-326 RCV indicator will NOT illuminate when TX/RCV link is tested. At end of test, ERROR is displayed on TMD-326.	a. Check TMD-326 and the radio set according to TMD-326 operational checklist above. b. Higher category maintenance required.