SECTION I

INTRODUCTION

1.1 PURPOSE

The purpose of this manual is to provide operating procedures and maintenance instructions for the Model 1280A Modem. Individual sections are devoted to installation, operation, theory of operation, preventive and corrective maintenance, and diagrams and parts lists.

1.2 GENERAL DESCRIPTION

The Model 1280A FSK Modem is microprocessor controlled. It is designed for use as a modem, a one or two channel modulator, or a one or two channel demodulator. It will accept input data of EIA-RS-232C, MIL-STD-188C, or high level (20 to 60 milliamps) loop current. It operates in the FSK* mode with shifts of 60 to 200 Hz and in the FEK mode with shifts from 60 to 5700 Hz (60 to 2700 Hz Bundespost). Baud rates are selectable to 1200. Operating parameters are entered by the front panel keypad (or a remote terminal) and displayed on the front panel plasma display.

The Modulator card(s) accepts high level current loop, EIA-RS-232 or MIL-STD-188C data in and modulates it at the frequencies selected. The Demodulator card(s) receives the keyed tones and demodulates them as determined by the selected parameters with a resulting data output of EIA-RS-232, MIL-STD-188C and optional high level current loop. The Control card serves as an interface between the keypad (or remote terminal) and the demodulator and modulator cards. The Control Board contains the high speed demodulator circuit with the standard configuration.

N O T E

The Demodulator Board D9087, Control Board D9084, and the Modulator Board D9096 make up the standard configuration. A dash one version (D9087-1 and D9084-1) is also available on special order.

* The modem offers true FSK as defined by FEC's U.S. Patent Number 4,317,209, which allows the change from mark to space to be made as a smooth progression of intermediate frequencies directly related to the selected keying rate. This reduces side band energy normally produced by the nearly instantaneous change from mark to space associated with the more commonly used FEK technique.

The location of the used cards are depicted in Figure 1-1. The keypad and plasma display are located on the front panel.

N O T E

When the unit is configured as a dual demodulator, only one of the demodulators will operate at 1200 baud. The second demodulator is limited to 600 baud operation.

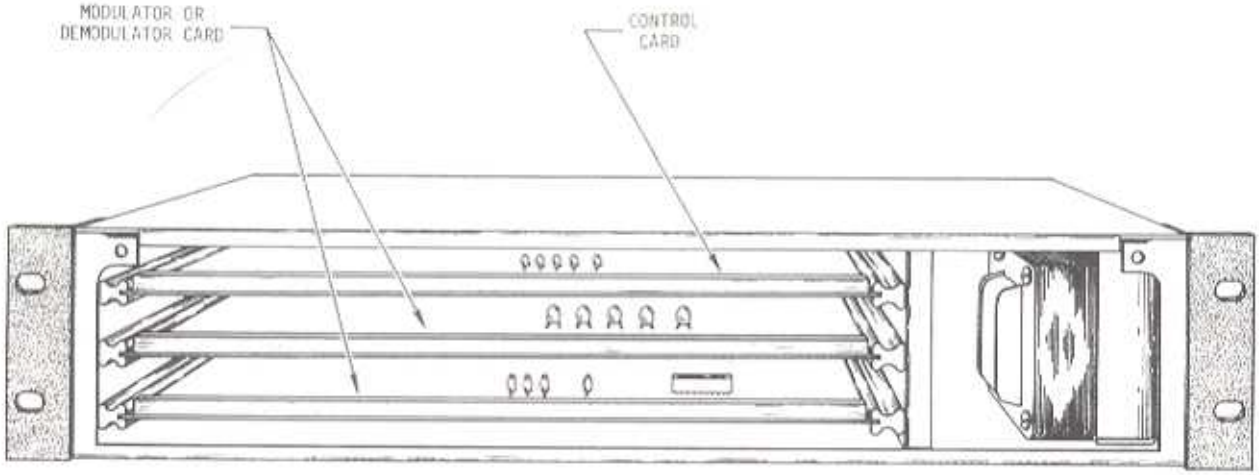

Figure 1-1. Unit With Front Panel Removed

The parameters selectable by the front panel keypad (or remote terminal) are as follows:

a. Channel (one or two)

b. Keying Type (FSK, Mark Only, Space Only, FEK)

c. Diversity

d. Mark Frequency

e. Space Frequency

f. Synchronous/Asynchronous mode

g. Mute

h. Baud Rate

i. Output Polarity (normal or reverse)

j. Auto Mark Hold/Hold (Standby)

A detailed functional analysis of each board is provided in Section IV, Theory of Operation.

Specifications are listed in Table 1-1.

Table 1-1. Modem Specifications

ITEM	SPECIFICATION
MODULATOR	
Output Impedance	600 ohms ± 10% (balanced and isolated).
Output Level	Adjustable internally from -20 dBm to +6 dBm into 600 ohms.
Output Frequency Range	300-6000 Hz 300-3000 Hz (special order)
Shift	60-200 Hz (FSK) 60-2700 Hz (FEK) (special order) 60-3000 Hz (FEK)
Transmit Clock*	EIA-RS-232
Mark and Space Tones	Selectable in 0.5 Hz increments.
Mute (low level only)	Automatic (strap selectable), 0-2.25 seconds transition time (switch selectable). Manual (keypad selectable)
Input Data	EIA-RS-232C, MIL-STD-188C, or optional High Level Loop
Sense	Selectable
Waveform Quality	Level of any harmonic will be less than -40 dB referenced to 0 dBm tone output. Maximum level of spurious output -60 dBm tone into 600 ohms.
Keyline Control*	Keyline disabled if no transitions are detected within preset time (0-2.25 seconds). (Standard)

*Added Feature

Table 1-1. Modem Specifications (cont.)

ITEM	SPECIFICATION
DEMODULATOR	
Input Impedance	600 or 10K ohms (balanced and isolated, strap selectable.)
Input Level	+6 to -45 dBm into 600 ohms
Input Frequency Range	300-6000 Hz 300-3000 Hz (special order)
Mark and Space Frequency	Selectable in 0.5 Hz steps.
Shift Standard Configuration	60 to 3000 Hz up to 600 baud 850 to 1200 Hz from 601 to 1200 baud. 60 to 2700 Hz (special order)
Baud Rate	Selectable 30 to 1200.
Diversity	Selectable in two-channel DEMOD configuration only. (Up to 600 baud only with the standard configuration).
Data Output	Selectable (keypad or remote).
Synchronous Mode Asynchronous Mode	Regenerated EIA-RS-232 and MIL-STD-188C. Programmable 5, 6, 7, or 8-level, EIA-RS-232 and MIL-STD-188C.
Mid-Bit Clock	EIA-RS-232
Auto Mark Hold/ Carrier Detect	Switch selectable 0 to -42 dBm in 6 dB increments, 1 to 5 second delay (switch selectable) after signal drops below threshold. Carrier detect sense is strap selectable.*
Sense	Selectable (keypad or remote).
Indicators	Plasma display of energy in filter (bar graphs), frequency of mark/space tones, and baud rate.

*Added Feature

Table 1-1. Modem Specifications (cont.)

ITEM	SPECIFICATION
REMOTE CONTROL	
Device Number	Switch selectable 01 thru 08.
Data In/Out	EIA-RS-232C Asynchronous (1 start bit, 8 data bits, 2 stop bits).
Status	Received data only.
Data Rate	Strap Selectable for 300, 600, 1200, 2400, 4800, 9600, or 19,200 baud.
GENERAL	
Dimensions	19 in (48.26 cm) W x 3.5 in (8.89 cm) H x 14 in (35.56 cm) D. With High Level or DC Power Supply Options, 18 in (45.72 cm) D; with High Level and DC Power Supply Options, 22 in (55.88 cm) D; with MS Connector Panel 16.69 in (42.4 cm) D; and with MS Connector Bulkhead 22.1 in (56.13 cm) D.
Weight	Approximately 12 lbs. (5.44 Kg).
Voltage	115/230 Vac ± 15%, 47 to 440 Hz (switch card selectable).
Optional Voltage #1	10 to 16 Vdc, 6A maximum at 10V.
Optional Voltage #2	19 to 31 Vdc, 2.5A maximum at 19V.

Table 1-1. Modem Specifications (cont.)

ITEM	SPECIFICATION
ENVIRONMENTAL	
Operating Range	
Temperature	0° to 50°C (32° to 122°F)
Humidity	To 95% non-condensing.
Altitude	MSL to 10,000 feet.
Non-Operating Range	
Temperature	-40° to $+80^{\circ}$C
Humidity	To 95% non-condensing.
Altitude	MSL to 50,000 feet.
OPTIONAL HIGH LEVEL	
Loop Power Supply	$\pm$ 65 Vdc at 80 mA max. (non-regulated)
Keyer	Polar/neutral contacts isolated 80 mA max.

1.3 LIST OF ITEMS SUPPLIED

Items supplied with the Model 1280A are listed in Table 1-2.

Table 1-2. List of Items Supplied

ITEM	QUANTITY	PART NUMBER
Model 1280A FSK Modem NOTE: May be configured as a modem or as a two-channel demodulator or a two-channel modulator as selected (refer to paragraph 1.5).	1 ea	M1280A
Technical Manual	1 ea	TMC21201
AK 1280A (Accessory Kit) Line Cord Connector Plug Contact, Male, Crimp Placard	 1 ea 1 ea 9 ea 1 ea	 366020 241192 744810 085700

1.4 CONFIGURATION IDENTIFICATION

Configuration of the Model 1280A, as shipped from the factory, can be identified by the Part Number on the rear I.D. Plate. The physical configuration of the Model 1280A is defined by the model number: M1280A-ABCDE, where:

A = Mod/Demod Combination
- 1 = 1 Demod
- 2 = 2 Demods
- 3 = 1 Mod (D9096)
- 4 = 2 Mods (D9096)
- 5 = 1 Mod (D9096) and 1 Demod
- 6 = 1 Mod (D9676) and 1 Demod (Radio Keyline controlled by RTS/CTS)

B = Rear Panel
- 0 = Standard (Barrier Strip)
- 1 = D9124 MS Connector (A must be 5)
- 2 = D9284 MS Connectors

C = Interface
0 = Standard Low Level
1 = High Level (Cannot be used when B = 1)

D = Power
0 = AC
1 = 12V DC (Cannot be used when B = 1)
2 = 24V DC (Cannot be used when B = 1)

E = Firmware
0 = Bundespost
1 = Extended Frequencies (6 KHz)