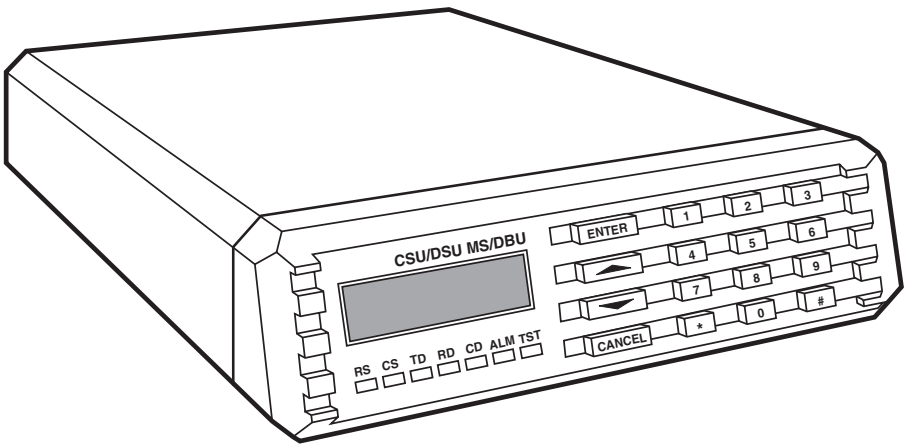
BLACK BOX®
NETWORK SERVICES

NOVEMBER 1993
MT134A-R2

CSU/DSU MS/DBU



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This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

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NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

Chapter **Page**

1.0 Specifications

DTE Rates—Async: 2.4, 4.8, 9.6, 19.2, 38.4, 56, 57.6, and 64 Kbps; Sync: 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 Kbps; Secondary channel (Async or Sync): 75, 150, 300, 600, 1200, and 2400 bps

Interface—Primary V.35/M34, primary RS-232/DB25, auxiliary RS-232/DB25, Telco—RJ-45

Indicators—RTS, CTS, TD, RD, CD, Alarm, Test

Power—115 VAC, 60 Hz, 8 watts

Size—2.3"H x 8.8"W x 11"D (5.8 x 22.4 x 27.9 cm)

Weight—31 lb. (14.1 kg)

2.0 Introduction

2.1 Overview

The CSU/DSU MS/DBU provides a reliable, high-speed data connection from a customer's Data Terminal Equipment (DTE) through Digital Data Service (DDS) lines. The CSU/DSU MS/DBU also provides automatic switched backup of the dedicated circuit. The unit is a 4-wire switched 56 DBU.

There are these easy methods for configuration:

1. A front panel dial pad and a Liquid Crystal Display (LCD) provide quick and easy access to configuration menus.

2. "AT" commands or V.25 bis commands in band.

3. Remotely located CSU/DSU MS/DBU units can be configured by using the front panel, AT commands, or V.25 bis.

The CSU/DSU MS/DBU provides both V.35 and RS-232 electrical and physical DTE interfaces to accommodate a variety of applications. A second RS-232 interface is provided if the unit is configured for use on DDS with secondary channel services.

To ensure a reliable connection, the unit features an extended receiver capability that permits operation over long loops (3.4 miles or 5.5 km of 26 AWG at 56 Kbps).

The CSU/DSU MS/DBU is compatible with AT&T Accunet® and U.S. Sprint® SW56 type services.

2.2 Introduction to DDS Overview

Digital Data Service (DDS) is a nationwide service that allows interconnection and transport of data at speeds up to 64 Kbps. The local exchange carriers provide the local loop service to DDS customers and may provide data for routing Inter-LATA to an interexchange carrier. In DDS mode, the CSU/DSU MS/DBU supports all DDS service rates yielding DTE rates of 2.4, 4.8, 9.6, 19.2, 38.4 (sync or async), 56, and 64 Kbps. An additional rate of 57.6 Kbps is available in async mode. At the service rate of 56K, the unit can be configured to run slower DTE rates (async or sync) over the 56 Kbps service. Secondary channel operation is supported at all service rates up to 56K, providing terminal rates of 75, 150, 300, 600, 1200, and 2400 bps. The secondary rates available depend on the service rate configured.

2.3 Introduction to 4-Wire Switched 56

This dial-up 4-wire Digital Data Service allows customers to pay for data connection only for the time the unit is active. The regional operating companies provide the 4-wire local loop service to SW56 customers. Switched 56 service is supplied by AT&T, U.S. Sprint, and other interexchange carriers. In SW56 mode, the CSU/DSU MS/DBU supports DTE rates of 2.4, 4.8, 9.6, 19.2, 38.4 (asynchronous or synchronous), and 56 Kbps (synchronous). The additional DTE rate of 57.6 Kbps is available in async modes.

2.4 The Front Panel

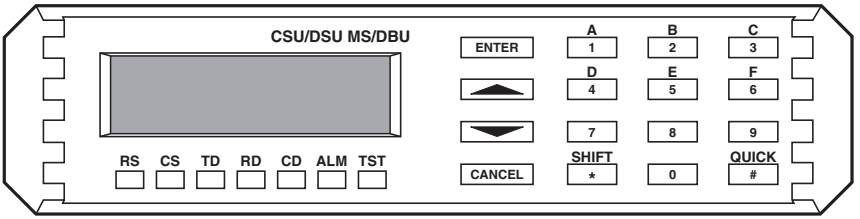

Fig. 2-1. CSU/DSU MS/DBU Front View.

The Light Emitting Diodes (LEDs) are identified as follows:

- RS—Request to Send
- CS—Clear to Send
- TD—Transmit Data
- RD—Receive Data
- CD—Carrier Detect
- ALM—Alarm Indication
- TST—Test Mode

2.5 The Rear Panel

The rear panel contains three data DTE connectors that provide primary-channel V.35 or RS-232, and a secondary-channel RS-232 port (auxiliary EIA 232). An 8-pin telco jack, a captive power cord, and a power switch are also located on the rear panel. Pin assignments for the DTE and network connections are listed in **Chapter 3**.

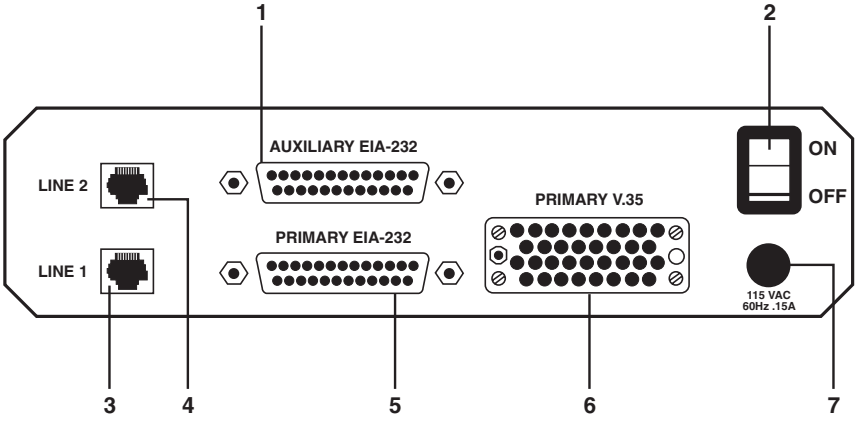

Fig. 2-2. CSU/DSU SW56 Rear Panel.

Table 2-1. Key to Fig. 2-2.

Item	Function
1. Auxiliary EIA-232	Secondary channel services
2. Power Switch	Used to turn power on or off
3. Line 1	Connection to the dedicated circuit
4. Line 2	Connection to switched backup
5. Primary EIA-232	DTE interface
6. Primary V.35	High-speed digital data service
7. 115 VAC Connection	Power-cord connection

3.0 Installation

3.1 Unpack, Inspect, Power Up

Carefully inspect the CSU/DSU MS/DBU for any shipping damage. If you suspect damage, file a claim immediately with the carrier and then contact your dealer. If possible, keep the original shipping container for use in shipping the CSU/DSU MS/DBU back for repair or for verification of damage during shipment.

Your package includes the following items:

- CSU/DSU MS/DBU
- Two line interface cables:
  an 8-position modular to 8-position modular and an
  8-position/modular to 8-position spade lug
- This User's Guide

You must provide the following items:

- DTE cable(s)
- An RS-232 interface cable with standard DB25 male connectors (Cannon or Cinch DB-19604-432) or V.35 cable

Each CSU/DSU MS/DBU is provided with a captive eight-foot power cord, terminated by a three-prong plug that connects to a grounded power receptacle.

A telco connector is provided for interface to the network and two others provide connection to the data terminal equipment (DTE).

CAUTION

Power to the CSU/DSU MS/DBU must be from a 115- VAC, 60-Hz grounded power supply.

3.2 Network Interface Connection

The CSU/DSU MS/DBU has two eight-position modular jacks labeled "LINE 1" and "LINE 2."

The "LINE 1" connector is used for connecting to the dedicated (DDS) network. The pinout for "LINE 1" connector is listed in **Table 3-1**.

Table 3-1. Pin Assignments for the LINE 1 Connector.

Pin	Name	Description
1	R	Transmit Data (from CSU/DSU to network ring)
2	T	Transmit Data (from CSU/DSU to network tip)
3-6		Not Used
7	T1	Receive Data (from network to CSU/DSU Tip 1)
8	R1	Receive Data (from network to CSU/DSU Ring 1)

The s“LINE 2” connector is used for connection to the switched backup network. The pinout for the “LINE 2” connector is shown in **Table 3-2**.

Table 3-2. Pin Assignments for the LINE 2 Connector.

Pin	Name	Description
1	R	Transmit Data (from CSU/DSU to network ring)
2	T	Transmit Data (from CSU/DSU to network tip)
3-6		Not Used
7	T1	Receive Data (from network to CSU/DSU Tip 1)
8	R1	Receive Data (from network to CSU/DSU Ring 1)

3.3 DTE Data Connection

The primary DTE should be connected to either the RS-232 DTE connector or the CCITT V.35 DTE connector. The maximum cable lengths recommended are 50 feet (15.2 m) for the RS-232, and 100 feet (30.5 m) for the CCITT V.35. The pin assignments for the connectors are listed in **Tables 3-3** and **3-4**.

The V.35 connector is recommended for use with data rates above 19.2 Kbps. The RS-232 connector will work at up to 56 Kbps with a low-capacitance cable or with the external transmit clock option selected. The primary DTE rate is configured from the front panel. The primary Data Terminal Equipment can operate in asynchronous or synchronous mode.

CAUTION

To prevent possible radio-frequency interference emissions, a shielded V.35 cable is required.

Table 3-3. Pin Assignments for the Primary RS-232 Connector.

Pin	Name	Description
1	AA	Protective Ground (PG)
2	BA	Transmit Data (SD)
3	BB	Receive Data (RD)
4	CA	Request to Send (RS)
5	CB	Clear to Send (CS)
6	CC	Data Set Ready (SR)
7	AB	Signal Ground (SG)
8	CF	Received Line Signal Detector (CD)
9	-	+12 Test Point
10	-	-12 Test Point
15	DB	Transmit Clock (TC)
17	DD	Receive Clock (RC)
18	-	Local Loopback (LL)
20	CD	Data Terminal Ready (TR)
21	-	Remote Loopback (RL)
22	CE	Ring Indicator (RI)
24	DA	External TX Clock (ETC)
25	-	Test Indicator (TI)

Table 3-4. Pin Assignments for the Primary V.35 Connector.

Pin	Name	Description
A	101	Protective Ground (PG)
B	102	Signal Ground (SG)
C	105	Request to Send (RTS)
D	106	Clear to Send (CTS)
E	107	Data Set Ready
F	109	Received Line Signal Detector (CD)
H	-	Data Terminal Ready (DTR)
J	-	Ring Indicator (RI)
L		Local Loopback (LL)
N	-	Remote Loopback (RL)
R	104	Received Data (RD-A)
T	104	Received Data (RD-B)
V	115	Receiver Signal Element Timing (SCR-A)
X	115	Receiver Signal Element Timing (SCR-B)
P	103	Transmitted Data (SD-A)
S	103	Transmitted Data (SD-B)
Y	114	Transmitter Signal Element Timing (SCT-A)
AA	114	Transmitter Signal Element Timing (SCT-B)
U	113	External TX Signal Element (SCX-A)
W	113	External TX Signal Element (SCX-B)
NN	-	Test Indicator (TI)

3.4 Secondary Channel Connection

If used, the secondary data terminal equipment should be connected to the auxiliary EIA-232 connector. The pinout for the connector is listed in **Table 3-5**.

Table 3-5. Pin Assignments for Auxiliary RS-232 Connector.

Pin	EIA	Description
1	AA	Protective Ground (PG)
2	BA	Transmit Data (SD)
3	BB	Receive Data (RD)
4	CA	Request to Send (RS)
5	CB	Clear to Send (CS)
6	CC	Data Set Ready (SR)
7	AB	Signal Ground (SG)
8	CF	Received Line Signal Detector (CD) on all the time

3.5 Configuration

The CSU/DSU MS/DBU contains four different user profiles (sets of configuration options), listed in **Appendix B**, that are stored in read only memory. The unit is shipped from the factory with profile 1 (default configuration) loaded into the non-volatile configuration memory. If profile 1 matches the desired system requirements, then no additional configuration is required to put the unit into service. If profile 1 does not match the desired system requirements, there are two options available:

1. Modify the default configuration.
2. Select one of the other profiles that more nearly matches the desired configuration, then modify to required specifications.

When a new profile is loaded, or the existing profile is modified, it is stored in the non-volatile configuration memory. The CSU/DSU MS/DBU is then configured with that profile every time power is turned on, or the unit is reset.

The CSU/DSU MS/DBU provides four different methods for local configuration and three different methods for remote configuration.

1. Front panel
2. AT commands
3. V.25 bis
4. Remote commands

3.5.1 Front Panel

The front panel provides access to all operation parameters of the CSU/DSU MS/DBU through a multi-level menu structure that begins with the four-part main menu.

1=STATUS—Displays status of network and DTE interface

2=TEST—Controls local and remote testing

3=CONFIG—Displays/changes current configuration parameters

4=DIAL—Provides manual dialing functions (available only when unit is configured for SW56 operation)

3.5.2 "AT" Commands

In addition to the front panel, the CSU/DSU MS/DBU can be configured and controlled with in-band AT commands from an asynchronous DTE port just as modems are.

To exit the data mode and enter the command mode, the asynchronous DTE device must transmit a proper escape sequence to the CSU/DSU MS/DBU. A specified time delay must occur between the last data character and the first escape sequence character.

This is the guard-time delay, and it can be changed by writing a value to the S12 register. The default value for the guard time is one second. For a valid escape sequence to occur, the DTE must transmit the escape-code character three times in succession, and the delay between characters must be less than the guard time.

Once the command mode is entered, AT commands can be transmitted to the CSU/DSU MS/DBU to configure most of the options, dial remote CSU/DSUs, or initiate tests to check both the CSU/DSU and the network connections. All command lines must begin with the AT character set in either capital or lower-case letters. A command line can be terminated at any time by transmitting the CTRL-X (ASCII 018) after the AT attention code. The CSU/DSU MS/DBU will ignore this command line and issue an OK response.

The command line may contain a single command or a series of commands after the AT attention code. When a series of commands is used, the individual commands may be separated with spaces for readability. The maximum length for a command line is 40 characters. Each command line is executed by the CSU/DSU MS/DBU upon receipt of a terminating character. The default terminating character is a carriage return (ASCII 013), but it can be changed by writing a different value to register S3.

Before the terminating character is transmitted, the command line can be edited by using the backspace character (ASCII 008) to erase errors.

Valid AT commands are listed in Appendix A.

3.5.3 V.25 bis Commands

When configured for the V.25 bis option, the CSU/DSU MS/DBU accepts in-band dialing and configuration commands from both synchronous and asynchronous DTE ports.

The V.25 bis option supports the following protocols:

1. SDLC
2. Bisync
3. Asynchronous

SDLC Option Character Format

1. Data bits—8
2. Parity bit—ignored

COMMAND STRUCTURE:

[F][A][C][V.25 bis COMMAND][FCS][F]

The address field [A] is FFH. The control field [C] is set to 13H except for cases of multi-frame responses. For this case, the control field is set to 03H in all but the last frame. The 03H in the control field indicates that other frames are to follow while the 13H in the control field indicates the final frame.

Bisync Option

CHARACTER FORMAT:

1. Data bits—7
2. Parity bit—ODD

COMMAND STRUCTURE:

[SYN][SYN][STX][V.25 bis COMMAND][ETX]

Asynchronous Option

CHARACTER FORMAT:

1. Start bit—1
2. Data bits—7
3. Parity bit—EVEN
4. Stop bit—1

COMMAND STRUCTURE:

[V.25 bis COMMAND][CR][LF]

Command Descriptions

The V.25 bis command set is a subset of the CCITT V.25 bis command set. In addition to the CCITT commands supported, this command set includes configuration commands for both the local and remote CSU/DSUs. This command set is:

CIC—Connect Incoming Call

CNL—CoNfiguration Local

CNR—CoNfiguration Remote

CRN—Call Request with Number

CRS—Call Request using Stored number

DIC—Disregard Incoming Call

PRN—PRogram Number

RLN—Request List of Numbers

Possible responses to V.25 bis commands are:

VALA—Valid V.25 command processed

INV—An Invalid command detected

CFIET—Call failed on switched network—busy detected

CFIDE—Call failed on switched network—no wink detected

CFINS—Call failed—no dial string in specified register

INVCU—Unknown command detected

INVPS—Invalid parameter syntax

INVPV—Invalid parameter value

INVBL—Invalid local password

INVBM—Invalid remote password

INC—Incoming call

CNX—Call connected

NOTE

If verbose responses are disabled (ATV0), the 3-character responses listed below are the only ones returned.

VAL—Valid V.25 command processed

INV—Invalid command received

CFI—Call failed

INC—Incoming call

CNX—Call connected

The Syntax and Possible Responses

- CIC, Connect Incoming Call—This command causes the CSU/DSU to go online. For dial-backup units, this command hangs up the dial-backup line and initiates an attempt to re-establish the main (DDS) line. There are no parameters associated with this command. Possible indications include: VALA, CNX, CFIxx.

- CNL, Local Configuration—This command is used to pass AT commands to the local modem via the V.25 bis command processor. This allows the CSU/DSU MS/DBU to be configured with AT commands via a synchronous interface. The format of this command is:

  CNL[LOCAL PASSWORD];AT[ONE OR MORE AT COMMANDS]

  The local password may or may not be required, depending on the present configuration of the unit. Responses to CNL commands are returned in the data format currently configured. Possible responses: VALA and INVAn.

- CNR, Remote Configuration—This command is used to pass AT commands over the network to the remote CSU/DSU MS/DBU via the V.25 bis command processor. This allows a remote CSU/DSU MS/DBU to be configured from a synchronous interface. The format of this command is:

  CNR[REMOTE PASSWORD];AT[ONE OR MORE AT COMMANDS]

  The remote password may or may not be required depending on the present configuration of the remote unit. Responses to the CNR commands are returned in the data format currently configured. Possible responsese: VAL and INVAn.

Switched 56 Operation

- CRN, Call Request with Number—When the CSU/DSU MS/DBU is configured for switched 56 operation, the CRN command causes the CSU/DSU MS/DBU to dial the supplied number. The format of the command is:

  CRN [NUMBER TO BE DIALED]

If no number is included in the command, the number stored in dial register number 1 is dialed. If no number is provided and no number is stored in dial register number 1, the CSU/DSU MS/DBU responds with the call failure indication CFINS (Call Failure Indication Not Stored).

For a DBU unit, this command initiates dialing on the backup circuit. If the number supplied contains non-dialable digits, they are ignored and only the dialable digits are dialed. Possible responses: VAL, CNX, CFIxx.

- CRS, Call Request using Stored number—The CRS command causes the CSU/DSU MS/DBU to dial the number stored in the specified register. The format of this command is:

  CRS [OPTIONAL SPACE][REGISTER NUMBER 1-10]

  If this command is issued without the register number parameter, the INVPS (INValid Parameter Syntax) response is issued. If this command is issued and the register parameter is not in the valid range for dialing registers, the INVPV (INValid Parameter Value) response is returned. Other possible responses: VAL, CNX, CFIxx.

- DIC, Disregard Incoming Call—This command causes the V.25 bis processor to return to command mode even if there is an incoming call pending. This allows the user to issue local commands and ignore the incoming calls. There are no parameters associated with this command. The only possible response is: VAL.

- PRN, PRogram Number—This command stores the supplied number into the specified register. The format of this command is:

  PRN [REGISTER NUMBER];
  [NUMBER TO BE STORED]

  If this command is entered with no parameters, the INVPS response is returned. If no register number is included in the command or if it is invalid, the INVPV response is returned. If the number to be stored contains invalid characters, the INVPV response is also returned. The characters 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, P,T, and & are valid dial characters. If no digits are issued with this command, the specified register is cleared. The only possible response is: VAL.

- RLN, Request List of Numbers—This command causes the CSU/DSU MS/DBU to return the number stored in the specified register. The format of this command is:

  RLN [REGISTER NUMBER]

  If the register number is invalid, the INVPV response is returned. When a correct register number is entered, the response is:

LSN [REGISTER NUMBER]; [NUMBER STORED]VAL

If no register number is present in this command, the CSU/DSU MS/DBU responds with a list of all the registers and the stored numbers. This list is followed by the VAL response.

3.5.4 Remote Command

Remote configuration is available by attaching a remote device via the primary EIA-232 connection on the rear panel and setting the CSU/DSU MS/DBU to accept remote configurations.

The 3=CONFIG menu is used to enable or disable the CSU/DSU MS/DBU remote configuration capability. See **Chapter 4, Menu 3=CONFIG**.

4.0 Operation

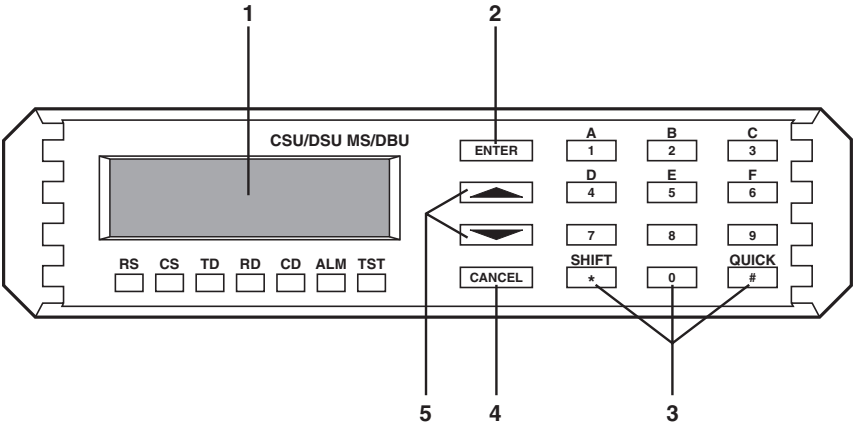

Fig. 4-1. Front Panel.

Table 4-1. Identification of Numbers.

Item	Function
1. LCD Window	Display menu items and messages in 2 lines by 16 characters.
2. ENTER	Selects active menu items.
3. Numeric Keypad	Numbers/alpha characters activate menu items.
Shift	The alpha characters are entered by pressing the shift key.
(Quick)/#	Quick return to the 3 main menu choices.
4. CANCEL	Exits submenus.
5. Up and Down Scroll Arrows	Changes display of menu items.

LED Identification

RS—Request to Send

CS—Clear to Send

TD—Transmit Data

RD—Receive Data

CD—Carrier Detect

ALM—Alarm Indication

TST—Test Mode

4.1 Manual Operation and Button Functions

Enter Button

The Enter button is used to select menu items.

Examples:

To select menu items, follow these steps:

1. Press the Up or Down scroll buttons to display menu items.
2. When the desired menu item is displayed, press the number of the item to activate it. That item will start flashing.
3. When the desired menu item is flashing, press the Enter button to select.
4. You have invoked a submenu or set a configuration parameter. The display of "command accepted" indicates a valid operation.

Cancel

This button cancels the current activity, and returns to the previous menu. Repeat until the desired menu level is displayed.

Examples:

When the submenu item is displayed, press the cancel button. The display returns to the previous menu. Repeat until the desired menu level is reached.

Up and Down Scroll

View all of the submenu selections available in the active menu. Submenu items display two at a time and in a circular or wrapping fashion. When the submenu items are scrolled, they continuously appear from beginning to end in a forward (down button) or reverse (up button) pattern.

NOTE

The active menu item or configuration parameter flashes.

Examples:

To view submenu items in a forward pattern:

1. When the menu is selected and the submenu items are displayed, press the down scroll button.
2. When the end of the list is reached, pressing the down scroll button again continues the display of the same menu from the beginning.

To view submenu items in a reverse pattern:

1. When the menu is selected and the submenu items are displayed, press the Up Scroll button.
2. When the beginning of the list is reached, pressing the up scroll button again continues the display of the same menu from the end.

Numeric Keypad

Numbers 0 through 9 and alpha characters, A through F, are used for activating menu items. Numbers 0 through 9 are used to enter parameters.

** (Shift)*

Alpha characters are activated by pressing the shift key before each alpha keystroke.

(Quick) #

Quick return to the main menu choices.

Examples:

To activate a menu item, choose its number or letter. (If you remember the number or letter of the menu item, you do not have to scroll to that item in the display to choose it.) The item you selected will start flashing. Press Enter to put your selection into effect.

4.2 Menu Structure

The CSU/DSU MS/DBU uses a multilevel approach to access its many features. All menu operations are displayed in the LCD window.

The opening menu is the access point to all other operations. There are three main menu items—1=Status, 2=Test, 3=Configuration—and an optional fourth item, 4=Dial.

Each main menu item has several functions and submenus to identify and access specific parameters.

Figure 4-1 shows the LCD display of the opening menu.

1=STATUS	2=TEST
3=CONFIG	4=DIAL

Fig. 4-2. LCD Display of the Opening Menu.

4.3 The Four Opening Menu Functions

1=STATUS—Used to display all relevant information for the network and DTE interfaces. Displays current operating data mode, loop status, DTE data rate and format, and DTE interface lead status. The system will return to the status display when idle.

2=TEST—Used to control local and remote testing. Selects local or remote testing, defines unit address for remote testing, and selects type of test and test pattern when required.

3=CONFIG—Used to select all desired network and DTE operating parameters. When certain loop rates (64K or 56K) are selected, a scramble option submenu is displayed in lieu of the DTE Rate menu to control scrambling.

4=DIAL—Provides manual dialing functions. This menu item is displayed and available for use only when Accunet SW56 or US Sprint SW56 is selected as the network type from the Network Opt menu.

4.4 General Operations and Menus

4.4.1 How to Use the Menus

- Activate—To "activate" (cause to flash) a numbered menu item, press the button with that item's number. The selection will not come into effect until you press the Enter button.

- Display—Use the up and down scroll keys to display menu choices. In this manual, choices are listed in order using the down scroll button. When all menu items have been displayed, continued pressing of the scroll button repeats the menu display list. Using the up scroll key moves through selections in reverse order.

- Select—Press the Enter button to select the activated menu item, which, in turn, may offer further choices. If the activated item is a parameter choice, it will be entered into the system. The message "Command Accepted" is displayed briefly before returning to the currently active menu/submenu item.

- Abort—To abort any operation, press the Cancel button or the #(Quick) button. The system returns to the main menu.

- Exit—Once you have selected a parameter, and the "Command Accepted" or other message has been displayed, the display returns to the active menu item. You can make another menu selection, or you may use Cancel or #(Quick). If no further operation follows, after 30 seconds the system returns to the status display.

4.4.2 Menu Map

In thismanual, the description of each operation begins with a menu map. Each level of menu selection is separated by a slash (/) mark. For example, the menu map

3=CONFIG/1=LOCAL/3=TEST OPTIONS/1=TEST TIMEOUT/(Parameter)

would be operated by the following method:

Go to the opening Main Menu (shown in **Fig. 4-3**).

```
1=STATUS        2=TEST
3=CONFIG        4=DIAL
```

Fig. 4-3. Opening Main Menu.

1. Press the number 3 to activate 3=CONFIG. That item will begin flashing.
2. When the menu 3=CONFIG is flashing, press the Enter button. Two lines of submenu items will appear.

```
1=LOCAL
2=REMOTE
```

Fig. 4-4. Submenu of the Main Menu.

1. Press the number 1 to activate the submenu 1=LOCAL. That item will begin flashing.
2. Press Enter to select the activated submenu, and two lines of submenu items will be displayed.

```
1=NETWORK OPT.
2=DTE OPTIONS
```

Fig. 4-5. Submenu Items.

Use the down scroll button to display menu items 3=TEST OPTIONS and 4=DIAL OPTIONS.

```
3=TEST OPTIONS
4=DIAL OPTIONS
```

Fig. 4-6. Test Options and Dial Options.

1. Press the number 3 to activate the submenu 3=TEST OPTIONS.

2. Press Enter to select the activated submenu, and the two lines of submenu items are displayed.

Fig. 4-7. Test Timeout and RDL EN/DIS Options.

Press the number 1 to activate the submenu TEST TIMEOUT, and the system prompts you to enter the desired parameters.

Fig. 4-8. Enter Timeout.

1. Use the number keys to enter the number of seconds desired for the timeout.

2. Press Enter to configure this system parameter.

3. The system responds with an acceptance or rejection of the command and returns to the previous submenu. If the system rejects your command, try it again, making sure you enter a legal value.

4.5 1=STATUS

The status selection displays two lines at a time of the current operational status of the network and the DTE interfaces.

After 30 seconds of no front- panel operation on the CSU/DSU SW56, it automatically reverts to the status display.

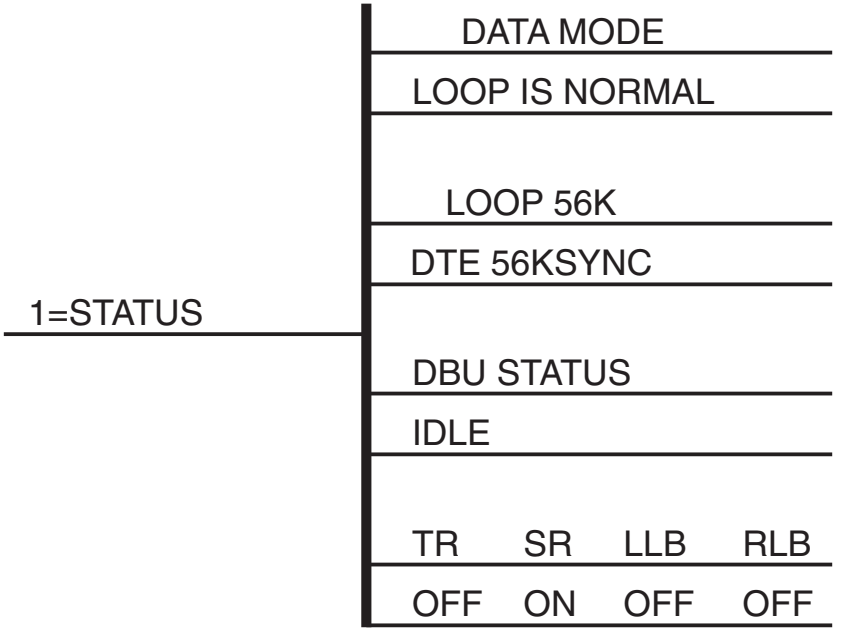

Fig. 4-9. Operational Status Display.

Submenu Items

- Data Mode—Current operation mode of the CSU/DSU MS/DBU.
- Loop is Normal—Current status of the network interface.
- Loop XX—Indicates the rate of the service from the network.
- DTE 56K Sync—Indicates the DTE data rate and format.
- DBU Status Idle—Indicates the status of the DBU function . Possible messages: IDLE, DIALING, or DATAMODE.
- TR SR LLB RLB—Lists four of the DTE interface leads.
- Off/On—State of the respective leads displayed immediately above.

Operation

Follow standard operating procedure.

To view additional information, press the Up or Down scroll key. Two new lines of information will be displayed.

To exit the Status menu, press the Cancel key.

4.6 2=TEST

The CSU/DSU MS/DBU is able to perform a variety of tests that allow problems in specific components of the communications circuit to be isolated and identified. These various test modes for the CSU/DSU MS/DBU are initiated and terminated from either the front panel or the DTE interface. When operating in asynchronous mode, AT commands can be used to control the testing from the DTE interface. For synchronous operation, V.25bis commands can provide the test control.

The unit also responds to standard DDS network tests initiated from the telephone company test centers. In addition, it can run several tests such as local and remote loopbacks to aid in problem isolation. There are six built-in test patterns that can be used with both local and remote loopbacks. See **Fig. 4-10**.

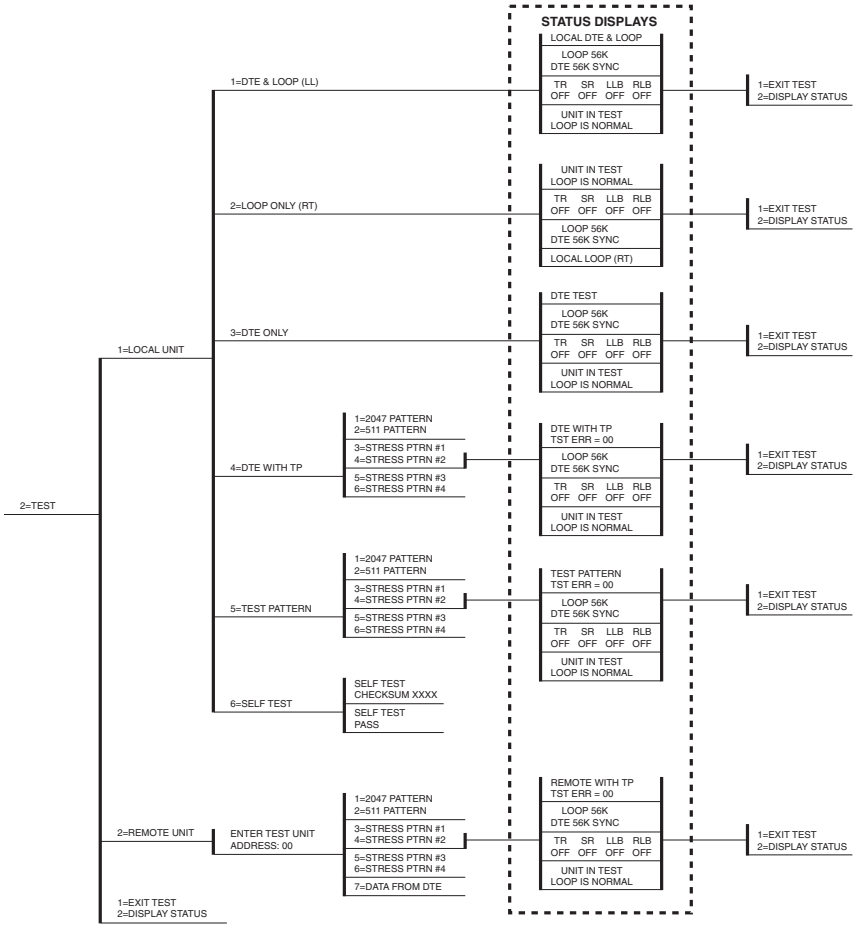

Fig. 4-10. Complete Test Menu.

Menu flow is normally depicted from left to right. When scrolling through submenu items with the down scroll button, the flow wraps from bottom to top and repeats the menu order. To back up, press the up scroll button. At every level of the menu, pressing the Cancel button returns the system to the previous menu level. Pressing the Cancel button repeatedly returns the system to the main menu, or you can press #(Quick) to return to the main menu immediately.

NOTE

Shaded items are restricted to specific configurations or operation.

4.6.1 1=LOCAL UNIT, SUBMENU OF 2=TEST

Purpose

The Local Unit selection is used to specify one of six different tests to be performed by the local CSU/DSU MS/DBU. The selections are shown as submenu selections 1 through 6.

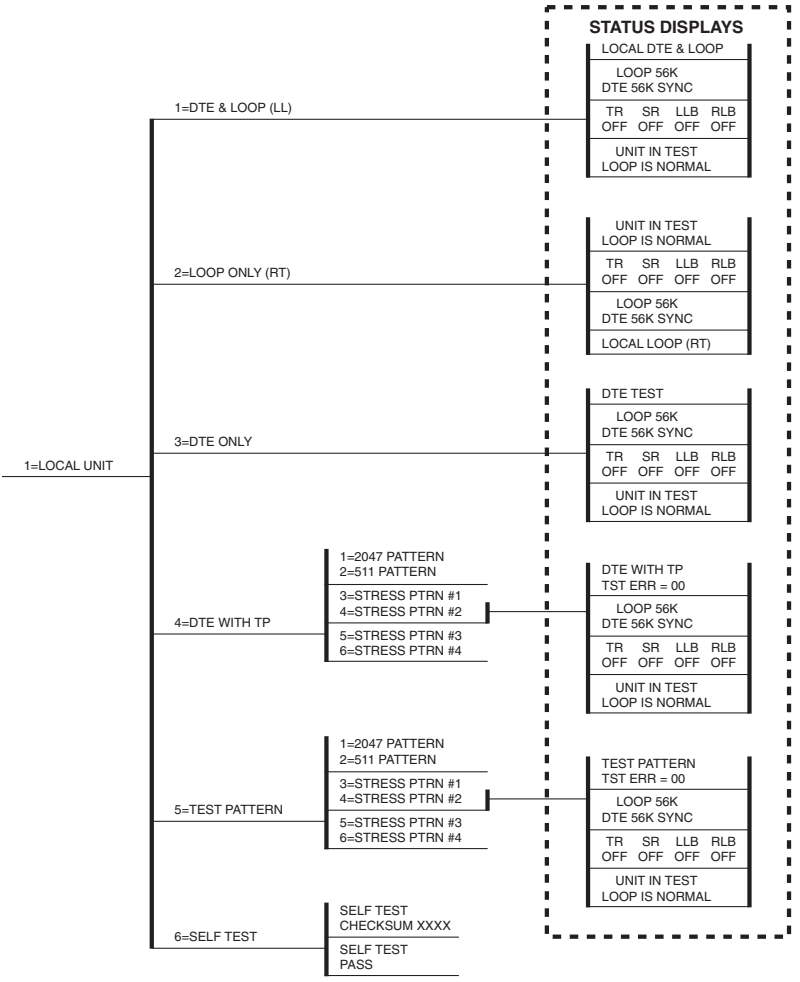

Fig. 4-11. Local Unit Submenu.

Menu Map

2=TEST/1=LOCAL UNIT

Operation

Follow standard operating procedure. When 2=TEST is flashing, press the Enter button. The first two submenu items are displayed.

```
1=LOCAL UNIT
2=REMOTE UNIT
```

Fig. 4-12. Local and Remote Unit Options.

1. Use the number 1 key to activate the 1=Local Unit Test submenu.
2. Press the Enter key to enter the submenu.
3. Two of the submenu choices are displayed.

Table 4-2. Test Commands.

Front Panel	AT Command	Description
1=DTE & LOOP (LL)	&T10	TD/RD and RX/TX Loopbacks
2=LOOP ONLY (RT)	&T11	RX/TX Loopback at DTE interface
3=DTE ONLY	&T1	TX/RX Loopback at network interface
4=DTE WITH TP	&T8	TX/RX Loopback with test pattern
5=TEST PATTERN	&T9	Transmit/receive test pattern
6=SELF TEST	NA	Check internal components

1=DTE & LOOP (LL)

The DTE and LOOP test splits the CSU/DSU MS/DBU into separate DTE and loop interface sections and then loops the receive data of each interface back to its respective transmit data. A block diagram illustrating the loopback points and the signal paths for this test is shown in **Fig. A-1** in Appendix A.

When the LL lead from the DTE is activated, the test described above is also performed by the CSU/DSU MS/DBU. The CSU/DSU MS/DBU acknowledges this DTE-activated test by activating the TM on the DTE interface.

This particular test permits the separate sections of the CSU/DSU MS/DBU to be checked. First, it allows the local DTE interface drivers and receivers to be tested with an external data analyzer or data from the DTE device. Second, it allows the loop interface section of the local CSU/DSU MS/DBU to be tested from the remote site over the actual communications circuit.

Testing from the remote end of the circuit is normally done with a bit error rate tester (BERT), or by using an internal Test Pattern Generator on the Remote CSU/DSU MS/DBU unit.

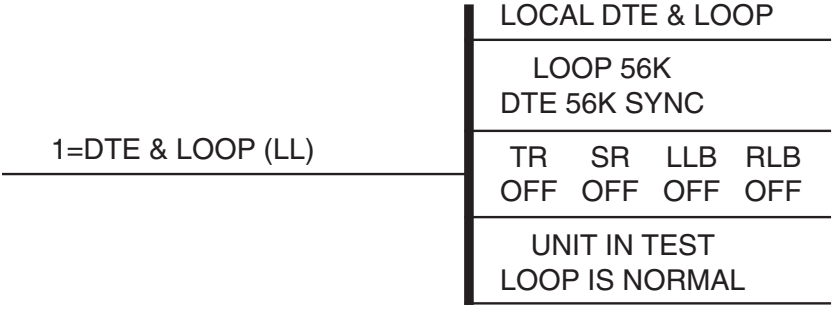

Fig. 4-13. DTE & Loop (LL) Status Display.

Menu Map

2=TEST/1=LOCAL UNIT/1=DTE & LOOP (LL)/Displays

Operation

Follow standard operating procedures. When 1=DTE & LOOP (LL) is flashing, press the Enter button to initiate the test. The system briefly displays "Please Wait," after which it displays the type of test being performed.

Fig. 4-14. DTE & Loop.

Use the scroll buttons to continue viewing the other test results.

Test Displays

- DTE & Loop—Type of test being performed
- Loop 56K—Loop rate
- DTE 56K Sync—DTE rate and data type

Available interface leads

- TR—Terminal Ready Input
- SR—Set Ready Output
- LLB—Local Loopback Input
- RLB—Remote Loopback Input
- OFF/ON—State of the respective leads displayed immediately above
- Unit in Test—Operating mode at CSU/DSU MS/DBU
- Loop is Normal—Status of network service

To Exit a Test

1. Press the #(Quick) key to access the 1=EXIT TEST/2=DISPLAY STATUS submenu

   or

   Press the Cancel key to change from the status display to the main menu. The TEST selection is active (flashing).

2. Press the Enter key, and the alternate test control menu is displayed.

Fig. 4-15. Exit Test and Display Status.

1=EXIT TEST—Terminates the test in progress and returns the CSU/DSU MS/DBU to the main menu.

2=DISPLAY STATUS—Re-enters the test display for additional viewing.

Table 4-3. Submenu Test Commands.

Front Panel	AT Command	Description
1=EXIT TEST	&T0	Stops test/returns to data mode
2=DISPLAY STATUS	N/A	Displays present test status

2=LOOP ONLY (RT)

With the LOOP ONLY (RT) test, the network receive data is looped to the network transmit Path inside the DTE interface section of the CSU/DSU MS/DBU. The physical DTE interface is ignored for this test. A block diagram illustrating the loopback point and the signal paths for this test is shown in **Fig. A-2** in **Appendix A**.

This test allows the loop interface and a major portion of the DTE interface for the local CSU/DSU MS/DBU to be tested from the remote site over the actual communications circuit. Like the DTE and LOOP (LL) test, the test from the remote site is usually done with a BERT tester.

While this test is being performed, the message, LOCAL LOOP (RT), is shown on the CSU/DSU MS/DBU display. The other status messages shown in the menu diagram are accessible by using the UP/DOWN SCROLL keys.

The loopback point within the CSU/DSU MS/DBU and its operation for the LOOP ONLY (RT) test are the same as the Remote Digital Loopback (RT) test initiated and controlled from a remote CSU/DSU MS/DBU.

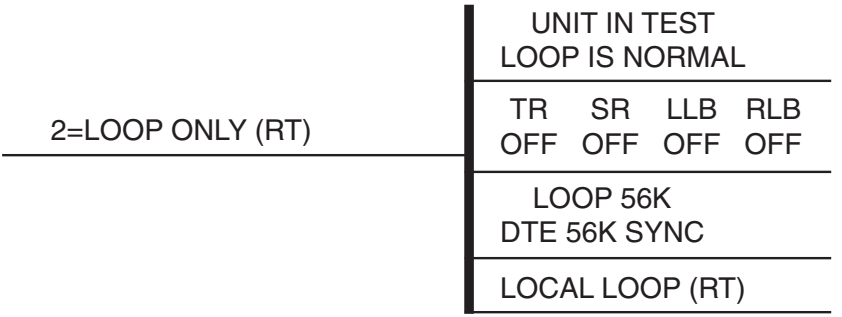

Fig. 4-16. Loop Only (RT) Status Display.

Menu Map

2=TEST/1=LOCAL UNIT/2=LOOP ONLY (RT)/Displays

Operation

Follow standard operating procedures.

1. When 2=LOOP ONLY (RT) is flashing, press the Enter button. The system briefly displays "Please Wait," after which it displays the first of the test results.

2. Continue with operational procedures described for DTE & LOOP (LL). The next six selections are the same as for DTE & Loop (LL).

   Local Loop (RT)—Type of test being performed.

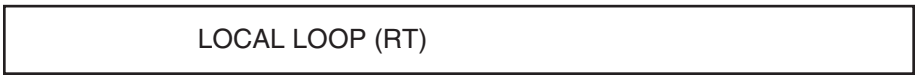

Fig. 4-17. Local Loop (RT).

3=DTE ONLY

The DTE ONLY test provides a method for testing both the DTE interface drivers and receivers of the local CSU/DSU MS/DBU plus its loop transmitter and receiver. For this test, the loop transmit data is connected to the loop receive data at a point close to the physical network interface. The data is then sent back towards the DTE. The transmit circuit to the network is terminated in a zero condition for this test. A block diagram illustrating the loopback point and the signal paths for this test is shown in **Fig. A-3** in **Appendix A**.

Test patterns from an external BERT tester are routed through the DTE interface section of the CSU/DSU MS/DBU and then to the output of the loop-transmitter section, where the signal is encoded for transmission. Instead of being coupled onto the physical transmit circuit of the network, the output of the loop transmitter is coupled back to the loop receiver input where the signal is then decoded and returned to the BERT tester where the serial receive data stream is checked for any bit errors.

This test is used to verify proper operation of both the DTE and loop-interface sections of the local CSU/DSU MS/DBU.

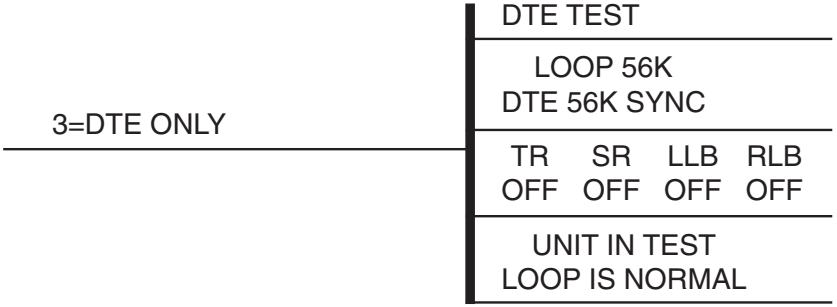

Fig. 4-18. DTE Only Status Display.

Menu Map

2=TEST/1=LOCAL UNIT/3=DTE ONLY/Displays

Operation

Follow standard operating procedures.

1. When 3=DTE ONLY (LAL) is flashing, press the Enter button. The system briefly displays "Please Wait," after which it displays the first of the test results.

2. Continue with operational procedures described for DTE & LOOP (LL).

   DTE ONLY—Type of test being performed.

   The remaining six selections are the same as for DTE & LOOP (LL).

DTE TEST

Fig. 4-19. DTE Test.

4=DTE WITH TP

The DTE WITH TP (test pattern) is similar to the DTE ONLY test described above. Instead of using an external BERT tester connected to the DTE interface, this test uses the internal test pattern generator and detector built into the CSU/DSU MS/DBU. The loopback point and the data paths for this test are illustrated in **Fig. A-4**. This test is primarily used to test the transmitter and receiver sections of the local CSU/DSU MS/DBU.

The internal test-pattern generator and detector of the CSU/DSU MS/DBU operate with one of six different data patterns. When DTE WITH TP test is selected, the particular test pattern to be transmitted by the generator must also be selected. When a selection is made, the test pattern detector examines the receive data stream until synchronization to the specified pattern is achieved. Once synchronized, the detector continues to check the receive data and reports any bit errors detected.

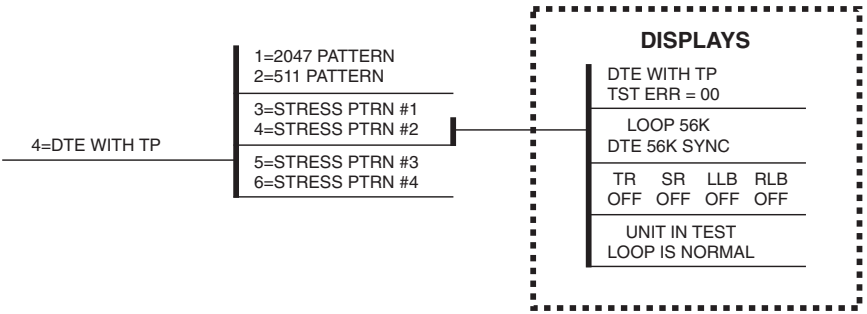

Fig. 4-20. DTE WITH TP Submenu.

Menu Map

2=TEST/1=LOCAL UNIT/4=DTE WITH TP/Submenus 1-6/Displays

Operation

Follow standard operating procedures.

1. When DTE WITH TP is flashing, press the Enter button. The system briefly displays "Please Wait," after which it displays the first of the test results.

```
1=2047 PATTERN
2=511 PATTERN
```

Fig. 4-21. 2047 and 511 Patterns.

Continue with operational procedures described for DTE & Loop (LL).

1=2047 Pattern—Selects the 2047 Pattern

2=511 Pattern—Selects the 511 Pattern

3=Stress Pattern #1—Selects DDS Stress Pattern 1

4=Stress Pattern #2—Selects DDS Stress Pattern 2

5=Stress Pattern #3—Selects DDS Stress Pattern 3

6=Stress Pattern #4—Selects DDS Stress Pattern 4

Table 4-4. DTE With Test Patterns Commands.

Front Panel	AT Command	Description
1=2047 PATTERN	_T0	Standard 2047 random data pattern
2=511 PATTERN	_T1	Standard 511 random data pattern
3=STRESS PTRN #1	_T2	DDS stress pattern #1
4=STRESS PTRN #2	_T3	DDS stress pattern #2
5=STRESS PTRN #3	_T4	DDS stress pattern #3
6=STRESS PTRN #4	_T5	DDS stress pattern #4

While this test is being performed, the CSU/DSU MS/DBU displays as shown in Fig. 4-22.

```
DTE WITH TP
TEST ERR=XX
```

Fig. 4-22. DTE WITH TP.

The first line of the display indicates the type of test being performed. The second line of the display indicates the number of errors accumulated by the test pattern detector.

If errors occur during this test, the TEST ERR display can be reset to zero, by pressing the "1" key. To verify proper operation of this test, single bit errors can be injected into the transmitted test pattern by pressing the "2" key. These errors appear on the TEST ERR display.

5=TEST PATTERN

The TEST PATTERN selection actually converts the local CSU/DSU MS/DBU into a BERT tester for use in testing a remote CSU/DSU MS/DBU over the actual communications circuit. With this test, the remote CSU/DSU MS/DBU can be looped back in either the DTE and LOOP (LL) or the LOOP ONLY (RT) mode. Instead of being looped back, the remote CSU/DSU MS/DBU can operate in the data mode with data supplied from an external BERT tester, or it can be operating in the TEST PATTERN mode. The data paths for this mode are illustrated in **Fig. A-5**.

When this test selection is chosen, the system presents the same test patterns as for DTE WITH TP.

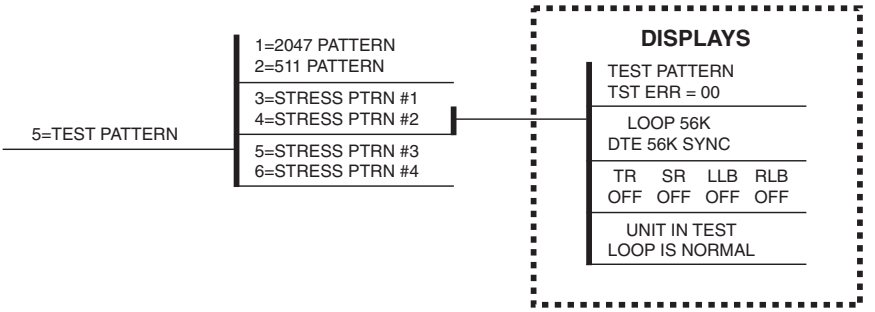

Fig. 4-23. Test Pattern Submenu.

Menu Map

2=TEST/1=LOCAL UNIT/5=TEST PATTERN/Submenus 1-6/Displays

Operation

Follow standard operating procedures.

1. When 5=TEST PATTERN is flashing, press the Enter button. The system briefly displays "Please Wait," after which it displays the first of the test results.

2. Continue with operational procedures described for DTE & Loop (LL).

1=2047 PATTERN
2=511 PATTERN

Fig. 4-24. 2047 and 511 Patterns.

6=SELF TEST

The self-test is designed to verify current operation of the CSU/DSU MS/DBU. It can be performed at any time. Try this test if you have any doubt about whether the CSU/DSU MS/DBU is working.

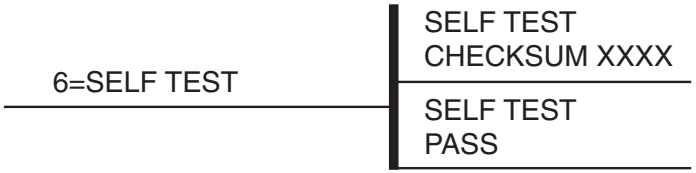

Fig. 4-25. Self Test Submenu.

Menu Map

2=TEST/1=LOCAL UNIT/6=SELF TEST

Operation

Follow standard operating procedures.

1. When b=SELF TEST is flashing, press the Enter button. The LEDs are active as the system runs the self-test, displays the results, and then returns to the Main Menu display.

Fig. 4-26. Self Test and Checksum.

Self Test Pass indicates no problem with the operation.

Self Test Checksum XXXX is the software version.

4.6.2 2=REMOTE UNIT, SUBMENU OF 2=TEST

The Remote Unit submenu lets you put a remotely installed CSU/DSU MS/DBU into Loopback. This also applies to CSU/DSU MS/DBU units installed in a multipoint network. After putting the remote CSU/DSU MS/DBU into loopback, you can choose one of 6 Test Patterns or Data from the DTE. Test-pattern results are then displayed.

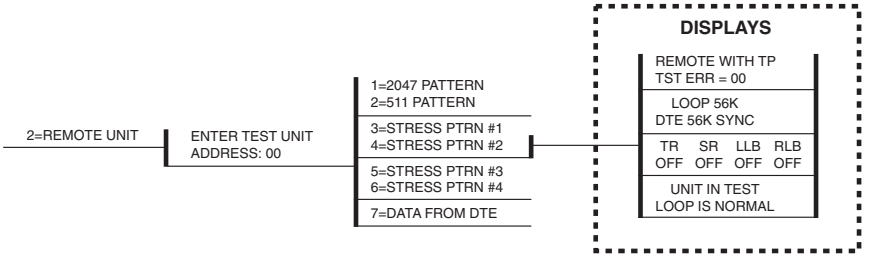

Fig. 4-27. Remote Unit Submenu.

Menu Map

2=TEST/2=REMOTE UNIT/SELECTIONS

Operation

Follow standard operating procedures.

1. When 2=REMOTE UNIT is flashing, press the Enter button. The prompt to enter the Test Unit Address is displayed.

```
ENTER TEST UNIT
ADDRESS:  XX
```

Fig. 4-28. Enter Test Unit.

2. Use the number keys to type the address of the remote CSU/DSU MS/DBU.

3. Press the Enter key to enter the address into the system. The first of the submenu items is displayed.

```
1=2047 PATTERN
2=511 PATTERN
```

Fig. 4-29. 2047 and 511 Pattern.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command accepted" and returns to the status menu.

1=2047 Pattern—Selects the 2047 pattern

2=511 Pattern—Selects the 511 pattern

3=Stress Pattern #1—Selects DDS Stress Pattern 1

4=Stress Pattern #2—Selects DDS Stress Pattern 2

5=Stress Pattern #3—Selects DDS Stress Pattern 3

6=Stress Pattern #4—Selects DDS Stress Pattern 4

7=Data From DTE

Status Displays

Remote with TP
Test Err—00

Local DTE & Loop—Type of test being performed

Loop 56K—Loop rate

DTE 56K sync—DTE rate and data type

Available interface leads

TR—Terminal Ready Input

SR—Set Ready Output

LLB—Local Loopback Input

RLB—Remote Loopback Input

OFF/ON—State of the respective leads displayed immediately above.

Unit in Test—Operating mode of CSU/DSU MS/DBU

Loop is Normal—Status of network service

1=EXIT TEST
2=DISPLAY STATUS

The menu choices here are used to immediately exit the test selection or to re-enter status display. These menu items are available only after tests have been performed.

1=EXIT TEST—exits the testing process, returning to the Main Menu for selection.

2=DISPLAY STATUS—re-enters test display for additional viewing.

When a test has been requested, the system briefly displays "Please Wait" before presenting the first test display. At any test result display, follow these steps:

1. Press the #(Quick) key to access the 1=EXIT TEST/2=DISPLAY STATUS submenu or

2. Press the Cancel key to change from the status display to the main menu.

The TEST selection is active (flashing).

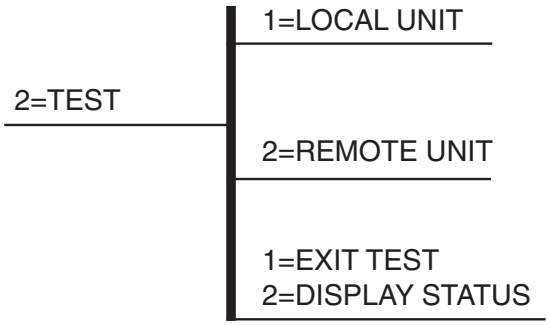

Fig. 4-30. Restricted Test Submenu.

Menu Map

2=TEST/1=LOCAL UNIT or REMOTE UNIT/Tests/1=EXIT TEST or 2=DISPLAY STATUS

Press the Enter key. The alternate test control menu is displayed.

1=Exit Test terminates the test in progress and returns the CSU/DSU MS/DBU to the data mode.

2=Display Status re-enters test display for additional viewing.

```
1=EXIT TEST
2=DISPLAY STATUS
```

Fig. 4-31. Exit Test and Display Status Options.

4.7 3=CONFIG

The Configuration menu consists of a group of five submenus, each relating to a specific interface or function of the CSU/DSU MS/DBU that requires setup.

1=Network Opt—Network Interface Parameters

2=DTE Options—DTE Interface Parameters

3=Test Options—Unit Test Options

4=Dial Options—Unit Dialing Options

5=Manual Command

The CSU/DSU MS/DBU has four different user profiles (sets of configurations options) that are stored in read-only memory. The unit is shipped from the factory with profile number 1 (default configuration) loaded into the current (non-volatile configuration) memory. If profile 1 matches requirements for the system, then no additional configuration is required to put the unit into service. If profile 1 does not match system requirements, it can be modified, or one of the other profiles that more closely matches the system requirements can be loaded into current memory. When a different profile is loaded, or the existing profile is modified, it is stored in the current (non-volatile configuration) memory. The CSU/DSU MS/DBU is then configured with that profile every time power is turned on or until the unit is reset.

Submenus of 3=CONFIG

1=LOCAL—Configuration submenus are available to set all the configuration parameters by manual operation of the front panel.

2=REMOTE—Establishes communication with the remote CSU/DSU MS/DBU so the front panel of the local CSU/DSU can be used to configure the remote CSU/DSU.

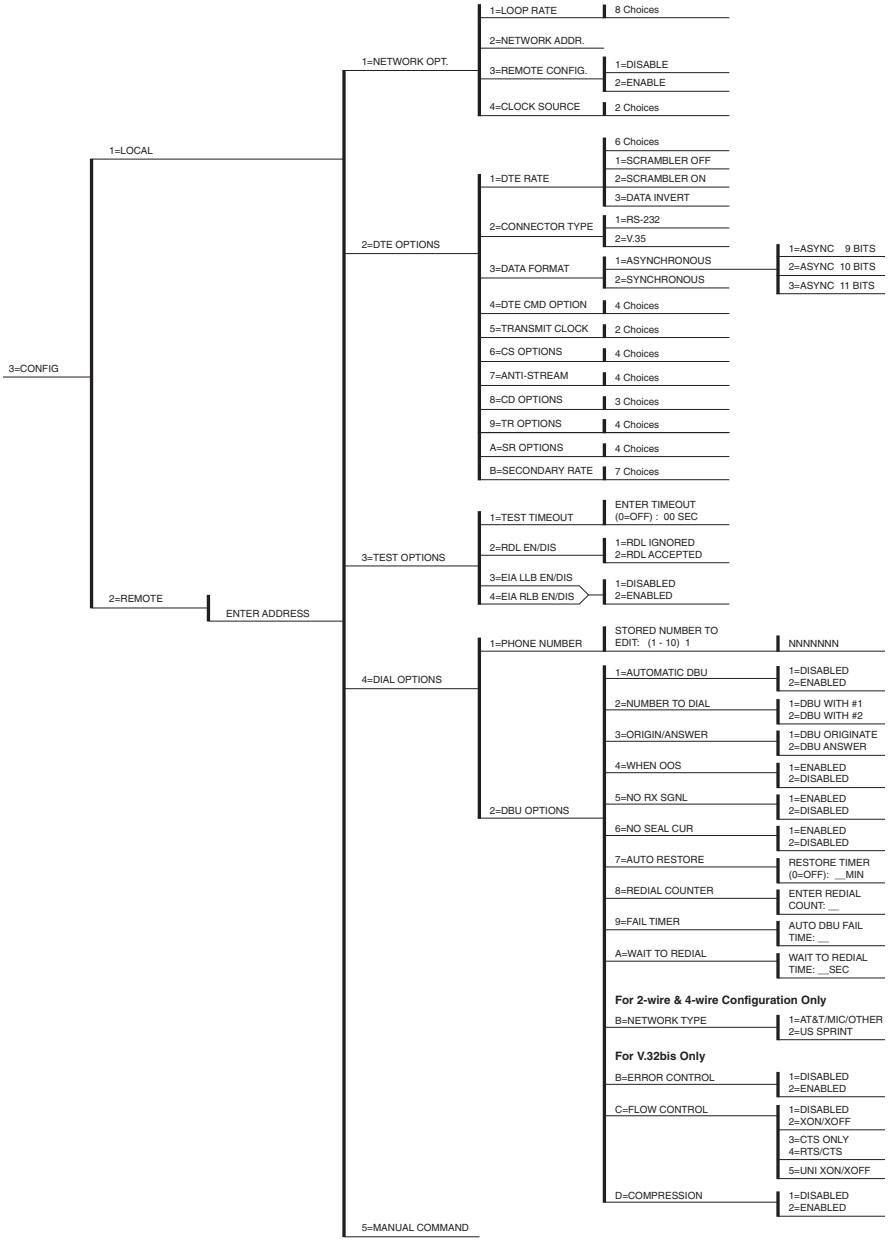

Fig. 4-32. Complete Configuration Menu.

Operation

Follow standard operating procedures.

Menu flow is normally depicted from left to right. When scrolling through submenu items with the down scroll buttons, the flow wraps from bottom to top and repeats the menu order. To back up, press the up scroll button. At every level of the menu, pressing the Cancel button returns to the previous menu level. Pressing the Cancel button repeatedly returns the system to the main menu, or you can press the #(Quick) button to return to the main menu immediately.

1. Press the Enter button to enter the Configuration mode. The two submenu choices, 1=LOCAL/2=REMOTE, are displayed.

2. Use the "1" key to activate the 1=Local Menu.

3. Press the Enter key to enter the Local submenus.

4. The first two submenu choices are displayed.

```
1=NETWORK OPT
2=DTE OPTIONS
```

Fig. 4-33. Network Opt and DTE Options.

4.7.1 1=NETWORK OPTIONS

Offers the choices of the configuration parameters that control the loop operation of the CSU/DSU MS/DBU.

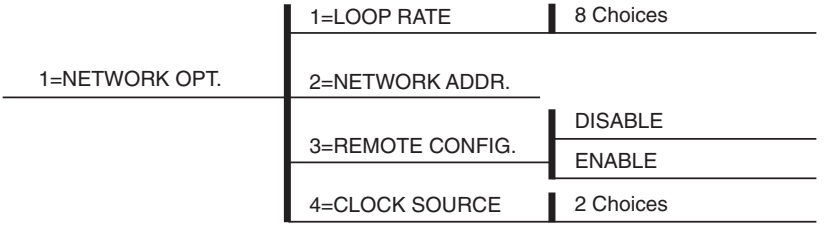

Fig. 4-34. Network Opt. Submenu.

Menu Map

3=CONFIG/1=LOCAL/1=
NETWORK OPT

Operation

Follow standard operating procedures.

1. When 1=NETWORK OPT is flashing, press the Enter button. The first of the submenu items is displayed.

2. Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu.

1=LOOP RATE
2=NETWORK ADDR.

Fig. 4-35. Network Type and Network Addr.

If submenu 1 or 8 is selected, the system will briefly display "Command Accepted" and return to the active Loop Rate menu.

If any submenu 2 through 7 is selected, the system will prompt for a selection of 1=No Second Channel, 2=Second Channel. If this option is presented, continue the same operation to arrive at the display of "Command Accepted."

Submenu 1 Loop Rate

The Loop Rate option sets the loop operating speed. The unit should be set to the rate required by the DDS service. The CSU/DSU MS/DBU also supports subrate DTE data over a 56K loop. The loop rate must be set independently of the DTE rate.

Eight loop selections are available. After selecting any loop rate other than Auto or 64K (1 or 8), the option for a secondary channel is available.

The various loop rates and format selections are listed in **Table 4-5** with the equivalent AT commands that perform the same configuration functions.

Table 4-5. Loop Rate Commands.

Front Panel	AT Command	Description
1=AUTO	%B0	DSU auto rate adapts to network
2=2.4K NO SEC CH	%B1	2.4K with no secondary channel
3=4.8K NO SEC CH	%B2	4.8 K with no secondary channel
4=9.6K NO SEC CH	%B3	9.6K with no secondary channel
5=19.2K NO SEC CH	%B4	19.2K with no secondary channel
6=38.4K NO SEC CH	%B5	38.4K with no secondary channel
7=56K NO SEC CH	%B6	56K with no secondary channel
8=64K NO SEC CH	%B7	64K clear channel
2=2.4K SEC CH	%B9	2.4K with secondary channel
3=4.8K SEC CH	%B10	4.8K with secondary channel
4=9.6K SEC CH	%B11	9.6K with secondary channel
5=19.2K SEC CH	%B12	19.2K with secondary channel
6=38.4K SEC CH	%B13	38.4K with secondary channel
7=56K SEC CH	%B14	56K with secondary channel

Submenu 2 Network Addr.

A two-digit decimal address can be assigned to each CSU/DSU MS/DBU. This addressing capability makes it possible to perform remote configuration and testing in point-to-point and multidrop networks.

1. Use the number keys to select an address.
2. Press the Enter key to enter the address into the system.
3. The system briefly displays “Command Accepted” and returns to the active Network Address menu.

Table 4-6. Network Address Commands.

Front Panel	AT Command	Description
xx (Decimal)	_N=xx	Assigns a two-digit Network Address

Submenu 3 Remote Configuration

This option sets up the CSU/DSU MS/DBU to accept or reject remote configuration commands.

1. Use the number of the desired mode to activate the selection.
2. Press Enter to select the mode.
3. The system briefly displays "Command Accepted" and returns to the active NETWORK OPT menu with the Remote Config selection active.

Table 4-7. Remote Configuration Commands.

Front Panel	AT Command	Description
1=DISABLE	&P4	Disable Remote Configuration
2=ENABLE	&P5	Enable Remote Configuration

Submenu 4 Clock Source

The Clock Source options specifies the timing source for the CSU/DSU MS/DBU's internal circuitry. When operating on a DDS network, the timing should be from network. On a point-to-point private network, one CSU/DSU MS/DBU must be set for master, the other set for network.

Table 4-8. Clock Source Commands.

Front Panel	AT Command	Description
1=MASTER	_X0	DSU is the master timing source
2=FROM NETWORK	_X1	Network RX Signal is timing source

4.7.2 2=DTE OPTIONS

Used to select the configuration parameters that control the operation of the DTE interface of the CSU/DSU MS/DBU.

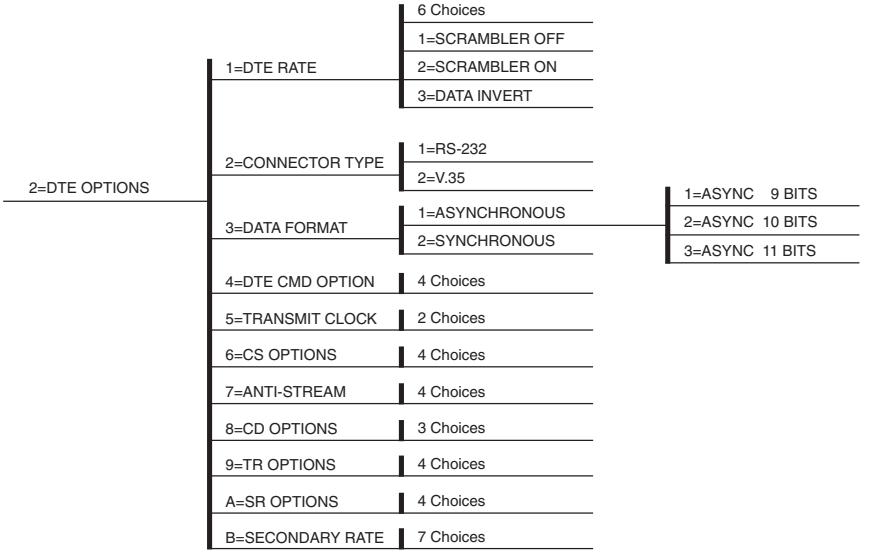

Fig. 4-36. DTE Options Submenu.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT.

Operation

Follow standard operating procedures.

1. When 2=DTE OPT is flashing, press the Enter button. The first of the submenu items is displayed.

Fig. 4-37. DTE Rate and Connector Type.

2. Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu.

Submenu 1 DTE Rate

The DTE RATE option sets the operating speed of the DTE interface when the unit is set for 56K. The CSU/DSU MS/DBU supports six different DTE rates over a 56K Loop.

1. Use the number of the desired DTE RATE to activate the selection.

2. Press Enter to select the DTE rate.

3. The system briefly displays "Command Accepted" and returns to the DTE OPTIONS menu with the DTE RATE selection active.

Table 4-9. DTE Rate Commands.

Front Panel	AT Command	Description
1=DTE 56K/57.6K	%K8	DTE rate: 56K sync or 57.6 async
2=DTE 2.4K	%K3	DTE rate 2.4K sync and async
3=DTE 4.8K	%K4	DTE 4.8K sync and async
4=DTE 9.6K	%K5	DTE 9.6K sync and async
5=DTE 19.2K	%K6	DTE 19.2K sync and async
6=DTE 38.4K	%K7	DTE 38.4K sync and async

Table 4-10. Loop Rate of 56K.

Front Panel	AT Command	Description
1=SCRAMBLER OFF	_F0	DTE data scrambler disabled
2=SCRAMBLER ON	_F1	DTE data scrambler enabled
3=DATA INVERT	_F2	DTE data invert enabled

NOTE

For point-to-point operation at 56K with secondary channel, the network will not allow both the primary and secondary channel data to be zero simultaneously. For those applications where HDLC protocol is being used, the above constraint can be eliminated by selecting the DATA INVERT OPTION. The constraint can also be eliminated by selecting the SCRAMBLER ON option.

For 64K clear-channel operation, there is a possibility that the DTE data sequences might mimic network loop-maintenance functions and erroneously cause other network elements to activate loopbacks. To prevent this, the SCRAMBLER ON option should be selected for this mode of operation.

The SCRAMBLER ON option must be selected in both the local and remote CSU/DSU MS/DBU for the situations described above, and it must never be used for multipoint operation.

Submenu 2 Connector Type

The Connector Type option is used to specify which of the primary-channel connectors is used to connect to the Data Terminal Equipment.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/Connector Type

Operation

Follow standard operating procedures.

1. When 2=Connector Type is flashing, press the Enter button. The first of the submenu items is displayed.

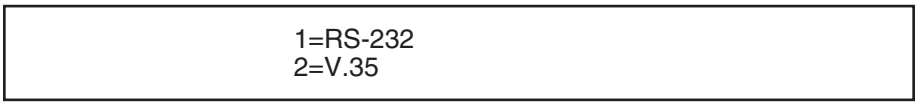

Fig. 4-38. RS-232 and V.35 Options.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the DTE Options menu.

Table 4-11. Connector Type Commands.

Front Panel	AT Command	Description
1=RS-232	N/A	Enables the EIA 232 interface
2=V.35	N/A	Enables the V.35 interface

Submenu 3 Data Format

The Data Format option is used to select either the synchronous or the asynchronous mode of operation for the DTE interface.

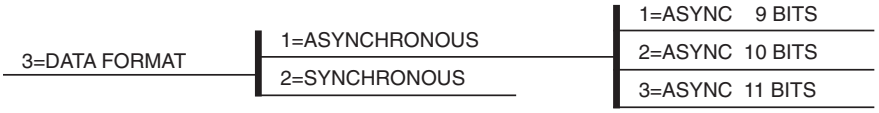

Fig. 4-39. Data Format Submenu.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/3=DATA FORMAT

Operation

Follow standard operating procedures.

1. When 3=DATA FORMAT is flashing, press the Enter button. The first of the submenu items is displayed.

1=ASYNCHRONOUS 2=SYNCHRONOUS

Fig. 4-40. Asynchronous or Synchronous Option.

2. Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the DTE Options menu.

NOTE

If the asynchronous option is chosen, the length of the data bytes must be selected.

3. Use the number of the desired submenu choice to activate the desired asynchronous format.

4. Press Enter to enter the selected choice into the system. The system briefly displays "Command Accepted" and returns to the DTE Options menu with the Data Format selection active.

Table 4-12. Data Format Commands.

Front Panel	AT Command	Description
1=ASYNCHRONOUS	&Q0	Always asynchronous
2=SYNCHRONOUS	&Q2	Always synchronous
For asynchronous options, select the length of the data bytes.		
1=ASYNC 9 BITS	N/A	9 bits including start, stop, parity
2=ASYNC 10 BITS	N/A	10 bits including start, stop, parity
3=ASYNC 11 BITS	N/A	11 bits including start, stop, parity

Submenu 4 DTE CMD Option

The DTE Command option is used to enable the DTE interface for one of the three different command modes.

3=CONFIG/1=LOCAL/2=DTE OPT/4=DTE CMD OPTION

Operation

Follow standard operating procedures. When 4=DTE CMD OPTION is flashing, press the Enter button. The first of the submenu items is displayed.

1=DISABLED
2=AT COMMAND SET

Fig. 4-41. Disabled and AT Command Set Options.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays “Command Accepted” and returns to the active menu.

Table 4-13. DTE CMD Commands.

Front Panel	AT Command	Description
1=DISABLED	N/A	Disables all DTE command modes
2=AT COMMAND SET	N/A	Enables AT commands from DTE
3=V.25 SYNC	N/A	Enables V.25 bis (SDLC) commands
4=V.25 BSC/ASYNC	N/A	Enables V.25 (BISYNC and ASYNC)

Submenu 5 Transmit Clock

The Transmit Clock option is used to select the source of the clock used to transfer data from the DTE into the CSU/DSU MS/DBU.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/5=TRANSMIT CLOCK

Operation

Follow standard operating procedures. When 5=TRANSMIT CLOCK is flashing, press the Enter button. The first of the submenu items is displayed.

1=NORMAL
2=EXTERNAL

Fig. 4-42. Normal and External Options.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the DTE OPTIONS menu with the Transmit Clock selection active.

Table 4-14. Transmit Clock Commands.

Front Panel	AT Command	Description
1=NORMAL	&X0	TX clock from CSU/DSU selected
2=EXTERNAL	&X1	ETC clock from DTE selected

NOTE

The External clock option is normally used in modem tail circuit applications. A CSU/DSU to modem interconnect diagram for this application is shown in Fig. B-1.

The External clock option is also recommended when the EIA 232 connector is used for 56 Kbps applications. A special CSU/DSU SW56 cable diagram for this application is shown in Fig. B-2**. Using this option and special cable eliminates data errors caused by excessive delays in the DTE transmit clock receiver and transmit data driver.**

Submenu 6 CS Options

The CS OPTIONS menu is used to select one of five different control modes for the Clear to Send (CS) lead.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/6=CS OPTIONS

Operation

Follow standard operating procedures. When 6=CS OPTIONS is flashing, press the Enter button. The first of the submenu items is displayed.

1=FORCED ON
2=FOLLOWS RS

Fig. 4-43. Forced On and Follows RS Options.

NOTE

If one of the options chosen involves request to send (RS), then you mustalso select the delay from RS to CS.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu or display choices for the delay.

Table 4-15. CS Options Commands.

Front Panel	AT Command	Description
1=FORCED ON	&R0	CS always ON
2=FOLLOWS RS	&R1	CS state same as RS state
3=FOLLOWS CD	&R2	CS state same as CD state
4=FOLLOWS RS+CD	&R3	CS state same as RS and CD state
If one of the options chosen involves request to send (RS), select the delay from RS to CS.		
1=CS DELAY SHORT	_D0	Short Delay from RS to CS selected
2=CS DELAY LONG	_D1	Long Delay from RS to CS selected

Specified times for the SHORT and LONG delays at the different operating speeds are shown in **Table 4-14**.

Table 4-16. Specified Times for Short and Long Delay.

Rate	Short Delay	Long Delay
64	1.1 ms	16.1 ms
56	1.1 ms	16.1 ms
19.2	1.5 ms	16.5 ms
4.8	1.5 ms	16.5 ms
2.4	1.5 ms	16.5 ms

Submenu 7 Anti-Stream

The Anti-Stream option is used to select the anti-stream timeout, which is the maximum time the CSU/DSU MS/DBU transmits data into the network from the DTE. This feature prevents one DTE device on a multidrop network from continuously tying up the transmit circuit back to the master CSU/DSU.

The anti-stream timer is reset to zero when RS transitions to the active state and is updated every second while RS is active. When the anti-stream timeout expires, the CSU/DSU MS/DBU stops transmitting DTE data into the network but continues to accept data from it. This condition exists until the DTE deactivates the RS input.
Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/7=ANTI-STREAM

Operation

Follow standard operating procedures. When 7=ANTI-STREAM is flashing, press the Enter button. The first of the submenu items is displayed.

```
1=TIMER OFF
2=TIME 10 SEC
```

Fig. 4-44. Timer Off and Time 10 Sec. Options.

NOTE

If one of the options chosen involves request to send (RS), then the delay from RS to CS is selected.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the DTE OPTIONS menu with the Anti-Stream selection active.

Table 4-17. Anti-Stream Commands.

Front Panel	AT Command	Description
1=TIMER OFF	&T0	Anti-stream timer disabled
2=TIME 10 SEC	&T1	Timeout equals 10 seconds
3=TIME 30 SEC	&T2	Timeout equals 30 seconds
4=TIME 60 SEC	&T3	Timeout equals 60 seconds

Submenu 8 CD Options

The CD Options menu is used to select one of three different control modes for the receive line signal detector (CD) lead.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/8=CD OPTIONS

Operation

Follow standard operating procedures. When 8=CD OPTIONS is flashing, press the Enter button. The first of the submenu items is displayed.

Fig. 4-45. Forced On and Normal Options.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the DTE OPTIONS menu.

Table 4-18. CD Options Commands.

Front Panel	AT Command	Selections Description
1=FORCED ON	&C0	ON all the time
2=NORMAL	&C1	ON only when data present on loop

Submenu 9 TR Options

The TR Options menu is used to select the response of the CSU/DSU MS/DBU to the data terminal ready (TR) lead.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/9=TR OPTIONS

Operation

Follow standard operating procedures. When 9=TR OPTIONS is flashing, press the Enter button. The first of the submenu items is displayed.

1=IGNORED
2=COMMAND SWITCH

Fig. 4-46. Ignored and Command Switch Options.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu.

Table 4-19. TR Options Commands.

Front Panel	AT Command	Selections Description
1=IGNORE	&D0	Ignore the TR input
2=COMMAND SWITCH	&D2	Switch to Backup/Dedicated

Submenu A SR Options

The SR Options menu is used to select the operating mode for the data set ready (SR) lead.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/A=SR OPTIONS

Operation

Follow standard operating procedures. When A=SR Options is flashing, press the Enter key to enter the SR Options submenu. The first of the SR Options submenu items is displayed.

1=FORCED ON
2=OFF OOS ONLY

Fig. 4-47. Forced On and Off OOS Only Options.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays “Command Accepted” and returns to the active menu.

Table 4-20. SR Options Commands.

Front Panel	AT Command	Selections Description
1=IGNORE	&S0	Always ON
2=OFF OOS Only	&S1	Off when network out of service
3=OFF Test Only	&S3	Off for test only
4=OFF Test + OOS	&S4	Off for test or OOS

Submenu B Secondary Rate

The Secondary Rate option is used to select the operating speed for the secondary channel if the secondary channel option was selected during setup of the NETWORK OPT.

Menu Map

3=CONFIG/1=LOCAL/2=DTE OPT/B=SECONDARY RATE

Operation

To display the SECONDARY RATE submenu of the 1=LOCAL submenu of 3=CONFIG.

1. Use the scroll buttons to display the B=SECONDARY RATE item.
2. Press the * (Shift) key , then the letter B to activate the Secondary rate submenu.
3. Press the Enter key to enter the Secondary rate submenu.
4. The first of the Secondary rate submenu items is displayed.

```
1=OFF          2=75
3=150          4=300
```

Fig. 4-48. Secondary Rate Submenu.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu.

Table 4-21. Secondary Rate Commands.

Front Panel	AT Command	Description
1=OFF	_Y0	No secondary channel selected
2=75	_Y1	Secondary channel rate: 75 bps
3=150	_Y2	Secondary channel rate: 150 bps
4=300	_Y3	Secondary channel rate: 300 bps
5=600	_Y4	Secondary channel rate: 600 bps
6=1.2K	_Y5	Secondary channel rate: 1200 bps
7=2.4K	_Y6	Secondary channel rate: 2400 bps

4.7.3 3=TEST OPTIONS

The Test Options menu is used to enable or disable different test modes as well as specify the maximum test time allowed.

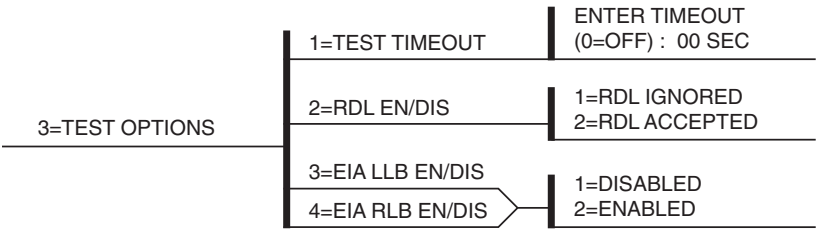

Fig. 4-49. Test Options Submenu.

Menu Map

3=CONFIG/1=LOCAL/3=TEST OPTIONS

Operation

Follow standard operating procedures. When 3=TEST OPTIONS is flashing, press the Enter button. The first of the Test Options submenu items is displayed.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu.

Submenu 1 Test Timeout

The Test Timeout option is used to specify the length of time a CSU/DSU MS/DBU remains in a test mode before an automatic return to the data mode. The LCD display is shown in **Fig. 4-50**.

Fig. 4-50. Test Timeout LCD Display.

Enter the timeout as a two-digit decimal value.

Submenu 2 RDL Select

The RDL Select option is used to specify whether or not the CSU/DSU MS/DBU responds to a remote digital loopback (RDL) request from the far end of the circuit.

Table 4-22. RDL Select Commands.

Front Panel	AT Command	Description
1=RDL Ignored	&T5	RDL request from remote CSU/DSU ignored
2=RDL Accepted	&T4	RDL request accepted

Submenu 3 EIA LLB Select

The EIA LLB Select option is used to specify whether or not the CSU/DSU MS/DBU responds to the local loopback (LLB) input from the DTE.

Table 4-23. EIA LLB Select Commands.

Front Panel	AT Command	Description
1=DISABLED	_A0	EIA LLB disabled
2=ENABLED	_A1	EIA LLB enabled

Submenu 4 EIA RLB Select

The EIA RLB Select option is used to specify whether or not the CSU/DSU MS/DBU responds to the remote loopback (RLB) input from the DTE.

Table 4-24. EIA RLB Select Commands.

Front Panel	AT Command	Description
1=DISABLED	_R0	EIA RLB disabled
2=ENABLED	_R1	EIA RLB enabled

4.7.4 4=Dial Options

The Dial Options menu is used to store up to ten telephone numbers and define Answer operation of the CSU/DSU MS/DBU when it is configured for Switched 56 operation.

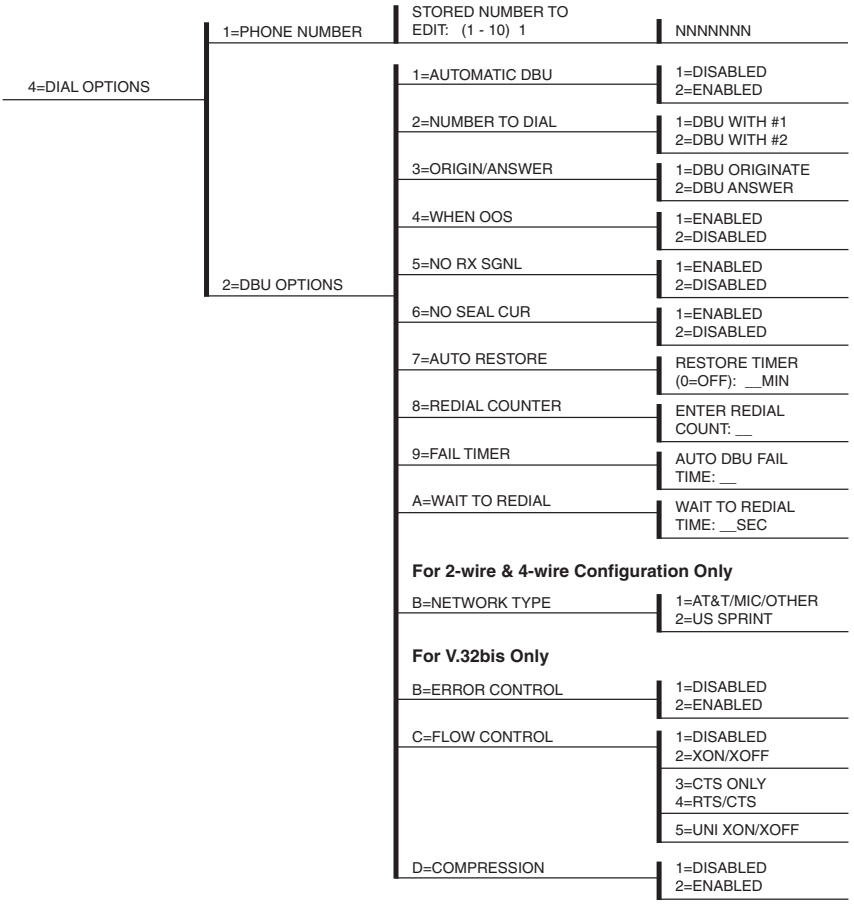

Fig. 4-51. Dial Options Submenu.

Menu Map

3=CONFIG/1=LOCAL/4=DIAL OPTIONS

Operation

Follow standard operating procedures. When 4=DIAL OPTIONS is flashing, press the Enter button. The first of the Dial Options submenu items is displayed.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu.

Submenu 1 Phone Number

The CSU/DSU MS/DBU has storage for ten numbers of 36 digits each. If a phone number is to be edited, the entire number must be re-entered. This process overwrites the previously stored number.

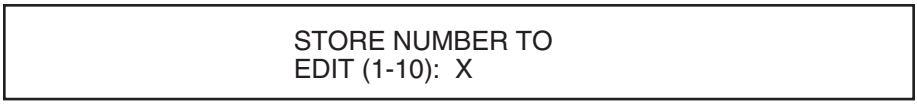

Fig. 4-52. Store Phone Number.

Operation

Use the number key to type the number to be edited. Press Enter. The number is displayed for editing. Typing numbers begins a new entry from left to right.

Submenu 2 DBU Options

The DBU Options are used to select the modes of operation of the Dial Backup features. There are 10 options available.

Menu Map

3=CONFIG/1=LOCAL/4=DIAL OPTIONS/2=DBU OPTIONS

Operation

Follow standard operating procedures. When 2=DBU OPTIONS is flashing, press the Enter button. The first of the DBU Options submenu items is displayed.

```
1=AUTOMATIC DBU
2=NUMBER TO DIAL
```

Fig. 4-53. Automatic DBU and Number to Dial.

Continue with standard operating procedures to select menu options. At the end of the options, the system briefly displays "Command Accepted" and returns to the active menu or display choice.

1=Automatic DBU

Used to specify whether the unit automatically or manually goes to the switched backup circuit.

Table 4-25. Automatic DBU Commands.

Front Panel	AT Command	Description
1=DISABLED	_K0	Automatic DBU disabled
2=ENABLED	_K1	Automatic DBU enabled

2=Number to Dial

The Number to Dial option offers a selection of stored numbers for the unit to automatically dial. The CSU/DSU MS/DBU will then dial automatically if the leased line fails if it is set as originate.

Table 4-26. Number to Dial Commands.

Front Panel	AT Command	Description
1=DBU with #1	_B0	Dial Stored #1
2=DBU with #2	_B1	Dial Stored #2

3=Origin/Answer

This option allows the selection of the DBU unit to originate or answer if the dedicated circuit fails. One end should be set to originate and the other to answer.

Table 4-27. Origin/Answer Commands.

Front Panel	AT Command	Description
1=DBU Originate	_E0	Originates if failure
2=DBU Answer	_E1	Answers if failure

4=When OOS

When enabled, this options allows the CSU/DSU MS/DBU to go to backup if an out-of-service condition is encountered.

Table 4-28. When OOS Commands.

Front Panel	AT Command	Description
1=Enabled	_G0	DBU when OOS
2=Disabled	_G1	Disabled

5=No RX Signal

When enabled, this option allows the CSU/DSU MS/DBU to go to backup when the unit detects a loss of signal.

Table 4-29. No RX Signal Commands.

Front Panel	AT Command	Description
1=Enabled	_H0	DBU when no RX signal
2=Disabled	_H1	Disabled

6=No Seal Cur

When enabled, this option allows the CSU/DSU MS/DBU to go to backup when the unit detects a loss of sealing current.

Table 4-30. No Seal Cur Commands.

Front Panel	AT Command	Description
1=Enabled	_I0	DBU when no Sealing Current
2=Disabled	_I1	Disabled

7=Auto Restore

This option allows the selection of how long the CSU/DSU MS/DBU is in the switched backup mode before it tries to revert back to the dedicated circuit. The selection is entered in minutes (up to 255).

RESTORE TIMER
(0=OFF)--MIN

Fig,. 4-54. Restore Timer.

8=Redial Counter

This option allows the selection of the number of times the CSU/DSU MS/DBU will redial the far end when going to backup. The redial count, which is manually entered, can be up to a maximum of 99 attempts. If the CSU/DSU MS/DBU encounters a busy or reorder, it automatically attempts to establish the call the entered number of times.

Fig. 4-55. Enter Redial.

9=Fail Timer

This option allows the selection of the amount of time that the dedicated circuit failure condition is active before attempting switched backup. The amount of time, which is manually entered, can be up to a maximum of 99 seconds.

Fig. 4-56. Auto DBU Fail.

A=Wait to Redial

This option works in conjunction with Option 8=Redial Counter. It allows the selection of the amount of time between Redial attempts. The amount of time, which is manually entered, can be up to a maximum of 99 seconds.

Fig. 4-57. Wait to Redial.

B=Network Type

This option is used to select the company to provide the switched digital service. When US Sprint is selected, an automatic echo- canceller-suppressor tone is emitted by the CSU/DSU MS/DBU when dialing.

```
1=AT&T, MCI, OTHER
2=US SPRINT
```

Fig. 4-58. Network Type.

4.7.5 5=MANUAL COMMAND

The Manual Command option is a short-cut method for entering configuration and control commands for the CSU/DSU MS/DBU.

Operation

The first display prompts the user to enter the command number.

```
COMMAND: 00
```

Fig. 4-59. Command Option.

Use the number keys to enter the hexadecimal command number. Press the Enter key. The command number is entered. The display shows both the command number and the present value or setting for the command. The command value can be edited or re-issued with the exiting value.

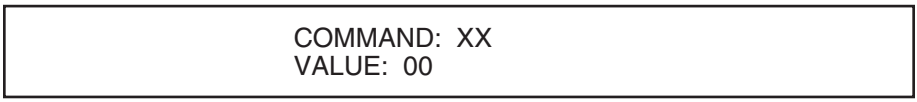

Fig. 4-60. Command and Value Options.

Use the number keys to enter the hexidecimal value. Press the Enter key to complete. The system briefly displays “Command Accepted” and returns to the active menu.

Appendix A: Test Diagrams

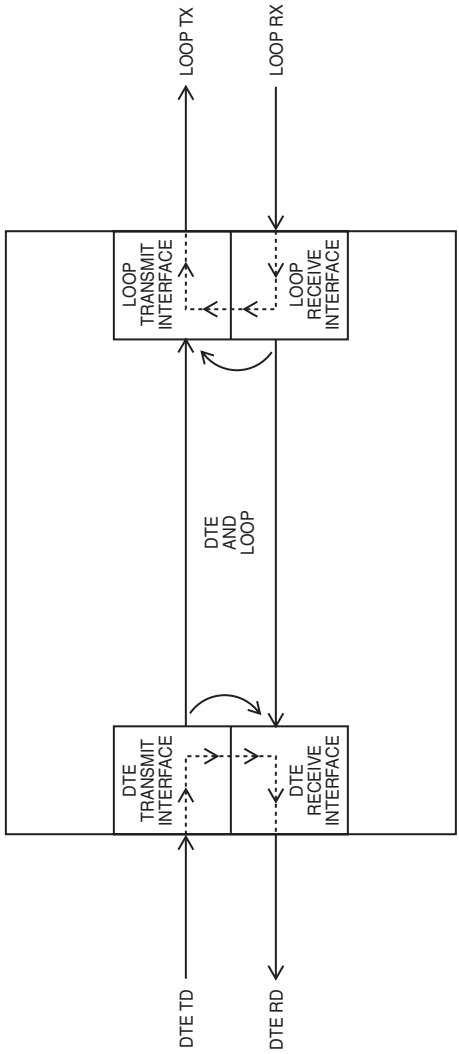

Fig. A-1. DTE and Loop Test Diagram.

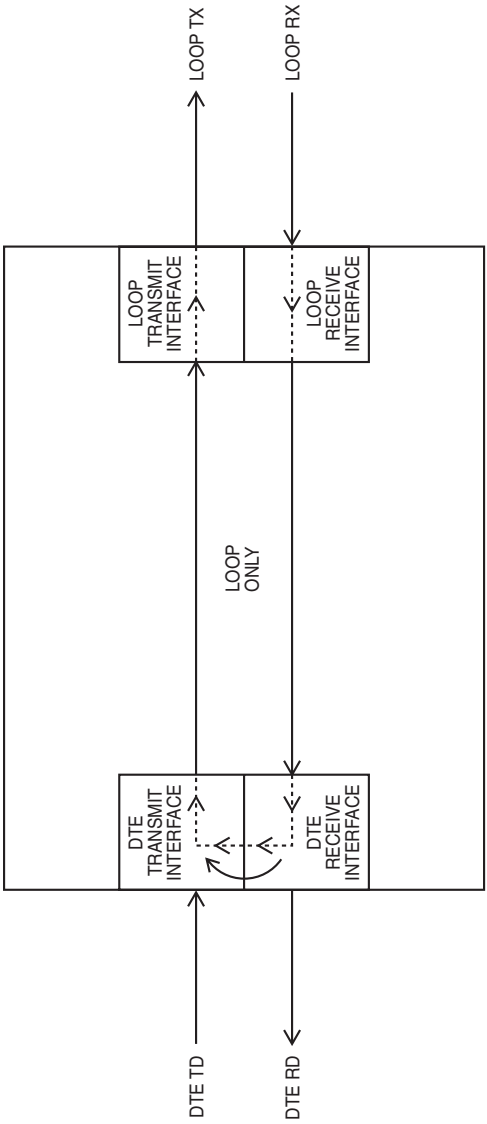

Fig. A-2. Loop Only Test Diagram.

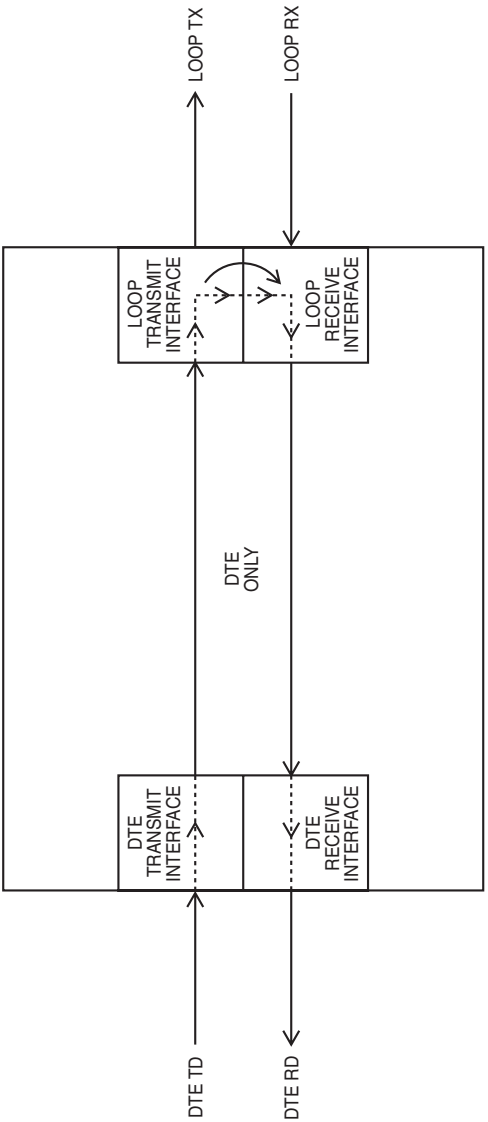

Fig. A-3. DTE Only Test Diagram.

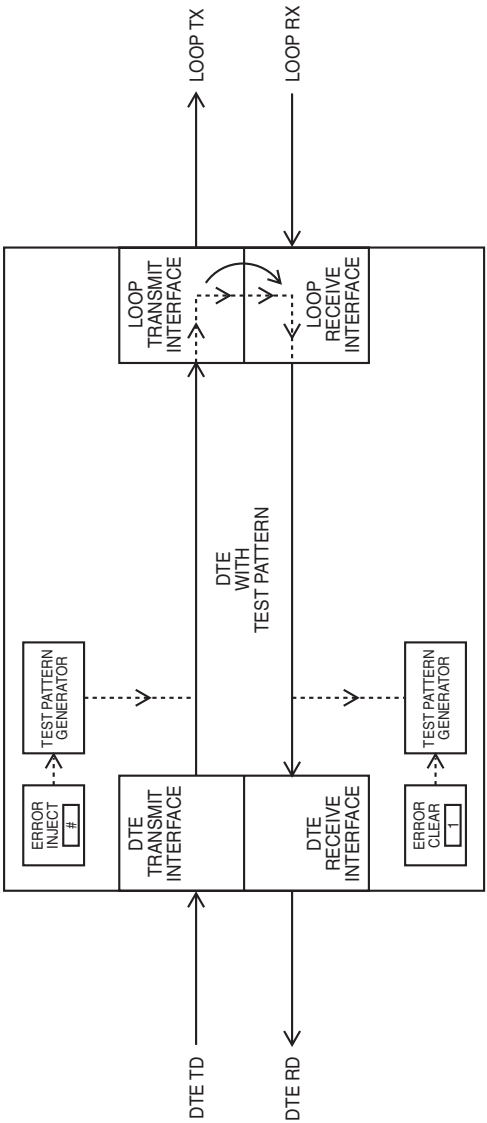

Fig. A-4. DTE With Test Pattern Diagram.

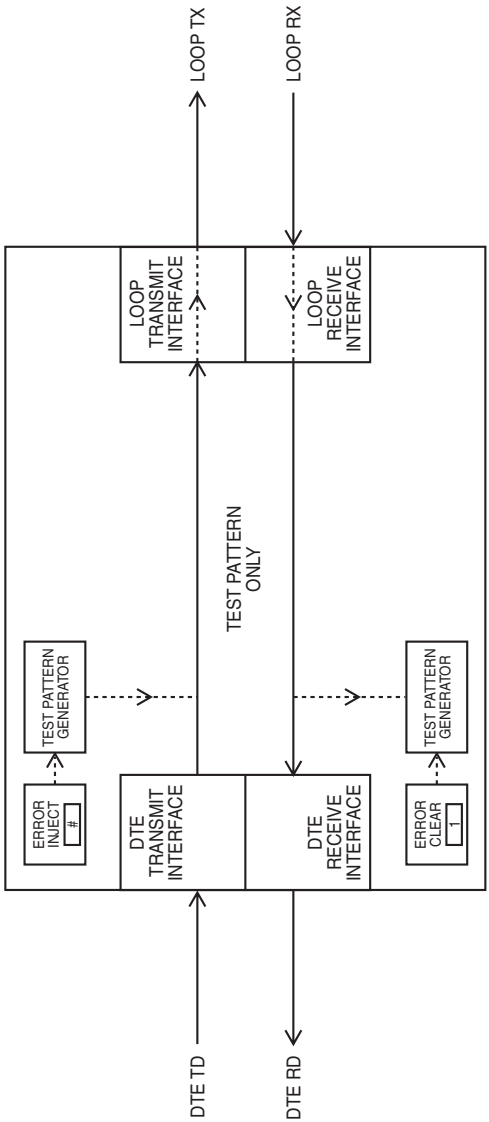

Fig. A-5. Test Pattern Only Diagram.

Appendix B: Clocking Configurations

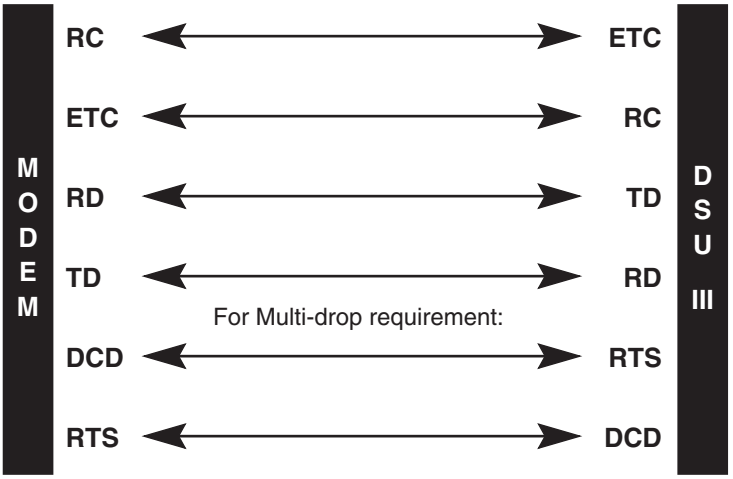

Fig. B-1. CSU/DSU SW56 to Modem Interconnect Diagram.

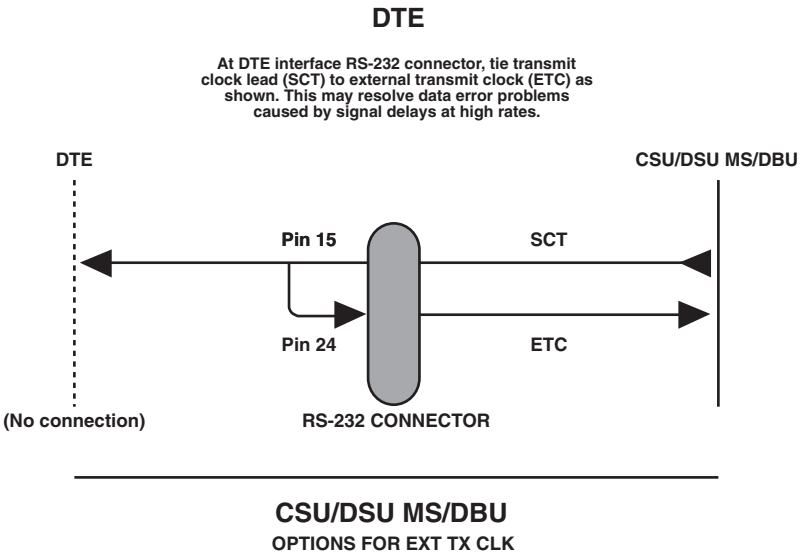

Fig. B-2. EIA 232 Connector for 56 Kbps Application.

Appendix C: AT Commands

Table C-1. AT Commands.

Comd	Title	Default
A/	Re-execute command	none
ATA	Answer	none
ATDn	Dial Number	none
ATE	Echo Command	1
ATH	Hang Up Call	none
ATO	Go Online	none
ATQn	Result Code Display	0
ATSn?	Read S Register	none
ATSn=x	Write to S Register	none
ATVn	Result Code Form	1
ATZ	Reset	none
AT&Cn	DCD Option	0
AT&Dn	DTR Option	0
AT&Fn	Restore Factory Options	none
AT&Kn	Flow Control	none
AT&Ln	Network Type	0
AT&Qn	DTE Data Format	0
AT&Rn	CS Options	0
AT&Sn	SR Options	0
AT&Tn	Test Commands	0
AT&V	View Current Configuration	none
AT&Wn	Store User Profile	0
AT&Xn	Transmit Clock	0
AT&Yn	Power Up User Profile	0
AT&Zn=x	Store Phone Number	none
AT\Tn	Inactivity Timer	
AT%Bn	Loop Rate Select	0
AT%Kn	DTE Rate Select	

Table C-1. AT Commands (continued).

Comd	Title	Default
AT%P	Password Control	0
AT%P=x	Password Entry	0
T%P>x	Password Verify	0
AT%Rx	Initiate Remote Config.	0
AT%Kn	DTE Rate Select	
AT%P	Password Control	0
AT%P=x	Password Entry	0
T%P>x	Password Verify	0
AT%Rx	Initiate Remote Config.	0
AT%Tn	Anti-Stream Option	0
AT_An	LLB Control	0
AT_Bn	DBU Number to Dial	0
AT_Cn	SR Control During Test	0
AT_Dn	RTS-CTS Delay	0
AT_En	DBU Originate/Answer	0
AT_Fn	Scrambler Control	0
AT_Jn	Auto Answer Enable/Disable	0
AT_N=xx	Set Network Address	none
AT_Pn	Front Panel Enable/Disable	0
AT_RR	LB Enable/Disable	0
AT_S=xx	Set Serial Number	none
AT_Tn	Select Test Pattern	0
AT_Xn	Clock Source Select	0

Appendix D: Configuration Profiles

Table D-1. Defaults for CSU/DSU SW56.

	Profile Numbers			
	1	2	3	4
Escape Character	+(2BH)	+	+	+
CR character	CR (ODH)	CR	CR	CR
LF character	LF (OAH)	LF	LF	LF
BS character	BS (08)	BS	BS	BS
Abort call timer	50	50	50	50
Escape guard time	50	50	50	50
Command echo	DIS	DIS	DIS	DIS
Result code	EN	EN	EN	EN
Long or Short Code	LONG	LONG	LONG	LONG
Test pattern type	2047	2047	2047	2047
EIA controlled ALB	DIS	DIS	DIS	DIS
EIA controlled RLB	DIS	DIS	DIS	DIS
DTE Type	V.35	RS-232	RS-232	RS-232
Front panel en/dis	EN	EN	EN	EN
Test timeout	OFF	OFF	OFF	OFF
DTE Command Set	V.25	AT	AT	DIS
CS option	RS	FORCED	FORCED	RS
SR test option	OFF	OFF	OFF	OFF
TR option	NRML	NRML	NRML	NRML
DTR RECOG.DELAY (X100ms)	3	3	3	3
DTR COMMAND TIMEOUT (X100)	30	30	30	30
CD option	NRML	FORCED	FORCED	NRML
SR option	NRML	NRML	NRML	NRML
RDL en/dis	EN	EN	EN	EN
DTE rate (56K loop)	56K	57.6K	9.6K	9.6K

Table D-1. Defaults for CSU/DSU SW56 (continued).

	Profile Numbers			
	1	2	3	4
RS-CTS delay	SHRT	SHRT	SHRT	SHRT
DTE data format	SYNC	ASYNC	ASYNC	SYNC
TC Timing source	INT	INT	INT	INT
TX Loop Timing	LOOP	LOOP	LOOP	LOOP
AT Password Control	OFF	OFF	OFF	OFF
Remote config. en/dis	EN	EN	EN	EN
Async word length	10	10	10	10
Remote DSU Address	0	0	0	0
Network Address	0	0	0	0

NOTES

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