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*Access System 2000*

# ConnecT 56K DSU User Manual

Part Number 896-502110-001-A  
November 1993



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Before performing any operations, PLEASE READ AND UNDERSTAND ALL INSTRUCTIONS IN THIS MANUAL.

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## FCC Warning Statement

The Federal Communications Commission (FCC) Rules require that you be notified of the following:

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this reference, can cause interference to radio communications.

This equipment has been tested and found to comply within the limits for Class A devices pursuant to Subpart J of Part 15 of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user(s) will be required to take whatever measures (that can be) required to fix the interference at their own expense.

Per FCC Part 68 requirements, the customer is required to notify the Telephone Company prior to disconnecting any CSU from the network interface.

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# Introduction

This chapter provides an overview of the Verilink Connect 56K DSU, Digital Data Service (DDS), and Switched 56 service.

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## Unit Overview

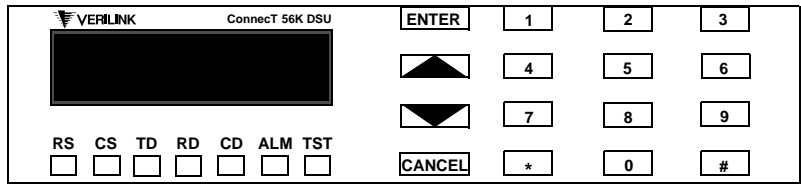
The stand-alone Verilink Connect 56K DSU provides a reliable, high speed data connection from a customer's Data Terminal Equipment (DTE) through Digital Data Service (DDS) lines, DDS secondary channel services (DDSII), or 4-wire Switched 56 Network (SW56) lines. The Connect 56K DSU supports both synchronous and asynchronous data communication over the DDS or SW56 networks.

There are three easy methods for configuration:

1. A front panel dial pad and a LCD display provides quick and easy access to configuration menus.
2. "AT" commands or by V.25 bis commands inband.
3. Remotely located Connect 56K DSU units can be configured by using the front panel, AT commands, or V.25 bis.

The Connect 56K DSU provides both V35 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. The Connect 56K DSU is compatible with AT&T Accunet and U.S. Sprint SW56 as well as standard DDS or DDS II services. To insure a reliable connection on those services, the unit features an extended receiver capability which permits operation over long loops (3.4 miles or 5.5 km at 26 awg).

**Figure 1-1 Connect 56K DSU Front View**



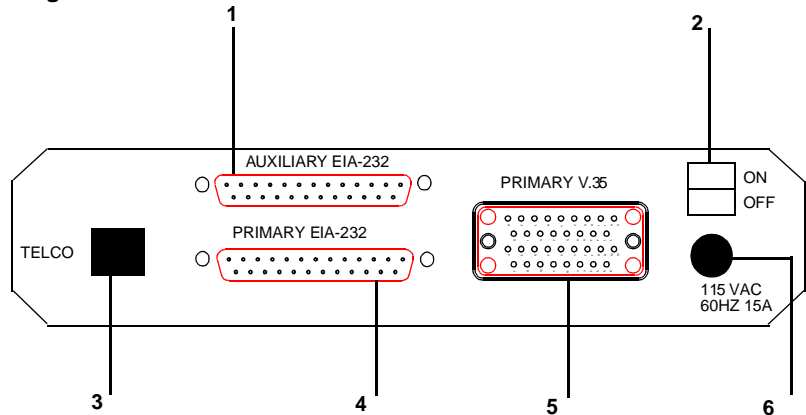
**Table 1-1 LED Identification**

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

## Connect 56K DSU rear panel

The rear panel contains three data DTE connectors which 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 2.

**Figure 1-2 Connect 56K DSU Rear View**



**Table 1-2 Identification of Numbers**

<b>Item</b>	<b>Function</b>
1. Auxiliary EIA-232	Secondary channel services
2. Power Switch	Used to turn power on or off.
3. Telco	Connection to the Telephone Company
4. Primary EIA-232	DTE interface
5. Primary V.35	High speed digital data interface
6. 115 VAC Connection	Power cord connection

## **DDS Overview**

Digital Data Service (DDS) is a nationwide service that allows interconnection and transport of data at speeds up to 64 kB/s. 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 Connect 56K DSU supports all DDS service rates yielding DTE rates of 2.4, 4.8, 9.6, 19.2, 38.4 (sync or async) 56kbps and 64kbps. 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 56kbps 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.

## Switched 56 overview

This dial-up 4-wire Digital Data Service allows customers to pay for data connection only when 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 ConnecT 56K DSU supports DTE rates of 2.4, 4.8, 9.6, 19.2, 38.4 (async or sync) and 56kbps (sync). Additional DTE rate of 57.6kbps is available in async modes.



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# Chapter 2

## Installation

This chapter explains how to install the ConneCT 56K DSU.

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### Unpack, inspect, power up

Carefully inspect the ConneCT 56K DSU for any shipping damages. If damage is suspected, file a claim immediately with the carrier and then contact Verilink Customer Service. If possible, keep the original shipping container for use in shipping the ConneCT 56K DSU back for repair or for verification of damage during shipment.

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#### What Verilink shipments include

Verilink shipments include the following:

- The ConneCT 56K DSU unit.
- Two line interface cables:
  - an 8-position/modular to 8-position modular
  - an 8-position/modular to 8-position spade lug
- The user guide.

---

#### What the customer provides

The customer must provide the following:

- DTE cable(s):
- An RS-232 Interface Cable with standard 25-pin male D-type connectors (Cannon or Cinch DB-19604-432) or V.35 cable.

---

#### Power up

Each DSU unit is provided with a captive eight-foot power cord, terminated by a three-prong plug which 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).



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**CAUTION**

**Power to the DSU must be from a 115 VAC, 60Hz that is grounded.**

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## Connecting the cable

This section describes the following connections:

- Network interface connection
- DTE data connection
- Secondary channel connection

---

### Network interface connection

The Connect 56K DSU has an eight-position modular jack labelled “TELCO.” The connector is used for connecting to the network when the unit is configured for either dedicated or switched operation. The pin-out for the “TELCO” connector is listed in Table 2-1, “Pin Assignments for TELCO Connector”.

**Table 2-1 Pin Assignments for TELCO Connector**

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

---

### 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 for the RS-232, and 100 feet for the CCITT V.35. The pin assignments for the connectors are listed in Table 2-2, “Pin Assignments for Primary RS-232 Connector” and Table 2-3, “Pin Assignments for Primary V35 Connector”.

The V.35 connector is recommended for use with data rates above 19.2kbps. The RS-232 connector will work up to 56kbps 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 modes.



**CAUTION**

To prevent possible Radio Frequency interference emissions, a shielded V.35 Cable is required.

**Table 2-2 Pin Assignments for Primary 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)
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 2-3 Pin Assignments for Primary V35 Connector**

Pin	CCITT	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 (SCTA)
AA	114	Transmitter Signal Element Timing (SCTB)
U	113	External TX Signal Element (SCX-A)
W	113	External TX Signal Element (SCX-B)
NN	-	Test Indicator (TI)

---

**Secondary channel connection**

If used, the secondary data terminal equipment should be connected to the Auxiliary EIA 232 connector. The pin-out for the connector is listed in Table 2-4, “Pin Assignments for Auxiliary RS-232 Connector”.

**Table 2-4 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). Always on.

## Configuration

The Connect 56K DSU contains four different user profiles (sets of configurations options) listed in Appendix II, 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, 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 Connect 56K DSU is then configured with that profile every time power is turned on, or the unit is reset.

---

## Configuration methods

The ConnectT 56K DSU 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

---

### Front panel

The Front Panel provides access to all operation parameters of the ConnectT 56K DSU through a multi-level menu structure which begins with the four-part Main Menu. (See Chapter 3).

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).

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### “AT” commands

In addition to the front panel, the ConnectT 56K DSU 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 ConnectT 56K DSU. 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 with delay between each character being less than the guard time.

Once the command mode is entered, AT commands can be transmitted to the Connect 56K DSU to configure most of the options, dial remote DSUs, or initiate tests to check both the Connect 56K 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 Connect 56K DSU 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 Connect 56K DSU 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 so the proper commands can be entered. Valid AT commands for the Connect 56K DSU are listed in Appendix I.

---

## V.25 bis commands

When configured for the V.25bis option, the Connect 56K DSU 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. BI-SYNC
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.

### **BI-Sync option character format**

1. Data bits - 7
2. Parity bit - OD

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 Verilink V25 bis command set is a subset of the CCITT V.25 bis command set. In addition to the CCITT commands supported, Verilink has added configuration commands for both the local and remote DSU's. The Verilink V25 bis 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 V25 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

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

Following is a list of V.25 bis commands and their possible responses.

#### **CIC      Connect Incoming Call:**

This command causes the DSU to go online. 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 Connect 56K DSU 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 include: VALA and INVAn.

#### **CNR      Remote Configuration:**

This command is used to pass AT commands over the network to the remote DSU via the V.25 bis command processor. This allows a remote Connect 56K DSU to be configured from a synchronous interface. The format of CNR 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 responses include: VAL and INVAn.

---

## Switched 56 operation

Following is a list of switched 56 commands and their possible responses.

### **CRN      Call Request with Number:**

When the Connect 56K DSU is configured for switched 56 operation, the CRN command causes the DSU 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 Connect 56K DSU responds with the call failure indication CFINS (Call Failure Indication Not Stored).

### **CRS      Call Request using Stored number:**

The CRS command causes the Connect 56K DSU 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 responses include: 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. Possible responses include: 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. Possible responses include: VAL

**RLN      Request List of Numbers:**

This command causes the Connect 56K DSU 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 the command, the Connect 56K DSU responds with a list of all the registers and the stored numbers. This list is followed by the VAL response. Possible indications include: VAL

---

## Remote commands

Remote Configuration is available by attaching a remote device via the Primary EIA-232 connection on the rear panel and setting the DSU to accept Remote Configurations.

The 3=CONFIG menu is used to enable or disable the Connect 56K DSU remote configuration capability. See Chapter 3, Menu 3=CONFIG.

# Chapter 3

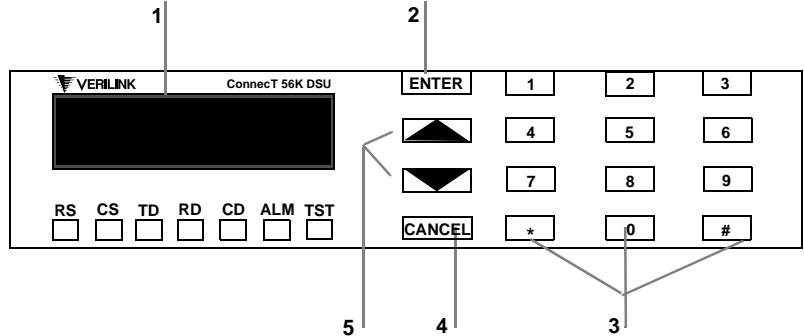
## Operation

This chapter describes the keypad, menu functions, and ConnectT 56K DSU operation.

### Understanding the keypad

Following is an illustration of the ConnectT 56K DSU keypad.

**Figure 3-1 ConnectT 56K DSU Front View**



**Table 3-1 Identification of Numbers**

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

**Table 3-2 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

---

## Manual operation and button functions

This section explains the use of buttons and manual operation.

### Enter button

The Enter button is used to select menu items. For example, to select menu items press the Up or Down scroll buttons to display menu items. When the desired menu item is displayed, press the number of the item to activate (flashing). When the desired menu item is flashing, press the Enter button. As a result, a submenu is invoked or a configuration parameter is set. The display of “command accepted” indicates a valid operation.

### Cancel

Cancel the current activity, and return to the previous menu; repeat until the desired menu level is displayed. For example, when the Submenu item is displayed. Press the cancel button resulting in the display returning 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 will 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: 1. To view submenu items in a forward pattern:

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

2. To view submenu items in a reverse pattern: When the menu is selected and the submenu items are displayed press the up scroll button. When the beginning of the list is reached, pressing the up scroll button again will continue 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 parameter settings.

#### **\* (Shift)**

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

#### **(Quick) #**

Quick return to the main menu choices.

---

## **Examples**

Following are two examples:

**EXAMPLE #1. To activate a menu item when menu selection is known**, either by seeing in the display or remembered from use, press the desired menu item number. The display will automatically update by activating (flashing) the desired selection. Press Enter to complete the selection. To use the alpha characters: Submenu 2=DTE Options, submenu of 1=Local, submenu of 3=Configuration has more than 9 choices. Submenu items A and B must be selected with the \* (Shift) key. When the 2=DTE OPTIONS menu is flashing, press ENTER. Use the scroll to display submenu item A or B. Press the \* (shift) key then, press

the desired letter. If the letter is mistakenly pressed without using the \* key, the numbered item will become active. To correct, repeat the correct procedure.

**EXAMPLE #2.** To enter a numeric entry, press the desired numbers at the cursor position, followed by pressing ENTER.

---

## Menu structure

The Connect 56K DSU uses a multilevel menu 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. The Dial menu is available only when Accunet SW56 or US Sprint SW56 is selected as the Network Type from the Network Opt., submenu of Configuration Main Menu.

Each Main Menu item has several functions and submenus to identify and access specific parameters. In the discussions that follow each main menu contains a menu diagram to identify the location of each operation.

LCD display of opening Menu:

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

---

### The four opening menu functions

This section discusses the four opening menu options.

#### **1=Status**

Used to display all relevant information for the network and DTE interfaces. Displays current Operating Data Mode, Loop Status, Rate of service from the network, DTE Data Rate and Format and DTE Interface Lead status. 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 56SC 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 the Accunet SW56 or US Sprint SW56 is selected as the Network Type from the Network Opt. Menu.

---

## General operations and menus

This section discusses general operations and menus for the Connect 56K DSU.

---

### General operation method

Following is a list of general operations and how to execute them.

- |                 |   |
|-----------------|---|
| <b>Activate</b> | The initial pressing of any Number will “activate” (cause to flash) that numbered menu item.  |
| <b>Display</b>  | 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 will repeat the menu display list. Using the up scroll key will move through selections in reverse order.     |
| <b>Select</b>   | Pressing the Enter button will enter into use of the activated menu item which will offer further choices. If the activated item is a parameter choice, it will be entered into the system. The message “Command Accepted” will briefly display before returning to the currently active menu/submenu item.                       |
| <b>Abort</b>    | To abort any operation, press the Cancel button or the # (Quick), number symbol, button. The system will return to the main menu.   |
| <b>Exit</b>     | Menu flows end with the selection of a parameter and the brief display of “Command Accepted” or other message, after which the display will return to the active menu item. Menu selection may resume or using Cancel or # (Quick) may be desired. If no further operation follows, the system will return to the Status display. |

---

### Menu map

The operation of the Connect 56K DSU is accomplished via use of multi level menus. The operation of each menu item will begin with a menu map. Each identified selection of a menu 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:

From the opening Main Menu

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

press the number 3 to activate (begin flashing) 3=CONFIG.

When the menu 3=CONFIG is flashing, press the Enter button to select, resulting in the displaying of two lines of submenu items.

1= LOCAL  
2= REMOTE

Press the number 1 to activate (begin flashing) the Submenu 1= LOCAL. Press Enter to select the activated submenu, resulting in the displaying of two lines of submenu items.

1= NETWORK OPT.  
2= DTE OPTIONS

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

3= TEST OPTIONS  
4= DIAL OPTIONS

Press the number 3 to activate the Submenu 3=TEST OPTIONS. Press Enter to select the activated submenu resulting in the displaying of two lines of submenu items.

1=TEST TIMEOUT  
2=RDL EN/DIS

Press the number 1 to activate the Submenu TEST TIMEOUT resulting in the displaying of system prompts to enter the desired parameters.

ENTER TIMEOUT  
(0=OFF) : 1 SEC.

Use the number keys to enter the number of seconds desired for the Timeout. Press Enter to configure this system parameter resulting in the system responding with an acceptance or rejection of the command and returning to the previous submenu.

---

# 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 Connect 56K DSU, it automatically reverts to the status display.

**Figure 3-2 Status Display**

1 = STATUS	DATA MODE
	LOOP IS NORMAL
	LOOP 56K
	DTE 56SYNC
	TR SR LLB RLB
	OFF ON OFF OFF

---

## Submenu items

Following are the submenu items:

### Data Mode

#### Loop is Normal:

Current operation mode of the Connect 56K DSU current status of the network interface.

### Loop X

#### DTE 56K Sync:

Indicates the rate of the service from the network. Indicates the DTE data rate and format.

### TR SR LLB RLB:

#### Off/On

Lists four of the DTE interface leads. State of the respective leads displayed immediately above.

### Operation:

Follow standard operating procedure.

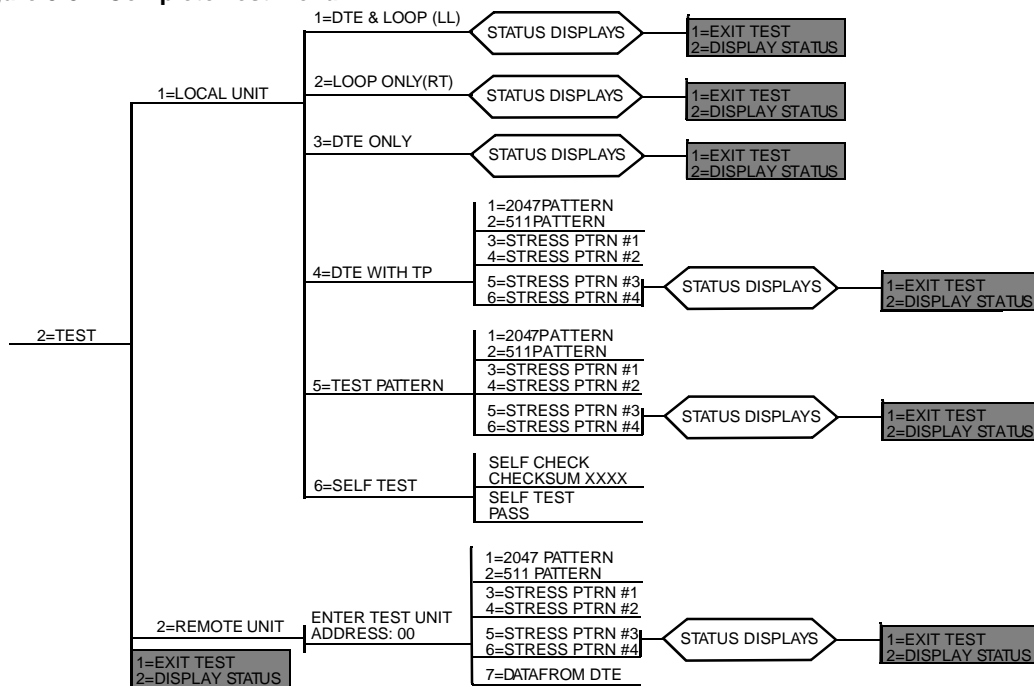
To view additional information, press the Up or Down scroll key which displays two new lines of information. To exit the Status menu, press the Cancel key.

## 2 = TEST

The ConnectT 56K DSU is able to perform a variety of tests that allow problems to specific components of the communications circuit to be isolated and identified. These various test modes for the ConnectT 56K DSU are initiated and terminated from either the front panel or from the DTE interface. When operating in an asynchronous mode, AT commands can be used to control the testing from the DTE interface. For synchronous operation, V25 bis commands can provide the test control.

The unit also responds to standard DDS network tests initiated from the TELCO 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 Test Menu drawing on the following page.

**Figure 3-3 Complete Test Menu**



Menu flow is normally depicted from left to right. When scrolling through submenu items with the down scroll button, the flow will wrap from bottom to top and repeat the menu order. A “back up” can be

effected by using the up scroll button. At every level of the menu pressing the Cancel button will return to the previous menu level; used repeatedly the system will return to the main menu.

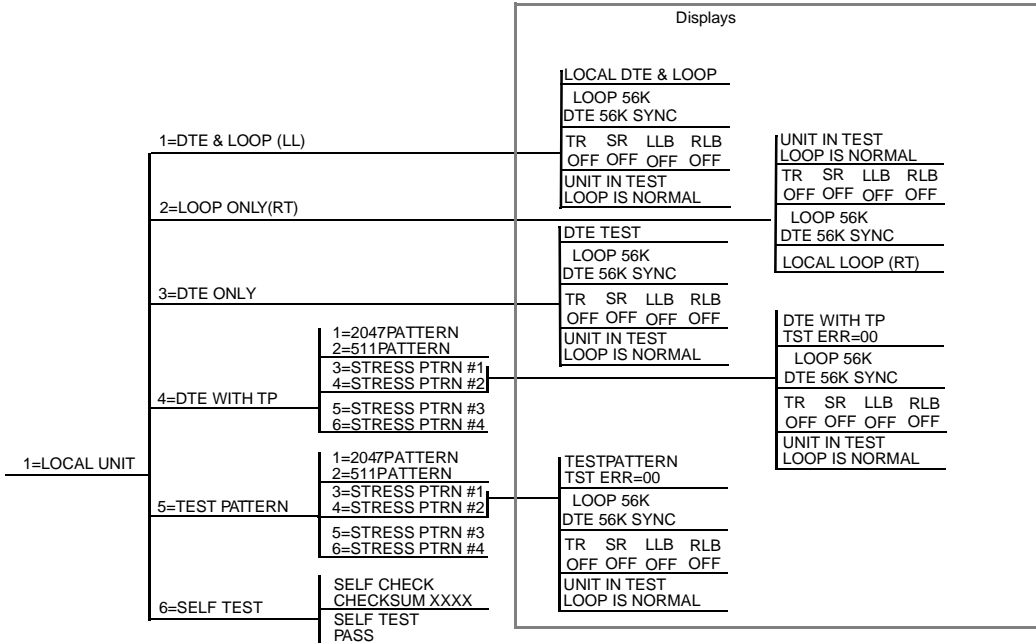


**Note:** Shaded items are restricted to specific configurations or operation.

## 1=Local Unit

The LOCAL UNIT selection is used to specify one of six different tests to be performed by the local Connect 56K DSU. The selections are shown as submenu selections 1 through six.

Figure 3-4 Local Unit Menu



### Menu map

2=TEST/1=LOCAL UNIT

## Operation

Follow standard operating procedure. When 2=TEST is flashing: Press the Enter button resulting in the displaying of the first two submenu items.

1=Local Unit  
2=Remote Unit

Use the number 1 key to activate the 1=Local Unit Test submenu press the Enter key to enter the submenu resulting in the displaying of two submenu choices.

**Table 3-3 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 with DTE interface
3=DTE ONLY	&T1	TX/RX Loopback at network interface
4=DTE WITH TP	&T8	TX/RX Loopback with test pattern
5=TESTPATTERN	&T9	Transmit/receive test pattern
6=SELF TEST	NA	Check internal components

### 1 = DTE & LOOP (LL)

The DTE and LOOP test splits the Connect 56K DSU 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 Table A-1, "DTE and Loop Test Diagram," on page A -8.

When the LL lead from the DTE is activated, the test described above is also performed by the Connect 56K DSU. The Connect 56K DSU acknowledges this DTE activated test by activating the TM on the DTE interface.

This particular test permits the separate sections of the Connect 56K DSU 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 DSU 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 DSU Unit.

**Figure 3-5 Status Display**

1=DTE & LOOP (LL)	DTE & LOOP			
	LOOP 56K			
	DTE 56K SYNC			
	TR	SR	LLB	RLB
	OFF	OFF	OFF	OFF
	UNIT IN TEST			
LOOP IS NORMAL				

**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 resulting in the system briefly displaying “Please Wait” after which it displays the type of test being performed.

DTE & LOOP

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

**Table 3-4 Test Displays**

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

**Table 3-5 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 to Connect 56K DSU
Loop is Normal	Status of network service

To Exit a Test 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 resulting in the TEST selection being  
active (flashing). Press the Enter key resulting in the alternate test control  
menu being displayed.

1=EXIT TEST  
2=DISPLAY STATUS

1=EXIT TEST	Terminates the test in progress and returns the ConnecT 56K DSU to the main menu.
2=DISPLAY STATUS	Re-enters test display for additional viewing.

**Table 3-6 Submenu Test Commands**

Front Panel	AT Command	Description
1=EXIT TEST	&T0	Stops test/returns to data mode.
2=DISPLAY STATUS	NA	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 ConnecT 56K DSU. 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 Table A-2, "Loop Only Test Diagram," on page A -9.

This test allows the loop interface and a major portion of the DTE interface for the local ConnecT 56K DSU 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 ConnecT 56K DSU display. The other status messages shown in the menu drawing are accessible by using the UP/DOWN SCROLL keys.

The loopback point within the ConnecT 56K DSU and its operation for LOOP ONLY (RT) test are the same as the Remote Digital Loopback (RT) test initiated and controlled from a remote DSU.

**Figure 3-6 Status Display**

2=LOOP ONLY(RT)	UNIT IN TEST
	LOOP IS NORMAL
	TR SR LLB RLB
	OFF OFF OFF OFF
	LOOP 56K
DTE 56K SYNC	
LOCAL LOOP (RT)	

**Menu map**

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

**Operation**

Follow standard operating procedures. When 2=LOOP ONLY (RT) is flashing: Press the Enter button resulting in the system briefly displaying “Please Wait” after which it displays the first of the test results.

LOCAL LOOP (RT)

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

**3 = DTE ONLY**

The DTE ONLY test provides a method for testing both the DTE interface drivers and receivers of the local Connect 56K DSU 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 loop back point and the signal paths for this test is shown in Table A-3, “DTE Only Test Diagram,” on pageA-9.

Test patterns from an external BERT tester are routed through the DTE interface section of the Connect 56K DSU 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 Connect 56K DSU.

**Figure 3-7 Status Display**

3=DTE ONLY	DTE TEST
	LOOP 56K
	DTE 56K SYNC
	TR SR LLB RLB OFF OFF OFF OFF
	UNIT IN TEST LOOP IS NORMAL

**Menu map**

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

**Operation**

Follow standard operating procedures. When 3=DTE Only is flashing: Press the Enter button resulting in the system briefly displaying “Please Wait” after which it displays the first of the test results.

DTE TEST

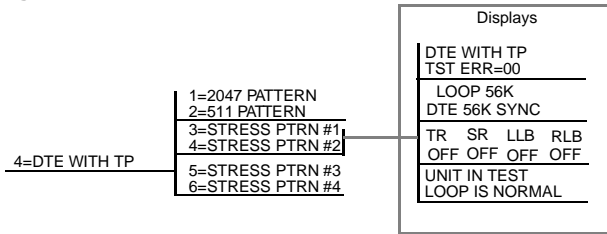
Continue with operational procedures described for DTE & LOOP (LL).

**4 = DTE WITH TP**

The DTE WITH TP (test pattern) test 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 ConneCT 56K DSU. The loopback point and the data paths for this test are illustrated in Table A-4, “DTE With Test Pattern Diagram,” on page A-10. This test is primarily used to test the transmitter and receiver sections of the local ConneCT 56K DSU.

The internal test pattern generator and detector of the ConneCT 56K DSU 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.

**Figure 3-8 DTE WITH TP MENU**



**Menu map**

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

**Operation**

Follow standard operating procedures. When 4=DTE With TP is flashing: Press the Enter button resulting in the system briefly displaying “Please Wait” after which it displays the first of the test results.

- 1=2047 PATTERN
- 2=511 PATTERN

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 3-7 DTE With Test Pattern Commands**

Front Panel	AT Command	Description
1=EXIT TEST	_T0	Standard 2047 random data pattern
2=DISPLAY STATUS	_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 Connect 56K DSU displays:

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

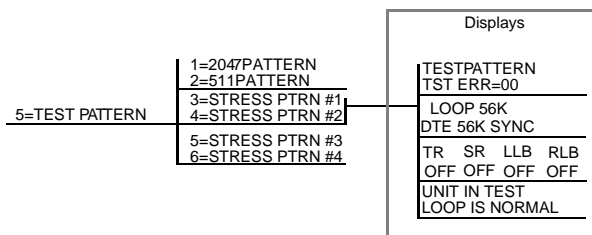
The first line of the display indicates the type of test being performed while the second line of the display indicates the number of errors accumulated by the test pattern detector.

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 will appear on the TEST ERR display.

## 5 = Test Pattern

The TESTPATTERN selection actually converts the local Connect 56K DSU into a BERT tester for use in testing a remote DSU over the actual communications circuit. With this test the remote DSU can be looped back in either the DTE and LOOP (LL) or the LOOP ONLY (RT) mode. Instead of being looped back the remote DSU can operate in the data mode with data supplied from an external BERT tester, or it can be operating in the TESTPATTERN mode. The data paths for this mode are illustrated in Table A-5, “Test Pattern Only Diagram,” on page A-10.

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



## Menu map

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

## Operation

Follow standard operating procedures. When 5=TESTPATTERN is flashing: Press the Enter button resulting in the system briefly displaying “Please Wait” after which it displays the first of the test results.

1=2047 PATTERN  
2= 511 PATTERN

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

### 6 = Self test

The Self Test is set designed to verify current operation of the Connect 56K DSU. It can be performed at any time and is recommended if there is any question about the current DSU health.

6=SELF TEST	SELF CHECK
	CHECKSUM XXXX
	SELF TEST
	PASS

### Menu map

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

### Operation

Follow standard operating procedures. When 6=Self Test is flashing: Press the Enter button resulting in the LEDs being active as the system runs the self test, displays the results, and then returns to the Main Menu display.

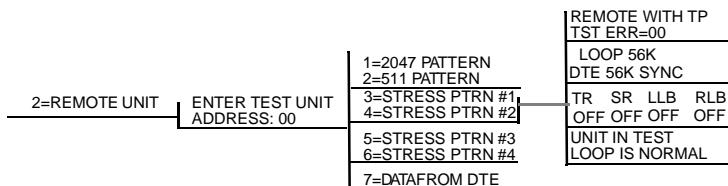
SELF TEST  
CHECKSUM XXXX

Self Test Pass = indicates no problem with the operation. Self Test Checksum XXXX = the software version.

---

## 2=Remote unit

The Remote Unit submenu allows the placement of a remotely installed DSU into Loopback. This also applies to DSUs installed in a multi-point network. After placing the remote DSU into loop a choice of 6Test Patterns or Data from the DTE may be selected. Test pattern results are then displayed.



## Menu map

2=Test/2=Remote Unit/Selections

## Operation

Follow standard operating procedures. When 2=Remote Unit is flashing, press the Enter button resulting in the displaying of the prompt to enter the Test Unit Address.

```
Enter Test Unit
Address:XX
```

Use the number keys to type the address of Remote DSU press the Enter key to enter the address into the system resulting in the displaying of the first of the submenu items.

```
1=2047 Pattern
2=511 Pattern
```

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command accepted” and return 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

**Table 3-8 Test Displays**

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

**Table 3-9 Available interface leads**

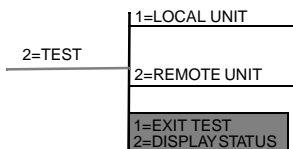
TR	Terminal Ready Input
SR	Set Ready Output
LLB	Local Loopback Input
RLB	Remote Loopback Input
OFF/ON	State of the respective leads displayed immediately above.
Unit in Test	Operating mode to Connect 56K DSU
Loop is Normal	Status of network service

### 1 = Exit Test and 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	Will effectively exit 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: 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 resulting in the TEST selection being active (flashing).



### Menu map

2=TEST/1=LOCAL UNIT or

REMOTE UNIT/Tests/1=EXIT TEST or

2=DISPLAY STATUS



**Note:** *Shaded items are restricted to specific configurations or operation.*

Press the Enter key resulting in the alternate test control menu being displayed.

1=EXIT TEST

2=DISPLAY STATUS

1=Exit Test	Terminates the test in progress and returns the ConnecT 56K DSU to the data mode.
2=Display Status	Re-enters test display for additional viewing.

## 3 = CONFIG

The Configuration menu consists of a group of five sub-menus relating to a specific interface or function of the Connect 56K DSU that requires set up.

**Table 3-10 Configuration submenus**

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 Connect 56K DSU contains 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 Connect 56K DSU is then configured with that profile every time power is turned on or until the unit is reset.

See Configuration drawing on the following page.

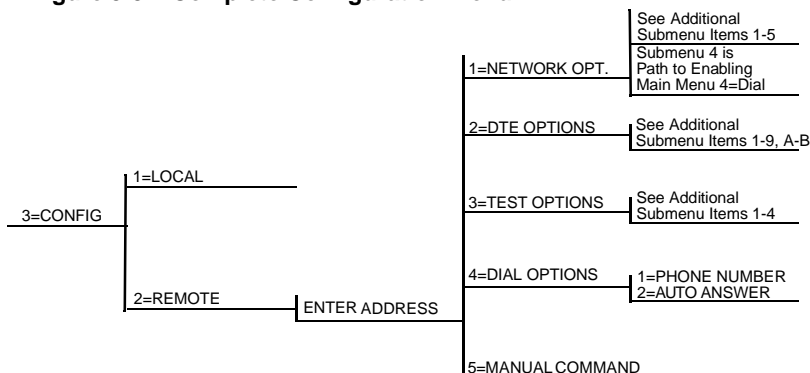
**Table 3-11 Submenus of 3=Config**

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 DSU so the front panel of the local DSU can be used to configure the remote DSU

---

## Operation

Follow standard operating procedures. When 3=CONFIG is flashing.

**Figure 3-9 Complete Configuration Menu**

Menu flow is normally depicted from left to right. When scrolling through submenu items with the down scroll buttons, the flow will wrap from bottom to top and repeat the menu order. A “back up” can be effected by using the up scroll button. At every level of the menu pressing the Cancel button will return to the previous menu level; used repeatedly the system will return to the main menu.

Press the Enter button to enter the Configuration mode. This results in displaying the two submenu choices:

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

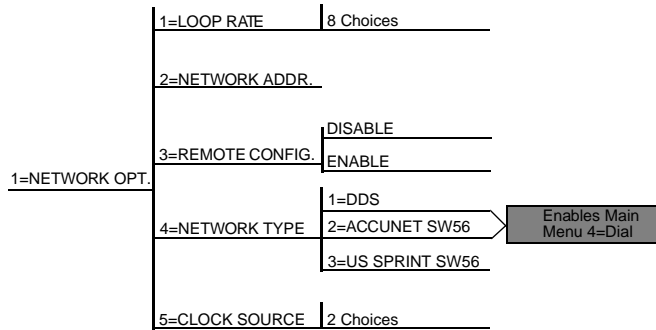
Use the “1” number to activate the 1=Local Menu. Press the Enter key to enter the Local submenus. This displays the first two submenu choices.:

```
1=Network Opt
2=DTE Options
```

---

## 1=Network Options

Offers the choices of the configuration parameters that control the loop operation of the ConnecT 56K DSU.



### Menu map

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

### Operation

Follow standard operating procedures. When 1=NETWORK OPT. is flashing, press the Enter button. This displays the first of the submenu items.

1=LOOP RATE  
2=NETWORK ADDR.

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the active menu.

### Non-standard operation

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 Connect 56K DSU also supports subrate DTE data over a 56K loop. The loop rate must be set independently of the DTE rate.

Eight loop rate elections 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 below with the equivalent AT commands that perform the same configuration functions.

**Table 3-12 Loop Rate Commands**

Front Panel	AT Command	Selections 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	4.8K 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 with no secondary 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

A two digit decimal address can be assigned to each Connect 56K DSU. This addressing capability makes it possible to perform remote configuration and testing in Point to Point and a multi-drop network.

Use the numbers keys to select an address press the Enter key to enter the address into the system resulting in the system briefly displaying “Command Accepted” and returning to the active Network Address menu.

**Table 3-13 Network Address Commands**

Front Panel	AT Command	Selections Description
XX (Decimal)	_N=xx	Assigns a 2 digit Network Address

### Submenu 3 remote configuration

This option sets up the Connect 56K DSU to accept or reject remote configuration commands. Use the number of the desired mode to activate the selection press Enter to select the mode resulting in the system briefly displaying “Command Accepted” and returning to the active Network Opt. menu with the REMOTE CONFIG. selection active.

**Table 3-14 Remote Configuration Commands**

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

### Submenu 4 network type

The Network Type option configures the Connect 56K DSU for the specific type of network being used. Use the number of the desired network type to activate the selection press Enter to select the network type resulting in the system briefly displaying “Command Accepted” and returning to NETWORK OPT. menu with the NETWORK TYPE selection active.




---

**Note:** *Additional menus become available when using the Accunet SW 56 or the US Sprint SW56. See Main Menu 4=Dial at the end of the menu section.*

---

**Table 3-15 Network Type Commands**

Front Panel	AT Command	Selections Description
1=DDS	&L0	Any 4-wire DOS network
2=DDS	&L1	ATT&T Switched 56 Service
3=US SPRINT SW56	&L2	Sprint Switched 56 Service

**Submenu 5 clock source**

The Clock Source options specifies the timing source for the Connect 56K DSU s internal circuitry. When Operating on a DDS network, the timing should be FROMNETWORK. On a point to point private network, one Connect 56K DSU must be set for MASTER, the other set for FROM NETWORK.

**Table 3-16 Clock Source Commands**

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

**2 = DTE options**

Used to select the configuration parameters that control the operation of the DTE Interface of the Connect 56K DSU.

2=DTE OPTIONS	1=DTE RATE	6 Choices
		1=SCRAMBLER OFF
		2=SCRAMBLER ON
		3=DATAINVERT
	2=CONNECTOR TYPE	1=RS-232
		2=V.35
	3=DATAFORMAT	Additional Submenus
	4=DTE CMD OPTION	4 Choices
	5=TRANSMIT CLOCK	2 Choices
	6=CS OPTIONS	5 Choices
	7=ANTI-STREAM	4 Choices
	8=CD OPTIONS	3 Choices
	9=TR OPTIONS	4 Choices
A=SR OPTIONS	6 Choices	
B=SECONDARY RATE	7 Choices	

### Menu map

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

### Operation

Follow standard operating procedures. When 2=DTE OPT. is flashing: Press the Enter button resulting in the displaying of the first of the submenu items.

- 1=DTE Rate
- 2=Connector Type




---

**Note:** *Shaded items are restricted to specific configurations or operation.*

---

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return 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 Connect 56K DSU supports six different DTE rates over a 56K Loop.

Use the number of the desired DTERATE to activate the selection press Enter to select the DTE Rate resulting in the system briefly displaying “Command Accepted” and returning to the DTE OPTIONS menu with the DTE RATE selection active.

If a loop rate of 56k or 64K was chosen during NETWORK OPT. configuration, then the following DTE RATE menu is shown:

**Table 3-17 DTE Rate Commands**

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

If a loop rate of 56k with secondary channel or 64K was chosen during NETWORK OPT. configuration, then the following DTERATE menu is shown:

**Table 3-18 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 requires that both the primary and secondary channel data not 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 Connect 56K DSU for the situations described above, and it must never be used for multi-point 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.

### **Operation**

Follow standard operating procedures. When 2=DTE OPT. is flashing: Press the Enter button resulting in the displaying of the first of the submenu items.

1=RS-232

2=V.35

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display "Command Accepted" and return to the DTE OPTIONS menu.

**Table 3-19 Connector Type Commands**

<b>Front Panel</b>	<b>AT Command</b>	<b>Description</b>
1=RS232	Not applicable	EIA 232 interface enabled
2=V.35	Not applicable	V.35 interface enabled

### Submenu 3 data format

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

3=DATAFORMAT	1=ASYNCHRONOUS	1=ASYNC 9 BITS
	2=SYNCHRONOUS	2=ASYNC 10 BITS
		3=ASYNC 11 BITS

### Menu map

3=CONFIG/1=Local/2=DTE Opt./3=Data Format

### Operation

Follow standard operating procedures. When 3=DATA FORMAT is flashing: Press the Enter button resulting in the displaying of the first of the submenu items.

1=ASYNCHRONOUS

2=SYNCHRONOUS

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to DTE OPTIONS menu.



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

Use the number of the desired submenu choice to activate the desired async format press Enter to enter the selected choice into the system resulting in the system briefly displaying “Command Accepted” and returning to the DTE OPTIONS menu with the Data For selection active.

**Table 3-20 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.		

Front Panel	AT Command	Description
1=ASYNC 9 BITS	Not applicable	9 bits including start, stop, parity
2=ASYNC 10 BITS	Not applicable	10 bits including start, stop, parity
3=ASYNC 11 BITS	Not applicable	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

Follow standard operating procedures. When 4=DTE CMD OPTION is flashing: Press the Enter button resulting in the displaying of the first of the submenu items.

1=Disabled

2=AT Command Set

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the active menu.

**Table 3-21 DTE CMD Commands**

Front Panel	AT Command	Description
1=DISABLED	Not applicable	Disables all DTE command modes
2=AT COMMAND SET	Not applicable	Enables AT commands from DTE
3=V.25 SNYC	Not applicable	Enables V.25bis (SDLC) commands
4=V.25 BSC/ASNYC	Not applicable	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 Connect 56K DSU.

### 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 resulting in the displaying of the first of the submenu items.

1=Normal  
2=External

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the DTE OPTIONS menu with the Transmit Clock selection active.

**Table 3-22 Transmit Clock Commands**

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



**Note:** *The EXTERNAL clock option is normally used in modem tail circuit applications. A DSU to modem interconnect diagram for this application is shown in Table A -6, “DSU to Modem Interconnect Diagram,” on page A-11.*

*The EXTERNAL clock option is also recommended when the EIA 232 connector is used for 56 KB/s and 64 KB/s applications. A special DSU cable diagram for this application is shown in Table A -7, “EIA 232 Connector for 56 KB/s and 64 KB/s Application,” on page eA-11. 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 resulting in the displaying of the first of the submenu items.

1=Forced On  
2=Follows RS

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 will briefly display “Command Accepted” and return to the active menu or display choices for the delay.

**Table 3-23 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
5=OFF WITH LOCD	&R4	ON except 5 seconds after disconnect in switched 56 applications.
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=CD DELAY LONG	_D1	Long Delay from RS to CS selected

Specified times for the SHORT and LONG delays at the different operating speeds are:

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

### Submenu 7 anti -stream

The ANTI-STREAM option is used to select the anti-stream timeout. The anti-stream timeout is the maximum time the Connect 56K DSU transmits data into the network from the DTE. This feature prevents one DTE device on a multi-drop network from continuously tying up the transmit circuit back to the master 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 Connect 56K DSU 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./7Anti-Stream

### Operation

Follow standard operating procedures. When 7=ANTI-STREAM is flashing: Press the Enter button resulting in the displaying of the first of the submenu items.

1=Timer Off

2=Time 10 Sec.



**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 will briefly display “Command Accepted” and return to the DTE OPTIONS menu with the Anti-Stream selection active.

**Table 3-24 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 6=CS OPTIONS is flashing: Press the Enter button resulting in the displaying of the first of the submenu items.

- 1=Forced on
- 2=Normal

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the DTE OPTIONS MENU.

**Table 3-25 CD Options Commands**

Front Panel	AT Command	Description
1=FORCED ON	&C0	CD always ON
2=NORMAL	&C1	ON only when data present on loop
3=OFF WITH LOCD	&C2	ON except 5 seconds after disconnect in switched 56 applications

### Submenu 9 TR Options

The TR OPTIONS menu is used to select the Connect 56K DSU response 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 resulting in the displaying of the first of the submenu items.

1=IGNORED

2=IDLE WHEN OFF

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the active menu.

**Table 3-26 TR Options Commands**

Front Panel	AT Command	Description
1=IGNORE	&D0	TR input ignored
2=IDLE WHEN OFF	&D1	ON only when data present on loop
3=OFF>ON DIAL #1	&D3	Dial stored #1: TR goes OFF to ON
4=OFF>ON DIAL #2	&D4	Dial stored #2: TR goes OFF to ON

### 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

To display the SR Options submenu of 1=Local submenu of 3=CONFIG. Use the scroll buttons to display the 9=Tr Options and A=SR Options. Press the \* (Shift) key to activate the alpha selections Use the letter A to activate the SR Options submenu press the Enter key to enter the SR Options submenu resulting in the displaying of the first of the SR Options submenu items.

1=Forced On  
2=Off OOS ONLY

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the active menu.

**Table 3-27 SR Options Commands**

Front Panel	AT Command	Description
1=FORCED ON	&S0	SR always ON
2=OFF OOS ONLY	&S1	OFF when network out of service
3=OFF LOCD ONLY	&S2	OFF 5 seconds after disconnect in switched 56 applications.
4=OFF TEST ONLY	&S3	OFF for test only
5=OFF TEST + OOS	&S4	OFF for test or OOS
6=OFF TEST + LOCD	&S5	OFF 5 seconds are disconnect for test

### 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 1=LOCAL submenu of 3=CONFIG. Use the scroll buttons to display the B=Secondary Rate press the \* (Shift) key to activate the alpha selections Use the letter B to activate the Secondary Rate submenu press the Enter key to enter the Secondary Rate submenu resulting in the displaying of the first of the Secondary Rate submenu items.

1=Off 2=75  
3=150 4=300

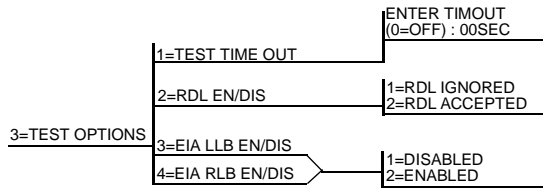
Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display "Command Accepted" and return to the active menu.

**Table 3-28 Secondary Rate Commands**

Front Panel	AT Command	Description
1=OFF	_Y0	No secondary channel selected
2=75	_Y1	Secondary channel rate: 75Bps
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

## 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.



### Menu map

3=CONFIG/1=Local/3=Test Options

### Operation

Follow standard operating procedures. When 3=TEST OPTIONS is flashing: Press the Enter button resulting in the displaying of the first of the Test Option submenu items. Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the active menu.

#### Submenu 1 test timeout

The Test Timeout option is used to specify the length of time a Connect 56K DSU remains in a test mode before an automatic return to the data mode. The LCD displays:

```
ENTER TIMEOUT  
(0=OFF) : 00SEC
```

Enter the time out in two digit decimal value.

#### Submenu 2 RDL select

The RDL Select option is used to specify whether or not the Connect 56K DSU responds to a remote digital loopback (RDL) request from the far end of the circuit.

**Table 3-29 RDL Select Commands**

Front Panel	AT Command	Description
1=RDL IGNORED	&T5	RDL request from remote 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 ConneCT 56K DSU responds to the local loopback (LLB) input from the DTE.

**Table 3-30 EIA LLB Select Commands**

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

**Submenu 4 EIA RLB select**

The EIA RLB Select option is used to specify whether or not the ConneCT 56K DSU responds to the remote loopback (RLB) input from the DTE.

**Table 3-31 EIA RLB Select Commands**

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

**4 = Dial options**

The Dial Option menu is used to store up to ten phone numbers and define Answer operation of the ConneCT 56K DSU when it is configured for Switched 56 operation.

4=DIAL OPTIONS	1=PHONE NUMBER	STORED NUMBER TO EDIT: (1-10) 1	NNNNNNN
	2=AUTO ANSWER	1=DISABLED 2=ENABLED	

### Menu map

3=CONFIG/1=Local/4=Dial Options

### Operation

Follow standard operating procedures. When 4=Dial Options is flashing: Press the Enter button resulting in the displaying of the first of the Dial Option submenu items.

Continue with standard operating procedures to select menu options. At the end of the options the system will briefly display “Command Accepted” and return to the active menu.

### Submenu 1 phone number

The Connect 56K DSU has storage for ten (10) numbers of 36 digits each. If a phone number is to be edited, the entire number must be re-entered. This process over writes the previously stored number.

```
STORE NUMBER TO  
EDIT (1-10): X
```

### Operation

Use the number key to type the number to be edited press Enter resulting in the number being displayed for editing. Typing numbers will begin a new entry from left to right.

### Submenu 2 auto answer

The Auto Answer option is used to specify whether incoming calls are to be automatically answered by the Connect 56K DSU or manually by the user.

**Table 3-32 Auto Answer Commands**

Front Panel	AT Command	Description
1=DISABLED	_J0	Auto Answer disabled
2=ENABLED	_J1	Auto Answer enabled

---

## 5 = Manual command

The Manual Command option is a short cut method for entering configuration and control commands for the Connect 56K DSU.

### Operation

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

```
COMMAND : 00
```

Use the number keys to enter the hexadecimal command number press the Enter key resulting in the command number being 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.

```
COMMAND : XX
VALUE : 00
```

Use the number keys to enter the hexadecimal value press the Enter key to complete resulting in the system briefly displaying “Command Accepted” and returning to the active menu.

Use the Manual Command option to access the configuration profiles listed in Table A-3, “Configuration Profiles,” on page A-6. The command values are:

**Table 3-33 Manual Command Values for Profiles**

Command	Profile
Command 8A Value 00	1
Command 8A Value 01	2
Command 8A Value 02	3
Command 8A Value 03	4



## Reference

This appendix provides information about warranty and customer service, what information is required by the telephone company, and AT commands. It also provides a table of configuration profiles you can load manually and many of the reference figures that are referred to in this manual.

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### Warranty and customer service

This unit contains no user serviceable parts. If it does not meet its published specifications or fails while in service, Verilink will replace or repair this product within five (5) years from the date of shipment. For detailed warranty, repair and return information refer to the Verilink Equipment Warranty and Repair and Return Policy Procedure.

Return Material Authorization (RMA) is required prior to returning equipment to Verilink. For Service, RMA requests, or more information, contact:

**Verilink Customer Service:**

145 Baytech Drive  
San Jose CA 95134

(408) 945-1199

**Repair and Return Address:**

145 Baytech Drive  
San Jose CA 95134

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## Telephone company information

The following information may be required when applying to your local telephone company for leased line facilities.

**Table A-1 Telephone company information**

<b>Service Type</b>	<b>Digital Facility Interface Code</b>	<b>Service Order Code</b>	<b>Network Jack</b>
2.4 kbps Digital Interface	04DU5-24	6.0F	RJ48S
4.8kbps Digital Interface	04DU5-48	6.0F	RJ48S
9.6 kbps Digital Interface	04DU5-96	6.0F	RJ48S
56 kbps Digital Interface	04DU5-56	6.0F	RJ48S

## AT commands

The following table lists the AT commands supported by the Connect 56K DSU.

**Table A-2 AT Commands**

AT Commands		
Command	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 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

<b>AT Commands</b>		
<b>Command</b>	<b>Title</b>	<b>Default</b>
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	none
AT%Bn	Loop rate selected	0
AT%Kn	DTE rate selected	none
AT%P	Password control	0
AT%P=x	Password entry	0
AT%P>x	Password verify	0
AT%Rx	Initiate remote configuration	0
AT%Tn	Anti-stream option	0
AT_An	LLB control	0
AT_Cn	SR control during test	0
AT_Dn	RTS-CTS dela	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

<b>AT Commands</b>		
<b>Command</b>	<b>Title</b>	<b>Default</b>
AT_Tn	Select test pattern	0
AT_Xn	Clock source select	0
AT_Yn	Secondary channel rate select	0

# Configuration profiles

The following table lists the configuration profiles you can load using the Manual Command option.

**Table A-3 Configuration Profiles**

Defaults for Connect 56K DSU				
	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
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	RS232	V.35	V.35
Front panel enable/disable	EN	EN	EN	EN
Test timeout	OFF	OFF	OFF	OFF
DTE Command Set	DIS	DIS	DIS	DIS
CS option	RS	RS	RS	RS
SR test option	OFF	OFF	OFF	OFF
TR option	IGNORE	IGNORE	IGNORE	IGNORE
DTR recog. delay(X100ms)	3	3	3	3

Defaults for Connect 56K DSU				
	Profile Numbers			
	1	2	3	4
DTR command timeout (X100)	30	30	30	30
CD option	NRML	NRML	NRML	NRML
SR option	NRML	NRML	NRML	NRML
RDL enable disable	EN	EN	EN	EN
DTE rate (56K loop)	56K	57.6K	56K	56K
RS-CTS dela	SHRT	SHRT	SHRT	SHRT
DTE data format	SYNC	ASYN	SYNC	SYNC
TC timing source	INT	INT	INT	INT
TX loop timing	LOOP	LOOP	LOOP	LOOP
Anti-stream time	OFF	OFF	OFF	OFF
Inactivity timer	OFF	OFF	OFF	OFF

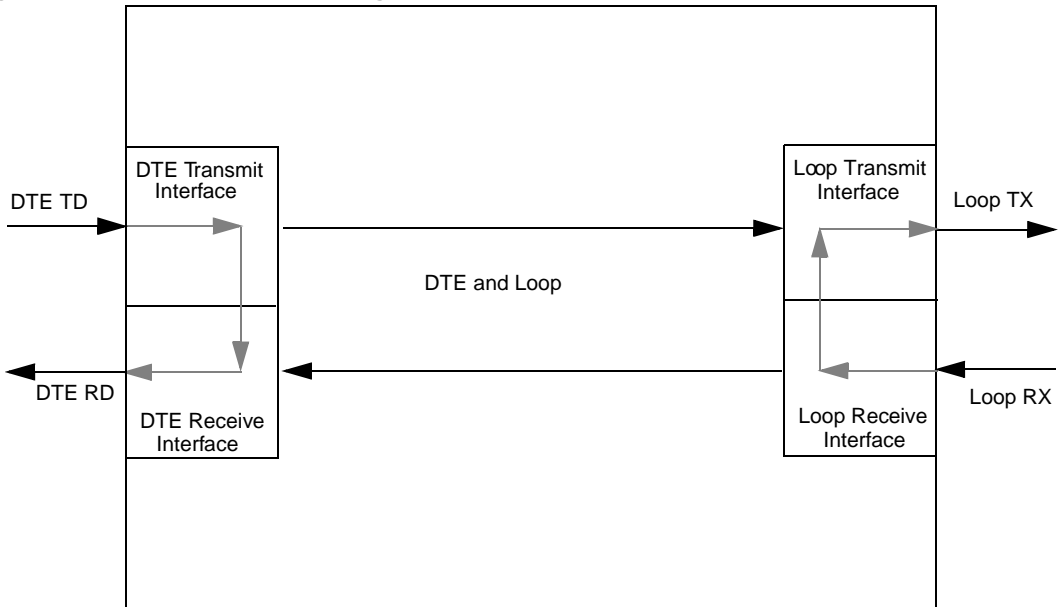
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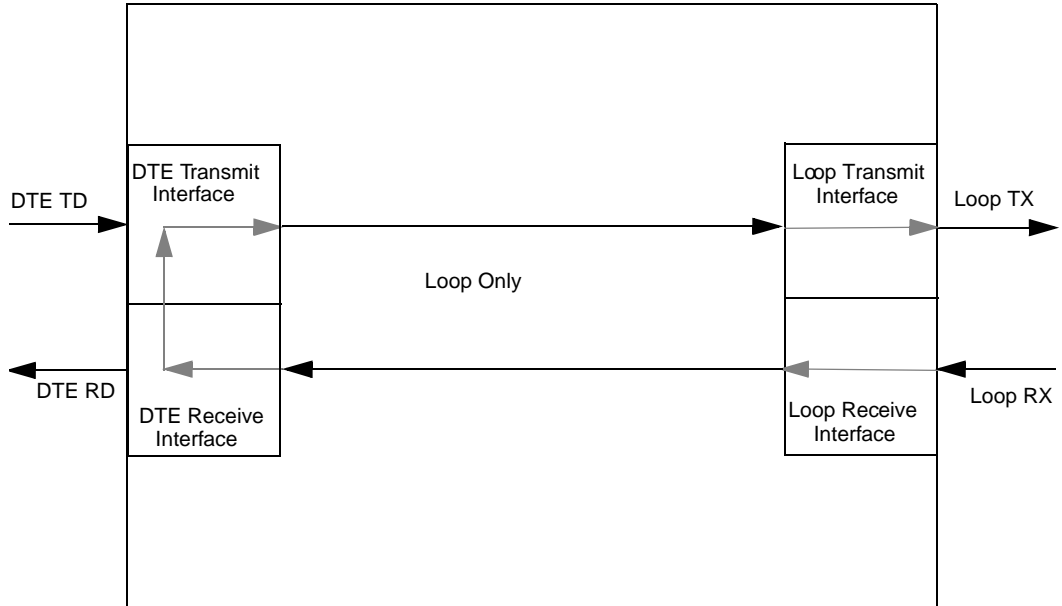
# Figures

This section lists the figures referred to throughout the manual.

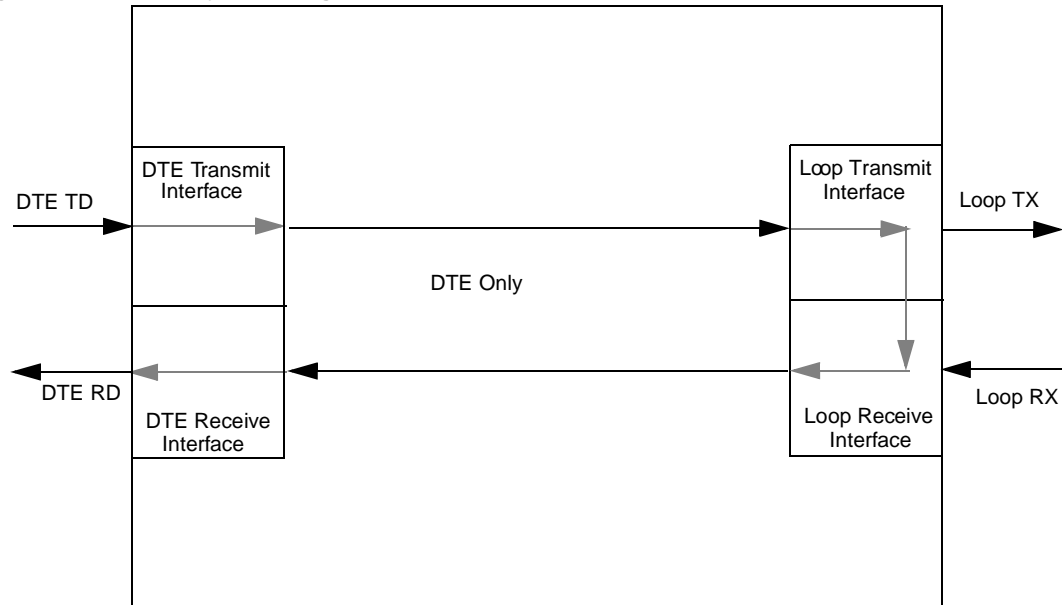
**Figure A-1 DTE and Loop Test Diagram**



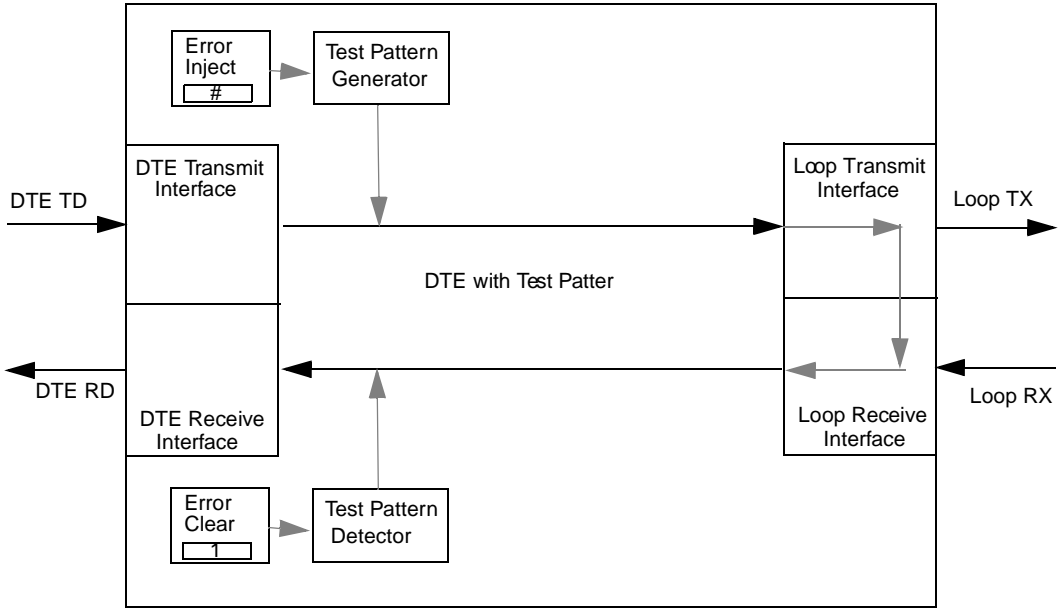
**Figure A-2 Loop Only Test Diagram**



**Figure A-3 DTE Only Test Diagram**



**Figure A-4 DTE With Test Pattern Diagram**



**Figure A-5 Test Pattern Only Diagram**

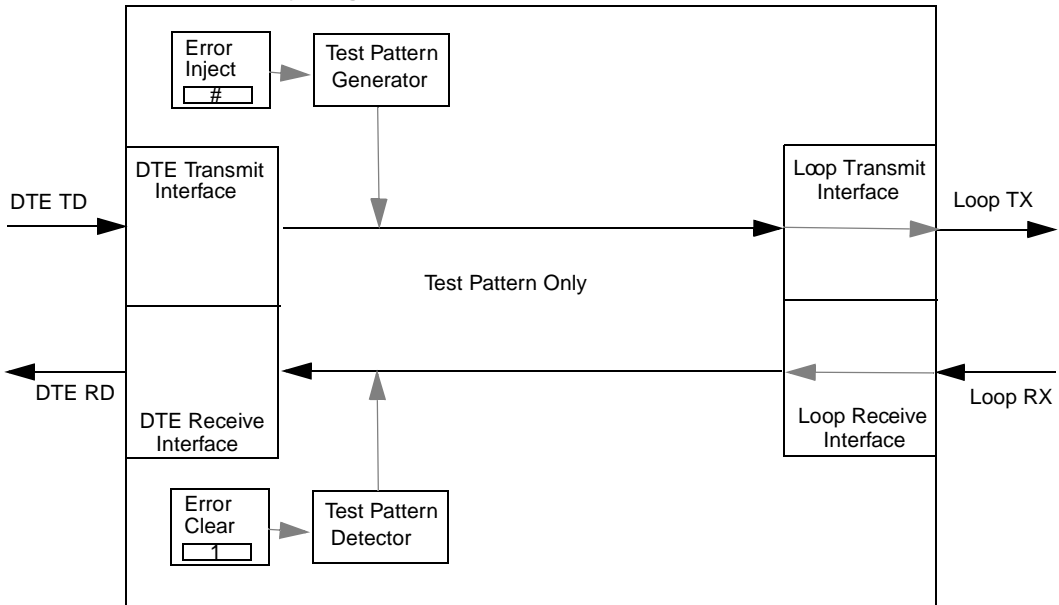


Figure A-6 DSU to Modem Interconnect Diagram

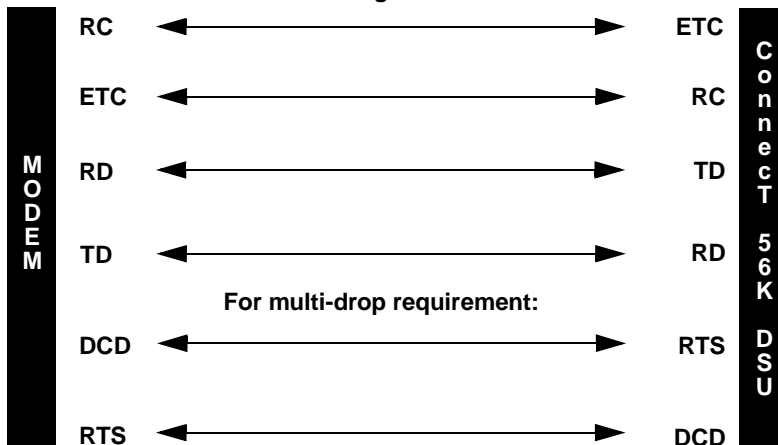


Figure A-7 EIA 232 Connector for 56 KB/s and 64 KB/s Application

DTE

At DTE Interface RS 232 connector, tie transmit clock lead (SCT) to external transmit clock (ETC) as shown. This may resolve data error problems caused by signal delays at high rates.

