PRISM 4001
DDS
CSU/DSU

34-00244.D
November 2004

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Documentation Disclaimer

Table of Contents

1. General

The Verilink PRISM 4001 (Figure 1-1) is a modular, nest mounted DDS CSU/DSU that provides the perfect solution for high density locations. The same type of system solution that Verilink provides for T1 is now available for Digital Data Service. Integrating the PRISM 4001, the PRISM 4101 and the 8100A Site Controller provides a Verilink end-to-end, LAN managed solution for your DDS needs.

The 4001 is an advanced CSU/DSU offering a managed interface for customer equipment into standard DDS service. It supports synchronous data rates from 2.4 to 56 kbps and asynchronous data rates from 2.4 to 57.6 kbps. The unit also supports 64 kbps non-clear channel for limited-distance modem (LDM) applications. The rate adaptation feature allows slower rate customer equipment to transmit over 56 or 64 kbps lines. The DTE supports both V.35 and RS-232 interfaces. External clocking is supported for tail circuit applications.

The 4001 is simple to install and operate. Full access to configuration, status, and diagnostic features is available via the software driven terminal interface connection or via the 8100A Site Controller which allows SNMP and TELNET connections from any host. Configuration can also be done with card-edge switches.

The 4001's diagnostic features permit quick and easy trouble isolation. It responds to all standard loop codes from the telco and can initiate remote V.54 loopbacks. An internal BERT may be used for stress testing. The 4001 monitors line conditions and reports them via front panel LEDs, a user connection to the terminal interface, a TELNET connection, or SNMP via the 8100A Site Controller.

The dial backup feature ensures that critical data applications are secure. The dedicated line service is monitored for trouble conditions. When a line failure is detected, the unit establishes a dial connection through an external device or an optional internal modem. Once the backup link is up, the unit routes the customer data through the switched service. When dedicated line service is restored, the unit automatically reverts back. The dial backup port allows the user to utilize any type of switched service.

The chapters in this manual are arranged as follows:

1. *General* - Describes product specifications, FCC and warranty information, in addition to Verilink ordering numbers and customer service telephone numbers.
2. *Installation* - Describes unit mounting, configuration, port and interface connections, and unit powering.
3. *Operation* - Describes the front panel controls and indicators, unit testing, and control port features.

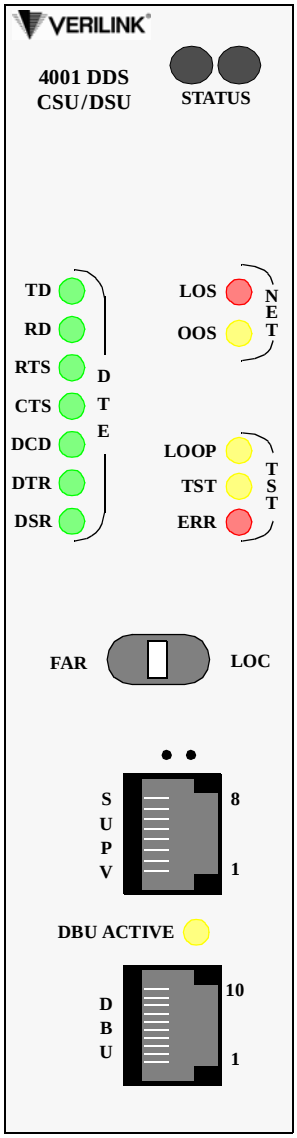

Figure 1-1 Verilink PRISM 4001

4. *Terminal Operation* - Describes the terminal interface setup and the menu-based screens which appear during a local or remote session.

Features

- Multirate DDS-I service at 2.4 to 64 kbps synchronous DTE rates and 2.4 to 57.6 kbps asynchronous DTE rates
- Verilink framed mode allows end-to-end communication
- Rate adaptation of subrate DTE onto 64 kbps lines
- Dial backup and automatic restoral of DDS line through an internal or external modem or an ISDN unit
- Complete diagnostic capabilities including multiple loops and built-in BERT

- Simple setup and software management through
  - a VT100-compatible terminal interface
  - card-edge switches
  - the 8100A Site Controller's SNMP agent
- Programmable alarm thresholds
- Flash memory allows field software upgrades

Specifications

Network Interface

Service Types:	DDS-I Conforming to TR62310 and TR41450
Operating Modes:	Full Duplex, Point-to-Point, Multi-Point
Line Rates:	2.4, 4.8, 9.6, 19.2, 38.4, and 56 kbps 64 kbps supported for LDM operation
Loop Range:	Up to 45 dB of loss
Timing Source:	Network, DTE, and Internal

Equipment Interface

Sync Data Rates:	2.4, 4.8, 9.6, 19.2, 38.4, 54, 56, 62, and 64 kbps
Async Data Rates:	2.4, 4.8, 9.6, 19.2, 38.4, and 57.6 kbps
Rate Adaptation:	Adapts subrate data port speeds to 56 or 64 kbps line rate
Anti-Stream Timer:	Off, 10, 30, or 60 seconds
DTE Connection:	DB-25 (PN 1051-2 25-pin) or V.35 Connector (PN 1051-3 34-pin). Selection depends on chassis model

Diagnostics

Status Indication:	Front panel LEDs Terminal Interface on SUPV Port TELNET Session or SNMP Management via VERILINK 8100A Site Controller
Loopbacks:	CSU, V.54 (receive and send) Front Panel Switch for Loop Activation
BERT:	511 Pattern

Configuration

Card Edge:	Four DIP Switches, two slide switches
SUPV Port:	Supervisory Port to Terminal Interface
Connection:	8-Pin Modular (RS-232)
Data Rates:	1.2, 2.4, 9.6, and 19.2 kbps
TELNET Session:	Via 8100A Site Controller
SNMP Management System:	Via 8100A Site Controller

All software configuration is non-volatile after configuration is saved.

Dial Backup

Connection:	RS-232, 10-Pin Modular
Backup Service:	PSTN or ISDN (External) Optional 14.4 Modem (Internal)
Configuration:	Information for backup unit is stored in 4001 and transmitted to backup unit by Inband AT Commands
Dialing:	Numbers programmed and stored in 4001, and transmitted to backup unit by in-band AT Commands
Restoral:	Manual or Automatic Restoral to leased line service

Power

-48 VDC:	130 mA, 20 W, 73 BTU maximum

Mechanical

Mounting:	Fits Verilink 1051 Chassis
Dimensions:	1.72" W, 6.8" H, 10.5" D (Unit) 17.2" W, 7" H, 10.5" D (Chassis)

Environmental

Operating Temp:	0° to 50°C (32° to 122°F)
Storage Temp:	-20° to 85°C (-4° to 185°F)
Humidity:	95% maximum, non-condensing

Compatibility

AT&T TR62310

AT&T TR41450

Industry Listings

FCC Compliance:	Part 15 Subpart B, Class A and Part 68
NRTL:	UL 1459
CSA Certified:	Pending
IC/CSO3:	Pending

FCC Requirements

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at his own expense.

Shielded cables must be used to ensure compliance with the Class A FCC limits.

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

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

The following instructions are provided to ensure compliance with FCC Rules, Part 68:

1. All direct connections to DDS lines must be made using standard plugs and jacks (compliant with Part 68). Table 1-A presents a list of applicable registration jack USOCs, facility interface codes (FIC), and service order codes (SOC). These are required when ordering service from the telco.

Table 1-A USOC FIC

Port ID	REN/SOC	FIC	USOC
56 kbps		04DU5-56	
64 kbps		04DU5-64	

2. If the CSU/DSU appears to be malfunctioning, it should be disconnected from the DDS lines until the source of trouble is determined to be your equipment or the telephone line. If your equipment needs repair, it should not be reconnected until it is repaired.
3. The CSU/DSU has been designed to prevent harm to the DDS network. If the telephone company finds that the equipment is exceeding tolerable parameters, it can temporarily disconnect service. In this case, the telephone company will give you advance notice, if possible.
4. Under FCC rules, no customer is authorized to repair this equipment, regardless of warranty status.
5. If the telephone company alters its equipment in a manner that will affect the use of this device, it must give you advance warning so that you can have the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.
6. In the event of equipment malfunction, all repairs should be performed by our company or an authorized agent. It is the responsibility of users requiring service to report the need for service to our company or to one of our authorized agents.

Canadian Emissions Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

On 48 VDC units only, end users should use existing 48 VDC battery sources or a CSA-certified power supply.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de la class A) prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

This equipment complies with Part 68 of the FCC Rules. On the rear or bottom of the unit is a label that contains the FCC registration number and other information. If requested, provide this information to the telephone company.

Warranty

Verilink's product warranty is included at the back of this document.

Ordering Numbers

Each 4001 unit (Table 1-B) is supplied with the PRISM 4001 reference manual and is equipped with both a V.35 and EIA232 data port (F-4001-01-111 is the default part number). Also provided is an 8-pin modular-to-receptacle 1051 shelf to DDS adapter (PN 9-1001-075-1).

Table 1-B Equipment Part Numbers

F-4001-101--111D	PRISM 4001 Module
D	Dial Backup option
1	RS-232 External Backup
2	V.32 Modem Backup
3	ISDN *

* Not released at time of printing

The optional equipment shown in Table 1-C may also be needed for the operation of the unit.

Table 1-C Optional Equipment Part Numbers

Part Number	Optional Equipment
Network Cables	
9-1001-070-010	DDS cross-over kit
9-1001-004-010	8-pin RJ-48 to 8-pin RJ-48 Network Cable
Supervisory Adapters	
9-1001-015-1	DB-25 male to 8-pin RJ-48 (terminal to SUPV)
9-1001-015-2	DB-25 female to 8-pin RJ-48 (terminal to SUPV)
9-1001-016-1	DB-25 male to 8-pin RJ-48 (modem to SUPV)
9-1001-016-2	DB-25 female to 8-pin RJ-48 (modem to SUPV)
Supervisory Cable and Cable/Adapter Kit	
9-1001-073-2	DB-9 female to 8-pin RJ-48 (terminal to SUPV) kit
9-1544-619-xxx	8-pin RJ-48 to 8-pin RJ-48 cable
Dial Back Up Cables	
9-1001-074-1	DB-25 male to 10-pin mod (modem to DBU)
9-1001-074-2	DB-25 female to 10-pin mod (modem to DBU)
9-1001-034-010	10-pin to 10-pin mod (DBU)
V.35 Cables	
9-1001-001-xxx	V.35 male to male null cable
9-1001-311-xxx	V.35 male to male, straight through
9-1001-312-xxx	V.35 male to female, straight through
RS-232 Cables	
9-1001-044-010	RS-232 male to male null cable
9-1001-211-xxx	RS-232 male to male, straight through
9-1001-212 -xxx	RS-232 male to female, straight through
9-1001-222 -xxx	RS-232 female to female, straight through
xxx = length 005 = 5 feet 010 = 10 feet 020 = 20 feet	

Verilink Customer Service

Verilink office hours are Monday through Friday from 8 a.m. to 5 p.m Central Time. For general, sales and marketing information, contact Verilink toll free at 800-926-0085 or locally at 256-327-2001.

Returns/RMA

Verilink's policy for product returns is provided in the warranty statement at the back of this document.

Technical Support

Technical support is available 24 hours a day, seven days a week. You may contact a support representative by telephone or e-mail.

Toll Free: 800-285-2755
Local: (256) 327-2255
e-mail: support@verilink.com

2. Installation

This chapter contains information and instructions required to prepare the Verilink PRISM 4001 unit for use. Included are initial inspection procedures, mounting instructions, configuration guidelines, connection instructions, and powering information.

Safety Summary

This manual contains information and warnings which must be followed by the user to ensure safe operation and to maintain the equipment in safe condition.

This WARNING sign denotes a potential hazard to the operator. It calls attention to a procedure or practice which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning sign until the indicated conditions are fully understood and met.

Follow proper ESD (electrostatic discharge) procedures when handling circuit boards.

Supplied Materials

The 4001 is shipped from the factory with the 1051-to-DDS adapter (PN 9-1001-075-1) and reference manual. The user may also require the following additional materials for installation and operation:

- -48 VDC power source
- Network and DTE Interface cables
- 20-gauge stranded wire (or similar) for DC power and alarm connections

For specific applications, the users may require additional cables and adapters. The interface requirements of any application may be met using the appropriate cable. Contact Verilink if assistance is required in cable. Additional cables are also shown in Optional Equipment Part Numbers on page 1-4.

Mounting

The PRISM 4001 is a modular unit that plugs into a 1051 chassis.

Chassis Assembly

Up to 12 PRISM 4001 units may be inserted into a chassis and the chassis may be installed into a 19-inch or 23-inch rack using four screws. Connections are made from the rear of the chassis (refer to Figure 2-6 and Figure 2-7 on page 2-7).

Unit Configuration

The PRISM 4001 can be hardware configured by switches or software configured by using a terminal connection to the front panel supervisory (SUPV) access port. The terminal interface provides more capabilities than do the configuration switches.

If there is a power failure and the configuration has been saved, the 4001 retains its configuration in non-volatile memory. This feature allows the unit to automatically restore normal service at power loss. See sections Configuration on page 4-1 and Store Parameters to EEPROM on page 4-13 for more information.

The 4001 stores its operating firmware in Flash memory. If a software upgrade is ever needed, Verilink will provide the hex files, the download program, and the downloading instructions.

Hardware switches on the side of the circuit boards will configure most simple applications. These switches are described in the following paragraphs. If an ambiguous configuration is programmed, the unit overrides invalid configuration items.

The unit is hardware configured using four DIP switches and two slide switches, which are located along the upper side of the unit (see Figure 2-2). Switch positions are numbered as follows: position 2 of Switch S4 is referred to as Switch S4-2, and so on.

Before installation, verify each configuration switch setting. A removable configuration guide is included at the back of this manual to record option selections for future reference.

Configuration Switch S1

Switch S1 (Figure 2-1) is used to set the configuration parameters listed in the following paragraphs.

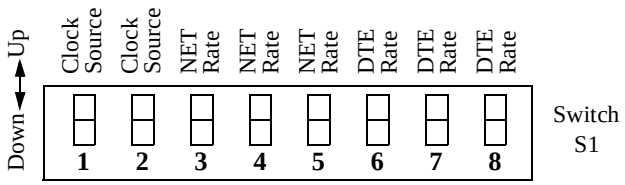

Figure 2-1 Switch S1

Factory default settings are underlined throughout this manual.

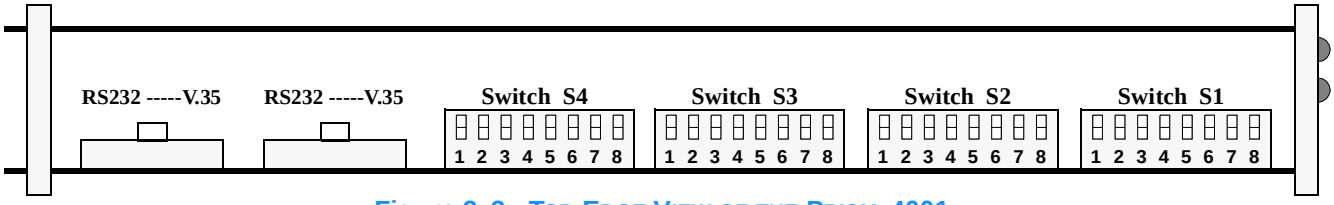

Figure 2-2 Top-Edge View of the Prism 4001

Timing Source

Positions S1-1 and S1-2 determine the source of unit clocking. The most common timing source for most DDS applications is to derive timing from the network. The unit may also be clocked from an internal standard or from the DTE as shown in Table 2-A.

Table 2-A Timing Source

Timing Source	S1-1	S1-2
Network	Down	Down
DTE	Down	Up
Internal	Up	Down

DDS Network Rate

Positions S1-2 through S1-5 are used to set the network interface line rate as shown in Table 2-B.

Table 2-B DDS Network Rate

Network Rate	S1-3	S1-4	S1-5
56 kbps	Down	Down	Down
64 kbps	Down	Down	Up
2.4 kbps	Down	Up	Down
4.8 kbps	Down	Up	Up
9.6 kbps	Up	Down	Down
19.2 kbps	Up	Down	Up
38.4 kbps	Up	Up	Down

DTE Line Rate

Positions S1-6 through S1-8 are used to set the DTE interface line rate as shown in Table 2-C. If in TxPORT mode and Sync mode and Line Rate is 56 kbps, then:

Table 2-C DTE Line Rate = 56 kbps, TxPORT Mode, and Sync Mode

DTE Rate	S1-6	S1-7	S1-8
54 kbps	Down	Down	Down
2.4 kbps	Down	Down	Up
4.8 kbps	Down	Up	Down
9.6 kbps	Down	Up	Up
19.2 kbps	Up	Down	Down
38.4 kbps	Up	Down	Up

If in TxPORT mode, Sync format, and the Line Rate is 64 kbps, set the DTE Line Rate as shown in Table 2-D.

Table 2-D DTE Line Rate = 64 kbps, TxPORT Mode, and Sync Mode

DTE Rate	S1-6	S1-7	S1-8
62 kbps	Down	Down	Down
56 kbps	Down	Down	Up
2.4 kbps	Down	Up	Down
4.8 kbps	Down	Up	Up
9.6 kbps	Up	Down	Down
19.2 kbps	Up	Down	Up
38.4 kbps	Up	Up	Down

If in TxPORT mode, with a Line Rate of 56 or 64 kbps, and in ASYNC format, set the DTE rate as shown in Table 2-E.

Table 2-E DTE Rate=56 or 64 kbps, TxPORT Mode, and Async Mode

DTE Rate	S1-6	S1-7	S1-8
57.6 kbps	Down	Down	Down
2.4 kbps	Down	Down	Up
4.8 kbps	Down	Up	Down
9.6 kbps	Down	Up	Up
19.2 kbps	Up	Down	Down
38.4 kbps	Up	Down	Up

In TxPORT mode, if the DDS Network Rate is less than 56 kbps. The DTE Rate must match the Net Rate. The Sync format is not allowed in TxPORT mode below 56 kbps.

If in Standard mode, set the DTE Rate as shown in Table 2-F.

Table 2-F DTE Rate in Standard Mode

DTE Rate	S1-6	S1-7	S1-8
56 kbps	Down	Down	Down
64 kbps	Down	Down	Up
2.4 kbps	Down	Up	Down
4.8 kbps	Down	Up	Up
9.6 kbps	Up	Down	Down
19.2 kbps	Up	Down	Up
38.4 kbps	Up	Up	Down

Configuration Switch S2

Switch S2 (Figure 2-3) is used to set the configuration parameters listed in the following paragraphs.

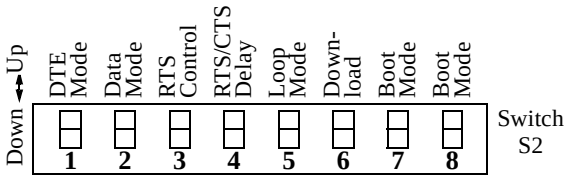

Figure 2-3 Switch S2

DTE Mode

Position S2-1 sets the unit to one of two general modes: Sync or Async (Async is allowed only in the TxPORT-proprietary mode) as shown in Table 2-G.

Table 2-G DTE Mode

DTE Mode	S2-1
Sync	Down
Async	Up

Data Mode

Position S2-2 sets the communication link to proprietary mode (Verilink equipment must be located on both ends) or to industry-standard mode (it interoperates with *standard equipment* from another vendor) as shown in Table 2-H.

Table 2-H Data Mode

Data Mode	S2-2
Standard	Down
Verilink	Up

RTS Control

Position S2-3 sets the behavior of the RTS and CTS as shown in Table 2-I.

Table 2-I RTS Control

RTS Control	S2-3
Normal	Down
Forced On	Up

RTS-to-CTS Delay

Position S2-4 sets the delay on an RTS-to-CTS transition as shown in Table 2-J.

Table 2-J RTS-to-CTS Delay

RTS-to-CTS Delay	S2-4
Normal	Down
Long	Up

Loop Mode

Position S2-5 selects the loopback method as shown in Table 2-K.

Table 2-K Loop Mode

Loop Mode	S2-5
Bidirectional	Down
Unidirectional	Up

Download on Reset

Position S2-6 is used in conjunction with the front panel FAR/LOC switch to force the 4001 into a software download mode as shown in as shown in Table 2-L. The FAR/LOC switch controls the download baud rate as shown in Table 2-M. If S2-6 is in the Up position at power up, the 4001 enters download mode at the rates specified by the FAR/LOC switch.

Table 2-L Download Mode

Download on Reset	S2-6
Run EEPROM	Down
Do Download	Up

Table 2-M Download Baud Rate

Baud Rate	FAR/LOC Position
57.6 kbps	FAR
38.4 kbps	Center
19.2 kbps	LOC

Boot Mode

Positions S2-7 and S2-8 select the startup boot configuration method as shown in Table 2-N.

Table 2-N Boot Mode

Power-up Mode	S2-7	S2-8
Boot from SAVED	Down	Down
Boot from DEFAULT	Down	Up
Boot from SWITCHED	Up	Down
Boot from CONTROLLER	Up	Up

Configuration Switch S3

Switch S3 (Figure 2-4) sets the configuration parameters listed in the following paragraphs.

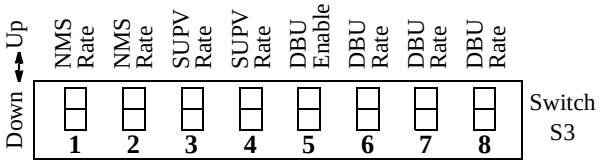

Figure 2-4 Switch S3

NMS Rate

Positions S3-1 and S3-2 set the bit rate for the network management system as shown in Table 2-O.

Table 2-O NMS Rate

NMS Rate	S3-1	S3-2
19.2 kbps	Down	Down
1.2 kbps	Down	Up
2.4 kbps	Up	Down
9.6 kbps	Up	Up

SUPV Port Rate

Positions S3-3 and S3-4 set the supervisory port rate as shown in Table 2-P.

Table 2-P SUPV Rate

SUPV Rate	S3-3	S3-4
19.2 kbps	Down	Down
1.2 kbps	Down	Up
2.4 kbps	Up	Down
9.6 kbps	Up	Up

Dial Backup

Position S3-5 can enable the unit's dial backup feature as shown in Table 2-Q.

Table 2-Q Dial Backup

Dial Backup	S3-5
Disabled	Down
Enabled	Up

DBU Rate

Positions S3-6 through S3-8 set the DBU port rate as shown in Table 2-R.

Table 2-R DBU Rate

DBU Rate	S3-6	S3-7	S3-8
57.6 kbps	Down	Down	Down
2.4 kbps	Down	Down	Up
4.8 kbps	Down	Up	Down
9.6 kbps	Down	Up	Up
19.2 kbps	Up	Down	Down
38.4 kbps	Up	Down	Up

Address Switch S4

Switch S4 sets the unit address. When using the 4001 with a 8100A Site Controller, each element in a group must have a unique unit address. As many as 50 units (with addresses from 1 to 50) can exist in a group. If the unit is not connected to a site controller, the NMS unit address should be left at the factory default setting of 1 where Position 1 is Up and all other positions are Down (see Figure 2-5).

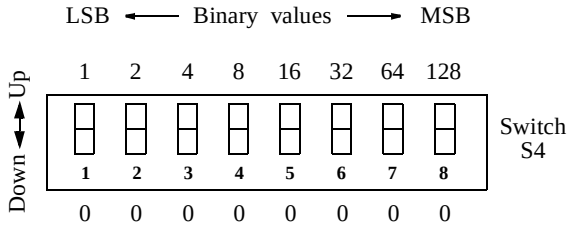

Figure 2-5 Switch S4

Switch S4 has eight positions used to create an 8-bit binary code for an address in the range of 1 to 50. Switch position S4-1is the least significant bit (LSB) and S4-8 is the most significant bit (MSB). If a switch is down, its value is 0. If up, its value is that of the upper location. the values are additive. For example, to set a unit address to 5, position S4-3 (binary value is 4) and position S4-1 (binary value is 1 would be set Up for a unit address of 5 (4+1). All other positions would be set Down.

Interface Switches S5 and S6

Switches S5 and S6 are slide switches that set the unit to either RS-232 or V.35. Both switches must be set to the same selection (that is, RS-232 or V.35).

Connections

SUPV Port Connection

The front panel supervisory port serves two functions. A modem may be connected to the SUPV port for remote access or use of the COA (call on alarm) feature. The terminal interface may be accessed through this port.

The SUPV port bit rate is set by configuration Switch Position S3-3 and S3-4. The port is a serial RS-232 DCE port configured for 8 bits, no parity, and 1 stop bit. The physical connection is an 8-pin modular jack with the following pinout (see Table 2-S).

Table 2-S SUPV Port Connections

Pin	SUPV Port Terminal Connection
1	DCD Out
2	CTS Out
3	Frame Ground
4	Data Out
5	Date In
6	Signal Ground
7	RTS In
8	DTR In

NMS Connection

The 4001 is fully compatible with the Verilink 8100A Site Controller. The 8100A is a manager that is installed in Slot 1 of the 1051 shelf. A single 8100A can manage up to fifty 4001s or a combination of Verilink nest-mount units.

Data Port Connections

Both models of the Verilink 1051 chassis provide connection to the customer equipment. Each slot of the 1051-2 has a corresponding DTE 8-pin RJ-48 connector and a high-speed DTE female 25-pin connector located on the chassis rear panel. The 1051-3 chassis is similar except that it has a high-speed DTE 34-pin connector instead of the 25-pin connector. The pinout for the DTE RJ-48 connector is given in Table 2-T and the pinout for the high-speed DTE connectors is given in Table 2-U.

Table 2-T DTE RJ-48 Pinout

Pin	Signal
1	Data Out
2	Data Out
3	Not Used
4	Data In
5	Data In
6	Not Used
7, 8	Chassis Ground

Table 2-U High-Speed DTE Connector Pinout

ITU/EIA Circuit	Common Name	DB-25 25-pin	V.35 34-pin	DCE
101/AA	Frame Ground	1	A	Gnd
102/AB	Signal Ground	7	B	Gnd
103/BA (A)	Transmit Data A	2	P	In
103/BA (B)	Transmit Data B	14	S	In
104/BB (A)	Receive Data A	3	R	Out
104/BB (B)	Receive Data B	16	T	Out
105/CA	Request to Send	4	C	In
106/CB	Clear to Send	5	D	Out
107/CC	Data Set Ready	6	E	Out
108/CD	Data Term Ready	20	H	In
109/CF	Data Carrier Detect	8	F	Out
114/DB (A)	Transmit Clock A	15	Y	Out
114/DB (B)	Transmit Clock B	12	AA	Out
115/DD (A)	Receive Clock A	17	V	Out
115/DD (B)	Receive Clock B	9	X	Out
113/DA (A)	External Clock A	24	U	In
113/DA (B)	External Clock B	11	W	In
141/LLB	Local Loopback	18	J	In
140/RLB	Remote Loopback	21	BB	In
142/TM	Test Mode	25	K	Out

Dial Backup Port Connection

The front panel Dial Backup port is a 10-pin modular connector that interfaces through the RS-232 DTE port to an external device for dial backup of the data channel when the DDS link fails. The 4001 configures and dials the backup unit using in-band AT commands. This connector is not used with the internal DBU. The Data In and Data Out pins are used for this type of connection. The pinout is as shown in Table 2-V.

Table 2-V Dial Backup Connection

Dial Backup Connection	Pin
Rx Clock In	1
DTR Out	2
RTS Out	3
Frame Ground	4
Data Out	5
Data In	6
Signal Ground	7
CTS In	8
DCD In	9
Tx Clock Out	10

For additional information regarding cables, see section Ordering Numbers on page 1-4 or contact Verilink.

Network Management

Network management is accomplished through the SUPV port as described earlier in this chapter. The unit has a ComView NMS interface and can be managed under SNMP/Telnet when connected to an 8100A Site Controller.

Power Connection

The 4001 requires a -48 VDC power source capable of supplying a 130 mA current. All units in the chassis are powered by -48 VDC sources which are connected to the 6-position terminal strip TB2 on the rear on the chassis. The power supply should be sized for maximum current draw for the chassis.

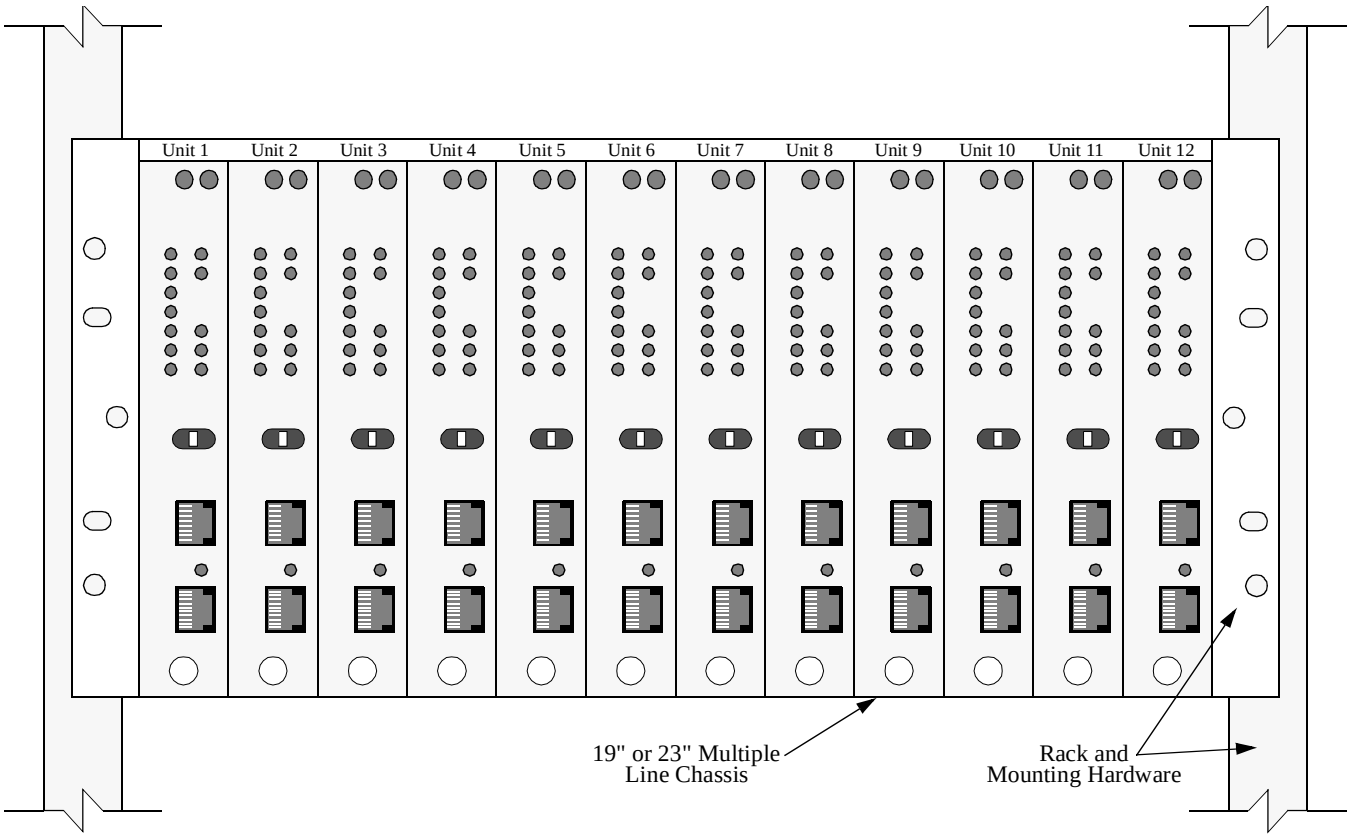

Figure 2-6 Model 1051-3 Chassis, Front View

NOTE: The DB-25 version (1051-2) is also available (the V.35 is shown).

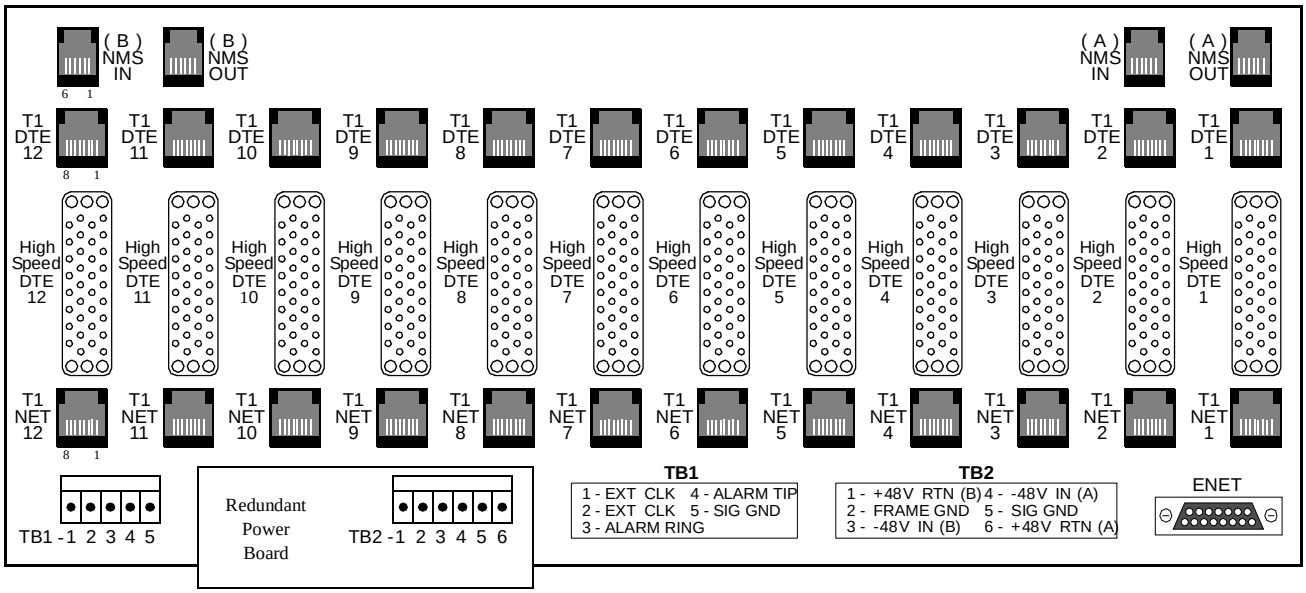

Figure 2-7 Model 1051-3 Chassis, Rear View

3. Operation

This chapter describes general operation of the Verilink PRISM 4001 front panel. The 4001 may be controlled manually using the front panel and the circuit board configuration switches (configuration switches are discussed in the Installation chapter).

The Terminal Operation chapter covers the firmware controlled Terminal Interface program, which gives the user maximum control. The 4001 may also be controlled using the 8100A Site Controller.

Factory default settings are underlined throughout this manual.

Front Panel Controls and Indicators

The front panel contains 17 LED indicators which convey status, alarm, and test information. The front panel also contains a test switch, a supervisory port connector, and a DBU port connector. The following descriptions refer to Figure 3-1.

General Status Indicators

1. **STATUS:** The 4001 has two LED indicators on the front panel. These general status LEDs provide a quick check of the 4001's operating condition (e.g., Alarmed or Not Alarmed).

   If neither LED is lit, the 4001 is not powered. If the green LED is lit, the 4001 is powered and may be functioning normally. If the red LED is lit, there is a fault that exceeds alarm thresholds or another type of 4001 failure. The problem can usually be isolated by further examination of the other front panel LEDs as described below. Some errors can only be determined through the terminal interface (OOF, for example).

2. **TD**: This green LED lights during a mark condition on the high-speed **transmit data** line.
3. **RD**: This green LED lights during a mark condition on the high-speed **receive data** line.
4. **RTS**: This green LED lights when the request to send signal is active.
5. **CTS**: This green LED lights when the clear to send signal is active.
6. **DCD**: This green LED lights when the data carrier detect signal is active.
7. **DTR**: This green LED lights when the data terminal ready signal is active.
8. **DSR**: This green LED lights when the data set ready signal is active.

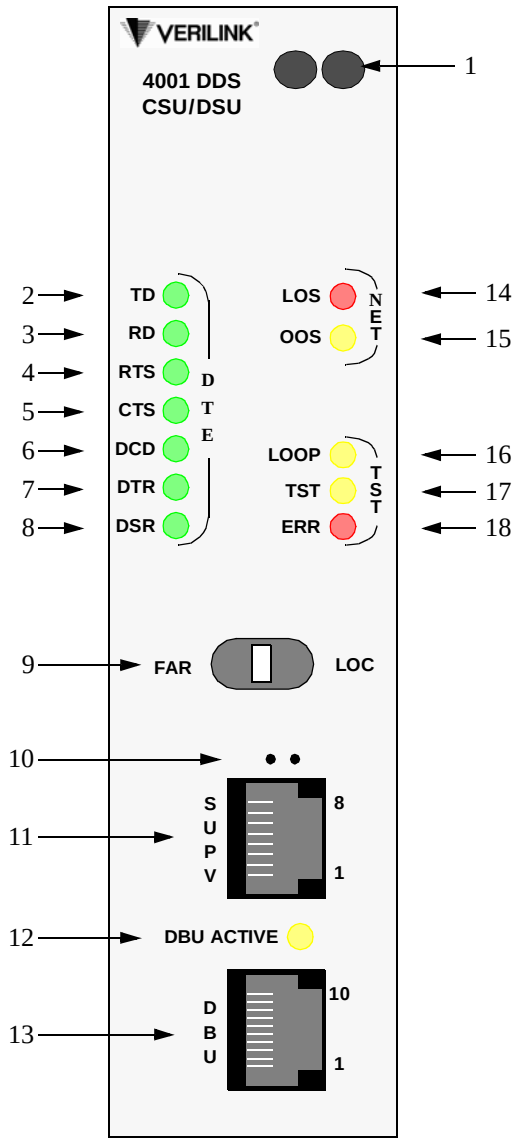

Figure 3-1 4001 Front Panel

9. **Test Switch**: This switch (FAR/LOC) is used for local testing. Refer to section Front Panel Testing on page 3-2 in this chapter for more information.
10. **Activity Indicators:** These two small, recessed LEDs indicate supervisory and network manager port activity.
11. **SUPV**: The supervisory jack provides direct terminal access to control and monitor the 4001. Refer to section *Supervisory Port* in this chapter for more information.

12. **DBU Active**: This yellow LED lights when the dial backup is active. It blinks as a dial backup connection is established or shutdown.
13. **DBU**: The DBU jack provides a sync or async interface for external dial backup equipment. Refer to section Dial Backup Port in this chapter for more information.
14. **LOS:** This LED lights with a loss of signal from the DDS network.
15. **OOS:** This LED lights when an out-of-sync condition is detected.
16. **LOOP:** This LED lights continuously when the network interface is in a loopback of any kind.
17. **TST:** This LED lights continuously whenever the BERT pattern generator is active, including during loop, unloop, and FAR tests.
18. **ERR:** This LED lights when BERT pattern errors are detected. At the end of a FAR test, it indicates the results of the test as long as the FAR/LOC switch remains in the FAR position.

Front Panel Testing

The previous section gave a brief description of each front panel control and LED indicator. This section explains the front panel test functions. Testing may also be performed using software control from the 8100A Site Controller or the Terminal Interface program (refer to the Terminal Operations chapter).

Test Switch

This switch (labeled FAR/LOC) is used for local testing. When in the FAR position, the 4001 sends five seconds of the V.54 loop pattern, then switches to the 511 pattern. When transmitting a test pattern, the TST LED is lit continuously. The ERR LED lights for one second when a bit error or sync loss on the returned data is detected. After the FAR test has been completed, the ERR LED is Off for passed or On for failed.

When the test switch is returned to the center position, the 4001 sends five seconds of V.54 loop down code and then returns to its normal operating mode.

When the Test switch is in the LOC position, the 4001 performs a network LLB as shown on page 4-5, and the LOOP LEDs light.

The test switch is also used when upgrading the 4001 software. When Switch 2 position 6 is up, the test switch then has the following functions:

The **LOC** position permits download at 19200 bps.

The **middle** position permits download at 38400 bps.

The **FAR** position permits download at 57600 bps.

Supervisory Port

This 8-pin modular RS-232 jack provides direct terminal access for controlling the 4001 and gathering status and performance data.

The supervisory port serves several functions. A terminal may be connected to this port for external software control. A modem may be connected for remote access. The port supports the *call on alarm* feature. Refer to section SUPV Port Connection on page 2-5 for connection information.

Dial Backup Port

This 10-pin modular RS232-level jack can provide an alternate data path when the DDS network connection fails. This port supports synchronous connection up to 64 kbps and asynchronous connection up to 57.6 kbps.

If an internal modem or ISDN terminal adapter is installed in the 4001, the Dial Backup Port is not used. A separate connector on the rear of the unit is used to attach a telephone or ISDN line.

4. Terminal Operation

This chapter describes the screens and menus associated with the ascom TimeplexVerilink TransportPRISM 4001 Terminal Interface, a firmware application embedded within the 4001. Refer to the Installation chapter for connection information. Cables are available from Verilink for most typical connections and are listed in Table 4-C on page 4-9. If necessary, contact Verilink for assistance in cable selection.

System Description

The Terminal Interface requires either an ANSI-compatible VT100 terminal (ASCII), or a computer running an ANSI terminal emulation program. The Terminal Interface utilizes ASCII break and escape functions; these functions are implemented differently by the various terminal emulation programs. For further reference, consult the documentation supplied with the terminal emulation program.

Once a compatible terminal is properly connected to the 4001, a terminal interface session can be started by sending a break to the 4001, or by pressing ENTER four times. The Main Menu screen (Figure 4-1) is then displayed.

Configuration

The TransportPRISM 4001 can be configured via the menu driven terminal interface described in this chapter. The terminal must be connected to the 8-pin serial RS-232 level SUPV port on the front panel. Although the SUPV port must be used for a Terminal Interface connection, the user may also connect to the 4001 through an 8100A Site Controller. Bit rates from 1.2 to 19.2 kbps may be selected.

When the 4001 is powered up, it is configured as specified by SW2 switches 7 and 8 (from SAVED, default, or the other switches). The terminal interface has a configuration screen for both the network line connection and the DTE port connection. Each configuration screen may have a field which allows the user to access the far-end unit's corresponding configuration screen when operating in TxPORT mode.

> *Refer to section Utilities Screen on page 4-13 for information on saving a custom configuration.*

Modem Compatibility

The 4001 supports an AT-command-set-compatible modem on the SUPV port. Set the modem to ignore DTR, enable auto answer, inhibit command echo, and return verbose result codes.

> *The modem hangs up if the user calls the 4001 and presses any key before receiving the connect message. This is caused by the any-key-abort feature of the modem, not the PRISM 4001.*

Screen Components

Terminal interface screens have several components common to all screens and are discussed individually in the following paragraphs. The common elements are displayed in the Main Menu (Figure 4-1).

DEVICE TYPE AND REVISION

The device type (such as TransportPRISM 4001) and the revision control numbers are shown in the upper left corner. The first number is the hardware revision and the second is the software revision. Information is displayed for the near-end unit (connected directly to the terminal) on the top line, and for the far-end unit (connected to the network interface) on the second line. Refer to this information when contacting the factory with inquiries. The far-end information is available only if the far-end unit is ascom Timeplexa Verilink product and is set for TxPORT operation which supports a proprietary message set.

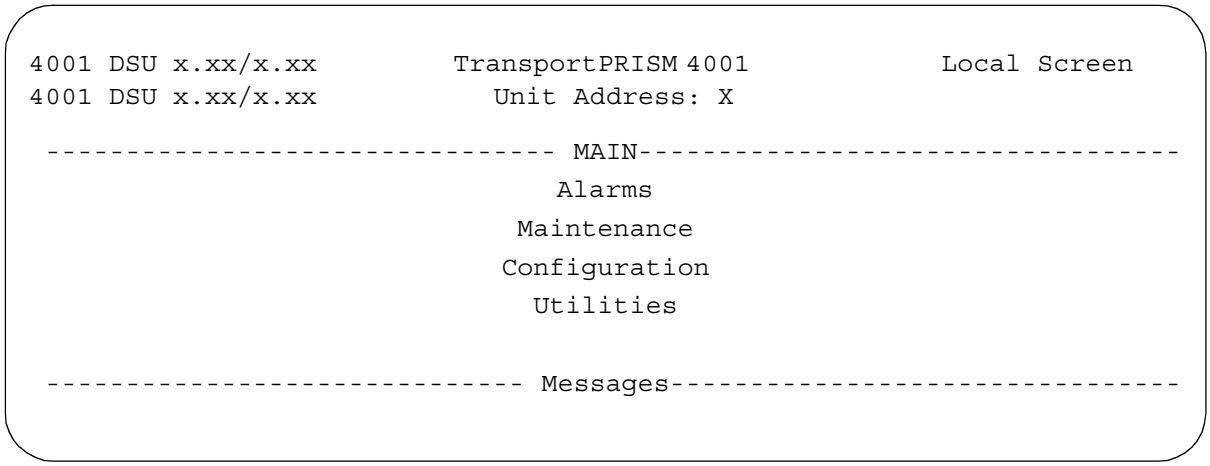

Figure 4-1 Main Menu

LOCAL/REMOTE

In the top right corner, Local Screen is displayed if the 4001 is accessed directly. If the 4001 is accessed remotely, Remote Screen is displayed.

UNIT ADDRESS

Displays the unit address which has been set on the configuration switch.

ELEMENT ID

Below the header (`Transport` PRISM 4001), the user-selectable Element ID is displayed (see section Utilities Screen on page 4-13).

MENU TITLE

The menu title (third line, center) denotes the general classification of functions currently user-accessible (such as MAIN or ALARMS).

ELEMENT

In this field (available only in the ascom TimeplexTxPORT mode of operation), the NEAR or FAR unit is selected by toggling the spacebar and pressing ENTER. When the far end is selected, the remote communications channel allows access to the far-end unit parameters as if the user were connected locally. The 4001 continually monitors its remote end for alarm and status conditions and reports these locally.

Messages: Diagnostic messages are displayed at the bottom of the screen. They reflect Alarm Status and Loop Status for the unit.

Cursor Controls

The terminal interface employs a highlighted cursor to make menu and field selections. The cursor is moved in different ways depending on the terminal emulation program used. Most programs allow the use of the TAB and SHIFT+TAB keys, and some allow the use of the arrow keys. Once a field is highlighted, it is manipulated as described in section below.

An alternate set of cursor control commands is provided for keyboards which lack standard keys or have an incomplete set (Table 4-A). Enter an alternate command by pressing its letter key while holding down the CONTROL key. Alternate commands and keyboard commands may be freely mixed.

Table 4-A Keyboard and Alternate Commands

Keyboard Command	Alternate Command
left arrow	CONTROL+S
right arrow	CONTROL+D
up arrow	CONTROL+E
down arrow	CONTROL+X
backspace	CONTROL+H
delete	CONTROL+Z

Field Types

Each screen is made up of fields. The two basic field types are *user selectable* and *display only.* If the highlighted cursor can be moved to a field, it is a user-selectable field. All other fields are display only. User-selectable fields permit the user to make changes or execute commands.

Fields without brackets or parenthesis are display only and cannot be changed on the screen. Most user-selectable fields are enclosed in brackets or parenthesis and are described in the following paragraphs.

Fields enclosed in brackets [ ] offer a list of selections. The selections may be toggled by pressing the spacebar. Each time it is pressed, a new item appears. When the appropriate choice is displayed, press ENTER to select it.

Fields enclosed in parenthesis ( ) are manipulated by one of the following two methods:

- Pressing ENTER on such fields as (Reset) and (Start Test) to execute the function.
- Typing input in the form of letters, numbers, or both. The most common type of field in parenthesis accepts typed input. Typing characters when the field is highlighted replaces the current entry with the new characters. To edit an existing entry rather than replace it, use the right arrow key to move the cursor to the point that needs editing, then insert or delete characters as necessary. Typed input is always inserted rather than typed over. If the field is full, however, at least one character must be deleted to add another.

Press CONTROL+U to redisplay or refresh a local or remote screen. Press CONTROL+T to toggle from the remote screen to the local screen.

Main Menu Screen

The Main Menu (Figure 4-1) lists the functional user accessible menus. To activate any menu, highlight the desired selection and press ENTER. All menus may be exited by pressing Escape. If the Main Menu is exited, the terminal interface program terminates. This is a valid way to end a user session. If any other menu is exited, the previous screen is returned. The menu structure (Figure 4-2) shows all the screens accessible from the Main Menu

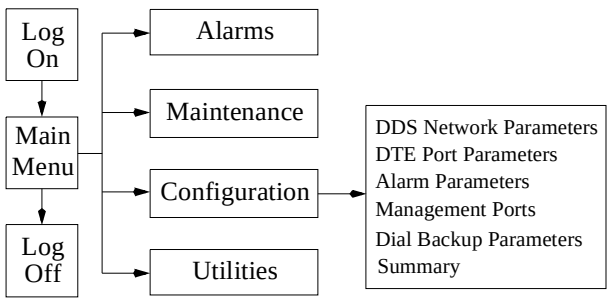

Figure 4-2 Menu Structure

If no key is pressed for ten minutes, the terminal interface logs off automatically. To manually log off, press ESCAPE from the Main Menu.

Alarms Screen

The Alarms screen (Figure 4-3) displays the current alarm status of the network and the DTE lines. The fields are described as follows:

NET AND DTE ALARMS

The status lines shown in Table 4-B display the selected element's current network/DTE signal alarm state. Alarms are determined by the following user-selectable thresholds:

Table 4-B Alarm Indications

Message	Meaning
none	No alarm threshold has been exceeded, although errors may exist which do not exceed thresholds.
OOS	The Out Of Service Seconds threshold is exceeded.
LOS	The Loss Of Signal Seconds threshold is exceeded.
OOF	The Out Of Frame Seconds threshold is exceeded.
DBA	Dial Backup is active.
DBF	Dial Backup failed.
DTR	The DTR port sees the DTR signal as low.

ALARM STATUS

The main body of the Alarms screen shows the current count for parameters that may be used to trigger an alarm.

The Current column shows the total of errored seconds for each alarm type. The Threshold column shows the values set in the Alarm Configuration screen (Figure 4-13). Any parameter that has a current value equal to or greater than its non-zero threshold generates an alarm. Any parameter with a threshold value of 0 is disabled from generating alarms.

The parameters shown on the Alarms Screen are updated at five-second intervals.

RESET ALARM REGISTERS

Pressing ENTER on (RESET) zeros the value of all Current alarm parameters.

```
4001 DSU x.xx/x.xx          TransportPRISM 4001            Local Screen
4001 DSU x.xx/x.xx             Unit Address: X

 ------------------------------ ALARMS-----------------------------------

                              Element: [NEAR]

                NET Alarms: LOSS
                DTE Alarms: NONE
                                                    Current     Threshold
                Loss of Signal Seconds (LOSS)         348           5
                Out of Service Seconds (OOSS)         482           0
                Out of Frame Seconds   (OOFS)          0            0

                Reset Alarm Registers:                  (RESET)
```

Figure 4-3 Alarms

Maintenance Screen

The Maintenance screen (Figure 4-4) allows the user to perform loop and BERT test functions on the DDS and DTE circuit. In this screen, the user can activate and clear loops and the BERT tester. BERT is performed by using on-board test facilities. No other test equipment is needed. Some of these tests may also be activated by the front panel toggle switch as described in the Operation chapter. Actions initiated by each field are detailed in the following paragraphs.

Clear Tests

Pressing ENTER in this field clears all tests and any line loops that have been initiated.

Clear Alarms

Pressing ENTER in this field clears all near-end alarms. If alarm conditions remain present, alarms are reactivated once thresholds are exceeded.

Test Loops

The 4001 can be looped from a local user interface session, from a remote user interface session, by loop codes in the network receive data stream, or by reversal of the loop sealing current. There are two loop points in the 4001: one at the DDS network interface and one at the data port (DTE) interface. Loop status changes can be made by the user only when the BERT function is not in the active mode.

LOOP

Select the type of loop test by toggling the spacebar, then execute the test by pressing ENTER. The near-loop choices are LOCAL, V.54, and FAR V.54. The far-loop choice is V.54 only. The 4001 can execute more loops than it can generate (for example, it cannot generate a Line or Data loop).

UNLOOP

Pressing ENTER takes down the specified loop.

LOOP MODE

Gives the user a choice of how the data is to be looped back, whether BIDIRECTIONAL or UNIDIRECTIONAL

The following are the four types of loops that can be activated on the 4001:

```
4001 DSU x.xx/x.xx          TransportPRISM 4001           Local Screen
4001 DSU x.xx/x.xx             Unit Address: X

 ------------------------- ELEMENT MAINTENANCE --------------------------

    (CLEAR TESTS)                                BERT:         [DDS NETWORK]
    (CLEAR ALARMS)                               Test Length:       [Cont. ]

    Loop:     [LOCAL]                            Pattern Sync:   NO TEST
    Unloop:   [LOCAL]                            Elapsed Time:  00:00:00
    Loop Mode:[BIDIRECTIONAL ]                   Bit Errors:             0
                                                 Errored Seconds:        0
   (Enable Far End Datalink)                     % EFS:                100

NET Status: LOS                                  (START TEST)
DTE Status: OK                                   (RESET ERRORS)
Near Loops:
Far Loops:
```

Figure 4-4 Maintenance Screen

Line Loop: This loop takes place at the DDS network interface. The loop is activated by the reversal of the simplex, 20 mA sealing current. This loop may be either unidirectional as shown in Figure 4-5 or bidirectional as shown in Figure 4-6. The unidirectional line loop ignores the DTE transmit data and retransmits the received DDS data. In the bidirectional line loop, network receive data is looped back to the network as network transmit data. DTE transmit data is looped back through the data port as receive data to the DTE.

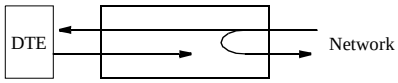

Figure 4-5 Unidirectional Line Loop

Figure 4-6 Bidirectional Line Loop

Data Loop: The data loop takes place at the data port (DTE) interface and is activated when the 4001 receives alternating loop codes in the network receive data stream. Technically, it is activated by the receipt of at least four consecutive loop commands and remains looped as long as each third pattern byte is the loop command. It returns to normal operation after receiving at least four non-loop command pattern bytes. Data loops may be either unidirectional as shown in Figure 4-7 or bidirectional as shown in Figure 4-8. Unidirectional data loops retransmit the DSU received data on the DSU transmit data including the loop code. Receive data is unaffected (but includes the modified loop codes) and circuits DSR and DCD are optionally forced OFF. In the bidirectional line loop, network receive data is looped back to the network as network transmit data. DTE transmit data is looped back through the data port as receive data to the DTE.

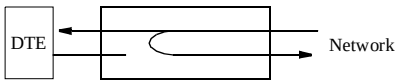

Figure 4-7 Unidirectional Data Loop and V.54 Loop

Figure 4-8 Bidirectional Data Loop and V.54 Loop

V.54 Loop: V.54 loops take place at the DTE data port interface and are activated upon receipt of in-band V.54 loop codes in the network receive data stream. V.54 loops unidirectional (Figure 4-7) and bidirectional (Figure 4-8) Unidirectional loops return the DSU receive data to the DSU transmit data, and then to the DDS transmit data. Receive data is unaffected and DSR and DCD are optionally forced OFF. In the bidirectional line loop, network receive data is looped back to the network as network transmit data. DTE transmit data is looped back through the data port as receive data to the DTE.

Local Loop: The Local loop is bidirectional only and takes place at the DDS network interface. It returns the DDS receive data to the DDS transmit line and the DSU transmit data to the DSU receive data output (see Figure 4-9).

Figure 4-9 Local Loop

For the Line Loop, Data Loop, and V.54 Loop, the user has a choice of what the receive data sent to the DTE is. This is determined by the setting of the Loop Mode option. When set to UNIDIRECTIONAL, the remotely activated loops behave as follows: The network receive data loops back to the network as network transmit data and continues to pass through the data port to the DTE. Transmit data from the DTE is terminated.

When set to BIDIRECTIONAL, remotely activated loops behave as follows: The network receive data is looped back to the network as network transmit data. Transmit data from the DTE is looped back through the data port as receive data to the DTE.

In addition to activating a local loop, the user may also instruct the 4001 to transmit in-band V.54 loop code to the remote-end unit causing it to enter a V.54 loop as described above.

> *The 4001 does not transmit alternating DSU loop code or cause sealing current reversal to activate a loop on the remote-end unit.*

Enable Far End Datalink

The Far End Datalink operation provides a means to establish end-to-end communications as a diagnostic tool. When in the standard mode of operation, end-to-end communications can be established by changing the Data Mode on the near end (Figure 4-4 on page 4-4) and then pressing ENTER on the Enable Far End Datalink field. This function changes the Data Mode on the far-end unit to TxPORT mode also. The user can then perform functions at that end of the circuit. Normal operation can be resumed by changing the Data Mode back to standard on the far-end unit first and then the near end.

This operation disrupts the data path!

BERT

The 4001 has an internal 511 pattern generator and comparator. The pattern can be transmitted toward the DDS line/network or toward the port/DTE interface. The internal BERT may be activated as described in the following paragraphs:

BERT

Specifies the direction the BERT signal is sent. The choices are DDS NETWORK and DTE. Note that the Start Test field must be used to activate the BERT, this field just specifies the direction.

Test Length

Defines the run-time of test pattern generation and error accumulation. The choices are 15 min, 30 min, 60 min, 24 Hour, and Continuous.

Start Test

Starts the selected test pattern when ENTER in pressed with the cursor in this field. Once the test has started, TEST IN PROGRESS appears. To end the test, press ENTER with STOP TEST highlighted.

Reset Errors

Clears the test error results to zero when ENTER is pressed with the cursor in this field. The test continues running.

The following fields are for display only. They show the selected test parameters and the results of these tests:

Pattern Sync: Displays the current state of pattern sync during a test. If no test is in progress, NO TEST is displayed. If a test is active, but the receiver is not in pattern sync, NO SYNC or SYNC LOST is displayed. If the receiver is in pattern sync, IN SYNC or SYNC RECOV is displayed.

Elapsed Time: Displays the amount of time elapsed since a timed test began or, if completed, the total test time.

Bit Errors: Displays the total number of bit errors detected since the test began or since error statistics were cleared (up to 999,999).

Errored Seconds: Displays the number of asynchronous errored seconds detected since the test began or since error statistics were last cleared. This parameter includes bit error seconds and sync loss seconds.

% EFS: Displays a ratio derived from the number of error free seconds divided by the number of seconds accumulated in the Elapsed Time field.

Line Fault and Loop Status

NET and DTE Status

These two fields display the fault status of the network and the far-end DTE. They indicate current fault conditions. They do not indicate that alarm thresholds are exceeded. Status prompts are the same as for the Alarms screen as shown in Table 4-B on page 4-3.

Near Loops: Displays the loop status of the near element.

Far Loops: Displays the loop status of the far element.

Configuration Screens

The various Configuration screens allow the user to view and set configuration parameters for the network elements. Only the installed options are available as menu items.

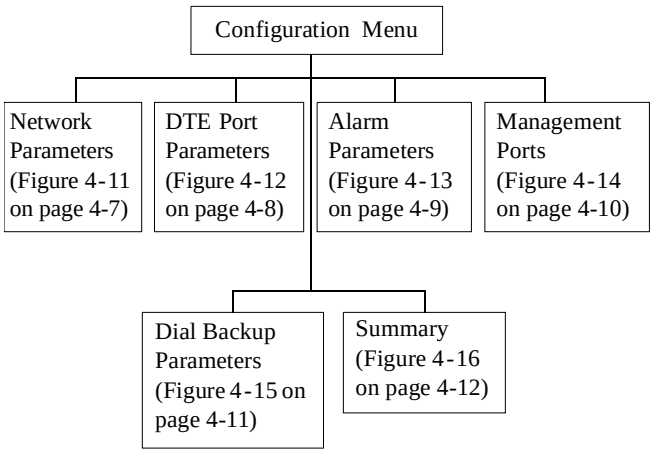

Figure 4-10 Configuration Screens

To send a new configuration to the 4001, press ENTER in one of the fields or exit the screen. The underlined values are the factory default parameters stored in ROM.

DDS Network Parameters

The DDS Network Parameters screen (Figure 4-9) allows the user to review and set line parameters for the selected element on the DDS circuit. The fields in this screen, all of which have user-selectable options, are discussed below. To send the new line configuration to the 4001, either press ENTER on one of the fields, change the Element selection, or exit the screen.

RATE

Selects the network interface line rate. The 4001 must be manually set to a specific line rate. The rate choices are: 2.4, 4.8, 9.6, 19.2, 38.4, 56, and 64 kbps.

DATA MODE

When set to TxPORT modeAscom Timeplex, the 4001 operates in proprietary mode (VerilinkAscom Timeplex equipment must be located on both ends). When set to STANDARD, the 4001 operates in industry-standard mode (it interoperates with equipment from another vendor).

TIMING

The DSU can source its timing from three choices: NET, DTE, and INT. With NET selected, timing is derived from the network recovered clock (the normal DDS mode). With DTE selected, the 4001 synchronizes to the clock recovered from the DTE port. With INT selected, the internal oscillator frequency is the standard for all timing. DTE timing is allowed only in Standard mode.

CIRCUIT ASSURANCE

This option allows the CTS control lead to respond to the data signal from the network. If ON is selected, the 4001 turns the CTS lead OFF when receiving idle code (for example, if DCD is OFF). If OFF is selected, the state of the CTS control lead is not affected by data signal from the network.

ANTI-STREAMING TIMER

This timer is used to prevent a streaming DTE, on a tributary DSU in a multi-point circuit, from locking up the circuit. If the RTS lead from the DTE stays constantly active for the anti-streaming time, the 4001 shuts off data transmission into the network. Whenever RTS goes inactive, the anti-streaming timer is reset. The timer can be turned OFF or set for 10, 30, or 60 seconds.

```
4001 DSU x.xx/x.xx          TransportPRISM 4001            Local Screen
4001 DSU x.xx/x.xx            Unit Address: X

------------------------- NETWORK PARAMETERS -------------------------

                              Element: [NEAR]

                        Rate:                 [56K  ]
                        Data Mode:            [STANDARD]
                        Timing:               [NET]
                        Circuit Assurance:    [OFF]
                        Antistreaming Timer:  [OFF]
```

Figure 4-11 Network Parameters

DTE Port Parameters

When operating in the proprietary mode on 56 or 64K loops with DTE rates as shown in section Specifications on page 1-2 an end-to-end management link can be established between units. When enabled, remote communications between units operates on a sideband channel and does not disrupt the customer's data traffic. On a 56K loop, the maximum DTE rate is 54K sync (57.6K async) and on a 64K loop, the maximum DTE rate is 62K sync (57.6 async). The DTE Port Parameters screen (Figure 4-12 on page 4-8) sets the following operating parameters for the V.35 or RS-232 ports:

Port Type

The active port is displayed here. This reflects which port is actively passing data. Port type is selected by slide switches SW5 and SW6.

Port Rate

Selects the DTE interface line rate. The choices are 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 54K, 56K, 57.6K, 62K, or 64K. Refer to section Configuration Switch S1 on page 2-1. The available choices are based on the Data Mode, the DDS Rate, and the DTE Port Format.

Port Format

The 4001 can operate in two general modes, Sync and Async (Async is allowed only in the TxPORT proprietary mode). For more information, refer to Data Mode in section DDS Network Parameters on page 4-7.

DSR Control

Data Set Ready is output from the 4001 to the DTE. Its behavior can be set to TEST>OFF where DSR is ON except when the 4001 is in test or set to FORCED ON all the time regardless of any unit condition.

DCD Control

Output from the unit to the DTE. Its behavior can be set to IDLE>OFF where DCD is ON except when the 4001 is receiving idle code from the network or FORCED ON all the time regardless of any unit condition, or DCD DELAYED. If your unit is E911 Enable (as indicated by a silver sticker on the faceplate of the unit), when DCD delay is selected, the DCD will be delayed from ON to OFF state for 100, 300, or 500 ms before changing states.

RTS Control

The behavior of RTS and CTS can be set to NORMAL where CTS follows transition of RTS or is FORCED ON all the time regardless of any unit condition.

RTS/CTS Delay

Allows the user to choose the amount of delay on an RTS-to-CTS transition. This delay can be set to NORMAL or LONG with the following times.

NORMAL: The 4001 reacts to RTS from DTE. When RTS is ON, the 4001 transmits data normally and turns CTS ON (depending on the Circuit Assurance switch setting and after the delay set by the RTS-to-CTS Delay option). When RTS is OFF, the 4001 transmits idle code to the network and turns CTS OFF.

```
4001 DSU x.xx/x.xx          TransportPRISM 4001              Local Screen
4001 DSU x.xx/x.xx             Unit Address: X

-------------------------  DTE PORT PARAMETERS--------------------------

                              Element: [NEAR]

                          Port Type:       RS232D
                          Port Rate:       [56K ]
                          Port Format:     [SYNC ]
                          DSR:             [FORCED ON]
                          DCD:             [FORCED ON]
                          RTS:             [FORCED ON]
                          RTS/CTS Delay:   [NORMAL ]
                          DTR Alarm:       [DISABLED ]
                          V.54 Loop:       [ENABLED ]
                          LL Detect:       [ENABLED ]
                          RL Detect:       [ENABLED ]
```

Figure 4-12 DTE Port Parameters

LONG: Same as NORMAL with longer delays. These delays are broken down in Table 4-C.

Table 4-C Normal and Long RTS-to-CTS Delays

DDS Loop Rate	Normal Delay	Long Delay
2.4 kbps	8 ± 0.4 ms	16 ± 0.8 ms
4.8 kbps	4 ± 0.2 ms	8 ± 0.4 ms
9.6 kbps	2 ± 0.1 ms	4 ± 0.2 ms
19.2 kbps	1 ± 0.05 ms	2 ± 0.1 ms
38.4 kbps	0.5 ± 0.025 ms	1 ± 0.05 ms
56 kbps	0.4 ± 0.02 ms	0.8 ± 0.04 ms
64 kbps	0.3 ± 0.015 ms	0.6 ± 0.03 ms

DTR Alarm

Selecting ENABLE allows the 4001 to go into alarm on loss of DTR. When set to DISABLE, the unit does not go into alarm.

V.54 Loop

Selecting ENABLE allows the 4001 to respond to inband-V.54 loop commands. If DISABLE is selected, the 4001 ignores these commands.

LL Detect

Allows the user to select whether the CSU/DSU responds to the local loop lead on the DTE connector of the 4001. When the DTE device changes the state of this lead, the DSU/DSU activates or deactivates a local loopback. The default setting is ENABLED.

RL Detect

Allows the user to select whether the CSU/DSU reesponds to the local loop on the DTE connector. When the DTE device changes the state of this lead, the CSU/DSU activates or deactivates a remote loopback. The default seting is ENABLED.

Alarm Parameters

The Alarm Parameters screen (Figure 4-11) allows the user to review and set alarm related thresholds for the unit. These thresholds are the minimum acceptable performance levels. To modify the parameters, highlight the desired statistic and press the spacebar to scroll through the value selections. If the set value is later surpassed, an alarm indication appears. If a field is set to - - then the element does not alarm on that statistic.

Loss of Signal Seconds (LOSS)

A one-second period in which the received signal is interrupted. The default is 5.

Out Of Service Seconds (OOSS)

A one-second period in which the 4001 received the OOS code. The default is 0 (shown on the screen as - - -).

Out of Frame Seconds (OOFS)

A one-second period in which the 4001 received the OOF code. The default is 0 (shown on the screen as - - -).

Alarm Reset Timer

Determines the number of seconds (from 10 to 900) after alarm conditions clear before indications are removed. The default is 30.

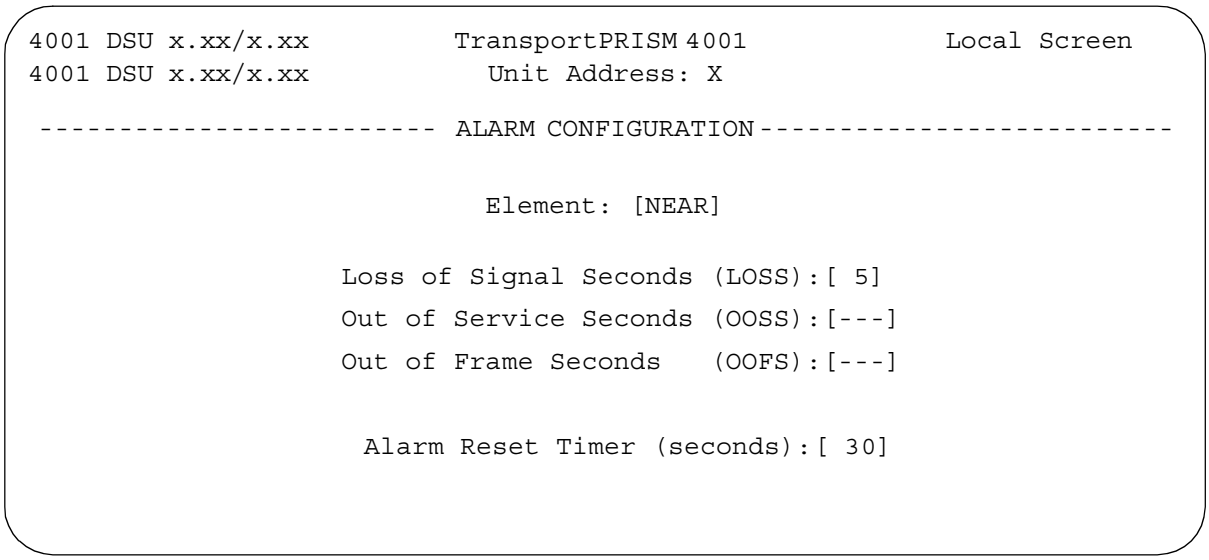

Figure 4-13 Alarm Parameters

Management Ports

The Management Ports screen (Figure 4-12) sets the following parameters for the SUPV port.

COA CONNECTION (SUPV)

Controls remote alarm reporting. ASCII alarm reporting through the supervisory port is independent of Trap alarm reporting which is done by the Site Controller 8100A. The ASCII alarm report type is set by the following choices:

DISABLED: Alarm reporting is disabled.

DIRECT: Sends reports to a printer or terminal connected directly to the SUPV port.

DIAL: Sends reports through an attached AT command set compatible modem connected to the SUPV serial port, which must dial out to a remote modem. The message format is described in the ELEMENT ID field.

PRIMARY DIAL STRING, SECONDARY DIAL STRING

ASCII strings for the primary and secondary call on alarm numbers used in the [DIAL] mode. The strings must include the ATDT command prefix. The 4001 makes three attempts to connect using the primary number. If all three attempts fail, it makes three attempts three to connect using the secondary number (if it is not blank). If the secondary number fails, the 4001 waits five minutes and then attempts to communicate with the primary number again. When a connection is detected, the 4001 outputs the notification message (as described in the ELEMENT ID field) and then disconnects.

INITIALIZATION STRING

The modem initialization string is entered in this field. Refer to the modem's documentation for further information. The default setting is ATEQ0V1S0=1.

DISCONNECTION STRING

Identifies the character string to be output when the modem session is terminated. The default setting is ATH0.

```
4001 DSU x.xx/x.xx          TransportPRISM 4001             Local Screen
4001 DSU x.xx/x.xx             Unit Address: X

--------------------------- Management Ports ----------------------------



--------------------------- Supervisory Port ----------------------------
           COA Connection:          [DISABLED ]
           Primary Dial String:     (                    )
           Secondary Dial String:   (                    )
           Initialization String:   (ATEQ0V1S0=1         )
           Disconnection String:    (ATH                 )

------------------------------- Messages---------------------------------
```

Figure 4-14 Management Ports

Dial Backup Parameters Screen

This 4001 can provide an alternate data path when the DDS network connection fails. This alternate data path is established across a switched circuit such as PSTN or ISDN. Dial Backup (Figure 4-15) handles the functions described in the following paragraphs.

DBU Status

Shows the current state on the left and the programming choices on the right in enclosed brackets. The possible values are DISABLED, DISALLOWED, ENABLED, CONNECTING, DIALING, ANSWERING, and ACTIVE.

DISABLED: DBU has been disallowed by the user via the DBU command field.

ENABLED: DBU is allowed, but is not immediately needed.

CONNECTING: Establishment of the DBU is in progress.

DIALING: Establishment of the DBU is in progress.

ANSWERING: The unit is waiting for the other end to call it.

ACTIVE: DBU is active.

DBU COMMAND

Used to control DBU operations. The choices are DISABLE, ENABLE, and ACTIVATE.

DBU Activator

Used to select the criteria that the 4001 uses to activate the dial backup sequence. The choices for dial backup activation are the LOS, OOS, OOF, or ANY one of these alarm thresholds.

DBU Format

Used to set the data format used between the 4001 and the DBU device, after connection is established. Connection is always done in ASYNC format. The SYNC format is to be used with ISDN terminal adapters at 56K, 64K, or synchronous modems.

DBU Rate

Used to select a dial backup rate of 2.4, 4.8, 9.6, 19.2, 38.4, or 57.6 kbps. The usable rates depend on the type of modem used or if a terminal adapter is used.

DBU Mode

Used to select the CSU/DSU's call response mode. If ORIGINATE is selected, the CSU/DSU initiates a call when needed. If set to ANSWER, it only answers an incoming call. If set to CALLBACK ORIGINATE, it calls the predefined number, issues a password, hangs up, and then waits for the other end to call back. After the password is delivered in the secure mode, the CSU/DSU is in the ANSWER mode only. If the setting is CALLBACK ANSWER, the CSU/DSU waits for a call and password from the CALLBACK ORIGINATE unit. It then calls the other unit back.

Password: This field only appears when DBU Mode is set to CALLBACK ORIGINATE or CALLBACK ANSWER. The password *trigger* character and text must be entered here. The values entered in this field must be identical in the

```
4001 DSU x.xx/x.xx          TransportPRISM 4001            Local Screen
4001 DSU x.xx/x.xx            Unit Address: X

 ----------------------  DIAL BACKUP PARAMETERS -------------------------

              DBU Status:                DISABLED
              DBU COMMAND:               [DISABLED]
              DBU Activator:             [LOS]
              DBU Format/Rate:           [SYNC] [19.2K]   Password
              DBU Mode:                  [Originate]      (*********)
              DBU Dial String:           (ATDT                        )
              Initialization String:     (AT&F                        )
              Disconnection String:      (ATH0                        )
              Reset String 1:            (                            )
              Reset String 2:            (                            )
              Reset String 3:            (                            )
              Reset String 4:            (                            )
              Reset String 5:            (                            )
```

Figure 4-15 Dial Backup Parameters

CALLBACK ORIGINATE and CALLBACK ANSWER units for them to connect.

DBU Dial String

Used to enter the telephone number (up to 30 characters) the 4001 calls. This is a *don't care* field when the Dial Backup Mode is ANSWER.

Initialization String

Enter the modem initialization string (up to 30 characters) here. See the modem documentation for further information. The default setting is AT&F.

Disconnection String

Identifies the character string (up to 30 characters) to be output when the modem session is terminated. The default setting is ATH0.

Reset String 1-5

Used for additional initialization commands, and are sent in the event of a DBU failure. In order to reduce the average DBU connection time, they are not sent at every DBU attempt.

Consult the DBU device manual for further commands.

Summary Screen

The Summary screen (Figure 4-16) is a display-only screen which summarizes configuration settings in three columns:

Current Column

The Current column shows the settings the 4001 is currently running.

Saved Column

The Saved shows the settings saved in the Flash EEPROM.

Switches Column

The Switches column shows the actual DIP switch positions.

SUPV Baud Rate, NMS Baud Rate, Unit ID, and Boot modes are switch settings only and do not appear in the saved column on the Summary Screen.

```
4001 DDS x.xx/x.xx          TransportPRISM 4001            Local Screen
4001 DDS x.xx/x.xx             Unit Address: X

 ------------------------------- SUMMARY --------------------------------


Configuration Item        Current     Saved       Switches    Other Information
------------------        -------     -----       --------    -----------------
DTE Baud Rate:            57.6K       57.6K       56K         Serial Num: 000054
Line Baud Rate:           64K         64K         56K         Port Type:  RS232D
Line Clk Source:          INT         INT         NET
Loop Mode:                BIDIR       BIDIR       BIDIR
RTS Delay Norm/Dbl:       NORMAL      NORMAL      NORMAL
RTS/CTS Norm/On:          NORMAL      NORMAL      NORMAL
Data Mode:                TXPORT      TXPORT      STANDARD
DTE Sync/Async:           ASYNC       ASYNC       SYNC
DBU Rate:                 57.6K       57.6K       57.6K
DBU Enable:               DISABLE     DISABLE     DISABLE
Supv Baud Rate:           19.2K       -----       19.2K
NMS Baud Rate:            19.2K       -----       19.2K
Unit ID:                  3           ---         3
Boot Mode:                SAVED       -----       SAVED

-----------------------------------MESSAGES-------------------------------
```

Figure 4-16 Summary

Utilities Screen

The Utilities screen (Figure 4-17) handles the functions described in the following paragraphs, including saving a custom configuration.

Element ID

Allows the entry of an ASCII string of up to 29 characters which identifies the 4001 to the device receiving the alarm notification messages. Call On Alarm (COA) messages are reported in the following format in the [DIAL] or [DIRECT] modes:

```
Element ID <CR> <LF>
NET Alarms: net-alarms <CR> <LF>
DTE Alarms: DTE-alarms <CR> <LF>
```

where net-alarms is a string consisting of some or all of the identifiers LOS, OOS, OOF, the word NONE, and DTE alarms is either DTR or NONE. The following is an example:

```
Joesunit
NET Alarms: LOS
DTE Alarms: NONE
```

The user-programmable ELEMENT ID string is transmitted first to allow the COA function to send a message with a specific meaning to some host (such as a log-on message).

New Password

Allows entry of a password of up to ten characters. An empty string (ENTER only) may be entered to disable the password feature. After ENTER is pressed, the new password is activated and is no longer visible. Passwords are case sensitive. Therefore, type carefully when entering a new password. When the terminal interface is exited and later reactivated, this password must be entered exactly to gain access. If the wrong password is entered, the following message appears:

```
Incorrect Password; Please Enter Again.
```

Do not exit the terminal interface program until the password procedure is understood. If a password has been specified, it must be typed exactly to reenter the program. Save the configuration to retain the password.

If the password is forgotten, contact Verilink Product Support for a one-time use *backdoor* password. Prior written approval must be sent to Verilink before the backdoor password can be issued.

Store Parameters to EEPROM

The current configuration may be saved to the Erasable Electronic Programmable Read Only Memory chip. Pressing ENTER brings up a confirmation screen which asks whether or not to proceed with the reprogramming.

If YES is selected, DDS data is briefly interrupted.

Maintenance Reset

Clears all user-selectable parameters, performance registers, and alarms. All parameters reset to factory defaults. Pressing ENTER brings up a confirmation screen. If confirmation is given, the 4001 clears all user-selectable parameters and restart.

If YES is selected, DDS data is interrupted and the 4001 may need to be reconfigured before restoring service.

```
4001 DSU x.xx/x.xx          TransportPRISM 4001            Local Screen
4001 DSU x.xx/x.xx            Unit Address: X

------------------------------ UTILITIES ------------------------------

                             Element: [NEAR]

            Element ID: (ddsunit 46                          )

                       New Password: (**********)

                     (STORE PARAMETERS TO EEPROM)

                          (MAINTENANCE RESET)
```

Figure 4-17 Utilities Screen