PRISM 4051
DDS
CSU/DSU

34-00253.2

Manual reorder # 34-00253

2nd Edition, June 1999

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. This device must also accept any interference received, including interference that may cause undesired operation. *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 equipment complies with Part 68 of the FCC Rules.

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

Port ID	REN/SOC	FIC	USOC
56 kbps	6.0F	04DU5-56	RJ-48S

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.

7 On the side of the 1051 chassis is a label that contains, among other information, FCC registration number for this equipment. If requested, this information must be provided to the telephone company.

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.

Notice: 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.

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

Warranty

Verilink's product warranty covers repair or replacement of all equipment under normal use for a five-year period from date of shipment. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer. Our in-house Repair Center services on a standard 10-work-day-turnaround basis.

Customer Service

Verilink offers the following services:

- System Engineers at regional sales offices for network design and planning assistance (800) 837-4546
- Technical Assistance Center for free 24×7 telephone support during installation, maintenance, and troubleshooting at (800) 285-2755 and support@verilink.com
- Return Materials Authorization (RMA) (800) 926-0085, ext. 2282
- Maintenance contracts and leasing plans (800) 837-4546, ext. 206
- Technical Training on network concepts and Verilink products at (800) 837-4546, ext. 346 and training@verilink.com

- Web site at www.verilink.com
- FAX-On-Demand at (800) 957-5465

Returning Products

A product must be assigned a Return Materials Authorization (RMA) number before it is sent to Verilink for repair. An RMA number is issued by Verilink Customer Service at (800) 926-0085. ext. 2282.

Safety Precautions

When handling this equipment, follow these basic safety precautions to reduce the risk of electric shock and injury:

- Follow all warnings and instructions marked on the product and in the manual.
- Unplug the hardware from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a slightly damp cloth for cleaning.
- Do not place this product on an unstable cart, stand, or table. It may fall, causing serious damage to the product.
- This product should be operated only from the type of power source indicated on the marking label and manual. If you are unsure of the type of power supply you are using, consult your dealer or local power company.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord interferes with the free movement of people.
- Do not overload wall outlets and extension cords, as this can result in fire or electric shock.
- Never push objects of any kind into the unit. They may touch dangerous voltage points or short out parts that could result in fire or electric shock. Never spill liquid of any kind on this equipment.
- Unplug the equipment from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - When the power supply cord or plug is damaged or frayed.
  - If liquid has been spilled into the product.
  - If the product has been exposed to rain or water.
  - If the product has been dropped or if the housing has been damaged.

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1 GENERAL

Introduction

The Verilink PRISM 4051 DDS CSU/DSU provides the ideal solution for remote DDS I and DDS II branch access synchronous 56 and 64 kbps data applications. It is a modular, nest mounted DDS CSU/DSU and can be managed from a menu-driven VT100 or by SNMP/Telnet commands from a Verilink 8100A Site Controller.

The PRISM 4051 is simple to install and operate. Full access to configuration, status, and diagnostic features is available through the software-driven terminal interface connection.

The 4051 unit offers a managed interface into standard DDS service. It supports synchronous data rates at 56 kbps for DDS I and 64 kbps in DDS II. The DTE supports V.35 or RS-232 interfaces. External clocking is supported for use in tail circuit applications.

The 4051 has diagnostic features which allow quick and easy trouble isolation. The CSU/DSU responds to all standard loop codes from the telco and can initiate remote V.54 loopbacks. An internal BERT may be used for testing. Line conditions are monitored and reported through front panel LEDs, a user connection to the terminal interface (or a Telnet connection through the 8100A Site Controller).

The chapters in this manual are arranged as follows.

General - describes product features, specifications, and ordering information.

Installation - describes unit mounting, configuration, port and interface connections, and unit powering.

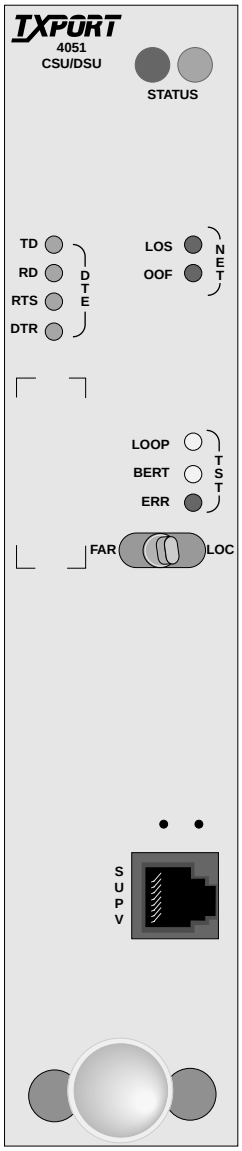


Figure 1-1 PRISM 4051 Unit

Operation - describes the front panel controls and indicators, unit testing, and control port features.

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

Features

- Mounts in a Verilink 1051 chassis
- Offers a mid-range solution for remote-site installations
- Provides DDS-I and DDS-II service
  - AT&T TR62310 compatible
  - 56 kbps (DDS I) and 64 kbps Clear Channel (DDS II)
- Simple setup and software management through a menu-driven interface on terminal connection to supervisory port.
- Complete diagnostics including multiple loops and built-in BERT
- Programmable alarm thresholds
- Flash memory allows software upgrades in the field
- Five-year product warranty

Specifications

Network Interface	Service Types:	DDS I or DDS II clear channel conforming to TR62310
	Operating Modes:	Full duplex, point-to-point, multi-point
	Line Rates:	56 (DDS I) and 72 kbps (DDS II)
	Loop Range:	Up to a 45-dB loss
	Line Connection:	RJ-48S jack, 8-pin modular
	Timing Sources:	Network, DTE, and Internal
Equipment Interface	Sync Data Rates:	56 (DDS I) and 64 kbps (DDS II)
	Anti-stream Timer:	Off, 10, 30, or 60 seconds
	DTE Clocking:	Internal or External
	DTE Connection:	34-pin V.35 (CCITT) or 25-pin RS-232D (EIA)
Diagnostics	Loopbacks:	CSU, V.54 (receive and send)
	BERT:	511 pattern
Management Interfaces	**Supervisory (SUPV) Port**	
	Connection:	8-pin modular (RS-232)
	Data Rates:	1.2, 2.4, 9.6, and 19.2 kbps
Power	24 VDC:	160 mA, 4 W, 14 BTU maximum
	48 VDC:	73 mA, 4 W, 14 BTU maximum
	Input Voltage Range:	17 VDC to 60 VDC

Mechanical	Housing:	Verilink 1051 chassis
	Mounting:	Rack mount
	Dimensions:	1.72 inches (4.37 cm) wide
		6.8 inches (17.27 cm) high
		10.5 inches (26.67 cm) deep
Environmental	Operating Temp:	32° to 122°F (0° to 50°C)
	Storage Temp:	−4° to 185°F (−20° to 85°C)
	Humidity:	95% maximum (non-condensing)
Compatibility	TR62310:	November 1987
	TR62310A:	December 1989 (addendum 3)
	TR41450:	November 1981
	Internet Standards:	RFC1157 (SNMP) RFC1155 (SMI) RFC1213 (MIB-II) RFC1055 (SLIP) Enterprise TXPORT MIB Enterprise DDS MIB
	MIB-II:	Device identification and interface performance data. All applicable objects and reporting maintained by the 8100A Site Controller.
Industry Listings	FCC Compliance:	Part 15 Class A, Subpart B, and Part 68
	U.S. Safety:	UL 1950, 3rd edition
	Canadian Safety:	CSA C22.2 No. 950-95
	Industry Canada:	CS-03, Issue 8

Ordering Numbers

Each 4051 unit (Table 1-1) is supplied with the PRISM 4051 reference manual and is equipped with V.35 data port (F-4051-01-111 is the default part number). Also provided is an 8-pin modular-to-receptacle 1051 shelf to DDS adapter (part number 9-1001-075-1).

Table 1-1 Equipment Part Numbers

F-4051-101--*ABCD*		**PRISM 4051 Module**
A	Company	1 - TxPORT 3 - Timeplex
B	Special Option	1 - Standard Unit 2 - Hardened Protection*
C	DTE Interface	1 - V.35 Unit 2 - RS-232 Unit
D	Option	1 - Not installed

* Not released at time of printing.

The optional equipment shown in Table 1-2 may also be needed for the operation of the unit.

Table 1-2 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
NMS Split Cable (Y-Cable)	
9-1001-030-xxx	8-pin to dual 6-pin modular
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-xxx	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

2 INSTALLATION

This chapter contains information and instructions required to prepare the Verilink PRISM 4051 for use. This chapter includes 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 retain the equipment in a 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 while handling the circuit boards.

Unpacking and Inspection

Upon receipt of shipment, inspect the shipping container and contents. If the contents of the shipment are incomplete or, if there is mechanical damage or defect, notify Verilink Customer Service. If the shipping container or cushioning material is damaged, notify the carrier and Verilink immediately and make a notation on the delivery receipt that the container was damaged (if possible, obtain the signature and name of the person making delivery). Retain the packaging material until the contents of the shipment have been checked for completeness and the instrument has been checked both mechanically and electrically.

Supplied Materials

The PRISM 4051 shipment contains four items.

- PRISM 4051 unit
- T1 to DDS adapter (part number 9-1001-075-1)
- Network Interface Cable (part number 9-1544-619)
- Reference manual with configuration guide

Mounting

The Verilink 4051 DDS CSU/DSU is a modular unit that plugs into a Verilink 1051 chassis which holds up to 12 units.

The chassis can be installed in either a 19- or 23-inch rack using four screws. Connections are made from the rear panel of the chassis.

Unit Configuration

The PRISM 4051 can be hardware configured by switches or software configured by using a terminal connection to the front panel supervisory access (SUPV) port. The terminal interface provides more capabilities than the configuration switches.

If there is a power failure, the 4051 retains its configuration in non-volatile memory. This feature allows the unit to automatically restore normal service following a power loss. See section Utilities on page 37 for more information.

The 4051 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 circuit boards allow configuring 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 located on the upper side between the circuit boards (see Figure 2-1). Switch positions are numbered as follows: position 2 of Switch S3 is referred to as Switch S3-2, and so on.

Before installation, verify each configuration switch setting.

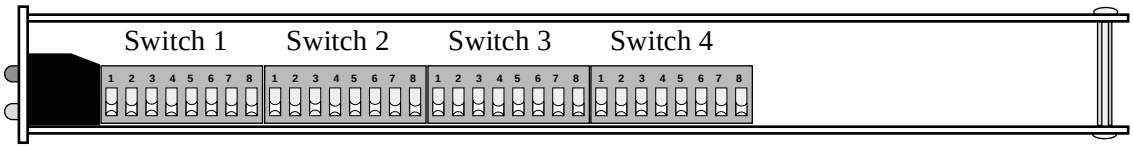


Figure 2-1 Top View of the PRISM 4051

Factory default settings are shown <u>underlined</u> throughout this manual.

Configuration Switch S1

Switch S1 (Figure 2-2) is used to set the configuration for boot mode; DDS mode; timing source; RTS-to-CTS delay; RTS, CTS, and DCD handshake; local and remote loopback enable; and DTE alarm.

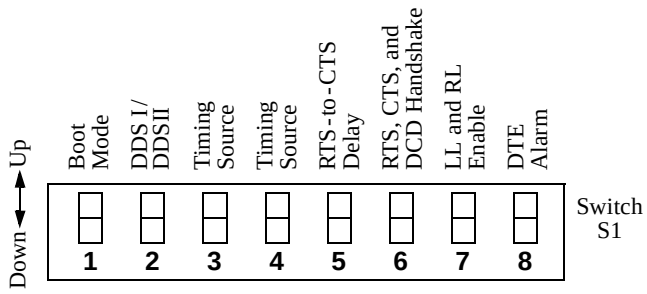


Figure 2-2 Switch S1

Boot Mode

Switch S1-1 is used to determine whether the unit configures itself from the DIP switches or from the saved configuration as shown in Table 2-1. If set to boot from the saved configuration, the switch settings are ignored. If set to boot from switches, the unit reads the DIP switches on power up and configures the unit accordingly. Once running, configuration changes can be made through the terminal interface, overriding the switch settings.

Table 2-1 Boot Mode

Mode	S1-1
Boot from the DIP switches	Down
Boot from the saved configuration	Up

DDS Mode

Switch S1-2 is used to establish the DDS mode as either DDS II/64 kbps or DDS I/56 kbps as shown in Table 2-2.

Table 2-2 DDS Mode

Mode	S1-2
DDS II/64 kbps	Down
DDS I/56 kbps	Up

Timing Source

Positions S1-3 through S1-4 select the source of unit clocking. Deriving timing from the network is the most common timing source for most DDS applications. The unit may also be clocked from an internal standard or from the DTE as shown in Table 2-3.

Table 2-3 Timing Source

Source	S1-3	S1-4
Network	Down	Down
Internal	Down	Up
DTE	Up	Down

RTS-to-CTS Delay

Switch S1-5 is used to select the delay on an RTS-to-CTS transition as shown in Table 2-4. When the RTS-to-CTS control option is set to Normal, CTS follows the state of RTS after some delay, depending on the data rate. The delay can be selected for a Normal or Long delay.

Table 2-4 RTS-to-CTS Delay

Delay	DTE Rate	Delay	S1-5
Normal	56 kbps	0.4 ± 0.02 ms	Down
	64 kbps	0.3 ± 0.015 ms	
Long	56 kbps	0.8 ± 0.04 ms	Up
	64 kbps	0.6 ± 0.03 ms	

RTS, CTS, and DCD Handshake

Switch S1-6 is used to determine the handshake process as either Force On or Normal as shown in Table 2-5.

Table 2-5 RTS, CTS, and DCD Handshake

Handshake	S1-6
Force On	Down
Normal	Up

Local and Remote Loopback Enable

Switch S1-7 is used to enable or disable local and remote loopbacks on the DTE interface as shown in Table 2-6.

Table 2-6 Local and Remote Looback Enable

Local and Remote Loopbacks	S1-7
Disable	Down
Enable	Up

DTE Alarm

Switch S1-8 is used to enable or disable the DTE alarm as shown in Table 2-7. The DTE alarm is generated when DTR from the DTE is false.

Table 2-7 DTE Alarm

DTE Alarm	S1-8
Disable	Down
Enable	Up

Configuration Switch S2

Switch S2 (Figure 2-3) configures the antistream timer, V.54 loop, circuit assurance, loop mode, supervisory port rate, and NMS port rate.

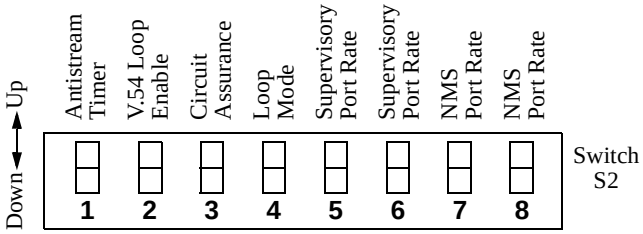


Figure 2-3 Switch S2

Antistream Timer

Switch S2-1 is used to set the Antistream Timer as shown in Table 2-8.

Table 2-8 Antistream Timer

Antistream Timer	S2-1
Off	Down
30 Seconds	Up

V.54 Loop Detection

Switch S2-2 is used to enable V.54 loop detection as shown in Table 2-9.

Table 2-9 V.54 Loop Detection

V.54 Loop	S2-2
Enable	Down
Disable	Up

Circuit Assurance

Switch S2-3 selects whether the CTS control lead responds to the data signal from the network as shown in Table 2-10. When Circuit Assurance is On and the unit is receiving idle code (i.e., DCD is Off), the 4051 turns the CTS lead off. When Circuit Assurance is turned off, the state of the CTS control lead is not affected by the data signal from the network.

Table 2-10 Circuit Assurance

Circuit Assurance	S2-3
Enable	Up
Disable	Down

Loop Mode

Switch S2-4 is used to select the loopback method as shown in Table 2-11.

Table 2-11 Loop Mode

Loop Mode	S2-4
Bidirectional	Down
Unidirectional	Up

SUPV Port Rate

Positions S2-5 and 2-6 set the bit rate for the network management system as shown in Table 2-12.

Table 2-12 SUPV Port Rate

NMS Port Rate	S2-5	S2-6
19.2 kbps	Down	Down
1.2 kbps	Down	Up
2.4 kbps	Up	Down
9.6 kbps	Up	Up

NMS Port Rate

Positions S2-7 and 2-8 set the bit rate for the network management system as shown in Table 2-13.

Table 2-13 NMS Port Rate

NMS Port Rate	S2-7	S2-8
19.2 kbps	Down	Down
1.2 kbps	Down	Up
2.4 kbps	Up	Down
9.6 kbps	Up	Up

Configuration Switch S3

Switch S3 (Figure 2-4) is reserved for future expansion, with the exception of S3-8, which is used to force download mode.

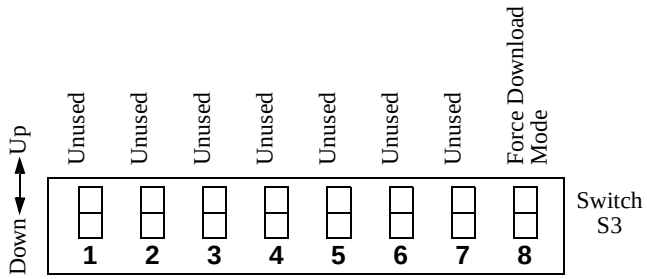


Figure 2-4 Switch S3

Force Download Mode

Switch S3-8 is used to Force Download Mode as shown in Table 2-14. For download bit-rate information refer to step 7 of PC Setup on page 39.

Table 2-14 Force Download Mode

Mode	S3-8
Normal Operation	Down
Begin Flash Download	Up

Address Switch S4

Switch S4 sets the unit address. When using the 4051 with an 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.

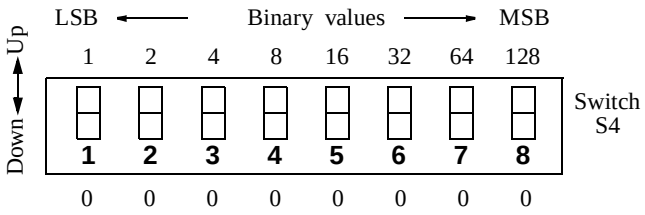


Figure 2-5 Switch S4

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).

Switch S4 has eight positions that are used to create an 8-bit binary code for an address in the range of 1 to 50. Switch position S4-1 is 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.

Network Management Connections

Network management is accomplished via the NMS or SUPV port as described earlier in this chapter. Each port provides a ComView NMS interface and can be managed under SNMP/TELNET when connected to an 8100A Site Controller.

Supervisory (SUPV) Connections

The front panel supervisory port, labeled SUPV, 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 can be configured for 1200, 2400, 9600, and 19200 bps as shown in SUPV Port Rate on page 2-9. The default is 19200 bps. Refer to section Ordering Numbers on page 4 for cable information.

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 2-15).

Table 2-15 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

The unit firmware may be accessed through this port (see Software Configuration on page 23) as well as the Call On Alarm feature (see Management Parameters on page 34). This port is accessed through either a direct connection or a dial-up connection via an AT-command-set-compatible modem. The modem should be optioned to ignore DTR, enable auto answer, inhibit command echo, and return verbose result codes.

If the unit is called and sent a break command before receiving the connect message, the modem hangs up.

The COA feature works through the supervisory mode only.

NMS Port

The PRISM 4051 is fully compatible with the Verilink 8100A Site Manager. The 8100A software system is used to manage small to large networks of Verilink network access products.

NMS ports located on the rear panel of the 1051 chassis provide access to the 8100A Site Controller. The unit accesses the built-in 1051 chassis bus.

An element may be accessed by using an RS-232 connection from the serial port of the computer running the 8100A program to the element's SUPV port or the

NMS IN and NMS OUT ports. The different connection methods are described in the following paragraphs.

NMS IN and NMS OUT

The two 6-pin modular connectors labeled NMS IN and NMS OUT on the 1051 rear panel may be used for connection to the 8100A Site Controller. These ports allow the connection of multiple collocated units in a daisychained IN/OUT bus arrangement as shown in Figure 2-6. The OUT port of one element is connected to the IN port of the next element, and so on, to form a complete chain among the group of elements.

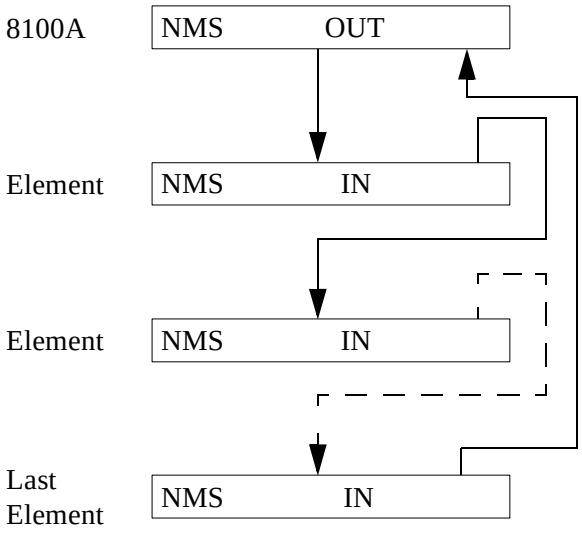


Figure 2-6 NMS Daisychain Arrangement

All units on the same NMS chain must use the same NMS bit rate.

NMS Split Cable

The 8100A Site Controller may be connected directly into the NMS chain between two elements if connection to the supervisory port is not desired. A Y-cable is used from the 8100A serial port which splits the transmit and receive signals into two 6-pin modular connectors for the NMS IN and NMS OUT ports. Ordering information for this cable is found in Ordering Numbers on page 4.

NMS IN Only

The NMS IN connector provides both the transmit and receive signal pair. This port may be used for a modem connection or as a VT100 terminal interface (refer to Terminal Interface on page 21).

Chassis Operation

8100A Site Controller operation in the 1051 chassis has the units chained together. The front panel supervisory port and the rear panel NMS ports operate in the same fashion.

The NMS address, port rate, and power up configuration mode may be set by either configuration switches or through software control. The physical connection is 6-pin modular connector with the pinouts for these connectors shown in Table 2-16. This port is a serial RS-232 DCE port configured for eight bits, no parity, and one stop bit.

Table 2-16 NMS Port Connector Pinouts

Pin	NMS Bus IN	NMS Bus OUT
1	Not Used	Not Used
2	Signal Ground	Signal Ground
3	Data Out	Data Out
4	Data In	Not Used
5	Signal Ground	Signal Ground
6	Not Used	Not Used

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 2-17 and the pinout for the high-speed DTE connectors is given in Table 2-18.

Table 2-17 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 2-18 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

⚠ *FCC rules require that interconnecting cables carrying high-speed data be shielded appropriately to minimize radio frequency interference.*

Port Connections

The PRISM 4051 is a nest-mount module that fits into the Verilink 1051 chassis, which provides the DDS Network and Data Port connections as shown in Figure 2-9 on page 15 and Figure 2-10 on page 15.

DDS NET

The DDS network is connected to the NET connector (8-pin modular) following the RJ-48S standard through the supplied adapter (part number 9-1001-070-010). Transmit data (from the CSU/DSU to the network) is on pins 1 and 2 and receive data (from the network to the CSU/DSU) is on pins 7 and 8.

The network side of the CSU/DSU is referred to as the network interface. This interface contains an ALBO (automatic line build out) which allows the CSU/DSU to be located a substantial distance away from the telco network interface with a receive signal level to −45 dB.

The network physical interface is a standard RJ-48S 8-pin modular jack with the pinout shown in Table 2-19.

Table 2-19 RJ-48S Adapter Pinout

Pin	NET Interface
1	Data Out (R1)
2	Data Out (T1)
3, 4, 5, 6	Not Used
7	Data In (T)
8	Data In (R)

⚠ *In accordance with FCC Rules, Part 68.218(b), notify the telephone company before disconnecting this product.*

Power Connection

The 4051 requires a −48 VDC power source capable of supplying a 150-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 of the 1051 chassis. The power supply should be sized for maximum current draw for the chassis.

The 1051 chassis is designed with two power buses. The A bus feeds the odd slots and the B bus feeds the even slots. A power board is installed on TB2 which allows the connection of two independent −48 VDC supplies operated in redundant mode. This is the default configuration described in Redundant Power Source below. The other powering method is described in Single Power Source.

Redundant Power Source

The power board allows the connection of two independent −48 VDC supplies operated in a redundant mode. All slots are powered from the combined input from the A and B power supplies (the A and B buses are in a logical OR arrangement). If one supply fails, the other powers the entire chassis. An example using a Verilink 1041 power supply is shown in Figure 2-7.

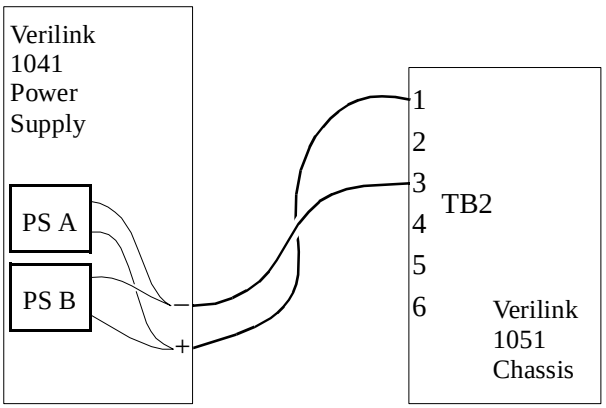


Figure 2-7 Wiring for Redundant Power Sources

Single Power Source

Using a single power source is essentially the same as the redundant configuration with power supply B not operational. If the redundant power board is not used, the A and B buses must be connected together as shown in Figure 2-8.

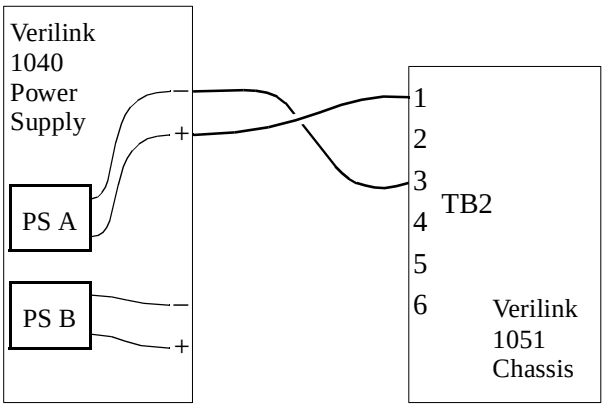


Figure 2-8 Wiring for a Single Power Source

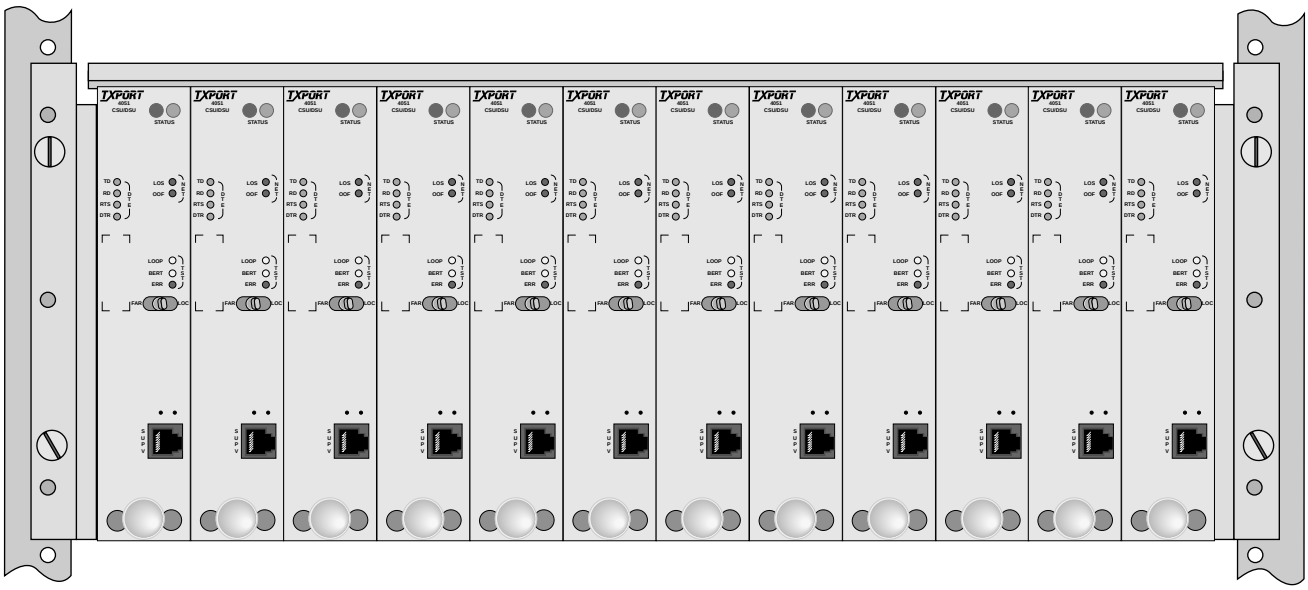


Figure 2-9 Model 1051-3 Chassis, Front View

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

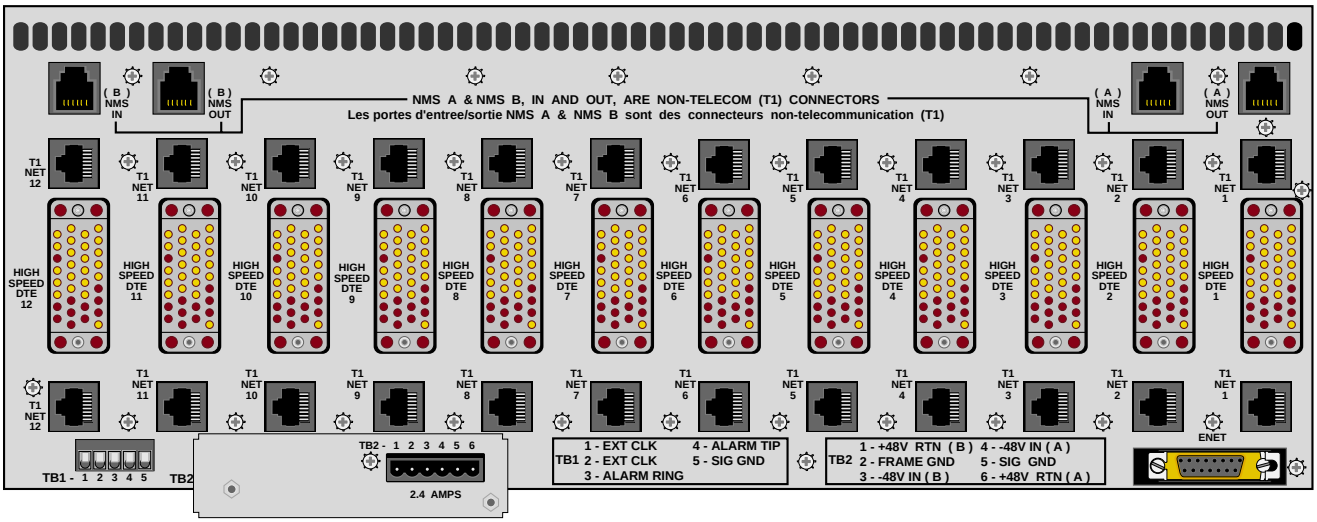


Figure 2-10 Model 1051-3 Chassis, Rear

3 OPERATION

Introduction

This chapter describes general operation of the Verilink PRISM 4051 front panel. The 4051 may be controlled manually using the front panel and the circuit board configuration switches (configuration switches are discussed in section Unit Configuration on page 6).

Chapter Terminal Operation covers the firmware-controlled Terminal Interface program, which gives the user maximum control. The 4051 may also be controlled using the 8100A Site Controller.

Factory default settings are <u>underlined</u> throughout this manual.

Front Panel Controls and Indicators

The front panel contains 12 LED indicators which convey status, alarm, and test information. The front panel also contains a test switch and a supervisory port connector. The following descriptions refer to Figure 3-1.

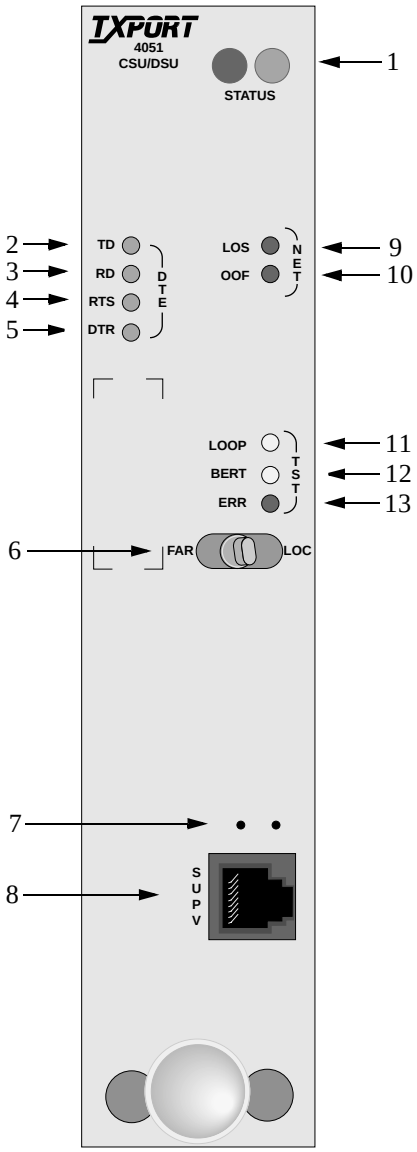


Figure 3-1 4051 Front Panel

General Status Indicators

1 **STATUS:** The 4051 has two general status indicators on the front panel that provide a quick check of the 4051 operating condition (Alarmed or Not Alarmed).

If neither indicator is On, the 4051 is not powered. If the green indicator is On, the 4051 is powered and may be functioning normally. If the red indicator is On, there is a fault which exceeds alarm thresholds or another type of 4051 failure. The problem can usually be isolated by further examination of the other front panel indicators as described below. Some errors can only be determined through the terminal interface (for example, OOS).

2 **TD**: This green indicator lights during a mark condition on the high-speed transmit data line.

3 **RD**: This green indicator lights during a mark condition on the high-speed receive data line.

4 **RTS**: This green indicator lights when the request to send signal is active.

5 **DTR**: This green indicator lights when the data terminal ready signal is active.

Test Controls and Indicators

6 **Test Switch**: This switch (FAR/LOC) is used for local testing. Refer to section Front Panel Testing in this chapter for more information.

7 **Activity Indicators:** These two small, recessed indicators show supervisory and network manager port transmission activity.

8 **SUPV**: The supervisory jack provides direct terminal access to control and monitor the 4051. Refer to section Supervisory Port on page 20 for more information.

Alarm Controls and Indicators

9 **LOS:** This indicator lights with a loss of signal from the DDS network.

10 **OOF:** This indicator shows that the unit detects an out of frame condition or OOF codes are received.

11 **LOOP:** This indicator lights continuously when the network interface is in any loopback.

12 **BERT:** This indicator shows that a 511-bit BERT is in progress.

13 **ERR:** This indicator shows when BERT pattern errors are detected.

Front Panel Testing

The previous section gave a brief description of each front panel control and 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 chapter Terminal Operation).

Test Switch

The test switch, labeled FAR/LOC, is used for local testing. When in the FAR position, the 4051 sends five seconds of the V.54 loop pattern, then switches to the 511 pattern. When transmitting a test pattern, the BERT indicator stays On. The ERR indicator lights for one second when a bit error or sync loss on the returned data is detected.

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 are either unidirectional (Figure 3-2) and bidirectional (Figure 3-3) 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.

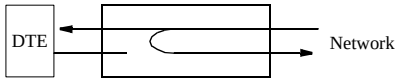


Figure 3-2 Unidirectional V.54 Loop

When the test switch is returned to the center position, the 4051 sends five seconds of V.54 loop down code and then returns to its normal operating mode.

Figure 3-3 Bidirectional V.54 Loop

When the Test switch is in the LOC position, the 4051 performs a network LLB as shown in Figure 3-4, and the LOOP LEDs light.

Figure 3-4 Local Loop

The Local loop is bidirectional or unidirectional 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 3-4).

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 4051 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 4051 does not transmit alternating DSU loop code, DSU latch, DSU unlatch, or cause sealing current reversal to activate a loop on the remote-end unit.

The test switch is also used when upgrading the 4051 software (see Upgrading Software on page 20).

Supervisory Port

This 8-pin modular RS-232 jack provides direct terminal access for controlling the 4051 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 Network Management Connections on page 10 for connection information.

Upgrading Software

The FAR/LOC switch is also used to set the SUPV port rate when upgrading software for the 4051 (see PC Setup on page 39).

4 TERMINAL OPERATION

Terminal Interface

This chapter describes the screen structure and menu controls for the Verilink PRISM 4051 terminal interface. The interface is an embedded firmware application program.

It requires an ANSI-compatible VT100 terminal (ASCII), or a computer running an ANSI terminal emulation program. The terminal interface uses ASCII break and escape functions, which are implemented differently with the various terminal emulation programs.

Screen Components

Terminal interface screens have several components common to all screens (Figure 4-1).

Device Type and Revision

The device type (such as PRISM 4051) and the revision control numbers are shown in the upper left corner. The first number is the hardware revision and the second number 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 DDS interface) on the second line. Refer to this information when contacting the factory with inquiries.

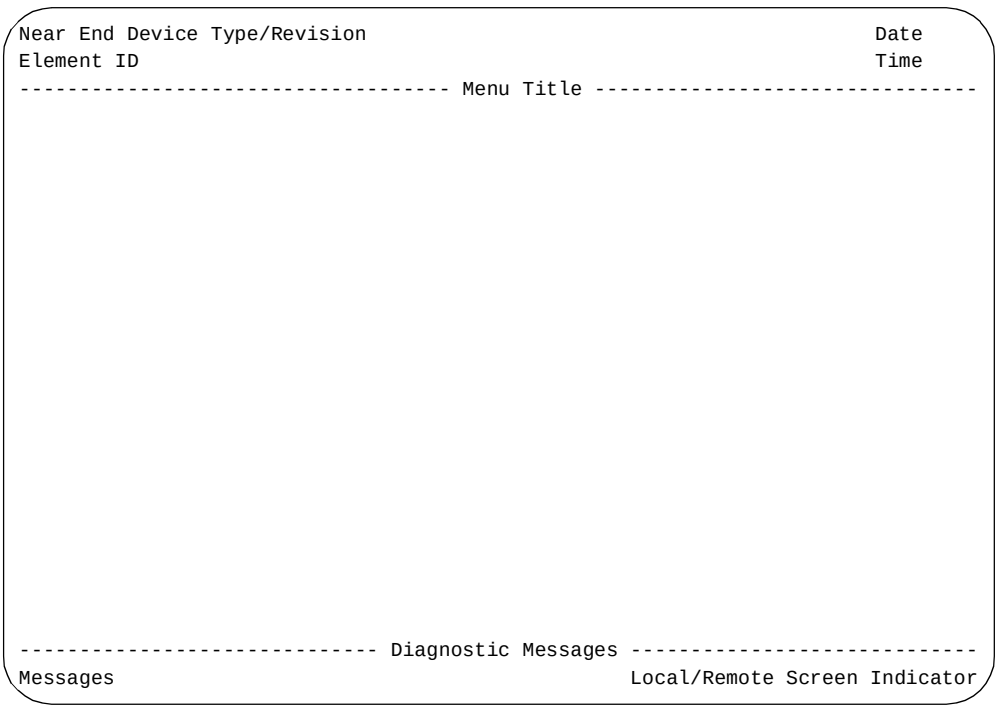


Figure 4-1 Terminal Interface Layout

Date/Time

The top right corner of the terminal screen displays the current date and time. The setting of these functions is described in Utilities on page 37.

Element ID

Below the header (PRISM 4051), the Element ID is displayed. Refer to Management Parameters on page 34 for information on the Element ID.

Menu Title

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

Near and Far Element

When remote access is activated on the Maintenance screen, the Element field is displayed to allow selection of the near- or far-end device (element).

Messages

Diagnostic messages may be displayed at the bottom of the screen.

Local/Remote Screen Indicator

Identifies the visible screen as displaying the local or remote interface.

Cursor Controls

The terminal interface utilizes a highlighted cursor to make selections from menus and select fields within screens to be operated on. The cursor is moved in different ways, depending on the terminal emulation program used. Most programs allow use of the Tab and Shift+Tab keys. Others allow use of the arrow keys. Once a field is highlighted, it is manipulated as described in section Field Types.

For keyboards which do not have these standard keys or have only some of them, an alternate set of cursor control commands is provided in Table 4-1. Each command is performed by pressing a letter key while holding down the Control key. Alternate commands may be freely mixed with the keyboard commands.

Table 4-1 Keyboard/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 for display only. User-selectable fields allow for changes to be made or commands to be executed.

Fields without brackets or parenthesis are display-only. They 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 the user a list of selections from which to choose. 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) simply executes the function.
- The most common type of field in parenthesis accepts typed input in the form of letters and/or numbers. Typing characters when the field is highlighted causes the current entry to be replaced with the new characters. To edit an existing entry rather than replace it, press the right arrow key to move the cursor to the point that needs editing. Characters may then be inserted or deleted. Typed data is always inserted rather than typed over. If the field is full, though, at least one character must be deleted to add another.

  Many fields of this type may also be toggled by pressing the spacebar. Other fields are range checked, where the user is not allowed to exit with an illegal value set.

Any screen may be redisplayed (or refreshed) by pressing Control+U. Any changes to fields on a screen, that have not been activated by pressing Enter, are discarded.

Software Configuration

The terminal interface is a firmware application program embedded inside the PRISM 4051, which can be accessed through the SUPV port (see Network Management Connections on page 10) using a Telnet session.

Interface Start-up

Once a compatible terminal is properly connected to the unit, a terminal interface session is started by sending a break command to the unit (or by pressing Enter four times). The Main Menu screen is displayed if a password has not been specified.

If a password has been previously established, the correct password must be entered to continue the session. *The password is case-sensitive.* If the password has been forgotten or is unavailable, note the date and time shown on the screen and contact Verilink Technical Support. A password can be established through the Utilities screen on page 37.

Menu Structure

The terminal interface opens with a main menu allowing four options: Alarms, Maintenance, Configuration, and Utilities (Figure 4-2). Each menu screen allows accessing the local or far-end menu screen.

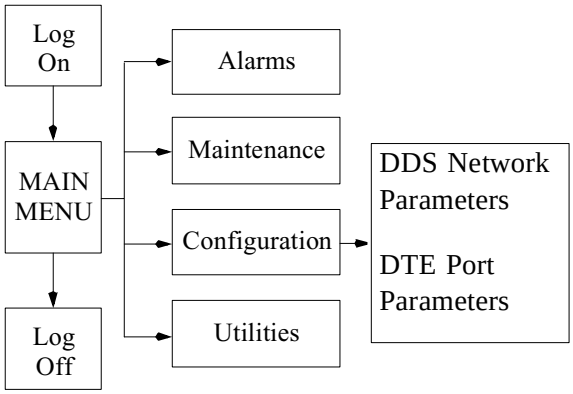


Figure 4-2 Menu Structure

⚠ *If a keystroke is not made for ten minutes, the terminal interface automatically logs off.*

Alarms Screen

The Alarms screen (Figure 4-3) allows viewing the current alarm status of the network and the DTE lines.

```
4051 DDS 255.255/1.02          P R I S M  4 0 5 1            Date: 08/23/96
                                (Unit Address: 1)            Time: 09:11:44
------------------------------------ ALARMS ---------------------------------


                NET Alarms: LOSS
                DTE Alarms: NONE


                                                Current      Threshold
                Loss of Signal Seconds (LOSS):     7874              5
                Out of Service Seconds (OOSS):        0              0
                Out of Frame Seconds   (OOFS):     7874              0




                Reset Alarm Registers: (RESET)


---------------------------------- Messages ----------------------------------
NET ALARM
```

Figure 4-3 Alarms Screen

NETAlarms

These status lines display the selected element's current network signal alarm state (Table 4-2). Alarms are determined by the selectable thresholds in Alarm Parameters on page 33.

Table 4-2 NET Alarm Indicators

Alarm	Description
-------	No status is available
None	No alarm threshold has been exceeded, although errors may exist which do not exceed thresholds.
ERRS	The Errored Seconds, Severely Errored Seconds, or Bipolar Errored Seconds threshold is exceeded.
LOSS	The Loss Of Signal Seconds threshold is exceeded.
OOSS	The Out of Service Seconds threshold is exceeded.
OOFS	The Out Of Frame Seconds threshold is exceeded.

DTE Alarms

These status lines display the selected element's current DTE signal alarm state (Table 4-3). The DTR Alarm may be enabled or disabled for the ports in the Port Parameters screen.

Table 4-3 DTE Alarm Indicators

Alarm	Description
None	DTR on DTE interface is true or ignored.
DTR	DTR on DTE interface is false.

(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 displays the consecutive seconds during which the error condition has existed.

The Threshold column displays the values set in the Alarm Configuration screen (page 33). Parameters having a current value equal to or greater than its non-zero threshold generates an alarm. Any parameter with a threshold value of zero is disabled from generating alarms. An alarm is declared when the value of any parameter exceeds its non-zero threshold.

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

Reset Alarm Registers

Pressing Enter on (RESET) clears the value of all Current alarm parameters.

Maintenance Screen

The Element Maintenance screen (Figure 4-4) allows performing loop tests and/or BERT functions on the DDS circuit. This screen also allows activating and clearing 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 switch as described in chapter Operation.

Clear Tests

Pressing Enter on this field clears all local tests and any line loops that have been initiated.

Clear Alarms

Pressing Enter on this field causes all near end alarms to be cleared.

Loop

The type of loop is chosen by toggling the spacebar and is executed by pressing Enter. Options include LOCAL, V.54, and FAR V.54. Local and V.54 generate near-end loops. Far V.54 generates a V.54 loop at the far end.

A FAR V.54 loop started from the front panel switch cannot be unlooped from the Maintenance screen. It must be unlooped from the front panel switch.

Unloop

Pressing Enter takes down the specified loop from the selected port. The type of loop is chosen by toggling the spacebar and is executed by pressing Enter. Options include LOCAL, V.54, and FAR V.54.

```
4051 DDS 255.255/1.02           P R I S M  4 0 5 1              Date: 08/23/96
                                 (Unit Address: 1)              Time: 09:14:26
------------------------------- 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 More: [BIDIRECTIONAL  ]                    Bit Errors:           0
                                                    Errored Seconds:      0
    (ACTIVATE REMOTE ACCESS)                        % EFS:              100

                                                    (START TEST)
                                                    (RESET ERRORS)

NET Status: LOS OOF
DTE Status: OK
Near Loops:
Far Loops:
---------------------------------- Messages ---------------------------------
```

Figure 4-4 Element Maintenance Screen

Loop Mode

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

The following loops can be activated on the 4051.

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.

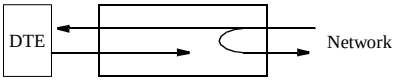


Figure 4-5 Unidirectional Line Loop

Figure 4-6 Bidirectional Line Loop

Data Loop. The data loop takes place at the data port (DTE) interface and only when the unit is in DDS I mode. The data loop is activated when the 4051 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.

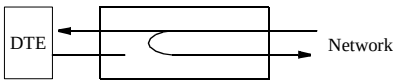


Figure 4-7 Unidirectional Data Loop and V.54 Loop

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

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.

Latching Loop. The latching loop takes place at the data port (DTE) interface and only when the unit is in DDS II mode. The latching loop is the same as the data loop except that it activates upon receiving DSU latching loop code. The latching loop deactivates upon receiving DSU unlatch loop code.

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 are either 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 or unidirectional 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).

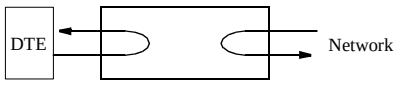


Figure 4-9 Local Loop

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 4051 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 4051 does not transmit alternating DSU loop code, DSU latch, DSU unlatch, or cause sealing current reversal to activate a loop on the remote-end unit.

Activate Remote Access

Pressing Enter on this field initiates communication with another PRISM 4051 DDS unit at the far end of the network link.

To activate remote access, both the near-end and far-end units must be similarly configured for DDS I or DDS II.

The near unit transmits an activation signal to the far-end unit for five seconds. At the end of this period, both units should be in remote access mode. While in this mode, the DCD and DSR signals to the DTE interface are FALSE and transmit data from the DTE is not transmitted to the network. The command field also changes to DEACTIVATE REMOTE ACCESS.

While Remote Access is active, the far-end type and revision information is displayed in the upper left corner of each screen. Also on each screen a field labeled Element with selectable values of Near and Far appears. Pressing Enter on this field activates the user interface for the selected element.

To terminate Remote Access, press Enter on the DISABLE REMOTE ACCESS field. Both units immediately return to normal operation.

During Remote Access, either unit returns to normal operation if communication with the far-end unit is lost for 30 seconds.

⚠ *Activating the remote access causes the unit to interrupt network traffic. Network traffic does not restart until remote access is deactivated.*

BERT

These fields control the Bit Error Rate Test feature. BERT is performed on the NET interface and preempts user data.

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.

Pattern Sync

This field 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 is displayed. If the receiver is in pattern sync, IN SYNC 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

This field displays the number of asynchronous errored seconds that have been detected since the test began or since error statistics were last cleared. This parameter includes bit error seconds and sync loss seconds.

% EFS

This ratio is derived from the number of error free seconds divided by the number of seconds accumulated in Elapsed Time.

Start Test

Pressing Enter with the cursor on this field starts the selected test pattern. TEST IN PROGRESS appears once the test has started. To end the test, press Enter on STOP TEST.

Reset Errors

Pressing Enter with the cursor on this field causes the test error results to be cleared to zero.

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 indications are described in the NET and DTE Status fields. Status indications are described in Table 4-4.

Table 4-4 Status Indications

Status	Description
-------	No status is available
OK	No errors are currently detected.
LOS	A loss of signal condition exists.
OOF	An out of frame condition exists or OOF codes are received.
OOS	Out of Service codes are received.
DTR	DTR from the DTE device is false.

Near Loops

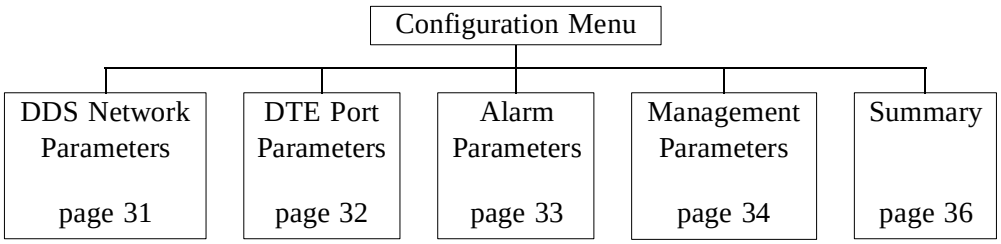
Displays the loop status of the near element.

Far Loops

Displays the loop status of the far element.

Configuration Screen

The Configuration screens allow viewing and setting configuration parameters for the network elements. Figure 4-10 shows the screens and where information about them is located in the manual.



igure 4-10 Configuration Menu

To send a new configuration to the unit, press Enter on one of the fields or exit the screen. The underlined values are the factory default parameters.

Changing any of the configuration settings of an active 4051 causes a brief synchronization loss.

DDS Network Parameters

The DDS Network Configuration screen (Figure 4-11) allows selecting parameters for the network interface.

Data Mode. Choices are DDS I and DDS II which is a clear channel 64 kbps without secondary channel.

Rate. This field is automatically set to 56K for DDS I and 64K (72K) for DDS II. DDS II mode inserts 64 kbps user data from the DTE into a 72 kbps framed network signal.

Timing. This field selects the bit rate clock source. NET uses received network signal as clock source. INT uses an internal oscillator (± 50 ppm) for clock source. DTE uses TXC from the DTE interface as the clock source.

Circuit Assurance. When Circuit Assurance is set to Off, CTS follows RTS. When RTS transitions to the On state, CTS transitions to the On state after the RTS-to-CTS delay. CTS transitions to the Off state within one bit time when RTS transitions to the Off state.

When Circuit Assurance is set to On, CTS follows RTS if DCD is On. When RTS transitions to the On state, CTS transitions to the On state after the RTS/CTS delay if DCD is On. CTS transitions to the Off state within one bit time when RTS transitions to the Off state. CTS is Off if DCD is Off.

When Circuit Assurance is On, RTS should be set to NORMAL on the DTE PORT parameters. the FORCE DCD option changes to NORMAL when Circuit Assurance is enabled.

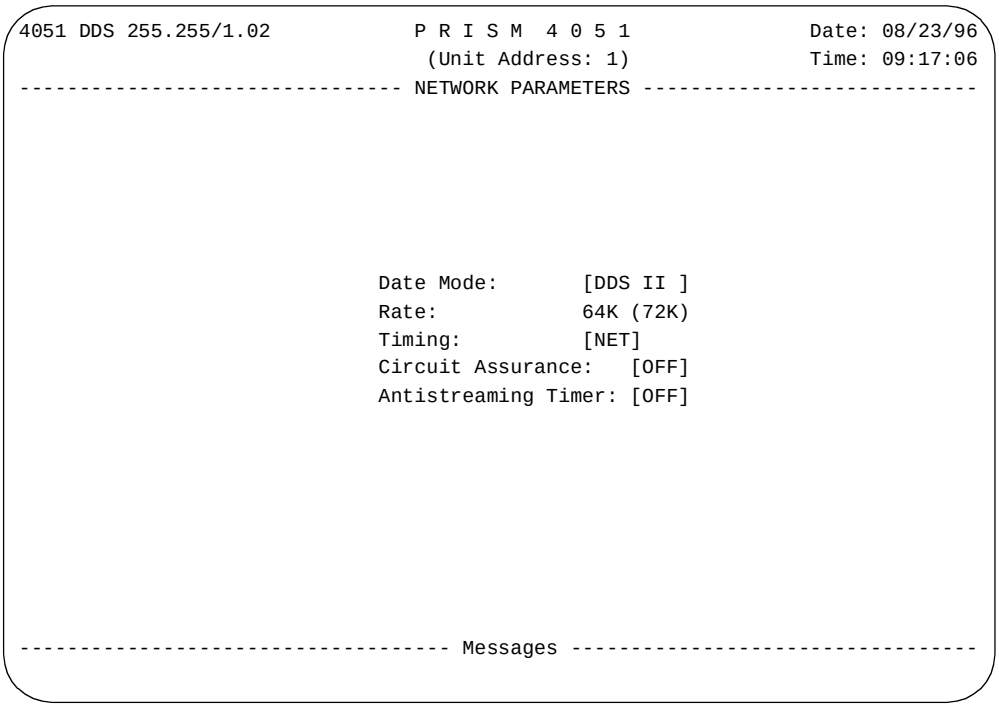


Figure 4-11 DDS Network Parameters Screen

Antistreaming Timer. The Antistreaming Timer is controlled by RTS. If RTS remains On long enough for a timeout to occur, the DDS transmitter sends DMI [Data Mode Idle (all ones)]. The Antistreaming Timer is reset when RTS transitions to the Off state. Choices are OFF, 10, 30, and 60.

DTE Port Parameters

The DTE Port Configuration screen (Figure 4-12) allows setting the operating parameters for the DTE ports.

Port Type. The Port Type field displays the installed DTE interface which is either V.35 or RS-232.

Port Rate. Port Rate is determined by the Data Mode selection on the Network Parameters. The values are 56K for DDS I and 64K for DDS II.

Port Format. This field shows the data format for the DTE port which is always synchronous.

DSR. This field controls the behavior of the DSR signal during test modes. If TEST>OFF is selected, DSR transitions to the Off state when a loop or BERT test is active. Options are FORCED ON or TEST>OFF.

DCD. This field controls the behavior of the DCD signal during an IDLE condition. When Data Mode Idle codes are received, DCD transitions to Off if this field is set to IDLE>OFF. This only applies to DDS I mode. Options are FORCED ON or IDLE>OFF.

RTS. If this field is set to NORMAL, the RTS signal controls the transmitter and CTS output signal. If set to FORCED ON, the RTS input signal is set to On inside the unit.

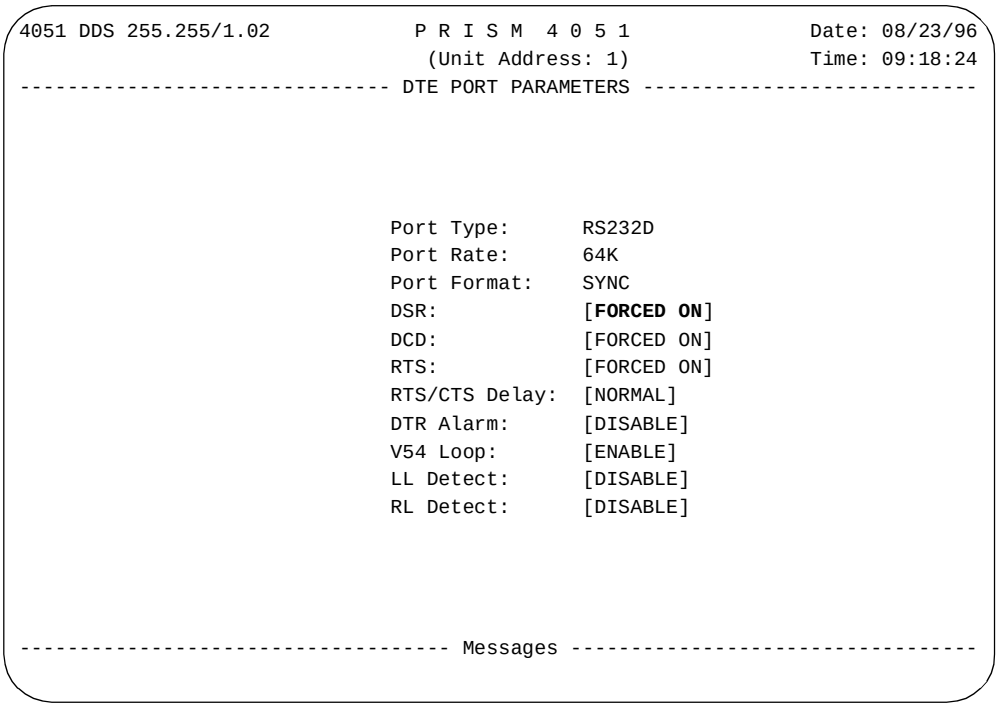


Figure 4-12 DTE Port Parameters Screen

RTS/CTS Delay. This field selects the delay from the RTS transition (to On) to the CTS transition. The delays are:

Normal = 0.4 ms ± 0.02 ms for DDS I
0.3 ms ± 0.015 ms for DDS II

Long = 0.8 ms ± 0.04 ms for DDS I
0.6 ms ± 0.03 ms for DDS II

Options are NORMAL and LONG.

DTR Alarm. This option allows Enabling or Disabling an alarm if the DTR signal from the DTE device goes false.

V54 Loop. This field controls the response to incoming V.54 Loop/Unloop codes. If set to Enable, the PRISM 4051 can loop and unloop. If set to Disable, loop codes are ignored.

LL Detect. This option allows Enabling or Disabling the local loop activation by the local loopback signal (V.35 pin J or RS-232 pin 18) on the DTE interface.

RL Detect. This option allows Enabling or Disabling the remote loop activation by the remote loopback signal (V.35 pin BB or RS-232 pin 21) on the DTE interface. Remote loopback causes transmission of V.54 loop or unloop codes to the far-end device.

Alarm Parameters

The Alarm Configuration screen (Figure 4-13) allows reviewing and setting alarm related thresholds for the selected element. These thresholds are the minimum

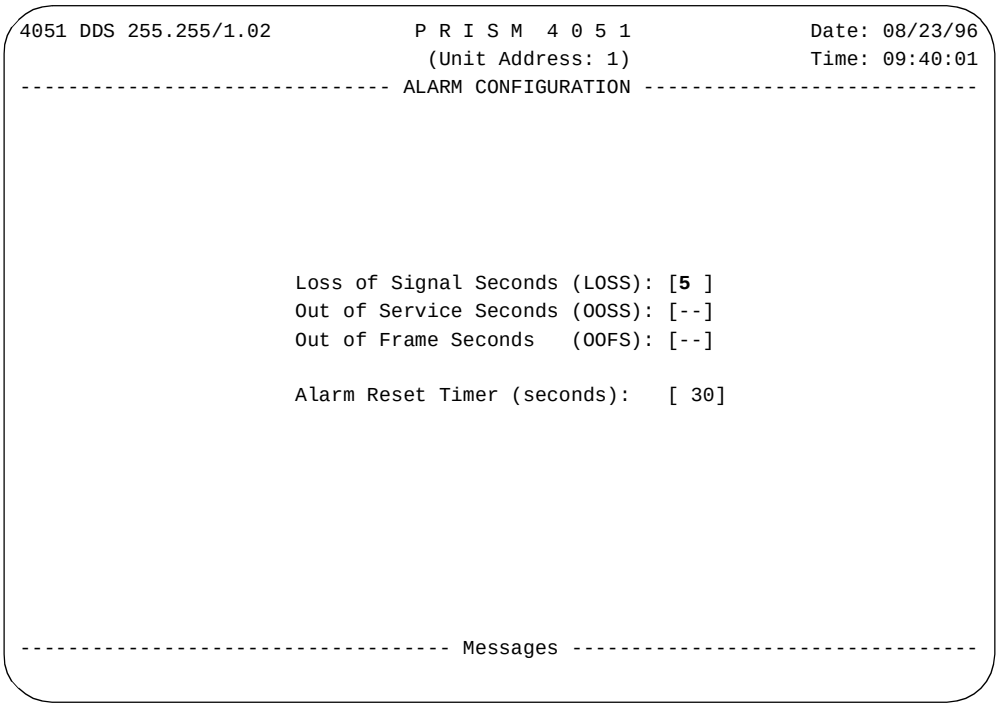


Figure 4-13 Alarm Configuration Screen

acceptable performance levels. To modify the parameters, highlight the desired statistic, type in the new value (any number from 0 to 900) and press Enter. If this value is later surpassed, an alarm indication appears. A field set to (0) causes the element not to alarm on that statistic.

Loss of Signal Seconds. A one-second period in which the DDS received signal is interrupted. Options are 1, 2, 3, 4, 5, 10, 20, 30, and (- -) (none).

Out of Service Seconds. A one-second period during which the Out Of Service code is received. Options are 1, 2, 3, 4, 5, 10, 20, 30, and (- -) (none).

Out of Frame Seconds. A one-second period in which the Out Of Frame code is received or a frame sync loss occurred. Options are 1, 2, 3, 4, 5, 10, 20, 30, and (- -) none.

Alarm Reset Timer. Determines the number of seconds after alarm conditions clear before indications are removed. Options are 10, 30, 60, 90, 100, 200, 300, 400, 500, 600, 700, 800, 900, and (- - -) (none).

Management Parameters

The Management Ports screen (Figure 4-14) sets the following parameters for the Call On Alarm (COA) connection on the supervisory (SUPV) port.

COA Connection (SUPV). This field controls the remote alarm reporting. The ASCII alarm report type is set by the following choices:

DISABLED: Alarm reporting is disabled.

```
4051 DDS 255.255/1.02           P R I S M  4 0 5 1              Date: 08/23/96
                                 (Unit Address: 1)              Time: 09:44:36
--------------------------------- Management Ports ----------------------------




--------------------------------- Supervisory Port ----------------------------
          Loss of Signal Seconds  [DISABLED]
          Primary Dial String:    (                                )
          Secondary Dial String:  (                                )
          Initialization String:  (ATE1QV1s0=1                     )
          Disconnection String:   (ATH                             )









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

Figure 4-14 Management Ports Screen

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.

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

COA messages are reported in the following format in the DIAL or DIRECT modes only:

```
Element ID HH:MM:SS MM/DD/YY <CR> <LF>
NET Alarms: alarms <CR> <LF>
DTE Alarms: alarms <CR> <LF>
```

where (alarms) is a string consisting of some or all of the identifiers LOS, OOF, RAS, AIS, UAS, ERRS, or NONE. The following is an example:

```
Joesunit 17:24:55 08/04/93
NET Alarms: LOS
DTE Alarms: DTR
```

The user-programmable Element ID string (see Utilities Screen on page 37) 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).

Primary Dial String, Secondary Dial String. These fields are ASCII strings for the primary and secondary call on alarm phone numbers used in the [DIAL] mode. The strings must include the ATDT command prefix.

The unit makes three attempts to connect using the primary number. If all three attempts fail, the unit makes three attempts to connect using the secondary number (if it is not blank). If the secondary number fails, the unit waits five minutes and then attempts to communicate using the primary number again. When a connection is detected, the unit outputs the notification message and 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 ATEQ0V1.

Disconnection String. This field identifies the character string to be output when the modem session is terminated. The default setting is ATH.

Summary

The Summary screen (Figure 4-15) is a display-only screen that summarizes all the configuration settings in multiple columns. The left column, labeled Current, shows the settings the unit is running. The middle column, labeled Saved, shows what settings have been saved into non-volatile memory. The third column, labeled Switches, shows the settings of DIP switches S1 through S4.

Configuration Item LL/RL Detect reads DIS/DIS, ENA/DIS, DIS/ENA, or ENA/ENA in the Current and Saved columns depending on how those parameters were set through a terminal (see DTE Port Parameters on page 32), but only as DISABLE or ENABLE in the Switches column because both loopback parameters are controlled by one DIP switch (S1-7, see Local and Remote Loopback Enable on page 7).

```
4051 DDS 255.255/1.02           P R I S M  4 0 5 1              Date: 08/23/96
                                 (Unit Address: 1)              Time: 09:45:36
------------------------------------ SUMMARY ---------------------------------

Configuration Item     Current   Saved    Switches    Other Information
DTE Bit Rate:          64K                64K         Serial Num: 065535
Line Bit Rate:         73K                72K         Port Type:  RS232D
Line Clk Source:       NET                NET
Loop Mode:             BIDIR              BIDIR
RTS Delay Norm/Dbl:    NORMAL             NORMAL
RTS/CTS Norm/On:       FORCED             FORCED
Data Mode:             DDS II             DDS II
LL/RL Detect:          DIS/ENA            DISABLE
DTR Alarm:             ENABLE             ENABLE
Antistreaming Timer:   30                 30
V.54 Loop:             DISABLE            DISABLE
Circuit Assurance:     ON                 ON
Supv Bit Rate:         19.2K              19.2K
NMS Bit Rate:          19.2K              19.2K
Unit ID:               252                252
Boot Mode:             SWITCHES           SAVED

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

Figure 4-15 Summary Screen

Utilities

The Utilities screen (Figure 4-16) handles the functions described in the following paragraphs.

Element ID. This field allows the entry of an ASCII string (up to 29 characters in length) which identifies the unit to the device receiving the alarm notification messages. This ASCII string is also displayed at the top of all terminal interface screens.

Set Time. The current time may be entered in this field using the 24-hour HH:MM:SS format. For example, 3:45 a.m. is entered as 0345 and 3:45 p.m. is entered as 1545.

Set Date. The current date may be entered in this field using the MM:DD:YY format. For example, July 4, 1993 is entered as 070493.

New Password. This field allows entry of a password of up to 10 characters. An empty string (Enter key only) may be entered to disable the password feature. After Enter is pressed, the new password is activated and is no longer visible. Therefore, type carefully when entering a new password and verify before pressing Enter. 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 fully understood. If a password has been specified, it must be typed exactly to reenter the program.*

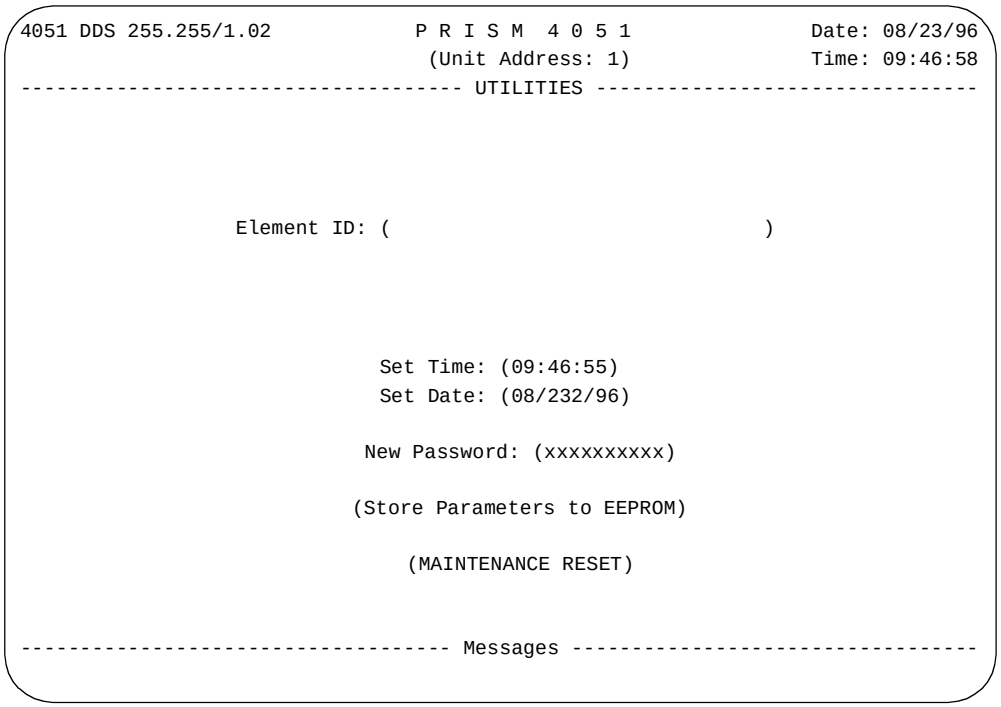


Figure 4-16 Utilities Screen

If a password is programmed and later forgotten, contact Verilink Technical support for a one-time backdoor password.

Store Parameters to EEPROM: This command causes the unit to store all user-selectable parameters into non-volatile memory. These settings then become the saved configuration which can be loaded at power-up.

This command causes the unit to restart and interrupts network traffic. Pressing Enter on this field to activate the command brings up the following warning:

```
ARE YOU SURE? - THIS WILL
    INTERRUPT DDS DATA

      (NO!)     (YES)
```

Maintenance Reset. This field clears all user-selectable parameters, performance registers, passwords, and alarms but saves the IP Address. All alarm threshold parameters are set to default values. These settings are then written to non-volatile memory as the saved configuration.

Pressing Enter on this field brings up the following warning:

```
DELETE ALL DATA AND
 RESTART UNIT?
  (NO!)  (YES)
```

To exit this screen without performing the reset function, press Enter with NO selected. To proceed with the reset function, move the cursor to YES and press Enter.

The reset operation sets all parameters to the factory default settings.

A FLASH PROM DOWNLOAD PROCEDURE

This appendix is a step-by-step procedure for downloading the Flash PROM software for the PRISM 4051.

Required Equipment

The following equipment is required to perform the download procedure.

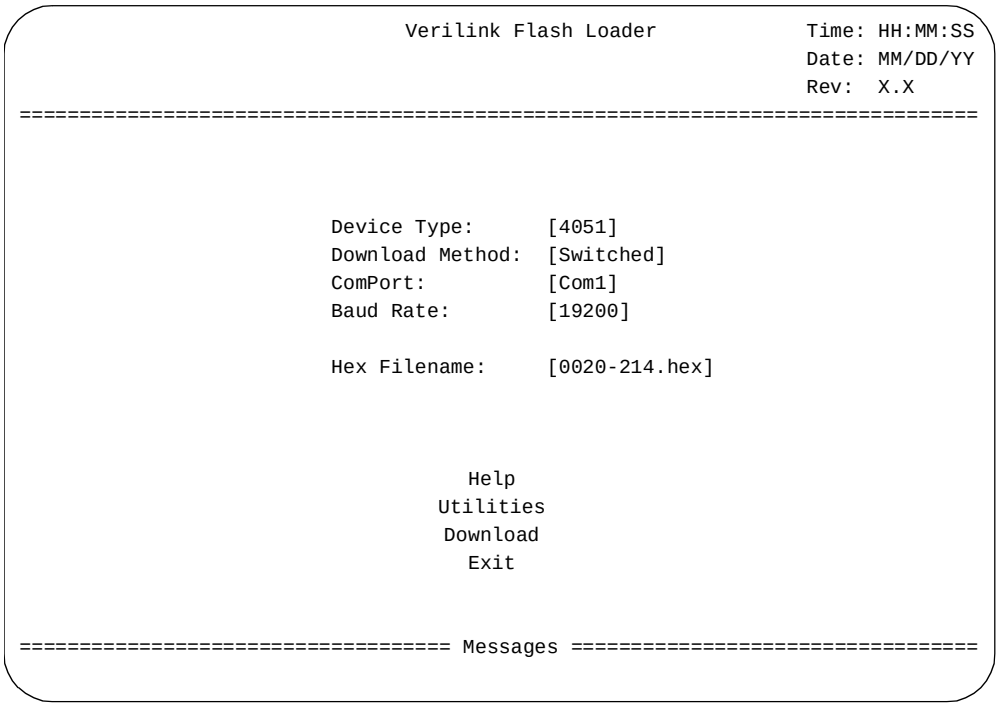
- PC with at least one available RS-232 serial (COM) port.
- A diskette containing the download.exe program.
- A diskette containing one or more hexadecimal files to be downloaded to the unit (these files have a .hex extension).

Throughout this manual, all factory default settings are shown underlined.

PC Setup

This operation sets all parameters according to the boot mode switches (see Boot Mode on page 7) and clears all performance registers. Record the current settings before performing this procedure.

1. Power up the PC and create a directory structure to contain the program files. Creating a new directory, such as c:\hex or c:\download, is recommended.
2. Copy all the files on the supplied diskette to the destination directory noting the complete file names of all hex files, such as 0020-214.hex.
3. Select the download.exe file. The Verilink Flash Loader main screen is displayed (Figure A-1).
4. Select 4051 at Device Type using the arrow keys to highlight the field and the spacebar to toggle through the list of available products.
5. Select the Download Method as Switched. Switched requires setting switch S3-8 Up to place the unit in a download mode.
6. Select the PC serial communications port to be used for the download procedure. The choices are Com1, Com2, Com3, and Com4.



igure A-1 Verilink Flash Loader Screen

7 Select the baud rate for configuring the communication program. The valid choices for the 4051 are 19200, 38400, and 57600 (see Upgrading Software on page 20).
The LOC position forces download at 19200 bps.
The middle position forces download at 38400 bps.
The FAR position forces download at 57600 bps.

The FAR/LOC switch only controls the SUPV port rate for downloading software for the unit's Flash PROM. Setting the SUPV port rate for terminal operation is done by hardware (see SUPV Port Rate on page 9).

8 Enter the hex file to be downloaded. When the Device Type was selected, the program automatically performed a look-up for existing applicable hex files in the local directory. If a file is found, it is displayed in this field. This filename can be accepted or another can be entered.

9 In Switched mode (step 5 above), verify that the 4051 has Switch S1-8 is in the Up position (see Force Download Mode on page 9) and the front panel FAR/LOC switch is set to match the rate selected in step 7. Power restart the unit with the correct switches.

10 Connect the PC serial COM port to the SUPV port of the 4051 with a DB-25 to 6-pin modular cable assembly (part number 9-1001-028-2). If the COM port has 9 pins, use a 9-pin to 6-pin modular cable assembly (part number 9-1001-025-2).

11 From the Flash Loader screen, select the Help option and follow the instructions for configuring the baud rate. This operation is different for each device type so read the instructions carefully. If the baud rate cannot be successfully configured, contact Verilink Technical Support.

12 The Utilities option is used for saving and restoring the configuration parameters for the 8100A Site Controller.

13 Select the Download option and press Enter for the download process to begin.

⚠ *The actual downloading procedure overwrites the existing program in Flash. Ensure that the appropriate file name is selected before pressing Enter on the Download option. Do not remove power or interrupt the download process in any manner. This can cause the unit to lose its serial and hardware revision numbers that can only be reinstalled at the factory.*

The process of erasing the Flash can last a couple of minutes. The PC message line indicates the number of records sent:

```
Records Sent: --
```

If the entered filename does not exist in the local directory, the following error message appears:

```
Cannot find file ----
Upload aborted, press a key to continue
```

14 Once the Flash is erased, the program begins counting the number of data blocks being uploaded. This process takes a few minutes to complete.

```
Records Sent: ----
Percent Sent:  --%
```

15 After the software is downloaded to the unit, the PC beeps to indicate completion. Most units automatically reset. Units requiring manual switch settings to enter the download mode must have their switches manually reset to the correct operating positions.

⚠ *Do not remove power until the LEDs stop flashing.*

16 When all files have been downloaded, a factory default maintenance reset operation is recommended (see Maintenance Reset on page 38). This can be performed through the unit's terminal interface start-up procedure (see Interface Start-up on page 23).