

**PRISM 3002
T1/FT1
CSU/DSU**



**34-00277
2nd Edition**

Copyright Notice

Copyright © 1999 Verilink Corporation. All rights reserved.

This document does not create any express or implied warranty about Verilink or about its products or services. Verilink's sole warranty is contained in its product warranty. The end-user documentation is shipped with Verilink's products and constitutes the sole specifications referred to in the product warranty. Verilink has made reasonable efforts to verify that the information contained herein is accurate, but Verilink assumes no responsibility for its use or for any infringement of patents or other rights of third parties that may result. The customer is solely responsible for verifying the suitability of Verilink's products for its use. Specifications are subject to change without notice.

Manual reorder # 34-00277

2nd Edition, May 1999

Trademarks

Verilink is a registered trademark Verilink Corporation.

Any named products herein are trademarks of their respective companies.

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.



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:

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

For Users of 1.544 Mbps Service

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

- 1 All direct connections to T1 lines must be made using Part-68-compliant plugs and jacks.
- 2 The telephone company may require the following information when applying for leased-line facilities.

Port ID: P/N FSG 3XX2/4

REN/SOC: 6.0 F

FIC: 04DU9-BN (SF)
04DU9-DN (B8ZS and SF)
04DU9-IKN (ESF)
04DU9-ISN(B8ZS and ESF)

USOC: RJ-48C

- 3 If the unit appears to be malfunctioning, it should be disconnected from the telephone lines until you learn if the source of trouble is your equipment or the telephone line. If your equipment needs repair, it should not be reconnected until it is repaired.

- 4 The unit has been designed to prevent harm to the T1 network. If the telephone company finds that the equipment is exceeding tolerable parameters, they can temporarily disconnect service. In this case, the telephone company will give you advance notice, if possible.
- 5 Under FCC rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.
- 6 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.
- 7 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.
- 8 This equipment complies with Part 68 of the FCC rules. On the left side (when facing the front) of the 1024 chassis of this equipment is a label that contains, among other information, the FCC registration number for this equipment. If requested, provide this information 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.

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.

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 24x7 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.
- Slots in the unit are provided for ventilation to protect it from overheating. These openings must not be blocked or covered. Never place this product near a radiator or heat register.
- 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.

Table of Contents

Copyright Notice	ii
Trademarks	ii
FCC Requirements	ii
For Users of 1.544 Mbps Service	ii
Canadian Emissions Requirements	iii
Warranty	iii
Customer Service	iii
Returning Products	iii
Safety Precautions	iv

1 General

Introduction	1-1
Features	1-2
Specifications	1-3
Network Interface	1-3
Equipment Interface	1-3
Management Interfaces	1-3
Supervisory Port	1-3
Dial Backup	1-3
Diagnostics	1-3
Alarms	1-4
Power	1-4
Mechanical	1-4
Environmental	1-4
Standards	1-4
Industry Listings	1-4
Ordering Information	1-5

2 Installation

Unpacking and Inspection	2-1
Supplied Materials	2-1
Mounting	2-1
Port Connections	2-2
NET (Network)	2-2
DBU (Dial Backup)	2-2
Data Port	2-3
Supervisory (SUPV) Port	2-3
Power Connection	2-4
Power Failure	2-4
Network Management	2-5

3 Hardware Configuration and Testing

Controls and Indicators	3-1
NMS Address	3-2
SUPV Port Bit Rate	3-2
Supervisory Port	3-3

Received Loop Codes	3-3
Upgrading Software	3-3

4 Terminal Configuration and Testing

Interface Start-up	4-1
Menu Structure	4-2
Screen Components	4-2
Device Type and Revision	4-2
Date and Time	4-2
Element ID	4-3
Menu Title	4-3
Messages	4-3
Local/Remote Screen Indicator	4-3
Cursor Controls	4-3
Field Types	4-4
Alarms Screen	4-5
NET Alarms	4-5
DTE Alarms	4-6
(alarm status)	4-6
Power Loss Seconds	4-6
Reset Alarm Registers	4-6
Performance Screens	4-7
Element	4-7
Target	4-7
User NET	4-7
Telco NET	4-8
Error Events	4-8
Reset Performance Registers	4-8
Standard 24 Hour	4-8
Status	4-8
Completed Days	4-8
Completed Intervals	4-8
24 Hr. % Error Free	4-8
(performance data)	4-8
Maintenance Screen	4-10
Clear Tests	4-10
Clear Alarms	4-10
T1 Loop	4-10
NET PLB (Payload Loopback)	4-11
FAR PLB	4-11
NET LLB (Line Loopback)	4-11
FAR LLB	4-12
DTE MLB	4-12
Far LLB	4-12
Port Loop	4-12
Port Unloop	4-13
FP Buttons	4-13

BERT	4-13	Status	4-21
Pattern	4-13	Command	4-21
Test Length	4-13	Disable	4-21
Pattern Sync	4-13	Enable	4-21
Elapsed Time	4-13	Enable Daily	4-21
Bit Errors	4-13	Activate	4-21
Errored Seconds	4-13	Test	4-21
% EFS	4-14	Activator 1	4-21
Start Test	4-14	Activator 2	4-21
Reset Errors	4-14	Mode	4-21
Line Fault and Loop Status	4-14	Security	4-21
NET Status	4-14	Password	4-21
Near Loops	4-14	DTR Dialing	4-21
Far Loops	4-14	Dial String	4-22
Configuration Screens	4-14	Init String	4-22
Line Parameters	4-15	Reset String	4-22
T1-NET Framing	4-15	Configure ISDN TA	4-22
T1-NET Line Code	4-15	Activation Periods	4-22
T1-NET LBO	4-15	Management Ports	4-22
PRM Enable	4-15	Element ID	4-22
Zero Suppression	4-15	COA Connection (SUPV)	4-23
T1-NET Timing	4-15	DISABLED	4-23
INTERNAL	4-16	DIAL	4-23
PORT 1	4-16	DIRECT	4-23
NETWORK	4-16	Primary Dial String and	
Remote Comm Channel	4-16	Secondary Dial String	4-23
Channel Allocation	4-16	Initialization String	4-23
Alarm Configuration	4-17	Disconnect String	4-23
Errored Seconds	4-17	Summary	4-24
Severely Errored Seconds	4-17	Utilities	4-25
Loss of Signal Seconds	4-17	Set Time	4-25
Unavailable Seconds	4-17	Set Date	4-25
Remote Alarm Seconds	4-17	New Password	4-25
AIS Seconds	4-17	Maintenance Reset	4-26
Out of Frame Seconds	4-18		
BPV Seconds	4-18		
Alarm Reset Timer	4-18		
Port Configuration	4-18		
Channel Allocation	4-18		
Port #	4-18		
Rate Multiplier	4-19		
DS0 Channel Assignment	4-19		
Start Channel #	4-19		
Port Rate	4-19		
# of Channels	4-19		
Transmit Clock	4-19		
LL (Local Loop) Detect	4-19		
RL (Remote Loop) Detect	4-19		
V.54 Loop	4-19		
Invert Data	4-20		
CTS/DSR/DCD Control	4-20		
Alarm on DTR Loss	4-20		
Dial Backup Parameters	4-20		
Alarm Reset Timer	4-20		

A Flash PROM Download Procedure

Required	
Equipment	A-1
PC Setup	A-1

1

GENERAL

Introduction

The Verilink PRISM 3002 is a modular, single port, fractional T1 CSU/DSU designed to take advantage of T1 integrated access and provide the most economical fractional T1 access solution available.

The PRISM 3002 allows connection of high-speed digital data to a T1 facility. The data interface is a standard ITU V.35 and supports port rates from 56 kbps to 1.536 Mbps. Interface to the T1 network is through the 3002's integral ESF CSU which provides full performance monitoring of the T1 span and is compliant with AT&T publications TR62411 and TR54016 and with ANSI document T1.403.

The 3002 is equipped with integral dial backup capabilities and can be used with any vendors switched service device such as an ISDN terminal adapter. Dial backup can be initiated from stored alarm thresholds or from loss of the T1 facility

For high-density CSU/DSU sites, the PRISM 3002 can be used in conjunction with the Verilink 8100A Site Controller. The 8100A incorporates an integrated Modular Embedded Community Agent (MECA) providing SNMP/Telnet management through a single IP address to access all its controlled units.

LED indicators are provided on the front panel of 3002 alert local personnel of alarm conditions, loop and test status, and DTE port activity. A test switch allows local and remote loops to be activated as well as BERT tests. All configuration parameters of the 3002 are soft selectable from the management system.

The Verilink PRISM 3002 CSU/DSU terminates a broad range of T1/FT1 networking applications. It integrates LAN-to-LAN networking and disaster recovery in managed or unmanaged environments.

The PRISM 3002 unit provides the T1 network connection through an advanced integral ESF CSU. Full performance T1 span monitoring allows early detection and correction of problems before they affect critical applications. The unit provides a wide range of test functions and loopbacks to aid in rapid fault isolation and repair and also responds to in-band fractional loop codes to accommodate fractional T1 service testing by the carrier. An internal BERT allows testing of both the network and equipment connections.

The PRISM 3002 is compatible with industry standards ensuring access to any T1 provided service and allowing connection of all equipment quickly and correctly.

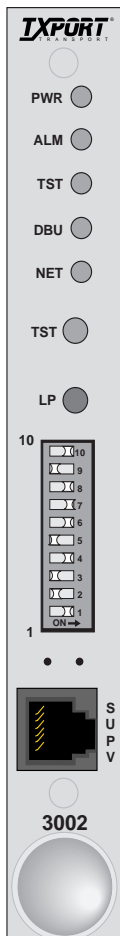


Figure 1-1 PRISM 3002

An innovative design eliminates clocking problems on the high-speed data ports. The unit uses Flash memory allowing firmware upgrades in the field eliminating the need for taking units out of service for an extended time or returning units to the factory for updates.

When connecting local area bridging or routing devices to a T1 network, other CSU/DSUs are out of the LAN management loop. The critical T1 connection point is under control of the existing SNMP management system, providing seamless integration of LAN and WAN, and eliminating the need for a separate CSU/DSU management system.

The PRISM 3002 may be provisioned through the terminal interface. The chapters in this manual are arranged as follows:

- 1 General - Describes product features, specifications, and Verilink ordering numbers.
 - 2 Installation - Describes unit mounting, port connections, and powering.
 - 3 Hardware Configuration and Testing - Describes hardware, including the LED indicators, test buttons, and procedures for hardware testing from the front panel.
 - 4 Terminal Configuration and Testing - Describes all the parts of the unit menus and their functions, including software testing procedures from the unit menu screens.
- A Flash PROM Download Procedure - Describes a step-by-step procedure for downloading the Flash PROM software for the PRISM 3002.

Features

- ◆ Single port
- ◆ Integral ESF/CSU provides full performance monitoring (meets TR62411, TR54016, and T1.403 standards)
- ◆ Complete diagnostic capabilities
- ◆ Full T1 network management through
 - a VT100-compatible terminal interface
 - SNMP Thru Site controller
 - 8100A Site Controller
- ◆ Programmable alarm thresholds
- ◆ Flash memory allows field software upgrades
- ◆ Dial Backup and automatic restoral of T1 line through an external device
- ◆ D4 or ESF line framing, AMI or B8ZS line coding
- ◆ Supports Fractional T1 services with flexible bandwidth allocation

Specifications

Network Interface	Line Rate:	1.544 Mbps (± 50 ppm)
	Line Framing:	D4 or ESF
	Line Code:	AMI or B8ZS
	Input Signal:	0 to -27 dB ALBO
	Connection:	RJ-48C jack, 100 Ω ($\pm 5\%$)
	Output Signal:	3.0 V ($\pm 10\%$) base-peak into 100 Ω with protection
	Line Build Out:	0, -7.5, -15, -22.5 dB attenuation
	Transient Voltage:	1000 V protection, fused input and output
	Jitter Control:	per TR62411 and T1.403
	Timing Source:	Internal, recovered line clock, external DTE
	Ones Density:	B8ZS, N \times 56 bit stuffing, alternate fill; complies with TR62411
	Equipment Interface	DTE Ports:
Compatibility:		Subminiature-D 26-pin, female ITU V.35
Data Rate:		Synchronous, N \times 56 kbps or N \times 64 kbps (where N = 1 to 24); independent selection on each port
Clocking:		Internal, External, Oversample
Data Invert:		May be enabled or disabled
Management Interfaces	Supervisory Port	
	Connection:	8-pin modular (RS-232)
	Data Rates:	1.2, 2.4, 9.6, and 19.2 kbps
Dial Backup	Connection:	RS-232, 10-pin modular
	Backup Service:	PSTN or ISDN, sync or async
	Configuration:	Information for backup unit is stored in unit and transmitted to backup unit by in-band AT commands
	Dialing:	Numbers programmed and stored in unit and transmitted to backup unit by in-band AT commands or DTR dialing (assertion)
	Restoral:	Manual or automatic restoral to leased line service
Diagnostics	Performance:	Monitoring per TR54016 and T1.403
	Network Loops:	Line loopback, payload loopback, or maintenance loopback in the network direction
	Fractional Loop:	Responds to in-band V.54 loop code

	DTE Port Loops:	Bidirectional loop toward DTE and Net
	BERT:	Multiple test patterns toward network or DTE port
Alarms	Activation:	Programmable thresholds
	Reporting:	Front panel LEDs, call out on alarm (COA), SNMP TRAPs
Power	DC:	48 VDC, 167 mA, 8 W maximum, 27.3 BTU maximum
Mechanical	Mounting:	Horizontal rack
	Dimensions:	Width 0.69 inches (1.75 cm) Height 5.50 inches (14.0 cm) Depth 11.0 inches (27.9 cm)
	Weight:	0.66 pounds (0.30 kg)
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)
Standards	TR62411:	December 1990
	TR54016:	September 1989
	ANSI T1.403:	1989
	TR54019A:	April 1988
Industry Listings	FCC Compliance:	Part 15 Class A, Subpart B, Part 68
	U.S. Safety:	UL 1950, 3rd Edition
	Canadian Safety:	CSA C22.2 No. 950-95
	Industry Canada:	CS03, Issue 8

Ordering Information

The PRISM 3002 is available with a single V.35 data port (P/N F-3002-101-1110 is the default). Ordering options are listed in Table 1-1 using the following format for a PRISM 3002: *F-3002-101--ABCDEFG*. Optional Equipment is provided in Table 1-2.

Table 1-1 Unit Ordering Numbers

	Description	Option	PMI Part #
A	Company	<u>1</u> - TxPORT	9-3002-101--1110
B	Special	<u>1</u> - Standard Unit	----
C	DTE Port	<u>1</u> - V.35 Unit	----
D	Option	0 - Not installed	----

Table 1-2 Optional Equipment

Part Number	Optional Equipment
Network/T1 DTE Cables	
9-1001-004	8-pin mod to 8-pin mod (4 twisted pairs)
9-1001-051-1	T1 crossover kit, 1 ft
9-1001-006-1	8-pin mod to 15-pin D-type adapter, male
9-1001-006-2	8-pin mod to 15-pin D-adapter, female
Supervisory Cables	
9-1001-073-2	DB-9 female to 8-pin (PC to SUPV)
9-1001-091-1	DB-25 female to 8-pin (modem to SUPV)
9-1544-619-xxx†	8-pin RJ-48/RJ-48 pin to pin
V.35 Cables	
9-1001-001-xxx	V.35 male to male (null)
9-1001-104-xxx	Subminiature-D, 26-pin to V.35 female
9-1001-103-xxx	Subminiature-D, 26-pin to V.35 male
DBU Cables	
9-1001-034-010	10-pin to 10-pin modular (DBU)
9-1001-081-xxx	10-pin to 8-pin DBU to ISDN interface
9-1001-087-xxx	10-pin to 4-pin RJ-11 internal DBU modem
Adapters	
9-1001-015-1	DB-25 pin/8-pin modular
9-1001-074-1	DB-25 male to 10-pin modular (modem to DBU)
9-1001-074-2	DB-25 female to 10-pin modular (modem to DBU)
The three-digit xxx denotes <i>feet</i> for cables that can have customer-specified lengths. For example, 010 is a ten-foot cable.	
† Cables ≥10 feet have a drain.	

2

INSTALLATION

This chapter contains instructions for physically installing the Verilink PRISM 3002 in a 1024 chassis as well as information concerning the communication ports and power supply on the rear of the unit.

Unpacking and Inspection

After receiving the 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 delivery person). 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 baseline PRISM 3002 shipment contains three items:

- ◆ PRISM 3002 unit
- ◆ T1 network cable (P/N 9-1544-619-009)
- ◆ Reference manual with configuration guide

Specific applications may require additional cables and adapters. Ordering information is located on Table 1-2 on page 1-5. Contact Verilink Customer Service for further assistance.

Mounting

The Verilink 3002 is a modular unit that plugs into a Verilink 1024 chassis which holds up to 24 units.

The chassis can be installed in either a 19- or 23-inch rack using four screws.

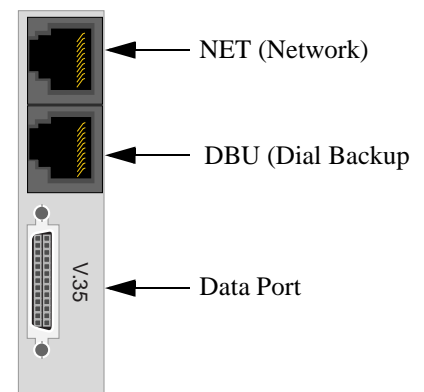


Figure 2-1 3002 Rear Panel



*The 3002 is designed for convection cooling.
Mount the 1024 chassis with a top and bottom clearance of at least 1¼ inches.*

Port Connections

The front of the PRISM 3002 has one port connection: the Supervisory (SUPV), discussed on page 2-3. The rear of the PRISM 3002 has three port connections: DBU, NET, and Data Port as shown in Figure 2-1.

NET (Network)

The network (NET) port provides connection to the network and contains an automatic line build out (ALBO) allowing the unit to be located a substantial distance away from the telco network interface with a receive signal level down to -27 dB.

The network interface LBO level should be set as instructed in section Line Parameters on page 4-15. Maximum suggested cable lengths for the connection from the unit to the network are listed in Table 2-1. Calculations are based on a 70°F cable temperature, a 0.083- μ F/mile capacitance, a 27- dB line loss, and a 100- Ω , non-loaded, twisted pair cable.

Table 2-1 Maximum Cable Lengths

Cable Type	Loss per 1000'	Max Cable Length
26-gauge PIC	6.8 dB	4,400 ft
24-gauge PIC	5.4 dB	5,500 ft
22-gauge PIC	4.2 dB	7,100 ft
19-gauge PIC	3.0 dB	10,000 ft
PIC - Plastic Insulated Cable		

The network physical interface is a standard RJ-48C 8-pin modular jack. Table 2-2 displays the pinout assignments.

Table 2-2 Network Interface Pinout

Pin	T1 NET Interface
1	Data In (Tip)
2	Data In (Ring)
3, 6	Not used
4	Data Out (Tip)
5	Data Out (Ring)
7, 8	Chassis Ground



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

DBU (Dial Backup)

The Dial Backup port provides an alternate path when the T1 network interface service is disrupted or performance quality is degraded. This port is a 10-pin RS-232 port that can connect, through a connector adapter, to a public switched digital network (PSDN) device such as a Verilink PS500. Table 2-3 displays the pinout assignments. See Dial Backup Parameters on page 4-20 for more information.

Table 2-3 DBU Port Pinout

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

Data Port The Data Port provides connection to the customer equipment. Pinouts for the backplane connector and both high-speed port interfaces are listed in Table 2-4. Default settings route all available DS0s to the DTE port.



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

Table 2-4 High-Speed DTE Interface

Common Name	EIA-530 Backplane	EIA-530 DB-25	V.35 34-pin
Frame Ground	1	1	A
Transmit Data	2, 14	2, 14	P, S
Receive Data	3, 16	3, 16	R, T
Request to Send	4	4, 19	C
Clear to Send	5	5, 13	D
Data Set Ready	6	6, 22	E
Signal Ground	7	7	B
Data Carrier Detect	8	8, 10	F
Transmit Clock	15, 12	15, 12	Y, AA
Receive Clock	17, 9	17, 9	V, X
Local Loopback	18	18	J
Data Term Ready	20	20, 23	H
Remote Loopback	21	21	BB
Terminal Timing	24, 11	24, 11	U, W

Supervisory (SUPV) Port

The front panel supervisory (SUPV) port can serve several functions. The unit's terminal interface may be accessed through this port (see Interface Start-up on page 4-1) as well as the Call On Alarm feature on page 4-23. This port may be accessed through either a direct connection or a dial-up connection using 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. Serial bit rates can be set from 1200 bps to 19200 bps. Refer to Table 2-5 for the pinout and to Figure 2-2 for typical terminal/modem cable diagrams.

Table 2-5 SUPV Port Pinout

Pin	Signal
1	DTR Out
2	RTS Out
3	Frame Ground
4	Data Out
5	Data In
6	Signal Ground
7	CTS In
8	DCD In

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

The SUPV port bit rates are configured through Switch S1 (see SUPV Port Bit Rate on page 3-2) and programmed through the Management Ports menu on page 4-22. This port is a DCE port configured for 8 bits, no parity, and 1 stop bit. The physical connections are 8-pin modular jacks (electrically RS-232). Figure 2-2 provides the pinout assignments. Refer to Table 1-2 on page 1-5 for cable information.

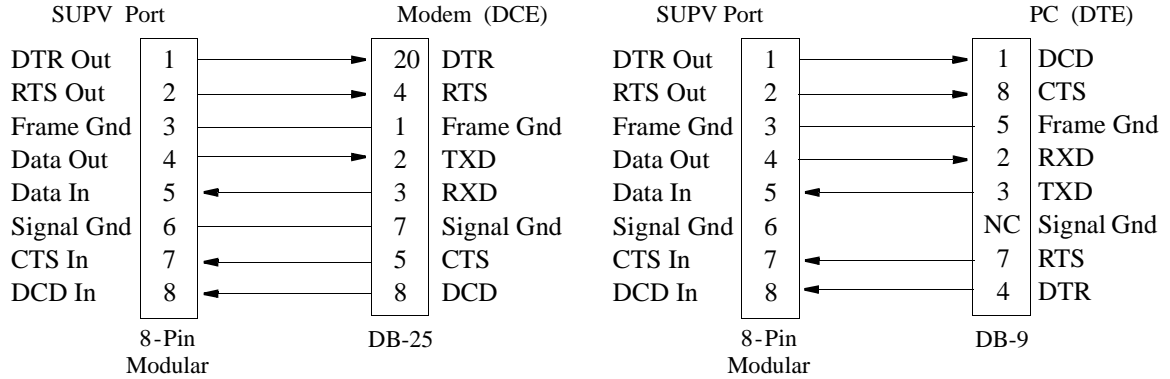


Figure 2-2 SUPV Terminal/Modem Connections

Power Connection

Power to the 3002 is supplied through the card-edge connection when the unit is installed in the 1024 chassis. The 3002 requires a -48 VDC power source capable of supplying a 150-mA current from the chassis. All units in the chassis are powered by -48 VDC sources which are connected to the 6-position terminal strip, TB1, on the rear of the 1024 chassis as shown in Figure 2-3.

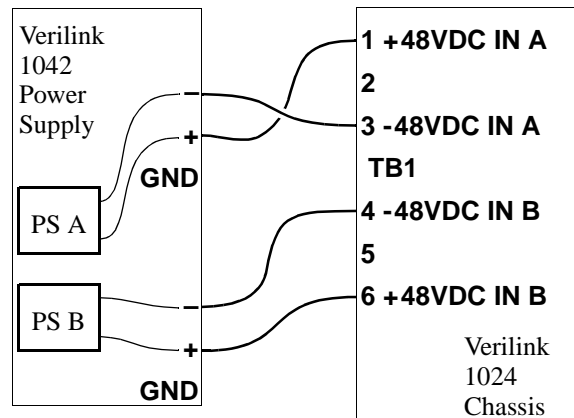


Figure 2-3 Wiring for a Single Power Source

Power Failure

The PRISM 3002 provides non-volatile memory retention of the unit configuration in case of a power failure. This feature allows the unit to automatically restore normal service following a power loss. When power is applied to the unit, the front panel indicators flash for approximately five seconds as the unit starts up.

Network Management

Network management is performed through the SUPV port and the NMS port. these ports allow connection of devices such as an 8100A Site controller (with optional SNMP management), modems, and terminal devices. The SUPV port can support any one of the three, whereas the NMS port can only support the 8100A Site Controller. It is recommended that the supervisory port be used with a terminal or modem, and the NMS port be used with the 8100A Site Controller. The terminal and modem configurations are explained in section Supervisory (SUPV) Port. The NMS port is made available through the card edge connector when the card is placed in the 1024 chassis. The 1024 chassis creates a communications daisychain from one card to the next, from one end of the chassis to the other. The 1024 chassis provides modular connectors where the 8100A Site Controller can complete the chain. An example chain is shown in Figure 2-4. There are different NMS configurations available with the 8100A Site Controller and this information is provided in the 8100A configuration guide and manual.

All units on the same NMS chain must use the same NMS bit rate and have different addresses (see NMS Address on page 3-2).

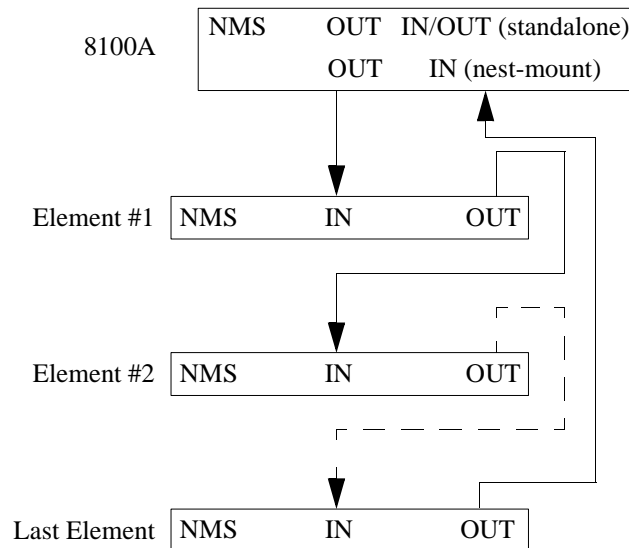


Figure 2-4 NMS Daisy-chain Arrangement

3

HARDWARE CONFIGURATION AND TESTING

This chapter contains general operating instructions for the Verilink PRISM 3002 front panel. The unit may be controlled manually using both the front panel buttons and the configuration switches. Chapter 4, Terminal Configuration and Testing, discusses the firmware controlled terminal interface program, which provides the maximum amount of control.

Controls and Indicators

The NMS address and supervisory (SUPV) port bit rate are set using the dual in-line package (DIP) switches located on the front panel of the unit (see Figure 3-1). A removable configuration guide (45-00121) is included in the back of this manual. Figure 3-1 depicts the front panel which has five LED indicators, two control buttons, a 10-position DIP switch, two viewing holes, the SUPV port, and the extractor/card lock. Table 3-1 references these controls and indicators.

Table 3-1 PRISM 3002 Controls and Indicators

Index	Feature	Function/Description
1	PWR (green)	This LED lights continuously when power is applied to the unit.
2	ALM (red)	This LED lights continuously when the unit is in an active alarm condition.
3	TST (3-color)	Flashing Green: The unit is transmitting loop code. Solid Green: BERT is on with no errors or the unit is in clear test. Red: BERT is on and receiving errors. Amber: The unit is looped.
4	DBU	This indicator is on when the unit is in dial backup mode.
5	NET (3-color)	Green: The unit is in frame sync. Amber: The unit is receiving a yellow alarm from the far end. Red: The unit is out of frame sync and/or has loss of signal.
6	TST	When this button is pushed once, the unit transmits five seconds of in-band LLB code (see Figure 3-3 on page 3-3) out to the network and performs a T1 NET BERT. The indicator blinks green during transmission of the loop code. If the TST button is pushed again, the unit transmits five seconds of in-band loop down code and returns to normal operating mode. The TST indicator then turns off.
7	LP	When this momentary push button is pushed once, the unit activates a line loopback, looping the network receive data back to the network, and looping the data from the DTE ports back to the DTE. The TST indicator is amber while the unit is looped. If pushed again, the unit clears the loop and turns off the TST indicator.
8		See NMS Address and SUPV Port Bit Rate on page 3-2.
9		These two small, recessed LEDs indicate supervisory and network manager port activity.
10	SUPV	See SUPV Port Bit Rate, Supervisory Port, and Upgrading Software on page 3-3. For the pinout, see Data Port on page 2-3.
11		Extractor/ Card Lock

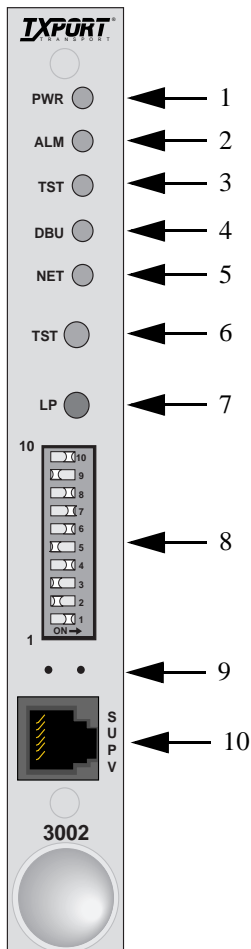


Figure 3-1 3002 Front

NMS Address Switches S1-1 through S1-8 set the NMS address. When using the 3002 with an 8100A Site Controller, each element must have a unique unit address. The 8100A Site Controller can address up to 100 units (with addresses from 1 to 100). If the unit is not connected to a site controller, the NMS unit address should remain at the factory default setting of 1 where Position 1 is Left and all other positions are Right.

Switch positions S1-1 through S1-8 are used to create an 8-bit binary code for an address in the range of 1 to 253. Switch position S1-1 is the least significant bit (LSB) and S1-8 is the most significant bit (MSB). If a switch is Right, its value is 0. If Left, its value is that shown on the left. The values are additive. For example, to set a unit address to 5, position S1-3 (value is 4) and position S1-1 (value is 1) would be set Left for a unit address of 5 (4+1). All other positions would be set Right. If all the switches are Right, the address is 1.

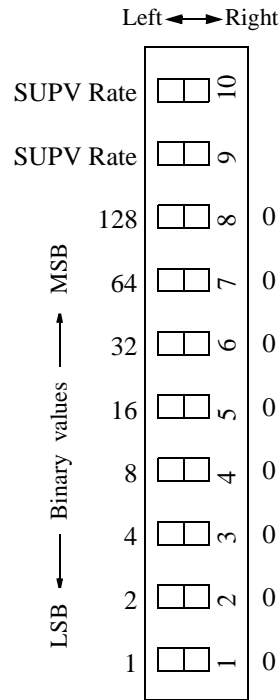


Figure 3-2 Switch S1

SUPV Port Bit Rate Switch S1-9 and S1-10 set the supervisory port bit rate. This is a serial RS-232 DCE port configured for 8 bits, no parity, and 1 stop bit. Table 3-A shows the available speeds.

Table 3-A SUPV Port Bit Rate

S1-9	S1-10	SUPV Port Rate
Left	Left	1.2 kbps
Right	Left	2.4 kbps
Right	Right	9.6 kbps
Left	Right	19.2 kbps

Supervisory Port The supervisory port serves several functions by allowing the connection of devices such as an 8100A Site Controller, modems, and terminal devices, however it is recommended that the supervisory port be used with a terminal and/or modem for configuring, status, and performance data gathering. The 8-pin modular RJ-48C jack, as shown in Figure 3-1, provides direct terminal connections with the pinout shown in Table 2-5 on page 2-4. For possible cable configurations, refer to Figure 2-2 on page 2-4.

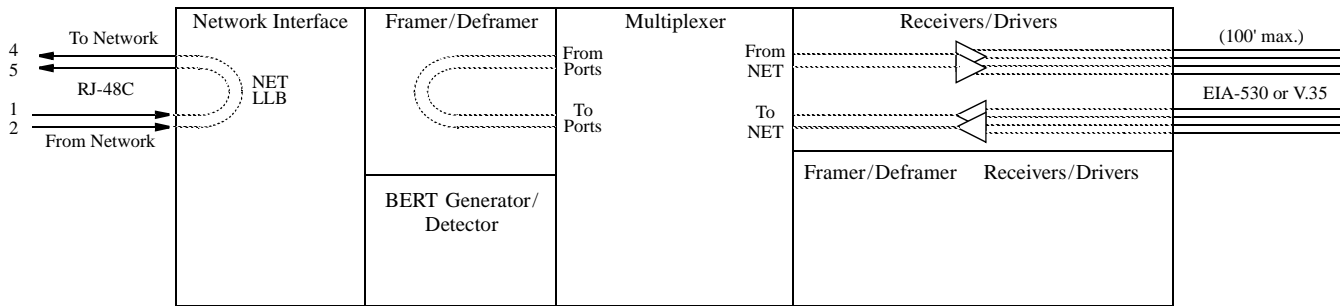


Figure 3-3 Network LLB

Received Loop Codes The PRISM 3002 responds to in-band loop codes received in ESF or D4 framing mode and FDL loop codes received in ESF framing mode. Response to network loop codes complies with TR54016 and T1.403 (1989) specifications. With either line loopback (LLB) or payload loopback (PLB), the data from the DTE ports is looped back to the DTE equipment. In a fractional V.54 loopback, the data port does a bidirectional loopback.

Upgrading Software

The TEST and LOOP buttons can be used to set the SUPV port rate when upgrading software for the 3002 (see page A-2).

4

TERMINAL CONFIGURATION AND TESTING

The terminal interface is an embedded firmware application program. This information can be accessed through the SUPV port (see Supervisory (SUPV) Port on page 2-3).

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 commands, which are implemented differently with the various terminal emulation programs.

Interface Start-up

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

```
3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
3002 DSU 1.00/2.10                Time: 08:35:47
----- MAIN -----
                                     Element: [NEAR]
                                     Alarms
                                     Performance
                                     Maintenance
                                     Configuration
                                     Utilities
----- Messages -----
                                                                Local Screen
```

Figure 4-1 Main Menu Screen

If the password is not available, 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 4-25.

Menu Structure

The Main Menu screen lists the functional user-accessible menus. To activate a menu, highlight the desired selection and press Enter. To exit this or any subsequent menu, press Escape. If the Main Menu is exited, the terminal interface program terminates. This is a valid way to end a 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.

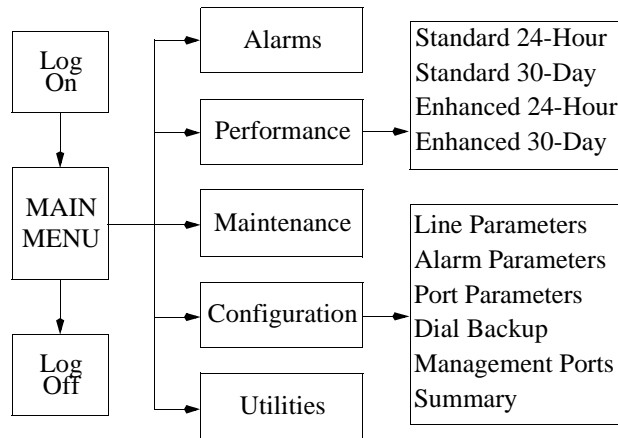



Figure 4-2 Terminal Interface Menu Structure

 *If a keystroke is not entered for 10 minutes, the terminal interface logs off automatically*

Screen Components

Terminal interface screens have several components common to all screens (Figure 4-3).

Device Type and Revision

The device type (such as PRISM 3002) 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 T1 interface) on the second line. Refer to this information when contacting Technical Support with inquiries.

The far-end information is available only for Verilink products that support a proprietary message set. If the far-end equipment does not support these messages but supports the standard 54016 protocol, then the far-end information is displayed as GENERIC 54016 FAR END. If the far-end equipment does not respond to either proprietary or 54016 messages, then NO FAR END RESPONSE is displayed. If the far end echoes the FDL messages transmitted by the near-end unit, then FAR END LINE LOOP is displayed.

Date and 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 4-25.

Element ID Below the header (PRISM 3002), the Element ID is displayed. Refer to Element ID on page 4-22 for information.

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

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

Local/Remote Screen Indicator Identifies the visible screen as displaying the local, remote, or proxy interface. The unit automatically determines the necessary interface when connected to the far-end unit.

The local interface allows configuring the local Verilink unit. The remote interface allows configuring Verilink units at a remote site. The proxy interface allows configuring Verilink units that do not support the remote screen interface.

Cursor Controls

The terminal interface uses 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 without these standard keys or only some of them, an alternate set of cursor control commands is provided. Each command is performed by pressing

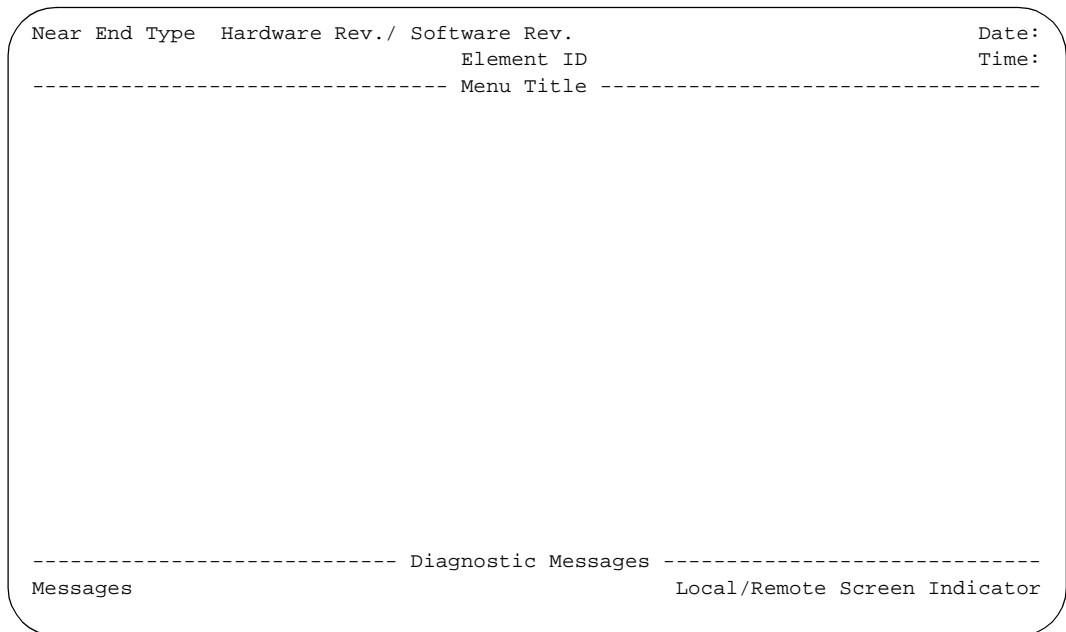


Figure 4-3 Terminal Interface Layout

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 display-only. User-selectable fields allow 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 program 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 that have not been activated by pressing the Enter key are discarded.

Alarms Screen

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

NET Alarms These status lines display the selected element's current network signal alarm state (Table 4-2). Alarms are determined by the selectable thresholds in the Alarm Configuration screen (see Figure 4-8 on page 4-17).

Table 4-2 NET Alarm Indicators

Alarm	Description
-----	No status is available.
OK	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.
OOFs	The Out Of Frame Seconds threshold is exceeded.
RAIS	The Remote Alarm Seconds threshold is exceeded.
AISS	The Alarm Indication Seconds threshold is exceeded.
UAS	The Unavailable Seconds threshold is exceeded.
DBA	Dial Backup Active.
DBF	Dial Backup Failed.

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:36:09
----- ALARMS -----
Element: NEAR]
NET Alarms: NONE
DTE Alarms: NONE
Current Threshold
Loss of Signal Seconds (LOSS):    0          5
Errored Seconds (ES):             0          45
Severely Errored Seconds (SES):   0          5
Unavailable Seconds (UAS):        0          0
Out of Frame Seconds (OOFs):      0          5
Remote Alarm Seconds (RAS):       0          0
AIS Seconds (AISS):               0          0
BPV Seconds (BPVS):               0          0
Power Loss Seconds (PLS):         0
Reset Alarm Registers:             (RESET)
----- Messages -----
Local Screen

```

Figure 4-4 Alarms Screen

DTE Alarms These status lines display the selected element's current DTE signal alarm state (Table 4-3). Alarms are determined by the selectable thresholds in the Alarm Configuration screen (see Figure 4-8 on page 4-17).

Table 4-3 DTE Alarm Indicators

Alarm	Description
OK	No alarm threshold has been exceeded, although errors may exist which do not exceed thresholds.
PORT 1	DTR Alarm on PORT 1.

Selectable thresholds in the Alarm Parameters screen and the DTR Alarm may be enabled or disabled for the ports in the Port Parameters screen.

(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 a total of the preceding 15 one-minute intervals. At the end of each one-minute interval, the oldest minute of the 15-minute interval is discarded.

The Threshold column displays the values set in the Alarm Configuration screen (see Figure 4-8 on page 4-17). 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.

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

Power Loss Seconds

This field displays the number of seconds that the element has been without power since this value was last cleared.

Reset Alarm Registers

Pressing Enter on (Reset) zeros the value of all Current alarm parameters, but does not affect 24-hour or 30-day performance registers.

Performance Screens

The Performance screens (Figure 4-5) display a detailed history of the continuously monitored error parameters. The terminal interface provides a display of near-end or far-end performance data using the facility data link.

The unit is equipped with a dual set of performance data registers that hold line statistics for both the telco and user. Each register set provides detailed status and performance history for the network interface.

The system has four Performance screens. The Standard 24 Hour and the Enhanced 24 Hour screens allow viewing the 24-hour detailed performance history of the T1 circuit. The only difference in the two screens is in the type of performance data displayed. The Enhanced 24 Hour screen is shown in Figure 4-5.

The Standard 30 Day and the Enhanced 30 Day screens allow viewing a 30-day history of a particular element's performance. These screens reference intervals by date rather than by time. To reach each of the four screen types, use the spacebar to toggle the Standard 24 Hour field. The other fields are described as follows:

Element Pressing the spacebar then Enter toggles this field for selection of either the NEAR or FAR unit as the source of performance data or the target of commands. NEAR refers to the unit to which the terminal is connected. FAR refers to the unit at the other end of the network T1 span.

Target This field selects the display of User or Telco performance registers. Telco registers are for viewing only and may not be changed. The options are:

User NET

Display the user performance registers for the network.

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:39:15
----- ENHANCED 24 HOUR PERFORMANCE -----
Element: [NEAR]                    Status: OK
Target: [USER ] [NET]              Completed Days: 1
Error Events: 65535 (RESET)        Completed Intervals: 96
(RESET PERFORMANCE REGS)          24 Hr. % Error Free: 99.3

                                [ENHANCED 24 HOUR]
312                                0      0      0      0      0
24 Hour                           660     6      0      0      0      660
30 Day                             660     6      0      0      0      660
-----
Time  INTERVAL  CRCES   OOFFS   LOSS   AISS   RAS   BPVS
-----
08:34    96     660     6      0      0      0     660
-----
Messages -----
Local Screen

```

Figure 4-5 Typical Performance Screen

Telco NET

Display the telco performance registers for the network.

Error Events This field displays the running total of ESF error events for the circuit selected in the Element field and is applicable only when Target is set to USER. This count accumulates until it reaches 65535 or is reset by pressing Enter with the (RESET) field highlighted.

Reset Performance Registers This field allows the element registers to be reset and may only be used when the Target field is set to USER. If Enter is pressed, the following warning appears:

```
DELETE ALL PERFORMANCE DATA?
(NO!) (YES)
```

To exit this screen without performing the reset function, press Enter with NO selected. To proceed with the reset function, press Enter on YES. All values for the register are then reset to zero.

Standard 24 Hour Toggling this field with the spacebar steps through the four available performance screens.

The remainder of the fields in the Performance screen are for display only. They are defined as follows:

Status

Displays the selected T1 line status derived from the type (or absence) of errors in the received data. This status represents the immediate state of the received T1 signal and is not related to the alarm thresholds. This field shows one or more of the signal status conditions listed in the section on page 4-14.

Completed Days

Displays the number of days which are included in the 30-day totals.

Completed Intervals

Displays the number of 15-minute intervals in the last 24-hour period since the registers were last cleared (a 24-hour period may contain up to 96 intervals).

24 Hr.% Error Free

Displays the percentage of error free seconds within the last 24 hours or since the event registers were last cleared (based only on the ES and UAS parameters).

(performance data)

The main body of display data consists of error events for three different periods: The first display line shows the data accumulated for the current 15-minute interval (from 0 to 900 seconds). The second line shows the totals for the last 24-hour period (the last 96 fifteen-minute intervals). The third line shows the 30-day totals.

The remaining lines of this screen show the data for any intervals containing errors. Interval 1 is the most recently stored 15-minute interval and interval 96 is the oldest in the current 24-hour period. On the 30-day screens, interval 30 is the oldest 1-day interval in the current 30-day period. The real time (or date on 30-day screens) of the interval beginning is shown in the first column.

If more than five errored intervals have elapsed, PAGE-DN appears to the left of the performance data. Pressing Enter on this field displays the next five errored intervals. PAGE-UP appears once PAGE-DN is used. Pressing Enter on PAGE-UP displays the previous five errored intervals. Only intervals containing errors are displayed, eliminating rows of zeroes. If an interval is not displayed, no errors were detected during that time period.

The parameters shown on the Performance screens are updated at five-second intervals.

Per AT&T TR54016, the Standard 24 Hour and Standard 30 Day performance data consists of Errored Seconds (ES), Unavailable Seconds (UAS), Bursty Errored Seconds (BES), Severely Errored Seconds (SES), Loss of Frame Count (LOFC), and Controlled Slip Seconds (CSS).

The Enhanced 24 Hour and Enhanced 30 Day screens show data for CRC Errored Seconds (CRCES), Out of Frame Seconds (OOFS), Loss of Signal Seconds (LOSS), Alarm Indication Signal Seconds (AISS), Remote Alarm Seconds (RAS), and Bipolar Violation Seconds (BPVS).

For generic 54016 far-end devices, only the standard telco 24-hour performance data is displayed. 30-day data is not available.

Maintenance Screen

The Element Maintenance screen (Figure 4-6) allows performing loop-test and BERT functions on the T1 circuit. Loops can be activated and cleared and the BERTs performed. A 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 push buttons as described in Controls and Indicators on page 3-1.

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:41:11
----- ELEMENT MAINTENANCE -----

(CLEAR TESTS)                      BERT: [T1 NET ]
(CLEAR ALARMS)                     Pattern: [QRSS ]
                                     Test Length: [Cont. ]

T1 Loop: [FAR PLB]                 Pattern Sync: NO TEST
T1 Unloop: [FAR PLB]              Elapsed Time: 00:00:00
                                     Bit Errors: 0
Port Loop:                          Errored Seconds: 0
Port Unloop:                        % EFS: 100

FP Buttons: [ENABLED ]             (START TEST)
                                     (RESET ERRORS)

T1 NET Status: OK

Near Loops:
Far Loops:
----- Messages -----
Local Screen

```

Figure 4-6 Element Maintenance Screen

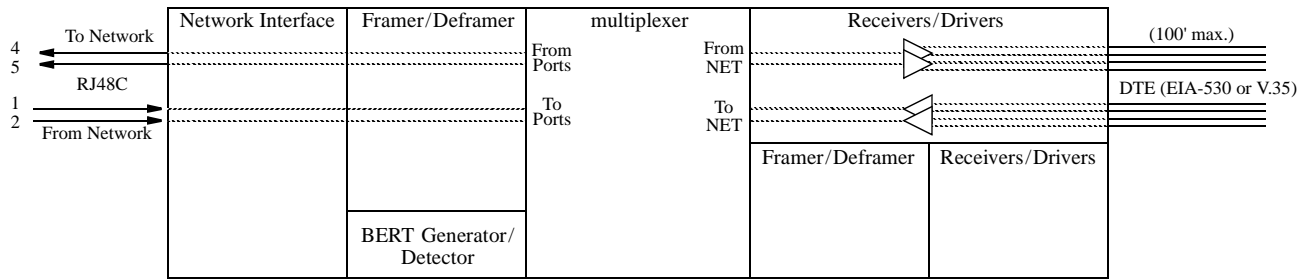
Clear Tests Pressing Enter on this field clears all local tests and any line loops that have been initiated.

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

T1 Loop The type of T1 loop is chosen by toggling the spacebar and is executed by pressing Enter. This unit supports payload loopbacks, line loopbacks, maintenance loopbacks for both the near and far ends of the network and DTE interfaces.

Loop status changes can be made only when the BERT function is not in the active mode.

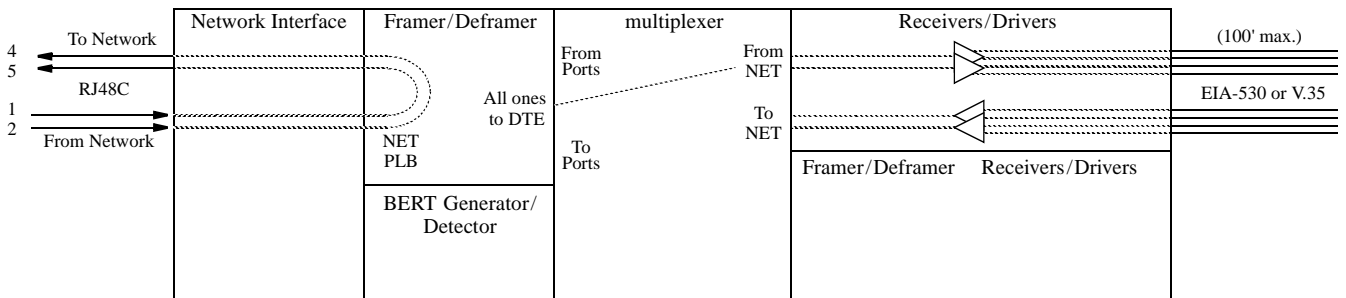
The type of T1 loop is chosen by toggling the spacebar and is executed by pressing Enter.



Normal Operation

NET PLB (Payload Loopback)

The received network signal is looped back toward the network with signal regeneration and framing and CRC regeneration. During the NET PLB, all 1s are transmitted to the DTE. The NET PLB may be activated by receiving out-of-band loop code on the network receive signal or by selection in the user interface maintenance screen.



Network PLB

FAR PLB

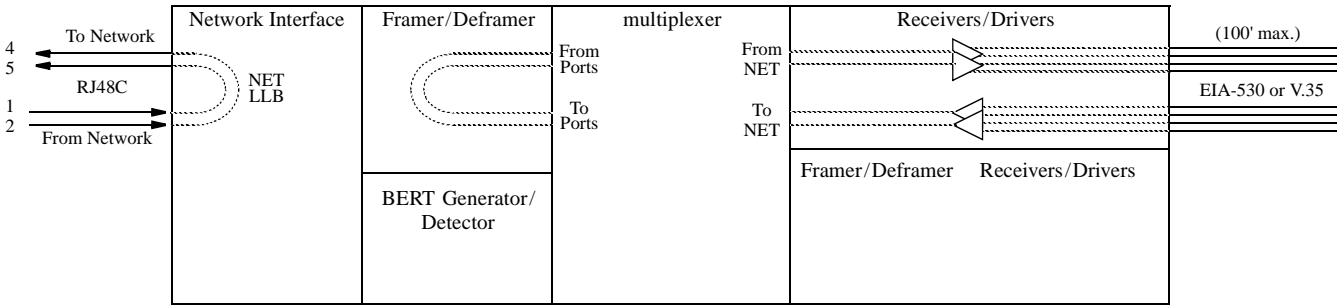
A NET PLB can be activated on the remote end unit through this selection.

NET LLB (Line Loopback)

The received network signal is looped back toward the network with signal regeneration only (framing and CRC intact). During the NET LLB, data from the DTE is looped back to the DTE. The NET LLB may be activated by receiving in-band or out-of-band loop code on the network receive signal, by the front panel loop switch, or by selection in the interface maintenance screen.

FAR LLB

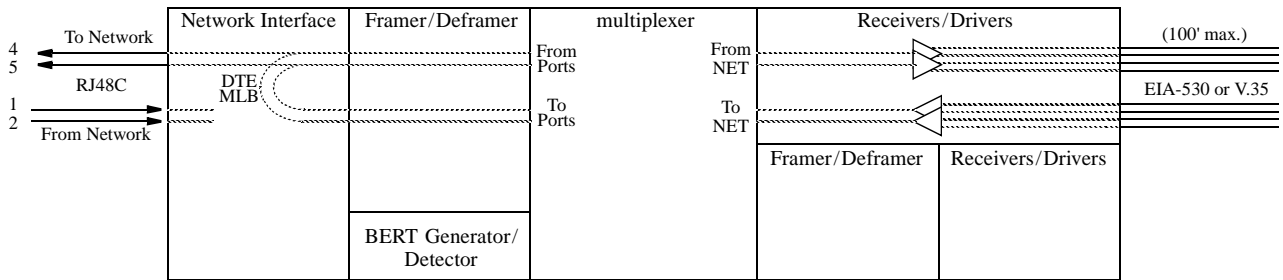
A NET LLB can be activated on the far-end unit through this selection or through the front panel TEST button.



Network LLB

DTE MLB

The DTE MLB command loops all network data back toward the DTE ports at the network interface. Data is passed through to the network. Set the T1-NET Timing to Internal when this loop is enabled.



DTE MLB

Far LLB

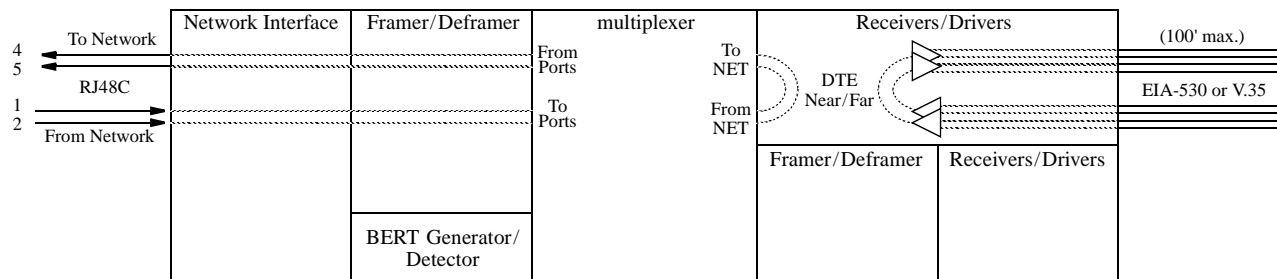
This field appears when the T1 Loop is set to Far LLB. Valid options for this field are Framed and Unframed. This setting must match the far-end unit loop code framing.

Port Loop

This field is used to loop a high-speed data port from the network back to the network and data from the DTE back to the DTE. The Port Loop may be activated by receiving in-band V.54 fractional loop code or by this field. The Port Loop only has ports with channels allocated to them as selections. Ports without channels allocated appear as blank fields

A Port Loop is activated on the remote-end unit through this field or by the front panel test switch. The test switch can be used to activate a remote Port 1. This

causes the unit to transmit in-band V.54 fractional loop code toward the network in the port's bandwidth.



Port Loop (bidirectional)

Port Unloop Pressing Enter takes down the specified loop from the currently selected port.

FP Buttons This field allows enabling or disabling the Test and Loop buttons on the unit front panel.

BERT This field selects the interface and direction for the test pattern transmission. The choices are T1_NET, One NET, One DTE, Channel 1-24, and IDLE. The internal BERT may also be activated through the front panel test switch as specified in Controls and Indicators on page 3-1.

Pattern Specifies the pattern to be transmitted during a test. Modifying this field does not cause the pattern to be transmitted (refer to on page 4-14). The choices are QRSS, 63, 511, 2047, 2^{15} , 2^{20} , 2^{23} , 1:8, 3:24, ALT, and Clear.

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.

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

Line Fault and Loop Status

NET Status

This field displays the fault status of the network. It indicates current fault conditions. It does not indicate that alarm thresholds are exceeded. 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.
ERR	Frame bit errors, CRC errors, or BPVs are detected.
LOS	A loss of signal condition exists.
OOF	An out of frame condition exists.
RAI	Far end is receiving a remote alarm indication signal.
AIS	The far end is receiving an alarm indication signal.
UAS	An unavailable signal state exists due to consecutive severely errored seconds.

Near Loops Displays the loop status of the near element.

Far Loops Displays the loop status of the far element.

Configuration Screens

The Configuration screens allow viewing and setting configuration parameters for the network elements.

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.

Line Parameters The Line Parameters screen (Figure 4-7) allows reviewing and setting line parameters for the selected element on the T1 circuit. This screen has the following fields, most of which have user-selectable options. To send the new line configuration to the unit, either press Enter on one of the fields, change the Element selection, or exit the screen.

T1-NET Framing

Selects the type of framing for the network side of the element as either ESF and D4.

T1-NET Line Code

Sets the network side line coding as either AMI and B8ZS.

T1-NET LBO

Sets the line build out for the network interface as either 0 dB, -7.5 dB, -15 dB, or -22.5 dB.

PRM Enable

This field allows the T1.403 Performance Report Message, which is sent once a second, to be Enabled and Disabled.

Zero Suppression

This field determines whether ones-density insertion is activated after 15 zeros. The choices are Enable and Disable.

T1-NET Timing

Sets the timing source to synchronize the unit's internal timing generators. Slips are controlled to occur on frame boundaries at the network and DSX1 ports when timing synchronization is lost.

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:41:53
----- LINE PARAMETERS -----

                                Element: [NEAR]

T1-NET Framing:  [ESF   ]      Rem Comm Channel: ( 0)
T1-NET Line Code: [B8ZS  ]
T1-NET LBO:      [0 dB   ]
PRM Enable:      [DISABLE]
Zero Suppression: [ENABLE ]
T1-NET Timing:   [Internal]

                                Channel Allocation: -----

----- Messages -----
Local Screen

```

Figure 4-7 Line Parameters Screen

INTERNAL. The unit's internal frequency standard is used for all timing.

PORT 1. Timing is synchronized to the external terminal timing clock supplied from the DTE and connected to the selected port.

Verify that the external DTE clock is operating at the data rate selected for Port 1.

NETWORK. Timing is derived from the network recovered clock (most applications use this selection).

Remote Comm Channel

This field selects a communication link to the far-end unit. Either a DS0 channel (1 through 24) or use an ESF facility data link (0) can be assigned. If 0 is selected, communication is established over the ESF facility data link (this is valid only when the network interface is configured for ESF and the FDL has end-to-end integrity). For example, the entire T1 bandwidth must be available to the user with no intervening multiplexers in the signal path blocking the FDL.

As an alternative, the communication link may be assigned to an unused idle channel. This option may be used whether the network is operating in D4 or ESF modes.

When the remote communication is programmed to operate over a spare network channel, test conditions such as a remote network LLB or PLB or a local network LLB interrupt access to the far-end unit.

When the remote communication is programmed to operate over the facility data link (FDL), test conditions such as a remote network LLB or a local LLB on the near end interrupt access to the far-end unit.

If far-end communication is interrupted for any reason while accessing the remote unit, exit and then re-enter this screen to ensure that all the parameters have been updated.

Channel Allocation

This display-only field indicates the network channel assignments with Channel 1 on the left and Channel 24 on the right. Channels assigned to a port are identified with a port number (1). Non-assigned idle channels are marked with a hyphen (-). Remote communication channels are marked with an R.

Alarm Configuration

The Alarm Configuration screen (Figure 4-8) allows reviewing and setting alarm-related thresholds for the selected element. These thresholds are the minimum 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. Setting a field to 0 causes the element not to alarm on that statistic.

Errored Seconds

A one-second period in which at least one logic error occurred.

Severely Errored Seconds

A one-second period in which at least 320 CRC errors or 1 OOF (out-of-frame) event occurred.

Loss of Signal Seconds

A one-second period in which the T1 received signal is interrupted.

Unavailable Seconds

A one-second period in which consecutive severely errored seconds cause an unavailable state.

Remote Alarm Seconds

Generated by the terminal equipment when an improper signal is received from the facility (or after receiving unframed all ones).

AIS Seconds

One-second period when all ones are received.

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:42:19
----- ALARM CONFIGURATION -----
                                     Element: [NEAR]

Errored Seconds (ES):                ( 45)   Remote Alarm Seconds (RAS): ( 0)
Severely Errored Seconds (SES):      ( 5)   AIS Seconds (AISS):         ( 0)
Loss of Signal Seconds (LOSS):       ( 5)   Out of Frame Seconds (OOF): ( 5)
Unavailable Seconds (UAS):            ( 0)   BPV Seconds (BPVS):        ( 0)

                                     Alarm Reset Timer (seconds): ( 30)

----- Messages -----
Local Screen

```

Figure 4-8 Alarm Configuration Screen

Out of Frame Seconds

A one-second period in which a frame sync loss occurred.

BPV Seconds

A one-second period in which at least one bipolar violation occurred.

Alarm Reset Timer

Determines the number of seconds after alarm conditions clear before indications are removed.

Port Configuration The Port Configuration screen (Figure 4-9) sets the operating parameters for the high-speed port. The default is all channels enabled.

When channel assignment changes are made to the high-speed port or to the remote communication link, the 3002 reestablishes the mapping of all channels. This interruption to traffic normally results in a brief burst of data errors.

Channel Allocation

This display-only field indicates the network channel assignments with Channel 1 on the left and Channel 24 on the right. Channels assigned to a port are identified with a port number (always 1). Non-assigned idle channels are marked with a hyphen (-). Remote communication channels are marked with an R. When channels are assigned to a port in the Alternate assignment mode, each data channel is followed by an idle channel not assignable for other ports and is marked with an X.

Port #

Selects the port to be configured. This value is always One.

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:42:36
----- PRISM Port Configuration -----
                                Element: [NEAR]

                                Channel Allocation: -----

Port #          [ONE      ]
Rate Mult:      [N x 64k]
DS0 Ch. Assign: [Contiguous]
Start Ch. #:    ( 0)
Port Rate:      [0 kHz    ]
# of Channels:  0
Tx Clock:       [Internal ]

LL Detect : [DISABLE]
RL Detect  : [DISABLE]
V.54 Loop : [ENABLE ]
Invert Data: [No ]
CTS Control: [Force True ]
DSR Control: [Force True ]
DCD Control: [Force True ]

Alarm on DTR Loss: [DISABLE]

----- Messages -----
Local Screen

```

Figure 4-9 Port Configuration Screen

Rate Multiplier

The unit can operate at any data rate that is a multiple of 56 or 64 kbps. When N×64K is selected, the ones density requirements of the T1 network line must be ensured. When N×56K is selected, the unit maintains ones density for the selected DS0 channel.

DS0 Channel Assignment

Selects whether the DTE channel assignment is made as a Contiguous group or as Alternate channels. Selecting Alternate assures ones density but reduces the available bandwidth from 1536 kbps to 768 kbps.

Start Channel #

The starting channel in the 24-channel DS1 bit stream must be selected in this field. The unit then assigns the following channels automatically according to the bit rate multiplier and the mode selected in DS0 Channel Assignment. The choices are 1 through 24.

Port Rate

Pressing the spacebar increases the required port bit rate in increments of 56 or 64 kbps, depending on the Rate Multiplier setting. The N multiplier ranges in value from 0 to 24.

of Channels

This field displays the number of channels to be passed through to the DTE. The number is determined by the Port Rate value divided by the Rate Multiplier.

Transmit Clock

This field is used to select the clock that the unit uses to sample the data transmitted from the DTE. When set to Internal, the data is automatically edge-aligned and sampled directly with the transmit data clock also supplied to the DTE as Transmit Clock. The External option uses the external clock supplied by DTE. The Oversample option is used to operate the port as a low-speed asynchronous port. In this mode, the port rate should be set to at least four times the asynchronous data rate (depending on the degree of allowable distortion for the particular DTE equipment used).

LL (Local Loop) Detect

Allows enabling or disabling pin J (V.35) or pin 18 (EIA-530) to loop-up the near (local) unit.

RL (Remote Loop) Detect

Allows enabling or disabling the monitoring of pin BB (V.35) or pin 21 (EIA-530) to loop-up the far unit.

V.54 Loop

Selecting Enable allows the unit to respond to in-band V.54 loop commands. If Disable is selected, the unit ignores these commands.

Invert Data

In the invert mode (YES), transmit and receive data are inverted at the port interface. This function may be used as a means of guaranteeing ones density when the data is composed of SDLC type protocols. The choices are Yes and No.

CTS/DSR/DCD Control

Setting any of these three fields to Force True or Force False allows the forcing of the port control lead output state. Internal allows for normal operation.

Alarm on DTR Loss

Selecting Enable allows the unit to go into alarm on loss of DTR. The default setting is Disable.

Dial Backup Parameters

The Dial Backup Parameters screen (Figure 4-10) allows configuring the DBU port. The DBU functionality is enabled by selecting two of the eight available alarm indicators or by selecting Any. These parameters can be any one of nine errors (LOS, ES, SES, UAS, LOF, RAS, AIS, BPV, ANY). These parameters allow establishing pre-defined thresholds (set in the Alarm Parameters screen) and initiating dial backup when these thresholds are exceeded.

See Alarm Configuration on page 4-17 to set the threshold parameters.

Alarm Reset Timer

This field can be set from 0 to 900 seconds. If this field is set to 0, the unit remains in dial backup mode even if the T1 circuit is re-established. If this field is set from 1 to 900, the circuit is up for that period before it re-establishes.

See Alarm Configuration on page 4-17 to set the thresholds for this field.

```

3002 DSU 42.136/9.00          3 0 0 2          Date: 05/17/71
No Far End Response          Time: 17:16:00
----- DIAL BACKUP PARAMETERS -----
Status:      DISABLED
Command:     [DISABLE      ]
Activators:  [LOS] [LOS]
Mode:        [MASTER]
Security:    [DISABLED]
Password:    (***** )
DTR Dialing: [DISABLED]
Dial String: (ATD          )
Init String: (AT&F&C1&M1&D2%A2=0%A4=0 )
Reset String 1: (          )
Reset String 2: (          )
Reset String 3: (          )
Reset String 4: (          )
Reset String 5: (          )
                                     (CONFIGURE ISDN TA)
----- Messages -----
Local Screen
    
```

Figure 4-10 Dial Backup Parameters Screen

Status

Lists the current DBU status as either Disabled, Enabled, Active, Connecting, Disallowed, Dialing, Disconnecting, Testing, Test Passed, and Test Failed.

Command

This field determines the dial backup operating mode.

Disable. Disables dial backup. The unit does not attempt to establish a dial backup connection.

Enable. Enables dial backup. The unit answers incoming DBU requests. If the thresholds specified in the *Activator 1* or *Activator 2* fields are exceeded, the unit establishes a dial backup connection.

Enable Daily. Enables dial backup only during the time specified in fields *Activator 1* and *Activator 2*.

Activate. The unit attempts to establish a dial backup connection. This is a forced condition and ignores the alarm states.

Test. The unit attempts to establish a dial backup connection with the far end. This is a non-intrusive continuity test that does not disrupt the data path and can be activated from either the local or remote unit.

Activator 1

Allows setting the first threshold value for initiating a dial backup. Available values are LOS, ES, SES, UAS, LOF, RAS, AIS, BPV, and ANY.

Activator 2

Allows setting the second threshold value for initiating a dial backup. Available values are LOS, ES, SES, UAS, LOF, RAS, AIS, BPV, and ANY.

Mode

This field determines the priorities when both units try to establish a DBU connection. One unit must be configured as a master unit and one unit must be configured as a slave.

Security

Allows enabling or disabling the security function limiting access to the DBU interface. The security setting must be the same on both ends.

Password

If the security feature is enabled, the password for the security option must be the same on both devices.

DTR Dialing

Allows enabling or disabling DTR dialing. The terminal adapter must be configured for DTR dialing, auto answer, and stored number.

Dial String

This is the character string used to dial the other unit.

Init String

This is the character string used to configure the modem to dial the other unit.

Reset String


These strings (1 through 5) are used to reconfigure the ISDN TA when the unit has trouble making a connection.

Configure ISDN TA

Routes the user interface of the switched service DBU unit. This feature allows for the configuration of necessary parameters in the switched unit.

Activation Periods

Then period when the unit is allowed to enter an active DBU state.

 *When configuring activation periods in the Time of Day map, remember to calculate any time zone differences.*

Management Ports

The Management Ports screen (Figure 4-11) sets the following parameters for the Call On Alarm (COA) connection on both the SUPV and SLIP ports.

Element ID

This field allows the entry of an ASCII string (up to 29 characters) which identifies the unit to the device receiving the alarm notification messages.

Call on alarm messages are reported in the following format in the DIAL or DIRECT modes only:

```

3002 DSU 1.00/2.40                3 0 0 2                Date: 06/24/97
No Far End Response                Time: 08:43:13
----- Management Ports -----
Element ID:          (                )
----- Supervisory Port -----

COA Connection:      (DISABLED)
Primary Dial String: (ATDT                )
Secondary Dial String: (ATDT                )
Initialization String: (ATEQ0V1          )
Disconnection String: (ATH                )

----- Messages -----
Local Screen
    
```

Figure 4-11 Management Ports Screen

```
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 AIS ERRS
DTE Alarms: LOS Port1
```

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).

The identifier ERRS represents an alarm caused by ES, SES, and BPV errors.

COA Connection (SUPV)

This field controls the remote alarm reporting. ASCII alarm reporting through the supervisory port is independent of TRAP alarm reporting. The ASCII alarm report type is set by the following choices:

DISABLED. Alarm reporting is disabled.

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.

Primary Dial String and 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 not 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.

Disconnect 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 4-12) is a display-only screen that summarizes all the configuration switch settings in the left column. Other pertinent information is shown in the right column.

```
3002 DSU 1.00/2.40          3 0 0 2          Date: 06/24/97
No Far End Response          Time: 08:43:29
----- SUMMARY -----

(S1:1-2 ) Supv Port Rate: 19200          Serial Num: 000107
(S1:2-10) NMS ADDRESS  : 001           NMS RATE  : 19200

                                ----- Unit Options -----
                                Port 1: V.35

----- Messages -----
Local Screen
```

Figure 4-12 Summary Screen

Utilities

The Utilities screen (Figure 4-13) handles the functions described in the following paragraphs.

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 PM 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.

The time and date can be set at the far end, but not displayed.

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.

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

The reset operation sets all parameters to the factory default settings and zeros all performance registers.

```

3002 DSU 1.00/2.40                3 0 0 2                Date:    06/24/97
No Far End Response                Time:    08:43:32
----- UTILITIES -----

Element: [NEAR]

Set Time: (17:57:26)
Set Time: (11/28/21)

New Password: (          )

(MAINTENANCE RESET)

----- Messages -----
Local Screen

```

Figure 4-13 Utilities Screen

Maintenance This field clears all user-selectable parameters, performance registers, passwords, and alarms but saves the IP Address. All alarm threshold parameters are reset to default values. The unit reloads start-up configuration settings from the default parameters stored in ROM. Pressing Enter on this field brings up the following warning:

Reset

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

A

FLASH PROM DOWNLOAD PROCEDURE

This appendix is a step-by-step procedure for downloading the Flash PROM software for the PRISM 3002.

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 zeros all performance registers. Refer to the unit's configuration guide noting 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 0026-214.HEX.
- 3 Select the DOWNLOAD.EXE file. The TxPORT FLASH Loader main screen is displayed (Figure A-1).
- 4 Select 3111/3112 or 3002 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 either Switched or Messaged. Switched requires pressing buttons as shown in Table A-1 to place the unit in a download mode. Messaged places the unit in a download mode through a message transmitted from the download program.
- 6 Select the PC serial communications port to be used for the download procedure. The choices are Com1, Com2, Com3, and Com4.

7 Select the baud rate for configuring the communication program. The valid choices for the 3002 are 19200, 38400, and 57600 (see Upgrading Software on page 3-3).

Table A-1 Flash PROM Download Rate

Button	19.2 kbps	38.4 kbps	57.6 kbps
TEST	Press		Press
LOOP	Press	Press	

- 8 The TEST and LOOP buttons only control 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 Bit Rate on page 3-2).
- 9 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 may be entered.
- 10 Connect the PC serial COM port to the SUPV port of the 3002 with a DB-25 to 6-pin modular cable assembly (P/N 9-1001-028-2). If the COM port has nine pins, use a 9-pin to 6-pin modular cable assembly (P/N 9-1001-025-2).
- 11 In Switched mode (step 5 above), press the 3002 front panel TEST and LOOP buttons to match the rate selected in step 7. Power restart the unit with the buttons pressed.
- 12 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.
- 13 The Utilities option is used for saving and restoring the configuration parameters for the 8100A Site Controller.

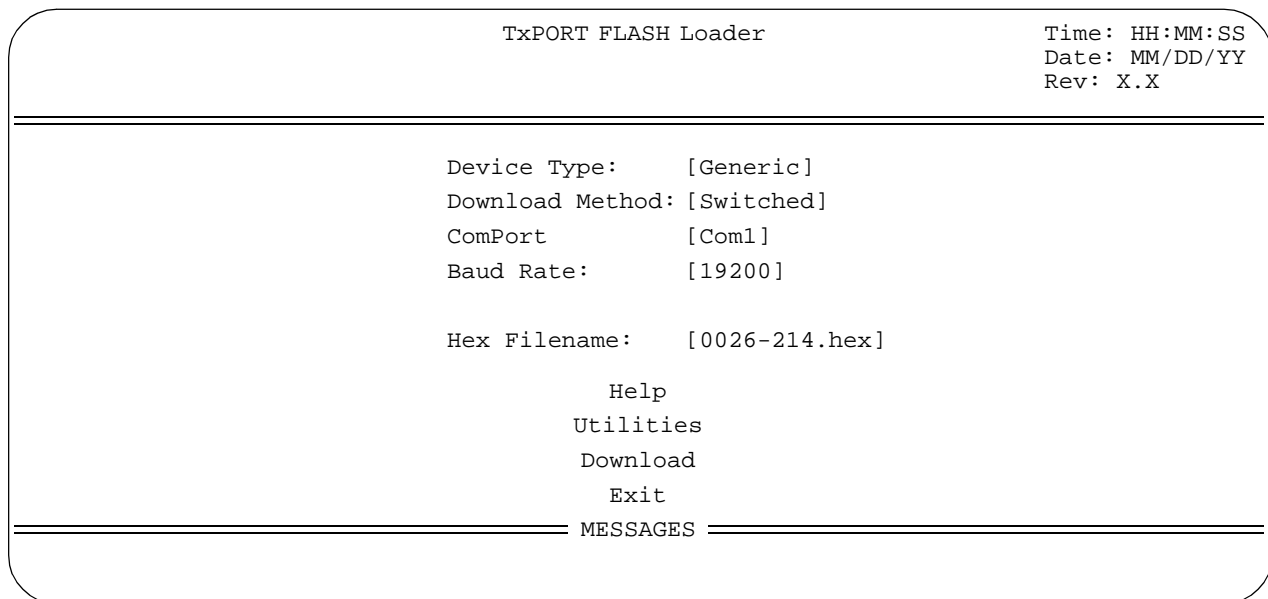


Figure A-1 TxPORT FLASH Loader Screen

- 14 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 may last a couple of minutes. The PC message line indicates the current 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
```

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

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

- 16 After the software is downloaded to the unit, the PC beeps to indicate completion. Most units automatically reset.



Do not remove power until the LEDs stop flashing.

- 17 When all files have been downloaded, a factory default maintenance reset operation is recommended (see Maintenance Reset on page 4-26). This can be performed through the unit's terminal interface start-up procedure (see Interface Start-up on page 4-1).

