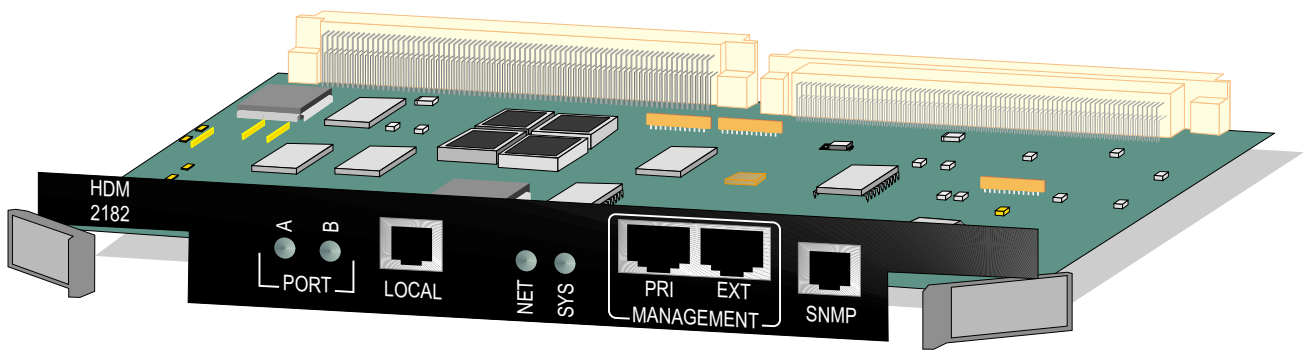


Verilink HDM 2182 User Manual

October 1999

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FCC Requirements

This equipment has been tested and found to comply within the limits for a Class A digital device pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide protection against harmful interference in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user manual, can cause harmful interference to radio communications.

There is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception—which can be determined by turning the equipment off and on—try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

- All direct connections to the network lines must be made using standard plugs and jacks (compliant with Part 68). The following tables list the applicable registration jack universal order codes (USOCs), facility interface codes (FICs), and service order codes (SOCs). These are required to order service from the telco.

For T1 interfaces:

Port ID	REN/SOC	FIC	USOC
1.544 Mbit/s SF	6.0N	04DU9 -BN	RJ-48C jack
1.544 Mbit/s SF, B8ZS		04DU9 -DN	
1.544 Mbit/s ANSI ESF		04DU9 -1KN	
1.544 Mbit/s ANSI ESF, B8ZS		04DU9 -1SN	

For DDS interfaces:

Port ID	REN/SOC	FIC	USOC
56 kbit/s	6.0N	04DU5 -56	RJ-48S jack
64 kbit/s		04DU5 - 64	

- If the unit appears to be malfunctioning, inform the telco and disconnect it from the network 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.
- The unit has been designed to prevent harm to the 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 provide you advance notice if possible.

- If the telephone company alters its equipment in a manner that can affect the use of this device, it must give you warning so that you have the opportunity to maintain uninterrupted service. You will be advised of your right to file a complaint with the FCC.
- No customer is authorized to repair this equipment, regardless of warranty status. All repairs must be performed by Verilink or an authorized agent. It is the responsibility of users requiring service to report the need for service to Verilink or to one of our authorized agents.

Lithium Battery

The lithium battery referred to in the following notices is contained inside the clock chip.

English

DANGER!

The battery can explode if incorrectly replaced! Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

DANGER!

To avoid electrical shock in case of failure, the power supply must be installed by a professional installer. The terminal labeled with the ground symbol ($\text{—}\text{—}\text{—}$) on the power supply must be connected to a permanent earth ground.

CAUTION!

Interconnecting circuits must comply with the requirements of EN60950:1992/A4:1997 Section 6.2 for telecommunications network voltages (TNV) circuits.

Français

ATTENTION!

Une explosion peut se produire si la batterie est remplacée d'une façon incorrecte! Remplacez-la seulement avec le même modèle de batterie ou un modèle équivalent selon les recommandations de manufacture. Disposez de les batteries usées selon les instructions de manufacture.

ATTENTION!

Pour éviter choc électrique en cas de insuccès, la provision de pouvoir doit être installé par un installateur professionnel. Le terminal de la provision de pouvoir, marqué du symbol de terre, ($\text{—}\text{—}\text{—}$) doit connecté à un circuit de terre permanent.

PRUDENT!

Les circuits doivent être interconnectés de manière à ce que l'équipement continue à être en agrément avec "EN60950:1992/A4:1997, Section 6.2, pour les circuits de voltage de liaisons d'échanges (réseau) par les télécommunications (TNV)," après les connexions de circuits.

Españole

ATTENCION!

La bateria puede explotar si se reemplaza incorrectamente. Reemplace la bateria con el mismo tipo de bateria ó una equivalente recomendada por el fabricante. Disponga de las baterias de acuerdo con las instrucciones del fabricante.

ATTENCION!

Para evitar contacto con circuitos que electrocutan, la fuente de alimentación debe ser instalada por un técnico profesional. La terminal de la fuente de alimentación marcada con el simbolo de tierra ($\text{—}\text{—}\text{—}$) debe ser conectada a un circuito de vuelta por tierra permanente.

PELIGRO!

Circuitos que se interconectan a la red de telecomunicaciones deben hacerse de tal manera que cumplan con los requisitos estipulados en las especificaciones "EN60950:1992/A4:1997, Sección 6.2, para los voltages de circuitos interconectados a la Red de Telecomunicaciones (TNV)," después de terminar las conexiones entre los circuitos.

Deutsch

VORSICHT!

Explosionsgefahr bei unsachgemäßem Ersetzen der Batterie! Batterie gleichen Typs und gleicher Qualität benutzen, wie vom Hersteller empfohlen. Entsorgung der Batterie nach Anweisung des Herstellers!

VORSICHT, GEFAHR!

Um keinen Schlag zu erhalten beim Versagen der elektrischen Anlage, muss der Stromanschluss von einem Elektriker vorgenommen werden. Der elektrische Pol, versehen mit dem Erdsymbol (—) muss am Stromanschluss permanent geerdet sein.

VORSICHT!

Schaltungen, die in den Geräten zusammengeschaltet sind, müssen weiterhin den Vorschriften EN60950:1992/A4:1997, Absatz 6.2 für Telecommunications Netz Spannung (TNV) Schaltkreise entsprechen.

Canadian 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.

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

The Industry Canada label identifies CS-03 certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. 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.

Safety Precautions

This equipment is intended to be installed only in a Restricted Access Location that meets the following criteria:

- Access can only be gained by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that must be taken.
- Access can only be gained through the use of a lock and key or other means of security, and is controlled by the authority responsible for the location.

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 cloth slightly dampened with water.
- Do not place this product on an unstable cart, stand, or table. It may fall, causing serious damage to the product.
- Slots and openings in the shelves are provided for ventilation to protect them 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 will interfere 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 shelves. 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 cabinet has been damaged.

Product 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 returns within ten working days.

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 (800) 285-2755 and support@verilink.com)
- To return a product, it must be assigned a Return Materials Authorization (RMA) number before sending it to Verilink for repair (800) 926-0085, ext. 2282
- Maintenance contracts and leasing plans (800) 837-4546
- Technical Training on network concepts and Verilink products (800) 282-2755 and training@verilink.com
- Web site (www.verilink.com)

Publications Staff

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Chapter 1

HDM 2182 DS3 DSU Overview

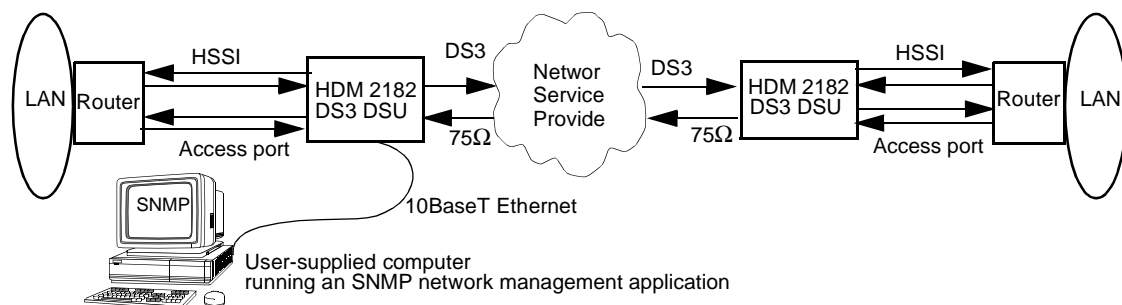
This manual describes how to use the HDM 2182 DS3 DSU Craft Interface. As part of Verilink's AS2000 modular platform, the HDM 2182 DS3 DSU provides a connection between T3 circuits and data terminal equipment (DTE) and provides clear channel service for two partially filled T3 services using a single DS3 pipe (28 T1 or 44.7 Mbit/s).

Applications

Clear-channel DS3 networking is used primarily with high-speed router backbones and mainframe channel extenders. The high-speed capabilities of clear-channel DS3 networking provide the bandwidth needed to meet the heavy demands of client-server applications, such as CAD/CAM, video imaging, data warehousing, data vaulting, and backup.

When the HDM 2182 is installed between large data centers it can support mission-critical applications that mirror data between mainframe computers or backbone routers. Installing a DS3 circuit between data centers can ensure that information is copied to both locations.

Figure 1-1 HDM 2182 Application



Features

Features of the HDM 2182 include the following:

Front Panel Management Ports

The HDM 2182 has enhanced SNMP-management *when used with a Node Controller Module (NCM 2000)* and can also be managed directly using the Craft (ASCII) interface through the Local port or via Telnet through the SNMP port.

Local ASCII Interface Port

The Local port provides a Craft interface for configuration, control, and monitoring. A secondary function of this interface is to provide a debug monitor port for troubleshooting.

This interface uses a 19.2 kbit/s rate and is asynchronous without hardware flow control. The HDM 2182 Local port is RS-232 compliant for a front-panel RJ-11 connector.

SNMP Port

The front panel of the HDM 2182 provides an RJ-45 SNMP port for direct Ethernet twisted-pair communication via Telnet. The HDM 2182 embedded SNMP supports SNMPv1 and is 10BaseT compliant.

Front Panel LEDs

Tri-color Network, Data Port, and System LEDs.

Dual High-Speed Serial Interface (HSSI) Ports

Two HSSI data port interfaces (DCE) for connection to DTE.

DS3 Network Ports

75 Ω coaxial TX and RX DS3 network ports.

Timing Options

The hardware supports three modes of system timing:

- Internal—Reference timing derived from the free-running internal oscillator
- Network—Reference timing derived from the incoming DS3 data stream
- External—75 Ω female BNC connector accepts external timing. The reference timing input accepts a TTL level DS3 rate clock.

Inband Management Channel

Specialized support is provided for the inband management channel in C-bit parity applications. The three C-bits in M-subframe 5 of the DS3 frame are assigned as a 28.2 kbit/s terminal-to-terminal path maintenance data link. The signal format used on this data link consists of messages using the Link Access Procedure on the D-channel (LAPD) protocol. A dedicated HDLC controller is built into the hardware for this 28.2 kbit/s LAPD data link. The controller supports polled, interrupt-driven operation.

Far-End Alarm and Control

Dedicated support is provided for Far End Alarm and Control (FEAC) signals in C-bit parity applications. The third C-bit in M-subframe 1 of the DS3 frame provides the FEAC signal. A bit-oriented message protocol (16 bit length) is used on the FEAC data stream.

Downloadable Upgrades

As a member of the AS2000 product family, the HDM 2182 incorporates Verilink's Advanced Programmable Architecture (APA).

With APA, you can download upgraded firmware to all HDM modules on your shelves from a single NCM source into the modules' onboard RAM via FTP. The firmware contained in the flash can also be field-replaced with upgraded chips.

Compatibility with Other Verilink Products

The HDM 2182 can reside on the same shelf with all other AS2000 products; however, it does not pass data on the midplane and does not use the TABS bus of the shelf midplane. The HDM 2182 is a standalone system that can also be managed through the ACP bus of the shelf midplane by an NCM 2000 module. Advantages of using the NCM module include:

- Higher security on the network with four levels of access using password control (instead of only one access password).
- Verilink's proprietary overhead bandwidth signalling that enables you to configure and troubleshoot the far-end node without interference from repeaters in the network. (This overhead bandwidth requires the C-bit parity format.)
- Up to three users can access the module at a time.
- Using the Advanced Programmable Architecture (APA) to download upgrade firmware to all HDM 2182 modules within or cross-shelf from a single NCM source.

- The HDM can be managed with a graphical user interface (GUI) using Verilink's Node Manager software application.

Technical Description

The HDM 2182 consists of two components:

- A front-panel module, which contains the DSU microprocessor including firmware in flash, and
- A detachable rear-panel connector interface module (CDM 2182), which contains two high-speed serial interface (HSSI) data ports and 75Ω coaxial transmit and receive network connectors for the DS3 network interface.

Figure 1-2 HDM 2182 Front Panel

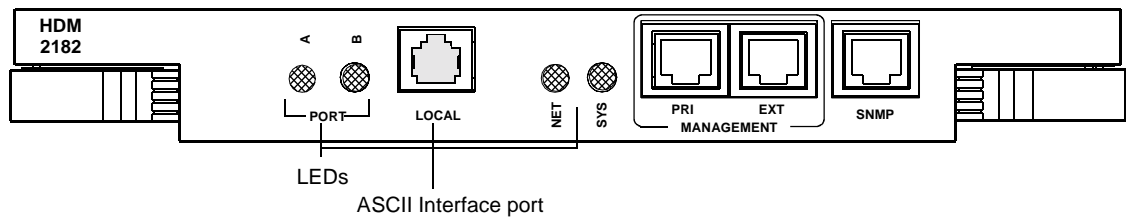


Figure 1-3 CDM 2182 Rear Panel

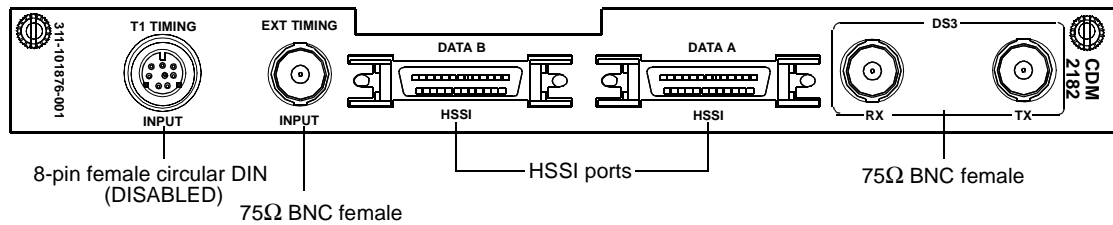
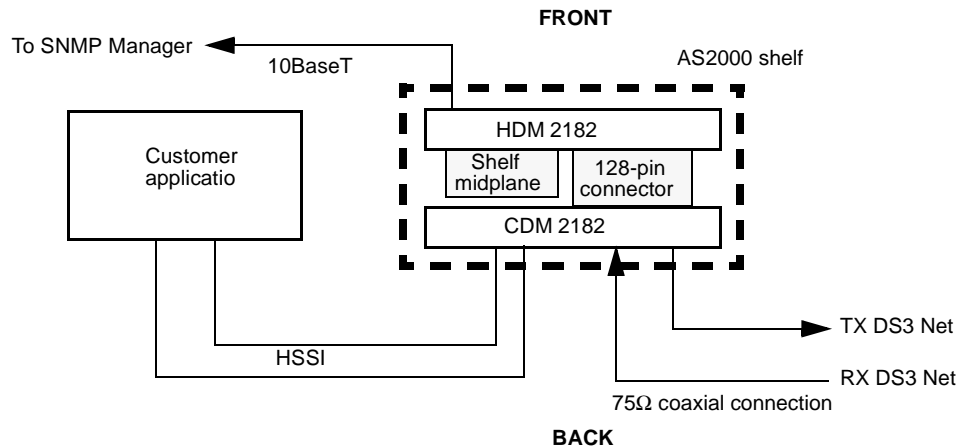


Figure 1-4 Functional Block Diagram of HDM 2182 Components



HDM 2182 Specifications

Table 1-1 Network Specifications

Network Interface	
Type	DS3
Line Rate	Line rate: 44.736 Mbit/s \pm 20 ppm
Framing	C-bit parity
Line Code	B3ZS
Input Signal	-11.7 dBm to +6.2 dBm, level DS3
Output Signal	-4.7 dBm to +3.6 dBm (DSX-3 cross-connect point)
Impedance	75 Ω \pm 5%
Connector	BNC female, one each for TX and RX
System Timing	T3 (BNC), Network, or Internal

Table 1-2 Data Port Specifications

Data Ports	
Type	Two HSSI, DCE only
Line rate	$n \times 1.578$ Mbit/s, where $n = 1$ to 28
Physical interface	50-pin HSSI
Hardware handshake	Control leads supported for DTR, DSR, TM, LLA, LLB

Table 1-3 Environmental Specifications

Non-operating	
Temperature range	-20 to + 80°C
Maximum temperature change rate	8°C per hour
Humidity	0% to 95% relative, non-condensing
Vibration, in transport, withstand	0.5 G from 5 Hz 3.0 G from 50 Hz to 500 Hz
Shock during shipping, withstand	20 msec, 25 G, half-sine shock pulse when mounted normally 80 G peak, half sine for 10 msec
Operating	
Power consumption	<15 Watts total, front and back modules
Temperature range	0 to 50°C, 0% to 95% relative humidity, non-condensing
Vibration	Withstand 25 G @ 1 to 60 Hz with no service interruption

Regulatory Requirements

This product complies with the following regulatory specifications as they apply to telecommunications equipment:

- FCC—Part 15, Subpart J, Class A: Computing devices
- 15.810: Radiated Emission
- 15.812: Conducted Emission
- UL 1459, 2nd Edition
- CSA—C225

Technical References for Network Interface

This product complies with the following industry standard specifications:

AT&T PUB 54014	All
AT&T TR-000499	Electrical interface
ANSI T1.102	Electrical interface
ANSI T1-107a	C-bit parity framing format
Technical references	Complies with the following industry standard specification, which defines the operation of the high-speed serial interface channel: TIA TR30.2-SP2795—all specifications.

Agency Approvals

This product is certified by the following agencies to verify compliance with regulatory requirements as part of the certification process for the AS2000 product family:

- FCC
- UL
- CSA

Dual-Line Shelf Limitations

These limitations apply when the HDM 2182 is used in a Dual-line shelf. They must be observed to prevent intermittent data loss.

- Because of heat build-up, only one HDM 2182 may be used in a Dual-Line shelf.
- Since the HDM 2182 draws more current than other AS2000 modules, two external power supplies must be used whenever an HDM 2182 is placed in a Dual-line shelf. The power supplies will not be fully redundant.
- Whenever an HDM 2182 is used in a Dual-line shelf with an NCM 2000 controller module, the HDM 2182 must be in the first (left hand) slot and the NCM 2000 must be in the right hand slot.

- When an HDM 2182 is used in a Dual-line shelf without an NCM 2000, the HDM 2182 must be mounted in the right hand slot (slot 2).

FCC Compliance

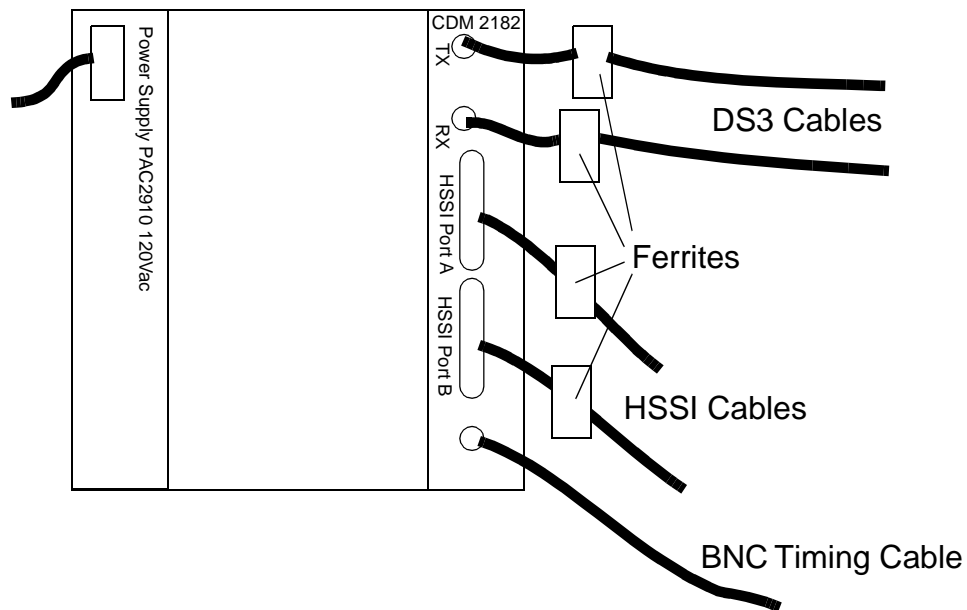
For this version of the HDM 2182 to comply with FCC Part 15, ferrites must be placed on the following cables to prevent EMI:

- DS3 Transmit
- DS3 Receive
- HSSI Port A
- HSSI Port B

Fair-Rite Products corporation manufactures snap-on ferrites that will meet this criteria. Their part number is:

- 0443167251 (Verilink P/N: 400-502821-001)

Figure 1-5 Ferrite Placement for Satisfying FCC EMI Compliance



In addition to the ferrites, the chassis ground must be connected to the signal ground on Terminal Block One (TB1) on the Multi-line Shelf (MLS), and the chassis ground must be connected to the signal ground on Terminal Block One (TB1) on the Dual-line Shelf (DLS).

For the MLS, loosen the screws for connections 3 and 4 on the TB1, insert insulated jumper wire (14 AWG) into the slots, then tighten the screws for those slots to secure the wire.

For the DLS, loosen the screws in the two slots in the TB1, insert the insulated jumper wire (14 AWG) into the slots, then tighten the screws for those slots to secure the wire.

The following diagrams show the method and locations.

Figure 1-6 Terminal Block One on the MLS—Chassis Ground Connected to Signal Ground

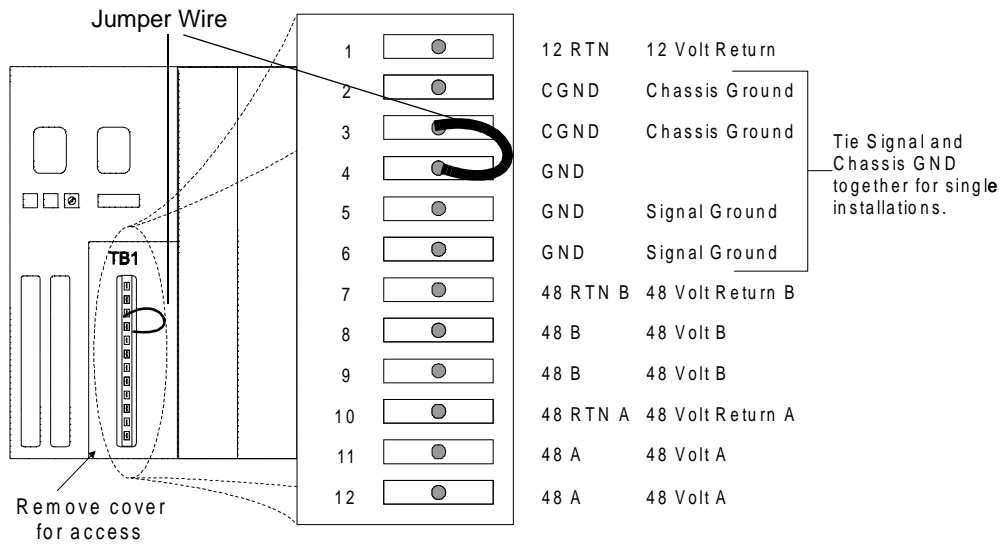
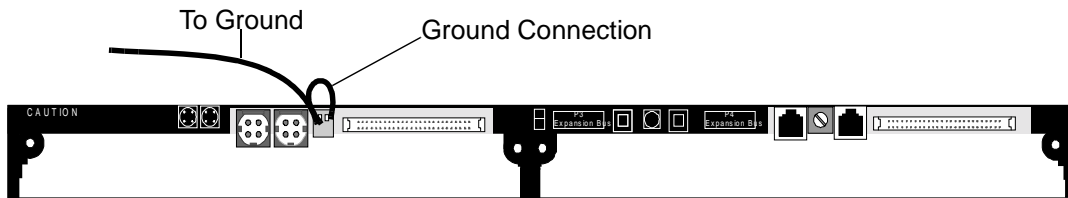


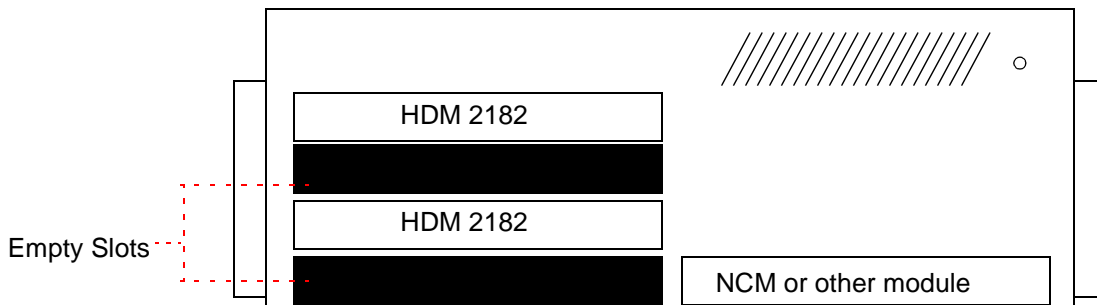
Figure 1-7 Terminal Block One on a DLS (back view) Showing Ground Connection



The application card itself has had the signal ground and chassis ground terminals connected within the printed circuit board. This additional connection has been made to prevent generation of unwanted electromagnetic interference (EMI).

NOTE: When using the HDM modules in a Quint-line Shelf, be sure to leave open slots between the modules to allow for proper air circulation and heat dissipation (Figure 1-8).

Figure 1-8 HDM Usage in Quint-line Shelf



HDM placement in Quint-line Shelf—limit use to slots 1 and 3 or 2 and 4 ONLY. Be sure to have open slots between the HDM modules for proper air circulation and heat dissipation.

Chapter 2

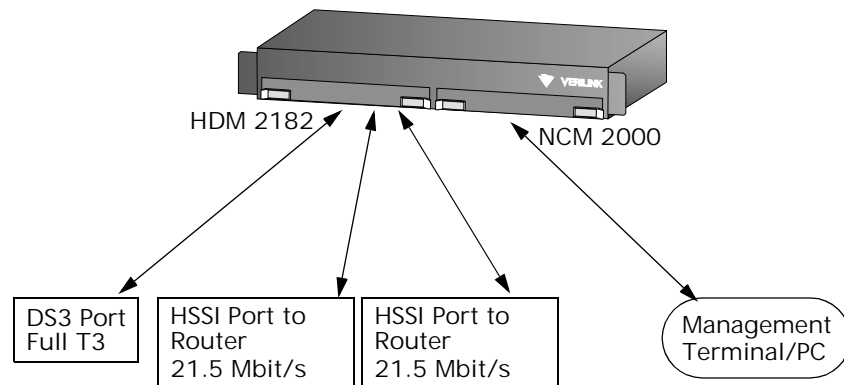
HDM 2182 Quick Set-Up

This chapter provides step-by-step procedures for setting up your HDM 2182 module. This quick configuration guide makes the following assumptions:

- You are installing the HDM 2182 and an NCM 2000 module in a Dual-line Shelf. Two external power supplies will be used.
- You are putting a router on each of the two HSSI ports of the HDM 2182, each outputting 21.5 Mbit/s of data.
- You are connecting a full T3 to the DS3 port.

NOTE: The NCM 2000 controller module **MUST** be installed in Slot 2 of the shelf. The HDM 2182 **MUST** be installed in Slot 1 of the shelf. When an HDM 2182 is used with an NCM 2000 in a Dual-line shelf, two external power supplies are required.

Figure 2-1 Example Configuration



NOTE: These procedures may not match your configuration. Use this chapter as a guide for equipment installation. Chapter 3 has complete details on configuration covering all options.

Installation

Do the following before installing the HDM 2182:

- Install all associated Access System 2000 shelves and power supplies, as outlined in the *AS2000: The Basics* manual.
- Install and test the NCM module first.

NOTE: *The node controller module (NCM 2000) is usually installed in slot 1 of shelf 1. However, for use with an HDM in a dual-line shelf, the NCM must be installed in slot 2.*

Connect to Craft Port

Connect the modular (RJ-11) end of the Craft cable (P/N 458-501788-008) to the port labeled LOCAL on the front panel of the NCM module.

Connect the other end of the Craft cable to your PC or terminal. If your PC has a DB-9 COM port connector, use a standard PC-AT serial cable to complete the connection.

Terminal Parameters

Set your terminal, or terminal program, to

- 19.2 kbit/s
- 8 data bits
- no parity
- one stop bit
- no flow control

NOTE: *For the most effective and efficient set-up, have all required planning data such as your intended use, network (telco) provider specifications, channel and line requirements, circuit configurations, and other important information handy. For your convenience, worksheets are provided in the manual, *AS2000: The Basics*, [Chapter 2—Site Planning](#).*

Logging On

1. Press ENTER to display the **pSH+>** prompt and type “craft”.
2. Press ENTER to display the NCM **Main Menu**.

The default password for the NCM gives the user Access Level 2 permissions. For a higher access level, see your *NCM 2000 User Manual*.

Figure 2-2 NCM Main Menu

```

Firmware Version and Date of Release
Node Address
Access Level (1-4)
-- VERILINK NCM CONTROLLER : FW Rev 4.17, Dec 30 1997 12:33:20 --
Site Name:
Access Level : 2
Managing at NEAR end node [127.255.255.0] Node ID: 0

<- SLOT ->
SHELF 1 2 3 4 5 6 7 8 9 10 11 12 13
0 ❶ - ❷ - ❸ - - - - - - - - - - - -
1 D [G] *N
2 - - - - - - - - - - - - - - -
3 - - - - - - - - - - - - - - -
4 - - - - - - - - - - - - - - -

KEY: A=DI DCSU, B=DI U/DBU, C=CSU, D=DI U, E=SDI U, F=DI U/DDS, G=DHDM,
H=ATM/I MUX, I=I DCSU, J=PEP, M=I MUX, N=NCM, P=DPRI, Q=QUAD,
R=SUBRATE, T=HDM, U=DCSU, V=VCU, X=QPRI

S) shel f/sl ot 0) admi ni strati on
C) confi gurati on D) di agnosti cs
P) performance/status F) di spl ay far end DS3 port i denti fi cati on
B) ci rcui t manager A) al arm
R) remote end setup I) manufacturi ng i nfo
X) exi t thi s screen

A [127.255.255.0] [1,1] HDM 2182 >

Node Address
Active NCM Master Designator
Data (Command) Entry Area

❶ Indicator for the type of shelf: M = Multi-line, Q = Quint-line, D = Dual-line
❷ Brackets around module letter ([G]) indicate current module selected
❸ Asterisk indicates that the NCM is the Main Controller in the shelf

```

From the NCM Craft interface **Main Menu** (Figure 2-2), select the HDM application module using option S, Shelf/Slot. The **Main Menu** uses brackets to enclose the G, indicating the HDM 2182 is now the active module.

Port Configuration

From the **Main Menu**, select option C, “Configuration”, to start the configuration task. The **Configuration Menu** displays (Figure 2-3). The **Configuration Menu** is used to enable—or put in service—each of the ports and to configure the various port parameters.

Figure 2-3 Configuration Menu

```
A [127.255.255.0] [1,1] HDM 2182 > c
-- HDM 2182 CONFIGURATION MENU --
P) DS3 Port Setup           H) HSSI A Port Setup
I) HSSI B Port Setup
X) Exit this screen

A [127.255.255.0] [1,1] HDM 2182 >
```

Network Port

The DS3 network port is usually configured before the HSSI ports. Press ENTER after typing each command letter.

1. Type "P" to display the **Port Configuration Menu** (Figure 2-4).

Figure 2-4 DS3 Configuration Menu

```
A [127.255.255.0] [1,1] HDM 2182 > p
-- HDM 2182 Port Configuration Menu --
- Line Code           B3ZS
- AIS C-Bit          0
T) Timing             Recover Clock
B) Line Build Out     Normal Cable <= 250 ft
H) Line Type          C-Bit Parity
R) Performance Control On
E) Equipment ID
L) Location ID
F) Frame ID
U) Unit ID
A) Facility ID
P) Port ID
C) Circuit ID
G) Test Sig ID
I) Inband Control     Enable
N) FE Inband Mgmt     Enable
X) Exit this screen

A [127.255.255.0] [1,1] HDM 2182 >
```

2. Type "P" to display the prompt:
Enter Port Id(38 char)
Enter an identifying character string (no more than 38 characters) to specify the Port ID.
3. Type "C" to display the prompt:
Enter Circuit Id(26 char)
Enter an identifying character string (no more than 26 characters) to specify the Circuit ID.

- Exit this menu and return to the **Configuration Menu**.

HSSI Port Set-up

- Type "H" to display the **HSSI A Configuration Menu**.

Figure 2-5 HSSI A Port Configuration Menu

```
A [127.255.255.0] [1,1] HDM 2182 >
-- HDM 2182 HSSI A Configuration Menu --
I) Circuit ID          Port A
P) Port Status        IN SERVICE
M) Configuration Mode Manual
D) HSSI Data Rate Mode NE Only
R) HSSI Data Rate     14, (22.4 Mbps)
X) Exit this screen
A [127.255.255.0] [1,1] HDM 2182 >
```

- Type "I" to display the prompt:

Enter circuit ID (18 characters):

Enter an identifying character string (no more than 18 characters) to specify the Circuit ID. "Port A" is suggested.

- Type "R" to display the prompt:

Warning: Config NE only. FE rate could become inconsistent. Change (Y/N)

Type "Y", then choose the data rate you will be using for your particular equipment. Choose the number of T1s to be used on this port (the bandwidth will automatically be calculated and displayed). The total number of T1s on the HDM module cannot exceed 28, so for this particular set-up, type "14" for this port.

- Type "X" to exit to the **Configuration Menu**. Type "I" to display the **HSSI B Port Configuration Menu**.

Figure 2-6 HSSI A Port Configuration Menu

```
-- HDM 2182 HSSI A Configuration Menu --

I) Circuit ID          Port A
P) Port Status        OUT OF SERVICE
M) Configuration Mode Automatic
D) HSSI Data Rate Mode NE Only
R) HSSI Data Rate     14, (22.4 Mbps)
A) Data Scramble      Disable
X) Exit this screen

A [127.255.255.0] [1,13] HDM 2182 >
```

- Type "I", then ENTER, to display the prompt:

Enter circuit ID (18 characters):

Enter an identifying character string (no more than 18 characters) to specify the Circuit ID. "Port B" is suggested.

5. Type "R", then ENTER, to display the prompt:

Warning: Config NE only. FE rate could become inconsistent. Change (Y/N)

Type "Y", then choose the data rate you will be using for your particular equipment. Choose the number of T1s to be used on this port (the bandwidth will automatically be calculated and displayed). The total number of T1s on the HDM module cannot exceed 28, so for this particular set-up, type "14" for this port. (Since you already chose 14 for Port A, you will be limited to 14 for Port B.)

6. Type "X" to exit to the **Configuration Menu**.

Your HDM 2182 is now configured and ready to be placed into service by connecting the unit to the appropriate cables to the network and to your equipment.

The four tri-color LEDs on the front panel (Network Port, Data Ports, System) should be lit solid green to indicate the module is properly configured and the equipment is operating normally.

Chapter 3

Standalone HDM 2182 Management

This chapter describes the Craft interface menu options for a standalone HDM 2182 (no NCM 2000 controller module used for management). See Chapter 4 for HDM features when using an NCM 2000 for management.

Using the Local Port

To access the HDM 2182 from an ASCII terminal:

1. Connect your ASCII terminal to the front panel LOCAL port.
2. Set your terminal parameters to the following values:
 - 19.2 kbps baud rate
 - 8 data bits
 - no parity
 - one stop-bit
 - no flow-control

Be sure that **X-ON/X-OFF** flow control is disabled.

3. Type “craft” and press ENTER.
4. At the **PASSWORD:** prompt, enter “verilink” (in lower case) and press ENTER.

The **HDM 2182 Craft Interface Main Menu (Main Menu)** displays.

HDM 2182 Craft Interface, Main Menu

The **Main Menu** is the starting point for all management tasks accessed directly through the HDM 2182 Craft interface. The menu title displays information such as the name and shelf/slot position of the HDM 2182 module, its firmware version, and date/time. The menu, with an explanation of each option, follows.

Figure 3-1 ASCII Screen: Main Menu via HDM 2182 Local Port

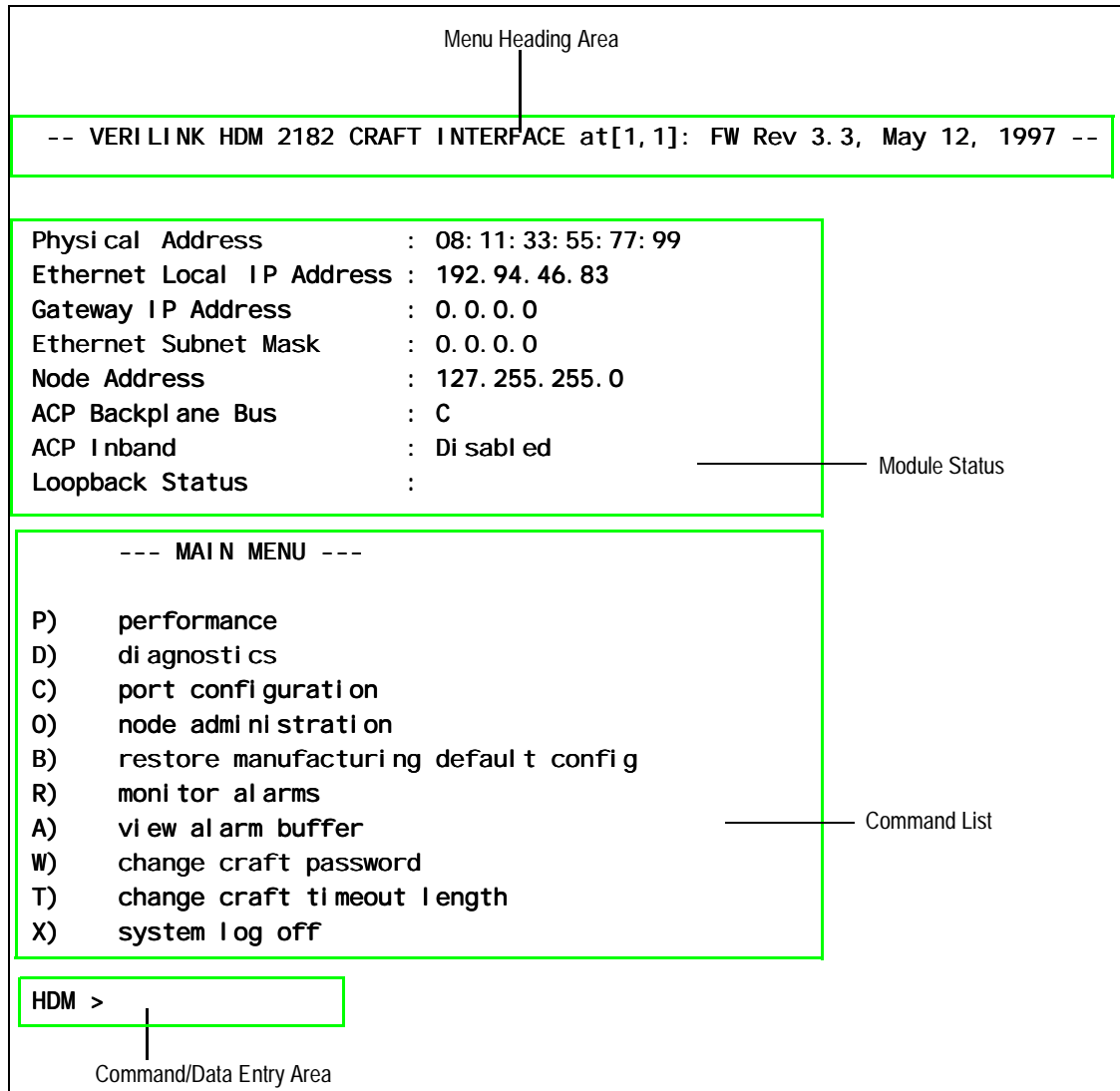


Table 3-1 HDM 2182 Craft Interface Menu Commands

Command	Description
P	Performance—displays the Performance Monitoring Menu . Figure 3-9, Table 3-9.
D	Diagnostics—displays the Diagnostics Menu . Figure 3-6, Table 3-6.
C	Port Configuration—displays the Port Configuration Menu , Figure 3-3, Table 3-3.
O	Node Administration—displays the Administration Menu , Figure 3-2, Table 3-2.
B	Restore Manufacturing Default Config—displays the Restore Manufacturing Default Config Menu , Figure 3-17, Table 3-11.
R	Monitor Alarms—displays the Alarm Monitoring display that provides real-time alarm notification, Figure 3-18.
A	View Alarm Buffer—displays the Alarm Buffer that provides a historical record of alarms up to the time of selection, Figure 3-19.

Command	Description
W	Change Craft Password—displays field used to change Craft password as follows: HDM > w Old Password: New Password (4-20 chars): Type New Password again: Password Changed.
T	Change Craft Timeout Length—displays menu from which one can change the Craft timeout period as follows: HDM > t The current timeout length: 15 mins. Change (Y/N)? y Please enter new timeout length (5 - 30 min): 15 Timeout length is changed.
X	System Log-off—Logs you out of the HDM access.

Although Table 3-1 above presents application management options in the order as they appear on the **Main Menu**, this manual discusses the options in the order that the options will be needed during initial set-up of the module.

Administration Menu

When you access the HDM 2182 for the first time after installation, various parameters must be set for the module to operate properly. Parameters such as the node address, site name, date/time, IP parameters, and firmware download are set in the node's **Administration Menu**. For information about IP addresses, check with your system administrator.

Type the command **O** from the **Craft Interface Menu**

O) node administration

to display the **Administration Menu**.

Figure 3-2 Node Administration Menu

```
--- ADMINISTRATION MENU ---  
A) Node Address : 127.255.255.0  
N) site name : VERILINK Corp, San Jose  
T) set time : 9/11/96 4:26:16  
L) Local IP address : 192.94.46.83  
G) Global IP address : 0.0.0.0  
U) IP Subnet Mask : 0.0.0.0  
H) Management host IP address : 0.0.0.0  
M) Management trap IP address1 : 0.0.0.0  
O) Management trap IP address2 : 0.0.0.0  
P) Management trap IP address3 : 0.0.0.0  
Q) Management trap IP address4 : 0.0.0.0  
C) community string - read : public  
W) community string - write : public  
F) DS3 flash download  
B) DS3 boot : partition B  
X) exit menu  
HDM >
```

Table 3-2 HDM 2182 Node Administration Options

Command	Description
A	<p>Node Address—Use this command to change the local node address. This is not the Ethernet IP address but is the number on the prompt line [0.0.0.1]. The value for each node master must be unique. Never set first octet greater than 127. Will cause momentary reset as it updates database records. Used by Verilink's Node Manager application to identify components within the system.</p> <p>HDM > a</p> <p>Node Address: 127.255.255.0.</p> <p>Input New Node Address in Decimal, e.g. 127.2.5.0 ></p>
N	<p>Site Name—Limit entry to 19 or fewer characters. This is an optional field that can be used to describe the location of your particular node.</p> <p>HDM > n</p> <p>Site Name : VERILINK Corp, San Jose Change (Y/N)? y</p> <p>Please enter new Site Name (19):</p>
T	<p>Set Time—This sets the time on the node/module to a logical time to coincide with the rest of your equipment.</p> <p>HDM > t</p> <p>Enter today's date (GMT) (mm/dd/yyyy):</p> <p>Please enter the current GMT time (hh:mm:ss):</p>
L	<p>Local IP address—Enter the Ethernet IP address of the node, in the form: [0.0.0.0] For example: [192.94.45.242]. If, after configuring IP addresses, an error message appears including the text " sendto: new socket sendto fail:", there is an error in the IP addresses used. The Ethernet IP address and the SLIP IP address must reflect different network segments as per the subnet mask in use. Correct the error and reset the HDM module to stop the error messages.</p> <p>HDM > l</p> <p>HDM IP address: 192.94.46.83,</p> <p>New HDM IP address ></p>
G	<p>Local Gateway IP address—The IP address of your network gateway device. This might be a router that the HDM will use to reach an SNMP manager. Consult with your network administrator. A gateway address is only required if the HDM module will be communicating with other devices not on the same LAN segment.</p> <p>HDM > g</p> <p>HDM Local Gateway IP address: 0.0.0.0,</p> <p>New HDM Local GateWay IP address ></p>
U	<p>IP Subnet Mask—The Ethernet subnet mask is based on the IP address according to the standard rules for IP address classes (A,B,C etc). For a class C Ethernet IP address use a subnet mask of [255.255.255.0].</p> <p>HDM > u</p> <p>HDM IP subnet mask address: 0.0.0.0,</p> <p>New HDM IP subnet mask address ></p>
H	<p>Management Host IP Address—This is the address of the PC running the Node Manager application.</p> <p>HDM > h</p> <p>Management Station IP address: 0.0.0.0,</p> <p>New IP address ></p>

Command	Description
M	<p>Management trap IP address1—This is an IP address to which alarm messages will be sent. This might be a copy of the Verilink Node Manager application or some other SNMP network manager.</p> <pre>HDM > m Management Station #1 Trap IP address: 0.0.0.0, New Trap IP address ></pre>
O	<p>Management trap IP address2—This is an alternate IP address to which alarm messages will be sent. This might be a copy of the Verilink Node Manager application or some other SNMP network manager.</p> <pre>HDM > o Management Station #2 Trap IP address: 0.0.0.0, New Trap IP address ></pre>
P	<p>Management trap IP address3—This is an alternate IP address to which alarm messages will be sent. This might be a copy of the Verilink Node Manager application or some other SNMP network manager.</p> <pre>HDM > o Management Station #3 Trap IP address: 0.0.0.0, New Trap IP address ></pre>
Q	<p>Management trap IP address4—This is an alternate IP address to which alarm messages will be sent. This might be a copy of the Verilink Node Manager application or some other SNMP network manager.</p> <pre>HDM > o Management Station #4 Trap IP address: 0.0.0.0, New Trap IP address ></pre>
C	<p>Community String - read—A security feature that enables you to establish who may read the information on the HDM module. Default is "public". You may set a different string up to 64 characters.</p> <pre>HDM > c Community string (Read): public Change (Y/N)? y Please enter new Read Community String (64):</pre>
W	<p>Community String - write—A security feature that enables you to establish who may write or change the information on the HDM module. Default is "public". You may set a different string up to 64 characters.</p> <pre>HDM > w Community string (Write): public Change (Y/N)? y Please enter new Write Community String (64) :</pre>
F	<p>DS3 flash download—Writes a firmware upgrade to Flash RAM after it has been transferred to the HDM 2182 using FTP.</p> <pre>HDM > f Current Booting Flash Partition: B Only Partition B can be upgraded. Do you really want to do so? !!! (Y/N)</pre>

Command	Description
B	DS3 Boot—Causes the HDM 2182 to re-boot from the selected partition. HDM > b Current Booting Flash Partition: B Enter 1) Partition A 2) Partition B) >
X	exit menu—Returns you to the Main Menu , Figure 3-1.

Port Configuration Menu

Once you have established and set the HDM 2182's IP addresses and other administrative parameters, the HDM 2182's ports need to be configured before signals can be properly transmitted and received.

From the **Main Menu** choose **C** to display the **Port Configuration Menu**.

Figure 3-3 Port Configuration Menu

```

      --- PORT CONFIGURATION MENU ---
D)   DS3 Port
H)   HSSI Port A
I)   HSSI Port B
X)   exit menu
HDM >
    
```

Table 3-3 Port Configuration Menu Choices

Command	Description
D	DS3 Port—displays the DS3 Network Port Configuration Submenu , Figure 3-4, Table 3-4.
H or I	HSSI Port—displays the HSSI (A or B) Port Configuration Menus , Figure 3-5, Table 3-5.
X	exit menu—Returns you to the Main Menu , Figure 3-1.

DS3 Network Port Configuration Submenu

From the **Port Configuration Menu**, select **D** for the **DS3 Port** option to display the **DS3 Network Port Configuration Menu**.

Figure 3-4 DS3 Network Port Configuration Submenu

```

HDM> d
    --- DS3 NETWORK PORT CONFIGURATION ---
S)  Port Performance Monitor : Disabled
H)  ACP Inband                : Disabled
L)  Line Type                 : C-Bit Framing
T)  Coding Type               : B3ZS
C)  Clock Source              : Network Clock
B)  Cable Selection           : Long Cable (Length >= 250ft)
A)  AIS C-Bit Value          : 0
E)  Port Equipment ID        :
O)  Port Location ID         :
F)  Port Frame ID            :
U)  Port Unit ID             :
I)  Port Facility ID         :
P)  Port ID                   :
G)  Port Test Sig ID         :
X)  exit menu
HDM >
    
```

Table 3-4 DS3 Port Configuration Submenu Options

Command	Description
S	Port Performance Monitoring—Displays the current status and provides a prompt asking if you want to change the status as follows: HDM > s DS3 Port Performance Monitoring: Disabled. Enter 1) Disabled 2) Enabled) >
H	ACP Inband—Displays the current status and provides a prompt asking if you want to change the status as follows: HDM > h DS3 ACP Inband: Disabled. Enter 1) Disabled 2) Enabled) >
L	Line Type—Displays the current status and provides a prompt to allow you to change the line type. HDM > l Many features related to CBit don't work at M13 Line Type, including: FEAC, FEBE, FE Lpbk, ACP Inband. Current Line Type : C-Bit Line Type. Enter 1) C-Bit 2) M13 >
T	Coding Type—Displays the current status. HDM > t Note: DS3 CSU only support B3ZS Line Coding!

Command	Description
C	<p>Clock Source—Displays the current status and provides a prompt asking if you want to change the status as follows:</p> <pre>HDM > c DS3 Port Clock Source: Network Clock 1) Network Clock 2) Internal Clock 3) External T3 Clock Enter your choice ></pre>
B	<p>Cable Selection—Displays the current status and provides a prompt asking if you want to change the status as follows:</p> <pre>HDM > b DS3 Port Cable Selection: Long Cable(length >= 250ft) Normal Cable: Length < 250ft Long Cable: Length >= 250ft Enter 1) Normal cable 2) Long Cable) ></pre>
A	<p>AIS C-Bit Value—Displays the current status:</p> <pre>HDM > a DS3 AIS C-Bit Values: 0. The DS3 AIS C-Bit Value is Read Only, Press Enter</pre>
E	<p>Port Equipment ID—Displays the current status and provides a prompt asking if you want to change the status as follows (10 characters maximum):</p> <pre>HDM > e Current DS3 Port Equipment ID: Change (Y/N)? y Please enter new DS3 Port Equipment ID(10):</pre>
O	<p>Port Location ID—Displays the current status and provides a prompt asking if you want to change the status as follows (11 characters maximum):</p> <pre>HDM > o Current DS3 Port Location ID: Change (Y/N)? y Please enter new DS3 Port Location ID(11):</pre>
F	<p>Port Frame ID—Displays the current status and provides a prompt asking if you want to change the status as follows (10 characters maximum):</p> <pre>HDM > f Current DS3 Port Frame ID: . Change (Y/N)? y Please enter new DS3 Port Frame ID(10):</pre>
U	<p>Port Unit ID—Displays the current status and provides a prompt asking if you want to change the status as follows (6 characters maximum):</p> <pre>HDM > u Current DS3 Port Unit ID: . Change (Y/N)? y Please enter new DS3 Port Unit ID(6):</pre>
I	<p>Port Facility ID—Displays the current status and provides a prompt asking if you want to change the status as follows (38 characters maximum):</p> <pre>HDM > i Current DS3 Port Facility ID: . Change (Y/N)? y Please enter new DS3 Port Facility ID(38):</pre>

Command	Description
P	Port ID—Displays the current status and provides a prompt asking if you want to change the status as follows (38 characters maximum): <pre>HDM > p Current DS3 Port ID: . Change (Y/N)? y Please enter new DS3 Port ID(38):</pre>
G	Port Test Sig ID—Displays the current status and provides a prompt asking if you want to change the status as follows (38 characters maximum): <pre>HDM > g Current DS3 Test Sig Generator ID: . Change (Y/N)? y Please enter new DS3 Port Test Sig Generator ID(38):</pre>
X	exit menu—Returns you to the Port Configuration Menu , Figure 3-3.

HSSI Port Configuration

From the **Port Configuration Menu**, select **H** or **I** for the **HSSI Port A** or **HSSI Port B** options to display the **HSSI Port Configuration** menus. The following examples show the display and options for HSSI Port A. The display and options are the same for HSSI Port B.

Figure 3-5 HSSI Port A Configuration Submenu

```

--- HSSI PORT A CONFIGURATION ---

Near End Data Rate : 14, (22.4 Mbps) Channel : 15 to 28
Far End Data Rate : 14, (22.4 Mbps) Channel : 15 to 28

C) Change Circuit ID      : Port A
S) Port State             : Out of Service
M) Port Configuration Mode : Automatic Mode
R) Change Near End Data Rate
A) Scrambling             : Disabled
X) exit menu

HDM >

```

Table 3-5 HSSI Port Configuration Submenu Choices

Command	Description
S	<p>HSSI Port State—When Configuration Mode (below) is Automatic, the Port State is an informational display. In Automatic mode the HSSI data port is In Service when DTR is presented by the DTE and it is Out of Service when the DTE fails to assert DTR.</p> <p>When Configuration Mode (below) is set to Manual, the Port State command becomes a toggle. If Mode = Manual and Port State = OUT OF SERVICE, then issuing the Port State command will place the port IN SERVICE, whether or not any DTE is present and whether or not it is asserting DTR. Conversely, if Configuration Mode = Manual and the Port State = IN SERVICE, issuing the Port State command will place the port OUT OF SERVICE, stopping all user data.</p> <pre>HDM > s HSSI Port A State: Out of Service Enter 1) Out of Service 2) In Service) ></pre>
M	<p>Configuration Mode—If in Automatic mode, this option detects the connection of HSSI equipment and its line speed. It then adjusts its line speed and mode accordingly. The Configuration Mode toggles between Automatic and Manual each time the Configuration Mode Command is issued.</p> <p>When Configuration Mode is Automatic, the Port State is an informational display. In Automatic mode the HSSI data port is In Service when DTR is presented by the DTE and it is Out of Service when the DTE fails to assert DTR.</p> <p>When Configuration Mode is set to Manual, the Port State command becomes a toggle. If Mode = Manual and Port State = OUT OF SERVICE, then issuing the Port State command will place the port IN SERVICE, whether or not any DTE is present and is asserting DTR. Conversely, if Configuration Mode = Manual and the Port State = IN SERVICE, issuing the Port State command will place the port OUT OF SERVICE, stopping all user data.</p> <pre>HDM > m HSSI Port A Mode: Manual Mode Enter 1) MANUAL 2) AUTOMATIC) ></pre>
R	<p>Change Near End Data Rate (The data rate for the Near End is listed at the top of the HSSI Port Configuration menu):</p> <pre>HDM > r Warning!! Config NE only. FE rate could become inconsistent. Change (Y/N)?</pre>
A	<p>Scrambling—If enabled, the actual user data is modified in an industry standard method. This feature has no bearing on encryption or the security of user data. It was added to allow inter-operation of the HDM 2182 with DS3 products from other manufacturers.</p>
X	<p>exit menu—Returns you to the Port Configuration Menu, Figure 3-3.</p>

Port Diagnostics Menu

When the node administration parameters have been set and the ports are configured, limited diagnostics are available with direct connection to the HDM 2182. From the **Main Menu**, choose **D** to display the **Port Diagnostics Menu**.

Figure 3-6 Port Diagnostics Menu

```
HDM > d
    --- PORT DIAGNOSTICS MENU ---
L)   Perform Loopback Diagnostics
T)   Transmit Diagnostics Alarms
N)   Display Diagnostics Loopbacks History
D)   Display Diagnostics Alarms History
H)   Real-Time Display HSSI Port A Status
I)   Real-Time Display HSSI Port B Status
X)   exit menu
HDM >
```

Table 3-6 Port Diagnostics Menu Commands

Command	Function Description
L	Perform Loopback Diagnostics—displays the Port Loopback Diagnostics Menu , Figure 3-7, Table 3-7.
T	Transmit Diagnostics Alarms—displays the Transmit Alarms Diagnostics Menu , Figure 3-8, Table 3-8.
N	Display Diagnostics Loopbacks History—Log number, date reported, time reported, description. <pre>HDM > n -- LOOPBACK HISTORY BUFFER ----- alarmlog num=1; 1-29-1997;7:22:44;Enable User Payload Loopback alarmlog num=2; 1-29-1997;7:23:8;Disable User Payload Loopback alarmlog num=3; 1-29-1997;7:23:56;Disable FAREND Payload Loopback alarmlog num=4; 1-29-1997;7:24:33;Enable User Equipment Loopback Hit Return to display diag loopback buffer again or X to exit</pre>

Command	Function Description
D	<p>Display Diagnostics Alarms History—Log number, date reported, time reported, description.</p> <pre>HDM > d --- TRANSMIT ALARM BUFFER ----- alarmlog num=1; 1-29-1997;7:8:11;Enable AIS Alarm alarmlog num=2; 1-29-1997;7:8:11;Enable DS3 FEAC Loss of Signal Alarm alarmlog num=3; 1-29-1997;7:23:56;Enable Transmit Line Loopback Deact alarmlog num=4; 1-29-1997;7:23:56;Enable Transmit DS3 FEAC Line code Hit Return to display alarm buffer again or X to exit</pre>
H or I	<p>Real-Time Display HSSI Port <i>n</i> Status—Displays the current state of the chosen HSSI port leads.</p> <pre>HDM > h ----- HSSI PORT A REAL TIME STATUS ----- (Press X to exit) TEST: off DCE: off DTE: off LPBK A: off LPBK B: off HDM > i ----- HSSI PORT B REAL TIME STATUS ----- (Press X to exit) TEST: off DCE: on DTE: off LPBK A: off LPBK B: off</pre>
X	<p>exit menu—Returns you to the Main Menu, Figure 3-1.</p>

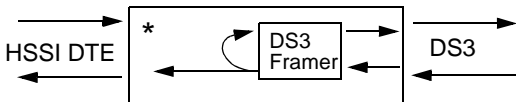
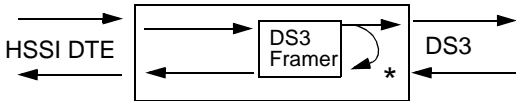
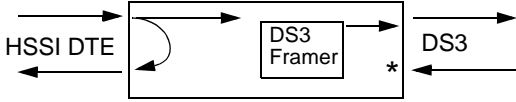
Port Loopback Diagnostics Menu

By returning transmitted signals to their source for comparison, loopbacks allow you to check the accuracy of the data transmission. To access these diagnostic options, select L on the **Port Diagnostics Menu** to display the **Port Loopback Diagnostics Menu**.

Figure 3-7 Port Loopback Diagnostics Menu

```
HDM > l
      ----- PORT LOOPBACK DIAGNOSTICS MENU -----
D)   DS3 Port Loopback       : No Loopback
H)   HSSI Port A Loopback    : No Loopback
I)   HSSI Port B Loopback    : No Loopback
      DS3 FEAC Loopback      : Deactivated
      FE DS3 Payload Loopback : Deactivated
X)   exit menu
HDM >
```

Table 3-7 Port Loopback Diagnostics Menu Commands

Command	Description
<p>D</p>	<p>Note: All data coming into/out of the port marked with the * is dropped.</p> <p>DS3 Port Loopback—Select 1 for no loopback to deactivate an existing loopback. Select 2 for a user payload loopback, which will cause the Net LED to turn amber. Select 3 for a user local loopback, which will cause the Data LED to turn amber. User = near end.</p> <p>HDM > d</p> <p>Set DS3 Loopback state:</p> <p>1) No Loopback</p> <p>2) User Payload Loopback</p> <p>3) Local loopback</p> <p>Enter your choice (Press Enter if no change) ></p> <p>User Payload Loopback</p>  <p>User Local Loopback</p> 
<p>H or II</p>	<p>HSSI Port Loopbacks—After selecting H for HSSI Port A or I for HSSI Port B, select 1 for No Loopback to deactivate an existing loopback. Select 2 to start a user equipment loopback. When activated, the Data LED will turn amber. User = near end.</p> <p>HDM > n</p> <p>Set HSSI Port n Loopback state:</p> <p>1) No Loopback</p> <p>2) User Equipment Loopback</p> <p>Enter your choice (Press Enter if no change) ></p> <p>HSSI Port Loopback (User Equipment Loopback)</p> 
<p>X</p>	<p>exit menu—Returns you to the Diagnostics Menu, Figure 3-6.</p>

Transmit Alarms Diagnostics Alarms

To verify that the far end (FE) can “see” transmitted alarms, select T from the **Port Diagnostics Menu** to display the **Transmit Alarms Diagnostics Menu**. This menu provides options for transmitting various types of alarms to the far end to verify connection.

NOTE: Only one FEAC alarm can be sent at a time.

Figure 3-8 Transmit Alarms Diagnostics Menu

```
--- TRANSMIT ALARMS DIAGNOSTICS MENU ---
Y) Transmit Yellow Alarm ..... off
A) Transmit AIS Alarm ..... off
S) Transmit IDLE Signal ..... off
F) Transmit FEBE ..... off
E) Transmit FEAC DS3 EQUIPMENT FAILURE (SA). off
L) Transmit FEAC DS3 LOS/HBER Alarm ..... off
O) Transmit FEAC DS3 Out-Of-Frame ..... off
R) Transmit FEAC DS3 AIS Received ..... off
I) Transmit FEAC DS3 Idle Received ..... off
C) Transmit FEAC DS3 Common Eqpt. Fail ..... off
P) Transmit FEAC DS3 EQUIPMENT FAILURE (NSA) off
X) exit menu
HDM >
```

Table 3-8 Transmit Alarms Diagnostics Menu Options

Command	Description
Y	<p>Transmit Yellow Alarm—Toggles transmission of RAI (Remote Alarm Indication signal) on and off to enable or disable transmission of the far end receive failure in the outgoing DS3 stream.</p> <p>HDM > y</p> <p>Set Yellow Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>
A	<p>Transmit AIS Alarm—Toggles transmission of AIS (Alarm Indication Signal), a pattern of unframed all ones, on and off to notify the other end that an alarm is being received.</p> <p>HDM > a</p> <p>Set AIS Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>
S	<p>Transmit IDLE Signal—Toggles transmission of idle code on and off. The idle signal is used for keeping the line active when no data signals are being sent.</p> <p>HDM > s</p> <p>Set IDLE Signal Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>
F	<p>Transmit FEBE—Far-End Block Error—Toggles transmission of the Far End Block Error alarm message on and off. It controls the insertion of Far End Block Errors in the outgoing DS3 stream.</p> <p>HDM > f</p> <p>Set FEBE Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>
E	<p>Transmit FEAC DS3 EQUIPMENT FAILURE (SA)—Conditions to cause activation of this FEAC signal alarm are not defined for this module.</p> <p>HDM > e</p> <p>Set Equipment FAIL SA Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>
L	<p>Transmit FEAC DS3 LOS/HBER Alarm—A LOS failure is declared when an incoming LOS defect persists during a range of 2 to 10 seconds. The LOS failure is cleared when the LOS defect is absent for 20 seconds.</p> <p>HDM > l</p> <p>Set LOS Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>
O	<p>Transmit FEAC DS3 Out-of-Frame—A Loss of Frame (LOF) failure is declared when the OOF defect persists during a range of 2 to 10 seconds. The LOF is cleared when the OOF defect is absent for 20 seconds.</p> <p>HDM > o</p> <p>Set FEAC OOF Alarm</p> <p>Enter 1) Disabled 2) Enabled) ></p>

Command	Description
R	Transmit FEAC DS3 AIS Received—An Alarm Indication Signal failure is declared when an incoming AIS defect persists during a range of 2 to 10 seconds. The AIS is cleared when the AIS defect is absent for 20 seconds. HDM > r Set AIS Receive Alarm Enter 1) Disabled 2) Enabled) >
I	Transmit FEAC DS3 Idle Received—An Idle Signal condition is declared when the Idle Signal persists for 2 to 10 contiguous 1-second intervals. The Idle Signal condition is cleared when it has been absent for 20 seconds. HDM > i Set FEAC IDLE Alarm Enter 1) Disabled 2) Enabled) >
C	Transmit FEAC DS3 Common Eqpt. Fail—Conditions to cause activation of this FEAC signal alarm are not defined for this module. HDM > c Set Transmit Common Equipment FAIL Alarm Enter 1) Disabled 2) Enabled) >
P	Transmit FEAC DS3 EQUIPMENT FAILURE (NSA)—Conditions to cause activation of this FEAC signal alarm are not defined for this module. HDM > p Set EQUIP FAIL (NSA) Alarm Enter 1) Disabled 2) Enabled) >
X	exit menu—Returns you to the Diagnostics Menu , Figure 3-6.

DS3 Performance Monitoring Menu

Pressing P from the **Main Menu** displays the **DS3 Performance Monitoring** menu. This menu allows you to see the 24-hour and quarter-hour (15-minute) performance of the selected module for the near end (NE) and a *locally-limited* set of information for the far end (FE).

Figure 3-9 DS3 Performance Monitoring Menu

```

HDM > p
    --- DS3 PERFORMANCE MONITORING ---
L)   NE Performance Monitoring
F)   Local FE Performance Monitoring
C)   24 Hr. Alerts Crossing Threshold (NE)
Q)   Qtr. Hr. Alerts Crossing Threshold (NE)
A)   24 Hr. Alerts Crossing Threshold (Local FE)
B)   Qtr. Hr. Alerts Crossing Threshold (Local FE)
R)   Reset NE Performance Counters
S)   Reset Local FE Performance Counters
X)   exit menu
HDM >

```

Table 3-9 Performance Monitoring Menu Command Options

Command	Description
L	NE Performance Monitoring—Displays the DS3 NE Performance Monitoring menu, Figure 3-10.
F	Local FE Performance Monitoring—Displays the DS3 Layer Local FE Performance Monitoring menu, Figure 3-12.
C	24 Hr Alerts Crossing Threshold (NE)—Displays the DS3 Layer Performance Alert Thresholds menu, Figure 3-13.
Q	Qtr Hr Alerts Crossing Threshold (NE)—Displays the DS3 Qtr Hr Alerts Crossing Threshold menu Figure 3-14.
A	24 Hr Alerts Crossing Threshold (Local FE)—Displays the DS3 24 Hr Local FE Alerts Crossing Threshold menu, Figure 3-15.
B	Qtr Hr Alerts Crossing Threshold (Local FE)—Displays the DS3 Qtr Hr Local FE Alerts Crossing Threshold menu, Figure 3-16.
R	Reset NE Performance Counters—Resets the DS3 NE Performance Counters.
S	Reset Local FE Performance Counters—Resets the DS3 Local FE Performance Counters.
X	exit menu—Returns you to the Main Menu, Figure 3-1.

DS3 NE Performance Monitoring Menu

Pressing L from the **DS3 Performance Monitoring Menu** displays the **DS3 NE Performance Monitoring Menu**. This menu displays the 24-hour near-end performance in 96 15-minute intervals for the parameters shown in the following figure and described in Table 3-10.

Figure 3-10 DS3 NE Performance Monitoring Menu

```

--- DS3 NE Performance Monitoring ---
C) 24 hr. LCV
E) 24 hr. LES
S) 24 hr. LSES
V) 24 hr. P-bit CV
R) 24 hr. P-bit CV ES
M) 24 hr. P-bit CV SES
P) 24 hr. C-bit CV
B) 24 hr. C-bit CV ES
I) 24 hr. C-bit CV SES
F) 24 hr. SEFS
A) 24 hr. AISS
U) 24 hr. UAS
L) 24 hr. LOSS
O) 24 hr. LOFS
X) exit
HDM >
    
```

To display the data for any of the parameters listed in the **DS3 NE Performance Monitoring Menu**, type the letter command for that particular parameter.

Table 3-10 Performance Monitoring Menu Command Choices

Command	Description
C	24 hour LCV—Line Code Violation: Displays the 24 hour NE LCV performance data register, Figure 3-11.
E	24 hour LES—Line Errored Seconds: Displays the 24 hour NE LES performance data register.
S	24 hour LSES—Line Severely Errored Seconds: Displays the 24 hour NE LSES performance data register in 96 15-minute intervals.
V	24 hour P-bit CV—P-bit Code Violation: Displays the 24 hour NE P-bit CV performance data register.
R	24 hour P-bit CV ES—P-bit Code Violation Errored Seconds: Displays the 24 hour NE P-bit CV ES performance data register.
M	24 hour P-bit CV SES—P-bit Code Violation Severely Errored Seconds: Displays the 24 hour NE P-bit CV SES performance data register.
P	24 hour C-bit CV—C-bit Code Violation: Displays the 24 hour NE C-bit CV performance data register.
B	24 hour C-bit CV ES—C-bit Code Violation Errored Seconds: Displays the 24 hour NE C-bit CV ES performance data register.
I	24 hour C-bit CV SES—C-bit Code Violation Severely Errored Seconds: Displays the 24 hour NE C-bit CV SES performance data register.
F	24 hour SEFS—Severely Errored Framing Seconds: Displays the 24 hour NE SEFS performance data register. Severely Errored Framing Seconds are those seconds in which two or more framing bit errors occur within a 3-millisecond period. For ESF, this interval may or may not coincide with an ESF (i.e., six framing bits).
A	24 hour AISS—Alarm Indication Signal Seconds: Displays the 24 hour NE AISS performance data register.
U	24 hour UAS—Unavailable Seconds: Displays the 24 hour NE UAS performance data register. An Unavailable Second is counted for every second in which an Unavailable Signal State occurs (This term is used by new standards in place of Failed Seconds). The Unavailable Signal State is declared whenever 10 consecutive Severely Errored Seconds (SES) occur. The Unavailable Signal State will not clear until 10 consecutive seconds of data are processed with no SES present.
L	24 hour LOSS—Loss of Signal Seconds: Displays the 24 hour NE LOSS performance data register. A Loss of Signal is the state of a network line when no bits are detected on input to the receiving equipment. The time for detection of Loss of Signal will vary depending on the type of equipment used. A Loss of Signal Second is a second during which the equipment detects no signal.
O	24 hour LOFS—Loss of Frame Seconds: Displays the 24 hour NE LOFS performance data register. A Loss of Frame occurs when the framing bit of the data packet is not detected by the receiving equipment. A Loss of Frame Second is a second during which the equipment can not detect the framing bit of the data packet.
X	exit—Returns you to the DS3 Performance Monitoring Menu , Figure 3-9.

Performance Data Displays For example, to see the 24 hr Near End Line Code Violation Performance Data:

HDM > C

The **24 Hour NE LCV Performance Data** screen displays:

Figure 3-11 24 Hour NE LCV Performance Data Display

24 HOUR NE LCV PERFORMANCE DATA 6-20-1997 10:52:04					
Site Name: VeriLink Corp, San Jose					
Valid Intervals 2		Seconds in Current Interval 424			
NE LCV in 24 Hours 0		NE LCV in Current Interval 0			
1: 0	17: -	33: -	49: -	65: -	81: -
2: 0	18: -	34: -	50: -	66: -	82: -
3: -	19: -	35: -	51: -	67: -	83: -
4: -	20: -	36: -	52: -	68: -	84: -
5: -	21: -	37: -	53: -	69: -	85: -
6: -	22: -	38: -	54: -	70: -	86: -
7: -	23: -	39: -	55: -	71: -	87: -
8: -	24: -	40: -	56: -	72: -	88: -
9: -	25: -	41: -	57: -	73: -	89: -
10: -	26: -	42: -	58: -	74: -	90: -
11: -	27: -	43: -	59: -	75: -	91: -
12: -	28: -	44: -	60: -	76: -	92: -
13: -	29: -	45: -	61: -	77: -	93: -
14: -	30: -	46: -	62: -	78: -	94: -
15: -	31: -	47: -	63: -	79: -	95: -
16: -	32: -	48: -	64: -	80: -	96: -
Press Enter to exit					

The other selections from the **Performance Monitoring Menu** (Figure 3-9) and the performance monitoring submenus produce similar performance data displays. To exit any of the performance data displays, press the ENTER key. The screen will refresh with the performance monitoring submenus, which will be ready for other commands at the prompt. To move further up the menu hierarchy, press X to exit your current screen and move to higher menu levels.

DS3 Layer Local Far-End Performance Monitoring Submenu

Far-end 24-hour performance can be accessed by a limited near-end (local) connection. Typing F for the **Local FE Performance Monitoring** option from the **DS3 Performance Monitoring Menu** displays the limited **DS3 Layer Local FE Performance Monitoring** submenu. Selecting any of the options will display the performance of that parameter in 96 15-minute increments for the previous 24 hours.

Figure 3-12 DS3 Layer Local FE Performance Monitoring Submenu

```

HDM > f
      --- DS3 Layer Local FE PERFORMANCE MONITORING ---
P)   24 hour C-bit CV
B)   24 hour C-bit CV ES
I)   24 hour C-bit CV SES
U)   24 hour UAS
X)   exit menu
HDM >

```

DS3 Layer Performance Alert Thresholds Submenu (24 Hr. NE)

To change the threshold values for near-end 24-hour alerts, select C for the 24 Hr. Alerts Crossing Threshold (NE) option from the **DS3 Performance Monitoring Menu** to display the **DS3 Layer Performance Alert Thresholds** submenu. The values shown are defaults established in Bellcore Technical Reference, OTGR 5.1, TR-TSY-000820.

Figure 3-13 DS3 Layer Performance Alert Thresholds Submenu

```

HDM > c
      --- DS3 Layer Performance Alert Thresholds ---
C)   LCV threshold value      : 3865
E)   LES threshold value     : 864
S)   LSES threshold value    : 40
P)   P-bit CV threshold value : 3820
B)   P-bit CV ES threshold value : 864
I)   P-bit CV SES threshold value : 40
V)   C-bit CV threshold value : 3820
R)   C-bit CV ES threshold value : 864
M)   C-bit CV SES threshold value : 40
F)   SEFS threshold value    : 8
A)   AISS threshold value    : 8
U)   UAS threshold value     : 10
L)   LOS threshold value     : 8
O)   LOFS threshold value    : 8
X)   exit menu
HDM >

```

DS3 Layer Performance Alert Thresholds Submenu (Qtr. Hr. NE)

To change the threshold values for near-end quarter-hour alerts, select Q for the Qtr. Hr. Alerts Crossing Threshold (NE) option from the **DS3 Performance Monitoring Menu** to display the **DS3 Layer Performance Alert Thresholds** submenu. The values shown are defaults established in Bellcore Technical Reference, OTGR 5.1, TR-TSY-000820.

Figure 3-14 DS3 Layer Performance Alert Thresholds Submenu

```

HDM > q
    --- DS3 Layer Performance Alert Thresholds ---
C)   LCV threshold value      : 387
E)   LES threshold value     : 86
S)   LSES threshold value    : 4
P)   P-bit CV threshold value : 382
B)   P-bit CV ES threshold value : 86
I)   P-bit CV SES threshold value : 4
V)   C-bit CV threshold value : 382
R)   C-bit CV ES threshold value : 86
M)   C-bit CV SES threshold value : 4
F)   SEFS threshold value    : 2
A)   AISS threshold value    : 2
U)   UAS threshold value     : 10
L)   LOS threshold value     : 2
O)   LOFS threshold value    : 2
X)   exit menu
HDM >
    
```

DS3 Layer Performance Alert Thresholds Submenu (24 Hr. FE)

To change the threshold values for limited far-end 24-hour alerts, select **A** for the **24 Hr. Alerts Crossing Threshold (Local FE)** option from the **DS3 Performance Monitoring Menu** to display the **DS3 Layer Performance Alert Thresholds** submenu. The values shown are defaults established in Bellcore Technical Reference, OTGR 5.1, TR-TSY-000820.

Figure 3-15 DS3 Layer Performance Alert Thresholds Submenu

```

HDM > a
    --- DS3 Layer Performance Alert Thresholds ---
P)   CCV threshold value     : 2200
B)   CES threshold value     : 864
I)   CSES threshold value    : 40
U)   UAS threshold value     : 10
X)   exit menu
HDM >
    
```

DS3 Layer Performance Alert Thresholds Submenu (Qtr. Hr. FE)

To change the threshold values for limited far-end quarter-hour alerts, select **B** for the **Qtr. Hr. Alerts Crossing Threshold (Local FE)** option from the **DS3 Performance Monitoring Menu** to display the **DS3 Layer Performance Alert Thresholds** submenu. The values shown are defaults established in Bellcore Technical Reference, OTGR 5.1, TR-TSY-000820.

Figure 3-16 Qtr Hr Alerts Crossing Threshold (Local FE) (DS3 Layer Performance Alert Thresholds Submenu)

```

HDM > b
      --- DS3 Layer Performance Alert Thresholds ---
P)   CCV threshold value : 382
B)   CES threshold value : 86
I)   CSES threshold value : 4
U)   UAS threshold value : 10
X)   exit menu
HDM >

```

Restore Manufacturing Default Config Menu

To restore the manufacturing defaults for the HDM 2182, type the command **B** from the **Main Menu** selection:

B) restore manufacturing default config

The **Restore Manufacturing Default Config Menu** is displayed. Note that if you restore the manufacturing defaults after installing your card and after setting parameters and configuring the ports, you will have to reboot the board/module, and your system may be adversely affected.

Figure 3-17 Restore Manufacturing Default Config Menu

```

HDM > b
      --- RESTORE MANUFACTURING DEFAULT CONFIG MENU ----
A)   TX Diagnostic Alarms
D)   Day Alert Thresholds
Q)   Qrt. Hr. Alert Thresholds
P)   DS3 Port Configuration
S)   SNMP Configuration
H)   HSSI Port A & B Configuration
X)   exit menu
HDM >HDM >

```

Table 3-11 Restore Manufacturing Default Config Menu Options

Command	Description
A	<p>TX Diagnostic Alarms—Sets the transmission of diagnostic alarms to the manufacturing defaults.</p> <p>HDM > a</p> <p>Set TX Diagnostic Alarms to Manufacturing Default? (Y/N) >y</p> <p>TX Diagnostic Alarms value is set to Default.</p> <p>System could be in Unknown State. Please REBOOT the board!!</p>
D	<p>Day Alert Thresholds—Sets the 24-hour day alert thresholds to the manufacturing defaults.</p> <p>HDM > d</p> <p>Set Day Alert Thresholds to Manufacturing Default? (Y/N) >y</p> <p>Day Alert Thresholds value set to Default.</p> <p>System could be in Unknown State. Please REBOOT the board!!</p>
Q	<p>Qrt. Hr. Alert Thresholds—Sets the quarter hour (15-minute) thresholds to the manufacturing defaults.</p> <p>HDM > q</p> <p>Set Qrt. Hr. Alert Thresholds to Manufacturing Default? (Y/N) >y</p> <p>Qrt. Hr. Alert Thresholds value set to Default.</p> <p>System could be in Unknown State. Please REBOOT the board!!</p>
P	<p>DS3 Port Configuration—Sets the DS3 Port Configuration to the manufacturing defaults.</p> <p>HDM > p</p> <p>Set DS3 Port Configuration to Manufacturing Default? (Y/N) >y</p> <p>DS3 Port Configuration value set to Default.</p> <p>System could be in Unknown State. Please REBOOT the board!!</p>
S	<p>SNMP Configuration—Sets the SNMP Configuration to the manufacturing defaults.</p> <p>HDM > s</p> <p>Set SNMP Configuration to Manufacturing Default? (Y/N) >y</p> <p>SNMP Configuration value set to Default.</p> <p>System could be in Unknown State. Please REBOOT the board!!</p>
H	<p>HSSI Port A & B Configuration—This option sets the HSSI Ports A and B Configurations to the manufacturing defaults.</p> <p>HDM > h</p> <p>Set HSSI Port A & B Configuration to Manufacturing Default? (Y/N) >y</p> <p>HSSI Port A & B Configuration value is set to Default.</p> <p>System could be in Unknown State. Please REBOOT the board!!</p>
X	<p>exit menu—Returns you to the Main Menu, Figure 3-1.</p>

Alarm Monitoring

To see real-time, continuous alarm notifications, from the **Main Menu**, select:

R) monitor alarms

to display the **Alarm Monitoring** screen:

Figure 3-18 Alarm Monitoring Display

```
HDM > r
          ----- ALARM MONITORING -----
          T: top menu alarms - D: diagnostics alarms - L: loopback alarms
          (Hit X to exit or Return to erase the screen)
          T: alarm log num=15; 1-29-1997; 7: 15: 11; (1/4 hour)DS3 UAS alert cross the threshold
          T: alarm log num=16; 1-29-1997; 7: 15: 11; (1/4 hour)DS3 FE UAS alert cross the threshold
```

Below the title of the **Alarm Monitoring Menu**, there is a descriptor telling which alarm buffer each real-time alarm will be stored in.

Each listed alarm will have a T, D, or L displayed in front of it. "T" alarms are stored under the "View alarm buffer" option found in the **Main** (top level) **Menu**. "D" alarms are stored under the "Display Diagnostics Loopbacks History" option in the **Diagnostics Menu**. "L" alarms are stored under the "Display Diagnostics Alarms History" option, also in the **Diagnostics Menu**.

If no alarms are active, the display is empty.

Once you press ENTER or you exit the real-time alarm display, the alarm message can be found in its respective buffer and is no longer visible in the real-time alarm monitoring screen.

Alarm Buffer

To see a historical listing of alarms, type **A** from the **Main Menu** to display the **Alarm Buffer**. Press ENTER to re-display the **Alarm Buffer**, or press X to exit to the **Main Menu**.

Figure 3-19 Alarm Buffer

```
          ----- ALARM BUFFER -----
          alarm log num=1; 9-11-1996; 4: 26: 17; declare loss of transmit clock
          Press Enter to display alarm buffer again or C to clear alarm buffer or X to exit
          T
          ----- ALARM BUFFER -----
          alarm log num=1; 3-25-1996; 11: 17: 1; declare Out of Frame in DS3 layer
          alarm log num=2; 3-25-1996; 11: 17: 3; declare DS3 layer Loss Of Frame
          alarm log num=3; 3-25-1996; 11: 17: 6; (1/4 hour)DS3 SEFS alert cross the threshold
          Hit Return to display alarm buffer again or X to exit
```

ASCII Access Settings

To access an HDM 2182 on the node from an ASCII terminal connected to the Local port on an NCM 2000:

1. Ensure that your terminal parameters are set to the following values:
 - 19.2 kbit/s
 - 8 data bits
 - no parity
 - one stop-bit
 - no flow-control

Be sure that **X-ON/X-OFF** flow control is disabled.

2. Type “craft” and press ENTER.
3. At the **PASSWORD:** prompt, press ENTER.

Until you change the password, the ENTER key is the default password. If you have changed the password or have been assigned a password, type the correct password (up to 8 characters, including spaces). The screen will display placeholders (*****) as you type the password. After typing the password, press ENTER.

The password of the NCM 2000 determines the level of access available with the various functions of the HDM 2182. See the *NCM 2000 User Manual* for more information about this security feature.

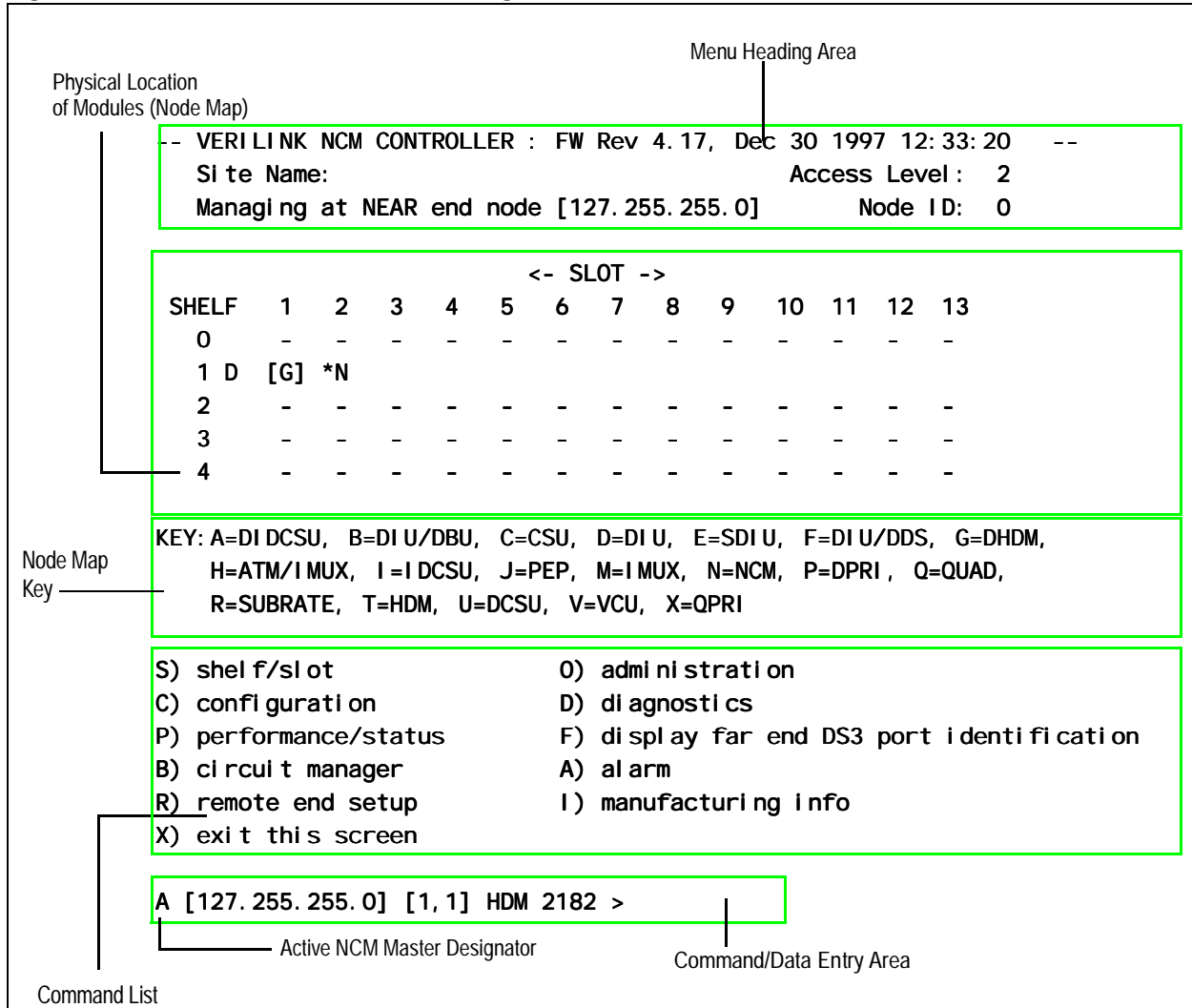
NCM Controller Menu (Main Menu)

The **NCM Controller Menu (Main Menu)** displays the contents of slots in the shelves of the selected node. This manual deals with the HDM 2182 module in particular and the NCM module with regard only to how the NCM module interacts with the HDM 2182 module. In the **Main Menu**:

- Slots display a **G** at the intersection of rows and columns that designate the shelf/slot location of the HDM 2182 module.
- The letter **N** displays the NCM module location.
- The letter surrounded by brackets ([]) designates the location of the currently active module that can be referenced and modified using the displayed menu.
- On initial log in, the brackets surround the module being used as the log-in access point (for example, the NCM).
- The **Main Menu** option **S** (shelf/slot) is used to move to a desired module in the node.

In Figure 4-1, the **Main Menu** shows an HDM 2182 (designated by **G**) in slot 1. From the **S** shelf/slot command, the currently accessed module indicated by the square brackets ([]) has been changed to the HDM 2182 in slot 1. The asterisk next to the **N** indicates that the NCM 2000 module is the node master. The **A** at the beginning of the prompt line indicates that the NCM 2000 you are accessing is the active NCM master.

Figure 4-1 NCM Controller Menu (Showing HDM 2182 at Shelf 1, Slot 1)



When accessing the HDM 2182 via the NCM 2000, many of the ASCII screens will differ from those accessed via the HDM 2182 Local Port (described in Chapter 3).

Using an NCM in your DS3 network offers several advantages:

- Higher security on the network with four levels of access using password control.
- Verilink’s proprietary overhead bandwidth enables you to configure and troubleshoot the far-end node without interference from repeaters in the network. The “inband channel” requires the C-bit parity format.
- Up to three users can access the DS3 module at a time.

The following commands are available on the **NCM Controller Menu** (the **Main Menu**) to set and manage many of the HDM 2182 parameters (for more extensive information about the NCM module, see the *NCM 2000 User Manual*):

Table 4-1 HDM 2182 NCM Controller Menu Commands

Command	Description
S	Shelf/slot: Using this command, you can navigate from one card to another. Table 4-2
O	Administration, Figure 4-2, Table 4-3.
C	Configuration, Figure 4-3, Table 4-4.
D	Diagnostics, Figure 4-7, Table 4-8.
P	Performance/status, Figure 4-13, Table 4-11.
F	Display far end DS3 port identification, Figure 4-20.
A	Alarm, Figure 4-18.
B	Circuit manager—This option is not used with the HDM 2130. For more information on this option, see the NCM manual.
R	Remote end setup, Figure 4-6, Table 4-7.
I	Manufacturing info—Displays the firmware and hardware version information for the appropriate card, Figure 4-21.
X	Exit this menu and log out.

Shelf and Slot Parameters

When accessing the HDM 2182 via the NCM Module, this will always be the first option to be chosen before any parameters on the HDM 2182 can be monitored or modified. Once the shelf/slot address for the HDM 2182 has been selected from the **Main Menu** and the screen is refreshed by pressing the ENTER key, the **Main Menu**'s prompt will display the shelf/slot address of the HDM 2182.

Table 4-2 Shelf and Slot Parameters

Command	Description	Options
S	Shelf: Use this field to select the shelf containing the HDM 2182 you want to access.	0-4
	Slot: Use this field to select the slot containing the HDM 2182 you want to access.	1-13 (Multi-line) 1-5 (Quint-line) 1-2 (Dual-line)

HDM 2182 Card Administration

Once the shelf/slot address for the HDM 2182 has been selected from the **Main Menu** and the screen is refreshed by pressing the ENTER key, the **Main Menu**'s prompt will display the shelf/slot address of the HDM 2182. Selecting the command **O** from the **Main Menu** will display the **Card Administration Submenu**.

Figure 4-2 Card Administration Menu via NCM

```

A [127.255.255.0] [1,1] HDM 2182 > o
-- NCM CONTROLLER ADMINISTRATION MENU --
Date/Time/Zone:          97-06-21 23:10:17
Node Address:            [127.255.255.0]
Node ID:                 0
Site Name:
System Uptime:          23:07:34
--- HDM 2182 -- Card Administration -- [01,01] ---
O) switch over permanent
P) change password
Q) query firmware
R) reset card
Y) switch over once
U) clear card configuration
X) exit this screen
A [127.255.255.0] [1,1] HDM 2182 >

```

Table 4-3 Card Administration Menu Commands

Command	Description	Options
O	Switch over permanent—Designates partition A or B and its corresponding firmware version when you reboot the card. Assign a permanent partition to boot from in case of power failure. Before choosing a partition, ensure that a firmware version exists on both partitions using the Query Firmware command below.	1) A 2) B
P	Change Password—Assigns a new password. Enter the password at the prompt. Then enter the new password and press the ENTER key. Confirm the new password by reentering it. (16 Characters Max)	
Q	Query Firmware—Displays the firmware versions and status for the A or B partitions.	
R	Reset Card—Reboots the card. This option re-initializes the operation of the firmware currently executing in RAM. It resets the system registers and restarts the current firmware operation.	
Y	Switch Over Once—Use this option mainly when testing new firmware versions. This option allows you to change from partition A to B or vice versa and overrides the partition specified in the “Switch Over Permanent” option, above. This option causes the specified flash to be loaded into memory and starts it; however, on the next cycling of power, the permanent partition will be again loaded and started.	1) A 2) B
U	Clear Card Configuration—Clears the configuration of the module and returns it to the default settings. A [127.255.255.0] [0,0] HDM 2182 > u Clear card configuration on shelf 1 slot 1 (Y/N)? y Card configuration cleared	
X	Exit this Screen—Returns you to the Main Menu , Figure 4-1.	

Configuration Menu

Typing the command C from the **Main Menu** displays the **HDM Configuration Menu**. This menu provides access to the menus used to configure your DS3 port or your HSSI ports.

Figure 4-3 Configuration Menu

```
A [127.255.255.0] [1, 1] HDM 2182 > c
-- HDM 2182 CONFIGURATION MENU --
P) DS3 Port Setup           H) HSSI A Port Setup
I) HSSI B Port Setup
x) Exit this screen
A [127.255.255.0] [1, 1] HDM 2182 >
```

Table 4-4 Configuration Menu Commands

Command	Description
P	Port Setup—Displays the HDM 2182 Port Configuration Menu , Figure 4-4, Table 4-5.
H or I	HSSI Setup—These options (H or I) display the HDM 2182 HSSI Port (A or B) Configuration Menu , example provided at Figure 4-5, Table 4-6.
X	Exit this Screen—Returns you to the Main Menu , Figure 4-1.

Port Configuration Menu (DS3)

From the **Configuration Menu**, pressing P for the **DS3 Port Set Up** option will display the **Port Configuration Menu** which is used for setting the DS3 parameters. The line code is set at B3ZS and the Alarm Indication Signal (AIS) C-bit is set for 0 (zero). These options are used in the C-bit parity line type. Various alarm functions and performance monitoring functions are not available with the M1-3 line type.

Figure 4-4 Port Configuration Menu (DS3)

```

A [127.255.255.0] [1,1] HDM 2182 > p
-- HDM 2182 Port Configuration Menu --
- Line Code                B3ZS
- AIS C-Bit                0
T) Timing                  Recover Clock
B) Line Build Out          Long Cable > 250 ft
H) Line Type               C-Bit Parity
R) Performance Control    Off
E) Equipment ID
L) Location ID
F) Frame ID
U) Unit ID
A) Facility ID
P) Port ID
C) Circuit ID
G) Test Sig ID
I) Inband Control         Disable
X) Exit this screen
A [127.255.255.0] [1,1] HDM 2182 >

```

Table 4-5 HDM 2182 Port Configuration Menu

Command	Description	Options
T	Timing—Selecting this option will display the HDM 2182 Timing Configuration Menu, which will in turn give the various options for the timing. If the synchronization option is selected, you will be presented with the three options listed below. <pre> A [127.255.255.0] [1,1] HDM 2182 > t -- HDM 2182 Timing Configuration Menu -- Source Synchronization Auto Restore PRIMARY S) Recover Clock -- YES X) Exit this screen A [127.255.255.0] [1,1] HDM 2182 > s Select Timing: 1) RECOVER 2) EXTERNAL T3 3) INTERNAL CLK </pre>	1) Recover 2) External T3 3) Internal CLK
B	Line Build Out—Toggles between Normal Cable (less than 250 ft) and Long Cable (greater than 250 ft). The selection reflects the distance to an optical multiplexer or T3 repeater on the network side.	1) Normal cable 2) Long cable
H	Line Type—Toggles between C-bit parity (default) and M13. Note that only the selection of C-bit will allow the use of inband control features. This is because the M13 multiplexing standard does not reserve as much bandwidth for framing overhead, giving the user more bandwidth for the payload.	1) C-bit 2) M13
R	Performance Control—Toggles performance control between On and Off for the use of the C-bit for controlling a far-end unit.	1) On 2) Off
E	Equipment ID—This optional parameter allows you to enter up to 10 characters to describe your DTE equipment. It will also prompt if you want to clear the string.	

Command	Description	Options
L	Location ID—This optional parameter allows you to enter up to 11 characters to describe the location of your equipment. It will also prompt if you want to clear the string.	
F	Frame ID—This optional parameter allows you to enter up to 10 characters to define the Frame ID. It will also prompt if you want to clear the string.	
U	Unit ID—This optional parameter allows you to enter up to 6 characters to define the Unit ID. It will also prompt if you want to clear the string.	
A	Facility ID—This optional parameter allows you to enter up to 38 characters to define the Facility ID. It will also prompt if you want to clear the string.	
P	Port ID—This optional parameter allows you to enter up to 38 characters to define the Port ID. It will also prompt if you want to clear the string.	
C	Circuit ID—This optional parameter allows you to enter up to 26 characters to define the Circuit ID. It will also prompt if you want to clear the string.	
G	Test Sig ID—This optional parameter allows you to enter a single character to define the Test Signal ID. It will also prompt if you want to clear the string.	
I	Inband Control—Toggles between Enable and Disable for an inband channel between the NE and FE DS3 ports.	1) Enable 2) Disable
X	Exit this screen—Returns you to the HDM Configuration Menu , Figure 4-4.	

HSSI Port *n* Configuration Menus

Selecting either **H** or **I** from the **Configuration Menu** displays the **HSSI Port *n* Configuration Menu** (that for HSSI Port A is shown below as an example).

Figure 4-5 HSSI Port A Configuration Menu

```

-- HDM 2182 HSSI A Configuration Menu --

I) Circuit ID          Port A
P) Port Status        OUT OF SERVICE
M) Configuration Mode Automatic
D) HSSI Data Rate Mode NE Only
R) HSSI Data Rate     14, (22.4 Mbps)
A) Data Scramble      Disable
X) Exit this screen

A [127.255.255.0] [1, 1] HDM 2182 >
    
```

Table 4-6 HSSI Port A Configuration Menu Commands

Command	Description	Options
I	Circuit ID—A label for the circuit on this HSSI port. You may use up to 18 characters for this field.	
P	<p>Port Status—When Configuration Mode (below) is Automatic, the Port Status is an informational display. In Automatic mode the HSSI data port is in service when DTR is presented by the DTE and it is out of service when the DTE fails to assert DTR.</p> <p>When Configuration Mode (below) is set to Manual, the Port Status command becomes a toggle. If Mode = Manual and Port Status = OUT OF SERVICE, then issuing the Port Status command will place the port IN SERVICE, whether or not any DTE is present and whether or not it is asserting DTR. Conversely, if Configuration Mode = Manual and the Port Status = IN SERVICE, issuing the Port Status command will place the port OUT OF SERVICE, stopping all user data.</p> <p>Status command will place the port OUT OF SERVICE, stopping all user data.</p>	1) In Service 2) Out of Service
M	<p>Configuration Mode—The Configuration Mode toggles between Automatic and Manual each time the Configuration Mode Command is issued.</p> <p>When Configuration Mode is Automatic, the Port Status is an informational display. In Automatic mode the HSSI data port is in service when DTR is presented by the DTE and it is out of service when the DTE fails to assert DTR.</p> <p>When Configuration Mode is set to Manual, the Port Status command becomes a toggle. If Mode = Manual and Port Status = OUT OF SERVICE, then issuing the Port Status command will place the port IN SERVICE, whether or not any DTE is present and is asserting DTR. Conversely, if Configuration Mode = Manual and the Port Status = IN SERVICE, issuing the Port Status command will place the port OUT OF SERVICE, stopping all user data.</p>	1) Manual 2) Automatic
D	HSSI Data Rate Mode—This option toggles between NE Only and Both NE & FE. Determines whether data rate changes made at this end are propagated to the remote DS3 module as well. Selecting BOTH NE and FE is suggested.	1) NE Only 2) Both NE & FE
R	HSSI Data Rate—This option displays prompt which allows you to enter a data rate within a range. The bandwidth that will be made available to the DTE on the HSSI interface will be expressed in increments of 1.6 Mbit/s each. ($21 \times 1.6 = 33.6$ Mbit/s).	
A	Data Scramble—If enabled, the actual user data is modified in an industry standard method. This feature has no bearing on encryption or the security of user data. It was added to allow inter-operation of the HDM 2182 with DS3 products from other manufacturers.	A
X	Exit this Screen—Returns you to the HDM Configuration Menu , Figure 4-4.	

Remote End Setup

Selecting **R** from the **Main Menu** displays the **Data Link Layer Remote Configuration** Menu. This option provides the ability to configure key communication characteristics of a DS3 module

connected to the far-end of a DS3 port *before* enabling the inband on this DS3 port. Configuration of the site name, node address, node ID, and inband state permits you to establish initial communication between local and remote units without having to send operators to remote sites to enable inband communication. However, you are limited to one inband session at a time over a DS3 inband channel to the far-end NCM node.

NOTE: *If you plug in a new DS3 at the far end of a DS3 port, and accessing this menu displays an acceptable configuration of node ID and node address, using the "Update NCM Node Table" option will permit the immediate update of the NCM knowledge base. If you do not use the "Update NCM Node Table" option to make the NCM aware of the configuration of remote DS3 units, you will be required to manually enter the information under the **Administration Menu** option "Node Selection".*

NOTE: *If you erroneously save an incorrect configuration using "Update NCM Node Table" you will have to go to the **Administration Menu** option "Node Selection" to delete the incorrect information.*

Figure 4-6 Remote End Setup Menu

```

A [100.94.46.50] [0,4] HDM 2182 > r

--- Data Link Layer Remote Configuration ---
Port  Node Address      Node Id  Name                               Inband
  1    100.94.46.50       0        VERILINK Corp, San                N/Y
B) Inband                               A) Node Address
I) Node Id                               N) Site name
U) Update NCM Node Table                 X) Exit this screen
A [100.94.46.50] [0,4] HDM 2182 >
    
```

Table 4-7 Remote End Setup Menu Commands

Command	Description	Options
B	Inband—Toggles between Enabled and Disabled for an inband channel between NE and FE DS3 ports. This is for using FEAC (Far-End Access and Control) test requests using the C-bit overhead.	1) Enabled 2) Disabled
A	Node Address—Enter the appropriate Node Address (in the form: www, xxx.yyy,zzz) according to instructions from your system administrator.	(www.xxx.yyy.zzz)
I	Node ID—Enter the appropriate Node ID (in the form: www, xxx,yyy,zzz) according to instructions from your system administrator.	(www.xxx.yyy.zzz)
N	Site Name—Use no more than 19 alpha-numeric characters for this field.	
U	Update NCM Node Table—Enables saving the node information in the local NCM for later use. This option should always be used before leaving this screen, if changes have been made to the configuration. Using this option will update the information available under the Administration Menu option of "Node Selection".	
X	Exit this Screen—Returns you to the Main Menu , Figure 4-1.	

Diagnostics Menu

Selecting **D** from the **NCM Controller Menu (Main Menu)** displays the **Diagnostics Menu**, which allows you to display status reports, to configure loopbacks, and to transmit test alarms.

Figure 4-7 Diagnostics Menu

```
A [127.255.255.0] [0,0] HDM 2182 > d
-- HDM 2182 DIAGNOSTICS MENU --
H) HSSI A Status Report      I) HSSI B Status Report
P) Port Status Report
L) Loopback Configure       T) Transmit Alarms
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

Table 4-8 Diagnostics Menu Commands

Command	Description
H or I	HSSI Status Report—Choosing either H or I displays the DS3 HSSI Port (A or B) Status Report for the designated HSSI Port, Figure 4-8. Pressing the ENTER key returns you to the HDM 2182 Diagnostics Menu .
P	Port Status Report—Displays the DS3 Port Status Report, Figure 4-10. Pressing the Enter key returns you to the HDM 2182 Diagnostics Menu .
L	Loopback Configure—Displays the HDM Loopback Options Menu , Figure 4-11, Table 4-9.
T	Transmit Alarms—Displays the HDM Transmit Alarms Menu , Figure 4-12, Table 4-10.
X	Exit this Screen—Returns you to the Main Menu , Figure 4-1.

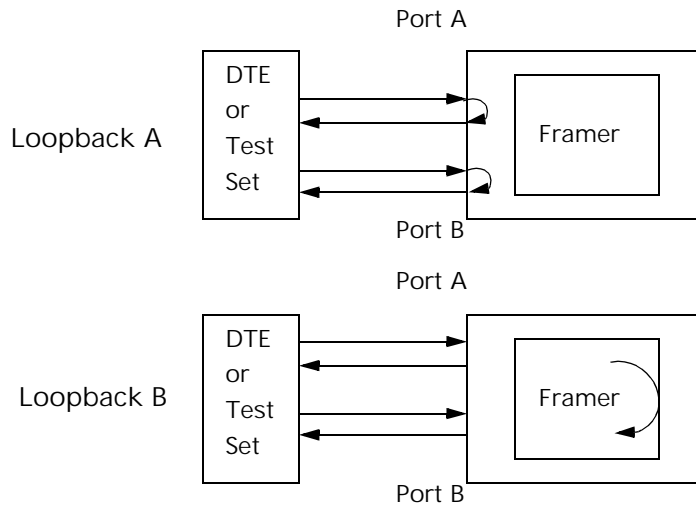
DS3 HSSI Port Status Report

Pressing **H** or **I** from the **Diagnostics Menu** displays the **DS3 HSSI Status Report** for either HSSI Port A or HSSI Port B. Pressing the ENTER key returns you to the **Diagnostics Menu**.

Figure 4-8 DS3 HSSI Port Status Report

```
A [127.255.255.0] [0,0] HDM 2182 > h
-- DS3 HSSI PORT A STATUS REPORT --
CDM 2182 DS3
In Service
Feature ----- State
DCE Ready                On
DTE Ready                Off
Loopback A               Off
Loopback B               Off
Test Mode                Off
Equipment Loopback       Off
Press enter to continue
```

Figure 4-9 Loopbacks A and B



DS3 Port Status Report

Selecting **P** from the **Diagnostics Menu** displays the **DS3 Port Status Report**. Pressing the **ENTER** key returns you to the **Diagnostics Menu**.

Figure 4-10 DS3 Port Status Report

```
A [127.255.255.0] [0,0] HDM 2182 > p
-- DS3 PORT STATUS REPORT --
ALARM ----- State
AIS                      No
IDLE                     No
Yellow Alarm            Yes
Frame Loss              Yes
Signal Loss             Yes
Local Loopback          Disabled
Payload Loopback        Disabled
FEAC Loopback           Disabled
Far-End Loopback        Disabled
Press enter to continue
```

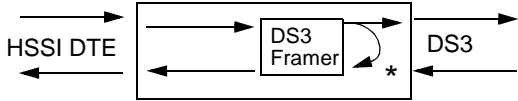

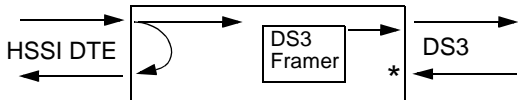
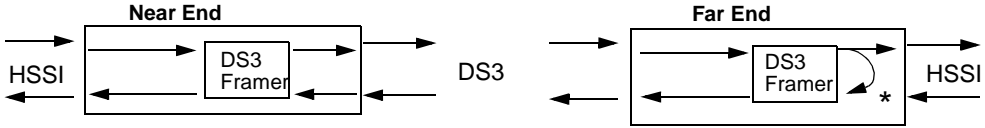
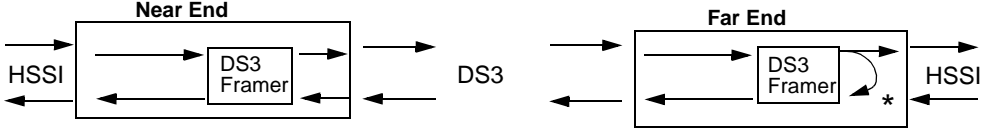
Loopback Options Menu

Selecting **L**) Loopback Configure from the **Diagnostics Menu** displays the **Loopback Options Menu**.

Figure 4-11 Loopback Options Menu

```
A [127.255.255.0] [0,0] HDM 2182 > l
-- HDM 2182 LOOPBACK OPTIONS MENU --
A) Activate Loopback      D) Deactivate Loopback
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

Table 4-9 HDM 2180 Loopback Options Menu Commands

Command	Description
A	<p>Activate Loopback—Displays whether or not there is an active test present, and gives options for activating various loopback tests. Note: All data coming into/out of the ports marked with the * is dropped. Options presented for activation are:</p> <p>“Local Loopbacks”</p> <p>1) Local—Data Port LED will turn amber.</p>  <p>2) Payload—Net Port LED will turn amber.</p>  <p>3) HSSI—Data Port LED will turn amber.</p>  <p>“Remote Loopbacks”</p> <p>4) FEAC—Remote end Net LED turns amber. Note: This loopback is activated <i>via overhead channel bits</i>.</p>  <p>5) Far-End—Remote end Net LED turns amber. Note: This loopback is activated <i>via inband signaling bits</i>.</p> 
D	<p>Deactivate Loopback—Displays whether or not there is an active test present, and will give options for deactivating various loopback tests. Options presented for deactivation are:</p> <ol style="list-style-type: none"> 1) Local 2) Payload 3) HSSI 4) FEAC 5) Far-End
X	<p>Exit this screen—Returns you to the HDM 2182 Diagnostics Menu, Figure 4-7.</p>

HDM Transmit Alarm Options

Selecting T from the **Diagnostics Menu** displays the **HDM Transmit Alarm Options** screen. By transmitting any of these alarms, you can verify whether or not the far end is receiving signals.

Figure 4-12 HDM Transmit Alarm Options

```
A [127.255.255.0] [0,0] HDM 2182 > t
-- HDM Transmit Alarm Options --
1) Yellow                Disabled
2) AIS                   Disabled
3) Idle                  Disabled
4) FEBE                  Disabled
5) FEAC                  No FEAC Alarm
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

Table 4-10 HDM Transmit Alarm Options Commands

Command	Description	Options
1	Yellow—Toggles the Yellow Alarm Transmit Option between Disabled and Enabled.	Disabled Enabled
2	AIS—Toggles the AIS Transmit Option between Disabled and Enabled.	Disabled Enabled
3	Idle—Toggles the Idle Transmit Option between Disabled and Enabled.	Disabled Enabled
4	FEBE—Toggles the FEBE Transmit Option between Disabled and Enabled.	Disabled Enabled
5	FEAC—Displays the following menu of selections. (Note: Only ONE of these options can be activated at a time. If one of the options has already been activated, it will be de-activated when a new option is selected.)	0) No FEAC Alarm 1) Equipment Failure SA 2) LOS/HBER 3) OOF 4) AIS Received 5) Idle Received 6) Equipment Failure NSA 7) Common Equipment Failure NSA
X	Exit this screen—Returns you to the HDM Diagnostics Menu , Figure 4-7.	

Performance / Status Menu

Selecting P from the **Main Menu** displays the **Performance/Status Menu**.

Figure 4-13 HDM 2182 Performance/Status Menu

```
A [127.255.255.0] [0,0] HDM 2182 > p
-- HDM 2182 PERFORMANCE/STATUS MENU --
T) Threshold Setting          R) Report Selection
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

Table 4-11 HDM 2182 Performance/Status Menu

Command	Description
T	Threshold Setting—Displays the HDM 2182 Performance Threshold Setting Option Menu , Figure 4-14, Table 4-12.
R	Report Selection—Displays the HDM 2182 Performance Report Options Menu , Figure 4-17, Table 4-13.
X	Exit this screen—Returns you to the Main Menu , Figure 4-1.

Performance Threshold Setting Option Menu

Selecting T) **Threshold Setting** from the **Performance/Status Menu** displays the **Performance Threshold Setting Option Menu** that enables you to select 15-minute and 24-hour threshold values for the DS3 port alarms.

Figure 4-14 HDM 2182 Performance Threshold Setting Option Menu

```
A [127.255.255.0] [0,0] HDM 2182 > t
-- HDM 2182 PERFORMANCE THRESHOLD SETTING OPTION MENU --
M) 15 Minute Threshold      H) 24 Hour Threshold
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

Table 4-12 HDM 2180 Performance Threshold Setting Option Menu Commands

Command	Description
M	15 Minute Threshold—Displays the HDM 2182 15 Minute Threshold Selector Menu , Figure 4-15.
H	24 Hour Threshold—Displays the HDM 2182 24 Hour Threshold Selector Menu , Figure 4-16.
X	Exit this Screen—Returns you to the HDM 2182 Performance/Status Menu , Figure 4-13.

15 Minute Threshold Selector Menu Selecting M from the **Performance Threshold Setting Option Menu** displays the **15 Minute Threshold Selector Menu**. The default values shown are displayed until they are changed by the user.

Figure 4-15 HDM 2182 15 Minute Threshold Selector Menu

```
[127.255.255.0] [1,6] HDM 2182 > m
-- HDM 2182 15 MINUTE THRESHOLD SELECTOR MENU --
A) FE_CCV          0      B) FE_CES          0
C) FE_CSES         0      D) FE_LUAS         0
E) LCV             387    F) LES             88
G) LSES            4      H) PCV            382
I) PES             86    J) PSES           4
K) CCV             382    L) CES            86
M) CSES            4      N) SEFS           2
O) AI SS           2      P) LUAS           10
Q) LOSS            2      R) LOFS           2
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

24 Hour Threshold Selector Menu Selecting H from the **Performance Threshold Setting Options Menu** displays the **24 Hour Threshold Selector Menu**. The default values shown are used until they are changed by the user.

Figure 4-16 HDM 2182 24 Hour Threshold Selector Menu

```
-- HDM 2182 24 HOUR THRESHOLD SELECTOR MENU --
A) FE_CCV          0      B) FE_CES          0
C) FE_CSES         0      D) FE_LUAS         0
E) LCV             3865   F) LES             864
G) LSES            40     H) PCV            3820
I) PES             864    J) PSES           40
K) CCV             3820   L) CES            864
M) CSES            40     N) SEFS           8
O) AI SS           8      P) LUAS           10
Q) LOSS            8      R) LOFS           8
X) Exit this screen
A [127.255.255.0] [0,0] HDM 2182 >
```

Performance Report Options Menu Selecting R) Report Selection from the **Performance/Status Menu** displays the **Performance Report Options Menu**.

Figure 4-17 HDM 2182 Performance Report Options Menu

```
A [127.255.255.0] [0,0] HDM 2182 > r
-- HDM 2182 PERFORMANCE REPORT OPTIONS MENU --
M) 15 Minute Report      O) One Hour Report
H) 24 Hour Report        R) Reset Registers
X) Exit this screen
[127.255.255.0] [1,6] HDM 2182 >
```

Table 4-13 HDM 2182 Performance Report Options Menu Commands

Command	Description
M	15 Minute Report—Displays a listing of alarms for the preceding 15 minutes.
O	One Hour Report—Displays a listing of alarms for the preceding hour.
H	24 Hour Report—Displays a listing of alarms for the preceding 24 hours.
R	Reset Registers—Resets the alarm registers to zero.
X	Exit this Screen—Returns you to the HDM 2182 Performance/Status Menu, Figure 4-13.

Alarm Menu

Selecting **A** from the **Main Menu** displays the **Alarm Menu**. Selecting **O**) Display Alarm Buffer from the **Alarm Menu** displays the **Alarm Buffer** for the previous 15-minute period. Press **q** to quit and return to the **Alarm Menu**. Press **X** to exit the **Alarm Menu** and return to the **Main Menu**.

Figure 4-18 Alarm Menu

```
A [127.255.255.0] [1, 1] HDM 2182 > a
-- HDM 2182 ALARM MENU --
O) Display Alarm Buffer
X) exit this screen
A [127.255.255.0] [1, 1] HDM 2182 >
```

Figure 4-19 Sample Alarm Buffer Display

```
A [0.0.0.2] [1, 5] HDM 2182 > o
* 0.0.0.2          HDM 2182    [01,05] Major alarm          DS3 Port
  (24-hour) DS3 FE UAS alert cross the threshold          3-24-98  5: 25: 50
* 0.0.0.2          HDM 2182    [01,05] Major alarm          DS3 Port
  (24-hour) DS3 UAS alert cross the threshold          3-24-98  5: 25: 50
* 0.0.0.2          HDM 2182    [01,05] Major alarm          DS3 Port
  (24-hour) DS3 AIS alert cross the threshold          3-24-98  5: 25: 50
* 0.0.0.2          HDM 2182    [01,05] Major alarm          DS3 Port
  (24-hour) DS3 SEFS alert cross the threshold          3-24-98  5: 25: 48
* 0.0.0.2          HDM 2182    [01,05] Info alarm          DS3 Port
  Enable User Equipment Loopback          3-24-98  5: 22: 00
* 0.0.0.2          HDM 2182    [01,05] Cleared alarm          DS3 Port
  clear Yellow alarm in DS3 layer          3-24-98  5: 21: 30
* 0.0.0.2          HDM 2182    [01,05] Cleared alarm          DS3 Port
  Disable DS3 AIS Alarm          3-24-98  5: 21: 30
-- MORE -- ('q' to quit)
```

Far End DS3 Port Identification

Selecting **F** from the **Main Menu** displays the **Far End Port Identification Information** display. This option displays port identification information associated with the node connected to the far end of the DS3 port on the module. This is an informational display that provides far end information if inband is enabled for the DS3 port:

Figure 4-20 Far End Port Identification Information Display

```

A [100. 94. 46. 50] [0, 4] HDM 2182 > f
--- FAR END PORT IDENTIFICATION INFORMATION ---

Equipment Id      : testing1
Location Id       : testing2
Frame Id          : testing3
Unit Id           : 123
Facility Id       : testing4
Port Id           : testing5
Generator Id      : 1234
Press enter to continue
    
```

Manufacturing Info

Selecting **I** from the **Main Menu** displays the **Manufacturing Information** screen. This information is useful when calling in to the Technical Assistance Center.

Figure 4-21 Manufacturing Information Display

```

A [127. 255. 255. 0] [1, 1] HDM 2182 > i
MANUFACTURING INFORMATION

                Main Card                CIM
Revision          RM) Rev A              RC) Rev A
Date              DM) 0/0/0              DC) 0/0/0
Serial number     SM) 34545673           SC) 235244365
Manuf. Part No.  MM) 2828394            MC) 98397597
Cage Code         CM) 2352              CC) 34534
Type              TM) HDM 2182          TC) CIM 2182
Press enter to continue
    
```

Chapter 5

Standalone HDM 2182 SNMP Management

NOTE: Before using SNMP, Telnet, FTP, or other TCP/IP protocol, you must set your TCP/IP addresses first via the Craft interface of whichever module is the “controlling module” for the shelf. Use the **Administration Menu** to set the required TCP/IP addresses.

Setting Up Your TCP/IP Addresses

Before using Telnet for the first time with an HDM 2182 module, access the module locally via the Craft interface.

1. From the **Main Menu**, type **O** for the command:

O) node administration

The **Administration Menu** displays.

2. For a local Ethernet address, type the **L** command to get the prompt to enter the address value:

L) Local IP Address

3. If using a router, you must enter the router’s IP address as the gateway using

G) Local gateway IP address

4. If using SNMP Management, then enter the IP Address of the SNMP Manager as

H) Management host IP address

5. The device to which alarm messages are to be sent, often the same as above, is entered as

M) Management trap IP address

6. After these parameters have been set, reboot the module.

Now you can log in via Telnet.

NOTE: You must log out from a Telnet session if you want to use the ASCII terminal interface via the Craft port.

Embedded Network Management System Using SNMP

The SNMP port connects to an Ethernet segment connected to a PC running a user-supplied SNMP application, such as Verilink's Node Manager. Using such an application and depending on the Management Information Base (MIB) interfaces provided, you can configure, control, and monitor the performance of an HDM 2182 circuit.

HDM 2182 allows appropriate values to be assigned to and collected from the configuration management objects defined in the supported MIBs.

An integrated (embedded) SNMP agent is used in the product. HDM 2182 is a separate manageable network entity under the SNMP management application protocol. All configuration, control, and monitoring elements that are handled via the ASCII terminal are available to the SNMP agent. The embedded management services provide information for network managers, system administrators, customer service, field service personnel, and engineers to manage the HDM 2182.

HDM 2182 SNMP Physical Interfaces

The only physical interface provided for SNMP on the circuit card assembly is a 10BaseT Ethernet twisted pair implementation. A SLIP interface is not supported.

Management Protocols

HDM 2182 embedded SNMP supports SNMPv1. These standard network management protocols support the following areas:

- Implementation of standard MIBs
- Implementation of enterprise-specific MIBs
- Remote booting
- Configuration Management
- Operator-selected saving of card configuration management objects and default settings into non-volatile storage onboard.
- During normal restart, in the absence of valid non-volatile configuration management objects, the HDM 2182 assumes a default configuration.
- Alarm and fault reporting and management, remote system diagnostics
- Embedded management offers extensive diagnostics. Alarms are offered through SNMPv1 generic traps with additional alarm information available through Verilink enterprise specific traps.
- HDM 2182 reports faults by sending the generic SNMPv1 traps to appropriate SNMPv1 node management systems.
- Security Management

- HDM 2182 uses SNMPv1 community strings.
- HDM 2182 provides filtering of SNMPv1 PDUs by source IP address for remote login password protection in **rlogin/telnet**.
- Performance monitoring and management
- Remote software upgrades as supported by Verilink APA
- HDM 2182 uses the **FTP/TCP/IP** protocol stack to download upgrade software remotely to non-volatile code storage.

MIB Interface Specifications

HDM 2182 supports the following standard MIBs for card management:

- Verilink Enterprise MIB (various RFCs)
- DS3 MIB (RFC 1407 MIB)

The mandatory groups in the DS-3 MIB, as defined by the IETF [25].

Chapter 6

Troubleshooting

What Elicits an Alarm

The NCM 2000 module polls the HDM 2182 modules for alarms.

If alarm reporting is enabled for the node and for the HDM 2182, the NCM retrieves and sends alarms to the Craft interface, Node Manager, or an SNMP agent where they can be viewed.

Alarms can also be automatically sent to a specified printer by setting up the printer address in the various management utilities menus. See the appropriate management utility user manual for more information on how to do this.

The Alarms

The alarm list will show:

- Whenever the system powers up and any module performs a self-test
- Power supply input is lost
- A default or user-designated threshold is exceeded
- A Yellow Alarm is received from the network
- An unframed all-ones or alarm indication signal (AIS) is received from the network
- There is a loss of signal (LOS) or loss of frame (LOF)
- A CSU or DIU loopback is present
- A module fails
- A module is removed from the shelf

Alarm Listings

On any of the various listings of the alarms being received by the NCM for the HDM, the alarm listing will generally show the following information about the alarms (This may vary depending on the management method you are using).

Alarm Description

The Alarm Description column lists the text which is

- printed on the display
- sent to the alarm printer (if using Node Manager or SNMP agent)
- saved to the alarm buffer/database

Classifications

Verilink classifies alarms into the following Severities:

- Critical
- Major
- Minor
- Warning
- Info
- Cleared

Problem Types

These classifications are further categorized into the following Problem Types:

- LOS—Loss of Signal
- LOF—Loss of Frame
- Error
- Call Setup

What To Do About Alarms

Some alarms will clear after the user-configured timeout has expired. Other alarms require you to take corrective action.

- If an alarm has been cleared, no other action is required.
- If there is a loopback present, unless you are intentionally testing, remove the loopback (Only if the loopback is from your end. If it is from your telco, you may need to verify the loopback with them.)
- If you have a Loss of Frame (LOF), you may have a telco or module problem. To test, do a Repeater Loopback (RLB) to test for LOF. If there is no LOF indicated by the test, the problem is with the telco.
- If you have a Loss of Signal (LOS), check your router cables, power, and ports.
- If you have a Powerup Self-test Fail, reseal the module to see if it will power up and pass the self test. If it does not pass after repeated self tests, replace the module.

Alarm Records

Every alarm record that appears on your screen is “active” in the database until you do something about it. You can do the following with the alarm records:

- Deactivating alarm records is a database management function. As long as an alarm is active, you can view it onscreen, using one of the management options on the Craft interface or Node Manager. When you deactivate an alarm, it’s still in the database, but not viewable on screen. Deactivated alarms can be subsequently archived, printed, or deleted.
- Archiving an alarm record stores it to a disk file you specify.
- Printing an alarm record prints a copy of all active and deactivated alarms.
- Deleting an alarm record removes it from the database. To delete an alarm, you must first deactivate it.

Interpreting Alarms

Fault conditions can result in critical, major, or minor alarms. In addition, a fault condition can also result in a Carrier Failure Alarm (CFA).

Critical Alarms

A critical alarm indicates that the node or components of the node have failed. The following alarms are classified as critical:

- **Alarm Indication Signal Second (AISS)**—A second when the CSU receives an unframed all-ones Alarm Indication Signal (AIS) from the network.
- **Loss of Frame Second (LOFS)**—A LOFS is the total number of seconds that the CSU was in the Loss of Frame (LOF) state.
- **Loss of Signal Second (LOSS)**—A LOSS is a second during which the CSU is in a Loss of Signal (LOS) state.
- **Severely Errored Framing Second (SEFS)**—the second in which two or more framing bit errors occur within a 3-millisecond period.

Major Alarms

A major alarm indicates a condition where performance is seriously affected, for example, a T3 line failure. It prevents data from being reliably transmitted across the circuit. When a major alarm is declared, the HDM 2182 module sends a message to the Craft interface and Node Manager (if used), lights the appropriate LED indicator, and trips the alarm relay (if connected). The following error conditions must persist for at least one second for a major alarm to be declared:

- **C-bit Severely Errored Seconds (CSES)**—A CSES is a second with 44 or more CCVs or one or more Out of Frame defects or a detected incoming AIS.
- **P-bit Severely Errored Seconds (PSES)**—A PSES is a second with 44 or more PCVs or one or more Out of Frame defects or a detected incoming AIS. This gauge is not increased when UASs are counted.
- **Local Unavailable Second (LUAS)**—An unavailable second during which the local DS3 port is unable to receive or transmit traffic.
- **Line Severely Errored Second (LSES)**—A second during which the port was (at any instance during the second) in the AIS state.

Minor Alarms

The following error conditions do not affect traffic along the DS3 line. They generate a minor alarm:

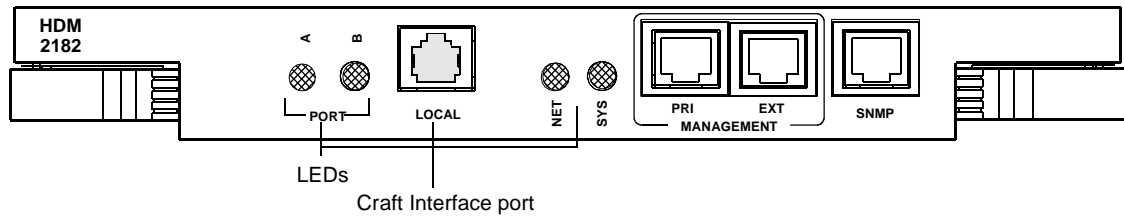
- **Power Supply Missing (in redundant power supply configurations)**—This alarm indicates that one of the redundant power supplies has failed.
- **Remote Alarm Indication (RAI)**—This alarm indicates that the remote end is in a state of alarm. A Remote Alarm or Remote Alarm Indication is the alarm a receiving channel bank or multiplexer sends to the other end of the circuit when it detects a Loss Of Signal or Loss Of Frame. There is a 2- to 3-

second integration period upon detection of LOS or LOF before a yellow alarm is sent to the far-end equipment. This condition is also referred to as a Yellow Alarm.

- **Alarm Indication Signal (AIS)**—Using an unframed all-ones bit pattern, an AIS alarm indicates that an alarm condition exists upstream in a circuit leading to the downstream equipment. This is also called an All-Ones Keep-Alive or Red Alarm Signal. An AIS defect is declared when there are 3 or fewer zeros in 512 bit times and an LOF defect. It is cleared when there are 3 or more zeros in two frames or the LOF defect no longer exists.
- **C-bit Coding Violation (CCV)**—An error event that reflects the occurrence of received CP-bit parity errors during the accumulation interval. The CP-bits are not affected by customer-owned equipment and are therefore more accurate than P-bit parity.
- **C-bit Errored Second (CES)**—A CES is a second with one or more CCVs or one or more Out of Frame (OOF) defects or a detected incoming AIS. This gauge is not increased when UASs are counted.
- **Alarm Indication Signal Second (AISS)**—A second when the CSU receives an unframed all-ones alarm indication signal (AIS) from the network.
- **Line Coding Violation (LCV)**—An LCV error event is a count of both bipolar violations (BPVs) and excessive zeros (EXZs) occurring over the accumulation period. An EXZ increments the LCV by one regardless of the length of the zero string.
- **Line Errored Second (LES)**—An LES is a second in which one or more LCVs occurred or one or more LOS defects.
- **Loss of Signal Second (LOSS)**—A second during which the CSU is in a loss of signal (LOS) state.
- **P-bit Coding Violation (PCV)**—A P-bit parity error event is the occurrence of a received P-bit code on the DS3 M-frame that is not identical to the corresponding locally-calculated code.
- **P-bit Errored Second (PES)**—A PES is a second with one or more P-bit Coding Violations (PCVs) or one or more Out of Frame defects or a detected incoming AIS. This gauge is not increased when unavailable seconds (UASs) are counted.

Interpreting Front Panel LEDs

Figure 6-1 HDM 2182 Front Panel



LED Indicators

HDM 2182 provides tri-color LEDs on the front panel for:

- Network Port
- Data Ports
- System

The LEDs use the following color codes:

- Solid Green** Module is properly configured and equipment is operating normally.
- Flashing Green** For the System LED, this indicates that the module is in “controller mode.”
- Solid Red** Indicates a problem occurring within the equipment.
- Solid Amber** Indicates test mode condition within the equipment.

Performance Statistics

The following network performance parameters can be stored within the HDM 2182 to support performance monitoring and statistics generation:

Near-End Performance Parameters

The following near-end performance parameters are supported by HDM 2182:

AISS	Alarm indication signal second
CCV	C-bit code violations
CES	C-bit errored seconds
CSES	C-bit severely errored seconds

LCV	Line code violations
LES	Line errored seconds
LOFS	Loss of frame second
LOSS	Loss of signal second
LSES	Line severely errored seconds
PCV	Parity (P-bit) code violations
PES	(P-bit) parity errored seconds
PSES	P-bit severely errored seconds
SEFS	Severely errored framing seconds
UAS	Unavailable seconds

Far-End Performance Parameters

The following far-end performance parameters are supported by HDM 2182:

CCV	C-bit code violations
CES	C-bit errored seconds
CSES	C-bit severely errored seconds
UAS	Unavailable seconds

Alarm Parameters

The following network alarm parameters can be monitored and stored within the HDM 2182:

Near-End Alarms

The following near-end alarms are detected and reported:

AIS Defect	Alarm indication signal
IS	Idle signal
LOF	Loss of frame
LOS	Loss of signal
OOF	Out of frame
Loss of Selected Tx clock	
Yellow Alarm	

Far-End Alarms

The following far-end alarms are detected and reported:

FEBE	Far End Block Error
FEAC	DS3 Equipment Failure (SA)
FEAC	DS3 LOS/HBER
FEAC	DS3 OOF
FEAC	DS3 AIS Received
FEAC	DS3 IDLE Received
FEAC	DS3 Equipment Failure (NSA)
	Common Equipment Failure (NSA)

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