Access System Centum Series
User Manual

Access System 100 Single Port CSU/DSU
Access System 150 Drop-and-Insert Single Port CSU/DSU
Access System 200 Dual Port CSU/DSU

VERILINK

Important Notice

Unpacking

This equipment is normally shipped in cardboard cartons with foam inserts to protect the units from shock and vibration during shipment. Upon arrival of the equipment, inspect the condition of the boxes and compare all items to the packing list. Notify Verilink and the carrier immediately if there are any damages or shortages.

Store the cartons and packing material in case the unit has to be shipped at a later date.

WARNING

The following rules should always be followed when connecting telephone equipment and/or wiring:

1. Never install telephone wiring during a lightning storm.

2. Never install the telephone jacks in wet locations unless the jack is specifically designed for wet locations.

3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

4. Use caution when installing or modifying telephone lines.

NOTE

Verilink reserves the right to incorporate product enhancements and/or change product specifications at any time and without notice.

Warranty

All Verilink equipment is covered by a 5-year new product warranty. For additional information, call 1.800.VERILINK.

FCC Information

This equipment complies with the requirements in Part 15 of FCC Rules for a Class A computing device. Operation of this equipment in a residential area may cause unacceptable interference to radio and television reception, requiring the operator to take whatever steps are necessary to correct the interference. Verilink shielded cables should be used with this unit to ensure compliance with the Class A limits.

This equipment meets the technical criteria specified in the Part 68 rules, sub-part A through F,(for connection of terminal equipment to the telephone network) as well as the requirements specified inAT&T Technical Publications 62411, 54016, and 54019A (ESF).

This equipment meets the safety requirements of the Underwriters' Laboratories (UL) technical publications UL 1950.

FCC Registration #	2J3USA-75166-DE-N
Type of Interface	1.544 Mbps Digital Channel
Facility Interface	04DU9-B for D4 format
	04DU9-C for ESF format with AMI Line Code
	04DU9-S for ESF format with B8ZS Line Code
Service Code	6.0N
Jack Arrangement	RJ-48C
Ringer Equivalence	N/A

FCC User Requirements

The following instructions are provided to ensure that you comply with the Federal Communications Commission (FCC) Rules, Part 68:

1. All direct connections to the T1 digital lines must be made through standard plugs and jacks furnished by the telephone company. no connections can be made to party lines or coin lines. Before connecting your unit, you must do the following:

   a. Tell your local telephone company that you have an FCC registered device that you wish to connect to the company's lines. Provide the 14-digit FCC registration number listed on the label. The telephone company will also need to know the facility interface code (04DU9-B) and service code (6.0N) in order to connect the necessary service.

   b. Inform the telephone company that you wish to use the RJ-48C jack arrangement.

   c. After the telephone company has installed the RJ-48C jack, you may connect the CSU with the appropriate cable.

2. If the unit appears to be malfunctioning, it should be disconnected from the telephone line until the source of the problem is confirmed. If the unit needs repair, it should not be reconnected until after the repair is completed.

3. The CSU has been designed to prevent harm to the DDS or T1 network. IF the telephone company determines that it is exceeding tolerance parameters, they are permitted to temporarily disconnect service. When possible, the customer will be given advance notice.

4. Under FCC Rules, no customer is authorized to repair the equipment, regardless of its warranty status.

5. If the telephone company alters the equipment in a manner that will affect its usage, advance notice must be given to prevent service interruption.

Normally, Verilink CSU equipment will be used to interface either FCC registered or grandfathered digital terminal equipment to the digital service channel. If the equipment to be connected is not of this type, institutional procedures provide that an affidavit be supplied to the

telephone company. This affidavit must state that the system will be operated only by trained individuals and that the signal power at the telephone company interface will not exceed the limits set forth in Part 68 of the FCC's Rules and Regulations.

Table of Contents

List of Figures

Chapter

1

Introduction

Verilink's Access System *Centum Series* consists of the following three models:

- **Access System 100 Single Port CSU/DSU (AS100)**

- **Access System 150 Drop-and-Insert Single Port CSU/DSU (AS150)**

- **Access System 200 Dual Port CSU/DSU (AS200)**

Verilink's Centum Series units integrate the capabilities of a T1 ESF CSU (Channel Service Unit) and DSU (Data Service Unit) in a single unit.

Engineered with either aV.35 or RS-449 serial port, each unit provides high bandwidth for LANs, image transmission, mainframe file transfers, and other high-speed, synchronous applications. Additionally, the Access System 150 has a DSX-1 port to handle voice transmissions for drop-and-insert applications.

T1 Concepts

A T1 digital transmission facility carries twenty-four 64 kbps DS-0 channels, for a total of 1.536 Mbps (plus 8 kbps overhead to achieve the well-known 1.544 Mbps). These DS-0s can be demultiplexed by the Centum Series, and a group of DS-0s can be assigned to the connectors on the equipment to transport information. In some cases, the user has access to the full 64 kbps per channel while, in other cases, the limit is 56 kbps per channel. A detailed explanation is provided in Chapter 3, *Configuring and Installing the Centum Series*.

The T1 facility itself can be a physical point-to-point circuit with all 24 DS-0s going from one site to another. The facility can also be an "Integrated Access" that uses a Central Office DACS and one or more Fractional T1 (FT1) links. This is a physical multipoint facility with logical point-to-point links formed by groups of DS-0s.

Product Features and Specifications

This section explains product features and specifications.

Special Centum Series Features

The Centum Series has a number of special features.

Built-in T1 ESF CSU

Interfacing to T1 or Fractional T1 services requires a T1 CSU (Channel Service Unit). The Centum Series includes a built-in T1 ESF CSU as standard equipment. The superior ESF (Extended Superframe) CSU includes provisions for continuous performance monitoring by both the user and the telephone company central office. ESF provides a 4 kbps link control channel (transparent to user data) which allows the telephone company to monitor the local loop, transmit and receive test messages and retrieve performance data, all without interrupting normal operations.

Network Protection

The Centum Series provides complete electrical protection for the network by automatically inserting pulses into the transmitted signal as required to meet the bit density formula specified in AT&T Pub 62411.

Front Panel Control

The Centum Series is easy to use. Configuration and testing are accomplished with a few buttons. Status is shown on a 32-character liquid crystal display (LCD) screen and 10 front-panel indicators. The LCD screen serves as a "window" that can be moved vertically. The indicators are separated in NI (Network Interface) and serial (DTE) port groups.

Terminal Control

All Centum Series features can be accessed via an external terminal. The terminal's CRT allows displays that are much more comprehensive than possible via the front panel LCD. The user-supplied terminal can be selected from a wide variety of standard offerings or can be a PC with terminal emulation software.

NMS Control

Configuration, dialing, and testing can also be controlled through a user-supplied PC using the optional Verilink SNMP-based network management software. Most DOS-based PC devices can serve as the NMS (Network Management System) console. The console port on the rear panel of the Centum Series, an RS-232C connector, supports speeds of 1200, 2400, 4800, and 9600 bps. A password routine prevents unauthorized access to the NMS console screens.

Printer Support

The Centum Series includes a port for serial printer support. Real-time reports of all system events are automatically sent out this port. In addition, the front panel or an externally attached terminal can command printouts of configuration, alarms, and ESF statistics.

Event Log

The Centum Series constantly monitors for the occurrence of events, such as alarms, test commands, and system resets. When an event occurs, a description with a time and date stamp is immediately sent out the printer port. In addition, the Centum Series maintains a log of the most recent sixteen events and that log can be accessed by either the front panel controls and LCD panel or an externally attached terminal.

Built-in Diagnostics

Verilink's Centum Series includes extensive capabilities to help pinpoint network problems without the need for external test equipment. Diagnostics include local and remote Serial Port digital loopbacks, LLB, RLB, and payload NI loopbacks.

The Centum Series also includes a built-in bit error rate tester (BERT), eliminating the need for external test equipment. The built-in tester transmits a 511-bit pseudo random test pattern. The Centum Series records errors received, seconds in test, and error-free seconds.

Alarm conditions are displayed on the front panel LCD screen as well as on the console's Alarms/Statistics screen. Front panel LEDs indicate unit and control signal status.

ESF Operation

Centum Series Extended SuperFrame (ESF) operation allows the telephone company central office to continuously monitor the local loop, to transmit and receive test messages, and to retrieve performance data, without interrupting normal operations. The unit is compatible with both AT&T 54016 and ANSI T1.403 specifications.

Clear Channel

The Centum Series provides clear channel signalling with B8ZS line coding (in installations where it is supported by the Telco central office) or alternate channel assignment.

Specifications

Product specifications for the Centum Series are listed on the following page.

	AS100	AS150	AS200
	✔	✔	✔
			✔
		✔	

56/64 kbps where N = 1 to 24
Synchronous CCITT V.35,EIA RS-422A/530, or
RS-422A/449 with optional adapter
ale 34-pin "M-series", 25-pin "D", or 37-pin "D" (with optional adapter)

4 Mbps
olar B8ZS/AMI and ESF/D4
ale 8-position RJ-48C

ESF/D4 compatibility per AT&T Tech Pubs 62411, 54019, and ANSI T1.403
4 Mbps ± 50 bps, bipolar B8ZS or AMI
5, 15, 22.5 dB
ale 8-position RJ-48C
rnal
uency locked to NI (Repeater)
uency locked to synchronous Serial Port #1
uency locked to DSX-1 Port
drive to 6000 feet

al Digital Loopback
note Digital Loopback (V.54)
al CSU Loopback, LLB, RLB, Payload Loopback
vork Interface and Serial Port with bidirectional testing,
ctable patterns of "511", 2047, "1 in 8", "2 of 16", and "All Ones"

sity, Loop, BPV, Alarm
sity, Loop, BPV, Alarm
, Loop, DCD
, Loop, DCD

haracter Liquid Crystal Display (LCD) with front panel buttons
II terminal
m printer

W x 1.75" H x 10" D
unds (maximum)
etop or Rack
30 Vac, 57-63 Hz
40 degrees C, 90% humidity (non-condensing)

Front Panel Overview

Introduction

The front panel LCD screen displays two rows of sixteen characters each. Menu parameters are presented individually. The buttons to the right of the LCD screen scroll data vertically through the screen, displaying up to two parameters at a time. There are also up to 10 LED indicators that are used to display the status of various Centum Series conditions.

Figure 2-1   Front Panel: Access System 100 (AS100) Single Por CSU/DSU
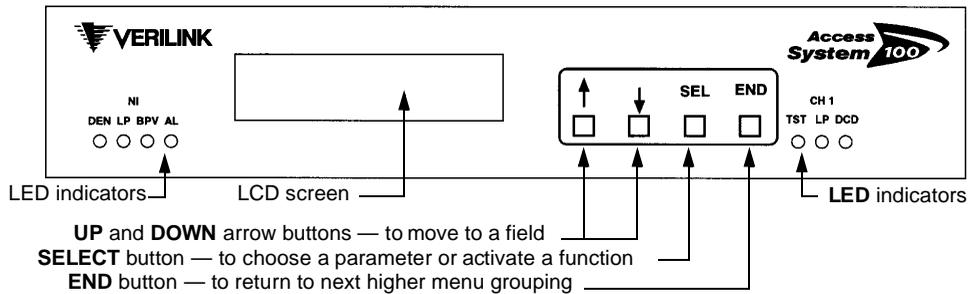
Figure 2-2   Front Panel: Access System 150 (AS150) Drop-and-Insert Single Port CSU/DSU
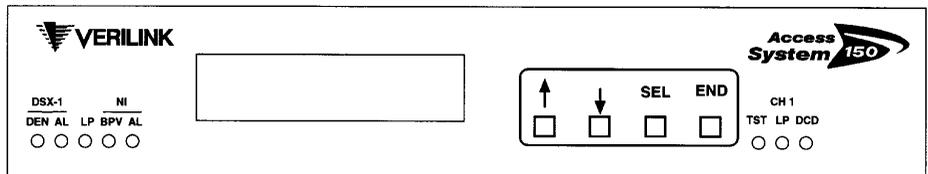
Figure 2-3   Front Panel: Access System 200 (AS200) Dual Port CSU/ DSU
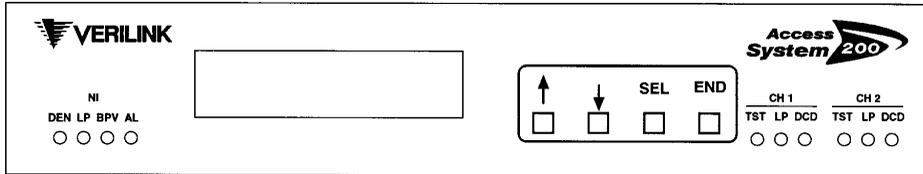
There are two **UP/DOWN** (arrow) buttons, a **SELECT** button, and an **END** button. The basic operating procedures are simple.

1. To select a menu, use the **UP** and **DOWN** buttons to move to the desired field.

2. Then, **SELECT** to choose the submenu.

3. To choose from a particular set of parameters or activate a function, use the **SELECT** key. Use **END** to return to the next higher menu grouping.

UP/DOWN (Arrow) Buttons.   These buttons are used to move the display window vertically within a menu grouping. The **UP** button moves the display window up (backwards). The **DOWN** button moves the display window down (forward) to the next menu entry.

SELECT   .Used to choose a submenu, choose a parameter activate a function.

END.   Used to return to the previous menu.

LCD Scree

The LCD screen is limited to two lines of 16 characters each.

The displayed menus include the **Main Menu**, which is sub-divided into the following five (5) menus: **Configuration**, **Diagnostics**, **Alarms & Statistics**, **Event Log**, and **Utilities**. Each sub-menu is further broken down into sub-level menus. Menu examples are shown below. Subsequent chapters give detailed information regarding these menus.

```
Main Menu        HH:MM

_Configuration
```

```
NI Configuration

Framing: _ESF
```

```
Port 1 Diag.

Local Loop: _On
```
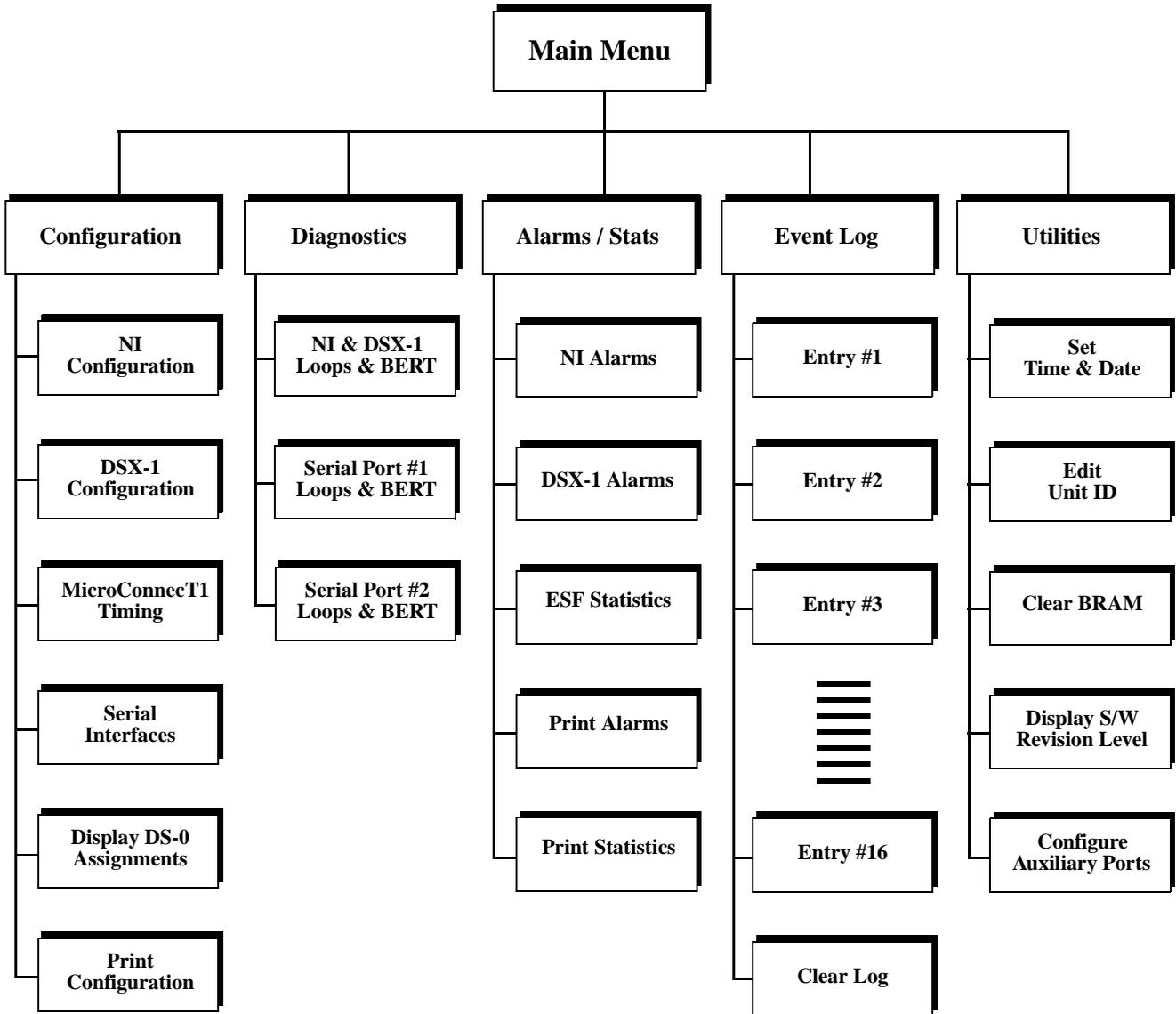
Figure 2-4   **Basic Centum Series Menu Tree**

Main Menu

Configuration	Diagnostics	Alarms / Stats	Event Log	Utilities
NI Configuration	NI & DSX-1 Loops & BERT	NI Alarms	Entry #1	Set Time & Date
DSX-1 Configuration	Serial Port #1 Loops & BERT	DSX-1 Alarms	Entry #2	Edit Unit ID
MicroConnecT1 Timing	Serial Port #2 Loops & BERT	ESF Statistics	Entry #3	Clear BRAM
Serial Interfaces		Print Alarms		Display S/W Revision Level
Display DS-0 Assignments		Print Statistics	Entry #16	Configure Auxiliary Ports
Print Configuration			Clear Log	

LED Indicators

There are up to ten LED indicators on the front panel. The actual quantity differs with the Centum Series model. They are used to indicate the status of various alarm and call conditions. They monitor three areas of Centum Series operation: DSX-1, Network Interface (NI) and Serial Channels.

DEN (Network Interface).   Indicates that the Network Interface is forcing the required number of transmitted "ones" to satisfy the T1 network requirements. This could be a result of improper configuration or failure of the customer's attached Serial port equipment and **will** result in data corruption.

AL (DSX-1 Port).   **ON** when receive alarm condition (Red, Yellow, etc.) is detected on the DSX-1 Port.

LP (DSX-1 Port & Network Interface).   **ON** when either the Network Interface *or* the DSX-1 Port is in a loopback state.

BPV (Network Interface)   **ON** when Bipolar Violations are being received from the network. Can also indicated a very weak or overly strong signal.

AL (Network Interface).   **ON** when receive alarm condition exists (Red, Yellow, etc.)

TST (Serial Port Channel 1).   Indicates the status of the BERT test if in progress. Will be **ON** only if the test results are good.

LP (Serial Port Channel 1).   **ON** when a loop condition exists in the serial port either at the local or remote end.

DCD (Serial Port Channel 1)   **ON** when the state of the Data Carrier Detect (or equivalent) lead being transmitted to the DTE connected to the serial port is **ON** or **HIGH**.

TST (Serial Port Channel 2).   Indicates the status of the BERT test if in progress. Will be **ON** only if the test results are good.

LP (Serial Port Channel 2).   **ON** when a loop condition exists in the serial port either at the local or remote end.

DCD (Serial Port Channel 2) **ON** when the state of the Data Carrier Detect (or equivalent) lead being transmitted to the DTE connected to the serial port is **ON** or **HIGH**.
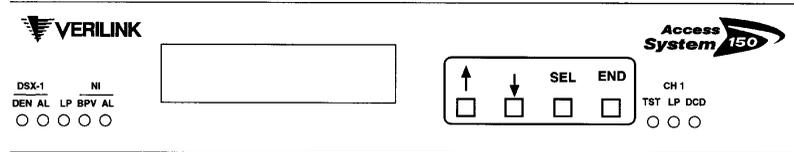
Configuring and Installing the Centum Series

WARNING

The following rules should always be followed when connecting telephone equipment and/or wiring:

1. Never install telephone wiring during a lightning storm.

2. Never install the telephone jacks in wet locations unless the jack is specifically designed for wet locations.

3. Never touch insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

4. Use caution when installing or modifying telephone lines.

NOTE

*Centum Series units should **not** be connected to the network until after it has been completely configured and has successfully passed self test.*

Requirements

Listed below are the requirements for operating Centum Series units.

Software an hardware

Each Centum Series product is a self-contained unit that can be configured with no additional software or hardware.

This chapter describes the steps necessary to configure, test, and install Centum Series using the front panel buttons and LCD panel. The same steps can be more easily performed using a customer-supplied external terminal (or PC with terminal emulation software). See Chapte r6, *Auxiliary Ports*, page 6-8.

Power and environmental

Centum Series uses 110-120 VAC, 60 Hz, at 0.25 amps.

Centum Series does not require a conditioned environment but should be operated in areas with adequate ventilation.

Centum Series Workshee

Centum Series Worksheet

Serial Port #1

①	
②	
②	
③	
③	
③	

Data Rate: _____	⑬
First DS-0: _____	⑭
Alt/Consecutive: _____	⑭
CD Handling: _____	⑮
Data Norm/Inv: _____	⑯
Clock Norm/Inv: _____	⑰
Clocks: _____	⑱
Remote Loop: _____	⑲

Serial Port #2

Data Rate: _____	⑳
First DS-0: _____	㉑
Alt/Consecutive: _____	㉑
CD Handling: _____	㉒
Data Norm/Inv: _____	㉓
Clock Norm/Inv: _____	㉔
Clocks: _____	㉕
Remote Loop: _____	㉖

ce

④	
⑤	
⑥	
⑦	
⑧	
⑨	
⑩	
⑪	

⑫	

DSX-1 Interface

Framing: _____	㉗
Line Code: _____	㉘
Distance: _____	㉙
DSX-1 CFA: _____	㉚

T-Channel Definitions

T-Channel Number	Serial Port 1 ⑭	Serial Port 2 ㉑	DSX-1 ㉗	Not Used ㉗
DS0-1				
DS0-2				
DS0-3				
DS0-4				
DS0-5				
DS0-6				
DS0-7				
DS0-8				
DS0-9				
DS0-10				
DS0-11				
DS0-12				
DS0-13				
DS0-14				
DS0-15				
DS0-16				
DS0-17				
DS0-18				
DS0-19				
DS0-20				
DS0-21				
DS0-22				
DS0-23				
DS0-24				

Configuration Parameters

Proper configuration of the Centum Series requires information regarding the network itself and the manner in which the network will be used. **Most of this information is readily available from the network supplier although some user decisions must be made from within the limitations of the network.**

This manual includes a configuration worksheet on page 3-2 to aid the user in configuring the Centum Series. Verilink recommends that the master worksheet be photocopied and that copies be used to record the actual information for Centum Series units. By using the information in this chapter, one worksheet should be completed for each unit in the network. *After* completing *all* worksheets for *all* units, this chapter should again be used to actually configure the units.

Note that the Centum Series can remain unpowered indefinitely without losing the configuration parameters.

Plug in the Centum Series and confirm that the LCD panel displays:

```
Main Menu          HH:MM
_Configuration
```
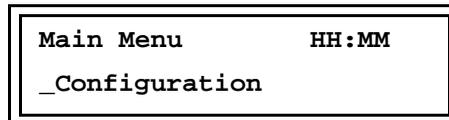
If necessary, press the **UP** or **DOWN** arrow buttons until the panel displays the above information. Now, refer to a photocopied configuration sheet. The item numbers below correlate to the reference numbers circled on the sheet.

1. **Model number** Administration information indicating specific Centum Series model being configured.

2. **Company name and location.** Administrative information determined by customer.

3. **T-Carrier ID, Local Circuit ID, and Billing Number.**
   Administrative information obtained from the network supplier

SELECT *to*
display:

```
Configuration
_NI Interface
```

SELECT *to*
display:

```
Configuration
Framing:_XX
```

4. **NI Framing.** This information must be obtained from the network
   supplier. Repeatedly **SELECT** to choose between **D4** and **ESF**.

DOWN *to*
display:

```
NI Configuration
Line Code:_XXX
```

5. **NI Line Code.** This information must be obtained from the network
   supplier. Repeatedly **SELECT** to choose between **AMI** and **B8ZS**.

DOWN *to*
display:

```
NI Configuration
LBO..:_X dB
```

6. **NI LBO.** Should be set to **0 dB** unless the network supplier
   specifically requests otherwise. If requested, repeatedly **SELECT** to
   choose **0**, **7.5**, **15**, or **22 dB**.

DOWN *to*
display:

```
NI Configuration

NTWK Diag.: XXX
```

7. **Network Diagnostics.** This entry determines the Centum Series'
    ability to respond to diagnostic commands received from the network
    supplier. Repeatedly **SELECT** to choose between **Yes** and **No**.

    User equipment must always respond to network-generated
    diagnostic commands. Select **Yes** unless the commands are to be
    passed to another T1 device that will respond.

DOWN *to*
display:

```
NI Configuration

Density: XXXX
```

8. **NI Density.** This information must be obtained from the network
    supplier. Repeatedly **SELECT** to choose **Clear** or **62411**. A **Clear**
    network imposes no "ones density" requirements on the user. A
    62411 network complies with AT&T Technical Reference #62411
    and limits Centum Series transmission to no more than fifteen
    consecutive zeroes.

    If the Line Code entry (item #5, above) is B8ZS, choose **Clear**. If the
    Line Code entry is AMI, choose **62411**.

DOWN *to*
display:

```
NI Configuration

NI CFA:_XXX
```

9. **NI CFA.** Repeated **SELECT** to choose between **Yes** and **No**.

    Yes causes Centum Series to discard data and send a "yellow alarm"
    if it is in a "red alarm" condition for three seconds.

Yes MUST be chosen if the network supplier is a common carrier, such as a telephone company. If the network is private, the selection is a user option.

DOWN *to*
display:

```
NI Configuration

ESF Frmt:_XXX
```

10. **ESF Reporting Format.** This entry describes the types of ESF network commands that the Centum Series will respond to. It has no meaning for D4 networks: see Framing (item #4, above). With ESF networks, this information must be obtained from the network supplier.

Repeatedly **SELECT** to choose between AT&T Technical Reference **54016** and ANSI specification **T1.403**.

DOWN *to*
display:

```
NI Configuration

Clear Regs:_XXX
```

11. **Clear Registers.** Repeatedly **SELECT** to choose between **Yes** and **No**. **Yes** is the recommended choice.

When commanded by the network supplier, Centum Series will transmit stored error information to the supplier.

A **Yes** entry will cause Centum Series to clear all error counts when the unit is powered down and back up again.

A **No** entry will allow potentially invalid registers in preparation for transmission to the network supplier.

'o display:

```
Configuration

_NI Interface
```

DOWN *to display:*

```
NI Configuration

_Timing Source
```

12. **Timing Source.** Repeatedly **SELECT** to choose **NI**, **Port 1**, **Int**, or **DSX-1**.

In an Integrated Access, Fractional T1 environment, ALL units **must** use **NI** timing.

In a point-to-point configuration, *one* unit **must** use **NI** timing and the other unit **must** use something else. This "something else" is nearly always **Int** (Internal) but some user configurations require **Port 1** or **DSX-1** timing. Contact the Technical Assistance Center if assistance is needed.

'o display:

```
NI Configuration

_Timing Source
```

<table>
<tr><td>NOTE
☞</td><td>Steps 13 through 19 apply to Serial Port #1 while the identical Steps20 through 26 apply to Serial Port #2.</td></tr>
</table>

ain Menu,
DOWN *to*
display:

```
Main Menu          HH:MM
_Configuration
```

LECT *and*
JP/DOWN
o display:

```
Configuration
_Serial Port #1 (or 2)
```

ELECT *to*
display:

```
Serial Port #1 (or 2)
_XXXK (XDS0)
```

13. **Serial Port #1 Data Rate.**
    [20. **Serial Port #2 Data Rate**]

<table>
<tr><td>NOTE
☞</td><td>In an Integrated Access, Fractional T1 environment, this selection MUST be coordinated with the network supplier.</td></tr>
</table>

Before entering a value, the user must first determine if each DS0 will carry 56 kbps or 64 kbps user data and must then determine the correct quantity of DS0s necessary to achieve the desired data rate.

See **Density** (item #8, above). If the NI is **Clear**, the 56/64 decision is completely user optional and **64Kbps** is recommended to obtain maximum data transfer efficiency in the network.

If the NI is *not* **Clear**, steps must be taken to ensure the proper "ones density" in the data presented to the network. If this is not done, Centum Series may occasionally damage user data in order to satisfy network requirements. There are three methods that can be used to ensure ones density in the data:

• Limit the user data to 56 kbps per DS0. Centum Series will use the remaining 8 kbps (in each DS0) to provide the required density.

• Allow 64 kbps user data in each DS0 and use alternate DS0s. Keep the intervening DS0s idle to provide the density. See **Alt/Consec** below (items #14 and #21). This method wastes significant bandwidth and should only be used when absolutely necessary.

• Allow 64 kbps user data in each DS0 when the user's protocol provides the required density. See **Data Norm/Inv** below (item s#16 and #23).

When the 56/64 decision has been made, repeatedly **SELECT** until the desired data rate is displayed on the left side of the LCD panel AND the correct DS0 quantity is displayed on the right side. Select N/U if the Serial Port will not be used.

⚠ CAUTION

In some cases, the same data rate can be achieved with two different DS0 quantities, one with 56 kbps DS0s and the other with 64 kbps DS0s.

DOWN *to display:*

```
Serial Port #1 (or 2)
First DS0: XX
```

14. **Serial Port #1 DS0 assignments.**
    [21. **Serial Port #2 DS0 assignments**]

    This selection determines which specific DS0s within the T1 stream will support the Serial Port.

*In an Integrated Access, Fractional T1 environment, this selection **MUST** be coordinated with the network supplier.*

The **First DS0** is the lowest numbered DS0 of the quantity indicated in **Data Rate** (items #13 and #20, above). Repeatedly **SELECT** until the desired **First DS0** appears in the display. The remaining DS0s required to support the desired data rate are the next higher numbered contiguous or alternate DS0s except that the string of DS0s cannot "wrap" from #24 to #1.

DOWN *to display:*

```
Serial Port #1 (or 2)
XXXXXXX DS0s
```

Repeatedly **SELECT** to choose either **Consecutive** or **Alternate**. If **Consecutive** is chosen, the DS0s assigned to this serial port will be a contiguous string beginning with the **First DS0**.

If **Alternate** is chosen, Centum Series will insert an idle DS0 immediately after each one required for user data. For example, if the first DS0 is #1 and four alternate DS0s are selected, #1, #3, #5, and #7 will carry user data while #2, #4, #6, and #8 will be idle.

When this selection is made, place checkmarks in the appropriate "T-Channel Definitions" boxes to simplify recordkeeping. Don't forget to account for 56 kbps vs. 64 kbps DS0s.

DOWN *to display:*

```
Serial Port #1 (or 2)
CD..: XX
```

15. **Serial Port #1 CD handling.**
    [23. **Serial Port #2 CD handling**]

    Centum Series presents a DCE interface to the attached customer equipment. **Carrier Detect (CD)** can be

    • permanently **On**

- permanently **Off**, or

- **Switched** (normally **On**, turns **Off** upon network carrier failure).

Switched is the recommended mode of operation unless the customer DTE requires otherwise. Repeatedly **SELECT** to choose **On**, **Off**, or **Switched**.

DOWN *to*
display:

```
Serial Port #1 (or 2)
Data..: XXX
```

16. **Serial Port #1 Data Normal/Inverted.**
    [23. **Serial Port #2 Data Normal/Inverted**]

    Repeatedly **SELECT** to choose between **Normal** and **Inverted**.

    Choose **Normal** if any of the following are true:

    - Density (item #8, above) is Clear.

    - Data Rate (items #13 and #20, above) uses 56 kbps per DS0

    - Alt/Consec (items #14 and #21, above) is Alternate

    If none of the above conditions apply, consider the following:

    Some user protocols, such as SDLC and HDLC, have a "zeroes density" characteristic that, when inverted, results in the required T1 "ones density". If the attached DTE uses one of these protocols AND also inverts the data, choose **Normal** and confirm that the mated serial port (at the "other end" of the circuit) is configured the same.

    If the attached DTE uses one of these protocols and does NOT invert the data, choose **Inverted** and confirm that the mated serial port (at the "other end" of the circuit) is configured the same.

NO OTHER CONDITIONS AREVALID. Please refer to discussion under Serial Port Data Rate (items #13 and #20, above).

DOWN *to*
display:

```
Serial Port #1 (or 2)

Clock..: XXXX
```

17. **Serial Port #1 Clock Normal/Inverted.**
    [24. **Serial Port #2 Clock Normal/Inverted**]

    Repeatedly **SELECT** to choose **Normal** or **Inverted**. Initially choose **Normal**. If frequent errors occur at this serial port, try **Inverted** and check performance.

    Normally, the down-going clock edge is in the middle of each bit. This is required by networks. Some DTEs, particularly with high-speedV.35 configurations and/or lengthy cables, place the rising edge in the middle of each bit. **Inverted** will correct this condition to satisfy the network.

DOWN *to*
display:

```
Serial Port #1 (or 2)

Clocks: XXXX XXX
```

18. **Serial Port #1 Clock Handling**
    [25. **Serial Port #2 Clock Handling**]

    Repeatedly **SELECT** to choose **Internal**, **External,** or **Int/Ext**.

NOTE

External is not available for Serial Port #2.

    Internal is the normal setting and should always be chosen unless there is specific reason to do otherwise. At the serial interface, Centum Series will provide both TX-clock and RX-clock to the customer DTE.

    External should be used with Serial Port #1 if the attached user equipment is DCE, rather than DTE. Centum Series will accept both TX-clock and RX-clock from the customer DCE. This setting

requires special user cabling and a very specific DCE configuration. Please refer to Appendi xC, *Special Serial Port Cabling* for more information.

Int/Ext should be used for Serial Port #1 if the attached user DTE is substantially far away from Centum Series *and/or* if Serial Port #1 is to be used as the system's master clock. See Timing Source (item #12, above).

Int/Ext should be used for Serial Port #2 if the attached user DTE is substantially far away from the Centum unit. The Centum unit will provide RX-clock to the attached DTE and will accept TX-clock from the DTE.

The **Int/Ext** setting requires a special DTE requires a special DTE configuration or a modified cable. Please refer to Appen d ixC, *Special Serial Port Cabling* for more information.

Important Notes:

a. If **Int/Ext** timing has been selected for Serial Port #1 because Serial Port #1 is to be used as the system's master clock (see item #12, above), the recommendation in Appendi xC *must* be followed.

b. If excessive DTE cable distance is the *only* concern, consider the following:

- Clocking problems appear as periodic (predictable) error bursts.

- **Internal** Serial Port timing should first be attempted with a normal DTE configuration and a standard cable.

- If clocking problems occur, they can frequently be corrected by using clock inversion (items #17 and #24, above) and retaining the normal DTE configuration and the standard cable.

- **Int/Ext** Serial Port timing with the recommendations in Appendix C need be used only if the above efforts fail.

DOWN to
display:

```
Serial Port #1 (or 2)

Rem Loop:_Enabled
```

19. **Serial Port #1 Remote Loop Enable/Disable.**
    [26. **Serial Port #2 Remote Loop Enable/Disable**]

    Repeatedly **SELECT** to choose between **Enabled** and **Disabled**.

    When **Enabled**, this Serial Port channel *will* respond to receipt of a remote digital loop command arriving from the Serial Port channel of the mated Centum Series unit. Enabled is recommended unless the user has specific reason to do otherwise.

    When **Disabled**, this Serial Port channel will *not* respond to receipt of a remote digital loop command.

ain Menu,
DOWN to
display:

```
Main Menu        HH:MM

_Configuration
```

LECT and
JP/DOWN
'o display:

```
Configuration

_DSX-1 Interface
```

ELECT to
display:

```
DSX-1 Config.

Framing:_XXX
```

20. **DSX-1 port framing.**

    Repeatedly **SELECT** to choose the framing provided by the attached PBX: **ESF** or **D4**. Choose **N/U** if a PBX will not be used.

    Refer to item #4, earlier. If the **NI framing** is ESF, the DSX-1 framing can be either ESF or D4 (the unit will provide the necessary conversion). If, however, the NI framing is D4, the DSX-1 framing should also be D4 (conversion from ESF to D4 is not recommended).

    All DS0s that have not been assigned to Serial Port #1 are given to the DSX-1 port by default (unless **N/U** is selected for DSX-1 framing). If the PBX will use some, but not all, of those DS0s, the appropriate DS0s should be idled by the PBX. The user is advised to mark the Worksheet in such a way that PBX idle can be differentiated from Centum Series idle.

    When this selection is made, place checkmarks in the "T-Channel Definitions" boxes to simplify recordkeeping.

DOWN *to*
display:

```
DSX-1 Config.
Line Code:_XXXX
```

21. **DSX-1 line code.**

    Repeatedly **SELECT** to choose the line code provided by the attached PBX: **B8ZS** or **AMI**.

    Refer to item #5, earlier. If the **NI line code** is B8ZS, the DSX-1 line code can be either B8ZS or AMI (the Centum Series unit will provide the necessary conversion). If, however, the NI line code is AMI, the DSX-1 framing should also be AMI (conversion from B8ZS to AMI is not recommended).

DOWN *to*
display:

```
DSX-1 Config.
Distance:_XXXft.
```

22. **PBX distance.**

    Repeatedly **SELECT** to choose a distance figure that most closely approximates the cable length from the DSX-1 port to the PBX.

DOWN *to*
display:

```
DSX-1 Config.

DSX-1 CFA:_XX
```

23. **DSX-1 CFA.**

    Repeatedly **SELECT** to choose **No** or **Yes**.

    Yes causes the Centum Series unit to pass "red alarm" signals to the PBX for appropriate action.

    Refer to **NI CFA**, item #9, earlier.

    If **NI CFA** is **Yes**, choose **DSX-1 CFA No**.

    If **NI CFA** is **No** and the network is provided by a common carrier, such as a telephone company, choose **DSX-1 CFA Yes**. Ensure that the attached PBX will react to a three-second "red alarm" by discarding data and sending a "yellow alarm".

    If **NI CFA** is **No** and the network is private, the selection is a user option.

Checking the "T-Channels"

ain Menu,
DOWN *to*
display:

```
┌─────────────────────────────┐
│ Main Menu          HH:MM    │
│                             │
│ _Configuration              │
└─────────────────────────────┘
```

SELECT
to display:

```
┌─────────────────────────────┐
│ Configuration               │
│                             │
│ _NI Interface               │
└─────────────────────────────┘
```

DOWN *as*
required to
display:

```
┌─────────────────────────────┐
│ Configuration               │
│                             │
│ _DS0 Assignments            │
└─────────────────────────────┘
```

SELECT
to display:

```
┌─────────────────────────────┐
│ Channel            Mode     │
│                             │
│ _01:          XXXX          │
└─────────────────────────────┘
```

Repeatedly depress **UP** or **DOWN** while comparing Centum Series display with the checkmarks in the worksheet T-Channel Definitions, columns #14 and 27.

Note that "Idle" refers to channels that have been configured as "Not Used" in the Centum Series. In some cases, typically involving Fractional T1, a portion of the DS0s assigned to the DSX-1 port will be forced to "idle" by the PBX; these channels will be displayed as "DSX-1"

channels by the Centum Series. The user is advised to mark the Worksheet in such a way that PBX idle can be differentiated from Centum Series idle.

The DS0 configuration can also be sent to a printer. Please refer to Chapter 6, *Auxiliary Ports*.

Self-Testing Centum Series

The self-testing can be performed via either the Centum Series control panel or an external terminal or PC. The instructions below assume that the Centum Series control panel is being used. Chapte r6, *Auxiliary Ports*, describes usage of an external terminal.

ain Menu,
DOWN *to*
display:

```
Main Menu        HH:MM
_Diagnostics
```

llowed by
s required
o display:

```
Diagnostics
_NI/DSX-1 Port
```

ELECT to
display:

```
NI/DSX-1 Diag.
CSU Loop..:_Off or On
```

If the **CSU Loop** is presently **Off**, the NI **ALARM** indicator should be illuminated. If the CSU Loop is presently **On**, the NI **ALARM** indicator should be extinguished. Repeatedly **SELECT** to turn the loop **On** and **Off** while confirming proper functioning of the NI **ALARM** indicator. Leave the CSU loop in the **On** condition.

o display:

```
NI/DSX-1 Diag.
BERT......:_Off or On
```

SELECT
o display:

```
NI/DSX-1 Diag.
BERT......:_On
```

quired and
o display:

```
NI/DSX-1 Diag.
Err Secs.:_ØØØØØ
```

quired and
to display:

```
NI/DSX-1 Diag.
Sec/Test.:_ØØØØØ
```

Confirm that the **Seconds/Test** is properly incrementing and then depress **UP** to confirm that the Errored Seconds is not incrementing. If the unit is receiving errored seconds, confirm your configuration and run the self-testing again. If the unit still indicates "errored seconds", contact our Technical Assistance Center.

Turn **Off** the BERT and the CSU Loop.

Cycle through the **Diagnostics** menus and confirm that all test functions (loops and BERT) are **Off**. (If necessary, turn them **Off**).

If the unit is being used in a point-to-point configuration, configure and self-test the remote unit. If the unit is being used in an Integrated Access, Fractional T1 environment, configure and self-test all remaining units.

Connecting the Centum Series

After all units have been configured and self-tested, they should be connected to the network via the 8-pin modular jack (RJ-48 configuration).

The User DTEs and the DSX-1 should also be connected at this time. The V.35 DTE connects to the DSU via female M-series, 34-pin connectors.

RS-530 DTEs connect to the DSUs via female DB-25 connectors. RS-449 (37-pin) DTEs connect to the DSUs via mechanical adapters and female DB-25 connectors. The DSX-1 port is an 8-pin modular jack (RJ-48 configuration).

All cable specifications are given in Appe ndixB, *Standard Cabling for User Ports*.

Figure 3-1   Rear Panel of Access System 100 (V.35 version)
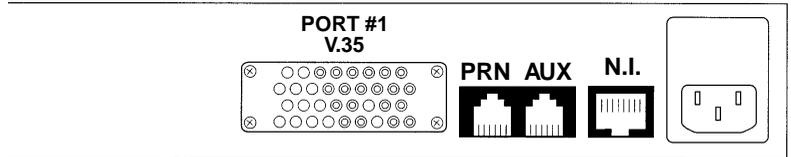
Figure 3-2   Rear Panel of Access System 150 (V.35 version)
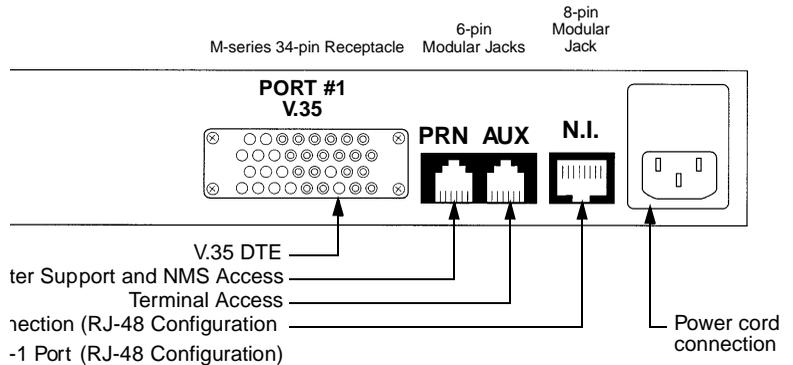
Figure 3-3   Rear Panel of Access System 200 (V.35 version)
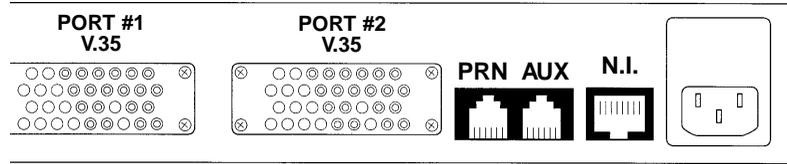
Line Testing (Point-to-Point Configuration)

The line testing can also be performed via either the Centum Series control panel or an external terminal or PC. The instructions belo assume that the Centum Series control panel is being used. Chap ter6, *Auxiliary Ports*, describes usage of an external terminal.

Confirm that both ends are configured, self-tested, and connected to the network. Confirm that the **ALARM** indicator is extinguished at both ends. If not, review both configurations and repeat both self-tests. If either **ALARM** indicator remains illuminated, contact our Technical Assistance Center. Once the **ALARM** indicators are extinguished, proceed as follows.

ain Menu,
DOWN *to*
display:

```
Main Menu          HH:MM
_Diagnostics
```

ollowed by
equired to
display:

```
Diagnostics
_NI/DSX-1 Port
```

o display:

```
NI/DSX-1 Diag.
CSU Loop..:_Off
```

to display:

```
NI/DSX-1 Diag.
NI RLB..:_Off
```

o display:

```
NI/DSX-1 Diag.
NI RLB..:_On
```

If the remote end responds properly to this command, the DSX-1/NI
LOOP indicator will illuminate within approximately ten seconds. If the
remote end does not respond properly, the **LOOP** indicator will remain
extinguished and the LCD panel will change to **NI RLB..:_Off**.

Confirm that the remote end has responded properly. If it has not, check
the NI cable connections and try again. If it still does not respond,
contact your network supplier. Continue with the following steps only if
the remote end has responded properly.

quired and
o display:

```
NI/DSX-1 Diag.

BERT......:_On
```

uired and
o display:

```
NI/DSX-1 Diag.

Err Secs.:_ØØØØØ
```

quired and
to display:

```
NI/DSX-1 Diag.

Sec/Test.:_ØØØØØ
```

Confirm that the **Seconds/Test** is properly incrementing and then depress
UP to confirm that the **Errored Seconds** is *not* incrementing. If the unit
is receiving errored seconds, confirm your configuration and run the
testing again. If the unit still indicates errored seconds, contact our
Technical Assistance Center.

Turn **Off** the BERT and the Loop. Your system is now ready for
operation.

Line Testing (Integrated Access, Fractional T1)

The line testing can be performed via either Centum Series control panel or an external terminal or PC. The instructions below assume that Centum Series control panel is being used. Chapter 6 ,*Auxiliary Ports*, describes usage of an external terminal.

The line itself cannot be tested directly in an Integrated Access, Fractional T1 environment (the NI remote loop will not function). It can, however, be tested indirectly by using the Serial Port channel.

If any locations are served by DSX channels (and *only* DSX channels), the PBX units must be connected and used to test the links to those locations.

ain Menu,
/DOWN *to*
display:

```
Main Menu          HH:MM

_Diagnostics
```
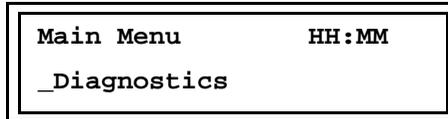
Use **SELECT** and the **UP** and **DOWN** arrows to choose Serial Port #1 Remote Loop On. Then, use the **UP/DOWN** arrows and **SELECT** to turn on the BERT. Finally, use the arrows to confirm that Seconds/Test is incrementing but Local and Remote Errored Seconds is not incrementing. This checks out the link from the local site to the ultimate Ser ial Port#1 destination.

Turn **Off** the BERT and the Loop. Your system is now ready for operation.

Testing the Centum Series

Centum Series testing can be performed via either the Centum Series control panel or an external terminal or PC. The instructions belo assume that the Centum Series control panel is being used. Chapter 6, *Auxiliary Ports*, describes usage of an external terminal.

The Centum Series includes extensive diagnostic capabilities that allow testing of the Centum Series unit itself as well as the attached T1 network. Follow the instructions below to access the Diagnostic Menus:

ain Menu,
/DOWN *to*
display:

```
Main Menu          HH:MM

_Diagnostics
```
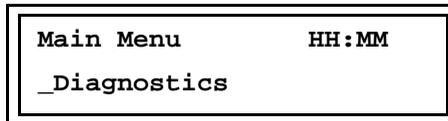
Then, proceed to the following pages to access the specific test features.

CSU Loop

When the **CSU Loop** is **ON**, the front panel **LP** LED will illuminate and local testing can be performed by external DTE equipment or by Centum Series's internal BERT (see *CSU Loop with BER*, on pa ge4-5).

ag. Menu,
***/DOWN** to*
display:

```
Diagnostics
_NI/DSX-1 Port
```

SELECT
eatedly to
display:

```
NI/DSX-1 Diag.
CSU Loop..:_Off/On
```


1.536 Mbps Payload   1.544 Mbps Network Interface   CSU Loop OFF (Normal Data)

1.536 Mbps Payload   1.544 Mbps Networ Interface   CSU Loop ON

Payload BERT

The Payload BERT is useful in a point-to-point environment. The Centum Series units at both ends of the circuit must be placed in a Payload BERT condition with the same BER pattern.

ag. Menu, **/DOWN** *to display:*

```
Diagnostics
_NI/DSX-1 Port
```

DOWN *to display:*

```
NI/DSX-1 Diag.
BER Patt>_XXX
```

SELECT as required to choose the desired Bit Error Rate pattern of **511**, **2 of 16**, or **All Ones**.

d **SELECT** *equired to display:*

```
NI/DSX-1 Diag.
BERT......:_On
```

If the BER pattern was changed in the previous step, the BERT must be turned **OFF** and back **ON** again to establish the new pattern.

d **SELECT** *equired to display:*

```
NI/DSX-1 Diag.
Sec/Test.:_∅∅∅∅∅
```

If the CSU portions of the Centum Series unit and the T1 link are all functioning properly, the **Seconds/Test** at both units will increment while the **Errored Seconds** at both units will remain at ∅∅∅∅∅.

WHEN TESTING IS COMPLETED, BE SURE TO TURN BOTH BERT TESTS 'OFF'.

Figure 4-1   Payload BERT diagram
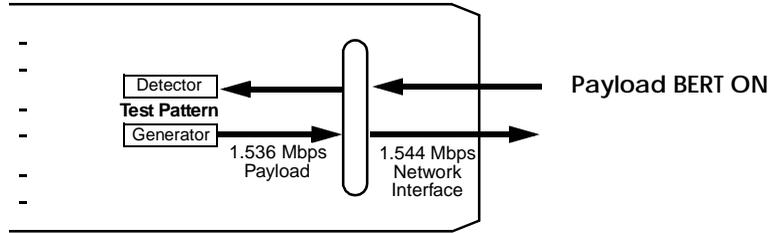
CSU Loop with BERT

The CSU portion of a single Centum Series unit can be tested by activating both the CSU Loop and the Payload BERT. Refer to page 4-2 and page 4-3.

If the CSU portion of the unit is functioning properly, the **Seconds/Test** will increment while the **Errored Seconds** will remain at ∅∅∅∅.

WHEN TESTING IS COMPLETED, BE SURE TO TURN BOTH THE LOOP AND THE BERT TESTS "OFF".

Figure 4-2   CSU Loop with BERT
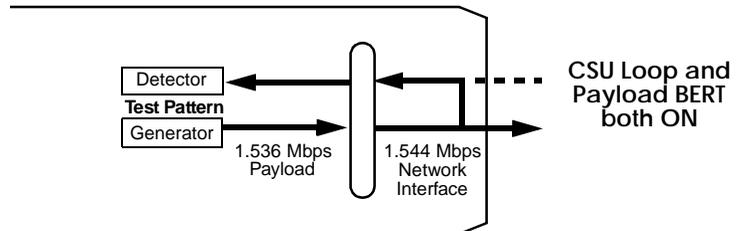
Payload Loop

The Payload Loop is useful for looping back any testing initiated by the other end of a point-to-point circuit, such as Payload, Serial Port, or DSX-1 BERTs or any externally generated testing.

It is also useful for looping back Serial Port or DSX-1 testing initiated by any remote location in an Integrated Access, Fractional-T1 circuit.

WHEN TESTING IS COMPLETED, BE SURE TO TURN THE LOOP "OFF".

ag. Menu,
/DOWN to
display:

```
Diagnostics

_NI/DSX-1 Port
```

OWN and
ELECT as
o display:

```
NI/DSX-1 Diag.

PAYLD Loop:_On
```
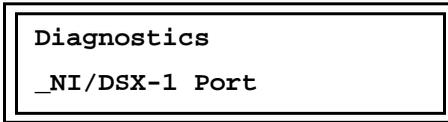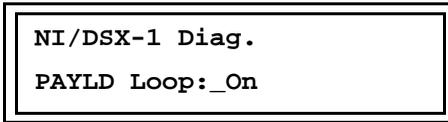
Figure 4-3   Payload Loop diagram
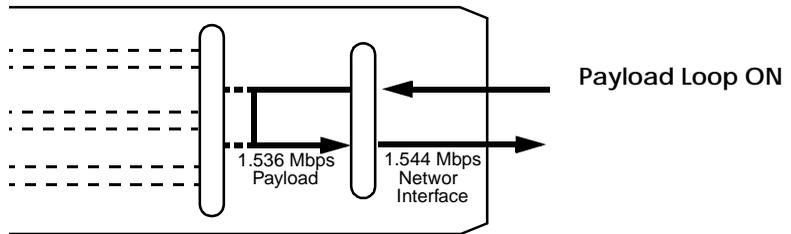
Line Loop

LLB causes a local line loop (at the Centum Series unit where the command was entered). RLB causes a remote line loop (at the distant end of a point-to-point circuit); RLB should *not* be attempted in an Integrated Access, Fractional T1 environment.

The CSU is excluded from the test path in a Line Loop configuration.

In a point-to-point circuit, the LLB and RLB are useful for looping back any testing initiated by the other end, such as Payload, Serial Port, or DSX-1 BERTs or any externally generated testing.

In an Integrated Access, Fractional T1 circuit, LLB is useful for looping back Serial Port or DSX-1testing initiated by any remote location.

WHEN TESTING IS COMPLETED, BE SURE TO TURN THE LOOP "OFF".

ag. Menu,
/DOWN to
display:

```
Diagnostics

_NI/DSX-1 Port
```

OWN and
ELECT as
o display:

```
NI/DSX-1 Diag.

NI LLB...:_On
```

OR

OWN and
ELECT as
o display:

```
NI/DSX-1 Diag.

NI RLB...:_On
```

Figure 4-4   Line Loop diagram

Line Loop ON

1.536 Mbps
Payload

1.544 Mbps
Networ
Interface
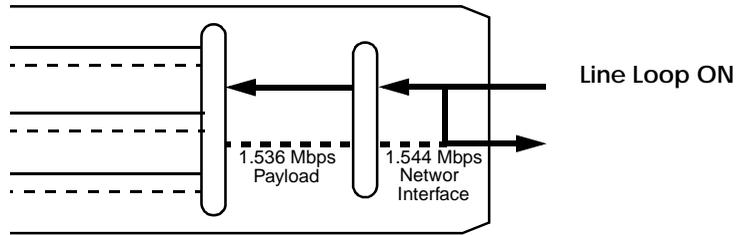
DSX-1 Loop

The DSX-1 Loop is useful for checking PBX cabling to the Centum Series units. With the loop enabled and all equipment properly configured, an attached PBX will synchronize onto its own looped signal.

WHEN TESTING IS COMPLETED, BE SURE TO TURN THE LOOP "OFF".

ag. Menu,
/DOWN *to*
display:

```
Diagnostics

_NI/DSX-1 Port
```

ELECT *to*
display:

```
NI/DSX-1 Diag.

CSU Loop..:_Ooff
```

/DOWN *to*
display:

```
NI/DSX-1 Diag.

DSX-1 Loop:_Off
```

SELECT *to*
display:

```
NI/DSX-1 Diag.

DSX-1 Loop:_On
```

Figure 4-5   DSX-1 Loop diagram

DSX-1 Loop ON

1.536 Mbps Payload

1.544 Mbps Network Interface
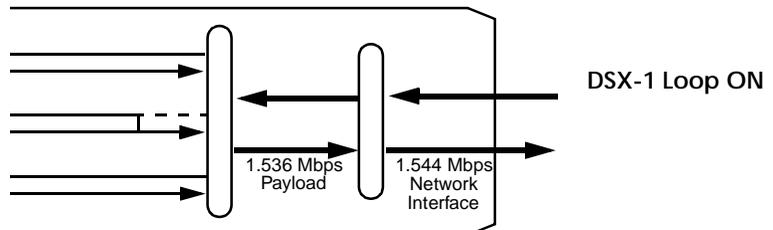
Serial Port Loop

Local Loop ON causes a loop (at the Centum Series unit where the command was entered). Remote Loop ON causes a loop at the Serial Port at the distant end. In an Integrated Access, Fractional T1 environment, the Serial Port #1 and Serial Port #2 links through the network is a logical point-to-point connection and the "distant end" is the destination for the serial port data.

⚠️

CAUTION

Local and Remote Loops should not be activated at the same time unless the serial port BERT is also activated at the local end. (See *Serial Port BERT,* **on page 4-12).**

WHEN TESTING IS COMPLETED, BE SURE TO TURN THE LOOP "OFF".

ag. Menu,
/DOWN to
display:

```
Diagnostics

_Serial Port #1 (or 2)
```

OWN and
ELECT as
o display:

```
SP 1 (or 2) Diagnostics

Local Loop: On
```

OR

OWN and
ELECT as
o display:

```
SP 1 (or 2) Diagnostics

Remote Loop: On
```

Figure 4-6   Serial Port Loop diagram

1.536 Mbps
Payload

1.544 Mbps
Network
Interface

Serial Port #1
Loop ON
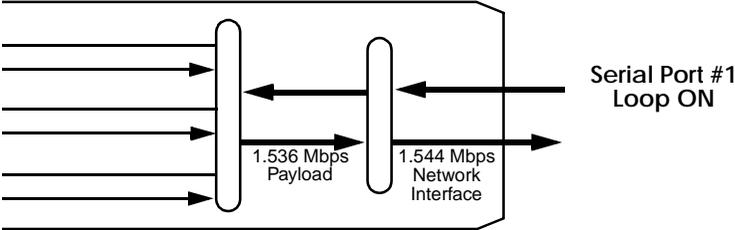
Serial Port BERT

The Serial Port (DTE) BERT can be used as a part of many different test configurations. It is most valuable with both the Local and Remote Serial Port Loops activated (see page 4-10); the local end of the recommended configuration is shown below.

The "Local" Errored Seconds are counted by the detector toward the left side in the figure. The "Remote" Errored Seconds are counted by the detector toward the right side.

WHEN TESTING IS COMPLETED, BE SURE TO TURN THE LOOP AND BERT "OFF".

ag. Menu,
/DOWN *to*
display:

```
Diagnostics
_Serial Port #1 (or 2)
```

ELECT to
display:

```
SP 1 (or 2) Diagnostics
_BERT.....: On
```

OWN and
ELECT *as*
o display:

```
SP 1 (or 2) Diagnostics
_Loc ES...:_⌀⌀⌀⌀⌀
```

OWN and
ELECT *as*
o display:

```
SP 1 (or 2) Diagnostics
_Rem ES...:_⌀⌀⌀⌀⌀
```

OWN and
ELECT *as*
o display:

```
SP 1 (or 2) Diagnostics
_Sec/Test.:_⌀⌀⌀⌀⌀
```

Figure 4-7   Serial Port BERT and Loop diagram

Chapter

5
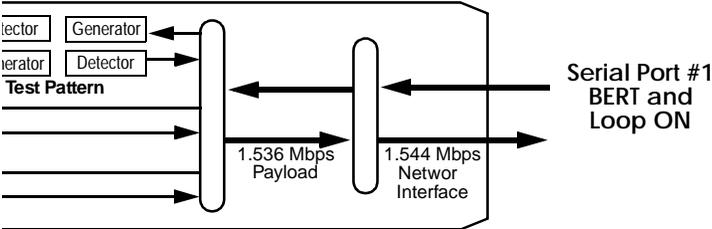
Other Features

Many other functions are available in the Centum Series. This chapter describes access from the front panel display. The same functions can also be accessed via an externally attached terminal. See Chapter 6, *Auxiliary Ports*.

Alarms and Statistics

The **Alarms and Stats** Main Menu is intended for those users with T1 alarm and ESF (Extended Superframe) statistics knowledge. From the **Alarms and Stats** Main Menu, **SELECT** then use **UP/DOWN** arrows to:

- Access current network (NI) and DSX-1 alarm conditions, which are shown with the number of seconds that the alarms have been present since the last alarm reset.

- Reset the alarm times.

- Access both current and 24-hour ESF statistics.

- Send alarms to an externally attached printer. See Chapter 6, *Auxiliary Ports*.

- Send ESF statistics to an externally attached printer. See Chapter 6, *Auxiliary Ports*.

Alarm Definitions

AIS.   An unframed "all ones" condition has been detected.

Red Alarm.   A "loss of frame alignment" has occurred and synchronization has been lost.

Yellow Alarm.   A Yellow Alarm is generated by the network and sent to the customer premises. It usually means that the network is not receiving Centum Series signalling correctly.

Framing Errors. One or more frame alignment bit errors have been detected. This does not mean that synchronization has been lost.

CRC6 Alar m. One or more CRC6 block errors have been detected. The D4 framing does not include CRC6; Centum Series replaces that parameter by counting the number of framing bit errors. The result is a useful picture over time regarding D4 link performance.

BPV. Bipolar Violations have been detected. This usually indicates that a very weak or overly strong signal is being received from the network.

ESF Statistics Definitions

Errored Second (ES). Any occurrence of a Loss of Frame or a CRC6 error in a one-second period.

Failed Signal State (FSS). Ten consecutive Errored Seconds.

Failed Second (FS). Each second during the occurrence of a Failed Signal State.

Severely Errored Second (SES) Three hundred twenty (320) or more CRC6 errors in a one-second period.

Bursty Errored Second (BES). More than one but less than 320 CRC6 errors in a one-second period.

Alarms/Statistics Menu

Please refer to *Alarm Definitions,* on page 5-1, and *ESF Statistics Definitions,* on page 5-2.

This chapter describes front panel access of the Alarms and Statistics storage. Please refer to page 6-12 for terminal access.

From the **Alarms/Stats** Main Menu, **SELECT** then use **UP/DOWN** arrows to display either **NI Alarms**, **DSX-1 Alarms,** or **ESF Statistics**. Then **SELECT** followed by **UP/DOWN** as described below.

NI Alarms will display the current status(Yes/No) of AIS, Red and Yellow Alarms, Frame Errors (Ferr), CRC6 and BPV alarms. **UP/DOWN** will scroll through the six possible alarms. If any entry is yes, the display will also indicated the quantity of seconds that the alarm has been present. The **DSX-1 Alarms** display is identical to the **NI Alarms** display except that BPV alarms are not included.

```
DSX-1 Alrm Errs

Yel  Yes  ∅∅∅1∅
```

If **ESF Statistics** is selected, the user is then presented with another choice, **Current Statistics**, **24-Hour Statistics**, or **ESF Registers**.

By choosing **Current Statistics**, the user is provided statistics for the current time interval (maximum fifteen minutes). Use **UP/DOWN** to scroll through **Current Status**, **Time in Current Interval** (in seconds), **ES & FS**, **SES & BES**, and the current quantity of **Valid Intervals** (fifteen minutes per interval). In the **Current Status** screen (shown below), the following interpretation applies.

Digit #1	**F** or ∅ where **F** indicates Failed Signal State (FSS).
Digit #2	**U** or ∅ where **U** indicates that the T1 line is unavailable.
Digit #3	Always ∅.
Digit #4	Always ∅.
Digit #5	Always ∅.

Digit #6   Always ∅.

Digit #7   **L** or ∅ where **L** indicates that the T1 line is in loop.

Digit #7   Always ∅.

```
 ┌─────────────────────────┐
 │  Current Stats          │
 │  Status: XX∅∅∅∅X∅        │
 └─────────────────────────┘
```

Scrolling **UP/DOWN** will provide detailed information. Below is the **SES/BES** display.

```
 ┌─────────────────────────┐
 │  Current Stats          │
 │  SES: ∅∅∅ BES: ∅∅∅       │
 └─────────────────────────┘
```

By choosing **24 Hour Stats**, the user can scroll through the ES, FS, SES, and BES counts for the preceding 24-hour period.

```
 ┌─────────────────────────┐
 │  24 Hour Stats          │
 │  SES: ∅∅∅∅∅              │
 └─────────────────────────┘
```

ESF Registers gives the same information but it is broken down for each of the ninety-six 15-minute intervals in that 24-hour period. Use **UP/ DOWN** to scroll through the intervals.

```
 ┌─────────────────────────┐
 │  ∅3. FS  SES BES         │
 │  ∅∅∅ ∅∅∅ ∅∅∅ ∅∅∅         │
 └─────────────────────────┘
```

In this example, the user has scrolled to interval #3. The ES count is the first three-digit number (directly below the ∅**3**).

Utilities

From the **Utilities** Main Menu, **SELECT** then use **UP/DOWN** arrows to:

- Set Date and Time.

- Edit Unit ID.

- Clear BRAM. This function clears all user-entered configuration parameters and returns the Centum Series unit to the factory default condition. **USE WITH CAUTION.**

- Determine installed software level.

- Configure Auxiliary CRT Port. See Chapter 6, *Auxiliary Ports*.

- Configure Auxiliary NMS/Printer Port. See Chapter 6, *Auxiliary Ports*.

Events

Centum Series constantly monitors for the occurrence of events, such as alarms, test commands, and system resets. When an event occurs, a description with a time and date stamp is immediately sent out the printer port. The format and interpretation of printed events are shown on the next page.

In addition, Centum Series maintains a log of the most recent sixteen events and that log can be accessed by either the front panel controls and LCD panel or an externally attached terminal. See page 6-15 for terminal access of the Event Log.

From the **Event Log** Main Menu, **SELECT** then use **UP/DOWN** arrows to view the stored events and/or clear the log. (The log is cleared is **SELECT** is depressed when the screen displays **Clear Event Log**.) The format of an LCD screen event is below. Interpretation of the events is the same as shown on the next page for printed events.

```
NN S Event Description
HH:MM:SS  MM/DD
```

NN is the Event sequence number. **S** indicates that the Event is the **Start** of an occurrence. **E** is used to indicate that the Event is the **End** of an occurrence.

Event Printing

Unit ID	Seq. Num	Time	Date	Status	Event
0012345	01155	10:39:39	02/25	End	PORT 1 LL

Type	Text	Description
System	UNIT START	Centum Series Power Up of Initialization Sequence
	BRAM CLEAR	Non-Volatile Memory has been Cleared
	CFG ERROR	Error Detected in Non-Volatile Memory
Alarm	NI RED	Network Interface is in Red Alarm
	NI AIS	Network Interface is Receiving all "Ones" (AIS)
	NI YEL	Network Interface is Receiving Yellow Alarm
	NI CRC	Network Interface is Experiencing CRC6 Errors
	NI FSS	Network Interface is in a Failed Signal State
	NI FERR	Network Interface is Experiencing Framing Errors
	DSX-1 RED	DSX-1 Interface is in Red Alarm
	DSX-1 AIS	DSX-1 Interface is Receiving all "Ones" (AIS)
	DSX-1 YEL	DSX-1 Interface is Receiving Yellow Alarm
	DSX-1 CRC	DSX-1 Interface is Experiencing CRC6 Errors
	DSX-1 FERR	DSX-1 Interface is Experiencing Framing Errors
Diagnostic	DTE1 LL	Serial Port #1 is in Local Digital Loopback
	DTE2 LL	Serial Port #2 is in Local Digital Loopback
	DTE1 RL	Serial Port #1 is in Remote Digital Loopback
	DTE2 RL	Serial Port #2 is in Remote Digital Loopback
	NI LLB	The Network Interface is in Local Line Loopback
	NI RLB	The Network Interface is in Remote Line Loopback
	NI PLLB	The Network Interface is in Payload Loopback
	NI CSU LL	The Network Interface is in Local CSU Loopback
Indications	DTE 1 CONN	Serial Port #1 is Connected (DTR/RTS Asserted)
	DTE 1 DISC	Serial Port #1 is Disconnected
	DTE 2 CONN	Serial Port #2 is Connected (DTR/RTS Asserted)
	DTE 2 DISC	Serial Port #2 is Disconnected

Chapter

6

Auxiliary Ports

The Centum Series includes two RS-232 "auxiliary" ports. The **CRT** port allows the user to connect an external terminal (or PC with terminal emulation). The connected terminal can perform all the functions of the **UP**, **DOWN**, **SELECT**, and **END** buttons on the front panel. Usage of this terminal is highly recommended by Verilink as the CRT display is not constrained by the limitations of the LCD panel and, as a result, the user is presented with a more comprehensive indication of available choices and Centum Series results.

The **NMS/Printer** port allows the user to connect an external *serial printer* to obtain a hard copy of configuration, statistics, alarm and real-time events.

Cabling

The table below provides a summary of the Verilink cables available for the Centum series.

Table 6-1

Verilink Cable Number	Length	Description	Type of Cable
CBE 010-00001	15 ft.	8-pin to 8-pin modular Male-to-Male for network connection	Networ
CBE 011-00001	15 ft.	8-pin to 8-pin modular Male-to-Male for equipment connection	T1 Equipment
CBE 010-00002	4 ft.	6-pin modular to 25D-type Female for direct connection	Management
458-502368-008	8 ft.	6-pin modular to 25D-type Male for modem connection	Management
458-501983-015	15 ft.	V.35 Male to Male, DCE to DTE	Application
458-501792-015	15 ft.	25D-type with RS-530 specification. Male-to-Male	Application
458-501776-015	15 ft.	V.35 Male-to-Male for external timing [a]	Application
458-501791-015	15 ft.	RS-530 Male-to-Male for external timing [a]	Application
Adapter Cables[b] (below)			
458-502361-015	15 ft.	25D-type (RS-530) Male to 37-pin (RS-449) Female	Application
458-502362-015	15 ft.	25D-type (RS-530) Male to 37-pin (RS-449) Male	Application
458-502363-015	15 ft.	25D-type (RS-530) Male to 37-pin (RS-449) Female for external timing[a]	Application
458-502364-015	15 ft.	25D-type (RS-530) Male to 37-pin (RS-449) Male for external timing[a]	Application

a. External Timing is the same as DSU-X, for a cross-over cable.

b. Adapter cables are used to convert between a 25-pin connector on the rear of the box to a 37-pin connector on the customer apparatus.

For additional cable and pinout detail, see the following sections of this manual:

- Appendix B, *Standard Cabling for UserPorts*
- Appendix C, *Special Serial Port Cabling*.

Auxiliary ports

Both auxiliary ports consist of 6-pin modular jacks. Because the ports are permanently DCE, there are two configurations for the required cabling, depending on whether the connections are "direct" or via modems.

NMS Access (Management Port) Cable. Six-position, 6-pin modular male to 25-pin D-type male for direct connection of a terminal or a printer. Four feet long. One cable supplied with unit.

458-502368- 0 0 Six-position, 6-pin modular male to 25-pin D-type male for modem connection of a terminal or a printer. Eight feet long. Available at extra cost.

The Verilink cables can be "stretched" by adding a 6-pin female/female adapter and a straight-through 6-wire make/male modular cable (see below). If the user chooses not to obtain Verilink cables, a male/male modular cable should be used with a connector adapter (female modular to D-25). See next page for adapter construction.

In any case, the 6-wire reference must be emphasized. A very common modular cable is 6-position, 4-wire (such as used in the RJ-11 configuration for a home telephone). **Although the plastic housing is identical to the 6-wire version, ONLYFOUR WIRES ARE IN THE CABLE AND IT WILL NOT FUNCTION WITH THE CENTUM SERIES.**

Connectors are "flipped" on a straight-through cable

Pins

Pins

NOTE

The device is shipped with the following cables:

Part Number	AS100	AS150	AS200
CBE 010-00001	Network Cable	Network Cable	Network Cable
CBE 011-00001	-----	DSX-1 Cable	-----
CBE 010-00002	Management Cable	Management Cabl	Management Cable

Modular Adapters

If Verilink cables will not be used, the adapters shown below should be used with straight-through male/male 6-wire modular cables. See previous page for a description of the available Verilink cables.

Figure 6-1   6-Pin Modular Adapter Pin Assignment

Direct Connection	6-pin Modular Jack (Female)				
		1	Signal Ground	←→	Signal Ground	7
		2	Carrier Detect	→	Carrier Detect	8
		3	Request to Send	←	Request to Send	4
		4	Receive Data	→	Receive Data	3
		5	Transmit Data	←	Transmit Data	2
		6	Power Ground	←→	Power Ground	1

DB-25 Pins To/From Terminal or Printer

Modem Connection	6-pin Modular Jack (Female)				
		1	Signal Ground	←→	Signal Ground	7
		2	Carrier Detect	→	Request to Send	4
		3	Request to Send	←	Carrier Detect	8
		4	Receive Data	→	Transmit Data	2
		5	Transmit Data	←	Receive Data	3
		6	Power Ground	←→	Power Ground	1

DB-25 Pins To/From Modem

Rear panel views

The three following figures show the rear panel views of the AS100, AS150, and AS200, respectively. As an example, the AS150 rear panel is labeled in detail.

Figure 6-2   Rear Panel of Access System 100 (V.35 version)

PORT #1
V.35   PRN AUX   N.I.
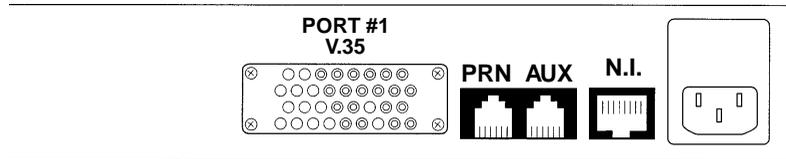
Figure 6-3   Rear Panel of Access System 150 (V.35 version)

M-series 34-pin Receptacle   6-pin
Modular Jacks

8-pin
Modular
Jack

PORT #1
V.35

PRN AUX   N.I.

-48 Configuration)

V.35 DTE

: and NMS Access

Terminal Access

-48 Configuration)

Power cord connection
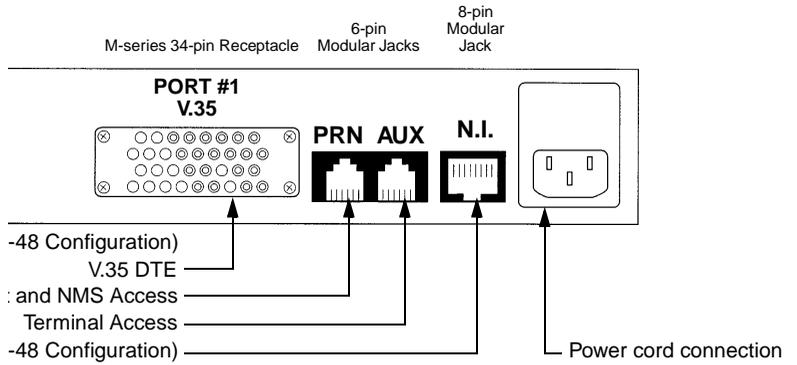
Figure 6-4   Rear Panel of Access System 200 (V.35 version)

PORT #1
V.35

PORT #2
V.35

PRN AUX   N.I.
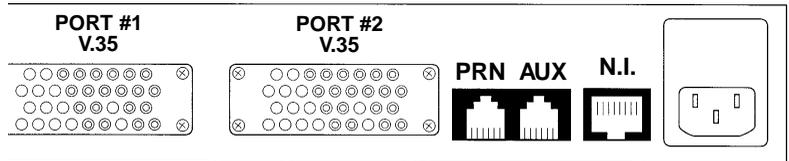
Terminal Configuration

The AUX (Terminal Access) Port supports automatic speed detection (AutoBaudRate or ABR). This should be noted before connecting a terminal to the AUX Port for configuration or monitoring functions. The AUX port will detect the following speeds: 1200, 2400, 4800, and 9600 bps.

The terminal should be configured for any of the above speeds, and full duplex, 8 data bits, 1 stop bit and no parity (8,1,N) for the ABR function to operate correctly. The terminal must present DTR (Data Terminal Ready — Pin 4 of the RS-232C (DB-25) connector) to AS100 for proper operation. Within those restrictions, all common terminal types are supported.

To operate:

1. Connect the terminal to the AUX (Terminal Access) Port using the cable supplied with the Centum Series unit.

2. Apply power to the unit and ensure that it performs its initialization cycle successfully and displays the Main Menu on the front panel LCD display. Turn on the terminal.

3. When the terminal has finished its initialization cycle and is fully operational, depress the **<CARRIAGE RETURN>** key once or twice. The unit will respond with the following text:

    ```
    ==>
    Verilink Corporation Access System 150 Series
    Please Enter Your Password Now!
    Depress [ENTER] key to register your password.
    ==>
    ```

NOTE

At login and on each screen, the text will reflect the appropriate unit — AS100, AS150, or AS200 — and its Unit ID number. The user has the option to access the Unit ID number through the menu tree and change it.

The default password is **<CARRIAGE RETURN>**.

4. The Centum Series unit will respond with the following text:

```
Verilink Corporation
Access System 150
Terminal Selection Menu

   (A) A.D.D.S. Viewpoint  (B) A.D.D.S  Regent 25
   (C) Data General DASHER (D) Datamedia 1521
   (E) Datamedia EXCEL 30  (F) DEC VT-52
   (G) DEC VT-100/131/220  (H) IBM 3101
   (I) Datamedia EXCEL 42  (J) FREEDOM 100
   (K) ICL 6401            (L) L.S.I. ADM 11, 31
   (M) Qume QVT-102, 108   (N) Televideo 900 Ser.
   (O) Wyse WY-50          (P) Paradyne 7811
   (Q) Teletype 5410, 5425 (R) ATTIS 4410, 4425

==> Enter Terminal Selection..
```

The Centum Series port depends on RTS from a terminal (or CD from a modem) to indicate a connected device. Every time that RTS (or CD) is lowered and subsequently raised, Centum Series assumes the possibility that a different terminal type is attached and therefore queries the attached device with a generic Terminal Selection message (see above). If this message does not appear on the screen, temporarily disconnect and reconnect the cable.

After selecting a terminal type, the user is presented with a Main Menu on the CRT screen and is allowed access to all configuration, test, and query functions provided by Centum Series.

Terminal Operation

Because the terminal functions are identical to the front panel functions previously described in this manual (except for a more comprehensive display), their descriptions are not repeated here. Instead, examples of some possible screen displays are shown, beginning with the Main Menu below. The user is advised to peruse the CRT menus while reviewing the front panel descriptions. In all cases, **SPACE** advances the cursor, **BS** moves the cursor back, **ENTER** or **RETURN** selects an entry, and **ESC** acknowledges an alarm.

```
==>


     ****              ****
      ****              ****                  MAIN MENU
       ****            ****
        ****          ****             System Configuration
         ****        ****              Diagnostics & Indicators
          *****    ****                Link Alarms and Statistics
           ****  ****                  ESF Registers
            **** ****                  Event Log
             *******                   System Utilities
              ******
                                         Cursor Forward = [SPACE]
         Verilink Corporation            Cursor Back = [BS]
         Access System 150 T-1 D&I DSU/CSU   Select Entry = [ENTER]
         Software: VER 3053_51           Acknowledge Alarm = [ESC]
                                         Deactivate Console = [X]
         Mar  18, 1995    14:34:00       Hangup Modem = [Ctrl-E]
         Unit ID........: 30000000
         DNS Front Panel: ENABLED
         System Status..: OK

```

Configuration Menus

From the terminal's Main Menu, the user has selected **System Configuration** and is presented with the next menu shown. From this menu, the user can view and/or change all Centum Series configuration parameters. Please refer to Chapter 3, *Configuring and Installing the Centum Series*, before changing any parameter(s).

By selecting **View DS0 Allocations**, the user can view all DS0 assignments on a single screen. This is the same function as *Checking the "T-Channels",* on page 3-19.

Note that "Idle" refers to channels that have been configured as "Not Used" in the Centum Series. In some cases, typically involving Fractional T1, a portion of the DS0s assigned to the DSX-1 port will be forced to "idle" by the PBX; these channels will be displayed as "DSX-1" channels by the Centum Series. The user is advised to mark the Worksheet in such a way that PBX idle can be differentiated from Centum Series idle.

```
Verilink Corporation                                       Mar  09, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU                  20:26:00
Unit ID: 30000000
                         SYSTEM CONFIGURATION


 Network (NI)              DSX-1           Serial Port Configuration
Configuration          Configuration              Port #1


Framing...: ESF        Framing...: N/U    Speed....: 1536k (24 DS0)
Line Code.: B8ZS       Line Code.: AMI    First DS0: 01
LBO.......: 0 db       Distance..: 100ft  DS0 Order: Consec. DS0s
Density...: Clear                         DCD......: Off
NTWK Loops: Yes                           Data.....: Norm
Yellow Alm: Yes                           Clock....: Norm
ESF Format: T1.403                        Timing...: Internal
CRT Alarm.: On                            Rem Loop.: Enabled


System Clock
Source....: Port 1
                                     Quit Configuration = [Q]
               View DS0 Allocations = [V] Save New Configuration = [S] or [X]
               Cursor Forward = [SPACE]   Next/Previous Entry = [ENTER]/[B]
               Cursor Back = [BACKSPACE]  Return to Previous Menu = [X]
```

```
Verilink Corporation                                       Mar  09, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU                  20:26:00
Unit ID: 30000000


                     T-Channel (DS0) Allocation


                DS0 #  Mode         DS0 #  Mode
                 01:   Port 1        13:   Idle
                 02:   Port 1        14:   Idle
                 03:   Port 1        15:   Idle
                 04:   Port 1        16:   Idle
                 05:   Port 1        17:   Idle
                 06:   Port 1        18:   Idle
                 07:   Port 1        19:   Idle
                 08:   Port 1        20:   Idle
                 09:   Port 1        21:   Idle
                 10:   Port 1        22:   Idle
                 11:   Port 1        23:   Idle
                 12:   Port 1        24:   Idle




           Return to System configuration Menu + [X]
```

Serial Port Diagnostics

The user has selected **Diagnostics and Indicators** from the terminal's Main Menu and is presented with the menu depicted below.

This menu provides the functions described in Chapter 4, *Testing the Centum Series*, page 4-10 and page 4-12.

Also, see the description, *Alarms and Statistics,* on page 5-1.

```
Verilink Corporation                                    Mar  18, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU                20:26:00
Unit ID: 30000000

                    System Diagnostics & Indicators


        Serial Port #1

 Diagnostics          Indicators

Local Loop.: Off     Rx Data.: Off
Remote Loop: Off     Tx Data.: Off
BERT.......: Off     RTS.....: Off
                     DCD.....: Off
Local ES...: 00000   DTR.....: Off
Remote ES..: 00000   Loop Ind: Off
Sec in Test: 65535




              Cursor Forward = [SPACE]   Select Entry = [ENTER]
              Cursor Back = [BACKSPACE]  Return to Previous Menu = [X]
```

TIP *If the device has two serial ports, a second set of Serial Port columns will be shown on the right half of the screen.*

Link Alarms and Statistics

The user has selected **Link Alarms and Statistics** from the terminal's Main Menu and is presented with the menu depicted below. This menu provides access to Network and DSX-1 Alarms and Network diagnostics (see Chapter 4, page 4-2 through page 4-6). Also see Chapter 5, *Alarms and Statistics,* on page 5-1.

```
Verilink Corporation                                    Mar  18, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU                20:26:00
Unit ID: 30000000
                    System Alarms and Statistics

Network Interface (NI)      Network Interface (NI)      DSX-1 Interface
     Alarms                     Diagnostics                  Alarms
     State  ErrSec                                       State  ErrSec
 AIS   No   00000     CSU Loop..: Off           AIS   No   00000
 Red   No   00001     NI LLB....: Off           Red   No   00000
 Yel   No   00000     NI RLB....: Off           Yel   No   00000
 Ferr  No   00001     PAYLD Loop: Off           Ferr  No   00000
 CRC6  No   00001     DSX-1 Loop: Off           CRC6  No   00000
 BPV   No   00000
 LOS   No   00001     Loop Ind...: Off
                      BER Pattern: 1 of 8
                      BERT.......: Off >> [E] to Insert BER Errors
                      Err Secs...: 00000
                      Sec/Test...: 00000

              Reset Counters = [R]
             Cursor Forward = [SPACE]   Select Entry = [ENTER]
             Cursor Back = [BACKSPACE]  Return to Previous Menu = [X]
```

ESF Registers

From the terminal's Main Menu, the user has selected **ESF Registers** and is presented with the following menu.

```
Verilink Corporation                                    Mar  18, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU                20:26:00
Unit ID: 30000000

                         ESF Registers

                         ESF Statistics

  Register                  Current  24 Hour

 Errored Seconds.........: 000      00001
 Failed Seconds (UAS)....: 000      00000
 Severely Errored Seconds: 000      00001
 Bursty Errored Seconds..: 000      00000
 Loss of Frame Count.....: 000      00000

 Time in Interval........: 150
 # Valid Intervals.......: 093
 ESF Status..............: 00000000


                    Display ESF Network Registers = [R]
                    Return to Previous Menu = [X]

```

The user can then proceed to this next menu for detailed information. These menus provide the functions described in *Alarms and Statistics,* on page 5-1.

```
Verilink Corporation                                Mar  18, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU              20:26:00
Unit ID: 30000000
                         ESF Registers


    INT ES  FS  SES BES      INT ES  FS  SES BES      INT ES  FS  SES BES
    01. 001 000 001 000      17. 000 000 000 000      33. 000 000 000 000
    02. 001 000 001 000      18. 000 000 000 000      34. 000 000 000 000
    03. 001 000 001 000      19. 000 000 000 000      35. 000 000 000 000
    04. 001 000 001 000      20. 000 000 000 000      36. 000 000 000 000
    05. 001 000 001 000      21. 000 000 000 000      37. 000 000 000 000
    06. 001 000 001 000      22. 000 000 000 000      38. 000 000 000 000
    07. 001 000 001 000      23. 000 000 000 000      39. 000 000 000 000
    08. 001 000 001 000      24. 000 000 000 000      40. 000 000 000 000
    09. 001 000 001 000      25. 000 000 000 000      41. 000 000 000 000
    10. 001 000 001 000      26. 000 000 000 000      42. 000 000 000 000
    11. 001 000 001 000      27. 000 000 000 000      43. 000 000 000 000
    12. 001 000 001 000      28. 000 000 000 000      44. 000 000 000 000
    13. 001 000 001 000      29. 000 000 000 000      45. 000 000 000 000
    14. 001 000 001 000      30. 000 000 000 000      46. 000 000 000 000
    15. 001 000 001 000      31. 000 000 000 000      47. 000 000 000 000
    16. 001 000 001 000      32. 000 000 000 000      48. 000 000 000 000


          Continue = [ENTER]        Return to Previous Menu = [X]
```

Event Log

From the terminal's Main Menu, the user has selected **Event Log** and is presented with the sixteen most recent events stored in the Centum Series unit (see below and *Events,* on page 5-6).

```
Verilink Corporation                                     Mar  18, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU                 20:26:00
Unit ID: 30000000                   EVENT LOG

Unit ID   Seq Num    Time      Date     Status       Event
30000000  00001    21:15:20  11/08    Start      UNIT START
30000000  00002    21:15:21  11/08    Start      NI    RED
30000000  00003    21:15:21  11/08    Start      NI    LOS
30000000  00004    21:15:22  11/08    End        NI    RED
30000000  00005    21:15:22  11/08    End        NI    LOS




                Clear Event Log = [C]        Reset Sequence Number = [R]
                Freeze Display = [F]         Return to Previous Menu = [X]
```

Utilities

From the terminal's Main Menu, the user has selected **System Utilities** and is presented with the screen depicted below. See *Utilities,* on page 5-5, *Terminal Configuration,* on page 6-6, and *Printer Configuration,* on page 6-17.

```
Verilink Corporation                                    Mar  18, 1995
Access System 150 T-1 Drop-and-Insert CSU/DSU
Unit ID: 30000000



                        System Utilities

                         Set System Time
                         Set System Date
                         Enter Unit Identification Number
                         Clear System Configuration
                         Configure Console and Printer Ports
                         Enter AutoDial Parameters
                         Enter Password
                         Disable



            Cursor Forward = [SPACE]   Select Entry = [ENTER]
            Cursor Back = [BACKSPACE]  Return to Previous Menu = [X]
```

Printer Configuration

To configure the <u>**SERIAL**</u>[1] **Printer** port, use the Centum Series control panel to enter (**SELECT**) the **Utilities** menu. Use the **UP/DOWN** arrows to locate **NMS/Prt Port** and the **SELECT** again. If necessary, use the **UP/DOWN** arrows to locate **Mode**.

Repeatedly **SELECT** until the mode indicates **Printer**. Note that the NMS function is not operational in this Centum Series revision.

Use the **UP** or **DOWN** arrow to display **Speed** and then **SELECT** to choose the desired printer data rate. Finally, **END** twice to return to the Main Menu.

The printer should be configured for the same data rate as the Centum Series printer port and 8-N-1 character coding. All data is output with both a CR and an LF at the end of each line. Printer "word wrap" is unnecessary and the printer should not add an LF to each received CR.

---

1. This is a non-standard printer port. Most printers are parallel, <u>not</u> serial.

Printer Port Flow Control

The Centum Series port supports simultaneous hardware and software flow control signaling from the attached device. The hardware control is RTS if connected directly to a printer or CD if connected via a modem. The software control is XOFF/XON. The XOFF is DC-3 (Cntl-S); however, any character arriving at the port is treated as an XO (to protect against a damaged DC-1).

Hardware control has priority: If RTS (or CD) is low, transmission to the device will be suspended and the data will be buffered in Centum Series. Receipt of software flow control characters while RTS (or CD) is low will have no effect on the port. Transmission will be resumed when RTS (or CD) goes high.

If the port receives an XOFF while RTS (or CD) is high, transmission will be suspended and the data will be buffered. Transmission will be resumed if any subsequent character (including another XOFF) is received **_or_** if RTS (or CD) is lowered and subsequently raised. This mechanism protects against a "lost" XON.

Printer Operation

Events are automatically sent (real-time) to the printer. See *Event Printing,* on page 5-7. Other print functions are available from both the front panel and the external terminal.

From the Main Menu, **SELECT** the **Configuration** menu and use the arrow buttons to display **Print Config**. Then **SELECT** to initiate a printout.

From the Main Menu, **SELECT** the **Alarms/Stats** menu and use the arrow buttons to display either **Print Alarms** or **Print ESF Stats**. Then, **SELECT** to initiate a printout.

Terminal control provides a much more comprehensive printing capability with CRT formatting: entering a **P** on the appropriate screen will cause a printout of **Configuration**, **DS0 Assignments**, **Link Statistics**, **Alarms**, **ESF Register Summar** , and **Complete ESF Register Contents**.

Link Alarms and Statistics

The user has selected **Link Alarms and Statistics** from the terminal's Main Menu and is presented with the menu depicted below. This menu provides access to Network Alarms and Network Diagnostics (see Chapter 4, *Testing the Centum Series*).

SNMP Managemen

This appendix describes the management of Centum Series units equipped with the Verilink embedded SNMP agent.

Connecting the Centum Series

This section describes two options for connecting the Centum Series units for use with SNMP management.

Option #1

The Centum Series comes equipped with two RS-232 asynchronous ports intended for the purpose of device management. The AUX connector is intended for use with a VT-100 style ASCII terminal and supports menus for the user to edit the device configuration and diagnostic options. The NMS/PRT connector is intended to be used as a printer port (non-SNMP version or the NMS port (SNMP version).

The Centum Series unit connects to an SNMP network management station such as HP Open Vie ™ or Sun's NetManager™ by either LAN or modem. Either method must support UDP/IP/SLIP over RS-232. The most straightforward method would be to connect the Centum Series NMS port to an intelligent port on either a router, hub, or terminal server. The intelligent port must be configured to run SLIP protocol. The port speed must be set as well as the IP address for the port and the port's remote device (in this case, the Centum Series unit).

The NMS Port on the DNS must be configured from either the terminal or front panel display. The port must first be configured for SNMP NMS, and then the baud rate for the port must be configured. The final option is for the user to configure the internet address that the Centum Series unit will respond to once connected to the LAN (via terminal server) or modem. Reference the diagram for the proper connection.

In Figur eA-1, the terminal server is permitting Ac cessSy stem100 to
access the LAN for SNMP management purposes. If multiple Centum
Series units are co-located, they all may access the LAN through the same
server (using a multi-port server).

Figure A-1   SNMP Manager access with a terminal server
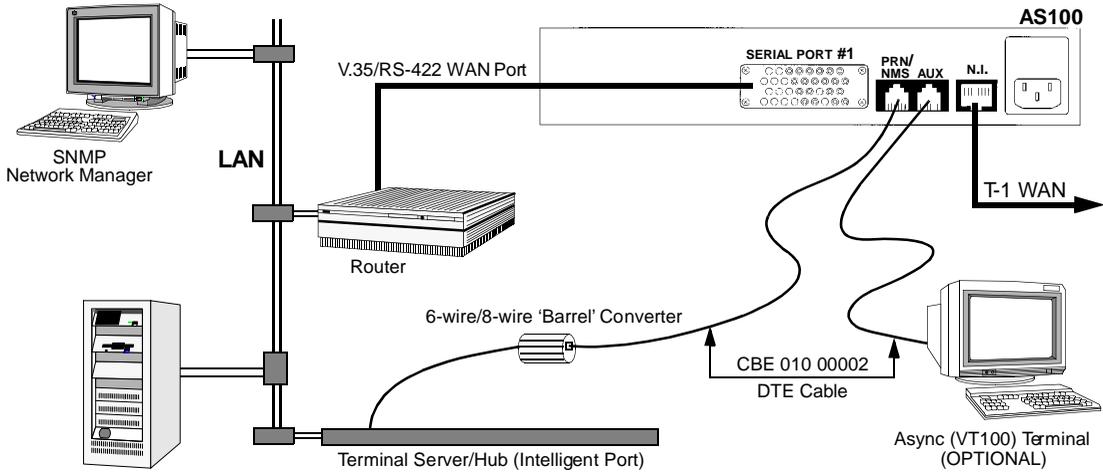
In Figur eA-2, an RS-232 (SLIP) port on the router is permitting Centum
Series to access the LAN for SNMP management purposes.

Figure A-2   SNMP Manager access with a router
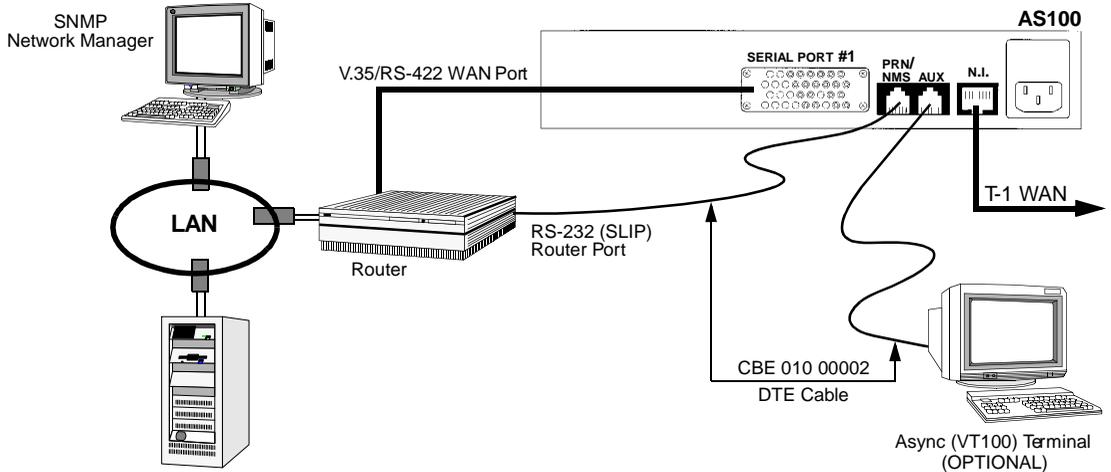
Option #2

Another method allows the SNMP Manager to access the Centum Series without the terminal server. This is by way of a direct or dial-up connection over an RS-232 port on the SNMP management station. The SNMP Network Management System must support UDP/IP/SLIP over the asynchronous serial link. This connection is diagrammed in Figur eA-3.

Figure A-3   SNMP Manager access via direct or dial-up connection
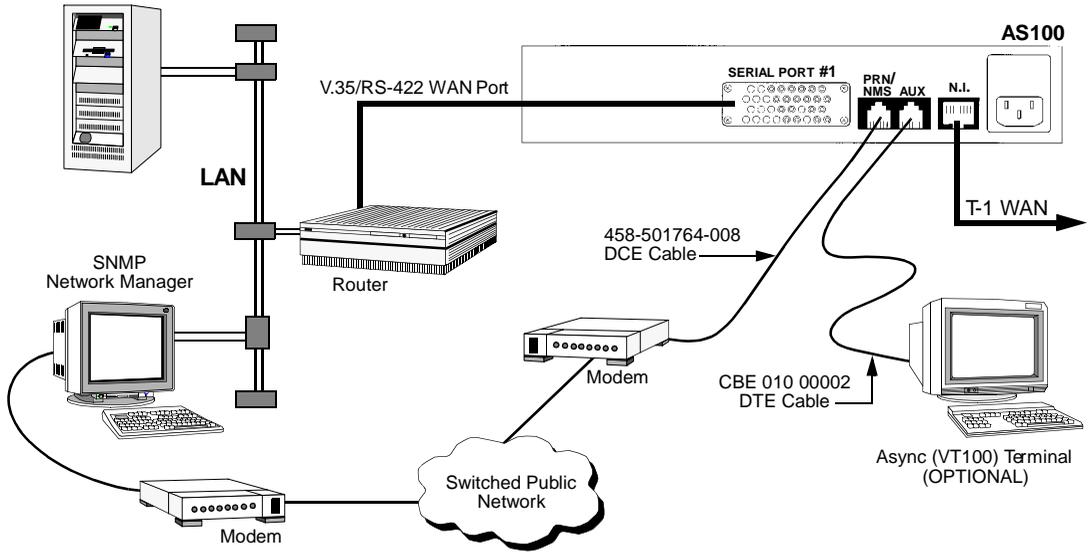
Compiling the Centum Series MIB

After the Centum Series unit has been connected to the SNMP management station by one of the methods mentioned in the previous section, the unit may be "pinged" to ensure connectivity. After this test has been passed, you are ready to manage the Centum Series unit.

The Centum Series SNMP agent comes equipped with MIB-II and the RFC-1232 DS1 MIB. These may be managed without any MIB compilation. However, to manage the device fully, you must install the Verilink Centum Series MIB, which is supplied on a DOS diskette (3.5" high-density micro floppy).

The Verilink Centum Series MIB must be compiled once it has been copied to the management station's hard disk medium in order to add the Centum Series objects to the management information base. This task will be different depending on which management software you are using and requires a MIB browse function to be present on the manager. If this is not the case, then you must design an NMS application for Centum Series on your management platform.

B Standard Cabling for User Ports

Network Interface and DSX-1 Por

The Network Interface and the DSX-1 Port both use an 8-pin modular jack in an RJ-48 configuration. The figures to the right show the pin numbering and the pin assignments of the two jacks. Verilink cables are recommended:

Network Interface Cable.   Eight-position, 8-pin male/male modular cable (RJ-48 configuration). Used for connecting the NI port to the supplier's network interface. Fifteen feet long. One cable supplied with unit. Additional cable optional at extra cost.

Figure B-1   Network Interface and DSX-1 Port (RJ-48)

1 2 3 4 5 6 7 8
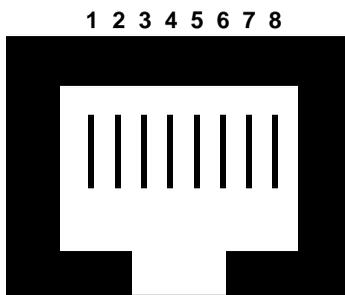
Pin	Signal	To/From Access System 100
1	Receive	To
2	Receive	To
3	Not Used	-----
4	Transmit	From
5	Transmit	From
6	Not Used	-----
7	Optional Shield Ground	-----
8	Optional Shield Ground	-----

V.35 Serial Port

V.35 signaling is provided through a female M-series, 34-pin connector. The connector and its pin assignments are shown below. Verilink cabling is recommended.

458-501983- 0 1 V.35 straight-through cable. M-series, 34-pin male connectors at both ends. Fifteen feet long. Optional at extra cost.

Figure B-2   V.35 Serial Port Pin Assignments (M-series, 34-pin connector)
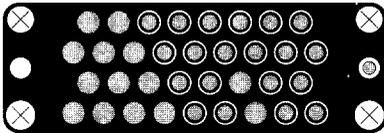
Pin	Signal	To/From Access System 100
Y	Transmit Clock (A)	From
V	Receive Clock (A)	From
U	Ext. Transmit Clock (A)	To
P	Transmit Data (A)	To
R	Receive Data (A)	From
AA (a)	Transmit Clock (B)	From
X	Receive Clock (B)	From
W	Ext. Transmit Clock (B)	To
S	Transmit Data (B)	To
T	Receive Data (B)	From
C	Request to Sen	To
F	Data Carrier Detect	From
D	Clear to Send	From
H	Data Terminal Ready	To
E	Data Set Ready	From
B	Signal Ground	------

RS-442A Serial Port

RS-422A Category I signaling is provided through a female DB-25 connector per the RS-530 specification. With an external adapter cable, the same signals are provided through a female DB-37 connector per the RS-449 specification. The pin assignments are shown. Verilink cabling is recommended:

458-501792- 0   1 D-type 25-pin (DB-25) male connectors at both ends (in compliance with RS-530 specification). Fifteen feet long. Optional at extra cost.

RS-530 (DB-25) Connector	RS-449 (DB-37) Adapter	Signal	To/From Access System 100
15	5	Transmit Clock (A)	From
17	8	Receive Clock (A)	From
24	17	Ext. Transmit Clock (A)	To
2	4	Transmit Data (A)	To
3	6	Receive Data (A)	From
12	23	Transmit Clock (B)	From
9	26	Receive Clock (B)	From
11	35	Ext. Transmit Clock (B)	To
14	22	Transmit Data (B)	To
16	24	Receive Data (B)	From
4	7	Request to Send (A)	To
8	13	Data Carrier Detect (A)	From
5	9	Clear to Send (A)	From
20	12	Data Terminal Ready (A)	To
6	11	Data Set Ready (A)	From
19	25	Request to Send (B)	To
10	31	Data Carrier Detect (B)	From
13	27	Clear to Send (B)	From
23	30	Data Terminal Ready (B)	To
22	29	Data Set Ready (B)	From
7	19	Ground	------

C

Special Serial Port Cabling

External Timing

If "External" timing is required to satisfy a particular application, Serial Port #1 must be used (Worksheet Item #18) **_and_** Serial Port #1 must supply the master network timing (Worksheet Item #12). The worksheet can be found on page 3-2.

External timing is used if the attached customer equipment is a DCE instead of a DTE. The customer DCE must be configured so that its Receive Clock is used for *BOTH* transmit and receive functions. This clock is also delivered to the Serial Port's External Clock input and drives the Centum Series transmit function. Transmit and Receive Data must also be reversed.

Cables for External Timing

The figures in this section describe the crossover cabling necessary to support a V.35 and an RS-422A Serial Port #1 with External timing. Note that the cables are **_not_** symmetrical.

The Centum Series units have female connectors and, therefore, the cable connectors are always male at the Centum Series end. They will also be male at the customer end unless specified otherwise.

V.35 Serial Port Cabling

458-501776- **0 1** V.35 cross-over cable. M-series, 34-pin male connectors at both ends. Fifteen feet long. Optional at extra cost.

Figure C-1   V.35 Serial Port #1 Cabling for External Timing

Centum Series V.35 Serial Port Pin Assignments				Customer V.35 DCE Pin Assignments	
M-Series 34-pin	Signal			Signal	M-Series, 34-pin
Y	TXC-A	X	X	TXC-A	Y
V	RXC-A	X		RXC-A	V
U	Ext. TXC-A		X	Ext. TXC-A	U
P	TXD-A			TXD-A	P
AA (a)	RXD-A			RXD-A	R
R	TXC-B	X	X	TXC-B	AA (a)
X	RXC-B	X		RXC-B	X
W	Ext. TXC-B		X	Ext. TXC-B	W
S	TXD-B			TXD-B	S
T	RXD-B			RXD-B	T
C	RTS			RTS	C
F	DCD			DCD	F
D	CTS	X	X	CTS	D
H	DTR			DTR	H
E	DSR			DSR	E
B	GROUND			GROUND	B
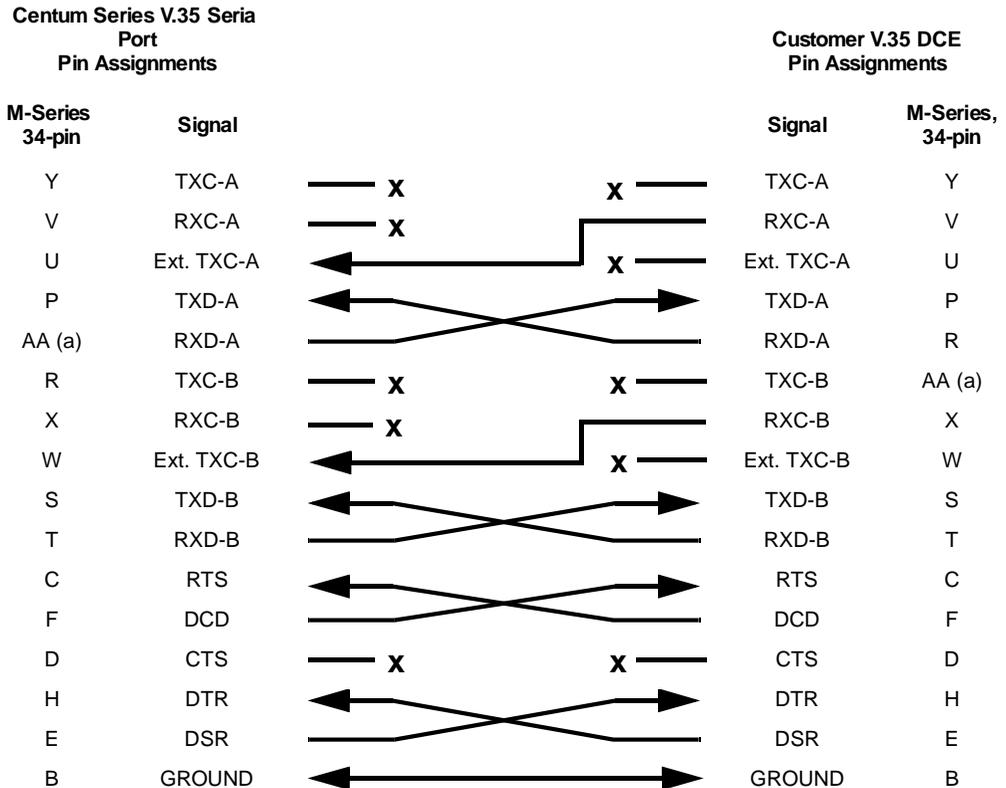
RS-422A Serial Port Cabling

458-501791- 0 1 RS-530 cross-over cable. D-type, 25-pin (DB-25) male connectors at both ends. Fifteen feet long. Optional at extra cost.

Figure C-2   RS-422A Serial Port #1 Cabling for External TIming

Centum Series RS-422 Serial Port Pin Assignments

Customer RS-422A DCE Pin Assignments

RS-530 (DB-25)	Signal			Signal	RS-530 (DB-25)	RS-449 (DB-37
15	TXC-A	X	X	TXC-A	15	5
17	RXC-A	X		RXC-A	17	8
24	Ext. TXC-A		X	Ext. TXC-A	24	17
2	TXD-A			TXD-A	2	4
3	RXD-A			RXD-A	3	6
12	TXC-B	X	X	TXC-B	12	23
9	RXC-B	X		RXC-B	9	26
11	Ext. TXC-B		X	Ext. TXC-B	11	35
14	TXD-B			TXD-B	14	22
16	RXD-B			RXD-B	16	24
4	RTS-A			RTS-A	4	7
8	DCD-A			DCD-A	8	13
5	CTS-A	X	X	CTS-A	5	9
20	DTR-A			DTR-A	20	12
6	DSR-A			DSR-A	6	11
19	RTS-B			RTS-B	19	25
10	DCD-B			DCD-B	10	31
13	CTS-B	X	X	CTS-B	13	27
23	DTR-B			DTR-B	23	30
22	DSR-B			DSR-B	22	29
7	GROUND			GROUND	7	19
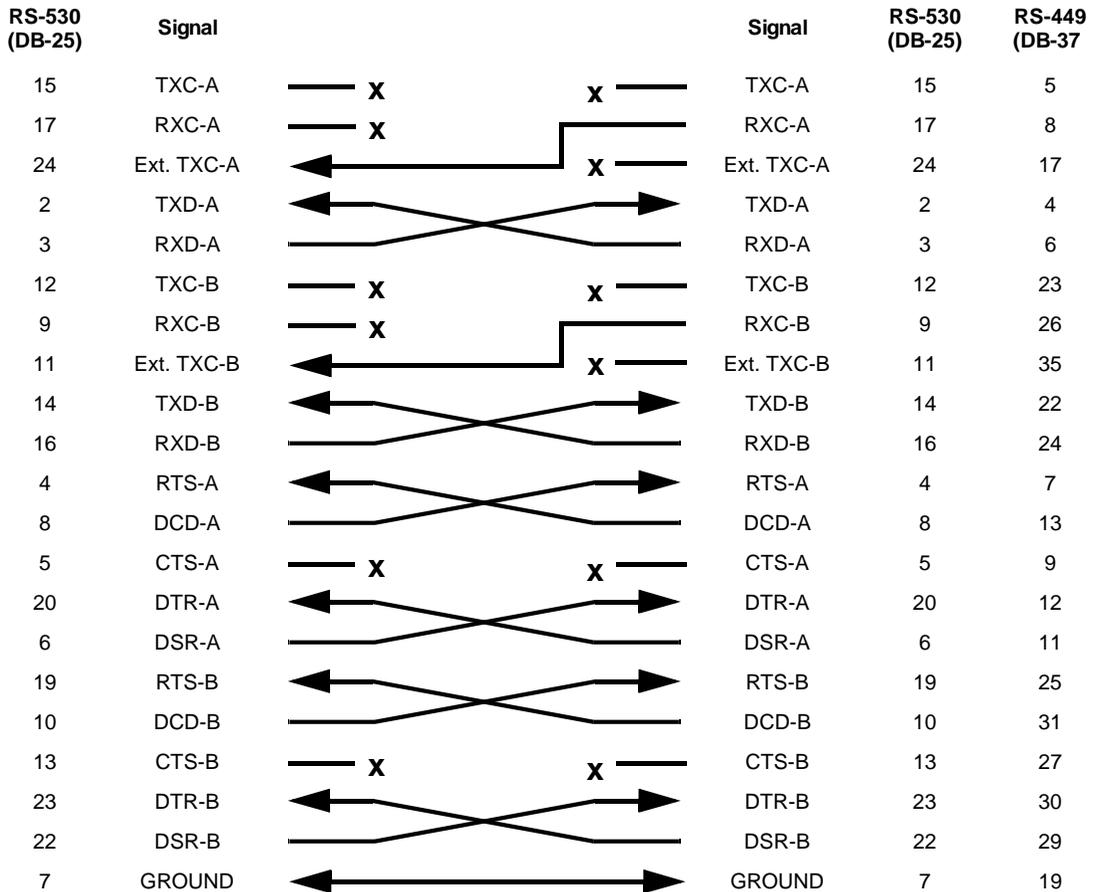
Adapter cables are available to convert 25D-type RS-530 to 37-pin RS-449. The following cables can be ordered from Verilink:

- 37-pin D-type (RS-530) male to 36-pin (RS-449) female

- 37-pin D-type (RS-530) male to 36-pin (RS-449) male

- 37-pin D-type (RS-530) male to 36-pin (RS-449) female for external timing

- 37-pin D-type (RS-530) male to 36-pin (RS-449) male for external timing

Cables for Internal/External Timing

Please refer to Worksheet items #12 and #18 on page 3-2.

Internal/External timing is supported with standard straight-through cabling. However, as shown below (V.35) and on the next page (RS-422A), the attached DTE must internally loop back its incoming Transmit Clock to its outgoing External Transmit Clock. If this can not be done inside the DTE itself, the same function can be provided with cable jumpers. Contact factory if assistance is needed.

IMPORTANT. If Int/Ext has been chosen because because os excessive DTE cable length and cable jumpers are installed, the indicated jumpers *must* be as physically close to the customer DTE as is possible (preferably inside the DTE connector).

Figure C-3   V.35 Serial Port #1 Cabling for Internal/External Timing

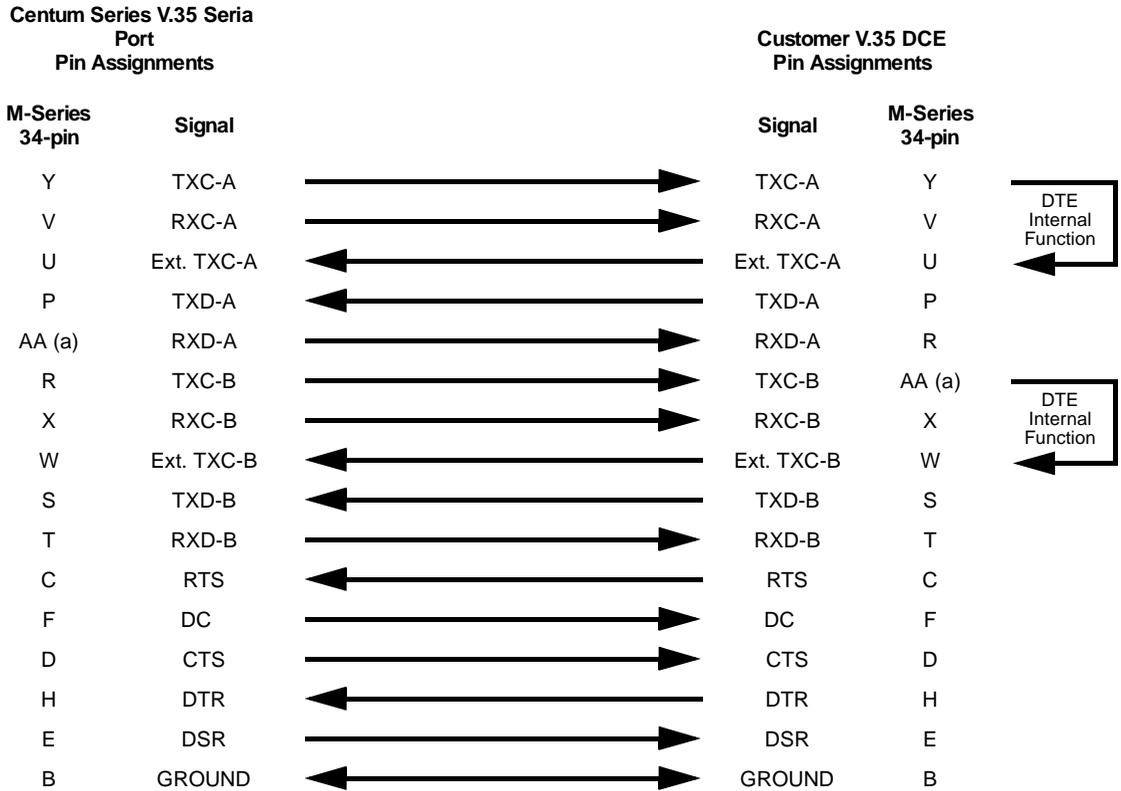| Centum Series V.35 Serial Port Pin Assignments			Customer V.35 DCE Pin Assignments		
M-Series 34-pin	**Signal**		**Signal**	**M-Series 34-pin**	
Y	TXC-A	⟶	TXC-A	Y	
V	RXC-A	⟶	RXC-A	V	DTE Internal Function
U	Ext. TXC-A	⟵	Ext. TXC-A	U	
P	TXD-A	⟵	TXD-A	P	
AA (a)	RXD-A	⟶	RXD-A	R	
R	TXC-B	⟶	TXC-B	AA (a)	
X	RXC-B	⟶	RXC-B	X	DTE Internal Function
W	Ext. TXC-B	⟵	Ext. TXC-B	W	
S	TXD-B	⟵	TXD-B	S	
T	RXD-B	⟶	RXD-B	T	
C	RTS	⟵	RTS	C	
F	DC	⟶	DC	F	
D	CTS	⟶	CTS	D	
H	DTR	⟵	DTR	H	
E	DSR	⟶	DSR	E	
B	GROUND	⟷	GROUND	B	

Figure C-4   RS-422A Serial Port #1 Cabling for External TIming

Centum Series RS-422A Serial Por Pin Assignments

Customer RS-422A DCE Pin Assignments

RS-530 (DB-25)	Signal		Signal	RS-530 (DB-25)	RS-449 (DB-37)	
15	TXC-A	→→→	TXC-A	15	5	DTE Internal Function
17	RXC-A	→→→	RXC-A	17	8	
24	Ext. TXC-A	←←←	Ext. TXC-A	24	17	
2	TXD-A	←←←	TXD-A	2	4	
3	RXD-A	→→→	RXD-A	3	6	
12	TXC-B	→→→	TXC-B	12	23	DTE Internal Function
9	RXC-B	→→→	RXC-B	9	26	
11	Ext. TXC-B	←←←	Ext. TXC-B	11	35	
14	TXD-B	←←←	TXD-B	14	22	
16	RXD-B	→→→	RXD-B	16	24	
4	RTS-A	←←←	RTS-A	4	7	
8	DCD-A	→→→	DCD-A	8	13	
5	CTS-A	→→→	CTS-A	5	9	
20	DTR-A	←←←	DTR-A	20	12	
6	DSR-A	→→→	DSR-A	6	11	
19	RTS-B	←←←	RTS-B	19	25	
10	DCD-B	→→→	DCD-B	10	31	
13	CTS-B	→→→	CTS-B	13	27	
23	DTR-B	←←←	DTR-B	23	30	
22	DSR-B	→→→	DSR-B	22	29	
7	GROUN	←←→	GROUND	7	19	