
# Frame Relay
# Digital Service Unit

## User's Manual - Installation Guide

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**The information in this manual pertains to Base Software Revision 10.01.XX**

PARADYNE®

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## EQUIPMENT INTERFERENCE NOTICE

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

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

# IMPORTANT SAFETY INSTRUCTIONS

When using your NetPath 100 equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water, for example, near any sink or tub, or where the floor is wet.
5. Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation, to protect it from overheating; these openings must not be blocked or covered. The openings should never be blocked by placing the product on a carpeted or other similar soft surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated only from the type of power source indicated on the marking label.
8. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
9. Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
10. Never push objects of any kind into this product through cabinet slots, as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
11. To reduce the risk of electric shock, do not disassemble this product, but contact Paradyne Corporation if repair or warranty work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.
12. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    a) When the power supply cord or plug is damaged or frayed.
    b) If liquid has been spilled into the product.
    c) If the product has been exposed to rain or water.
    d) If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
    e) If the product has been dropped or the cabinet has been damaged.
    f) If the product exhibits a distinct change in performance.

SAVE THESE INSTRUCTIONS

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# 1 Preface

## About This Manual

This manual provides basic installation, operation and troubleshooting information for the NetPath 100 Frame Relay Channel Service Unit (FSU). The information is directed to the installer who has a working knowledge of telecommunication systems and networks. The Network Service Provider will furnish specific addressing and any other information required for your installation.

## Page Layout

This manual is designed to conform to conventional documentation standards. The header on each page contains the major heading of the current section. The footer of each page shows the document name, number, revision date and page number.

### Locating Information

The format of this manual includes several aids to help the user locate and use information quickly.

At the beginning of this manual there is a Table of Contents, which provides an outline and quick overview of the major topics covered. A List of Figures and a List of Tables are also provided for quick reference.

### Special Paragraphs

There are special paragraphs throughout this manual to help identify important information. These are:

**NOTE(S):** or **NOTICE:** These identify clarifying or additional information for the proper installation and operation of this equipment.

***CAUTION:*** ***This identifies information that requires careful attention in order to prevent equipment damage.***

***Warning:*** ***This identifies information that requires careful attention in order to prevent equipment damage and/or injury to the operator.***

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

## Special Instructions

The following are to be performed by qualified service personnel ONLY.

When installing NetPath 100 equipment, observe the following precautions:

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless a 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.

***WARNING***

***NO OPERATOR SERVICEABLE PARTS ARE INSIDE THIS EQUIPMENT. SERVICE MUST BE PERFORMED BY QUALIFIED SERVICE PERSONNEL.***

***ATTENTION***

***CET APPAREIL NE CONTIENT AUCUN ELÉMENT QUE L'UTILISATEUR PUISSE RÉPARER. CONFEIR LA MAINTENACE À UN PERSONNEL TECHNIQUE QUALIFIÉ.***

Do not expose the NetPath 100 to moisture, excessive heat or bright sunlight, vibration, sudden impact, or voltage surges.

**Avoid Moisture**

**Avoid Direct Sunlight/Heat**

**Avoid Vibration/Sudden Impact**

**Avoid Voltage Surges**

### UNPACKING AND HANDLING

When you receive the equipment, inspect the exterior of the shipping container for signs of obvious damage. If the container is damaged, inform the local carrier that they may be subject to a claim.

As you unpack the equipment, check for physical damage and conformance to the packing list. If the equipment is damaged or does not conform to the packing list, please inform Paradyne Corporation immediately.

# Equipment Attachment Limitations

Certain equipment attachment limitations apply when installing and operating this equipment.

The limitations for use in Canada and the U. S. (FCC Part 68) are described below.

## Canadian

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

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

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

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

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

The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five (5.0).

## FCC Part 68 (U.S.)

This equipment complies with Part 68 of the FCC Rules. On the underside of this equipment is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be provided to the telephone company.

This equipment uses the following USOC jacks: RJ11C, RJ48C and RJ49C (optional).

This equipment is designed to be connected to the telephone network using compatible modular plugs which are Part 68 compliant. See installation instructions for details.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

If the NetPath 100 equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this NetPath 100 equipment, for repair or warranty information, please contact Paradyne Corporation, 16-00 Pollitt Drive,
Fair Lawn, New Jersey 07410, (201) 703-4800. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

There are no user-replaceable parts that may be serviced inside the NetPath 100.

This equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information.)

**Table 1-1 FCC Registration Information**

| Port | FIC | SOC | REN | Network USOC |
|---|---|---|---|---|
| Modem Line (Dial Line) | 02LS2 | 9.0Y | 0.7B | RJ11C |
| T1 Line with D4 Framing | 04DU9-B | 6.0N | --- | RJ48C |
| T1 Line with ESF Framing | 04DU9-C | 6.0N | --- | RJ48C |
| T1 Line with ESF Framing B8ZS Line Code | 04DU9-S | 6.0N | --- | RJ48C |
| ISDN Line | 02IS5 | 6.0Y | --- | RJ49C |

## Software Revision History

This manual pertains to NetPath 100 Base Software Revision 10.01.xx.

Revision changes for this and previous versions are listed below.

## Current Revision

This revision incorporates the following operational additions and/or changes:

**Rev. 10.01.xx from Rev. 9.01.xx**

- Added - ISDN Call (Connection) Statistics.
- Added - Configurable ISDN Backup and Demand - Downspeed Minimums.
- Added - ISDN Demand LMI Holdoff configuration.
- Changed - Maximum power interrupt time for external device reboot command increased from 30 to 300 seconds.

**Download Notes**

Downloading Revision 10.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be restored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.
- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

## Previous Revisions

The following lists operational additions and/or changes incorporated in previous software revisions.

**Rev. 9.01.xx from Rev. 8.01.xx**

- Added - Top Talker/Conversation Statistics reporting.
- Changed - Dynamic IP Relearn function is user-selectable.
- Removed - Hubbing for Tunneled Management.
- Removed - Auto-learn of WAN Management IP Address *only* when LMI disabled.

**Download Notes**

Downloading Revision 9.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be restored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.
- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

### Rev. 8.01.xx from Rev. 7.01.xx

- Added - Dynamic IP Relearn function: WAN Mgmt IP address is relearned each time the PVC returns to an active condition (always.)
- Added - Event Log, which captures and logs Trap occurrences for SNMP retrieval.

**Download Notes**

Downloading Revision 8.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be restored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.
- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

Downloading Revision 8.01.xx software to a NetPath 100 unit currently running Rev. 4.01.xx or 3.01.xx software will have the following effect:

- Protocol Monitoring configuration will revert back to defaults.

Downloading Revision 8.01.xx software to a NetPath 100 unit currently running Rev. 2.01.xx software will have the following effect:

- PVCs that were included in the delay measurement list on the PVC Performance Configuration screen will be deleted.
- Protocol Monitoring configuration will revert back to defaults.

### Rev. 7.01.xx from Rev. 6.01.xx

- Added - ML-PPP option for ISDN BOD bundling (8 B-Channels.)
- Added - ISDN BOD Traps for Primary and Secondary connections.
- Added - Trace Diagnostic capability for BOD calls.

**Download Notes**

Downloading Revision 6.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be re-

stored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.
- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

### Rev. 6.01.xx from Rev. 5.01.xx

- Added - V.54 Network initiated Loopback.
- Obsoleted - AUX2 Contact Sense function.

**Download Notes**

Downloading Revision 6.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be restored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.
- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

### Rev. 5.01.xx from Rev. 4.01.xx

- Added - Loop to User operator command, for ISDN Data port.
- Added - Call Out / Loop Test to ISDN Demand Tests.
- Added - Separate traps for PVC Availability and Unavailability.
- Added - Current CIR rate per PVC to PVC Statistics Screen display.
- Added - ML-PPP option for ISDN BOD bundling (2 B-Channels.)
- Added - Display of Cause Codes for ISDN connection failure.

**Download Notes**

Downloading Revision 5.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be restored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.

- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

### Rev. 4.01.xx from Rev. 3.01.xx

- Added - Tunneled option for WAN management PVC, including configuration by DLCI DIP Switches.
- Added - Message Segmentation support for management traffic and configurable maximum message size (MTU).
- Added - Asynchronous LMI support.

**Download Notes**

Downloading Revision 4.01.xx software to a NetPath 100 unit currently running with a prior version may result in some configuration changes which will have to be restored (via remote management accessed reconfiguration). Specific configuration items affected are:

- Delay monitoring for all PVCs will be turned OFF if previously configured for Delay monitoring.
- Protocol Monitoring selections may be mis-mapped (different protocols selected) if previously configured for Protocol monitoring.

### Rev. 3.01.xx from Rev. 2.xx

- Added - Loss Monitor Packets including: per PVC statistics collection and threshold alarm.
- Added - CIR traffic measurements including: per PVC statistics collection and threshold alarm.
- Added - Multi-Network Delay measurements including: per PVC statistics collection and threshold alarm.
- Added - Monitoring of additional Internet and manufacturer specific protocols.
- Added - LMI protocol types: LMI (Rev 1) and Annex A (Q933).
- Added - Traps: Login security violation, ISDN Backup and Demand.
- Added - Backup occurrence indication to CSU Statistics.
- Added - ISDN Option supports unbonded mode for single B-Channel configuration.
- Changed - Link Test Packet size to be user selectable.

Downloading Revision 3.01.xx software to a NetPath 100 unit running a prior version should not affect the unit's current configuration.

# 2 Description

The NetPath 100 Frame Relay Channel Service Unit (FSU) is a special purpose T1/FT1 CSU/DSU which provides management and diagnostic functions through Simple Network Management Protocol (SNMP), transported over a Frame Relay network. It also includes an integral modem which supports access to the CSU/DSU as well as other co-located equipment such as routers. The NetPath 100 can be factory optioned to include an ISDN Adapter (4 BRIs, for Backup and/or Bandwidth On-Demand). Network Service Providers (NSPs) who prefer to have independent management access from their end-user networks (customer networks), can utilize the isolated management PVC designed into the NetPath 100 for network demarcation and diagnostics.

## System Level

Figure 2-1 shows a system level view of the NetPath 100 FSU, including management transport. As shown in the figure, the Frame Relay network provides Permanent Virtual Circuits (PVCs) for both the Customer Data and FSU management.

**NOTE:** NetPath 100 is transparent to SVCs (Switched Virtual Circuits).

The NetPath 100 can have up to two IP Addresses for management. One IP Address allows it to communicate with SNMP work stations that have access to the NSP management PVC. A second IP Address can provide management access via a customer data PVC.

NetPath 100 can also send SNMP Traps to multiple SNMP Alarm Servers via the management PVCs. The integral modem is used to dial into the Network Control Center (NCC) Terminal Server to access the SNMP Alarm Server and report faults that are prevented from being reported over the PVC management channels. It can also accept maintenance calls from NCC Work Stations to support operator interaction, and accept inbound calls from a customer or NCC Work Station to manage co-located devices such as routers.

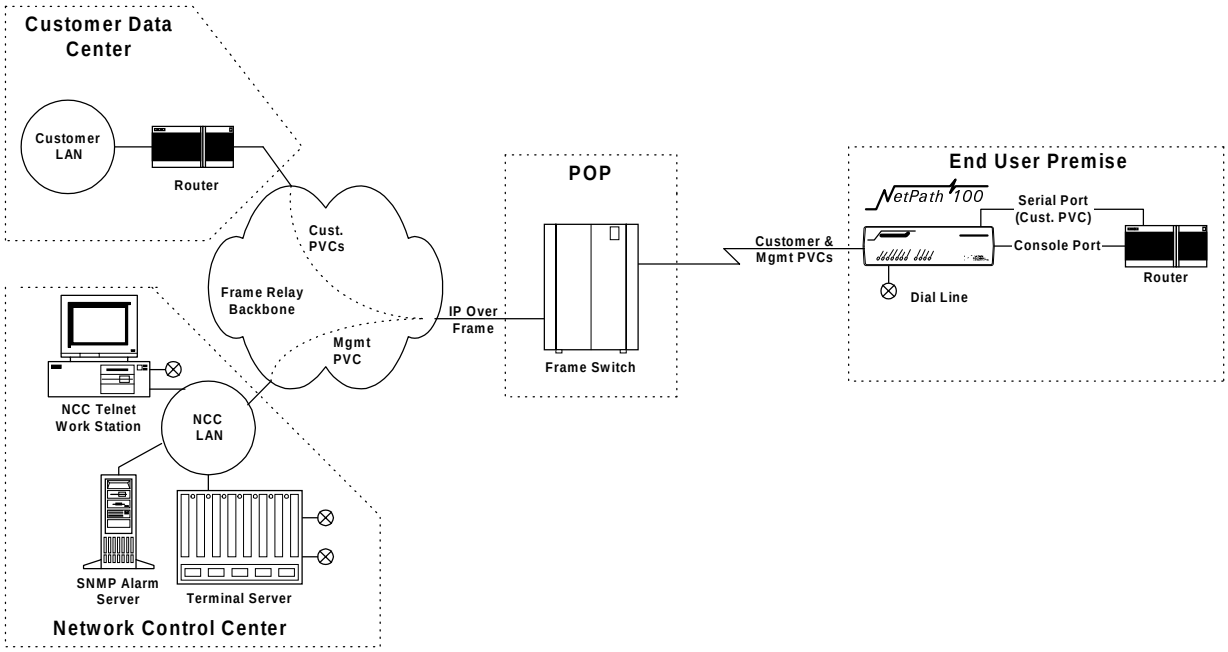



**Figure 2-1 NetPath 100 Typical Network Application**

NetPath NP 100 provides a configuration option to capture and rank IP Traffic in either Top Conversation Pair or Top Talker/Listener mode. By examining Top IP Traffic statistics, the network manager can determine the local device or the host/client connections sending and receiving excessive traffic.

## ISDN Adapter Option

The NetPath 100 can be factory-optioned to include an integral ISDN Adapter module.

The ISDN adapter includes four "U" ISDN TA Interfaces with two integral NT1 Inverse Multiplexers, thereby providing up to 512 Kbps of switched connectivity for network Backup and/or additional Bandwidth On-Demand.

## ISDN Backup

Backup in Frame Relay Protocol utilizing the Router's Primary Port can be via dedicated PVCs on an alternate port, or the frame switch manager may reroute the original PVCs to the Backup Frame Switch. It is also possible to bypass the entire Frame Relay Network and initiate backup to a pool of ports on an alternate Frame Switch connected directly to another Router.

A typical network configuration showing the backup connection to a Backup Frame Switch using rerouted PVCs is shown in Figure 2-2.

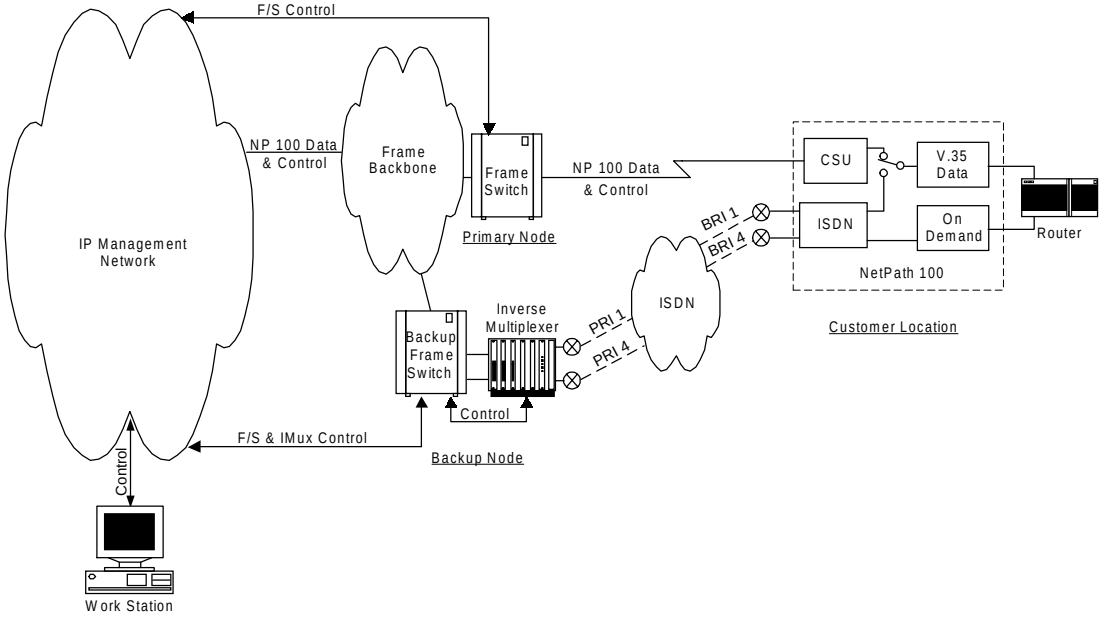



**Figure 2-2 Typical Backup Configuration**

The backup process is described as follows:

- NetPath 100 detects loss of connectivity at CSU.
- ISDN Adapter card calls Backup Frame Switch and is identified by caller ID.
- Frame Switch Manager either reroutes original PVCs, or Frame Switch uses alternate PVCs for the backup connection.

- NetPath 100 switches the data path when connected.
- Associated routers determine that PVCs have been established through LMI enquiries.
- Communication is resumed.

## ISDN Bandwidth On-Demand

Bandwidth On-Demand provides an additional network connection for a second DTE (router) port based on a request from the DTE. In this configuration the NetPath 100 ISDN Adapter is protocol-transparent. The Router determines the protocol used.

A typical network configuration showing simultaneous Bandwidth On-Demand and Backup connections is shown in Figure 2-3.

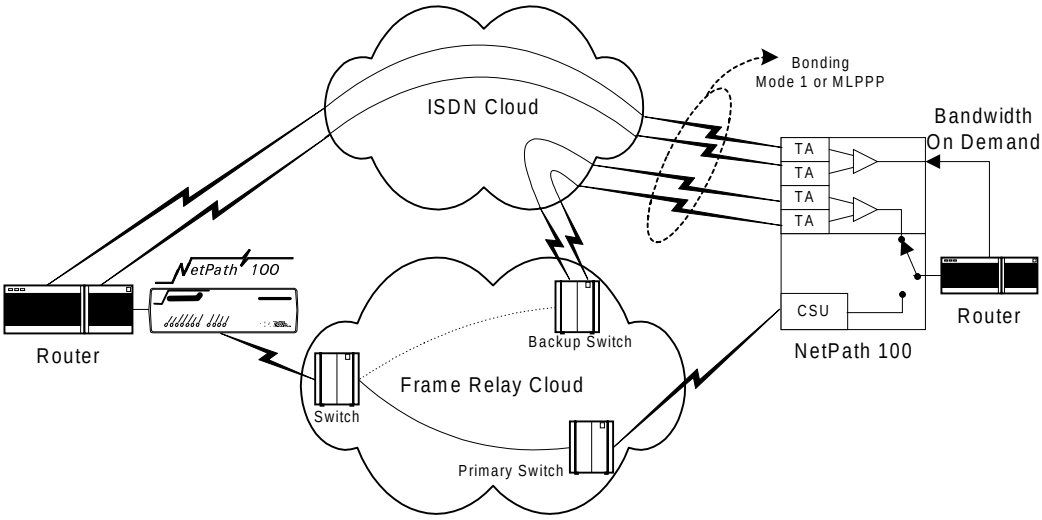



**Figure 2-3 Typical Simultaneous Bandwidth On-Demand Configuration**

The bandwidth on-demand process is described as follows:

- User's router detects need for bandwidth and raises DTR on its second port.
- NetPath 100 ISDN Adapter calls predetermined number.
- The Central Router answers the call and establishes communications with the remote Router.
- Communication commences between Routers.
- User's Router lowers DTR to terminate the ISDN connection when the "demand" has been satisfied.

## NetPath 100

The basic NetPath 100 includes a T1 interface, network-compliant Fractional Rate to Full Rate CSU/DSU, a Frame Relay switch function, a Frame Relay management module, and an SNMP Agent.

The unit also includes two Auxiliary ports and may be factory-optioned to include an internal V.32bis or V.34-compliant modem. An integral call director connects the modem to the CSU, AUX 1 port, AUX 2 port, or Option module (ISDN) based on a DTMF code sent by the caller. All the devices can access the modem for call-out purposes on a first-come, first-served basis.

System software can be downloaded to the NetPath 100 for upgrades.

The front and rear panels of the basic NetPath 100 are shown in Figure 2-4 and Figure 2-5.

Detailed descriptions of the NetPath 100 indicators and controls are provided in section 5 Diagnostics of this manual. Connector and pinout details are provided in Installation, Section 3 of this manual.

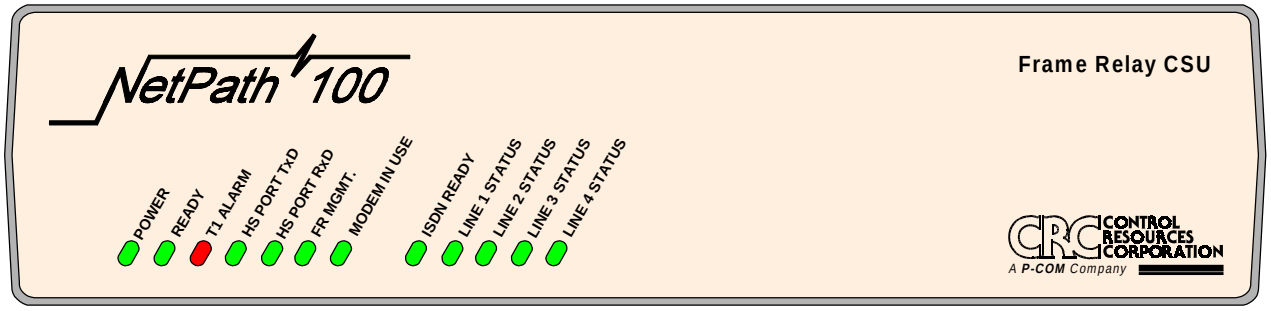



**Figure 2-4 NetPath 100 Front Panel (shown with ISDN option)**

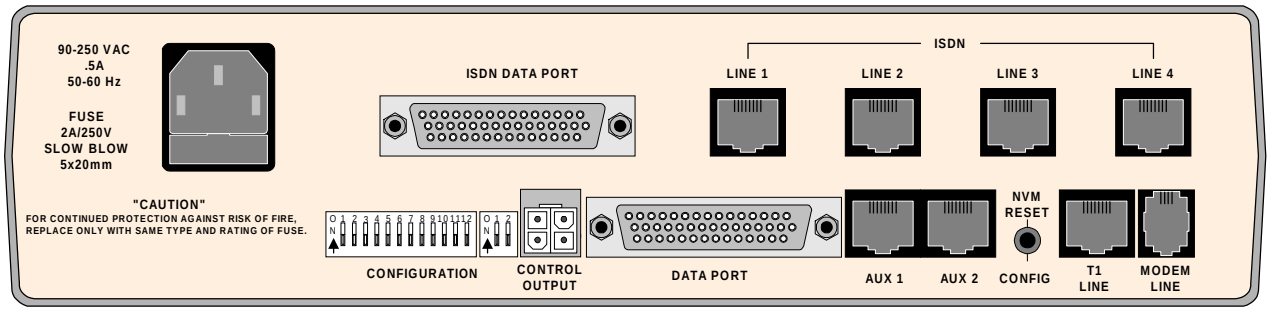



**Figure 2-5 NetPath 100 Rear Panel (shown with ISDN option)**

## Power Control Unit Option

The optional Model 467 Power Control Unit (PCU) provides a mechanism for rebooting an external device by momentarily interrupting its AC power source.

The PCU is a separate unit which consists of an AC power relay, relay control circuit, power transformer, and connectors/cables for: AC IN, SWITCHED AC OUT and Control/Power.

The PCU responds to an operator command to interrupt power to the connected device for a duration of one (1) to 300 seconds. When commanded, the PCU interrupts both the Hot and Neutral power leads.

The PCU can be wall-mounted using its built-in mounting holes, shown in Figure 2-6.

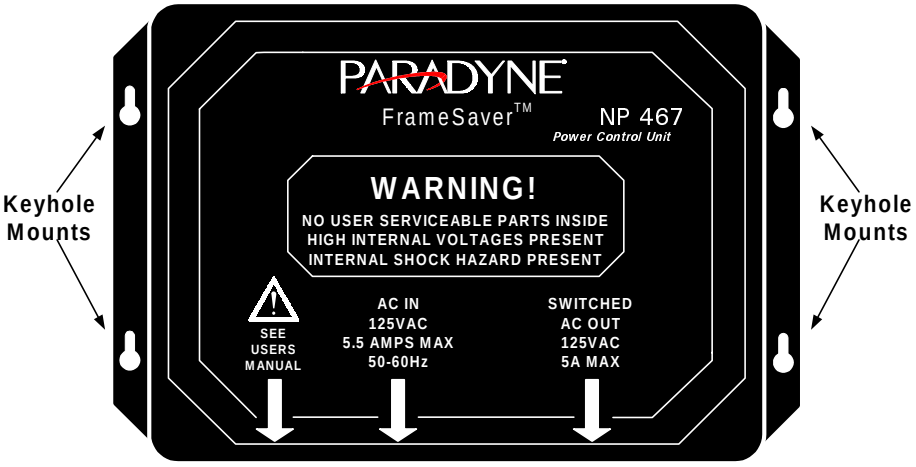



**Figure 2-6 Model 467 Power Control Unit**

## Operating Features

This section contains operation information about the following:

- Management Access
- Software Download
- Trap Reporting
- Modem & Call Director

## Management Access

Management access for control sessions or to retrieve alarm status is provided to the NetPath 100 via in-band Telnet, dial-in VT-100 console connection or direct-connected VT-100 terminal. NetPath 100 also supports SNMP “Get,” “Get Next,” and “Set” commands for retrieval of configurations and statistics information.

### Password Security

Security is provided through five levels of password-protected access.

Level 1, System Access Password:
Allows access to system login via User Access Passwords.

Levels 2 - 5, User Access Passwords:

View - Allows user to display all screens.

Test - Allows user to perform diagnostic tests from Status / Test screens and allows View password access.

Configuration - Allows user to change operating parameters and allows Test password access.

Supervisor - Grants unlimited access including the viewing and changing of passwords.

### System Screen Displays

Once successfully logged in, the system provides screen displays for configuration, testing, and performance statistics. Help text describing each screen’s display fields and commands is also provided.

## WAN DLCI

The in-band Frame Relay Management Channel WAN address is defined by the DLCI (Data Link Connection Identifier). The WAN DLCI can be configured for a Dedicated PVC, or as a Tunneled channel within a Payload PVC. During initial installation the WAN DLCI can be set via the unit's rear panel Configuration DIP Switches, Local Console Port or Dial-In Console Port. Thereafter the DLCI can also be changed via in-band management access.

## Management IP Addressing

NetPath 100 has special features for Network Service Providers (NSPs) who require management access to the FSU to be isolated from the payload data. This isolated access is provided either by NetPath 100's dedicated network-facing management PVC as shown in Figure 2-1 or by the Tunneled management channel on a network-facing Payload PVC as shown in Figure 2-7.

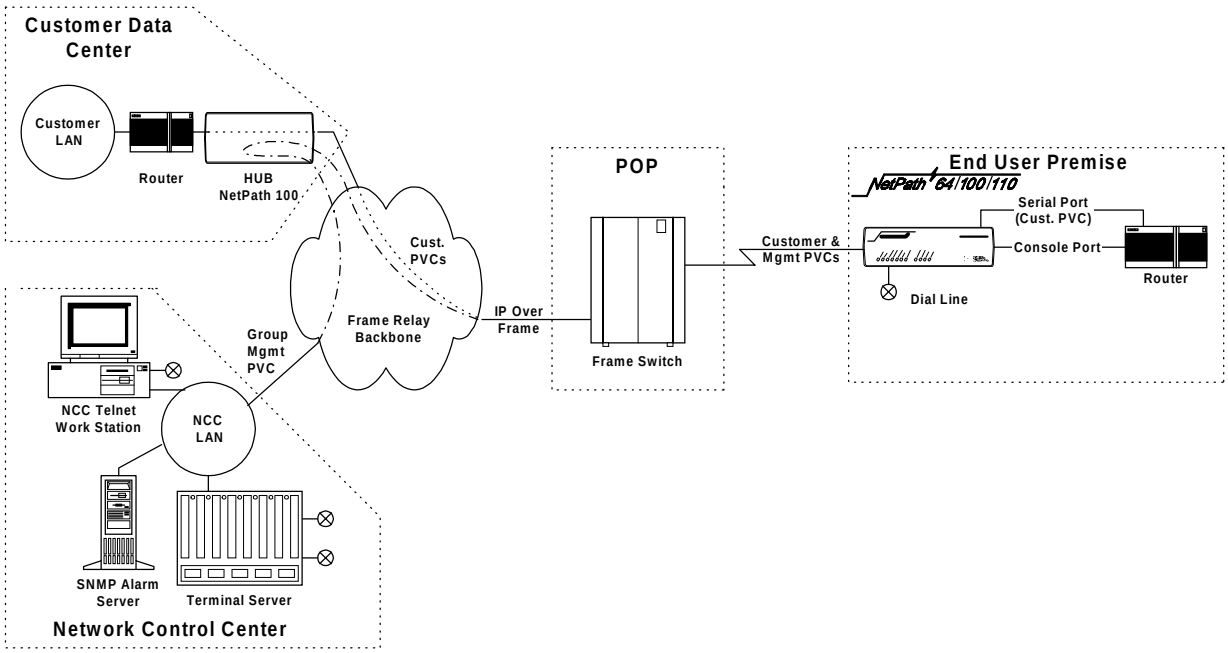



**Figure 2-7 Tunneled Management**

Tunnel management is accomplished by a NetPath HUB (NetPath 1xx class unit) located at a site which supports up to 48 PVCs connected to NetPath units located at remote (spoke) sites. The HUB unit performs the routing and encapsulation function for management channel messages going to and from the remote units. The HUB is connected to the network management systems by a separate, dedicated group management PVC.

NetPath 100 also provides expanded management access to the FSU through the following features:

- Support for two IP Addresses.
- An optional network-facing management channel via a specified IP Address on a specified payload PVC.
- An optional CPE-facing dedicated PVC management channel.

These optional management paths are shown in Figure 2-8.

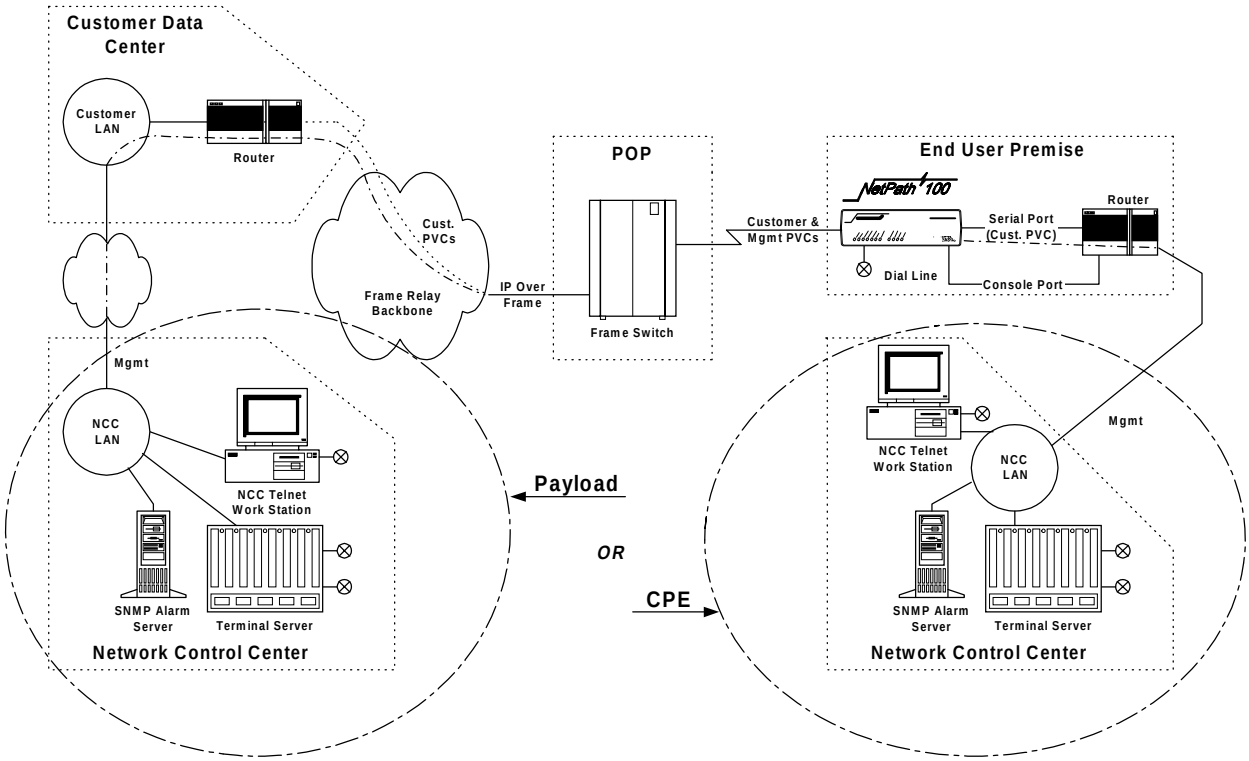



**Figure 2-8 Payload / CPE Management**

With these features, NSP and/or customer management of the FSU can be accomplished through three basic management modes:

- The primary IP Address is associated with the network-facing dedicated PVC or Tunneled payload PVC. In this mode, there may be a secondary IP Address. The secondary IP Address can be associated with a specified payload PVC or a dedicated CPE-facing PVC.
- The primary IP Address is associated with a specified payload PVC. There is no secondary IP Address.
- The Primary IP Address is associated with a dedicated CPE-facing PVC. There is no secondary IP Address.

## WAN Management IP Address

NetPath 100 utilizes one IP Address on the dedicated, network-facing Wide Area Network (WAN) management channel. This address is embedded within the various communications protocol stacks used for SNMP, Telnet and PPP. The unit's WAN Management IP Address may be automatically learned from the first message received on the management PVC, or it can be set via the local or remote Console Port.

When optioned with ISDN, NetPath 100 can have several communications paths that allow the management channel to connect to the frame relay network in different places. Each of these connection points could result in the management PVC routing through different IP sub-nets to reach the Network Control Center, or it may be desirable to have the NetPath 100 appear as a logically different object in the SNMP manager, especially if static routing and dedicated backup ports are utilized. The setting/learning of these additional IP Addresses is described in detail in Section 4, "Configuration," in this manual.

NetPath 100 will retain in Non-Volatile Memory (NVM), a separate WAN IP Address for each connection point. All communications via OOB PPP (Out-Of-Band Point-to-Point Protocol) will utilize whatever IP Address is in effect depending on how the unit is currently connected to the network. There are several options for establishing the WAN IP Address within the NetPath 100.

When the unit is shipped from the factory or when NVM is cleared on initial installation, the WAN IP Address for each connection point is set to 000.000.000.000, which indicates no address is known.

The WAN IP Address to be used on the T1 link is automatically "learned" from the first valid IP message received over the unit's management PVC. Learning will take place as long as the value of the WAN IP Address in NVM is 000.000.000.000. Once the IP Address is set or learned it is retained and used until the NVM is cleared or another address is manually set.

## Software Download

The NetPath 100 system software (firmware) is stored in flash memory. A new version of the software can be downloaded to the unit for software upgrade, or for restoration in the event an error is detected in the flash storage.

A description of the software download process is provided in Section 5, “Diagnostics,” of this manual.

## Trap Reporting

The NetPath 100 provides an MIB which includes standard MIB-II groups and also contains a Private MIB Extension which supports the issuance of unique Traps. Traps are issued either in-band or dial-out (out-of-band) via the on-board modem, depending on the specific fault detected.

Section 5, “Diagnostics” of this manual lists the MIB objects and the Trap reporting path for each.

## Event Log

NetPath 100 includes an Event Log which captures Trap occurrences and logs them into a table for SNMP retrieval. The table stores up to 255 of the latest occurred events.

The log table includes the following:

- A unique event number for each event. Maximum number is 65,536 after which the count restarts. The count is also restarted by a unit reset or power up.
- A relative time-stamp which counts from when the unit last started operation.
- A description of the event, including any data included in the Trap regarding that event.

## Modem & Call Director

The integral on-board modem can be switched to any one of the interfaces of the NetPath 100 by the call director. The call director connects the modem to the Base module, Optional ISDN Adapter module, AUX 1 Port, or AUX 2 Port.

In this way, the modem is used for out-of-band trap reporting (NetPath 100 Base module, Option module or DTE device connected to an AUX Port) and accepts incoming calls for management access of the NetPath 100, DTE device or any other device connected to an AUX Port.

Figure 2-9 shows a block diagram of the Modem and Call Director.

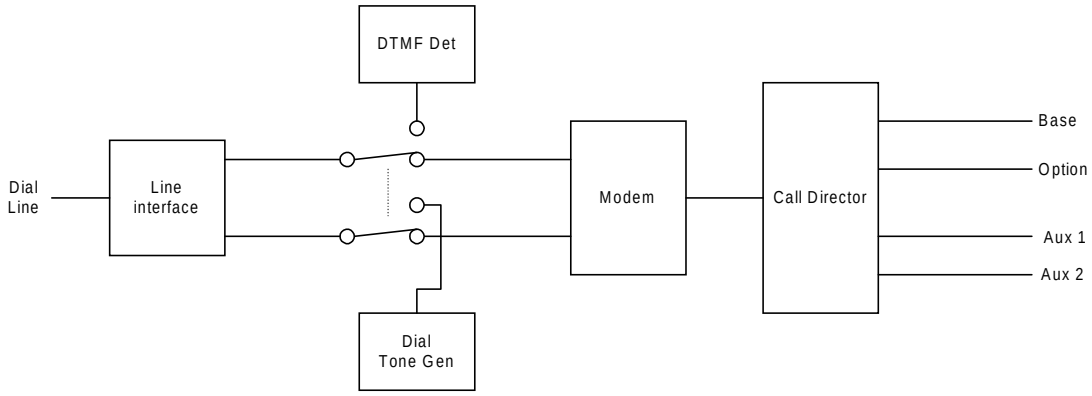



**Figure 2-9 Modem & Call Director Block Diagram**

On incoming calls, the modem-to-interface assignment is made based on the DTMF code detected after the NetPath 100 line interface goes off-hook and returns a second Dial Tone.

DTMF code selections are shown in Table 1.

**Table 2-1. Call Director DTMF Codes**

| Interface | DTMF Code |
|---|---|
| Base module (CSU) | 1 |
| Aux 1 Port | 2 |
| Aux 2 Port | 3 |
| Option Adapter Module | 4 |
| Defaults to Base module after timeout. | All Others |

Modem parameters may be modified in the database as part of the configuration.

The configuration also includes a periodic self-test option for the modem and a dial tone test for the dial line (performed every four hours), with results indicated on the status screen, and failures reported as a Trap on the dedicated facility.

# 3 Installation

This section contains information to complete the physical installation of a NetPath 100 which includes: mounting the unit, power connection, and input/output connections.

## Mounting

NetPath 100 comes equipped with rubber feet for table or shelf-top placement. Optional adapter brackets are available for wall mounting and standard 19" or 24" rack mounting. Sufficient space for cooling and access to the front panel indicators for troubleshooting are required in all installations.

***CAUTION***

***Failure to provide adequate cooling space may overheat the unit and void the warranty.***

1. Before unpacking, ensure that the factory carton does not show any signs of damage. If it does, contact the freight carrier immediately.
2. Unpack the NetPath 100 and power cord from the factory carton(s). Check all the components for signs of damage. If they appear damaged, contact your equipment provider before proceeding.
3. Mount the NetPath 100 in its operating location. Table-top or shelf-top location is assumed in this manual.

***CAUTION***

***Select a location where the unit will not be disturbed once it is operational. Do not place the NetPath 100 on top of any heat-producing equipment. Do not place any other equipment on top of the NetPath 100.***

To Wall-Mount or Rack-Mount the NetPath 100, follow the instructions supplied with the Wall or Rack mount adapter.

## Mounting Optional NP 467 Power Control Unit

If this installation includes an optional NP 467 Power Control Unit, this may be wall-mounted using the four keyhole mounts provided on its base (refer to Figure 3-1).

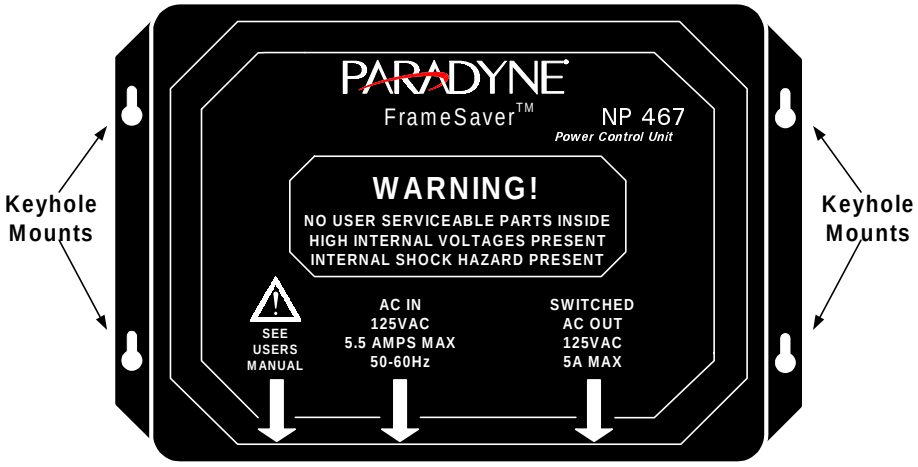



**Figure 3-1 Power Control Unit Mounting**

**NOTE:** Use wall fasteners appropriate for the wall's surface material, i.e. wood screws for wooden surfaces, expansion fasteners for gypsum wall board, etc.

The Power Control Unit may also be placed or mounted on a table-top, shelf, or floor near the NetPath 100.

***CAUTION***

***The Power Control Unit must not be placed where the unit or its cables may be bumped, kicked or walked on.***

## Connections

NetPath 100 has connectors on the rear panel for power and input/output connections. Rear panel connectors and controls are shown and described in Figure 3-2 and Table 3-1.

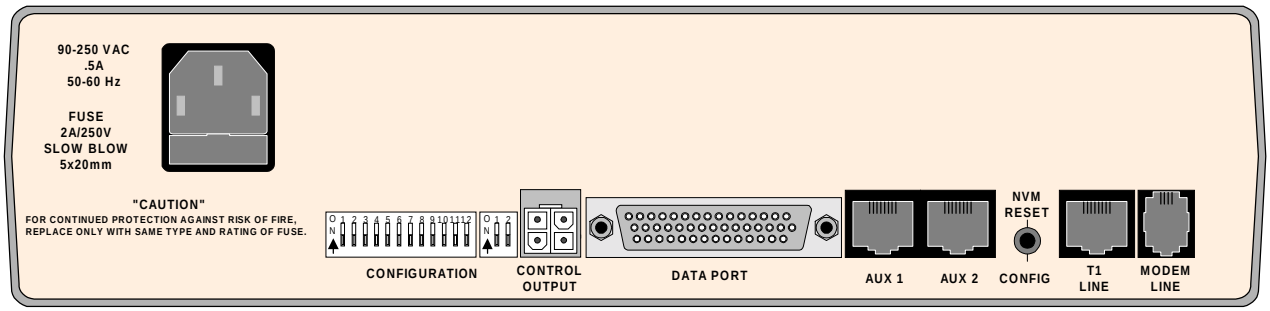



**Figure 3-2 NetPath 100 Rear Panel (Basic)**

**Table 3-1 Basic NetPath 100 Input/Output Connectors and Control Specifications**

| Connectors | Description |
|---|---|
| Power Connector | Internal Power Supply with IEC 320 power cord. |
| Control Output | 4-pin keyed connector to control Model 467 Power Control Unit. |
| Data Port | DB-44, high-density connectors provide the following interfaces, selected by the interface cable used:<br>EIA-530<br>EIA-530-A<br>ITU-V.35<br>ITU-X.21-NS (Non-Switched) |
| AUX 1, AUX 2 | 8-pin modular connectors, EIA-232 |
| NVM Reset/Config | Recessed push button that causes the unit's NVM to be cleared if pressed and held (approximately four seconds) during the unit's power-up self-test. |
| T1 Line | 8-pin modular connector, RJ48C |
| Modem Line (Analog) | 6-pin modular connector, RJ11C |
| DIP Switches | One 2-position and one 12-position DIP switch for the initial setting of the DLCI address, the DS0 configuration for the T1 link, and the CSU/DTE parameters. |

# Power Connections

## NetPath 100 Power

1. The NetPath 100 includes an internal universal Power Supply. Plug the IEC 320 end of the Power Cord into the connector on the rear of the NetPath 100, shown in Figure 3-3.

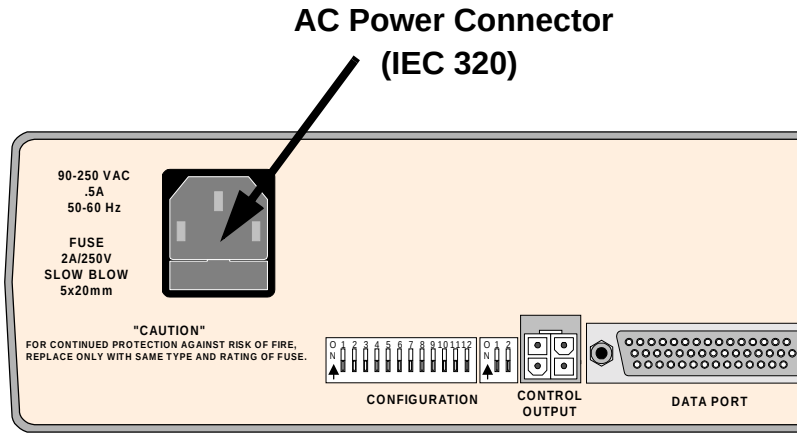



**Figure 3-3 NetPath 100 Power Connection**

## Power On Self Test

2. Verify that the proper voltage (90 - 250 VAC, 50 - 60 Hz) is present at the outlet to be used. If the outlet voltage is correct, plug the other end of the Power Cord into the AC outlet.
3. Once connected, the NetPath 100 will go through the following normal power up sequence:

**Basic NetPath 100**

a. The POWER LED will light immediately and stay on.

b. The READY LED will flash while the unit performs its self-test (test duration - approximately 45 seconds).

c. The READY LED will be ON steady after successful completion of the self-test.

d. The T1 ALARM and FR MGMT. LEDs should ***not*** be flashing together.

e. All other LED indications should be ignored at this time.

**NetPath 100 with ISDN**

a. The POWER LED will light immediately and stay on.

b. The READY and ISDN READY LEDs will flash while the unit performs its self-test (test duration - approximately 45 seconds).

c. The READY and ISDN READY LEDs will be ON steady after successful completion of the self-test.

d. The T1 ALARM and FR MGMT. LEDs should ***not*** be flashing together.

e. All other LED indications should be ignored at this time.

If the LED indications are not as described above, refer to section 5 Diagnostics of this manual.

If operation looks normal, unplug the NetPath 100 and make the required data input/output connections. If an optional Power Control Unit is to be installed with this NetPath 100, proceed to the next page of this manual. Otherwise, skip this page and go the Input/Output Connections section.

**NOTE:** The NetPath 100 does ***not*** have a Power ON/OFF switch. To remove power from the NetPath 100, disconnect the Power Cord from the AC outlet.

***CAUTION***

***It is recommended that you remove AC power from the NetPath 100 before attaching input and output cables during the installation process.***

## Connections to Optional NP 467 Power Control Unit

If this installation includes an NP 467 Power Control Unit (PCU), connections to it are made as follows.

A. Connect one end of the Switched AC Out cable to its PCU connector, shown in Figure 3-4 below. Connect the other end of this cable to the AC Input cable of the device to be controlled (usually the DTE device connected to the User Port of the NetPath 100).

***CAUTION***

***Do not plug the power cord from the NetPath 100 into the SWITCHED AC OUT cable of the Power Control Unit. This is an invalid configuration.***

B. Connect one end of the Control/Power cable to the PCU connector marked "See Users Manual", shown in Figure 3-4. Connect the other end to the Control Output connector on the rear panel of the NetPath 100, shown in Figure 3-3.

C. Verify that the proper voltage is present at the outlet to be used (125 VAC, 50-60 Hz). If the outlet voltage is correct, connect one end of the AC IN cable to its PCU connector. Plug the other end of this cable into the AC outlet.

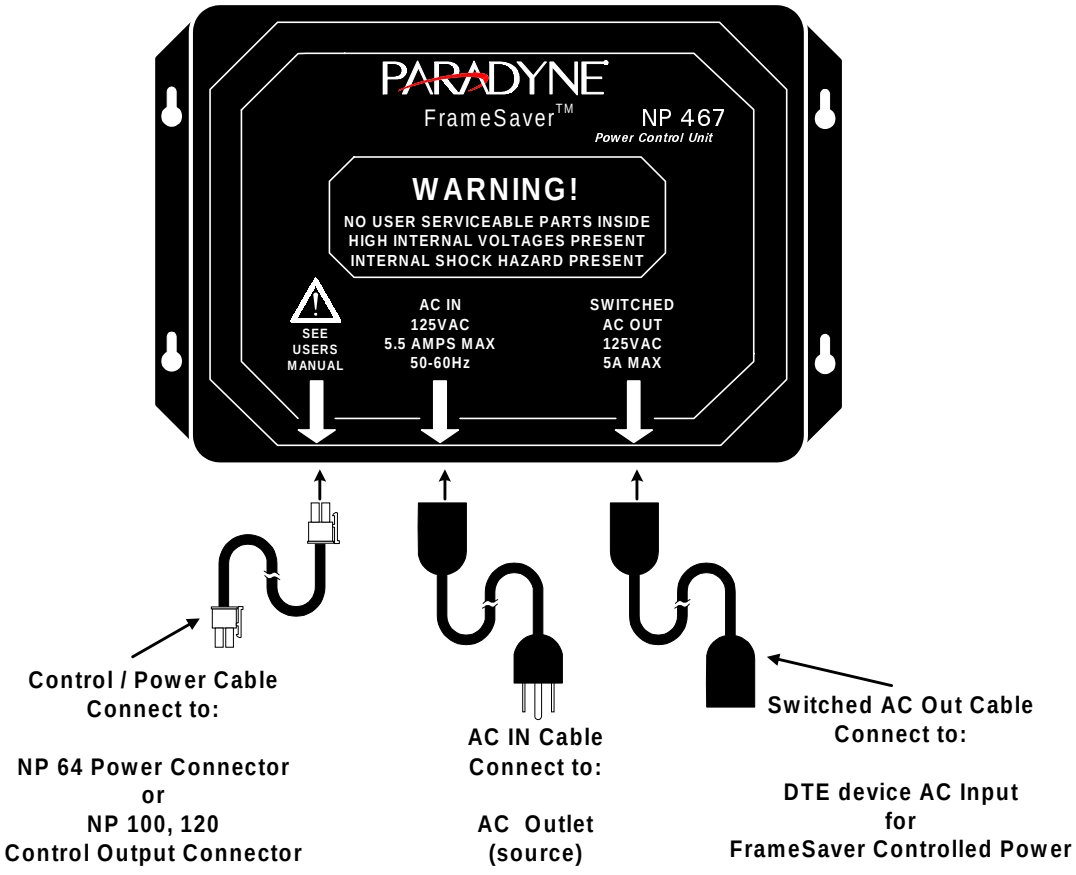



**Figure 3-4 Power Control Unit Connections**

Continue the installation by making Input/Output connections and Configuring the NetPath 100 as described in the following sections of this manual.

## Input/Output Connections

Basic NetPath 100 has input/output connectors for the T1 Line, Data Port (DTE), two AUX ports, and Modem Line. Pinouts for each of the these ports are provided in the tables that follow.

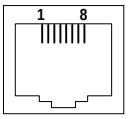
**NOTE:** Refer to Section 6, "Options" of this manual for a description of additional connectors for options such as ISDN Adapter.

***CAUTION***

***The installer must ensure that the plugs connecting the T1 Line to the NetPath 100 are matching "keyed" modular plugs. This will prevent the accidental connection of the T1 Line to either of the NetPath 100 AUX connectors.***

## T1 Line Connection

Use cable assembly # 135-982-0006, or per pinout shown in Table 3-2.



T1 Line

**Table 3-2 T1 Line Pinout, RJ48C Connector**

| Pin | Description | Direction |
|---|---|---|
| 1 | R1 (Ring 1) | Receive |
| 2 | T1 (Tip 1) | Receive |
| 3,6 | No Connection | N/A |
| 4 | R (Ring) | Transmit |
| 5 | T (Tip) | Transmit |
| 7,8 | Frame Ground | N/A |
| **NOTE:** Use Twisted Pair Cable conductors for pins: 1 & 2, 4 & 5, and 7 & 8. | | |

## Data Port Interface & Cable Codes

The NetPath 100 Data Port (DTE) supports four electrical interface types; ITU-V.35, EIA-530, EIA-530-A and ITU-X.21-NS. The Data Port connector on the back of the NetPath 100 is a DB-44 high density female. A short (approx. 2.5 ft.) adapter cable is used to convert from the DB-44 to the appropriate connector type for the interface selected. The adapter cable also includes a unique Cable Code (CBC), a special wiring pattern at the DB-44 connector, which automatically sets the port to the desired interface type.

**NOTE:** Some manufacturer specific cable pinouts are provided at the end of this manual section, under General Specifications.

## Data Port Pinout

Table 3-3 shows the pinout for the Data Port connector.

Table 3-4 through Table 3-7 show the pin connections for the adapter cables for each of the interface types.

.

**Table 3-3 Data Port Pinout DB-44F Connector**

| Pin | Signal | Direction | | Pin | Signal | Direction |
|---|---|---|---|---|---|---|
| 1 | Shield | N/A | | 23 | DCD-A | Output |
| 2 | NC | | | 24 | DTR-A | Input |
| 3 | NC | | | 25 | TC-A | Output |
| 4 | RTS(s) | Input | | 26 | CBC-A* | N/A |
| 5 | CTS(s) | Output | | 27 | RC-A | Output |
| 6 | DSR(s) | Output | | 28 | CBC-B* | N/A |
| 7 | Sig. Gnd. | N/A | | 29 | TCE-A | Input |
| 8 | DCD(s) | Output | | 30 | CBC-C* | N/A |
| 9 | DTR(s) | Input | | 31 | Shield | N/A |
| 10 | NC | | | 32 | TD-B | Input |
| 11 | NC | | | 33 | RD-B | Output |
| 12 | NC | | | 34 | RTS-B | Input |
| 13 | NC | | | 35 | CTS-B | Output |
| 14 | NC | | | 36 | DSR-B | Output |
| 15 | NC | | | 37 | Sig. Gnd. | N/A |
| 16 | Shield | N/A | | 38 | DCD-B | Output |
| 17 | TD-A | Input | | 39 | DTR-B | Input |
| 18 | RD-A | Output | | 40 | TC-B | Output |
| 19 | RTS-A | Input | | 41 | NC | |
| 20 | CTS-A | Output | | 42 | RC-B | Output |
| 21 | DSR-A | Output | | 43 | NC | |
| 22 | Sig. Gnd. | N/A | | 44 | TCE-B | Input |

**Notes:** *CBC = Cable Code pin.
(s) = single ended.

## ITU-V.35 Adapter Cable

Use cable assembly # 135-001-0400, or per pinout shown in Table 3-4.

**Table 3-4 ITU-V.35 Interface Adapter Cable (CBC=1)**

| M-34F Pin | DB-44M Pin | Signal | Direction | | M-34F Pin | DB-44M Pin | Signal | Direction |
|---|---|---|---|---|---|---|---|---|
| A | 1 | Shield | N/A | | U | 29 | TCE-A | Input |
| B | 7 | Sig. Gnd. | N/A | | V | 27 | RC-A | Output |
| C | 4 | RTS(s) | Input | | W | 44 | TCE-B | Input |
| D | 5 | CTS(s) | Output | | X | 42 | RC-B | Output |
| E | 6 | DSR(s) | Output | | Y | 25 | TC-A | Output |
| F | 8 | DCD(s) | Output | | Z | | | |
| G | | | | | AA | 40 | TC-B | Output |
| H | 9 | DTR(s) | Input | | BB | | | |
| I | | | | | CC | | | |
| J | | | | | DD | | | |
| K | | | | | EE | | | |
| L | | | | | FF | | | |
| M | | | | | GG | | | |
| N | | | | | HH | | | |
| O | | | | | II | | | |
| P | 17 | TD-A | Input | | JJ | | | |
| Q | | | | | KK | | | |
| R | 18 | RD-A | Output | | LL | | | |
| S | 32 | TD-B | Input | | MM | | | |
| T | 33 | RD-B | Output | | NN | | | |
| | | | | | | 26 | CBC-A* | N/A |
| | | | | | | 28 to 22 | CBC-B* | N/A |
| | | | | | | 30 to 22 | CBC-C* | N/A |

**Notes:** *CBC = Cable Code pin.
(s) = single ended.
Twisted Pair cable conductors for: TD-A & B, RD-A & B, TC-A & B, RC-A & B and TCE-A & B.
Install 300 Ohm, 1/4W, 5% resistors at DB-44 end across pins: 17 to 37, 32 to 37, 29 to 22, and 44 to 22.
Shielded cable is recommended.

## EIA-530 Adapter Cable

Use cable assembly # 135-002-0400, or per pinout shown in Table 3-5.

**Table 3-5 EIA-530 Interface Adapter Cable (CBC=2)**

| DB-25F Pin | DB-44M Pin | Signal | Direction | | DB-25F Pin | DB-44M Pin | Signal | Direction |
|---|---|---|---|---|---|---|---|---|
| 1 | 16 | Shield | N/A | | 14 | 32 | TD-B | Input |
| 2 | 17 | TD-A | Input | | 15 | 25 | TC-A | Output |
| 3 | 18 | RD-A | Output | | 16 | 33 | RD-B | Output |
| 4 | 19 | RTS-A | Input | | 17 | 27 | RC-A | Output |
| 5 | 20 | CTS-A | Output | | 18 | | | |
| 6 | 21 | DSR-A | Output | | 19 | 34 | RTS-B | Input |
| 7 | 22 | Sig. Gnd. | N/A | | 20 | 24 | DTR-A | Input |
| 8 | 23 | DCD-A | Output | | 21 | | | |
| 9 | 42 | RC-B | Output | | 22 | 36 | DSR-B | Output |
| 10 | 38 | DCD-B | Output | | 23 | 39 | DTR-B | Input |
| 11 | 44 | TCE-B | Input | | 24 | 29 | TCE-A | Input |
| 12 | 40 | TC-B | Output | | 25 | | | |
| 13 | 35 | CTS-B | Output | | | | | |
| | | | | | | 26 to 22 | CBC-A* | Cable Code - A |
| | | | | | | 28 | CBC-B* | Cable Code - B |
| | | | | | | 30 to 22 | CBC-C* | Cable Code - C |

**Notes:** *CBC = Cable Code pin.
(s) = single ended.
Twisted Pair cable conductors for: TD-A & B, RD-A & B, RTS-A & B, CTS-A & B, DSR-A & B, DCD-A & B, DTR-A & B, TC-A & B, RC-A & B and TCE-A & B.
Shielded cable is recommended.

## EIA-530-A Adapter Cable

Use cable assembly # 135-003-0400, or per pinout shown in Table 3-6.

**Table 3-6 EIA-530-A Interface Adapter Cable (CBC=3)**

| DB-25F Pin | DB-44M Pin | Signal | Direction | | DB-25F Pin | DB-44M Pin | Signal | Direction |
|---|---|---|---|---|---|---|---|---|
| 1 | 16 | Shield | N/A | | 14 | 32 | TD-B | Input |
| 2 | 17 | TD-A | Input | | 15 | 25 | TC-A | Output |
| 3 | 18 | RD-A | Output | | 16 | 33 | RD-B | Output |
| 4 | 19 | RTS-A | Input | | 17 | 27 | RC-A | Output |
| 5 | 20 | CTS-A | Output | | 18 | | | |
| 6 | 6 | DSR(s) | Output | | 19 | 34 | RTS-B | Input |
| 7 | 22 | Sig. Gnd. | N/A | | 20 | 9 | DTR(s) | Input |
| 8 | 23 | DCD-A | Output | | 21 | | | |
| 9 | 42 | RC-B | Output | | 22 | | | |
| 10 | 38 | DCD-B | Output | | 23 | | | |
| 11 | 44 | TCE-B | Input | | 24 | 29 | TCE-A | Input |
| 12 | 40 | TC-B | Output | | 25 | | | |
| 13 | 35 | CTS-B | Output | | | | | |
| | | | | | | 26 | CBC-A* | N/A |
| | | | | | | 28 | CBC-B* | N/A |
| | | | | | | 30 to 22 | CBC-C* | N/A |

**Notes:** *CBC = Cable Code pin.
(s) = single ended.
Twisted Pair cable conductors for: TD-A & B, RD-A & B, RTS-A & B, CTS-A & B, DCD-A & B, TC-A & B, RC-A & B and TCE-A & B.
Install 470 Ohm resistor at DB-44 end across pins: 9 to 37.
Shielded cable is recommended.

## ITU-X.21-NS Adapter Cable

Use cable assembly # 135-005-0400, or per pinout shown in Table 3-7.

ITU-X.21-NS (NS indicates Non-Switched)

**Table 3-7 ITU-X.21-NS Interface Adapter Cable (CBC=4)**

| DB-15F Pin | DB-44M Pin | Signal | Direction | | DB-15F Pin | DB-44M Pin | Signal | Direction |
|---|---|---|---|---|---|---|---|---|
| 1 | 16 | Shield | N/A | | 9 | 32 | TD-B | Input |
| 2 | 17 | TD-A | Input | | 10 | 34 | Control-B | Input |
| 3 | 19 | Control-A | Input | | 11 | 33 | RD-B | Output |
| 4 | 18 | RD-A | Output | | 12 | 38 | Indication-B | Output |
| 5 | 23 | Indication-A | Output | | 13 | 40 | TC-B | Output |
| 6 | 25 | TC-A | Output | | 14 | | | |
| 7 | | | | | 15 | | | |
| 8 | 22 | Sig. Gnd. | N/A | | | | | |
| | | | | | | 26 to 22 | CBC-A* | N/A |
| | | | | | | 28 to 22 | CBC-B* | N/A |
| | | | | | | 30 | CBC-C* | N/A |

**Notes:** *CBC = Cable Code pin.
(s) = single ended.
Twisted Pair cable conductors for: TD-A & B, RD-A & B, Control-A & B, Indication-A & B, and RC-A & B.
DTR signal and DTE timing are not supported in ITU-X.21-NS mode.
Shielded cable is recommended.

## AUX 1 & AUX 2 Connections

AUX Ports can be used to access other equipment through the NetPath 100 dial line. For example, the console port of the DTE device (Router, FRAD, etc.) connected to data port of the NetPath 100, can be connected to an AUX Port.

Use cable assembly # 135-008-0400 for modular to DB25, or # 135-990-0006 for modular to Cisco* router console, or per pinouts shown in the tables on the next page.

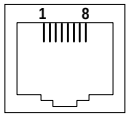
* Cisco is a registered trademark of Cisco Systems, Inc.

***CAUTION***

***Use caution when connecting to an AUX Port. AUX Port connectors are similar to the connector for the T1 Line. Accidental connection to either of the AUX Ports with the T1 Line, may damage the AUX Port electrical interface.***

The AUX 1 and AUX 2 Port pinouts are shown in Table 3-8 and Table 3-9.

**Table 3-8 AUX 1 Pinout, 8 Pin Modular Connector**




AUX
Conn.

| Pin | Signal | Direction |
|---|---|---|
| 1 | CTS | Output |
| 2 | DSR* | Output |
| 3 | RxD | Output |
| 4 | SG | Sig. Gnd |
| 5 | No Connection | N/A |
| 6 | TxD | Input |
| 7 | DTR | Input |
| 8 | RTS | Input |

**NOTES:** Electrical Interface = EIA-232
*DSR is used to drive both RLSD and DSR leads within the adapter.

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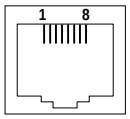
**Table 3-9 AUX 2 Pinout, 8 Pin Modular Connector**




AUX
Conn.

| Pin | Signal | Direction |
|---|---|---|
| 1 | CTS | Output |
| 2 | DSR* | Output |
| 3 | RxD | Output |
| 4 | SG | Sig. Gnd |
| 5 | Console | Input |
| 6 | TxD | Input |
| 7 | DTR | Input |
| 8 | RTS | N/A |

**NOTES:** Electrical Interface = EIA-232
*DSR is used to drive both RLSD and DSR leads within the adapter.

***CAUTION:*** Pin 8 is not used. If the unit senses a signal on this pin, "Improper Aux 2 Cable" will be displayed in the "Test/Fault" Field on the System View and CSU Statistics Summary Screens, and the "READY" LED on the front panel will flash OFF every 5 seconds. These indications are reset by the "ResetTest" command on the Device Test Screen or through a power-up reset /self-test of the unit.

In addition to providing an EIA-232 Auxiliary Port, AUX 2 also provides a local console connection to the Base module or Option Adapter.

## Console Cabling

In Console Mode, the AUX 2 port is configured as a VT-100 interface, 9.6Kbps, asynchronous, 8 data bits, one start bit, one stop bit, and no parity.

The Console Mode is enabled on the AUX 2 port when the "Console" Pin (#5) on the AUX 2 connector is asserted (connect the Console pin to the terminal's DTR). Use cable assembly # 135-007-0400 for DB-25 connector, cable assembly # 135-000-0464 for DB-9 connector, or per pinout shown in Figure 3-5.

**NOTE:** When AUX 2 Console Mode is enabled, the internal Modem is disabled.

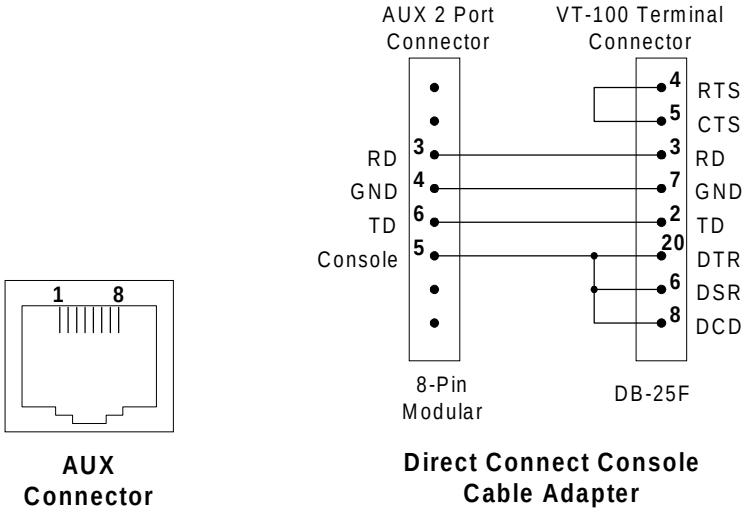
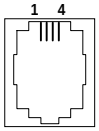



**Figure 3-5 AUX 2 Port, Console Cabling**

## Modem Line Connection

Use cable assembly # 135-007-7200, or per pinout shown in Table 3-10.




Dial Line

**Table 3-10 Modem Line Pinout, RJ11C Connector**

| Pin | Description |
|---|---|
| 1,2 | No Connection |
| 3 | R (Ring) |
| 4 | T (Tip) |
| 5,6 | No Connection |

## Connections Completed

All connections to basic NetPath 100 are now completed.

Proceed to the Configuration in section 4 Operation of this manual.

# General Specifications

## NetPath 100 Specifications

**Table 3-11 NetPath 100 General Specifications**

| Item | Description |
|---|---|
| Dimensions | Table Top (with rubber feet):<br>3.5" H x 10.5" W x 12.0"D.<br>Wall Mount (with removable wall mounting bracket):<br>10.5" H x 12.0" W x 3.5" D.<br>Rack Mount (with removable rack mounting adapter):<br>5.25" H x 19.0" W ( or 24.0" W ) x 12.0" D. |
| Weight | As normally packaged including carton and accessories: 8 lbs.<br>Unit alone (without packaging and accessories): 6 lbs. |
| Operating Range | Temperature: 0 to 50 degrees C. operating.<br>Relative Humidity: 5 to 95% non-condensing.<br>Altitude: 10,000 ft. max. operating,<br>50,000 ft. max. non-operating.<br>Shock and Vibration: As normally encountered during shipping and handling. |
| Power Requirements | 90 - 250 VAC, 50 - 60 Hz.,15 Watts max.<br>Fused - 2A/250V Slow Blow, 5x20mm.<br>***CAUTION:***<br>FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE FUSE ONLY WITH THE SAME TYPE AND RATING.<br>***ATTENTION:***<br>POUR NE PAS COMPROMETTRE LA PROTECTION CONTRE LE RISQUE D'INCENDIE REMPLACER PAR UN FUSIBLE DE MEMES TYPE ET CARACTERISTIQUE NOMINALES. |
| Regulatory Compliance | UL - 1459, Third Edition and CAN/CSA C22.2 No. 225-M90<br>FCC Part 15, Class A Digital Device<br>Canada's ICES003, Class A Digital Device<br>FCC Part 68 |

# Power Control Unit Specifications

**Table 3-12 Model 467 Power Control Unit General Specifications**

| Item | Description |
|---|---|
| Dimensions | 2.5" H x 7.25" W x 4.6" D |
| Weight | As packaged including carton: 4.5 lbs.<br>Unit alone: 3.5 lbs. |
| Operating Range | Temperature: 0 to 50 degrees C. operating.<br>Relative Humidity: 5 to 95% non-condensing.<br>Altitude: 10,000 ft. max. operating,<br>50,000 ft. max. non-operating.<br>Shock and Vibration: As normally encountered during shipping and handling. |
| Power Requirements | AC Input: 125 VAC, 50 - 60 Hz, 0.22A for the internal power transformer in addition to the connected device.<br>7-foot cord with 3-prong connectors.<br><br>Switched AC Output: 125 VAC, 5 AMPS max.<br>7-foot cord with 3-prong connectors.<br><br>Power Output: 22 VAC, 30 VA (NetPath 64 Only).<br>7-foot Control/Power Cable: 4-conductor with 4-pin keyed locking connectors. |
| Regulatory Compliance | UL - 1950 |

## Cisco HD-60 Adapter Cable Specifications

To connect a Cisco* router to a NetPath 100 Data Port configured for ITU-V.35, use cable assembly # 135-006-0400, or per pinout shown in Table 3-13.

**Table 3-13 Cisco HD-60M to NetPath 100 HD-44M**

| Cisco HD-60M Pin | DB-44M Pin | Signal | | Cisco HD-60M Pin | DB-44M Pin | Signal |
|---|---|---|---|---|---|---|
| Shield | Shield | Shield | | 27 | 33 | RD-B |
| 17 | 32 | TD-B | | 28 | 18 | RD-A |
| 18 | 17 | TD-A | | 33 | 8 | DCD(s) |
| 19 | 44 | TCE-B | | 34 | 6 | DSR(s) |
| 20 | 29 | TCE-A | | 35 | 5 | CTS(s) |
| 23 | 40 | TC-B | | 42 | 4 | RTS(s) |
| 24 | 25 | TC-A | | 43 | 9 | DTR(s) |
| 25 | 42 | RC-B | | 45 | 7 | Sig. Gnd. |
| 26 | 27 | RC-A | | 46 | 1 | Shield |
| | | | | | | |
| | | | | | | |

**NOTES:**

Shielded cable is required.

Twisted Pair cable conductors for HD-60 pins: 17 & 18, 19 & 20, 21 & 22, 23 & 24, 25 & 26, 27 & 28, 33 & 34, 35 & 42, 43, & 44, 45 & 46.

HD-60 pins tied: 48 to 49, 50 to 51 to 52, 53 to 54 to 55 to 56.

HD-44 pins tied: 17 to 37 via resistor, 32 to 37 via resistor,
22 to 28 to 30, then all to 29 via resistor,
22 to 28 to 30, then all to 44 via resistor
(Resistor = 300 Ohm, 1/4 W, 5%).

(s) = single ended.

* Cisco is a registered trademark of Cisco Systems, Inc.

# 4 Operation

This section contains configuration and operation information for basic NetPath 100. Refer to Section 6, “Options” of this manual for installation, configuration and operation information for NetPath 100 Options such as the ISDN Adapter.

## Configuration

NetPath 100 configuration consists of initially setting the T1, CSU parameters and the WAN Management Channel’s DLCI address via the rear panel DIP Switches, via dial-in VT-100 console connection or via direct connected VT-100 terminal. These parameters can also be reconfigured via in-band Telnet Management session after the initial installation.

Additional parameters are configured via in-band Telnet, dial-in VT-100 console connection or direct connected VT-100 terminal.

The configuration procedures to complete the installation using the DIP Switches for initial settings, are presented in and should be performed in the following order:

- Power the unit on while clearing NVM.
- Use the DIP Switches to set the T1 Interface (CSU) parameters.
- Use the DIP Switches to set the DS0 (Time Slot) configuration of the T1 link.
- Use the DIP Switches to set the WAN DLCI address.
- Establish management session.
- Set other operating parameters.

## Power On

With all the connections completed, the NetPath 100 is ready to be powered on.

Proceed by holding in the recessed push button switch labeled "NVM RESET / CONFIG" on the unit's rear panel while plugging in the power cord and continue to hold the button for approximately four (4) seconds. This will "clear" the unit's NVM, resetting all the configuration parameters to their default values. After the NVM Reset button is released, the NetPath 100 will go through the power-on sequence as follows:

a. The POWER LED will light immediately and stay on.

b. The READY LED will flash while the unit performs it's self-test (test duration - approximately 45 seconds).

c. The READY LED will be ON steady after successful completion of the self-test.

d. The T1 ALARM and FR MGMT. LEDs should ***not*** be flashing together.

e. All other LED indications should be ignored until configuration has been completed.

If the LED indications are not as described above, refer to section 5 Diagnostics of this manual. If operation looks normal, proceed with DIP Switch Configurations.

**NOTE:** If the Dial Line has not been connected to the NetPath 100 prior to powering the unit on, the unit will issue a Dial Line Failure In-Band Trap to the Trap Manager after it completes its Modem and Dial Line self test.

## DIP Switch Configurations

The "Configuration" DIP Switches are located on the rear panel of the NetPath 100, and appear as shown in Figure 4-1.

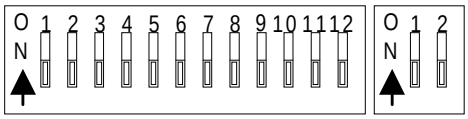



**Figure 4-1 Configuration DIP Switches**

The 12-position DIP Switch on the left selects the specific parameters, while the two-position DIP Switch on the right selects the function.

The functions and their switch positions are shown in Table 4-1.

**Table 4-1 Two-Position DIP Switch Functions**

| Pos. 1 | Pos. 2 | Function |
|---|---|---|
| OFF | OFF | Set WAN Management DLCI address |
| OFF | ON | Set time slots |
| ON | OFF | Set CSU parameters |
| ON | ON | Reserved |

## CSU Parameters

To set the T1 Line configuration and CSU operating mode:

1. Set the two-position DIP Switch - 1 = ON, 2 = OFF.
2. Set the 12-position DIP Switch to select the configuration.
3. Depress the NVM RESET / CONFIG push button for at least one second to enter the parameters in the unit's NVM.

The meaning of the 12-position DIP Switch settings are shown in Figure 4-2 and described as follows:

Switch positions 1 - 2 select the LBO setting from 0 to -22.5 dB.

Switch positions 3 - 4 select the Framing Mode of ANSI, AT&T, or SF.

Switch position 5 selects the coding method B8ZS or AMI.

Switch position 6 selects whether the Tx data input is aligned with the DCE-supplied clock, or the DTE-supplied clock.

Switch position 7 selects Frame Relay or Transparent (Clear Channel) mode.

Switch positions 8 - 12 are reserved for future use and should remain off.

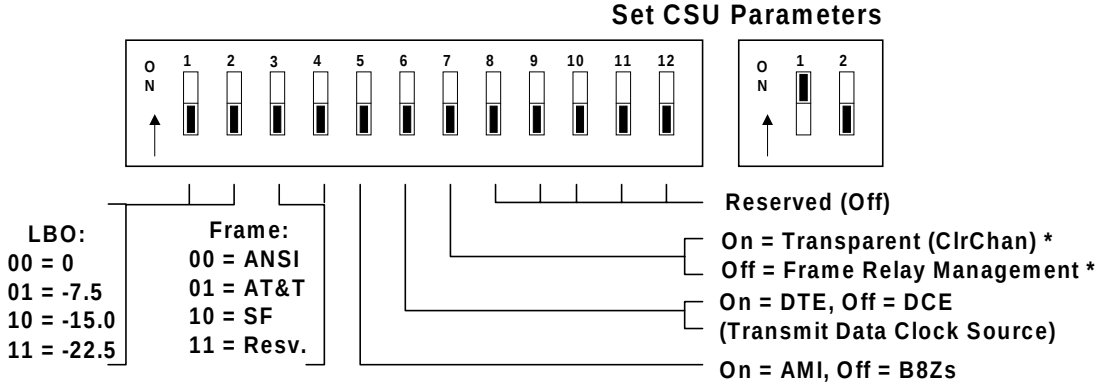



**Figure 4-2 Set CSU Parameters**

## Time Slot Configuration

To set the T1 Time Slot configuration:

1. Set the two-position DIP Switch - 1 = OFF, 2 = ON.
2. Set the 12-position DIP Switch to select the configuration.
3. Depress the NVM RESET / CONFIG push button for at least one second to enter the parameters in the unit's NVM.

The meaning of the 12-position DIP Switch settings are shown in Figure 4-3 and described as follows:

Switch positions 1 - 5 represent (in binary format) the number of time slots used in the T1. FT1 service ranges from 1 to 23 time slots. A value of 0 or any value 24 or above indicates service is full T1.

Switch positions 6 - 10 represent (in binary format) the starting DS0 (1 - 24).

Switch position 11 selects contiguous or alternating DS0s from the starting DS0.

Switch position 12 selects the DS0's data rate, 56 or 64 Kbps.

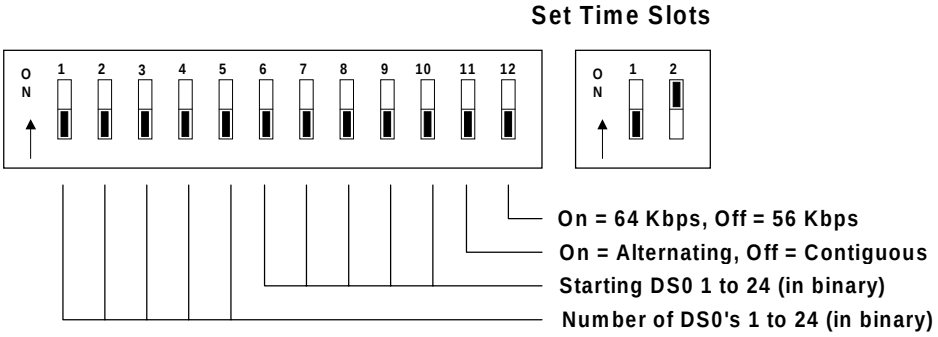



**Figure 4-3 Set T1 Time Slots**

## WAN DLCI Address

To use the in-band WAN Frame Relay Management Channel, the WAN Management DLCI (Frame Relay Management Channel's PVC Address) must be set.

The DIP switch settings are read and stored in the unit's NVM when the recessed push button labeled "NVM RESET / CONFIG" on the unit's rear panel is pressed (unit must have completed its power-on self-test).

The WAN DLCI is stored by entering two settings of the DIP switches as follows:

1. Set the two-position DIP Switch - 1 = OFF, 2 = OFF
2. Set 12-position DIP Switches to either:

   a) All switches OFF to select Dedicated WAN management PVC.
   b) All switches ON to select Tunneled WAN management PVC.
3. Press the NVM RESET / CONFIG push button and hold for at least one second.
4. Set the 12-position DIP Switch to desired DLCI value (see Example Figure 4-4.)
5. Press the NVM RESET / CONFIG push button and hold for at least one second.

**NOTE:** An invalid DLCI value will be ignored (valid values are: 16-991.)

***CAUTION***

***If the WAN DLCI value is changed, the NetPath 100 will perform a system reset after the new value is entered. The system reset will terminate any console session in progress and interrupt data traffic.***

An example DLCI switch setting is shown in Figure 4-4.

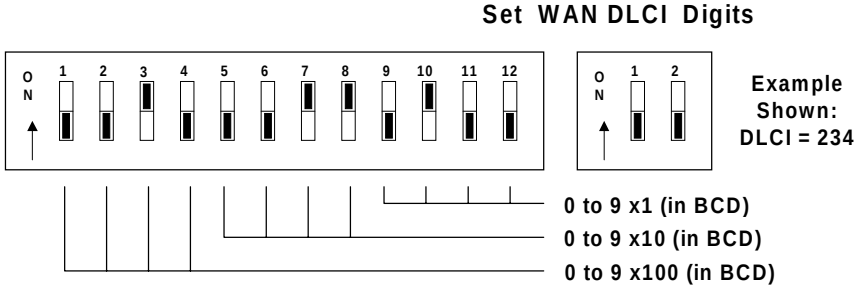



**Figure 4-4 DLCI DIP Switches**

The DLCI is a three-digit decimal number, with each digit represented in binary format (BCD - Binary Coded Decimal) by four DIP switch positions.

The DLCI DIP Switches are set for the desired value using the switch positions shown in Table 4-2 to represent each of the decimal digits.

**Table 4-2 DIP Switch Settings (BCD)**

| Decimal Digit | Switch Positions | | Decimal Digit | Switch Positions |
|---|---|---|---|---|
| 0 | DDDD | | 5 | DUDU |
| 1 | DDDU | | 6 | DUUD |
| 2 | DDUD | | 7 | DUUU |
| 3 | DDUU | | 8 | UDDD |
| 4 | DUDD | | 9 | UDDU |
| **Note:** U (Up) = ON, D (Down) = OFF | | | | |

***CAUTION***

***An unintentional parameter change and possible unit reset could occur if the "NVM RESET / CONFIG" push button is pressed while the unit is operating. To prevent this, set all the DIP Switches to "OFF" after the WAN DLCI, Time Slot and CSU parameters have been entered.***

Proceed to the next section of this manual, Establish Management Session.

## Establish Management Session

The NetPath 100 sends a Startup/Login Prompt when a management connection has been established (via in-band Telnet, dial-in VT-100 console connection or direct connected VT-100 terminal), provided that another management session is not already in use.

### Login

The startup display and prompt are:

```
FrameSaver NP 100 - Frame Relay Service Unit
(C) Copyright Paradyne Corporation 1996-2000.
All Rights Reserved
Base:00.13/09.01.95.05

Please enter your SYSTEM access password:
Please enter your USER access password:
```

Only the User access password prompt will be displayed if System-level password feature is disabled. If enabled, the System access password prompt will be displayed and User access password prompt will only be displayed after entering a valid System Password.

At the User access prompt, enter the Configuration or Supervisor Password followed by ENTER (factory default Configuration Password is “33333333”).

**NOTE:** Only Configuration or Supervisor-level USER Password will allow configuration changes. View level displays all screens but allows no configuration changes or testing; and Test level displays all screens, allows performance of tests, but no configuration changes.

The next prompt asks for your name and phone number:

```
Please enter your USER access password:
Please enter your name and phone #:
```

Enter name and phone number followed by ENTER. If this information is provided, it will be displayed to any other operator attempting to Login while in use, so they may contact you in case they have to gain immediate access.

**NOTES:**

1. Console session will be terminated and must be reinitiated if there are three invalid password attempts, or a timeout resulting from no attempt for one minute.
2. If the unit’s NVM has been cleared since the last successful login, this will be indicated on the Startup screen display as shown below.:

```
FrameSaver NP 100 - Frame Relay Service Unit
(C) Copyright Paradyne Corporation 1996-2000.
All Rights Reserved
Base:00.13/09.01.95.05

System Database Reset to Factory Defaults.

Please enter your USER access password:
```

## Block Mode

NetPath 100 supports Block as well as Character mode management access.

To enable Block mode, set the VT-100 terminal (or emulator) to "LOCAL ECHO." When logging in, along with entering the password, type " \VT100" (include a space between the last character of the password and the "\" character) followed by ENTER.

In this mode, the VT-100 terminal will echo characters to the screen locally and store them, sending the entire string to the NetPath 100 when ENTER is pressed. The NetPath 100 will not echo received characters in this mode. It will process all received characters at once.

## Logout

Logout is automatic on disconnecting the local terminal, terminating a dial-in call, or after a timeout period (approx. 10 mins.) if a Telnet session is broken.

Logout can be done manually by selecting Logout (LO) from the System View Screen.

## Screen Format

The general format for NetPath 100 screen displays is as follows:

**Title** - A screen title is always shown at the top center of each screen.

**Body** - The central portion shows the specific screen details for that screen.

**Command Line -** User commands are always entered at the bottom of the screen marked by the cursor character ">".

**Error or Warning Messages** - Are always shown immediately below the Command Line.

Examples of each of the screen displays are shown in the appropriate sections of this manual.

## Help Text

Help text is provided for each of the NetPath 100 screen displays to assist the user. Help text for a screen is accessed from that screen by entering "?" followed by ENTER. The HELP command is shown on the command line of each applicable screen.

## Edits - Selections

Edits to parameters fields, such as on the configuration screens, are made one field at a time. Each field is edited by entering the character used to designate the field (shown in brackets) on the screen, followed by the equal sign "=" and a selection from a pick-list (a number, an ID, or a string of characters), all followed by ENTER.

Current selections are highlighted on the screens by being bracketed by ">>".....<<" characters.

**NOTE:** Multiple fields may be edited using a single command (except when indicated otherwise) by separating the entries by commas, all followed by ENTER.

This page intentionally left blank.

## Management Command Flow

Figure 4-5 shows the general flow for management access for the basic NetPath 100. It shows each of the screen displays and the general function for that screen.

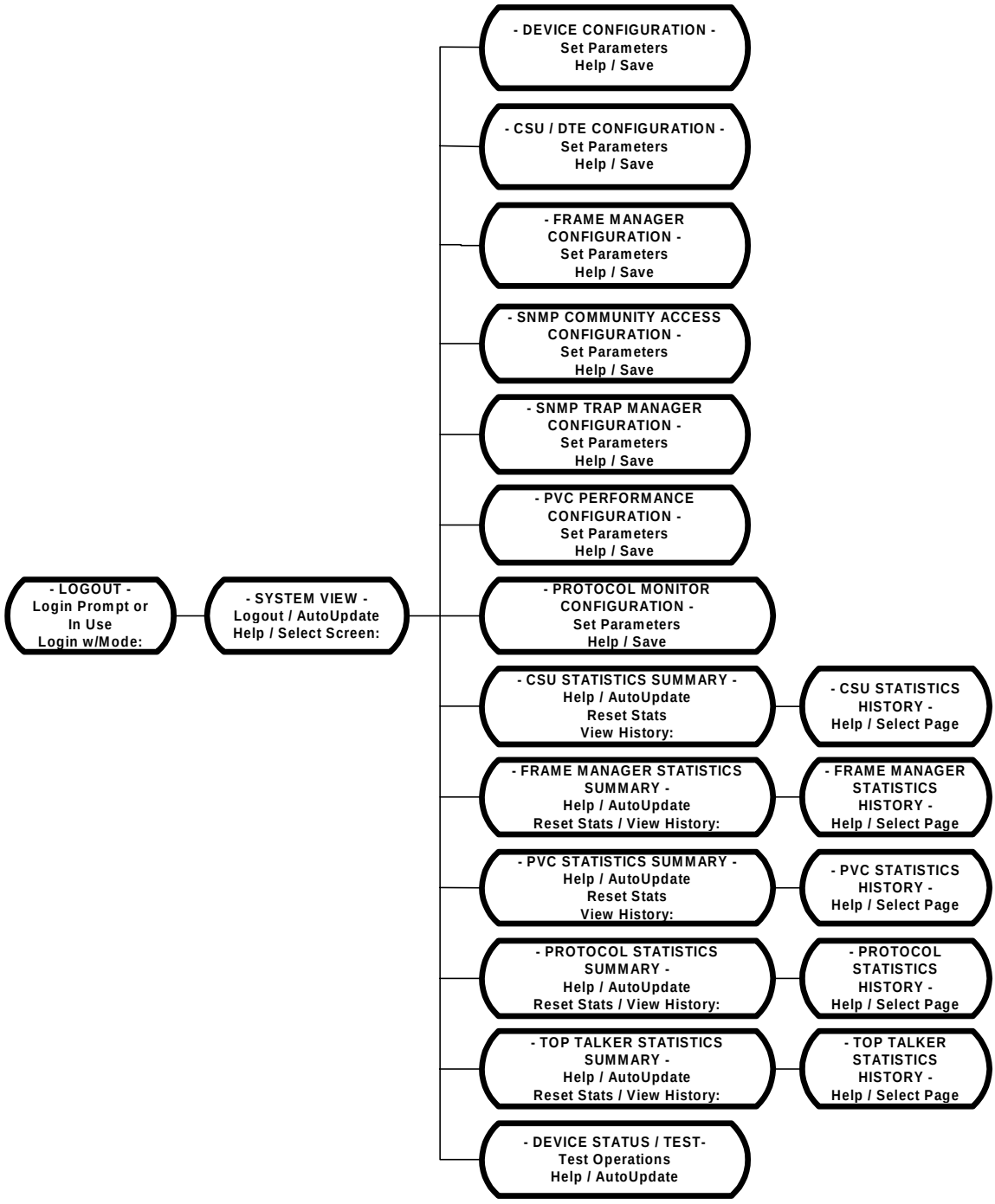



**Figure 4-5 Management Control Flow for Basic NetPath 100**

## Parameter Setting

Upon successful login, the System View screen is displayed.

The System View screen presents an overview of the system and provides access to configuration, test, and other status screens.

The System View screen is shown in Figure 4-6.

```
********************** FrameSaver NP 100 - System View ************************
     Name: F@43802                                          Base S/W: 09.01.95
 Location: Fair Lawn, N.J.                                       S/N: 001812
  Contact: J. Jones

    System                                      High Speed Interface Status
     Test/Fault:                                        DTR: On
                                                        RTS: On
                                                      Power: On
    Modem Status                                  Interface: ITU-V35
          Fault:
     Connection:

    Aux Port Status
     Aux1 DTR: Off
     Aux2 DTR: Off


 DevConfig[DC]   CsuConfig[CC]   FrameConfig[FC]   PvcConfig[PC]   MonConfig[MC]
   DevTest[DT]    CsuStats[CS]    FrameStats[FS]    PvcStats[PS]    MonStats[MS]
SnmpConfig[SC]  TrapConfig[TC]
Help[?]    Logout[LO]    AutoUpdate[AU]             TopStats[TS]
>
```

**Figure 4-6 System View Screen**

The System View screen fields are as follows:

**Name** - Device ID defined in the Unit Configuration.

**Location** - Physical location (city and state) of unit.

**Contact** - Contact person and phone number contained in the Unit Configuration.

**Base S/W** - Software revision number currently operating the unit.
The first two-digit number indicates the unit's feature set, the second indicates the base software revision, and the last indicates minor revision level. An Alpha character at the end of this field indicates the option type installed, if any.

**S/N** - Serial Number of Unit.

**System**

**Test / Fault:** Highest priority Test or Fault causing disruption of the data path. States are:

Improper Aux2 Cable - Improper cable detected at Aux 2 Port. Remove cable and contact Technical Support immediately.

NVM Failure - Unit has detected NVM failure and latest configuration may *not* have been saved. Contact Technical Support immediately.

Additional Tests, CSU and Frame Relay faults are displayed here. See Device Status / Test screen in Section 5 of this manual for details.

**Modem Status** -

**Fault:** Highest priority fault that disrupts modem operation.

**Connection:** Currently active modem assignment.

Valid items are: Base module, AUX 1 Port, AUX 2 Port, Option module or (blank) if none active.

**Aux Port Status** -

**Aux1 DTR:** State of DTR Lead for the interface, ON or OFF.

**Aux2 DTR:** State of DTR Lead for the interface, ON or OFF.

**Aux2 Alm:** (blank).

**NOTE:** Contact Sense feature has been obsoleted.

See "Aux2 Setup" on page 14 of this section of the manual.

**High Speed Interface Status** -

**DTR:** State of DTR lead, when Power is being detected from the DTE. States are: ON, OFF or (blank) if Power OFF.

**RTS:** State of RTS lead, when Power is being detected from the DTE. States are: ON, OFF or (blank) if Power OFF.

**Power:** ON or OFF based on sensing voltage on Tx data lead(s) from the DTE.

**Interface:** Interface adapter cable currently installed.

Types are: ITU-V35, EIA-530, EIA-530-A, ITU-X21-NS or (blank) if none.

### Commands:

**DevConfig [DC]** - Advances to Device Configuration Screen.
**CsuConfig [CC]** - Advances to CSU / DTE Configuration Screen.
**FrameConfig [FC]** - Advances to Frame Manager Configuration Screen.
**PvcConfig [PC]** - Advances to PVC Performance Configuration Screen.
**MonConfig [MC]** - Advances to Protocol Monitor Configuration Screen.
**DevTest [DT]** - Advances to Device Status / Test Screen.
**CsuStats [CS]** - Advances to CSU Statistics Summary Screen.
**FrameStats [FS]** - Advances to Frame Manager Statistics Summary Screen.
**PvcStats [PS]** - Advances to PVC Statistics Summary Screen.
**MonStats [MS]** - Advances to Protocol Monitor Statistics Summary Screen.
**SnmpConfig [SC]** - Advances to SNMP Community Access Configuration Screen.
**TrapConfig [TC]** - Advances to SNMP Trap Manager Configuration Screen.
**TopStats [TS]** - Advances to Top Talker/Conversation Statistics Summary Screen.

**Help [?]** - Advances to "Help" for System View screen.

**Logout [LO]** - Logs out from system.

**AutoUpdate [AU] -** Causes the status fields on the current screen displayed to refresh automatically (approximately every five seconds).

To proceed setting operating parameters, select Device Configuration screen [DC] by typing "DC" followed by ENTER.

## Device Configuration

The Device Configuration screen allows you to view and alter parameters for System and Modem operations.

The Device Configuration screen is shown in Figure 4-7.

```
*************************** Device Configuration ****************************
                                                          Frm Mgr [Z=]
      Name [N=]: F@43802                                 >>1) FrRelay<<
  Location [L=]: Fair Lawn, N.J.                           2) ClrChan
   Contact [C=]: J. Jones
 WAN IP Add [I=]: 0.0.0.0              Payload/CPE IP Add [J=]: 0.0.0.0
      ------ Modem Setup / Model: RC144DPi Rev CA V1.610-CS29F ------
  Dial String [D=]:
 Answer Call [AC=]:
  Aux1 Setup [A1=]: A96N8AT&K0Q1^MATA
  Aux2 Setup [A2=]: A96N8AT&K0Q1^MATA
 (NOTE: Text & IP entries may not be made in combination with other parameters!)

 ModemLine [M=]  RtryCount[R=#]:2  RtryHoldoff[H=#]:30  InactivityLogout[O=#]:15
  1) Test         1 thru 4          1 thru 60 seconds    1 thru 30 minutes
>>2) No Test<<
                  WAN Encap [T=]   MTUSize[W=#]:1492    View Pswrd [P=]:11111111
 P/C Encap [U=]  >>1) Learning<<    88 thru 4000 Octs   Test Pswrd [E=]:22222222
>>1) Raw<<         2) Raw                             Config Pswrd [F=]:33333333
  2) IETF          3) IETF    ---- CHAP Name/Key ---   Super Pswrd [S=]:********
                   4) SNAP    [CN=]:CHAPNAME********  Super Verify [V=]:********
Help[?]  Save[SA]  Cancel[X]  [CK=]:****************  System Pswrd [Y=]:DISABLED
>
```

**Figure 4-7 Device Configuration Screen**

All NetPath 100 screen entries and selections are made by entering the two or three characters shown in brackets next to the field titles, equals "=", then entering the value or string followed by ENTER.

Example: To enter "ABC" in the Name field,

Type: N=ABC and press ENTER

Current selections are highlighted by bracketing with, ">>".....“<<” characters.

### Device Configuration

1. Enter **Name** and **Location** of this NetPath 100 installation (optional but recommended).
2. Enter **Contact** Name and Phone Number of local technical contact (optional).
3. Enter **WAN IP Address** for SNMP management of the NetPath 100. If set to the default value as shown in Figure 4-7, the IP Address will be learned automatically. The first valid IP Address will be "learned". Once a value is entered or learned automatically, it will replace the "0.0.0.0" value and auto learning will be discontinued unless configured for "relearn" mode (see "WAN Mgmt DLCI" on page 4-18 of this section.
4. Enter **Payload** or **CPE (**private user) **IP Address** for PVC management of the NetPath 100.

***CAUTION***

***If either WAN or Payload/CPE Mgmt "IP Address" or "Encap" (see next page) settings are altered, any in-band management session (Telnet) will be terminated after the Save (SA) command is issued, and will have to be reestablished.***

5. **Frame Mgr** - Select "FrRelay" to configure for normal Frame Manager function. Setting the Frame Manager to "ClrChan" causes the unit to operate in the "Transparent" mode. Transparent mode will also disable Frame Relay related monitoring and statistics gathering, and block access to Frame Relay related configuration screens.

***CAUTION***

***If the Frame Manager setting is changed, the NetPath 100 will perform a system reset after the Save [SA] command is issued. The system reset will terminate any console session in progress and interrupt data traffic.***

## Modem Setup

1. **Model:** Displays the model and firmware version of the installed modem.
2. **Dial String** - Enter modem "AT" string with phone number to dial Trap Manager and any other AT codes (if required) for modem initialization. Default is (blank).

   **NOTE:** Each character sequence "^M" within the AT string causes <CR> to be sent followed by a one (1) second delay, making it possible to define multiple command lines.
3. **Answer Call** - Enter modem "AT" string (if required) for modem initialization when answering a call. Default is (blank).
4. **AUX 1 Setup** - Enter modem "header" and "AT" string for modem initialization when answering a call for AUX 1 port. The header consists of the first one to six characters of the string, which specify the operating mode, data rate, parity, and number of data bits for the device connected to the AUX port.
   Choices are:

   Operating Mode - "A" (Answer), "D" (Dial Out), "B" (Bi-Directional)
   Data Rate - "12" (1200), "24" (2400), "48" (4800), "96" (9600), "192" (19200), "288" (28800), "384" (38400), "576" (57600 bps).
   ("Data Rate" is the asynchronous interface rate. Actual modem rate is negotiated upon connection.)
   Parity - "N" (None), "E" (Even), or "O" (Odd)
   Data Bits - "8" (8 data bits), or "7" (7 data bits)

   Default is shown in Figure 4-7: 9600bps, 8 data bits, no parity, no flow control.

**NOTES:**

Operating Mode A or B - On incoming call, modem must establish connection within 60 seconds.

Operating Mode D or B - Raising DTR will assign modem to AUX Port (if not already in-use) within five seconds.

Each character sequence "^M" within the AT string causes <CR> to be sent followed by a one (1) second delay, making it possible to define multiple command lines.

5. **AUX 2 Setup** - Functions the same as AUX 1 above, but without RTS sensing.

   **NOTE:** AUX 2 Contact Sense Alarm feature has been obsoleted. Entering "CS" for the first two characters of the AUX 2 Setup string will cause the "Aux2 Alm" label to be displayed on the System View Screen. However, no Alm status will ever be issued.

6. **Retry Count** - Enter number of times the NetPath 100 will reattempt a connection when dialing out via modem, after the initial attempt has failed.
7. **Retry Holdoff** - Enter the delay time before a dial-out attempt will be retried.
8. **Modem Line** - Select "Test" or "No Test" to enable or disable the automatic dial-tone testing of the dial line (during power-up/reset as well as the 4-hour routine test). Default = No Test.

## Inactivity Logout

Set the console session inactivity (idle) time, which when reached will force a logout.

## Encapsulation

Protocols are encapsulated and carried within each Frame Relay "Frame" and are identified by the NLPID (Network Level Protocol ID). The NLPID may identify a specific protocol such as defined by IETF, or indicate a set of lower level protocols such as SNAP (SubNetwork Access Protocol).

**WAN Encap** - Select the type of IP encapsulation to be used for private network PVC management access. Selections are:

**Learning** - The unit will attempt to learn automatically. Once a value is entered or auto-learned, auto-learning will be discontinued.

**Raw** - No protocol specified. Data (user's payload) is encapsulated only by the frame of the Frame Relay packet.

**IETF** - Protocol will be specified by its own NLPID.

**SNAP** - Protocol will be under the SNAP NLPID.

**P/C Encap** - Select the type of IP encapsulation to be used for management access via the Payload PVC or CPE (private user) PVC. Selections are:

**Raw** - No protocol specified. Data (user's payload) is encapsulated only by the frame of the Frame Relay packet.

**IETF** - Protocol will be specified by its own NLPID.

**MTU Size** - Sets the maximum size (Maximum Transmit Unit) for any IP packet sent by the unit via any management route (dedicated, backup, or PPP dial session.)

**NOTE:** Setting the MTU Size to less than 120 could prohibit the generation of the “Power Loss” trap.

## CHAP

Challenge Handshake Authentication Protocol used for access verification when the unit attempts to establish a PPP session to report Out-of-Band Traps.

**NOTE:** For enhanced network security, it is highly recommended that the terminal server designated to receive these calls be configured to limit network access to Trap Reporting only.

**CHAP Name** - Name identifier for the response returned by the unit. Factory Default = “CHAPNAME”

**CHAP Key** - Key identifier used as the common secret for any CHAP challenge. When (blank), the CHAP feature is disabled (default).

**NOTE:** Password and CHAP fields will only be displayed if logged in as Supervisor.

## Passwords

1. **View Pswrd** - “View Only” access password. Factory Default = “11111111.”
2. **Test Pswrd** - “Test” and “View” access password. Factory Default = “22222222.”
3. **Config Pswrd** - “Configuration,” “Test” and “View” access password. Factory Default = “33333333.”
4. **Super Pswrd** - “Supervisory” access password (unlimited access, including ability to change all passwords).
5. **Super Verify** - Supervisor password must be re-entered here if the Supervisor Password is changed.
6. **System Pswrd** - Provides an additional layer of password access protection prior to the standard Login prompt. Feature is not active when set to “DISABLED.”

### Commands:

**Help [?]** - Advances to “Help” for System Configuration screen.

**Save [SA]** - Saves parameters and display returns to System View screen.

**Cancel [X]** - Changes made (if any) are not saved and display returns to System View screen.

Save the System Configuration changes when they are all set correctly by entering “SA” followed by ENTER. This will also return the user to the System View screen.

Proceed to CSU / DTE Configuration, selecting [CC] by typing “CC” followed by ENTER.

## CSU / DTE Configuration

The CSU / DTE Configuration screen allows you to view and alter parameters for the CSU and DTE interface operations.

The CSU / DTE Configuration screen is shown in Figure 4-8.

```
*************************** CSU / DTE Configuration ***************************
     Name: F@43802

                            T1 ID [I=]: NONAME


       Data Rate: 1344 kbs                 Build Out [B=]    T1 Framing [T=]
                                          >>1) T1-0<<       >>1) ANSI<<
     Number of DS0's [N=]: 24               2) T1-7           2) AT&T
        Starting DS0 [S=]: 1                3) T1-15          3) SF
         1 thru 24                          4) T1-22

  DS0 Pattern [P=]     DS0 Format [F=]      Ones Dens [D=]    DTE TxD Clk [C=]
 >>1) Contiguous<<    >>1) Nx56 kbs<<      >>1) B8ZS<<       >>1) DCE<<
   2) Alternate         2) Nx64 kbs          2) AMI            2) DTE

  Link Err Thres [L=#]: Disabled
   X to Disable or 1 thru 895 seconds



Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 4-8 CSU / DTE Configuration Screen**

1. **T1 ID** - Enter an ID for this T1.
2. **Data Rate** - Displays the data rate which results from the settings for “Number of DS0’s” and “DS0 Format.”
3. **Number of DS0’s**, **Starting DS0**, and **DS0 Pattern** - Select which DS0s will be used to form the data payload.
4. **DS0 Format** - Select data rate for all DS0s in the payload.
5. **Build Out -** Selects the Line Build-Out value for the T1 line connection.
6. **Ones Dens** - Selects the Ones Density format to be used.
7. **T1 Framing** - Selects T1 Framing format to be used.

   **NOTE:** ANSI or AT&T are ESF format, SF includes D4.
8. **DTE TxD Clk** - Configure the DTE to clock in the Tx data based on either the DCE (NP 100) supplied clock, or the DTE (cable loop or router) supplied clock.
9. **Link Err Thres** - Disables or sets the threshold of Rx Errored Seconds plus Unavailable Seconds which when reached or exceeded will cause an alarm to be declared.

**Commands:**

**Help [?]** - Advances to “Help” for CSU / DTE Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

Save the CSU / DTE Configuration changes when they are all set correctly by entering “SA” followed by ENTER. This will also return the user to the System View screen.

Proceed to Frame Manager Configuration, selecting [FC] by typing “FC” followed by ENTER.

## Frame Manager Configuration

The Frame Manager Configuration screen allows you to view and alter parameters for Frame Manager operations.

The Frame Manager Configuration screen is shown in Figure 4-9.

```
************************* Frame Manager Configuration ************************
     Name: F@43802
                                                 LMI Protocol [P=]
   WAN Mgmt DLCI [D=#,T#orD#]: Disabled           1) None        3) "LMI"
   P/C Mgmt DLCI [E=P#orC#]: Disabled           >>2) ANSI"D" <<  4) ITU"A"
    X to Disable or 16 thru 991
   ------------ Network ------------       -------------- User --------------
   T391/Status Enq Rate [S1=#]: 10          T392/Status Enq Timeout [S2=#]: 15
    5 thru 30 seconds                        5 thru 30 seconds
   N392/Event Err Thres [T1=#]: 3           N392/Event Error Thres [T2=#]: 3
       N393/Event Count [C1=#]: 4                 N393/Event Count [C2=#]: 4
        1 thru 10                                  1 thru 10
   N391/Full Status Freq [F1=#]: 6          Force Full Status Response [F2=]
    1 thru 255                             >>1) Disable<<
                                             2) Enable
   PVC BECN/FECN Thres [B=#]: Disabled
    X to Disable or 1 thru 895 seconds

   Link Err Thres [L1=#]: Disabled          Link Err Thres [L2=#]: Disabled
    X to Disable or 1 thru 895 seconds       X to Disable or 1 thru 895 seconds

Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 4-9 Frame Manager Configuration Screen**

### Configure Frame Manager

1. **WAN Mgmt DLCI** - Displays current DLCI value of the private network PVC or Tunneled PVC for WAN management of the NetPath 100, as stored in the unit's non-volatile memory (NVM). This value may be entered using the unit's rear panel DLCI DIP Switches, or entered from this screen. Enter the DLCI number only, for private network PVC. Preface the DLCI number with "T" for tunneled PVC. Preface the DLCI number with "D" to have the WAN Mgmt IP Address relearned each time the PVC returns to an "active" condition.
2. **P/C Mgmt DLCI** - Sets or disables the direction and PVC for Payload/CPE management access to the NetPath 100. The first letter (P or C) determines which direction, and the remainder indicates the DLCI value.

**NOTE:** The P/C Mgmt DLCI value must NOT be the same as WAN Mgmt DLCI.

***CAUTION***

***If either WAN or P/C Mgmt DLCI value is changed, the NetPath 100 will perform a system reset after the Save [SA] command is issued. The system reset will terminate any console session in progress and interrupt data traffic.***

3. **LMI Protocol** - Displays and allows the selection of the LMI protocol used. If set to "None," LMI traffic (if any) to or from the Network will be passed through the NetPath unaffected, and the unit's LMI alarms and status will be cleared.

4. **Network** (DTE) - Consists of the settings required for the various protocols. These include T391, N392, N393 and N391.

   **T391/Status Enquiry Rate** - Interval in seconds between the LMI Status Enquiries issued by the NetPath 100 to the Network (Frame Switch).

   The ratio of N392 to N393 defines the rate of Bad/No LMI responses to Count of events, beyond which the Network link is declared Out-of-Service. This ratio is set by selecting values (1 to 10) for each of these parameters, defined as follows:

   **N392/Event Error Threshold** - Number of Bad/No responses to LMI Status Enquiries issued by NetPath 100.
   **N393/Event Count -** Count of all monitored requests (to be used for the ratio).

   **N391/Full Status Frequency** - The Frequency Number "***n***" will cause every "$n^{th}$" LMI Status Enquiry issued to be a Full LMI Status Enquiry.

   **PVC BECN/FECN Threshold** - NetPath 100 maintains a count of seconds during which a receive frame contained a BECN or FECN bit set. When number of seconds containing BECN or FECN bits for any PVC in the most recent interval equals or exceeds this Threshold Setting, an alarm is declared.

5. **User** (DCE) - Consists of the settings required for the various protocols. These include T392, N392 and N393.

   **T392/Status Enquiry Timeout** - Timeout interval in seconds while waiting for an LMI Status Enquiry from the User equipment.

   The ratio of N392 to N393 defines the rate of Bad/No LMI inquiries to Count of events, beyond which the User link is declared Out-of-Service. This ratio is set by selecting the values (1 to 10) for each of these parameters, defined as follows:
   **N392/Event Error Threshold** - Number of Bad/No inquiries for LMI Status Enquiries issued by the User equipment.
   **N393/Event Count -** Count of all monitored inquiries (to be used for the ratio).

   **Force Full Status Response** - Enable causes the NetPath 100 to send four consecutive Full LMI Enquiry Messages toward the Network upon detecting a recovery of its T1 link (or ISDN link if so optioned and active). Upon receiving a Full Response it forwards that to the DTE, regardless of that enquiry type. In some cases this will speed recovery from a link outage. Disable causes the NetPath 100 to follow normal conventions per the N391 parameter.

6. **Link Err Threshold** - Disable or set the threshold of Data Frame Error Seconds which when reached or exceeded causes an alarm to be declared. Set independently for Network and User sides.

### Commands:

**Help [?]** - Advances to "Help" for Frame Manager Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

Save the Frame Manager Configuration changes when they are all set correctly by entering "SA" followed by ENTER. Also returns the user to the System View screen.

Proceed to SNMP Community Access Configuration, selecting [SC] by typing "SC" followed by ENTER.

## SNMP Community Access Configuration

The SNMP Community Access Configuration screen allows you to view and alter parameters for SNMP community access operations.

The SNMP Community Access Configuration screen is shown in Figure 4-10.

```
********************** SNMP Community Access Configuration ********************
     Name: F@43802

           Community #1 Name [C1=]: public
           Community #2 Name [C2=]:
           Community #3 Name [C3=]:
           Community #4 Name [C4=]:
           Community #5 Name [C5=]:
           Community #6 Name [C6=]:

    Comm #1 Access [A1=]      Comm #2 Access [A2=]      Comm #3 Access [A3=]
     1) Read Only              1) Read Only              1) Read Only
   >>2) Read/Write<<         >>2) Read/Write<<         >>2) Read/Write<<
     3) None                   3) None                   3) None

    Comm #4 Access [A4=]      Comm #5 Access [A5=]      Comm #6 Access [A6=]
     1) Read Only              1) Read Only              1) Read Only
   >>2) Read/Write<<         >>2) Read/Write<<         >>2) Read/Write<<
     3) None                   3) None                   3) None

NOTE: Each Name entry must be made individually.
Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 4-10 SNMP Community Access Configuration Screen**

1. **Community # *n* (1-6) Name** - Community names to which the unit belongs. These commands [C*n*] must be entered individually, not with other fields.
2. **Comm # *n* (1-6) Access** - Setting for Read/Write access in each of the communities.

**NOTE:** Settings may only be changed after login with Supervisor password.

Default values for these settings are as shown in Figure 4-10.

### Commands:

**Help [?]** - Advances to “Help” for SNMP Community Access Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

Save the SNMP Community Configuration changes when they are all set correctly by entering “SA” followed by ENTER. Also returns the user to the System View screen.

Proceed to Trap Configuration, selecting [TC] by typing “TC” followed by ENTER.

This page intentionally left blank.

## SNMP Trap Manager Configuration

The SNMP Trap Manager Configuration screen allows you to view and alter parameters for the SNMP Trap Manager operations.

The SNMP Trap Manager Configuration screen is shown in Figure 4-11.

```
********************** SNMP Trap Manager Configuration ***********************
     Name: F@43802
Mgr ------ IP Address ----- ---------------- Name ---------------- ---- Path ---
 #1 [T1=]:0.0.0.0           [N1=]:                                 [P1=WorP]:WAN
 #2 [T2=]:0.0.0.0           [N2=]:                                 [P2=WorP]:WAN
 #3 [T3=]:0.0.0.0           [N3=]:                                 [P3=WorP]:WAN
 #4 [T4=]:0.0.0.0           [N4=]:                                 [P4=WorP]:P/C
 #5 [T5=]:0.0.0.0           [N5=]:                                 [P5=WorP]:P/C
 #6 [T6=]:0.0.0.0           [N6=]:                                 [P6=WorP]:P/C
    NOTE: Each Name & IP entry must be made individually.

  Disable Traps [B=] ([B=m,n,...r] and/or [B=m-n] for multiple disables)
>> 1)Authen Fail<<     7)Netw Thresh      13)ContactSense    19)ISDN Backup
   2)CSU LineFail      8)User Thresh      14)BECN/FECN       20)ISDN Demand
   3)CSU Thresh        9)DTR Loss         15)IsdnAdptFail    21)PVCDrpdThres
   4)CSU Failure      10)DtePowerLoss     16)IsdnLineFail    22)PVCDlvdThres
   5)LMI NetwFail     11)Modem Fail       17)PVCDly Thresh   23)PVCAvailable
   6)LMI UserFail     12)DialLineFail     18)Login Fail      24)PVCUnavail

         Clear Holdoff [H=#]: 5          Terminate Delay [D=#]: 45
          1 thru 15 minutes               1 thru 120 seconds
Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 4-11 SNMP Trap Manager Configuration Screen**

Occurrences of any Traps (unless disabled), will be sent to all Trap Managers defined, including Traps sent Out-of-Band (dial-out) using the NetPath 100 internal modem. Out-of-Band Traps, however, will only be sent provided the modem is not already in use when the trap occurs.

1. **Mgr # *n* (1-6)** - Parameters to be selected for each Trap Manager are as follows: Each Trap Manager defined will be sent a copy of each Trap (alarm) that occurs.

***CAUTION***

***The Loss-of-Power (cry-for-help) Trap will only be sent to the First Trap Manager defined. This Trap Manager should be defined with a WAN or Payload IP Address to ensure receipt of this trap. A CPE IP Address defined Trap Manager will probably not receive this Trap, due to this message passing through other CPE equipment affected by the loss-of-power.***

**IP Add** - Sets the IP Address for each Trap Manager designated to receive Traps.
**Name** - 32-character string that identifies the Trap Manager.
**Path** - Selects WAN (W) or Payload/CPE (P) as the management path for sending traps to the corresponding Trap Manager.

***CAUTION***

***Trap Manager addresses must be unique across both WAN and P/C Networks. Out-of-band traps are sent to all trap managers assigned to one of the two paths. The AC power loss trap is sent to the first trap manager in the list with a valid IP address.***

2. **Disable Traps** - Selects Traps to be disabled. Can be selected individually, or in groups. Selected (disabled) items are bracketed by ">>".....“<<” characters as shown in item #1 on the example screen above.

3. **Clear Holdoff** - Sets the number of minutes that a trap condition must remain clear, before it is declared clear.

4. **Terminate Delay** - Sets the time a Dial-Out connection will remain in place after the last Out-of-Band Trap was sent, to permit exchange of additional PDUs (Protocol Data Units).

### Commands:

**Help [?]** - Advances to “Help” for SNMP Community Access Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

Save the SNMP Trap Manager Configuration changes when they are all set correctly by entering “SA” followed by ENTER. This will also return the user to the System View screen.

Proceed to PVC Configuration, selecting [PC] by typing “PC” followed by ENTER.

## PVC Performance Configuration

The PVC Performance Configuration Screen allows you to view and alter parameters for Network Performance measurement operations on a per PVC basis.

The PVC Performance Configuration Screen is shown in Figure 4-12.

```
************************ PVC Performance Configuration ************************
     Name: F@43802
                                Page [P=#]: 1 of 6
 Desired Delay Mon Rate [R=#]: 10            Drpd Mon Pkt Thres [L=#]: Disabled
  X to Disable or 1 thru 240 Seconds          X to Disable or 1 thru 895 pkts
 Min Pkts for Delay Alarm [C=#]: 10          PVC Delay Thres [T=#]: Disabled
  3 thru 895 pkts                             X to Disable or 10 thru 9000 mSecs
 Desired Loss Mon Rate [S=#]: 60             PVC Dlvd Pkt Thres [G=#]: Disabled
  X to Disable or 60 thru 240 Seconds         X to Disable or 10 thru 99 %
 "LMI" CIR Values [V=]                       Interval Period [I=#]: 15
>>1) Use<<                                    1 to 15 minutes
  2) Ignore
       CIR Bins [B=#,#,#,#,#,#]: 25,35,50,71,100,141     (1 thru 200 %)

  Auto: TxCIR[A1=#]:0    RxCIR[A2=#]:0     Mon [AM=None,Dlay,Loss,orBoth]: None
Manual: TxCIR[M1=#]:0    RxCIR[M2=#]:0     Mon [MM=None,Dlay,Loss,orBoth]: Dlay
         0 thru 1536 Kbs
AddPVC [A=#]  DeletePVC [D=#] ([A=m,n,...r) and/or [A=m-n] for multiple entries)
 PVC,TxCR,RxCR,Mon   PVC,TxCR,RxCR,Mon   PVC,TxCR,RxCR,Mon   PVC,TxCR,RxCR,Mon


Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 4-12 PVC Performance Configuration Screen**

1. **Desired Delay Mon Rate** - Setting for the rate at which a Delay measurement packet is injected on each PVC in the list specified at the bottom of this screen. Default value (10) dictates that within each 10-second period, every PVC on the list is measured once. A PVC's packet is considered lost if it does not return before a subsequent packet is injected on that PVC. The packet send rate cannot exceed 10 per second.

   **NOTE:** NetPath 100 Delay measurement packets are 36 bytes in length, when issued. A NetPath looping (receiving and returning) a Delay measurement packet will add two additional bytes to the packet.

2. **Min Pkts for Delay Alarm** - Setting for the number of packets that must be received within the current interval on a PVC before the "PVC Delay Thres" average is considered a valid check for that PVC. If the number is not reached within the interval, that PVC cannot cause the alarm condition to be declared or maintained, based on the average of the packets received.

3. **Desired Loss Mon Rate** - Setting for the rate at which a Loss measurement packet (Packet-Counting packet) is injected on each PVC in the list specified at the bottom of this screen. Default value (60) dictates that within each 60-second period, every PVC in the list is measured once. A PVC's packet is considered lost if it does not return before a subsequent packet is injected on that PVC. On a per-PVC basis, the originating unit delays 10 seconds if the previous response was lost. The packet send rate cannot exceed 10 per second.

   **NOTE:** NetPath 100 Loss packets are 42 bytes in length, when issued. A NetPath looping (receiving and returning) a Loss packet will add two additional bytes to the packet.

4. **Drpd Mon Pkt Thres** - NetPath 100 maintains a count of monitor packets lost (both Delay and Loss packets) for the current interval for each PVC. When either of the monitor packet counts on any PVC equals or exceeds this threshold setting, a "PVC Drpd Mon Alarm" is declared. The alarm is cleared when all PVCs in a subsequent interval fail to equal or exceed the threshold value. Applies to auto and manually learned DLCIs.

5. **PVC Delay Thres** - NetPath 100 maintains an average delay measurement for each PVC for the current interval. A "PVC Delay Alarm" is declared when the average on any PVC equals or exceeds this setting. The alarm is cleared when all PVCs in a subsequent interval fail to equal or exceed the threshold value. Applies to auto and manually learned DLCIs.

6. **PVC Dlvd Pkt Thres** - A "PVC Dlvd Pkt Alarm" is declared when the percentage of packets delivered on any monitored PVC falls below this threshold setting. The alarm is cleared when all PVCs in a subsequent interval fail to fall below the threshold value. Applies to auto and manually learned DLCIs.

7. **Interval Period** - Sets the time period for each interval of PVC statistics, from one (1) to 15 minutes.

   **NOTE:** Changing the interval period will cause all PVC and Protocol Monitoring statistics to be cleared.

8. **"LMI" CIR Values** - Selecting "Use," sets (automatically) the CIR value of each PVC to the value reported by the Frame Switch LMI message.

   **NOTE:** This feature operates only with "LMI" LMI Protocol selected.

9. **CIR Bins** - Sets the upper value (in %) for each of the six "bins" in which CIR data will be collected. All six values must be entered with each setting.

10. **Auto** & **Manual** - Specifies the Tx and Rx CIR value and Mon (monitoring packet(s)) type to be used when PVCs are added to the statistics list. Valid CIR values are 0 through 1536, default value is zero.

    **Auto** - When a non-configured PVC is detected, the indicated settings are used until reconfigured by an operator, learned from the LMI, or the PVC is unlearned (via reset or software purge).

    **Manual** - For PVCs manually added (using the AddPVC command), the parameters will be as specified here.

    **Mon** - Selects the Monitor setting for PVCs added automatically and manually. Defaults are None for Auto, and Delay for Manual.

    **Dlay** = Delay packets only.

    **Loss** = Loss packets only.

    **Both** = Delay and Loss packets.

    **None** = Neither packet types will be sent.

11. **Add PVC** - Inserts one or more additional DLCIs onto the list to be monitored.
12. **Delete PVC** - Removes one or more DLCIs from the list.

**PVC,TxCR,RxCR,Mon** - Heading under which the DLCIs and parameters are listed (in numerical order) for all PVCs to be included for continuous background performance measurement. Up to a maximum of 270 DLCIs may be listed.

**NOTE:** Additional pages displaying the DLCIs are accessed using the [P=] command as shown on the top of the screen.

### Commands:

**Help [?]** - Advances to “Help” for PVC Performance Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

Save the PVC Performance Configuration changes when they are all set correctly by entering “SA” followed by ENTER. This will also return the user to the System View screen.

Proceed to Protocol Monitor Configuration, selecting [MC] by typing “MC” followed by ENTER.

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## Protocol Monitor Configuration

The Protocol Monitor Configuration Screen allows you to view and alter parameters for Protocol Monitor operations.

The Protocol Monitor Configuration Screen is shown in Figure 4-13.

```
********************** Protocol Monitor Configuration **********************
     Name: F@43802
               Percentage of Sorting Resources Required:  37.93 %

   Protocols [P=] ([P=m,n,...r] and/or [P=m-n] for up to 7 selections)
  >> 1) IP<<                >>11) APPLETALK(SNAP)<<     21) DECNET(Raw)
     2) IP/TCP              >>12) DECNET(SNAP)<<        22) VINES(Raw)
     3) IP/TCP/TELNET         13) VINES(SNAP)           23) XNS(Raw)
     4) IP/TCP/FTP            14) XNS(SNAP)             24) IP/TCP/HTTP
     5) IP/UDP                15) ISO CLNP(IETF)        25) IP/TCP/GOPHER
     6) IP/UDP/SNMP           16) IP/ICMP
  >> 7) IPX(SNAP)<<           17) IP/TCP/SMTP
     8) IPX/SPX(SNAP)         18) IPX(Raw)
  >> 9) NETBIOS(SNAP)<<       19) IPX/SPX/(Raw)
  >>10) SNA(SNAP)<<           20) APPLETALK(Raw)

              Top Statistics [T=]           Rank Top Stats By [R=]
             >>1) Conversation<<           >>1) Octets<<
               2) Talk/Listen                2) Packets
               3) Disable

Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 4-13 Protocol Monitor Configuration Screen**

1. **Percentage of Sorting Resources Required** - Displays the percentage of sorting logic needed to support the currently displayed Protocol selections.

2. **Protocols** - Selects up to seven protocols to be monitored, from the protocol list displayed. All protocols to be monitored must be entered with a single command. Can be selected individually, in a range, or group. Selected items are bracketed by ">>".....“<<” characters as shown in item #1 on the example screen above. Enter “P=” followed by nothing or a space to deselect all (factory default). Parenthesis indicate the subset under which a protocol is grouped, such as SNAP (Refer to “Encapsulation” on page 4-14 in this manual for details).

**NOTE:** Additional protocols will not be added if the current value for Percentage of Sorting Resources Required exceeds 100%. The command will be rejected when the “Save” command is issued, and an error message will be displayed on the screen.

3. **Top Statistics** - Selection determines whether the Top IP Traffic collection will be based on the top User "Talker" and "Listener," or the top "Conversation" Pair in each direction.

   Top Talker/Listeners are determined by separately tracking, in the send and receive direction, the IP address and the total traffic of the most prolific transmitters and receivers of IP traffic within the measurement interval.

   Top Conversation Pairs are determined by separately tracking, in send and receive direction, IP address pairs of each host/client conversation and the total traffic sent by each pair during the measurement interval.

   Both Top Conversation Pair and Talker/Listener are calculated across the aggregate link regardless of the PVC on which the traffic occurred.

4. **Rank Top Stats By** - Selection determines whether the Top IP Traffic collection will be ranked by IP traffic with the highest Packet counts or IP traffic with the highest Octet counts.

**Commands:**

**Help [?]** - Advances to "Help" for PVC Performance Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

Save the Protocol Monitor Configuration changes when they are all set correctly by entering "SA" followed by ENTER. Also returns the user to the System View screen.

## Configuration Completed

The basic NetPath 100 initial configuration is now completed.

If the unit is not optionally equipped, such as with an ISDN Adapter, or the option feature will not be used at this time, then proceed to the next section of this manual, Test Installation.

If the NetPath 100 is equipped with an option module, proceed to Section 6, "Options," of this manual for installation and configuration instructions for that option.

# Test Installation

The final step of the NetPath 100 installation is to verify operations. This is done through the Network Control Center (NCC).

1. Contact the Network Control Center and inform the Operator that the physical installation and initial configuration are completed.
2. The NCC will establish a management session to the NetPath 100 and complete any final/additional configuration, and review the system's status screens to verify operation.

**NOTE:** To enable NCC management access, the local console session must be logged out, and if the NCC is attempting a dial-in connection, the local terminal must also be disconnected from the AUX 2 port.

If this installation is configured for Out-Of-Band Trap Reporting, a test of this feature should also be performed. This is done by initiating a Network communications failure which causes the NetPath 100 to issue a Trap Report to the Trap Manager. This test must be coordinated with the NCC Operator to verify that the Trap Report is received and that Network communications are restored after the test.

3. Coordinate the initiation of this test with the NCC Operator, and when told to do so, disconnect the T1 Line from the NetPath 100. The NetPath 100 will dial-out to issue a Trap Report after approximately five (5) seconds. This can be seen on the front panel by the "MODEM IN USE" LED going steady ON. After the "MODEM IN USE" LED goes OFF, reconnect the T1 Line and confirm with the NCC Operator that the Trap Report has been received, and that good communications have been reestablished with the NetPath 100.

**NOTE:** If the NCC management session (Step # 2) was established via dial-in, this must be terminated before the NetPath 100 can use the Modem to issue the Trap Report.

This dial-out Trap Report test is highly recommended because it adds a greater level of confidence to the completion of the installation process. This test verifies all of the following, in addition to the normal operation of the NetPath 100:

- Dial Line is operational and a call can be made (not inadvertently blocked).
- Trap Manager phone number is correct.
- IP Address is correct.
- Trap Manager Address and Community are correct.

The installation and initial testing are now complete. If any results were other than those described, refer to Section 5, "Diagnostics" of this manual for assistance.

# 5 Diagnostics

This section contains general diagnostic information for basic NetPath 100. Refer to Section 6, “Options” of this manual for additional diagnostic information regarding optional features such as the ISDN Adapter.

NetPath 100 diagnostic features include; Front Panel LED Indicators, BER Testing, Statistic gathering and reporting, and Alarm reporting.

## LED Indicators

Front panel indicators are shown in Figure 5-1 and described in Table 5-1.


**Figure 5-1 NetPath 100 Front Panel View (Basic)**

**Table 5-1 NetPath 100 Front Panel Indicators**

| Nomenclature | Description | Function |
|---|---|---|
| POWER | Green LED | ON indicates unit is receiving proper operating voltages. |
| READY | Green LED | Steady ON, indicates base unit has successfully passed its internal self-test.<br>FLASHING, indicates the unit is performing the self-test.<br>OFF after self-test (test time approx. 45 sec.), indicates a hardware failure was detected during the self-test. |
| T1 ALARM | Red LED | Steady ON, indicates WAN facility (T1 loop) is not receiving properly framed T1 data or is detecting red, blue, or yellow alarm conditions.<br>FLASHING *simultaneously* with FR MGMT. LED, indicates software download* in process. |
| HS PORT TxD | Green LED | ON, indicates High Speed data is being Received from local DTE (Router). |
| HS PORT RxD | Green LED | ON, indicates High Speed data is being Sent to local DTE (Router). |
| FR MGMT. | Green LED | ON momentarily whenever a message is received on the Management Channel PVC.<br>FLASHING *simultaneously* with T1 ALARM LED, indicates software download* in process. |
| MODEM IN USE | Green LED | Steady ON, indicates the modem is connected to a port.<br>FLASHING, indicates ringing is incoming on the Dial Line, or the modem is dialing out.<br>OFF, indicates on-hook. |
| * See Software Download at the end of this section for description. | | |

# Testing

NetPath 100 provides management access diagnostic test support.

## Diagnostic Test Support

NetPath 100 responds to and can issue T1 loopback codes, set operator-initiated loopbacks, source BER Tests directed toward the T1 circuit or toward the DTE, and source Frame Relay Test Packets toward the T1 circuit.

A block diagram of the test paths within the unit are shown in Figure 5-2.

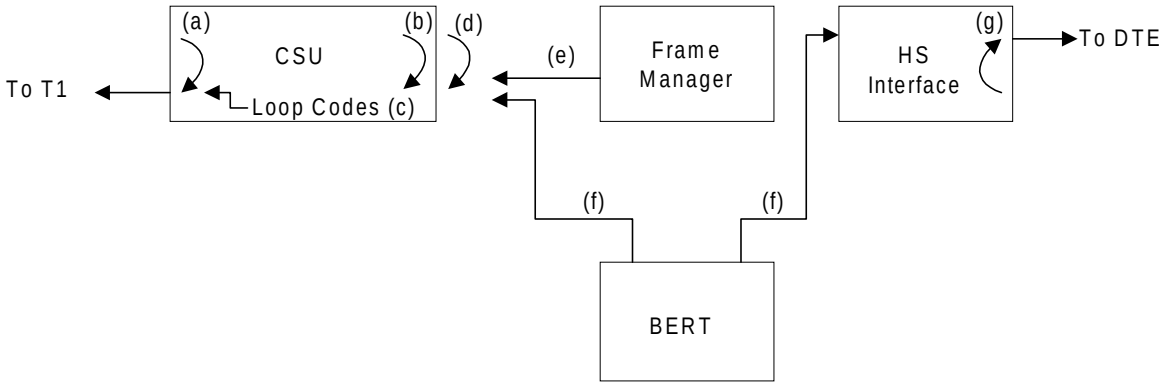


**Figure 5-2 Diagnostic Test Paths**

The arrows indicate the direction of the loopbacks and direction of the sourced test.

Loops and sources are as follows:

a. CSU loop in response to telco-initiated loop code, or operator command.

b. Payload loop in response to telco-initiated loop code, or operator command.

c. Line and Payload Loop codes directed toward the T1.

d. V.54 loop in response to telco-initiated code.

e. Frame Relay Test Packets directed toward the T1 circuit by operator commands issued through management session. Results are updated every five seconds and displayed on the Device Status / Test screen.

f. BER Test directed toward the T1 circuit or DTE by operator commands issued through management session. BER results are updated every five seconds and displayed on the Device Status / Test screen.

g. DTE loop by operator command.

All tests are initiated from the Device Status / Test screen.

The Device Status / Test screen is accessed from the System View screen, selecting [DT] by typing “DT” followed by ENTER.

## Device Status / Test

The Device Status / Test screen provides base module status and access to system tests.

The Device Status / Test screen is shown in Figure 5-2.

```
***************************** Device Status / Test *****************************
     Name: F@43802
     CSU Fault:                                  T1 ID: NONAME
 Netw Set Loop:
        Test Mode [T=]
         1) Clear                          Frame Mgr Fault: LMI Netw Failure
         2) Line Lp to Netw
         3) Payld Lp to Netw                   High Speed Interface
         4) Send LoopUp                               DTR: On
         5) Send LoopDn                               RTS: On
       >>6) QRSS to Netw<<                           Power: On
         7) Alt Ones to Netw                   Interface: ITU-V35
         8) 2047 Payld to Netw
         9) 2047 Payld to User
        10) Loop to User
        11) Test Pkts to Netw

BERT: Blocks Sent:   ,   ,      Block Errors:   ,   ,     BlkErr Rate: 0.00E+00
      Test Duration: 00:00:00

ResetTest[RT]    InjectErr[IE secs]    RebootExt[RE secs]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 5-3 Device Status / Test Screen**

**CSU Fault**, **Netw Set Loop**, **Frame Mgr Fault** - Display (blank) or the highest priority Fault or Network Loop causing a disruption of the data path.

Refer to the Appendix in this manual for a list and description of fault and loop displays.

**Test Mode** - Allows selection of the following mutually exclusive test modes:

**Clear** - Terminates operator or Telco-initiated Loopbacks, BERT, and Test Packet tests.

**Line Lp to Netw** - Sets a Line Loopback at the T1 interface toward the Network.

**Payld Lp to Netw** - Sets a Payload Loopback in the CSU toward the Network.

**Send LoopUp** - Sends a T1 Line Loopback code toward the Network.

**Send LoopDn** - Sends a T1 Remove Line Loopback code toward the Network.

**BER Testing:**

BER patterns which can be directed toward the Network (T1 facility) include QRSS, Alt Ones or 2047 Payload. 2047 Payload can also be directed toward the User (DTE - high-speed port) Only one BER test may be active at a time. The results are a count of the number of Blocks Sent, Blocks Errored, Block Error Rate and the duration of the test, displayed as shown on the example screen above. When the BERT duration reaches the maximum count of 99:59:59, all counts freeze until cleared or reset by the operator (the BERT data however, continues to be sent).

**Loop to User** - Sets a DTE Loopback at the Data Port toward the User.

**Test Pkts to Netw** - Sends Link Test Packets (40 -1590 octets) toward the network (T1 Facility). Displayed test results include selected DLCI, packets sent, packets dropped, percent received, octets sent, test duration and; average and maximum delay (network and full delay), for each network.

**NOTES:**

1. PVC tests will prompt for the input of a PVC DLCI destination.
2. This test's delay values may not correlate to values displayed on the PVC Statistics Screens because the Link Test Packet size (40 - 1590 octets) is larger than the Delay measurement packet (36 octets).
3. Delay and Loss measurement packets (for ALL PVCs) are halted, while a "Test Pkts to Netw" test is performed. This will also effect the Delay and Loss packet counts and measurement fields on the PVC Statistics Screens.
4. Initiating certain test options, when management access is via the T1 link, will terminate management.These tests will be blocked and an Error Message displayed on the screen. Examples of this are "BERT to Netw" and "Test Pkts to Netw" where the DLCI selection matches the management DLCI of this unit.

**High Speed Interface Status** -

**DTR:** State of DTR lead, when Power is being detected from the DTE.
States are: ON, OFF or (blank) if Power OFF.

**RTS:** State of RTS lead, when Power is being detected from the DTE.
States are: ON, OFF or (blank) if Power OFF.

**Power:** ON or OFF based on sensing voltage on Tx data lead(s) from the DTE.

**Interface:** Interface adapter cable currently installed.
Types are: ITU-V35, EIA-530, EIA-530-A, ITU-X21-NS or (blank) if none.

**Commands:**

**ResetTest [RT]** - Resets BERT or PVC result counters without disrupting the test operation and refreshes all dynamic information contained on the screen.

**InjectErr [IE secs]** - Injects a single bit error into the BERT stream. When issued without the “secs,” a single bit error will be injected at execution of this command. When issued with a “secs” value between 1 - 255, a single bit error will be injected once a second for the number of “secs” entered (user can issue other commands while this takes place in background).

**RebootExt [RE secs]** - Used with optional external Power Control Unit (PCU) to interrupt AC Power to the DTE device (force reboot of device). When issued with a “secs” parameter, power will remain off for the specified length of time (1 - 300 seconds). When issued as “RE” only, PCU output power will be interrupted for five seconds at the execution of this command.

**Help [?]** - Advances to “Help” for PVC Performance Configuration screen.

**Close [X]** - Returns to System View screen.

**AutoUpdate [AU]** - Provides automatic screen update and refresh (every five seconds) of all status and Test (when active) results. No changes can be made while in this mode, and the bottom lines on the screen are replaced as shown in Figure 5-4. AutoUpdate is exited by pressing ENTER.

```
--->  Screen updates every 5 seconds  <---
--->  Press Enter for Command Prompt  <---
```

**Figure 5-4 Auto Update Screen Change**

## Statistics

NetPath 100 provides current and historical performance statistics for the following:

- CSU interface
- CSU and Frame Relay Traffic (in summary and on a per-PVC basis)
- PVC, Protocol, and Top IP Traffic statistics

CSU and Frame Manager statistics are accumulated in 15-minute intervals for the last 24 hours. PVC and Protocol monitoring statistics are accumulated in user-defined intervals (1 - 15 minutes).

## CSU Statistics Summary

The CSU Statistics Summary screen provides summary performance information and access to detailed performance history displays.

The CSU Statistics Summary screen is accessed from the System View screen, selecting [CS] by typing “CS” followed by ENTER.

The CSU Statistics Summary screen is shown in Figure 5-5.

```
*************************** CSU Statistics Summary ****************************
     Name: F@43802

    System                                    High Speed Interface Status
     Test/Fault:                                      DTR: On
                                                      RTS: On
                                                    Power: On
         T1 ID: NONAME
                                     Current          24Hr Total
         Interval Count              419 secs           96 valid
                                    Rx      Tx         Rx      Tx
         Error Free Sec(%)         100     100        100     100
         Availability(%)           100     100        100     100
         Bipolar Violations          0                  0

      ------------ RX ------------ -TEST/(*=Bkp)- ------------ TX ------------
         ES   SES   UAS   BES  LOFC                   ES   SES   UAS   BES   CSS
Curr:   600   600   600   600   600              /    600   600   600   600   600
24Hr: 65000 65000   900   900   900 NetwSetLine /* 65000   900   900   900   900

ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 5-5 CSU Statistics Summary Screen**

**System Test / Fault:** Displays (blank) or the highest priority Test or Fault causing disruption of the data path.

Refer to the Appendix in this manual for a list and description of all fault displays.

**High Speed Interface Status** -
**DTR:**State of DTR lead, when Power is being detected from the DTE.
States are: ON, OFF or (blank) if Power OFF.
**RTS:**State of RTS lead, when Power is being detected from the DTE.

States are: ON, OFF or (blank) if Power OFF.
**Power:** ON or OFF based on sensing voltage on Tx data lead(s) from the DTE.

**T1 ID** - T1 ID in unit's configuration.

**Interval Count:**

**Current -** Displays the number of seconds that have elapsed in the current 15-minute interval.

**24Hr Total** - Displays the number of 15-minute intervals that have been accumulated since the last reset of the counters (max. of 96).

Totals for the following performance parameters are displayed for the Current interval and the 24Hr Total (Rx and Tx are displayed in ANSI mode).

**Error Free Sec (%)** - Available seconds in interval minus ES, divided by available seconds (or 1 if zero) in interval, expressed in percent.

**Availability (%)** - Total seconds in interval minus UAS, divided by total seconds in interval, expressed in percent.

**Bipolar Violations** - Total number of bi-polar violations detected in interval to a maximum of 65535.

**Rx** and **Tx** (headings): Totals for the following performance parameters are displayed for the Current interval and the 24Hr Total.

**NOTE:** AT&T and SF Framing settings display only **Rx** parameters.

**ES:** Errored Seconds
SF Framing - Count of seconds with one or more Frame errors OR one or more Bi-polar Violations.
ESF Framing - Count of seconds with one or more Frame errors OR one or more CRC6 errors.

**SES:** Severely Errored Seconds - Count of seconds with 320 or more CRC6 errors OR one or more Out-of- Frame events.

**UAS:** UnAvailable Seconds - Count of seconds Out-of-Frame.

**BES:** Bursty Errored Seconds - Count of Errored Seconds during which the error rate was greater than 1 but less than 320.

**LOFC:** Loss of Frame Count - Count of Out-of-Frame events.

**CSS:** Controlled Slip Seconds - Count of seconds with one or more occurrences of a replication or deletion of a DS1 frame by the receiving terminal.

**Test/(*=Bkp):**

Test - Displays the last Telco or operator-activated test (if any) that was active during the interval.

/(*=Bkp) - Field is only displayed if the unit is optioned with an ISDN Adapter module. The character "*" in this field indicates the aggregate link was out of service at some point during the interval due to tests (or backup).

Additional commands on this screen are:

**ResetStats [RS]** - Clears all counters (including 24 hour history).

**ViewHistory [VH** current_time (optional)] - Advances to Page 1 of the CSU Statistics History screen.

The "current_time" optional parameter causes the history interval count to reflect the actual time-of-day rather than a simple count of intervals. The entry is in 24-hour format, using three or four digits. Example: 1445 = 2:45 PM.

## CSU Statistics History

The CSU Statistics History screen displays all performance parameters for the CSU for each of the 96 possible, 15-minute intervals.

The first history screen (1 of up to 6) is accessed by selecting ViewHistory [VH] from the CSU Statistics Summary screen.

The first page of the CSU History screen is shown in Figure 5-6.

```
*************************** CSU Statistics History ***************************
     Name: F@43802
Page [P=#]: 1 of 6               T1 ID: NONAME
   Past  ----------- RX ------------ -TEST/(*=Bkp)- ----------- TX ------------
   Int.    ES    SES    UAS    BES   LOFC                   ES    SES    UAS    BES    CSS
     1      0      0    900      0      0               /    0      0      0      0      0
     2      0      0    900      0      0               /    0      0      0      0      0
     3      0      0    900      0      0               /    0      0      0      0      0
     4      0      0    900      0      0               /    0      0      0      0      0
     5      0      0    900      0      0               /    0      0      0      0      0
     6      0      0    900      0      0 NetwSetLine /*    0      0      0      0      0
     7      0      0    900      0      0               /    0      0      0      0      0
     8      0      0    900      0      0               /    0      0      0      0      0
     9      0      0    900      0      0               /    0      0      0      0      0
    10      0      0    900      0      0               /    0      0      0      0      0
    11      0      0    900      0      0               /    0      0      0      0      0
    12      0      0    900      0      0               /    0      0      0      0      0
    13      0      0    900      0      0               /    0      0      0      0      0
    14      0      0    900      0      0               /    0      0      0      0      0
    15      0      0    900      0      0               /    0      0      0      0      0
    16      0      0    900      0      0               /    0      0      0      0      0
Help[?]    Close[X]
>
```

**Figure 5-6 CSU Statistics History Screen**

**Page [P=]** - Selects the desired History page.

**Rx**, **Tx** and **Test/(*=Bkp)** statistics are as described for the previous screen (CSU Statistics Summary).

Interval “1” shows the statistics for the most recently *completed* interval of the previous 24 hours.

The interval can be displayed as time-of-day rather than a simple count of intervals by including the “current_time” parameter with the command to enter this screen, as described on the previous page of this manual.

## Frame Manager Statistics Summary

The Frame Manager Statistics Summary screen provides summary performance information and access to detailed performance history displays for general Frame Relay Traffic.

The Frame Manager Statistics Summary screen is accessed from the System View screen, selecting [FS] by typing “FS” followed by ENTER.

The Frame Manager Statistics Summary screen is shown in Figure 5-7.

```
********************** Frame Manager Statistics Summary **********************
     Name: F@43802


    System                                      High Speed Interface Status
     Test/Fault:                                        DTR: On
                                                        RTS: On
                                                      Power: On


                       Current Interval Count: 455 secs
                       24 Hour Interval Count: 96 Valid

                     ---- Network ----      ----- User ------
                     LTO    LFE   DFES      LTO    LFE   DFES
           Current     0      0      0        0      0      0
           24 Hour     0      0      0        0      0      0



ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 5-7 Frame Manager Statistics Summary Screen**

**System Test / Fault:** Displays (blank) or the highest priority Test or Fault causing disruption of the data path.

Refer to the Appendix in this manual for a list and description of all fault displays.

**High Speed Interface Status** -
**DTR:**State of DTR lead, when Power is being detected from the DTE.
States are: ON, OFF or (blank) if Power OFF.
**RTS:**State of RTS lead, when Power is being detected from the DTE.
States are: ON, OFF or (blank) if Power OFF.
**Power:** ON or OFF based on sensing voltage on Tx data lead(s) from the DTE

**Current Interval Count: -** Displays the number of seconds that have elapsed in the current 15-minute interval.

**24Hr Interval Count:** - Displays the number of 15-minute intervals that have been accumulated since the last reset of the counters (max. of 96).

**Network** and **User** (headings):

**Network** - Statistics representing traffic received from the frame switch.

**User** - Statistics representing traffic received from the DTE (router).

The Frame Relay traffic parameters displayed for Network and User are:

**LTO:** LMI Timeouts - Count of LMI timeouts detected for the interval.

**LFE:** LMI Frame Errors - Count of LMI Frame Errors detected for the interval.

**DFES:** Data Frame Errored Seconds - Count of seconds during which the unit's Frame Manager detects an Errored data frame.

**NOTE:** When the "LMI Protocol" is set to "None," the values for LTO and LFE will be (blank).

**Current** - Displays the total count for each of the performance parameters within the current 15-minute interval.

**24 Hour** - Displays the total counts for each of the performance parameters over all valid history intervals (does not include current interval).

Additional commands on this screen are:

**ResetStats [RS]** - Clears all counters (including 24 hour history).

**ViewHistory [VH** current_time (optional)] - Advances to Page 1 of the Frame Manager Statistics History screen.

The "current_time" optional parameter causes the history interval count to reflect the actual time-of-day rather than a simple count of intervals. The entry is in 24-hour format, using three or four digits. Example: 1445 = 2:45 PM.

## Frame Manager Statistics History

The Frame Manager Statistics History screen displays all performance parameters for the Frame Manager for each of the 96 possible, 15-minute intervals.

The first history screen (1 of up to 6) is accessed by selecting ViewHistory [VH] from the Frame Manager Statistics Summary screen.

The first page of the Frame Manager History screen is shown in Figure 5-8.

```
********************** Frame Manager Statistics History **********************
     Name: F@43802
                              Page [P=#]: 1 of 6
               Past   ---- Network ----      ----- User -----
               Int.   LTO    LFE   DFES      LTO    LFE   DFES
                 1     0      0      0        0      0     0
                 2     0      0      0        0      0     0
                 3     0      0      0        0      0     0
                 4     0      0      0        0      0     0
                 5     0      0      0        0      0     0
                 6     0      0      0        0      0     0
                 7     0      0      0        0      0     0
                 8     0      0      0        0      0     0
                 9     0      0      0        0      0     0
                10     0      0      0        0      0     0
                11     0      0      0        0      0     0
                12     0      0      0        0      0     0
                13     0      0      0        0      0     0
                14     0      0      0        0      0     0
                15     0      0      0        0      0     0
                16     0      0      0        0      0     0
Help[?]    Close[X]
>
```

**Figure 5-8 Frame Manager Statistics History Screen**

**Page [P=]** - Selects the desired History page.

**Network** and **User** statistics are as described for the previous screen (Frame Manager Statistics Summary).

Interval “1” shows the statistics for the most recently *completed* interval of the previous 24 hours.

The interval can be displayed as time-of-day rather than a simple count of intervals by including the “current_time” parameter with the command to enter this screen, as described on the previous page of this manual.

## PVC Statistics Summary

The PVC Statistics Summary screen provides summary performance information and access to detailed performance history displays for the Frame Relay Traffic on a per-PVC basis.

The PVC Statistics Summary screen is accessed from the System View screen, selecting [PS] by typing "PS" followed by ENTER.

The PVC Statistics Summary screen, in Packet Mode, is shown in Figure 5-9.

```
*************************** PVC Statistics Summary ***************************
     Name: F243802                      Mode[M=P,O,TC,RC,TL,RL,FD,orND]:Pkt
  (P=Pkt,O=Oct,TC=TxCir,RC=RxCir,TL=TxLoss,RL=RxLoss,FD=FullDlay,orND=NetwDlay)
First DLCI [P=#]: 16    Current Interval Count: 455 of 900 secs     Delay(mS)
   DLCI   RxPkts    TxPkts      BECN      FECN      RxDE      TxDE   Avg  Max
    25         0         0         0         0         0         0    55   70
    33         0         0         0         0         0         0    55   70
   234         0         0         0         0         0         0    55   70
   341         0         0         0         0         0         0    55   70
   464         0         0         0         0         0         0    55   70
   531         0         0         0         0         0         0    55   70
   793         0         0         0         0         0         0    55   70
   795         0         0         0         0         0         0    55   70
   942         0         0         0         0         0         0    55   70
   Etc         0         0         0         0         0         0
   Sum         0         0         0         0         0         0
-- 15 Min Interval History: 96 Valid -- Past Summary for DLCI [D=#orSum]: Sum --
                 RxPkts     TxPkts       BECN       FECN       RxDE       TxDE
  10 Second:          0          0          0          0          0          0
    History:          0          0          0          0          0          0
ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    NextPage[+]    AutoUpdate[AU]
>
```

**Figure 5-9 PVC Statistics Summary Screen (Packet Mode)**

**Mode [M=]** - Selects one of the listed options for displaying information.

**First DLCI** - Defines the lowest number DLCI to be displayed on the screen.

**Current Interval Count** - Displays "n" of "m" seconds, where "n" indicates the number of elapsed seconds in the current interval, and "m" indicates the total number of seconds per interval (set on the PVC Performance Configuration Screen). Current interval statistics are total counts for each parameter within the current interval.

**NOTES:** **Rx** - Indicates traffic received from the Frame Relay Network.
**Tx** - Indicates traffic sent toward the Frame Relay Network.

**HUB DLCI** - Tx statistics (Pkts, Octs, etc...) for a "Hub DLCI" will always be 0 (zero). This applies to a unit configured as a Tunneled Management Hub.

## Packet Mode

The Frame Relay traffic parameters displayed for each DLCI are:

**DLCI** - The DLCI to which this line of statistics applies. “Etc” is the summation of all unlisted DLCIs and “Sum” is the summation of all DLCIs.

**RxPkts** & **TxPkts** - Count of packets received (Rx) and of packets sent (Tx).

**NOTE:** Measurement Packets (Delay, Loss and Link Test) are included in the RxPkts and TxPkts counts of the NetPath originating the packets. Measurement Packets are included *only* in the RxPkts count of a NetPath looping (receiving and returning) Measurement Packets.

**BECN** & **FECN** - Count of packets with the BECN or FECN bit set, up to 65,535.

**RxDE** & **TxDE** - Count of packets received (Rx) with the DE bit set and count of packets sent (Tx) with the DE bit set, up to 65,535 (*does not* include time Measurement Packets).

**Delay (mS) Avg** & **Max** - Average and Maximum delay of Delay measurement Packets received back from a distant NetPath unit. These values are overwritten with 9999 during an interval where PVC “Drpd Mon Pkt Alarm” has been detected for that specific PVC. These values are set to “0” (zero) for PVCs not designated for the sending of Delay monitor packets. These values will freeze (not update) and Delay and Loss measurement packets (for ALL PVCs) are halted, while a “Test Pkts to Netw” test is performed.

PVCs are displayed and added as follows:

WAN Management PVC and PVCs added to the PVC List (on the PVC Performance Configuration Screen, up to a total of 270) are always displayed. Additional PVCs are included in the “Etc” PVC, which is also always displayed.

With LMI Protocol set to “None”-

A PVC will be added to the display if data is received from the network on that PVC and it is not on the PVC List, and there are less than 270 PVCs already displayed. It will be included in the “Etc” PVC if 270 PVCs are already displayed. If data is transmitted *to* the network on a PVC that is not on the PVC List, it is included in the “Etc” PVC.

With LMI Protocol *not* set to “None”-

A PVC will be added to the display if it is reported in a Full LMI Status Report from the network and it is not on the PVC List, and there are less than 270 PVCs already displayed. It will be included in the “Etc” PVC if 270 PVCs are already displayed. A PVC will also be included in the “Etc” PVC, if data is received or transmitted on that PVC and it is not on the PVC List and is not reported in a Full LMI Status Report.

***n* Minute Interval History** - Displays the number of valid intervals that have been accumulated since the last reset of the counters. ("n" value is Interval Period set on the PVC Performance Configuration screen.) History statistics are total counts for each performance parameter over all valid intervals up to 96 intervals.

**Past Summary for DLCI [D=#orSum]** - Determines what part of statistics history will be used to produce the 10-second and History statistics displays. Choices are:

Specific PVC - Enter DLCI number (#) or "Etc," for that PVC.

Sum of all PVCs - Enter Sum (or only "S").

Frame Relay traffic parameters displayed are the same as for Current Interval above.

**10 Second:** - Counts for each of the performance parameters for the selected PVC(s) accumulated during the first 10-second period after entering this screen.

**NOTE:** This count will update every 10 seconds only if AutoUpdate [AU] is activated.

**History:** - Total counts for each of the performance parameters for the selected PVC(s) over all valid intervals up to a maximum of 96 intervals. Does not include current interval.

Additional Commands on this screen are:

**Next Page [+]** - Advances to the next page of summary statistics until all DLCIs (up to 270) have been displayed.

## Octet Mode

The Octet Mode screen display is shown in Figure 5-10.

```
************************** PVC Statistics Summary **************************
     Name: F243802                      Mode[M=P,O,TC,RC,TL,RL,FD,orND]:Oct
  (P=Pkt,O=Oct,TC=TxCir,RC=RxCir,TL=TxLoss,RL=RxLoss,FD=FullDlay,orND=NetwDlay)
First DLCI [P=#]: 16    Current Interval Count: 455 of 900 secs
   DLCI   RxPkts    TxPkts     RxOcts     TxOcts   RxKbps   TxKbps
    25         0         0          0          0        0        0
    33         0         0          0          0        0        0
   234         0         0          0          0        0        0
   341         0         0          0          0        0        0
   464         0         0          0          0        0        0
   531         0         0          0          0        0        0
   793         0         0          0          0        0        0
   795         0         0          0          0        0        0
   942         0         0          0          0        0        0
   970         0         0          0          0        0        0
   Etc         0         0          0          0        0        0
   Sum         0         0          0          0        0        0
-- 15 Min Interval History: 96 Valid -- Past Summary for DLCI [D=#orSum]: Sum --
                RxPkts     TxPkts      RxOcts      TxOcts  RxKbps  TxKbps
  10 Second:         0         21           0         567       0       0
    History:         0      24965           0      674055       0       1
ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    NextPage[+]    AutoUpdate[AU]
>
```

**Figure 5-10 PVC Statistics Summary Screen (Octet Mode)**

Octet Mode replaces some columns with the following additional statistics:

**RxOcts and TxOcts -** Count of octets within packets.

**RxKbps and TxKbps -** Data rate calculated from the total count of octets counted for the particular PVC.

## TxCir & RxCir Modes

The TxCir Mode screen display is shown in Figure 5-11.

```
************************** PVC Statistics Summary ***************************
     Name: F243802                      Mode[M=P,O,TC,RC,TL,RL,FD,orND]:TxCir
  (P=Pkt,O=Oct,TC=TxCir,RC=RxCir,TL=TxLoss,RL=RxLoss,FD=FullDlay,orND=NetwDlay)
First DLCI[P=#]: 16   Current Interval Count: 455 of 900 secs            CIR
   DLCI  |  0  |1-25 | -35 | -50 | -71 | -100| -141| >141%(ofCIR)  UAS   Kbps
    25    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
    33    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   234    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   341    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   464    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   531    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   793    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   795    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   942    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
   Etc
   Sum    100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)
-- 15 Min Interval History: 96 Valid -- Past Summary for DLCI [D=#orSum]:  25 --
         |  0  |1-25 | -35 | -50 | -71 | -100| -141| >141%(ofCIR)  UAS   Kbps
10 Secs:  100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
History:  100.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0%(ofTime)   0      0
ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    NextPage[+]    AutoUpdate[AU]
>
```

**Figure 5-11 PVC Statistics Summary Screen (TxCIR & RxCIR Mode)**

**TxCIR** and **RxCIR** Modes - Display the Tx or Rx traffic level for each PVC based on the time spent at each range of CIR.

**xxx% (of CIR)**, column headings - Indicate the range of values assigned on the PVC Performance Configuration Screen to each of the “Bins” (columns). In the example shown above, the CIR ranges for the eight Bins are:

| 0 | 1 - 25 | 26 - 35 | 36 - 50 | 51 - 71 | 72 - 100 | 101 - 141 | > 141 |

**xxx% (of Time) -** Indicates the percentage of available seconds during which the traffic level for this PVC was within this Bin’s CIR range.

**UAS** - UnAvailable Seconds determined by LMI reporting that the PVC is not fully active or while Netw LMI Failure exists.
(UAS counts are not maintained for the NetPath’s WAN Management PVC.)

**CIR Kbps -** Current CIR value being used for percent of usage calculations (binning), for each PVC listed.

## TxLoss & RxLoss Modes

TxLoss Mode screen display is shown in Figure 5-12.

```
*************************** PVC Statistics Summary ***************************
     Name: F243802                      Mode[M=P,O,TC,RC,TL,RL,FD,orND]:TxLoss
  (P=Pkt,O=Oct,TC=TxCir,RC=RxCir,TL=TxLoss,RL=RxLoss,FD=FullDlay,orND=NetwDlay)
First DLCI[P=#]: 16   Current Interval Count: 455 of 900 secs
   DLCI      NonDEPkts/-DEPkts-/Sta        NonDEPkts/-DEPkts-/Sta    %Dlvd
    25 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
        NNI-1:       0/       0/      NNI-2:       0/       0/
    33 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   234 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   341 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   464 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   531 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   793 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   795 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   942 Origin:       0/       0/Rst  Destin:       0/       0/     100.000
   Sum
-- 15 Min Interval History: 96 Valid -- Past Summary for DLCI [D=#orSum]:  25 --
    NonDEPkts/--DEPkts--      NNI-1      NNI-2  NonDEPkts/--DEPkts--/Sta   %Dlvd
LstP:       0/         0          0          0          0/         0/    100.000
H:          0/         0          0          0          0/         0/    100.000
ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    NextPage[+]    AutoUpdate[AU]
>
```

**Figure 5-12 PVC Statistics Summary Screen (TxLoss & RxLoss Mode)**

**TxLoss** Mode - Displays Loss measurement packet data for each PVC based on Loss packets originating from this NetPath.

**RxLoss** Mode - Displays Loss measurement packet data for each PVC based on Loss packets originating from a distant NetPath.

**NonDEPkts/DEPkts** - Counts of packets (with and without DE flags) which have passed through the indicated segment.

**Sta** - Status for the indicated device. One of the following will appear:
(blank) - Indicates normal status.
Drpd - The number of Dropped Loss measurement Packets has exceeded the threshold for this PVC. (TxLoss mode only.)
Rst - Resync was executed at some time during the interval.

**Origin & Destin** - The Origin counts and status from the device where the traffic is entering the network. Destination values are derived from where the traffic leaves the network.

**NNI-1 -** Values are from the first NNI encountered after the Origin.

**NNI-2 -** Values are from the second NNI encountered after the Origin.

**% Dlvd** - Percentage of sent packets delivered to the far end (NonDEPkts plus DEPkts).

**LstP** - Counts (as above) for the Last Loss measurement packet received.

**H** - Counts (as above) for the accumulated history.

**NOTE:** Sending of Delay and Loss measurement packets is suspended for ALL PVCs while a “Test Pkts to Netw” (operator initiated) test is performed on any PVC.

## FullDlay & NetwDlay Modes

Full Delay screen display is shown in Figure 5-13.

```
************************** PVC Statistics Summary **************************
Name: F243802                          Mode[M=P,O,TC,RC,TL,RL,FD,orND]:FullDlay
  (P=Pkt,O=Oct,TC=TxCir,RC=RxCir,TL=TxLoss,RL=RxLoss,FD=FullDlay,orND=NetwDlay)
First DLCI[P=#]: 16   Current Interval Count: 455 of 900 secs
   DLCI          1stN:Avg  Max  MidN:Avg  Max  LstN:Avg  Max  Total:Avg  Max
    25  Delay(mS):      15   20        20   25        20   25         55   70
    33  Delay(mS):      15   20        20   25        20   25         55   70
   234  Delay(mS):      15   20        20   25        20   25         55   70
   341  Delay(mS):      15   20        20   25        20   25         55   70
   464  Delay(mS):      15   20        20   25        20   25         55   70
   531  Delay(mS):      15   20        20   25        20   25         55   70
   793  Delay(mS):      15   20        20   25        20   25         55   70
   795  Delay(mS):      15   20        20   25        20   25         55   70
   942  Delay(mS):      15   20        20   25        20   25         55   70
   Etc
   Sum
-- 15 Min Interval History: 96 Valid -- Past Summary for DLCI [D=#orSum]:  25 --
                    1stN:---       MidN:---       LstN:---      Total:---
 LstPkt:  Delay(mS):      55             55             55             55
History:
ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    NextPage[+]    AutoUpdate[AU]
>
```

**Figure 5-13 PVC Statistics Summary Screen (FullDlay & NetwDlay Mode)**

FullDlay and NetwDlay Modes - Display the round-trip network delay for each PVC based on Delay measurement packets received back from a distant NetPath. Applies only to PVCs configured for Delay packet measurement.

**Full Delay -** Delay compiled from ALL Delay packets received.

**Network Delay -** Delay compiled using only Delay packets which did not encounter congestion as they passed through the elements of the network (based on there being sufficient flags between packets).

**1stN, MidN,** & **LstN** - Average and Maximum delay for each Network (up to three) through which the Delay packets passed.

**Total: Avg & Max** - Average and Maximum delay for the Total round-trip of the Network through which the Delay packets passed.

**LastPkt** - Delay based on the last Delay measurement packet received.

**History** - Field unused in this mode

**NOTE:** Sending of Delay and Loss measurement packets is suspended for ALL PVCs while a "Test Pkts to Netw" (operator initiated) test is performed on any PVC.

Additional commands on these screen are:

**ResetStats [RS]** - Clears all counters (including 24-hour history).

**ViewHistory [VH** current_time (optional)] - Advances to Page 1 of the PVC Statistics History screen.

The "current_time" optional parameter causes the history interval count to reflect the actual time-of-day rather than a simple count of intervals. The entry is in 24-hour format, using three or four digits. Example: 1445 = 2:45 PM

## PVC Statistics History

The PVC Statistics History screen displays all performance parameters for the Frame Relay Traffic on a per-PVC and per-interval basis for each of the 96 possible intervals.

The first history screen is accessed by selecting ViewHistory [VH] from the PVC Statistics Summary screen.

The first page of the PVC History screen is shown in Figure 5-14.

The first page begins with Interval # 1.

```
*************************** PVC Statistics History ***************************
     Name: F@43802                    Mode[M=P,O,TC,RC,TL,RL,FD,orND]:Pkt
 FirstDLCI[L=#]:16       (Pkt,Oct,TxCir,RxCir,TxLoss,RxLoss,FullDlay,orNetwDlay)
 Past     FirstInterval[F=#]: 2 of 96    DLCI[D=#,All,orSum]:All       Delay(mS)
 Int. DLCI    RxPkts     TxPkts       BECN       FECN       RxDE       TxDE    Avg  Max
  2    25          0          0          0          0          0          0     55   70
      234          0          0          0          0          0          0     55   70
  3    25          0          0          0          0          0          0     55   70
       33          0          0          0          0          0          0     55   70
      234          0          0          0          0          0          0     55   70
  4    25          0          0          0          0          0          0     55   70
       33          0          0          0          0          0          0     55   70
      234          0          0          0          0          0          0     55   70
  5    25          0          0          0          0          0          0     55   70
       33          0          0          0          0          0          0     55   70
      234          0          0          0          0          0          0     55   70
  6    25          0          0          0          0          0          0     55   70
       33          0          0          0          0          0          0     55   70
      234          0          0          0          0          0          0     55   70


Help[?]    Close[X]    NextPage[+]
>
```

**Figure 5-14 PVC Statistics History Screen**

**Mode [M=]** - Selects one of the displayed modes (refer to the PVC Statistics Summary Screens for detailed descriptions). Display fields will correspond to the mode selected.

**First DLCI** - Defines the lowest number DLCI to be displayed on the screen.

**First Interval [F**=#] - Selects the first interval number of the possible 96, to begin the display of data. The data lines (16 lines per screen) will be filled by as many subsequent intervals as can fit without placing only part of their DLCIs on the screen. The selection defaults to 1 when first entering the History screen.

**DLCI [D=#,All,or Sum]** - selects the PVC(s) for which the historical statistics will be produced. Choices are:

Specific PVC or "Etc"- Enter DLCI number for the desired PVC (or "Etc"). Provides a display of the activity for the selected DLCI beginning with the selected interval. If an interval contains no activity, a single line with DLCI number and all other values = "0" is displayed.

All PVCs - Enter All (or only "A"). Displays a listing by intervals providing an individual line of statistics for each DLCI found within that interval. Within the interval, the DLCIs are listed in numerical DLCI order, with the interval number (count) placed only on the first line of statistics for that DLCI. If an interval contains no activity, a single line with DLCI = "Etc" and all other counts = "0" is displayed.

Sum - Enter Sum (or only "S"). Provides one line of statistics for each interval, containing the sum of all PVC counts within the interval. The Average and Maximum time measurement values are set to "0" (zero). The DLCI value is displayed as "Sum."

Additional commands on this screen are:

**Next Page [+]** - Advances to the next page of historical statistics until all intervals (up to 96) have been displayed.

## Protocol Monitor Statistics Summary

The Protocol Monitor Statistics Summary screen displays summary performance information and provides access to detailed performance information for the Frame Relay Traffic for each protocol specified.

The Protocol Monitor Statistics Summary screen is accessed from the System View screen, selecting [MS] by typing “MS” followed by ENTER.

The Protocol Monitor Statistics Summary screen is shown in Figure 5-15.

```
********************* Protocol Monitor Statistics Summary **********************
     Name: F243802

                            DLCI [D=#orSum]: Sum

                   Current Interval Count: 455 of 900 secs
                 15 Minute Interval History Count: 96 Valid

                 ----- Current -----  ---- 10 Second ----  ----- History -----
     Protocol        RxBps     TxBps       RxBps     TxBps     RxBps     TxBps
 IP                ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
 IPX(SNAP)         ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
 NETBIOS(SNAP)     ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
 SNA(SNAP)         ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
 APPLETALK(SNAP)   ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
 DECNET(SNAP)      ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
 OTHER             ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0
                   ,   ,  0  ,   ,  0    ,   ,  0  ,   ,  0  ,   ,  0  ,   ,  0


ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]     AutoUpdate[AU]
>
```

### Figure 5-15 Protocol Monitor Statistics Summary Screen

**DLCI [D=#orSum]** - selects which portion of the statistics history will be used to produce the current 10 Second and History statistics.
Choices are:

Specific PVC - Enter DLCI number (#) or “Etc,” for that PVC.

Sum of all PVCs - Enter Sum (or only “S”).

**Current Interval Count: -** Displays the number of seconds that have elapsed in the current interval.

***n* Minute Interval History Count** - Displays the number of user-defined (1-15 Minute) intervals that have been accumulated since the last reset of the counters.

**Protocols** - Lists up to eight counting categories for which statistics are displayed. Seven (or less) of these were selected on the Protocol Monitor Configuration Screen. “OTHER” always appears as the last protocol, and includes all others.

**Current** - Displays total counts for each parameter within the current interval.

**10 Second** - Displays total counts for the latest completed 10-second period.

**History** - Displays total counts for each of the performance parameters over all valid intervals up to the maximum of 96 intervals.

**RxBps** & **TxBps** - Data rate calculated from the total count of octets counted for the particular protocol category and specified PVC.

Additional commands on this screen are:

**ResetStats [RS]** - Clears all Protocol Monitoring ***and*** PVC Monitoring statistics counters (including history).

**ViewHistory [VH** current_time (optional)] - Advances to Page 1 of the Protocol Monitor Statistics History screen.

The “current_time” optional parameter causes the history interval count to reflect the actual time-of-day rather than a simple count of intervals. The entry is in 24-hour format, using three or four digits. Example: 1445 = 2:45 PM.

## Protocol Monitor Statistics History

The Protocol Monitor Statistics History screen displays all performance parameters for the Frame Relay Traffic on a per-interval basis for each of the 96 possible intervals for each protocol specified.

The first history screen is accessed by selecting ViewHistory [VH] from the Protocol Monitor Statistics Summary screen.

The first page of the Protocol Monitor History screen is shown in Figure 5-16.

```
******************** Protocol Monitor Statistics History **********************
     Name: F243802                                    DLCI [D=#orSum]: 16
                        First Interval [F=#]: 2 of 96
 Past
 Int. Protocol             RxBps    TxBps  Protocol              RxBps     TxBps
  2   IP                ,   ,  0  ,   ,  0  IPX(SNAP)          ,   ,  0  ,   ,  0
      NETBIOS(SNAP)     ,   ,  0  ,   ,  0  SNA(SNAP)          ,   ,  0  ,   ,  0
      APPLETALK(SNAP)   ,   ,  0  ,   ,  0  DECNET(SNAP)       ,   ,  0  ,   ,  0
      OTHER             ,   ,  0  ,   ,  0                     ,   ,  0  ,   ,  0
  3   IP                ,   ,  0  ,   ,  0  IPX(SNAP)          ,   ,  0  ,   ,  0
      NETBIOS(SNAP)     ,   ,  0  ,   ,  0  SNA(SNAP)          ,   ,  0  ,   ,  0
      APPLETALK(SNAP)   ,   ,  0  ,   ,  0  DECNET(SNAP)       ,   ,  0  ,   ,  0
      OTHER             ,   ,  0  ,   ,  0                     ,   ,  0  ,   ,  0
  4   IP                ,   ,  0  ,   ,  0  IPX(SNAP)          ,   ,  0  ,   ,  0
      NETBIOS(SNAP)     ,   ,  0  ,   ,  0  SNA(SNAP)          ,   ,  0  ,   ,  0
      APPLETALK(SNAP)   ,   ,  0  ,   ,  0  DECNET(SNAP)       ,   ,  0  ,   ,  0
      OTHER             ,   ,  0  ,   ,  0                     ,   ,  0  ,   ,  0
  5   IP                ,   ,  0  ,   ,  0  IPX(SNAP)          ,   ,  0  ,   ,  0
      NETBIOS(SNAP)     ,   ,  0  ,   ,  0  SNA(SNAP)          ,   ,  0  ,   ,  0
      APPLETALK(SNAP)   ,   ,  0  ,   ,  0  DECNET(SNAP)       ,   ,  0  ,   ,  0
      OTHER             ,   ,  0  ,   ,  0                     ,   ,  0  ,   ,  0
Help[?]    Close[X]     NextPage[+]
>
```

**Figure 5-16 Protocol Monitor Statistics History**

**DLCI [D=#orSum]** - selects which portion of the statistics history will be used to produce the History statistics.
Choices are:

Specific PVC - Enter DLCI number (#) for that PVC.

Sum of all PVCs - Enter Sum (or only “S”).

**First Interval** - Selects the interval of the indicated number (max of 96) to begin the display of data.

Performance data is displayed as described on the Protocol Monitor Statistics Summary screen.

Additional commands on this screen are:

**NextPage[+]** - Advances the display to the next highest page of DLCI numbers, when applicable.

This page intentionally left blank.

## Top Talker/ Conversation Statistics Summary

The Top Talker/Conversation Statistics Summary screen displays summary performance information and provides access to detailed performance information for the Top IP Traffic irrespective of PVC divisions.

The Top Talker/Conversation Statistics Summary screen is accessed from the System View screen, selecting [TS] by typing “TS” followed by ENTER.

An example of a Top Talker/Conversation Statistics Summary screen, in Tx Conversation mode ranked by Octet, is shown in Figure 5-17.

```
***************** Top Talker / Conversation Statistics Summary *****************
     Name: F243802                                          Mode[M=Tx,Rx]: Tx

                              Tx Conversation

                    Current Interval Count: 455 of 900 secs
                  15 Minute Interval History Count: 96 Valid

          -------------- Most Recent Completed Interval --------------
                                      ----- Near ---- > ----- Far -----
   Rank       Bps      Octs   %Rate           Source   Destination
    #1:         0         0   0.000         0.0.0.0   0.0.0.0
    #2:         0         0   0.000         0.0.0.0   0.0.0.0
    #3:         0         0   0.000         0.0.0.0   0.0.0.0
    #4:         0         0   0.000         0.0.0.0   0.0.0.0
    #5:         0         0   0.000         0.0.0.0   0.0.0.0
    #6:         0         0   0.000         0.0.0.0   0.0.0.0



ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 5-17 Tx Conversation Mode, Ranked by Octet**

**Mode [M=]** - Selects Tx or Rx mode for displaying information. The mode displayed is a result of the combination of the Tx or Rx mode selected on this screen and the “Top Stats” basis configuration (set on the Protocol Monitor Configuration Screen.) The four possible modes are:
Tx Conversation, Rx Conversation, Tx Talker, and Rx Listener.

**Note:** The parameters displayed depend on whether the “Rank Top By” setting (set on the Protocol Monitor Configuration Screen) is Octet or Packet.

**Interval Count:**

**Current Interval Count -** Displays the number of seconds that have elapsed in the current 15-minute interval.

**15 Minute Interval History Count -** Displays the number of 15-minute intervals that have been accumulated since the last reset of the counters (max. of 96).

**Most Recent Completed Interval -** Totals for the following performance parameters are displayed for the most recent interval (i.e., interval 1 of the history).

**Rank -** Number 1 to 6, showing the rank (with 1 being the highest) the line of statistics holds compared to other talkers/conversations.

**For Rank by Octet, the following are displayed:**

**Bps** - The displayed Bps is calculated from the total count of Octets for the particular talker/conversation in the indicated direction.

**Octets** - Count of bytes within packets for that particular talker/conversation. The count includes only traffic passing from Network to User and User to Network.

**% Rate -** The displayed % of rate is calculated from the total count of Octets for the particular talker/conversation in the indicated direction, based on the current data rate.

**Near -** Indicates the IP address(es) of the User Port Router. The heading shows "**Source**" in Tx mode or "**Destination**" in Rx mode.

**Far** - Indicates the IP address(es) of the Network Router. The heading shows "**Destination**" in Tx mode or "**Source**" in Rx mode.

**NOTE:** The "Far" fields are *not* displayed in Talker/Listener mode.

**For Rank by Packet, the following are displayed:**

**Pkts** - Count of packets for the talker/conversation. The count includes only traffic passing from Network to User and User to Network.

**Near** & **Far** - As described above.

Additional commands on this screen are:

**ResetStats [RS]** - Clears all counters associated with Top statistics.

**ViewHistory [VH current_time (optional)]** - Advances to Page 1 of the Top Talker/Conversation Statistics History screen.

The "current_time" optional parameter causes the history interval count to reflect the actual time-of-day rather than a simple count of intervals. The entry is in 24-hour format, using three or four digits. Example: 1445 = 2:45 PM.

**Help [?]** - Advances to "Help" for Top Talker/Conversation Statistics Summary screen.

**Close [X]** - Returns to System View screen.

**AutoUpdate [AU]** - Provides automatic screen update and refresh (every five seconds) of all statistics. No changes can be made while in this mode. AutoUpdate is exited by pressing ENTER.

## Rx Conversation Mode

An example of a Top Talker/Conversation Statistics Summary screen, in Rx Conversation mode ranked by Octet, is shown in Figure 5-18.

```
***************** Top Talker / Conversation Statistics Summary *****************
     Name: F243802                                          Mode[M=Tx,Rx]: Rx

                              Rx Conversation

                    Current Interval Count: 455 of 900 secs
                  15 Minute Interval History Count: 96 Valid

          -------------- Most Recent Completed Interval --------------
                                      ----- Near ---- < ----- Far -----
   Rank       Bps      Octs   %Rate      Destination   Source
    #1:         0         0   0.000          0.0.0.0   0.0.0.0
    #2:         0         0   0.000          0.0.0.0   0.0.0.0
    #3:         0         0   0.000          0.0.0.0   0.0.0.0
    #4:         0         0   0.000          0.0.0.0   0.0.0.0
    #5:         0         0   0.000          0.0.0.0   0.0.0.0
    #6:         0         0   0.000          0.0.0.0   0.0.0.0



ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 5-18 Rx Conversation Mode, Ranked by Octet**

Performance data is displayed as described on the previous pages.

Note that the Near (User Port Router) heading indicates “Destination”, and the Far (Network Port Router) heading indicates “Source”.

## Rx Listener Mode

An example of a Top Talker/Conversation Statistics Summary screen, in Rx Listener mode ranked by Packet, is shown in Figure 5-19.

```
***************** Top Talker / Conversation Statistics Summary *****************
     Name: F243802                                          Mode[M=Tx,Rx]: Rx

                                  Rx Listener

                    Current Interval Count: 455 of 900 secs
                  15 Minute Interval History Count: 96 Valid

          -------------- Most Recent Completed Interval --------------
                                      ----- Near ----
   Rank                Pkts                Destination
    #1:                   0                    0.0.0.0
    #2:                   0                    0.0.0.0
    #3:                   0                    0.0.0.0
    #4:                   0                    0.0.0.0
    #5:                   0                    0.0.0.0
    #6:                   0                    0.0.0.0



ResetStats[RS]    ViewHistory[VH current_time(optional)]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 5-19 Rx Listener Mode, Ranked by Packet**

Performance data is displayed as described on the previous pages.

Note that only the Near (User Port Router) heading and IP Address(es) are displayed when ranked by “Packet”.

## Top Talker/ Conversation Statistics History

The Top Talker/Conversation Statistics History screen displays detailed performance information for the Top Talker/Conversation of IP Traffic irrespective of PVC divisions.

The Top Talker/Conversation Statistics History screen is accessed from the Top Talker/Conversation Statistics Summary screen, selecting [VH] by typing “VH” followed by ENTER.

An example of a Top Talker/Conversation Statistics History screen, in Rx Conversation mode ranked by Octet, is shown in Figure 5-20.

```
***************** Top Talker / Conversation Statistics History *****************
     Name: F243802                                        Mode[M=Tx,Rx]: Rx
 First Interval [F=#]: 2 of 96     Rx Conversation
 Past                                      ----- Near ---- < ----- Far -----
 Int. Rank       Bps      Octs   %Rate      Destination  Source
  2    #1:         0         0   0.000          0.0.0.0   0.0.0.0
       #2:         0         0   0.000          0.0.0.0   0.0.0.0
       #3:         0         0   0.000          0.0.0.0   0.0.0.0
       #4:         0         0   0.000          0.0.0.0   0.0.0.0
       #5:         0         0   0.000          0.0.0.0   0.0.0.0
  3    #6:         0         0   0.000          0.0.0.0   0.0.0.0
       #1:         0         0   0.000          0.0.0.0   0.0.0.0
       #2:         0         0   0.000          0.0.0.0   0.0.0.0
       #3:         0         0   0.000          0.0.0.0   0.0.0.0
       #4:         0         0   0.000          0.0.0.0   0.0.0.0
       #5:         0         0   0.000          0.0.0.0   0.0.0.0
       #6:         0         0   0.000          0.0.0.0   0.0.0.0



Help[?]    Close[X]    NextPage[+]
>
```

**Figure 5-20 Top Talker/Conversation Statistics History Screen (Rx Conversation Mode)**

**Mode [M=]** - Selects Tx or Rx mode for displaying information.

**First Interval [F=]** - Selects the interval of the indicated number (max of 96) to begin the display of data.

The first six lines display Top Talker/Conversation statistics for the first interval, the next six lines for the next interval. Additional intervals are displayed on subsequent pages.

Performance data is displayed as described on the Top Talker/Conversation Statistics Summary screens.

Additional commands on this screen are:

**NextPage[+]** - Advances the display to the next page of intervals.

## Alarms

NetPath 100 generates “traps” (SNMP alarms or alerts) in response to certain detected network conditions. The traps are reported either In-band utilizing the Management PVC, or via Dial-Out utilizing the internal Modem. Alarm conditions are also displayed on NetPath 100 status screens and on front panel indicators.

## Traps

The conditions (objects) which generate traps are included in the NetPath 100 Private MIB Extension and are listed in Table 5-2.

**Table 5-2 Traps - Private MIB Extension**

| Component | Object | Description | Trap Reported In-Band/ Modem |
|---|---|---|---|
| T1 Facility | Carrier Loss (Red, Blue or Yellow) | Carrier status of T1 facility. | Modem* & In-Band |
| | Total Secs in error (ES + UAS) | Errored seconds based on the current interval performance. | In-Band |
| CSU | CSU Fault | Unit subsystem failed self-test. | Modem* & In-Band |
| LMI | LMI Netw Failure | Errored LMI response per N392/393 counters on Network side. | Modem* & In-Band |
| | LMI User Failure | Errored LMI enquiries per N392/393 counters on User side. | In-Band |
| Link Data | Network Frame Errors Secs | Errored seconds based on the current interval performance. | In-Band |
| | User Frame Errors Secs | Errored seconds based on the current interval performance. | In-Band |
| | BECN/FECN Secs (max PVC) | Highest BECN/FECN seconds of all PVCs based on the current interval performance. | In-Band |
| | PVC Dropped Monitor Packets | Highest Dropped packet count of all PVCs based on the current interval performance. | In-Band |
| | PVC Delay msec (max PVC) | Highest PVC round trip delay of all PVCs based on the current interval performance. | In-Band |
| | PVC Delivered Packets (%) ( | Lowest percentage of Delivered packets of all PVCs based on current interval performance. | In-Band |
| | PVC Available | PVC going from non-Active to Active as reported by frame switch. | In-Band |
| | PVC Unavailable | PVC going from Active to non-Active as reported by frame switch. | In-Band |
| DTE | DTR Loss | Returns state of DTR lead. | In-Band |
| | DTE Power Loss | Returns state of DTE Power indication. | In-Band |
| Power | NetPath Power Loss | State of AC power into unit. Reports on loss only. Sent to first trap manager only. | In-Band |
| Modem | Modem Failure | Modem failed self-test which is initiated periodically. | In-Band |
| | Dial Line Failure | Dial line failed self-test which is initiated periodically. | In-Band |
| Security | Security Violation (Login) | Identifies access point of failed login attempts (3 consecutive): Console, Modem, Telnet, UDP, or SNMP. | In-Band |
| | Authentication Failure | Unauthorized SNMP Community Access detected (community not configured for access). | In-Band |
| Aux Functions | External Alarm | Sensed contact closure. | In-Band |

* Modem-Reported Traps are only issued on the occurrence of a primary facility failure and provided that the modem is not already in use when the trap occurs.

# Fault Isolation

Figure 5-21 shows a typical application with potential fault locations marked ( a ) through ( i ). Table 5-3 describes the corresponding indications, reporting mechanisms including the traps for each fault, and suggested test options.

.

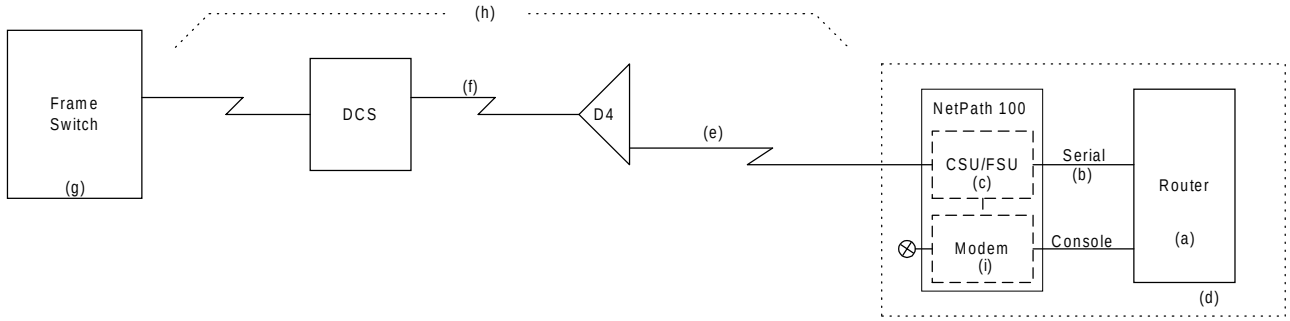


**Figure 5-21 Fault Locations**

**Table 5-3 Fault Conditions**

| Fault | Loc | Indication(s) | Fault Sensing | Trap Transport | Test Options |
|---|---|---|---|---|---|
| Router Failure | (a) | No LMI from Router.<br>DTR low at Router. | FSU senses lack of LMI, no DTR, or no power at serial interface. | FSU sends inband Trap. | PING Router<br>Dial into router console port. |
| Router - FSU Cable disconnected or router powered down | (b) | No LMI from Router.<br>DTR low at Router. | FSU senses lack of LMI and no DTR, and no power at serial interface. | FSU sends inband Trap. | PING Router<br>Dial into router console port. |
| CSU | (c) | No LMI at Frame Switch and NetPath 100. | FSU self-check. | FSU sends Trap via modem. | Call in to Modem.<br>Frame Switch CSU/Payload loop tests. |
| Local Power | (d) | No LMI at Frame Switch. | CSU senses AC Power loss. | FSU sends inband Trap. | Dial in and check for answer. |
| T1 Local Loop or DCS failure | (e) | No LMI at Frame Switch.<br>No LMI at NetPath 100. | CSU senses carrier loss or loss of FDL (in non SF mode). | FSU sends Traps via modem. | Call in to Modem to view T1 status.<br>Frame Switch CSU/DSU loop tests. |
| Frame Switch T1 Access Loop | (f) | No LMI at Frame Switch.<br>No LMI at NetPath 100. | FSU senses no response to LMI enquiries. | FSU sends Trap via modem. | Check T1 status at Frame Switch.<br>FSU to Frame Switch BERT. |
| Frame Switch | (g) | No LMI response to CSU. | FSU senses no LMI response. | FSU sends Trap via modem. | Loopback at Frame Switch toward itself. |
| High Error Rate | (h) | Trap from Frame Switch, NetPath 100, or Router. | FSU monitors Frame Relay frames.<br>CSU monitors T1 frames. | FSU sends inband Trap. | BER from FSU, to loop at Frame Switch.<br>View 24 hour statistics. |
| Modem or Dial Line | (i) | Fails periodic Dial Tone Test. | Modem can't detect/break dial tone. | FSU sends inband Trap. | Routine Modem and Dial Line. |

## LED Indicator Troubleshooting

The NetPath 100 front panel LED indicators may also be used to troubleshoot a problem. Table 5-4 describes the LED indicator's normal states, and some possible causes for abnormal indications.

.

**Table 5-4 NetPath 100 LED Diagnostics**

| NetPath 100 LED Status | | | | | | | Condition | Possible Cause(s) |
|---|---|---|---|---|---|---|---|---|
| POWER | READY | T1 ALARM | HS PORT TxD | HS PORT RxD | FR MGMT. | MODEM IN USE | | |
| ON | ON | OFF | Flashing | Flashing | --- | --- | NORMAL, No problem | Normal LED status for NetPath 100. |
| OFF | --- | --- | --- | --- | --- | --- | Loss of power to NetPath 100 | Check AC power cord to NetPath 100. Verify AC outlet is powered. |
| ON | Flashing | --- | --- | --- | --- | --- | NetPath 100 performing self-test | Normal on power-up or reset, duration of test approx. 45 seconds. Successful completion sets READY LED On steady. Continuous cycles of flashing indicate critical internal circuit fault, replace with known good unit. |
| ON | ON but Flash OFF every 5 Secs. | --- | --- | --- | --- | --- | Improper AUX 2 cable detected. | Disconnect AUX 2 cable and contact Technical Support immediately. |
| ON | OFF | --- | --- | --- | --- | --- | NetPath 100 fails 45 sec. self-test | Internal circuit fault. Replace with known good unit. |
| ON | ON | Flashing Slowly | --- | --- | Flashing Slowly | --- | NetPath 100 is waiting for a software download* | A command was issued to the unit to upgrade its software, or an error was detected in the internal program storage. |
| ON | ON | Flashing Fast | --- | --- | Flashing Fast | --- | NetPath 100 is in the process of downloading* its software | Do not disturb the unit until this process completes. |
| ON | ON | ON | --- | --- | --- | --- | Loss of T1 facility | Check T1 facility. |
| ON | ON | OFF | On Steady or OFF | --- | --- | --- | Loss of Data from DTE | Check power to DTE and interconnection cable. |
| ON | ON | OFF | --- | On Steady or OFF | --- | --- | Loss of Data to DTE | Check for data from Network and/or for LMI traps from Network. |
| ON | ON | OFF | --- | --- | OFF | --- | Loss of management channel data | Check for valid DLCI. |
| ON | --- | --- | --- | --- | --- | OFF | Dial Line on hook | Normal for no Dial-In or Dial-Out. |
| ON | --- | --- | --- | --- | --- | ON | Modem in use | Normal for Dial-In or Dial-Out. |

**NOTE:** A table entry of "---" means status of that LED is not relevant.
*Refer to Software Download on the next page of this manual for description.

## Additional Descriptions

The paragraphs in this section provide additional information, notes, or tips about some of the specific operating features of the NetPath 100.

This information is intended to assist anyone in the use of these features or in trouble-shooting problems concerning these features.

## Software Download

A new version of the NetPath 100 system software (firmware) can be downloaded to the unit for software upgrade, or to restore damaged system software.

Initiation of the download process is by command or as the result of a detected error. The NetPath 100 indicates the initiation of the download process by simultaneously flashing the “T1 FAULT” and “FR MGMT.” front panel LEDs. The rate of flashing is relatively slow (approximately 2/sec.) while waiting for the actual transfer of data to begin. The rate of flashing becomes noticeably faster (blinking) when the transfer of data begins, and will continue until the download is complete.

Once the download process is initiated, the NetPath 100 must complete the download before it is able to perform any other functions.

Upon completion of the download, the NetPath 100 reinitializes by performing its start-up self-test.

The actual download is performed by dial-in to the NetPath 100 modem using a special application for this purpose.

## DTE Dialing Using NetPath 100 AUX Ports & Internal Modem

In addition to the internal CSU and Option modules, the NetPath 100's internal modem may be shared by external devices, which interface the NetPath 100 through AUX ports 1 and 2. The modem sharing process is controlled by the DTR lead of each connected device.

Before making the modem available to a requesting device, the NetPath 100 loads a user-configurable AT command string for that device from its database.

The DSR lead for the NetPath 100 AUX ports is OFF until that port is connected to the modem. Once the DSR lead is ON for a given port, the associated Router (DTE) can issue its own AT strings to the modem.

RLSD follows DSR. CTS can be programmed to always be ON, follow RTS, or provide flow control in response to RTS. Modem configuration is done through the AUX Setup fields on the System Configuration screen.

Outbound calling is accomplished in one of two ways:

- DTR Dialing - the phone number to be called is stored in the NetPath 100.
- AT Dialing - the Router issues the phone number.

**Note:** It is important that the Router does not have DTR ON unless it wants to use the modem, because this will prevent other devices from gaining access to the modem.

### DTR Dialing

1. The call is initiated by the Router turning DTR ON.
2. The NetPath 100 responds in one of two ways, based on the AT Commands included in the Setup String for the AUX Port:
   a. DSR comes ON as soon as the modem is available.
   b. DSR follows the status of the far end connection.
3. The Router lowers DTR at the end of the call.
4. If the NetPath 100 was configured per 2a) above, DSR will go OFF after the Router turns DTR OFF. If configured per 2b), DSR will go off after the connection is broken by either end or if DTR is turned OFF.

### AT Dialing

AT dialing is similar to DTR dialing, but the Router can issue the dialing command strings.

1. The call is initiated by the Router turning DTR ON.
2. The NetPath 100 turns DSR ON when the modem is available.
3. The Router issues the necessary AT commands.
4. Connect messages can be enabled to indicate the connection status.
5. The Router lowers DTR at the end of the call.
6. DSR goes OFF after the Router turns DTR OFF.

# Management Access

## Dial-In

When using a PC (desktop or laptop) to establish management access to a NetPath 100, ensure that the VT-100 configuration is set to use flow control, and that the BAUD rate does not exceed 57600 (56Kbps).

Some emulation programs will automatically configure to the highest rates available (such as 115200), and this may cause the dropping of characters while NetPath is returning a screen to the PC terminal.

## Direct Connect (AUX 2)

When AUX 2 Console Mode is enabled (a console terminal is direct-connected), the internal Modem is disabled and unavailable for incoming or outgoing calls.

# SNMP SET Command

NetPath 100 supports SNMP "Set." Set is compliant with SNMP Version 1, but implemented with CRC proprietary features that include security through the SNMP control group. To use these security features, you must log in through SNMP and apply Set to the SNMP objects that are settable. Complete the following steps.

1. Before you begin, be sure that an SNMP community is configured for Read/Write access within the NetPath 100.
2. Define a community name within the SNMP manager that matches the SNMP community in the NetPath 100.
3. Choose the node you wish to configure and access the NetPath 100 Group within the MIB.
4. Select the "SnmpSetCtl" object from within the NetPath 100 group.
5. Confirm that an SNMP session is not currently active by performing a GET on the "SNMPSetExecutionStatus" object. A value of "passive" should be returned. If "active" is returned, the IP address of the current user can be obtained by performing a GET on the "LoggedNMSIPAddress" object.
   **Note:** The following three objects must be configured in the order described.
6. Select the "SNMPSystemAccessPassword" object. Enter the NetPath system access password and choose Set.
   **Note:** A value must be entered even if no system password exists.
7. Select the "SNMPUserAccessPassword" object. Enter the user password and choose SET.
8. Select the "SNMPOperatorID" object. Enter the operator ID and choose SET.
   **Note:** A value must be entered.

9. Set the “SNMPSetExecution” object to a value of “accept.”
   **Note:** While a login session is established, if this object is not set to “accept,” “cancel,” or “none” within five minutes, the login session will be automatically terminated. (The “SNMPSetInactivity” object maintains the elapsed time since the last SetExecution command.)
10. An SNMP session should have been established in Step 9. To verify that a session was established, perform a GET on the “SNMPSetStatus” object. If a value of “active” is returned, a session was established. If a value of “passive” is returned, a session was not established. If so, perform a GET on the SNMPSetExecutionStatus object to determine the reason access was denied.
11. You can now access any SNMP object in the NetPath 100 MIB and perform a SET on the object, including objects in the Config, ResetStats and TimeEventCmd groups. However, once you configure all the objects within a group, you must return to the SnmpSetCtl group and set the SNMPSetExecution object to “accept.”
    **Note:** You can only configure one group at a time.
12. To verify that the new settings of a group were accepted, you must do a GET on the “SNMPSetExecutionStatus” object. If the SET was successfully executed, this object will return nothing. If an error message is returned, the new settings were not accepted.
13. To terminate the SNMP login session prior to inactivity logout, enter an incorrect password in the SNMPUserAccessPassword and choose SET.
14. Confirm that the session has been terminated by performing a GET on the “SNMPSetStatus” object. A value of “passive” should be returned.

# 6 Options

This section contains installation, operation and diagnostic information specific to factory Options which are available with NetPath 100 units.

The Options currently available and covered in this manual are:

- ISDN Adapter Option

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## ISDN Adapter Option

This section contains installation, operation and diagnostic information specific to the ISDN Adapter option for NetPath 100.

The front panel of NetPath 100 with the ISDN Adapter option is shown in Figure 6-1.


**Figure 6-1 NetPath 100 Front Panel with ISDN Adapter**

## Installation

Installation for the ISDN feature for NetPath 100 consists of making the Data Port and ISDN Line connections.

### Input/Output Connections

NetPath 100 rear panel ISDN connectors are shown in Figure 6-2.

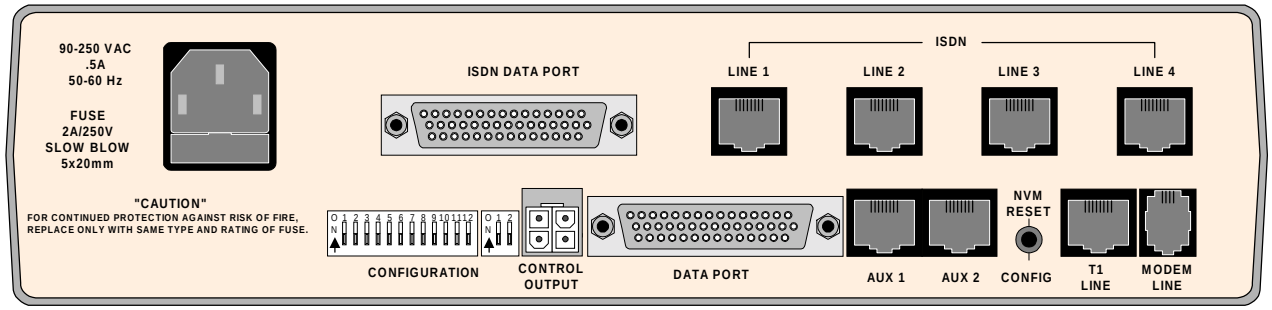



**Figure 6-2 NetPath 100 Rear Panel with ISDN Adapter**

NetPath 100 ISDN connectors are described in Table 6-1.

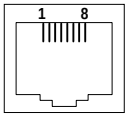
**Table 6-1 NetPath 100 ISDN Input/Output Connectors and Specifications**

| Connectors | Description |
|---|---|
| ISDN Data Port | DB-44, high-density connector provides the following interfaces, selected by the interface cable used:<br>EIA-530<br>EIA-530-A<br>ITU-V.35 |
| ISDN Line | RJ49C, 8-pin modular connector. |

The ISDN Data Port supports the same electrical interface types as the base unit Data Port (except for ITU-X.21-NS), and the connector pinouts are also identical.

Refer to Section 3, “Installation,” in this manual for Data Port pinout and cable details.

Use cable assembly # 135-981-0006, or per pinout shown in Table 6-2.



ISDN Line

**Table 6-2 ISDN Line Pinout, RJ49C Connector**

| Pin | Description |
|---|---|
| 1,2,3 | No Connection |
| 4 | R (Ring) |
| 5 | T (Tip) |
| 6,7,8 | No Connection |
| **NOTE:** Use Twisted Pair cable conductors for pins 4 & 5. | |

## Configuration

With the ISDN connections and base unit connections completed, the NetPath 100 is ready to be powered on and the ISDN Adapter configured for operation.

### Power On with Connections Completed

Power the unit on by connecting the power cord and plugging it into an appropriate AC outlet. The NetPath 100 with ISDN will complete its power-on self-test sequence with front panel LED indications as follows:

a. The POWER LED will light immediately and stay on.

b. The READY and ISDN READY LEDs will flash while the unit performs its self-test (test duration - approximately 45 seconds).

c. The READY and ISDN READY LED will be ON steady after successful completion of the self-test.

d. The T1 ALARM and FR MGMT. LEDs should ***not*** be flashing together.

e. All other LED indications should be ignored until configuration has been completed.

If the LED indications are not as described above, refer to section 5 Diagnostics of this manual.

If operation looks normal, proceed by establishing a Management Session and entering the operating parameters as described in Parameter Setting on the next pages of this section in the manual, or contact the Network Control Center to have the parameters set remotely.

**NOTE:** If the Dial Line has not been connected to the NetPath 100 prior to powering the unit on, the unit will issue a Dial Line Failure In-Band Trap to the Trap Manager after it completes its Modem and Dial Line self test.

## Establish Management Session

The NetPath 100 sends a Startup/Login Prompt when a management connection has been established (via in-band Telnet, dial-in VT-100 console connection or direct connected VT-100 terminal), provided that another management session is not already in use.

### Login

The startup display and prompt are:

```
FrameSaver NP 100 - Frame Relay Service Unit
(C) Copyright Paradyne Corporation 1996-2000.
All Rights Reserved
Base:00.13/09.01.95.05i Opt:01.29.04

Please enter your SYSTEM access password:
Please enter your USER access password:
```

Only the User access password prompt will be displayed if System-level password feature is disabled. If enabled, the System access password prompt will be displayed and User access password prompt will only be displayed after entering a valid System Password.

At the User access prompt, enter the Configuration or Supervisor Password followed by ENTER (factory default Configuration Password is “33333333”).

**NOTE:** Only Configuration or Supervisor-level USER Password will allow configuration changes. View level displays all screens but allows no configuration changes or testing; and Test level displays all screens, allows performance of tests, but no configuration changes.

The next prompt asks for your name and phone number:

```
Please enter your USER access password:
Please enter your name and phone #:
```

Enter name and phone number followed by ENTER. If this information is provided, it will be displayed to any other operator attempting to Login while in use, so they may contact you in case they have to gain immediate access.

**NOTES:**

1. Console session will be terminated and must be reinitiated if there are three invalid password attempts, or a timeout resulting from no attempt for one minute.
2. If the unit’s NVM has been cleared since the last successful login, this will be indicated on the Startup screen display as shown below.:

```
FrameSaver NP 100 - Frame Relay Service Unit
(C) Copyright Paradyne Corporation 1996-1999.
All Rights Reserved
Base:00.13/09.01.95.05i Opt:01.29.04

System Database Reset to Factory Defaults.

Please enter your USER access password:
```

## Management Command Flow

Figure 6-3 shows the general flow for management access for NetPath 100 with the ISDN Option. It shows the screen displays and the general function for that screen. The ISDN related screens are at the bottom of the flow chart.

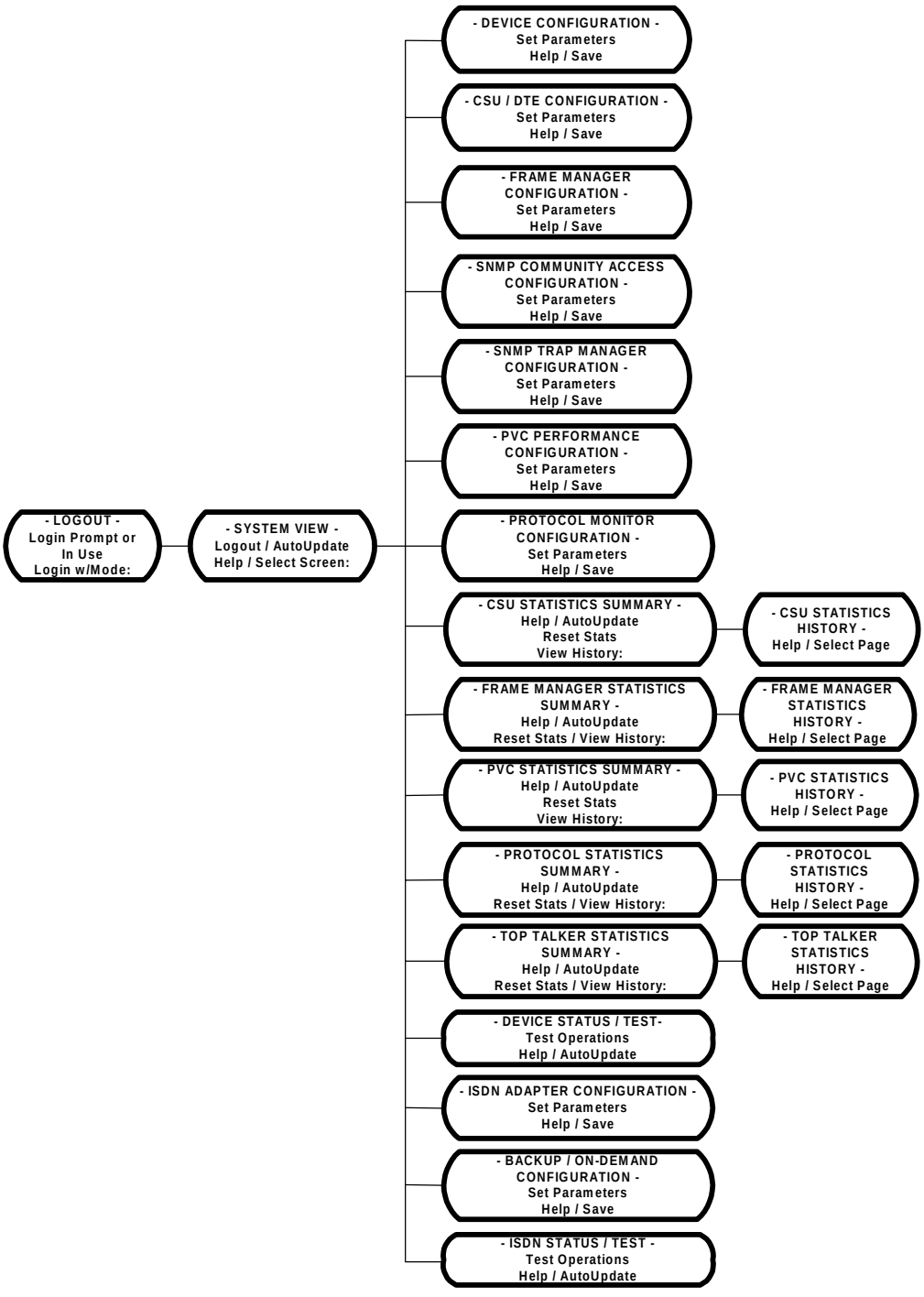



**Figure 6-3 Management Control Flow for NetPath 100 with ISDN Option**

## Parameter Setting

This section describes the additional screens and parameters used to configure the ISDN Adapter option. There are also some field changes on the System View Screen specific to the ISDN Adapter option. The ISDN configuration screens are; ISDN Adapter Configuration Screen and the Backup/On-Demand Configuration Screen. All basic unit screens are described in Section 4, “Operation,” in this manual.

## System View Screen

The System View screen for NetPath 100 with ISDN Adapter is shown in Figure 6-4.

```
********************** FrameSaver NP 100 - System View ************************
     Name: F@43802                                          Base S/W: 09.01.95i
 Location: Fair Lawn, N.J.                                       S/N: 001812
  Contact: J. Jones

    System                                    High Speed Interface Status
     Test/Fault:                                      DTR: On
                                                      RTS: On
                                                    Power: On
    Modem Status                                  Interface: ITU-V35
          Fault:                                ISDN Backup: Armed
     Connection:
                                              On-Demand Interface Status
    Aux Port Status                                   DTR: On
     Aux1 DTR: Off                                    RTS: On
     Aux2 DTR: Off                              Interface: ITU-V35
                                              ISDN Demand: Armed

 DevConfig[DC]   CsuConfig[CC]   FrameConfig[FC]   PvcConfig[PC]   MonConfig[MC]
   DevTest[DT]    CsuStats[CS]    FrameStats[FS]    PvcStats[PS]    MonStats[MS]
SnmpConfig[SC]  TrapConfig[TC]    IsdnConfig[IC]  BkupConfig[BC]    IsdnTest[IT]
Help[?]    Logout[LO]    AutoUpdate[AU]            TopStats[TS]   HubConfig[HC]
>
```

**Figure 6-4 System View Screen with ISDN Adapter Option**

The ISDN-specific fields on the System View screen are as follows:

**Base S/W** - Software revision number currently operating the unit.
The first two-digit number indicates the unit’s feature set, the second indicates the base software revision, and the last indicates minor revision level.
An Alpha character at the end of this field indicates the option type installed, if any. In the example shown in Figure 6-4 above, i = ISDN Adapter option.

**ISDN Backup** - State as reported by ISDN Adapter module.
Further detail is available on the ISDN Test Screen. This title and field will not be displayed unless the ISDN Adapter module is configured for Backup operation.

**On-Demand Interface Status** - If the ISDN Adapter is not configured for On-Demand operation, these fields will not be displayed. If configured for On-Demand, the fields are as follows:

**DTR:** State of DTR lead, ON or OFF.
**RTS:** State of RTS lead, ON or OFF.
**Interface:** Interface adapter cable currently installed.
Types are: ITU-V35, EIA-530, EIA-530-A or (blank) if none.
**ISDN Demand:** Displays the current state as reported by the ISDN Adapter.

### ISDN Commands:

**IsdnConfig [IC]** - Advances to ISDN Adapter Configuration Screen.

**BkupConfig [BC]** - Advances to Backup / On-Demand Configuration Screen.

**IsdnTest [IT]** - Advances to ISDN Status / Test Screen.

## ISDN Adapter Configuration

The ISDN Adapter Configuration screen allows you to view and alter parameters for the ISDN Adapter related operations.

To proceed to ISDN Adapter Configuration, from the System View Screen, type “IC” and press ENTER.

The ISDN Adapter Configuration screen is shown in Figure 6-5.

```
************************* ISDN Adapter Configuration *************************
     Name: F@43802                                          ISDN S/W: 01.29
                                                          Switch Type [S=]
 Bkp: Rate [R1=]    IMUX [M1=]      Dwnspd [D1=]       >>1) National/NI-1<<
     >>1) Nx56k<<  >>1) Bond/M1<<  >>1) Enable<<         2) 5ESS-PtoP/NonInit
       2) Nx64k                     2) Disable          3) 5ESS-MultiP/Init
                                                        4) DMS100

 Dmd: Rate [R2=]    IMUX [M2=]      Dwnspd [D2=]    TxD Clk [T=]   Control [C=]
     >>1) Nx56k<<  >>1) Bond/M1<<  >>1) Enable<<   >>1) DCE<<     >>1) DTR<<
       2) Nx64k      2) ML PPP       2) Disable      2) DTE         2) V.25

     -Channel-   ----------- SPID ----------   ------- Directory # -------
     Line1  B1   [P1=]:                       [N1=]:
            B2   [P2=]:                       [N2=]:
     Line2  B1   [P3=]:                       [N3=]:
            B2   [P4=]:                       [N4=]:
     Line3  B1   [P5=]:                       [N5=]:
            B2   [P6=]:                       [N6=]:
     Line4  B1   [P7=]:                       [N7=]:
            B2   [P8=]:                       [N8=]:
Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 6-5 ISDN Adapter Configuration Screen**

**ISDN S/W:** Software revision number currently operating the ISDN Adapter module.

**Switch Type** - Selects the Protocol to match the ISDN Switch being used by the Telco providing the ISDN service.

**Bkp:** Parameters to be selected for Backup operation.

**Rate** - Select the data rate to be used when establishing Backup ISDN connections.

**IMUX** - Select the method of inverse multiplexing to be used for Backup calls.
**Bond/M1** - Selects Bonding Mode 1 Protocol to bond up to eight B-Channels.

**Dwnspd** - “Disable” will not allow a multi-B Channel backup connection to be completed if only a portion of the B Channels succeed.
Default is “Enable” (downspeeding allowed).

**Dmd:** Parameters to be selected for On-Demand operation.

**Rate** - Select the data rate to be used when establishing On-Demand ISDN connections.

**IMUX** - Select the method of inverse multiplexing to be used for On-Demand calls.
**Bond/M1** - Selects Bonding Mode 1 Protocol to bond up to eight B-Channels.
**ML PPP** - Selects Multi Link-Point to Point Protocol to bundle up to eight B-Channels.
**NOTE:** The unit is transparent to PAP or CHAP, if used to authenticate the ML PPP connection.

**Dwnspd** - Disable will not allow a multi-B Channel On-Demand connection to be completed if only a portion of the B Channels succeed.
Default is "Enable" (downspeeding allowed).

**TxD Clk** - Selects the clock source for aligning Tx Data input; either DTE-supplied clock or DCE-supplied clock (default).

**Control** - Selects On-Demand operation to be controlled by either the DTE's DTR lead, or by V.25bis commands.

**Channel: Line *n, B* 1** & **2** - Fields for setting the SPID (Service Profile Identifier) and Directory Number for each of the B Channels of each ISDN Line, as assigned by Telco when the ISDN service was established.

The formats for these fields are as follows:

**SPID** - Telco ID #, numeric string (0 - 20 character) as assigned by Telco.

**NOTE:** The SPIDs must NOT be the same for both B-Channels on an ISDN Line.

**Directory #** - Numeric string, (0 - 20 character) as assigned by Telco.
This is typically the phone number and may or may not include the area code, dependent upon local Telco requirements.

**NOTE:** For the NetPath 100 to accept a Dial-In connection to the B-Channels, the Directory # that is entered must match the called number passed from the carrier during the ISDN call setup.

### Commands

**Help [?]** - Advances to "Help" for ISDN Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

***CAUTION***

***If any parameter on this screen was changed, the ISDN Adapter will perform a reset after the Save [SA] command is issued. The reset will interrupt ISDN data traffic.***

Save the ISDN Configuration changes when they are all set correctly by entering "SA" followed by ENTER. This will also return the user to the System View screen.

## Backup / On-Demand Configuration

The Backup / On-Demand Configuration screen allows the user to view and alter parameters for the ISDN Backup or On-Demand operations.

To proceed to Backup/On-Demand Configuration, from the System View Screen, type "BC" and press ENTER.

The Backup / On-Demand Configuration screen is shown in Figure 6-6.

```
********************** Backup / On-Demand Configuration **********************
     Name: F@43802                              Bkp Downspeed Minimum [M1=#]: 1
 Bkp#1 WAN IP Add [I1=]: 0.0.0.0                Dmd Downspeed Minimum [M2=#]: 1
 Bkp#2 WAN IP Add [I2=]: 0.0.0.0                 1 thru 8 channels
 Bkp Activate Delay [A=#]: 1                    Dmd LMI Holdoff [N=#]: 0
  0 thru 240 mins                                0 thru 15 minutes
 Bkp Rtry Count [C1=#]: 1      Learn IP Add [L=]   Dmd Rtry Count [C2=#]: 1
  1 thru 4                   >>1) Each Connect<<   1 thru 4
 Bkp Rtry Holdoff [H1=#]: 2     2) When Zero       Dmd Rtry Holdoff [H2=#]: 2
  1 thru 15 minutes                                 1 thru 15 minutes

  Assign to Backup [B=]/Demand [D=]  ([B=m,n,..r] and/or [B=m-n] for multiples)
     -Channel- -Assign-   ----- Primary Dial #1 ---- ---- Secondary Dial #2 ---
>>1) Line1  B1  Backup<<  [P1=]:                     [S1=]:
>>2)        B2  Backup<<  [P2=]:                     [S2=]:
>>3) Line2  B1  Backup<<  [P3=]:                     [S3=]:
>>4)        B2  Backup<<  [P4=]:                     [S4=]:
>>5) Line3  B1  Demand<<  [P5=]:                     [S5=]:
>>6)        B2  Demand<<  [P6=]:                     [S6=]:
  7) Line4  B1            [P7=]:                     [S7=]:
  8)        B2            [P8=]:                     [S8=]:
Help[?]    Save[SA]    Cancel[X]
>
```

**Figure 6-6 Backup / ON-Demand Configuration Screen**

**Backup:** Establishes an ISDN data link and switches the Base module Frame Manager from the T1 link onto the ISDN link(s). Backup is triggered by a T1 outage, loss of Network or may be operator-initiated. Configuration items are:

**Bkp # *n* WAN IP Add** - Sets the IP Address for management access while the unit is on backup. Bkp # 1 WAN IP Add is used for Primary Dial # 1, and Bkp # 2 WAN IP Add is used for Secondary Dial # 2.

**Bkp Activate Delay** - Sets the time to wait after a T1 outage or loss of Network is detected, before a backup attempt is initiated. Valid range is from 0 to 240 minutes.

**NOTE:** If the original initiating condition clears for a duration of at least one minute and the Bkp Activate Delay has not yet expired, the backup will be aborted.

**Bkp Rtry Count** - Sets the number of retry attempts to establish a backup connection on each set of phone #'s (Primary then Secondary). Valid range is from 1 to 4.

**Bkp Rtry Holdoff** - Defines the delay between each retry attempt. Valid range is from 1 to 15 minutes.

**Learn IP Add** - Selects IP Address to "Learning Mode," where unit will learn its IP Address from the first valid Frame received after connecting. Set to "1" for learning on "Every Connection." Set to "2" for learning only if "Bkp # n WAN IP Add" is set to zero.
**NOTE:** See the next page of this section for detailed description of SNMP IP Address learning.

**Bkp Downspeed Minimum** - Sets the minimum number of B-Channel calls that must be established for the call bundle to be considered successful. Failure to establish a connection with that number of calls or more, will result in a tear-down of the bundle and retries. Default setting is 1.

**On - Demand:** Establishes and maintains an ISDN data link(s) for the ISDN Data Port while the DTE on that port holds DTR High. Does not affect Frame Manager.

**NOTE:** Demand operation is not supported when using an X.21 electrical interface.

**Dmd Downspeed Minimum** - Sets the minimum number of B-Channel calls that must be established for the call bundle to be considered successful. Failure to establish a connection with that number of calls or more, will result in a tear-down of the bundle and retries. Default setting is 1.

**Dmd LMI Holdoff** - When the value is not zero, this sets the time delay between Network LMI returning to a good state (after having failed) and the unit notifying the DTE by restoring LMI to the dedicated User Port. The process is initiated by the DTE raising the DTR signal on the ISDN User Port to establish a Demand Call and the unit finding the Network LMI in a failed state. This can be viewed as using the Demand Port for backup operation.

**Dmd Rtry Count** - Sets the number of retry attempts to establish a backup connection on each set of phone #'s (Primary then Secondary). Valid range is from 1 to 4.

**Dmd Rtry Holdoff** - Defines the delay between each retry attempt. Valid range is from 1 to 15 minutes.

**Assign to Backup / Demand** - Designates which B Channel(s) will be used for Backup operation and which B Channel(s) will be used for On-Demand operation. Issuing "B=" or "D=" commands without any parameters deselects all associated B Channels.

**Primary & Secondary Dial #*n*** - Enter the phone numbers to be dialed to establish a Backup or On-Demand connection. Numeric string (0 - 20 characters).

**NOTE:** For Bond/M1 IMUX selection, a single connection must be established prior to dialing the remaining numbers. The first assigned channel in the list and its number will be used for the initial call. All other dial numbers are ignored.

**NOTE:** For On-Demand ML-PPP IMUX selection, a router LCP Time-Out of less than 3 minutes may prohibit the dialing of secondary numbers.

### Commands

**Help [?]** - Advances to “Help” for Backup / On-Demand Configuration screen.

**Save [SA]** - Saves parameters and returns to System View screen.

**Cancel [X]** - Returns to System View screen without saving changes.

***CAUTION***

***If any parameter on this screen was changed, the ISDN Adapter will perform a reset after the Save [SA] command is issued. The reset will interrupt ISDN data traffic.***

Save the Backup / On-Demand Configuration changes when they are all set correctly by entering “SA” followed by ENTER. This will also return the user to the System View screen.

## Management IP Address per Connection

When optioned with ISDN, NetPath 100 can have three different communications paths that allow it to connect to the frame relay network in different places. They are CSU, ISDN dial up Phone # 1 and ISDN dial up Phone #2. Each of these connection points could result in the management PVC routing through different IP sub-nets to reach the NCC (Network Control Center), or it may be desirable to have the NetPath 100 appear as a logically different object in the SNMP manager, especially if static routing and dedicated backup ports are utilized.

The WAN IP address to be used on the T1 link is automatically "learned" from the first valid IP message received over the unit's dedicated management PVC. Learning will take place as long as the value of the CSU IP Address in NVM (Non-Volatile Memory) is 000.000.000.000.

This approach is practical because the management PVC is dedicated to one NetPath 100 and it will only carry traffic for that NP 100. In this arrangement static routing is typically used, and the first message is either a manual PING initiated by an NCC operator or an automatic status POLL from the SNMP manager. In networks where dynamic routing of the management traffic is used, the WAN IP Address must be set manually because the messages cannot be sent specifically to the NP 100 until it has established communications with its boundary router. This is done through the console port either locally or via VT 100 dial up. Once the IP Address is set or learned it is retained and used until the NVM is cleared or another address is manually set.

The IP Address to be used on each of the ISDN dial up phone numbers can be established using two different options. The first option functions identically to the CSU line described above. The IP Address will be automatically learned when the NVM value is 000.000.000.000. Once learned or set it will not be changed.

The second option is to learn the address on each dial up connection. In this case, after the connection is made, the OOB PPP (Out-Of-Band Point-to-Point Protocol) trap indicating the CSU failure is sent, and communication is established with the frame relay network, the learn function will be enabled. Upon receiving a good IP message the address will be stored in the NVM and displayed on the ISDN configuration display. This can be examined at any time, as the address will remain in the display until a new address is learned.

**NOTES:**

1. Resetting the IP Address will momentarily disrupt all management IP-level traffic and potentially cause the loss of some messages. If the IP Address is set to a new address via a Telnet session it will break that session and require the operator to reconnect to the NetPath 100 via the new IP Address.
2. Upon a T1 line failure the NetPath 100 will (if so configured) create and send an OOB PPP trap indicating the problem(s). This will be sent with the IP Address used for the CSU line. If ISDN dial backup is automatically initiated by the NetPath 100, the system will not change its IP Address to the one associated with the ISDN dial line until the OOB PPP trap is complete or it has timed out. This should occur in less than two minutes using the default settings.
3. If a T1 failure is corrected while the NetPath 100 is on ISDN dial backup, a clear trap will be sent indicating the problem is resolved. This trap will be sent "in band" via the ISDN line and have the IP Address of the dial up line. This address may be different than the address the failure trap was reported on.
4. While on dial backup if the T1 clears and fails again, another failure trap will be sent indicating the current problem, even though the NetPath 100 has not been affected by it. This trap will be sent in band with the IP Address of the ISDN dial-up line.

## Diagnostics

This section contains diagnostic information specific to the ISDN Adapter option.

Refer to section 5 Diagnostics of this manual for diagnostic information regarding basic NetPath 100 features.

ISDN Adapter option diagnostic features include; ISDN Adapter Status information and Tests, Alarm reporting, and Front Panel LED Indicators.

## LED Indicators

The ISDN front panel indicators are shown in Figure 6-7.

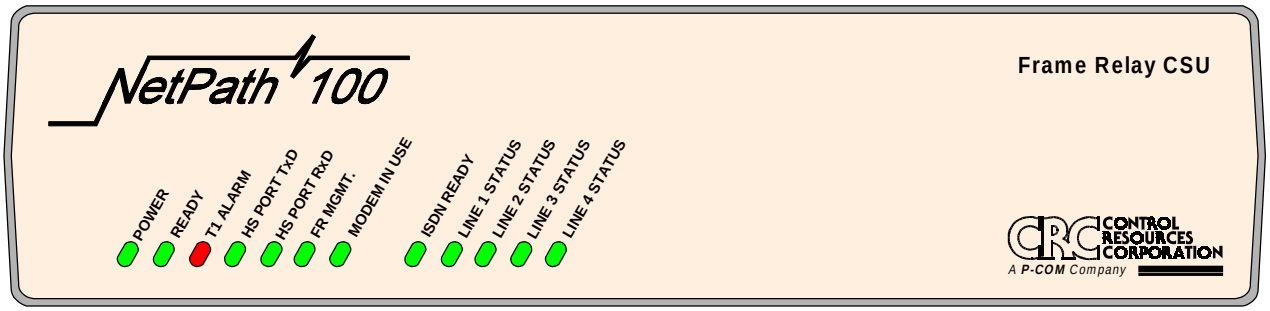



**Figure 6-7 NetPath 100 Front Panel with ISDN Adapter**

ISDN Indicator descriptions are shown in Table 6-3.

**Table 6-3 ISDN Adapter Indicators**

| Nomenclature | Description | Function |
|---|---|---|
| ISDN READY | Green LED | Steady ON, indicates the ISDN Adapter has successfully passed its internal self-test.<br>FLASHING, indicates the unit is performing the self-test.<br>OFF after self-test (test time approx. 45 sec.), indicates a hardware failure was detected during the self-test. |
| LINE 1-4 STATUS | Green/Red LED (Dual Color) | OFF, indicates the ISDN Facility is properly connected and available. |
| | Green | Steady ON, indicates the associated U interface is active.<br>FLASHING, indicates one or both B-Channels are either initiating or answering a call. |
| | Red | Steady ON, indicates an associated U interface alarm.<br>FLASHING, indicates an incorrect SPID.<br>1 Flash - B1 SPID incorrect<br>2 Flashes - B2 SPID incorrect<br>3 Flashes - Both SPIDs incorrect |

## ISDN Tests

ISDN testing features include Network Loopback, User Loopback and Adapter Status information and Tests.

## Network Loopback

The ISDN "B" channels may be looped back (toward the Network) for external testing.

### Configured for Backup operation

Loopback of a B-Channel is automatically initiated when connection is made to a Dial-In call, provided the B-Channel is currently configured for Backup operation.

> **NOTE:** In some cases, the Directory # assigned (as entered and displayed on the ISDN Configuration screen), may not match the actual number to be dialed in order to establish a Dial-In connection to the B-Channels. Contact the Network Control Center or Telephone Service Provider to verify the Dial-In number if problems are encountered.

The Backup process has priority over loopback, and will automatically clear a B-Channel loopback and initiate the Backup process if Backup is triggered while a loopback is established.

### Configured for On-Demand operation

The "Call Out/Loop" test feature on the ISDN Status / Test screen initiates a Bandwidth On Demand (BOD) call-out and sets a loopback toward the Network at the On-Demand configured data rate.

## ISDN Status /Test

The ISDN Status / Test screen provides ISDN Adapter status and test capability.

The ISDN Status / Test screen is accessed from the System View screen, selecting [IT] by typing “IT” followed by ENTER.

The ISDN Status / Test screen is shown in Figure 6-8.

```
***************************** ISDN Status / Test ******************************
     Name: F@43802

   CSU Fault:                           Frame Mgr Fault:
 Test Status:

          Backup Setup [B=]                  High Speed Interface Status
           1) Reset/Arm                              DTR: On
           2) Activate                               RTS: On
           3) Service Disable                      Power: On
           4) Time Disable
               Duration: hh:mm:ss             ISDN Backup: Ready

          Demand Setup [D=]                  On-Demand Interface Status
           1) Reset/Arm                              DTR: Off
           2) Call Out/Loop                          RTS: On
           3) Loop to User                    ISDN Demand: Ready
  Netw:0.0.0.0          User:0.0.0.0        /Name            /Password
     ----- Line 1 ----  ----- Line 2 ----  ----- Line 3 ----  ----- Line 4 ----
 B1: Ready-000          Ready-000          Ready-000-ML
 B2: Ready-000          Ready-000          Ready-000-ML
Help[?]    Close[X]   AutoUpdate[AU]     ViewStats[VS]
>
```

**Figure 6-8 ISDN Status / Test Screen**

**CSU Fault, Frame Mgr Fault, and Test Status**

All Test and/or Fault fields display: Blank or the highest priority Test or Fault causing a disruption of the data path or other operation of the unit.

Refer to the Appendix in this manual for a list and description of all fault displays.

**Backup Setup** - Selects the current state for backup operations.
Selections are as follows:

**Reset/Arm** - Terminates any current activity and clears any Failed or Disabled conditions so that automatic backup initiation may occur. This is the default state.

**Activate** -Initiates backup connection process.

**Service Disable** -Terminates and/or disables all backup activity to prevent initiation of undesired backup while preforming service activity. Disable is automatically released to the Reset/Arm state after 15 continuous minutes of no service activity detected (service activity is indicated by the existence of fault conditions or tests such as Red Alarm, Line Loopback, etc.).

**Time Disable** - Terminates and/or disables all backup activity for the specified period of time. When selected, a prompt is displayed to select the time period (1 to 72 hours). After valid time period is entered, the "Duration" field is displayed, showing the time remaining before Disable is released to the Reset/Arm state.

**High Speed Interface Status** -

**DTR:** State of DTR lead, when Power is being detected from the DTE. States are: ON, OFF or (blank) if Power OFF.
**RTS:** State of RTS lead, when Power is being detected from the DTE. States are: ON, OFF or (blank) if Power OFF.
**Power:** ON or OFF based on sensing voltage on Tx data lead(s) from the DTE.

**ISDN Backup** - Displays current status as reported by ISDN Adapter module.

Status states are:

ISDN Adp Fault - The ISDN hardware has failed (backup cannot be accomplished).
Primary Online - Backup connection in place using Primary Dials.
Secondary Online - Backup connection in place using Secondary Dials.
Primary DwnSpd - Backup connection in place using Primary Dials, but with fewer ISDN connections than configured for.
Secondary DwnSpd - Backup connection in place using Secondary Dials, but with fewer ISDN connections than configured for.
Connecting - Connection is being established.
Failed - Retry attempts exhausted.
ISDN Line Failure - The ISDN line of at least one B-Channel is faulty (backup may not be possible).
ISDN SPID Failure - An invalid or incorrect SPID has been entered for at least one B-Channel (backup may not be possible).
B1 SPID Failure - A B2-Channel cannot operate due to a SPID failure on its associated B1-Channel.
Service Disabled - "Service Disable" has been selected on the "ISDN Status / Test" screen.
Time Disabled - "Time Disable" has been selected on the "ISDN Status / Test" screen.
LoopUp - LoopUp connection in place.
Armed - Default state if not disabled and no failure exists.

**Demand Setup** - Selects the current state for demand operations.

**Reset/Arm** - Terminates any current activity and clears any Failed condition so that automatic demand initiation may occur. This is the default state.

**Call Out/Loop** - Initiates Bandwidth On-Demand (BOD) call-out and sets a loopback toward the Network at the On-Demand configured data rate.
If configured for ML-PPP inverse multiplexing, the user will be prompted to enter the following items:

User Name

User Password

Network IP Address

User IP Address

After entering all the items, they will be displayed on the screen as shown in Figure 6-8 above.

**Loop to User** - Loops data back toward the User at the ISDN Data Port. If a Bandwidth On-Demand call is active, it will be terminated before the loopback is established.

**On - Demand Interface Status** - Displays current state or activity for the interface.
**DTR:** State of DTR lead, ON or OFF.
**RTS:** State of RTS lead, ON or OFF.

**ISDN Demand:** Displays current status as reported by ISDN Adapter module.
Status states are:
ISDN Adp Fault - The ISDN hardware has failed (call cannot be accomplished).
Primary Online - On-Demand connection in place using Primary Dial number(s).
Secondary Online - On-Demand connection in place using Secondary Dial number(s).
Primary DwnSpd - On-Demand connection in place using Primary Dial number(s), but with fewer ISDN B-Channels than specified in configuration.
Secondary DwnSpd - On-Demand connection in place using Secondary Dials number(s), but with fewer ISDN B-Channels than specified in configuration.
Connecting - Connection is being established.
Failed - Retry attempts exhausted.
ISDN Line Failure - The ISDN line of at least one B-Channel is faulty (call may not be possible).
ISDN SPID Failure - An invalid or incorrect SPID has been entered for at least one B-Channel (call may not be possible).
B1 SPID Failure - A B2-Channel cannot operate due to a SPID failure on its associated B1-Channel.
Armed - Default state if not disabled and no failure exists.

**Line *n* / B*n*:** Displays current status of each ISDN line and B Channel.

Status states are:

ISDN Adp Fault - The ISDN hardware has failed.

ISDN Line Failure - The ISDN line of this B-Channel is faulty.

ISDN SPID Failure - An invalid or incorrect SPID has been entered for this B-Channel.

B1 SPID Failure - A B2-Channel cannot operate due to a SPID failure on its associated B1-Channel.

LoopUp - LoopUp connection in place.

Connecting - Connection is being established.

Online - Connection in place.

Ready-xxx(-mmmm) - Default state if not disabled and no failure exists.

"xxx" indicates the latest Cause Code (See NOTE below.)

"mmmm" indicates the last connection status, see Table 6-5 for codes (applies to ML-PPP inverse multiplexing *ONLY*.)

Failed-xxx(-mmmm) - Retry attempts exhausted.

"xxx" indicates the latest Cause Code (See Note below.)

"mmmm" indicates the last connection status, see Table 6-5 for codes (applies to ML-PPP inverse multiplexing *ONLY*.)

**NOTE:** An ISDN switch will return a "Cause Code" indicating a status for the latest connection attempt. A "Ready" or "Failed" status and the latest returned code number are displayed in this field for each configured B-Channel. A list of codes and causes are shown in Table 6-4.

### Commands

**Help [?]** - Advances to "Help" for ISDN Status / Test screen.

**Close [X]** - Returns to System View screen without saving changes.

**AutoUpdate [AU] -** Causes the status fields on the current screen displayed to refresh automatically (approximately every five seconds).

**ViewStats [VS] -** Advances to ISDN Statistics Screen.

## Table 6-4 ISDN Connection Cause Codes

| Code | Cause | | Code | Cause |
|---|---|---|---|---|
| 1 | Unallocated (unassigned) number. | | 52 | Outgoing calls barred. |
| 2 | No route to specified transit network. | | 53 | Outgoing calls barred within CUG. |
| 3 | No route to destination. | | 54 | Incoming calls barred. |
| 4 | Send special information tone. | | 55 | Incoming calls barred within CUG. |
| 5 | Misdialed trunk prefix. | | 57 | Bearer capability not authorized. |
| 6 | Channel unacceptable. | | 58 | Bearer capability not presently available. |
| 7 | Call awarded and being delivered in an established channel. | | 62 | Inconsistency in outgoing information element. |
| 8 | Preemption. | | 63 | Service or option not available, unspecified. |
| 9 | Preemption - circuit reserved for reuse. | | 65 | Bearer service not implemented. |
| 16 | Normal call clearing. | | 66 | Channel type not implemented. |
| 17 | User busy. | | 69 | Requested facility not implemented. |
| 18 | No user responding. | | 70 | Only restricted digital information bearer capability is available. |
| 19 | User alerting, no answer from user. | | 79 | Service or option not implemented, unspecified. |
| 20 | Subscriber absent. | | 81 | Invalid call reference value. |
| 21 | Call rejected. | | 82 | Identified channel does not exist. |
| 22 | Number changed. | | 83 | A suspended call exists, but this call identity does not. |
| 26 | Non-selected user clearing. | | 84 | Call identity in-use. |
| 27 | Destination out of order. | | 85 | No call suspended. |
| 28 | Invalid number format (incomplete number). | | 86 | Call having the requested call identity has been cleared. |
| 29 | Facility rejected. | | 87 | User not a member of CUG. |
| 30 | Responses to STATus ENQuiry. | | 88 | Incompatible destination. |
| 31 | Normal, unspecified. | | 90 | Non-existent CUG. |
| 34 | No circuit/channel available. | | 91 | Invalid transit network selection. |
| 35 | Call Queued | | 95 | Invalid message, unspecified. |
| 38 | Network out of order. | | 96 | Mandatory information element is missing. |
| 39 | Permanent frame mode connection out-of-service. | | 97 | Message type non-existent or not implemented. |
| 40 | Permanent frame mode connection operational. | | 98 | Message not compatible with call state or message type non-existent or not implemented. |
| 41 | Temporary failure. | | 99 | Information element non-existent or not implemented. |
| 42 | Switching equipment congestion. | | 100 | Invalid information element contents. |
| 43 | Access information discarded. | | 101 | Message not compatible with call state. |
| 44 | Requested circuit/channel unavailable. | | 102 | Recovery of timer expiry. |
| 46 | Precedence call blocked. | | 103 | Parameter non-existent or not implemented - passed on. |
| 47 | Resources unavailable, unspecified. | | 110 | Message with unrecognized parameter discarded. |
| 49 | Quality of service unavailable. | | 111 | Protocol error, unspecified. |
| 50 | Requested facility not subscribed. | | 127 | Interworking, unspecified. |

**Table 6-5 ML-PPP Connection Codes**

| Code | Status |
|---|---|
| LCP | Link Configuration Protocol negotiation failure. |
| Auth | Authentication (PAP or CHAP) failure. |
| NCP | Network Configuration Protocol failure. |
| MP | ML-PPP connection established successfully. |

## ISDN Statistics

The ISDN Statistics screen displays summary performance information of ISDN connection activity.

The ISDN Statistics screen is accessed from the ISDN Status / Test screen, selecting [VS] by typing “VS” followed by ENTER.

The ISDN Statistics screen is shown in Figure 6-9.

```
****************************** ISDN Statistics ******************************
     Name: F@43802
 -------------------Channel Connection Attempts / Failures -------------------
               --- Line 1 --     --- Line 2 --     --- Line 3 --     --- Line 4 --
  ISDN:  B1:      0 /     0        0 /     0        0 /     0        0 /     0
         B2:      0 /     0        0 /     0        0 /     0        0 /     0
   LCP:  B1:      0 /     0        0 /     0        0 /     0        0 /     0
         B2:      0 /     0        0 /     0        0 /     0        0 /     0
  Auth:  B1:      0 /     0        0 /     0        0 /     0        0 /     0
         B2:      0 /     0        0 /     0        0 /     0        0 /     0
   NCP:  B1:      0 /     0        0 /     0        0 /     0        0 /     0
         B2:      0 /     0        0 /     0        0 /     0        0 /     0
 ----- Elapsed Times for Most Recent Out Bound Connection (DDD:HH:MM:SS) -----
         B1:   ddd:hh:mm:ss     ddd:hh:mm:ss     ddd:hh:mm:ss     ddd:hh:mm:ss
         B1:   ddd:hh:mm:ss     ddd:hh:mm:ss     ddd:hh:mm:ss     ddd:hh:mm:ss

 ----- Connection Attempts / Failures / Time Since Attempt (DDD:HH:MM:SS) -----
                ---------- Backup ----------    ----------On-Demand --------
      Primary:      0 /     0 / ddd:hh:mm:ss        0 /     0 / ddd:hh:mm:ss
    Secondary:      0 /     0 / ddd:hh:mm:ss        0 /     0 / ddd:hh:mm:ss
ResetStats[RS]
Help[?]    Close[X]    AutoUpdate[AU]
>
```

**Figure 6-9 ISDN Statistics Screen**

**Channel Connection Attempts / Failures** - Counters showing the number of attempts at a connection operation, and the number of failures to successfully complete that operation. Retries are counted as attempts. The counts are shown per B-Channel for each of the call establishment protocols:

**ISDN** - Establishment of ISDN connection (applies to both MLPPP and Mode 1 Bonding).
**LCP** - Link Configuration Protocol negotiation (MLPPP only).
**AUTH** - CHAP/PAP Authentication (MLPPP only).
**NCP** - Network Configuration Protocol negotiation (MLPPP only).

**Elapsed Times for Most Recent Out Bound Connection** - Timer for each B-Channel showing the elapsed time of a current call or the duration of the last call if not currently active.

**Connection Attempts/ Failures/ Time Since Attempt** - Counters for the aggregate bonded bundle (MLPPP or Mode 1) with or without downspeed enabled.

**Attempt** - Counted from time a bundle level action is initiated and includes the entire operation (retries are not counted as separate attempts).

**Failure** - Counted only when a bundle is not established after all retries fail.

**Time Since Last Attempt** - A count of Days, Hours, Minutes, and Seconds shows the time since the most recent attempt occurred for each bundle.

### Commands

**Reset Stats [RS] -** Resets all counters but leaves the time duration values intact.

**Help [?] -** Advances to "Help" for ISDN Statistics screen.

**Close [X] -** Returns to the ISDN/Status Test screen.

**AutoUpdate [AU] -** Causes the status fields on the current screen displayed to refresh automatically (approximately every five seconds).

## ML-PPP Diagnostic Trace Feature

NetPath 100 has a built-in Diagnostic Trace feature which can be used to monitor ML-PPP connection activity. This feature is equivalent to and compliments the diagnostic trace capabilities provided by several other major manufacturers of routers and network switching equipment.

The Trace feature is accessed via VT-100 dial-in to the NetPath 100 ISDN Adapter module. A dial-in call is routed to the ISDN Adapter by the unit's integrated call director (refer to Figure 2-9 of this manual).

The steps to activate a trace are as follows:

1. Dial-in through the unit's modem line. The setup string must include the digits to direct the call to the ISDN Adapter module ("w,,,4").
2. The ISDN startup display and a password prompt will appear. Enter any character followed by ENTER. "Login for PPP TRACE messages" should be displayed.

   **NOTE:** If the startup display does *NOT* have "ISDN" in its first line, then the call was not properly routed to the ISDN Adapter. Hang up, recheck the setup string and place the call again.
3. Turn trace ON by entering the command, "TRACE  PPPTRACE" followed by ENTER.
4. Start diagnostic message display by entering the command, "DIAG" followed by ENTER.

The first line will display, "Entering Diagnostic Mode - Press Esc To go back to OCP Mode". Thereafter, each event message will be displayed as it occurs.

The Trace Diagnostic Mode will remain active until the user presses the "Esc" key or an inactivity logout occurs (5 minutes without keystroke.)

The following is an example of a trace initiation and some of the diagnostic messages displayed during the establishment of a one B-Channel MP-PPP connection.

Establish dial-in connection.

```
atdt(dial number)w,,,4
CONNECT 9600/ARQ

FrameSaver NP 100 - FSU/ISDN Version 01.29 - May 25 2000 - 18:50:45
(C) Copyright Paradyne Corporation, 1997-2000.
All Rights Reserved
```

Enter any character followed by ENTER.

```
Login for PPP TRACE messages
Type HELP for available commands
Type EXIT to end the session

OCP-ISDN>
```

Activate trace by entering “TRACE  PPPTRACE” followed by ENTER.

Start Diagnostic Mode by entering “DIAG” followed by ENTER.

```
OCP-ISDN>TRACE PPPTRACE
PPP Trace Messages Enabled
OCP-ISDN>DIAG
Entering Diagnostic Mode - Press Esc to go back to OCP Mode
OCP-ISDN>
```

Initiate an On-Demand ML-PPP connection, and a sequence of messages similar to those shown in Figure 6-10 will be displayed as the connection is established.

```
OCP-ISDN>DIAG
Entering Diagnostic Mode - Press Esc to go back to OCP Mode
OCP-ISDN>
User  : LCP:   Phase is Establishing
Netw/0: LCP:   Phase is Establishing
User  : LCP:   Timer Expired
Netw/0: LCP:   Timer Expired
User  : LCP:   Received CONFIG REQ
User  : LCP:        MagicNumber 3a126c8
Netw/0: LCP:   Sent CONFG REQ
Netw/0: LCP:        MRU 1500
Netw/0: LCP:       MagicNumber 9fbf2
Netw/0: LCP:        MRRU 1500
Netw/0: LCP:       EndpointDisc Local/59511
Netw/0: LCP:   Received CONFIG REQ
Netw/0: LCP:        AuthProto PAP
Netw/0: LCP:        MagicNumber 158ada97
Netw/0: LCP:        MRRU 1524
Netw/0: LCP:        EndpointDisc Type/# = 1/Router6
User  : LCP:   Sent CONFIG REQ
User  : LCP         MRU 1524
User  : LCP:        AuthProto PAP
User  : LCP:        MagicNumber 9fbfa
Netw/0: LCP:   Received CONFIG ACK
User  : LCP:   Received CONFIG ACK
User  : LCP:   Received CONFIG REQ
User  : LCP:         MagicNumber 3a1260c8
User  : LCP:   Sent CONFIG ACK
User  : LCP:   State is Open
User  : PAP:   Received AUTHENTICATE REQ
Netw/0: MP     MP Bundle is Establishing
Netw/0: LCP:   Sent CONFIG ACK
Netw/0: LCP:   State is Open
Netw/0: PAP:   Phase is Authenticating
User  : LCP    Received ECHO REQ
User  : LCP:   Sent ECHO REPLY
Netw/0: PAP:   Timer Expired
Netw/0: LCP    Received ECHO REQ
Netw/0: LCP:   Sent ECHO REPLY
User  : PAP:   Received AUTHENTICATE REQ
Netw/0: PAP:   Forwarded AUTHENTICATE REQ
Netw/0: PAP:   Received AUTHENTICATE ACK
User  : PAP:   Forwarded AUTHENTICATE ACK
User  : PAP:   Authentication Phase Complete
User  : NCP:   Phase is Establishing
Netw/0: PAP:   Authentication Phase Complete
Netw/0: MP:    MP Bundle Established
```

**Figure 6-10 MLPPP TRACE**

## Alarms

NetPath 100 generates “traps” (SNMP alarms or alerts) in response to certain detected network conditions. Specific Traps apply to the ISDN Adapter option.

## Traps

ISDN-related conditions (objects) which generate traps are listed in Table 6-6.

**Table 6-6 Traps - Private MIB Extension**

| Component | Object | Description | Trap Reported In-Band/ Modem |
|---|---|---|---|
| ISDN | ISDN Adapter Fault | Adapter failed self-test after reset or periodic check. | In-Band |
| | ISDN Line Failure | Loss of connectivity with CO Switch. | In-Band |
| | ISDN Backup | Issued for the following conditions:<br>On-Line<br>On-Line reminder (every 2 hrs)<br>Idle<br>Failed | Modem* and In-Band |
| | ISDN Demand | Issued for the following conditions:<br>Primary On-Line<br>Primary Downspeed<br>Secondary On-Line<br>Secondary Downspeed<br>Primary On-Line Reminder (every 2 hrs)<br>Primary Downspeed Reminder (every 2 hrs)<br>Secondary On-Line Reminder (every 2 hrs)<br>Secondary Downspeed Reminder (every 2 hrs)<br>Idle<br>Failed | Modem* and In-Band |
| * Modem-Reported Traps are only issued on the occurrence of a primary facility failure and provided that the modem is not already in use when the trap occurs. | | | |

**NOTE:** During ISDN multi-B-Channel Demand operation, if a B-Channel connection fails, and Downspeed is enabled, the downspeed change will be reported by the next “Reminder” trap.

## LED Indicator Troubleshooting

The ISDN Adapter front panel LED indicators may also be used to troubleshoot a problem. Table 6-7 describes the ISDN Adapter LED indicator's normal states, and some possible causes for abnormal indications.

.

**Table 6-7 NetPath 100 ISDN Adapter LED Diagnostics**

| NetPath 100 ISDN Adapter LED Status | | Condition | Possible Cause(s) |
|---|---|---|---|
| ISDN READY | LINE 1 - 4 STATUS | | |
| ON | OFF | NORMAL, No problem. | Normal LED status for ISDN Adapter. |
| Flashing | --- | ISDN Adapter performing Self-test. | Normal on power-up or reset, duration of test approx. 30 seconds. Successful completion sets ISDN READY LED On steady.<br>Continuous cycles of flashing indicate critical internal circuit fault. Replace with known good NetPath 100. |
| OFF | --- | ISDN Adapter fails Self-test. | Internal circuit fault.<br>Replace with known good NetPath 100. |
| ON | OFF | ISDN facility is properly connected, available, and configured. | Normal indication after Configuration. |
| ON | ON<br>Green | Indicates the associated U-Interface for that line is active (at least one of the B-Channels for this interface are on line or looped back). | Normal indication. |
| ON | Flashing<br>Green | One or both B-Channels are either initiating or answering a call. | Normal indication. |
| ON | ON<br>Red | Loss of ISDN facility. | Check ISDN facility. |
| ON | Flashing<br>Red | 1 Flash - B1 SPID incorrect.<br>2 Flashes - B2 SPID Incorrect.<br>3 Flashes - Both SPIDs incorrect. | Correct SPID configuration information. |
| **NOTE:** A table entry of "---" means status of that LED is not relevant. | | | |

## Additional Descriptions

This (these) paragraphs provide additional information, notes, or tips about some of the specific operating features of the ISDN Adapter option.

This information is intended to assist anyone in the use of these features or in trouble-shooting problems concerning these features.

## ISDN Adapter Software Download

Initiation of the download process is by command or as the result of a detected error. The ISDN Adapter provides no LED indication for the download process.

Once the download process is initiated, the ISDN Adapter must complete the download before it is able to perform any other functions.

Upon completion of the download, the ISDN Adapter reinitializes by performing its start-up self-test.

The actual download is performed by dial-in to the NetPath 100 modem using a special application for this purpose.

# Appendix

## Fault & Test Screen Displays

NetPath 110 screen displays include status fields which indicate Fault and/or Test conditions that relate to the selected screen. These fields are indicated on the screens by a title such as “System Test/Fault”. After the title, the highest priority fault or test currently active is displayed, if any.

This section provides a list of entries for the Status, Fault or Test which may appear for each Title. The entries are listed in the tables in the order of highest priority-first. Priority levels within tables are separated by a double line between rows.

The tables are presented by title (screen field) in alphabetical order.

They are as follows:

- CSU Fault
- Frame Fault
- ISDN Backup
- ISDN Demand
- Line *n*/B*n* (ISDN)
  ISDN Connection Cause Codes
  ML-PPP Connection Codes
- Modem Status, Fault
- Network Set Loop
- System Test/Fault
- Test/BKP
- Test Status

## CSU Fault

CSU Fault shows the highest priority CSU fault currently detected. This is displayed on the Device Status / Test and ISDN Status / Test screens.

**Table A-1 CSU Fault**

| Display | Description |
|---|---|
| **CSU Fault** | Failure of CSU related hardware detected by the unit. |
| **CSU CFA/Red Alarm** | Detected loss of T1 facility. |
| **CSU Rmt/Yellow Alarm** | Carrier alarm notification that Transmit failure from this DCE has been detected on this T1 facility. |
| **CSU AIS/Blue Alarm** | Carrier alarm notification that an upstream signal failure has been detected on this T1 facility. |
| **CSU Threshold Alarm** | Link Error Threshold reached or exceeded. |

## Frame Manager Fault

Frame Manager Fault shows the highest priority Frame Manager fault currently detected. This is displayed on the Device Status / Test and ISDN Status / Test screens.

**Table A-2 Frame Manager Fault**

| Display | Description |
|---|---|
| **Clear Channel** | Frame Manager configured for and operating in “Transparent” mode. |
| **LMI Netw Failure** | Invalid or no response to LMI Status enquiries toward Network. |
| **LMI User Failure** | Invalid or no LMI Status requests from User equipment. |
| **Netw Threshold Alarm** | Network Link Error Threshold (Data Frame Error Seconds) reached or exceeded. |
| **User Threshold Alarm** | User Link Error Threshold (Data Frame Error Seconds) reached or exceeded. |
| **PVC Drpd Mon Alarm** | PVC Dropped Monitor Packet Threshold reached or exceeded. |
| **PVC Dlvd Mon Alarm** | Percentage of delivered packets for a PVC, has fallen below the PVC Dlvd Pkt Threshold value. |
| **PVC Delay Alarm** | PVC Delay Threshold reached or exceeded. |
| **BECN/FECN Alarm** | BECN/FECN Error Threshold reached or exceeded. |

## ISDN Backup

ISDN Backup shows the highest priority ISDN Backup related fault, test or status currently detected. This is displayed on the System View and ISDN Status / Test screens.

**Table A-3 ISDN** (Backup, User Circuit)

| Display | Description |
|---|---|
| **ISDN Adapt Fault** | The ISDN hardware has failed (backup cannot be accomplished) |
| **Primary On Line** | Backup connection in place using Primary Dials. |
| **Secondary On Line** | Backup connection in place using Secondary Dials. |
| **Primary Dwn Spd** | Backup connection in place using Primary Dials, but with fewer ISDN connections than configured for. |
| **Secondary Dwn Spd** | Backup connection in place using Secondary Dials, but with fewer ISDN connections than configured for. |
| **Connecting** | Connection is being established. |
| **Failed** | Retry attempts exhausted. |
| **ISDN Line Failure** | The ISDN line of at least one B-Channel is faulty (backup may not be possible). |
| **ISDN SPID Failure** | An invalid or incorrect SPID has been entered for at least one B-Channel (backup may not be possible). |
| **B1 SPID Failure** | A B2-Channel cannot operate due to a SPID failure on its associated B1-Channel. |
| **Service Disabled** | "Service Disable" has been selected on the "ISDN Status / Test" screen. |
| **Time Disabled** | "Time Disable" has been selected on the "ISDN Status / Test" screen. |
| **Loop Up** | LoopUp connection in place on any assigned B-Channel. |
| **Armed** | Default state if not disabled and no failure exists. |

## ISDN Demand

ISDN Demand shows the highest priority ISDN On-Demand related fault, test or status currently detected. This is displayed on the System View and ISDN Status / Test screens.

**Table A-4 ISDN** (On-Demand Port)

| Display | Description |
|---|---|
| **ISDN Adapt Fault** | The ISDN hardware has failed (call cannot be accomplished) |
| **Connecting** | On-Demand connection in place using Primary Dials. |
| **Failed** | On-Demand connection in place using Secondary Dials. |
| **Loop to User** | On-Demand connection in place using Primary Dials, but with fewer ISDN connections than configured for. |
| **Online Call/Lp** | On-Demand connection in place using Secondary Dials, but with fewer ISDN connections than configured for. |
| **Primary On Line** | Connection is being established. |
| **Secondary On Line** | Retry attempts exhausted. |
| **Primary Dwn Spd** | The ISDN line of at least one B-Channel is faulty (call may not be possible). |
| **Secondary Dwn Spd** | An invalid or incorrect SPID has been entered for at least one B-Channel (call may not be possible). |
| **ISDN Line Failure** | "Time Disable" has been selected on the "ISDN Status / Test" screen. |
| **ISDN SPID Failure** | LoopUp connection in place on any assigned B-Channel. |
| **B1 SPID Failure** | Default state if not disabled and no failure exists. |
| **Armed** | The ISDN hardware has failed (call cannot be accomplished) |

## Line *n*/B*n* (ISDN)

Line *n*/B*n* shows the highest priority fault, test or status currently detected for each ISDN Line (1-4) and B-Channel (1-2). This is displayed on the ISDN Status / Test screen.

**Table A-5 Line *n*/B*n* (ISDN)**

| Display | Description |
|---|---|
| **ISDN Adapt Fault** | The ISDN hardware has failed. |
| **ISDN Line Failure** | The ISDN line of this B-Channel is faulty. |
| **ISDN SPID Failure** | An invalid or incorrect SPID has been entered for this B-Channel. |
| **B1 SPID Failure** | A B2-Channel cannot operate due to a SPID failure on its associated B1-Channel. |
| **LoopUp** | LoopUp connection in place. |
| **Connecting** | Connection is being established. |
| **Online** | Connection in place. |
| **Online-mmmm (Applies to MLPPP only)** | Connection in place.<br>"mmmm" indicates the last connection status, see Table A-7 |
| **Failed-xxx** | Retry attempts exhausted.<br>"xxx" indicates the latest Cause Code (See Note below.) |
| **Failed-xxx-mmmm (Applies to MLPPP only)** | Retry attempts exhausted.<br>"xxx" indicates the latest Cause Code (See Note below.)<br>"mmmm" indicates the last connection status, see Table A-7 for codes. |
| **Ready-xxx** | Default state if not disabled and no failure exists.<br>"xxx" indicates the latest Cause Code (See NOTE below.) |
| **Ready-xxx-mmmm (Applies to MLPPP only)** | Default state if not disabled and no failure exists.<br>"xxx" indicates the latest Cause Code (See NOTE below.)<br>"mmmm" indicates the last connection status, see Table A-7 for codes. |

**NOTE:** An ISDN switch will return a "Cause Code" indicating a status for the latest connection attempt. A "Ready" or "Failed" status and the latest returned code number are displayed in this field for each configured B-Channel. A list of codes and causes are shown in Table A-6 on the following page.

## Table A-6 ISDN Connection Cause Codes

| Code | Cause | | Code | Cause |
|---|---|---|---|---|
| 1 | Unallocated (unassigned) number. | | 52 | Outgoing calls barred. |
| 2 | No route to specified transit network. | | 53 | Outgoing calls barred within CUG. |
| 3 | No route to destination. | | 54 | Incoming calls barred. |
| 4 | Send special information tone. | | 55 | Incoming calls barred within CUG. |
| 5 | Misdialed trunk prefix. | | 57 | Bearer capability not authorized. |
| 6 | Channel unacceptable. | | 58 | Bearer capability not presently available. |
| 7 | Call awarded and being delivered in an established channel. | | 62 | Inconsistency in outgoing information element. |
| 8 | Preemption. | | 63 | Service or option not available, unspecified. |
| 9 | Preemption - circuit reserved for reuse. | | 65 | Bearer service not implemented. |
| 16 | Normal call clearing. | | 66 | Channel type not implemented. |
| 17 | User busy. | | 69 | Requested facility not implemented. |
| 18 | No user responding. | | 70 | Only restricted digital information bearer capability is available. |
| 19 | User alerting, no answer from user. | | 79 | Service or option not implemented, unspecified. |
| 20 | Subscriber absent. | | 81 | Invalid call reference value. |
| 21 | Call rejected. | | 82 | Identified channel does not exist. |
| 22 | Number changed. | | 83 | A suspended call exists, but this call identity does not. |
| 26 | Non-selected user clearing. | | 84 | Call identity in-use. |
| 27 | Destination out of order. | | 85 | No call suspended. |
| 28 | Invalid number format (incomplete number). | | 86 | Call having the requested call identity has been cleared. |
| 29 | Facility rejected. | | 87 | User not a member of CUG. |
| 30 | Responses to STATus ENQuiry. | | 88 | Incompatible destination. |
| 31 | Normal, unspecified. | | 90 | Non-existent CUG. |
| 34 | No circuit/channel available. | | 91 | Invalid transit network selection. |
| 35 | Call Queued | | 95 | Invalid message, unspecified. |
| 38 | Network out of order. | | 96 | Mandatory information element is missing. |
| 39 | Permanent frame mode connection out-of-service. | | 97 | Message type non-existent or not implemented. |
| 40 | Permanent frame mode connection operational. | | 98 | Message not compatible with call state or message type non-existent or not implemented. |
| 41 | Temporary failure. | | 99 | Information element non-existent or not implemented. |
| 42 | Switching equipment congestion. | | 100 | Invalid information element contents. |
| 43 | Access information discarded. | | 101 | Message not compatible with call state. |
| 44 | Requested circuit/channel unavailable. | | 102 | Recovery of timer expiry. |
| 46 | Precedence call blocked. | | 103 | Parameter non-existent or not implemented - passed on. |
| 47 | Resources unavailable, unspecified. | | 110 | Message with unrecognized parameter discarded. |
| 49 | Quality of service unavailable. | | 111 | Protocol error, unspecified. |
| 50 | Requested facility not subscribed. | | 127 | Interworking, unspecified. |

**Table A-7 ML-PPP Connection Codes**

| Code | Status |
|---|---|
| LCP | Line Configuration Protocol negotiation failure. |
| Auth | Authentication (PAP or CHAP) failure. |
| NCP | Network Configuration Protocol failure. |
| MP | ML-PPP connection established successfully. |

## Modem Status, Fault

Modem Status shows the highest priority internal modem related fault currently detected. This is displayed on the System View screen.

**Table A-8 Modem Status, Fault**

| Display | Description |
|---|---|
| **Modem Failure** | Failure of Modem hardware detected by the unit. |
| **Dial Line Failure** | Failure of routine Dial Line test detected. |

## Network Set Loop

Network Set Loop shows the highest priority externally initiated loopback currently running. This is displayed on the Device Status / Test screen.

**Table A-9 Network Set Loop**

| Display | Description |
|---|---|
| **Line Lp to Netw** | Full T1 Line loopback in place toward Network Circuit. |
| **Payld Lp to Netw** | Full T1 Payload loopback in place toward Network Circuit. |
| **V54 User Lp to Netw** | Loopback is in place at the User Port toward the Network Circuit, in response to a V.54 LoopUp code from the Network (only if DS0s are assigned to the User Port.) |

## System Test/Fault

System Test / Fault shows the highest priority System related test or fault currently detected. This is displayed on the System View, CSU Statistics Summary and Frame Manager Statistics Summary screens.

**Table A-10 System Test/Fault**

| Display | Description |
|---|---|
| **Improper Aux2 Cable** | Improper cable connection has been detected (Pin 8 may not be used.) |
| **NVM Failure** | Failure of NVM (Non-Volatile Memory) detected by the unit and the latest configuration may *not* have been saved. |
| **Lp to User** | Loopback is in place at the User Port toward the User Circuit. |
| **2047 Payld to User** | 2047 pattern BERT is being sent toward the User Circuit. |
| **LMI Netw Failure** | Invalid or no response to LMI Status enquiries toward Network. DS0s must be assigned to the User Port. |
| **LMI User Failure** | Invalid or no LMI Status requests from User equipment. DS0s must be assigned to the User Port. |
| **CSU Fault** | Failure of CSU related hardware detected by the unit. |
| **Line Lp to Netw** | Full T1 Line loopback in place at Network Port toward Network Circuit. |
| **Payld Lp to Netw** | Full T1 Payload loopback in place toward Network Circuit. |
| **V.54 Lp to Netw** | Loopback is in place at the User Port toward the Network Circuit, in response to a V.54 LoopUp code from the Network (only if DS0s are assigned to the User Port.) |
| **QRSS to Netw** | QRSS pattern BERT is being sent toward the Network Circuit. |
| **Alt Ones to Netw** | Alternating Ones pattern BERT is being sent toward the Network Circuit. |
| **2047 Payld to Netw** | 2047 pattern BERT is being sent toward the Network Circuit. |
| **CFA/Red Alarm** | Detected loss of T1 facility. |
| **Rmt/Yellow Alarm** | Carrier alarm notification that Transmit failure from this DCE has been detected on this T1 facility. |
| **AIS/Blue Alarm** | Carrier alarm notification that an upstream signal failure has been detected on this T1 facility. |
| **Netw Threshold Alarm** | Network Link Error Threshold (Data Frame Error Seconds) reached or exceeded. DS0s must be assigned to the User Port. |
| **User Threshold Alarm** | User Link Error Threshold (Data Frame Error Seconds) reached or exceeded. DS0s must be assigned to the User Port. |
| **CSU Threshold Alarm** | Link Error Threshold reached or exceeded. |
| **PVC Drpd Mon Alarm** | PVC Dropped Monitor Packet Threshold reached or exceeded. DS0s must be assigned to the User Port. |

**Table A-10 System Test/Fault**

| Display | Description |
|---|---|
| **PVC Dlvd Pkt Alarm** | Percentage of delivered packets for a PVC, has fallen below the PVC Dlvd Pkt Threshold value. DS0s must be assigned to the User Port. |
| **PVC Delay Alarm** | PVC Delay Threshold reached or exceeded. DS0s must be assigned to the User Port. |
| **BECN/FECN Alarm** | BECN/FECN Error Threshold reached or exceeded. |
| **Test Pkts to Netw** | Link Test Packets (40 -1590 octets) are being sent toward the Network Circuit. |

## Test/BKP (CSU)

Test/BKP shows the highest priority CSU related test or Backup (ISDN) condition detected within the interval. This is displayed on the CSU Statistics Summary screen.

**Table A-11 Test/BKP** (CSU)

| Display | Description |
|---|---|
| **Netw Set Line** | Externally initiated (Network sent code) Full T1 Line loopback in place at Network Port toward Network Circuit. |
| **Netw Set Payld** | Externally initiated (Network sent code) Full T1 Payload loopback in place toward Network Circuit. |
| **Netw Set V.54** | Externally initiated (Network sent V.54 code) Payload loop back in place toward Network Circuit. |
| **Mgmt Line Netw** | Operator initiated Full T1 Line loopback in place at Network Port toward Network Circuit. |
| **Mgmt Pyld Netw** | Operator initiated Full T1 Payload loopback in place toward Network Circuit. |
| **Mgmt Send Lp Up** | Operator initiated T1 Line Loop Up code sent toward the Network. |
| **Mgmt Send LpDn** | Operator initiated T1 Line Loop Down code sent toward the Network. |
| **Mgmt QRSS Netw** | Operator initiated QRSS pattern BERT is being sent toward the Network Circuit. |
| **Mgmt Alt1 Netw** | Operator initiated Alternating Ones pattern BERT is being sent toward the Network Circuit. |
| **Mgmt 2047 Netw** | Operator initiated 2047 pattern BERT is being sent toward the Network Circuit. |
| **Mgmt 2047 User** | Operator initiated 2047 pattern BERT is being sent toward the User Circuit. |
| **Mgmt Loop User** | Operator initiated Loopback applied toward the User Port. |

## Test Status

Test Status shows the highest priority test currently running. This is displayed on the ISDN Status / Test screens.

**Table A-12 Test Status**

| Display | Description |
|---|---|
| **Lp to User** | Loopback is in place at the User Port toward the User Circuit. |
| **2047 Payld to User** | 2047 pattern BERT is being sent toward the User Circuit. |
| **Line Lp to Netw** | Full T1 Line loopback in place at Network Port toward Network Circuit. |
| **Payld Lp to Netw** | Full T1 Payload loopback in place toward Network Circuit. |
| **V.54 Lp to Netw** | Loopback is in place at the User Port toward the Network Circuit, in response to a V.54 LoopUp code from the Network (only if DS0s are assigned to the User Port.) |
| **QRSS to Netw** | QRSS pattern BERT is being sent toward the Network Circuit. |
| **Alt Ones to Netw** | Alternating Ones pattern BERT is being sent toward the Network Circuit. |
| **2047 Payld to Netw** | 2047 pattern BERT is being sent toward the Network Circuit. |
| **Test Pkts to Netw** | Link Test Packets (40 -1590 octets) are being sent toward the Network Circuit (only on the DS0s assigned to the User Port.) |