SkyPerformer Option NetPerformer[®] System Reference







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Product Overview

1.1 About SkyPerformer

SkyPerformer is a licensed software option that provides satellite access functionality to the NetPerformer product line.

- With SkyPerformer, a hybrid terrestrial/satellite network is created using a single hardware platform and network management system.
- This solution is able to exploit the broadcast nature of satellite communications, while taking advantage of powerful NetPerformer features.

NOTE: The SkyPerformer network solution requires external third-party satellite modems that operate up to 2 or 6 Mbps, depending on the application.



Figure 1-1: SkyPerformer Hybrid Network

1.2 SkyPerformer Features

The SkyPerformer software is based on Frame Relay standards and offers a scalable solution for both remote and central sites:

- Permits seamless communication with any Frame Relay compliant equipment such as FRADs, routers and switches.
- Goes where terrestrial Frame Relay cannot, providing a cost-effective solution for small to medium sized satellite networks.
- Efficiently consolidates voice, data and LAN traffic with terrestrial Frame Relay networks and equipment.
- Offers a hubless VSAT solution that requires neither an expensive DAMA computer nor a central site switch (TDMA).
- Interfaces with all third-party satellite modems.
- Supports a wide variety of satellite network topologies: single or distributed star, partially meshed, point-to-point and multipoint networks.

1.2.1 SkyPerformer versus Point-to-Point Single Channel Per Carrier

The SkyPerformer option offers a superior solution to the point-to-point Single Channel Per Carrier (SCPC) approach:

- SkyPerformer requires fewer satellite carriers. This results in a significant reduction in bandwidth and considerable cost savings.
- It uses less hardware and may dispense with a central site PBX or host, for reduced one-time capital costs.
- It provides better performance:
 - Minimizes double-hop satellite delay for voice/data
 - Minimizes double compression for voice.

1.2.2 NetPerformer Platform

To support satellite functionality in a NetPerformer network, the SkyPerformer software is loaded onto each participating NetPerformer product. This means that the SkyPerformer option is able to take advantage of the NetPerformer base software and feature set:

- Integrates SNA, legacy data, LAN traffic, toll-quality analog or digital voice and fax transmissions over a single communication circuit.
- Transmits and receives traffic over public or private Frame Relay or leased line networks for both terrestrial and satellite communications.
- Replaces SNA leased lines with a single Frame Relay connection supporting both PVCs and SVCs.
- Supports IP/IPX/OSPF routing and bridging.

- Takes advantage of highly efficient data compression algorithms.
- Adds provision for line failure with Virtual Connections and Dial Backup functions.
- Optimizes bandwidth utilization with cell-based multi-protocol prioritization, Bandwidth-On-Demand and Load Balancing.
- Manages the impact of bursty LAN traffic and handles time-sensitive applications with reduced delays.
- Ensures standards compliant interoperability with RFC-1490 and SNMP management.
- Facilitates firmware upgrades through FTP download and proprietary access tools.

1.2.3 Participating Products

The SkyPerformer option can be installed on the following NetPerformer products:

NetPerformer Model	Product Description
SDM-9500	Central site rackmount chassis with 8 card slots and 1 expansion slot. SkyPerformer supported on SDM-9585 voice/data card, SDM-9580 high-end data card and SDM- 9530 entry-level data card.
SDM-9380	Regional office unit with 3 WAN/user ports, 1 Ethernet port, and 4 expansion slots for optional analog voice or digital voice/data interface cards.
SDM-9220/9230	A cost-effective voice and data integrated access device for the branch office. It provides up to 3 serial ports, 2 Ethernet ports and 2 or 3 slots, depending on the model.
SDM-9360	Branch office unit with 2 WAN/user ports, 1 Ethernet port, and 4 expansion slots for optional analog voice or digital voice/data interface cards.
SDM-9400	Regional office unit (legacy model) with 8 WAN/user ports, 8 expansion slots for optional VFC-03 analog voice/ fax cards or E1/T1/ISDN cards paired with DVC-06 digital voice/fax cards, and 4 high-speed I/O slots for optional Ethernet or channelized CSU/DSU cards.
SDM-9350	Branch office unit (legacy model) with 4 WAN/user ports, 2 analog voice/fax channels, and 2 expansion slots for optional voice (2 analog channels), Ethernet, Token-Ring or channelized CSU/DSU cards.

Table 1-1: Participating NetPerformer products

NetPerformer Model	Product Description
SDM-8400	A cost-effective data only access device for the regional or branch office, as well as a serial port extender unit. It provides 4 to 8 serial ports with 1 Ethernet port.
SDM-8200	Small branch office data-only unit (legacy model) with 1 or 2 WAN/user ports.

 Table 1-1: Participating NetPerformer products

NOTE: The PowerCell license is a prerequisite for installing the SkyPerformer option on the SDM-9220/9220GW or SDM-9230/9230GW.

1.3 Network Topologies Supported

SkyPerformer supports three main types of satellite networks:

- Single star
- Distributed star
- Partial mesh
- Full mesh.

1.3.1 Single Star Network



Figure 1-2: Single Star Network Connections









Figure 1-3: Single Star Network with SkyPerformer

1.3.2 Distributed Star Network



Figure 1-4: Distributed Star Network Connections



Figure 1-5: Distributed Star Network with SkyPerformer

1.3.3 Partial Mesh Network



Figure 1-6: Partial Mesh Network Connections









Figure 1-7: Partial Mesh Network with SkyPerformer

1.3.4 Full Mesh Network



Figure 1-8: Full Mesh Network Connections



Figure 1-9: Full Mesh Network with SkyPerformer

1.4 Typical SkyPerformer Applications

SkyPerformer has been designed to handle the following networks:

- Hybrid terrestrial/satellite networks with a mix of voice and data
- Networks that start small and need to grow. SkyPerformer and the NetPerformer provide modular expansion capabilities.
- · Multiplexer/SCPC modem networks, especially for multipoint applications
- Small to medium-sized enterprise networks:
 - Star networks with up to 350 sites
 - Distributed star networks with unlimited sites
 - Mesh networks with up to 50 sites.

In particular, SkyPerformer is ideal for the following applications:

- Voice/data enterprise solutions via satellite (see Figure 1-10)
- E1/T1 voice trunking via satellite (see Figure 1-11)
- Internet backbone extension via satellite (see Figure 1-12)
- Public network extension via satellite (see Figure 1-13).

NOTE: An example application, with a screen dump of the console configuration it requires, is provided in "Example Application" on page 5-1.

1.4.1 Voice/data Enterprise Networks

In this application all NetPerformer units in the enterprise network communicate via satellite connection using the SkyPerformer software.



Figure 1-10: Voice/data Enterprise Network via Satellite

1.4.2 E1/T1 Voice Trunking

This application shows how digital voice traffic from multiple E1 channels can be sent to remote sites via satellite connection. It is ideal for:

- Bypass operators
- Public telephony
- Cellular
- Wireless Local Loop.



Figure 1-11: E1/T1 Voice Trunking via Satellite

1.4.3 Internet Backbone Extension

This application shows how a NetPerformer gateway with SkyPerformer can provide Internet access to multiple POP/ISP sites via satellite, supporting connections to PSTN, ISDN and ADSL modems.



Figure 1-12: Internet Backbone Extension via Satellite

1.4.4 Public Network Extension

A Public network can be extended to remote areas with the addition of SkyPerformer satellite access.



Figure 1-13: Public Network Extension via Satellite

1.5 Theory of Operation

1.5.1 Transmission to Remote Sites



Figure 1-14: SkyPerformer Transmission to Remote Sites

In the diagram above, the SkyPerformer at the main headquarters transmits to the remote sites in a star topology.

- Uses the Frame Relay standard, with the DLCI addresses included in the frame headers
- Supports Multiple-Address Per Carrier (MAPC)
- A connection is made when the remote unit receives the carrier from the central site
- Each remote unit filters all packets received, keeping only those packets that carry its DLCI address.

1.5.2 Reception at Main Headquarters



Figure 1-15: SkyPerformer Reception at Main Headquarters

In the diagram above, the remote SkyPerformer units return traffic to the main headquarters in a star topology.

- Each unit transmits at a different frequency
- Each remote unit filters the received packets using Transmit/Receive Address Filtering. Packets not addressed to the unit are discarded.
- In this way, Frame Relay switching over satellite is achieved.

1.5.3 Intra-network Transmissions



Figure 1-16: SkyPerformer Intra-network Transmissions

In the diagram above, some remote SkyPerformer units send traffic to other remote units in addition to the main headquarters.

- Each unit transmits at a different frequency
- Each unit filters the received packets using Transmit/Receive Address Filtering, and keeps only those packets that are addressed to it
- In this way, a partial mesh topology is achieved.

NOTE: A demodulator can receive at a single frequency only. For each frequency required, you must connect a separate demodulator to the NetPerformer.

- For network requirements and the software load procedure, turn to "Getting Started" on page 2-1.
- For the configuration procedure, turn to "Configuration" on page 3-1.
- For monitoring and statistics capabilities, turn to "Monitoring and Statistics" on page 4-1.
- For a typical application scenario, turn to "Example Application" on page 5-1.



Getting Started

2.1 Preparing the Site

This chapter offers some helpful hints for site preparation, network planning and activating the software license. A general power-up procedure is provided at the end of this chapter.

2.1.1 Unpacking

As soon as you receive the SkyPerformer product package, check the package and its contents for any sign of damage during shipment. If there is any damage, contact the shipping agent immediately.

Verify the contents of the SkyPerformer package to ensure that you have received a complete shipment, which includes the following items:

- Software License Key label on package cover
- SkyPerformer product license
- This guide.

If any of these items are missing, or if you have any questions concerning your shipment, please contact your NetPerformer distributor.

2.1.2 What You Will Need

For trouble-free product installation you should have the following items on hand:

- The SkyPerformer product package, including the Software License Key.
- The NetPerformer unit that will serve as the main chassis.
- (Optional) One or more additional NetPerformer units that will serve as expansion chassis, if required.
- Third party external satellite modems. These modems are required for modulation/demodulation between the SkyPerformer and the earth station. They typically have the following characteristics:
 - IF frequency: 52-88 MHz, 104-176 Mhz or 950-1450 MHz
 - Modulation: BPSK or QPSK
 - FEC: Rate 1/2, 3/4, 7/8 convolutional encoding, Viterbi decoding
- **NOTE:** SkyPerformer transmissions are independent of these modem frequencies, modulation and FEC, since the NetPerformer chassis connects to the external satellite modem using a V.35 or other type of serial connection.
 - Bit rate: 9.6 Kbps to 2 or 6 Mbps, depending on the application.
 - A configuration and management access device, either:

- A console terminal (TTY terminal or a PC equipped with terminal emulation software) for direct or dial-up connection to the console port at the rear of the NetPerformer unit,
- A TELNET network device accessed through IP connectivity over LAN/ WAN, or
- An SNMP agent accessed through IP connectivity over LAN/WAN.
- **NOTE:** If the NetPerformer unit still has its factory configuration, the only configuration device that will work is the console terminal, since the unit does not yet have an IP address.
 - All user equipment that will be directly connected to the SkyPerformer ports. This includes external satellite modems for communication to (modulators) and from (demodulators) the earth station.
 - A sufficient number and length of cables. Refer to the *Hardware Installation Guide* for the specific product (or *Quick Setup Guide*, for legacy products).
 Also refer to page 6 of this document for a table of required physical connections.

2.2 Network Diagram

Before you install the SkyPerformer software and connect the NetPerformer to your satellite equipment, you should have a clear idea of how you want to design your network. To do this, create a network diagram:

- 1. Draw a diagram of your proposed physical network. This diagram will prove useful when configuring the SkyPerformer or making later modifications to your network.
- 2. Determine what naming convention you will use to distinguish this SkyPerformer from all other NetPerformer units in your network. We suggest that you name each unit according to its location, to reflect the physical network structure. Write all unit names on the network diagram.
- **3.** Next to each SkyPerformer unit, make a list of all equipment you want to support at each site. A main chassis can have:
 - One **MODULATOR** port for connection to an external modulator (TX satellite modem). The modulator transmits packets to the satellite.
 - One or more **DEMODULATOR** ports for connection to an external demodulator (RX satellite modem). The demodulator decodes the packets that the satellite sends to earth. The maximum number of **DEMODULATOR** ports is determined by the number of data ports available on the NetPerformer unit.

NOTE: Traffic from the **DEMODULATOR** ports on one NetPerformer unit can be sent to a **MODULATOR** port on another unit using **SP-MULTIPLEX** PVCs. Refer to Configuring the Logical Layer (PVCs) on page 10.

- 4. An optional expansion chassis can have:
 - One or more **DEMODULATOR** ports for connection to an external demodulator. The maximum number is determined by the number of data ports available on the unit.
- **5.** If the NetPerformer unit has not been previously configured for the other network equipment, determine:
 - For the voice connections: all speed dial numbers, extension numbers, interfaces, speeds, line activation types, IP addresses, ring voltage, ring frequency and any other information relevant to your network setup.
 - For the data connections: the required protocol, line speed, port interface and gender (DTE/DCE). If an SNA/SDLC application, all controller (PU) numbers and addresses, and all primary and secondary connections to the NetPerformer unit. If a Frame Relay application, all PVC numbers, operating modes, DLCI addresses, SVC network addresses, CIR and BIR.
 - For the LAN connections: all required IP and/or network addresses, required interfaces and speeds.

• For the T1/E1 connections: timeslot usage, operating protocols for data/voice channels.

Annotate the network diagram with this information. Keep in mind the number of voice, WAN/user, LAN, T1/E1, PVC and PU connections permitted on each unit (refer to the *Hardware Installation Guide* for the specific NetPerformer product).

- 6. Determine the priority level of each traffic type in your network:
 - To avoid response time problems and session timeouts, delay sensitive protocols such as LLC2 or SDLC can be assigned a high priority.
 - Voice/fax traffic is given high-priority status by default, due to its time-sensitive nature. You can change this priority to a lower level, if desired.
 - For LAN/legacy traffic, the way the available bandwidth will be partitioned depends on the way you configure the class assignments, the relative class weights and specific data filters.

Annotate the network diagram with an indication of relative traffic priority levels.

2.3 Physical Connections

This section addresses installation requirements that are specific to a SkyPerformer network. Full installation instructions for the NetPerformer unit can be found in the *Hardware Installation Guide* for that product (or *Quick Setup Guide* for a legacy product).

These documents are available on the *NetPerformer Online Reference CD*, which is included with each NetPerformer product package.

In addition to the installation requirements for the NetPerformer unit, a SkyPerformer application requires the physical connections described in Table 2-1.

NOTE: Use standard cables (certain interfaces and NetPerformer products only) or custom-made cables available from Memotec Inc.. Supported interfaces include RS-232, V.35/V.11,V.35 CE, X.21/V.11, RS-449/422 and RS-530.

Function of the Connection	SkyPerformer Port Type	To External Device	Cable Gender
Transmits packets to the sat- ellite modulator	MODULATOR	Modulator (TX sat- ellite modem) or modem (Modula- tor and Demodula- tor)	DTE
Receives the packets from the satellite demodulator	DEMODULATOR	Demodulator (RX satellite modem)	DTE

Table 2-1: SkyPerformer cable connections

2.3.1 Installation Tips

- Usually, each NetPerformer unit will have one connection to a modulator, and another connection to a demodulator. This provides full duplex transmission via satellite.
- Physical cabling between NetPerformer units is not required. All connections between nodes are made using **SP-MULTIPLEX** PVCs.
- A modulator broadcasts on one frequency, which can be received by more than one remote unit.
- A demodulator can receive a single frequency only. For the central site unit, you will require the same number of demodulators as there are remote units.

2.4 Software License

Important: The SkyPerformer option includes a Software Licensing Agreement, which can be found in the product package.

- You must agree to the terms and conditions of this agreement before loading the software.
- Each NetPerformer unit in the SkyPerformer application requires a separate software license.
- SDM-9500 units that are linked with an expansion card are considered as one unit, since they are part of the same chassis system.
- The PowerCell license is a prerequisite for installing the SkyPerformer option on the SDM-9220/9220GW or SDM-9230/9230GW.

2.4.1 Before You Configure

The SkyPerformer software must be activated on the NetPerformer unit before you can configure and use any SkyPerformer features. This requires entering the SkyPerformer Software License to the License Profile.

NOTE: A specific License Profile is valid for a single NetPerformer unit only.

To prepare for SkyPerformer configuration you must first:

- Install the NetPerformer unit according to the instructions given in the *Hard-ware Installation Guide* for the particular product, which is available on the *NetPerformer Documentation CD* (Part No. 161-0692-001).
- Install and activate the SkyPerformer Option software license, following the procedure provided in the *Software Licensing* chapter of the *Software Installation and Licensing* fascicle of this document series.
- At any time, you can reset the unit configuration to its factory defaults: enter **FS** at the command prompt. The SkyPerformer Option is reset along with all other areas of the configuration, and all previously defined values are lost.

When you execute the **FS** command, the NetPerformer unit clears its License Profile and turns off all data ports that were configured for SkyPerformer operation (port protocol set to **SP**). You must:

- Re-enter the SkyPerformer Option software license, and
- Change the *Protocol* parameter on all ports involved in the application to **SP** (see Setting the Port Protocol on page 2).

2.4.2 Is the SkyPerformer Option Already Installed?

To determine whether a NetPerformer unit is already installed with the SkyPerformer

licensed software option, execute any of the following commands:

- Display Parameters (**DP**)
- Display Version (**DV**)
- Display Alarms (**DA**).

These commands include information on any optional software that has already been installed on the unit. The message **SkyPerformer license (AAAA-BBBB-CCCCCCC-DDDD) enabled on this unit** indicates the software license number.

DP example:					
with	SDM-9230> DP				
SkyPerformer	DISPLAY PARAMETERS				
enabled	Item (BRIDGE/CALLER ID/CLASS/CUSTOM/FILTER/GLOBAL/HUNT/IP/IPX/MAP/				
	PHONE /				
	PORI/PU/PPPOE/PPPOSER/PVC/REDUNDANCI/SCHEDULE/SLOI/USER/VLAN,				
	Ucit for (ENTER) ofter each gareer (NO/VEC def:VEC) 2 NO				
	Wait for $CENTER = alter each screen (NO/TES, der TES) : NO$				
	Signaling Engine VX X X Memotec Inc. (c) 2004				
	Console connected on port CSL				
	SkyPerformer license (AAAA-BBBB-CCCCCCCC-DDDD) enabled on this unit				
DV example:					
with	SDM-9230> DV				
SkyPerformer	DISPLAY VERSION				
onabled	SDM-9230 vX.X.X Memotec Inc. (c) 2004				
enableu	Signaling Engine vX.X.X Memotec Inc. (c) 2004				
	DSP code version: X.X.X				
	Console connected on port CSL				
	SkyPerformer license (AAAA-BBBB-CCCCCCC-DDDD) enabled on this unit				
DA example:					
, with	SDM-9230> DA				
SkyPerformer	DISPLAY ALARMS				
enabled	SDM-9230 vX.X.X Memotec Inc. (c) 2004				
	Signaling Engine vX.X.X Memotec Inc. (c) 2004				
	DSP code version: X.X.X				
	Console connected on port CSL				
	SkyPerformer license (AAAA-BBBB-CCCCCCCC-DDDD) enabled on this unit				
	•••				

2.5 **Power-up Sequence**

Due to hardware differences, the power-up sequence differs slightly from one NetPerformer product to the next. For details, refer to the *Hardware Installation Guide* for your particular product (or *Quick Setup Guide*, for legacy NetPerformer products).

In general, the power-up procedure includes the following steps:

- 1. Connect the factory supplied power cord to the AC inlet.
- 2. Plug the other end of the power cord into an AC power outlet (100-240 VAC, 50/60 Hz).
- **3.** On units with a power switch, power up the unit by pushing the power switch to the 1 position (ON).
- **4.** On power-up the NetPerformer unit executes program decompression and system test. Follow the system status LED displays.
- 5. If you are using a console terminal, plug it into the console port using an RS-232/V.24 cable, and power it on.
- 6. Access the console by pressing the Enter key at least three times.
- 7. Configure all SkyPerformer parameters and options.
- 8. Once you have configured the data ports you can connect the cables from these ports to the Frame Relay devices. Voice ports can be configured before or after cable connection.
- 9. Activate a data port by bringing up the connected user equipment.
- 10. Activate a voice port by dialing a speed dial number to place a call.
- **11.** Check the status of the NetPerformer unit, its connections and all active ports, PUs and PVCs by executing the statistics commands. Commands specifically used for the SkyPerformer are described in "Monitoring and Statistics" on page 4-1.



Configuration

3.1 Configuring SkyPerformer Links

This chapter addresses configuration requirements for the SkyPerformer option only. Parameters and commands for configuring other NetPerformer functions are described in the other fascicles of this document series.

NOTE: Turn to the section "Before You Configure" on page 2-7 for important information prior to setting up your SkyPerformer network.

Each data port that connects to an external modulator or demodulator must be configured as a SkyPerformer satellite link. In a SkyPerformer application a satellite link can be configured on:

- A serial port, including built-in ports and ports on a Dual Serial Port interface card installed in the unit chassis
- A digital channel on a T1 or E1 interface card.

3.1.1 Setting the Port Protocol

Use the **PORT** or **SLOT** submenu of the NetPerformer **SETUP** command to configure a serial port as a satellite link.



Figure 3-1: SETUP/PORT and SETUP/SLOT/CHANNEL Paths on the CLI Tree for SP Protocol

Built-in Serial Port

To configure a SkyPerformer link on a built-in serial port:

- 1. At the main command line prompt on the console, enter the menu sequence: SE → PORT
- 2. Select the *Port number*

On some legacy NetPerformer models, you may need to specify **DATA** as the port type before you can select the port number

- 3. Set the *Protocol* to **SP**
- 4. Set the port *Type* to **MODULATOR** or **DEMODULATOR**.

The main chassis requires one or more **MODULATOR** ports. All remaining ports can be defined as **DEMODULATOR**. See "Setting the Port Type" on page 3-5 for details.

5. Change the other port parameters from their default values, if desired.

Serial Port on Dual Serial Interface Card

To configure a SkyPerformer link on a serial port on the Dual Serial interface card:

- 1. At the main command line prompt on the console, enter the menu sequence: SE → SLOT
- 2. Select the *Slot number*
- **3.** Select the *Channel number*
- 4. Set the *Protocol* to **SP**
- 5. Set the port *Type* to **MODULATOR** or **DEMODULATOR**. See "Setting the Port Type" on page 3-5 for details.
- 6. Change the other port parameters from their default values, if desired.

Digital Channel on T1 or E1 Interface Card

NOTE: To configure the physical port (**LINK**) of the T1 or E1 interface card, set the *Signaling mode* to **NONE**. Details on **LINK** configuration are provided in the chapter *Configuring Digital Data Connections* in the *Digital Data* fascicle of this document series.

To configure a SkyPerformer link on a digital channel:

- 1. At the main command line prompt on the console, enter the menu sequence: SE → SLOT
- 2. Select the *Slot number*
- 3. Enter CHANNEL

- 4. Select the *Channel Number*, e.g. **102**, where the first digit indicates the slot and the last two digits indicate the channel.
- 5. Set the *Protocol* to **SP**
- 6. Select the *Timeslot* and *Number of consecutive timeslots* to be used for this connection
- 7. Set the port *Type* to **MODULATOR** or **DEMODULATOR**. See "Setting the Port Type" on page 3-5 for details.
- 8. Change the other port parameters from their default values, if desired.

SE/SLOT/#/				
CHANNEL	9230-1> SE			
example	SETUP			
	Item (BRIDGE/CALLER ID/CLASS/CUSTOM/FILTER/GLOBAL/HUNT/IP/IPX/MAP/PHONE/			
	PORT/PU/PPPOE/PPPUSER/PVC/REDUNDANCY/SCHEDULE/SLOT/USER/VLAN,			
	def:SLOT) ? SLOT			
	SLOT> Slot number (1/2,def:1) ?			
	<pre>Item (LINK/CHANNEL,def:LINK) ? CHANNEL</pre>			
	SLOT> Channel Number (101-124/ALL,def:101) ? 101			
	PORT 101> Protocol (def:PVCR) ? SP			
	PORT 101> Timeslot (def:1) ?			
	PORT 101> Number of consecutive timeslots (1-24,def:12) ? 4			
	PORT 101> Type (def:DEMODULATOR) ? MODULATOR			
	PORT 101> DS0 speed (bps)64000			
	PORT 101> Cell Packetization (def:YES) ?			
	PORT 101> Congestion flow control (def:ON) ?			
	PORT 101> CLLM function (def:OFF) ?			
	PORT 101> Maximum number of voice channels (0-10000,def:10000) ?			
	PORT 101> Maximum Voice Channels If High Priority Data (0-10000,def:10000)			
	?			
3.1.2 Setting the Port Type

A SkyPerformer link can be set to the following types using the *Type* parameter for the port (SNMP *ifwanSpType* variable):



Figure 3-2: SkyPerformer Ports

• **MODULATOR**: A port that connects to an external modulator (TX satellite modem) or modem (modulator and demodulator).

NOTE: A port defined as MODULATOR acts as a demodulator on incoming traffic.

• **DEMODULATOR**: A port that connects to an external demodulator (RX satellite modem).

Caution: NetPerformer versions prior to V10.2.3 R01 also permitted configuration of the values EXPANSION and AGGREGATE for the port *Type* parameter. You must reconfigure these values *before* upgrading to V10.2.3 R01 or higher. Refer to "Reconfiguring EXPANSION and AGGREGATE Types from an Earlier Version" on page 3-9.

NOTE: To multiplex **DEMODULATOR** traffic between several NetPerformer units, set up a PVC in **SP-MULTIPLEX** mode. Refer to "Configuring the Logical Layer (PVCs)" on page 3-10.

3.1.3 Type

Console	SNMP	Text-based Config
Туре	ifwanSpType	[ifwan] SpType

Determines the type of satellite connection on this port.

Values: MODULATOR, DEMODULATOR

Default: DEMODULATOR

Configuring a MODULATOR Port

A **MODULATOR** port connects to an external modulator (TX satellite modem) or modem (modulator and demodulator).

NOTE: When you define a **MODULATOR** port on the NetPerformer, **only DEMODU-LATOR SkyPerformer ports can be added to this unit.**

SE/SLOT/	SDM-9230> SE
Channel/SP	SETUP
example:	Item (BRIDGE/CALLER ID/CLASS/CUSTOM/FILTER/GLOBAL/HUNT/IP/IPX/MAP/PHONE/
MODULATOR	PORT/PU/PPPOE/PPPUSER/PVC/REDUNDANCY/SCHEDULE/SLOT/USER/VLAN,
Type	def:BRIDGE) ? SLOT
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	SLOT> Slot number $(1/2/3, def:1)$? 2
	SLOT> Channel Number (201-202/ALL,def:201) ?
	PORT 201> Protocol (def:OFF) ? SP
	PORT 201> Type (def:DEMODULATOR) ? MODULATOR
	PORT 201> InterfaceDCE-V35
	PORT 201> Clocking mode (def:INTERNAL) ?
	PORT 201> Port speed (bps) (1200-2048000,def:56000) ?
	PORT 201> Fallback speed (def:ENABLE) ?
	PORT 201> Cell Packetization (def:YES) ?
	PORT 201> Congestion flow control (def:ON) ?
	PORT 201> CLLM function (def:OFF) ?
	PORT 201> Maximum number of voice channels (0-10000,def:10000) ?
	PORT 201> Maximum Voice Channels If High Priority Data (0-10000,def:10000)
	?
	• The <i>Interface</i> parameter is provided for information purposes only, and indicates the type of cable that is connected to the port. This is useful for checking that you have installed the right kind of cable on the port.

The value of this parameter cannot be changed, as the type of interface is detected automatically.

NOTE: If no cable is attached to the port, the *Interface* parameter indicates **UNDE**-**FINE**.

- Set the *Clocking mode* to **EXTERNAL** if DTE cables are installed on the port, or to **INTERNAL** for DCE cables.
- The *Port speed* must be able to accommodate the highest BIR of any PVC that uses this port.
 - For a built-in serial port, the *Port speed* can be set to any speed from **1200** to **6144000** bps on the SDM-9230, or up to **2048000** bps on the other products
 - For a serial port on the Dual Serial interface card, the *Port speed* can be set to 8, 16, 32, 56, 64, 112, 128, 256, 512, 768, 1024 or 1536 kbps

NOTE: On the SDM-9220/9230, Dual Serial interface card port speeds are the same as those for built-in serial ports.

• *Fallback speed* is disabled if *Congestion flow control* is **ON**. If you prefer to use fallback rather than flow control for this port, enter 3 carriage returns at the console to reach the *Congestion flow control* parameter. Then enter **OFF**.

For the Dual Serial interface card, *Fallback speed* is available on the SDM-9220/ 9230 only. It cannot be configured on a Dual Serial interface card on the SDM-9360, SDM-9380 or SDM-9585.

- Cell Packetization is always on when Frame Relay over IP is enabled.
- Set *CLLM function* to **ON** to enable Consolidated Link Layer Management (CLLM) on the port.
- If the *Maximum number of voice channels* is left at its default value (**10000**), no call blocking is performed on this connection.
- Use *Maximum Voice Channels If High Priority Data* to limit the number of voice calls when a transparent data port (HDLC, T-ASYNC, R-ASYNC or PASSTHRU) is set to high priority with the *Class* parameter. The DSR, DCD, DTR and RTS modem signals (RI and RL in X.21) must be active for this to take place.

If *Maximum Voice Channels If High Priority Data* is left at its default value (**10000**), no call blocking is performed on this connection.

Configuring a DEMODULATOR Port

A **DEMODULATOR** port connects to an external demodulator (RX satellite modem).

- A port can be set to **DEMODULATOR** on both the main and expansion chassis.
- You can configure more than one **DEMODULATOR** port on a NetPerformer unit, up to the number of serial ports available.

NOTE: Keep in mind that the main chassis also requires one or more **MODULATOR** ports.

All remaining serial ports can be defined as **DEMODULATOR**, if required by your application.

SE/PORT/#/SP example: SDM-9230>SE DEMODULATO SETUP Item (BRIDGE/CALLER ID/CLASS/CUSTOM/FILTER/GLOBAL/HUNT/IP/IPX/MAP/PHONE/ **R** Type PORT/PU/PPPOE/PPPUSER/PVC/REDUNDANCY/SCHEDULE/SLOT/USER/VLAN, def:BRIDGE) ? PORT Port number (ETH1/ETH2/CSL/1,def:ETH1) ? 1 PORT 1> Protocol (def:HDLC) ? SP PORT 1> Type (def:DEMODULATOR) ? DEMODULATOR PORT 1> Interface.....DTE-V35 PORT 1> Clocking mode (def:EXTERNAL) ? INTERNAL PORT 1> Port speed (bps) (1200-6144000,def:56000) ? PORT 1> Fallback speed (def:ENABLE) ? PORT 1> Cell Packetization (def:YES) ? PORT 1> Modulator port (def:1) ? • Protocol, Type, Interface, Clocking mode, Port speed, Fallback speed and Cell

- Protocol, Type, Interface, Clocking mode, Port speed, Fallback speed and Cell Packetization behave as for a MODULATOR port (see "Configuring a MODU-LATOR Port" on page 3-6)
- Enter the *Modulator port* that will be used for transmissions to the satellite. Select the number of a SkyPerformer link that is configured with the *Type* parameter set to **MODULATOR**.

NOTE: To view all active ports, enter a question mark, **?**, at the command line prompt.

3.1.4 Modulator port

Console	SNMP	Text-based Config
Modulator port	ifwanSpType	[ifwan] SpType

The specified **MODULATOR** port will multiplex all traffic received on this **DEMODULATOR** port. This is done internally and transparently, so as to provide a full connection for the PVCs.

NOTE: The **DEMODULATOR** ports can send traffic to different modulators. This permits having more than one **MODULATOR** port per unit.

Values: A port number (the range of values is automatically generated by the NetPerformer), **NONE**

Default:

1

Reconfiguring EXPANSION and AGGREGATE Types from an Earlier Version

The **EXPANSION** and **AGGREGATE** values of the **SP** port *Type* parameter were removed in software version V10.2.3 R01.

Caution: If you are upgrading to V10.2.3 R01 or higher from an earlier version, and your SkyPerformer configuration includes SP ports set to EXPANSION or AGGREGATE, you *must* execute the following procedure *before* you upgrade:

1. Using console or SNMP access, select a built-in serial port, a serial port on a Dual Serial Interface card, or a digital channel that is currently configured with one of the following combinations:

SP	EXPANSION	
SP	AGGREGATE	

2. Change the port *Type* to **MODULATOR** or **DEMODULATOR**.

NOTE: The main chassis requires one or more **MODULATOR** ports. All remaining ports can be defined as **DEMODULATOR**.

- 3. Configure a PVC for each new **MODULATOR** or **DEMODULATOR** port, and set the PVC *Mode* parameter to **SP-MULTIPLEX**.
- 4. Continue from step 1 with all other **SP EXPANSION** and **SP AGGREGATE** ports on all units in the network that will be upgraded to NetPerformer V10.2.3 R01 or higher.

3.2 Configuring the Logical Layer (PVCs)

A PVC provides a logical path between two network access points. Multiple PVCs can be bundled and attached to the same SkyPerformer link.

You must configure a separate PVC for each satellite connection between the SkyPerformer and a remote unit.

- Each remote unit sends its traffic at a distinct frequency.
- Each full-duplex connection must be defined with a unique DLCI address.
- A transmit-only connection can have the same DLCI address as its corresponding receive-only connection. See Figure 3-4 on "SP-MULTIPLEX PVCs on the SDM-9500" on page 3-12 for an example of this.

The NetPerformer does not declare an address conflict if one PVC is used for transmission, and another PVC with the same DLCI address is used for reception.

• If an expansion chassis is required in addition to a main chassis, define all PVCs on the main chassis. The main chassis will send a DLCI list to the expansion chassis on startup.

All types of PVCs are configured with the **PVC** submenu of the **SETUP** command.



Figure 3-3: SETUP/PVC Path on the CLI Tree

To configure a PVC for a satellite connection:

- **1.** Enter the menu sequence: **SE** \dashv **PVC**
- 2. Select the *PVC number*
- **3.** Set the *Mode* parameter to the type of PVC required for your application. The most commonly used modes are:
 - **SP-MULTIPLEX:** To multiplex **DEMODULATOR** traffic between several Net-Performer units (usually SDM-9585 cards)

- **PVCR:** To access a remote NetPerformer via satellite using PowerCell
- **RFC1490**: To access a remote RFC1490-compatible FRAD via satellite
- **MULTIPLEX**: To multiplex data coming from a Frame Relay or X.25 enduser device via satellite
- **BROADCAST**: To send broadcast analog voice traffic frames to the multicast server (the Frame Relay switch) via satellite
- **TRANSPARENT**: To switch data coming from one end-user device directly to the satellite network and the destination end-user device without alteration on the frame.
- 4. Select a unique *DLCI address* for this PVC
- 5. Change the other PVC parameters from their default values, if desired.

SP-MULTIPLEX PVC configuration is dealt with in the next section. Special considerations for PVCR PVC configuration are mentioned on "PVCR PVC" on page 3-14. For information concerning the other PVC types, refer to the *WAN/Frame Relay* fascicle of this document series.

3.2.1 SP-MULTIPLEX PVC

To multiplex **DEMODULATOR** traffic between several NetPerformer units (usually SDM-9585 cards), configure an **SP-MULTIPLEX** PVC. The multiplexed **DEMODULATOR** traffic is returned to the main card (or chassis) equipped with a **MODULATOR** port.

NOTE: SP-MULTIPLEX PVCs are available with the SkyPerformer licensed software option only, and can connect only with remote **SP-MULTIPLEX** PVCs.

By setting up **SP-MULTIPLEX** PVCs, you can multiplex SkyPerformer traffic between several NetPerformer units, or from several cards in the SDM-9500 chassis. Figure 3-4 shows how **SP-MULTIPLEX** PVCs can be used.



Figure 3-4: SP-MULTIPLEX PVCs on the SDM-9500

Unit 9585M PVC Configuration:		Unit 9585D PVC Configuration:
PVC #1 Mode: PVCR Port: 1 DLCI address: 101	PVC # Port: 1 DLCI a	1 Mode: SP-MULTIPLEX ddress: 101
PVC #2 Mode: PVCR Port: 1	Remot Remot	e unit: 9585M e PVC: 3
DLCI address: 102	PVC #2	2 Mode: SP-MULTIPLEX
PVC #3 Mode: SP-MULTIPLEX Port: 1 DLCI address: 101 Remote unit: 9585D	Port: 2 DLCI address:102 Remote unit: 9585M Remote PVC: 4	
Remote PVC: 1	Note:	Unit 9585M does not declare a con-
PVC #4 Mode: SP-MULTIPLEX Port: 1 DLCI address: 102 Remote unit: 9585D Remote PVC: 2		flict of address between PVCR and SP-MULTIPLEX PVCs that serve the same remote location (DLCI), since the PVCR PVC is used for transmission and the SP-MULTI- PLEX PVC is used for reception.

Table 3-1: Unit 9585M and 9585D PVC Configuration

SE/PVC/SP-

MULTIPLEX	SDM-9230> SE
example	SETUP
•	Item (BRIDGE/CALLER ID/CLASS/CUSTOM/FILTER/GLOBAL/HUNT/IP/IPX/MAP/PHONE/
	<pre>PORT/PU/PVC/SCHEDULE/SLOT/USER/VLAN,def:PORT) ? PVC</pre>
	PVC number (1-300,def:1) ? 2
	PVC 2> Mode (def:PVCR) ? SP-MULTIPLEX
	PVC 2> Port (def:1) ?
	PVC 2> DLCI address (0-1022,def:0) ? 101
	PVC 2> Committed Information rate (4000-6144000,def:56000) ?
	PVC 2> Burst Information rate (4000-6144000,def:56000) ?
	PVC 2> Remote unit name (def:) ? CHICAGO-9230
	PVC 2> Remote PVC number (1-300,def:1) ?
	PVC 2> Class number (def:3) ?
	PVC 2> Compression (def:YES) ?

- *Mode* is set to **SP-MULTIPLEX** for this application.
- The *Port* parameter must refer to an **SP** port set in **MODULATOR** or **DEMODU-LATOR** mode.
- The *Class number* can be set to 1, 2, 3, 4, 5, 6, 7, 8 or HIGH PRIORITY.

Use the **SETUP/CLASS** submenu to define the relative weight and preferred route for each numeric priority class. For details, refer to the *Quality of Service* (QoS) fascicle of this document series.

• The other parameters behave as for a PVCR PVC, described in the next section.

3.2.2 PVCR PVC

SEATTLE>SE

Configure a PVCR PVC for PowerCell access to a remote NetPerformer via satellite.

• Set the PVC *Mode* to PVCR, as in the following example.

SE/PVC/PVCR

```
example
```

```
SETUP
Item (BRIDGE/CALLER ID/CLASS/CUSTOM/FILTER/GLOBAL/HUNT/IP/IPX/MAP/PHONE/
PORT/PU/PPPOE/PPPUSER/PVC/REDUNDANCY/SCHEDULE/SLOT/USER/VLAN,
def:BRIDGE) ? PVC
PVC number (1-300,def:1) ? 1
PVC #1> Mode (def:PVCR) ? PVCR
PVC #1> Port (def:1) ?
PVC #1> DLCI address (0-1022,def:0) ? 101
PVC #1> Committed Information rate (4000-2048000,def:56000) ?
PVC #1> Burst Information rate (4000-2048000, def: 56000) ?
PVC #1> Demodulator port (def:ANY) ?
PVC #1> Expansion port (def:NONE) ?
PVC #1> Remote unit name (def:) ? TORONTO
PVC #1> Type (def:DEDICATED) ?
PVC #1> Timeout (ms) (1000-30000,def:1000) ?
PVC #1> Number of retransmission retries (1-1000,def:100) ?
PVC #1> Compression (def:YES) ?
PVC #1> IP address (def:000.000.000) ?
PVC #1> Subnet mask (number of bits) (0-24,def:0) ? {000.000.000}
PVC #1> NAT enable (NO/YES,def:NO) ?
PVC #1> IP RIP (def:V1) ?
PVC #2> IP RIP TX/RX (def:DUPLEX) ?
PVC #2> OSPF (def:DISABLE) ?
PVC #1> IP multicast active (def:NO) ?
PVC #1> IP multicast protocol (def:NONE) ?
PVC #1> IPX RIP (def:DISABLE) ?
PVC #1> IPX SAP (def:DISABLE) ?
PVC #1> IPX NETWORK NUMBER (def:0000000) ?
PVC #1> Broadcast group (def:NO) ?
PVC #1> Maximum number of voice channels (0-10000, def:10000) ?
PVC #1> Maximum Voice Channels If High Priority Data (0-10000,def:10000)
?
```

• Set the *Port* parameter to the number of an **SP** port set in **MODULATOR** mode. If the port is located on an expansion chassis, select the port that communicates with the main chassis.

Refer to the configuration example in the chapter "Example Application" on page 5-1.

• Set the *DLCI address* to a unique identifier. If you do not choose a unique DLCI address, you will be alerted of the conflict and requested to select a different value for this parameter.

Caution: Do not leave the *DLCI address* at its default value, **0**, for auto-learning. DLCI auto-learning is not permitted on the SkyPerformer.

• The *Type* can be set to **DEDICATED**, **ANSWER** or **CALL-BKUP**. These choices are configured in much the same way as for a backup WAN link. For details, refer to the *WAN/Frame Relay* fascicle of this document series.

On a **CALL-BKUP** PVC, the *Backup* parameter can be set to **ANY** or **ALL**.

- If you leave the *IP address* at its default value, **0.0.0.0**, the PVC will operate in unnumbered IP mode.
- *IP RIP* can be set to **DISABLE**, **V1**, **V2 BROADCAST** or **V2 MULTICAST**.
- All parameters affecting IP RIP, NAT, OSPF, IP Multicast and IPX are similar to those used for configuring a WAN link. For details, refer to the *WAN/Frame Relay* fascicle of this document series.
- Set *Broadcast group* to **YES** to assign this PVC to a broadcast group.



Monitoring and Statistics

4.1 About the Statistics Commands

Once the unit is powered up and the data ports are activated, you can execute NetPerformer statistics commands from the console to check the status of SkyPerformer operations.

NOTE: All of the commands mentioned in this chapter can be executed by users with **FULL** or **MONITOR** console access.

The SkyPerformer statistics commands include the following:

- Display Destination Table (**DD**): Shows which remote NetPerformer units are connected to the unit currently accessed on the console. Consult the *WAN/ Leased Lines* fascicle of this document series for details on executing and using this command.
- Setup Capture (**SC**), Start Capture (**STC**) and View Capture (**VC**): Enable the capture and display of all traffic through a specific port or PVC. Consult the *Monitoring and Statistics* fascicle of this document series for details.
- Display States (**DS**): Provides current status information concerning a specific port or PVC (see page 3).

These statistics can also be displayed in real time with the **DPORT**, **DPVC** and **DDLCI** commands.

- Display Counters (**DC**): Shows all counters stored in memory, including the mean or peak value of the transmitter and receiver rates (see page 8).
- Display Errors (**DE**): Displays the values of the error counters for all ports and PVCs (see page 10).



Figure 4-1: SkyPerformer Display Commands on the CLI Path

4.2 Display States (DS) Command

4.2.1 Data Port Status

Built-in Port

To view the status of SkyPerformer ports configured on the built-in serial ports:

• Enter the menu sequence: **DS** \sqcup **PORT**.

On some legacy NetPerformer models, you may need to specify **DATA** as the port type before the statistics will be displayed.

Serial Port on Dual Serial Interface Card

To view the status of SkyPerformer ports configured on the Dual Serial interface card:

- 1. Enter the menu sequence: **DS** \exists **SLOT**
- 2. Select the *Slot number*.

DS/PORT example

SDM-9230> DS
DISPLAY STATES
<pre>Item (GLOBAL/PORT/PU/PVC/SLOT/SVC/VLAN,def:GLOBAL) ? PORT</pre>
PORT ETH> ProtocolETHERNET
PORT 1> ProtocolSP (MODULATOR)
PORT 1> InterfaceDTE-V35
PORT 1> Speed used [bps]1824k
PORT 1> Modem signalsSTDRC-
PORT 1> StateDATA

The current status of a SkyPerformer port can be interpreted as follows:

Statistic	Value	Meaning
Protocol	SP (MODULATOR)	The data port has been configured to connect to an external modulator or satellite modem.
	SP (DEMODULATOR)	The data port has been configured to connect to an external demodu- lator.

Table 1SkyPerformer port status and interpretation

Statistic	Value	Meaning
Interface	<i>gender-interface,</i> e.g. DCE-RS232	The <i>gender</i> may be DTE or DCE. The <i>interface</i> may be V.35, X.21, RS-232, RS-449, RS-530 or another interface supported by the NetPerformer unit.
Speed used [bps]	1200 - 2048k	If external clocking is used on the data port, indicates the port speed measured by the NetPerformer.
		If internal clocking is used, indi- cates the speed that was config- ured for the port.
Modem signals	A 6-character field: STDRCI	Modem signals that are currently active for a V.35, RS-232, RS-449 or RS-530 interface:
	When a modem control signal is inactive the NetPerformer displays a dash [-] in the appro- priate field position.	S: DSR ON T: DTR ON D: DCD ON R: RTS ON C: CTS ON I: RI ON
	A 2-character field: CI	Modem signals that are currently
	When a modem control signal is inactive the NetPerformer displays a dash [-] in the appro- priate field position.	C: COMMAND ON I: INDICATION ON
State	DATA	Port in operation with normal data traffic flow.
	IDLE	Waiting for connection to modem signals. If this state persists and the link is in DATA state, there may be an incompatibility between the local and remote port configuration. In particular, check the Protocol, Remote Unit and Remote Port parameter settings.
	OFF	Port inactive. This will appear if the SkyPerformer license was deleted, then reinstated.

Table 1SkyPerformer port status and interpretation

Real-time Display

All of these statistics are also available in a continuously refreshed real-time format, using the Display Port States command.

To execute this command:

• Enter **DPORT** at the console command prompt.

4.2.2 PVC Status

To view the status of SkyPerformer PVCs:

• Enter the menu sequence: **DS** \downarrow **PVC**.

DS/PVC/FR

example

SDM-9230> DS
DISPLAY STATES
<pre>Item (GLOBAL/PORT/PU/PVC/SLOT/SVC/VLAN,def:PORT) ? PVC</pre>
PVC TYPE (ATM/FR/ALL,def:FR) ?
PVC 1> ModePVCR
PVC 1> Information signalsNET -A
PVC 1> Speed used (bps)512
PVC 1> DLCI100
PVC 1> Remote unit nameSDM-9230-2
PVC 1> State & DelayDATA 14ms

The current status of a PVC can be interpreted as follows:

Statistic	Value	Meaning
Mode	PVCR	The current operating mode is PVCR, using PowerCell.
	SP-MULTIPLEX	The current mode is SP-MULTI- PLEX, for multiplexing demodula- tor traffic.
	other PVC mode	The other modes that may be listed include: 1490, MULTIPLEX, BROADCAST and TRANSP.
	OFF	No operating mode was configured for this PVC
Information sig- nals	NET or USER	Indicates whether the port inter- faces with another data port (NET) or with the satellite network (USER).

Table 2SkyPerformer PVC status and interpretation

Statistic	Value	Meaning
	A 6-character field: NACFB	Information signals are currently active on the PVC:
	When a signal is not present the NetPer- former displays a dash [-] in the appropriate field position.	 N: New PVC A: Active PVC C: CIR reached F: Forward congestion (to destination PVC) B: Backward congestion (from destination PVC)
	off line	The PVC is inactive

Table 2SkyPerformer PVC status and interpretation

Real-time Display

All of these statistics are also available in a continuously refreshed real-time format, using the Display PVC States command. The name of the destination unit for each PVC is also provided.

To execute this command:

• Enter **DPVC** at the console command prompt.

SP-	DISPLAY PVC STATES								
PVCs	PVC MODE 	INFO. SIGNALS	SPEED (BPS)	PORT	DLCI	DESTINATION NAME	TATE & ELAY(MS)		
	1 SP-MULT 2 SP-MULT 	IPLEX NET IPLEX NET	-A 56000 -A 56000	WAN WAN	1 101 1 102	CHICAGO-9230 CHICAGO-9230	DATA 15ms DATA 15ms		
	 Information 	signals:N	ETwork/USER (N)ew (A)ctive	e (C)ir (F)ecn (B)ecn ()off		

You can also display PVC DLCI states.

• Enter **DDLCI** at the console command prompt.

DDLCI example: with SP-	SDM-9230> DDLCI DISPLAY PVC DLCI STATES								
PVCs	 DLCI & 	 PVC	MODE	INF SIGNA	O. Als ()	SPEED BPS)	PORT	DESTINATI(NAME	DN STATE
	101 5ms 102	 1 2	SP-MULTIPL	EX NET	Г -А Г -А	- 56000 - 56000	WAN WAN	1 CHICAGO-9 1 CHICAGO-9	9230 DATA 9230 DATA
		I							
		0.2200	tion gignal	a · NE	Tuork /II	SED (N)	(A) dti		
) off	 		.ə• INE			=w (A)CLI	ve (C)II (F)	

Use HOME, END, UP and DOWN arrow keys to scroll. Press any other key to exit.

4.3 Display Counters (DC) Command

4.3.1 Data Port Counters

Built-in Port

To view the counters for SkyPerformer ports configured on the built-in serial ports:

1. Enter the menu sequence: **DC** \sqcup **PORT**.

On some legacy NetPerformer models, you may need to specify **DATA** as the port type before the statistics will be displayed.

2. Select **MEAN** or **PEAK** counters.

Serial Port on Dual Serial Interface Card

To view the counters for SkyPerformer ports configured on the Dual Serial interface card:

- **1.** Enter the menu sequence: **DC** \dashv **SLOT**.
- 2. Select the *Slot number*.
- 3. Select **MEAN** or **PEAK** counters.

DC/PORT example: with SDM-9230>DC SP ports DISPLAY COUNTERS Item (BOOTP/CONFIG/DNS/IP/NAT/PORT/PVC/Q922/Q933/QOS/SLOT/SVC/TIMEP, def:BOOTP) ? PORT Counters (MEAN/PEAK, def:MEAN) ? Compression rate.....1.00 (M) Decompression rate.....1.00 (M) PORT 1> Transmitter rate......20 % (M) PORT 1> Receiver rate.....0 % (M) PORT 1> Number of frames transmitted.....211210 PORT 1> Number of frames received.....1 PORT 1> Number of octets transmitted.....20254359 PORT 1> Number of octets received.....1 . . .

The SkyPerformer port counters are interpreted in the same way as PVCR port counters. For details, refer to the *WAN/Leased Lines* fascicle of this document series.

4.3.2 PVC Counters

To view the counters for SkyPerformer PVCs:

- **1.** Enter the menu sequence: **DC** \dashv **PVC**.
- 2. Select **MEAN** or **PEAK** counters.

DC/PVC								
example: with	SDM-9230> DC							
SP-	DISPLAY COUNTERS							
MULTIPLEX	<pre>Item (BOOTP/CONFIG/DNS/IP/NAT/PORT/PVC/Q922/Q933/QOS/SLOT/SVC/TIMEP,</pre>							
PVCs	def:PORT) ? PVC							
	Counters (MEAN/PEAK,def:MEAN) ?							
	PVC 1> Transmitter rate20 % (M)							
	PVC 1> Receiver rate							
	PVC 1> Number of frames transmitted46638							
	PVC 1> Number of frames received51021							
	PVC 1> Number of octets transmitted4781062							
	PVC 1> Number of octets received4829811							
	PVC 1> Number of BECN received0							
	PVC 1> Number of BECN transmitted0							
	PVC 1> Number of FECN received0							
	PVC 1> Number of FECN transmitted0							
	PVC 1> Number of CLLM frames received0							
	PVC 1> Number of CLLM frames transmitted0							
	•••							

These PVC counters are interpreted in the same way as PVCR PVC counters. For details, refer to the *WAN/Frame Relay* fascicle of this document series.

4.4 Display Errors (DE) Command

4.4.1 Data Port Errors

Built-in Port

To view the errors for SkyPerformer ports configured on the built-in serial ports:

• Enter the menu sequence: **DE** → **PORT**.

On some legacy NetPerformer models, you may need to specify **DATA** as the port type before the statistics will be displayed.

Serial Port on Dual Serial Interface Card

To view the errors for SkyPerformer ports configured on the Dual Serial interface card:

- **1.** Enter the menu sequence: **DE** \exists **SLOT**.
- **2.** Select the *Slot number*.

DE/PORT example

SDM-9380>DE DISPLAY ERRORS Item (BOOTP/CHANNEL/DICT/GROUP/NAT/PORT/PU/PVC/Q922/SLOT/SVC/TIMEP, def:BOOTP) ? **PORT** PORT 1> Number of bad frames......0 -----PORT 1> Number of underruns.....0 PORT 1> Number of retries.....0 PORT 1> Number of restarts.....2 PORT 1> Number of frames discarded (overrun)...0 PORT 1> Number of octets discarded (bad).....0 PORT 1> Number of octets discarded (overrun)...0 PORT 1> Number of octets discarded (overrun)...0 ... Bad flags: U:Bad LENGTH Q:Overflow F:Flush S:Overrun B:Bad CRC A:Abort

The SkyPerformer port errors are interpreted in the same way as PVCR port errors. For details, refer to the *WAN/Leased Lines* fascicle of this document series.

4.4.2 PVC Errors

To view the errors for SkyPerformer PVCs:

• Enter the menu sequence: **DE** \dashv **PVC**.

DE/PVC example

SDM-9380>DE
DISPLAY ERRORS
Item (BOOTP/CHANNEL/DICT/GROUP/NAT/PORT/PU/PVC/Q922/SLOT/SVC/TIMEP,
def:PORT) ? PVC

These PVC counters are interpreted in the same way as PVCR PVC counters. For details, refer to the *WAN/Frame Relay* fascicle of this document series.



Example Application

5.1 About this Chapter

This chapter provides an example of the SkyPerformer in a simple satellite network application.

- Only the essential parameters required to configure the SkyPerformer are shown. All other parameters may be left at their default values.
- Critical parameter values are given in **boldface**, for example:

PVC 1> Mode.....PVCR

To ensure trouble-free operations, these critical parameters must be configured correctly for your application.

5.2 Network Diagram

The example application includes the following NetPerformer units:

- Main chassis: an SDM-9230 unit named BOSTON,
- Expansion chassis: an SDM-8400 unit named **BOSTON2**,
- 1st remote unit: an SDM-9220 unit named CHICAGO,
- 2nd remote unit: an SDM-9220 unit named NEW YORK,
- 3rd remote unit: an SDM-8400 unit named LOS ANGELES.

These NetPerformer units are connected in a single star topology, depicted in Figure 5-1.



Figure 5-1: Network Diagram of SkyPerformer Application (Star Topology)

5.3 Configuration

In the following parameter lists, essential parameters appear in **boldface type**. These parameters must be configured with the displayed values for the application to work. All other parameter values are non-essential, that is, in most SkyPerformer applications they do not need to be changed from their default values.

5.3.1 Main Chassis

The following provides essential parameter values for configuring the main chassis at the **BOSTON** site:

GLOBAL> Unit name.....BOSTON PORT ETH 2> Protocol.....ETH AUTO PORT ETH 2> Link integrity.....YES PORT ETH 2> LAN speed (mbps).....AUTO PORT ETH 2> MAC address......00000000000 PORT ETH 2> DHCP.....DISABLE PORT ETH 2> Subnet mask 1 (number of bits).....24 {255.255.255.000} PORT ETH 2> Subnet mask 2 (number of bits).....8 {255.000.000.000} PORT ETH 2> Frame size.....1500 PORT ETH 2> IP RIP.....DISABLE PORT 1> Protocol.....SP PORT 1> Type.....MODULATOR PORT 1> Interface.....DTE-V35 PORT 1> Clocking mode.....EXTERNAL PORT 1> Cell Packetization.....YES PORT 1> Congestion flow control.....ON PORT 1> CLLM function.....OFF PORT 1> Maximum number of voice channels.....10000 PORT 1> Maximum Voice Channels If High Priority Data 10000 IP> Router......ENABLE PVC 1> Mode.....PVCR PVC 1> Port.....1 PVC 1> DLCI address.....100 PVC 1> Committed Information rate......256000 PVC 1> Demodulator port.....ANY PVC 1> Expansion port.....NONE PVC 1> Remote unit name.....CHICAGO PVC 1> Type.....DEDICATED PVC 1> Timeout (ms).....1000 PVC 1> Number of retransmission retries.....100 PVC 2> Mode.....PVCR PVC 2> Port.....1 PVC 2> Committed Information rate.....128000

PVC 2> Burst Information rate.....128000 PVC 2> Demodulator port.....ANY PVC 2> Expansion port.....NONE PVC 2> Remote unit name.....NEW YORK PVC 2> Type.....DEDICATED PVC 2> Timeout (ms).....1000 PVC 2> Number of retransmission retries.....100 PVC 3> Mode.....PVCR PVC 3> Port.....1 PVC 3> DLCI address.....400 PVC 3> Committed Information rate......64000 PVC 3> Demodulator port.....ANY PVC 3> Expansion port.....NONE PVC 3> Remote unit name.....LOS ANGELES PVC 3> Type.....DEDICATED PVC 3> Timeout (ms).....1000 PVC 3> Number of retransmission retries.....100 PVC 11> Mode.....PVCR PVC 11> Port.....0 PVC 11> DLCI address......700 PVC 11> Committed Information rate......2048000 PVC 11> Remote unit name.....BOSTON2 PVC 11> Type.....DEDICATED PVC 11> Timeout (ms).....1000 PVC 11> Number of retransmission retries.....100 PVC 11> Compression.....NO PVC 11> Subnet mask (number of bits).....8 {255.000.000.000} PVC 11> NAT enable.....NO PVC 11> Filter.....ALL PVC 11> Maximum number of voice channels.....10000 PVC 11> Maximum Voice Channels If High Priority Data 10000 PVC 11> Frame over IP, source.....005.060.001.001 PVC 11> Frame over IP, destination.....005.060.001.002 PVC 11> Frame over IP, port number.....1024 PVC 11> Redundant link.....NO PVC 12> Mode.....SP-MULTIPLEX PVC 12> Port.....1 PVC 12> Committed Information rate......128000 PVC 12> Burst Information rate.....128000 PVC 12> Demodulator port.....ANY PVC 12> Remote unit name.....BOSTON2 PVC 12> Remote PVC number.....2 PVC 12> Compression.....NO PVC 13> Mode.....SP-MULTIPLEX PVC 13> Port.....1 PVC 13> DLCI address.....400 PVC 13> Demodulator port.....ANY

5.3.2 Expansion Chassis

The following provides essential parameter values for configuring the expansion chassis at the Boston site, **BOSTON2**:

GLOBAL> Unit name.....BOSTON2 PORT ETH> Protocol.....ETH AUTO PORT ETH> Link integrity.....YES PORT ETH> LAN speed (mbps).....AUTO PORT ETH> DHCP.....DISABLE PORT ETH> Subnet mask 1 (number of bits).....24 {255.255.255.000} PORT ETH> IP address 2.....000.000.000.000 PORT ETH> Subnet mask 2 (number of bits).....8 {255.000.000.000} PORT ETH> Frame size.....1500 PORT ETH> IP RIP.....DISABLE IP> Router.....ENABLE PORT 1> Protocol.....SP PORT 1> Type.....DEMODULATOR PORT 1> Interface.....DTE-V35 PORT 1> Clocking mode.....EXTERNAL PORT 1> Cell Packetization.....YES PORT 1> Modulator port.....NONE PORT 2> Protocol.....SP PORT 2> Type.....DEMODULATOR PORT 2> Interface.....DTE-V35 PORT 2> Clocking mode.....EXTERNAL PORT 2> Cell Packetization.....YES PORT 2> Modulator port.....NONE PVC 1> Mode.....PVCR PVC 1> Port.....0 PVC 1> DLCI address.....700 PVC 1> Committed Information rate.....2048000 PVC 1> Remote unit name.....BOSTON PVC 1> Type.....DEDICATED PVC 1> Timeout (ms)......1000 PVC 1> Number of retransmission retries.....100 PVC 1> Compression.....NO PVC 1> Subnet mask (number of bits).....8 {255.000.000.000}

PVC 1> NAT enable.....NO PVC 1> Filter.....ALL PVC 1> Maximum number of voice channels.....10000 PVC 1> Maximum Voice Channels If High Priority Data 10000 PVC 1> Frame over IP, source.....005.060.001.002 PVC 1> Frame over IP, destination.....005.060.001.001 PVC 1> Frame over IP, port number.....1024 PVC 1> Redundant link.....NO PVC 2> Mode.....SP-MULTIPLEX PVC 2> Port.....1 PVC 2> Committed Information rate......128000 PVC 2> Burst Information rate.....128000 PVC 2> Remote unit name.....BOSTON PVC 2> Remote PVC number.....12 PVC 2> Compression.....NO PVC 3> Mode.....SP-MULTIPLEX PVC 3> DLCI address.....400 PVC 3> Burst Information rate......64000 PVC 3> Remote unit name.....BOSTON PVC 3> Remote PVC number.....13 PVC 3> Compression.....NO EXTENDED PARAMETERS IP> (MULTIHOMEDTYPE) Multihomed type.....DISABLED

5.3.3 1st Remote Unit

The following provides essential parameter values for configuring the SkyPerformer unit at the first remote site, **CHICAGO**:

GLOBAL>	Unit nameCH	IICAGO
PORT 1>	ProtocolSI	þ
PORT 1>	ТуреМо	DULATOR
PORT 1>	InterfaceD	TE-V35
PORT 1>	Clocking modeEX	TERNAL
PORT 1>	Cell PacketizationYE	S
PORT 1>	Congestion flow control	1
PORT 1>	CLLM functionOF	F
PORT 1>	Maximum number of voice channels10	0000
PORT 1>	Maximum Voice Channels If High Priority Da	ata 10000
PVC 1> 1	ModeP\	/CR
PVC 1> 1	Port1	
PVC 1> 1	DLCI address10	00
PVC 1> (Committed Information rate25	56000
PVC 1> I	Burst Information rate25	56000
PVC 1> I	Demodulator port1	

PVC	1>	Expansion portNONE
PVC	1>	Remote unit nameBOSTON
PVC	1>	TypeDEDICATED
PVC	1>	Timeout (ms)1000
PVC	1>	Number of retransmission retries100
PVC	1>	CompressionYES
PVC	1>	IP address000.000.000.000
PVC	1>	Subnet mask (number of bits)8 {255.000.000.000}
PVC	1>	NAT enableNO
PVC	1>	IP RIPV1
PVC	1>	IP RIP TX/RXDUPLEX
PVC	1>	OSPFDISABLE
PVC	1>	IP multicast activeNO
PVC	1>	IPX RIPDISABLE
PVC	1>	IPX SAPDISABLE
PVC	1>	IPX network number00000000
PVC	1>	FilterALL
PVC	1>	Broadcast groupNO
PVC	1>	Maximum number of voice channels10000
PVC	1>	Maximum Voice Channels If High Priority Data 10000
PVC	1>	Redundant linkNO

5.3.4 2nd Remote Unit

The following provides essential parameter values for configuring the SkyPerformer unit at the second remote site, **NEW YORK**:

GLOBAL	> Unit nameNEW YORK
PORT 1:	> ProtocolSP
PORT 1:	> TypeMODULATOR
PORT 1:	> InterfaceDTE-V35
PORT 1:	> Clocking modeEXTERNAL
PORT 1:	> Cell PacketizationYES
PORT 1:	> Congestion flow controlON
PORT 1:	> CLLM functionOFF
PORT 1:	> Maximum number of voice channels10000
PORT 1:	> Maximum Voice Channels If High Priority Data 10000
PVC 1>	ModePVCR
PVC 1>	Port1
PVC 1>	DLCI address
PVC 1>	Committed Information rate128000
PVC 1>	Burst Information rate128000
PVC 1>	Demodulator port1
PVC 1>	Expansion portNONE
PVC 1>	Remote unit nameBOSTON
PVC 1>	TypeDEDICATED
PVC 1>	Timeout (ms)1000
PVC 1>	Number of retransmission retries100
PVC 1>	CompressionYES
PVC 1>	IP address000.000.000.000
PVC 1>	Subnet mask (number of bits)8 {255.000.000.000}
PVC 1>	NAT enableNO
PVC 1>	IP RIPV1
PVC 1>	IP RIP TX/RXDUPLEX

PVC	1>	OSPFDISABLE
PVC	1>	IP multicast activeNO
PVC	1>	IPX RIPDISABLE
PVC	1>	IPX SAPDISABLE
PVC	1>	IPX network number00000000
PVC	1>	FilterALL
PVC	1>	Broadcast groupNO
PVC	1>	Maximum number of voice channels10000
PVC	1>	Maximum Voice Channels If High Priority Data 10000
PVC	1>	Redundant linkNO

5.3.5 3rd Remote Unit

The following provides essential parameter values for configuring the SkyPerformer unit at the third remote site, **LOS ANGELES**:

GLOBAL> Unit name.....LOS ANGELES PORT 1> Protocol.....SP PORT 1> Type.....MODULATOR PORT 1> Interface.....DTE-V35 PORT 1> Clocking mode.....EXTERNAL PORT 1> Cell Packetization.....YES PORT 1> Congestion flow control.....ON PORT 1> CLLM function.....OFF PORT 1> Maximum number of voice channels.....10000 PORT 1> Maximum Voice Channels If High Priority Data 10000 PVC 1> Mode.....PVCR PVC 1> Port.....1 PVC 1> DLCI address.....400 PVC 1> Committed Information rate......64000 PVC 1> Demodulator port.....1 PVC 1> Expansion port.....NONE PVC 1> Remote unit name.....BOSTON PVC 1> Type.....DEDICATED PVC 1> Timeout (ms).....1000 PVC 1> Number of retransmission retries.....100 PVC 1> Compression.....YES PVC 1> Subnet mask (number of bits).....8 {255.000.000.000} PVC 1> NAT enable.....NO PVC 1> IP RIP.....V1 PVC 1> IP RIP TX/RX.....DUPLEX PVC 1> OSPF.....DISABLE PVC 1> IP multicast active.....NO PVC 1> IPX RIP.....DISABLE PVC 1> IPX SAP.....DISABLE PVC 1> IPX network number.....00000000 PVC 1> Filter.....ALL PVC 1> Broadcast group.....NO PVC 1> Maximum number of voice channels.....10000 PVC 1> Maximum Voice Channels If High Priority Data 10000 PVC 1> Redundant link.....NO

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