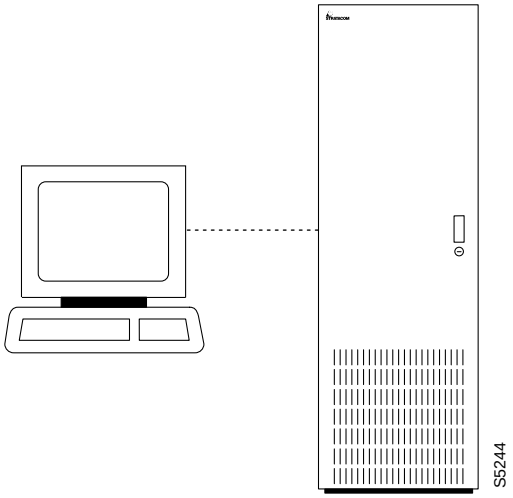
CHAPTER 2

IPX, IGX, and BPX Fundamentals



A workstation or a PC can function as a control terminal for an IPX, IGX, or BPX through an RS-232 link or over an Ethernet TCP/IP LAN. All command input takes place at the terminal, and all displays appear on the terminal screen. Through displays that show status, alarm, or statistics, the terminal constantly provides a view of an individual node, a trunk, a connection, or the whole network.

The control terminal provides control of the network from any routing node. A remote access command is available for controlling the network from a node other than the node physically connected to the terminal. This command is the Virtual Terminal (**vt**) command. The **vt** command creates a communication channel for the operator to a remote node. Once a node is accessed by **vt**, command execution at the accessed node can begin. Most commands and tasks that are executable at the local node are also executable at a remote node.

The StrataView Plus Network Management Station provides network management capabilities for multi-node networks. StrataView Plus also collects and displays statistics. For access, StrataView Plus operates in LAN mode or telnet mode. (As of Release 8.0, access through the serial port is no longer possible.) Refer to the *StrataView Plus Operations Manual* for more information.

Powering Up the Control Terminal

After the node receives power and correctly starts up, the terminal screen appears as shown below. If the screen is blank or does not display the initial screen, check all connections to the node, and make sure the terminal and node are receiving power. If the connections are correct, press the Delete key a few times or cycle the terminal power.

Figure 2-1

```
gamma          TRM   YourID:1        IPX 16    8.2    Mar. 15 1996  13:47 CST









Enter User ID:
```

To collect statistics, the StrataView Plus workstation must operate in StrataView mode, not terminal mode. A PC-type terminal always operates in terminal mode.

The User-Command Screen Layout

The screen has three areas. The top line of the screen (status line) displays the node name, current user name, software revision level, date, time and time zone. If the date and time have not been configured on the node, the screen states this.

The middle part of the screen shows the information returned by command execution. This could be, for example, configuration information or statistical information.

The bottom area of the screen displays prompts for the next command or the current command parameters. As the system receives the entered parameters, it duplicated them above the command entry line to serve as a record of the entries. The bottom area also shows the last entered command.

All command screens eventually time out. This includes dynamically updated screens such as the display for the **dspbob** command. Furthermore, if sufficient time passes, the user is logged out.

Entering a Command

This section describes command entry for those who are unfamiliar with Cisco WAN Switching equipment. It also describes the online help for the commands.

Each user command can have one or more privilege levels. Entry of a particular command is possible for a user at the same or higher privilege of the command. Each definition in this manual shows the privilege or range of privileges for the command.

When the **Next Command** prompt is at the bottom of the screen, the system is ready for a new command. Some commands do not require parameters. These usually are commands for displaying information. Display commands often have no required parameters but have one or more optional parameters for changing the scope of displayed information. Commands that require parameters usually prompt for each parameter. To abort a command for any reason, press the Delete key. More information for altering command line entries appears in the forthcoming section called "In case of a mistake."

The general syntax is *command* <*parameter*(*s*)> [*optional parameter*(*s*)]. When a command definition displays actual parameters, the required parameters appear within the arrow heads (<>). If the list of command parameters is too long, the command definition's "Syntax" field just shows "parameters," which means the parameters are available only in the parameters table for the definition. For information on the format of system resource numbering, see the forthcoming section titled "How network trunks, lines, and channels are numbered."

Users who are not familiar with the system can use the online help feature to become familiar with the categories of commands and obtain syntax information on a command. Seven categories of commands exist. The figure below lists them. To enter a command from the menu, do the following:

Step 1 At the **Next Command** prompt, either press the Escape key or enter the word **help** or a question mark. A list of command categories appears as in the figure below.

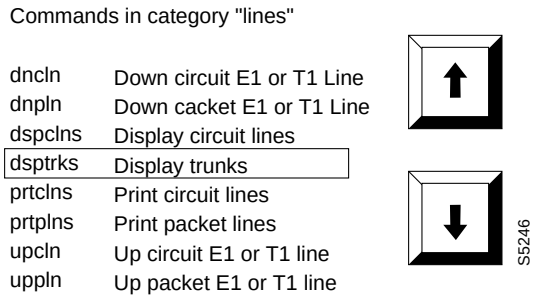
Figure 2-2

```
gamma          TRM   YourID:1        IPX 16    8.2     Mar. 15 1996 13:47 CST

All commands fall into one (or more) of the following categories:

Control Terminal
Configuration
Lines
Network
Connections
Cards
Alarms and Failures




This Command: ?


Use cursor keys to select category and then hit <RETURN> key:
```

Step 2 Use the up/down arrow keys to select a command category, then press **RETURN**. A listing of all the commands in that category appears. (The next example is from the "line" category of commands.)

Step 3 Use the cursor key to select the command you wish to enter (**dsptrks** for example), then press the *RETURN* key. The selected command appears on the screen, and the system prompts you for any additional parameters that are required to complete the command.

Figure 2-3 Entering a Command



A faster way to enter a command, using fewer keystrokes, is to enter the command on the command line, then press the **RETURN** key. The system prompts you for any additional parameters required to complete the command. The fastest way to enter a command, using the fewest keystrokes, requires that you know the command along with the necessary parameters. Enter the command name and all of the required parameters in the correct format, then press the **RETURN** key.

About Command Categories

The command category menu is listed when you press the **ESCAPE** key. The commands are organized into seven categories. These categories are not the categories used to organize this manual. The following lists and describes the command categories.

Table 2-1

Category	Description
Control Terminal	These commands let you configure your password, serial port and printer functions, use the help facility, establish virtual terminal connections, and create and edit jobs.
Configuration network and line timing.	These commands configure voice and data channels, and display network configuration.
Lines	These commands activate and deactivate circuit lines display the status of lines.
Network	These commands add and delete trunks, configure a node name, and display and print network status.
Connections	These commands add, delete, and display circuit (voice and data) and FastPacket data channel connections, configure network routing and connection characteristics (Frame Relay and ATM), and perform connection.
Cards	These commands activate, deactivate, and reset printed circuit cards, and display power supply status.
Alarms and Failures	These commands display, print, and clear alarms, errors, and network history. They also configure alarm thresholds.

Aborting a Command

You can abort any command by pressing the **DELETE** key [on terminals without a DELETE key, you may need to type SHIFT-BACKSPACE or some other key(s) to perform the DELETE function]. The **Next Command:** prompt appears at the bottom of the screen indicating that you can enter another command. The command you aborted appears in low intensity letters on the screen after the **Last Command:** prompt.

About Command Names

Most of the command names follow a descriptive verb and noun format. For example, the **addcon** command adds a connection, the **delcon** command deletes a connection, and the **dspcon** command displays information about a connection. The following lists and describes the command verbs.

Table 2-2

Format	Mnemonic	Descriptor
Verb	add	Add
	bye	Bye
	clr	Clear
	cnf	Configure
	cpy	Copy
	del	Delete
	dn	Down
	dsp	Display
	edit	Edit
	grp	Group
	help	Help
	prt	Print
	red	Redraw
	reset	Reset
	run	Run
	stop	Stop
	switch	Switch
	tst	Test
Noun	adv	Adaptive voice
	ait	AIT
	alm(s)	Alarms
	bob	Breakout box
	bus(es)	Bus(es)
	cd(s)	Card(s)
	ch	Channel
	clk	Clock
	cln(s)	Circuit line(s)
	cls	Class
	cnf	Configuration
	con(s)	Connection(s)
	congrp	Connection group
	cond	Conditioning
	cos	Class of service (COS)
	d	Data
	date	Date
	dfm	DFM
	dial	Dial
	dl	Dial type

Format	Mnemonic	Descriptor
Nouns (continued)	dsc	Descriptor
	eia	EIA
	errs	Errors
	extlp	External loop
	fp	FastPAD
	fr	Frame relay
	ftc	FTC
	func	Function
	gn	Gain insertion
	grp(s)	Group(s)
	ict	Interface control template
	ip	IP
	job(s)	Job(s)
	lcn	Logical connection
	ln(s)	Line(s)
	load	Load
	loclp	Local loop
	log	Log
	mc	multicast
	msg	Message
	name	Name
	nw	Network
	ospace	Open space
	parm(s)	Parameter(s)
	port	Port
	pref	Preference
	prt	Printer
	pwr	Power
	rcv	Receiver
	red	Redundant
	rmtlp	Remote loop
	rts	Routes
	scr	Screen
	seg	Segment
	sig	Signal
	slot	Slot
	snmp	SNMP
	src(s)	Source(s)
	st	Status

Format	Mnemonic	Descriptor
Nouns (continued)	stats	Statistics
	stby	Standby
	sys	System
	term	Terminal
	tmzn	Time zone
	tp	Type
	trig	Trigger
	trk(s)	Trunk(s)
	user	User
	utl	Utilization
	xmt	Transmit
	yred	Y-cable redundancy

Command Shortcuts

When you enter a command, it displays next to the **Last Command:** prompt at the bottom of the screen. Press the **Ctrl** and **A** keys simultaneously to copy the command to the new command line. You can edit the command line and then press the **RETURN** key, to execute the previous command. You can also enter an exclamation mark (**!**) followed by the first letter or letters of a previous command and press the **RETURN** key. For example, to repeat the dspcons command:

Last Command: dspcons

Next Command: **!dsp**

Press the **RETURN** key. You can use the **Display Command History** (**.**) command to display the 12 most recently executed commands:

Step 1 Type **.** and press **RETURN**. A numbered list of commands displays. In the following example, the most recently executed command is numbered 1.

```
12:
11:
10:
  9:
  8:
  7:        prtscrn
  6:        addcon 12.1 alpha 12.1 v
  5:        delcon 12.1
  4:        cnfport a 1200 n 8 1 x x n
  3:        cnftime 17 19 34
  2:        redscrn
  1:        help
```

Step 2 Type the number of the command you want to re-execute, then press the **RETURN** key. The command displays after the **Next Command:** prompt. You can press the **RETURN** key to execute the command, or you can edit the command line and then press the **RETURN** key. Whenever you end a terminal session by signing off (**bye**), the command list is cleared.

In Case of a Mistake

Before you press the Return key, you can use control keys to edit a typed command. The following lists the control key you can use to edit information on the command line. Not all terminals have the same key characters. If the exact key is not available on your terminal, check to see which key performs the function.

Table 2-3

Function	Keys	Cursor Movement
Move the cursor	Ctrl-B	Moves the cursor left one word.
	Ctrl-F	Moves the cursor right one word.
	Ctrl-L	Moves the cursor right one character.
	Ctrl-G	Moves the cursor left one character.
	Arrows	Moves the cursor in the direction of the arrow.
Delete	Ctrl-W	Deletes a character.
	CHAR DEL	Deletes a character.
	Ctrl-H	Moves the cursor left one character and deletes that character.
	Ctrl-D	Deletes all characters from the cursor position to the end of the line.
	Ctrl-X	Deletes a line.
	BACKSPACE	Moves the cursor left one character and deletes that character.
Insert	Ctrl-I	Toggles insert mode.
	TAB	Toggles insert mode.
	CHAR INSERT	Toggles insert mode.
	Ctrl-^	Inserts line.
Miscellaneous	*	Leave the data in this field as it is displayed and go to the next field.
	DELETE	Aborts command.
	Ctrl-M	Carriage Return.
	RETURN	Carriage Return.
	Ctrl-S	Stops the flow of data from the IPX to the terminal screen.
	Ctrl-Q	Restarts the flow of data from the IPX.
Miscellaneous (continued)	Ctrl-A	Copies the last command line.
	! (..)	(The exclamation mark followed by the first characters or character of a command, brings that command back to the command line.)

Access Privileges

Access to the commands is password protected. To access the commands, type your **user ID** and **user password** at the log-in prompts. Each user is assigned a privilege level for command usage by the System Manager. There are six user privilege levels, ranging from 1 to 6. Level 1 has access to all the commands and level 6 has access to the fewest commands. A given privilege level has access to all levels below it. For example, level 3 has access to levels 3 through 6. The privilege level for each command is part of the command summary.

Commands Supported by Release 8.2

The screens and examples in this manual come network equipped with BPX, IPX, and IGX nodes with both narrowband (T1 and E1) trunks and broadband (DS3 and OC3) ATM trunks. IPX and IGX nodes run T3, E3, T1, and E1 services.

Commands associated with optional software features function only if the option has been purchased and activated for each node in the network. Optional features are activated from the Cisco WAN Switching TAC. The features that fall into this category are:

- Data Frame Multiplexing
- Adaptive Voice
- Frame Relay
- ForeSight
- Frame Relay ForeSight
- Priority Bumping
- Configuration Save/Restore
- Frame Relay Network to Network Interface
- Multiple Virtual Terminals (VTs)
- Configuring an IPX as an interface shelf
- Network Expansion

Help

The system software itself provides a command help function. This function resides in system software and consists of a list of all commands and a display of the command syntax. Entering “help” or “?” with no parameters displays a list of the seven command categories. These categories are listed below. Entering “help” and a command name displays the command syntax. Entering “help” and the few letters of a command lists all commands containing these characters. For example, “help fr” will list all commands containing the letters “fr”. A particular command can then be selected from this list for help information.

- Control terminal
- Configuration
- Lines
- Network

- Connections
- Cards
- Alarms and failures

The On-Line Help feature of StrataView Plus provides more detailed command information. Hypertext links allow you to navigate through command category lists, alphabetical indexes, and the command descriptions. Refer to the *StrataView Plus Operations Manual* for more information.

The Numbering of Trunks, Lines, and Channels

The information contained in this manual allow you to setup, configure, and maintain data traffic running across trunks, lines, and channels. The following information specifies numbering conventions for trunks, lines, and channels.

Table 2-4

Trunk, line, or channel	Description
CDP/CVM Circuit Line and NTC/NTM Trunk	The number assigned to a CDP or CVM circuit line (CLN) or an NTC or NTM trunk (TRK) is the backslot number of the BC-T1 or BC-E1 back card in the physical slot where the CLN or TRK is connected to the IPX or IGX. In the case of redundant pairs, it is the slot associated with the primary back card.
AIT Trunk	The number assigned to the backslot of the BC-T3 or BC-E3 backcard.
BPX Trunk Numbers	The number assigned to a BPX trunk (TRK) is the backslot number and port (1 - 3) of the BNI (**slot.port; example, 2.1**) card to which the T3 trunk cable is attached.
Voice Channel Numbers	A voice channel is specified by "SLOT.CH". Sets of voice channels are specified by "SLOT.CH-CH". The notation "SLOT" refers to the back slot number of a circuit line and "CH" refers to a channel (1-24 for T1 or 1-31 for E1). For example, "12.1" indicates channel 1 on circuit line 12, and "12.1-9" indicates channels 1-9 on circuit line 12.
Data Channel Numbers	Data channels are specified by "SLOT.PORT", where "SLOT" refers to the slot number of a data card, and "PORT" refers to a port on that data card. For example, "9.3" specifies port 3 on the data card in slot 9. The notation "9.1-4" refers to ports 1-4 on that card. The range of port numbers is from 1 to 4 for SDI and DDS data cards. An appended "a", for example; 11.1-5a, indicates the channels are configured to use the super-rate alternating channel feature.
Frame relay channel numbers (local addressing)	In the local addressing convention, frame relay channels are specified by “SLOT.PORT.DLCI”, where “SLOT” refers to the slot number of an FRP, “PORT” refers to a port on the FRP card, and “DLCI” is the local data link connection identifier. The range of port numbers is from 1 to 4. For example, the following **addcon** command at alpha: addcon 6.1.101 beta 4.1.102 2 The command adds a connection between alpha and beta. The user device at alpha refers to this connection using the local DLCI of 101. The user device at beta refers to this connection using the local DLCI of 102. The DLCIs have local significance only. With local addressing, the same DLCI can be used again, but not for more than one destination from the same port. For example, the following adds another connection from alpha port 6.1: addcon 6.1.100 gamma 6.2.102 2 In this case, a DLCI of 100 is used at alpha. A DLCI of 102 can be used at gamma as well as at beta, because the DLCIs have only local significance.

Trunk, line, or channel	Description
Frame relay channel numbers (Global Addressing)	In the global addressing, the format for frame relay channel specification is "SLOT.PORT.DLCI." However, each FRP or FRM port (and associated user device) is identified by a unique DLCI. No two ports in the network can have the same DLCI. For example, alpha port 6.1, gamma port 6.2, and beta port 4.1 could be assigned unique DLCIs of 79, 80, and 81, when adding connections, as in the following example: addcon 6.1.80 gamma 6.2.79 2 (at alpha) addcon 6.1.81 beta 4.1.79 1 (at alpha) addcon 4.1.80 gamma 6.2.81 5 (at beta) The user device at alpha refers to the connection between alpha and gamma, using the DLCI of 80 assigned to gamma. The user device at gamma refers to this connection using the DLCI of 79 assigned to alpha. The user device at alpha refers to the connection between alpha and beta using the DLCI of 81 assigned to beta. The user device at beta refers to this connection using the DLCI of 79 assigned to alpha. The user device at beta refers to the connection between beta and gamma using the DLCI of 80 assigned to gamma. The user device at gamma refers to this connection using the DLCI of 81 assigned to beta. For information on adding frame relay connections through a FastPAD, refer to the command descriptions in the *FastPAD Users's Guide*.