VCX-101 Administrator Manual

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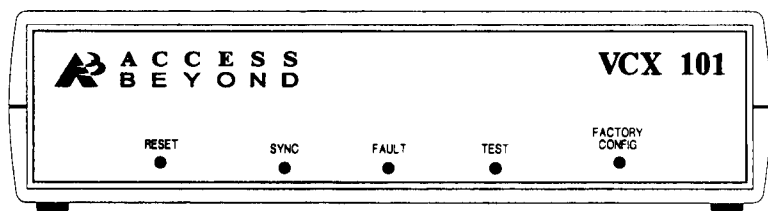
A **C C E S S**
B E Y O N D

IMPORTANT NOTICES

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

Changes or modifications to this device not expressly approved by the manufacturer could void the user's authority to operate it.

For use in Canada: This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le règlement sur le brouillage radioélectrique édicte par le Ministère des Communications du Canada.

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VCX-101 System Administrator Manual

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VCX 101

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Introduction

VCX (Virtual Circuit eXchange) is a modular data communications system allowing terminal users to communicate with and switch between host computer applications. The VCX-101, a switching statistical multiplexer, is *the* product for use in small networks or as a feeder to a larger VCX chassis. VCX-101 options are available for 8 or 16 ports, an RS 232, and V.35 or V.11 trunk interface.

The VCX-101 is part of the VCX family and enjoys the feature rich heritage of this system. The VCX system is a modular data communications system. The basic function of a VCX system is to allow terminal users to communicate with host computers. A VCX system consists of one or more chassis populated with hardware and software modules. The modular design of the VCX system allows for open-ended expansion in both system size and function. With a basic complement of modules, a single chassis functions as an expandable intelligent data switch. With additional hardware and software modules, the VCX-101 can be linked to form a data communications network in which each chassis functions as a switching multiplexer.

Using This Manual

This *VCX-101 Instruction Guide* describes how to install, configure, and use a VCX-101 system. Some familiarity with data communications is required. New users should first read : Chapter 1 – *General Information;* Chapter 2 – *Specifications*; and Chapter 3 – *Installation*. Other chapters are detailed reference for the VCX system.

Concepts and Terminology

The terms "port", "node", and "network" can vary in meaning. In this manual, the following definitions apply:

A **port** is a VCX interface to other data processing equipment. Computers, terminals, and modems are examples of equipment that can be connected to a VCX port. A port can be an asynchronous interface or a synchronous interface (trunk). Note that other data processing devices may also have a port or ports; however, in this manual the unmodified term "port" refers specifically to a VCX port, and the ports of other equipment are distinguished as "computer ports", "terminal ports", and so on.

A **node** is a group of ports at one location. Physically, a node consists of a VCX chassis with the hardware and software necessary to make the system work.

A **network** consists of nodes at different locations. Synchronous trunk lines interconnect nodes in a VCX network. Typically, a network allows multiple terminals to communicate with one or more remote computers.

A **user** refers to a user of a terminal attached to a VCX port.

A **system administrator** (SA) is a supervisor with access to routines available to configure, monitor, test, and control the VCX node.

Service refers to a communications service offered to the user. This may be a connection to an exchange, another subscriber, or may be a subscriber function such as the Time or FOX test.

Organization

The following information summarizes the contents of the *VCX-101 Instruction Manual:*

Chapter 1 – General Information

This chapter discusses the organization of the manual, presents examples of VCX networks, and lists the features of the VCX data communications system.

Chapter 2 – Specifications

This chapter reviews the electrical and mechanical specifications, diagnostic functions of the VCX-101, and the VCX-101 input/output (I/O) pin-outs.

Chapter 3 – Installation

This chapter describes the procedure for setting up a VCX system and preparing for configuration. This chapter describes how to configure and begin using your VCX-101. All interaction with a VCX-101 is achieved with an ASCII terminal attached to a port. Routines or services are initiated by typing the service name on a command line.

Chapter 4 – Operation

This chapter describes the procedure for setting up a VCX system and preparing for configuration. How to enter commands, set your terminal type, and enter a sample configuration consisting of one originating and one answering port, is explained.

The VCX services include:

- **Configuration Service**. The Configuration Service allows the system administrator to define node operating characteristics. Through the Configuration Service, the system administrator specifies global parameters (such as the installation name), port parameters (such as whether ports are for connection to user terminals or to another node), and access control parameters (which connection paths are allowed). A substantial portion of chapter 5 is dedicated to this extensive service.

- **Settime Service**. The Settime Service allows the system administrator to set the date and time for the node.

- **Setup Service**. The setup service permits rapid configuration of a point-to-point statistical multiplexer.

Chapter 5 – User Services

This chapter describes VCX services or functions that are generally intended for use by the terminal user.

The VCX services include:

- **Fox Service**. The Fox Service continuously transmits a "quick brown fox" test message from the port to the attached terminal.

- **Loopback Service**. The Loopback Service echoes received data back to the attached terminal for test purposes.

- **Set Service**. The Set Service allows users to alter a subset of the configured parameters of their local port for the duration of a session. The changed parameters revert to their configured states when the user terminates the session or after a reset.

- **Time Service**. The Time Service displays the system date and time.

- **TM (Transparent Mode) Service**. The TM Service allows transparent uploading and downloading of binary files.

- **Who Service**. The Who Service displays the installation, port name, slot, and port number.

Chapter 6 – Reference

This chapter describes VCX services or functions that are generally intended for use by a limited number of individuals such as the system administrator. Restricting access is accomplished by security provisions discussed in this chapter.

These services include:

- **Busy Service**. The Busy Service allows the system administrator to render a port or series of physically contiguous ports out-of- service.

- **Diagnostic Service**. The Diagnostic (Diag) Service allows the network administrator to place any port or trunk in a loopback state, send "Fox" messages, and to monitor data traffic.

- **Greeting Service**. The Greeting Service allows the system administrator to enter a sign-on message for the node.

- **Load/Dump Service**. The Load/Dump Service allows the system administrator to load or dump the memory contents of a configuration module. A dump occurs when the memory of the module is transferred to a PC floppy, hard disk, another configuration module, or other third party media for storage. A load occurs when the stored configuration is transferred from storage media to a configuration module.

- **Logging Service**. The logging service reports all network activity for network monitoring, administration, and planning purposes. The Logging Service allows the system administrator to designate any port in a network to accumulate logged events and to select classes of events to be logged.

- **Mode Service**. A quick method to obtain current data on the name of the node, name of the active configuration, and PM slot location of the active configuration where applicable.

- **Print Service**. A versatile system to print all or part of a Configuration Storage Module and all or part of a target configuration to any printer connected to the network.

- **Reset Service**. The Reset Service allows the system administrator to reset a VCX port, virtual circuit, card, or chassis from a terminal.

- **Status Service**. The Status Service allows the system administrator to monitor chassis and port activity.

Conventions

This manual uses the following conventions:

User entries are shown in contrast to surrounding material. Within plain text, what you should enter is shown in **boldface**. Within examples that contain system menus or prompts in boldface, what you should enter is shown in plain text, i.e., "**Prompt:** response<CR>". *Italics* (with or without boldface depending on where they appear) are used for a generic descriptive sample entry such as *user_name*.

"**<CR>**" indicates a carriage return. The carriage return key may be labeled "RETURN", "NEW LINE", or "ENTER" on different terminals.

"**^**" indicates a control character. To enter a control character, hold down the control key while pressing the character key. For example, "enter **^H**" means: (1) hold down the control key; (2) press the H key; and, (3) release the H key and the control key. The control key may be labeled "CTRL", "CTL", "CONTROL", or "ALT" on different terminals.

"**<BS>**" is the backspace key. The backspace deletes the previous character, allowing you to retype it. This key may be labeled "DEL", "RUBOUT", or "BACKSPACE" on different terminals. **^H** can also be used as a backspace key.

"**<ESC>**" is the escape key. The escape key may be labeled "ESC", "ESCAPE", or "ALT" on different terminals.

"**Connect to:**" indicates the system connect prompt. The system displays the connect prompt when it is ready for you to enter a command. The default connect prompt is "Connect to:"; however, the system administrator can change or delete the connect prompt. For example, the actual connect prompt displayed could be "Next Request?" or "—>".

Network Application Examples

The following figures show communications networks that can be configured using the VCX-101. ("Async" is used to indicate "Asynchronous.")

1) **16- or 32-port switch** - To double the switching capability, two VCX-101s can be linked together via the trunk ports, to provide a total of 32 ports, as shown in figure 1-1.

Async   Async users

16- or 32-port switch
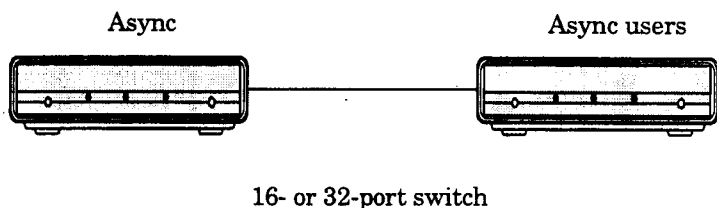
Figure 1-1. Two units linked together

Async

Modem   Modem

Part of a VCX network

Async
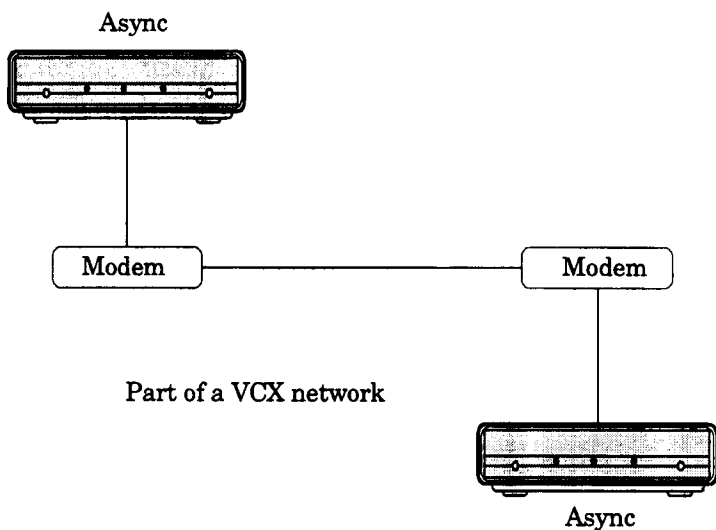
Figure 1-2. Point-to-point multiplexing

2) **Point-to-point multiplexing** - In this example, two VCX are interconnected providing a "transport" of 16 channels between two nodes. This is a small but powerful network allowing user switching and contention. The two nodes depicted could be located within the same building or in different cities. This is illustrated in figure 1-2.

3) **Feeding into a larger VCX network** - Larger networks are possible if VCX feed into 5 or 19 slot VCXs. VCX are totally

Async

VCX
network

Part of a VCX
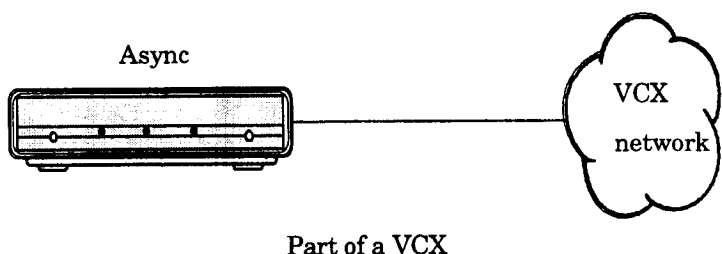
Figure 1-3. One unit connected to a VCX network

Async

Packet network
or
packet host

Gateway to X.25 packet network or
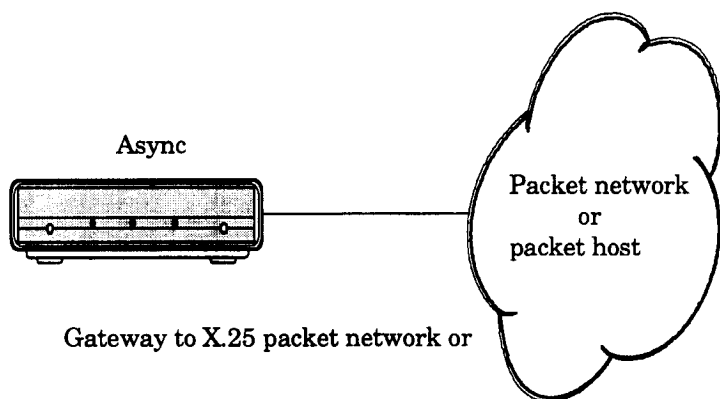
Figure 1-4. Unit connected to X.25 network

"link compatible" with the other VCX, allowing for network expansion whenever the need arises, as illustrated in figure 1-3.

(4) Access to X25 - A VCX-101 can provide connection to a X.25 packet network or packet host. Figure 1-4 illustrates such a connection.

System Overview

Hardware

VCX-101 8 Port DeskTop Unit

Product No. 4950-01, 11/220 V
Product No. (To be determined), UK

The VCX-101 8 Port Desktop Unit consists of an enclosure,a main card with 8-asynchronous ports, 1 RS-232 trunk I/O and a wall mount transformer. The main card contains a 68000 microprocessor, 512K of RAM, 512K of ROM, and 8K of EEROM for configuration storage.

VCX-101 16 Port Desktop

Product No. 4950-02, 110/220 V
Product No. (To be determined), UK

This product supports 16 asynchronous ports. Other than port size, it is identical in all other respects to the previously described Desktop VCX-101 (#4900-01).

8 Port Expander

Product No. 4954-01

The expander consists of a card with 8 asynchronous ports. One expander can be added to an 8 port desktop or rack mount VCX-101 unit to increase its capacity to 16 ports.

VCX-101 V.11 Trunk Kit

Product No. 4905-01, factory installed
Product No. 4905-11, field installed

This card allows you to run V.11 on the VCX-101 trunk rather than RS-232. The maximum transmission speed is extended to 64K bps. Adapter cable 4864-01 is included with the kit.

VCX-101 V.35 Trunk Kit

Product No. 4905-02, factory installed
Product No. 4905-12, field installed

This card allows you to run V.35 on the VCX-101 trunk rather than RS-232. The maximum transmission speed is extended to 64K bps by using the V.35 interface. Adapter cable 4865-01 is included with the kit.

VCX-101 X.25 Kit

Product No. 4956-01, factory installed
Product No. 4956-11, field installed

This kit of two EPROMs allows the trunk to operate with a standard X25 protocol providing a PAD capability. An X25 instruction guide is supplied with the kit.

Software

The VCX-101 contains all of the switching and multiplexing capabilities necessary to function as a stand-alone switching statistical multiplexer.

Port Selection (Switching)

A terminal user can request a connection to any destination port in the network, terminal ports can connect to other terminal ports, and computer ports can connect to other computer ports. Only the system administrator can restrict the user port connectivity using security provisions.

Multiple Sessions

A terminal user can establish up to 8 simultaneous connections and switch to them using forward or backward toggles.

Port Contention and Queuing

Originating ports can contend on a first-come-first-served basis for a limited number of destination ports. When all available ports for a computer are in use, the user is informed by placing the session in a queue and advising queue position. The terminal user can then wait for automatic connection when a computer port becomes free, or escape from the queue to go elsewhere.

Distributed Switching

Originating ports can use various routes through the network to a destination. Distributed switching enhances network reliability by allowing connections to be routed around inoperative or congested parts of the network.

Statistical Multiplexing

The synchronous line cards running proprietary multiplexing or X.25 protocol link the nodes in the VCX network. Hardware interfacing options include RS-232 (V.24), V.11, and V.35. Link transmission is error-free, using an HDLC protocol with a 16-bit Cyclical Redundancy Check and ARQ (Automatic Retransmission reQuest) error correction.

Public Network Access

The X.25 PAD (Packet Assembler/Dissembler) implementation is certified for connection to the Canadian Datapac, UK PSS , and US Tymnet and Telenet and other major worldwide Public Data Networks. Also, X.25 can be used for any application requiring X.25 compatibility, such as direct connection to X.25-compatible CPU ports. The X.25 trunk can support up to 18 logical channels (10 when used as a Master Netmux).

Soft Configuration

The system administrator configures a node or network from a control terminal. There are no DIP (Dual In-line Package)

switches to set or configuration PROMs (Programmable
Read-Only Memory chips) to replace.

Remote Network Control

System administrator services for any node are accessible from
any terminal in the network. Access via a dial-up modem is
also possible; however, for security reasons, access to network
control can be limited to any desired subset of ports in the
network.

Security

Access rights can be assigned to answer ports, originate ports,
trunk lines, and system services. They can serve as a security
measure, allowing the system administrator to restrict the
access of a user to specific services, computer ports, and trunk
lines.

Menu-Driven Services

Services feature user-friendly menu-driven operation.

Programmable Menus

Programmable Menus can be created that are automatically
displayed when a user attaches to the system.

Programmable Help Resources

One or more programmable help screens can be created that
can be called up by any user.

Logging

The logging function reports nodal activity for monitoring,
administration, and planning purposes. A printer is usually
connected to the logging port. The printer provides for hard
copy of the system log. Logging information from all nodes in
the network can be merged onto one logging printer; this is a
powerful feature, giving the system administrator a means of
monitoring events throughout the network. Alternatively, a
logging printer can also be assigned to each node.

Status

The Status Service allows selective monitoring of chassis, card, or port activity from any terminal in the network.

Terminal User Diagnostics

The Fox Service transmits a test message to the terminal. The Loopback Service echoes received data for test purposes.

System Administrator Diagnostics

Ports and trunks can be placed in local/remote loopback to diagnose network problems. Any asynchronous port can be monitored to troubleshoot user application problems.

Load/Dump

This utility allows the system administrator to store the contents of a configuration module on a PC and subsequently to read it back into a configuration storage module anywhere in the network.

Port Busy

The system administrator can render a port or series of ports temporarily out-of-service. This feature allows parts of the network to be taken down for maintenance without physically disconnecting equipment.

Remote Reset

The Reset Service allows the system administrator to reset a port, card, or an entire chassis from a terminal located anywhere in the network.

Speed Connect

The system administrator can create speed connect names for users to simplify complex routes through the network.

High Speed Asynchronous Ports

These ports communicate at speeds up to 19,200 baud.

Transparent Operation

Binary ASCII data can be uploaded or downloaded between asynchronous ports, employing a user-specified escape sequence to revert to normal data transfer mode.

Autobaud

Upon user entry of one or two carriage returns, the asynchronous ports can automatically detect the following baud rates: 75, 110, 150, 300, 600, 1200, 1800, 2400, 4800, 9600 and 19,200 bps (bits per second).

Echo

The asynchronous ports can provide a local echo to the terminal.

Flow Control

Supports XON/XOFF, DC1/DC2, RTS/CTS, ENQ/ACK, HEX 91/93, FF/FE, HEX 94/93, DG XON/XOFF and HP XON/XOFF flow control protocols.

Inter-Port Conversions

When a connection is established between async ports using different baud rate, parity, flow control or stop bit settings, inter-port conversions of these parameters are automatically performed.

Modem Support

Dial-in or dial-out modems are fully supported.

Automatic Connection

A terminal port, upon attachment, can be automatically routed to a given destination. Dual auto-connection can also be configured to allow the user to hot-key between two fixed computer ports.

Channel Priority

The system administrator assigns one of four composite line channel priorities to each Originate port. Higher priorities enhance system responsiveness for interactive devices such as terminals.

Break Key Pass-Through or Intercept

A BREAK can pass through to the other end of a connection, or can be intercepted. Ports can be individually configured to ignore a BREAK or to interpret it as a command.

Inactivity Disconnect

Automatic terminal disconnection can occur after a specified period of inactivity. This feature prevents destination ports from being monopolized by users who fail to disconnect. The system administrator can set the inactivity time-out from 1 to 255 minutes, or select "0" to disable inactivity time-out.

Attach/Detach Strings

The system administrator has the option of transmitting a string to an Answer or Originate port when a specific port is either attached or detached. The string can contain alphanumeric characters and/or control codes such as CR, LF, etc. Such strings can be used for automatic logging onto computer applications, dialing a remote modem, etc.

Alarms

Thresholds can be set to trigger minor and major alarms, and to be recorded at a user-selectable logging port.

Trunk Monitor

Utilization and error statistics can be automatically gathered on any trunk or set of trunks in a node.

Configuration Control

Software and hardware can be interrogated for type, revision, and checksums.

Specifications

In this chapter

➤ Environment
➤ VCX-101 Installation
➤ Cables and Connectors

Description

The VCX-101 is available only as a desktop unit. A rack, when required, can be used only with the VCX-100 model.

The small size of the 16-port VCX-101 (2.5" H X 10.1" D X 9.7" W) is achieved by using RJ-45 physical I/Os for the ports, LSI devices to minimize the number of components, and an external wall-mount transformer for AC power.

The VCX-101 is totally software controlled. Configuration, status checking, and diagnostic routines are performed using a terminal attached to any VCX-101 port or via the trunk of a remote unit.

Specifications

Switches and indicators are discussed in this chapter and a complete list of specifications are given in table 2-1.

Table 2-1. VCX-101 Technical Specifications

Ports:	❏ Number: 8 or 16
	❏ Interface: Electrical: RS-232/V.24 DCE async
	          Physical: RJ-45 (pinout per EIA
	                TR 30.2/87-04-017R1)
	❏ Control signals: DTR, DSR, RTS, CTS, DCD
	❏ Speed:75, 110, 134.5, 150, 300, 600, 1200,
	         1800, 2000, 2400, 4800, 9600,
	         19.2K bps and autobaud

Trunk:	❏ Number: 1
	❏ Interface: RS-232/V.24 DTE sync to 19.2K bps,
	         V.11/V.35 DTE sync to 64K bps (opt.)
	❏ Control Signals: TR, DSR, RTS, CTS, DCD
	❏ Internal speed:1200, 2400, 4800, 7200 9600,
	         19.2K, 38.4K, 56K, 64K bps
	❏ External speed: 0 - 64K bps

Dimensions:	❏ Height: 2.5 in. ❏ Width: 9.7 in. ❏ Depth: 10.1 in.
Weight:	3 lbs.
Voltage:	108-132 VAC (U.S.) 207-264 VAC (International)
Power requirements:	15 Watts

Environmental requirements:	❏ Storage temperature: -20° to 70° Celsius
	                    (0° to 158° F)
	❏ Ambient operating temp 0° to 40° C
	                    (32° to 104° F)
	❏ Relative humidity: 5 to 95% (non-condensing)
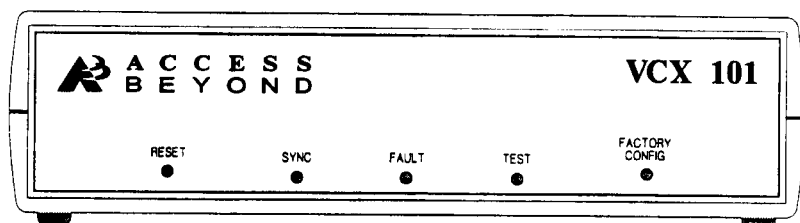
Figure 2-1. Front panel LED indicators

LED Indicators

There are three LED indicators on the front panel of the VCX-101: SYNC, FAULT, and TEST, as shown in figure 2-1. The various LED states and their meaning are as follows:

SYNC LED (green) —
ON: The configured trunk is "up".
Flashing: (Green)The configured trunk is "down"
OFF: The power is off.

FAULT LED (red) —
ON: the VCX-101 has detected an unrecoverable error and has "crashed". The FAULT LED will remain ON for 45 seconds and then the VCX-101 will reboot.
Flashing: the VCX-101 is unconfigured by the user and is operating in the factory config mode.
OFF: the VCX-101 is properly configured (or powered off).

TEST LED (yellow) —
ON: when the VCX-101 is powered up, it conducts a self test; if at the end of the self test, errors are found, the TEST LED will remain ON until the VCX-101 is rebooted. If the TEST LED is ON, the user can run the Diag Service (option #3 on the first Diag screen) to display the results of the self test.
Flashing: the VCX-101 is conducting the self test. This condition is usually seen during the power up of the VCX.
OFF: Normal operation.

SYNC, Fault, and Test Are All Flashing — This condition
occurs briefly during power up. However, if all three LEDs
continue to flash for an extended period of time it indicates that
a memory or EPROM error was discovered during the power
up diagnostic self test. If the terminal is connected to the
VCX-101 via port 1, then a screen of diagnostic information will
be displayed, telling the operator whether it was a checksum
failure or a problem with main memory. The VCX-101 will not
reboot if this condition has occurred.

Recessed Switches

There are two recessed switches on the VCX-101; one on the far
lower-left and the second on the far lower-right of the front
panel. Their functions are as follows:

Reset: Located on the left, this switch will completely reset the
VCX-101, i.e., the software will be re-initialized, the power up
self test will be conducted, etc.
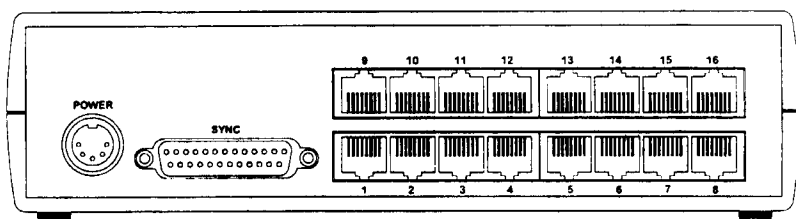
Figure 2-2. Rear panel
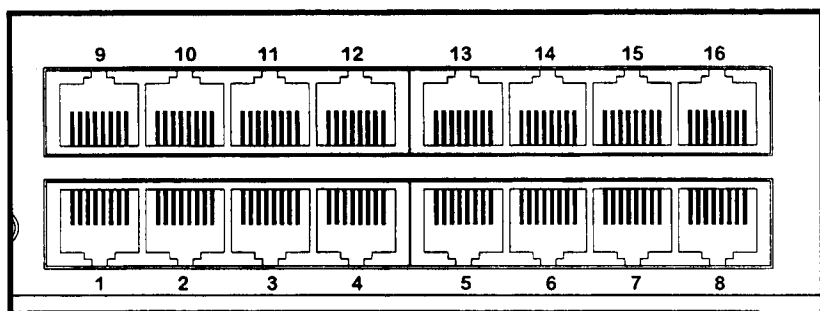
Figure 2-3. Port connectors (Enlarged view)

Unmarked: Located on the right, this switch will force the VCX-101 into factory configuration. To initiate factory config, first depress this switch, and then simultaneously depress the RESET switch. Release the RESET switch but keep depressing the UNMARKED switch for approximately 45 seconds.

Interfaces

A complete list of the Trunk Port connections for RS-232, V.35 and RS-422/V.11, with direction given, are listed in table 2-2. Connections for the Asynchronous Ports 1 through 16 are given in table 2-3. These connectors are located on the rear panel and are illustrated in figure 2-2, and enlarged in Figure 2-4.

Table 2-2. Trunk Port DB-25 Pinouts (Connections)

Pin	Type of Signal			
	RS-232	**V.35**	**RS-422/V.11**	**Direction**
1	Frame ground			
2	TXD	TXDA	SDA	Out
3	RXD	RXDA	RDA	In
4	RTS	RB	RSA	Out
5	CTS	CTS	CSA	In
6	DSR	DSR	DMA	In
7	Signal GND	Signal GND	Signal GND	
8	DCD	DCD	RRA	In
9	+10V		+V	
10	-10V		-V	
11		TXCIB	STB	In
12			RRB	In
13			CSB	In
14		TXDB	SDB	Out
15	TXC	TXCIA	STA	In
16		RXDB	RDB	In
17	RXC	RXCIA	RTA	In
18		RXCIB	RTB	In
19			RSB	Out
20	DTR	DTR	TRA	Out
21			DMB	In
22				
23			TRB	Out
24	EXT TXC	TXCOA	TTA	Out
25		TXCOB	TTB	Out

Table 2-3. Asynchronous Ports 1-16 RJ-45 Pinouts

Pin number	Signal	Direction
1	DSR	Out
2	DCD	Out
3	DTR	In
4	SG GROUND	
5	RD Rx DATA	Out
6	TD Tx DATA	In
7	CTS	Out
8	RTS	In

Getting Started

In this chapter
- ➤ VCX Working Environment
- ➤ Installation
- ➤ Cables and Connections

Unpacking

The VCX-101 is shipped with padding to survive normal shipment handling. If the unit must be returned for any reason, the original shipping carton and padding should be used.

IS EVERYTHING THERE? After opening the shipping carton, check the contents. Besides this Guide, there should be all the items that were ordered. Verify with your ordering information.

IS THE VCX-101 DAMAGED? Inspect all the items for damage that may have occurred during shipment. If there is damage, contact the shipping agent. If further questions exist regarding damage or missing parts, contact the manufacturer.

Operating Environment

The VCX-101 is designed to operate in any normal office or electronic computer room environment. Temperature/humidity and other operating conditions are given in the specifications table (table 2-1), in Chapter 2 of this manual.

The VCX-101 is supplied with a Desk-Top power supply which contains a DIN connector to plug into the VCX-101. The proper power cord for connection between the Desk-Top power supply and the AC line is supplied for the country ordered.

For UK users only:

United Kingdom units have their rear panel marked adjacent
to the port connectors with the label:

"SAFETY WARNING: See Instructions for use."

This apparatus has been tested and found to comply with
BS6301, and thus does not in itself constitute a hazard to the
telecommunications network. However, it is necessary to warn
users that interconnection directly, or by way of other
apparatus, of ports marked "WARNING: Connect only
apparatus complying with BS6301 to the ports," with ports not
so marked may produce hazardous conditions on the public
telecommunications system and advice should be obtained from
a competent engineer before such a connection is made. They
should note also that the DTE ports marked 1-8 (or 16) do not
provide isolation sufficient to satisfy the requirements of the
relevant parts of BS6301, from the network port (NTTP)
marked "TRUNK". Therefore apparatus connected to these
ports must have either been approved to the relevant parts of
BS6301, or have been previously evaluated against British
Telecom (Post Office) Technical Guides 2 or 26 and given
permission to attach. Other usage will invalidate any approval
given to this apparatus.

Installation Steps

Installation of a VCX-101:

❑ *STEP 1)* Set your terminal/monitor to the following
parameters: XON/XOFF (DC/DC3) flow control, 8 data bits, no
parity and a bit rate of 9600 bps.

❑ *STEP 2)* Connect your terminal/monitor to port 1 on the
VCX-101 using the appropriate length of RJ-45 modular cable
(P/N 4811-xx) and a straight- through RJ-45/DB-25 adapter
(P/N 4810-01 Male, P/N 4810-03 Female). (Note:PC Serial ports
are all Male.).

❑ *STEP 3)* Connect the power cord to the Desk-Top power
supply and the other end to the AC line. The VCX-101 does not
have a power switch, so "plugging" the unit into an AC outlet,
will power it on. Once on, you will see the three LEDs on the
front panel progress through the following sequence.

- All three LEDs flash for three seconds.
- The Test LED flashes (RAM is being tested).
- The Sync and Fault LED's flash briefly.
- The Test LED flashes again (further power up diagnostics.)
- The Sync LED goes to a steady state condition, ON or Flashing. The ON condition occurs if a configured trunk is up and running; while the Flashing state occurs if a configured trunk does not come up.
- The Fault LED may be OFF or flashing. If flashing it indicates no configuration could be found and the default (factory configuration) was used.

The VCX-101 typically requires only 45 seconds from power-up to "ready".

NOTE: To reset to factory configuration after a configuration has been entered, use the recessed button on the right side of the VCX-101. Hold the button in, then simultaneously depress the recessed RESET switch (on the left side of the front panel). Release the RESET switch but keep depressing the UNMARKED switch for approximately 45 seconds.

❑ *STEP 4)* To stop the Fault LED from flashing, you must create your own valid configuration rather than remain in factory configuration. When configuring the VCX-101 for the first time, it is wise to "initialize" it, erasing any configurations which may have been written into RAM during the factory test. This is done by completing the following steps. First run Set Service to Configure to your terminal type. Set service is entered by typing "set" after the "Connect to:" prompt. Then enter the Configuration Service by typing "configure" after the "Connect to:" prompt. The first menu displayed after you enter the Configuration Service is:

1. **ADD/MODIFY** configurations, user lists or texts
2. **INITIALIZE** configuration

Enter selection (or ESC to exit)

Finally, select option 2 to "initialize" the configuration.

❏ *STEP 5)* Proceed with the remainder of the configuration. Once you have configured and then selected a configuration on the VCX-101, it will automatically boot with that new configuration. Chapter 4 discusses the "how to" of configuration.

❏ *STEP 6)* Connect the remaining trunk and terminal/modem cables to the appropriate VCX-101 port connectors.

Connecting a Printer

When connecting a printer to a VCX-101 it is important to know exactly what control signals are needed by the printer (i.e., DTR, RTS, CTS, ...). The VCX expects to see an active signal from the device on pin 20 of the termination panel when configured for DTR attachment control.

Connectors and Cables

Each VCX-101 trunk interface appears to a system as DTE (Data Terminal Equipment). Each VCX-101 "async" port interface appears as DCE (Data Communication Equipment).

The VCX-101 async ports use a RJ45 interface. Three cable adapters are available to convert the RJ45 pinout to a DB-25 pinout if necessary. See the straight through adapter illustration (figure 3-1) for attaching to terminals and the crossover adapter (figure 3-2) for attaching to modems.

RJ45/RJ45 cables, to connect to the async ports, are available in various lengths:
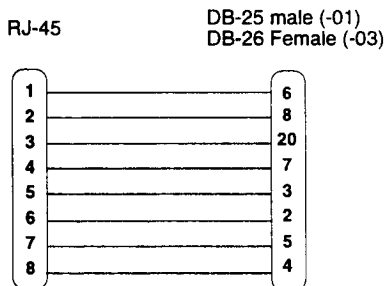
Figure 3-1. RJ45/DB-25 adapter

RJ-45   DB-25

Figure 3-2. RJ45/DB-25 crossover
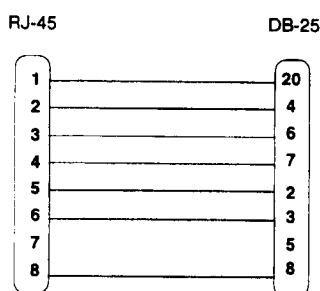
2 ft. - Product No. 4811-02

5 ft. - Product No. 4811-05

10 ft. - Product No. 4811-10

30 ft. - Product No. 4811-30

50 ft. - Product No. 4811-50

A V.24 trunk cable is available that links the port of a VCX-101 to a modem or other network-terminating device (Product No. 4852-01 [10ft], -03 [30ft], -05 [50ft]). A suitable user-supplied cable may be up to 50ft long (screened multi-conductor, with a capacitance less than 40 pF/ft), terminated in any ISO-2110 (DB-25) standard male connector at both ends with a one-to-one pin assignment. The VCX-101 end of the cable can be attached using standard threaded screw locks.

A cable is also available that links the trunk port of one VCX-101 to a trunk port of another VCX-101 or aVCX-100. (See figure 3-3.)

Looking at the back of the VCX-101, the power socket for the AC transformer can be seen on the far left. Next to it is the RS-232 trunk connector, and on the right 8 or 16 async ports. As shown in the figure, either a modem or a collocated VCX-101 can be connected to the trunk connector.

DB-25   DB-25
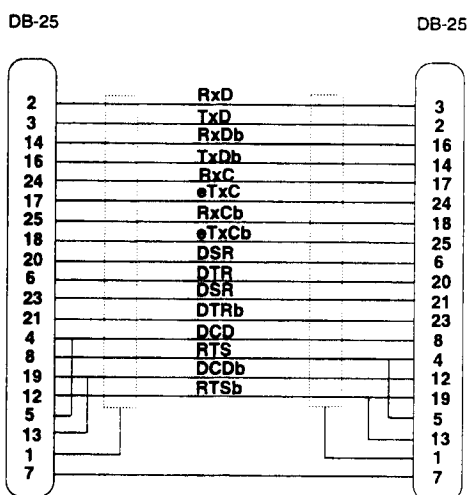
Figure 3-3. Crossover cable No. 4859-01

Installation of V.11/V.35 Trunk Option

If the V.11 or V.35 card is to be installed in a desktop unit remove the four (4) screws on the bottom of the plastic enclosure securing it to the top enclosure. For a card set VCX-101, the previous step is, of course, not necessary.

Locate the trunk interface card near the 25 pin trunk connector. Remove the single screw holding it to the main

Figure 3-4. Pinouts No. 4867-01

card and lift the interface card off of the main card. It may take a little force to move it off the intercard connector. Re-install using the V.11 or V.35 option card.

Locate the V.11 or V.35 label supplied with the card over the DB25 trunk connector. A cable (Product No. 4867-01) is included with the V.11 kit for attachment to a V.11 device or extension cable. (See figure 3-4.)

Modems, computers, terminals or printers can be attached to the async ports of the VCX-101. The proper connectors and cables for each of these attachments are shown in figure 3-6. (See page 3-7.

A different cable (Product No. 4865-01) is included with the V.35 kit for attachment to a V.35 device or extension cable. The cable pinouts are shown in figure 3-5.

Figure 3-5. No. 4865-01 interface cable
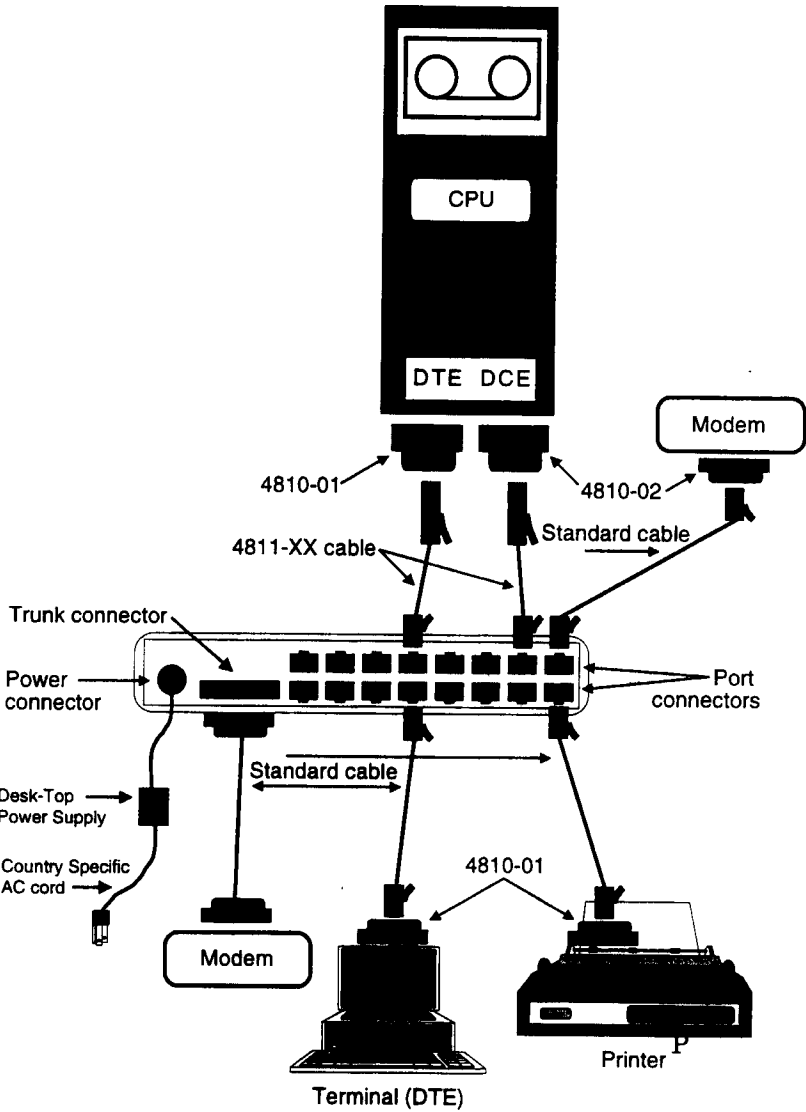
Figure 3-6. General cabling diagram

The pin numbering of an RJ-45 plug, used with the VCX-101 and its orientation, is shown in figure 3-7.
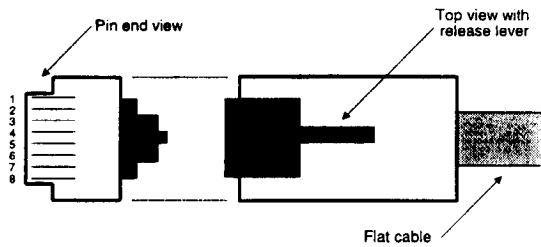
Figure 3-7. RJ-45 Male plug illustrating pinouts

Operation

In this chapter

➤ Access Control
➤ Setup Service
➤ Configuration Service

Introduction

The installation chapter (chapter 3) describes the step by step procedure to power up and cable to your VCX-101. Once the VCX-101 is installed, it is desirable to configure it to your specific application. This chapter discusses how to configure and use your VCX-101.

The three services discussed in this Operation chapter are:

- Setup Service. The setup service permits rapid configuration of a *point-to-point* statistical multiplexer. A point-to-point multiplexer can be configured in seconds to suit simple applications. The resulting configurations automatically generated by the VCX-101 are stored in an EEROM and can be modified by using the Configure Service at any time. Alternatively, a more flexible switching node can be configured with all the "bells and whistles" using the Configure Service from the very beginning. (See page 4-3.)

- Configuration Service. The Configuration Service allows the system administrator to define node operating characteristics for any VCX-101 network. Using this service, the system administrator specifies global parameters (such as the installation name), port parameters (such as speed, parity, & flow control), trunk parameters (such as speed & clocking) and access control. (See page 4-9.)

- Settime Service. The Settime Service allows the system administrator to set the date and time for the node. (See page 4-76.)

After the basic operating characteristics have been selected using configure, you will very likely want to implement features such as a greeting, help resources, user directories and even filtered system logging. These are discussed along with other services such as status, diag, broadcast, etc., to control and manage your VCX-101 node/network, in chapter 6 of this manual.

Access Control

As received from the factory, a VCX-101 has no default access rights defined in the global configuration. Therefore all facilities are given access rights of 1, which means anyone can connect to anything. It is recommended that at least services such as broadcast, busy, configure, forward, greeting, settime, load/dump, and diag be given restricted access.

Accomplish this by giving the aforementioned services access rights of 64, using controlled services in the Configure Service; and grant only one originate port access rights of 64. That port will be the one to which the system administrator's terminal is connected. This ensures that *only the system administrator's terminal* can access potentially disruptive services. Additional restriction can be invoked by requiring the system administrator port user to login with a name and password when accessing the switch. This is achieved by creating a user list with the name and password.

After protecting disruptive services, other resources such as computer ports and the remaining services can be restricted as desired by combinations of user lists, access rights and controlled services facilities. For more information on access rights, see "Restricted Access" in chapter 6.

Attachment Control

If a configuration is created for a switching application, it will be necessary to designate attachment control and direction for each port configured. The direction parameter is somewhat obvious. If the port is to originate calls only, select originate; for answer calls only, select answer; for both, select both. The latter is necessary when user terminals are to be allowed to communicate with each other or when the VCX-101 port(s) are connected to a dial-in/dial-out modem pool.

The choice of attachment control parameters is determined to a large extent by the cabling used to connect computer ports and user terminals to the switch, i.e., "is it a 3-wire system with TX data, RX data and GND only, or are control leads distributed as well?" If the cabling used is 3-wire, the **only form of attachment control that can be used is *unqualified.*** If control leads are available as well, then more control can be exercised by the VCX-101.

For instance, with DTR attachment control on an answer port, when a terminal user logs off an application, the computer can drop DTR to the answer port and automatically break the switch connection. Also, when a user turns off the terminal, the originate port DTR attachment control will automatically disconnect from the switch and can auto-log-off the computer application. For more information on attachment control, see the reference chapter, chapter 6.

Setup Service

Quick Point-to-Point Configuration

The Setup Service, using a predefined configuration, allows the system administrator to quickly establish a 16 channel *point-to-point* multiplexer system with two VCX-101 interconnected. This saves the administrator from having to build configurations for each VCX-101 using the Configuration Service. **You must use the *Configure Service* to create other than this point-to-point configuration.**

Note: The setup service creates 16 originate and answer ports regardless of whether the VCX-101 is a 4, 8, or 16 port unit. The configuration can be left as is (it will cause no operational problems) or the auto generated configuration can be modified. To modify, delete the proper number of ports from the originate and answer end configurations after running the setup service.

Frames displaying monitor screens (in most cases) in this manual are the actual displays. The **vertical size** of some of the frame illustrations however, may be reduced to save manual space, because of the amount of data displayed on the monitor screen.

WARNING

Making changes or setups described below will initially CLEAR
the configuration memory.

Using Setup

Setup defines one VCX-101 as having 15 originating ports
which are auto- connected via a trunk line to the second
VCX-101 which has 15 answer ports. The originating port #2
(on first VCX-101) is connected to answer port #2 (on the
second VCX-101), originating port #3 to answer port #3, etc.
Port #1 on the answer unit is a *both* port to allow services, and
in particular Configure, to be used. A connection between port
#1 at the originate end and port #1 at the answer end can be
established by responding with 't1.p01' to a "connect to:"
prompt after running the Setup Service.

Setup is initiated by entering either "setup o", "setup a", "setup
on", or "setup an" after the connect prompt, where each option
represents a different setup:

Setup o — This option sets a VCX-101 up with 16
asynchronous originate ports, 15 if which are automatically
connected across a trunk line. The trunk supplies TX clock.
This configuration is suitable for collocated VCX-101s.

Setup a — This option sets a VCX-101 up with 1 asynchronous
both port, 15 asynchronous answer ports, and a synchronous
trunk. The trunk supplies TX clock. This configuration is
suitable for collocated VCX-101s.

Setup on — This option is the same as setup o, except that the
trunk supplies no clock. It accepts both transmit and receive
clock from the attached modem.

Setup an — This option is the same as setup a, except that the
trunk supplies no clock. It accepts both transmit and receive
clock from the attached modem.

NOTE: Once a VCX-101 has been configured using Setup, the
new prompt "ORIG" or "ANS" will replace the "connect to:"
prompt.

Setup Example

STEP 1) Assume two new VCX-101s have arrived. They should be unpacked and powered up.

STEP 2) For collocated units cable 4859-01 or other suitable crossover cable should be connected between the units. For remotely located units, use appropriate modems and cables.

STEP 3) The VCX-101 connected to the user terminals will be the originate end and the VCX-101 connected to the computer will be the answer end. A terminal should be connected to "port 1" of the originate end VCX-101 and set for 9600 bps, 8 data bits, no parity and 1 stop bit.

STEP 4) The VCX-101 after cycling through self test should have the green LED steady on or flashing. Press the RETURN key on the terminal (which was installed in Step 3) once or twice. If the "**connect to**:" prompt appears on the screen, go to step 6; if not, perform step 5.

STEP 5) Place the originate unit in factory configuration (a known set of parameters on port 1). This is accomplished by holding in the factory configuration front panel switch (right-hand side) while depressing and releasing the reset front panel switch (left-hand side). Continue holding in the factory configuration switch for about 45 seconds as the unit progresses through self test and ending with the red "fault" LED flashing. This indicates the unit is running with factory configuration which places port 1 in autobaud, 8 data bits, no parity, and 1 stop bit. Now hit the RETURN key once or twice and the "**connect to**:" prompt should appear.

For Collocated Units

STEP 6) Enter "setup o" or "setup on" as appropriate after the "**connect to**:" prompt, as shown in the following:
connect to: setup o <CR>

This will initiate the configuration of 16 originate ports and a trunk line on the VCX-101. After 30 or so seconds hit the RETURN key. The new prompt "**ORIG**" will appear, indicating the setup configuration is complete.

STEP 7) Place a terminal on port #1 of the second VCX-101. Repeat step 4 and 5.

STEP 8) Enter "setup a" or "setup an" as appropriate after the "connect to:" prompt, as shown below:

connect to: setup a

This will initiate the configuration of 15 answer ports and a synchronous trunk line on the second VCX-101. After 10 seconds hit the RETURN key. **"ANS"** will appear, indicating that the second configuration is complete. Both VCX should now be communicating, as indicated by steady illumination of SYNC LEDs.

For Remotely Located Units

NOTE: Another approach can be used to initiate the configuration in the second VCX-101, if the second VCX-101 is a remote unit, linked to the first VCX-101 via modems and a telephone line and they are in sync (solid sync light).

STEP 9) Once "setup on" has been entered, and the first VCX-101 has responded with the "ORIG" prompt, then enter "t1.setup an" as follows:

ORIG: t1.setup an <CR>

This causes the setup service to run on the remote VCX-101 over the trunk line (called t1) and to initiate the configuration of the answer ports in the second unit.

STEP 10) The remaining or 16th point-to-point channel can be established by entering **"t1.p1"** to the ORIG prompt on the originate end VCX-101.

STEP 11) The setup configuration can now be confirmed by entering the Status Service mode. The chassis status of each port will be depicted within Status Service as being "C", which means the port is connected.

The parameters automatically configured in Setup are:

The Originate VCX-101

Configuration name	Originate
port names	p01 through p16
trunk names	t1

port parameters (ports 2-16)

-speed	9600
-bits	8
-stop bits	1
-parity	none
-attachment	unqualified
-port flow control	XON/XOFF
-device flow control	XON/XOFF
-timeout direction	Receive
-attach/detach strings	none
-Originate access rights(Default)	
-auto connect	t1.p2 through t1.p16
-break key	pass-through
-messages	All
-Broadcast option	Accept routine
-Session limit	2
-control state char.	^A
-Forward toggle char.	^N
-Backward toggle char.	^B
-connection timeout	0
-terminal type	VT-101

trunk parameters for t1

-speed	9600
-clocking	TX clock; selection "o" provides TX clock; "on" select provides no TX clock
-timeout	60 seconds
-TUX threshold	75%
-TRX threshold	25%
-virtual circuits	20
-access rights	default
-prompt	orig>

The Answer VCX-101

The parameters for an answer VCX-101 port (ports 2-16) are:

Configuration name   Answer
port names   p01 through p16
trunk names   t1

port parameters (ports 2-16)

speed   9600
bits   8
stop bits   1
parity   none
attachment   unqualified
port flow control   XON/XOFF
device flow control   XON/XOFF
timeout direction   Receive
connection timeout   0
answer access rights   1
prompt is   ANS>

The direction is "answer" and port #1 is a *both* port.

trunk parameters for t1

-speed   9600
-clocking   TX clock; selection "o" provides TX clock;
                         "on" select provides no TX clock
-timeout   60 seconds
-TUX threshold   75%
-TRX threshold   25%
-virtual circuits   20
-access rights   default
-prompt   ANS>

The "n" Option, No Clocks

When "on" or "an" is selected, the originate and answer end
agree with the above parameters. The only difference is that
the Answer VCX-101 provides no clocks.

Configuration Service

This section contains an overview of the Configuration Service, general rules for using the Configuration Service, and sections describing each menu. The Configuration Service also includes item-by-item descriptions of the menu selections and fields.

Before you can configure or define the operating parameters of a node, you must correctly install and power up the VCX-101. (See "Installation", chapter 3 in this manual.) The system installation procedure describes how to enter the Configuration Service and initialize the Configuration Storage portion of RAM.

Configuration Service Overview

Configurations

A configuration is a set of operating parameters for a node. Some parameters are global, such as the installation name. Other parameters are specific to a port, such as whether the port is an asynchronous line or a synchronous trunk line.

You can define several configurations for a node and store them. However, only one configuration can be active at a time. Alternate configurations can be stored for future expansion or for use in special circumstances, such as CPU failure, holidays, or night service.

User Lists

A collection of user names with applicable passwords, account ID and access rights.

Text

Free text can be created by the system administrator and then called up by the user or automatically displayed when a device attaches to the VCX-101.

Name Types

A "name definition" is a label for a set of parameters that describe the functions of a logical port. A logical port is anything that can connect or be connected to.

Examples of logical ports are:

- asynchronous port

- a collection of asynchronous ports (group)

- a trunk line

- a VCX control service

- a pathname

- a character string

To each name definition you create, you must assign one of the following name types:

- Asynchronous line(s)—Asynchronous ports can be connected to computers, terminals, asynchronous modems (dial-up or dedicated), printers, or virtually any other device with an EIA RS-232C interface. A name of this type can refer to one asynchronous port or to a series of physically contiguous asynchronous ports. Note that ports in a series have identical parameters.

- Trunk line—A trunk line is a single synchronous line for point-to-point statistical multiplexing to another node. There is one trunk line on the VCX- 100.

- Speed connect—A speed connect name is a one-name abbreviation for a more complex pathname through the network (Macro).

- Group—A group name represents several logical ports. For example, suppose the names "vax1", "vax2", and "vax3" have been created for ports connected to a VAX minicomputer. These ports can be collected under the group name "vax". The VCX-101 routes users who attempt to connect to "vax", to either "vax1", ""vax2", or "vax3". The VCX-101 queues users for connection if all ports in the group are currently connected. Note that the ports in a group need not be contiguous or similarly named.

- Services, controlled access—This name type allows you to limit access to VCX-101 services to a desired subset of users.

- String—An ASCII string which is output at attachment or detachment time for originate or answer ports.

Using the Configuration Service

Menus

The Configuration Service is menu-driven; you configure a node by responding to prompts. There are three levels of configuration menus. You must step through the menus from Level 1 to Level 2 to Level 3. Similarly, to exit the Configuration Service from the this menu, you must "back out" from Level 3 to Level 2 to Level 1.

Level 1.

The Configuration Service Level 1 Menu functions include initializing and adding or modifying configurations.

Level 2.

The menu functions include: adding, copying, deleting, and displaying configurations. Also, at the Level 2 Menu you select the configuration that runs on power-up or reset.

Level 3

The Menu functions include: adding, modifying, deleting, and displaying name definitions within a configuration. Also, at the Level 3 Menu you modify global configuration parameters.

Forms

When you wish to add or modify a name definition, you fill out "forms" to describe the characteristics of the logical port. Examples of these characteristics include: the name type, the baud rate of the port (if applicable), and the list of ports that have access rights (if applicable).

Each of the name types—

    asynchronous line(s)
    trunk line
    speed connect
    group
    services, controlled access
    strings

—presents different forms (and subforms, if necessary) to collect the required information about the name being defined. There are also forms for global configuration parameters.

In using the Configuration Service, notice that one distinction between a menu and a form is that you cannot back out of a form. Once you enter a form you must complete it by entering new values or accepting the current values.

Name Selection

When several configurations have been created and stored in the Configuration Storage, you must select the name of the configuration you wish to examine or edit. The Configuration Service prompts for a configuration name, and as shown in the example below:

Terminate With:

ESCape-exit <CR>-current name ^E-previous name ^C-next name

Enter Configuration name: anyname

When this prompt appears, your options are to:

- press <ESC> to abort the command sequence.

- press <CR >to examine or modify the configuration name currently displayed under the cursor.

- enter "^E" to scroll back to the previous configuration name.

- enter "^C" to scroll forward to the next configuration name.

- type the name of the configuration you want to examine or modify.

When the name of the configuration you wish to examine or modify appears under the cursor (whether via scrolling or direct entry), enter <CR> to accept the configuration name.

Prompts allow you to scroll through the name definitions within a configuration.

Field Selection

Similar to above "name-scrolling" prompt is this instruction line:

<CR>= next field——^E=previous field—— ESC=accept screen

This line generally accompanies a display of parameters in the upper part of your screen. A pointer character (>) indicates which parameter is the current field. In the lower part of your screen, the Configuration Service prompts you to enter a value into the current field.

The instruction line above indicates that you can enter <CR>to step forward one field or a "^E" to step backward one field. Entering <ESC> accepts currently displayed values and steps to the next form or menu.

HINT: To examine a form without editing, avoid entering any data. Press <ESC>to accept data on your screen when you are ready to move on.

Note: Do not use arrow or function keys. They create <ESC> characters.

Note: All entries should be made in lower case.

Configuration Service Menu Summary

The following summarizes the Configuration Service menus:

Level 1 Menu

Selection: 1) ADD/MODIFY configurations, user lists or texts in a module
Selection: 2) INITIALIZE configuration storage

Level 2 Menu

Selection: 1) ADD a new configuration
Selection: 2) ADD a new user list
Selection: 3) ADD a new text
Selection: 4) EXAMINE/MODIFY a configuration, user list or text
Selection: 5) DELETE a configuration, user list or text

Selection: 6) LIST existing configurations, user lists or texts
Selection: 7) SELECT configuration to run

Level 3 Menu (Configurations)

Selection: 1) ADD new name(s)
Selection: 2) EXAMINE/MODIFY a name
Selection: 3) DELETE a name
Selection: 4) LIST existing names
Selection: 5) EXAMINE/MODIFY global configuration parameters
Selection: 6) MERGE all names with those from another configuration

Level 3 Menu (Users Lists)

Selection: 1) ADD new user(s)
Selection: 2) EXAMINE/MODIFY a user
Selection: 3) DELETE a user
Selection: 4) LIST existing users
Selection: 5) EXAMINE/MODIFY user list description
Selection: 6) MERGE all users with those from another user list

Level 3 Menu (text)

Selection: 1) EXAMINE/MODIFY text description
Selection: 2) EDIT text

The menu selections are explained in detail on the following pages.

Configuration Service Level 1 Menu

To invoke the Configuration Service, enter the following:

Connect to: configure <CR>

The first Configuration Service display menu is shown in figure 4-1.

```
  1) ADD/MODIFY configurations, user lists or texts
  2) INITIALIZE configuration storage
Enter selection [or ESC to exit]:
```

Figure 4-1. Basic Configuration Service menu

Exiting the Configuration Service

Press <**ESC**> at the Level 1 Menu to exit the Configuration Service and return to the connect prompt.

1. Add/Modify Configurations, User Lists or Texts

Type "1 <CR>" at the Level 1 Menu to add a configuration or modify an existing configuration.

In the upper right corner of your screen, the Configuration Service displays the number of memory blocks available in the Configuration Storage you select. The format of this display is: [x/32 used] where x is the number of blocks used and 32 is the number of blocks available in a VCX-101. One block is equivalent to 256 bytes of memory.

The Configuration Service also displays the configurations, if any. If more than 12 configurations are stored, the Configuration Service displays configuration names twelve at a time in alphabetical order, then prompts:

more names——continue? (y/n) [n]

Enter "y" to view the additional configuration names. When all the stored configurations have been displayed, or if you enter or "n" in response to the "more names" prompt, the Configuration Service displays the Level 2 Menu. See below under "Level 2 Menu" for instructions on adding, examining, and modifying configurations.

2. Initialize Configuration Storage

Type "2 <CR>" at the Level 1 Menu to initialize the
Configuration Storage —a process analogous to formatting a
disk. You must initialize a Configuration Storage if you have
not yet configured the node. You may wish to initialize a
Configuration Storage to erase the data stored in it.

The Configuration Service displays a "second chance" prompt:

Are you sure you want to initialize entire module (y/n)? [n]

Enter <CR>or "n <CR>" to abort the initialization process. If
you enter "y <CR>" the initialization process reformats the
RAM in the Configuration Storage, erasing the stored data.

Warning: Entering "y<cr>" will cause all configurations to be lost.

Configuration Service Level 2 Menu

The Level 2 menu is shown in figure 4-2.

NOTE: If no configuration exists in the Configuration Storage,
only selection 1, "Add a new configuration" is valid.

Exiting to Level 1

Return to the Level 1 Configuration Service Menu by pressing
"*ESC*" at the level 2 prompt.

```
        Name    Type              Description

        example1 Configuration    Manual Example 1
        example2 Configuration    Manual Example 2




    1) ADD a new configuration
    2) ADD a new user list
    3) ADD a new text
    4) EXAMINE/MODIFY a configuration, user list or text
    5) DELETE a configuration, user list or text
    6) LIST existing configurations, user lists and texts
    7) SELECT configuration to run
  Enter selection [or ESC to exit]:
```

Figure 4-2. Level 2 Configuration Service menu

1. Add a New Configuration

Type "1 <CR>" at the Level 2 Menu to add a new configuration name. The Configuration Service then prompts for the name of the new configuration:

New configuration name:

To abort the name addition process, press <ESC>. To proceed, type the name you wish to use and press carriage return. The name can consist of up to ten alphanumeric characters. For example, to name a configuration "example1", you enter:

New configuration name: example1<CR>

The Configuration Service immediately routes you to the Global Configuration Parameters Form. (This form is shown in figure 4-8, in chapter 4, on Global Configuration parameters.)

2. Add a New User List

If for security reasons, you want the VCX-101 users to log-in their name and a password, you will need to enter into the VCX-101, an actual list of user names. The user names are added using selection 4 from the menu, EXAMINE/MODIFY a configuration, user list or text. However, before this can be done, you must give a name to your new user list. This is accomplished with menu selection 2, (see figure 4-2). When "2 <CR>" is typed, the following prompt will be displayed:

New user list name: ourgang

You are asked by the prompt to enter the name for the user list, i.e., "ourgang". The name can be no more than ten characters in length. After naming the user list, the screen display will change to that illustrated in figure 4-3.

```
Config: ourgang                    [6/32 used]
        Description:>
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------
```

Figure 4-3. New user name menu

Description: The description of the user list can be no longer than 30 characters. After entering a description, you are returned to the Level 2 Menu. To actually add names to the user list, use Selection 4, "EXAMINE/MODIFY a configuration or user list". Remember, when you are prompted in Selection 4 for a Configuration name, enter your new user list name.

3. Add a New Text

If you want to have text describing a particular VCX function accessible to the user or if you want to display text when a device attaches to the VCX, you can use the text function. However, before you actually compose the text (Selection 4, "EXAMINE/MODIFY a configuration, user list or text") you need to give the text file a name.

Selecting "ADD a new text", option 3, from the Level 2 menu will generate a prompt which asks for the name of the text file:

new text name: salutation <CR>

After the name has been entered ("salutation" in this example), a description prompt is displayed.

You can now enter a brief description about the text file, 30 characters or less in length. Following the description, you can select the access rights associated with the text file. These are rights the user must have before they can display and read the text. If there are restrictions, type <CR>.

4. Examine/modify a Configuration, User List, Or Text

Type "4 <CR>" at the Level 2 Menu to go to the Level 3 Menu. The Configuration Service prompts you for the name of the configuration, user list or text you wish to examine or change:

Configuration or user list name:

Enter <ESC> to return to the Level 2 Menu. To continue, scroll to or type the configuration name, followed by <CR>. The Configuration Service then displays the name definitions for the selected configuration. If more than 12 names are defined, the Configuration Service displays the names twelve at a time in alphabetical order, then prompts:

more names - continue? (y/n) [n]

Enter "y <CR>" to view the additional names. When all the
names have been displayed, or if you enter <CR>or "n <CR>" in
response to the "more names" prompt, the Configuration
Service displays the Level 3 Menu. See below under "Level 3
Menu" for instructions on editing name definitions and global
configuration parameters.

NOTE: If you are adding user names and passwords to a user
list, all alphanumeric characters must be entered in lower case.

5. Delete a Configuration, User List Or Text

Type "5 <CR>" at the Level 2 Menu to delete a configuration,
user list or text. The *Configuration Service displays:*

Configuration, user list or text name to be deleted: anyname

To abort the deletion process, press <ESC>. To delete the
displayed configuration, press <CR>. To delete a configuration
other than the one initially displayed, scroll to or type the name
of the configuration you wish to delete, then press <CR>. The
Configuration Service then displays the second chance prompt:

Do you really want to delete this configuration/user list/text?
(y/n) [n]

Enter <CR> or "n <CR>" to abort the deletion process. If you
want to delete the configuration, enter "y <CR>". The
configuration will be erased— with all its associated port,
trunk, and group names.

6. List Existing Configurations, User Lists or Texts

Type "6 <CR>" at the Level 2 Menu to display existing
configurations or user lists, as shown in figure 4-4.

The Configuration Service displays up to twelve configuration
names in alphabetical order with their associated comments. If
more than twelve configurations are stored, the Configuration
Service displays them twelve at a time and prompts:

— more names — continue (y/n)?

Respond "y <CR>" to view the additional names. Respond "n
<CR>" to return to the Level 2 Menu.

```
Config: ourgang                            [7/32 used]


        Name  Type              Description

        example1 Configuration  Manual Example 1
        example2 Configuration  Manual Example 2
         ourgang User List




   1) ADD a new configuration
   2) ADD a new user list
   3) ADD a new text
   4) EXAMINE/MODIFY a configuration, user list or text
   5) DELETE a configuration, user list or text
   6) LIST existing configurations, user lists and texts
   7) SELECT configuration to run
  Enter selection [or ESC to exit]:
```

Figure 4-4. Configurations or user lists menu

7. Select Configuration to Run

Level 2 menu selection 7 determines which configuration will run and become active with the next power-up or reset.

The prompt is:

Configuration to run:

Enter the name of the configuration to be used, then press <CR>.

Configure Service Level 3 Menu: Configuration

The level 3 Configuration service menu is displayed in figure 4-5.

```
Config: example1                        [7/32 used]


        Name  Type                 Brief Description
No names defined.






    1) ADD new name(s)
    2) EXAMINE/MODIFY a name
    3) DELETE a name
    4) LIST existing names
    5) EXAMINE/MODIFY global configuration parameters
    6) MERGE all names with those from another configuration

```

Figure 4-5. Configuration service menu (level 3)

NOTE: If no name definition exists in the configuration, only selection 1, "ADD a new name", and selection 5, "EXAMINE/MODIFY global configuration parameters", are valid.

Exiting To Level 2

Press <ESC> to exit Level 3 and return to the Level 2 Menu.

1. Add a New Name

A name definition is a label for a set of parameters associated with a logical port. Type "1 <CR>" at the Level 3 Menu to add a name definition. This prompt appears:

New entry name:

To abort the name addition process, press <ESC>. To proceed, type the name you wish to use and press <CR>. The name can consist of up to ten alphanumeric characters. The

Configuration Service then displays the Name Type Form, which is shown in figure 4-6.

```
Config: example1    Name: new              [12/32 used]
   Name type:>Asynchronous line(s)         (Slot 1)
------- <CR>=next field ---- ^E=previous field --- ESC=accept screen -------




 1) Asynchronous line(s)     (Slot 1)  5) Services, controlled access
 2) Trunk line               (Slot 2)  6) X.25 port                 (Slot 2)
 3) Speed connect                      7) String
 4) Group
Name type:
```

Figure 4-6. Add a new name menu

You must select a name type, then complete the form(s) associated with that name type. (See the chapters describing the forms for details.) After you complete the form(s) for the name type you select, the Configuration Service again displays the prompt:

New entry name:

You can then add another name or press <ESC> or <CR> to exit to the Level 3 Menu. For example, to name an asynchronous VCX-101 port cabled to a port on a VAX minicomputer "vax1", you enter:

Enter port name: vax1

The Configuration Service then displays the forms for Asynchronous Line(s).

HINT: Once entered, *forms do not allow you to back out of them*. Should you decide not to add the name after pressing, **enter** <ESC> until the Configuration Service re-displays the Level 3 Menu. You can then use Level 3 Menu selection 3, "DELETE a name," to erase the added name. See below for details.

2. Examine/modify a Name

Type "2 <CR>" at the Level 3 Menu to change the
characteristics of a logical port. First, the Configuration Service
prompts for the name of the logical port:

Terminate with:
ESCape-exit -current name ^E-previous name ^C-next name
Entry to modify: name1

To return to the Level 3 Menu, press <ESC> .To proceed, scroll
to or type the name you wish to examine or modify, then press
<CR>. The Configuration Service then displays the Name Type
Form.

You must select a name type, then complete the form(s)
associated with that name type. (See the chapters describing
the forms for details.) After you complete the form(s) for the
name type you select, the Configuration Service again displays
the prompt:

Terminate with:
ESCape-exit -current name ^E-previous name ^C-next name
Entry to modify: name1

You can then examine/modify another name or press <ESC> to
exit to the Level 3 Menu.

3. Delete a Name

Type "3 <CR>" at the Level 3 menu to delete a name definition.
A prompt similar to the following example will appear:

Terminate with:
ESCape-exit -current name ^E-previous name ^C-next name
Entry to delete: name1

To abort the deletion process and return to the Level 3 Menu,
press <ESC>. To proceed, scroll to or type the name you wish to
delete, then press. <CR>. The Configuration Service then
displays the second chance prompt.

Do you really want to delete this entry? (y/n) [n]

Enter " <CR>" or "n <CR>" to abort the deletion process. If
your sure you want to delete the name definition, enter "y
<CR>". After deleting the name, the Configuration Service
displays the Level 3 Menu.

4. List Existing Names

Selection 4 of the Level 3 menu, displays a summary chart of name definitions, which is shown in figure 4-7.

```
Config: example1                           [7/32 used]


      Name  Type                     Brief Description

      name1 Asynchronous line(s)     01\02 - 01\02
      port1 Asynchronous line(s)     01\03 - 01\03






  1) ADD new name(s)
  2) EXAMINE/MODIFY a name
  3) DELETE a name
  4) LIST existing names
  5) EXAMINE/MODIFY global configuration parameters
  6) MERGE all names with those from another configuration
Enter selection [or ESC to exit]:
```

Table 4-7. Name summary chart at level 3

Up to ten names are displayed at a time. If there are more names, the Configuration Service prompts:

- more names - continue (y/n)? [n]

Respond "y <CR>" to view the additional names. Respond <CR> or "n <CR> " to return to the Level 3 menu.

5. Examine/modify Global Configuration Parameters

Global configuration parameters are those parameters not
specific to a logical port. When you first add a configuration,
the Configuration Service automatically routes you to the
Global Parameters Form. To examine or change the global
parameters of a configuration, enter "5 <CR>" from the Level 3
Menu.

The Global Parameters Form will then appear on the monitor.
This form is shown in figure 4-8 and described in the following
paragraphs.

```
Config: trunk                              [9/32 used]
        Description:>
    Installation name:
        Connect prompt:
Default Access Rights: 1-64
        Logging port:
      Logging enabled: No     Binary output: No     Logging mask:
Modem network mgr port: node2
                 addr: 1
IOK log message timer: 1
            Node name:
      User list name: usr
      Local time zone: est
   Local time when it is midnight Greenwich Mean Time -
             Hours: 0              Minutes: 00
      Display format: European (dd-mm-yy hh.mm.ss)
Queue length threshold: 30
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen



Description:
```

Figure 4-8. Examine/modify global parameters

Global Parameters Form

The following paragraphs describes the fields of the Global
Parameters Form.

Description

The description field can be used to comment on the
configuration. The length of your entry is limited to thirty
characters. You can use any printable letters, digits, or
symbols. For example, you might choose to enter:

Description: Run normally <CR>

as your description about a configuration to be run except in
the event of CPU failure. The description field accepts upper
and lower case letters in your input just as you enter them. To
delete an entered comment, press the spacebar followed by
<CR>.

Installation Name

The installation name appears as the first line of the node
logon banner. You can enter any combination of printable
upper and lower case characters, up to 60 characters in length.
VCX-101 stores the string just as you enter it. For example,
you might enter:

Installation name: Acme Balloon Co. - Boston Node <CR>

To delete an entered installation name, press the spacebar
followed by <CR>.

Connect Prompt

The connect prompt appears to the terminal user as the last
line of the logon banner; it reappears any time the user enters
the control state. Throughout VCX-101 documentation the
connect prompt shown is the default:

Connect to:

However, you can change this prompt to any combination of up
to thirty printable characters. VCX-101 retains upper and
lower case within the string just as you enter it. The prompt is:

Connect prompt:

Enter the connect prompt just as you wish it to appear
(including a colon or any other desired punctuation).

Default Access Rights

The next prompt allows you to set the default access rights.
These are the access rights that any port (answer, originate, or
trunk) will default to, before they are configured for any access
rights or password override. Enter 1 - 64 to allow access to any
resource.

The prompt is:

Default access rights: 1 - 64 <CR>

(The default value, if left blank, is 1.)

Logging Port

You can request VCX-101 to collect usage data (for example, connection attempts, successful connections, disconnections) and continuously route this data to the logging port. A printer or computer port is usually connected to the logging port, although a CRT may also be used for demo or for non-permanent logging. The name you enter for the logging port must correspond to a configured port on the node. It is also possible to output logging information to a remote destination by entering a trunk name. Press <CR>without naming the port if the system logger is not desired. If you already have a logging port named, pressing the space bar then <CR> erases it, leaving you with no logging.

For example, if you wish to configure a printer as a logging terminal and name it "logger", enter:

(blank for logging disabled)
Logging port: logger

See the Logging Service chapter in Reference Chapter 6 of this manual for a detailed description of the logging function, and information presented.

Logging Enable

"Yes" turns on the logging task and "No" turns it off. Without logging enabled there can be no system logger, the Log Service will not work, and if a Master NetMux is used (needed for modem network management), it will not operate.

The prompt is:

1) No
2) Yes
Logging enabled:

Binary Output

The next field is Binary output and determines whether logging data is in binary or ASCII format. The added benefit of binary is more compact data and configuration data for auto building hardware inventory records. Enter 1 for "No" or 2 for "Yes" and enter <CR> to select binary output from the logging port. No is chosen when the logging port connects to a printer. Yes is chosen when connected to a (Network Management System (NMS).

Binary output: 1) No
                 2) Yes

Logging Mask

A mask can be entered at the prompt to filter logging classes
and prevent them being forwarded to a NMS. For example,
"NP" would prevent "normal" and "performance" events from
being output from the logging port. The prompt for the field is:

(Discard A-major,I-minor,E-exceptions,N-normal, X-Protocol, P-performance logs)
Logging Mask:

Modem Network Mgr Port

This field is the network manager port. This refers to the path
to the management modem center. This path may be an async
port name, a multiplexing trunk name or an X.25 trunk name.
If an X.25 trunk name, it must be followed by the X.121
address of the distant end. If a function is not required, press
<CR>.

Addr

The address for the management center NMS is entered at this
prompt and can be any address from 1 to 9999. If no NMS or
Master NetMux system is being used, press <CR>.

IOK Log Message Timer

Next is the "IOK log message timer:" listing on the menu.
When logging is enabled, a time in the range of 0 to 15 minutes
may be entered for the parameter. This is the rate at which the
logging timer will report to the network management system (if
so equipped). Entering 0 disables the message timer. Press
<CR> to continue to the next menu item.

Node Name

The next prompt allows you to enter the node name of your
present VCX-101 unit. The node name you select will show up
in the logging report. It can be no more than ten characters in
length. It also converts 0-11 upper case letters to lowercase
when <CR> is pressed.

Node name: new york

User List Name

The next prompt concerns the user list name. If you want the VCX-101 users to enter user names and passwords during log-in you will need to enter a list of user names under another configuration menu. This user list should in turn be given a name like "ourgang". This particular prompt is asking for the name of the user list. If you don't plan to have a user's list, just hit <CR>.

User list name: <CR>

Local Time Zone

The nodes in a network frequently lie in different time zones. For VCX-101 to display the local time at each node, you must identify the time zone. Time zones usually have universally accepted abbreviations. For example, "EST" stands for Eastern Standard Time, "PDT" for Pacific Daylight Time, and "GMT" for Greenwich Mean Time. The Configuration Service prompts you to enter the abbreviation for your local time zone:

Local time zone:

Enter the abbreviation you want the VCX-101 to display along with the time of day. Your response can be up to four characters long. Entering just <CR> causes no time zone abbreviation to be displayed.

Local Time When It is Midnight Greenwich Mean Time

The VCX-101 must adopt a single standard time internally to monitor and report usage statistics. Greenwich Mean Time is that standard. You must indicate the difference between the local time at your node and Greenwich Mean Time so VCX-101 can display local time for your users. The Configuration Service prompts you to enter the local time in military format relative to midnight (0:00) GMT.

The hours prompt is: The minutes prompt is:
Range: 0 - 23   1) 00
Hours: 2) 15
**   3) 30**
**   4)45**
**   Minutes:**
A <CR> defaults to midnight and 0 minutes

Enter the number displayed beside the minutes portion of this node's local time when it is midnight Greenwich Mean Time. For example, in the case of a node located in Boston, enter "1 <CR>" (or just <CR>, since the default value is 0 minutes).

Display Format

Different countries employ different formats for displaying dates. In the United States dates are displayed month first, then day, then year. In most European countries dates are displayed day first, then month, then year. To make the dates displayed by VCX-101 understandable, you must specify the format. The prompt reads:

1) U.S. (mm/dd/yy hh:mm:ss)
2) European (dd-mm-yy hh.mm.ss)
Display format:

Enter the number displayed beside the display format of your choice. For dates in mm/dd/yy form, enter "1 <CR>". You may also enter just <CR>to default to the U.S. display format. For dates in dd-mm-yy form, enter "2 <CR>".

BPE Alarm Threshold

(not used for the VCX-101)

Queue Length Threshold

The queue length is the number of people waiting to be serviced on the VCX. The threshold for the queue length is the level that if exceeded will generate a logging message. The default for the threshold is 30, out of a range of 1 to 299. Enter <CR> to select the default and return to the Name summary form.

Range: 1 - 299
Queue length threshold: 30 <CR>

6. Merge All Names with Those from Another Configuration.

To merge the names from one configuration with another, type "6 <CR>" at the Level 3 Menu (Users Lists). The following screen will then be displayed:

Terminate with:
   ESCape=exit <CR>=current name^E=previous name^C=next name
Configuration to copy from:

Enter the name of the configuration you wish to copy from.
What configuration will you be copying into? The one you
selected, when you entered the Level 3 Menu. NOTE: If
duplicate names exist in both lists (i.e., trunk names, port
names, etc.), they will be recognized, and only one name will
remain in the combined list.

Once you have entered the name of the configuration, press
<CR> and you will be returned to the Level 3 Main Menu
(Users Lists).

Configure Service Level 3 Menu: User List

If after selecting the "EXAMINE/MODIFY a configuration,
user list or text" option from the Level 2 Menu, a user list is
chosen, the following Level 3 Menu choices are made available,
as discussed previously. This menu is shown in figure 4-9.

NOTE: If no users exist under the user list name, only selection

```
 1) ADD new user(s)
 2) EXAMINE/MODIFY a user
 3) DELETE a user
 4) LIST existing users
 5) EXAMINE/MODIFY user list descriptions
 6) MERGE all users with those from another configuration
Enter selection [or ESC to exit]:
```

Figure 4-9. Level 3 User list

1, "ADD a new user", and selection 5, "EXAMINE/MODIFY
user list description", are valid.

A description of the six menu options follows.

Press <ESC> to exit Level 3 and return to Level 2 Menu.

1. Add New User(s)
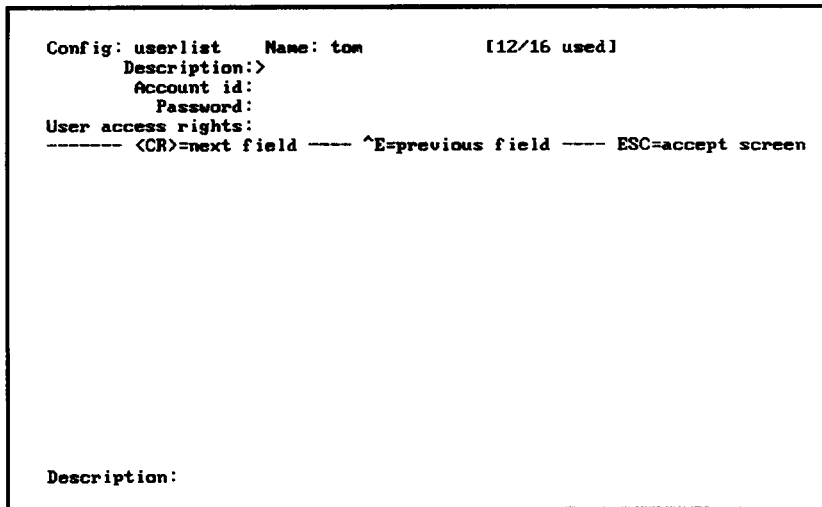
To add a new user to a user list, type "1 <CR>" at the Level 3
Menu. The following prompt will appear:

New user name:

To abort this option, just press <ESC>. To proceed, type the name you wish to use and press <CR>. For example, you might enter the name "Tom".

New user name: Tom <CR>

After entering a name, the screen shown in figure 4-10 will be displayed.

```
Config: userlist    Name: tom              [12/16 used]
        Description:>
        Account id:
           Password:
User access rights:
-------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen










Description:
```

Figure 4-10. Add new user to user list

The account id is the identity tag that will be printed in any logging message. Up to ten alphanumeric characters can used. You can use a name, a number or some combination for the account id.

If you want the user to enter a password during sign-on, then enter a password. If not, enter <CR>.

The access rights you want that particular user to have should be entered at the "User access rights" prompt. Access rights can be entered as a series of single digits such as "1,5,6,7", as a range, "1-32" or as a combination, "1,5,6,7-32". If total access rights are granted, the range should be 1-64. For details on access rights read chapter 6, *Restricted Access Session*.

To return to the Level 3 Menu (Users Lists), press the ESCape key.

2. Examine/modify a User

To modify the account id., password, or access rights of a user, type "2 <CR>" at the Level 3 Menu. The following screen will appear:

Terminate with:
ESCape=exit CR>=current name^E=previous name ^C=next name

User to modify: Tom

This screen allows you to select a user. Page through the user list using either ^E or ^C or enter the name. When the user you are interested in is displayed, press <CR> The screen seen earlier when "ADD new user(s)" was used, is once again displayed.

You can now modify or change the account id., password, or user access rights for that particular user. When you have completed the modifications, press the ESCape key.

3. Delete a User

To delete a user name, type "3 <CR>" at the Level 3 Menu. A prompt similar to the example below will appear:

Terminate with:

ESCape=exit<CR>=current name^E=previous name^C=nextname

Entry to delete: John

Page through the existing names, using ^E or ^C, until the name you wish to delete appears on the screen or enter the name, then press <CR>.

The Configuration Service then displays the second chance prompt:

Do you really want to delete this entry (y/n)? n
Entry to delete: John

Enter <CR> or "n <CR>" to abort the deletion process. If you truly want to delete the name definition, enter "y <CR>". After deleting the name, the Configuration Service again displays the Level 3 Menu (User lists).

4. List Existing Users

To select a summary chart that shows the existing user names, type "4 <CR>" at the Level 3 Menu. The display illustrated in figure 4-11 will appear on the monitor.

```
Config: example1                    [7/32 used]


    Name     Type              Brief Description

    Tom      User name
    John     User name
    Sally    User name
    Bill     User name
    Jane     User name
    Mary     User name




 1) ADD new user(s)
 2) EXAMINE/MODIFY a user
 3) DELETE a user
 4) LIST existing users
 5) EXAMINE/MODIFY user list description
 6) MERGE all users with those from another list

Enter selection [or ESC to exit]
```

Figure 4-11. List existing users menu at level 3

Up to ten user names are displayed at a time. If there are more names, the Configuration Service prompts:

— more names — continue (y/n)? [n]

Respond "y <CR>" to view the additional names. Respond <CR> or "n <CR>" to return to the Level 3 Menu.

5. Examine/modify User List Description

To change the user list description, type "5 <CR> at the Level 3 Menu. A prompt similar to the example shown below will be displayed:

Description:
   <CR>=next field ^E=previous field ESC=accept screen
Description: The 8:00 to 5:00 shift

Once you have entered the new user list description, press the ESCape key to return to the Level 3 Menu.

6. Merge All Users with Those from Another User List

To merge the names of one user list with another, type "6 <CR>" at the Level 3 Menu (Users Lists). The following screen will then be displayed:

Terminate with:

ESC=exit <CR>=current name ^E=previous name^C=next name

User list to copy from:

Enter the name of the user list you wish to copy from. What list will you be copying into? The user list you selected, when you entered the Level 3 Menu. NOTE: If duplicate user names exist in both lists, they will be recognized, and only one name will remain in the combined list.

Once you have entered the name of the list, press <CR> and you will be returned to the Level 3 Main Menu (Users Lists).

Configure Service Level 3 Menu for Text

If after selecting the "EXAMINE/MODIFY a configuration, user list or text" option from the Level 2 Menu, "text" is chosen, the 2 selection option will be displayed, as shown below:

1) EXAMINE/MODIFY text description
2) EDIT text
Enter selection [or ESC to exit]:

The two menu options will now be described:

Exiting To Level 2

Press to exit Level 3 and return to Level 2 Menu.

1. Examine/modify Text Description

When this option is selected, the text's description and access rights are displayed and the user can change that information if desired. This selection results in the menu shown in figure 4-12. When the description and/or access rights are completed, the service returns to the Level 2 menu.

2. Edit Text

Selecting the "edit text" option (2), the menu shown in figure 4-13 is displayed on the monitor.

```
Config: text                            [12/32 used]
        Description:>Text Example
        Access Rights: 1-64
------- <CR>=next field ---- ^E=previous field ---- ESC=accept scr(



Description:
```
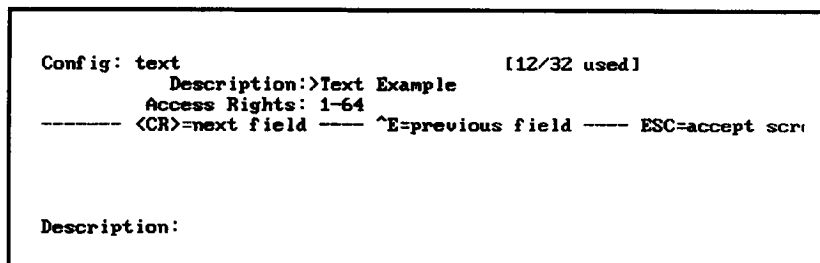
Figure 4-12. Examine/modify text description

```
Config: text                       [8/32 used]
----------------------------------------------------------------
001:This is an example of typed in text. Note line number on left.
002:Notice Line 002 pops-up with <CR> of line 1. (etc.)
003:








----------------------------------------------------------------
1) ADD Line(s)     3) REPLACE Line    5) NEXT Screen  7) REDISPLAY Screen
2) INSERT Line(s)  4) REMOVE Line(s)  6) PREV Screen  8) DISPLAY Line
Enter selection [or ESC to exit]:
```
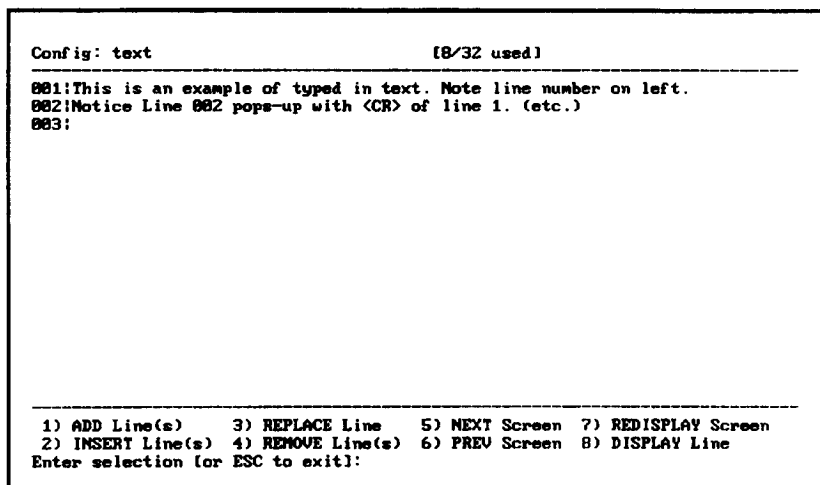
Figure 4-13. Edit text screen

At this point, the user by choosing the appropriate options (seen at the bottom of the screen), can add, delete, replace or display free text lines. The user can also exit the screen by hitting the ESC character.

Each of the "edit text" options discussed next.

Option 1: ADD Line(s)

New lines of free text can be added using this option.

NOTE: Maximum number of characters per line is 75 characters and must contain printable ASCII characters. The tab character, for example, can not be used. Blank lines can also be entered.

If text lines already exist on the screen when using the "add line" option, the following prompt will be displayed:

Add line(s) after which line number?

There are a number of ways this prompt can be answered. You can enter a line number, such as 11 and new line(s) will be added after it. You can also enter "F" or "f" for "first line" and "L" or "l" for the "last line" and line(s) will be added at those locations.

If no text lines exist, then line 1 is assumed and no prompt will be displayed.

A blank line can be entered by hitting either a carriage return <CR> or a line feed.

To exit option 1, just hit the ESC key. ESC will return you to the text screen display.

Option 2: Insert Line(s)

This option allows you to insert text between existing text lines.

If, when using the "INSERT Line(s)" option, text lines already exist on the screen, the following prompt will be displayed:

Insert line(s) before which line number?

As in the "add line" option, permissible answers include an actual line number, "F" or "f" for "first line" and "L" or "l" for "last line".

If no free text lines exist, then line 1 is assumed and no prompt will be displayed.

A blank line can be entered by hitting either a carriage return <CR> or a line feed.

To exit option 2, just hit the ESC key. ESC will return you to the text screen display.

Option 3: Replace Line

Using This Option, An Entire Text line can be replaced with another. The chosen line is essentially erased and a new line inserted in its place. The following prompt appears when you select this option:

Replace which line number?

Like the first two options, permissible answers include an actual line number, "F" or "f" for "first line" and "L" or "l" for "last line".

If no free text lines exist, then a message to that effect will be displayed.

A blank line can be entered by hitting either a carriage return <CR> or a line feed.

To exit option 3, just hit the ESC key. ESC will return you to the text screen display.

Option 4: Remove Line(s)

Multiple lines of text can be removed using this option. When the option is first selected, two prompts are displayed:

Remove starting line number?

and

Remove ending line number?

Like the first three options, permissible answers include an actual line number, "F" or "f" for "first line" and "L" or "l" for "last line".

If no free text lines exist, then a message to that effect will be displayed.

After the lines are removed, the user is returned to the text screen and it is redisplayed to "close the gaps" created by the deletions.

Option 5: Next Screen

A SCREEN is defined as a contiguous group of 18 lines of text (blank or filled) displayed at any one time. The user can flip from one SCREEN (a group of 18 text lines) to another SCREEN of text lines), using this option. If there is no next group, the display will not change.

Option 6: Prev Screen

The PREV (previous) SCREEN (group of contiguous text lines) will be displayed when this option is used. If there is no previous group, the display will not change.

Edit Option 7: Redisplay Screen

The current SCREEN will be cleared and redisplayed when this option is used. This option is useful when the screen becomes overwritten or fouled, i.e., by a broadcast message, and difficult to read.

Edit Option 8: Display Line

This option allows the user to go the SCREEN associated with a particular line number. The following prompt appears when this option is used:

Display screen containing which line number?

Permissible answers include an actual line number, "F" or "f" for "first line" and "L" or "l" for "last line".

If the specified line is not currently defined in text, then a message to that effect will be displayed.

Configure Service Name Types

Name Type 1—Asynchronous Line(s):

Main Form

From Level 2, option 4 (Examine/Modify, a configuration, user list or text), the Name type1—Asynchronous line menu be reached. Enter "1 <CR>" at the Name Type Form. This will causes the Asynchronous Line(s) Main Form, as illustrated in figure 4-14.

```
Config: originate   Name: p10        [12/32 used]
   Name type: Asynchronous line(s)   (Slot 1)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        Starting port: 10        Attachment control: Unqualified
          Ending port: 10       Device flow control: XON/XOFF
            Baud rate: 9600       Port flow control: XON/XOFF
     Character length: 8 bits        Timeout (mins): 0
            Stop bits: 1 bits    Timeout direction: Receive
               Parity: None              Direction: Originate
         Escape delay: No
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Auto connect A: t1.p10
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Auto connect B:
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Autocon. limit:>0
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------



Range: 0 - 255
(Number of times to retry an Autoconnect A, 0 for no limit)
Autocon. limit:
```

Figure 4-14. Asynchronous line(s) form

NOTE: You can configure a single asynchronous port or a series of asynchronous ports simultaneously under the same name, provided the devices connected to these ports all use the same character length, type of flow,etc.

Fields of the main Asynchronous Line(s) Form follow.

Starting Port/Ending port.

A given name definition can encompass several physically contiguous asynchronous ports. The starting and ending port parameters specify which port or ports are defined under the name.

Range: 01 - 16
Starting port: <CR>
Range: 01 - 16
Ending port: 4 <CR>

Baud rate

Baud rate is the speed of data transmission in bits per second
(bps). For a terminal or computer to communicate, its baud
rate must match the baud rate of the port to which it is cabled.

Autobaud is frequently used when terminals of different speeds
dial into a port. The users of ports set to autobaud must first enter
one or two <CR>'s before the port will display the connect prompt.
The carriage returns allow the port to sense the baud rate of the
terminal automatically. A port set for autobaud can sense the
following baud rates: 75, 110, 150, 300, 600, 1200, 1800, 2400,
4800, 9600, 19,200. Users with terminals set to 1200 baud or
greater must type **one** <CR>. Users with terminals set below
1200 baud must type **two or more** <CR>'s.

When in the detached state and a character other than <CR> is
entered, the port may sense the wrong speed. In this case,
entering **BREAK** restarts the autobaud routine, allowing the
user to retry autobaud. The re-autobaud action only works in
the detached state, (i.e., if attachment or a connection is made,
the device must detach to re-invoke autobaud).

The split baud rate 75/1200 means that the terminal sends
data at 75 baud but receives data at 1200 baud. The European
service Viewdata uses the 75/1200 split baud rate. The
"Direction" parameter on the Asynchronous Line(s) Main Form
determines the transmit and receive baud rate. Originating
ports receive at 75 baud and transmit at 1200 baud. Answering
ports receive at 1200 baud and transmit at 75 baud. Baud Rate:

1) **Autobaud**	8) **1200**
2) 75	9) **1800**
3) 110	10) **2400**
4) 134.5	11) **4800**
5) 150	12) **9600**
6) 300	13) **19200**
7) 600	14) **75/1200**

15) **reserved**
Baud rate:

Note that a port set for one baud rate can connect to a port set
for a different baud rate. VCX-101 performs the baud rate
conversion automatically, buffering data input from the higher
speed port as needed.

Character length

Character length refers to the number of data bits in a
character, exclusive of start, stop, or parity bits.

The majority of computers and terminals in use today require
character lengths of seven or eight bits. To set the character
length to seven bits for a port cabled to an ASCII terminal, enter:

1) 8 bits
2) 7 bits
3) 6 bits
4) 5 bits
Character length: 2 <CR>

NOTE: The character length setting correlates with the parity
setting (see below). Generally, for asynchronous devices with
no parity, set the character length to eight bits and the parity
to none. Generally, for asynchronous devices that use parity,
set the character length to seven bits and the parity to match
that of the device. There are exceptions to this rule however,
and some equipment uses eight data bits plus a parity bit. The
more common setting for ASCII terminals is seven data bits
plus parity or eight bits without parity. Also, for character
lengths of 5 or 6 bits, configure originating ports for automatic
logon and no messages.

Stop bits

A stop bit allows an asynchronous device to detect the end of a
character. Most terminals and computer ports use one stop bit.
Some older devices (particularly mechanical ones such as
teletype machines) require two stop bits. You must specify the
number of stop bits used by the terminal or computer plugged
into the asynchronous port you are configuring. (Usually one
stop bit is used.) The prompt is:

1) 1 bit
2) 2 bits
3) 1.5 bits
(Usually 1)
Stop bits:

Enter "1 <CR>" to set the port to a single stop bit. Enter "2 <CR>" to set the port to two stop bits. If you set the character length to eight bits and the parity (see below) to anything other than "none", then VCX-101 generates one stop bit regardless of how you set the number of stop bits. If you set the character length to five bits, then setting the stop bits to "2" actually causes the port to generate and expect 1.5 stop bits.

Parity

The parity bit is typically appended to a seven-bit character and used for error-checking. Parity can be set to: none, odd, even, mark, or space. Set the parity to match that of the device plugged into the asynchronous port that you are configuring. The prompt is:

1) None
2) Odd
3) Even
4) Mark
5) Space
Parity:

Disconnect Delay

To assure that all data in the buffers is removed before the port is detached, the disconnect time for DTR toggle to attachment is configurable from 0 to 10 seconds. At "0", the port detaches immediately. At 10, the delay is the same as the VCX 2.8.4 software release. Other times between 0 and 10 may be entered as required.

The attachment prompt is:

Range: 0 - 10
(Delay between detaching and breaking cnx)
Disconnect delay (secs):

Attachment control

The attachment control prompt is:

1) Unqualified
2) DTR toggle
3) Modem
4) DTR-No toggle
Attachment control:

You must enter the number displayed next to the type of attachment control to be implemented. A comprehensive explanation of attachment control follows.

Attachment Concepts and Terminology

Attachment control is the means by which the VCX-101 system distinguishes session boundaries. "Attachment control" and the "direction" parameter combine to provide several forms of EIA control lead manipulation; allowing the VCX-101 to be compatible with a wide variety of applications.

Explanations of the terms "direction", "attachment", "connection", "disconnection", "detachment", and "reverse detachment" follow.

Direction— The "direction" parameter determines whether a port originates connections, answers a connection request, or does both.

Attachment— "Attachment" marks the beginning of a session. Attachment occurs when a VCX-101 port recognizes that an external device has become active. For example, attachment can be accomplished via RS-232C control line handshaking. In the case of an originating port, the device may raise one or more RS-232C control lines to signal that it is active and requires attention. The port responds by raising its control lines to complete the handshake. In the case of an answering port, the port receives an internal connection request and raises its control lines. The port then tests the control lines of the external device.

Connection—"Connection" occurs when a virtual circuit is established between an originating port and a destination port. For example, when a user types connect to: vax <CR> and can then log onto a VAX minicomputer, a connection is established between the terminal user's port and the vax port.

Disconnection—*"Disconnection" occurs when a virtual circuit is broken. For example, when a user quits a connection.*

Detachment—"Detachment" marks the end of a session. The following examples serve to distinguish detachment and disconnection:

- without having established a connection, a user enters "quit" at the connect prompt.

- A user quits a primary connection. In this case the user disconnects from the primary destination and detaches when the response is "yes" to the disconnect from switch prompt.

- A user quits a secondary connection. In this case the user disconnects from the secondary destination but maintains the primary connection. From the user's standpoint, the session continues. From the standpoint of the port that was the secondary destination, however, the session is over. Therefore, an "internal session" with the secondary destination terminates, and that port detaches.

Reverse Detachment—: "Reverse detachment" occurs when the answering port or the virtual circuit initiates the detachment sequence, rather than the originating port doing so.

Types of Attachment Control

The Configuration Service provides three types of attachment control: unqualified, DTR, and modem. These attachment controls are discussed in more detail in the Reference Section.

Device/Port flow control

Flow control is a protocol for stopping and starting data transmission. Typically, a device receiving data exerts flow control to prevent the source from sending data faster than the data can be processed. For example, printers often use flow control to stop a computer from sending data until the printer catches up with the output of the computer.

"Inband" flow control uses control characters in the data stream to start and stop data transmissions. XON/XOFF and DC1/DC2 are examples of inband flow control. "Outband" flow control uses control line signaling to start and stop data transmissions. RTS/CTS is an example of outband flow control.

VCX-101 supports the following flow control options:

- None   No flow control is exercised and **loss of data can occur** if transmissions exceed the capacity of the device buffer and prints them.

- XON/XOFF   This option employs two ASCII characters to start and stop transmission. XON (ASCII DC1; also CTRL Q) starts flow. XOFF (ASCII DC3; also CTRL S) stops flow.

- DC1/DC2   This mode is similar to XON/XOFF but uses
  a different ASCII flow stop character. DC2 stops flow.
  DC1/DC2 flow control is most frequently associated with
  older Hewlett-Packard systems.

- RTS/CTS   Refers to the RS-232 interface control signals
  Request- to-Send and Clear-to-Send. The DCE asserts
  CTS TRUE to start flow. The DCE asserts CTS FALSE to
  stop flow. The DTE asserts RTS TRUE to start flow. The
  DTE asserts RTS FALSE to stop flow.

- ENQ/ACK   This option employs an ASCII character pair
  to implement flow control. However, ENQ/ACK differs
  significantly from start/stop protocols such as XON/XOFF.
  The ENQ/ACK protocol is a relatively complex pacing
  mechanism used with block mode transmissions on
  Hewlett-Packard (HP) systems. In the ENQ/ACK
  environment, the HP host computer functions as the master
  and the terminal functions as slave.

If the VCX-101 is between the master and the slave, the
VCX-101 port cabled to the terminal emulates the master as:

1. After initializing, the port transmits an ENQ every 15
seconds until it receives an ACK from the terminal.

2. The port inserts an ENQ into the data stream every 60
characters, then stops flow until the terminal transmits an
ACK. If the port does not receive an ACK within 15 seconds,
the port restarts flow by default.

3. The terminal employs XON/XOFF within the ENQ/ACK
protocol to control flow. If the terminal transmits XOFF, the
port immediately suspends data flow. The port resumes flow
upon
receiving XON.

The VCX-101 port cabled to the CPU emulates the slave as
follows:

1. The port transmits an ACK in response to every ENQ from
the master unless the input buffer of the port is full.

2. The port ACKnowledges ENQs, then discards them.

To implement HP Terminal Type 10 flow control, set flow
control as follows:

At the port cabled to the terminal:

Device flow control = ENQ/ACK
Port flow control = XON/XOFF

At the port cabled to the CPU:

Device flow control = XON/XOFF
Port flow control = ENQ/ACK

- HEX 91/93 is a type of XON/XOFF flow control used with an extended position A, ASCII character set.

- HEX FE/FF. Used by Datapoint as flow control.

- HEX 94/93. Used with Siemens computer equipment.

- DG XOFF/XON - Used with Data General computer equipment

- HP XOFF/XON

- XPC XON/XOFF

Device flow control refers to the control characters or signals sent by the external device to the VCX-101 port. The prompt is:

1) **None**
2) **XON/XOFF**
3) **DC1/DC2**
4) **RTS/CTS**
5) **ENQ/ACK**
6) **HEX 91/93**
7) **HEX FE/FF**
8) **HEX 94/93**
9) **DG XON/XOFF**
10) **HP XON/XOFF**
11) **XPC XON/XOFF**
(generated by the device to slow the port's output)
Device flow control:

Port flow control refers to the flow control characters or signals sent by the VCX-101 port to the external device. The prompt is:

1) **None**
2) **XON/XOFF**
3) **DC1/DC2**
4) **RTS/CTS**
5) **ENQ/ACK**
6) **HEX 91/93**
7) **HEX FE/FF**
8) **HEX 94/93**
9) **DG XON/XOFF**

10) HP XON/XOFF
11)XPC XON/XOFF
   (recognized by the device)
   Port flow control:

Timeout

Establishing a connection timeout limit causes the VCX-101 to monitor a connected port and disconnect the port automatically after a specified period of inactivity. The timer is reset depending on timkeout direction. The timeout prompt is:

Range: 0 - 255
(0 to disable disconnect-on-timeout)
Timeout (minutes):

The minutes of inactivity which will provoke automatic disconnection. Enter "0 <CR>" and VCX never times the port out.

Timeout Direction

The Timeout direction parameter allows the user to select the timeout direction for the VCX. Timeout direction can be from receive or from transmit, or from both receive and transmit directions. Select 1 for receive, 2 for transmit, 3 for both.

The prompt is:

1) Receive
2) Transmit
3) (Timeout on Tx, Rx, or Both lines)
Timeout direction: <CR>

Direction

For a device at one port to connect to a device at another port, one port must originate the connection, and the other port must answer it. The "Direction" parameter specifies whether the port originates connections, answers connections, or does both.
Ports cabled to terminals generally originate connections. Ports cabled to computers generally answer connections. Some ports need to have both originate and answer connections.

The prompt is:

1) Answer
2) Originate
3) Both (terminals are normally originate)

Direction: <CR>

Name Type 1—Asynchronous Line(s) Subforms

The value assigned to the "Direction" parameter determines which Asynchronous Line(s) Subforms must be completed for the port.

Access Subform: If you define the port direction as "answer," the Configuration Service displays the Access Subform. The Access Subform allows you to permit unrestricted access to the port or to restrict access to a desired subset of originating ports. This is accomplished by assigning answer access rights to the port. The Access Subform then allows you to define an attachment string name, a detachment string name and a host disconnect ASCII string.

Automatic Connection Subforms: If you define the port direction as "originate," the Configuration Service displays the Auto Connect Subform, the Terminal Characters Subform, the Terminal Type Subform and allows you to define originate attachment and detachment string names, an attachment text name and the originate access rights. The Auto Connect Subform allows you to specify manual or automatic connection. Manual connection requires the user to type the destination port name upon attachment (or to program the port device to transmit the destination name automatically upon attachment). With automatic connection, the port, upon attachment, immediately attempts to connect to a specified destination. You enter the name or the pathname of the automatic connection into the Automatic Connection Subform.

Terminal Characteristics and Terminal Type Subforms: If you define port direction as "originate," you must also complete the Terminal Characteristics and Terminal Type Subforms. The Terminal Characteristics Subform allows you to select: local echo, the system messages which are displayed, the type of BREAK processing, the control state character, the connect hold character, the channel priority for the port and automatic detach (from the switch) after disconnect. The Terminal Type Subform selects the type of cursor addressing for the port.

Note 1. You must select a terminal type other than "unspecified" to enable normal backspacing for users of video display terminals. However, the terminal type you select need not correspond in most instances to the actual terminal used, unless the user is granted access to the Configuration Service. Only the Configuration Service employs cursor addressing.

Note 2. If you define a computer port as an "originate" port, the Configuration Service assumes the computer is to be treated as a terminal and displays the Terminal Characteristics and Terminal Type Subforms. Generally, selecting the terminal type "unspecified" is appropriate for originating computer ports. Details follow.

If you define the port direction as "both" originate/answer, the Configuration Service displays all of the above subforms.

Name Type 1—Asynchronous Line(s)

Access Subform

The Access Subform appears below the Asynchronous Line(s) Main Form as shown in figure 4-15.

```
Config: originate   Name: p12          [12/32 used]
  Name type: Asynchronous line(s)      (Slot 1)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
        Starting port: 12        Attachment control: Unqualified
          Ending port: 12      Device flow control: XON/XOFF
            Baud rate: 9600        Port flow control: XON/XOFF
     Character length: 8 bits         Timeout (mins): 0
            Stop bits: 1 bits     Timeout direction: Receive
               Parity: None               Direction: Answer
         Escape delay: No
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Answer access rights:
    Password override: No
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen --


Answer detachment, first extention string name:
```

Figure 4-15. Access subform asynchronous lines

Answer access rights are those rights that incoming calls (users) must have to complete a connection to the answer port being defined. The answer access rights can be listed as a series of numbers with commas (used as delimiters, i.e., 1,2,3,4,5) or as a range (i.e., 1-5). NOTE: The role of access rights are explained under restricted access. (See *Reference* Chapter 6.

You can provide unlimited answer access rights by entering the following:

Answer access rights: *1 - 64*

(The default is 1, when left blank.)

If Yes is chosen, a prompt for the password will be presented.

1) No
2) Yes
(Can password override access restrictions?)
Password override:

In cases where the access rights of the originate port do not match the access rights of the answer port (access restriction), the user will be prompted for a password, which will override the access restriction. After answering the "answer access rights" and "password override" prompts, three more prompts are displayed on the screen. These are shown in figure 4-16. The "answer attachment string name" prompt provides the option of defining a name for a string which will be transmitted to the answer port (i.e., host computer) at the time of attachment. The name can be no longer than ten characters in length. The actual string is recorded using selection 7, "String", from the Level 3 Menu. At this point you are merely asked for the string's name. Normally, however, one would not transmit an answer port attachment string. To exit this prompt press <CR>.

The "answer detachment string name" prompt allows you to define a name of a string that will be displayed at the answer port (i.e., host) at the time of detachment. Again, up to ten characters are allowed. The string is recorded using selection 7, "String", from the Level 3 Menu. You are asked for the name of the string at this point. If you don't wish to define a string, press <CR>.

The "answer disconnect string" prompt allows you to define a string, up to 10 characters long, which if transmitted to an answer port from a host, will cause the VCX to disconnect that answer port. The "answer disconnect string" is designed to accommodate 3 wire host systems allowing the host to initiate the disconnect.

If an answer disconnect string name is specified, configuration prompts for "Enter out of service state", as seen in figure 4-16.

```
Config: originate   Name: p12        [12/32 used]
   Name type: Asynchronous line(s)   (Slot 1)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
       Starting port: 12            Attachment control: Unqualified
         Ending port: 12          Device flow control: XON/XOFF
           Baud rate: 9600            Port flow control: XON/XOFF
      Character length: 8 bits          Timeout (mins): 0
         Stop bits: 1 bits        Timeout direction: Receive
             Parity: None                  Direction: Answer
        Escape delay: No
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - -
  Answer access rights:
    Password override: No
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                Answer attachment string name:
                Answer detachment string name:
  Answer detachment, first extention string name:>
  Answer detachment, second extention string name:
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen --


  Answer detachment, first extention string name:
```

Figure 4-16. Asynchronous lines submenus

Name Type 1—Asynchronous Line(s)

Automatic Connection Subform

If an "originate" port under the "Direction" parameter of the "Auto Connect" prompt is displayed, it must be answered. The Automatic Connection Subform is illustrated in figure 4-17.

The Auto connect Subform allows you to specify an automatic connection path upon attachment, or allow the terminal user switched service (that is, the user enters the destination port name or pathname).

```
Config: originate   Name: p08        [12/32 used]
   Name type: Asynchronous line(s)   (Slot 1)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
       Starting port: 8             Attachment control: Unqualified
         Ending port: 8           Device flow control: XON/XOFF
           Baud rate: 9600            Port flow control: XON/XOFF
      Character length: 8 bits          Timeout (mins): 0
         Stop bits: 1 bits        Timeout direction: Transmit
             Parity: None                  Direction: Originate
        Escape delay: No
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Auto connect A: t1.p08
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Auto connect B:
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Autocon. limit:>0
```

Figure 4-17. Automatic connection subform screen

If no entry is made to the "Auto connect" prompt, and a carriage return is used, the VCX-101 will assume switched service for the port. However, if a destination port or pathname is entered, VCX will automatically attempt to make that connection on behalf of the terminal user. Destination names are limited to 10 characters and a pathname to sixty characters including periods.

When a name is entered for Auto Connect A, but none entered for B, the auto connection limit feature is available. Enter in this field the number of times (0-255 tries, where 0 is unlimited) to try the automatic connection. (For example, if a trunk is down, how many times should the VCX try the automatic connection before giving up.) If the limit of retries is reached, the port must be reset before it will restart.

Whether switched or automatic service should be designated for a port depends on the type of access desired for the terminal user. Several types of access can be configured: dedicated, contended, dedicated with switch option, and switched.

- Dedicated access. When a particular originating port has access to a unique destination port. In this case there is no need for VCX to prompt for a desired connection, and autoconnect to a destination port is appropriate.

- Contended access. When several originating ports have access to a single resource destination, and that resource has fewer ports than necessary if all originating ports were active at once, the originating port is said to have contended access. Each originating port must contend with the others on a first-come-first-served basis for connection to that destination. As with dedicated access, manual connect is appropriate for this application and a single destination pathname is entered.

- Dedicated with switch option (control state out of autoconnect). In this application a terminal user to a large extent uses a dedicated resource, but on occasion must access another. The autoconnect pathname is entered to accommodate the usual connection, but a control state character is defined (see terminal characteristics subform which follows). The entry of the control state character by the terminal user causes VCX to leave the autoconnect and prompt the user for a destination. When the switched session is complete and the user quits the connection, autoconnect is restored. If a Forward and/or Backward hold character is also

defined for the port, the user can toggle between an autoconnect and the selected switched connection until the user has quit the latter. If the network administrator does not want a particular port to have any switched service, i.e. contended or dedicated as described in the previous paragraphs, then a control state character and Forward and/or Backwards must not be defined for the autoconnect port.

- Switched access. When the port being configured is to have access to several destinations, the originating port has switched service. When the switched port attaches or disconnects from the previous session, VCX prompts for the desired destination. VCX then attempts connection to the designated name. (NOTE: Switched access may also be contended if connection is attempted to a group having all available ports occupied.)

Note: Switched access may also be contended if connection is attempted to a group having all available ports occupied.

In summary, when the connection is auto, VCX knows where to attempt the connection. When the connection is attempted from a switched service port, VCX does not know the desired address and must prompt for it.

An example auto connection might be:

Auto connect to: newyork.phil.pdp-11

Session Limit

Up to 8 multiple sessions are available to the user (see figure 5-4). Select the number of sessions at the prompt:

Range 2 - 8
(Number of sessions, 1 - 8)
Sessions limit: <CR>

Note: *If an auto connect is used, the number of sessions is fixed at two.* (Before configuration the session limit will *indicate 0*. This number is actually the default, 2.)

Control State Screen

This is a good time to mention the Control State screen. As explained above, up to 8 sessions are allowed, unless autoconnects are used in which case the limit is 2 per port. The Control state screen permits the user to see the sessions in use,

what they are, and the one being
used now. A sample of the screen is
shown in figure 4-18 . The active
session is shown with the > next to
it. To set up sessions, use Control A.

```
1.   set
2. > settime
3.   print
4.   broadcast
5.   fox

Config>>>
```

*Figure 4-18. Control
state screen*

Note: The number of sessions shown
depends on the number in use. Non
used sessions are *not* shown.

Use the forward toggle character to move to the next higher
session, or use the backward toggle character to move back one
session. The Select command (**Sel**) may also be used to move
directly to the session desired.

Select Command

The Select command is also used with multiple sessions. The
command is used to select any active session without toggling
forward or backward using the Forward or Backward toggle
characters. The command is:

sel #

where # is the number of the desired session. If an error is
made in entering the session, a warning message is given.

Name Type 1—Asynchronous Line(s)

Terminal Characteristics Subform

If a port is defined as "originate or "both" originate/answer
under the "Direction" parameter, you must complete the
Terminal Characteristics Subform. The Terminal
Characteristics Subform appears below the Asynchronous
Line(s) Main Form. If the Logon Subform and/or the Automatic
Connection Subform are displayed, the Terminal
Characteristics Subform appears below them as well. This is
illustrated in the example shown in figure 4-19.

The following describes the fields of the Terminal
Characteristics Subform:

```
Config: originate  Name: p10      [12/32 used]
Name type: Asynchronous line(s)   (Slot 1)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
          Echo: CPU & VCX services      BREAK key: Pass through
          Messages: All                Control state char: 1
   Confirm connections: Yes           Forward toggle char: 14
        Login required: No           Backward toggle char: 2
   Ignore routine bcasts: No            Channel priority: 1
  Detach after disconnect: No      Disconnect delay(secs):>0
------ <CR>=next field ---- ^E=previous field ---- ESC=accept screen ------



Range: 0 - 10
(Delay between detaching and breaking cnx)
Disconnect delay(secs):
```

Figure 4-19. Terminal characteristics subform screen

Echo

Echo is the retransmission of received data. Echo allows users to see what they type. The VCX-101 system supports the following echo options:

- CPU echo The setting is appropriate when the CPU or host system supplies a remote echo to the terminal.

- VCX-101 local port echo. The setting is appropriate for applications in which the terminal does not supply its own echo (the terminal does not support half-duplex) and the CPU does not supply a remote echo.

- Terminal echo The setting is appropriate when the terminal is set for half-duplex.

Select the type of echo from the prompt:

1) **CPU and VCX services echo**
2) **VCX local port echo**
3) **Terminal echo**
Echo:

Messages

The "messages" parameter determines the type of messages transmitted by the port in the control state. The system supports the following options:

- All — The port transmits all user messages.

- Prompt — The port transmits only messages requiring a response from the port device or operator of the device.

- Service — The port transmits only those messages that are informative but require no response. For example, "Disconnecting from secondary destination" is a service message.

- None — The port transmits no user messages. Use this setting with caution.

Select the messages setting from the prompt:

1) All
2) Prompt
3) Service
4) None
Messages:

Confirm Connections

Messages which confirm connections with a destination can be displayed at a port.

- No. — No messages confirming connections will be displayed.

- Yes. — Messages confirming connections will be displayed.

1) No
2) Yes
Confirm connections:

Login Required

You can require the port user to enter a user name and password during login.

- No. —The user will not have to enter a password and user name.

- Yes. — The user will have to enter a password and user name.

1) No
2) Yes
(should port prompt user for name and password?)
Login required:

Ignore Routine Bcasts (Broadcasts)

You can choose to accept or ignore routine messages transmitted via the Broadcast Service to the port.

- No. Routine messages will not be blocked, which is to say they will be accepted.

- Yes. Routine messages will be ignored.

1) No
2) Yes
(should routine broadcasts be blocked?)
Ignore routine bcasts:

Detach After Disconnect

You can choose, using this parameter, to have your terminal automatically detach from the switch when the destination end disconnects. The Detach after disconnect prompt is:

1) No
2) Yes
(yes detaches user after exit from first connection)
Detach after disconnect: <CR>

Break Key

This parameter determines how the VCX-101 processes a BREAK. The system supports the following options:

- Pass through. The system sends a BREAK through to the destination. The choice is useful if the device at the destination port responds to a BREAK.

- Ignore. The system does not pass the BREAK through, nor does it take any action in response to a BREAK.

- Enter control state. BREAK functions similarly to the control state character. See the following paragraphs for information on the control state character.

- Forward toggle. Allows entry of an ASCII character to be used to forward toggle. When the character is used it toggles to the next higher (forward) session.

- Backward toggle. Allows entry of an ASCII character to be used to backward toggle. When the character is used, toggles to the next lower session.

Select the type of BREAK key processing from the prompt:

1) Pass through   **4) Forward toggle**
2) Ignore   **5) Backward toggle**
3) Enter control state
BREAK key: <CR>

Control State

The control state character is a reserved character that the system does not send to the destination port. Instead, entering the control state character suspends the connection in progress and allows the user to communicate with the VCX-101 system. For example, the control state character is commonly used to initiate disconnection. If you define the control state character as "^\", enter "^\" while connected, the VCX-101 displays the connect prompt. The user can then type

Connect to: quit <CR>

to disconnect. Without a control state character configured for the port, the terminal must drop Data Terminal Ready to disconnect or rely on an inactivity timeout.

Like the control state character, the forward and backward toggle control characters are reserved characters that the system does not send to the destination port. Instead, if the user has more than one connection active at once, entering the forward toggle character or the backward toggle character, toggles forward (or backward) one connection (session) each time the forward toggle character, or the backward toggle character is used.

Note: Enabling flow control at the destination port prevents data loss from occurring when the user enters the control state or connect hold character. The prompt for the control state character is:

Range: 0 -127
(ASCII code or 0 for none — 0..4 or 20..31
recommended)
Control state char: <CR>

You must enter the ASCII decimal equivalents to the characters you wish to use. For example, entering "28 <CR>" at

the control state prompt sets the control state character to
"^\". Entering "0 <CR>" at the control state prompt indicates
that the port has no control state character unless you select
that meaning for the BREAK key (see under "BREAK key"
above). Entering a connect hold character works the same way.

Note: Avoid entering identical control state and connect hold
characters. Also, avoid entering characters that are used for
other purposes by the host computer system. For example, a
printable character is generally not a good choice for the control
state or connect hold character. The less often-used ASCII
characters listed below are recommended candidates.

Suggested Control State/Connect Hold Characters

DEC ENTRY   ASCII   MEANING

1	^A	SOH	start of header (*default Control character)
2	^B	STX	start of text (*default Backward charcter)
3	^C	ETX	end of text
4	^D	EOT	end of transmission
14	^N	SO	shift out (*default Forward charcter)
15	^O	SI	shift in
16	^P	DLE	data link escape
20	^T	DC4	device control 4
21	^U	NAK	negative acknowledge
22	^V	SYN	synchronous idle
23	^W	ETB	end of transmission block
24	^X	CAN	cancel
25	^Y	EM	end of medium
26	^Z	SUB	substitute
28	^\	FS	file separator
29	^]	GS	group separator
30	^^	RS	record separator
31	^_	US	unit separator

WARNING: *Do not choose a control state or connect hold
character that can interact with other functions such as
flow control. Default setting will interfere with function
key usage in applications and must be changed.*

Suggested settings in this case are:

Conterol state character	14(^N)
Forward character	15(^O)
Backward character	22(^V)

Control State/Connect Hold Characters to Avoid

DEC   ENTRY   ASCII   INTERACTION

5	^E	ENQ	used for ENQ/ACK flow control
6	^F	ACK	used for ENQ/ACK flow control
17	^Q	DC1	used for XON/X OFF and DC1/DC2
18	^R	DC2	used for DC1/DC2 flow control
19	^S	DC3	used for XON/XOFF flow control
27	<ESC>	ESC	used by VCX services

Forward Toggle

At this prompt you can enter an ASCII character that can be
used as a Forward toggle character. When used, this character
will toggle to the next higher session number. The prompt for
the Forward toggle character is:

Range 0-127
(ASCII code or 0 for none)
Forward toggle char: <CR>

Backward Toggle

At this prompt you can enter an ASCII character that can be
used as a Backward toggle character. When used, this
character will toggle to the next lower session number. The
prompt for the Backward toggle character is:

Range 0-127
(ASCII code or 0 for none)
Backward toggle char: <CR>

Channel Priority

Channel priority applies only to asynchronous ports granted
access to trunk lines. This parameter determines how VCX-101
allocates trunk line bandwidth. If higher and lower-priority
ports simultaneously have data to transmit, data from
higher-priority ports are transmitted on the composite link
first. Priority 1 is the highest priority and priority 4 the lowest.

The channel priority prompt is:

Range: 1 - 4
1 is highest priority
Channel priority:

Disconnect Delay

To assure that all data in the buffers is removed before the port is detached, the disconnect time for DTR toggle to attachment is configurable from 0 to 10 seconds. At "0", the port detaches immediately. At 10, the delay is the same as the VCX 2.8.4 software release. Other times between 0 and 10 may be entered as required.

The attachment prompt is:

Range: 0 - 10
(Delay between detaching and breaking cnx)
Disconnect delay (secs): Disconnect Delay

```
Config: simple       Name: org          [5/64 used]
  Name type: Asynchronous line(s)       (Slot 1)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Terminal type:>Unsupported
------ <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------

  1) Unsupported          17) Honeywell
  2) ADDS Regent series   18) H19 / Z19
  3) ADDS Viewpoint       19) HP 2621
  4) ADM-3A               20) IBM Displaywriter
  5) ADM-31               21) IBM 3101
  6) Ann Arbor 400D       22) N9400
  7) ANSI Std: Ambassador 23) MDCSC
  8) Control Data CD110   24) Perkin Elmer 550
  9) Control Data CD722   25) PE 1251/1245 Super Owl
 10) DG Dasher 211/411    26) QuickScreen
 11) Datamedia            27) VDB 8024
 12) Datapoint 8220/4240  28) Tandberg 2215
 13) DEC VT-100/VT-180    29) Teleray
 14) DEC VT-52            30) TeleVideo
 15) Hazeltine 1500       31) Wyse WY-100
 16) Hazeltine 1510       32) Xerox 820
 Terminal type:
```

Figure 4-20. Terminal characteristics subform screen

Name Type 1—Asynchronous Line(s)

Terminal Type Subform

Once the Terminal Characteristics Subform is setup, the system displays the Terminal Type Subform. The resultant monitor screen display is shown in figure 4-20. If you see your terminal type listed, enter the number displayed beside the terminal name and press <CR>.

Note: If you cannot find your terminal listed, try entering
ADM-3A since many terminals use cursor control identical to
the ADM-3A.

After you have selected your terminal type, figure 4-21 is
displayed.

```
  Config: example1    Name: port1        [41/256 used]
     Name type: Asynchronous line(s)

   Originate attachment string name:
   Originate detachment string name:
  - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Attachment text name:
  - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Originate access rights:>
  ------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -----




  Originate access rights:
```

Figure 4-21. Terminal subform monitor display

The "originate attachment string name" prompt allows you to
define a name for a string which will be displayed at the
originate port at the time of attachment. The actual string is
defined using Selection 7, "String", from the Name Type Form.
The only request at this point is for the name of the string.
Press <CR> to exit this prompt.

The next prompt, "originate detachment string name", allows
you to define a name for a string that will be displayed at the
originate port at the time of detachment. Again, the actual
string is defined using Selection 7, "String", from the Name
Type Form. You only provide the name of the string at this
point. Press <CR> to exit this prompt.

You are now asked for the "attachment text name". To display
text whenever a user attaches to the VCX, enter the name of
the text file. This is not the actual text, only the name of the

file that contains the text. This facility essentially becomes a programmable directory.

Next, you are asked to define the access rights of the originating port. The originate port access rights are the rights the users must have to use the originate port.

Access rights defined for the originate port can be listed as a series of numbers with commas as delimiters (i.e., 1,2,3,4,5,6,7) or a range (i.e., 1-7).

Name Type 2—Trunk Line Main Form

A trunk line is a single synchronous line used for point-to-point statistical multiplexing to a single remote node.

Type "2 <CR>" from the Name Type form to display the Trunk Line Main Form. The Trunk Line Main Form appears, illustrated in figure 4-22.

```
Config: node4      Name: don          [7/32 used]
  Name type: Trunk line              (Slot 2)
- - - - - - - - - - - - - - - - - - - - - - - - - - - -
                    Port view, clocking:>DTE, supplies no clock
                            Baud rate: **
                     Virtual circuits: 8
                 Multiplexing protocol: Muxing
                       Login required: No
                  Trunk Timeout (secs): 68
                 Utilization Threshold: 75
               Retransmission Threshold: 25
                Statistics Logging Timer: 8
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------




1) DTE, supplies no clock
2) DTE, supplies transmit clock
Port view, clocking:
```

Figure 4-22. Trunk Line Main Form menu

Port View, Clocking

This field determines the source of the clock signal used to synchronize data transmissions between the VCX-101 port and external device, typically a synchronous modem. Two clock signals are required: transmit and receive. Either the VCX-101 port or the modem can supply transmit clocking. Clocking can

also be split, so that the DTE port supplies transmit clocking with receive clocking supplied by the modem. The options are:

- DTE, supplies no clock. The port is DTE. The modem supplies both transmit clocking and receive clocking. This selection is appropriate for ports connected to most modems, line drivers, and Digital Data Services.

- DTE, supplies transmit clock. The port is DTE. The trunk supplies transmit clocking to the modem. The modem supplies receive clocking to the port. This selection is required in some multiport modem and TDM applications.

For example, to configure the synchronous port for modem-supplied transmit and receive clocking, you enter:

1) DTE, supplies no clock
2) DTE, supplies transmit clock
Port view, clocking: 1 <CR>

Baud Rate

This field specifies the baud rate of the synchronous port. Set the port baud rate to match that of the modem. For port-supplied clocking (see "Port view, clocking" above), this value determines the frequency of the clock signals generated by the port. Also, the baud rate entry is used to calculate retransmission timeouts, regardless of the clock source. For modems using 14.4K, 16K, and 16.8K baud, configure the "Port view, clocking" to "DTE, supplies no clock" and selects 9600 as the port baud rate. **Note:** Baud rate affects statistic collection when DTE supplies no clock.

For example:

1)   1200
2)   2400
3)   3600
4)   4800
5)   7200
6)   9600
7)   19.2K
8)   38.4K
9)   56K
10)   64K
11) 128K
12) 256K
Baud rate: 6<CR>

Number of Virtual Circuits

Connections between VCX-101 ports at different nodes are multiplexed onto a common trunk line. This field determines the maximum number of multiplexed connections or virtual circuits the trunk line supports. A VCX-101 trunk line supports from 1 to 250 virtual circuits. If you select 250 virtual circuits, the trunk line supports up to 250 simultaneous connections. If a port attempts to originate the 251st connection, VCX-101 queues that port for connection until a virtual circuit is freed by a disconnection or the user decides to exit the queue.

It is strongly recommended that you select only as many virtual circuits as needed. If the application is a point-to-point 16-port multiplexer, select 16 + 3 or 4 extra or 19 or 20 virtual circuits. If the application uses all the user ports, and switched dual sessions are possible, then allow 2 virtual circuits per port or 32 plus 3 or 4 extra for 35 or 36 virtual circuits.

Also, buffer allocation for each virtual circuit is fixed. Specifying a large number of virtual circuits reduces the amount of buffer space allocated to each circuit. Insufficient buffering per circuit results in frequent transmission interruptions due to flow control or, for ports which do not support flow control, data loss.

Enter the maximum number of multiplexed connections:

Range: 0 - 256
Virtual circuits:

Note: If the local and remote synchronous ports are configured for a different number of virtual circuits, the system selects the lower number of virtual circuits as the maximum. Trunk settings on each MUX should mirror it's partner to prevent connection problems.

Multiplexing Protocol

This field permits selection of a multiplexing protocol. The prompts are:

  1) Muxing
  2) X21
  3) X21 PSTN
  Multiplexing protocol:

Enter a 1 for muxing, 2 for X.21 or 3 for X.21 PSTN. (See page 4-77 for details on X.21 and X.21 PSTN.)

Login Required

If for security reasons, you want the user to enter a password and a user name before accessing the trunk line, then answer Yes to the following prompt:

1) No
2) Yes
(Should port prompt user for name and password?)
Login required: 2 <CR>

Trunk Timeout

This option serves a dual function. When the trunk is configured for muxing protocol it represents the number of seconds the trunk can remain inoperative before it is declared out of service. Typically this means carrier detector at the interface has disappeared or a constant state of retransmissions for that time period has occurred. When the trunk protocol is set for X.21 or X.21/PSTN, it represents, a configurable inactivity timeout parameter. In either case, DTR at the interface is dropped to put a modem on-hook in the X.21/PSTN mode or to go idle in the X.21 mode.

Range: 1 - 255
Trunk Timeout (secs): 60 <CR>

Utilization Threshold

With this parameter, a threshold level is set for trunk utilization, that if exceeded will generate a minor alarm. The trunk utilization threshold is entered as a percentage of the maximum bytes that can be transmitted over the trunk. The default for the utilization threshold is 75 percent.

Range: 1 - 100
(Percent of utilization)
Utilization Threshold: 75

Retransmission Threshold

This option allows you to set a threshold level for frame retransmissions, that if exceeded will generate a minor alarm. The threshold level is expressed as a percentage, i.e., the number of frame retransmissions per 100 frames transmitted/received. A higher percentage indicating a lower line quality. The default for the retransmission threshold is 25 percent.

Range: 1 - 100
(Retransmissions per 100 frames)
Retransmission Threshold:

Statistical Logging Timer

This option is provided for entry of the time interval between statistics log messages. The interval range is 0 to 15 minutes. Entering 0 <CR> disables the timer. (Default is 0.)

Answer Access Rights

The trunk lines access subform appears below the Trunk Line Main Form, (shown in figure 4-23). This access subform is similar to the one for asynchronous line(s).

```
Config: node4        Name: don            [7/32 used]
   Name type: Trunk line               (Slot 2)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                        Port view, clocking: DTE, supplies no clock
                                 Baud rate: **
                           Virtual circuits: 0
                      Multiplexing protocol: Muxing
                             Login required: No
                        Trunk Timeout (secs): 60
                        Utilization Threshold: 75
                      Retransmission Threshold: 25
                       Statistics Logging Timer: 0
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
  Answer access rights:
     Password override: No
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Originate access rights:>
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------



Originate access rights:

|
```

Figure 4-23. Access subform for trunk lines

Trunk line answer access rights are those rights that out-going calls must have to use the trunk. The answer access rights can be listed as a series of numbers with commas (used as delimiters, i.e., 1,2,3,4,5) or as a range (i.e., 1-5). For example, to define the trunk line as having the answer access rights of one through sixty four, you would enter: 1 - 64.

Password Override

This entry allows you to use a password to override when access restrictions are in effect. That is, in the case where the access rights of the originate port do not match the access rights of the answer port (access restriction), should someone

be allowed to enter a password to override the access restriction.

If you choose 2 for Yes, you will be asked for the password.

1) No
2) Yes
(Can password override access restrictions?)
Password override: 1 <CR>

The "originate access rights" prompt allows you to define which originate ports are to have access to the node. Those ports which you want to allow access can be listed as a series of numbers, separated by commas (i.e., 1,2,3,4) or as a range (i.e., 1 - 4).

Originate access rights: 1 - 4

NOTE: Access rights are more fully explained under "Restricted Access" in the Reference Chapter 6.

Name Type 3—Speed Connect

A speed connect name is a one-word abbreviation for a complex pathname. The purpose of Speed Connect names is to make remote connections easier for the terminal user. Suppose a Boston terminal user frequently connects to the PDP 11/34 in Philadelphia.

When presented with the connect prompt, he must respond:

Connect to: newyork.phil.pdp-11 <CR>

You can create a speed connect name to make this process easier for the user. For example, you can create the speed connect name "port1" to stand for the pathname "newyork.phil.pdp11". The Speed Connect Form monitor screen is illustrated in figure 4-24.

```
Config: example1   Name: port1        [8/32 used]
   Name type: Speed connect
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   Routing name:>
  ------- <CR>=next field --- ^E=previous field --- ESC=accept screen -------
```

Figure 4-24. Speed connect menu

Enter the pathname that the speed connect name is to represent. In the example described above, you enter:

Routing name: newyork.phil.pdp11 <CR>

Name Type 4—Group

A group name represents several logical port names. A group can contain any combination of:

- async lines: originate ports, answer ports, "both" originate/answer ports, port series
- trunk lines
- speed connect names
- pathnames
- VCX services.

A group differs from a port series as follows:

- A port series consists of physically contiguous, identical, asynchronous ports. Group members need not be physically contiguous or identical.

- Configuring a port series conserves memory in the Configuration Storage module, since only one set of parameters is stored for the entire series. Group members have individual name definitions, so memory is not conserved.

- You can restrict access to a port series. You can restrict access to a group only by separately restricting access to members of the group.

Type "4 <CR>" from the Name Type Form to display the Group Form. The Group Form will then appears on the monitor screen, as shown in figure 4-25.

The fields of the group name form are:

Names

The group can include both simple names and pathnames. Simple names consist of up to ten alphanumeric characters. Pathnames consist of two or more valid simple names separated by periods (.). Pathnames describe complex routing through the network. The pathname "newyork.phil.pdp11" might describe a connection path from the Boston node through New York to a PDP 11/34 in Philadelphia if VCX-101s are included in a large VCX network. In entering the names which

comprise the group, separate each simple name or pathname from the next with a comma. The string you enter can contain no spaces, and its length cannot exceed sixty characters. You can enter up to three strings of names for a total of 180 characters.

To define a group consisting of "name1" "name2", and "name3", you need enter only one string, as shown in figure 4-26.

```
Config: example1    Name: port1         [8/32 used]
   Name type: Group
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
A comma-delimited list of pathnames:

        Names:>through
   more names:
   more names:
Line allocation: Sequential
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------





Names:
```

Figure 4-25. Group form submenu of the Name type form

Line allocation

The VCX-101 can allocate connections between vax1, vax2, and vax3 in the example using a sequential or round robin algorithm. Sequential allocation means that VCX-101 adds new connections to vax1 until all ports are connected. VCX-101 then assigns connections to vax2 until all are used and then to vax3. Round robin allocation means that VCX-101 allocates the first connection to the first route, the second connection to the second route, and so on, starting over with the first route when the number of connections exceeds the number of routes.

The prompt is:

1) Sequential
2) Round robin
Line allocation:

```
Config: example1    Name: port1        [8/32 used]
   Name type: Group
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
A comma-delimited list of pathnames:

        Names: name1,name2,name3
   more names:
   more names:
Line allocation:>Sequential
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------




   1) Sequential
   2) Round robin
Line allocation:
```

Figure 4-26. Group form monitor screen

Enter "1 <CR>" (or just <CR>) to have VCX-101 utilize all
virtual circuits on a given route before using the next route.
Enter "2 <CR>" to have VCX-101 alternate connections
between or among the various routes.

Name Type 5—Services, Controlled Access

This name type allows you to restrict access to VCX-101
services (both system administrator and user services) to a
desired subset of ports. The Services, Controlled Access Form is
similar to the Access Subform for Asynchronous Lines
configured as "answer" or "both" originate/answer ports. For
example, suppose that you wanted to restrict access to the Fox
Service. You first create the name "fox" and define the name
type as Services, Controlled Access.

The form for the name is illustrated in figure 4-27.

Answer access rights are those rights that incoming calls must
have to gain access to the service. Answer access rights can be
listed as a series of numbers with commas (used as delimiters,
i.e., 1,2,3,4,5) or as a range (i.e., 1-5). For example, assume that
only the answer access rights 4, 5, 6, and 10 will be granted
connection.

To accomplish this, enter:

```
Config: example1    Name: fox          [9/32 used]
   Name type: Services, controlled access
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 Answer access rights:>
    Password override: No
------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -------










(Access rights the user must have to gain access)
Answer access rights:
```

Figure 4-27. Access rights subform

Answer access right: 4 - 6, 10 <CR>

Note: Access rights are more fully explained under "Restricted Access" in the reference chapter, chapter 6.

The next entry asks whether you would like a password override when access restrictions are in effect. That is, in the case where the access rights of the originate port do not match the access rights of the answer port (access restriction), should someone be allowed to enter a password which will override the access restriction. If you choose 2 for Yes, you will be asked for the password.

1) No
2) Yes
(Can password override access restrictions?)
Password override: 2 <CR>
Password: Zap

Name Type 6: X.25 Port

An X.25 port functions as a PAD (Packet Assembler/Disassembler) allowing access to an X.25 network or to an X.25 CPU port. The default X.25 Main Form menu is shown in figure 4-28.

If the X.25 option is installed, selecting an X.25 port as the name type automatically designates the trunk as an X.25 interface. If the X.25 option is not installed, the X.25 forms can

```
Config: node4        Name: example1        [7/32 used]
   Name type: X.25 port                    (Slot 2)
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
                           Port view, clocking: DTE, supplies no clock
                                     Baud rate: **

           Network ID:>Datapac 76          I frame window (k): 1
          Network address:                 Frame response (T1): 1
           Login required: No              Max. retrans. (N2): 1
           X.25 DTE or DCE?: X.25 DTE      Link idle polling: No

      No. of incoming LCNs: 0                     Window size: 1
        First incoming LCN: 1            Restart timer (T20): 30
      No. of bothway LCNs: 0          Call request timer (T21): 30
        First both way LCN: 1          Accept reverse charging: No
      No. of outgoing LCNs: 0          Reverse charges on calls: No
        First outgoing LCN: 1            Make high priority calls: No
              Packet size: 128 bytes      Utilization Threshold: 75
 ------- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -
  1) Datapac 76  5) Datex-P   9) Datapak   13) DCS
  2) TeleNet     6) Transpac 10) Datanet 1
  3) Datapac 80  7) TymNet   11) Austpac
  4) PSS         8) Generic  12) Compuserve
 Network ID:
```

Figure 4-28. X.25 main form monitor screen

be filled out, but the trunk never boots up with X.25
parameters. (See the *X.25/ VCX-100 Administrator's Guide* for
more information on X.25.)

Name Type 7: String

Attach and detach strings are defined using this menu
selection. The String Form is shown in figure 4-29.

```
Config: example1    Name: detach        [9/32 used]
   Name type: String
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
String name contents:> off
   ---- <CR>=next field ---- ^E=previous field ---- ESC=accept screen ----
```

Figure 4-29. String from monitor display

The attach or detach string that you would like to have
displayed, should be defined after the "String name contents"
prompt. The string can be up to sixty characters in length and
contain control codes. If a control code character is to be
entered, place a caret first, "^", (usually a shift 6) then a
character. For example, a line feed (LF) would be entered as a

^J and a carriage return (CR) as a ^M. Remember that a control character requires two characters to be entered to fully define it; therefore it consumes 2 of the possible 60 characters allowed in a string.

A break can be programmed into the string by using "\B". A pause is programmed into the string using "\Pnn", where nn is the pause time in tenths of a second. For example, 99 is 9.9 seconds. Multiple \P entries can be strung together to produce pauses greater than 9.9 seconds up to a 14 second maximum pause.

In this sample menu, the name of a detach string is "Detach" and its contents are "Off".

NOTE: It is recommended that all strings output to a display terminal begin and end with a <CR>, (carriage return, line feed, line feed) to avoid overwriting information previously displayed on the screen as well as to start the string at the left hand margin of the monitor.

Dynamic Reconfiguration

Configuration changes to VCX are dynamic; that is, they are incurred on the fly. The exact time of change to new parameters varies according to the following:

Groups, speed connects, controlled services, strings, text, user lists, and global parameters assume new values when configure is exited. The only exception is that the chassis must be reset to change the logging port in the global parameter set.

Trunks must be reset to incur changes.

Async port changes occur upon exiting configure to currently detached originate ports and currently attached/detached answer ports. Connected ports are reconfigured when they detach.

Settime Service

The Settime Service sets the date and time for the node.
The date and time are not retained if the node is powered
down or reset. Enter **Settime** at the prompt

Connect to: settime <CR>

The Settime Service presents one of two displays, depending
on whether the date and time have been set since the last
power-up or reset. If the system date and time are currently
set, the Settime Service displays the time-of-day (figure
4-30).

```
settime

**** Set Date and Time ****



Mon, 07/17/89 - 09:54:23
Do you wish to change it? (y/n)
```

Figure 4-30. Menu to set date and time

If the date and time are correct, enter "n <CR>" to exit the
Settime Service and return to the connect prompt. If you wish
to reset the date and/or time, enter "y <CR>". If the date and
time are not currently set, the Settime Service displays the
menu shown in Figure 4-31.

```
settime

**** Set Date and Time ****


Time and date not set.
Do you wish to set it (y/n)?
```

Figure 4-31. Date and time set menu

To set or reset the date and time, use the prompts. For example, to set the date and time to Tuesday, January 1, 1989 at 12:01 AM, you respond as follows:

Enter date (MM DD YY): 1 1 89 <CR>
Enter time (HH MM): 0 1 <CR>
Time has been set to:
Tuesday, 01/01/89 - 00:01:00 EST

Do you wish to change it (y/n)?

Respond "n <CR>" to accept the displayed date and time and return to the connect prompt. System timekeeping starts when you press <CR>.

NOTES

1. Entry of leading zeroes and zero values is optional.

2. The Settime Service displays the date and time in the configured American or European format with the configured time zone abbreviation (see under the Configuration Service, "Level 3 Menu Selection 5: EXAMINE/MODIFY global configuration parameters"). Also, the Settime Service performs range checks on your entries. For example, if you enter:

Enter date (MM DD YY): 15 6 89 <CR>

Settime responds:

Invalid value for month (MM)
Enter month (MM):

X.21 - PDN/PSTN

A VCX trunk can be set to run multiplexing, X21, or PSTN protocol. The latter two involve connection to a Public Data Network (PDN) or a Public Switched Telephone Network (PSTN). Benefit of switched trunk connection is, trunk charges occur only when the connection is active.

X21 (PDN)

PDN circuits are designed for carrying medium speed (9600 bps) synchronous data traffic, with very low error rates. They offer an economical and flexible alternative to leased lines, particularly for low to medium usage.

Auto Direct Call

The implementation of call procedures is confined to Automatic Direct Call (ADC) over a standard V.24 interface. ADC operates by circuitry sensing when there is data flow for the trunk, and translating this into a Call Request. The Call Request is signaled to the PDN which establishes the call routing through an internally stored destination address. At the remote end the PDN signals an incoming call to the attached VCX and following an acceptable response, link setup proceeds. Transparent link operation is then achieved and the data transfer phase will exist until clear down. The Call Request-to-Data-Transfer-state-time, will typically be 0.1 seconds, which is imperceptible to the user.

Note 1:

Full implementation of the X.21 specification involves storage of a directory of numbers and dialing into the PDN. This is not supported by the X.21 software.

Note 2:

In this document and elsewhere X.21 is treated as synonymous with X.21 bis". To be strictly accurate all X.21 references should really be X.21 bis" as the implementation only covers working through a V.24/RS232C interface.

Operational Details

When a VCX in the X.21 mode is operating over a switched circuit link, it appears as though it was connected via a direct link. The following X.21 features and operating specifications are supported:

- Receive Incoming Call
- Initiate Outgoing Call
- Remote (Network DCE) Cleardown
- Local (No activity)
- Cleardown Automatic Retry
- Retrycounter Overflow

Receive Incoming Calls

When in the Idle state, RI (Ring Indicate - pin 22) becomes active, VCX will turn on DTR (Data Terminal Ready - pin 20)

to accept the call. It will then wait for DSR and CTS to come on before attempting synchronization and entering the Data Transfer state.

Initiate Outgoing Calls

When in the Idle state, and data for the link is detected, VCX asserts DTR and starts a 6 second Call Request timer. If the timer expires without VCX seeing DSR and CTS go high, VCX enters the retry loop. When DSR and CTS are asserted, VCX proceeds to establish synchronization with the remote VCX.

Remote (network DCE) Cleardown

When in the Data Transfer state, and CTS or DSR drops,VCX Drops DTR to confirm network clearing, and enters Idle state. If the VCX still has data to send it enters the retry loop.

Automatic Retry

When in the Data Transfer state, no data is detected for a programmable period (typically 10 seconds, after the initial minimum 10 seconds), then VCX will issue a Clear Request by dropping DTR and entering the Idle state. Any virtual circuits established across the link will be maintained. When subsequent data is sensed, VCX will enter the Call Request state, and upon successful link setup will continue to pass data to the same virtual circuit.

When attempting a call setup and the Call Request timer expires (2 seconds), the VCX will drop DTR and wait for a random time between 1 and 19 seconds, before re-attempting the Call Request. The purpose of waiting a random period is to minimize the possibility of Call Request collisions from both ends of the link.

Retry Counter Overflow

When the VCX is unable to establish a link within 3 attempts, it will stop trying, flash the SYNC light and declare the link down. It will also break down any virtual circuits made and tell any connected users that the requested port is out of service. Subsequent user attempts to connect across the link will result in a message that the requested port is out of service. This condition is reset by an incoming call, or by resetting the trunk/unit.

Timer Settings (X.21)

Timer settings for X.21 are given in table 4-1.

Table 4-1. Timer Settings for X.21.

Parameter	Timer setting
Call request:	6 seconds
Call collision backoff timer:	Random at 1, 5, 9, or 13 seconds
Minimum call duration:	10 seconds
Inactivity timeout:	Programmable (trunk timeout parameter)
Maximum Number of retries:	3 attempts (2 retries)

Configuration

The X.21 interface should be configured as a trunk line and normally set to DTE, supplies no clock and operate with a baud rate of 9600.

X21 PSTN

An alternative interface selection is available which will enable VCX to be used across the PSTN with a pair of V.32 modems.

PSTN software provides the capability to have VCX control a pair of V.32 modems, allowing them to initiate and answer calls, totally transparent to the user. This allows users who do not need to access the remote end very often, to have transparent access to the remote ports without the expense of a leased line or X21. Local switching between ports may be accomplished without dialing across the PSTN, therefore not incurring any call charges.

Operational Details

When data for the trunk is sensed, the local VCX will raise DTR, causing the local modem to dial the number stored in the modem. When the remote V32 detects the ringing signal, it will raise RI on its interface. When the remote VCX senses RI raised, it raises DTR, enabling the V.32 modem to answer the

call. The two VCX's will then synchronize and are ready for data transfer.

VCX will wait 90 seconds from asserting DTR to handshake completion, prior to entering the Data Transfer phase. The line will be maintained until there has been no data flow for the inactivity timer timeout, after which time DTR will be dropped and the VCX will go back to Idle state. Any virtual circuits made across the link will be maintained and data flow will continue as necessary following subsequent link setups.

Timer Settings (PSTN)

Timer settings for PSTN are given in table 4-2.

Table 4-2. X.21 PSTN Timer Settings

Parameter	Timer setting
Call request:	90 seconds
Call collision backoff timer	Random, 1, 31, 61, 91, 121 seconds
Minimum Call Duration:	Timeout value
Inactivity timeout:	Programmable, 0 - 255 seconds
Maximum number of retries:	3 attempts (2 retries)

Configuration

The VCX trunk interface should be configured as DTE, supplies no clocks, have a baud rate of 9600 bps, with multiplexing protocol set to X.21 PSTN. The V.32 modems should be powered up and configured for no result codes or ECHO.

Other modem settings:

Data type:	Set to SYNC
Dialer:	Set to DTR
CTS (EIA) setups:	Set to Normal (Norm)
Phone number:	Store remote modem phone number

X.21/PSTN Cable

The trunk for X21/PSTN operation requires a DB25 male-to-DB25 male cable (part number 16D166A11-01). Cable pinouts are shown in figure 4-32.
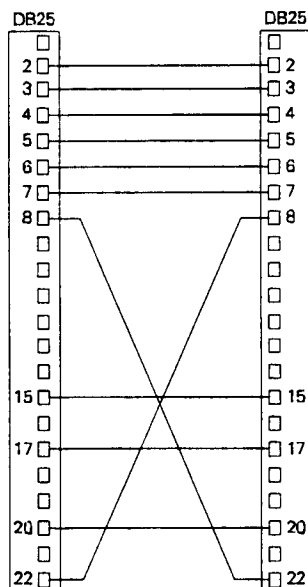

Figure 4-32. X21 Trunk Cable pinouts

User Services

In this chapter

➤ Introduction to User Services
➤ Discussion of User Services

Introduction

User Services describes the VCX-101 services intended for general use and which are usually granted open access. These services include:

- **Fox Service.** The Fox Service continuously transmits a "quick brown fox" test message toward the port.

- **Loopback Service.** The Loopback Service echoes received data for test purposes.

- **Set Service.** The Set Service allows users to alter the configured parameters of their local port. The Set Service and the Configuration Service can perform similar functions. However, the Set Service affects only the port that invokes the service, while the Configuration Service allows the system administrator to alter the parameters of any port. Also, parameters changed with the Set Service (for example, the port baud rate) revert to their configured states when the user terminates the session or after a reset.

- **Time Service**. The Time Service displays the system date and time.

- **TM (Transparent Mode) Service.** The TM Service allows transparent uploading and downloading of binary files.

- **Who Service.** The Who Service displays the installation name, port name and port number.

These services are discussed in the following pages.

Fox Service

The Fox Service transmits a test message continuously at the baud rate, character length, parity, and number of stop bits set for your port. At the "Connect to:" prompt, type **Fox** <CR>. This produces the Fox test message illustrated in figure 5-1.

```
***** Fox Test *****
Enter ESC to exit.

The quick brown fox jumped over a lazy dog's back 1 time.
The quick brown fox jumped over a lazy dog's back 2 times.
The quick brown fox jumped over a lazy dog's back 3 times.
The quick brown fox jumped over a lazy dog's back 4 times.
The quick brown fox jumped over a lazy dog's back 5 times.
The quick brown fox jumped over a lazy dog's back 6 times.
The quick brown fox jumped over a lazy dog's back 7 times.
The quick brown fox jumped over a lazy dog's back 8 times.
The quick brown fox jumped over a lazy dog's back 9 times.
The quick brown fox jumped over a lazy dog's back 10 times.
The quick brown fox jumped over a lazy dog's back 11 times.
The quick brown fox jumped over a lazy dog's back 12 times.
The quick brown fox jumped over a lazy dog's back 13 times.
The quick brown fox jumped over a lazy dog's back 14 times.
The quick brown fox jumped over a lazy dog's back 15 times.
```

Figure 5-1. Fox service monitor screen

A carriage return/line feed follows each one line occurrence of the message.

If you enter a printable character while the test is running, the Fox Service places the character in the first character position on the next fox message line. For example, if you type # the displayed message becomes:

#The quick brown fox jumped over a lazy dog's back n times.

The Fox Service continues sending the "fox" message until you press <ESC>.

NOTE: The Fox Service responds to the currently set device flow control protocol (see the "Set Service" chapter). If the device flow control is set to "none," or if it is set to a different protocol than the one actually used by your equipment, portions of the test message may be lost.

Loopback Service

The Loopback Service echoes received data. If invoked at a
remote node, the Loopback Service tests the communications
path to and from the remote node. Figure 5-2 illustrates the
Loopback service menu. To use the service at the "Connect to"
prompt, type:

loopback <CR>

Type a test message. The message should be displayed on your
terminal screen or printer exactly as entered. Your port
remains in loopback mode until you press <ESC> .

NOTE: If your terminal is set to half-duplex, each character
typed appears twice. This double-echo occurs because the
terminal writes to the screen (echoes) once, and the Loopback
Service provides a second echo. Also, the Loopback Service

```
***** Loopback test *****

Type ESC to exit.
```

Figure 5-2. Loopback service menu

echoes data (except for <ESC>) exactly as received. The service
does not add line feeds when echoing <CR>.

Set Service

The Set Service alters the configured characteristics of a port. For this reason, use the Set Service with caution. Changes remain in effect until you quit the session. Then the port returns to its configured characteristics. To display the Set Service Main Menu, enter:

Connect to: set <CR>

```
**** Set Terminal Characteristics ****

                       Current               Requested
1. Exit
2. Baud rate          - 9600                 - 9600
3. Character length   - 8 bits               - 8 bits
4. Parity             - None                 - None
5. Stop bits          - 1 stop bit           - 1 stop bit
6. Echo               - CPU & VCX services   - CPU & VCX services
7. Terminal type      - DEC VT-100/VT-180    - DEC VT-100/VT-180
8. Device flow control - XON/XOFF            - XON/XOFF
9. Port flow control  - XON/XOFF             - XON/XOFF
10. Messages          - All                  - All
11. BREAK key         - Pass through         - Pass through
12. Control state key - ^A                   - ^A
13. Forward toggle key - ^B                  - ^B
14. Backward toggle key - ^C                 - ^C
15. Broadcast option  - Accept routine       - Accept routine
16. Apply changes

Enter selection: 1
```

Figure 5-3. Set terminal characteristics menu

The Set service screen display is shown in figure 5-3.

To use the Set Service select one or more parameters and their new values. These become the requested values until "(16) Apply changes" is selected. The requested values then become the current values until the session ends.

1. Exit

Type 1 <CR> to exit the Set Service and return to the connect prompt.

2. Baud Rate

Baud rate is the speed of data transmission. Type **2** <CR> to request a new baud rate setting.

The Set Service displays:

Change Baud Rate

1. **75**
2. **110**
3. **134.5**
4. **150**
5. **300**
6. **600**
7. **1200**
8. **1800**
9. **2400**
10. **4800**
11. **9600**
12. **19200**
13. **75/1200**

Enter selection or <CR> to return:

Enter the number for the baud rate you wish to select. For example, to request 1200 baud enter 7 <CR>. The system re-displays the Set Service Menu with "1200" as the baud rate in the "Requested" column. To return to the Set Service Menu without requesting a new baud rate, press <CR>. To make the new baud rate active, select **15 <CR>**, which prompts you to change the terminal and then hit **<CR>**. The new baud rate now appears in the current column.

Each of the other parameters (3 to 15 on the Set Service Menu) have been discussed in the various chapters in this manual. Select the parameter to change as above, entering the number of the parameter shown on the menu (Figure 5-3). The choice available will be displayed. Select the number of your choice and **<CR>**. Each of the 15 parameters may be set in this manner.

When all parameters have been set to you requirments, enter **16<CR>**. This will apply all of the changes made at this menu. Then enter **1<CR>** to exit Set Service.

Time Service

The Time Service displays the date and time.

Connect to: time <CR>

The Time Service responds:

Tuesday, 01/01/89 - 00:01:00 EST

and re-displays the connect prompt.

Note: The displayed format is affected by the settings in Global Parameters.

TM (Transparent Mode) Service

The TM Service allows unidirectional or bi-directional binary file transfer between connected ports. Transparent communication between ports has several implications:

The devices at both ends of the connection must use a word length of eight bits.

Transmitting binary data implies that the local port should not respond to inband flow control (XON/XOFF or DC1/DC2) if these characters appear in the data stream.

Receiving binary data implies that the remote port should not respond to inband flow control (XON/XOFF or DC1/DC2) if these characters appear in the data stream.

The control state and connect hold characters cannot be used, so exiting transparent mode requires a special escape sequence.

To invoke the TM Service:

1. Establish a connection.

2. Enter the control state character.

3. **Enter:** tm <CR>.

The TM Service responds:

***** **Transparent Mode** *****

Will you receive binary data (y/n)?

Enter y *<CR>* or n *<CR>*. The TM Service prompts:

Will you transmit binary data (y/n)?

Enter y *<CR>* or n *<CR>*.

If you receive but do not transmit binary data, the local port can still respond to inband flow control. If you transmit but do not receive binary data, the remote port can still respond to inband flow control exerted by the remote device. For high speed file transfers, flow control may be required to prevent data loss by the device receiving the file. If you elect both to send and receive binary data, you disable inband flow control.

The TM Service then prompts:

Enter escape sequence:

The escape sequence allows exit to the transparent mode. The escape sequence should be a character string that is unlikely to occur as a bit pattern in the binary data. The escape sequence can be up to 32 characters long and can contain any character except the command characters <CR> and comma (,). Entering <CR> terminates the escape sequence entry and immediately enables transparent operation. Entering a comma in the escape sequence specifies 0.5 seconds of "quiet," in which no data transmission occurs, as part of the escape sequence. You can use multiple commas for longer delays. You can also enter a commas-only escape sequence so that a "quiet" line terminates TM. The TM Service monitors both transmitted and received data for the escape sequence regardless of the direction selected for binary transfer.

Note that the TM Service buffers any data matching characters in the escape sequence until the complete escape sequence occurs or until it finds a mismatch. For example, if the escape sequence "fred" is entered, the TM Service buffers each occurrence of "f", waiting to see if the next character will be an "r". If the next character is an "r", the TM Service buffers the "r", waiting for an "e". If, however, the next character is an "x", the TM Service transmits the buffered "f" and "r", then the "x".

For example, if you enter:

Enter escape sequence: "fred" <CR>

TM monitors both transmitted and received data for one second of "quiet," followed by the characters "fred", followed by one second of "quiet." If these criteria are met, the system returns you to the control state with the connection still established.

Who Service

The Who Service displays the installation and port names. It also displays the slot and port number. For example, consider an installation with the following data named Acme Balloon Co.- Boston Node

The port is named term 3

The slot number is 1

The port number is 1
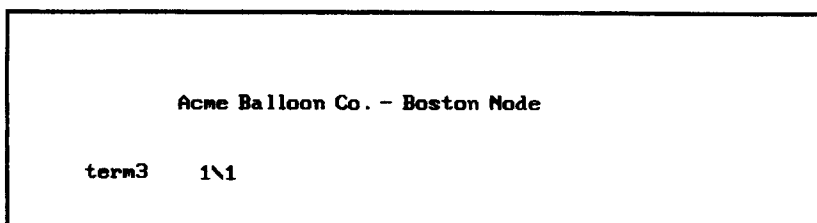
If you enter at the **Connect to** prompt:

Connect to: who <CR>

```
                Acme Balloon Co. - Boston Node


term3     1\1
```

Figure 5-4. Who service menu

The Who Service responds with the monitor display shown in figure 5-4.

Notes: 1. The slot number is shown to the left of the backslash
(\) and the port number is shown to its right.
2. Slot "1" refers to the Async ports.
3. Slot "2" refers to the Trunks

Reference

In this chapter

- ➤ Introduction to Restricted Services
- ➤ Access Control Discussion
- ➤ Attachment Control
- ➤ Discussion of Individual Restricted Services

Introduction

This reference chapter includes VCX-101 services or functions that are generally intended for use by a limited number of individuals such as the node or network supervisor. Restricting access is accomplished by security provisions discussed later in this chapter. These services include:

- **AB Slave Operation.** The VCX will respond to AB commands from a VCX-101, but AB Service cannot be run on a VCX-101.

- **Busy Service.** The Busy Service allows the system administrator to render a port or series of physically contiguous ports out-of- service.

- **Diagnostic (Diag) Service**. The Diag Service allows the network administrator to place any port or trunk in a loopback state, send fox messages, and to monitor data traffic.

- **Greeting Service**. The Greeting Service allows one or two lines to be displayed as a logon banner.

- **Load/Dump Service**. The Load/Dump Service allows the system administrator to load or dump the memory contents of a configuration module. A dump occurs when the memory of the config module is transferred to a PC floppy, hard disk, or other third party media for storage. A load occurs when the stored configuration is transferred from a third party media to a configuration module.

- **Logging Service**. The VCX-101 logging service allows any or all events to be monitored at a port irrespective of the system logger.

- **Mode Service.** Provides quick information on several items of current information.

- **Print Service**. The Print service allows hard copy of all or part of a configuration.

- **Reset Service**. The Reset Service allows the system administrator to reset a VCX-101 port or chassis from a terminal.

Status Service. The Status Service allows the system administrator to monitor chassis and port activity.

Also reviewed in this chapter are:

- **Restricted Access**. The use of access rights to control who can use specific terminals, ports, and services.

- **Attachment Control. The** signals used between "originate", "answer" and "both" ports to communicate attachment and de-attachment of devices.

Restricted Access

Access Rights Assignments

As received, a VCX-101 node will not have a security system established. All users and resources have an access right of "1" for a default and the global default access right field will have no entry. If the intent is to have all users able to access everything, it is not necessary to make any entries to configuration menu's and forms for access rights. In addition, under normal security filtering, a user whose access rights have been diminished to "0" will be given a "1" access right.

To avoid potential conflicts, when establishing a security system, use only the access rights of 2 though 64 inclusive; "0" and "1" are reserved for the proper handling of users where no security system is desired.

Security

Security functionality in the VCX-101 is a combination of access control and *auditing*. Access control is the mechanism that allows a system administrator to create and enforce policies for use of a system. The administrator sets up rules which control each user's access to the system resources. A resource is defined as anything that a terminal user can connect to, i.e., a service, a port, or a trunk line. The VCX-101 treats all three types of resource in the same way.

Auditing is the means by which the system administrator keeps track of the actual uses of the system resources. Auditing is used to detect attempts to violate access control, to evaluate the damage done by the violations, and to account for resource usage. The system administrator uses access control to specify what users can do, and auditing to determine what they have done.

There is a conflict between ease of use and access control. Access control is intended to make life difficult for intruders and to force intended users to do only what they should do. The more secure a system is, the more burdensome the user ID procedures are, and the more difficult it is to do anything unusual.

Access Control

User perspective: To the terminal user, access control is straightforward. A user starts a session and depending on the security configuration may be asked to provide his user name and password. If the password is correct, the switch logs him on, generates a logging message, and starts a user session running. The user then attempts connection to a resource and there are three possible outcomes:

1) The terminal may be allowed access to the desired resource, and is connected.

2) If access is not allowed, the user may be prompted for a password associated with that particular resource. Proper password entry results in a connection to the resource.

3) Last of all, access may be prohibited and the switch will not allow connection.

Administrator perspective: Access control is set up with the configuration utility. You can view the security function as a multipoint filter. You can apply this filter to any one or more of the following points to narrow down the access:

- the user

- the originating port

- the trunk lines

- the destination port

If you do not specify a filter at any of the above points, then the security access allowed previously, prevails. The user security is enabled by requiring the user to submit name and password prior to attachment to the VCX-101. This is particularly useful to limit hacker access, screening some of them out prior to dialogue with the switch.

Further security is achieved by assigning access levels to the originating port. Only user access levels, (defined in the user list along with name, password, and account ID) that match the originating port access levels, can go any farther. The user list is a configuration like any other, allowing the system administrator to add, modify, or delete names. The user list is referenced in the global configuration to allow the VCX-101 to associate the proper set of users with the running configuration.

The trunk lines and destination port provide additional filtering to permit only desired users access to the network resources. Resources again, are any VCX-101 services, interconnecting trunk lines, and ports (usually an answering port attached to a computer port). Should access rights not match somewhere during this sequential check, it is still possible for users with the proper password(s) to override the access block. This override capability is set up during configuration for any answering port, including trunks and originate/answer ports.

Access Rights

Access rights are given to the user and to resources, in the form of numbers from 1 to 64. They can be placed in the configuration menus in a variety of ways, i.e.,

1-5, 6, 8, 33-35

1-6, 8, 33, 34-35

1, 2, 3, 4, 5, 6, 8, 33, 34, 35

All of these examples mean the same thing. The user, originate ports, services trunks, and answer ports are all given access rights. By way of example , a user with access rights 1-10 is attached to an originate port with access rights 8-33, so the connection can utilize any remaining resource in the range 8-10. If the requested computer port is connected to an answer port with access rights 1-20, the request for connection to that computer is granted, no questions asked.

If, however, the answer port had access rights of 11-20, the connection could be flatly denied or the user prompted for a password to override the block. Which scenario prevails is determined at configuration time.

User Lists

User lists are configurations, but unlike running configurations they merely allow the VCX-101 to control access to the switch by screening out intruders and non-qualified users. Unless a name and password match are found in the user list designated to control the security (found in the global configuration), access to the switch is denied, unless of course logon has not been enabled for that port. Denial is in the form of allowing three attempts by the intruder to present the proper name and password, otherwise communication with the VCX-101 is terminated for 30 seconds before another attempt can be made. The idea is to slow down the intruders trying to play a guessing game. Combine this with the logging of a violation message, and the system administrator can zero in on the source of attempted intrusion.

Password Override

Any answering port can be configured to permit password override in the event of an access rejection. Normally this is only to allow someone that is not the usual terminal operator to perform tasks on a foreign terminal, i.e., a roving network troubleshooter. The configuration service stores access rights for all resources and override passwords where applicable.

Access Rights for VCX-101 Services

A VCX-101 service is a special case of a destination port where
the resource is in fact stored internal to the VCX-101. When
beginning from a cold start, all services are given a "1" access
right just like everything else in the VCX-101. However, it is
not wise to allow any user access to all services, some of which
can be catastrophic to network performance. User services like
those listed below can be given to all as they affect only the
user terminal.

- Fox
- Loopback
- Set
- Time
- TM (transparent mode)
- Who
- Status

However, controlled services that affect overall network
performance should be given restricted access. Controlled
Services include:

- Busy
- Configure
- Diagnostic
- Greeting
- Load/dump
- Logging
- Mode
- Print
- Reset
- Settime
- Setup

Attachment Control

Types of Attachment Control

The Configuration Service provides three types of attachment control: unqualified, DTR, and modem. Exactly how each form of attachment control works depends on a several factors:

- whether the port is an "originate", "answer", or "both" (originate/answer)

- whether outband flow control is configured for the port

- if the attached host toggles DTR (i.e., drops DTR to acknowledge completion of a session, and then raises DTR when ready to begin another session) or does not toggle DTR

In discussing the various forms of attachment behavior several more definitions are appropriate.

The "neutral state" are conditions that exist at the EIA interface with no connection and no attachment. The port is considered to be detached.

A "service request" are the events that must take place at an originate port to attach to the VCX-101. The end result is a "connect to" prompt from the VCX-101.

A "connection request" is a request from within the VCX-101 to establish a virtual circuit to an answering port.

"Control" refers to CTS and DSR. The DCD is maintained continuously "high".

When EIA "controls toggle", a high-to-low-to-high transition occurs, the low period being from 500 ms. to 1500 ms.

Unqualified Originate

NEUTRAL STATE	CONTROLS are high
SERVICE REQUEST	User types <CR>
CONNECTION DENIED	User re-prompted
CONNECTED	Connect request granted

| USER QUITS | CONTROLS toggle returning to the neutral state |
| REVERSE DETACHMENT | User re-prompted |

Unqualified Answer

NEUTRAL STATE	All CONTROLS are low
CONNECTED	Connect request granted and CONTROLS are raised
USER DISCONNECTS	CONTROLS return to the neutral state

Unqualified Both

Originate sequence

NEUTRAL STATE	CONTROLS are high
SERVICE REQUEST	User types <CR>
CONNECTION DENIED	User re-prompted
CONNECTED	Connect request granted
USER QUITS	CONTROLS toggle returning to the neutral state
REVERSE DETACHMENT	User re-prompted

Answer sequence

| CONNECTED | Connect request granted |
| USER QUITS | CONTROLS toggle returning to the neutral state |

DTR Originate

NEUTRAL STATE	CONTROLS are high
SERVICE REQUEST	DTR is high and user types<CR>
CONNECTION DENIED	User re-prompted
CONNECTED	Connect request granted
USER QUITS or DTR DROPS at ORIGINATE END	CONTROLS toggle returning to the neutral state
REVERSE DETACHMENT	Connection broken and user is re-prompted

DTR Answer

NEUTRAL STATE	All CONTROLS are low
CONNECTION REQUEST	CONTROLS are raised and wait for 100ms. and check for DTR high. If high, the connection is established; if not the connection is denied.
CONNECTED	Connect request granted
USER DISCONNECTS	DTR toggle: CONTROLS drop and port goes to the out-of-service state. If DTR drops, it returns to the neutral state If DTR does not drop, all subsequent connection requests are denied. When host raises DTR, answer port will make connections. DTR no toggle: CONTROLS drop and return to the neutral state. The answer port will make connections regardless of whether the host has dropped and then raised DTR or not.
ANSWER END DROPS	CONTROLS return to neutral state DTR

DTR Both

Originate sequence

NEUTRAL STATE   CONTROLS are high

SERVICE REQUEST   DTR is high and user types
                            <CR>

CONNECTION DENIED   User re-prompted

CONNECTED   Connect request granted

USER QUITS or   CONTROLS toggle
DTR DROPS at Originate end returning to the neutral state.

REVERSE DETACHMENT   User re-prompted

Answer sequence

CONNECTED   Connect request granted

USER DISCONNECTS   CONTROLS toggle
                            returning to the neutral state.

(ANSWER DISCONNECT IS NOT POSSIBLE)

Modem Originate

NEUTRAL STATE	CONTROLS are high
SERVICE REQUEST	User types <CR>
CONNECTION DENIED	User is re-prompted
CONNECTED	Connect request is granted
USER QUITS or DTR DROPS or USER DISCONNECTS	CONTROLS toggle returning to the neutral state
Operation is the same as the DTR ORIGINATE except DTR High is not required to initiate a connection (DTR state is "don't care").	

Modem Answer

NEUTRAL STATE	All CONTROLS are low
CONNECTION REQUEST	CONTROLS are raised/connection granted (DTR state doesn't matter)
CONNECTED	Connect request granted
ANSWER END DROPS DTR or USER DISCON-NECTS	CONTROLS return to the neutral state

Modem Both

Originate sequence

NEUTRAL STATE	CONTROLS are high
SERVICE REQUEST	User types <CR>
CONNECTION DENIED	User is re-prompted
CONNECTED	Connect request granted
USER QUITS or DTR DROPS at ORIGINATE END	CONTROLS toggle returning to the neutral
REVERSE DETACHMENT	User re-prompt
CONNECTED	Connect request granted

Answer sequence

USER DISCONNECTS or DTR DROPS at ANSWER END	CONTROLS toggle returning sequence to the neutral state.

Operates as DTR BOTH except that the state of DTR doesn't matter in the originate mode. In an answer mode, falling DTR disconnects/toggle controls.

Attachment Control Applications

The application and control of these 9 types of attachment control are discussed in the following paragraphs.

DO NOT cable a modem to a port with outband flow control. Such an application is inconsistent. Inband flow control only works when cabled directly to DTE.

Typical Applications

Unqualified originate—The terminal user attaches by simply typing a "**<CR>**". Detachment can be made by "quitting" a connection or by logging off the host (provided that the answer port is configured as DTR answer), whereby the user is re-prompted for his next choice of a destination.

Unqualified both—Desired behavior is the same as above except terminal-to-terminal communication is also required.

DTR originate—The terminal is required to have DTR high while trying to attach. Detachment occurs when the terminal user quits or drops DTR. Logging off the host can cause disconnection and re-prompt for the next destination (provided that the answer port is configured as DTR answer).

Modem originate—A dial-in modem pool is used to allow VCX-101 resources to be used by remote users via the network. VCX-101 port controls are high so that the modem can answer the call. If the terminal user quits a connection, VCX-101 port controls drop to allow the modem to go back on-hook, but return high allowing the next call to be answered. Should the terminal user require connection to other resources without redialing, then logging off the host can cause a virtual circuit disconnect and a re-prompting of the user.

Modem both—A dial-in and dial-out modem pool is used to allow remote users access to VCX-101 resources as well as providing VCX-101 users access to resources off the network. Dial-in behavior is the same as above. In the dial-out mode, the VCX-101 port becomes an answer port with its controls high, allowing the VCX-101 user to talk to the auto-dialer and set up a call over the network. The VCX-101 user can detach causing controls to toggle low causing the modem to go back on-hook, or the host resource off the network can go on-hook causing a

falling DTR at the port and VCX-101 detachment to be
completed.

Unqualified answer—A CPU port is required to answer calls
only from the VCX-101. The user will always terminate the
connection after logging off the host.

DTR answer with toggle—A CPU answers calls from the
VCX-101 network which are only accepted by the VCX-101 if
the host DTR is high. Upon user disconnection VCX-101 drops
its controls but will not go back high unless the host
acknowledges by dropping its DTR. This prevents tail-ending
on some other application.

Modem answer—A CPU answers calls from the VCX-101
network which are accepted only if the host's DTR is high.
Upon user disconnection, VCX-101 controls are dropped. The
next incoming call again raises the VCX-101 controls.

DTR both — A dial-in/out modem pool connects to the
VCX-101. A VCX-101 user can place a call over the network to
other resources. However, the only way to break the VCX-101
connection is for the VCX-101 user to detach. The host off the
network cannot initiate a sequence to break the VCX
connection. The originate mode is identical to DTR originate
behavior.

Busy Service

The Busy Service renders a port (or series of ports), or a trunk out-of-service, allowing non-disruptive equipment maintenance. If the port is currently in use, the port remains in service until detachment occurs. Therefore, busying a port does not interrupt a user session in progress. The busied status of a port is retained if the chassis is powered down or reset.

To invoke the Busy Service, enter:

Connect to: busy <CR>

VCX-101 displays the Busy Service Main Menu, shown in figure 6-1.

```
***** Busy Service *****

1. Exit
2. Busy a port or port series
3. Remove busy status from a port or series

Enter selection:
```

Figure 6-1. Busy service main menu

The selections available at this menu are:

1. Exit

Type 1 <CR> to exit the Busy Service and return to the connect prompt.

2. Busy a Port or Port Series

Type 2 <CR> to designate the port, ports or trunk to be busied. For example, to busy the port org, enter:

Enter Selection: 2<CR>

Should you decide not to busy anything, enter <CR>. The Busy Service redisplays the Busy Service Main menu. If you enter the name of a port or trunk series, the Busy Service displays the Port Range Submenu.

3. Remove Busy Status from a Port or Series

Type 3 <CR> to allow busied ports or trunk to resume normal operation. For example, having busied the port org, you restore it to normal operation as shown in figure 6-2.

```
***** Busy Service *****

1. Exit
2. Busy a port or port series
3. Remove busy status from a port or series

Enter selection: 3 <CR>


Enter port or series name: port1
Busy removed from "port1".
```

Figure 6-2. Busy service menu

If you decide not to change the busy a port, ports, series, or trunk, enter <CR>. The Busy Service re-displays the Busy Service main menu. If you enter the name of a port series, the Busy Service displays the Port Range Submenu.

Port Range Submenu

If you wish to busy or unbusy a port series, the Busy Service displays the Port Range Submenu. This submenu allows you to select all the ports defined under the name or a range of ports within the series. The Port Range Submenu provides the following choices, as shown in figure 6-3.

```
** Select Port Range **

1. Exit
2. All ports in series
3. Port range relative to start of series
4. Physical port range

Enter selection:
```

Figure 6-3. Port range submenu

Selections available at this submenu are:

1. Exit

Type 1 <CR> to exit the Port Range Submenu and return to the Busy Service Main Menu.

2. All Ports in Series

Type 2 <CR> to busy or unbusy all ports defined under the name.

3. Port Range Relative to Start of Series

Type 3 <CR> to busy or unbusy a range of ports within the series. This selection allows you to specify the range as beginning and ending ports relative to the first port in the series. For example, suppose that you had a series of asynchronous ports called *series* which included ports 6-16., and you want to busy out five ports (6-10). You would enter data at the prompt as shown in figure 6-4.

```
** Select Port Range **

1. Exit
2. All ports in series
3. Port range relative to start of series
4. Physical port range

Enter selection: 3

Number must be relative to first port in series.
Enter starting port number (1-13): 6

Number must be relative to first port in series.
Enter ending port number (6-13): 10
"s1" now busied
```

Figure 6-4. Port range submenu

VCX then displays the Busy Service Main Menu. Unbusying a port range relative to the starting port of a series works in exactly the same way as busying the ports. If you enter a port range that exceeds that of the named series of ports, VCX-101 displays this error message:

Name does not include all ports requested.

and returns you to the Busy Service Main Menu.

4. Physical Port Range

Type 4 <CR> to busy a range of ports.

This selection allows you to specify the range as absolute port numbers. For example, you have configured seven ports, numbers 2-8 with the name *series*. You want to busy out ports 4-8. Figure 6-5 details how this is accomplished.

The VCX then displays the Busy Service Main menu.

```
** Select Port Range **

1. Exit
2. All ports in series
3. Port range relative to start of series
4. Physical port range

Enter selection: 4

Number must be physical position in chassis.
Enter starting port number (2-8): 4

Number must be physical position in chassis.
Enter ending port number (2-8): 8
"s1" now busied.
```

Figure 6-5. Menu for selecting a port range

Unbusying a physical port range works in exactly the same
way as unbusying the ports. If you enter a port range which
exceeds that of the named series of ports, VCX-101 displays the
error message:

Name does not include all ports requested.

Diagnostic Service

The Diagnostic Service allows the System Administrator to
conduct tests on asynchronous ports, and multiplexing/X.25
ports to determine if data is being properly communicated
within a VCX node or network. The asynchronous diagnostic
tests include: internal loopback, external loopback, fox
message, and data monitor. The multiplexing/X.25 port
diagnostics include local loopback and remote loopback.

Most loopbacks permit either the insertion of a VCX generated
fox message to be propagated to the target port UART/USART
and looped back to the diagnostic terminal user; or the
diagnostic terminal user to have TX data sent to the target
port, looped back and returned to RX data for display on the
terminal.

The terminology internal/external and local/remote need
explanation. Local and remote loopbacks are performed on sync
ports which, by definition, have a permanent circuit in place.
Async switched ports, on the other hand, are merely attached

to the switch prior to virtual circuit setup. Therefore, if the
target async port is unconnected, a loopback can be performed
externally, TX data to RX data toward the terminal; or
internally, TX data to RX data toward VCX. NOTE: For clarity
as to signal paths for the tests, see the figures following page
6-27.

It should be remembered, with the exception of data monitor,
diagnostic tests are disruptive to either the port under test, or
the trunk under test. Therefore, one or many users can
potentially be affected.

To select the Diagnostic Service, enter *Diag* after the prompt.

Connect to: diag<CR>

This will display the Diagnostic Port Selection menu shown in
figure 6-6. The Diagnostic Service can be exited by entering 1.
To continue on within the Diagnostic Service enter 2, *Select a
port*. This action will generate two prompts: *Enter 1 for Async
or 2 for Sync:* and *Enter port number*. After the specific
async/sync type and port number are entered, the Diagnostic
Service determines whether an asynchronous or
multiplexing/X.25 port has been selected. Depending on the
type of port, different menus are displayed. The menus for an
asynchronous port are presented first.

```
***** Diagnostic Port Selection *****

1. Exit
2. Select a port

Enter selection:
```

Figure 6-6. Diagnostic service main menu

Asynchronous Port Diagnostics

Assume that the port to be selected to test is an asynchronous
port. The menu shown in figure 6-7. is then displayed. If you
enter 1 you will be returned to the previous menu. Options 2-4
allow you to select specific tests for the async port and option 5
allows you to monitor the data at the port. Let's review each of
these options, beginning with *Internal loopback*. Selecting 2,

```
***** Asynchronous Diagnostics *****

Node:      Card: 1    Port: 6    Port name: series2

1. Exit
2. Internal loopback
3. External loopback
4. Transmit fox
5. Data monitor

Enter selection:
```

Figure 6-7. Asynchronous port diagnostic menu

Internal loopback, generates another menu illustrated in figure
6-8.

```
***** Internal loopback *****

Node:      Card: 1    Port: 6    Port name: series2

1. Exit
2. Fox
3. Echo              (Current)
4. Begin Loopback

Enter selection:
```

Figure 6-8. Internal loopback menu

This menu is necessary since there are two internal loopback
tests that can be chosen: internal fox and internal echo. The
active choice is marked (Current); and whenever 4 is selected,
the loopback test marked (Current) will be started. For
example, to select the fox test, you enter 2. This will move the
(Current) status up to Fox. Then selecting 4, will begin the Fox
test, which appears as shown in figure 6-9.

To exit the Fox test and reactivate the menu, hit the <ESC>
key. During the internal fox loopback, the test message *The
quick brown fox jumped....times* is routed to target UART
(Universal Async Receive and Transmit chip) and then back to
the terminal. This tests the UART's ability to receive and
retransmit data, as well as tests all intervening circuitry to the
diagnostic port.

```
    4. Begin Loopback

Enter selection: 4


Hit <ESC> to exit.


    The quick brown fox jumped over a lazy dog's back 1 times.
    The quick brown fox jumped over a lazy dog's back 2 times.
    The quick brown fox jumped over a lazy dog's back 3 times.
    The quick brown fox jumped over a lazy dog's back 4 times.
    The quick brown fox jumped over a lazy dog's back
```

Figure 6-9. Internal loopback fox message test

To select the second internal loopback option (Echo), enter 3 to makeEcho (Current), and then enter 4 to start the test. A screen like that shown in figure 6-10 is displayed.

```
    ***** Internal loopback *****

Node:      Card: 1     Port: 6     Port name: series2

1. Exit
2. Fox
3. Echo            (Current)
4. Begin Loopback

Enter selection: 4


Hit <ESC> to exit.

"This is a test of the loopback operation."
```

Figure 6-10. Internal loopback with echo

In the case of echo, anything typed on the diagnostic terminal will be routed through the target UART and retransmitted back to the terminal. In our example, the sentence "This is a test of internal loopback" was typed and echoed back. As in the previous fox test, this is a way of checking the functioning of the VCX's UART.

Completing the internal echo test, you can exit and return to the previous menu by selecting 1.

External loopback can be selected as shown in figure 6-11. The
external loopback test can be conducted by selecting option 3,
as shown above. In this particular test, data is transmitted
from an external terminal to the VCX's UART and is then sent
back to the terminal. The external loopback mode can be exited
by hitting <ESC>.

```
        ***** Asynchronous Diagnostics *****

        Node:      Card: 1    Port: 6    Port name: series2

        1. Exit
        2. Internal loopback
        3. External loopback
        4. Transmit fox
        5. Data monitor

        Enter selection: 3


        Hit <ESC> to exit external loopback mode.
```

Figure 6-11. External loopback test menu

The option Transmit fox can be started by selecting 4. This
screen is illustrated in figure 6-12.

Transmit fox sends the fox message to the selected port and
displays it on the user terminal but will not display the

```
        ***** Asynchronous Diagnostics *****

        Node:      Card: 1    Port: 6    Port name: series2

        1. Exit
        2. Internal loopback
        3. External loopback
        4. Transmit fox
        5. Data monitor

        Enter selection: 4


        Hit <ESC> to exit fox mode.
```

Figure 6-12. Asynchronous diagnostics, "transmit fox"

message on the diagnostic terminal. The <ESC> key should be used to exit the *Transmit fox* mode.

Selecting option 5, Data Monitor, will generate the screen shown in figure 6-13.

```
****** Data Monitor ******

Mode:      Card: 1     Port: 6     Port name: series2

1. Exit
2. Direction       (current is BOTH)
3. Format          (current is ASCII)
4. Trigger         (current is NO TRIGGER)
5. Begin Monitoring

Enter selection:
```

Figure 6-13. Menu for data monitor selection

The Data Monitor can programmed to show the data being received at a port, the data being transmitted at a port, or both directions. The Data Monitor can also be set to an ASCII or HEX display as well as be set to start with or without a trigger character. The active parameters are displayed via the statement: "current is ____".

Selecting option 1, (exit) will return you to the previous menu. Selecting option 2, (Direction) will take you to the Monitor Direction menu, as seen in figure 6-14.

```
****** Monitor Direction ******

Mode:      Card: 1     Port: 6     Port name: series2

1. Exit
2. Receive
3. Transmit
4. Both

Enter selection:
```

Figure 6-14. Monitor direction menu

If you just want to see the port's received data on the Data
Monitor, select option 2. Option 3, will cause only the port's
transmitted data to appear on the Data Monitor. While option
4, will cause both the received and transmitted data to be
displayed. Once you have made your choice, select option 1,
exit, to return to the previous Data Monitor menu.

Returning to the previous Data Monitor Menu and then
selected Format, option 3, from that menu, results in the
monitor display shown in figure 6-15.

```
     ***** Monitor Format *****

     Node:     Card: 1    Port: 6    Port name: series2

     1. Exit
     2. ASCII
     3. HEX

     Enter selection:
```

Figure 6-15. Monitor format menu

Option 2 will cause all of the monitor's data to be displayed in
ASCII, while all the data is displayed in HEX with option 3.
Once your choice has been made, select option 1, *exit*, to return
to the previous menu.

Assuming that you have returned to the previous *Data Monitor*
menu and have selected the *Trigger* option from that menu;
you would see a screen like that shown in figure 6-16.

```
     ***** Data Monitor *****

     Node:     Card: 1    Port: 6    Port name: series2

     1. Exit
     2. Direction     (current is BOTH)
     3. Format        (current is ASCII)
     4. Trigger       (current is NO TRIGGER)
     5. Begin Monitoring

     Enter selection: 4

     Enter printable character or a two digit hex number
     or hit <RETURN> to continue.
```

Figure 6-16. Data monitor trigger menu

Notice that you are asked for a printable character or a two digit hex number for the trigger. After hitting <CR>the Diagnostic Service checks to see whether a character or hex number has been entered. If not, the Diagnostic Service assumes a *no trigger* state exists.

Option 5 of the Data Monitor menu starts the actual data monitoring. Two examples of Data Monitor screens follow:

Figure 6-17 is an example of data monitor set ASCII and no trigger .

```
Rx ^M^J The quick brown fox jumped over a lazy dog's back 328 times.^M^J The qu
Tx
Rx ick brown fox jumped over a lazy dog's back 329 times.^M^J The quick brown f
Tx
Rx ox jumped over a lazy dog's back 330 times.^M^J The quick brown fox jumped o
Tx
Rx ver a lazy dog's back 331 times.^M^J The quick brown fox jumped over a lazy
Tx
Rx dog's back 332 times.^M^J The quick brown fox jumped over a lazy dog's back
Tx
Rx 333 times.^M^J The quick brown fox jumped over a lazy dog's back 334 times.
Tx
Rx ^M^J The quick brown fox jumped over a lazy dog's back 335 times.^M^J The qu
Tx
Rx ick brown fox jumped over a lazy dog's back 336 times.^M^J The quick brown f
Tx
Rx ox jumped over a lazy dog's back 337 times.^M^J The quick brown fox jumped o
Tx
Rx ver a lazy dog's back 338 times.^M^J The quick brown fox jumped over a lazy
Tx
Rx dog's back 339 times.^M^J The quick brown fox jumped over a lazy dog's back
Tx
Rx 340 times.^M^J The quick
```

Figure 6-17. Data monitor set to ASCII, no trigger

Figure 6-18 is an example of a Data Monitor set to HEX, and No Trigger.

```
Rx 70 65 64 20 6F 76 65 72 20 61 20 6C 61 7A 79 20 64 6F 67 27 73 20 62 61 63
Tx
Rx 6B 20 31 32 32 39 20 74 69 6D 65 73 2E 0D 0A 20 54 68 65 20 71 75 69 63 6B
Tx
Rx 20 62 72 6F 77 6E 20 66 6F 78 20 6A 75 6D 70 65 64 20 6F 76 65 72 20 61 20
Tx
Rx 6C 61 7A 79 20 64 6F 67 27 73 20 62 61 63 6B 20 31 32 33 30 20 74 69 6D 65
Tx
Rx 73 2E 0D 0A 20 54 68 65 20 71 75 69 63 6B 20 62 72 6F 77 6E 20 66 6F 78 20
Tx
Rx 6A 75 6D 70 65 64 20 6F 76 65 72 20 61 20 6C 61 7A 79 20 64 6F 67 27 73 20
Tx
Rx 62 61 63 6B 20 31 32 33 31 20 74 69 6D 65 73 2E 0D 0A 20 54 68 65 20 71 75
Tx
Rx 69 63 6B 20 62 72 6F 77 6E 20 66 6F 78 20 6A 75 6D 70 65 64 20 6F 76 65 72
Tx
Rx 20 61 20 6C 61 7A 79 20 64 6F 67 27 73 20 62 61 63 6B 20 31 32 33 32 20 74
Tx
Rx 69 6D 65 73 2E 0D 0A 20 54 68 65 20 71 75 69 63 6B 20 62 72 6F 77 6E 20 66
Tx
Rx 6F 78 20 6A 75 6D 70 65 64 20 6F 76 65 72 20 61 20 6C 61 7A 79 20 64 6F 67
Tx
Rx 27 73 20 62 61 63 6B 20 31 32 33 33 20 74 69
```

Multiplexing/X.25 Port Diagnostics

If a synchronous port is selected from the Diagnostic Service
main menu rather than an asynchronous port, a different set of
menus will be seen. The first submenu is shown in figure 6-19.
As can be seen, local loopback (option 2) or remote loopback
(option 3) diagnostic tests can be selected for a multiplexing
port. While option 1, exit, will return you to the main menu.

```
      ***** Multiplexing Port Diagnostics *****

      Node:      Card: 2    Port: 1    Port name: trunk

      1. Exit
      2. Local loopback
      3. Remote loopback

      Enter selection:
```

Figure 6-19. Multiplexing port diagnostics menu

Assume you selected option 2, Local loopback. The monitor will
display the menu shown in figure 6-21.

```
      ***** Local loopback *****

      Node:      Card: 2    Port: 1    Port name: trunk

      1. Exit
      2. Fox
      3. Echo            (Current)
      4. Begin Loopback
```

Figure 6-20. Local loopback selection menu

There are two local loopback tests that can be conducted: Fox
and Echo. The loopback test that is active and ready to run is
denoted by the word (Current). When option 4, Begin
Loopback, is selected, the (Current) test is started.

If you selected the Fox test, option 2, and then selected *Begin
Loopback*, you will see a screen like that shown in figure 6-21 .
To exit the fox test, you must use the <ESC>key. You can now
conduct the local loopback echo test. The screen for the local
loopback echo test is illustrated in figure 6-22 .

Data typed at the terminal is sent to the VCX's USART and
then echoed back to the terminal's screen (i.e., "This is a test of

```
***** Local loopback *****
Node:       Card: 2     Port: 1     Port name: trunk

1. Exit
2. Fox              (Current)
3. Echo
4. Begin Loopback

Enter selection: 4

Hit <ESC> to exit.

The quick brown fox jumped over a lazy dog's back 1 times.
The quick brown fox jumped over a lazy dog's back 2 times.
The
```

Figure 6-21. Example of local loopback with FOX test

```
***** Local loopback *****

Node:       Card: 2     Port: 1     Port name: trunk

1. Exit
2. Fox
3. Echo             (Current)
4. Begin Loopback

Enter selection: 4

Hit <ESC> to exit.

"This is a test of local loopback"
```

Figure 6-22. ECHO loopback test

```
***** Multiplexing Port Diagnostics *****

Node:       Card: 2     Port: 1     Port name: trunk

1. Exit
2. Generate fox messages
3. Echo user characters only

Enter selection:
```

Figure 6-23. Remote loopback monitor screen

local loopback"). To escape the local loopback echo mode, press the <ESC>ape key.

Select option 1, exit, to return to the previous *Multiplexing Port Diagnostics* menu, shown in figure 6-19 .

```
Selected trunk is down, unable to perform remote loopback test.

****** Multiplexing Port Diagnostics ******

Node:      Card: 2     Port: 1     Port name: trunk

1. Exit
2. Local loopback
3. Remote loopback

Enter selection:
```

Figure 6-24. Multiplexing remote loopback menu

Remote loopback diagnostic tests can be selected from this menu, by selecting Remote loopback, option 3.

In remote loopback, as in local loopback, two types of tests are available: fox and echo. During these tests the local VCX communicates using a virtual circuit on the synchronous port's trunk line to the remote VCX; it is therefore non-disruptive. The remote VCX's fox or loopback service is turned on and then sent back to the local VCX.

Displays on the diagnostic terminal for fox and echo in remote loopback are identical to those in local loopback.

Illustrations showing data flow for all diagnostic tests are shown in figures 6-25, 6-26 and 6-27   .
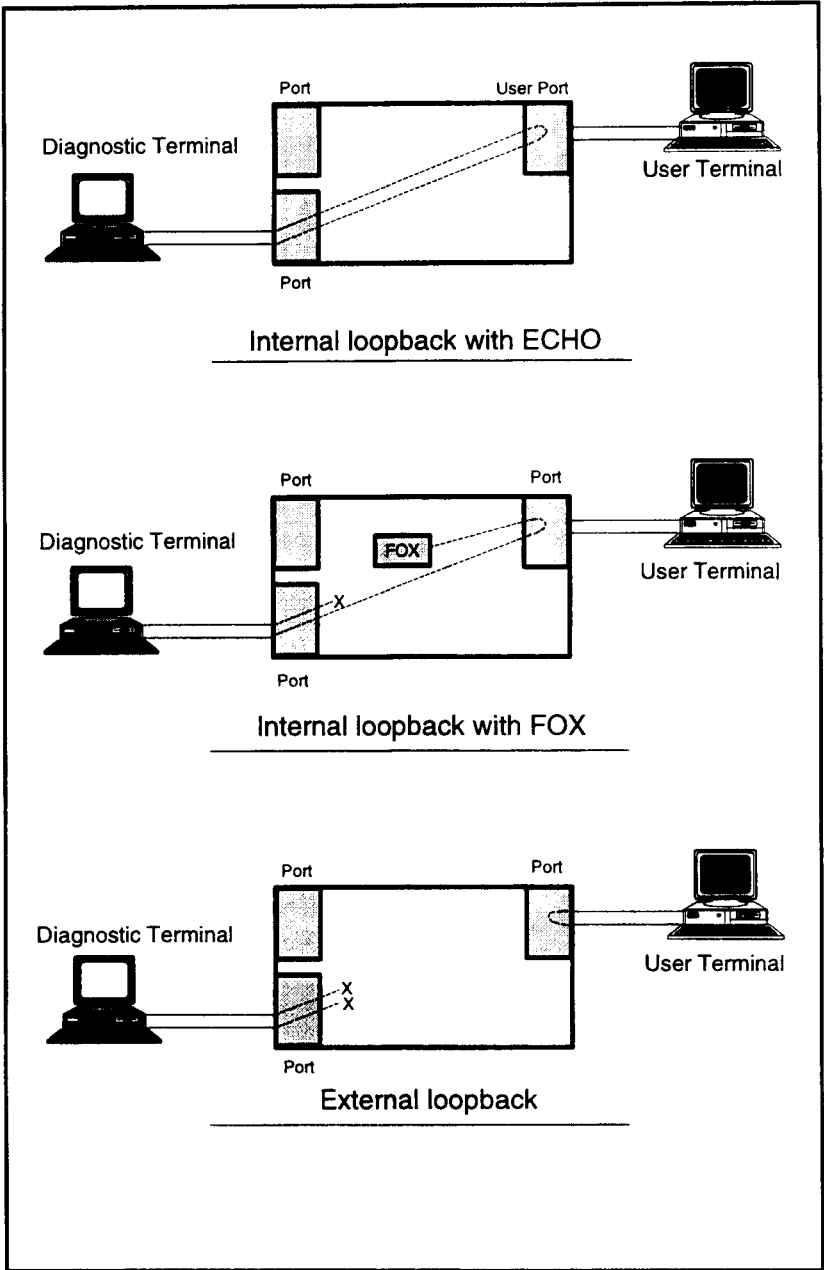
Figure 6-25. Various line configurations

Transmit FOX

Data Monitor

Remote trunk loopback with ECHO
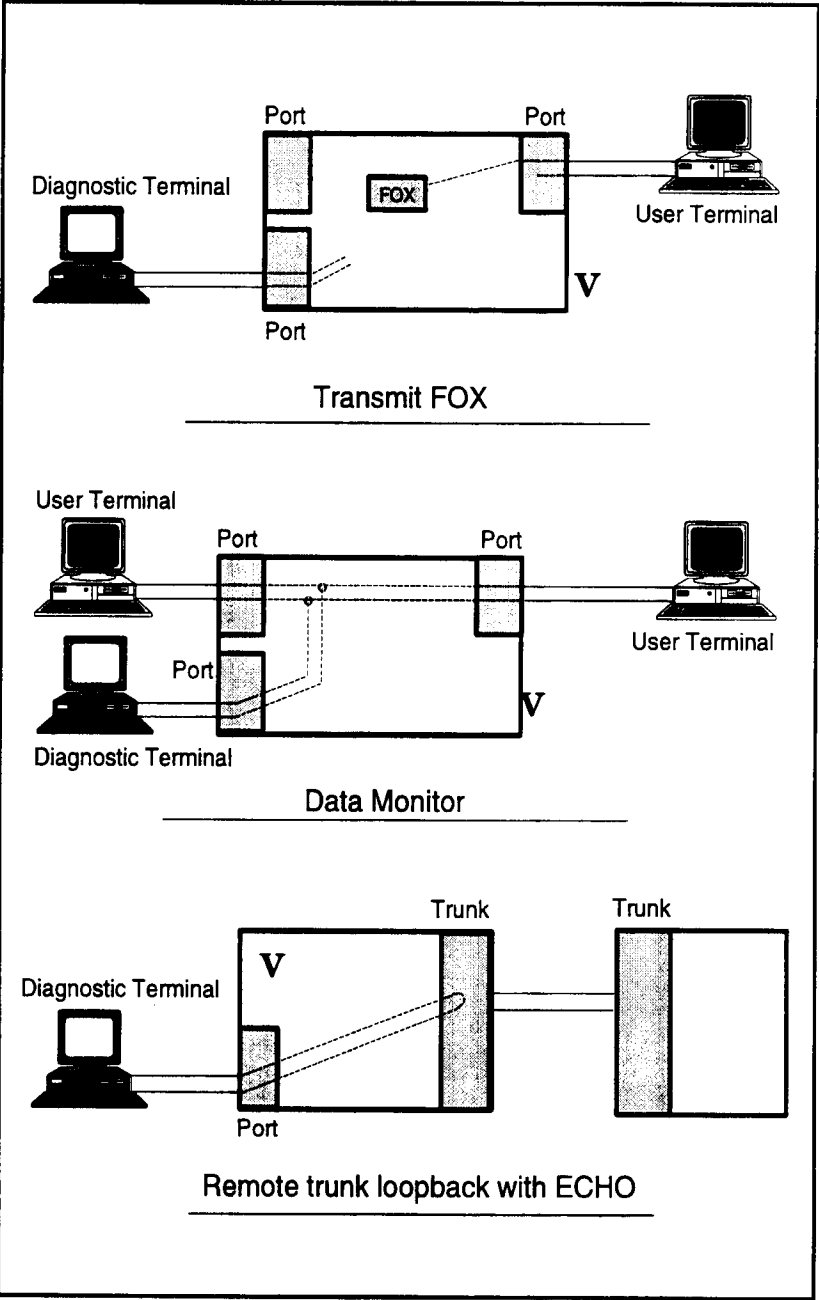
Figure 6-26. Additional line configurations

Local trunk loopback with FOX

Remote trunk loopback with ECHO

Remote trunk loopback with FOX
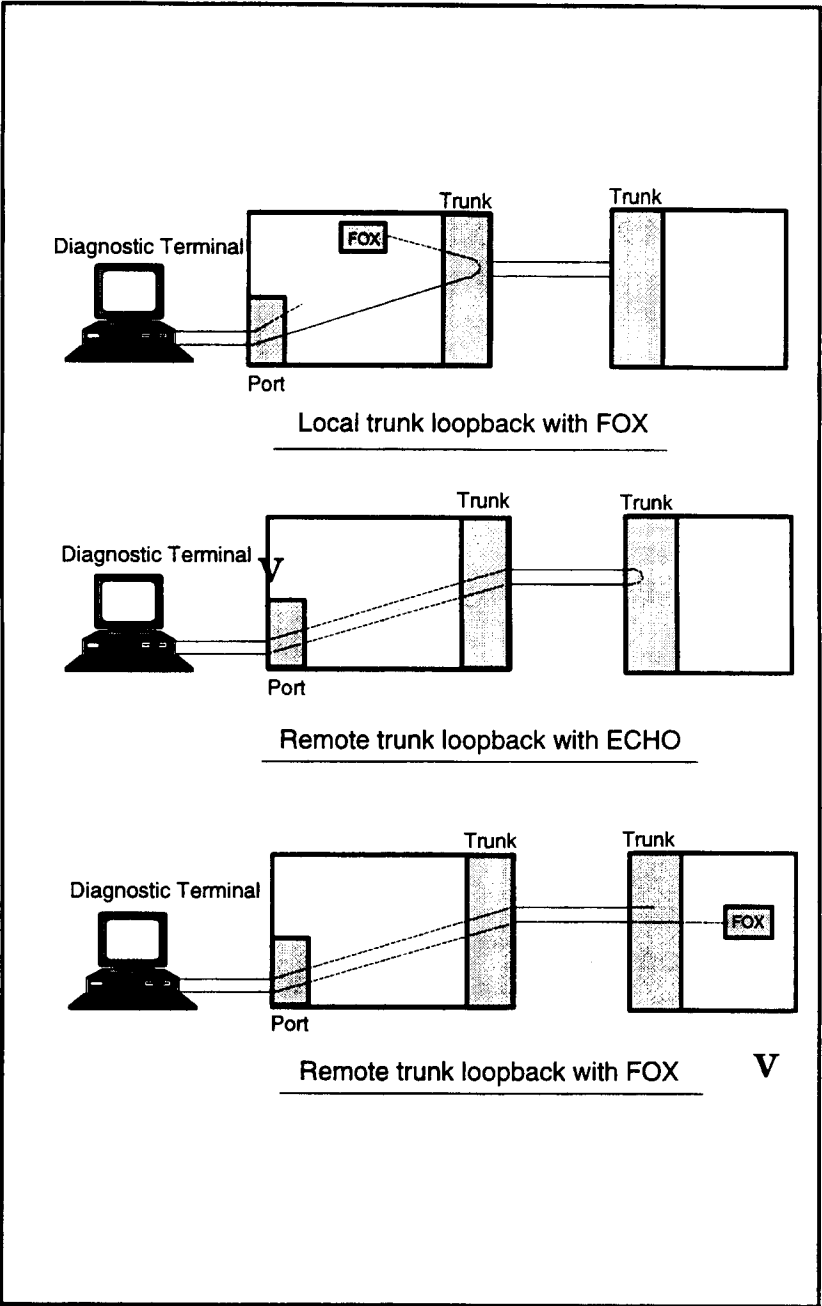
Figure 6-27. Additional line configurations

Greeting Service

The Greeting Service allows you to enter one or two strings to be displayed as part of the node logon banner. The logon banner consists of the date and time (entered via the Settime Service), the installation name and connect prompt (entered via the Global Parameters Form in the Configuration Service), and any greeting lines to be displayed. Greeting lines are not retained if the node is powered down or reset.

To invoke the Greeting Service, enter: **Connect to:** greeting <CR>

The Greeting Service displays:

**** Set Greeting ****
 Current greeting:
 <current greeting line 1 is displayed here >
 <current greeting line 2 is displayed here >
 Greeting OK (y/n)?

If the current greeting is satisfactory, enter **y** <CR> to exit the Greeting Service and return to the connect prompt. To change or add a greeting message, enter **n** <CR>. Your message can consist of one or two lines with up to sixty characters each. Any printable character can be included in the greeting, and upper and lower-case are retained as entered. For example, suppose you wish to inform users of CPU downtime with the messages: "VAX going down for maintenance 11:00 PM" and "VAX back up 7:00 AM tomorrow". Enter:

Greeting OK (y/n)? n <CR>

Enter new greeting line *1*:

VAX going down for maintenance 11:00 PM <CR>

Enter new greeting line 2:

VAX back up 7:00 AM tomorrow <CR>

The Greeting Service then displays this greeting message:

Current greeting:
VAX going down for maintenance 11:00 PM
VAX back up 7:00 AM tomorrow
Greeting OK (y/n)?

Enter y <CR> to accept the new greeting. The Greeting
Service displays:
Greeting Service complete

and returns you to the connect prompt.

Load/Dump

This utility allows the user to either load or dump the contents (memory) of a configuration module. A dump occurs when the contents of a configuration module are transferred to a mini-computer, a configuration module located in another node, or some other third party media for storage. A load occurs when a configuration is transferred to the configuration module. The module contents can be transferred to or from any asynchronous answer port or transmitted to your originating port (where the load/dump service is being run), regardless whether it is local or remote. An additional feature allows verification of a dumped configuration to guarantee error free transfers.

NOTE: If a VCX-101 is the source of a configuration dump or the destination of a configuration load, the load/dump service does not prompt for the storage module location, since there is only one.

To allow for ASCII transmission through async ports, the binary formatted data within the configuration module is translated into an S-record (S1) format.

Load/dump can be requested to occur at the user's VCX port or at any other VCX async answer port. However, the load/dump service must be initiated on the node which contains the configuration module. Examples follow to illustrate usage of the load/dump facility.

Dump to a Minicomputer and Verify

To initiate the load/dump utility, enter **ld** after the system prompt.

connect to: ld <CR>

The following menu is displayed:

**** LOADDUMP ****

1. Exit
2. Load configuration
3. Dump configuration
4. Verify dumped configuration

In this example, the configuration is to be "dumped" from a VCX node to a remote Sun System, so option 3 would be selected:

Enter selection: 3 <CR>

The next prompt displayed, asks whether a port other than the user's port is the Destination of the Configuration. This example involves a dump to a remote Sun System, so the answer is "yes", (it is a port other than the user's port).

Is the destination of configuration other than your port?
y<CR>

Answering "Yes" will generate a prompt asking the path to the destination. Naming a port is often all that is necessary. However, if the port can only be reached over trunk lines, then the trunk names must be included in the path, i.e., t1. t2. SUN.

Enter path: t1. t2. SUN <CR>

A connection to the path name is now attempted. If the connection is not successful, the user is told of the failure and prompted again for a path name. If the user hits return in response to this prompt, the previous menu is displayed.

However, if the connection to the path name is successful, the following prompts appear:

Enter commands to prime receiving device
Enter "~~~" to end pass through mode

The pass-through mode is now in effect. This mode allows the user to carry on a dialogue and give instructions to the receiving device in order to prepare it to receive the configuration file. Once the preparation is complete, the user need only type "~~~" to exit the pass-through mode.

For this example, assume the pass-through mode is active and we are in communication with the SUN System where we plan to dump the config file. The SUN System will then ask for a user name and password.

Login: user name
Password: strange name

After the SUN System accepts the entries, a SUN prompt will appear (/u/user name in our example). Unique to the UNIX

language on the SUN System, you would enter the following after the prompt: *cat >filename*. The "cat" command is an abbreviation for "concatenate", a function similar to TYPE in MS DOS. In short, the concatenate function accepts data from a "standard input device" (in this case, the port communicating with the VCX) and inputs it to a file. The > in the command string is equivalent to saying "into", the "filename" the file you want the config data stored in. (Redirect output of cat to file.)

/u/user name cat >filename <CR>

After entering the command string and hitting <CR>, you exit the pass-through mode by entering "~~~".

A prompt now appears:

Hit return to begin download ...

After hitting <CR> and beginning the download, a counter will appear just below the prompt. The numbers that flash on the counter indicate the current HEX memory address offset into the config module.

At some point during the download, the following message will appear:

Almost Finished

You should not hit any keys at this point, just let the download continue. Eventually, the following prompts will be displayed:

DOWNLOAD IS NOW COMPLETE

Enter commands to terminate listening mode of receiving device and to initiate transmitting downloaded file for verification.

After the down load is complete, the pass-through mode is once again entered so that the user can communicate with the receiving device. The user at this point should enter commands that will stop the receiving device from receiving data and writing it to a file. In this example, the UNIX commands you would use to close a SUN System file would be: ^D (a Control D). Note that although you have closed the file, you have not exited the SUN System.

If you want to exit the receiving device (the Sun System in our example), hit the "~~~". The VCX will disconnect from the receiving device, and the main load/dump menu will be displayed.

However, if you want to verify your data, you need to "tell" the receiving device to send the data file back to the port which is linked with the VCX. In this manner the VCX can compare the data file's S-record checksums. To accomplish this on the UNIX based Sun System, you would use the command: cat filename, where "cat" as described earlier means catalog and filename is the name of the file to be transferred.

/u/username > cat filename <CR>

After hitting <CR>, the file is uploaded to the VCX and verification begins. During this process, a counter appears just below the prompt which indicates the current HEX memory address offset being sent to the VCX. When the verification is successful, you will get a message to that effect:

VERIFICATION IS NOW COMPLETE

Enter commands to end session with the external device.
Enter "~~~" to end pass through mode.

If there has been a verification error, a prompt will appear informing you of the error:

ERROR ENCOUNTERED DURING VERIFICATION

Enter commands to end session with external device.
Enter "~~~" to end pass through mode.

Repeat the load/dump by logging off the CPU, entering "~~~" and returning to the Load/Dump main menu.

Load a configuration from a Minicomputer.

Initiate the load/dump facility by entering "ld" after the system prompt.

connect to: ld <CR>

The system prompts:

**** LOADDUMP ****

1. Exit
2. Load configuration
3. Dump configuration
4. Verify dumped configuration

Enter selection: 2 <CR>

The service will then ask for the configuration source to which we respond yes and then enter a path:

Is the source of your configuration other than your port? y
Enter path: t1.t2.SUN <CR>

The SUN responds with a prompt for login and password.

Login: *username*
Password: *strange name*

After a system prompt from the SUN the file to be dumped is designated.
/u/username > cat filename <CR>

After hitting the <CR> and beginning a load, a counter will appear just below the command line. When the load is complete a message appears:

LOAD IS NOW COMPLETE

Enter commands to end the session with the external device
Enter "~~~" to end pass through mode

It is not necessary to verify a load since the load task running in the target node checks each S-record, and if a checksum fails, the service will terminate the load and output a message indicating a load failure.

Load and Dump Between Configuration Store

Modules in Two Nodes

To obtain a copy of a Configuration Store Module on a remote Configuration Store Module can be easily accomplished using the load/dump service. Run the load/dump utility by entering "ld" to a system prompt on the local node to obtain the Main menu and select 2 to load.

**** LOADDUMP ****

1. Exit
2. Load configuration
3. Dump configuration
4. Verify dumped configuration
Enter selection: 2

The service responds with:

Is the source of your configuration other than your port?
y <CR>

A response of **y** for yes gets the prompt:

Enter path: t1.t3.ld <CR>

The above is the path to the remote node which is the source of the configuration and we want to run load/dump in that node. The first part of the prompt is from the first node and the main menu from the remote node. We respond with a **3** since it is desired to dump the remote configuration to the local node.

Enter commands to prime transmitting device

**** LOADDUMP ****

1. Exit
2. Load configuration
3. Dump configuration
4. Verify dumped configuration
Enter selection: 3 <CR>

Is the destination of your configuration other than your port? n <CR>

The service asks for a start:

Hit return to begin download.....

After entering <CR> a counter will appear below the last command line. When the dump is complete, the service responds with:

LOAD IS NOW COMPLETE

**Enter commands to end session with external device.
Enter "~~~" to end pass through mode.**

It is not necessary to verify in this case since the act of loading continuously checks the S-records for correct receipt and will terminate the load/dump if a record is received in error. Action is completed by entering "~~~" and then exiting the load/dump on the local node.

To dump from the local node and load into the remote node, reverse the process.

Dump a Configuration to a PC and Verify

A typical use for the load/dump service will be to store configurations on a PC diskette. Vterm is a software package offered by Coefficient Systems Corporation that can be used, but there are many others. For purposes of discussion Vterm has been chosen.

The first step is to run the application and set up the parameters so that they match the modem you may be accessing the VCX through or match the VCX async port parameters the PC may be attached to. Next setup 2 of Vterm is setup as follows:

file name:	conf.vcx
direction:	receive
protocol:	ASCII text
remove escape sequence:	**no**
stop upon receiving:	
remove characters:	

The important entries are to make sure that ASCII text is selected and that the PC will receive since we desire to dump the configuration from the storage module to the PC.

An <ESC>is now entered to place the PC in the terminal mode. The load/dump service is initiated by entering **ld** to a VCX system prompt and the main menu appears. A "3" is selected since it is desired to dump the configuration store to the PC.

**** LOADDUMP ****

1. **Exit**
2. **Load configuration**
3. **Dump configuration**
4. **Verify dumped configuration**
Enter selection: 3 <CR>

The destination is prompted for and we respond with a "n" for no since the destination is in fact our PC.

Is the destination of the configuration other than your port? N <CR>
Hit return to begin download....

An <ALT>T is now entered to set Vterm in the PC to read to disk followed by a <CR> to begin the download. While the download is occurring the PC monitor will display the S-records. When the S-9 record is received, the dump is complete. For Vterm an <ALT>K is now used to close the file.

To verify, escape to the Vterm setup 2 screen and change the direction to "send". An <ALT>T begins the dump to the configuration storage module for verification. When done the load/dump service responds with:

VERIFICATION IS NOW COMPLETE

Load a Configuration from a PC

Setup Vterm to send and to the terminal mode. Initiate the load/dump service by responding to a VCX system prompt with a "ld". The main menu will appear and load will be selected.

**** LOADDUMP ****

1. **Exit**
2. **Load configuration**
3. **Dump configuration**
4. **Verify dumped configuration**
Enter selection: 3 <CR>

The service will ask for the destination and source. We will answer **n** for no for source since it is in fact the PC.

Which configuration store module is destination?
Is the source of your configuration other than your port?
n<CR>

ALT is now entered to start Vterm sending the configuration to the target Configuration Storage Module. When the transfer is complete, the service responds with:

LOAD IS NOW COMPLETE

Following this the main menu is presented to allow exit from the service.

Logging Service

Overview

The logging function collects significant events in 7 class codes from the node and reports these events to a designated asynchronous port or a trunk. If sent to an async port, it is for the purpose of the logging port (system logger) or for a port running the logging service. When sent to a trunk, the events are intended to be merged with the receiving node's events.

Logging Port

The system administrator creates a logging port (system logger) by entering a port name in the logging port field of the Global Parameters Form. The designated port must be a single answer port (there can be only one system logger) with no attachment or a detachment strings and have no access by users nor have password override. The Global Parameters Form also permits selection of binary or ASCII data as well as creating a logging mask (which bridges power outages). Data out is in readable ASCII except when intended for a Network Management System. In the latter case the output can be in binary to conserve memory space and improve throughput.

Remote Log Merging

Logging from remote nodes can be merged to form a single logging stream for forwarding to a single network printer or for forwarding to a Network Management PC. Logging to be merged with a head node is accomplished by entering the trunk name (path to be taken toward the head node) in the logging port of the Global Parameters Form.

For example, node A is the head node and is connected to node B, which in turn is connected to Node C. The trunk between A and B is named TAB and the trunk between B and C is named TBC. Enter TAB as the logging port for node B and TBC as the logging port for Node C.

Each node in a merged log network can determine events it reports by setting the logging mask in the Global Parameters Form.

Logging Service

The logging service allows event messages to be received by the
device on which the service is run. The service also permits
setting of a filter by class. If the node has local as well as
merged events from other nodes, all are equally filtered.
Multiple devices running the logging service can be set up to
capture unique events, i.e., X.25 activity on device 1, async
activity on device 2, alarms on device 3, etc.

The logging service additionally allows the system logger mask
to be altered. The difference between manipulating the system
logger mask, via the logging service, (as opposed to setting the
mask in the Global Parameters Form) is that power outages or
reboots will reset the mask to the Global Parameters Form.

The logging function collects significant events in the node and
reports these events to a designated asynchronous port or to
other system software for processing. The log format is both
human and machine-readable.

Loggable Event Classes

The logging software assigns all loggable events to one of seven
classes: (E) Exception, (N) Normal, (M) Mandatory, (X) X25,
(A) Major Alarms, (I) Minor Alarms and (P) Performance.
Explanations of the logging event classes follow.

- **Exceptions**. Events in this class are unusual but do not
  affect the reliability of the node. Exceptions request
  attention, while Major alarms demand attention.

IPC   Inconsistent port configuration
TON   Diagnostic test "ON"
TOFF   Diagnostic test "OFF"

- **Normal**. Generated by normal Events in this class.

BTG   Backward toggle character was pressed
FTG   Forward Toggle character was pressed
DSC   Disconnection of originating port
CON   Connection of originating port
ENQ   User placed in queue
DEQ   User escapes from queue
DET   Port detached
ATT   Port attached

SST   Sync session start
SEN   Sync session end

- **Mandatory.** Logging software always reports events in this class. The system administrator cannot disable the reporting of mandatory events.

CUP   Card up
LOS   Lost messages
REM   User log entry
SYS   System error logged
CRS   Card reset
TUP   Trunk up
IOK   Node is alive

- **X.25.** Call request and call clear packets with network addresses, connect time, and packets transferred for billing.

CRQ   Call request
CLR   Call clear

- **Major alarms.** Events that must be investigated.

CCR   Card crash
TDN   Trunk down

- **Minor alarms.** Events that require attention.

TUX   Trunk utilization threshold exceeded
TRX   Trunk retransmission rate threshold exceeded
QLX   Queue length threshold exceeded
DLS   Data lost
VIO   Security violation

- **Performance.** Planning data for internodal trunks.

MGT   Data to management center report generation)
UTL   Peak/average trunk utilization, line quality

General Logging Message Format

Whenever a loggable event happens, the logging software can write an entry to the system log and to each additional log started by the Logging Service. If an event belongs to a class for which logging is disabled, that event is not logged. Since the Logging Service allows the system administrator to enable and disable event classes on a per-log basis, events can be reported in one log but not another. For example, the system

administrator could enable, then disable the logging of security events at his terminal without disturbing the system log.

The general logging message format is:

#<class code><time><node name><event mnemonic><slot/port><supplemental data>

To simplify computer analysis, a pound sign (#) prefixes each entry. In addition, logged alarms have increased visibility. Major and minor alarms are highlighted by the addition of three asterisk on a line before the alarm data and three asterisk on the next line below the report. An example is:

***

#A 03:31:00<node name>CCR 03

***

The class code specifies the event class. The classes and events are listed in table 6-1.

Table 6-1. Class Code Descriptions.

Class code	Description
E	Exception
N	Normal
M	Mandatory
X	X.25/LAN
A	Major alarms
I	Minor alarms
P	Performance

A space delimits each field following the class code.

If system time is set via the Settime Service, the entry contains the time the event occurred. Otherwise, the time is reported as "00:00:00". In a multi- mode environment, all events are recorded using the logging port's time. The date is reported in a IOK log message, the frequency of which is selected in the Global configuration.

The node name display is useful when a single logging port is configured to allow events from all nodes to be output at a single port. An event can then be attributed to the proper node.

The event mnemonic indicates the type of entry. For example, the mnemonic "CON" indicates a connection attempt. For details on the types of entries and event mnemonics, refer to the "Logging Messages Summary" below. Supplemental information follows the event mnemonic. For example, supplemental information for a "CON" event indicates the requested destination and whether the attempt succeeded or failed.

Logging Messages Summary

This section describes messages for each loggable event in alphabetical order by mnemonic. Examples illustrating possible log messages are shown in the Complete Log of Events, immediately following this section.

Event: **Backward Toggle**
Mnemonic: **BTG**   Class: Normal (N]
Description: The backward toggle character was pressed, toggling backward to the next lower session number or looped back to the last active session.

Event: **Port Attached**
Mnemonic: **ATT** Class: Normal (N]
Description: A session is started when an originating port successfully attaches. The log entry specifies the port at which the session was started and the name and user ID if login is required.

Event: **Card Crash**
Mnemonic: **CCR** Class: Major Alarm (A)
Description: Indicates a card has crashed and reports the card number.

Event: **Call Clear**
Mnemonic: **CLR** Class: X25 (X)
Description: Both incoming and outgoing calls that have been cleared are recorded on the logger. Port number is reported along with LCN, transmitted packets and characters.

Event: **Connection**
Mnemonic: **CON** Class: Normal (N)
Description: This message logs a connection. In the example above, port one on card one successfully connected to "vaxport" at port six on card one. Note that protection violations are not treated as connection failures but are logged separately as a Minor Alarm. The possible keywords for a CON event are:

FAILURE The connection attempt was unsuccessful.
SUCCESS. The connection attempt was successful.
INVALID. The connection attempt used an invalid syntax.

Event: **Call Request**
Mnemonic: **CRQ** Class: X25 (X)
Description: Either an outgoing or an incoming call request packet is logged. Card and port of the X.25 interface is reported along with LCN assigned. For outgoing calls the called address and the slot/port in the requesting node are reported.

Event: **Card Reset**
Mnemonic: **CRS** Class: Mandatory (M)
Description: This message logs a card reset. The possible keywords for a CRS event are:

FAILED: Reset occurred because the card failed to respond to polling. **RESET**: The system administrator reset the card via the Reset Service.

Event: **Card Up**
Mnemonic: **CUP** Class: Mandatory (M)
Description: This message logs card initialization. If a card re-initializes after crashing, the message contains internal status information. This information includes the crash code, register values, and the identity of the crashed routine.

Event: **Dequeued**
Mnemonic: **DEQ** Class: Normal (N)
Descriptions: This message logs a queue exit (the user enters
<ESC> while queued). The message shows the originating port,
the pathname to which the user is attempting to connect, and
the initial queue position (not the actual position).

Event: **Port Detached**
Mnemonic: **DET** Class: Normal (N)
Description: This message indicates that an asynchronous port
detached. The two numbers are the counts of characters
received and transmitted by the port since it was last attached.

Event: **Data Lost Message**
Mnemonic: **DLS** Class: Minor Alarms (I)
Description: A buffer overflow occurred at the receiving end of
either an answer port or an originate port. Port number is
reported.

Event: **Disconnection**
Mnemonic: **DSC** Class: Normal (N)
Description: This message logs a disconnection. Card and port
numbers are indicated. If a NORMAL disconnect occurs then
the total session connect time is displayed
(hours:minutes:seconds).

The possible keywords for a DSC event are:

NORMAL   The user entered "quit" to disconnect.
RESET   A port reset forced the disconnection.
TIMED OUT   The inactivity timer expired.
OUT OF   An unexpected detachment broke the connection.
SERVICE

Event: **Enqueued**
Mnemonic: **ENQ** Class: Normal (N)
Description: This message logs a queued connection attempt.
The message shows the originating port, the pathname to
which the user is attempting to connect, and the queue
position.

Event: **Forward Toggle**
Mnemonic: **FTG**   Class: Normal (N]
Description: The forward toggle character was pressed,
toggling forward to the next lower session number or looped
back to the last active session.

Event: **Node is O.K.**
Mnemonic: **IOK** Class: Normal (N)
Description: This message is output at a rate programmable in
the Global configuration. It reports the active configuration
with a time and date stamp.

Event: **Inconsistent Port Configuration**
Mnemonic: **IPC** Class: Exception (E)
Description: This message occurs when a port fails to boot
because its configuration is inconsistent. Card and port number
are indicated. Note that resetting an inconsistently configured
port does not log an IPC message, but that resetting a card
containing an inconsistently configured port does log an IPC
message. Furthermore, overlapping port series are not
detectable.

Event: **Lost Messages**
Mnemonic: **LOS** Class: Mandatory (M)
Description: Under conditions of extreme congestion, logging
messages can be discarded. If this event occurs, logging
software maintains a count of lost messages and reports the
count when the situation improves. Lost messages are
extremely unusual and suggest that something else may be
wrong as well.

Event: **Management**
Mnemonic: **MGT** Class: Performance(P)
Description: This message is output at a programmable rate
for each trunk. Information includes card and port number,
packets received and transmitted, characters received and
transmitted and the trunk speed.

Event: **Queue Length Exceeded**
Mnemonic: **QLX** Class: Minor Alarms (I)
Description: The queue length threshold set in the global
configuration has been exceeded. The queue length which
triggered the event is reported.

Event: **User Log Entry**
Mnemonic: **REM** Class: Mandatory (M)
Description: Through the Logging Service system
administrators can insert arbitrary text into the system log to
serve as a note.

Event: **End Session**
Mnemonic: **SEN** Class: Normal (N)
Description: The message logs the end of a synchronous
session. Port number is reported.

Event: **Start Session**
Mnemonic: **SST Class: Normal (N)**
Description: A session is started when a partial trunk
connection (for example, a connection to "boston" rather than
"boston.port") is established. The log entry specifies the port at
which the session was started.

Event: **System Error Log**
Mnemonic: **SYS** Class: Mandatory (M)
Description: When an operating problem is detected,
information is logged rather than causing a fatal crash. Card
number and register contents are reported.

Event: **Entered Test Mode**
Mnemonic: **TON** Class: Exception (E)
Description: Used for purposes of reporting to a network
management system, that the specified card/port has entered a
test mode.

Event: **Leave Test Mode**
Mnemonic: **TOF** Class: Exception (E)
Description: Indicates that the specified card/port entered for a test has left the test mode.

Event: **Trunk Down**
Mnemonic: **TDN** Class: Major Alarms (A)
Description: This message occurs when a trunk line goes down. Card number and port are reported.

Event: **Trunk Retransmission Rate Threshold Exceeded**
Mnemonic: **TRX** Class: Minor Alarms (I)
Description: Whenever the retransmission rate threshold for a trunk is exceeded, an alarm is logged with the trunk identity.

Event: **Trunk Up**
Mnemonic: **TUP** Class: Mandatory
Description: This message occurs when a trunk comes up. Port number is reported.

Event: **Trunk Utilization Exceeded**
Mnemonic: **TUX** Class: Minor Alarms (I)
Description: Whenever the trunk utilization threshold is exceeded, an alarm is logged with trunk identity.

Event: **Peak/Average Trunk Utilization, Line Quality**
Mnemonic: **UTL** Class: Performance (P)
Description: When running the performance service, each sample is reported with card and port identity, transmit and receive average and peak utilization and line quality.

Event: **Security Violation**
Mnemonic: **VIO** Class: Minor Alarms (I)
Description: When a user attempts to attach, a user name and
password are requested. If a wrong entry is made is made three
times in succession then a logging message will be generated,
recording a violation at the indicated port.

Complete Log of Events

The following section provides a complete listing of each event
of the events log. The correct format is displayed for every case.

***

#A 22:14:03 NewYork   TDN   02\01
***

#E 22:14:02 NewYork   TON   01\01
#E 22:14:11 NewYork   TOF   01\01
#E 22:14:38 NewYork   IPC   01\12
***

#I 22:13:58 NewYork   TUX   02\01
***

***

#I 22:14:02 NewYork   DLS   01\04
***

***

#I 22:14:28 London   TRX   02\01
***

#M 22:14:17 NewYork   TUP   02\02
#N 22:13:33 NewYork   SST   02\01
#N 22:14:11 NewYork   TGL   01\01
#N 22:13:34 NewYork   SEN   02\01
***

#I 22:13:33 London   VIO   01\10
***

***

#I 22:13:33 London	VIO	07\10 t1.t3.vax

***

#N 22:13:33 NewYork	ATT	01\16
#N 22:13:33 NewYork	ATT	01\16 FRED 81326
#N 22:13:34 NewYork	DEQ	01\14 POSITION 14 QUEPORT
#N 22:13:34 London	DET	01\10 1000
#N 22:13:33 NewYork	ENQ	01\14 POSITION 14 QUEPORT
#N 22:13:33 London	DSC	01\01 OUT_OF_SERVICE
#N 22:13:33 London	DSC	01\01 TIMED_OUT
#N 22:13:33 London	DSC	01\01 RESET
#N 22:13:33 London	DSC	01\01 NORMAL00:19:33
#N 22:13:33 NewYork	CON	01\05\01\02SUCCESSNY1
#N 22:13:33 NewYork	CON	01\05\01\03INVALIDVAX3
#N 22:13:33 NewYork	CON	01\05\01\04FAILUREIBM
#M 22:13:57 London	CUP	01
#M 22:14:18 NewYork	CUP	01 DO: XXXXXXXX D1: YYYYYYYY
#P 22:13:33 NewYork	UTL	01\01 Av/Pk%: Rx 60 85 Tx 59 92 good
#X 22:13:34 NewYork	CLR	01\01 ilcn 28 211 25497
#X 22:14:15 NewYork	CLR	01\01 olcn 31 5000 125009
#X 22:13:57 NewYork	CRQ	01\01 ilcn 29
#X 22:14:0 NewYork	CRQ	0101 olcn 30 123456789 for 01\01 in NewYork

***

#A 22:13:35 NewYork	CCR	01

***

***

#I 22:14:54 NewYork	QLX	11

***

#M 22:13:34 NewYork	LOS	18	MSGS
#M 22:14:17 NewYork	CRS	01	FAILED
#M 22:14:17 NewYork	CRS	01	RESET
#M 22:13:57 NewYork	REM		(Up to a 50 character comment)
#M 22:14:15 NewYork	SYS	02	XXXX YYYY ******
#M22:17:28 NewYork	IOK		<Config running>on Fri, 04-02-90-22:17:28EDT

Notes

1. The Status Service shows the logging port as connected on the chassis status and port status displays. The port status display shows the logging port connected to a task.

2. Resets performed by the node manager are reported. This information implies the card manager did not respond to an "are you up?" poll from the node manager. The crash code contains specific information regarding card failure. After the logging mechanism initializes, it generates CUP (Card Up) entries with crash codes.

3. If the system fails so that the node manager or logging cannot run, logging is restarted when the system recovers. Logging initializes with all logging event classes enabled. As with any changes made via services other than the Configuration Service, Logging Service changes are lost when the system boots.

4. The maximum number of simultaneous logs (that is, logs generated via Logging Service invocations) is five.

5. Whether a remote connection is accomplished via pathname or via a series of partial connections affects the way the connection is logged. For example, if a user at node 2 successfully connected to "node1.vax", then node1 generates the logging message:

#N CON 14:00:00 name01\01SUCCESSnode1.vax

and node2 logs nothing. However, if a user at node2 first makes a partial connection to "node1", then successfully connects to "vax", node2 generates the logging message:
#N CON 14:00:00 name 01\01 SUCCESS node1

and node1 generates:

#N CON 14:00:04 name 01\01 SUCCESS vax

LOGGING SERVICE DESCRIPTION

To invoke the Logging Service from any port other than the logging port enter:

Connect to: log<CR>

The Logging Service then displays the Logging Service Main Menu, which is shown in figure 6-28.

Logging Service Main Menu

```
***** Logging Service *****

1. Exit.
2. Manipulate System Log.
3. Monitor Log.
4. Add User Entry to System Log.

Enter selection:
```

Figure 6-28. Logging service menu

1 Exit

<CR> to exit the Logging Service and return to the connect prompt.

Logging Service Main Menu

2: Manipulate System Log

Enter 2<CR> to display which messages are reported to the system logging port and to enable or disable the logging of event classes. The Logging Service will then display the submenu shown in figure 6-29.

Enter 1<CR> to exit this submenu and return to the Logging Service Main Menu.

Enter 2<CR> at the Manipulate System Log Submenu to request system logging of an event class. The Logging Service prompts:

Enter Class to Enable:

```
***** Manipulate System Log *****

E. Exception        (enabled)
N. Normal           (enabled)
A. Major            (enabled)
I. Minor            (enabled)
X. X25calls         (enabled)
P. Performance      (enabled)

(Mandatory class permanently enabled in System Log)

1. Exit.
2. Enable Logging by Class.
3. Disable Logging by Class.
4. Apply Changes.

Enter selection:
```

Figure 6-29. The manipulate logging submenu

Enter the letter of the event class you wish to enable, followed
by <CR>.To   enter all the classes, enter a "T". For example, to
request system logging of Major events, enter m<CR>.

Enter 3<CR> at the Manipulate System Log Submenu to
request that system logging of an event class be disabled.

The Logging Service prompts:

Enter Class to Disable:

Enter the letter of the event class you wish to disable, followed
by <CR>. For example, to request that system logging of
Normal events be disabled, enter n<CR>. To disable all the
classes, enter **T**. Note that you cannot disable the logging of
mandatory events.

Enter 4<CR> at the Manipulate System Log Submenu to apply
the changes you have requested. For example, if you request
that logging messages of the Normal class be disabled, then
apply this change, the system log status is then displayed.

The following data is displayed:

E   Exception   (enabled)
N   Normal   (disabled)
A   Major   (enabled)
I Minor   (enabled
X   X.25 calls   (enabled)
P   Performance   (enabled)

This indicates that no events of the Normal class are reported
to the system logging port.

3: Monitor Log

Enter 3<CR> from the Logging Service Main Menu to display
logging information at the local port. This selection also allows
you to select which event classes you wish to monitor. Note
that disabling logging of certain events at the local port does
not affect the system log. The Logging Service displays the
submenu shown in figure 6-30.

```
******* Monitor Log *******

E. Exception        (disabled)
N. Normal           (disabled)
M. Mandatory        (disabled)
A. Major            (disabled)
I. Minor            (disabled)
X. X25calls         (disabled)
P. Performance      (disabled)


1. Exit.
2. Enable Logging by Class.
3. Disable Logging by Class.
4. Start Log Monitor.

Enter selection:
```

Figure 6-30. The monitor log display

Enter 1 <CR> to return to the Logging Service Main Menu.

Enter 2<CR> to enable logging of an event class. The Logging
Service prompts:

Enter Class to Enable:

Enter the letter of the event class you wish to enable, followed by <CR>. For example, to enable the logging of X.25 calls, enter **x** <CR>. If you want to enable the logging of all events, enter a **T**.

Enter **3** to disable logging of an event class. The Logging Service prompts:

Enter Class to Disable:

Enter the letter of the event class you wish to disable, followed by <CR>. For example, to disable the logging of Normal events, enter **n**<CR>. To disable all events enter **T**. Note that log monitoring permits disabling of the mandatory class.

Enter 4<CR> to monitor logging messages.

The Logging Service displays:

Starting Log Monitor.
Enter ESC to exit.

It then directs logging information to your port until you enter <ESC>. The Logging Service then again displays the Main Menu.

4: Add User Log Entry

Enter 4<CR> from the Logging Service Main Menu to log a REMark. The Logging Service prompts:

Enter text of entry:

Type the REMark. REMarks are limited to 60 characters in length. You can use to edit the REMark. Entering <CR> terminates text entry and returns you to the Logging Service Main Menu.

NOTE: The Logging Service replaces pound signs (#) in REMarks with spaces.

Log Monitor: Quick Logging Method

A quick method of logging one or more classes of events can be used, where the logged events are displayed on a monitor. After you have become acquainted with the letter codes that denote each of the event categories (i.e., the letter "X" for X.25 calls or the letter "N" for Normal events), type the word log, leave a

space and then type the letter code of the event category (or the multiple categories) you are interested in seeing. For example:

Log (space) X (space) N

The Log Service will then prompt you:

Starting Log Monitor.
Enter ESC to exit.

In the above example all X.25 calls or Normal events will be displayed on the monitor. Enter <ESC>. To escape from this quick logging method.

Mode Service

Mode service provides a quick method for the System
Administrator to get three items of current data on the active
configuration of a node. Included is: the name of the node,
name of the active configuration, and PM slot location of the
node where applicable. A monitor screen is provided by the
Mode service, which is illustrated in figure 6-31. The mode is
activated by typing "Mode". Note that the information appears
on the monitor screen at the **position of the cursor** .

```
mode


You are currently in node          : vcx100

The running configuration is called : test

Which can be located in PM slot     : 1
```

Figure 6-31. Mode service menu

Print Service

Print service offers a versatile system to print all or part of a Configuration Storage Module and all or part of a target configuration. (Note that a printer must be connected to an answer port to print the data.) The service is selected by typing "PRINT" at the system prompt. This will result in the first level monitor menu shown in figure 6-32.

```
**** Configuration Print    ****

**** Printer Port Selection ****

1. Exit
2. Select Printer Path


Enter Selection:
```

Figure 6-32. First level service menu

Two choices are available. Selection 1, "Exit" will return to the system prompt and take the user out of the Print service. Selection 2, "Select Printer Path" adds two additional lines, producing the menu shown in figure 6-33.

```
**** Configuration Print    ****

**** Printer Port Selection ****

1. Exit
2. Select Printer Path


Enter Selection: 2
Enter Printer Path (<CR> only to send output to this terminal)
Enter :
```

Figure 6-33. Menu for selecting the printer path

Two choices are available at this menu. The prompt requests entry of the printer path. Typing the path plus a <CR> will enter the path. The other choice is entering ONLY a <CR>, causing all data to be sent to the monitor screen. Following

```
Name              Type              Description

911               Text              Test 911
John              Text              Text on John Sys
Hardy             Text              hardy's directory
Charles           Configuration     Charles configuration
Company           User List         A list of users who dial in Ok
standard          Configuration     Standard configuration
text1             Text              initial help text

1. Exit
2. Print This List
3. Print Whole Configuration Module
4. Print a User List
5. Print a Text Name
6. Select Configuration


Enter Selection: 6
Enter Name: Standard
```

Figure 6-34. Configuration module listing menu

entry of a pathname <CR> or a <CR> only, the monitor display shown in figure 6-34 print is obtained.

Listed in this screen are the names, types and descriptions of all configurations, user lists and texts files. This menu has 6 selections available:

1.   "Exit" results in return to the previous menu.

2.   "Print This List" prints the list shown on the monitor.

3.   "Print Whole Configuration Module" prints the complete configuration module contents.

```
      *** Configuration: standard  Printout ***
      Name              Type              Description

      all1              Group Name
      b                 Speed Name
      b00               Asynchronous      6/1        6/1
      b01               Asynchronous      6/2        6/2
      b02               Asynchronous      6/3        6/3
      b03               Asynchronous      6/4        6/4
      b04               Asynchronous      6/5        6/5
      b05               Asynchronous      6/6        6/6
      b06               Asynchronous      6/7        6/7
      b07               Asynchronous      6/8        6/8

      List more names (y/n) ?
```

Figure 6-35. "Standard" configuration display

4. "Print a User List" causes a prompt for the user list name and when entered presents the user list.

5. "Print a Text Name" causes a prompt for the text name and when entered, prints the text.

6. "Select Configuration" causes a prompt for the Configuration name to be printed.

In the example, selection 6 was chosen and at the prompt, (as shown in figure 6-35), "Standard" configuration was entered. The Print service then produces the monitor screen shown in figure 6-36.

```
*** Configuration: standard      Printout ***
Name              Type           Description

100               Group Name
101               Group Name
102               Group Name
150               Group Name
2net              Asynchronous   1/3        1/3
5                 Group Name
5s                Speed Name
6000log           Asynchronous   1/15       1/15
6000term          Asynchronous   1/14       1/14
a1                Asynchronous   2/2        2/2

List more names (y/n) ? n

1. Exit
2. Print this list
3. Print this Configuration
4. Print Global Parameters
5. Select Configuration Type to Print
6. Select Individual Name to Print

Enter Selection:
```

Figure 6-36. Menu for selecting Configuration type

The bottom of the menu in figure 6-34 prompts with, "List more names?" This may be answer "Y" or "N". A "Y" will result in more names to be listed (if more are available). "N" will result in the monitor display shown in figure 6-38.

Six choices are available from the menu shown in figure 6-38.

These are:

1. "Exit" which returns the user to the previous menu.

2. "Print this list", prints this list of names.

3. "Print this Configuration" prints the entire Configuration", first the global, then the name list, and finally each name parameter set.

4. "Print Global Parameters" prints the Global Parameters.

5. "Select Configuration Type to Print" allows selection of the Configuration to be printed.

Selection of number 5 results in a new menu which is shown in figure 6-37.

```
*** Configuration: standard  Printout ***
Name                Type            Description

t1                  Trunk           2/1

1. Exit                         6. Controlled Service
2. Asynchronous                 7. X25 Trunks
3. Trunks                       8. String
4. Speed Connect
5. Group

Enter Configuration Type:
```

Figure 6-37. Menu for selecting configuration type

Again there is a choice of "List more names (y/n) ?". Eight options are available for selection in addition to "Exit" selection number 1. These are shown in figure 6-37. Typing any of the numbers between 2 and 9 causes all of the names in the type selected to be printed. The last selection on this menu (figure 6-38), is number 6:

6. "Select Individual Name to Prints" allows selection of an individual Name to be selected for printing.

When selection is made, the service prompts: (figure 6-37).

Printing please wait.

When complete, the Service prompts:

Enter <CR> to continue

Pressing <CR> will cause the Service to accept more entries of items to print.

Reset Service

The Reset Service allows you to reset chassis, individual ports or port statistics from a terminal. To invoke the Reset Service, enter:

Connect to: reset

The Reset Service displays the Reset Service Menu, shown in figure 6-38.

```
1. Exit
2. Chassis
3. Port
4. Virtual Circuit
5. Originate Session
6. Statistics
```

Figure 6-38. First level Reset service menu

1. Exit

Type 1<CR> to exit the Reset Service and return to the connect prompt.

2. Reset chassis

Type 2<CR> to reset the entire chassis. The Reset Service displays a second chance prompt:

Reset entire chassis? Are you sure? (y/n)

Enter n<CR> or<CR> to abort the chassis reset and return to the Reset Service Menu. To proceed, enter y<CR>.

3. Reset port

Type 3<CR> to reset a port. The Reset Service displays:

Enter 1 for Async or 2 for Sync:

If Async is selected, then a second prompt will appear:

Enter port number:

After your selection is entered, the port will be reset and the Reset Service Main Menu displayed. To abort the port reset

process, enter<CR> from the "Enter 1 for Async or 2 for Sync:"
or "Enter port number:" prompt.

4. Virtual Circuit

To reset a virtual circuit, enter 4<CR>. The VCX prompts:

Enter VC number (from Card status):

Enter the number of the virtual circuit you wish to reset. (This
information is available from Card Status, if you do not already
know this number.) If for an example you enter **1**, the screen
then prompts with:

VC 1 or Port 1 and Card 2 reset

5. Originate Session

Resetting one of the 8 possible sessions is accomplished much
in the same way as resetting a virtual circuit. To reset a
specific originate session, for example session 3, on port 16.
Select session by entering: **5<CR>**. The VCX prompts:

Enter Port No: 16<CR>

Enter the port number of the port that contains the originate
session, such as 16<CR> in this example. The VCX prompts:

Enter Originator session number (from card status):
3<CR>

The card status display lists all virtual circuit numbers and you
are prompted to get the number from that display if you don't
already know the number. Then enter the number of the
session to be reset, such as **3<CR>** in this example. The VCX
then resets the selected originate session and you are returned
to the menu shown in figure 6-38.

6. Statistics

To reset statistics, type **5<CR>**. After doing so, the following
menu will be displayed, as illustrated in figure 6-39.

1. Exit

To exit the Reset Statistics Menu and return to the Reset
Service Menu, enter 1<CR>.

```
***** Reset Statistics *****

1. Exit
2. Chassis
3. Async or Sync
4. Port

Enter selection:
```

Figure 6-39. Reset Statistics display

2. Chassis

Selecting option 2, causes statistics for the entire chassis to be reset.

3. Async or Sync

Selection option 3 brings up the following prompt:

Enter 1 for Async or 2 for Sync:

If you select Async, this message appears:

Now resetting async statistics:

The Reset statistics menu is then displayed.

If you select Sync, you will be immediately told about the reset:

Re-setting sync statistics

The Rest statistics menu is then displayed.

4. Port

When option 4 is selected, the user is asked which slot and port will be used for the statistics reset:

Enter 1 for Async or 2 for Sync:

If you select Async, then a second prompt asks:

Enter port number:

After the port number (#) has been entered, the following message is displayed:

Re-setting port 1/1 stats

If you select the sync port for the sync port, the resetting statistics message will be displayed:

Re-setting port 2/1 stats

The Statistics

Which statistics are reset? It depends on whether the port is asynchronous or synchronous. An asynchronous card will have the following parameters reset:

characters transmitted
characters received
errors
buffer utilization
buffer peak utilization

A synchronous card will have these parameters reset:

characters transmitted
characters received
messages transmitted
messages received
message errors
retransmissions
BER indicator
peak transmit utilization
peak receive utilization

Status Service

The Status Service monitors overall chassis activity and the
activity of individual ports. The chassis display reports:
detached, attached, connected, out-of-service, busy and under
test ports. The screen display is refreshed approximately every
5 seconds, maintaining an up to date display of the status. For
individual ports the Status Service displays: connection status,
configured and current port characteristics, hardware interface
status, and usage statistics. To invoke the Status Service,
enter:

   Connect to: status<CR>

The Status Service displays the Status Service Main Menu
illustrated in figure 6-40.

```
***** Status *****

1. Exit
2. Chassis
3. Card
4. Port
5. Name definition
6. Power up diagnostic results

Enter selection:
```

Figure 6-40. Reset Statistics display

Main Menu

1. Exit

Type *1<CR>* to exit the Status Service and return to the
connect prompt.

2. Chassis Status

Type *2<CR>* to display a report of overall chassis activity,
which produces a monitor screen like that shown in figure 6-41.

```
                              Port Status
Card Type      1  2  3  4  5  6  7  8  9  10 11 12 13 14 15
1    V100      C1 A  A
2    V100TR    vS


D =Detached,A =Attached,C =Connected,O =Out of service,B =Busied,TST =Test
S =Statmux     X =X.25    ^ =Trunk up    v =Trunk down
Enter <CR> to continue:
```

Figure 6-41. Chassis status display

A letter shows the current status-detached, attached, connected, out-of- service, in test or busied of each configured asynchronous port in the chassis. The letter S indicates a synchronous trunk line with a caret (^) indicating trunk up and a v indicating trunk down. The chassis status display shows unconfigured ports in the chassis as blank. Busying a currently attached or connected port does not force detachment or disconnection. Therefore, the chassis status display can show the compound states of BD (busy/detached), BA (busy/attached), and BC (busy/connected). When you finish examining the chassis status display, enter <CR>. The Status Service redisplays the Status Service Main Menu.

3. Card Status

The status of a particular card can obtained by entering 3

```
Card: 1   Card type: V100    Configuration: swupdate    Node:

Port Name       Type   Current active connection

1    originate  Org    1--1-status
2    answer     Ans
3    don3       Org

Connection info:  Session-Nodename-Card/Port-Portname,
Session-Nodename-Card/Port/Vc-Portname, Session-Nodename-Card-Taskn
Enter <CR> to continue:
```

Figure 6-42. Card status display

<CR> from the Status Service Main Menu. The prompt "Enter
1 for Async or 2 for Sync" is displayed. After a 1 is entered, the
screen shown in figure 6-42 is displayed on the monitor.

If the card is a multiplexing trunk, the screen menu displayed
will be the one shown in figure 6-43.

```
Card: 2   Card type: V100TR  Configuration: standard      Node: newsun

Port    : 1
Name    : tlab
Type    : mux
Speed   : 19200
No. Vcs : 10

Vc        Connection

2           1/2-protole3
3           1/10-vax
4           1/16




Connection info: Card-Taskname,   Card/Port-Portname,   Card/Port/Vc.
Enter <CR> to exit:
```

Figure 6-43. Multiplexing trunk status display

4. Port status

To obtain detailed status information for a particular port,
enter 4 from the Status Service Main Menu. The Status Service
prompts,

Enter 1 for Async or 2 for Sync: 1<CR>.

A 1 is entered in this case and the Status Service displays the
Port Status submenu for Async ports, shown in figure 6-44.

```
*****  Port Status  *****

1. Exit
2. Connection information
3. Port characteristics
4. Modem control signals / usage statistics

Enter selection:
```

Figure 6-44. Port status submenu

Note: The menus for asynchronous ports are described next. Synchronous (trunks) will be detailed after the async ports description.

Asynchronous Port Status Submenu

The choices available at the submenu are:

1. Exit

Type "1" to return to the Status Service Main Menu.

2. Connection information

Port Status Menu selection 2 displays the current connection status of the port you have selected. The example shown in figure 6-45, illustrates the connection status display for an asynchronous port.

```
Card: 1 Port: 1 Name: 1         Dir: Org  Att: Unqualified State: Connected

 S# Name          Card Port UC# In-Node    Last-Connection     Last-Disconnection

 1 status      1                       06/08/94-10:05:37
   Path: status
 2
 3
 4
 5
 6
 7
 8
Enter <CR> to continue:
```

Figure 6-45. Connection status of an async port

3. Port characteristics

Port Status Menu selection 3 displays both the configured and the current port characteristics. This display allows you to monitor any changes that users may have made via the Set Service. The example shown in figure 6-46 illustrates the port characteristics display for asynchronous ports.

4. Modem control signals / usage statistics

Port Status Submenu selection 4 displays interface control line status and usage statistics, as shown in Figure 6-47, the statistics for an asynchronous port.

```
                    Card: 1  Port: 1  Name:  originate

                    Configured                       Current

Baud rate              : 9600                         9600
Stop bits              : 1 stop bit                   1 stop bit
Character length       : 8 bits                       8 bits
Parity                 : None                         None
Device flow control    : XON/XOFF                     XON/XOFF
Port flow control      : XON/XOFF                     XON/XOFF
Terminal type          : Unsupported                  DEC VT-100/VT
Control state char     : ^@                           ^@
Forward toggle char    : ^@                           ^@
Backward toggle char   : ^@                           ^@
BREAK key              : Ignore                       Ignore
Messages               : All                          All
Broadcast option       : Accept routine               Accept routin
Session limit          : 2
Channel priority       : 1
Connection timeout     : 2
Timeout direction      : Both
Originate access rights : 1

Enter <CR> to continue:
```

Figure 6-46. Configured port characteristics

The example shows that the "Errors" statistic is the total of
received data errors (usually parity errors) detected by the
port.

```
                    Card: 1  Port: 1  Name:  port1

                    Modem signals

                    RTS  : High        CTS: High
                    DTR  : High        DSR: High
                                       DCD: High

                    Flow stopped : (in)No      (out)No

                    Characters transmitted       : 3833
                    Last character transmitted   : <CR>
                    Characters received          : 39
                    Last character received      : <CR>
                    Errors                       : 0
                    Buffer Size                  : 2048
                    Buffer Utilization           : 0
                    Buffer Peak Utilization      : 1

       Enter <CR> to exit:
```

Figure 6-47. Asynchronous port usage display

The Buffer Size parameter refers to the per port buffers. The Buffer Utilization is the instantaneous measure of the buffer's use in bytes. Buffer Peak Utilization measures the buffer's use from the time the async card was initialized/reset.

When finished with the menu, enter 1 to exit back to the Status menu.

Synchronous (Trunk) Port Submenu

To view status of the synchronous ports (trunks), select 4 at the Status Status menu. Then select 2 (for sync) to display the menus for a trunk. The submenu for synchronous (trunk) port is shown (figure 6-48). This is the only screen of the Sync Port Status submenu that is the same as the async submenu.

```
****** Port Status ******

1. Exit
2. Connection information
3. Port characteristics
4. Modem control signals / usage statistics

Enter selection:
```

Figure 6-48. Port status submenu

2. Connection Information

Figure 6-49 illustrates a connection status display for a trunk line.

```
              Card: 2  Port: 1  Name:  trunk

              Multiplexing Trunk Connection Status

                           Priority
                  1     2     3     4    Total

Current connections   8     8     8     8     8
Peak connections      8     8     8     8     8

Configured maximum number of trunk connections: 28

Enter <CR> to exit:
```

Figure 6-49. Connection status display for trunk line

3. Port Characteristics

The example shown in figure 6-50 is the monitor screen of the
port characteristics display for a trunk line.

```
            Card: 2  Port: 1  Name:  trunk2

            Multiplexing Trunk Configuration Data

            Baud rate                    : Autobaud
            Clocking                     : DTE - supplies no clocks
            Number of virtual circuits : 0
            Multiplexing protocol        : Muxing
            Trunk timeout (secs)         : 60
            Utilization threshold        : 75
            Retransmission threshold     : 25
            Statistics Logging Timer     : 0
            Originate access rights      : 1
            Answer access rights         : 1

 |> to continue:
```

Figure 6-50. Multiplexing trunk characteristics

4. Modem Control Signals/Port Usage

A synchronous port (trunk) modem control signals and port
usage screen is shown in figure 6-51.

In the example, the "Messages transmitted" and "Messages
received" indicate the number of packets transmitted and
received. The "Errors" statistic indicates the number of
received data packets with errors. The "Retransmissions"
statistic indicates the number of retransmitted packets, that is,
the number of packets not received correctly by the remote site.
And BER represents the Bit Error Rate. If BER exceeds 1 in
10,000, then "Yes" will be displayed.

The average trunk utilization, over the past 5 seconds, the
peak trunk utilization since the trunk came up, and the date of
the peak utilization are also displayed. This information can be
used to determine whether the trunks are being over-worked. If
peak utilization is near 100% you may want to consider a faster
trunk or an additional trunk line.

When you have finished using the Modem Control
Signals/Usage display, use <CR> to exit and return to the main
Status Service menu (figure 6-40).

The Buffer Size parameter refers to the per port buffers. The Buffer Utilization is the instantaneous measure of the buffer's use in bytes. Buffer Peak Utilization measures the buffer's use from the time the async card was initialized/reset.

When finished with the menu, enter 1 to exit back to the Status menu.

Synchronous (Trunk) Port Submenu

To view status of the synchronous ports (trunks), select 4 at the Status Status menu. Then select 2 (for sync) to display the menus for a trunk. The submenu for synchronous (trunk) port is shown (figure 6-48). This is the only screen of the Sync Port Status submenu that is the same as the async submenu.

```
****** Port Status ******

1. Exit
2. Connection information
3. Port characteristics
4. Modem control signals / usage statistics

Enter selection:
```

Figure 6-48. Port status submenu

2. Connection Information

Figure 6-49 illustrates a connection status display for a trunk line.

```
                        Card: 2  Port: 1  Name:  trunk

                     Multiplexing Trunk Connection Status

                               Priority
                        1       2       3       4     Total

Current connections     0       0       0       0       0
Peak connections        0       0       0       0       0

Configured maximum number of trunk connections: 20

Enter <CR> to exit:
```

Figure 6-49. Connection status display for trunk line

3. Port Characteristics

The example shown in figure 6-50 is the monitor screen of the port characteristics display for a trunk line.

```
            Card: 2  Port: 1  Name:  trunk2

        Multiplexing Trunk Configuration Data

        Baud rate                    : Autobaud
        Clocking                     : DTE - supplies no clocks
        Number of virtual circuits   : 0
        Multiplexing protocol        : Muxing
        Trunk timeout (secs)         : 60
        Utilization threshold        : 75
        Retransmission threshold     : 25
        Statistics Logging Timer     : 0
        Originate access rights      : 1
        Answer access rights         : 1

!> to continue:
```

Figure 6-50. Multiplexing trunk characteristics

4. Modem Control Signals/Port Usage

A synchronous port (trunk) modem control signals and port usage screen is shown in figure 6-51.

In the example, the "Messages transmitted" and "Messages received" indicate the number of packets transmitted and received. The "Errors" statistic indicates the number of received data packets with errors. The "Retransmissions" statistic indicates the number of retransmitted packets, that is, the number of packets not received correctly by the remote site. And BER represents the Bit Error Rate. If BER exceeds 1 in 10,000, then "Yes" will be displayed.

The average trunk utilization, over the past 5 seconds, the peak trunk utilization since the trunk came up, and the date of the peak utilization are also displayed. This information can be used to determine whether the trunks are being over-worked. If peak utilization is near 100% you may want to consider a faster trunk or an additional trunk line.

When you have finished using the Modem Control Signals/Usage display, use <CR> to exit and return to the main Status Service menu (figure 6-40).

```
                  Card: 2  Port: 1  Name:  t1

                  Modem signals

                  CTS    : High      RTS: High
                  DSR    : High      DTR: High
                  DCD in: High

                  Characters transmitted    : 297158714
                  Characters received       : 114087300
                  Messages transmitted      : 6159895
                  Messages received         : 4167485
                  Errors                    : 74
                  Retransmissions           : 21
                  BER exceeded 1 in 10,000  : No

Trunk Utilization    :      Receive                 Xmit

Past 5 seconds       :        0.9%                   4.4%
Peak                 :       20.0%                  83.1%
Peak time            :  12/18/89 - 00:10:13 EST   12/30/89 - 00:21:10 E


Enter <CR> to exit:
```

Figure 6-51. Synchronous port usage display

5. Name definition

Next on the Status Service main menu is this selection allows
you to obtain information about a name. If the name
corresponds to a port, the Status Service displays the type of
port and the slot and port numbers. If the name does not
correspond to physical port, the Status Service displays the
type of port (for example, speed connect or group name) and
provides other relevant information. For example, enter 5<CR>
from the Status Service Main Menu, the Status Service
prompts:

   Enter name:

Type the name of the port to obtain information for the port:

Enter name:
Name: (Name)
Type: Asynchronous line(s)
Starting card: 1
Starting port: 1
Ending card: 1

Ending port: 1
Enter <CR> to exit:

When you finish examining the display, enter <CR> to return to the Status Service Main Menu.

6. Power up test results

Selecting option 6, "Display Power Up Test Results", from the opening Diagnostic's screen will generate the screen shown in figure 6-52.

```
                **** Power Up Test Results ****
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Memory    Main : Pass       Configuration : Pass

Rom  : Block  1: Pass  U25 - 80cf  U17 - 470b

Trunk 1 : Pass
Port  1 : Pass
Port  2 : Pass
Port  3 : Pass
Port  4 : Pass
Port  5 : Pass
Port  6 : Pass
Port  7 : Pass
Port  8 : Pass
Enter <CR> to continue:
```

Figure 6-52. Powerup test results displayed

There is a PASS or FAIL for each port and trunk. Failures in the power-up tests of RAM or ROM are easily noted. Void indicates no chip in that ROM block. If the test LED is ON, a test error is indicated.

Notes:

1.   If system time is not set (Settime Service), the Status Service accumulates usage statistics but displays no date in the "Statistics since:" field.

2.   If you run Status on your own port, the "Characters transmitted" and "Last character transmitted" statistics show the character count and the character transmitted at the time the statistical accounting routine was called, but not necessarily the character most recently transmitted from the port.

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