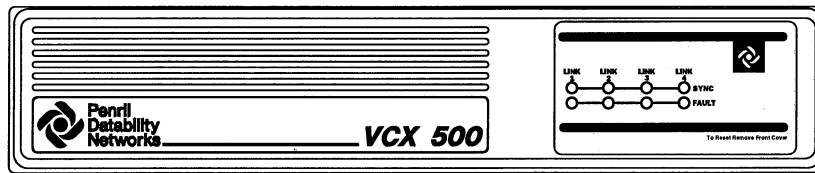


VCX-500 System Administrator's Manual

602050101 Rev. A





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VCX-500 System Administrator's Manual

Table of Contents

Chapter 1 Introduction

General Information	
Using This Manual	1-1
Concepts and Terminology	1-1
Organization	1-2
Conventions	1-4
Network Examples	1-5
VCX Features	1-8

Chapter 2 System Overview/Installation

Hardware	2-1
VCX-500 Technical Specifications	2-2
VCX-500 — Modular/Plug-in Design	
Plug-in Design	2-3
Link Interface Settings	2-4
Installation	2-7
Unpacking	2-7
Operating Environment	2-7
Installation Steps	2-8
LED Indicators	2-10
Recessed Switches	2-11
Interfaces	2-12
Connecting a Printer	2-16
General Cabling Information	2-16

Chapter 3 Operation

Introduction	3-1
Access Control	3-1
Attachment Control	3-2

Chapter 4 Configuration Service Overview

Using the Configuration Service	4-2
Configuration Service Menu Summary	4-5
Configuration Service Level 1 Menu	4-6
Configuration Service Level 2 Menu	4-8
Configuration Service Level 3 Menu:	4-12
Configure Service Level 3 Menu: User List	4-20
Configure Service Level 3 Menu: Text	4-24
Dynamic Reconfiguration	4-28

Chapter 5	Name Type 1 – Asynchronous Line(s)	
	Main Form	5-1
	Attachment Control	5-4
	Attachment Concepts and Terminology	5-5
	Device/Port Flow Control	5-6
	Name Type 1—Async Line(s) Subforms	5-10
	Name Type 1—Asynchronous Line(s)	5-11
	Name Type 1—Asynchronous Line(s)	5-13
	Name Type 1—asynchronous Line(s)	5-16
Chapter 6	Name Type 2 – Link	
	Main Form	6-1
	X.21 - PDN/PSTN	6-7
	General	6-7
	X21 (PDN)	6-7
	Auto Direct Call	6-7
	Operational Details	6-8
	Receive Incoming Calls	6-8
	Initiate Outgoing Calls	6-8
	Remote (Network DCE) Cleardown	6-8
	Automatic Retry	6-8
	Retry Counter Overflow	6-9
	Timer Settings (X.21)	6-9
	Configuration	6-9
	X21 PSTN	6-10
	Operational Details	6-10
	Timer Settings (PSTN)	6-10
	Configuration	6-11
	PSTN Cable	6-11
Chapter 7	Name Type 3 – Speed Connect	7-1
Chapter 8	Name Type 4 – Group Name	8-1
Chapter 9	Name Type 5 – Controlled Access	9-1
Chapter 10	Name Type 7 –Strings	
	Attach and Detach Strings	10-1

Chapter 11 AB Service	
Accessing the Service	11-1
Chapter 12 Broadcast Service	
Transmitting a Message	12-1
Fast Entry	12-4
Chapter 13 Busy Service	
Main Menu	13-1
Port Range Submenu	13-3
Chapter 14 Diagnostic Service	
Introduction	14-1
Asynchronous Port Diagnostics	14-2
Multiplexing/X.25 Port Diagnostics	14-8
Chapter 15 Forward Service	15-1
Chapter 16 Greeting Service	16-1
Chapter 17 Load/Dump Service	
Introduction	17-1
Dump to a Minicomputer and Verify	17-2
Load a Configuration from a Minicomputer	17-4
Load and Dump Between Configuration Store -	
Modules In Two Nodes	17-5
Dump a Configuration to a Personal Computer -	
and Verify	17-7
Load a Configuration from a Personal Computer	17-8
Chapter 18	
Overview	18-1
Logging Port	18-1
Remote Log Merging	18-1
Logging Service	18-2
Loggable Event Classes	18-2
General Logging Message Format	18-3
Logging Messages Summary	18-5
Complete Log of Events	18-10
Logging Service Description	18-13
Log Monitor: Quick Logging Method	18-16

Chapter 19 Mode Service	
Quick Configuration Data	19-1
Chapter 20 Print Service	
Printing Configuration Storage Modules	20-1
Chapter 21 Quick Status Service	21-1
Chapter 22 Reset Service	
Introduction	22-1
Chapter 23 Settime Service	
Setting Date and Time for a Node	23-1
Chapter 24 Status Service	
Main Menu	24-1
Chapter 25 Software Update Service	
Introduction	25-1
Complete Software Set	25-1
Separate Block Upload	25-3
Chapter 26 Fox Service	
Transmitting Test Messages	26-1
Chapter 27 Loopback Service	
Testing the Communications path	27-1
Chapter 28 Set Service	28-1
Chapter 29 TM (Transparent Mode) Service	29-1
Chapter 30 Who Service	
Displaying Installation and Port Names	30-1
Appendix A Tables and Worksheets	
EIA RS-232C Interface	A-1
ASCII Code Chart	A-3
Configuration Worksheets	A-8

Appendix B Attachment Control

Types of Attachment Control	B-1
Attachment Control Applications	B-6

Appendix C Restricted Access

Access Rights Assignments	C-1
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Appendix D Software Layers

Kernel Operating System (KOS)	D-2
General Functions	D-2
Switching	D-2
Formats	D-3

General Information

Introduction

The VCX Virtual Circuit eXchange system is a modular data communications switching system that basically enables terminal users to communicate with host computers. A VCX *system* consists of one or more chassis populated with hardware modules. The modular design of the VCX 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, VCX can be linked to form a data communications network, each chassis functioning as a switching multiplexer. (See figure 1-1 to 1-5.)

***Note: X.25 is not implemented in this release.
References to X.25 should be ignored.***

Using This Manual

This Manual describes how to install, configure, and use a VCX-500 system. Some familiarity with data communications is required to understand this manual. It is not intended to be read from start to finish. New users should first read the following chapters of this manual: Chapter 1 – *General Information*; Chapter 2 – *System Overview/Installation*; Chapter 3 – *Operation*; and Chapter 4 – *Configuration*.

Concepts and Terminology

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

A **Link** in this manual refers to outbound connections such as trunks, WANs, Ethernet or any other such mode. Users of other VCX products will find this newer, much broader term *link*, substituted for the more familiar word, “trunk”.

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 port. A port can be an asynchronous interface or in the future, 10baseT connec-

tion, modem, etc.. Other data processing devices may also have ports; 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*, etc

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 link lines interconnect nodes in a VCX network. Typically, a network allows multiple terminals to communicate with one or more remote computers. .

Organization

The following information summarizes the contents of this *VCX System Administrator's Guide*:

Chapter 1 – General Information

This chapter discusses the organization of the manual, presents examples of VCX networks, and lists the features of the VCX-500.

Chapter 2 – System Overview/Installation

This chapter contains a technical description of the VCX system and specifications on the VCX chassis sub assemblies. It also covers installation steps, indicators, interfaces, and cabling.

Chapter 3 – Operation/Getting Started

This chapter describes Access and Attachment control in the VCX.

Chapter 4 – Configuration

This chapter is the introduction to configuration and presents an overview of the Configuration Service.

Chapters 5 through 8 – Name Types of the Configuration Service

Each of these chapters discuss one of the name types of the configuration service.

Chapters 9 through 25 – Controlled Services

All VCX Services are provided in two groups; first the restricted services (chapters 9 through 25), then the user services. For convenience, the chapters are arranged alphabetically within the two groups. Individual chapters describes a specific VCX service or function that the service provides.

Chapter 26 through 30 – User Services

Each chapter discusses a user service, which are so called because they are provided for the convenience of the terminal user.

Appendixes –

Contains details on PSTN, forms for configuration, tables and other useful information for the user and System Administrator.

VCX Services Chapters

Restricted Services

- **AB Service.** The AB Service allows the system administrator to force all dual auto-connect users to either the A destination or the B destination. It also allows the system administrator to busy-out an entire chassis.
- **Broadcast Service.** The Broadcast Service allows the system administrator to transmit a message of up to 1000 characters or 23 lines to a port, to a group of ports, or to the entire network.
- **Busy Service.** The Busy Service allows the system administrator to render a port or series of physically contiguous ports out-of-service.
- **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). Information on this subject will be found in chapters 4 through 10.
- **Diagnostic Service.** The Diagnostic (Diag) Service allows the network administrator to place any port or link in a loopback state, send *Fox messages*, and to monitor data traffic.
- **Forward Service.** The Forward Service allows the system administrator to reroute connection attempts for a designated destination port to a different port or route through the network.
- **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 the classes to be logged.
- **Mode Service.** A quick method to obtain current data on the name of the node, name of the active configuration.
- **Print Service.** The Print Service is 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, Originate session, statistics or chassis from a terminal.
- **Settime Service.** The Settime Service allows the system administrator to set the date and time for the node.
- **Status Service.** The Status Service allows the system administrator to monitor chassis and port/link activity.
- **SWupdate Service.** The SWupdate service provides the method to load the latest operational VCX software into EPROM memory. With the Redundancy flash EPROMs, future upgrades can be done from anywhere in the network. The system will automatically select the newest version to run.

User Services

- **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 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.
- **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.

Appendixes

Appendixes include a summary of interface specifications, ASCII chart, configuration worksheets, Attachment control, Restricted access, and Software layers.

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 where used) 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 Examples

1) Point-to-point Multiplexing With Dual Link Load Balancing - In this example, a pair of VCX-500s are interconnected providing a 'transport' of 16 channels between two nodes. This is a small but powerful network allowing user switching and contention. You can use the other 3 links for security (i.e., if one link goes down) or for additional through-put. The two nodes depicted could be located within the same building or in different cities. (See figure 1-1.)

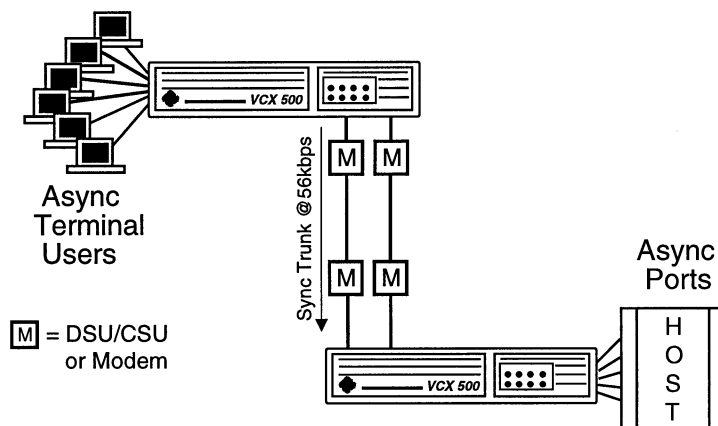


Figure 1-1. 16, or 32 port multiplier

2) Point-to-point Multiplexing With Larger Clusters - You may want more than 32 ports at a node. If so, the other links can be used to link many local VCX-500's together. An example is shown in figure 1-2 , expanding each node. User switching and contention exist in these larger clusters as well.

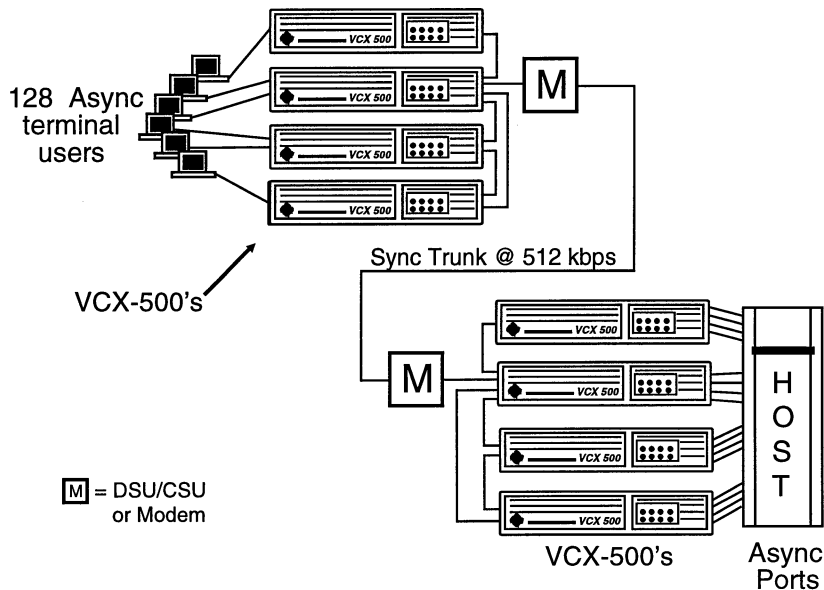


Figure 1-2. Expanded Point-to-point multiplexer

3) Onlinking - Instead of two nodes, you can have three or more within a network. Six nodes are linked to a single host in figure 1-3 . The configuration might be: 6 ports at each VCX-500 contending for 50 host ports. **Note:** This is Multipoint Multiplexing, *not* multidrop.

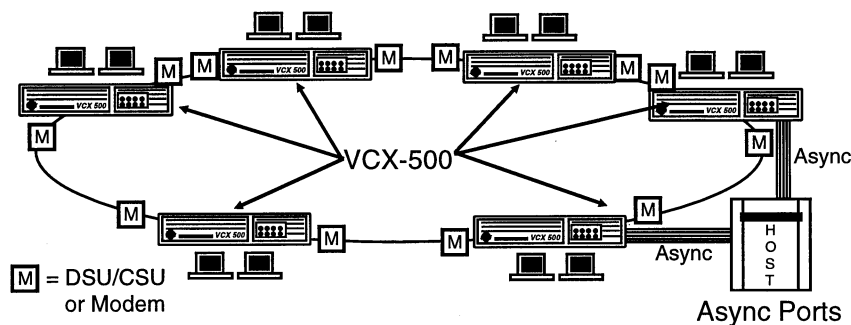


Figure 1-3. Onlinking

4) Feeders Into a Larger VCX Network - Larger networks are possible if VCX-500s feed into 5 or 19 slot VCX's, as illustrated in figure 1-4 . The VCX-500s are totally *link compatible* with the VCX-1000's, allowing for network expansion whenever the need arises.

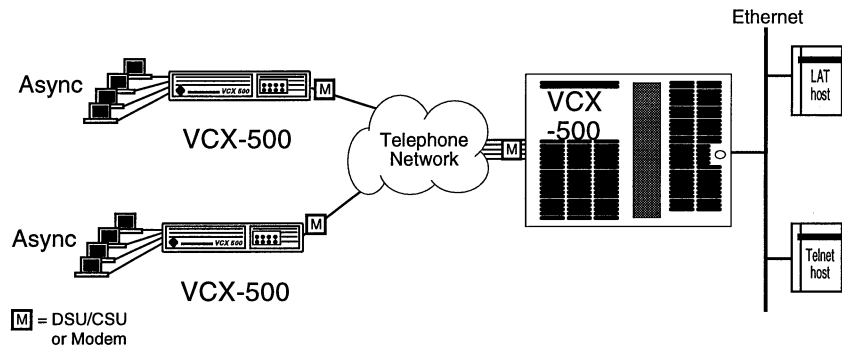


Figure 1-4. Remote units connect to Ethernet

VCX Features

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 eight simultaneous connections and switch between destinations using a control character and Forward toggling.

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

Hardware interfacing includes 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 Re-transmission reQuest) error correction.

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, links, 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 links.

Menu-Driven Services

Services feature user-friendly menu-driven operation.

Programmable Directories

Programmable directories can be created that automatically display when a user attaches to the system.

Programmable Help Resources

One or more programmable help screens that the user can call up.

Broadcast Service

The Broadcast Service allows the system administrator to transmit a message of up to 1000 characters to any Originate or Both port. There are two types of broadcast messages: (1) a routine message, which is delivered to a selected port but may be filtered out by that port, and (2) an urgent message, which the port can not refuse. This message is always delivered.

Logging

The logging function reports nodal activity for monitoring, administration, and planning purposes. A printer is usually connected to the logging port and 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 links 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 allows the system to continue to operate, while part of the network is taken down for maintenance.

Call Forwarding

The Forward Service reroutes all connection attempts for a designated destination port to a different port or route through the network. This service is especially useful if the network has compatible computers, one of which is down. Terminal users will be transparently connected to the backup computer.

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 115,200 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: 1200, 1800, 2400, 4800, 9600, 19,200 bps, 38,400, 57,600, and 115,200 (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, Data General XON/XOFF and Hewlett Packard XON/XOFF protocols, XPC XON/XOFF.

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. (This only take effect over links.)

Break Key Pass-Through or Intercept

A BREAK can pass through to the other end of a connection, or be intercepted. Ports can be individually configured to ignore or 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 timeout from 1 to 255 minutes, or select 0 to disable inactivity timeout. This timer can be setup in Tx, Rx or both.

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.

Link Monitor

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

Configuration Control

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

Update Software

The VCX has the ability to download the latest software into provided flash EPROMs. The operational software is stored in one set of flash EPROMs while the new software is downloaded to duplicate flash EPROMs. Rebooting causes the VCX to switch to the new downloaded software.

Control State Screen

A Control State screen provides a list of the active control states in use and provides a direct path to any of the control states. Up to 8 sessions may be setup in the VCX.

Chapter 2

System Overview/Installation

Overview

The hardware and software modules selected for a VCX-500, determine its capabilities.

Hardware

VCX-500 Main Chassis

Product No. 4450-01 AC Chassis

The VCX-500 AC chassis includes an enclosure, main processor card, SW/MUX/XNET software midplane card and an AC power supply module which will operate on 90 to 260 Vac (U.S.) at 47 to 63 Hz. The main card contains a 68360 microprocessor, a non-volatile real time clock, 1 Mbyte of Flash EPROM and 4 Mbytes of DRAM. The main card can support 1 to 4 link modules and 2 port modules, described later in this section.

Product No. 4450-03 -48 Vdc Chassis

The VCX-500 48 Vdc chassis includes an enclosure, main processor card, SW/MUX/XNET software midplane card and a -48 Vdc power supply module. The main card contains a 68360 microprocessor, a non-volatile real time clock, 1 Mbyte of Flash EPROM and 4 Mbytes of DRAM. The main card can support up to 4 link modules and 2 port modules, described later in this section.

Product No. 4454-01 16 Port Async Expander Module

The 16 Port Async Expander module plugs into one of the two port slots on the VCX-500 chassis, providing 16 RS-232, RJ-45 port interfaces.

Product No. 4455-01 RS-232/V.35/V.11 Link Module

The RS-232/V.35/V.11 Link Module plugs into one of the four link slots on the VCX-500 chassis, providing user configurable RS-232, V.35, or V.11 interfaces through a combination of software configuration and switch selections on the Link module. Switches must only be changed if the module is configured from V.35 to a non-V.35 interface or from non-V.35 to V.35.

VCX-500 Technical Specifications

Ports

Number	32
Interface	RJ-45 (8 pin)
Control signals	DTR, DSR, RTS, CTS, DCD
Speed	1200, 1800, 2400, 4800, 9600, 19,200, 38,400, 57,600, 115,200 bps, fixed.
Autobaud	1200 - 115,200 bps

Synchronous Links

Number	4
Interface Connector	DB-25
Interface types	RS-232 (V.24), V.11, V.35. All are synchronous DTE
Interface selection	Software controlled (Except changing from V.35 to non-V.35 or vice versa.)
Control signals	DTR, DSR, RTS, CTS, DCD
Protocol support	VCX HDLC proprietary; X.21, X.25 1988, PTSTN
Speed (RS-232)	1200, 2400, 4800, 96, 14.4k, 19.2 k bps
Speed (V.11, V.35)	1200, 2400, 4800, 7200, 9600, 19.2k, 38.4k, 56k, 64k, 128k, 256k, 512 k, 1.536M, 1.920M,bps

General Specifications

Input Voltage (AC)	90 to 260 Vac
Input Frequency	47 - 63 Hz
Input Voltage (DC)	36 to 60 Vdc
Output Voltages	4.7 to 4.25 Vdc @ 3 A 11.4 to 12.6 Vdc @ 2 A -11.4 to -12.6 Vdc @ .5 A -4.75 to -5.25 Vdc @ .5 A (Not currently required)
Height	3.6 in.
Width	17.25 in.
Depth	15.8 in.
Environmental	0 to 40 degrees C operating; -20 to 70 degrees C storage
Relative Humidity	5 to 95% (non-condensing)

VCX-500 — Modular/Plug-in Design

The VCX-500 is a totally modular unit. This includes the main circuit board as well as the link options, port modules and power supply. While the main circuit board is not subject to substitution or change, the design is that of a plug-in board, removed from the front, after removing the snap-off front panel. The front view of the VCX-500 is shown in figure 2-1.

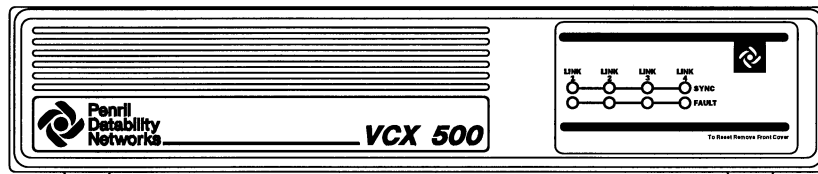


Figure 2-1. Front panel and LED indicators

The top view of the VCX-500 (with the cover removed) is shown in Figure 2-3 and illustrates the position of the main circuit board, power supply, fan, and various modules at the rear panel. Power supplies currently available are; 120/240 Vac and -48 Vdc. A number of modules are available for network connection. These modules are plug-in units that are easily removed at the rear of the chassis. (For details of installing and removing modules, see *Installation / Removing Plug-in Modules* on page 2-8.

There are two vertical levels or layers used for modules that are accessible at the rear of the VCX-500. The lower level (see figure 2-3) can host two 16 Async Port modules side by side. There are 16 ports available in the modules. A total of 32 asynchronous ports can be incorporated in the VCX-500. The power supply is also contained at the lower level of the chassis. (See 2-3.) Two power supplies are available, 120/240 Vac and -48 Vdc.

The upper level of the chassis is used to house up to 4 link modules. These include RS-232 and V.wer/V.11. The modules are retained in the chassis with thumb/screw fasteners at each side of the module.

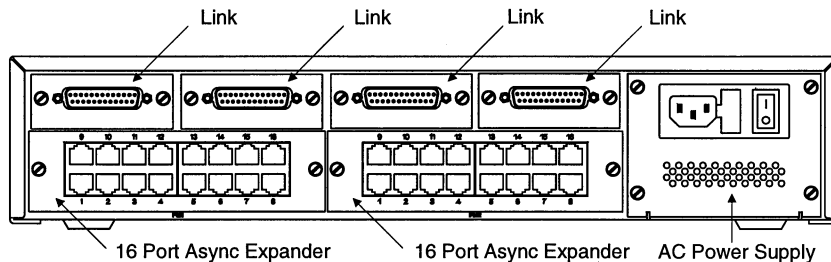


Figure 2-2. Plug-in modules (upper and lower)

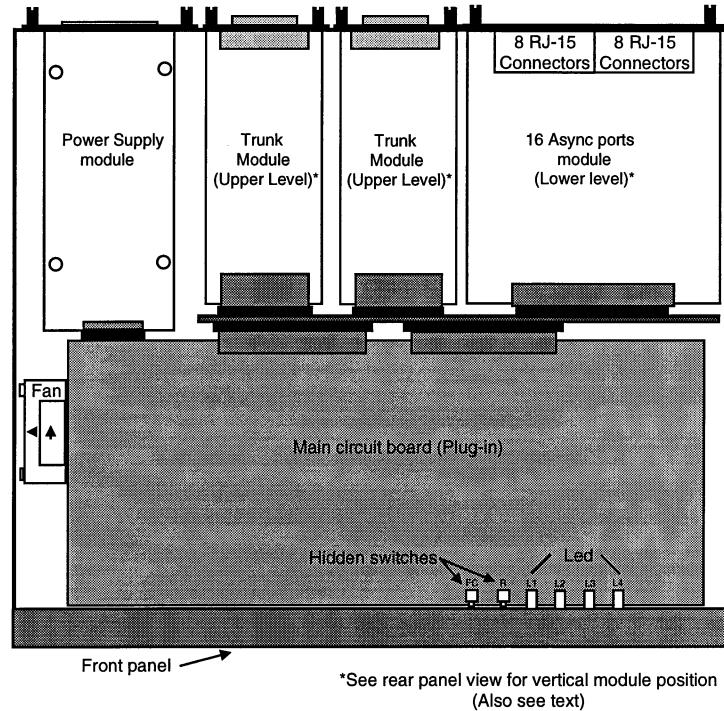


Figure 2-3. Top view layout of modules and parts

Link Interface Settings

Some of the cards have switches and/or jumpers which need to be set, depending on user method of operation and system for grounding. In the case of the V.11, V.35, RS-232 Link module, switches must be set for the type of operation that the card is going to be used for. (See text.)

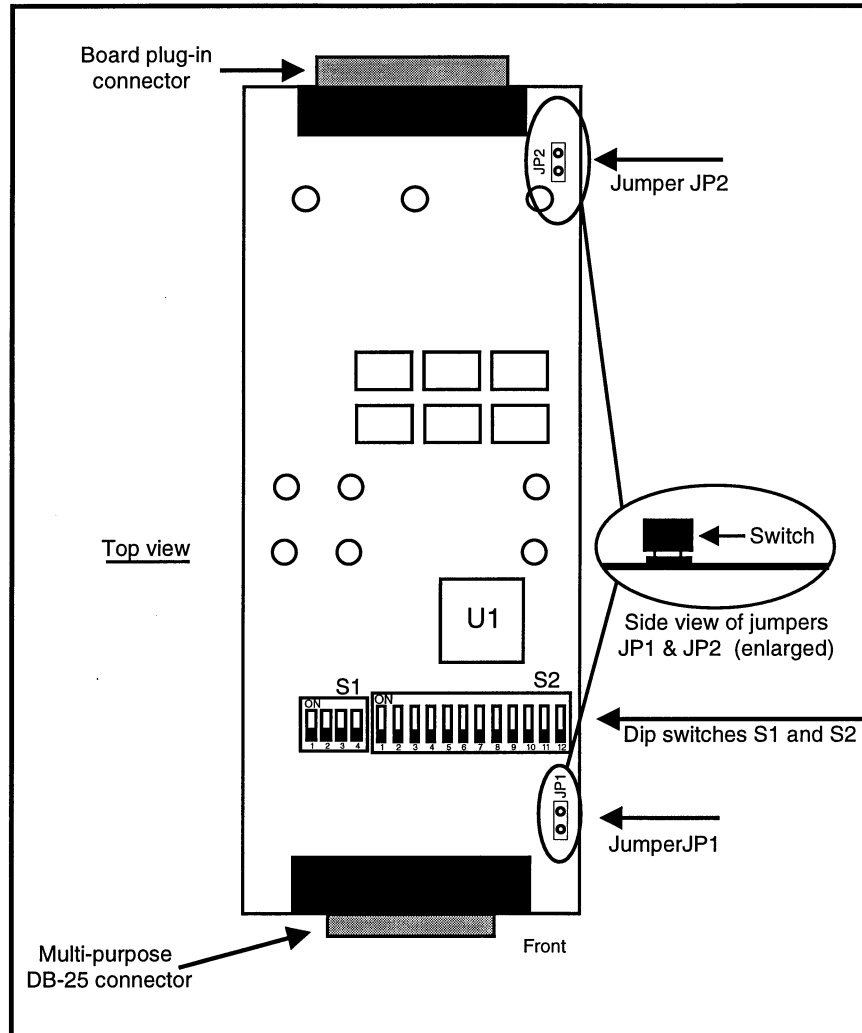
L1, L2, L3 and L4 – RS-232/V.11/V.35 Link Module

Jumper Switches on Link Modules

Two jumper switches are used on the V.11, V.35, RS-232 Link Module. Both have to do with grounding. The users grounding scheme will determine these settings. The function of these jumper switches are:

JP1—When in place, the **Cable Frame Ground** is connected to **Chassis Ground**.

JP2—When in place, the **Frame Ground** is connected to the **Signal Ground**.



Installation

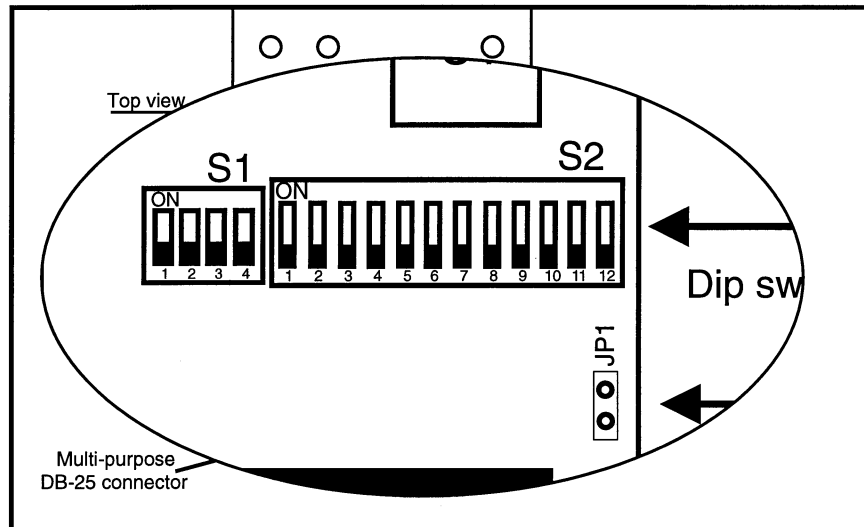
Figure 2-4. Plug-in modules (upper and lower)

Dip Switch Settings on Link Module

This module is used for RS-232, V.11 and V.35 link operation. The only hardware change required in changing from one mode of operation to another, is the change of switch positions. Table 2.1 illustrates S1 and S2 switch settings. (See figure 2-4 for the location and number scheme of both switches and figure 2-5 or a closeup illustration of dip switch S1, S2 and one of the jumper switches, JP1.)

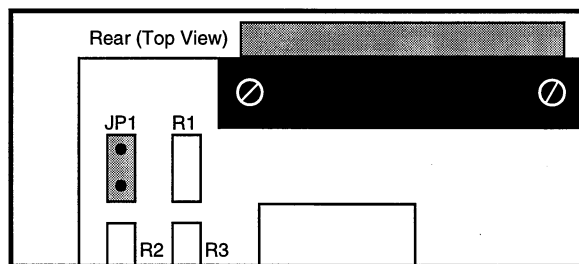
Table 2-1. S1 and S2 Switches Positions for V.11, V.35 and RS-232

Switch	RS-232/V.11	V.35
S1	All Dip Switches ON	All Dip Switches OFF
S2	All Dip Switches OFF	All Dip Switches ON

**Figure 2-5. Dip Switch close-up (Partial Drawing)**

Jumper switch on 16 Port Asynchronous Port Module

There is one jumper switch on the 16 port Async Port Module. The location of the switch is shown in figure 2-6. This is the same type of switch as JP1 and JP2 used on the Link Module, discussed on page 2-4. The switch (JP1) is used as follows:

**Figure 2-6. Partial 16 Port card, showing JP1**

JP1—When jumper is installed, the **Frame Ground** is connected to the **Signal Ground**.

Installation

Unpacking

The VCX-500 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-500 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-500 is designed to operate in any normal office or electronic computer room environment. Temperature/humidity and other operating conditions are given in the list of technical specifications earlier in this manual.

Domestic US and International units are equipped with a power supply module, that is is designed for connection to a 90 to 260 VAC branch circuit, at 47 to 63 Hz.

There is also a dc supply available which operates with an input voltages of AUI and Ethernet modules (Ethernet not available at this time -36 to 60 Vdc @3A, for a nominal input of -48 Vdc. It provides outputs of:

11.4 to 12.6 Vdc @ 2 A
-11.4 to -12.6 Vdc @ .5 A
-4.75 to -5.25 Vdc @ .5 A (Not currently required)

Installation Steps

Installation of a Desktop VCX-500:

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

STEP 2) Connect your terminal/monitor to port 1 on the VCX-500 16 port asynchronous expander module, 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).

STEP 3) Connect the VCX-500's power cord to an AC outlet. Then flip the VCX-500 power switch to "**ON**".

At power-up, the VCX-500 will test all memory locations. The Sync and Fault LEDs on the front panel, LED 1 through LED 4, will blink and some LEDs will be on and some off, as testing continues. When testing is complete, all LEDs will be off, until a problem is present or no link is configured. (See page 2-10 for individual meanings of LEDs; ON, OFF and flashing.)

STEP 4) Proceed with the remainder of the configuration. Once you have configured and then selected a configuration on the VCX-500, it will automatically boot with that new configuration. Chapter 4 discusses the "how to" of configuration.

STEP 5) Connect the remaining link and terminal/modem cables to the appropriate VCX-500 port connectors.

Installing VCX-500 Modules

See figure 2-1 for an illustration of the front view of the VCX-500 and figure 2-7 for the rear panel.

Note: Power ***must be OFF*** before removing or installing VCX-500 Link modules or 16 port Async Port modules.

Install a Module) To install a VCX-500 module, at the rear of the chassis, line up the sides of the module to be installed, into the card guides that are on each side of the module cavity in the VCX-500 chassis. Link modules are installed only in the 4 upper level module locations and the 16 Port Async Port modules in the two lower level cavities to the left of the power supply location. (See locations in figure 2-7. Carefully slide the module back into the chassis until the connector in the rear is engaged. Press the module back firmly so that the connector on the module is firmly inserted into the connector at the rear of the module cavity. Tighten the captive thumb/screw nuts at each side of the module to physically secure the module to the chassis.

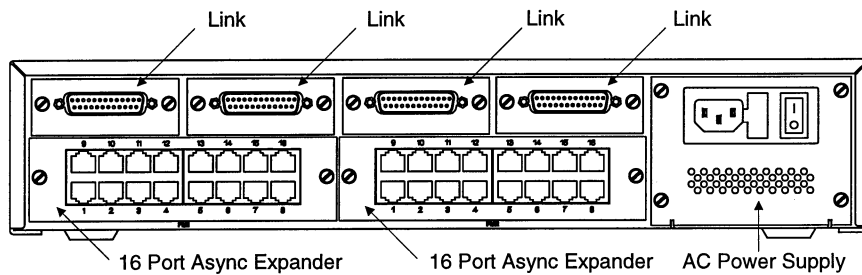


Figure 2-7. Link, port and power connections

To Remove a Module

Note: *Power must be removed from the VCX-500 and the line cord removed from the unit before removing any modules, main circuit board or power supply module!*

A module is removed by loosening the thumb/screw nuts at each side of the module. Now pull the module to the rear until the rear connector is disconnected from the chassis connector. Now carefully slide the module out of the card guides on each side of the module cavity in the VCX-500 chassis.

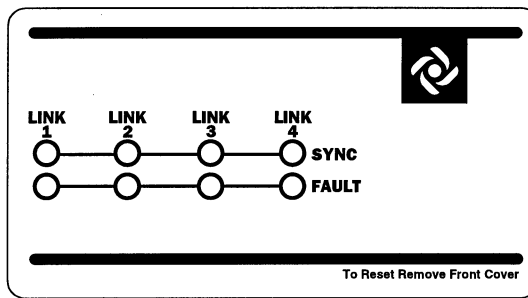
The power supply is removed by first loosening 4 thumb/screw nuts, then removing the power supply from the VCX-500 chassis. Note that card guides are not used with power supply modules.

LED Indicators

There are eight LED indicators on the front panel. They are:

LINK 1 SYNC - LINK 1 FAULT
 LINK 2 SYNC - LINK 2 FAULT
 LINK 3 SYNC - LINK 3 FAULT
 LINK 4 SYNC - LINK 4 FAULT

The LEDs are shown in figure 2 -1 and also in the close-up in figure 2-8 .



LED states and their meaning are given in table 2-2. Each of the four links have two LED indicators, labeled SYNC and FAULT. The indications given by the LEDs are the same for each, with the exception of Link 1. Link 1 has an additional diagnostic display, listed at the bottom of table 2-2.

Figure 2-8. Close-up of LED indicators

Table 2-2. Link LED Indicator Explanations

Type	LED (Red/Green)	Explanation
Indications are the same for Links 1*, 2, 3 and 4		
SYNC	Both LEDs OFF	Link not configured
	Green LED ON	Link configured and synchronized
	Red LED ON	Flashes if configured, but link is down or it is not synchronized
FAULT	Both LEDs OFF	Link down or no cable attached
	Green LED ON	CTS and CD are active
	Red LED ON	Power up diagnostic failure
* Link 1 only: Both RED SYNC and RED FAULT LEDs will flash when diagnostics pass, but no user configuration is found.		

Recessed Switches

There are two recessed switches on the VCX. These are located behind the front panel of the VCX-500. Remove the panel by grasping the rim of the front panel on both sides and pulling the front panel towards you. Snap connectors used on the front panel will release it and will expose the main circuit board. The two switches are located on the right-hand side of the unit, with the eight LEDs. The two switches will be found just to the left of the LEDs. See partial front view of the mounted main circuit board, showing LEDs and switches, in figure 2-9. (Front panel removed from the VCX-500.)

The switch closest to the LEDs is the **Reset switch**. To the left is the other switch, **Factory Config**. Notice that these switches are marked on the upper front chassis frame, visible when the front panel is removed. (See figure 2-9.)

The function of each switch is discussed next.

Reset

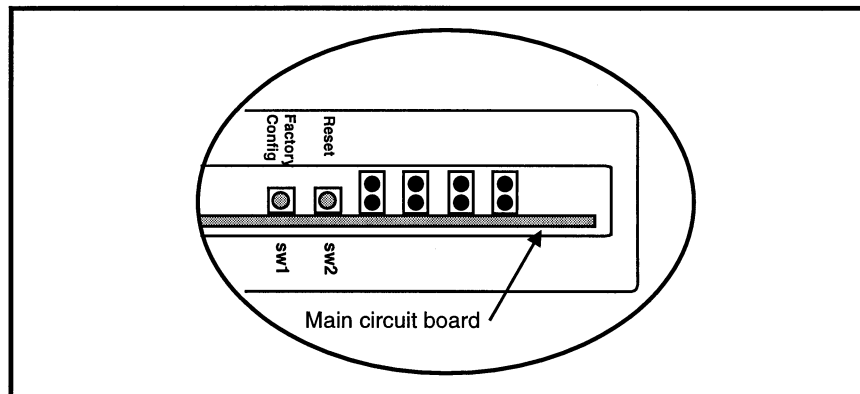


Figure 2-9. LEDs and switches (with panel removed)

Reset (located on the left of the LEDs) completely reset the VCX when pressed, i.e., the software will be re-initialized, the power up self test will be conducted.

Factory Config

Factory Config (located at the left of the Reset switch, forces the VCX-500 into factory configuration. To initiate factory configuration, first depress this switch, and then simultaneously depress the **Reset** switch. Release the **Reset** switch but keep depressing the **Factory Config** switch for approximately 30 seconds.

Interfaces

Asynchronous port interfaces are RJ-45 with a DCE orientation and pinout as shown in table 2-3. Link interfaces are DB-25, with a DTE orientation and pinouts as shown in table 2-4. These connections are located on the rear panel and are illustrated in figure 2-7.

Table 2-3. Async Port Interface DCE

RJ-45	Name	Description	Direction
1	DSR	Data Set Ready	Output
2	DCD	Data Carrier Detect (Always pulled to +12v)	Output
3	DTR	Data Terminal Ready	Input
4	GND	Ground	
5	RXD	Receive Data	Output
6	TXD	Transmit Data	Input
7	CTS	Clear To Send	Output
8	RTS	Request To Send	Input

Table 2-4. Link Interface

DB-25	Link module			Direction
(Pins)	V.24	V.11	V.35	(In/Out)
1	Frame Gnd	Frame Gnd	Frame Gnd	
2	TXD	TXDa	TXDa	out
3	RXD	RXDa	RXDa	in
4	RTS	RTSa	RTS	out
5	CTS	CTSa	CTS	in
6	DSR	DRAa	DSR	in
7	Sig Gnd	Sig Gnd	Sig Gnd	
8	DCD	DCDa	DCD	in
9	(Not used)			
	(Not used)			

DB-25	Link module			Direction
(Pins)	V.24	V.11	V.35	(In/Out)
11		TXCb	TXClb	in
12		DCDb		in
13		CTSb		in
14		TXDb	TXDb	out
15	TXC	TXCa	TXCla	in
16		RXDb	RXDb	in
17	RXC	RXCa	RXCla	in
18		RXCb	RXCla	in
19		RTSb		out
20	DTR	DTRa	DTR	out
21		DSRb		in
22	(Not used)			
23		DTRb		out
24	RTXC		TXCOa	out
25			TXCOb	out

Installation

Asynchronous Connections

The VCX-500 async ports use a RJ-45 interface. Three cable adapters are available to convert the RJ-45 pinout to a DB-25 pinout if necessary. See the straight through adapter illustration (figure 2-10) for attaching to terminals and the crossover adapter (figure 2-11) for attaching to modems. Also see the RJ-45 illustration with pin numbers and signal names in figure 2-12.

RJ-45/RJ-45 cables, to connect to async ports, are available in various lengths:

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

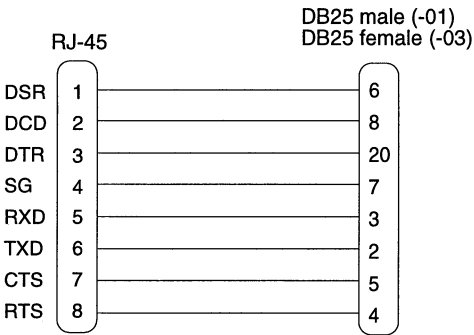


Figure 2-10. RJ-45/DB25 adapter (Part 4810-01, 03)

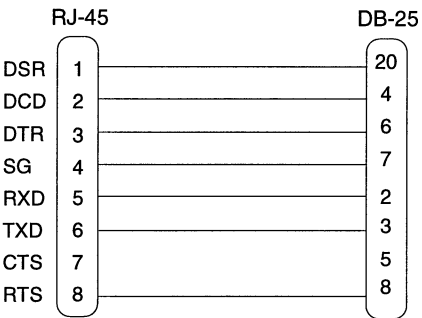


Figure 2-11. RJ-45/DB25 crossover (Part 4810-02)

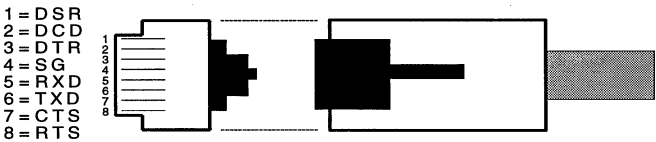


Figure 2-12. RJ-45 Male plug w/numbers and names

Link Connections

The VCX-500 uses a DB-25 for all of the available interfaces, V.24(RS232), V.11 and V.35. The DB-25 physical I/O is standard for V.24(RS232), but not for V.11 or V.35. To provide a standard interface (for V.11 and V.35) the cables illustrated in figure 2-13 and figure 2-14 are supplied with the respective interface cards.

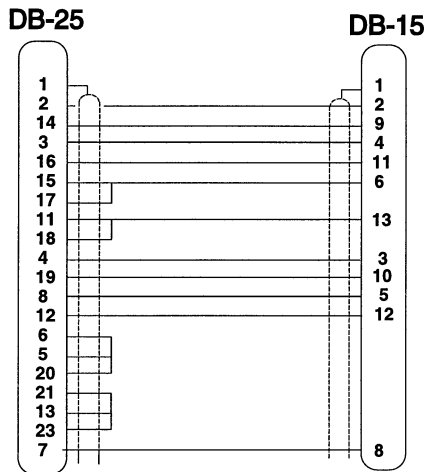


Figure 2-13. V.11 link interface cable (4864-01)

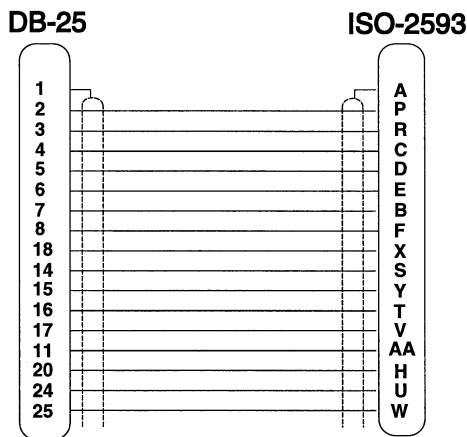


Figure 2-14. V.35 link interface cable (4865-01)

To connect a pair of VCX-500 links back-to-back, use either a V.24, V.11 or V.35 interface with the Link crossover cable, shown in figure 2-15.

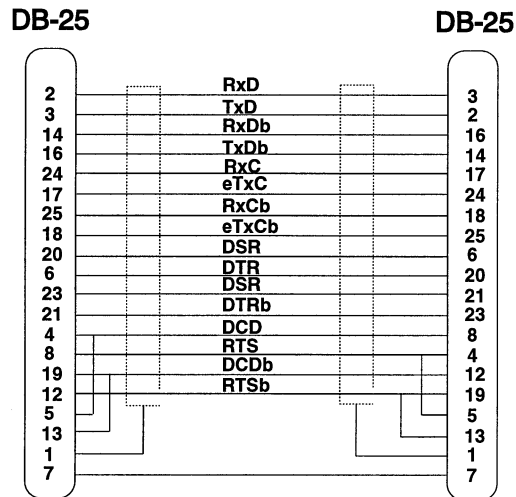


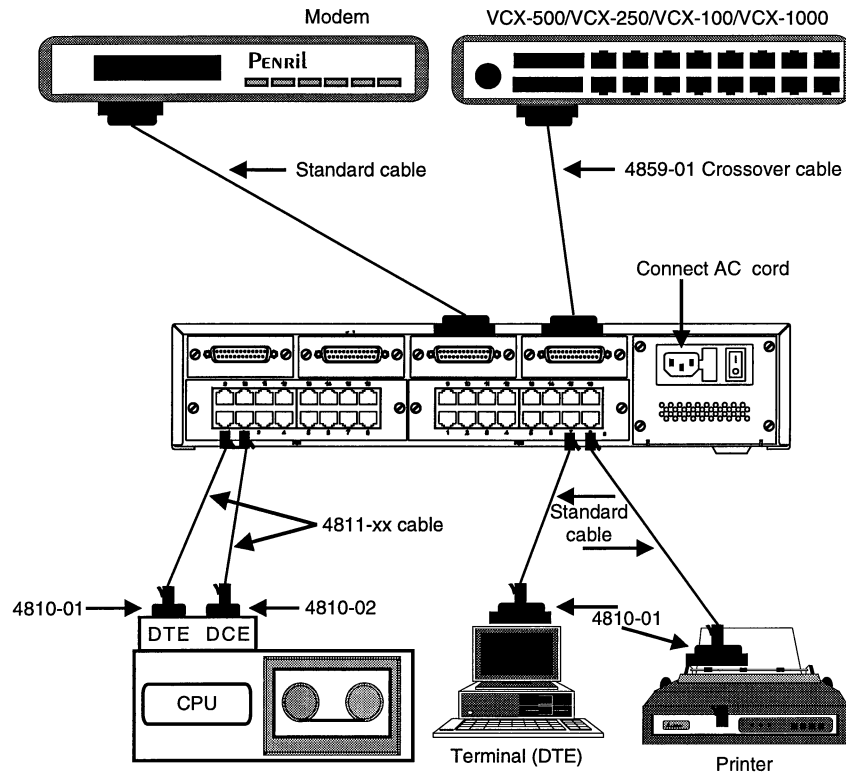
Figure 2-15. Link crossover cable (4859-01)

Connecting a Printer

When connecting a printer to a VCX-500 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 when configured for DTR attachment control.

General Cabling Information

As shown in figure 2-16, either a modem or a collocated VCX can be connected to the link connector. Modems, computers, terminals or printers can be attached to the async ports of the VCX-500. A number of possible connectors and cables for each of these attachments are shown in figure 2-16 on the next page.

**2-16. General cabling information**

Chapter 3

Operation

Introduction

The System Overview/Installation chapter (chapter 2) described the procedure to cable and power up a VCX-500. Once the VCX is installed, it is desirable to configure it to your specific application.

Before proceeding, two questions should be answered. (1) Is the application point-to-point and not part of a large VCX network? (2) Are the users dedicated to a fixed computer port at the other end with no ability to switch between resources? If the answer is *yes* to both questions, a simple quick configuration can be used. If there is a *no* to either question, the usual long configuration method discussed in the next chapter must be used.

Access Control

As received from the factory, a VCX-500 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 *Controlled Access* in chapter 9 and *Appendix C*.

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 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.

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 *Appendix B*.

Chapter 4

Configuration Service

Configuration Service Overview

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. (See *Installation*, chapter 2 in this manual.) The system installation procedure describes how to enter the Configuration Service and initialize the Configuration Storage portion of RAM.

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 link 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. (See *Appendix C* for details on Restricted Access 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.

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
- a link line
- a VCX control service
- a pathname
- a character string

Each name definition created must be assigned 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.
- *Links*—A link is a single synchronous line for point-to-point statistical multiplexing to another node. Up to four optional links are available on the VCX-500.
- *Speed connect*—A speed connect name is a one-name abbreviation for a more complex pathname through the network.
- *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 routes users who attempt to connect to “vax”, to either “vax1”, “vax2”, or “vax3”. The VCX queues users for connection if all ports in the group are currently connected. **Note:** Ports in a group need not be contiguous or similarly named.
- *Services, controlled access*—This name type allows you to limit access to VCX 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 level 3 menu, you must “back out” to Level 2, then 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)
- link(s)
- 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, 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 the 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.

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

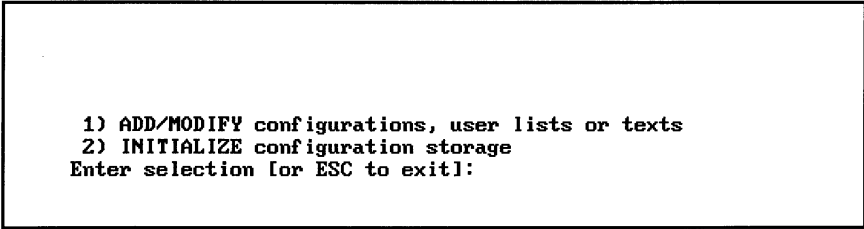
The menu selections are explained in detail in this and later chapters of this manual.

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

Note: Make sure your terminal type matches the type shown in Set Service; for example vt100.

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

1. Add Or 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/128 used] where x is the number of blocks used and 128 is the number of blocks available in a VCX-500. One block is equivalent to 256 bytes of memory. Therefore, in excess of 30k bytes of configuration storage space is available.

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.

Configuration Service Level 2 Menu

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

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

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.

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>

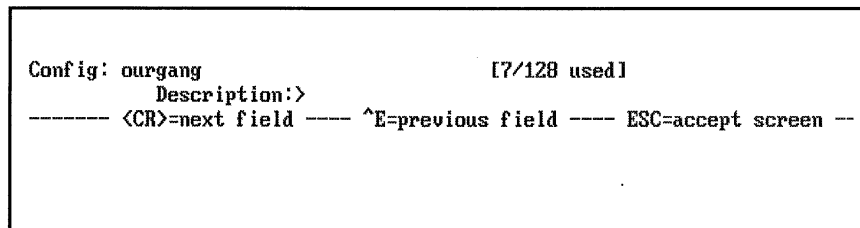
The Configuration Service immediately routes you to the Global Configuration Parameters Form. (This form is shown in figure 4-8 , in chapter 4, on Global Configuration parameters.)

2. Add A New User List

If for security reasons, you want the VCX users to log-in their name and a password, you will need to enter into the VCX, 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                               [7/128 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, link, 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 .

[11/128 used]		
Name	Type	Description
don	Configuration	Test Configuration for Pubs
flashconf	Configuration	Testing Flash
jm9600	Configuration	jm's 9600 setup
trunktest	Configuration	trunktest
Example 1	Configuration	Test Configuration
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 for ESC to exit!:		

Figure 4-4. Configurations or user lists menu

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.

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>.

Configuration Service Level 3 Menu:

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

```

[11/128 used]

      Name  Type          Description
      don Configuration  Test Configuration for Pubs
      flashconf Configuration  Testing Flash
      jm9600 Configuration  jm's 9600 setup
      trunktest Configuration  trunktest

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 for ESC to exit!:
```

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: don          Name: new          [11/128 used]
Name type:>Async port (Port modules 1 & 2)
----- <CR>=next field ----- ^E=previous field ----- ESC=accept screen -----

1) Async port (Port modules 1 & 2)  4) Group
2) Trunk port (Link modules 1 - 4)  5) Services, controlled access
3) Speed connect                    6) String
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> to exit to the Level 3 Menu. For example, to name an asynchronous VCX 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: new

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: new

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:new

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 .

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.

Config: don		[11/128 used]
Name	Type	Brief Description
example1	Trunk	03\01
new	Asynchronous line(s)	01\01 - 01\01
ten	Asynchronous line(s)	01\01 - 01\01

- 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 for ESC to exit]:

Table 4-7. Name summary chart at level 3

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.

Global Parameters Submenu

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>.

```

Config: don                                [12/128 used]
      Description:>Documentation configuration
      Installation name: new
      Connect prompt: Pubs>>
      Default Access Rights:
      Logging port:
      Logging enabled: No      Binary output: No      Logging mask:
      Modem network mgr port:
      addr: 1
      IOK log message timer: 0
      Node name: chucks
      User list name:
      Local time zone:
      Local time when it is midnight Greenwich Mean Time --
      Hours: 0      Minutes: 00
      Display format: U.S. (mm/dd/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

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. VCX stores the string just as you enter it. For example, 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 documentation the connect prompt shown is the default:

Connect to:

You can change the prompt to any combination (up to thirty printable characters). VCX retains the case within the string just as you enter it. 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 link) 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>**

Logging Port

You can request VCX 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 link 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 for a detailed description of the logging function.

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 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 the management system. For example, "N.P." 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 modem management center. This path may be an async port name, a multiplexing link name or an X.25 link name. If an X.25 link name, it must be followed by the X.121 address of the distant end. If a Master NetMux function is not required, press <CR>.

(Blank for modem management disabled)

Modem Network Mgr port: <CR>

Addr

The address for the management center, NMS (Network Management System) 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>.

Range 1-9999

(The network address for this mode)

Addr: <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). Press <CR> to continue to the next menu item if there is no network management system.

Range: 0-15

(0 will disable the message)

IOK Log message timer: <CR>

Node Name

The next prompt allows you to enter the node name of your present VCX unit. The node name you select will show up in the logging report. It can be no more than ten characters in length.

Node name: New York

User List Name

The next prompt concerns the user list name. If you want the VCX 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 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 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 Verses Greenwich Mean Time

The VCX 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 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 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>”.

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., link 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 .

```
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 for ESC to exit!:
```

Figure 4-9. Level 3 User list

Note: If no users exist under the user list name, only selection 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 “John”.

New user name: John <CR>

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

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

To have user enter a password at sign-on, 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

```

Name: john           [8/128 used]
Description:>
Account id:
Password:
User access rights:
----- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -----

Description:

```

Configure Srv.

Figure 4-10. Add new user information

access rights are granted, the range should be 1-64. For details on access rights read the introduction of Configuration and See Appendix A for details on the subject of Access Rights. Also see *Appendix B* for information on Attachment Control.

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.

[8/128 used]			
Name	Brief Description	Password	Access
bill			
jane			
john			
mary			
sally			
sandy			
tom			
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 user 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: 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.

Config: text	[8/128 used]
Description:>	
Access Rights:	
----- <CR>=next field ----- ^E=previous field ----- ESC=accept	
Description:	

Figure 4-12. Examine/modify text description

2. Edit Text

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

Config: text	[9/128 used]
<pre> 001:This is an example of text typed in the text user configuration. 002: 003: </pre>	
<hr/> 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 for 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, 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 to 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.

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.

Links 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.

Chapter 5

Name Type 1 – Asynchronous Line(s)

Main Form

From the Level 2, option 4 (Examine/Modify, a configuration, user list or text), the Name type1—Asynchronous line menu can be reached. Enter “1 <CR>” at the Name Type Form. This displays the Asynchronous Line(s) Main Form, (figure 5-1).

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 are discussed individually in the next paragraphs.

```
Config: don      Name: new      [11/128 used]
Name type: Async port  (Port modules 1 & 2)
-----
Starting PM:>1      Baud rate: Autobaud  Attachment control: Unqualified
Starting port: 1    Character length: 8 bits Device flow control: None
Ending PM: 1        Stop bits: 1 bits    Port flow control: None
Ending port: 1      Parity: None          Timeout (mins): 0
                  Escape delay: No        Timeout direction: Receive
                                      Direction: Originate
----- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -----

Range: 1 - 2
(Select the starting port module (PM))
Starting PM:
```

Figure 5-1. Asynchronous line(s) form

Starting PM

There are two Port Modules, PM1 (left module from the rear) and PM2 (right module from the rear). Each has 16 ports. Select the module to be configure by typing 1 or 2 from the choice at the bottom of the menu of figure 5-1.

PM 1 or 2

(Select the starting port module (PM))

Starting Port Module: 1<CR>

Starting 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:1 <CR>

Ending PM

Select the ending Port Module from the prompt.

PM 1 or 2

(Select the ending port module (PM))

Ending Port Module: 1<CR>

Ending Port

Select the ending port from the prompt.

Range: 01 - 16

Ending port: 1 <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: 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, 115200. Users with terminals set to 1200 baud or greater 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 baud rates are:

- 1) Autobaud
- 2) 1200
- 3) 2400
- 4) 4800
- 5) 9600
- 6) 14400
- 7) 16800
- 8) 19200
- 9) 38400
- 10) 57600
- 11) 115200

Baud rate: <CR>

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

Note: Autobaud may require up to 3 carriage returns before autobauding can take place, depending a number of factors.

Character Length

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

The majority of terminals and computers in use today require character lengths of seven or eight bits. For example, to set the character length to seven bits for a port cabled to an ASCII terminal, you 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
- Stop bits: <CR>

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 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:

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 system distinguishes session boundaries. “Attachment control” and the “direction” parameter combine to provide several forms of EIA control lead manipulation; allowing the VCX 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-500 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 *Appendix B*.

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 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 to buffer and print 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 a slave.

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

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 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.

Device flow control refers to the control characters or signals sent by the external device to the VCX 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** (for Data General)
 - 10) **HP XON/OFF**
 - 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 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** (for Data General)
 - 10) **HP XON/XOFF**
 - 11) **XPC XON/XOFF**
(recognized by the device)
- Port flow control:**

Timeout

Establishing a connection timeout limit causes the VCX to monitor a connected port and disconnect the port automatically after a specified period of inactivity. The timer is reset uni-directionally (sensing input to the port from the attached device), whether terminal or computer. The timeout prompt is:

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

Enter the number of minutes of inactivity which will provoke an automatic disconnection. If you enter "0 <CR>", 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:

One port must originate the connection and the other port must answer it. The “Direction” parameter specifies that the port will originate connections, answer connections or will do both. Ports cabled to terminals generally originate connections. Ports cabled to computers are generally answer connections. Some ports need to be both.

The prompt is:

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

Direction:

Name Type 1—Async 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. This Subform permits 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 allows you to define an attachment, a detachment 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, 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 5-2.

Config: don	Name: new	[11/128 used]
Name type: Async port (Port modules 1 & 2)		
Starting PM: 1	Baud rate: Autobaud	Attachment control: Unqualified
Starting port: 1	Character length: 8 bits	Device flow control: None
Ending PM: 1	Stop bits: 1 bits	Port flow control: None
Ending port: 1	Parity: None	Timeout (mins): 0
	Escape delay: No	Timeout direction: Both
		Direction: Originate
Auto connect A:>		
----- <CR>=next field ----- ^E=previous field ----- ESC=accept screen -----		

Figure 5-2. 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 *Appendix C*).

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

Answer access rights: 1 - 64

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. If a 2 for Yes is chosen, a prompt for the password will be presented.

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

After answering the “answer access rights” and “password override” prompts, three more prompts are displayed on the screen. These are shown in figure 5-3. 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 5-3 .

Config: don			Name: user5			[9/128 used]		
Name type: Async port			(Port modules 1 & 2)					
-----			-----					
Starting PM: 2	Baud rate: 9600		Attachment control: Unqualifi					
Starting port: 1	Character length: 8 bits		Device flow control: XON/XOFF					
Ending PM: 2	Stop bits: 1 bits		Port flow control: XON/XOFF					
Ending port: 1	Parity: None		Timeout (mins): 0					
Escape delay: No			Timeout direction: Receive					
			Direction: Answer					

Answer access rights:								
Password override: No								

Answer attachment string name:								
Answer detachment string name:								

Answer disconnect string:>								
----- <CR>=next field ----- ^E=previous field ----- ESC=accept screen -----								

Figure 5-3. Menu after correct "password override"

The “Enter out of service state” prompt defaults to “no”. However, the System Administrator can have the answer port go out of service should the user disconnect before the host has issued the disconnect string. This prevents tail-ending into an open session with possible security breach consequences. Selecting “yes” for this option requires the host to issue the disconnect string before the answer port can accept another call.

Name Type 1—Asynchronous Line(s)

Automatic Connection Subform

If a port is defined as an *originate* port under the *Direction* parameter the *Auto Connect* prompt is displayed and must be answered. The Automatic Connection Subform is illustrated in figure 5-4.

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).

If no entry is made to the Auto connect prompt, and a carriage return is used, the VCX 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.

```

Config: don          Name: user2          [6/128 used]
Name type: Async port (Port modules 1 & 2)
-----
Starting PM: 2      Baud rate: Autobaud    Attachment control: Unqualified
Starting port: 1    Character length: 8 bits Device flow control: XON/XOFF
Ending PM: 2        Stop bits: 1 bits      Port flow control: None
Ending port: 16     Parity: None           Timeout (mins): 0
Escape delay: No    Timeout direction: Transmit
                                   Direction: Originate
-----
Auto connect A:
-----
Session limit:>2
----- <CR>=next field ----- ^E=previous field ----- ESC=accept screen -----

Range: 1 - 8
(Number of sessions, 1 - 8)
Session limit:

```

Figure 5-4. Automatic connection subform screen

When a name is entered for Auto connect A, but none entered for B, the Autocon. 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 link were 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.
- **Dual Dedicated.** Same as above except the user is given two destination ports that are toggled between by using the control state character.
- **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, auto 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 backward or forward toggle control character is also defined for the port, the user can toggle forward or backward between connections. If the network administrator does not want a particular port to have forward or backward toggling, then a control character must not be defined for either the backward or the forward toggle port when configuring.
- **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.)

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 5-5. 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>>>

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

Figure 5-5. Control state screen

Use the forward toggle character to move to the next higher 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 # <CR>

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 as well. This is illustrated in the example shown in figure 5-6.

```

Config: don      Name: user2      I6/128 used1
Name type: Async port (Port modules 1 & 2)
-----
Echo: >CPU & VCX services      BREAK key: Ignore
      Messages: All            Control state char: 0
      Confirm connections: No   Forward toggle char: 0
      Login required: No       Channel priority: 1
      Ignore routine bcsts: No Disconnect delay(secs): 0
      Detach after disconnect: No
----- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -----

1) CPU & VCX services
2) VCX local port
3) Terminal
Echo:

```

Figure 5-6. Terminal characteristics subform screen

The following describes the fields of the Terminal Characteristics Subform:

Echo

Echo is the retransmission of received data. Echo allows users to see what they type. The VCX 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 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 those messages that require a response from the port device or operator of the port 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: <CR>

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: <CR>

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 and prompt:

1) No

2) Yes

(yes detaches user after exit from first connection)

Detach after disconnect:

Break Key

This parameter determines how the VCX 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 chapter 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.

Select the type of BREAK key processing from the prompt:

- | | |
|-----------------|------------------------|
| 1) Pass through | 3) Enter control state |
| 2) Ignore | 4) Forward toggle |

BREAK key:

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 system. For example, the control state character is commonly used to initiate disconnection. If you define the control state character as “^\\”, and the terminal user enters “^\\” while connected, the VCX 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 toggle control characters are reserve 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 control character toggles forward one connection each time the forward toggle control character is used.

Note: Enabling flow control at the destination port prevents data loss from occurring when the user enters the control state or the forward toggle control 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:

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 the forward or backward toggle control character works in exactly the same way.

Note: Avoid entering identical control state, backward toggle and forward toggle 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 the backward/forward control toggle characters. The less often-used ASCII characters listed below are recommended candidates.

Suggested Control State/Backward Toggle/Forward Toggle Control Characters

DEC	ENTRY	ASCII	MEANING
1	^A	SOH	start of header
2	^B	STX	start of text
3	^C	ETX	end of text
4	^D	EOT	end of transmission
14	^N	SO	shift out
15	^O	SI	shift in
16	^P	DLE	data link escape (except X.25)
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 toggle character that can interact with other functions such as flow control.

Control State/Forward/Backward Control 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
10	^J	LF	Line Feed
13	^M	CR	Carriage return
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>

Channel Priority

Channel priority applies only to asynchronous ports granted access to trunk lines. This parameter determines how VCX 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:

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 5-7.. If you see your terminal type listed, enter the number displayed beside the terminal name and press <CR>.

```

Config: don          Name: user2          [6/128 used]
Name type: Async port (Port modules 1 & 2)
-----
Terminal type:>ANSI Std: Ambassador
----- <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) M9400
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) UDB 8024
12) Datapoint 8220/8240  28) Tandberg 2215
13) DEC VT-100/VT-100   29) Telera
14) DEC VT-52           30) TeleVideo
15) Hazeltine 1500       31) Wyse WY-100
16) Hazeltine 1510       32) Xerox 820

Terminal type:

```

Figure 5-7. Terminal characteristics subform screen

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, the following screen (figure 5-8) is displayed.

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

```

Config: don          Name: user2          [6/128 used]
      Name type: Async port  (Port modules 1 & 2)

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 5-8. Terminal subform monitor display

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) .

Chapter 6

Name Type 2 -Link

Main Form

A link 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 Link Line Main Form. The Link Line Main Form will appear on the monitor, as illustrated in figure 6-1.

```
Config: don      Name: user4      [6/128 used]
Name type: Trunk port (Link modules 1 - 4)
-----
Link module:>1      Port view, clocking: DTE, supplies no clock
                   Baud rate: 19.2K
                   Virtual circuits: 0
                   Multiplexing protocol: Muxing
                   Interface type: U.24
                   Login required: No
                   Trunk Timeout (secs): 60
                   Utilization Threshold: 75
                   Retransmission Threshold: 25
                   Statistics Logging Timer: 0
----- <CR>=next field ---- ^E=previous field ---- ESC=accept screen -----

Range: 1 - 4
Link module:
```

Figure 6-1. Link Main Form menu

Link Module

This field asks for the Link Module which is to support the link (four are available). For example, to select Link Module 1, enter:

Range: 1 - 4
Link Module: 1<CR>

As viewed from the rear of the chassis, Link Modules are numbered left to right.

Port view, Clocking

This field determines the source of the clock signal used to synchronize data transmissions between the VCX port and external device, typically a synchronous modem. Two clock signals are required: transmit and receive. Either the VCX 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 port 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 and 16.8K baud, configure the "Port view, clocking" to "DTE, supplies no clock" and selects 19.2 as the port baud rate. The available baud rates at the prompt are shown in figure 6-2. Enter the number shown for the baud rate desired.

1) 1200	6) 9600	11) 38.4K	16) 128K	21) 1.024M
2) 2400	7) 14.4K	12) 48K	17) 256K	22) 1.536M
3) 3600	8) 16.8K	13) 56K	18) 384K	23) 2.048M
4) 4800	9) 19.2K	14) 64K	19) 512K	
5) 7200	10) 28.8K	15) 112K	20) 768K	

Baud rate:

Figure 6-2. Available baud rates shown at prompt

Number of Virtual Circuits

Connections between VCX ports at different nodes are multiplexed onto a common link. This field determines the maximum number of multiplexed connections or virtual circuits the link supports. A VCX link supports from 1 to 250 virtual circuits. If you select 250 virtual circuits, the link supports up to 250 simultaneous connections. If a port attempts to originate the 251st connection, VCX 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 + 1 extra or 17 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 1 extra for 33 virtual circuits.

Also, buffer allocation for each virtual circuit is fixed. When large numbers of virtual circuits are specified, the amount of buffer space allocated to each circuit is reduced. 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 in response to the prompt:

Range: 0 - 250

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.

Multiplexing Protocol

This field permits selection of a multiplexing protocol. The prompt for this field is:

1) **Muxing**

2) **X21**

3) **X21 PSTN**

Multiplexing protocol:

Enter a 1 for muxing, 2 for X.21 or 3 for X.21 PSTN.

Interface type

At this field of the menu, select the interface type from the list at the prompt. (Figure 6-3.) These include V.24, V.11 and V.35. Enter the number of the interface type at the prompt, i.e.,

```

Config: don      Name: user4      [9/128 used]
Name type: Trunk port (Link modules 1 - 4)
-----
Link module: 1      Port view, clocking: DTE, supplies no clock
                      Baud rate: 19.2K
                      Virtual circuits: 0
                      Multiplexing protocol: Muxing
                      Interface type: >V.24
                      Login required: No
                      Trunk Timeout (secs): 60
                      Utilization Threshold: 75
                      Retransmission Threshold: 25
                      Statistics Logging Timer: 0
----- <CR>=next field ----- ^E=previous field ----- ESC=accept screen -----

1) V.24
2) V.11
3) V.35
(Definition of sync port interface type?)
Interface type:

```

Figure 6-3. Access subform for links

(Definition of sync port Interface type?)

Interface type: 1<CR>

Login Required

If for security reasons, you would like to have the user enter a password and a user name before accessing the link, then answer Yes to the following prompt:

1) No

2) Yes

(Should port prompt user for name and password?)

Login required: 2 <CR>

Link Timeout

This option serves a dual function. When the link is configured for muxing protocol it represents the number of seconds the link 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 link 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

Link Timeout (secs): 60 <CR>

Utilization Threshold

With this parameter, a threshold level is set for link utilization, that if exceeded will generate a minor alarm. The link utilization threshold is entered as a percentage of the maximum bytes that can be transmitted over the link. 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 access subform for links appears below the Link Line Main Form, as shown in figure 6-4. This access subform is similar to the one for asynchronous line(s).

Link answer access rights are those rights that out-going calls must have to use the link. 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 link as having the answer access rights of one through sixty four, you would enter: 1 - 64.

```

Config: don      Name: user4      [6/128 used]
Name type: Trunk port (Link modules 1 - 4)
-----
Link module: 1      Port view, clocking: DTE, supplies no clock
                        Baud rate: 19.2K
                        Virtual circuits: 0
                        Multiplexing protocol: Muxing
                        Interface type: V.24
                        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 6-4. Access subform for links

Password Override

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: 1 <CR>

Originate Access Rights

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

X.21 - PDN/PSTN

General

A VCX link can be set to run multiplexing protocol, X21 protocol or PSTN protocol. The latter two involve connection to a Public Data Network (PDN) or a Public Switched Telephone Network (PSTN) and are discussed. The benefit of switched connection for the link is charges only occur 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 link, 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 feature 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
- Retry Counter 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 will assert DTR and start a 6 second Call Request timer. If the Call Request timer expires without the VCX seeing DSR and CTS go high, the VCX will enter the retry loop. When DSR and CTS are asserted, the VCX will proceed and establish synchronization with the remote VCX.

Remote (Network DCE) Cleardown

When in the Data Transfer state, and either CTS or DSR drop, the VCX will Drop DTR to confirm the network clearing, and enter the Idle state. If the VCX still has data to send it will enter the retry loop.

Automatic Retry

When in the Data Transfer state, no data is detected for a programmable (typically 10 second) period (after the initial minimum 10 seconds). The VCX will then 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 saying that the requested port is out of service. This condition will be reset by an incoming call, or by resetting the link/unit.

Timer Settings (X.21)

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

Table 6-1. 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 via the link timeout parameter
Maximum Number of retries:	3 attempts (2 retries)

Configuration

The X.21 interface should be configured as a link 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 link is sensed, the local VCX will raise DTR, causing the local modem to dial the number stored manually (through the front panel pushbutton switches). 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 1 minute 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 5 minutes, 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.

Note: X.21 requires 2 call attempts when a trunk goes down.

Timer Settings (PSTN)

Timer settings for PSTN are given in table 6-2. .

Table 6-2. 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:	5 Minutes
Inactivity timeout:	Programmable to 255 seconds via the link timeout parameter
Maximum number of retries:	3 attempts (2 retries)

Configuration

The VCX link interface should be configured as DTE, supplies no clocks and have a baud rate of 9600 bps. The V.32 modems should be powered up and configured by selecting the “2-Wire Dial (Dumb)” Quick Setup. (See V.32 manual for more details.) Use the front panel pushbuttons and LCD to select the following option settings:

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

PSTN Cable

The link for X21/PSTN operation requires a DB-25 male-to-DB-25 male cable (part number 16D166A11-01). Cable pinouts are shown in figure 6-5.

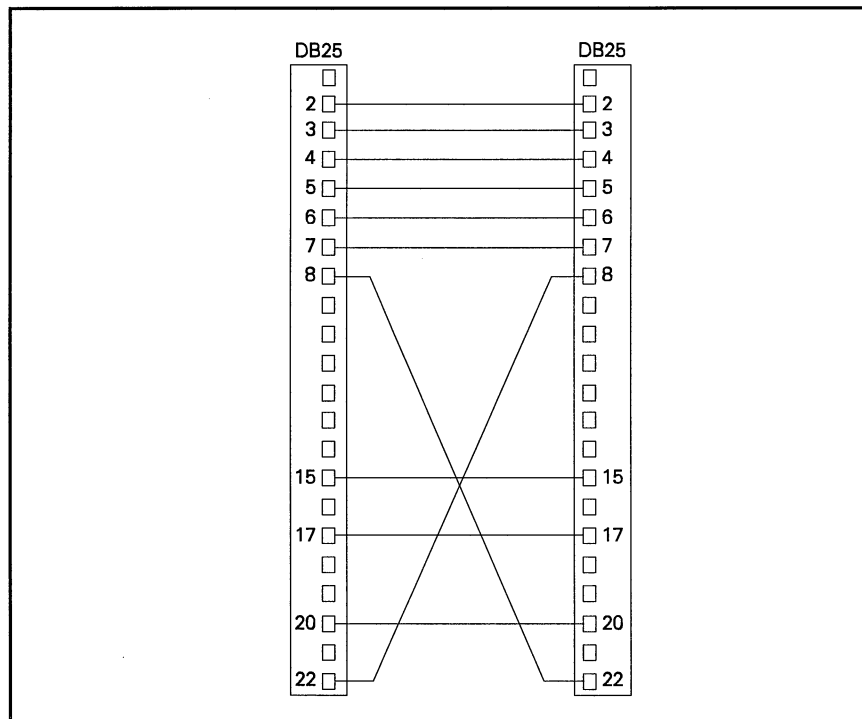


Figure 6-5. X21 Trunk Cable pinouts

Chapter 7

Name Type 3 –Speed Connect

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”.

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

Routing name: newyork.phil.pdp11 <CR>

The Speed Connect Form monitor screen is illustrated in figure 7-1 (next page). In this case the name selected was “c”. The speed connect was set up so that at the **Routing name:** prompt, Configure was entered. Now whenever a “c” is entered (plus Enter) at the prompt, the VCX automatically speed connects to the Configure service.

```
Config: don      Name: c      [9/128 used]
Name type:>Speed connect
----- <CR>=next field ---- ^E=previous field ---- ESC=accept screen

1) Async port (Port modules 1 & 2) 4) Group
2) Trunk port (Link modules 1 - 4) 5) Services, controlled access
3) Speed connect 6) String
Name type:
```

Figure 7-1. Speed connect menu

Chapter 8

Name Type 4 – Group

Group Name

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
- Links
- speed connect names
- pathnames
- VCX services.

Group

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 8-1.

The fields of the group name form follow.


```

Config: don      Name: group      [12/128 used]
Name type: Group
-----
A comma-delimited list of pathnames:

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

Names:

```

Figure 8-1. Group form submenu of the Name type form

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’s 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 8-2.

Line allocation

The VCX can allocate connections between vax1, vax2, and vax3 in the example using a sequential or round robin algorithm. Sequential allocation means that VCX adds new connections to vax1 until all ports are connected. VCX then assigns connections to vax2 until all are used and then to vax3. Round robin allocation means that VCX 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.

```

Config: don      Name: group      [12/128 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 8-2. Group form monitor screen

The prompt is:

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

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

Group

Chapter

Controlled Access

The form for the name is illustrated in figure 9-1..

Control. Access

9-1

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:

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

Note: Access rights are more fully explained under "Restricted Access" in *Appendix C*.

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

Chapter 10

Name Type 7 – Strings

Attach and Detach Strings

Attach and detach strings are defined using this menu selection. The String Form is shown in figure 10-1.

```
Config: don      Name: detach      [12/128 used]
Name type: String
-----
String name contents:>off
----- <CR>=next field ----- ^E=previous field ----- ESC=accept screen -----
```

Figure 10-1. Attach/Detach string form

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 an up-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 140 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.

Chapter 11

AB Service

AB Service

The AB service gives the Network Administrator a rapid ability to change the destination of any or all dual auto-connects in a single node or an entire VCX network. A typical application is a network with a primary host and a backup host. Should the primary host fail, or maintenance be required, switchover can occur within a fraction of a second. When the network Administrator changes the position from A to B, or vice-versa, all affected ports receive a message regarding location (provided the port is configured to receive system messages). For example, the message “connecting to A” or “connecting to B” is sent to affected ports.

The AB service offers the opportunity to “set to A”, “set to B”, or to turn the VCX “off”. A and B were previously discussed. The “off” command suspends the node and no processing of connections, no auto-connects, no dual auto-connects, and no user switched connections will occur. This can be useful when trouble shooting a live network where remote users may be accessing resources causing uncontrolled behavior.

Accessing the Service

To access the AB service, enter **AB<CR>** in response to the system prompt.

connect to: AB<CR>

The menu displayed is shown in figure 11-1 .

Selecting option 1 will return to the system prompt. Selecting option 2 will result in the prompt:

**Enter name to be switched
(Or \$ALL for all ports this node):**


```
***** NETWORK AB SERVICE *****

1. Exit AB Service
2. Enter name to be switched

Enter selection:
```

Figure 11-1. AB Main Menu

Enter the name of a port, a series of ports, a group, a speed connect or \$ALL. The \$ALL entry will take the appropriate action on all dual auto-connect - ports in the node. A name has been entered for this example which results in the a display like that shown in figure 11-2.

```
Appears to be in the A (Disable B) position.

1. Exit
2. Set to A position
3. Set to B position
4. Set to OFF position
5. Set to A/Disable B position
6. Set to B/Disable A position

Enter selection:
```

Figure 11-2. AB Service 2nd level menu

Notice that the service makes a determination of the current position by sampling the position of the first port of the name specified.

Note: If users are given a toggle character, different ports can be in different positions at any point in time. Therefore, it is impossible to know the exact status and display it in simple terms. The first port is shown in the example.

If the selection is 3, VCX further prompts:

Are you sure you want the B position? [y/n]

If this change is NOT desired, an "n" for no can be entered, returning the main menu. With "y" entered, after completion of the switching and producing messages, the VCX responds to the affected ports with:

**Sending messages ...
DONE**

In addition to the affected terminals receiving a “connecting to ...” message, the system logger outputs a toggle event for each port.

When option 2 (set to A position) or 3 (set to B position) are selected, the non-active destination will still accept data and generate or respond to flow control characters. In some applications this behavior is not desirable. Therefore option 5 or 6 should be selected which connects the originate port to the A or B destination while disabling the non-active answer port. For example, if A/Disable B is selected, the originate port will be connected to the A destination and the B answer port will not take in data, or generate flow control characters or respond to flow control characters.

It is possible to use the AB service and enter action arguments in a single command line without dialogue with the AB service. This is particularly useful if a CPU is to initiate the AB switchover.

The command syntax is:

AB(sp)[name](sp)[A or B or O or AD or BD] where,

name = a port, a port series, a group, or a speed connect

A = position A

B = position B

O = turn off

AD = position A/Disable B

BD = position B/Disable A

If the name is a group which consists of one or more speed connects, it is possible to switch more than one node in a single command line. For example a name network can be defined in configure to permit simultaneous switching of all nodes in a 4-node network.

network=\$ALL,t1.\$ALL,t2.\$ALL,t3.\$ALL.

Chapter 12

Broadcast Service

Transmitting a Message

The Broadcast Service allows the System Administrator to transmit a message of up to 1000 characters or 23 lines to any Originate port or Both port.

The main menu for the Broadcast Service is entered by typing *broadcast* after the Connect prompt.

Note: One can by-pass the main menu by using the fast entry. See the description of the fast entry at the end of this section.

Connect to: broadcast <CR>

After doing so the Broadcast Service's main menu shown in figure 12-1. will be displayed.

Each of the options in the menu are discussed in the following paragraphs.

```
***** BROADCAST *****

1. Exit Broadcast Service
2. Enter message class
3. Enter destination of broadcast message
4. Enter broadcast message
5. Broadcast message to destination

Enter selection:
```

Figure 12-1. Broadcast service main menu

1. Exit Service

To exit the Broadcast Service, type *1 <CR>*, which returns you to the connect prompt.

2. Enter Message Class

There are two classes or levels of messages that are broadcast: a routine or an urgent message. The System Operator must define into which class his message falls by selecting option 2 from the Broadcast Service Main Menu. The selection of option 2 generates the following prompt.

Enter message class routine(1) or urgent(2):

If the broadcast message is to be classified as routine, *1* is entered. A routine message is one which is delivered to a port but may or may not be accepted by the port. A port will block a routine message if the message port parameter (set within Configure or Set Service) has been configured to ignore routine messages. **Note:** a routine message that is blocked at a port is simply dropped.

If *2* is entered, the broadcast message is classified as urgent. An urgent message is one that can not be refused by a port and therefore will always be delivered.

3. Enter Destination of Broadcast Message

Selecting option 3 from the Broadcast Service's Main Menu allows one to define the message's destination. The following prompt is displayed when option 3 is selected:

Enter message destination:

Only one name can be entered for the destination. However depending on the name selected, from between one port to virtually all Originate ports can be chosen as the destination. The various names that can be used are:

1) a single async port name

2) a trunk (or X.25) name with a valid extension

3) a group name (previously defined in Configuration), where the members in the group represent all of the selected destination ports.

Note: This is the most common approach to defining the destination ports. Groups can be nested up to five levels deep.

4) or the special name *\$ALL*, which designates all of the existing async originate ports on the local node. Example: Let's assume you wanted to broadcast a message to all the originate ports on the local node and a remote node which is across a trunk named *t1*. You could define the name of all the destination ports as follows:

\$ALL,t1.\$ALL

4. Enter Broadcast Message

When you are ready to input the broadcast message, select option 4 from the Broadcast Service's Main Menu and the following prompt will appear:

Enter broadcast message text:

Note: If you forget to define the message's class (routine or urgent) or its destination, you will be prompted to provide that necessary data.

The broadcast message can be no longer than 1,000 characters or 23 lines. If the user exceeds this upper character limit or line number, the input mode will automatically abort. Normally, however, for a message that is less than 1,000 characters, the user ends the input mode by hitting the Escape <ESC> key.

The text of the message can include both alphanumeric characters and control characters. Control characters are entered by typing a caret (^) followed by the proper upper case letter. For example, the control code for a carriage return is represented as ^M.

5. Broadcast Message to Destination

When you select option 5 from the Broadcast Service's Main Menu, the message is actually sent to the destination defined earlier (in option 3). After option 5 is selected, the following will be displayed,

BROADCASTING MESSAGE

The broadcast message will be transmitted and the user returned to the system prompt.

When the message is transmitted to a port, it is announced by a BELL, a banner stating the time of day and the introduction:

**** BROADCAST MESSAGE ****

followed by the actual broadcast message and then the prompt,

Hit Return To Continue

Fast Entry

The Broadcast Service's main menu can be superseded if you enter the message class (1 for routine, 2 for urgent) and the destination group name at the time you call up the Broadcast Service. For example, suppose your message destination is defined by a group called mygroup and you consider the message to be routine. In this case you could enter broadcast 1 mygroup to call-up Broadcast, by-pass the main menu, and jump directly into the message input mode.

Chapter 13

Busy Service

Main Menu

The Busy Service renders a port or series of ports, link, or links out-of-service, allowing non-disruptive equipment maintenance. If the port/link is currently in use, the port/link remains in service until detachment occurs. Therefore, busying a port/link does not interrupt a user session in progress. The busied status of a port/link is retained if the chassis is powered down or reset.

To invoke the Busy Service, enter:

Connect to: busy <CR>

VCX-500 displays the Busy Service Main Menu illustrated in figure 13-1. Menu options 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 link to be busied. For example, to busy the port org, enter:

Enter Selection: 2<CR>

```
***** Busy Service *****
```

- 1. Exit
- 2. Busy a port or port series
- 3. Remove busy status from a port or series

```
Enter selection:
```

Figure 13-1. Busy service main menu


```
***** Busy Service *****  
  
1. Exit  
2. Busy a port or port series  
3. Remove busy status from a port or series  
  
Enter selection: 2  
Enter port or series name: org  
"org" now busied.
```

Figure 13-2. Busy service menu with 2 selected

This menu is shown in figure 13-2.

Should you decide not to busy a port, ports, or link, enter <CR>. The Busy Service redisplay the Busy Service Main Menu. If you enter the name of a port series, the Busy Service displays the Port Range Submenu. The details are:

3. Remove Busy Status From a Port Or Series

Type 3 <CR> to allow busied ports links to resume normal operation. For example, having busied the port *org*, you restore it to normal operation as shown in figure 13-3.

```
***** Busy Service *****  
  
1. Exit  
2. Busy a port or port series  
3. Remove busy status from a port or series  
  
Enter selection: 3  
Enter port or series name: org  
Busy removed from "org".
```

Figure 13-3. Busy service menu with "org" entered

If you decide not to change the busy status of a port or link, enter <CR>. The Busy Service redisplay 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 is shown in figure 13-4. Menu selections are discussed below.

```

** 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 13-4. Port range submenu before selection

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 5-16. And you want to busy out five ports 6-10, you would enter data in the menu as shown in figure 13-5.

VCX then displays the Busy Service Main Menu. Unbusyng a port range relative to the starting port of a series works in exactly the same way as busyng the ports. If you enter a port range that exceeds that of the named series of ports, the VCX-500 displays the error message:

Name does not include all ports requested

and returns you to 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 (1-12): 2  
  
Number must be physical position in chassis.  
Enter ending port number (1-12): 6  
"s1" now busied.
```

Figure 13-5. Port range submenu

4. Physical Port Range

Type 4 <CR> to busy a range of ports.

This selection allows specifying 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 13-6 details how this is accomplished .

```
** 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 13-6. Physical port range submenu

The VCX-500 then displays the Busy Service Main Menu.

Unbusying a physical port or link range works in approximately the same way as unbusying the ports. If you enter a port range which exceeds that of the named series of ports, the VCX-500 displays the error message:

Name does not include all ports requested.

and returns you to the Busy Service Main Menu.

Chapter 14

Diagnostic Service

Introduction

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 (Universal Async Receive and Transmit chip) 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 14-11 (at the end of this chapter).

It should be remembered, with the exception of data monitor, diagnostic tests are disruptive to either the port under test, or the link 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 14-1. 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

Diagnostic Srv.

```
***** Diagnostic Port Selection *****

1. Exit
2. Select a port

Enter selection: 2

Enter module number (1=PM1 2=PM2 3=LM1 4=LM2 5=LM3 6=LM4): 1
Enter port number: 2
```

Figure 14-1. Diagnostic service main menu

```
***** Asynchronous Diagnostics *****

Node: node1   Port module: 1   port: 2   name: user1

1. Exit
2. Internal loopback
3. External loopback
4. Transmit fox
5. Data monitor

Enter selection:
```

Figure 14-2. Asynchronous diagnostics main menu

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.

Asynchronous Port Diagnostics

Assume that the port to be selected to test is an asynchronous port. The menu shown in figure 14-2. 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, *Internal loopback*, generates another menu illustrated in figure 14-3.

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 14-4.

```

**** Internal loopback ****

Node: node1   Port module: 1   port: 2   name: user1

1. Exit
2. Fox
3. Echo      (Current)
4. Begin Loopback

Enter selection:

```

Figure 14-3. Internal loopback menu

```

**** Internal loopback ****

Node: node1   Port module: 1   port: 3   name: user1

1. Exit
2. Fox      (Current)
3. Echo
4. Begin Loopback

Enter selection: 4

The quick brown fox jumped over a lazy dog's back 130 times.
The quick brown fox jumped over a lazy dog's back 131 times.
The quick brown fox jumped over a lazy dog's back 132 times.
The quick brown fox jumped over a lazy dog's back 149 times.
The quick brown fox jumped over a lazy dog's back 150 times.
The quick brown fox jumped over a lazy dog's back 151 times.
The quick brown fox jumped over a lazy dog's back 152 times.
The quick brown fox jumped over a lazy dog's back 153 times.
The quick brown fox jumped over a lazy dog's back 154 times.
The quick brown fox jumped over a lazy dog's back 155 times.
The quick brown fox jumped over a lazy dog's back 156 times.
The quick brown fox jumped over a lazy dog's back 157 times.
The quick brown fox jumped over a lazy dog's back 158 times.

```

Figure 14-4. Internal loopback of fox message

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 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.

To select the second internal loopback option (External loopback), echo, enter 2 to make echo (Current), and then enter 4 to start the test. A screen like that shown in figure 14-5.

```
***** Internal loopback *****  
  
Node: node1   Port module: 1   port: 2   name: user1  
  
1. Exit  
2. Fox  
3. Echo      (Current)  
4. Begin Loopback  
  
Enter selection: 4  
  
Hit <ESC> to exit.
```

Figure 14-5. 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 14-6. 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>.

The option *Transmit fox* can be started by selecting 4. This screen is illustrated in figure 14-7.

```
Node: newyork   Card: 1   Port: 2   Port name: Term1  
  
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 14-6. Selection "3" entered

```

**** Asynchronous Diagnostics ****

Node: node1   Port module: 1   port: 2   name: user1

1. Exit
2. Internal loopback
3. External loopback
4. Transmit fox
5. Data monitor

Enter selection: 4

Hit <ESC> to exit.

```

Figure 14-7. Asynchronous diagnostics, select 4

Transmit fox sends the fox message to the selected port and displays it on the user terminal but will not display the 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 14-8.

The Data Monitor can be 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 ____".

```

***** Data Monitor *****

Node: newyork   Card: 1   Port: 2   Port name: Term1

1. Exit
2. Direction           (current is BOTH)
3. Format               (current is ASCII)
4. Trigger              (current is NO TRIGGER)
5. Begin Monitoring

Enter selection:

```

Figure 14-8. Data display monitor submenu

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 14-9.

```
***** Monitor Direction *****  
  
Node: newyork    Card: 1    Port: 2    Port name: Term1  
  
1. Exit  
2. Receive  
3. Transmit  
4. Both  
  
Enter selection:
```

Figure 14-9. 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 14-10.

```
***** Monitor Format *****  
  
Node: newyork    Card: 1    Port: 2    Port name: Term1  
  
1. Exit  
2. ASCII  
3. HEX  
  
Enter selection:
```

Figure 14-10. 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 14-11.

```

***** Data Monitor *****

Node: newyork    Card: 1    Port: 2    Port name: vax1

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 14-11. Data monitor menu, Trigger selected

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.

```

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 14-12. Data monitor set to ASCII/no trigger

Option 5 of the Data Monitor menu starts the actual data monitoring. Two examples of Data Monitor screens follow:

Figure 14-12 is an example of data monitor set ASCII and no trigger .

Figure 14-13 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

```

Figure 14-13. Data monitor set to HEX and no trigger

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 14-14. 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.

Assume you selected option 2, Local loopback. The monitor will display the menu shown in figure 14-15 .

```
***** Multiplexing Port Diagnostics *****  
  
Node: node1   Link module: 1   name: user4  
  
1. Exit  
2. Local loopback  
3. Remote loopback  
  
Enter selection: 2
```

Figure 14-14. Multiplexing port diagnostics

```
***** Local loopback *****  
  
Node: node1   Link module: 1   name: user4  
  
1. Exit  
2. Fox  
3. Echo      (Current)  
4. Begin Loopback  
  
Enter selection:
```

Figure 14-15. Local loopback 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 14-16 . 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 14-17 .

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"). 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 14-14 .

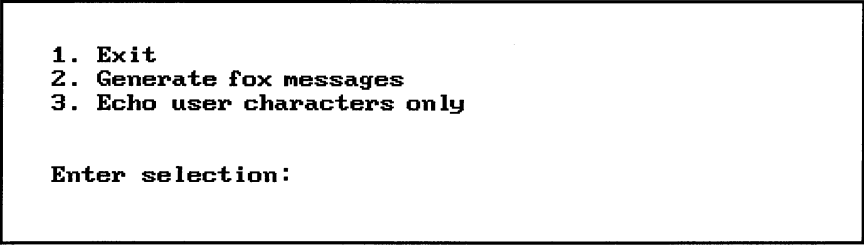
```
***** Local loopback *****  
  
Node: node1   Link module: 1   name: user4  
  
1. Exit  
2. Fox           (Current)  
3. Echo  
4. Begin Loopback  
  
Enter selection: 4  
  
Hit <ESC> to exit.  
  
The quick brown fox jumped over a lazy dog's back 1 times.  
The quick brown fox jumped over a lazy dog's back 2 times.  
The 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
```

Figure 14-16. Local loopback of fox message

```
***** Internal loopback *****  
  
Node: node1   Port module: 1   port: 2   name: user1  
  
1. Exit  
2. Fox  
3. Echo           (Current)  
4. Begin Loopback  
  
Enter selection: 4  
  
Hit <ESC> to exit.  
  
"This is a test of internal loopback."
```

Figure 14-17. Local loopback echo test

Remote loopback diagnostic tests can be selected from this menu. Selecting Remote loopback, option 3, displays the menu shown in figure 14-18 .

- 
- ```
1. Exit
2. Generate fox messages
3. Echo user characters only

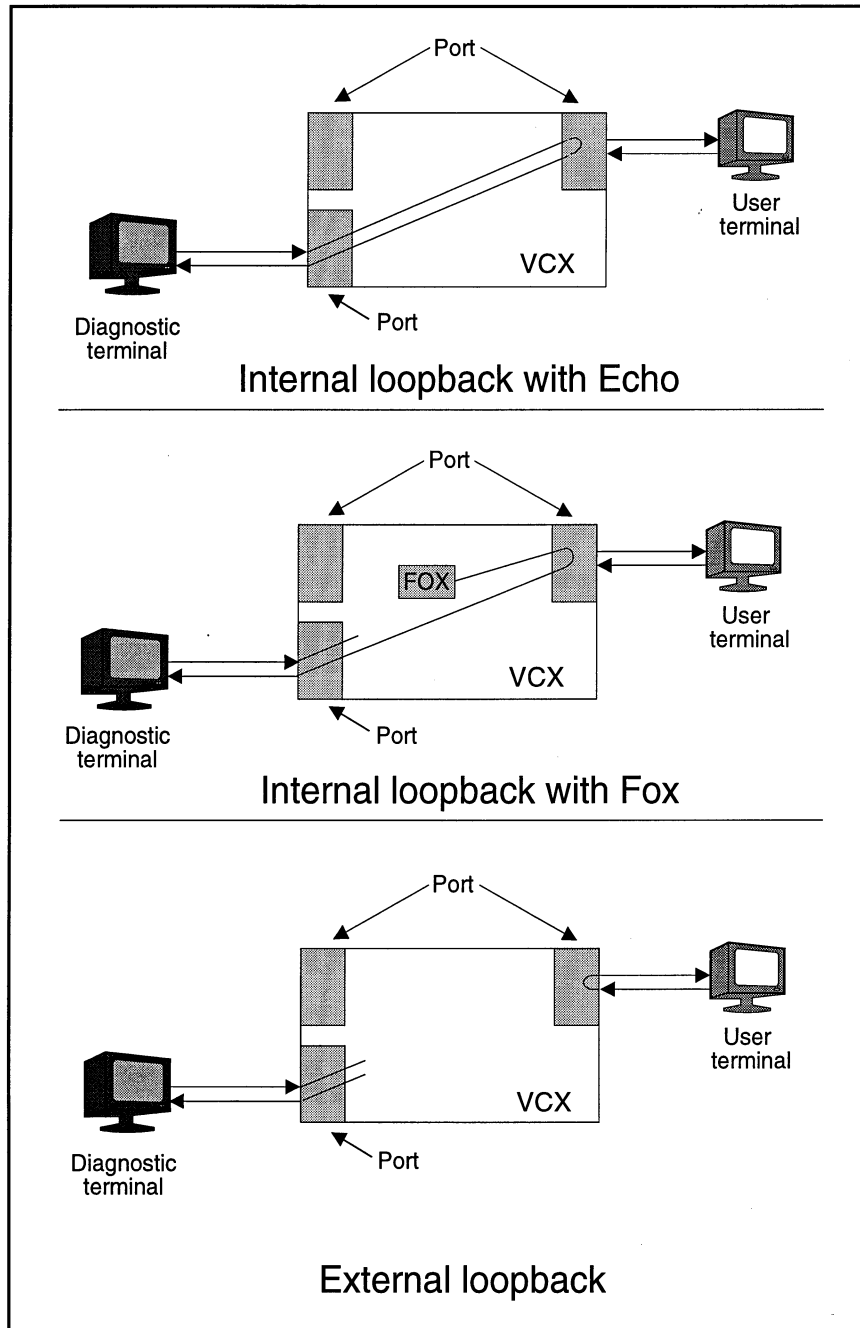
Enter selection:
```

**Figure 14-18. Remote loopback diagnostic tests menu**

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 link 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 14-19, 14-20 and 14-21 .

**Figure 14-19. Loopback operation examples**

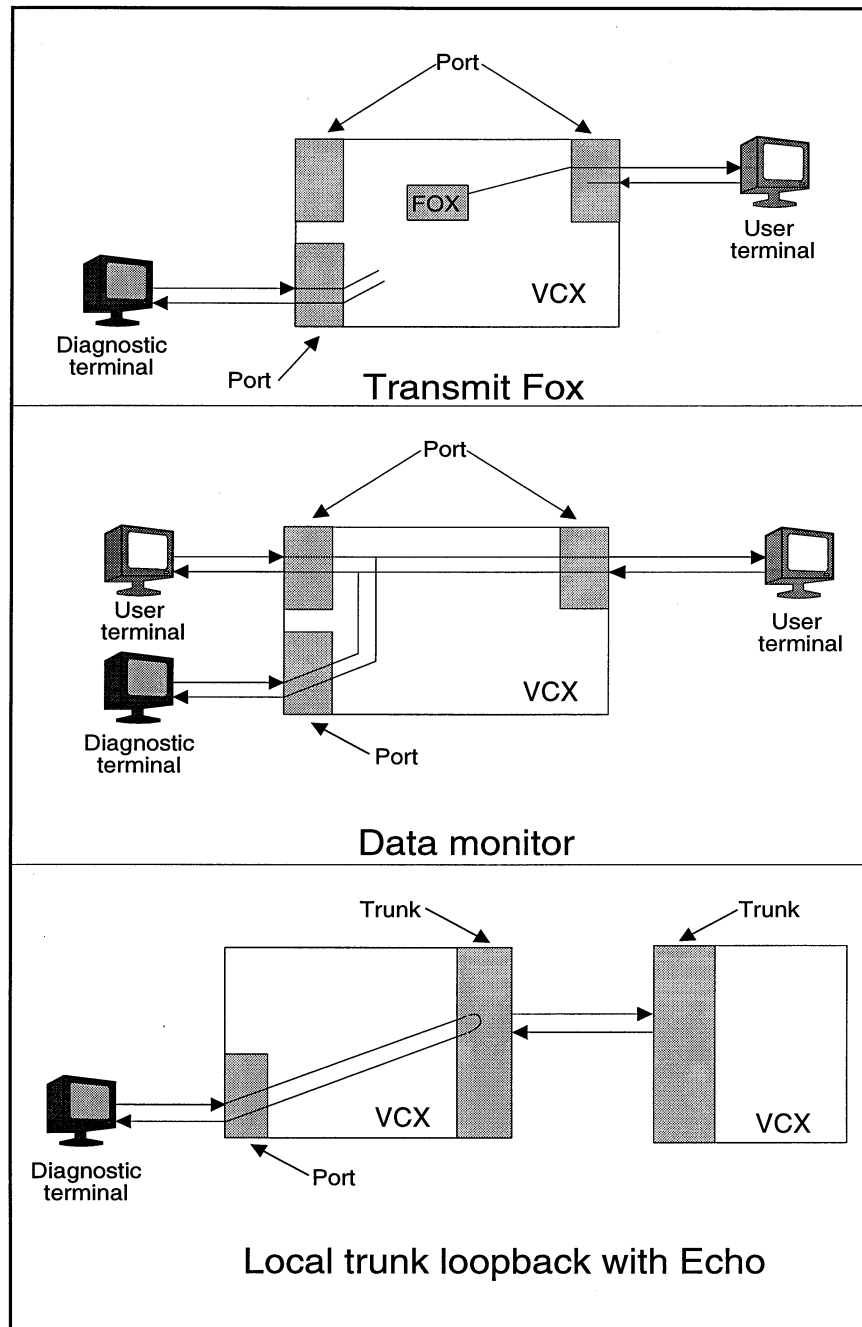
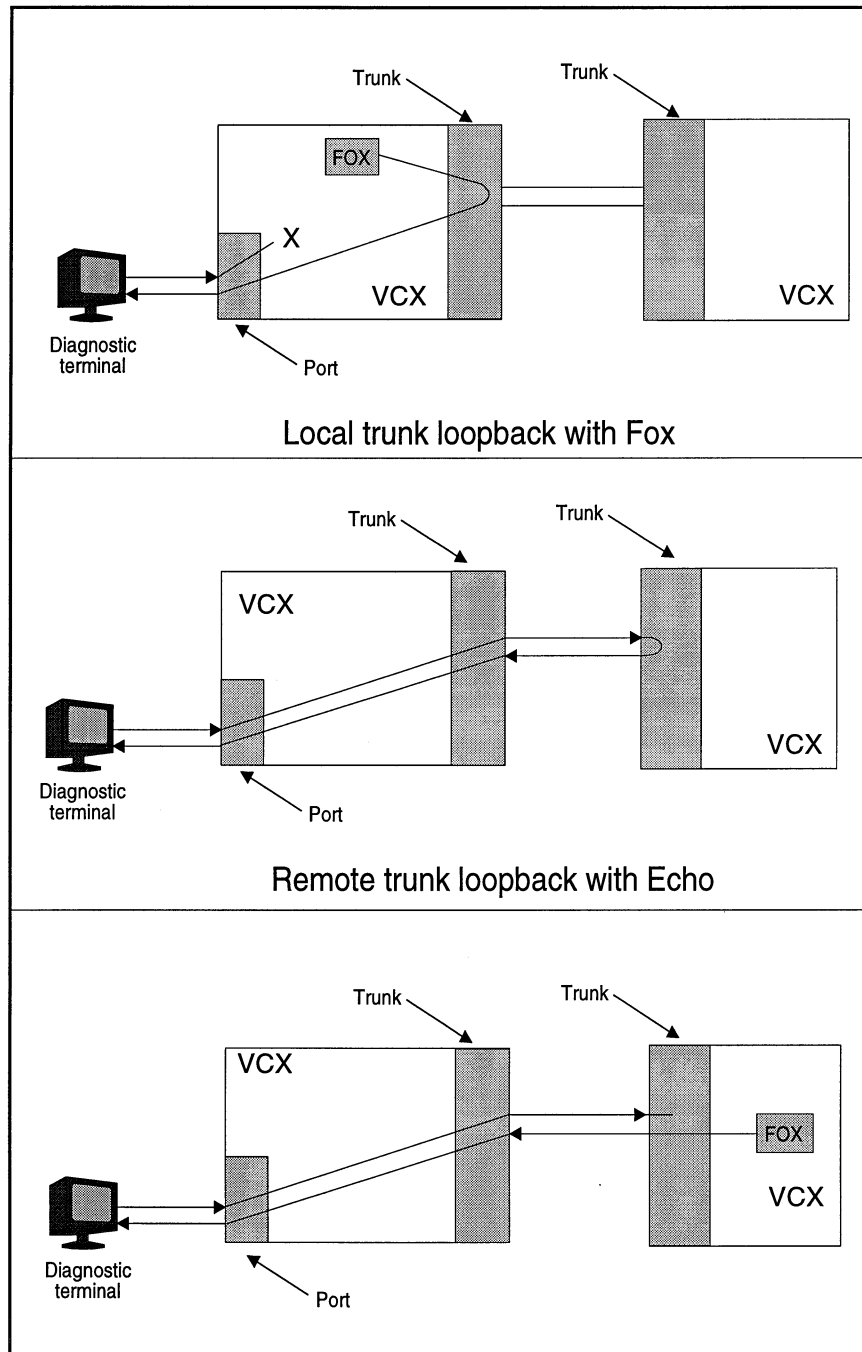


Figure 14-20. Additional diagnostic tests



**14-21. Additional diagnostic Tests**

# Chapter 15

## Forward Service

The Forward Service allows connection requests for one destination to be routed to a different destination. Users requesting the off-line computer can be routed to an alternate functioning unit.

To invoke the Forward Service enter (see figure 15-1):

```
***** Forward Service *****

1. Exit
2. Display forwarded connections
3. Forward connection
4. Remove connection forwarding

Enter selection:
```

Figure 15-1. Forward service main menu

Connect to: forward <CR>

**1. Exit** Type 1 to exit the Forward Service and return to the connect prompt.

### 2. Display Forwarded Connections

Type 2 <CR> for a display of currently forwarded connections (figure 15-2 ).

| Name | Pathname              |
|------|-----------------------|
| vax1 | node1.node2.othervax1 |
| vax2 | node1.node1.othervax2 |
| vax3 | node1.node2.othervax3 |

Figure 15-2. Current forwarded connections

### 3. Forward Connection

Type 3 <CR> to enter a forwarding name or pathname. For example, to forward *vax* connection attempts through remote node *node1* to *node2* and *other vax*, enter:

**Forward to:** Node1.node2.otherwise <CR>

(As shown in figure 15-3 .)

```
***** Forward Service *****

1. Exit
2. Display forwarded connections
3. Forward connection
4. Remove connection forwarding

Enter selection: 3 <CR>

Forward from: vax <CR>
Forward to: node1.node2.othervax <CR>
```

Figure 15-3. Forwarding service, 3 selected

### 4. Remove Connection Forwarding

Type 4 <CR> to delete a forwarding pathname. For example, having forwarded connection attempts to *vax* to a remote port, you restore *vax* to its normal routing as shown in figure 15-4 .

The Forward Service menu is then redisplayed.

```
***** Connection Forwarding *****

1. Exit
2. Display existing forwarded connections
3. Forward connection
4. Delete forwarded connection

Enter selection:4<CR>

Enter name forwarded from: vax<CR>
Forward removed from "vax"
```

Figure 15-4. Forwarding service, 4 selected

# Chapter 16

## 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 the menu shown in figure 16-1.

```
**** Set Greeting ****

Current greeting:

Welcome! Acme Ballon Co.

Greeting OK (y/n)?
```

**Figure 16-1. Greeting service main menu**

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*.

You enter:

```
Greeting OK (y/n)? n <CR>
Enter new greeting line 1:
VAX going down for maintenance 11:00 PM <CR>

Enter new greeting line2:
VAX back up 7:00 AM tomorrow
```

The Greeting Service then displays the greeting message illustrated in figure 16-2.

```
Current greeting:

VAX going down for maintenance 11:00 PM
VAX back up 7:00 AM tomorrow

Greeting OK (y/n)?
```

**Figure 16-2. Greeting menu for proofing greeting**

Enter y <CR> to accept the new greeting. The Greeting Service displays:

**Greeting Service complete**

and returns you to the connect prompt.

# Chapter 17

## Load/Dump Service

---

### Introduction

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-500 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.

Load/Dump Srv.

---

## 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, assume that the configuration is to be *dumped* from a VCX node to a remote PCs System called *Sun* (operating in Unix), so option 3 should 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. Our example involves a Dump to a remote PC System, so answer *yes*, (it is a port other than the user's port).

**Is the destination of configuration other than your port? y<CR>**

Answer **Yes**, generating a prompt asking the path to the Destination. Often a name of a port is all that is necessary. However, if the port can only be reached over trunk lines, then the trunk names would also have to 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 you press return in response to this prompt, the previous menu is redisplayed.

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 passthrough 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 passthrough mode.

Assume for this example that you are in the passthrough mode and are now communicating with *Sun*, where the config file is to be dumped. The *Sun* System will ask for user name and a password, which of course need to be correctly answered.

**Login:** user name<CR>

**Password:** strange name<CR>

After the *Sun* System accepts the entries, a *Sun* prompt will appear (/u/user name in this example). Unique to the UNIX language, you enter the following after the prompt: **cat>filename**. The *cat* command is an abbreviation for *catalog*, a function similar to TYPE in MS DOS. In short, the catalog 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* you want the config data stored in.

**/u/user name:** cat > filename<CR>

After entering the command string and hitting <CR>, you exit the passthrough mode by inputting "~~~".

A prompt now appears:

**Hit return to begin download . . .**

After hitting <CR> and beginning the download, a counter appears 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 passthrough mode is once again entered so that the user can communicate with the receiving device. At this point, enter commands that will stop the receiving device from receiving data and inputting it to a file. In this example, the UNIX commands to use to close a Sun System file are: CTRL D (a Control D). Note, that although you have closed the file, you have *not* exited the Sun System.



**<CTRL>D**

To exit the receiving device (the Sun System in this example), hit “~~~”. The VCX disconnects from the receiving device, and the main load/dump menu is displayed.

To verify 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, 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 pressing <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 is 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.**

In all likelihood you will want to 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 Loaddump menu is displayed:

**\*\*\*\* LOADDUMP \*\*\*\***

- 1. Exit**
- 2. Load configuration**
- 3. Dump configuration**
- 4. Verify dumped configuration**

**Enter selection:** *2* <CR>

In this example a configuration is loaded from the Sun to a Configuration Store Module, therefore enter **2**, load configuration.

The service will then ask for the configuration source. Respond with **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<CR>

**Password:** strange name <CR>

After a system prompt from the Sun the file to be dumped is designated.

**/u/username cat filename <CR>**

After pressing <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<CR>

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 you want to run load/dump in that node.

**Enter commands to prime transmitting device**

**\*\*\*\* LOADDUMP \*\*\*\***

- 1. Exit**
  - 2. Load configuration**
  - 3. Dump configuration**
  - 4. Verify dumped configuration**
- Enter selection:**

Select 3, which then prompts:

**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 Personal Computer and Verify***

A typical use for the load/dump service is to store configurations on a personal computer (PC) diskette. Vterm is a software package offered by Coefficient Systems Corporation that can be used, but there are many others. For purposes of this discussion, Vterm is assumed.

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 optioned as follows:

|                                |                   |
|--------------------------------|-------------------|
| <b>file name:</b>              | <b>conf.vcx</b>   |
| <b>direction:</b>              | <b>receive</b>    |
| <b>protocol:</b>               | <b>ASCII text</b> |
| <b>remove escape sequence:</b> | <b>no</b>         |
| <b>stop upon receiving:</b>    |                   |
| <b>remove characters:</b>      |                   |

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>**

VCX prompts for the destination. Respond with an **n** for no, since the destination is in the PC.

**Is the destination of the configuration other than your port? n <CR>**

**Hit return to begin download....**

**Load/Dump Srv.**

Enter an <ALT>T 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 Personal Computer***

Setup Vterm to send and <ESC> 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. Answer *n* for no 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 T> 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**

The main menu is then displayed to allow exit from the service.

# Chapter 18

## 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 trunkname (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.

---

## **Loggable Event Classes**

The logging software assigns all loggable events to one of seven classes: (E) Exception, (N) Normal, (M) Mandatory, (X) X.25, (A) Major Alarms, (I) Minor Alarms and (P) Performance. Explanations of the logging event classes follow.

- **Exception.** 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  
**TOF** Diagnostic test OFF

- **Normal.** Events in this class are generated by normal use.

**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** Configuration running

- **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 re-transmission rate threshold exceeded  
**QLX** Queue length threshold exceeded  
**DLS** Data lost  
**VIO** Security violation

- **Performance.** Planning data for internodal trunks.

**MGT** Raw data for management center  
**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 and then disable the logging of security events at his terminal without disturbing the system log.

The general logging message format is:

**#<class><time><node name><event mem><Slot\port><other 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. Note that the 5 space area for the slot\port, is dedicated space. That is, the space remains in the log even if a slot\port is not given or is not applicable. A log example is illustrated in the following pages.

\*\*\*

#A 03:31:00<node name>CLR 04\01 ilcon 28 21125497

\*\*\*

The class code specifies the event class. This is illustrated in table 18-1.

**Table 18-1. General Logging Message Format Event Classes**

| 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.

Note that neither time or date information are logged if the time is not set.

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 originating port, the requested destination, and whether the attempt succeeded or failed. Note that supplemental information can continue to the next line. If an entry is split into two or more lines, the continuation is indented to align with the event mnemonic.

## ***Logging Messages Summary***

Messages for each loggable event are given in alphabetical order by mnemonic.

---

### 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. In this example, a session was started on card 1 port 1 by 'fred' whose account id is 81326.

---

### Event: **Card Crash**

Mnemonic: **CCR** Class: Major Alarm (A)

Description: Indicates a card has crashed.

---

### Event: **Call Clear**

Mnemonic: **CLR** Class: X.25 (X)

Description: Both incoming and outgoing calls that have been cleared are recorded on the logger. The first example is of a cleared incoming call on LCN 1 of trunk 2 on card 2 named PAD. 14 packets were transmitted during the session and 179 characters were transferred. The second example is of a cleared outgoing call on LCN 1 of trunk 2 on card 2 named PAD. The originating port was named FRED, port 1 of card 1 on the WASH node. Packet and character counts are given.

---

---

**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:** Protection violations are not treated as connection failures but are logged separately as a Minor Alarm. 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:** X.25 (X)

**Description:** Either an outgoing or an incoming call request packet is logged. In the first example, a call request packet was sent on LCN 1 of trunk 2 of card 2, named PAD, to the address 7654321. The originating port was named FRED and was port 1 of card 1 in the WASH node. In the second example, an incoming call request on the PAD trunk, port 2 of card 5 has been assigned to LCN 1.

---

**Event: Card Reset****Mnemonic:** CRS    **Class:** Mandatory (M)

**Description:** This message logs a card reset. The possible keywords for a CRS event are:

**FAILED.** The 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 several lines of 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 gives the originating port, 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. The message *Data Loss* will also appear on the user's terminal when this error occurs.

---

**Event: Disconnection**

Mnemonic: **DSC** Class: Normal (N)

Description: This message logs a disconnection. If a NORMAL disconnect occurs then the total session connect time is displayed (hours:minutes:seconds). In the example above, the user at port one of card 1 typed *quit* to disconnect. 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 SERVICE.** An unexpected detachment broke the connection.

---

**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: Indicates that the forward toggle character was pressed, toggling to the next higher session number.

---

**Event: Notice to Management Center that Node is Alive**

Mnemonic: **IOK** Class: Mandatory (M)

Description: This message is output at a programmable frequency to indicate to the management center that the node is alive. Information contained in the supplementary data is the configuration running, the time and the date.

---

**Event: Inconsistent Port Configuration****Mnemonic: IPC** Class: Exception (E)

Description: This message occurs when a port fails to boot because its configuration is inconsistent. 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, trunk speed, peak utilization transmitted and received, characters transmitted and received.

---

**Event: Queue Length Exceeded****Mnemonic: QLX** Class: Minor Alarms (I)

Description: The queue length threshold set in the global configuration has been exceeded. In the above example, the queue length threshold was set to 4 and a measured queue length of 5 triggered the alarm.

---

**Event: User Log Entry****Mnemonic: REM** Class: Mandatory (M)

Description: Through the Logging Service system administrators can insert arbitrary text into the system log by generating a remark such as the one above.

---

**Event: End Session****Mnemonic: SEN** Class: Normal (N)

Description: The message logs the end of a synchronous session. A session at the end of a trunk ends when a connection is established or the user quits.

---

**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. For example, each of several calls on an incoming dial-up line are separate sessions. The log entry specifies the port at which the session was started. Only an incoming session of a trunk is logged.

---

**Event: System Error Log**

Mnemonic: **SYS** Class: Mandatory (M)

Description: When the software detects an operating problem, information is logged rather than causing a fatal crash.

---

**Event: Trunk Down**

Mnemonic: **TDN** Class: Major Alarms (A)

Description: This message occurs when a trunk line goes down. In the example above, the trunk at port 1 of card 2 is down.

---

**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 Re-transmission Rate Threshold Exceeded**

Mnemonic: **TRX** Class: Minor Alarms (I)

Description: Whenever the re-transmission 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.

---

**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 sampling appears as above. In this example, the trunk utilization on trunk 1 of card 2 has an average Rx utilization of 20% and a peak of 35%; and an average Tx utilization of 0% with a peak of 10%. The quality can be good or bad, but in this case it is good.

**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\02

\*\*\*

#E 22:14:02 NewYork TON 01\02

#E 22:14:11 NewYork TOF 01\02

#E 22:14:38 NewYork IPC 01\12

\*\*\*

#I 22:13:58 NewYork TUX 01\01

\*\*\*

\*\*\*

#I 22:14:02 NewYork DLS 01\04

\*\*\*

## Chapter 18

## General Logging Message Format

\*\*\*

#I 22:14:28 London TRX 01\01

\*\*\*

#M 22:14:17 NewYork TUP 01\02

#N 22:13:33 NewYork SST 01\01

#N 22:14:11 NewYork TGL 01\01

#N 22:13:34 NewYork SEN 01\01

\*\*\*

#I 22:13:33 London VIO 01\10

\*\*\*

\*\*\*

#I 22:13:33 London VIO 01\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 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 NORMAL 00:19:33

#N 22:13:33 NewYork CON 01\05 01\02 SUCCESS NY1

#N 22:13:33 NewYork CON 01\05 01\03 INVALID VAX3

#N 22:13:33 NewYork CON 01\05 01\04 FAILURE IBM

#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\02 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 01\01 olcn 30 123456789 for 01\01
 in NewYork

#A 22:13:35 NewYork CCR 01

#I 22:14:54 NewYork Q LX 11

#M 22:13:34 NewYork LOS 18 MSGS

#M 22:14:17 NewYork CRS 02 FAILED

#M 22:14:17 NewYork CRS 02 RESET

#M 22:13:57 NewYork REM (Up to 50 characters)

#M 22:14:15 NewYork SYS 02 ***** XXXX YYYY,*****

#M22:17:28 NewYork IOK <Config running>on
 Fri, 04-02-90 - 22:17:28

```

(This message is output at a programmable rate (set at the Global Configuration menu) to indicate, to the management center, that the node is alive. Information contained in the supplementary data is the configuration running, the time and the date.)

```

#P 22:15:33 NewYork MGT 01\02 pktx pkrx speed chtx chrx

```

(This message is output at a programmable rate, set at the Trunk configuration menu, to present raw data to the management center for report generation. Supplementary Data is the peak transmit and receive utilization since the last MGT event, speed of the trunk, running transmit and receive character count since last reset.)

**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.

---

## 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 illustrated in figure 18-1.

```
***** Logging Service *****

1. Exit.
2. Manipulate System Log.
3. Monitor Log.
4. Add User Entry to System Log.

Enter selection:
```

**Figure 18-1. Logging service main menu**

Logging Service

**Selection 1: Exit**

Enter 1<CR> to exit the Logging Service and return to the connect prompt.

**Selection 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 displays the submenu shown in figure 18-2 .

```
***** Manipulate System Log *****

E. Exception (enabled)
N. Normal (enabled)
A. Major (enabled)
I. Minor (enabled)
X. X25/LAN (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 18-2. System log submenu**

Enter 1<CR> to exit the 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:**

Enter the letter of the event class you wish to enable, followed by <CR>. If you want to enter all the classes, enter 'P'. 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>. If you wish to disable all the classes, enter 'P'. 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 shows that no events of the Normal class are reported to the system logging port.

**Selection 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 18-3 .

```

***** Monitor Log *****

E. Exception (Enable)
N. Normal (Enable)
M. Mandatory (Enable)
A. Major (Enable)
I. Minor (Enable)
X. X25/LAN (Enable)
P. Performance (Enable)

1. Exit.
2. Enable Logging by Class.
3. Disable Logging by Class.
4. Start Log Monitor.

Enter selection:

```

**Figure 18-3. Logging service monitor submenu**

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<CR> 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>. If you want to disable all events enter a *T*. Note that log monitoring does permit disabling of the Mandatory class.

Enter "4<CR>" to monitor logging messages. The Logging Service displays:

**Starting Log Monitor.**

**Enter ESC to exit.**

then directs logging information to your port until you enter <ESC>. The Logging Service then re-displays the Main Menu.

**Selection 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. 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.25calls or Normal events will be displayed on the monitor. Enter <ESC> to escape from this quick logging method.

# Chapter 19

## Mode Service

---

### Quick Configuration Data

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.

One monitor screen is provided by the Mode service, as illustrated in figure 19-1.

```
You are currently in node : newyork
The running configuration is called : simple
Which can be located in PM slot : 1
```

Figure 19-1. Mode service display

The Mode service is activated by typing **Mode**. Note that the information will appear on the monitor screen at the position of the cursor.



# Chapter 20

## Print Service

### Printing Configuration Storage Modules

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 20-1.

```
**** Configuration Print ****

**** Printer Port Selection ****

1. Exit
2. Select Printer Path

Enter Selection:
```

Figure 20-1. First level Print service menu

Two choices are available from this menu. 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 (figure 20-2.).

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 entry of a pathname <CR> or a <CR> only, the monitor display shown in figure 20-3 is obtained.



```
**** 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 20-2. Configure Print - select printer path**

```
*** PM SLOT: 1 Printout ***

Name Type Description
don Configuration Test Configuration for Pubs
flashconf Configuration Testing Flash
jm9600 Configuration jm's 9600 setup
trunktest Configuration trunktest

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:
```

**Figure 20-3. Configuration module - Printout**

Listed in this screen are the names, types and descriptions of all configurations, user lists and texts files.

This menu has 6 selections:

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.
4. **Print a User List** causes a prompt for the user list name and when entered prints 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 20-3), *Standard* configuration was entered. The Print service then produces the monitor screen shown in figure 20-4.

| *** 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) ? n                |              |             |     |

**Figure 20-4. Selected configuration name list**

The bottom of the menu in figure 20-4 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). An *N* will result in the monitor display shown in figure 20-5 .

| *** 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) ? 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 20-5. Configuration listing submenu

Six choices are available from the menu shown in figure 20-5 . 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 Type to be printed and results in a new monitor screen shown in figure 20-6 .
6. **Select Individual Name to Print** allows selection of an individual Name to be selected for printing.

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 20-6. Typing any of the numbers between 2 and 8 causes all of the names in the type selected to be printed.

| *** Configuration: don Printout *** |              |                       |     |  |
|-------------------------------------|--------------|-----------------------|-----|--|
| Name                                | Type         | Description           |     |  |
| c                                   | Speed Name   |                       |     |  |
| detach                              | String Name  |                       |     |  |
| link1                               | Trunk        | 3/1                   |     |  |
| link2                               | Trunk        | 4/1                   |     |  |
| link3                               | Trunk        | 5/1                   |     |  |
| link4                               | Trunk        | 6/1                   |     |  |
| pm1p1                               | Asynchronous | 1/1                   | 1/1 |  |
| pm1p2                               | Asynchronous | 1/2                   | 1/2 |  |
| pm1p3                               | Asynchronous | 1/3                   | 1/3 |  |
| pm2p1                               | Asynchronous | 2/1                   | 2/1 |  |
| List more names (y/n) ? n           |              |                       |     |  |
| 1. Exit                             |              | 6. Controlled Service |     |  |
| 2. Asynchronous                     |              | 7. String             |     |  |
| 3. Trunks                           |              |                       |     |  |
| 4. Speed Connect                    |              |                       |     |  |
| 5. Group                            |              |                       |     |  |
| Enter Configuration Type:           |              |                       |     |  |

**Figure 20-6. Submenu - Select configuration type**

The last selection on this menu is number 6, which allows the user to *Select Individual Name to Print*. When selection is made, the service prompts:

**Printing please wait.**

When complete, the Service prompts:

**Enter <CR> to continue**

Pressing enter will cause the Service to accept more entries of items to print.



# Chapter 21

## Quick Status Service

### Q Status Service

Quick Status (Q Status) provides quick access to information on an Asynchronous line Port module. Information on each port and link module is presented, one page of information at a time, on the monitor. Port information includes, Port module connected to, port connected to, bits per character, stop bits, parity, baud rate, flow control, name, A or B destination, and originate or answer port.

Enter **QSTATUS** <CR> to reach the Q Status Service. The monitor displays the first asynchronous encountered while searching. This may be Port module 1, or may be Port module 2. Note that the first Port module in the unit is first to be displayed, regardless of number of ports. There are two pages of information, one of which is shown in figure 21-1. Enter N for next page.

| Asynchronous Connection Status                             |        |        |   |   |      |      |       |       |                     |              |
|------------------------------------------------------------|--------|--------|---|---|------|------|-------|-------|---------------------|--------------|
| Port module: 1 Type: ASYNC Mode: chunks Configuration: don |        |        |   |   |      |      |       |       |                     |              |
| Connect To                                                 |        |        |   |   |      |      |       |       |                     |              |
| Port                                                       | Module | Port B | S | P | Baud | Flow | Name  | SN    | Description         |              |
| 1                                                          | PM1    | 8      | 1 | N | 9600 | X/X  | pm1p1 | 1     | cnx to service/task |              |
| 2                                                          | PM1    | 3      | 8 | 1 | N    | 9600 | X/X   | pm1p2 | 1                   | cnx to pm1p3 |
| 3                                                          | PM1    | 2      | 8 | 1 | N    | 9600 | X/X   | pm1p3 |                     | cnx to pm1p2 |
| 4                                                          |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 5                                                          |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 6                                                          |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 7                                                          |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 8                                                          |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 9                                                          |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 10                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 11                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 12                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 13                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 14                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 15                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |
| 16                                                         |        |        |   |   |      |      |       |       | Unconfigured        |              |

(N - Next page, P - Previous page, R - Redisplay page, E - exit)

Figure 21-1. Q Status for a 16 port (ALC-16) card

Q Status Service

The Q Status display is illustrated in figure 21-1. This is the screen displayed when the card data is for a 16-port Port Module.

A Port Module display with less ports, is the same as figure 21-1, except that there are less ports.

Note that under menu title, "Asynchronous Connection Status", is information specific to the Port module, including type, node, and configuration. Below this level of the display are the columns of information which detail each port of the Port module. Table 21-1 explains the information presented.

**Table 21-1. Quick Status Service Field Screens**

| Item         | Description                                                                                                                                                                                    |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Port         | The number of the Port module or Link module port.                                                                                                                                             |
| Module       | The number of the Port module or Link Module that the port is connected to.                                                                                                                    |
| Port         | The number this port is connected to.                                                                                                                                                          |
| B(Baud)      | The configured baud rate for this port.                                                                                                                                                        |
| S(Stop bits) | The number of stop bits configured for this port.                                                                                                                                              |
| P(Parity)    | May be odd (O), even (E) , Mark (M), space (S), or none (N).                                                                                                                                   |
| Baud         | Refers to the baud rate configured for this port.                                                                                                                                              |
| Flow         | Flow control may be one of the following:<br>N= No flow control<br>X= XON/XOFF<br>D= DC1/DC2<br>R= RTS/CTS<br>E= ENQ/ACK<br>T= TPAUSE<br>4= X94/X93<br>9= X91/X93<br>F= XFE/XFF<br>HP=XON/XOFF |
| Name         | The name given to this port of the Port module described.                                                                                                                                      |
| SN           | Current session number                                                                                                                                                                         |
| Description  | Describes this port connection                                                                                                                                                                 |

# Chapter 22

## Reset Service

### Introduction

The Reset Service allows resetting chassis, cards, individual ports, virtual circuits, or port statistics from a terminal. To invoke the Reset Service, enter:

**Connect to: reset<CR>**

The Reset Service displays the Reset Service Menu, shown in figure 22-1.

```
***** Reset *****

1. Exit
2. Chassis
3. Port
4. Virtual Circuit
5. Originate Session
6. Statistics

Enter selection:
```

Reset Service

Figure 22-1. Reset service main menu

#### 1. Exit

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

#### 2. 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. Port

If you type “3<CR>”, the Reset Service displays:

**Enter 1 for Async or 2 for Sync:**

Enter <CR> to abort the reset and return to the Reset Service Menu. Entering *1* <CR> or *2* <CR> presents the prompt for port number. Enter either the Async or Sync port number or a range of ports. (i.e., ports *2-6* <CR> for ports 2 through 6.)

The service will confirm the reset with:

**Port N on card 1 reset:**

### 4. Virtual Circuits

To reset a specific virtual circuit, enter 4<CR>. VCX prompts:

**Enter Port No.:2<CR>**

Enter the number of the card that contains the virtual circuit to be reset, such as *2* <CR> in this example. VCX prompts:

**Enter VC number (from card status): 2<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 virtual circuit to be reset, such as *2* <CR> in this example. VCX then resets the selected virtual circuit and you are returned to the menu shown in figure 22-1.

### 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 Originate session by enter: *5* <CR>. The VCX prompts:

**Enter Port No:**

Enter the number of the port that contains the originate session, such as *16* <CR> (in this example). The VCX prompts:

**Enter Originate 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 22-1.

## 6. Statistics

To reset statistics type 5 <CR>. The menu shown in figure 22-2 is used.

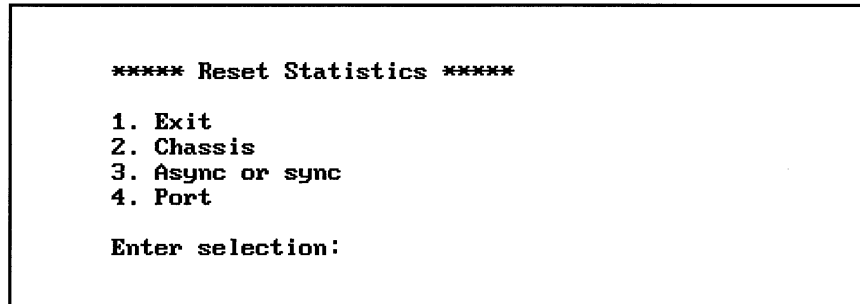


Figure 22-2. Reset statistics menu

The options are:

### 1. Exit

To exit the Statistics Reset Menu and return to the Reset Service Menu, enter 1<CR>.

### 2. Chassis

If option 2 is selected, the statistics for the entire chassis will be reset.

### 3. Async Or Sync

Selecting option 3 causes the following option to be displayed:

**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:

**Now resetting sync statistics**

### 4. Port

When option 4 is selected, the user is asked which type of port is to be reset and prompts:

**Enter 1 for Async or 2 for Sync**

If you select Async, then a second prompt appears:

**Enter port number:<CR>**

After the port number (#) have been entered, the following prompt is displayed:

**Resetting port 1/1 stats)**

If you selected sync for the type of port to reset statistics, the VCX displays the following message:

**Resetting port 2/1 stats**

## Statistics

Which statistics are reset? This 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

While a synchronous card will these parameters reset:

- Characters transmitted
- Characters received
- Messages transmitted
- Messages received
- Message errors
- Re-transmissions
- BER indicator
- Peak transmit utilization
- Peak receive utilization

# Chapter 23

## Settime Service

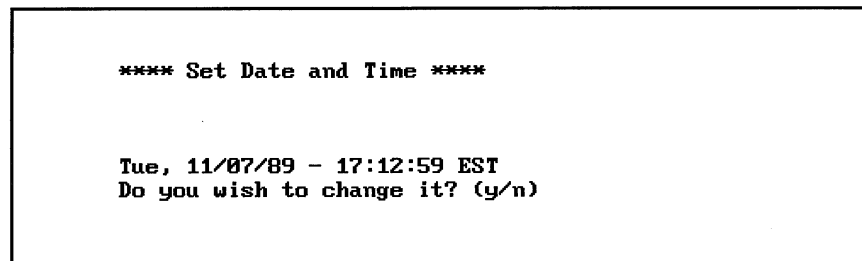
---

### Setting Date and Time for a Node

The Settime Service sets the date and time for the node. The date and time is retained if the node is powered down or reset. To invoke the Settime Service, enter:

**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 as in the example shown in figure 23-1..



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

Tue, 11/07/89 - 17:12:59 EST
Do you wish to change it? (y/n)
```

**Figure 23-1. Settime menu**

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 following prompt (figure 23-2.).

Settime Service

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

```
No current date and time set in system.
```

### 23-2. Settime menu for date/time entry

To set or reset the date and time, you respond to a series of prompts. For example, to set the date and time to Sunday, 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:
```

```
Sunday, 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 time-keeping 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 *Configuration Service, Level 3 Menu Selection 5: EXAMINE/MODIFY global configuration parameters*). Also see, 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):
```

## 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 10 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 24-1.

### Main Menu

#### 1. Exit

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

```
***** Status *****

1. Exit
2. Chassis
3. Card
4. Port
5. Name definition
6. Power up diagnostic results

Enter selection:
```

Figure 24-1. Status service main menu

## 2. Chassis Status

Type 2<CR> to display a report of overall chassis activity, which produces a monitor screen like that shown in figure 24-2.

|      |        | Port Status |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
|------|--------|-------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|
| Card | Type   | 1           | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 1    | PM1ASY | C1          | A | A | A | A | A | A | A | A | A  | A  | A  | A  | A  | A  | A  |
| 2    | PM2ASY | D           | D | D | D | D | D | D | D | D | D  | D  | D  | D  | D  | D  | D  |
| 3    | LM1TRK | vS          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| 4    | LM2TRK | vS          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| 5    | LM3TRK | vS          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| 6    | LM4TRK | vS          |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |

D =Detached,A =Attached,C =Connected,O =Out of service,B =Busied,TST =Test  
 S =Statmux ^ =Trunk up v =Trunk down  
 Enter <CR> to continue:

**Figure 24-2. 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

| Card: 1 Card type: PM1ASY Configuration: don Mode: node1 |       |                           |  |
|----------------------------------------------------------|-------|---------------------------|--|
| Port Name                                                | Type  | Current active connection |  |
| 1                                                        | Org   | 1-node1-1-status          |  |
| 2                                                        | user1 | Ans                       |  |
| 3                                                        | user1 | Ans                       |  |
| 4                                                        | user1 | Ans                       |  |
| 5                                                        | user1 | Ans                       |  |
| 6                                                        | user1 | Ans                       |  |
| 7                                                        | user1 | Ans                       |  |
| 8                                                        | user1 | Ans                       |  |
| 9                                                        | user1 | Ans                       |  |
| 10                                                       | user1 | Ans                       |  |
| 11                                                       | user1 | Ans                       |  |
| 12                                                       | user1 | Ans                       |  |
| 13                                                       | user1 | Ans                       |  |
| 14                                                       | user1 | Ans                       |  |
| 15                                                       | user1 | Ans                       |  |
| 16                                                       | user1 | Ans                       |  |

Connection info: Session-NodeName-Card/Port-Portname,  
 Session-NodeName-Card/Port/Uc-Portname, Session-NodeName-Card-Taskname  
 Enter <CR> to continue:

**Figure 24-3. Asynchronous card status**

(busy/connected). When you finish examining the chassis status display, enter <CR>. The Status Service re-displays the Status Service Main Menu.

### 3. Card Status

The status of a particular card can be obtained by entering 3 <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 24-3 is displayed on the monitor.

If the card type is a multiplexing trunk, the screen menu displayed will be that shown in figure 24-4.

```

Card: 3 Card type: LM1TRK Configuration: don Node: node1

Port : 1
Name :
Type : Muxing
Speed : 9600
No Ucs: 16

Uc Connection

Trunk idle

Connection info: Card-taskname, Card/Port-Portname, Card/Port/Uc.
Enter <CR> to continue:

```

**Figure 24-4. Multiplexing (sync) trunk card status**

### 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 24-5.

**Note:** The menus for asynchronous ports are described next. Synchronous (trunks) will be detailed after the async ports description.



```

***** Port Status *****

1. Exit
2. Connection information
3. Port characteristics
4. Modem control signals / usage statistics

Enter selection:

```

Figure 24-5. Port status submenu

### 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 24-6, illustrates the connection status display for an asynchronous port.

```

PM1 Port: 1 Name: Dir: Org Att: Unqualified State: Connected

S# Name Card Port UC# In-Node Last-Connection Last-Disconnection
1 status 1 node1 06/13/99-18:21:06 06/12/99-23:01:18
 Path: status
2

Enter <CR> to continue:

```

Figure 24-6. Connection status 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 24-7 illustrates the port characteristics display for asynchronous ports.

| PM1 Port: 1 Name:       |                  |                      |
|-------------------------|------------------|----------------------|
|                         | Configured       | Current              |
| Baud rate               | : Autobaud       | 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    | ANSI Std: Ambassador |
| Control state char      | : ^@             | ^@                   |
| Forward toggle char     | : ^@             | ^@                   |
| BREAK key               | : Ignore         | Ignore               |
| Messages                | : All            | All                  |
| Broadcast option        | : Accept routine | Accept routine       |
| Session limit           | : 2              |                      |
| Channel priority        | : 1              |                      |
| Detach delay time       | : 0              |                      |
| Connection timeout      | : 0              |                      |
| Timeout direction       | : Receive        |                      |
| Escape char delay       | : No             |                      |
| Originate access rights | :                |                      |
| Enter <CR> to continue: |                  |                      |

Figure 24-7. Configured port characteristics

#### 4. Modem control signals / usage statistics

Port Status Submenu selection 4 displays interface control line status and usage statistics, as shown in Figure 24-8, the statistics for an asynchronous port.

```

PM1 Port: 1 Name:

Modem signals

RTS : Low CTS: High
DTR : Low DSR: High
 DCD: High

Flow stopped : (in)No (out)No

Characters transmitted : 432233
Last character transmitted : 4
Characters received : 1367
Last character received : <CR>
Errors : 11
Buffer Size : 2848
Buffer Utilization : 0
Buffer Peak Utilization : 10

Enter <CR> to continue:

```

Figure 24-8. Asynchronous port usage display

The example shows that flow is not currently stopped either “In” (the port has not exerted flow control to stop the external device from transmitting) or “Out” (the external device has not exerted flow control to stop the port from transmitting). The “Errors” statistic is the total of received data errors (usually parity errors) detected by the port.

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) ports is shown (figure 24-9). 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 24-9. Status service main menu

### 2. Connection Information

Figure 24-10 illustrates a connection status display for a trunk line.

```

LM1 Port: 1 Name:

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: 16

Enter <CR> to continue:

```

Figure 24-10. Connection status for a trunk line

### 3. Port Characteristics

The example shown in figure 24-11 is the monitor screen of the port characteristics display for a trunk line.

```

LM1 Port: 1 Name:

Multiplexing Trunk Configuration Data

Baud rate : 9600
Clocking : DTE - supplies no clocks
Number of virtual circuits : 16
Multiplexing protocol : Muxing
Link module interface : v24
Trunk timeout (secs) : 60
Utilization threshold : 75
Retransmission threshold : 25
Statistics Logging Timer : 0
Originate access rights :
Answer access rights :

Enter <CR> to continue:

```

Figure 24-11. Multiplexing trunk characteristics

### 4. Modem Control Signals/Port Usage

A synchronous port (trunk) modem control signals and port usage screen is shown in figure 24-12.

```

LM1 Port: 1 Name:

Modem signals

CTS : Low RTS: High
DSR : Low DTR: High
DCD in: Low

Characters transmitted : 0
Characters received : 0
Messages transmitted : 0
Messages received : 0
Errors : 0
Retransmissions : 0
BER exceeded 1 in 10,000 : No

Trunk Utilization : Receive Xmit
Past 5 seconds : 0% 0%
Peak : 0% 0%
Enter <CR> to continue:

```

Figure 24-12. Synchronous port usage display

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 “Re-transmissions” statistic indicates the number of re-transmitted 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 26-1).

### **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 24-13.

| **** Power Up Test Results **** |             |      |      |                      |      |      |
|---------------------------------|-------------|------|------|----------------------|------|------|
| UCX500 Software Revision 2.8.6  |             |      |      |                      |      |      |
| Memory                          | Main : Pass |      |      | Configuration : Fail |      |      |
| Flash block                     | 1:          | Pass | 26b4 | 1cb0                 | 2:   | Pass |
|                                 | 3:          | Pass | a3b8 | c58e                 | 4:   | Pass |
|                                 | 5:          | Pass | 5719 | 92d4                 | 6:   | Void |
|                                 | 7:          | Void | 0000 | 0000                 | 8:   | Void |
| Link modules                    | 1 :         | Pass | 2 :  | Pass                 | 3 :  | Pass |
| Port module                     | : 1         |      |      |                      |      |      |
| Ports                           | 1 :         | Pass | 2 :  | Pass                 | 3 :  | Pass |
|                                 | 5 :         | Pass | 6 :  | Pass                 | 7 :  | Pass |
|                                 | 9 :         | Pass | 10 : | Pass                 | 11 : | Pass |
|                                 | 13 :        | Pass | 14 : | Pass                 | 15 : | Pass |
| Port module                     | : 2         |      |      |                      |      |      |
| Ports                           | 1 :         | Pass | 2 :  | Pass                 | 3 :  | Pass |
|                                 | 5 :         | Pass | 6 :  | Pass                 | 7 :  | Pass |
|                                 | 9 :         | Pass | 10 : | Pass                 | 11 : | Pass |
|                                 | 13 :        | Pass | 14 : | Pass                 | 15 : | Pass |
| Enter <CR> to continue:         |             |      |      |                      |      |      |

**Figure 24-13. Powerup test results display**

Every P/F on the screen is where a PASS or FAIL will appear. Thus, failures in the power-up tests of RAM or ROM can be easily noted. A “Void” indicates that no chips exist in that particular ROM block. If the test LED is ON, a test error is indicated. Use this screen to find the trouble location.

### Notes:

1. If the system time is not set via the 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.



# Chapter 25

## Software Update Service

Sw Update Srv.

### Introduction

The Software Update Service (SWupdate) allows the VCX-500 software to be updated to the latest revision without returning the unit to the factory or installing new EPROMs. The service operates by overwriting the software modules, located in flash memory, within the VCX-500. The update is accomplished by uploading a complete set of software modules, or through individual module blocks. However, note that *the use of individual module updates is reserved for factory Tech Support or Product Development.*

### Complete Software Set

To use the SWupdate Service to update VCX-500 software, use the following steps:

1. Enter **SWupdate** at the prompt. This opens the SWupdate menu, shown in figure 25-1.
2. There are three options: **1, Exit** by entering 1; **2, Load a new software set (complete set of software modules)**, or **3, Update an individual software block**. (Option 3 is reserved for use by factory Tech Support or Product Development.) Enter **2 <CR>** at the prompt. This indicates to VCX that you want to upload a new software set to the VCX-500 and opens the menu shown in figure 25-2.

```
**** Software Update ****

1. Exit
2. Load a new software set
3. Update an individual block

Enter Selection (1-3):
```

Figure 25-1. Software Update Service main menu



```
**** Source Connection ****

1. Exit
2. Current
3. Another

Enter Selection (1-3): 2
```

**Figure 25-2. Software Update connection menu**

3. Three selections are available: **1, *Exit***, to cancel out and return to the menu of figure 25-1; **2, *Current***; or **3, *Another***. This menu is labeled *Source Connection*, referring to the connection between the VCX-500 and the device that will upload the software. In most cases, this is the device presently interfacing with the VCX-500. If the download will take place at another location, enter 3 at the prompt. Entering a **3<CR>** (*Another*) will cause the VCX-500 to prompt with:

**Enter path:**

Enter the path to the device at this prompt. When the connection is complete, the VCX will respond with the prompt:

**Connection complete**

4. When the connection to be used is the ***Current*** connection to the VCX-500, enter **2<CR>** at the prompt as shown in figure 25-2. The VCX responds with:

**How many files are in this release (See release notes, 9 to cancel)?**

The number of software blocks form a part of the update disc label and will be clearly given in the software Release notes included with the new software set. Enter the number of blocks at the prompt and add <CR> (or enter 9 to cancel).

5. The VCX-500 responds with the prompt:

**Start transmitting file b12.hex**

Regardless of whether the source device is ***Other***, or ***Current***, the prompt will be:

**Start device transmitting file b12.hex**

(The request for specific file name will depend on the the file set, of course.)

Using the upload software (used with the device to upload the files to VCX), begin uploading the requested file. (b12.hex.) As the file is being uploaded, the VCX-500 continually updates the line in a prompt format that looks like:

**Line: 2188**

When the file has been completely transferred, VCX responds with the prompt:

### Erasing block 2

The VCX-500 is indicating that it is erasing the block where the data will reside in memory. When this has been completed, the VCX prompts:

### Comparing block 2 with source

When completed, the VCX prompts with a request for the name of the next file to be uploaded, for example:

### Start device transmitting file b13.hex

6. After the last file has been successfully uploaded, checked and written into memory, VCX prompts that the complete software set has been uploaded successfully by returning you to the *main menu shown in figure 25-1*.

## Separate Block Upload

7. Should you need to upload an individual software block (as directed by factory Technical Support or Development Engineering), enter **2<CR>** at the prompt shown in figure 25-2, to select *Update an individual block*. VCX will then display the File List, shown in figure 25-3.

Follow the directions of the Technical Services people to complete the upload.

When complete, (either individual block upload or software set) the VCX returns you to the main menu, shown in figure 25-1.

Enter **1 <CR>** to leave the SWupdate Service.

7. The last step in the uploading procedure, using the SWupdate Service, is to reset the VCX-500. Enter **Reset** at the prompt. Then select **2 <CR>** to reset the chassis.

```
**** File List ****
1. b11.hex (This file may/may not be present)
2. b12.hex
3. b13.hex
4. b14.hex
5. b15.hex
6. b16.hex (This file may/may not be present)
7. b17.hex (This file may/may not be present)
8. b18.hex (This file may/may not be present)

Enter Selection (1-9, 9 to cancel):
```

Figure 25-3. File List for single module upload



# Chapter 26

## Fox Service

### Transmitting Test Messages

The Fox Service transmits a test message continuously at the baud rate, character length, parity, and number of stop bits set for your home port.

**Connect to:** *fox*<CR>

Entering FOX at the prompt results in the Fox message (figure 26-1.).

If you enter a printable character while the test is running, the Fox Service prepends the character to the fox message.

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* section). 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.

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 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 d
```

Figure 26-1. Fox message display



# Chapter 27

## Loopback Service

---

### Testing the Communications path

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.

**Connect to:** loopback<CR>

Typing *loopback* displays the menu shown in figure 27-1.



```
***** Loopbaack Test *****
Enter ESC to exit:
```

Figure 27-1. Loopback submenu

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 echoes once, and the Loopback Service provides a second echo. Also, the Loopback Service echoes data (except for <ESC>) exactly as received. The service does not add line feeds when echoing <CR>.

Loopback Serv.



# Chapter 28

## 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 (figure 28-1), enter:

**Connect to:** set<CR>

To use the Set Service, select one or more parameters and their new values. These become the requested values until item 15, *Apply changes* is selected. The requested values then become the current values until the session ends.

|                                        |                        |                        |
|----------------------------------------|------------------------|------------------------|
| Pub>> set                              |                        |                        |
| **** 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                       | - ANSI Std; Ambassador | - ANSI Std; Ambassador |
| 8. Device flow control                 | - None                 | - None                 |
| 9. Port flow control                   | - None                 | - None                 |
| 10. Messages                           | - All                  | - All                  |
| 11. BREAK key                          | - Ignore               | - Ignore               |
| 12. Control state key                  | - ^@                   | - ^@                   |
| 13. Forward toggle key                 | - ^@                   | - ^@                   |
| 14. Broadcast option                   | - Accept routine       | - Accept routine       |
| 15. Apply changes                      |                        |                        |
| Enter selection:                       |                        |                        |

Figure 28-1. Terminal type selection menu



**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. 1200
2. 2400
3. 4800
4. 9600
5. 19200
6. 38400
7. 57600
8. 115200

Enter selection or <CR> to return:

Enter the number for the baud rate you wish to select. For example, to request **19200** baud enter **7**<CR>. The system re-displays the Set Service Menu with **19200** 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.

The other parameters, 3-14 on the Set Service menu, are selected and set to new values in the same manner as 2 above. All possible values for a parameter are clearly displayed on the lower left side of the terminal screen.

# Chapter 29

## TM (Transparent Mode) Service

The TM Service allows unidirectional or bidirectional 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. Therefore, 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 with the menu shown in figure 29-1..

```
***** Transparent Mode *****
Will you receive binary data (y/n)?
```

Figure 29-1. Transparent mode main menu

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 you to exit 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 binary transfer direction selected.

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 you enter the escape sequence *fred*, 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, **fred <CR>**, when prompted, 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.

# Chapter 30

## Who Service

### Displaying Installation and Port Names

The Who Service displays the installation and port names. It also displays the slot and port number. For example, suppose the installation is:

1. Named Acme Balloon Co.- Boston Node.
2. The port is named org.
3. The slot number is 1.
4. And the port number is 1.

If you enter Who:

**Connect to:** who<CR>

The Who Service responds as shown in figure 30-1. and re-displays the connect prompt.

Notice that the slot number is shown to the left of the slash (\) and the port number is shown to its right.

```
who
Acme Ballon Co. - Boston Node
org 1\1
```

**Figure 30-1. Who service main menu**



# Appendix A

## Tables and Worksheets

### EIA RS-232C Interface

The EIA (Electronic Industries Association) Recommended Standard 232C defines the interface between Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). RS-232C signals are named with respect to the DTE. For example, the DTE transmits data at pin 2 and receives data at pin 3. The DCE receives data at pin 2 and transmits at pin 3. RS-232C specifies that logical 0 be represented by a voltage between -5 and -15 volts and that logical 1 be represented by a voltage between +5 and +15 volts. The data lines use negative-true logic. Other signals are positive-true. The pinout data is given in table A-1.

Table A-1. EIA RS-232C Interface Pinouts

| Pin | Mnemonic | Circuit | Function                 |
|-----|----------|---------|--------------------------|
| 1   |          | AA      | Chassis ground           |
| 2   | TxD      | BA      | Transmit Data            |
| 3   | RxD      | BB      | Receive Data             |
| 4   | RTS      | CA      | Request to Send          |
| 5   | CTS      | CB      | Clear to Send            |
| 6   | DSR      | CC      | Data Set Ready           |
| 7   |          | AB      | Signal ground            |
| 8   | DCD      | CF      | Data Carrier Detect      |
| 9   |          |         | Positive test voltage    |
| 10  |          |         | Negative test voltage    |
| 11  |          |         | Unassigned               |
| 12  |          | SCF     | Secondary carrier detect |
| 13  |          | SCB     | Secondary clear to send  |

| Pin | Mnemonic | Circuit | Function                   |
|-----|----------|---------|----------------------------|
| 14  |          | SBA     | Secondary transmit data    |
| 15  | TxC      | DB      | Transmit Clock             |
| 16  |          | SBB     | Secondary receive data     |
| 17  | RxC      | DD      | Receive Clock              |
| 18  |          |         | Unassigned                 |
| 19  |          | SCA     | Secondary request to send  |
| 20  | DTR      | CD      | Data Transmit Ready        |
| 21  |          | CG      | Signal quality detect      |
| 22  | RI       | CE      | Ring indicator             |
| 23  |          | CH/CI   | Data rate detect (DTE/DCE) |
| 24  |          | DA      | External transmit clock    |
| 25  |          |         | Unassigned                 |

## ASCII Code Chart

Table A-2. ASCII Code Chart with Definitions

| DEC | HEX | Entry | ASCII | Definition              |
|-----|-----|-------|-------|-------------------------|
| 0   | 0   | ^@    | NUL   | Null                    |
| 1   | 1   | ^A    | SOH   | Start of header         |
| 2   | 2   | ^B    | STX   | Start of text           |
| 3   | 3   | ^C    | ETX   | End of text             |
| 4   | 4   | ^D    | EOT   | End of transmission     |
| 5   | 5   | ^E    | ENQ   | End of transmission     |
| 6   | 6   | ^F    | ACK   | Acknowledge             |
| 7   | 7   | ^G    | BEL   | Bell                    |
| 8   | 8   | ^H    | BS    | Backspace               |
| 9   | 9   | ^I    | HT    | Horizontal tab          |
| 10  | A   | ^J    | LF    | Line feed               |
| 11  | B   | ^K    | VT    | Vertical tab            |
| 12  | C   | ^L    | FF    | Form feed               |
| 13  | D   | ^M    | CR    | Carriage return         |
| 14  | E   | ^N    | SO    | Shift out               |
| 15  | F   | ^O    | SI    | Shift in                |
| 16  | 10  | ^P    | DLE   | Data link escape        |
| 17  | 11  | ^Q    | DC1   | Device control 1 (XON)  |
| 18  | 12  | ^R    | DC2   | Device control 2        |
| 19  | 13  | ^S    | DC3   | Device control 3 (XOFF) |
| 20  | 14  | ^T    | DC4   | Device control 4        |
| 21  | 15  | ^U    | NAK   | Negative acknowledge    |



| DEC | HEX | Entry    | ASCII | Definition                |
|-----|-----|----------|-------|---------------------------|
| 22  | 16  | ^V       | SYN   | Synchronous idle          |
| 23  | 17  | ^W       | ETB   | End of transmission block |
| 24  | 18  | ^X       | CAN   | Cancel                    |
| 25  | 19  | ^Y       | EM    | End of medium             |
| 26  | 1A  | ^Z       | SUB   | Substitute                |
| 27  | 1B  | ^[       | ESC   | Escape                    |
| 28  | 1C  | ^\       | FS    | File separator            |
| 29  | 1D  | ^]       | GS    | Group separator           |
| 30  | 1E  | ^^       | RS    | Record separator          |
| 31  | 1F  | ^_       | US    | Unit separator            |
| 32  | 20  | Spacebar | SP    | Space                     |
| 33  | 21  | !        | !     | Exclamation mark          |
| 34  | 22  | "        | "     | Double quotation mark     |
| 35  | 23  | #        | #     | Pound sign                |
| 36  | 24  | \$       | \$    | Dollar sign               |
| 37  | 25  | %        | %     | Percentage sign           |
| 38  | 26  | &        | &     | Ampersand                 |
| 39  | 27  | '        | '     | Single quote              |
| 40  | 28  | (        | (     | Open parenthesis          |
| 41  | 29  | )        | )     | Close parenthesis         |
| 42  | 2A  | *        | *     | Asterisk                  |
| 43  | 2B  | +        | +     | Plus sign                 |
| 44  | 2C  | ,        | ,     | Comma                     |
| 45  | 2D  | -        | -     | Hyphen                    |
| 46  | 2E  | .        | .     | Period                    |
| 47  | 2F  | /        | /     | Slash                     |

| DEC | HEX | Entry | ASCII | Definition          |
|-----|-----|-------|-------|---------------------|
| 48  | 30  | 0     | 0     | Zero                |
| 49  | 31  | 1     | 1     | One                 |
| 50  | 32  | 2     | 2     | Two                 |
| 51  | 33  | 3     | 3     | Three               |
| 52  | 34  | 4     | 4     | Four                |
| 53  | 35  | 5     | 5     | Five                |
| 54  | 36  | 6     | 6     | Six                 |
| 55  | 37  | 7     | 7     | Seven               |
| 56  | 38  | 8     | 8     | Eight               |
| 57  | 39  | 9     | 9     | Nine                |
| 58  | 3A  | :     | :     | Colon               |
| 59  | 3B  | ;     | ;     | Semicolon           |
| 60  | 3C  | <     | <     | Open angle bracket  |
| 61  | 3D  | =     | =     | Equal sign          |
| 62  | 3E  | >     | >     | Close angle bracket |
| 63  | 3F  | ?     | ?     | Interrogation mark  |
| 64  | 40  | @     | @     | At sign             |
| 65  | 41  | A     | A     | Upper-case A        |
| 66  | 42  | B     | B     | Upper-case B        |
| 67  | 43  | C     | C     | Upper-case C        |
| 68  | 44  | D     | D     | Upper-case D        |
| 69  | 45  | E     | E     | Upper-case E        |
| 70  | 46  | F     | F     | Upper-case F        |
| 71  | 47  | G     | G     | Upper-case G        |
| 72  | 48  | H     | H     | Upper-case H        |
| 73  | 49  | I     | I     | Upper-case I        |
| 74  | 4A  | J     | J     | Upper-case J        |

| DEC | HEX | Entry | ASCII | Definition           |
|-----|-----|-------|-------|----------------------|
| 75  | 4B  | K     | K     | Upper-case K         |
| 76  | 4C  | L     | L     | Upper-case L         |
| 77  | 4D  | M     | M     | Upper-case M         |
| 78  | 4E  | N     | N     | Upper-case N         |
| 79  | 4F  | O     | O     | Upper-case O         |
| 80  | 50  | P     | P     | Upper-case P         |
| 81  | 51  | Q     | Q     | Upper-case Q         |
| 82  | 52  | R     | R     | Upper-case R         |
| 83  | 53  | S     | S     | Upper-case S         |
| 84  | 54  | T     | T     | Upper-case T         |
| 85  | 55  | U     | U     | Upper-case U         |
| 86  | 56  | V     | V     | Upper-case V         |
| 87  | 57  | W     | W     | Upper-case W         |
| 88  | 58  | X     | X     | Upper-case X         |
| 89  | 59  | Y     | Y     | Upper-case Y         |
| 90  | 5A  | Z     | Z     | Upper-case Z         |
| 91  | 5B  | [     | [     | Open square bracket  |
| 92  | 5C  | \     | \     | Backslash            |
| 93  | 5D  | ]     | ]     | Close square bracket |
| 94  | 5E  | ^     | ^     | Caret                |
| 95  | 5F  | —     | —     | Underscore           |
| 96  | 60  | '     | '     | Back tick            |
| 97  | 61  | a     | a     | Lower-case a         |
| 98  | 62  | b     | b     | Lower-case b         |
| 99  | 63  | c     | c     | Lower-case c         |
| 100 | 64  | d     | d     | Lower-case d         |
| 101 | 65  | e     | e     | Lower-case e         |

| DEC | HEX | Entry | ASCII | Definition    |
|-----|-----|-------|-------|---------------|
| 102 | 66  | f     | f     | Lower-case f  |
| 103 | 67  | g     | g     | Lower-case g  |
| 104 | 68  | h     | h     | Lower-case h  |
| 105 | 69  | i     | i     | Lower-case i  |
| 106 | 6A  | j     | j     | Lower-case j  |
| 107 | 6B  | k     | k     | Lower-case k  |
| 108 | 6C  | l     | l     | Lower-case l  |
| 109 | 6D  | m     | m     | Lower-case m  |
| 110 | 6E  | n     | n     | Lower-case n  |
| 111 | 6F  | o     | o     | Lower-case o  |
| 112 | 70  | p     | p     | Lower-case p  |
| 113 | 71  | q     | q     | Lower-case q  |
| 114 | 72  | r     | r     | Lower-case r  |
| 115 | 73  | s     | s     | Lower-case s  |
| 116 | 74  | t     | t     | Lower-case t  |
| 117 | 75  | u     | u     | Lower-case u  |
| 118 | 76  | v     | v     | Lower-case v  |
| 119 | 77  | w     | w     | Lower-case w  |
| 120 | 78  | x     | x     | Lower-case x  |
| 121 | 79  | y     | y     | Lower-case y  |
| 122 | 7A  | z     | z     | Lower-case z  |
| 123 | 7B  | {     | {     | Open brace    |
| 124 | 7C  |       |       | Vertical bar  |
| 125 | 7D  | }     | }     | Close brace   |
| 126 | 7E  | ~     | ~     | Tilde         |
| 127 | 7F  | DEL   | DEL   | Delete/rubout |

## Equipment/Cabling List

|                                  |  |
|----------------------------------|--|
| <b>Network/Node</b>              |  |
| <b>Equipment Type/Serial No.</b> |  |
| <b>Site</b>                      |  |

### Cabling/Equipment Description

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, leaving small margins at the top and bottom. There is no handwriting or other markings on the paper.

**Table A-3. Global Configuration Parameter Form**

|                                  |  |
|----------------------------------|--|
| <b>Network/Node</b>              |  |
| <b>Equipment Type/Serial No.</b> |  |
| Configuration name               |  |
| Description                      |  |
| Installation name                |  |
| Connect prompt                   |  |
| Default access rights            |  |
| Logging port                     |  |
| Logging card                     |  |
| Binary output logging mask       |  |
| Modem network manager port       |  |
| IOK log timer                    |  |
| Addr                             |  |
| Node name                        |  |
| User list name                   |  |
| Local time zone                  |  |
| Local time when it is midnight   |  |
| Greenwich Mean Time              |  |
| Date display format              |  |
| Queue length threshold           |  |

**Table A-4. Controlled Services Form**

| <b>Service name</b> | <b>Password</b> | <b>Access</b> | <b>Service name</b> | <b>Password</b> | <b>Access</b> |
|---------------------|-----------------|---------------|---------------------|-----------------|---------------|
| Broadcast           |                 |               | Log                 |                 |               |
| Busy                |                 |               | Print               |                 |               |
| Configure           |                 |               | Reset               |                 |               |
| Diag                |                 |               | Rev                 |                 |               |
| Forward             |                 |               | Settime             |                 |               |
| Greeting            |                 |               | Status              |                 |               |
| Load/dump           |                 |               | SW-Update           |                 |               |

**Table A-5. Worksheet for an Asynchronous Line**

|                                  |  |
|----------------------------------|--|
| <b>Network/Node</b>              |  |
| <b>Equipment Type/Serial No.</b> |  |
| Answer access rights             |  |
| Answer attachment string         |  |
| Answer detachment string         |  |
| Answer disconnect string         |  |
| Attachment control               |  |
| Attachment text name             |  |
| Autocon limit                    |  |
| Auto connect to                  |  |
| Baud rate                        |  |
| Break key                        |  |
| Channel priority                 |  |
| Character length                 |  |
| Confirm connections              |  |
| Control state character          |  |
| Detach after disconnect          |  |
| Device flow control              |  |
| Echo                             |  |
| Forward toggle character         |  |
| Ignore routine broadcasts        |  |
| Login required                   |  |
| Messages                         |  |
| Number of stop bits              |  |
| Originate access rights          |  |
| Originate attachment string      |  |
| Originate detachment string      |  |
| Parity                           |  |
| Port flow control                |  |
| Port name                        |  |
| Session limit                    |  |
| Starting/port to Ending/port     |  |



|                                  |  |
|----------------------------------|--|
| <b>Network/Node</b>              |  |
| <b>Equipment Type/Serial No.</b> |  |
| Terminal type                    |  |
| Timeout                          |  |

**Table A-6. Worksheet for a Trunk Line**

|                           |  |
|---------------------------|--|
| Network/Node              |  |
| Equipment Type/Serial No. |  |
| Trunk name                |  |
| Range/port                |  |
| Port view clocking        |  |
| Baud rate                 |  |
| Virtual circuits          |  |
| Multiplexing protocol     |  |
| Login required            |  |
| Trunk timeout             |  |
| Utilization threshold     |  |
| Retransmission threshold  |  |
| Statistics logging timer  |  |
| Answer access rights      |  |
| Password override         |  |
| Password                  |  |
| Originate access rights   |  |

### Table A-7. A Form Useful for Other Names

[illegible]

## Tables/Sheets

**Note:** A port configuration chart and a multi-card configuration sheet, which may be photocopied, appear at the end of this appendix.



## 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” is a condition that exist at the EIA interface with no connection and no attachment. The port is considered to be detached.

A “service request” is the event that must take place at an originate port to attach to the VCX-500 . The end result is a “connect to” prompt from the VCX-500.

A “connection request” is a request from within the VCX-500 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***

|                           |                                                |
|---------------------------|------------------------------------------------|
| <b>Originate sequence</b> |                                                |
| 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                               |
| <b>Answer sequence</b>    |                                                |
| 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 QUILTS or<br>DTR DROPS at<br>ORIGINATE END | CONTROLS toggle returning to the<br>neutral state |
| REVERSE<br>DETACHMENT                           | Connection broken and user is<br>re-prompted      |

Attachment Cont.

***DTR Answer***

|                       |                                                                                                                                                                                                                                                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NEUTRAL STATE         | All CONTROLS are low                                                                                                                                                                                                                                             |
| CONNECTION<br>REQUEST | CONTROLS are raised and wait for<br>100ms. and check for DTR high. If high, the<br>connection is established; if not the<br>connection is denied.                                                                                                                |
| CONNECTED             | Connect request granted                                                                                                                                                                                                                                          |
| USER DISCONNECTS      | DTR toggle: CONTROLS drop and port<br>goes to the out-of-service state. If DTR drops,<br>it returns to the neutral state. If DTR does not<br>drop, all subsequent connection requests are<br>denied. When host raises DTR, answer port<br>will make connections. |
|                       | DTR no toggle: CONTROLS drop and return<br>to the neutral state. The answer port will<br>make connections regardless of whether the<br>host has dropped and then raised DTR or not.                                                                              |
| ANSWER END DROPS      | CONTROLS return to neutral state DTR                                                                                                                                                                                                                             |

***DTR Both***

| <b>Originate sequence</b>                      |                                                    |
|------------------------------------------------|----------------------------------------------------|
| 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<br>DTR DROPS at<br>ORIGINATE END | CONTROLS toggle<br>returning to the neutral state. |
| REVERSE DETACHMENT                             | User re-prompted                                   |
| <b>Answer sequence</b>                         |                                                    |
| CONNECTED                                      | Connect request granted                            |
| USER DISCONNECTS                               | CONTROLS toggle<br>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<br>DROPS or USER<br>DISCONNECTS                                                                                            | CONTROLS toggle returning<br>to the neutral state |
| Operation is the same as the DTR ORIGINATE except that DTR High is not required to initiate a connection (the state of DTR 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<br>DTR or USER DISCONNECTS | 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<br>DTR DROPS at<br>ORIGINATE END                                                                                                      | CONTROLS toggle returning to the neutral                 |
| REVERSE DETACHMENT                                                                                                                                  | User re-prompt                                           |
| CONNECTED                                                                                                                                           | Connect request granted                                  |
| Answer sequence                                                                                                                                     |                                                          |
| USER DISCONNECTS or<br>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 Cont.



## ***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. Outband flow control only works when cabled directly to DTE.

### **Typical Applications**

**Unqualified originate**—The terminal user attaches by simply typing a “.”. 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 typing 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-500 resources to be used by remote users via the DDD network. VCX-500 port controls are high so that the modem can answer the call. If the terminal user quits a connection, VCX-500 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-500 resources as well as providing VCX-500 users access to resources off the DDD network. Dial-in behavior is the same as above. In the dial-out mode, the VCX-500 port becomes an answer port with its controls high, allowing the VCX-500 user to talk to the auto-dialer and set up a call over the DDD. The VCX-500 user can detach causing controls to toggle low causing the modem to go back on-hook, or the host resource off the DDD network can go on-hook causing a falling DTR at the port and VCX-500 detachment to be completed.

**Unqualified answer**—A CPU port is required to answer calls only from the VCX-500. The user will always terminate the connection after logging off the host.

**DTR answer with toggle**—A CPU answers calls from the VCX-500 network which are only accepted by the VCX-500 if the host DTR is high. Upon user disconnection VCX-500 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-500 network which are accepted only if the host's DTR is high. Upon user disconnection, VCX-500 controls are dropped. The next incoming call will again raise the VCX-500 controls.

**DTR both** — A dial-in/out modem pool connects to the VCX-500. A VCX-500 user can place a call over the DDD network to other resources. However, the only way to break the VCX-500 connection is for the VCX-500 user to detach. The host off the DDD cannot initiate a sequence to break the VCX connection. The originate mode is identical to DTR originate behavior.

Attachment Cont.



## Restricted Access

---

### Access Rights Assignments

As received, a VCX-500 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 through 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-500 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-500 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-500. 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-500 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-500 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-500 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-500 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-500 Services

A VCX-500 service is a special case of a destination port where the resource is in fact stored internal to the VCX-500. When beginning from a cold start, all services are given a "1" access right just like everything else in the VCX-500. 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
- TM (transparent mode)
- Who

However, controlled services that affect overall network performance should be given restricted access. Controlled Services include:

- AB
- Busy
- Configure
- Diagnostic
- Forward
- Greeting
- Load/dump
- Logging
- Mode
- Print
- Reset
- Settime
- Setup
- Status
- SWupdate

# Appendix **D**

## Software Layers

---

VCX-500 software information is presented in this appendix. The various layers of the software are given and details of the services are listed. The VCX software is graphically illustrated in figure D-1. The software is described in two layers: 1. KOS and; 2. Switching (Node and Asynchronous Port Management..

| Services  |        |      |
|-----------|--------|------|
| Switching | Muxing | X.25 |
| KOS       |        |      |

Figure D-1. Software layers



---

# Kernel Operating System (KOS)

## ***General Functions***

- Resource Management (Memory)
- Task Management (Loading, Scheduling)
- Message Management (Backplane\Interface\Packet Switching)
- Card Initialization (PM Bus contention\Initial Task load)

The KOS is ROM resident.

---

# Switching

## **Node Management**

### ***Card Manager***

- Gets card configuration
- Loads Port Managers
- Loads special tasks

### ***Node Manager***

- Configuration access
- Polls cards
- Connection Management
  - Name resolution
  - Queing
  - Security Management

## **Asynchronous Port Management**

### ***Port Manager***

- Gets port configuration
- Attachment control
- Outputs attach/detach strings
- Loads device handler (DH)
- Loads session manager

***Device Handler (DH)***

- Controls UART
- Receives/transmits data
- Interrupt driven
- Manages “Ring buffers”
- Monitors RS232 signals

***Session Manager***

- Outputs prompt and greeting
- User interface
- Initiates connection request
- Provides dual session capability

***DH Mover***

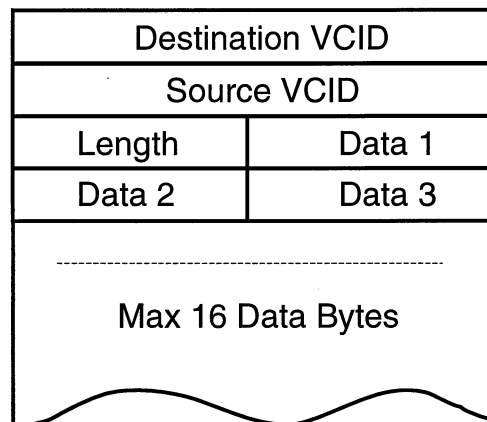
- Moves data from Ring buffer to destination

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## Formats

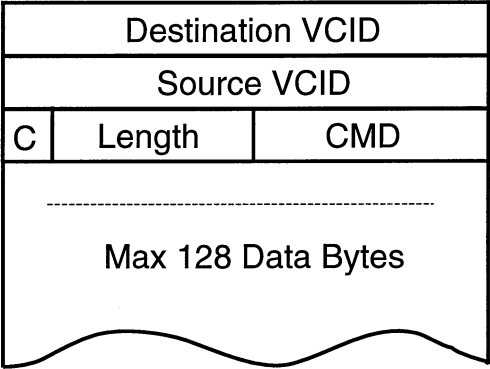
### Packet Formats

***Data Packet Format***



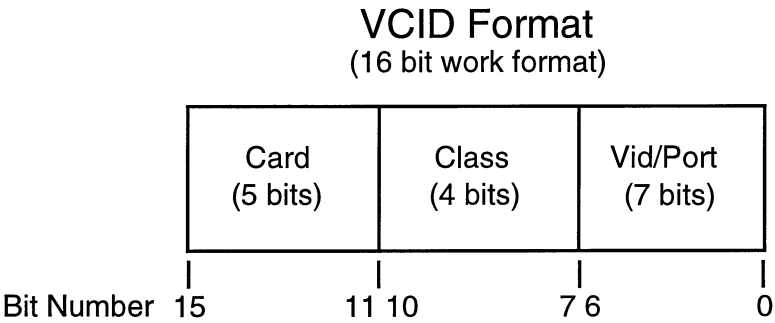
**Figure D-2. Software layers**

**Command Packet Format**



**Figure D-3. Software layers**

**VCID Format**



**Figure D-4. Software layers**

The appropriate bits and their definition for the VCID format are given in table D-1. Bits for card, class and VID/Port are listed.

**Table D-1. VCID Format Word Bit Descriptions**

| <b>Word</b>  | <b>Bit No.</b> | <b>Meaning</b>       |
|--------------|----------------|----------------------|
| <b>Card</b>  | 0              | Slot 1               |
|              | 1              | Slot 2               |
|              | 2              | Slot 3               |
|              | 3              | Slot 4               |
|              | 4              | Slot 5               |
|              | 5              | Slot 6               |
|              | 6              | Slot 7               |
|              | 7              | Slot 8               |
|              | 8              | Slot 9               |
|              | 9              | Slot 10              |
|              | 10             | Slot 11              |
|              | 11             | Slot 12              |
|              | 12             | Slot 13              |
|              | 13             | Slot 14              |
|              | 14             | Slot 15              |
|              | 15             | Slot 16              |
|              | 16             | Slot 17              |
|              | 17             | Slot 18              |
|              | 18             | Slot 19              |
| <b>Class</b> | 0              | Tasks                |
|              | 1              | Async Device Handler |
|              | 2              | Mux Port 1           |
|              | 3              | Mux Port 2           |
|              | 4              | Mux Port 3           |
|              | 5              | Mux Port 4           |
|              | 6              | PM Access            |

| Word     | Bit No. | Meaning                        |
|----------|---------|--------------------------------|
| VID/Port | 0-127   | Task ID if class = 0           |
|          | 0-15    | Port ID if class = 1           |
|          | 0-127   | Mux channel ID if class = 2-5  |
|          | 0-127   | I/O Descriptor ID if class = 6 |

## Index

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48 volt power supply 2-1, 2-3

### A

AB Service 11-1  
    assessing the service 11-1  
    configuration/using 11-1  
    defined 1-3  
Access control 3-1  
    administrator perspective C-2  
    user perspective C-2  
Access Rights 1-8, C-3  
    Control C-2  
    Pasword override C-3  
    Reference to 4-22  
    Security C-1  
Access rights assignment  
    C-1, C-2, C-3, C-4  
Account id 4-21  
Alarms 1-11  
Answer 5-11  
    access rights 5-11  
    disconnect string 5-12  
Answer attachment string 5-12  
ASCII Code Table A-3  
Asynchronous lines 4-2, 5-1  
    access subforms 5-11  
    answer 5-12  
    auto connection subform 5-13  
    character length 5-3  
    device/portflow 5-6  
    ignore routine Bcst 5-18  
    parity 5-4  
    stop bits 5-4  
    subforms 5-10  
Asynchronous Port Diagnostics  
    14-2  
Asynchronous ports  
    Cables 2-13  
    RJ45/DB-45 adapter 2-13  
    RJ45/RJ45 adapter 2-13

Attachment control 3-2  
    applications B-6  
    concepts and terminology 5-5  
    reference to 4-22  
    types 5-6  
    types of B-1, B-2, B-3, B-4, B-5,  
        B-6, B-7  
Autobaud  
    rates and selection 1-10  
Autoconnect  
    example 5-16  
Autoconnection subform 5-13  
Automatic Connection 1-11

### B

Break Key 5-19  
    ignore or interpret 1-11  
Broadcast Service 12-1  
    defined 1-3  
    types 1-9  
Busy Service 13-1  
    defined 1-3

### C

Channel Priority 1-11  
Configuration  
    global 3-1  
    level 1 4-3  
    level 2 4-3  
    level 3 4-3  
    menus 4-2  
    name 4-3  
    soft 1-8  
Configuration Control  
    interrogation 1-12

- Configuration Service
  - add a new configuration 4-8
  - add a new text 4-9
  - add a new User list 4-9
  - add/modify configuration 4-6
  - attachment types 5-6
  - defined 1-3, 4-1
  - delete 4-10
  - delete a name 4-14
  - device portflow 5-6
  - emulation, CPU 5-7, 5-9
  - global configuration
    - parameters 4-15
  - level 1 menu 4-6
  - level 3 menu 4-12, 4-20
  - list existing 4-11
  - menu summary 4-5
  - Subforms 5-10
- Configuration Worksheet A-8
- Configuration Worksheets
  - asynchronous lines A-11
  - global parameters form A-9
  - other names form A-13
  - trunkline definition A-12
- Connect hold 5-19
- Connection
  - automatic 1-11
- Contended access 5-14
- Control State
  - screen 5-15
- Control State Screen 1-12, 5-15
- Controlled Services
  - overview 1-2
- Controlled Services Form A-10
- Conventions
  - type styles and key names 1-4

## D

- Dedicated access 5-14
- Dedicated access/with switch
  - 5-14
- Link 1-1
- Link Module 2-1

- Diagnostic Service 14-1
  - defined 1-3
- Diagnostics
  - system administrator 1-9
  - user 1-9
- Distributed Switching 1-8
- Download Service
  - Defined 1-4
  - Redundancy module 1-4
- DTE 6-2
- DTR answer B-3
- DTR attachment control 3-2
- DTR both B-4
- DTR Originate B-3
- Dual Dedicated 5-14
- Dynamic reconfiguration 4-28

## E

- Echo
  - local 1-10
- Edit option 4-27

## F

- Field selection 4-4
- Flow Control 5-7
  - protocols 1-11
- Forms 4-3, 4-13
- Forward Service 15-1
  - call forwarding 1-10
  - defined 1-3
  - menu 15-2
- Forward toggle 5-19, 5-21
- Fox Service 26-1
  - defined 1-4

## G

- General Information 1-1
- General Logging Message Format 18-3
- Greenwich mean time 4-19

Greeting Service 16-1  
  defined 1-3  
  Menu 16-1  
Group  
  defined 8-1

## I

Initialize storage  
  level 1 menu 4-7  
  level 2 menu 4-8, 4-9, 4-10, 4-11  
Installation 2-8  
Interfaces 2-12  
Introduction  
  general 1-1  
  organization 1-2  
  using this manual 1-1  
I/O Timer 4-18

## L

LED indicators 2-10  
Load/Dump Service 17-1  
  defined 1-3  
  Examples 17-2, 17-4, 17-5,  
    17-7, 17-8  
Load/Dump Utility 1-9  
Local time 4-19  
Log of Events 18-10  
Loggable Event Classes 18-2  
Logging Function 1-9  
Logging Message  
  Notes 18-13  
Logging Message Format 18-3  
Logging Message Summary 18-5  
Logging Service  
  defined 1-3  
  Description 18-13  
  General Message Format 18-4  
  Logging Port 18-1  
  Logging Service 18-2  
  Overview 18-1  
  Quick Logging Method 18-16

Logging Service Main Menu  
  Add User Log Entry 18-16  
  Exit 18-13  
  Manipulate System Log 18-13  
  Monitor Log 18-15  
Loopback Service 27-1  
  defined 1-4

## M

Master NetMux  
  required global parameter 4-17  
Mode Service 19-1  
  defined 1-3  
Modem answer B-5  
Modem both B-5  
Modem originate B-4  
Modem Support 1-11  
Multiplexing  
  statistical 1-8  
Multiplexing/X.25  
  Port Diagnostics 14-8

## N

Name  
  defined 4-1  
  displaying names 4-10  
  types 4-2  
Name Type 5  
  Services, controlled access 9-1  
Network  
  defined 1-2  
  example 1-5, 1-6, 1-7  
Network Examples  
  Ethernet 1-7  
  Example 1 1-5  
  Example 2 1-6  
  Example 3 1-6  
  Example 4 1-7  
  Onlinking 1-6  
Network management  
  Address 4-18  
  port 4-18



Node  
    defined 1-2  
Number of multiplexed  
    connections 6-3

## O

Originate access rights 6-6  
Originate sequence B-2  
Originate Session  
    Resetting 22-2  
Out of service state 5-13

## P

Password 3-1, 4-21  
Password override C-3  
Port  
    attach/detach strings 1-11  
    busyding 1-10  
    contention and queuing 1-8  
    defined 1-2  
    emulation, CPU 5-7  
    high speed asynchronous 1-10  
    parameter conversion 1-11  
    selection (switching) 1-8  
Port Expander  
    Described 2-1  
Port Range Submenu 13-3  
Print Service 20-1  
    defined 1-3  
    requirement 20-1  
Programmable Directories 1-9  
Programmable Help 1-9  
Protocol  
    flow control 1-11

## Q

Q Status 21-1  
    monitor screens  
        description 21-2

Queue  
    port contention 1-8  
Queue length threshold 4-20

## R

Rear view 2-12  
Recessed switches 2-11  
Redundancy Check 1-8  
Remote Network Control 1-8  
Remote Reset 1-10  
Reset 2-11  
Reset Service  
    defined 1-4  
Reset service 22-1  
Restricted access  
    C-1, C-2, C-3, C-4  
Retransmission Request  
    automatic 1-8  
Reverse detachment 5-5  
RS-232C Interface  
    data A-1  
    interface pinouts table A-1

## S

Security C-1  
    access rights 1-8  
Select Command 5-15  
Sessions limit 5-15  
Sessions, Multiple 1-8  
Set Service 28-1  
    Baud rate 28-2  
    defined 1-4  
    Exit 28-2  
Settime Service  
    defined 1-4  
Soft Configuration 1-8  
Speed Connect 1-10, 7-1  
Statistical Multiplexing 1-8  
Status Service 24-1  
    activity monitoring 1-9  
    defined 1-4  
    port status submenu 24-3

- Strings 10-1
- Subforms 5-10
- Summary chart 4-22
- Switching
  - distributed 1-8
- SWupdate Service
  - Updating present software 25-1
- System Administrator 3-1
- System Overview
  - Introduction 2-1

## T

- Technical Specifications 2-2
- Terminal characteristics
  - subform 5-16
- Text service 4-1, 4-24, 4-25, 4-26, 4-27
  - delete 4-10
  - edit option 1 4-25
  - edit option 2 4-26
  - edit option 3 4-26
  - edit option 4 4-26
  - edit option 5 4-27
  - edit option 6 4-27
  - edit option 7 4-27
  - edit option 8 4-27
  - edit text 4-25
- Three wire cabling 3-2
- Time zone
  - set 4-19
- Timeout
  - inactivity disconnect 1-11
- Timeout direction 5-9
- Transformer 2-7
- Transparent (TM) Service 29-1
  - defined 1-4
- Transparent Operation 1-10
- Trunk line 4-2
  - access subform 6-5
  - DTE 6-2
  - main form 6-1
  - multiplexed connections, number 6-3
  - utilization threshold 6-5

- Trunk Monitor 1-12
- Trunkline Main Form
  - port 6-2
- Typical applications B-6

## U

- Unlimited access rights 5-11
- Unpacking unit 2-7
- Unqualified answer B-2
- Unqualified both B-2
- Unqualified originate B-2
- User lists 4-1, C-3
  - add/modify lists 4-6
  - delete 4-10
  - description 4-9
- User Services
  - Overview 1-2
- User Session
  - multiple 1-8
- Using This Manual
  - concepts and terminology 1-1
  - organization 1-2
- Utilization threshold 6-5

## V

- VCX Feature overview
  - 1-8, 1-9, 1-10, 1-11, 1-12

## W

- Who Service 30-1
  - defined 1-4

## X

- X.21
  - Configuration 6-11
  - General 6-7
  - PDN 6-7
  - PDN/ PSTN Trunk cable pinouts 6-11
  - PSTN 6-10



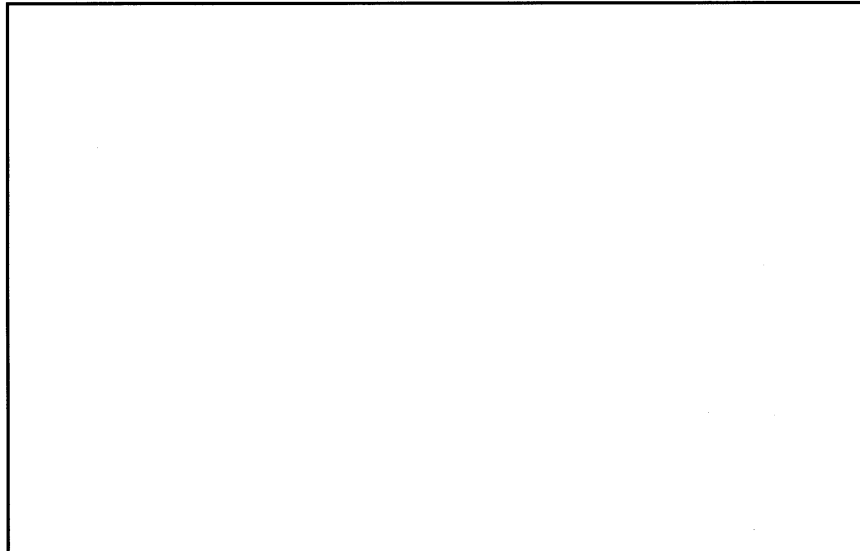
# Chapter 10

## Name Type 6 – X.25 Port

**Note:** X.25 is not implemented in this release of the VCX-500.

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 10-1.

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 still be filled out, but the trunk never boots up with X.25 parameters. (See the separate manual, *X.25 Administrator's Guide* part number 60X166A02-06 for more information on X.25.)



**Figure 10-1. X.25 main form monitor screen**

X.25

