Bull DPX/20

HiSpeed WAN Comm.
Installation & Service Guide

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HiSpeed WAN Comm.
Installation & Service Guide

Hardware

June 1996

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About this Book

This book contains information for understanding and performing installation and exploitation tasks in the **HiSpeed WAN Communications** environment.

It provides an overview of WAN communications (X.25 protocol), lists the available HiSpeed WAN Comm. products, explains how to install and configure hardware and software and provides problem solving information.

Who Should Use this Book

This book is intended for system administrators who have to install and manage **HiSpeed WAN Communications**.

Before you Begin

- This document is at Revision 5 level, which applies to AIX Version 4.1
- A glossary is included at the end of this book, but some generic terms need a specific explanation:

  HiSpeed WAN Comm. means **HiSpeed WAN Communications**.

  HiSpeed WAN Communications refers to the **HiSpeed WAN Communications** adapters family. It includes four types of X.25 adapters:

  a. **4Port HiSpeed WAN Comm. Adapter**,

  b. **1Port HiSpeed WAN Comm. Adapter**,

  c. **1Port HiSpeed WAN Comm–B Adapter**,

  d. **1Port WAN Comm Adapter (ISA)**.

  System refers to an AIX system, mono-processor or multi-processor, on which the HiSpeed WAN Comm. adapters may be installed.
  Refer to the appendix **HiSpeed WAN Comm. Adapters and Systems** to know which adapter can be installed in which system.
- The whole documentation relative to the **HiSpeed WAN Communications** is provided in this present book, except for:
  - the hardware installation of the 4Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm–B and 1Port WAN Comm Adapter (ISA) adapters which is documented in a paper documentation provided directly with the hardware.
  - the OSI Stack Configuration for X.25 adapters which is detailed in *OSI Services Reference Manual.*
- The X.25 documentation which is dispatched in *System Management Guide* and *Communication Programming Concept* refers to another type of X.25 adapter, the X.25 Interface Co-Processor/2.

How to Use this Book

This book contains the following chapters:

Introduction **HiSpeed WAN Communications Support Overview**.

Chapter 1. **X.25 Introduction** is an overview of the X.25 functions and terminology.

Chapter 2. **HiSpeed WAN Comm. Kits** is a description of the HiSpeed WAN Comm. communications support. It lists and describes the mandatory and available components.

Chapter 3. **HiSpeed WAN Comm. Installation** explains how to perform the HiSpeed WAN Comm. hardware and software installation and how to configure it.

Chapter 4. **HiSpeed WAN Comm. Configurator** describes the configuration actions which may be performed on HiSpeed WAN Communications and lists and explains all the configuration parameters.

Chapter 5. **HiSpeed WAN Comm. Tools for Problem Solving** describes simple procedures, using the HiSpeed WAN Comm. tools.

Appendix A. **HiSpeed WAN Comm. Adapters and Systems** lists for each type of AIX system the HiSpeed WAN Comm. adapters which can be used.

Appendix B. **HiSpeed WAN Comm. Physical Interfaces** describes the physical interfaces available on HiSpeed WAN Comm. adapters and explains how to recognize which type of interface is implemented on a channel.

Appendix C. **HiSpeed WAN Comm. Cables** gives connector diagrams and pinout information concerning the attachment cables.

Appendix D. **HiSpeed WAN Comm. Links** lists the links which may be implemented using HiSpeed WAN Comm. communications.

Appendix E. **HiSpeed WAN Comm. Adapter and Port Numbering**.

Appendix F. **HiSpeed WAN Comm. Commands** are Reference Manual pages concerning the HiSpeed WAN Comm. commands.

Glossary

Index

Revision 05 Modifications

Updates include:

- two new (or newly documented) commands: **xdconnect** and **rc.fun.**
- one new parameter **'line opening mode'** in 'Change/Show Physical Parameters'.
- improvements in softcopy documentation.

Related Publications

- Blue Book, Volume VIII – Fascicle VIII.2 (Melbourne 1988)

  CCITT Recommendation X.25 – Interface between data terminal equipment (DTE) and circuit terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuits.

- ISO 8208 – The International Standard on information processing systems – Data Communications – X.25 Packet Level Protocol for Data Terminal Equipment (1987).
- ISO 7776 – The International Standard on information processing systems – Data Communications – High-level Data Link Control procedures – Description of the X.25 LAPB-compatible DTE data link procedures.

- *4Port HiSpeed WAN Comm. Adapter Installation Guide*
  86 A1 78AT
- *1Port HiSpeed WAN Comm–B Adapter Installation Guide*
  86 A1 77AT
- *1 Port WAN Comm Adapter (ISA) Installation Guide*
  86 A1 42AT
- *bullx25 Diagnostics Guide*
  Reference: 86 A2 51AJ
  This document describes how to diagnose and solve problems with bullx25 running on HiSpeed WAN Comm. adapters. It is not delivered with the bullx25 software, but may be ordered separately.
- *XTI/XX25 Administrator and User Guide*
  Reference: 86 A2 04AP

Table of Contents

Introduction.
HiSpeed WAN Communications Support Overview

The **HiSpeed WAN Communications** kits are a family of components which enable running applications needing a large bandwidth or high performance access to wide area networks.

A HiSpeed WAN Comm. kit is composed of:

- A multi-channel or mono-channel X.25 adapter.
  Each channel is customized with a daughter-board and an associated attachment cable, providing thus one of the following physical interfaces, V24/V28, V24/V35, leased X21.
- X.25 protocol (link and packet layers) resident on the adapter and software interfaces which allow different communication stacks to access an X.25 network.

HiSpeed WAN Comm. Software

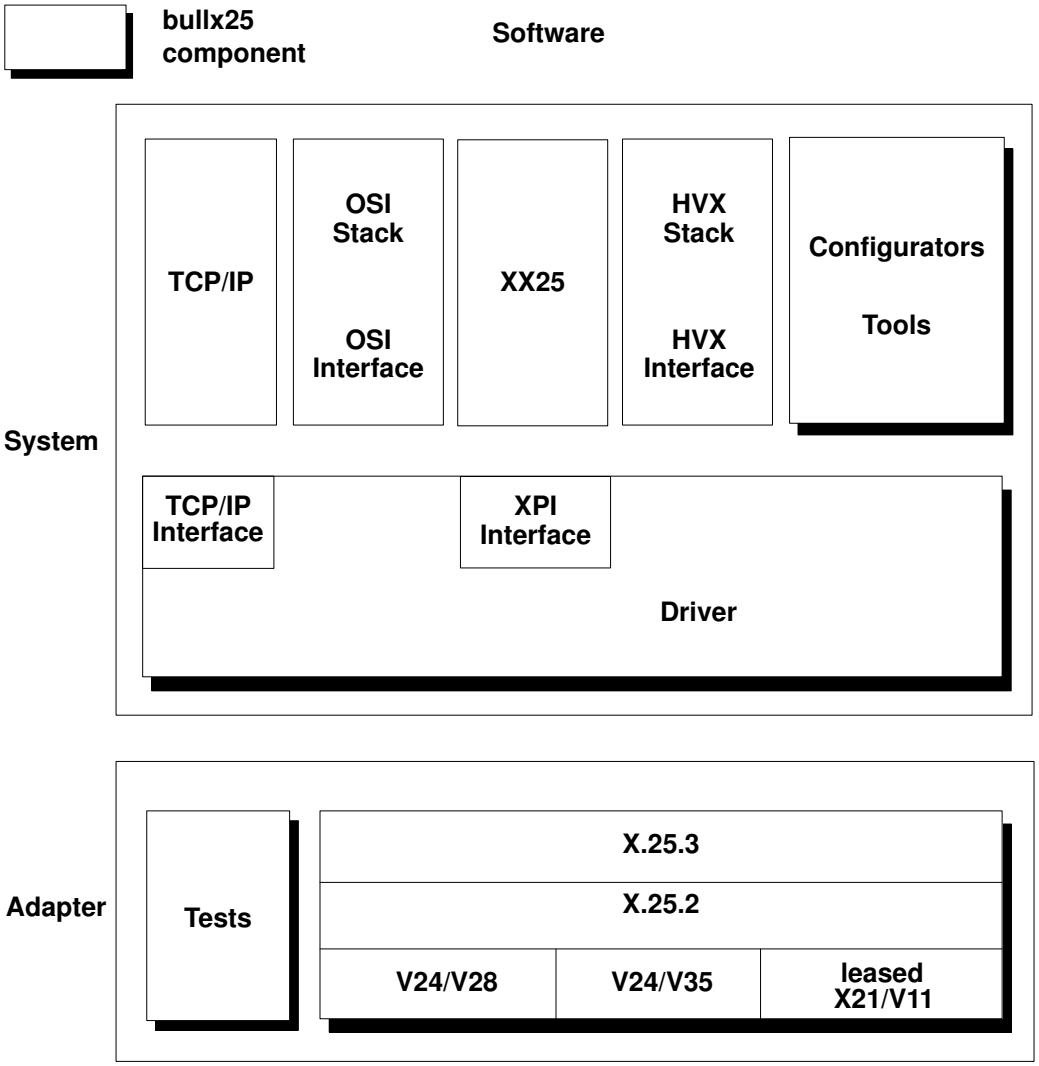


Figure 1. HiSpeed WAN Comm. Software

The figure shows the HiSpeed WAN Comm. software (or **bullx25**) components:

- X.25 protocol and tests which are loaded at bootstrap into the HiSpeed WAN Comm. adapter.
- Adapter driver which handles communications between the HiSpeed WAN Comm. adapter micro-code and applications using one of these communications providers:
  - **TCP/IP**,
  - **OSI stack**,
  - **XX25**,
  - **HVX stack**.
- Configurators for setting up the X.25 adapter and the interface (if TCP/IP) according to the network subscription.
- Tools supplied for:
  - using and testing the X.25 network without any application program with direct access to the driver,
  - managing the network by getting statistics and displaying information.

Notes:

1. **XX25** (X.25 Programming Interface using XTI) is an API which provides full access to all X.25.3 services through the XPI interface. XX25 is suited for applications such as videotext servers and in a general way for servers with direct X.25 access.

   XPI (X.25 Provider Interface) is specified by the OSI Working Group of UNIX International.

2. **HVX** is an emulation of GCOS6/HVS6 software on AIX, which allows to run DPS6 applications on AIX systems. The HVX communications stack accesses directly the HiSpeed WAN Comm. driver.

Chapter 1. X.25 Introduction

X.25 Overview

The X.25 protocol was first defined at the end of the seventies by CCITT Recommendation X.25. Further revisions of the recommendation were published in 1984 and 1988. The International Organization for Standardization (ISO) has also published the X.25 recommendations as ISO 8208 and ISO 7776.

The X.25 protocol is designed to manage communications on a wide area network (WAN). Such a network can interconnect intelligent switching nodes and transmit messages divided into parts (called packets) over circuits which are used by many network users.

This chapter is an introduction to the X.25 functionality. It provides:

- some basic information and terminology on an X.25 network, on page 1-1,
- a description of the X.25 protocol layers, on page 1-5,
- a list of X.25 packets, on page 1-9.

X.25 Network: some Basic Information

Packet-Switching Network

In a packet-switching network, the data to be transmitted is combined in a packet with addressing and control information. A packet is an independent unit which can be sent through any suitable path in the network. The packets of many different communications can share the same physical routes and lines in the network.

The figure 2 shows how packet switching makes more efficient use of a high-speed circuit. The triangles, squares and circles represent the packets belonging to each of the three communications.

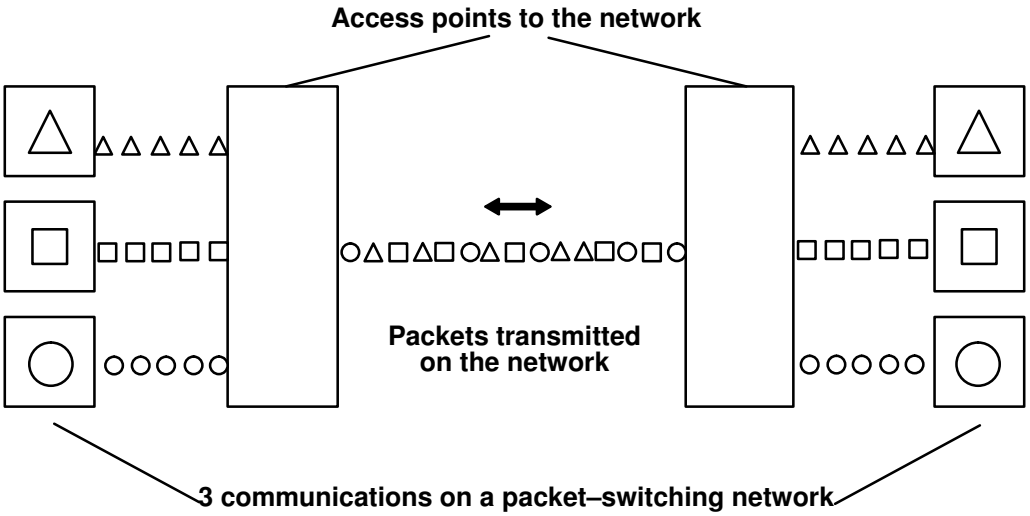


Figure 2. Packet-Switching Network

DTE and DCE

Two types of equipment are used on an X.25 network:

- **DTE** (Data Terminal Equipment) is an equipment which uses the network for communications. A process on this DTE has to communicate with another process running on another equipment.
- **DCE** (Data Circuit-Terminating Equipment) is an equipment which provides access to the network, that is establishes, maintains and ends the connections.

Every DTE must have an associated DCE.

DTE and DCE are functional definitions, they do not correspond to specific items of equipment.

In a public network, a DTE is a user equipment which has information to communicate with another DTE, whereas a DCE is an equipment which provides DTEs with access to the network. See the figure 3.

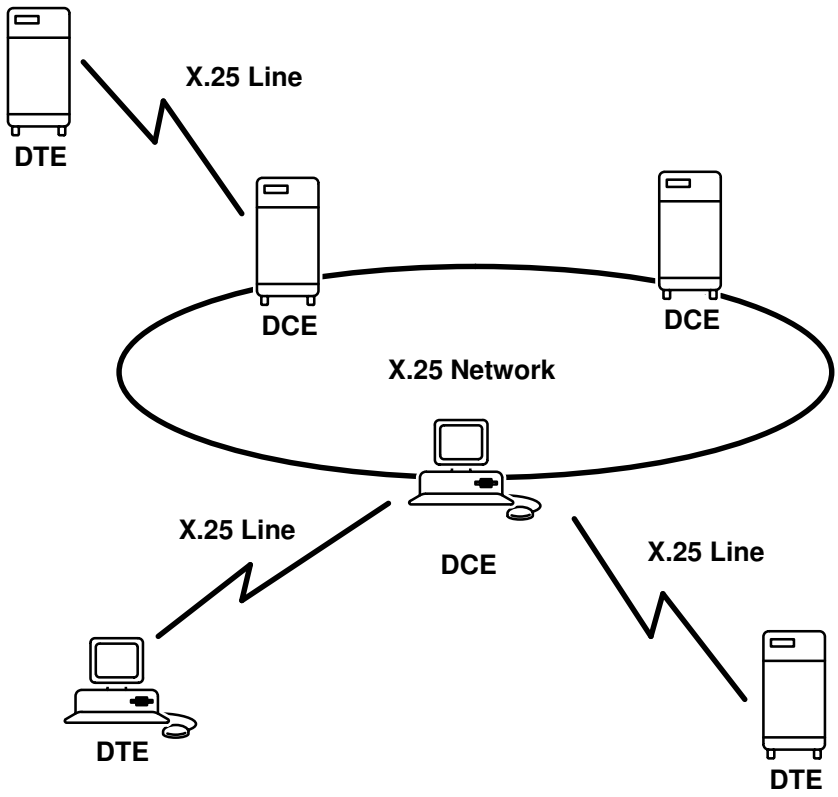


Figure 3. X.25 Public Network : DTEs and DCEs

In a direct connection through an X.25 line, the two equipments located at each end of the connection must apply the following rule: one must be declared as DTE type and the other as DCE type. See the figure 4.

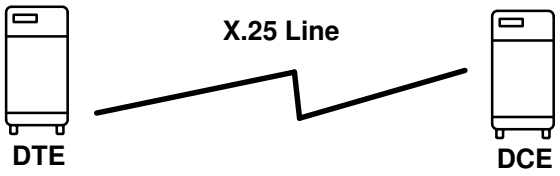


Figure 4. X.25 Direct Connection : DTE and DCE

Network User Address

Each X.25 line in an X.25 network is identified by a number called the **Network User Address** (**NUA**) which is assigned by the network provider of the X.25 line subscription. While most public networks use the X.121 addressing standard to create NUAs, private networks may use their own schemes for assigning addresses to lines.

Under the X.121 addressing standard, the NUA comprises a 3-digit country code, followed by a **National Terminal Number** (NTN) up to 12 digits long. This 15-digit code uniquely identifies the X.25 line throughout the world. If the network provider allocates fewer than 12 digits to the NTN, the remaining digits can be allocated as a sub-address, to identify individual users.

Virtual Circuits and Logical Channel Numbers

When a user (process) wants to communicate with another user over the X.25 network, a logical path or **virtual circuit** has to be assigned to this communication. All the packets of this communication will be transmitted through this virtual circuit.

For each DTE, the number of maximum needed virtual circuits are defined by the X.25 line subscription.

The communication between two DTEs is established:

- on each DTE, making active an available **virtual circuit** in order to connect to its associated DCE. A **logical channel number** identifies this connection and is included in each packet sent.
  The two logical channel numbers (one for calling DTE, the other for called DTE) may be different. Each DTE only needs to know its own logical channel number.
- between the two DCEs, reserving a **virtual circuit** for this communication.
  At configuration, each virtual circuit is either for outgoing calls only, incoming calls only, or two-way calls, but once the virtual circuit is established it is always for two-way communication.

Figure 5 shows four DTEs connected to an X.25 network. For each of them a defined number of virtual circuits has been subscribed, but not all of these virtual circuits are active.

DTE1 has configured four virtual circuits, two of them are active and connected to DTE2, another is active and connected to DTE3, the last is available.

DTE4 has configured two virtual circuits, but it is not communicating with any other DTE and both virtual circuits are available.

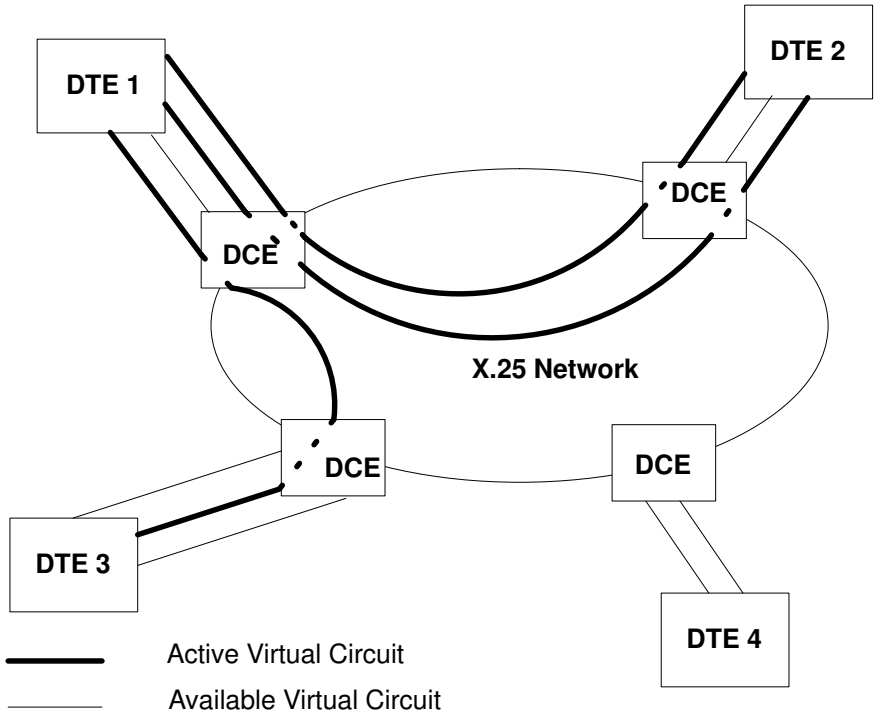


Figure 5. X.25 Network : Virtual Circuits

A virtual circuit may be either switched or permanent:

- a **switched virtual circuit** (**SVC**) is a virtual circuit which exists only for the duration of the call, acting like a connection over the normal telephone network,
- a **permanent virtual circuit** (**PVC**) is a virtual circuit which is permanently established between two addresses; it ties up a logical channel permanently. It is like having a leased line. Nowadays in practice, permanent virtual circuits are rarely used.

The X.25 Protocol Layers

The X.25 protocol comprises the three lowest layers of the OSI model, as shown in the figure 6:

- physical layer,
- link layer,
- network layer or packet layer.

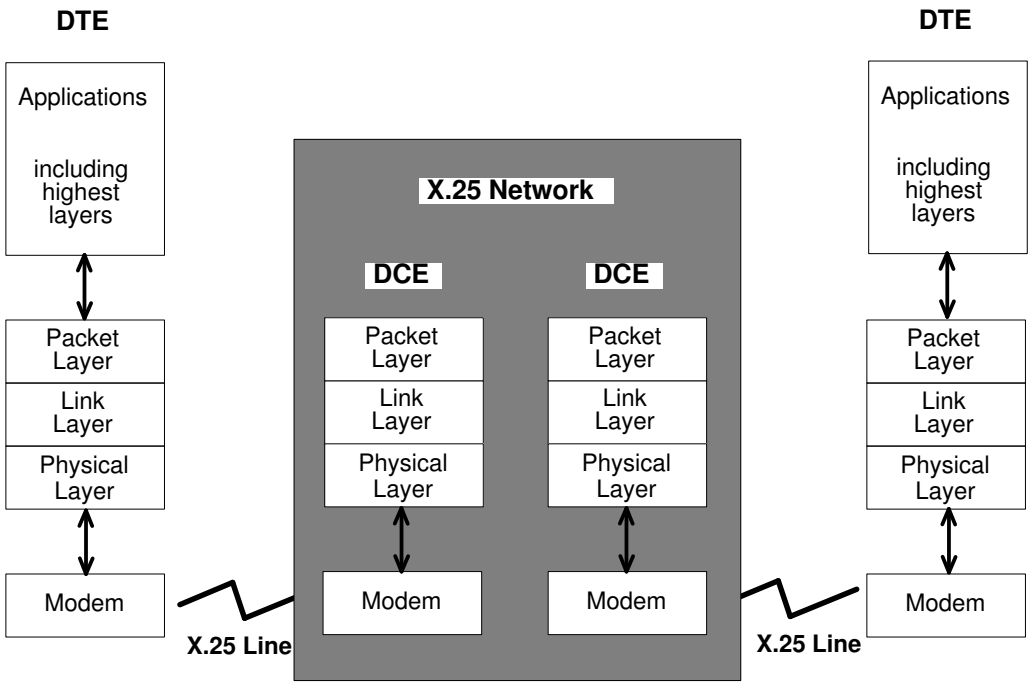


Figure 6. X.25 Protocol layers

X.25 Physical Layer

The physical layer handles the mechanical, electrical and functional characteristics to access and transmit the bit stream over the physical medium. It activates, maintains and de-activates the physical circuit between a DTE and a DCE.

The physical layers implemented on the HiSpeed WAN Comm. adapters are completely described in Appendix B. Physical Interfaces.

As the X.25 transmissions are synchronous, the clock signals have to be transmitted with the data and may have different origins:

- either external, provided by the network or the peer equipment (local modem or associated DCE)
- or internal, generated by the physical layer when the equipment is a DCE.
- In the case of a private link, the clock signals may be generated by both equipments, that is, each equipment generates its transmission clock and receives the corresponding reception clock.

X.25 Link Layer

The link layer is responsible for the reliable transfer of blocks of data across the physical layer. It provides error detection, flow control and sequencing of blocks of data provided by, and delivered to, the network layer.

The link layer uses a link access procedure to ensure that data and control information are accurately exchanged over the physical circuit between the DTE and DCE. The characteristics of this layer are based on High-level Data Link Control (**HDLC**), and more precisely on the Link Access Procedure Balanced (**LAPB**).

LAPB is a synchronous and full-duplex procedure. Once a link is started, either station can transfer information on its own initiative without waiting for permission from the other. It includes recovery functions.

HDLC Frames

In HDLC, all commands, responses and data are transmitted in frames.
In an HDLC frame the data are inserted after a header containing address and control information and before a trailer containing a frame-check sequence; two flags define the limits of the frame.

Flag 01111110	Address 11000000 10000000	Control	Data	FCS	Flag 01111110

Figure 7. HDLC Frame

HDLC Addressing

The address field identifies a frame as a command or a response (figure 8):

- a command frame includes the HDLC address of the DTE or DCE to which the frame is addressed,
- a response frame includes the HDLC address of the DTE or DCE which sent the frame.

For a DTE, the HDLC address is 11000000; and for a DCE the HDLC address, 10000000.

Figure 8. HDLC Addressing

HDLC Control

The control field determines the frame type and contains counters for frame numbering. Frame numbering may be done in modulo 8 or modulo 128.

HDLC Frame Types

There are three types of frames:

Format	Commands	Responses
Information	**I**	
Supervisory	**RR** Receive Ready **RNR** Receive Not Ready **REJ** Reject	**RR** Receive Ready **RNR** Receive Not Ready **REJ** Reject
Unnumbered	**SABM** Set Asynchronous Balanced Mode	
	DISC Disconnect	
		DM Disconnect Mode
		UA Unnumbered Acknowledge
		FRMR Frame Reject

Figure 9. HDLC Frame Types

Information frames

I Information frame transfers user data.

Supervisory frames

RR Receive Ready frame, sent by a receiver in order to acknowledge **I** frame reception when this receiver has no **I** frame to send.

RNR Receive Not Ready frame, sent by a receiver in order to stop transmission. **RNR** acknowledges the frames received earlier.

REJ Reject frame requests a new transmission of frames, numbers of which are subsequent to a specified number. **REJ** acknowledges the frames received earlier.

As for the Information frames, the Supervisory frames are numbered sequentially.

Unnumbered frames

SABM Set Asynchronous Balanced Mode frame, indicates to the receiver that it may transmit data without asking for permission.

DISC Disconnect frame ends the link connection.

DM Disconnect Mode frame indicates that the station is disconnected.

UA Unnumbered Acknowledge frame acknowledges an unnumbered command, for instance SABM.

FRMR Frame Reject frame indicates the reason why a frame has been rejected by the receiver.

X.25 Network or Packet Layer

The packet layer manages the establishment, maintenance and termination (routing) of connections while providing the upper layer with independence from the data transmission and switching functions used to connect systems.

The packet layer protocol specifies how virtual circuits between DTEs are established, maintained and cleared. This layer defines:

- the way a single physical channel (physical and link layers) can be treated as a set of multiple logical channels, each of them providing a virtual circuit,
- the structure of data packets, and of the control packets used to establish and manage a virtual circuit between two DTEs.

A packet is a unit of information transmitted from one DTE to another DTE through the network. It comprises a sequence of data and control elements in a special format which is always transmitted as a whole. The default packet size is defined by subscription.

The recommendations for the packet layer are not so specific as those for the physical and link layers. Network providers have some freedom in implementing the packet functions.

X.25 Packets Types

Different types of packet are used for making a call and accepting a call, transferring data and terminating a call.

Here is the list of the X.25 packet types; some of them are DTE specific or DCE specific, the others may be generated either by a DTE or by a DCE.

Packet Type	
From DTE to DCE	**From DCE to DTE**
Call Set-Up and Clearing	
Call-Request	Incoming-Call
Call-Accepted	Call-Connected
Clear-Request	Clear-Indication
DTE Clear-Confirmation	DCE Clear-Confirmation
Data and Interrupt	
DTE Data	DCE Data
DTE Interrupt	DCE Interrupt
DTE Interrupt-Confirmation	DCE Interrupt-Confirmation
Flow Control and Reset	
DTE Receive Ready (RR)	DCE Receive Ready (RR)
DTE Receive Not Ready (RNR)	DCE Receive Not Ready (RNR)

Figure 10. X.25 Packets Types

In some cases, the contents and even the type of the packet when it reaches the called DTE are different from when it left the calling DTE. This is because some information is different for each DTE (for example logical channel number), or some information is inserted or modified by the network.

The figure 11 shows a simple example of transferred packets during a call between two DTEs using a switched virtual circuit (SVC):

1. A makes a call, which B receives.
2. B accepts the call; A receives a call saying the call has been connected.
3. A sends some data, but does not ask for acknowledgment.
4. A sends some more data, which B acknowledges.
5. A clears the call; B receives indication of this and confirms that is has received the indication.
6. The network confirms to A that the call has been cleared.

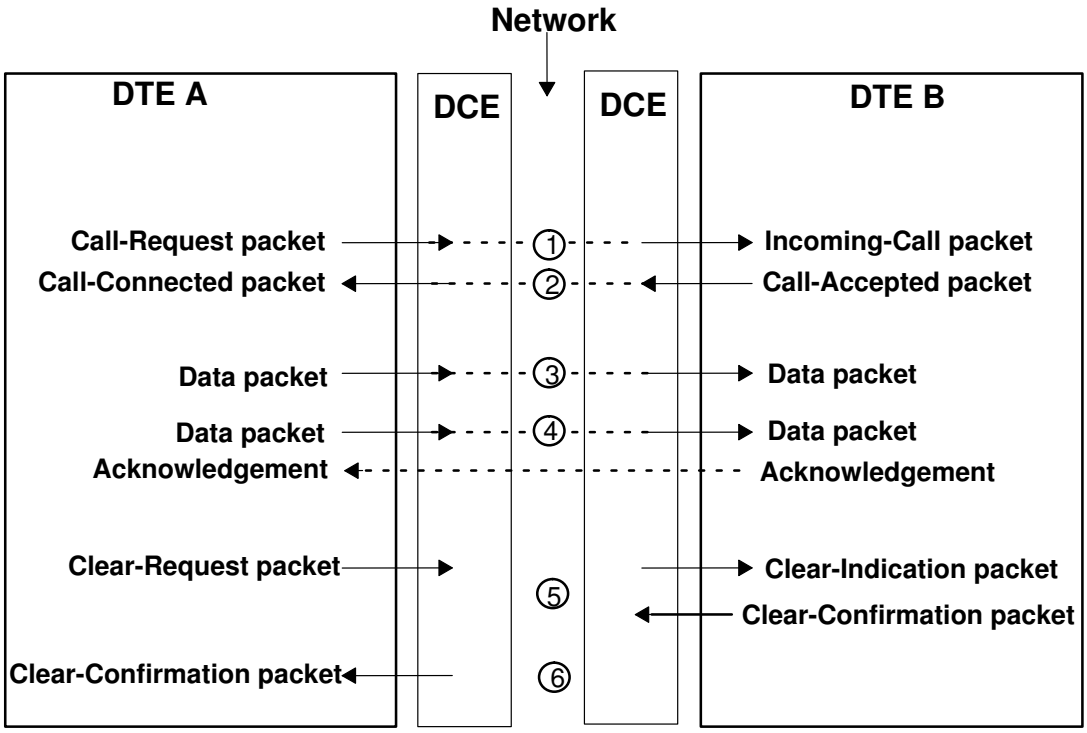


Figure 11. Sequence of packets in an example call over a switched virtual circuit

Brief Explanation of X.25 Packets

Call Set-Up and Clearing Packets

Call-Request Packet transmitted by a DTE to ask that a connection for a call be established throughout the network.

Incoming-Call Packet transmitted by a DCE to inform a DTE that another DTE has requested a call.

Call-Accepted Packet transmitted by a called DTE to indicate to the DCE that it accepts the incoming call.

Call-Connected Packet transmitted by a DCE to inform a calling DTE that the connection for the call has been completely established.

Clear-Request Packet transmitted by a DTE to ask that a call be cleared.

Clear-Indication Packet transmitted by a DCE to inform a DTE that a call has been cleared.

Clear-Confirmation Packet transmitted either by a DCE or a DTE to confirm that a call has been cleared.

Data and Interrupt Packets

These three packet types may be transmitted either by a DTE or by a DCE.

Data Packet to transmit user data over a virtual circuit.

Interrupt Packet to overtake normal data packets (which are delivered in sequence).

Interrupt-Confirmation Packet used to acknowledge the receipt of an interrupt packet.

Flow Control and Reset Packets

Receive-Ready Packet transmitted by a DTE or a DCE to indicate the ability to receive a defined number of data packets.

Receive-Not-Ready Packet transmitted by a DTE or a DCE to indicate a temporary inability to receive additional data packets on a given virtual circuit.

Reset-Request Packet transmitted by a DTE for resetting a virtual circuit at the DTE/DCE interface.

Reset-Indication Packet transmitted by a DCE to indicate to a DTE that a reset-request packet has been received.

Reset-Confirmation Packet transmitted either by a DCE or a DTE to confirm that a reset operation has been cleared.

Restart Packets

Restart-Request
: Packet transmitted by a DTE to request that a link be restarted.

Restart-Indication
: Packet transmitted by a DCE to indicate to a DTE that a restart-request packet has been received.

Restart-Confirmation
: Packet transmitted either by a DCE or a DTE to confirm that the link has been restarted.

Diagnostic Packets

Diagnostic
: Packet used by a DCE to indicate errors conditions which cannot be indicated by usual indication packets.

Chapter 2. Kits

The HiSpeed WAN Comm. communications kits have some common characteristics:

- X.25 protocol (including X.25.3) resident on the adapter,
- interface with different communications providers, TCP/IP, OSI, XX25 and HVX,
- software conformity with the ISO 8882 standard and the X.25–84 and X.25–88 CCITT recommendations,
- hardware and software conformity with NET2 conformity tests.

This chapter describes the specific characteristics of the adapters:

4Port HiSpeed WAN Comm. Adapter

Characteristics

The 4Port HiSpeed WAN Comm. adapter provides four X.25 channels. **The four channels together support a maximum of 1024 virtual circuits** (SVC or PVC) with a total data transfer rate of 2Mbps. Packet size is up to 4096 bytes.

The four channels can be configured independently, which provides flexibility and modularity.

Three types of physical interfaces are available :

- V24/V28, up to 19.2 Kbps,
- V24/V35, up to 64 Kbps,
- Leased X21–X24/V11, up to 2 Mbps.

The V24/V28, V24/V35 and leased X21–X24/V11 interfaces may be implemented on any of the four channels.

Refer to:

- Physical Interfaces, on page B-1, to get more information about interface description.

Hardware Components

The figure 12 shows the four items included in the 4Port HiSpeed WAN Comm. hardware:

- 4Port HiSpeed WAN Comm. board,
- interface daughter-boards,
- distribution box,
- cables, for connection to the X.25 networks.

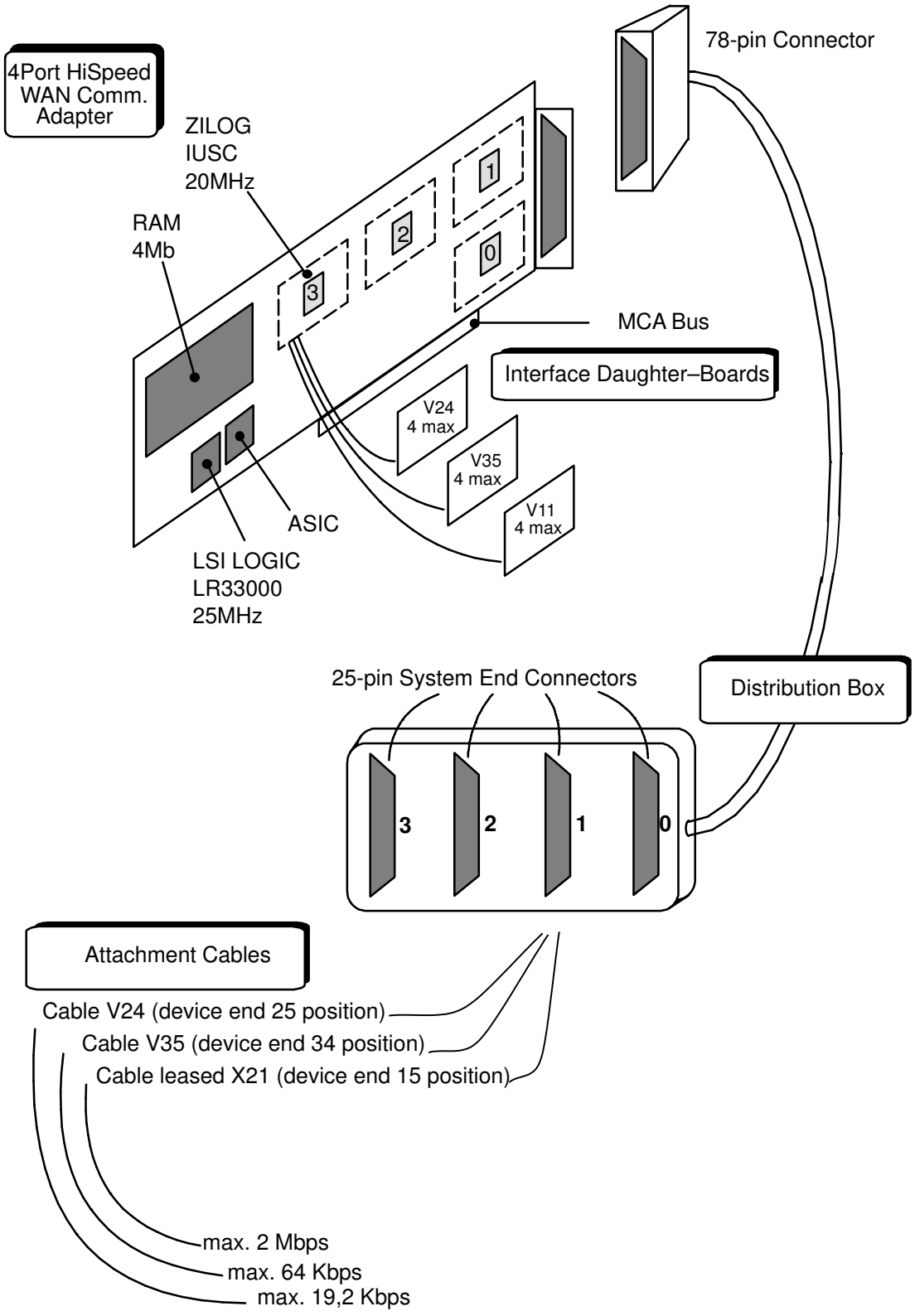


Figure 12. 4Port HiSpeed WAN Comm. Hardware Components

Board

The 4Port HiSpeed WAN Comm. board occupies one slot on the MCA bus of the system. It is based on:

- a RISC 32-bit processor (LSI LOGIC LR33000, 25MHz) with a 4-Mbyte RAM,
- an ASIC (Application-Specific Integrated Circuit) for dispatch of the four channels,
- an HDLC communication controller (ZILOG IUSC 20MHz) per channel,
- a 78-pin connector which plugs in at the rear panel of the system.

Interface Daughter-Boards

For each channel the physical interface is defined by both a daughter-board and the associated attachment cable. The daughter-board(s) is(are) plugged onto the 4Port HiSpeed WAN Comm. board at the emplacement(s) corresponding to the channel(s) to be used. There are three types of interface daughter-board:

- V24 daughter-board for implementation of V24/V28 interface,
- V35 daughter-board for implementation of V24/V35 interface,
- V11 daughter-board for implementation of leased X21/V11 interface.

Distribution Box

The distribution box picks up all the signals concerning the four X.25 channels on the 78-pin connector of the 4Port HiSpeed WAN Comm. board and dispatches them 3 meters further, on four 25-pin connectors, one for each channel.

Cables

For each channel, the attachment cable plugs in the distribution box in the 25-pin connector of the corresponding channel. The cable to be used depends on the interface daughter-board installed on this channel and on some other specifications.

Refer to *4Port HiSpeed WAN Comm. Adapter Installation Guide* provided with the 4Port HiSpeed WAN Comm. hardware to have the complete list of cables.

Environment Requirements and Compliance

Electrical power source loading

+5V : 2 A max.
+12V : 400 mA max.
–12V : 400 mA max.

Temperature range

operating : 0 to 55 °C
(permitting insertion in a system operating up to 40 °C)
non-operating : –40 to 85 °C

Humidity 0 to 90% (non-condensing)

Electromagnetic disturbances

Compliance with these standards (Class A)
– EN 55022 (CISPR22) for Europe
– FCC CFR47 Part 15 for USA
– CSA C.108.8 M1983 for Canada
– VDE 871 6/78 for Germany

Safety Compliance with these standards
– EN 60 950 (IEC 950) for Europe
– UL 1950 for USA
– CSA C.22.2.N950 for Canada

Certification BABT Approval
– The host equipment (system) is considered as an indirect attachment to the public network and therefore is eligible under the General Approval NS/G/12345/J/100003 (7/1/1993).
– The 4Port HiSpeed WAN Comm. adapter, to be connected to the public network, has been given the BABT National Approval.

1Port HiSpeed WAN Comm. Adapter

Characteristics

The 1Port HiSpeed WAN Comm. adapter provides an X.25 channel, which supports a **maximum of 256 virtual circuits** (SVC or PVC) with a total data transfer rate of 128 Kbps. Packet size is up to 4096 bytes.

Three types of 1Port HiSpeed WAN Comm. adapters are available :

- 1Port HiSpeed WAN Comm. adapter – V24, which implements V24/V28 physical interface, up to 19.2 Kbps,
- 1Port HiSpeed WAN Comm. adapter – V35, which implements V24/V35 physical interface, up to 64 Kbps,
- 1Port HiSpeed WAN Comm. adapter – V11, which implements Leased X21–X24/V11 physical interface, up to 128 Kbps,

Refer to:

- Physical Interfaces, on page B-1, to get more information about interface description.

Hardware Components

The 1Port HiSpeed WAN Comm. hardware is composed of these items:

- 1Port HiSpeed WAN Comm. board,
- cables, for connection to the X.25 networks.

Board

The 1Port HiSpeed WAN Comm. board (figure 13) occupies one slot on the MCA bus of the system. It uses:

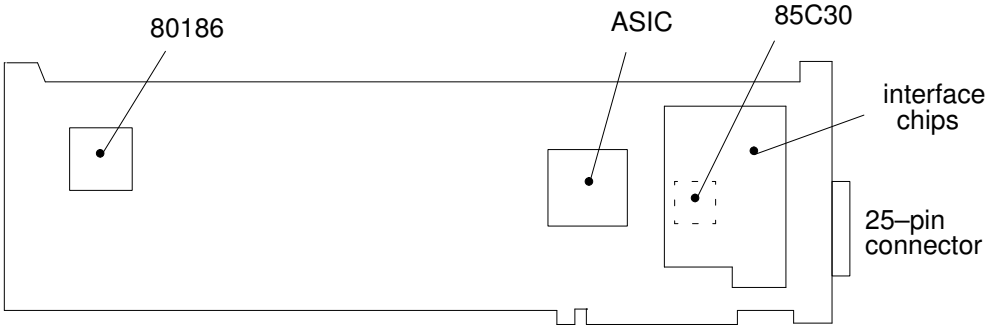


Figure 13. 1Port HiSpeed WAN Comm. Board

The 1Port HiSpeed WAN Comm. adapter is based on:

- an INTEL 80C186 processor with a 1-Mbyte RAM,
- an ASIC (Application-Specific Integrated Circuit) for managing the CPU and Communication Controller accesses,
- a Multiprotocol Serial Communication Controller (SCC – 85C30, 7,68 MHz),
- interface chips specific to one of the three interfaces: V24/V28, V24/V35 or leased X21–X24/V11,
- a 25-pin connector which plugs in at the rear panel of the system.

The physical interface is defined by both the interface chips and the associated attachment cable.

Cables

The cables to be used depend on the type of the physical interface and on some other specifications.

- 1Port HiSpeed WAN Comm.–V24 cable,

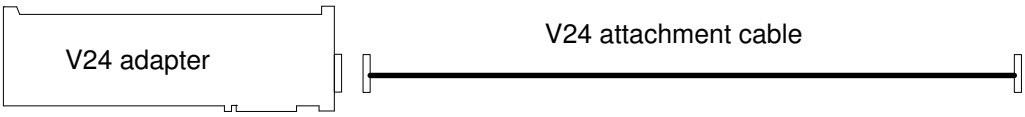


Figure 14. 1Port HiSpeed WAN Comm.–V24 Board

- 1Port HiSpeed WAN Comm.–V35 cables,

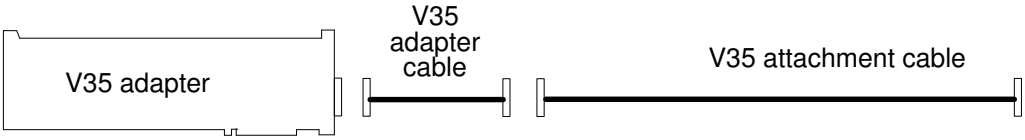


Figure 15. 1Port HiSpeed WAN Comm.–V35 Board

- 1Port HiSpeed WAN Comm.–V11 cables,

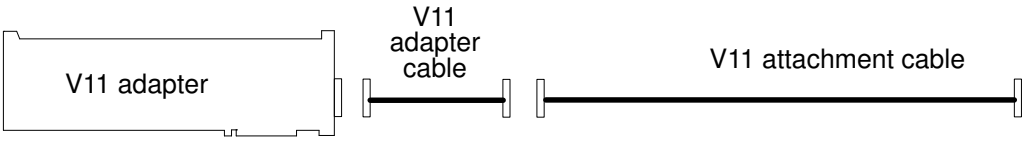


Figure 16. 1Port HiSpeed WAN Comm.–V11 Board

Refer to 1Port HiSpeed WAN Comm. Components Identification, on page 3-6, to have the complete list of cables.

Environment Requirements and Compliance

Electrical power source loading

+5V : 1.3 A max.
+12V : 100 mA max.
–12V : 100 mA max.

Temperature range

operating : 0 to 55 °C
(permitting insertion in a system operating up to 40 °C)
non-operating : –40 to 85 °C

Humidity 0 to 90% (non-condensing)

Electromagnetic disturbances

Compliance with these standards (Class A)
– EN 55022 (CISPR22) for Europe
– FCC CFR47 Part 15 for USA
– CSA C.108.8 M1983 for Canada
– VDE 871 6/78 for Germany

Safety Compliance with these standards
– EN 60 950 (IEC 950) for Europe
– UL 1950 for USA
– CSA C.22.2.N950 for Canada

1Port HiSpeed WAN Comm–B Adapter

Characteristics

The 1Port HiSpeed WAN Comm–B adapter provides an X.25 channel, which supports a **maximum of 256 virtual circuits** (SVC or PVC) with a total data transfer rate of 128Kbps. Packet size is up to 4096 bytes.

Three types of physical interfaces are available:

- V24/V28, up to 19.2 Kbps,
- V24/V35, up to 64 Kbps,
- Leased X21–X24/V11, up to 128 Kbps,

Refer to:

- Physical Interfaces, on page B-1, to get more information about interface description.

Hardware Components

The figure 17 shows the three items included in the 1Port HiSpeed WAN Comm–B hardware:

- 1Port HiSpeed WAN Comm–B board,
- interface daughter-board,
- cable, for connection to the X.25 network.

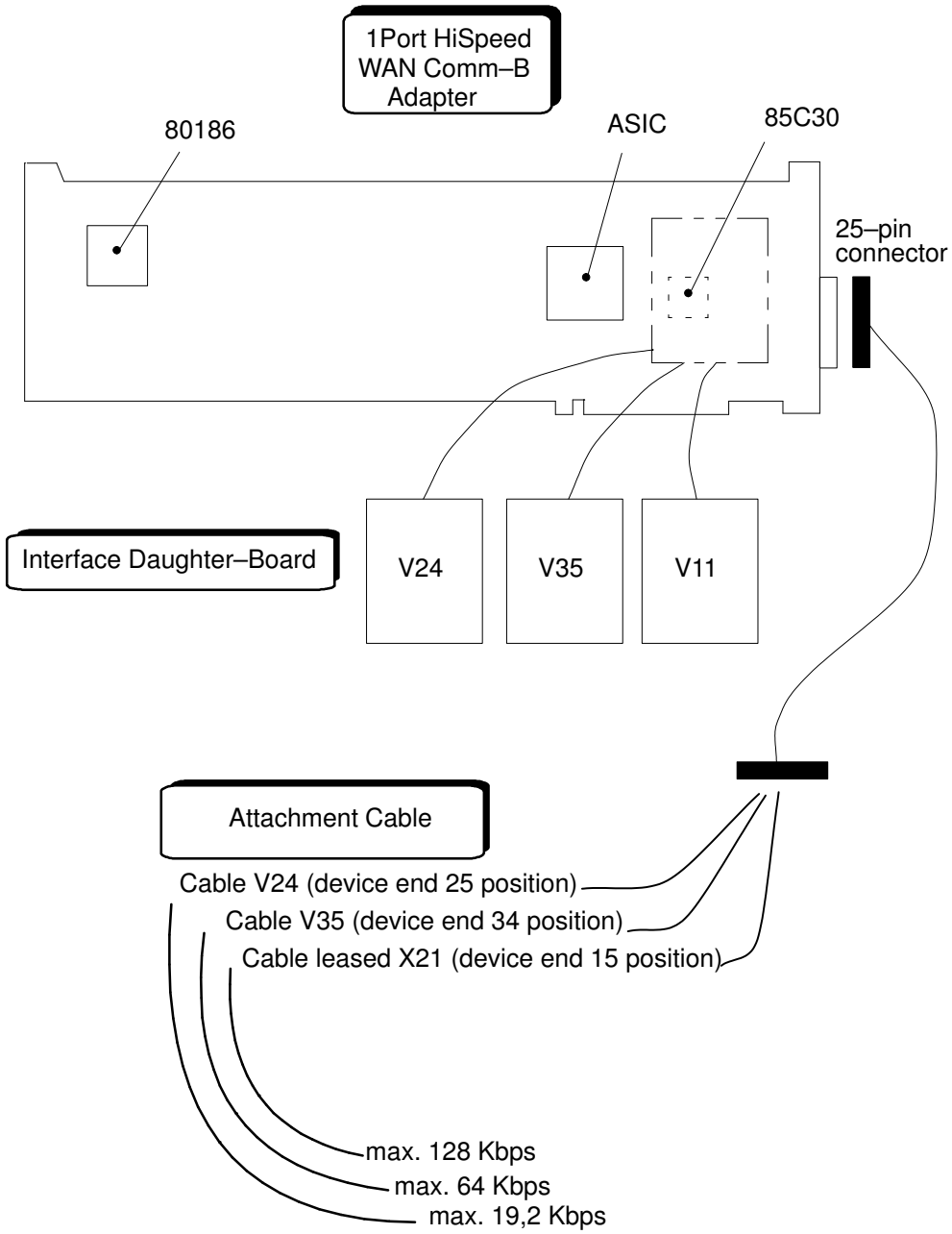


Figure 17. 1Port HiSpeed WAN Comm–B Hardware Components

Board

The 1Port HiSpeed WAN Comm–B board is an adapter which occupies one slot on the MCA bus of the system. It uses:

- an INTEL 80C186 processor with a 1-Mbyte RAM,
- an ASIC (Application-Specific Integrated Circuit) for managing the CPU and Communication Controller accesses,
- a Multiprotocol Serial Communication Controller (SCC – 85C30, 7,68 MHz),
- a 25-pin connector which plugs in at the rear panel of the system.

Interface Daughter-Board

The physical interface is defined by both a daughter-board and the associated attachment cable. The daughter-board is plugged onto the 1Port HiSpeed WAN Comm–B board at the reserved emplacement. There are three types of interface daughter-board:

- V24 daughter-board for implementation of a V24/V28 interface,
- V35 daughter-board for implementation of a V24/V35 interface,
- V11 daughter-board for implementation of a leased X21/V11 interface.

Cable

The terminal cable plugs into the 25-pin connector of the board. The cable to be used depends on the interface daughter-board installed and on some other specifications.

Refer to *1Port HiSpeed WAN Comm–B Adapter Installation Guide* provided directly with the 1Port HiSpeed WAN Comm–B hardware to have the complete list of cables.

Environment Requirements and Compliance

Electrical power source loading

+5V : 1.5 A max.
+12V : 100 mA max.
–12V : 100 mA max.

Temperature range

operating : 0 to 55 °C
(permitting insertion in a system operating up to 40 °C)
non-operating : –40 to 85 °C

Humidity 0 to 90% (non-condensing)

Electromagnetic disturbances

Compliance with these standards (Class A)
– EN 55022 (CISPR22) for Europe
– FCC CFR47 Part 15 for USA
– CSA C.108.8 M1983 for Canada
– VDE 871 6/78 for Germany

Safety Compliance with these standards
– EN 60 950 (IEC 950) for Europe
– UL 1950 for USA
– CSA C.22.2.N950 for Canada

Certification BABT Approval
– The host equipment (system) is considered as an indirect attachment to the public network and therefore is eligible under the General Approval NS/G/12345/J/100003 (7/1/1993).
– The 1Port HiSpeed WAN Comm–B adapter, to be connected to the public network, has been given the BABT National Approval.

1Port WAN Comm Adapter (ISA)

Characteristics

The 1Port WAN Comm Adapter (ISA) adapter provides an X.25 channel, which supports a **maximum of 256 virtual circuits** (SVC or PVC) with a total data transfer rate of 128 Kbps. Packet size is up to 4096 bytes.

Three types of 1Port WAN Comm Adapter (ISA) are available:

- 1Port WAN Comm Adapter (ISA) – V24, which implements V24/V28 physical interface, up to 19.2 Kbps,
- 1Port WAN Comm Adapter (ISA) – V35, which implements V24/V35 physical interface, up to 64 Kbps,
- 1Port WAN Comm Adapter (ISA) – V11, which implements Leased X21–X24/V11 physical interface, up to 128 Kbps,

Refer to:

- Physical Interfaces, on page B-1, to get more information about interface description.

Hardware Components

The 1Port WAN Comm Adapter (ISA) hardware is composed of these items:

- 1Port WAN Comm Adapter (ISA) board,
- cables, for connection to the X.25 networks.

Board

The 1Port WAN Comm Adapter (ISA) board (figure 18) occupies one slot on the ISA bus of the system.

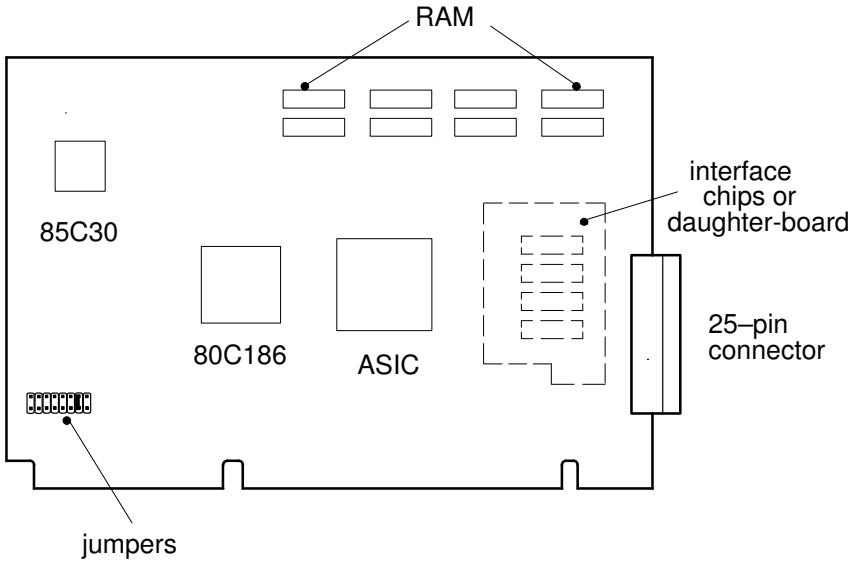


Figure 18. 1Port WAN Comm Adapter (ISA) Board

The 1Port WAN Comm Adapter (ISA) is based on:

- an INTEL 80C186 processor with a 1-Mbyte RAM,
- an ASIC (Application-Specific Integrated Circuit) for managing the CPU and Communication Controller accesses,
- a Multiprotocol Serial Communication Controller (SCC – 85C30, 7,68 MHz),
- interface chips specific to one of the three interfaces: V24/V28, V24/V35 or leased X21–X24/V11,
- a 25-pin connector.

The physical interface is defined by both the interface chips and the associated attachment cable.

Cables

The cables to be used depend on the type of the physical interface and on some other specifications.

- 1Port WAN Comm Adapter (ISA)–V24 cable,

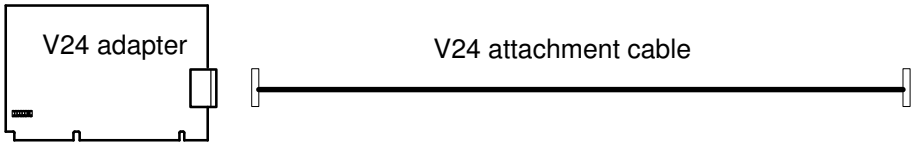


Figure 19. 1Port WAN Comm Adapter (ISA)–V24

- 1Port WAN Comm Adapter (ISA)–V35 cables,

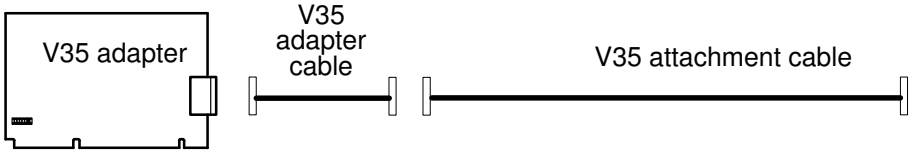


Figure 20. 1Port WAN Comm Adapter (ISA)–V35

- 1Port WAN Comm Adapter (ISA)–V11 cables,

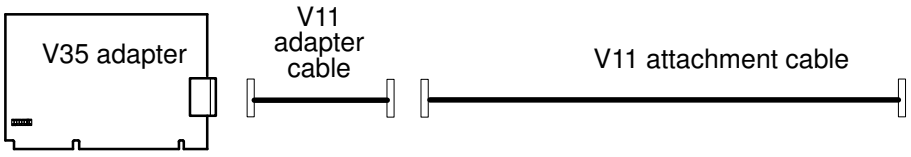


Figure 21. 1Port WAN Comm Adapter (ISA)–V11

Refer to *1 Port WAN Comm Adapter (ISA) Installation Guide* provided directly with the 1Port WAN Comm Adapter (ISA) hardware to have the complete list of cables.

Environment Requirements and Compliance

Electrical power source loading

+5V : 2 A max.
+12V : 150 mA max.
–12V : 150 mA max.

Temperature range

operating : 0 to 55 °C
(permitting insertion in a system operating up to 40 °C)
non-operating : –40 to 85 °C

Humidity 0 to 90% (non-condensing)

Electromagnetic disturbances

Compliance with these standards (Class A)
– EN 55022 (CISPR22) for Europe
– FCC CFR47 Part 15 for USA
– CSA C.108.8 M1983 for Canada
– VDE 871 6/78 for Germany

Safety Compliance with these standards
– EN 60 950 (IEC 950) for Europe
– UL 1950 for USA
– CSA C.22.2.N950 for Canada

Certification BABT Approval
– The host equipment (system) is considered as an indirect attachment to the public network and therefore is eligible under the General Approval NS/G/12345/J/100003 (7/1/1993).
– The 1Port WAN Comm Adapter (ISA), to be connected to the public network, has been given the BABT National Approval.

Chapter 3. Installation

HiSpeed WAN Comm. Installation Scenario

Here are the list of the sequential tasks to be performed for a correct installation of an **HiSpeed WAN Communications** kit:

- Installation preparation, on page 3-1, is common to all HiSpeed WAN Comm. adapter types.
- Hardware installation, is specific to each adapter type:
  - 4Port HiSpeed WAN Comm. hardware installation is described in *4Port HiSpeed WAN Comm. Adapter Installation Guide* provided directly with the 4Port HiSpeed WAN Comm. hardware.
    It is also described in 4Port HiSpeed WAN Comm. hardware installation, on page 3-2.
  - 1Port HiSpeed WAN Comm. hardware installation, on page 3-6.
  - 1Port HiSpeed WAN Comm–B hardware installation is described in *1Port HiSpeed WAN Comm–B Adapter Installation Guide* provided directly with the 1Port HiSpeed WAN Comm–B hardware.
    It is also described in 1Port HiSpeed WAN Comm–B hardware installation, on page 3-9.
  - 1Port WAN Comm Adapter (ISA) hardware installation is described in *1 Port WAN Comm Adapter (ISA) Installation Guide* provided directly with the 1Port WAN Comm Adapter (ISA) hardware.
- Software installation, on page 3-13, is common to all HiSpeed WAN Comm. adapter types and has to be performed only once after the first hardware installation
- Configuration, on page 3-16, is common to all HiSpeed WAN Comm. adapter types and has to be performed for each new channel installed.

After completion of each task, when it is possible and significant, a simple test is described in order to verify if this task has been correctly fulfilled.

Installation Preparation

- Subscribe to an X.25 line (or more) from your network provider if you have to connect your system on a public network.

  (Refer to Chapter 4. Adapter Configuration to get information about X.25 parameters).
- Check in the SRB (Software Release Bulletin) provided with the **bullx25 HiSpeed WAN Communications** Software, that your system conforms to the hardware requirements (disk and memory space).
- Refer to the Installation Guide specific to your system if you are not familiar with hardware and software installation.
- Define in which MCA slot(s) to install the 4Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm. or 1Port HiSpeed WAN Comm–B adapter(s).
  Refer to *1 Port WAN Comm Adapter (ISA) Installation Guide* for a 1Port WAN Comm Adapter (ISA).

Note: A 4Port HiSpeed WAN Comm. adapter cannot be installed in a DPX/20 1xx system for mechanical limitations.

4Port HiSpeed WAN Comm. Hardware Installation

Preparation

Verify the hardware components. They are:

- 4Port HiSpeed WAN Comm. board,
- Interface daughter-boards,
- Distribution box,
- Cables, according to interfaces used.

If you are not sure of a component type, refer to the following table which gives, for each component, the correspondence between type, MI (Marketing Identifier, that is commercial identification) and the Identification number which is written on the component.

4Port HiSpeed WAN Comm. Components Identification

Component	Designation	MI Identification	Identification Number
Adapter	4Port HiSpeed WAN Comm. adapter	DCCG044–0000	76 706 766–002
Daughter–Boards	V24 HiSpeed WAN Comm. interface card	DCCG047–0000	76 706 767–001
	V35 HiSpeed WAN Comm. interface card	DCCG045–0000	76 706 768–001
	V11 HiSpeed WAN Comm. interface card	DCCG046–0000	76 706 769–002
Distribution Box	4Port HiSpeed WAN Comm. interface cable	CKTG043–0000	
Cables:			
– V24	10m HiSpeed WAN Comm. cable V24	CBLG087–1900	90 246 001–001
– V35	10m cable remote sync V35/IF (25m/34m) ISO std PTT/TRANSPAC	VCW 3657	76 958 153–001
	10m cable remote sync V35/IF (25m/34m) EIA standard	VCW 3660	76 958 300–001
	10m cable remote sync V35/IF (25m/34m) ISO 2593	VCW 3666	76 958 248–001
– V11	10m HiSpeed WAN Comm. cable V11	CBLG095–1900	90 166 001–002

Figure 22. 4Port HiSpeed WAN Comm. Components Identification

Installation Tasks

Daughter-Boards Installation

Plug the daughter-board(s) into the emplacement(s) as indicated in figure 23:

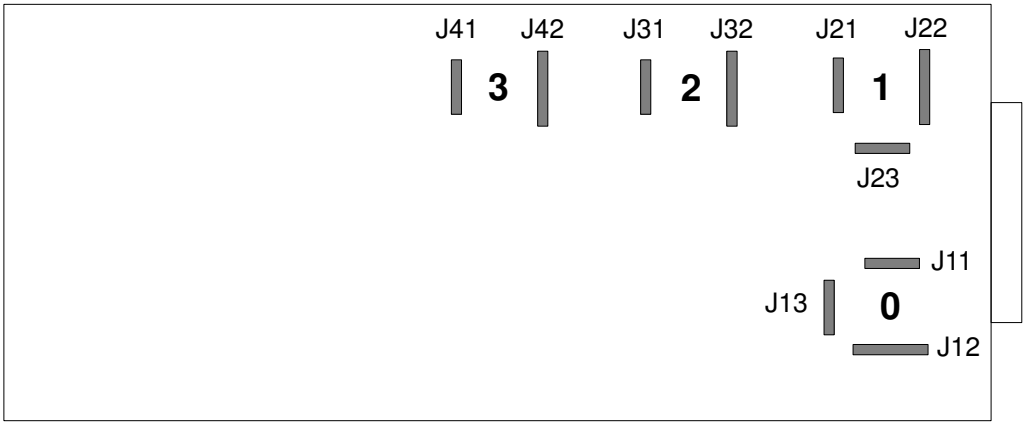


Figure 23. 4Port HiSpeed WAN Comm.: Installation of interface daughter-boards

The V24, V35 and V11 interface boards may be plugged into any of the four emplacements:

J11 and J12 connectors, noted as channel 0,

J21 and J22 connectors, noted as channel 1,

J31 and J32 connectors, noted as channel 2,

J41 and J42 connectors, noted as channel 3.

Notice that it is not necessary to use all the channels of the adapter, in which case do not plug any daughter-board into the emplacement(s) corresponding to the non-operating channel(s).

Adapter Installation in the System

- Remove the front cover, side cover or rear cover, according to your system to access to the MCA planar.
  If necessary, refer to the corresponding Installation Guide.
- Remove the rear cover in order to remove the cache, if any, in front of the MCA slot where you choose to install the 4Port HiSpeed WAN Comm. board.
- Plug the 4Port HiSpeed WAN Comm. board into the defined MCA slot and secure it by screwing in the 78-pin connector at the rear of the MCA planar.

Attachment Cables Connection

- Connect the distribution box to the 78-pin connector of the 4Port HiSpeed WAN Comm. board at the rear of the system.
- Connect the cables to the distribution box, according to the installation of the interface daughter-board.
  A cable is plugged into the distribution box using the 25-pin male connector end.

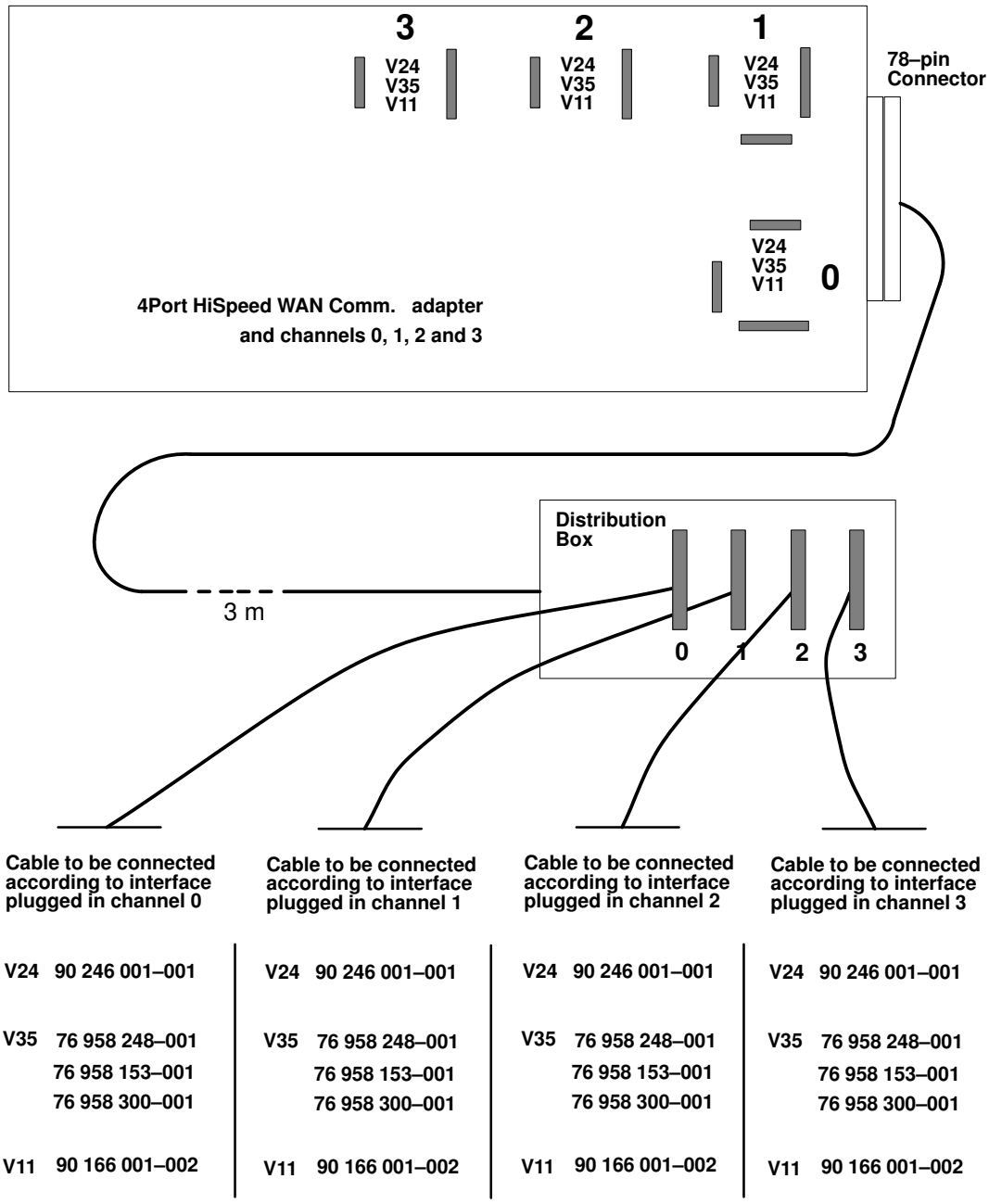
Warning: V24 attachment cable
Both ends of the V24 attachment cable are equipped with a 25-pin male connector, but these two connectors are not the same, so be careful when you connect this type of cable.

To distinguish which connector to plug into the distribution box, look at the identification written on the cable, near the connectors.

- Near the connector to be plugged into the distribution box, the identification begins with: `SYSTEM END`
- Near the other connector, the identification begins with: `DEVICE END`

Warning:
Before connecting, make sure that the cable type fits with the interface type on each channel; for instance, V24 cable and V24 interface daughter-board. When types of cable and interface daughter-board are not the same, there may be a temporary problem such as a short-circuit on power sources. This problem disappears after disconnecting the cable.

Figure 24 lists for each channel and interface type the cable which can be connected to the distribution box.



Cable to be connected according to interface plugged in channel 0	Cable to be connected according to interface plugged in channel 1	Cable to be connected according to interface plugged in channel 2	Cable to be connected according to interface plugged in channel 3
V24 90 246 001–001	V24 90 246 001–001	V24 90 246 001–001	V24 90 246 001–001
V35 76 958 248–001 76 958 153–001 76 958 300–001	V35 76 958 248–001 76 958 153–001 76 958 300–001	V35 76 958 248–001 76 958 153–001 76 958 300–001	V35 76 958 248–001 76 958 153–001 76 958 300–001
V11 90 166 001–002	V11 90 166 001–002	V11 90 166 001–002	V11 90 166 001–002

Figure 24. 4Port HiSpeed WAN Comm.: Connection of the cables on the distribution box

- Reinstall the different covers.

Connection to the Network

Connection to the network depends on the user application and in particular on the network type.

Appendix D. Links gives some possible connections, especially direct connection between two systems using HiSpeed WAN Comm. communications.

1Port HiSpeed WAN Comm. Hardware Installation

Preparation

Verify the hardware components. They are:

- 1Port HiSpeed WAN Comm. adapter,
- Cable(s), according to interface used.

If you are not sure of a component type, refer to the following table which gives, for each component, the correspondence between type, MI (Marketing Identifier, that is commercial identification) and the Identification number which is written on the component.

1Port HiSpeed WAN Comm. Components Identification

Component	Designation	MI Identification	Identification Number
Adapters			
– V24	1Port HiSpeed WAN Comm. adapter – V24	DCCG049–xxxx	76 706 763–xxx
– V35	1Port HiSpeed WAN Comm. adapter – V35 with an adapter cable (30 cm)	DCCG050–xxxx	76 706 764–xxx 90 217 001–xxx
– V11	1Port HiSpeed WAN Comm. adapter – V11 with an adapter cable (30 cm)	DCGG051–xxxx	76 706 765–xxx 90 216 001–xxx
Cables			
– V24	12m HiSpeed WAN Comm. cable V24	CBLG110–1900	76 958 057–xxx
– V35	10m cable remote sync V35/IF (25m/34m) ISO std PTT/TRANSPAC	VCW 3657	76 958 153–xxx
	10m cable remote sync V35/IF (25m/34m) EIA standard	VCW 3660	76 958 300–xxx
	10m cable remote sync V35/IF (25m/34m) ISO 2593	VCW 3666	76 958 248–xxx
– V11	10m HiSpeed WAN Comm. cable V11	CBLG095–1900	90 166 001–xxx

Figure 25. 1Port HiSpeed WAN Comm. Components Identification

Installation Tasks

Adapter Installation in the System

- Remove the front cover, side cover or rear cover, according to your system to access to the MCA planar.

  If necessary, refer to the corresponding Installation Guide.

- Remove the rear cover in order to remove the cache, if any, in front of the MCA slot where you choose to install the 1Port HiSpeed WAN Comm. board.
- Plug the 1Port HiSpeed WAN Comm. board in the defined MCA slot and secure it by screwing the 25-pin connector at the rear of the MCA planar.

Attachment Cables Connection

Warning:
Before connecting a cable on an adapter make sure that the cable type fits with the interface type of the adapter; for instance V24 cable and 1Port HiSpeed WAN Comm. adapter – V24. When types of cable and adapter are not the same, there may be a temporary problem such as a short-circuit on power sources. This problem disappears after disconnecting the cable.

Therefore, verify the type of your 1Port HiSpeed WAN Comm. adapter and refer to the corresponding paragraph.

Cable Connection on a 1Port HiSpeed WAN Comm. adapter – V24

The V24 attachment cable is entirely symmetrical, you can plug either of the two connectors in the 25-pin connector of the adapter. It is shown in Figure 26.

Figure 26. 1Port HiSpeed WAN Comm.–V24 Board

Cable Connection on a 1Port HiSpeed WAN Comm. adapter – V35

The V35 attachment cable may be one of the three cables listed on Figure 27.

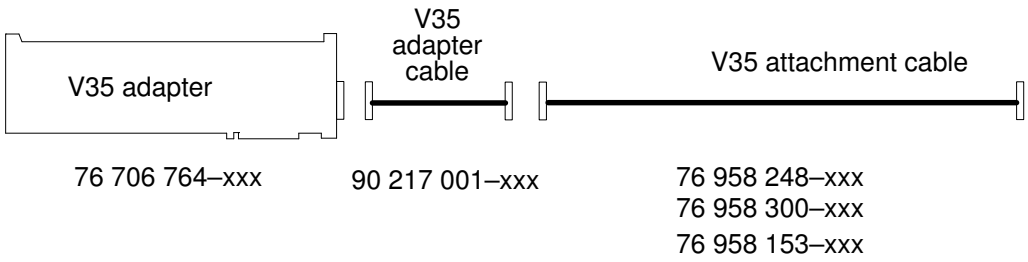


Figure 27. 1Port HiSpeed WAN Comm.–V35 Board

Cable Connection on a 1Port HiSpeed WAN Comm. adapter – V11

The V11 attachment cable is shown in Figure 28.

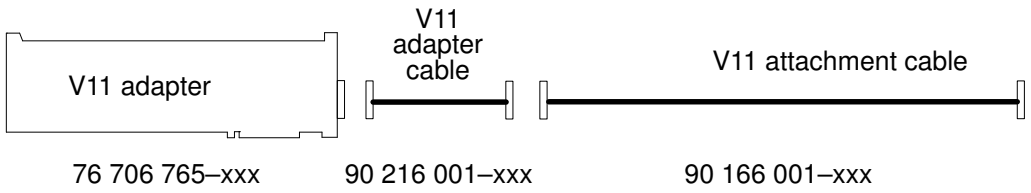


Figure 28. 1Port HiSpeed WAN Comm.–V11 Board

Connection to the Network

Connection to the network depends on the user application and in particular on the network type.

Appendix D. Links gives some possible connections, especially direct connection between two systems using HiSpeed WAN Comm. communications.

1Port HiSpeed WAN Comm–B Hardware Installation

Preparation

Verify the hardware components. They are:

- 1Port HiSpeed WAN Comm–B adapter,
- Interface daughter-board,
- Cable, according to interface used.

If you are not sure of a component type, refer to the following table which gives, for each component, the correspondence between type, MI (Marketing Identifier, that is commercial identification) and the Identification number which is written on the component.

1Port HiSpeed WAN Comm–B Components Identification

Component	Designation	MI Identification	Identification Number
Adapter	1Port HiSpeed WAN Comm–B adapter	DCCG058–0000	76 729 218–001
Daughter–Boards	V24 HiSpeed WAN Comm. interface card	DCCG047–0000	76 706 767–001
	V35 HiSpeed WAN Comm. interface card	DCCG045–0000	76 706 768–001
	V11 HiSpeed WAN Comm. interface card	DCCG046–0000	76 706 769–002
Cables:			
– V24	10m HiSpeed WAN Comm. cable V24	CBLG087–1900	90 246 001–001
– V35	10m cable remote sync V35/IF (25m/34m) ISO std PTT/TRANSPAC	VCW 3657	76 958 153–001
	10m cable remote sync V35/IF (25m/34m) EIA standard	VCW 3660	76 958 300–001
	10m cable remote sync V35/IF (25m/34m) ISO 2593	VCW 3666	76 958 248–001
– V11	10m HiSpeed WAN Comm. cable V11	CBLG095–1900	90 166 001–002

Figure 29. 1Port HiSpeed WAN Comm–B Components Identification

Daughter-Boards Installation

Plug the daughter-board (V24, V35 or V11) into the emplacement as indicated in the figure:

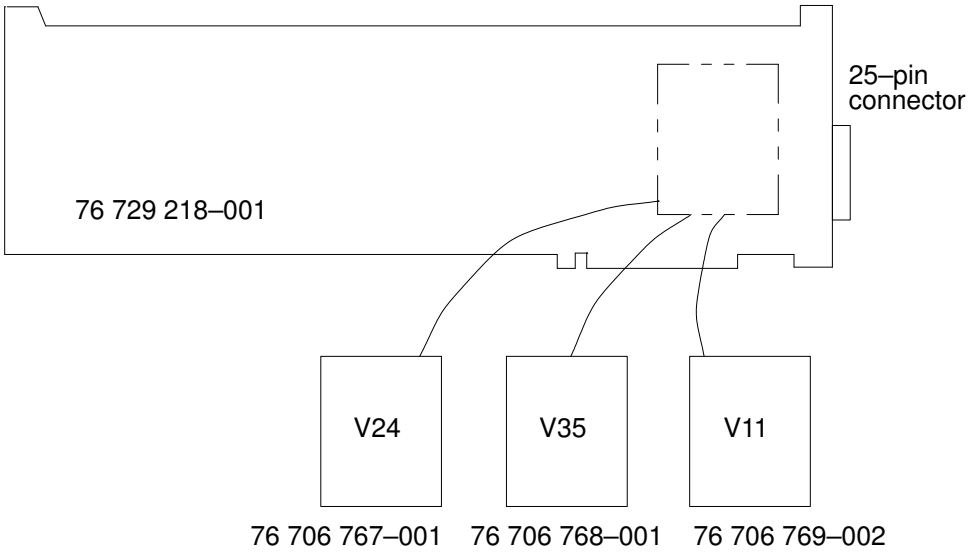


Figure 30. 1Port HiSpeed WAN Comm–B: Installation of Interface Daughter-board

Adapter Installation in the System

- Remove the front cover, side cover or rear cover, according to your system to access to the MCA planar.
  If necessary, refer to the corresponding Installation Guide.
- Remove the rear cover in order to remove the cache, if any, in front of the MCA slot where you choose to install the 1Port HiSpeed WAN Comm–B board.
- Plug the 1Port HiSpeed WAN Comm–B board in the defined MCA slot and secure it by screwing in the 25-pin connector at the rear of the MCA planar.

Attachment Cables Connection

Connect the cable to the 25-pin connector of the 1Port HiSpeed WAN Comm–B board at the rear of the system, according to the installation of the interface daughter-board.
A cable is plugged into the adapter connector using the 25-pin male connector end.

Warning:
Before connecting, make sure that the cable type fits with the interface type; for instance V24 cable and V24 interface daughter-board. When types of cable and interface daughter-board are not the same, there may be a temporary problem such as a short-circuit on power sources. This problem disappears after disconnecting the cable.

So verify the type of your 1Port HiSpeed WAN Comm–B adapter and refer to the corresponding paragraph.

Cable Connection on a 1Port HiSpeed WAN Comm–B adapter – V24

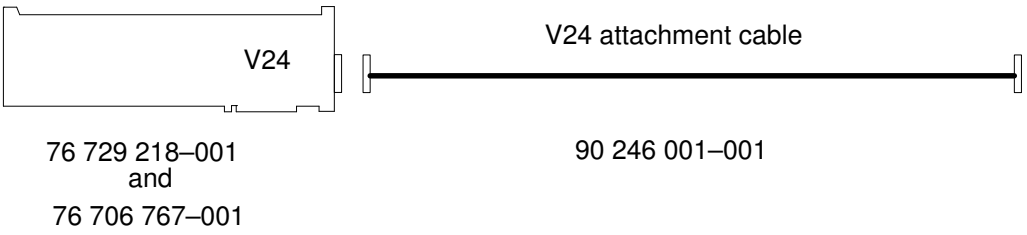


Figure 31. 1Port HiSpeed WAN Comm–B–V24 Board

Warning: V24 attachment cable
Both ends of the V24 attachment cable are equipped with a 25-pin male connector, but these two connectors are not the same, so be careful when you connect this type of cable.

To distinguish which connector to plug into the distribution box, look at the identification written on the cable, near the connectors.

- Near the connector to be plugged into the distribution box, the identification begins with: `SYSTEM END`
- Near the other connector, the identification begins with: `DEVICE END`

Cable Connection on a 1Port HiSpeed WAN Comm–B adapter – V35
The V35 attachment cable may be one of the three cables listed on the figure 32.

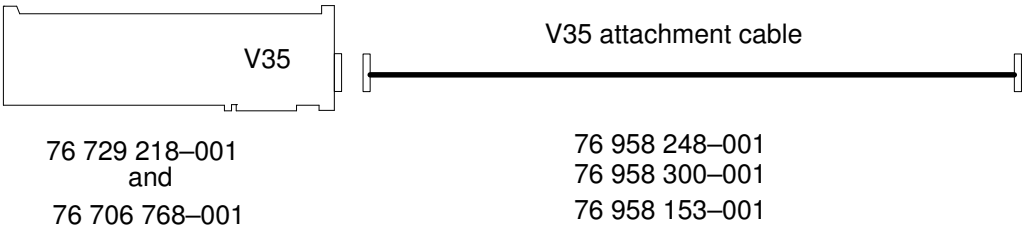


Figure 32. 1Port HiSpeed WAN Comm–B–V35 Board

Cable Connection on a 1Port HiSpeed WAN Comm–B adapter – V11

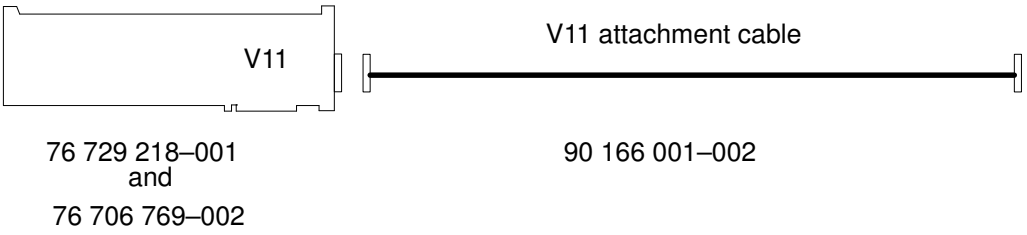


Figure 33. 1Port HiSpeed WAN Comm–B–V11 Board

Connection to the Network

Connection to the network depends on the user application and in particular on the network type.

Appendix D. Links gives some possible connections, especially direct connection between two systems using HiSpeed WAN Comm. communications.

Software Installation

The software installation is common to all HiSpeed WAN Comm. adapter types installed in the system. It must be performed by the system administrator (**root** authority).

The HiSpeed WAN Comm. software (bullx25) is installed using the standard software installation procedure. Refer to the booklet provided with the Communications Software CD-ROM for more information about installation of the current release.

bullx25 comes in three packages:

1. **bullx25.board**, which is mandatory in any case (HiSpeed WAN Comm. adapter accessed by any communications provider (TCP/IP, OSI, etc.) and is made of the following OPPs,

bullx25.board.mcode	microcode
bullx25.board.diag	diagnostic tests
bullx25.board.rte	drivers and daemons
bullx25.board.smit	SMIT configurator (adapter)
bullx25.board.com	commands

2. **bullx25.tcpip**, which is necessary only in case of a HiSpeed WAN Comm. adapter accessed using TCP/IP, it is made of the following OPPs,

bullx25.tcpip.rte	drivers and daemons
bullx25.tcpip.smit	SMIT configurator (TCP/IP)
bullx25.tcpip.com	methods

3. **bullx25.xpi**, which is necessary only in case of a HiSpeed WAN Comm. adapter accessed using XPI, it is made of the following OPPs,

bullx25.xpi.rte	drivers and daemons
bullx25.xpi.smit	SMIT configurator (XPI)
bullx25.xpi.com	methods

Note: The OPPs are roughly described and listed only for information. It is strongly recommended to install the whole packages.

This product uses iFOR/LS encrypted license keys for license management. It supports the 'Nodelocked' license type only. License status is validated only when the product is used, thus permitting installation and configuration without need of the license key.
Refer to the iFOR/LS Installation Notice and Password Order Form delivered with your Communications Product.
Refer to the SRB file for details on how the product uses the license key.

The availability of a bullx25 license can be checked using the **funstat** command.

System Reconfiguration

After having loaded the software you must re-configure the operating system to load the HiSpeed WAN Comm. device driver. This will download the microcode to the adapter and change its status to ”**available**”.

The procedure depends on the type of the HiSpeed WAN Comm. adapter:

1. If the adapter type is 4Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm. or 1Port HiSpeed WAN Comm–B

   To reconfigure the system, you can use:

   – either the system **reboot**

   – or the **cfgmgr** command

     #cfgmgr

   – or the **smit** interface

     #smit dev

     and choose the sub-menu

     Configure Devices Added after IPL

2. If the adapter is a 1Port WAN Comm Adapter (ISA):

   The adapter must be declared to the system using the **smit** interface

   #smit isa

   – Choose the sub-menu

     Add an ISA Adapter

   – Select

     atrfut isa 1port X25 Comm Adapter ISA

   – Select

     bus1 Available 00–10 ISA Bus

     A message is then displayed

     fun[x] defined

     where **x** is equal to **0** for the first adapter declared, **1** for the second, etc.

   – To update the adapter configuration, choose the sub-menu

     Change / **Show Characteristics of an ISA Adapter**

   – Select in the list, the adapter to be configured, for instance **fun1**

```
Change / Show Characteristics of an ISA Adapter
Device Name                          fun1
Slot on the ISA Bus                   [1]            +
Bus I/O Address                      [0x360]         +
Physical Interface Line              [V24]           +
```

   Where

   Slot on the ISA Bus is the slot where the adapter is plugged (1, 2 or 3)

   Bus I/O Address is the value of jumpers on the board (0x300 to 0x370)

   Physical Interface Line depends on the type of the adapter (V24, V35 or V11).

Installation Verification

You can check the successful installation with the **lsdev** command, which lists the adapters installed on the system.

- For a 4Port HiSpeed WAN Comm. adapter

```
#lsdev -C -H -t mcfuthd4
name    status     location    description
fun0    Available   00-01      4Port HiSpeed WAN Comm Adapter
```

- For a 1Port HiSpeed WAN Comm. adapter

```
#lsdev -C -H -t mcfut
name    status     location    description
fun1    Available   00-02      1Port HiSpeed WAN Comm Adapter
```

- For a 1Port HiSpeed WAN Comm–B adapter

```
#lsdev -C -H -t mcfutb
name    status     location    description
fun2    Available   00-03      1Port HiSpeed WAN Comm Adapter - B
```

- For a 1Port WAN Comm Adapter (ISA)

```
#lsdev -C -H -t atrfut
name    status     location    description
fun0    Available   00-11      1Port WAN Comm Adapter ISA
```

In any case, the adapter must appear as `Available`.

Configuration

Configuration of a HiSpeed WAN Comm. adapter consists of:

- configuration of each HiSpeed WAN Comm. line, see on page 3-17,
- configuration of TCP/IP on HiSpeed WAN Communications, if TCP/IP applications are using HiSpeed WAN Communications, see on page 3-18,
- configuration of OSI Stack on HiSpeed WAN Communications, if OSI applications are using HiSpeed WAN Communications, see on page 3-19.
- configuration of XPI on HiSpeed WAN Communications, for applications using XPI through XX25 and HiSpeed WAN Communications, see on page 3-20.

The configuration tasks to be executed when using these procedures and all the configuration parameters are described in:

- HiSpeed WAN Comm. adapter configurator, on page 4-2,
- TCP/IP on HiSpeed WAN Comm. configurator, on page 4-25,
- **Configuring the OSI Stack Using SMIT** described in *OSI Services Reference Manual,*
- XPI on HiSpeed WAN Comm. configurator, on page 4-33.

Three procedures, mandatory when loading configuration on a device and when running tests, are described in this section:

- How to stop and restart TCP/IP applications, see on page 3-21,
- How to stop and restart OSI applications, see on page 3-21,
- How to stop and restart XPI (XX25) applications, see on page 3-21.

How to Configure a HiSpeed WAN Comm. Line

1. Refer to the subscription sheet in order to enter the correct value of the parameters to configure, then run the HiSpeed WAN Comm. configurator using the command

   #smit x25d

   This procedure lists only the major parameters to configure and check. The other parameters are defined by default.

2. Select the entries:

   Change/Show Characteristics of a HiSpeed WAN Comm. Adapter

   Physical Parameters on page 4-5

   – The clock is generally provided externally, but if the clock is generated internally configure the speed of the line.

3. Select the entries:

   Change/Show Characteristics of a HiSpeed WAN Comm. Adapter

   Frame Parameters on page 4-7

   – Check type of line (DTE/DCE),

   – Check window size,

   – Check timers,

   – Check connection mode (active/passive).

4. Select the entries:

   Change/Show Characteristics of a HiSpeed WAN Comm. Adapter

   Network Parameters on page 4-9

   – Enter the NUA,

   – Enter the number of the virtual circuits subscribed (SVCs and eventually PVCs) and the associated logical channel numbers,

   – Check packet level mode (DTE/DCE),

   – Define if the local address is transmitted or not (must not be transmitted if connection to the French X.25 TRANSPAC network),

   – Check timers

   – Check packet size, packet window and throughput class.

5. Select the entry:

   Generate a Current Configuration for a HiSpeed WAN Comm. Adapter on page 4-23**.**

6. Select the entry:

   Load HiSpeed WAN Comm. Adapter with the last Generated Configuration on page 4-24**.**

How to Configure TCP/IP on HiSpeed WAN Communications

1. Configure HiSpeed WAN Comm. line on page 3-17.

2. Add entries concerning the local and remote hosts in the /etc/hosts file

   #smit tcpip
   Select the entries
   Further Configuration
   Name Resolution
   Hosts Table (/etc/hosts)
   Add a Host

3. Create the IP/X25 interface corresponding to the physical line, if it does not exist

   #smit inet
   Select the entry
   Add a Network Interface
   Add a HiSpeed WAN Comm. Network Interface on page 4-26
   A HiSpeed WAN Comm. network interface is then created under the name **xd**<n>

4. Initialize and start the IP/X25 interface corresponding to the physical line

   #smit inet
   Select the entry
   Change/ Show Characteristics of a Network Interface
   Select from the list the IP/X25 interface previously created and change the current state to **up**.

5. Map IP addresses to X.25 NUAs

   For each remote host, create an entry in the IP/HiSpeed WAN Comm. translation table to create correspondence between IP addresses and NUAs

   #smit inetx25d
   Select the entries
   Add an IP/HiSpeed WAN Comm. Host Entry
   Add a Switched Virtual Circuit (SVC) IP/HiSpeed WAN Comm. Host Entry on page 4-30
   Enter the remote hostname and its NUA.

6. Check that everything is correct using **netstat –r**

7. Check that the local site is configured on the remote machines in the same way

8. Test the connection with the remote host using **ping.**

How to Configure OSI Stack on HiSpeed WAN Communications

The OSI configuration must first be performed according to **Configuring the OSI Stack Using SMIT** described in *OSI Services Reference Manual.*

1. Configure HiSpeed WAN Comm. line as described on page 3-17

2. Select an unloaded OSI configuration

   #smit OSIconf
   Select the entries
   Configuration Management
   Select a Configuration

3. Declare the HiSpeed WAN Comm. adapter in the selected OSI configuration

   #smit OSIconf
   Select the entries
   Configuration Definition
   Communications Adapter Access
   Add Communications Adapters
   HiSpeed WAN Comm Adapter

4. Unload the currently loaded OSI configuration (if any), after stopping all running OSI applications not declared to the Stack Application Support (SAS)

   #smit OSIconf
   Select the entry
   Unload Current Loaded Configuration

5. Load the new OSI configuration

   #smit OSIconf
   Select the entry
   Load Last Selected Configuration

How to Configure XPI on HiSpeed WAN Communications

1. Configure HiSpeed WAN Comm. line on page 3-17

2. Create and start the XPI interface corresponding to the physical line, if it does not exist.

   #smit xpi_xd_if

   Select the entry

   Add a Network Interface on page 4-34

   Select the physical line **x25I**<n> from the list, an XPI interface is then created under the name **xpi_xd**<n> in the state `Available`.

3. Initialize and start the XPI interface corresponding to the physical line, if it already exists but is not activated (`stopped`).

   #smit xpi_xd_if

   Select the entry

   Change/Show Characteristics of a Network Interface on page 4-35

   Select the network interface **xpi_xd**<n> from the list, and choose the action `start`

Warning:
Using XPI, the default routing is based on SPI routing (Subsequent Protocol Identifier), but only 24 SPIs may be used at a time on each adapter.
To use addressing routing refer to **Change/Show Incoming Calls Routing**, on page 4-18.

How to Stop and Restart TCP/IP Applications

1. Stop the TCP/IP applications accessing the HiSpeed WAN Comm. adapter concerned
2. Stop the IP interface using the HiSpeed WAN Comm. adapter

   #smit inet
   Select the entry
   Change/ Show Characteristics of a Network Interface
   Select from the list the IP/X25 interface and change the current state to **detach**
3. Stop all processes using the HiSpeed WAN Communications driver, such as:

   xdmanage, xdmonitor, x25dstat
4. Execute the command, for instance **funload**, **funautotest**, etc..
5. Restart the IP interface

   #smit inet
   Select the entry
   Change/ Show Characteristics of a Network Interface
   Select from the list the IP/X25 interface and change the current state to **up**
6. Restart the TCP/IP applications

How to Stop and Restart OSI Stack Applications

1. Stop all the OSI applications not declared to the Stack Applications Support (SAS)
2. Unload the OSI stack and the applications declared to SAS

   #osiunload
3. Execute the command, for instance **funload**, **funautotest**, etc..
4. Restart the OSI stack and the applications declared to SAS

   #osiload
5. Restart the OSI applications not declared to SAS

How to Stop and Restart XPI (XX25) Applications

1. Stop the XPI (XX25) applications accessing the concerned HiSpeed WAN Comm. adapter
2. Stop the XPI interface using the HiSpeed WAN Comm. adapter

   #smit xpi_xd_if
   Select the entry
   Change/ Show Characteristics of a Network Interface
   Select from the list the XPI interface and select the **stop** action
3. Stop all processes using the HiSpeed WAN Communications driver, such as:

   xdmanage, xdmonitor, x25dstat
4. Execute the command, for instance **funload**, **funautotest**, etc..
5. Restart the IP interface

   #smit xpi_xd_id
   Select the entry
   Change/ Show Characteristics of a Network Interface
   Select from the list the XPI interface and select the **start** action
6. Restart the XPI (XX25) applications

Chapter 4. Configurator

The configurator is common to all HiSpeed WAN Comm. adapter types. It must be used by the system administrator (**root** authority) and is accessed through the **smit** command. Enter:

`smit` if you are using an X terminal,

`smit -C` if you are using an ASCII terminal.

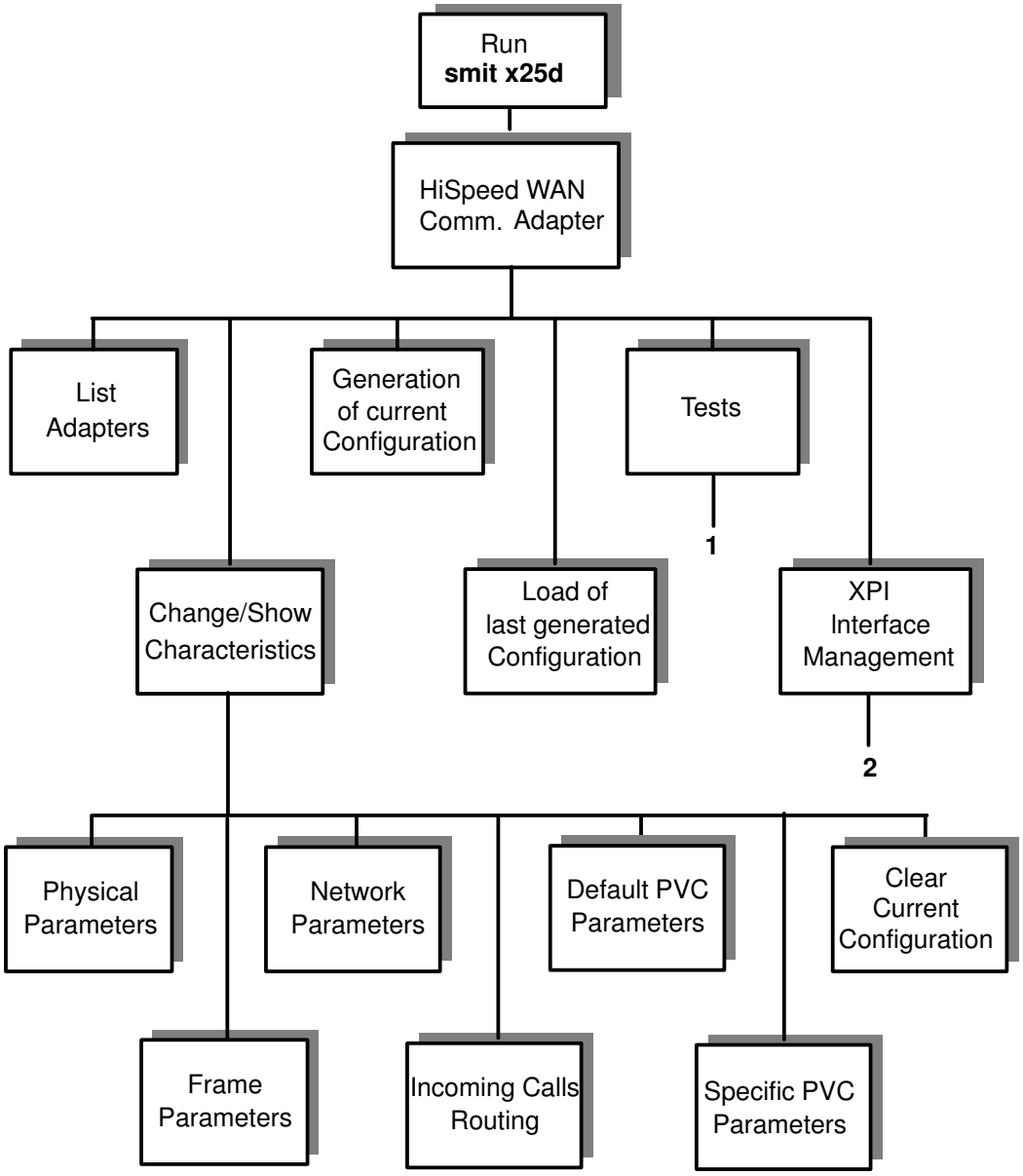
In this configurator description:

- the values between square braces ("[ ]") are the default values,
- a + sign at the end of the line indicates that the parameter may be chosen in a list.

The HiSpeed WAN Comm. configurator is composed of:

HiSpeed WAN Comm. Adapter Configurator

HiSpeed WAN Comm. Adapter Configuration Menu



Four basic functions are effectively related to HiSpeed WAN Comm. adapter configuration:

- List of adapters described on page 4-3,
- Change/Show characteristics of an adapter described on page 4-4,
- Save current configuration of an adapter described on page 4-23,
- Load the last saved configuration on an adapter described on page 4-24,

The two other functions are not directly related to configuration but to:

1. Test of HiSpeed WAN Comm. adapter described on page 5-2,
2. XPI Interface management described on page 4-33.

How to List HiSpeed WAN Comm. Adapters

Access

Using the HiSpeed WAN Comm. Adapter configurator, run the command:

smit x25d

Then select the function:

```
List Hispeed WAN Comm Adapters
```

Description

The list of the HiSpeed WAN Comm. lines, installed and configured in the system, is displayed according to this format:

x25l<n> <state> 00–ss–01–ll HiSpeed WAN Comm. Adapter Line

<n> line number (from 0 to the maximum number of lines in the system)

<state> Available : the board is configured and loaded
Defined : the board is configured, but not loaded
or no daughter-board is plugged onto this channel

ss slot number

ll line number on the board (from 00 to 03)

For instance:

```
x25l0  Available  00-02-01-00  Hispeed WAN Comm Adapter Line
x25l1  Available  00-04-01-00  Hispeed WAN Comm Adapter Line
x25l2  Available  00-04-01-01  Hispeed WAN Comm Adapter Line
x25l3  Available  00-04-01-02  Hispeed WAN Comm Adapter Line
x25l4  Available  00-04-01-03  Hispeed WAN Comm Adapter Line
x25l5  Defined    00-03-01-00  Hispeed WAN Comm Adapter Line
```

How to Change / Show Characteristics of a HiSpeed WAN Comm. Adapter

Access

Using the HiSpeed WAN Comm. Adapter configurator, run the command:

smit x25d

Then select the function:

```
Change / Show Characteristics of a Hispeed WAN Comm Adapter
```

Description

This menu allows access to the configuration operations of a HiSpeed WAN Comm. adapter. Select the line corresponding to the type of parameters to configure.

Change / Show Physical Parameters

Display and/or modification of the physical parameters, that is relative to the X.25.1 layer, of an X.25 line selected from the list.

```
Change / Show Physical Parameters

Device name                              x25l0
Physical line interface                  V24
Clock signal                             [external]          +#
Line Opening Mode                        [automatic]         +#
```

Note: This menu may be accessed directly, using the command: **smit x25datp**

Physical Line Interface
Display the physical interface installed on this line.

List of possible values: [**V24** , **V35** , **V11**]

Note: For a 1Port WAN Comm Adapter (ISA), the displayed value is not read directly on the adapter, but has been previously configured when the adapter has been declared present in the system. Refer to **System Reconfiguration**, on page 3-14.

Clock Signal **[external]**
Origin of the clock signal:

external. It is provided by the network or the peer equipment (local modem or corresponding DCE).
internal: It is provided by a baud rate generator on the adapter (meaningful if type of line is DCE).

List of possible values for a line of a 4Port HiSpeed WAN Comm. adapter:
external 1200 2400 4800 9600 19200 48000 56000 64000 128000 256000 512000 1024000 1536000 2000000

List of possible values for the line of a 1Port HiSpeed WAN Comm. adapter or 1Port HiSpeed WAN Comm–B adapter:
external 75 150 300 600 1200 2400 4800 9600 19200 48000 56000 64000 128000

List of possible values for the line of a 1Port WAN Comm Adapter (ISA):

external 75 150 300 600 1200 2400 4800 9600 19200 48000 56000 64000

Note: For 1Port HiSpeed WAN Comm. adapter or a 1Port WAN Comm Adapter (ISA), equipped with a V35 interface, the origin of the clock signal cannot be chosen and is fixed to **external**.

Note: For any type of HiSpeed WAN Comm. line, the range of possible values depends on the type of the physical interface.

Line Opening Mode [automatic, manual]

Activation mode chosen for the line:

automatic:	the line is active at each loading of the board.
manual:	the line is inactive at each loading of the board. In that case, the command ”xdconnect on” must be run to make the line active. After this action, the line has the same behavior as in automatic mode (included the case of connection recovery).

Change / Show Frame Parameters

Display and/or modification of the frame parameters, that is relative to the X.25.2 layer, of an X.25 line selected from the list.

```
Change / Show Frame Parameters

Device name                                x25l0
Type of line                               [DTE]              +#
Frame window size                          [7]                +#
Frame modulo                               [8]                +#
T1 timer                                   [30]               +#
T4 timer                                   [80]               +#
N2 counter                                 [10]               +#
Connection mode                            [passive]          +#
```

Note: This menu may be accessed directly, using the command: **smit x25datf**

Type of Line [DTE]
Two possible values:

DTE (Data Terminal Equipment)
DCE (Data Communication Equipment)

The type of line is defined by the subscription.

Frame Window Size [7]
Number of frames that can be outstanding without acknowledgment

Two possible ranges of values:

1 to **7** if frame modulo is 8
1 to **127** if frame modulo is 128

Frame Modulo [8]
Numbering modulo used to order the frames within the frame window.
This parameter is noted in the subscription sheet.

Two possible values:

8
128

T1 Timer [30]
T1 parameter is defined in the CCITT recommendation.
Time after which, if it has not been acknowledged, a frame is transmitted again.

The value must be in the range **1** to **32767** (multiple of 1/10 seconds) and lower than T4 timer.

T4 Timer [80]
Time after which, if there was no activity on the line, an RR frame (Receive Ready) is sent.
Frame-layer recovery is started if no answer is received within T1.

The value must be either **0** (meaning that T4 is disabled) or in the range **1** to **32767** (multiple of 1/10 seconds) and greater than T1 timer.

N2 Counter **[10]**
N2 parameter is defined in the CCITT recommendation.
Maximum number of retries to send a frame.

The value must be in the range **0** to **32767**.

Connection Mode **[passive]**
Two possible connection modes on the frame layer:

passive X.25.2 layer of the line waits for an SABM frame from the network to determine whether the network is connected.

active X.25.2 layer of the line sends an SABM frame to the network, waiting for the network to send an UA frame to acknowledge that it is connected.

The connection mode is defined at subscription time.

Note:

The following table lists the value of **Connection Mode** when a HiSpeed WAN Comm. adapter is connected to another Bull X.25 adapter through a private network.

X.25 adapter communicating with the HiSpeed WAN Comm. adapter	HiSpeed WAN Comm. adapter = DTE	HiSpeed WAN Comm. adapter = DCE
HiSpeed WAN Comm. on DPX/20	at least one of the two adapters must be active	at least one of the two adapters must be active
Co-Processor2 on DPX/20	at least one of the two adapters must be active	at least one of the two adapters must be active
CFS on DPX/2	passive	passive
FECP on DPX/2	active	active or passive
MTB4-A on DPX/2	active	active or passive

Change / Show Network Parameters

Display and/or modification of the network and packet parameters, that are relative to the X.25.3 layer, of an X.25 line selected from the list.

```
Change / Show Network Parameters

Device name                                              x25l0
Local network user address (NUA)                         [1101]     #
Lowest logical channel number for an incoming SVC        [0]       +#
Number of logical channels for incoming SVCs             [0]       +#
Lowest logical channel number for a two-way SVC          [1]       +#
Number of logical channels for two-way SVCs              [64]      +#
Lowest logical channel number for an outgoing SVC        [0]       +#
Number of logical channels for outgoing SVCs             [0]       +#
Lowest logical channel number for a PVC                  [1]       +#
Number of PVCs                                           [0]       +#
Packet level mode                                        [DTE]     +#
Optional addresses in call request/accept packet         [allow]   +#
Packet modulo                                            [8]       +#

Defined Timers
**********
ISO8208 T20 timer                                       [180]      +#
ISO8208 T21 timer                                       [200]      +#
ISO8208 T22 timer                                       [180]      +#
ISO8208 T23 timer                                       [180]      +#
Inactivity timer                                        [0]        +#

Default Attributes for SVCs
**********
Default receive packet size                             [128]      +#
Default transmit packet size                            [128]      +#
Default receive packet window                           [2]        +#
Default transmit packet window                          [2]        +#
Default receive throughput class                        [9600]     +#
Default transmit throughput class                       [9600]     +#

Maximum Negotiable Attributes for SVCs
**********
Maximum receive packet size                             [128]      +#
Maximum transmit packet size                            [128]      +#
Maximum receive packet window                           [7]        +#
Maximum transmit packet window                          [7]        +#
Maximum receive throughput class                        [48000]    +#
Maximum transmit throughput class                       [48000]    +#

Optional Facilities
**********
Outgoing call acceptance (CUG)                          [enable]   +#
Incoming call                                           [enable]   +#
Network user identification                             [enable]   +#
Redirection notification                                [enable]   +#
Call redirection                                        [enable]   +#
Charging information                                    [enable]   +#
Local charging prevention                               [enable]   +#
Reverse charging acceptance                             [disable]  +#
Fast select                                             [enable]   +#
Throughput class negotiation                            [enable]   +#
Flow control negotiation                                [enable]   +#
Outgoing call                                           [enable]   +#
Incoming call                                           [enable]   +#
Packet retransmission                                   [disable]  +#
```

```
Change / Show Network Parameters

1st CUG
*********
CUG state                                [two-way]        +#
CUG value                                 [00]             #

2nd CUG
*********
CUG state                                [disable]        +#
CUG value                                 [00]             #

.........

8th CUG
*********
CUG state                                [disable]        +#
CUG value                                 [00]             #
```

Note: This menu may be accessed directly, using the command: **smit x25datn**

Local Network User Address (NUA)
The X25 subscription number is given in the subscription sheet in the form of an 8 digit number preceded by a prefix.
The user must define the local address for private connections.

Virtual Circuits and Logical Channel Numbers

The number of virtual circuits which may be used on a HiSpeed WAN Comm. line depends on the type of the line:

- up to 1024 virtual circuits on a 4Port HiSpeed WAN Comm. line,
- up to 256 virtual circuits on 1Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm–B and 1Port WAN Comm Adapter (ISA) line.

The logical channel number is in the range 0 to 4095. The logical channel numbers are allocated to virtual circuits, according to the virtual circuit types and according to the connection mode:

- DTE, refer to figure 34

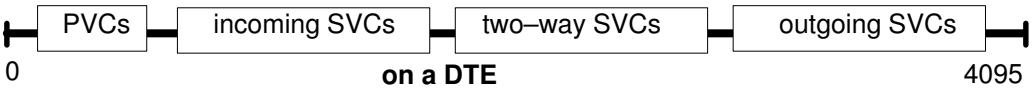


Figure 34. Logical channel numbering according to virtual circuit types on a DTE

- DCE, refer to figure 35

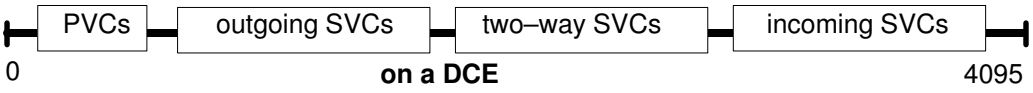


Figure 35. Logical channel numbering according to virtual circuit types on a DCE

For each type, the number of virtual circuits and the logical channel numbers are defined by the subscription.

Lowest logical channel number for an incoming SVC [0]
Range of possible values:

0 to **4095**

Number of logical channels for incoming SVCs [0]
Range of possible values:

0 to **1024** on a 4Port HiSpeed WAN Comm. line
0 to **256** on a 1Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm–B and 1Port WAN Comm Adapter (ISA) line

Lowest logical channel number for a two-way SVC [1]
Range of possible values:

0 to **4095**

Number of logical channels for two-way SVCs [64]
Range of possible values:

0 to **1024** on a 4Port HiSpeed WAN Comm. line
0 to **256** on a 1Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm–B and 1Port WAN Comm Adapter (ISA) line

Lowest logical channel number for an outgoing SVC [0]
Range of possible values:

0 to **4095**

Number of logical channels for outgoing SVCs [0]
Range of possible values:

0 to **1024** on a 4Port HiSpeed WAN Comm. line
0 to **256** on a 1Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm–B and 1Port WAN Comm Adapter (ISA) line

Lowest logical channel number for a PVC [1]
Range of possible values:

1 to **4095**

Number of PVCs [0]
Range of possible values:

0 to **1024** on a 4Port HiSpeed WAN Comm. line
0 to **256** on a 1Port HiSpeed WAN Comm., 1Port HiSpeed WAN Comm–B and 1Port WAN Comm Adapter (ISA) line

Packet level mode [DTE]
Two possible connection modes on the network layer:

DTE X.25.3 layer of the line waits for a **restart-indication** packet from the network to determine whether the network is connected. The logical channel numbers are allocated starting from the highest possible values.

DCE X.25.3 layer of the line sends a **restart-request** packet to the network, waiting for the peer X.25.3 layer to send a **restart-confirmation** packet to acknowledge that it is connected. The logical channel numbers are allocated starting from the lowest possible values.

The packet level mode is defined by the subscription, it is generally the same value as the frame parameter **Type of line**.

Optional address in call request/accept packet [allow]
Modification or not of the addresses in the **call-accepted** and **call-request** packets

Two possible values:

allow Packets are transmitted without any address changes

forbid Packets are transmitted with some address modifications.
In **call-request** packets, the Network User Address (NUA) is removed from the calling address field but the sub-address is kept.
In **call-accepted** and **clear** packets, both the called and calling addresses are removed.
This forbid option must be set to connect to the French TRANSPAC X.25 network.

Packet Modulo [8]
Numbering modulo used to order the packets.

Two possible values:

8
128

ISO 8208 Defined Timers

T20 timer [180]
Time within which a **restart-confirmation** packet should be received after transmission of a **restart-request** packet

The value must be either **0** (meaning that T20 is disabled) or in the range **1** to **255** (in seconds)

T21 timer [200]
Time within which a **call-connected**, **clear-indication** or **incoming-call** packet should be received after transmission of a **call-request** packet.

The value must be either **0** (meaning that T21 is disabled) or in the range **1** to **255** (in seconds)

T22 timer [180]
Time within which a **reset-confirmation** packet should be received after transmission of a **reset-request** packet.

The value must be either **0** (meaning that T22 is disabled) or in the range **1** to **255** (in seconds)

T23 timer [180]
Time within which a **clear-confirmation** packet should be received after transmission of a **clear-request** packet.

The value must be either **0** (meaning that T23 is disabled) or in the range **1** to **255** (in seconds)

Inactivity timer [0]
Time within which packet(s) should be exchanged. If no packet is exchanged within this time, the connection is closed.

The value must be either **0** (meaning that the inactivity timer is disabled) or in the range **1** to **255** (in seconds)

Default Attributes for SVCs

The default value of an attribute cannot be set higher than the maximum negotiable value for this attribute (see **Maximum Negotiable Attributes for SVCs**). However, the maximum negotiable value can be increased before a default value is modified.

Any attribute value may be modified for an individual call, using the optional facilities in the **call-request** packet.

Default receive packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

Default transmit packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

Default receive packet window [2]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

Default transmit packet window [2]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

Default receive throughput class [9600]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

Default transmit throughput class [9600]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

Maximum Negotiable Attributes for SVCs

For each way (reception and transmission) of a switched virtual circuit, three attributes have to be configured:

packet size defined in bytes

packet window
number of packets that can be outstanding without acknowledgment

throughput class
speed at which the packets travel through the network

During a connection, there may be, using optional facilities, negotiations concerning flow control (packet size and window) or throughput class in order to use temporary values instead of default values defined in **Default Attributes for SVCs**. The attributes values may vary from the minimum value to the maximum negotiable value.

Maximum receive packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

Maximum transmit packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

Maximum receive packet window [7]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

Maximum transmit packet window [7]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

Maximum receive throughput class [48000]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

Maximum transmit throughput class [48000]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

Optional Facilities

Optional facilities are those which may or may not be offered by the network provider and to which customers choose whether or not to subscribe. The facilities implemented on HiSpeed WAN Comm. adapters refer to these main concerns:

- incoming and outgoing data accesses, in general or according to the membership of a Closed User Group,
- redirection and retransmission of data,
- charging of communications.

Some facilities are valid for all calls whereas other ones must be specifically requested for the duration of the call. In this case, a facility request is inserted in the call packets, either in call-request packet or in call-accepted packet, such as described in the figure 36.

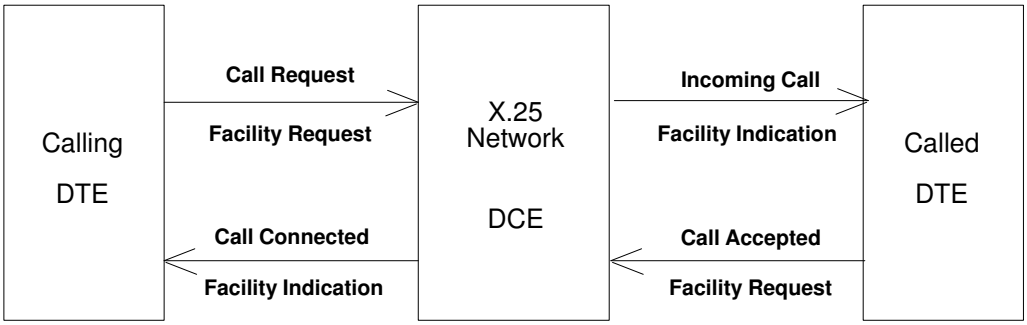


Figure 36. Facilities and Call Packets

The facilities and their coding are described in the X.25 CCITT recommendation.

Outgoing call acceptance (CUG) [enable]
Acceptance of outgoing calls from a user to users who do not belong to the same Closed User Group.
Two possible values:

enable
disable If there is any such outgoing call, it is cleared immediately, returning a clear-indication packet to the user

Incoming call acceptance (CUG) [enable]
Acceptance by a user of incoming calls from users who do not belong to the same Closed User Group
Two possible values:

enable
disable If there is any such incoming call, it is cleared immediately

Network user identification [enable]
Possibility for a user to give to the network, in a call or data packet, information about charging, security or network management.
Two possible values:

enable
disable

Redirection notification [enable]
Indication to a DTE receiving a call whether this one has been redirected.
Two possible values:

enable
disable

Call redirection [enable]
Redirection of a call to another DTE when the first one is busy or out of order.
Two possible values:

enable
disable

Charging information [enable]
Retrieval of information in order to compute the billing.
Two possible values:

enable
disable

Local charging prevention [disable]
Prevention of outgoing and incoming calls to be paid for locally.
Two possible values:

enable If so, any outgoing call must specify reverse charging and incoming calls which ask for reverse charging are rejected.
disable
Default is **disable**.

Reverse charging acceptance [disable]
Acceptance of incoming calls which ask for reverse charging.
Two possible values:

enable If so, the incoming calls may be paid for locally, if the reverse charging is asked and the 'Local charging prevention' disabled.
disable
Default is **disable**.

Fast select [enable]
Option of a virtual call facility which allows inclusion of data in call-setup and call-clearing packets.
Two possible values:

enable
disable

Throughput class negotiation [enable]
Possibility for a DTE to negotiate the speed at which its packets travel through the network.
Two possible values:

enable
disable The default value is selected and the incoming throughput class value is checked for acceptability; if unacceptable, the call is cleared.

Flow control negotiation **[enable]**
Possibility for a DTE to negotiate the flow control parameters (packet and window sizes). If the flow control parameters are not present in the call packet, the default values are selected.
Two possible values:

enable
disable

Outgoing call **[enable]**
Two possible values:

enable
disable A disconnect indication is returned to any application which processes a call-request packet

Incoming call **[enable]**
Two possible values:

enable
disable A clear-indication packet is sent on reception of a call-request packet

Packet retransmission **[enable]**
Retransmission of data packets after reception of a reject packet. The retransmission begins with the sequence number given in the reject packet.
Two possible values:

enable
disable

Closed User Group

A Closed User Group (CUG) is a group of users who can communicate with other users in the group, but not with users outside the group. The CUG selection facility allows the DTE to specify which CUG it will be working with.
In this HiSpeed WAN Comm. implementation, a DTE may belong to up to 8 CUGs. Here are the parameters to configure for a DTE, the membership of a CUG.

CUG state **[disable]**
Four possible values:

disable
incoming
outgoing
two-way

CUG value **[no default value]**
Closed User Group name which is defined by all the users which are members of this group

The optional facilities, **outgoing call acceptance** and **incoming call acceptance**, may however modify these communications rules.

Change / Show Incoming Calls Routing

Display and/or modification of the routing parameters related to an X.25 line selected from the list.

Warning:

This facility must be used carefully, the default configuration being valid for most of standard cases.
The addressing routing solves possible conflicts between applications using the same SPI (Subsequent Protocol Identifier) on different communications stacks.
If you are not concerned by this problem, keep the default configuration and do not bother reading the following.

```
Change / Show Incoming Calls Routing

Device name                              x25l0

Local network user address (NUA)         1000

OSI stack local network address          []                #
OSI stack address                       [used]           +

XPI/XX25 local network address           []                #
XPI/XX25 address                        [unused]         +

HVX stack local network address          []                #
HVX stack address                       [unused]         +
```

Note: This menu may be accessed directly, using the command: **smit x25datr**

This incoming calls routing concerns only the incoming calls from adapter to stacks (and not from stacks to applications).

SPI routing has a greater priority than addressing routing.

The communications stacks act in this way:

- OSI Stack does not declare the application SPI to the adapter. It works only with the addressing routing.
- XPI (XX25) and HVX stacks declare the application SPI to the adapter except if the addressing routing is specified, that is if the flag is set to `used`.

Stack Local Network Address
Local network user address (NUA) and/or sub-address
Each address cannot have more than 15 decimal digits.

If the optional address in **call request/accept** packet is not allowed (i.e. French network Transpac), only the sub-address is useful.

Stack Address
Flag which allows to use or not the address for the considered stack
Two possible values:
used
unused

Warning:
It is impossible to configure the same address (with the flag set to **used**) for two different stacks.

Example

How to manage the coexistence between these two applications: PAD over OSI Stack and Videotext over XPI/XX25 Stack by using the sub-addressing routing.

PAD (OSI Stack)	**Videotext (XPI/XX25 Stack)**
with SPI 0x01000000	with SPI 0x01000000
Line NUA 1001	Line NUA 1001
OSI sub-address none	XPI/XX25 sub-address 34
OSI Stack address used	XPI/XX25 Stack address used

If the default incoming calls routing is used, the XPI/XX25 stack declares to the line that it uses the SPI 0x01000000 (Videotext): all the incoming calls with the SPI 0x01000000 (PAD inlcuded) are routed to the XPI stack.

Consequently, it is mandatory to change the incoming calls routing.

```
Change / Show Incoming Calls Routing

Device name                              xxxx

Local network user address (NUA)         1000

OSI stack local network address         []           #
OSI stack address                       [used]            +

XPI/XX25 local network address          [100134]           #
XPI/XX25 address                        [used]            +

HVX stack local network address          []                #
HVX stack address                       [unused]          +
```

All incoming calls with the address `100134` are routed to the XPI/XX25 Stack, and the others are routed to the OSI Stack, irrespective of the SPIs.

To receive all incoming calls which are not switched to the other configurated routes (default routing), the **address** must be null and the **address flag** set to `used`. This is the default configuration address for OSI Stack.

Warning: Be careful, if a **Local Network Address** is set on OSI, because many OSI applications use the default routing.

Change / Show Default PVC Parameters

Display and/or modification of the default maximum values of PVCs parameters relative to an X.25 line selected in the list.

```
Change / Show Default PVC Parameters

Device name                              x25l0
PVC Default receive packet size          [128]          +#
PVC Default transmit packet size         [128]          +#
PVC Default receive packet window        [2]            +#
PVC Default transmit packet window       [2]            +#
PVC Default receive throughput class     [9600]         +#
PVC Default transmit throughput class    [9600]         +#
```

Note: This menu may be accessed directly, using the command: **smit x25datcsd**

PVC Default receive packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

PVC Default transmit packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

PVC Default receive packet window [2]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

PVC Default transmit packet window [2]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

PVC Default receive throughput class [9600]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

PVC Default transmit throughput class [9600]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

Change / Show Specific PVC Parameters

Display and/or modification of the maximum values of a specific PVC parameters (PVC associated with an X.25 line selected in the list).

Change / Show Specific PVC Parameters		
PVC Number to Change / Show	[]	+#
Device name	x25l0	
PVC Number to Change / Show	1	
PVC receive packet size	[128]	+#
PVC transmit packet size	[128]	+#
PVC receive packet window	[2]	+#
PVC transmit packet window	[2]	+#
PVC receive throughput class	[9600]	+#
PVC transmit throughput class	[9600]	+#

Note: This menu may be accessed directly, using the command: **smit x25datcsa**

PVC Number to Change / Show
press [F4] or select List

PVC receive packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

PVC transmit packet size [128]
List of possible values:

16 32 64 128 256 512 1024 2048 4096

PVC receive packet window [2]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

PVC transmit packet window [2]
Two possible ranges of values:

1 to **7** if packet modulo is 8
1 to **127** if packet modulo is 128

PVC receive throughput class [9600]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

PVC transmit throughput class [9600]
List of possible values:

75 150 300 600 1200 2400 4800 9600 19200 48000

Clear Current Configuration

Sets to their default values all the parameters:

- Physical Parameters
- Frame Parameters
- Network Parameters
- Default PVC Parameters
- Specific PVC Parameters
- Incoming Calls Routing

Note: This may be useful before reconfiguring a HiSpeed WAN Comm. line.

There is no FastPath to access directly to this SMIT functionality, but you can use the **xdclear** command.

How to Generate Current Configuration for a HiSpeed WAN Comm. Adapter

Access

Using the HiSpeed WAN Comm. Adapter configurator, run the command:

smit x25d

Then select the function:

```
Generate current configuration for Hispeed WAN Comm Adapter
```

Description

Generation of a configuration file, in order to save the changes made in the configuration of an adapter selected in the list (all the lines of the adapter).

The configuration file is generated in /etc/fun directory :

- **/etc/fun/mcfuthd4***(x+1)***.conf** for the 4Port HiSpeed WAN Comm. adapter designated as **fun***x,*
- **/etc/fun/mcfut***(x+1)***.conf** for the 1Port HiSpeed WAN Comm. adapter designated as **fun***x*,
- **/etc/fun/mcfutb***(x+1)***.conf** for the 1Port HiSpeed WAN Comm–B adapter designated as **fun***x*,
- **/etc/fun/atrfut***(x+1)***.conf** for the 1Port WAN Comm Adapter (ISA) adapter designated as **fun***x.*

There is no FastPath to access directly to this SMIT function, but you can use the **genconf** command.

How to Load a HiSpeed WAN Comm. Adapter with Last Generated Configuration

Access

Using the HiSpeed WAN Comm. Adapter configurator, run the command:

smit x25d

Then select the function:

```
Load Hispeed WAN Comm Adapter with last generated configuration
```

Description

Load a configuration on an adapter from the last generated configuration file. This loading concerns all the lines of the adapter.

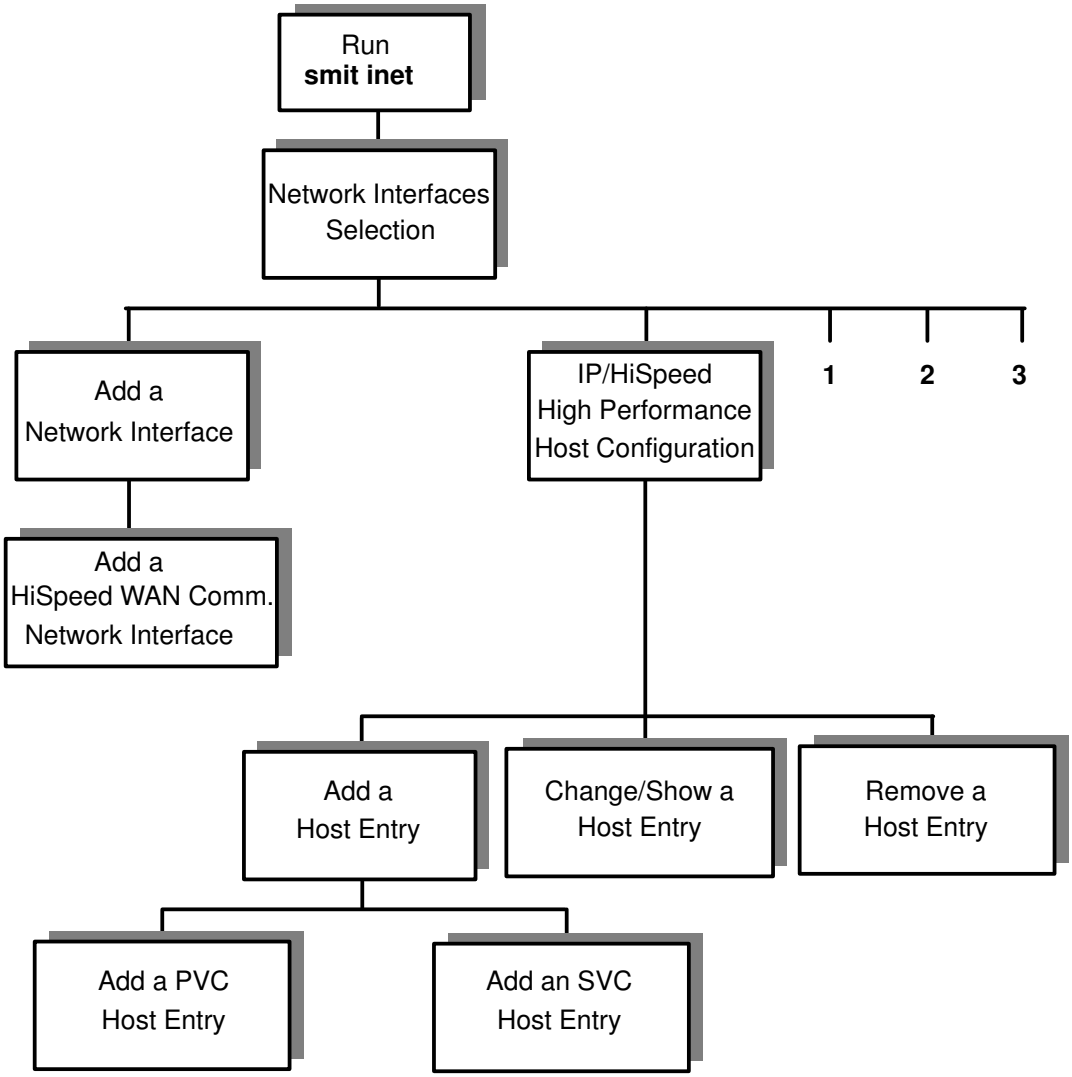
Warning:
Before loading a configuration on a device, the telecommunications applications (OSI stack and TCP/IP) must be stopped. see on page 3-21.

There is no FastPath to access directly to this SMIT function, but you can use the **funload** command.

If the last configuration has not been generated using SMIT or the **genconf** command, loading cannot be performed and the configuration remains as it was.

TCP/IP on HiSpeed WAN Comm. Configurator

TCP/IP on HiSpeed WAN Comm. Configuration Menu



Two functions achieve TCP/IP configuration on HiSpeed WAN Comm.:

- Add a network interface, described on page 4-26,
- IP/HiSpeed WAN Comm. host configuration, described on page 4-27.

Other functions are accessed running **smit inet**:

1. List all network interfaces,
2. Change/Show characteristics of a network interface,
3. Remove a network interface.

These functions are useful for TCP/IP configuration on any type of communications adapters. They are described in *AIX System Management Guide: Communications and Networks*, **SMIT Interface for TCP/IP**.

Note: To each HiSpeed WAN Comm. port in the `available` state and referred to as **x25I***n* is associated an IP network interface referred as **xd***n* in the TCP/IP configurator.

How to Add a HiSpeed WAN Comm. Network Interface

Access

Using the TCP/IP on HiSpeed WAN Comm. configurator, run the command:

smit inet

Then select the function:

```
Add a Network Interface
```

And finally select the function:

```
Add a Hispeed WAN Comm Network Interface
```

Description

This menu is used to add a HiSpeed WAN Comm. network interface for the current host.

```
Add a Hispeed WAN Comm Network Interface

INTERNET ADDRESS                              []
Network Mask                                  []
Activate the interface after creating it      [YES]        +
```

Note: This menu may be accessed directly, using the command: **smit mkinet1xd**

INTERNET ADDRESS **[no default value]**
The Internet address of the network interface is defined in dotted decimal form (101.164.0.0)

Network MASK **[no default value]**

ACTIVATE the interface after creating it **[YES]**

How to Manage an IP/HiSpeed WAN Comm. Host

Access

Using the TCP/IP on HiSpeed WAN Comm. configurator, run the command:

smit inet

Then select the function:

```
IP / Hispeed WAN Comm Host Configuration
```

Description

This menu is used to update the translation table for mapping IP addresses to HiSpeed WAN Comm. virtual circuits. Select the line corresponding to the action to be performed.

Add an IP/HiSpeed WAN Comm. Host Entry

Add a host entry to the IP/HiSpeed WAN Comm. translation table (virtual circuits).

When a pair of logical channels are assigned to a call, a virtual circuit is established. The virtual circuit may either be switched or permanent:

- A switched virtual circuit (SVC) is a virtual circuit which exists only for the duration of the call,
- A permanent virtual circuit (PVC) is a virtual circuit which is permanently established between two addresses. It gives a permanent connection to the destination, but on the other hand ties up a logical channel permanently.

Select the type of virtual circuit to be added.

```
Add a Permanent Virtual Circuit (PVC) IP/Hispeed WAN Comm Host Entry
```
see on page 4-29

```
Add a Switched Virtual Circuit (SVC) IP/Hispeed WAN Comm Host Entry
```
see on page 4-30

Note: This menu may be accessed directly, using the command: **smit mkx25d**

Add a PVC IP/HiSpeed WAN Comm. Host Entry

Add a PVC host entry to the IP/HiSpeed WAN Comm. translation table.

A permanent virtual circuit is a pair of logical channels which sets up a permanent connection.

```
Add an IP / Hispeed WAN Comm Host Entry

* Remote HOSTNAME                                []
* Logical CHANNEL number                         []              #
* X25 Device Number                                             +
```

Note: This menu may be accessed directly, using the command: **smit mkx25dp**

Remote Hostname **[no default value]**

Specify the host name, expressed in alphanumeric value, to add to the translation table.

Logical Channel Number **[no default value]**

Specify the HiSpeed WAN Comm. logical channel to be used for the PVC.
Refer to the HiSpeed WAN Comm. adapter configuration where the PVCs logical numbers have been previously defined.

Range of possible values
1 to **4095**

X.25 Device Number **[no default value]**

Specify the HiSpeed WAN Comm. port number to be used by the PVC.
Refer to HiSpeed WAN Comm. Adapters and Ports Numbering on page E-1.

Range of possible values
0 to **31**

Add an SVC IP/HiSpeed WAN Comm. Host Entry

Add an SVC host entry to the IP/HiSpeed WAN Comm. translation table.

A switched virtual circuit is a pair of logical channels which exists only for the duration of the call.

```
 Add IP / Hispeed WAN Comm SVC Host Entry

* Remote HOSTNAME                                    []
* Remote DTE Address                                 []       #
* X25 Device Number                                          +
  ---------- Optional X.25 Facilities ----------
  RECEIVED data PACKET size                                   +
  TRANSMITTED data PACKET size                                +
  RECEIVED data WINDOW size                          []       #
  TRANSMITTED data WINDOW size                       []       #
  CLOSED USER GROUP selection                        []       #
  CLOSED USER GROUP WITH OUTGOING ACCESS selection    []      #
  User-Defined Facilities and CALL USER Data         []
```

Note: This menu may be accessed directly, using the command: **smit mkx25ds**

Remote Hostname **[no default value]**

Specify the host name, expressed in alphanumeric value, to add to the translation table.

Remote DTE Address **[no default value]**

Specify the X.25 address (network-layer) or NUA of the remote host.
Valid values are 1 to 15 ASCII decimal digits (X.121 address).

X.25 Device Number **[no default value]**

Specify the local HiSpeed WAN Comm. port number to be used by the SVC.
Refer to HiSpeed WAN Comm. Adapters and Ports Numbering on page E-1.

Range of possible values
0 to **31**

Optional X.25 Facilities

Definition of the attributes relative to the X.25 optional facilities which may be set up at the call establishment.

Received data packet size **[no default value]**

Maximum received packet size to be used with the virtual circuit. The received data packet size refers to the size of the packets the calling DTE wants to receive from the called DTE.

List of possible values
16 32 64 128 256 512 1024 2048 4096

Transmitted data packet size **[no default value]**

Maximum transmitted packet size to be used with the virtual circuit. The transmitted data packet size refers to the size of the packets the calling DTE wants to transmit to the called DTE.

List of possible values
16 32 64 128 256 512 1024 2048 4096

Received data window size [no default value]
Maximum receive window size to be used with the virtual circuit.

Possible range of values
1 to **127**

Transmitted data window size [no default value]
Maximum transmit window size to be used with the virtual circuit.

Possible range of values
1 to **127**

CLOSED USER GROUP selection [no default value]
Closed User Group index to be used with the closed user group facility.
Refer to the HiSpeed WAN Comm. adapter configuration where the Closed User Groups have been previously defined.

Possible range of values
0 to **99**

CLOSED USER GROUP with outgoing access selection [no default value]
Closed User Group index to be used with the closed user group outgoing access facility.
Refer to the HiSpeed WAN Comm. adapter configuration where the Closed User Groups have been previously defined.

Possible range of values
0 to **99**

User-Defined Facilities and CALL USER Data [no default value]
Specification of the optional user-defined facilities to be used in the call-request packet.
Valid values are 1 through 16 hexadecimal digits.

Change/Show an IP/HiSpeed WAN Comm. Host Entry

Display and/or modification of an IP/HiSpeed WAN Comm. Permanent or Switched Circuit.

The virtual circuit to be displayed is specified by clicking in the list of defined virtual circuits; a virtual circuit (PVC or SVC) is indicated by the remote host name, with which it communicates.

Note: This function may be accessed directly, using the command: **smit chinetx25d**

The attributes are the same as for Add an IP/HiSpeed WAN Comm. Host Entry.
Refer to:

- Add a PVC IP/HiSpeed WAN Comm. Host Entry, on page 4-29, if you have to modify a PVC,
- Add an SVC IP/HiSpeed WAN Comm. Host Entry, on page 4-30, if you have to modify an SVC.

Remove an IP/HiSpeed WAN Comm. Host Entry

Removal of an IP/HiSpeed WAN Comm. Permanent or Switched Circuit.

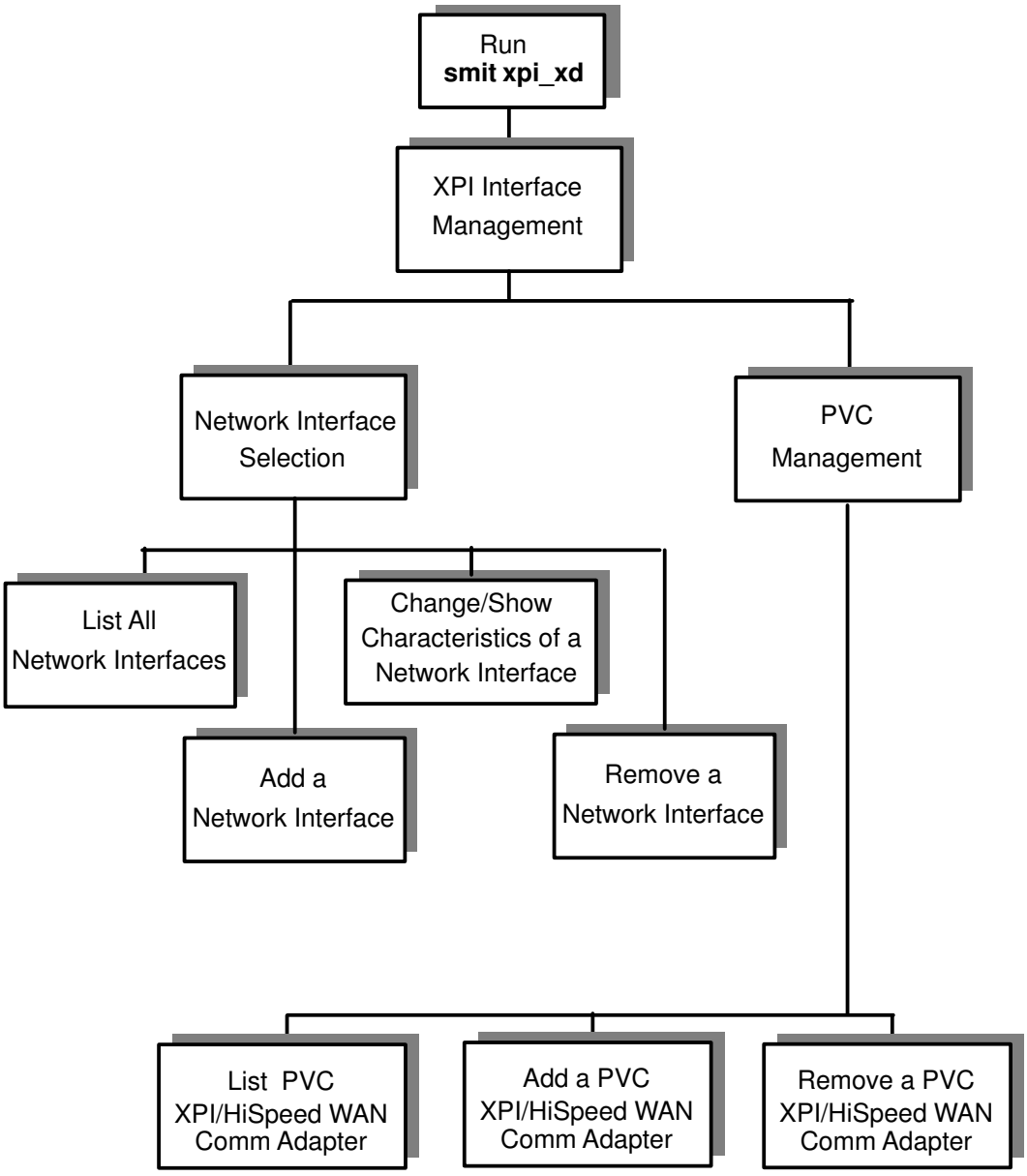
The virtual circuit to be removed is specified by clicking in the list of defined virtual circuits. The virtual circuits (PVC or SVC) are indicated by the remote host name, with which they communicate.

Note: This function may be accessed directly, using the command: **smit rmx25d**

There is no attribute for this command.

XPI Interface Configurator

XPI Interface Configuration Menu



To each HiSpeed WAN Comm. port in the `Available` state and referred as **x25I***n* is associated an XPI network interface referred as **xpi_xd***n*, which is created in the state `Defined`.

The XPI Interface configurator enables:

- Managing the state of an XPI interface, see on page 4-34,
- Associating PVCs to an XPI interface, see on page 4-36,

How to Manage XPI Network Interface

Access

Using the HiSpeed WAN Comm. Adapter configurator, run the command:

smit xpi_xd

Then select the function:

```
Network Interface Selection
```

Description

This menu enables access to the XPI Network Interface management operations, that is operations related to the state of the XPI Network Interface. Select the line corresponding to the action to be performed.

List All XPI Network Interfaces

Each line of the list has the following format:

xpi_xd<n> <state> XPI Interface over HiSpeed WAN Comm. Adapter

<n> line number (from 0 to the maximum number of HiSpeed WAN Comm. lines in the system)

<state> **Defined**, the XPI interface is not configured
Available, the XPI interface is configured and activated
Stopped, the XPI interface is temporarily desactivated

For instance:

```
xpi_xd0 Available  XPI Interface over HiSpeed WAN Comm Adapter
xpi_xd1 Available  XPI Interface over HiSpeed WAN Comm Adapter
xpi_xd2 Defined    XPI Interface over HiSpeed WAN Comm Adapter
xpi_xd3 Stopped    XPI Interface over HiSpeed WAN Comm Adapter
xpi_xd4 Defined    XPI Interface over HiSpeed WAN Comm Adapter
xpi_xd5 Defined    XPI Interface over HiSpeed WAN Comm Adapter
```

Add an XPI Network Interface

Activate the XPI Network Interface associated with a HiSpeed WAN Comm. port selected in a list, that is change its state from `Defined` to `Available`.

Note: PVCs which were previously configured and associated with this XPI network interface, are taken into account.

Change / Show Characteristics of an XPI Network Interface

Change temporarily the state of the XPI Network Interface associated with a HiSpeed WAN Comm. port selected in a list. Its state can be changed from `Available` to `Stopped` and from `Stopped` to `Available`.

```
Change/Show Characteristics of a Network Interface

Network Interface Name          xpi_xd0
Action                           start                          +
```

The action previously executed is displayed (`start` or `stop`). Its value must be changed to indicate the new action to be performed.

This operation is useful to change a HiSpeed WAN Comm. adapter in the system without losing the PVCs configuration associated with the corresponding port.

Note: If the state of an XPI Network Interface has been changed to `Stopped`, it is changed again to `Available` after **reboot** of the system.

Remove an XPI Network Interface

Desactivate and delete the configuration (PVCs) related to an XPI Network Interface, which is in the state `Available` or `Stopped`.

The new state of this XPI Network Interface is `Defined`.

How to Manage PVCs on an XPI Network Interface

Access

Using the HiSpeed WAN Comm. Adapter configurator, run the command:

smit xpi_xd_pvc

Description

This menu enables access to the PVCs management operations on an XPI network interface to be specified:

- The PVCs can be associated to or retrieved from an XPI network interface at any time.
- The modifications are taken into account immediately if the interface is in the state `Available` or `Stopped`, or later when its state changes from `Defined` to `Available`.
- The PVCs configuration is deleted when the state of an XPI network interface is changed from `Available` or `Stopped` to `Defined`.

```
Permanent Virtual Circuit (PVC) Management

List Permanent Virtual Circuit (PVC) XPI/Hispeed WAN Comm Adapter
Add a Permanent Virtual Circuit (PVC) XPI/Hispeed WAN Comm Adapter
Remove a Permanent Virtual Circuit (PVC) XPI/Hispeed WAN Comm Adapter
```

List PVC Assigned to an XPI Network Interface

Specify an XPI Network Interface by choice in the list

Each line of the list has the following format:

xpi_xd<n> <Logical Channel Number>

<n> Network interface number

For instance:

```
xpi_xd1  1
```

Assign a PVC to an XPI Network Interface

Specify an XPI Network Interface by choice in the list

```
Add a Permanent Virtual Circuit (PVC)

Name of Network Interface       xpi_xd0
Logical Channel Number          []              +#
```

Specify the HiSpeed WAN Comm. logical channel to be used for the PVC.
Refer to the HiSpeed WAN Comm. adapter configuration where the PVCs logical numbers have been previously defined.

Range of possible values
1 to **4095**

Remove a PVC

Specify an XPI Network Interface by choice in the list

Select the PVC to be removed in the list.

Chapter 5. Tools for Problem Solving

HiSpeed WAN Comm. Maintenance Tools and Problem Solving

Some tools, designated as maintenance tools, are supplied in order to help the user to determine if a HiSpeed WAN Comm. adapter is correctly running and if the connection to the network is also correct.

Simple procedures, using maintenance tools, are described in order to help in problem solving, on page 5-14.

Maintenance Tools

The maintenance tools are Unix commands, which must be run by the **root** user. Their syntax is detailed in Appendix F.They are listed below:

rc.fun Displays information about the usage of X25 HiSpeed WAN Comm. adapter or enables to stop all applications using an X25 HiSpeed WAN Comm. adapter.

xdconnect Displays or changes the status of a HiSpeed WAN Comm. line.

xdmanage Displays status information for an X.25 port
Gets statistics for an X.25 port.
Connects/Disconnects the line.

xdmonitor Monitors in real time the activity on an X.25 port at the link or packet layer.

xdping sends an echo request from a HiSpeed WAN Comm. link to another one.

x25dstat Displays basic statistics of all X.25 lines located on HiSpeed WAN Comm. adapters.

funstat, **funsnap**
Gathers basic information about HiSpeed WAN Comm. adapters for technical support and/or engineering teams.

Some other maintenance tools or tests are accessed directly using SMIT:

Auto-Tests, on page 5-2,

Loop-Back Tests, on page 5-2,

Error Log Reports, on page 5-3.

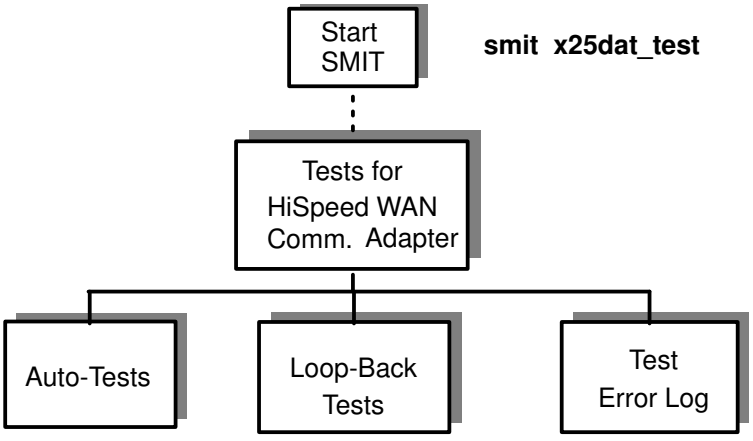


Figure 37. HiSpeed WAN Comm. Maintenance Tools using SMIT

Auto-Tests

The auto-tests verify the HiSpeed WAN Comm. hardware with internal loop-back (reception on transmission) on the adapter. No wrap plugs need to be used to run auto-tests.
The auto-tests may be run in different ways:

- automatically, at bootstrap,
- using the **funautotest** command, see on page F-4,
- using the **smit x25dat_test_auto** command.

  Choose in the list the **Name of Device to Test [ ]**.
- using the **diag** AIX command.

Warning:
Before running the auto-tests, the telecommunications applications (OSI stack and TCP/IP) must be stopped. see on page 3-21**.**

If the auto-tests fail, the adapter status is set to `Defined` and a report is generated in the system ErrorLog. The auto-tests error report, described on page 5-4, may be displayed. Refer to How to Display Error Log Reports, on page 5-3.

If an error is detected, refer to the recommended actions listed in the Error Log Report:

- Retry and check physical installation.

If the error persists, call your Bull Representative.

Loop-Back Tests

The loop-back tests verify the HiSpeed WAN Comm. lines (interface, distribution box for 4Port HiSpeed WAN Comm. adapter and attachment cables).

Specific wrap plugs need to be plugged on the attachment cables to run loop-back tests. These wrap plugs are not part of the standard HiSpeed WAN Comm. kits but may be ordered separately. Ask your Bull Representative for more information.

However the loop-back tests may be run without any wrap plugs:

- either using the **smit x25dat_test_loop** command.

  Choose in the lists the **Name of Device to Tests [ ]** and **Channel Number to Test [ ]**
- or using the **diag –A** AIX command.

In any case, the loop-back tests fail and a report is generated in the system ErrorLog. The loop-back tests error report, described on page 5-5, may be displayed.
Refer to How to Display Error Log Reports, on page 5-3.

HiSpeed WAN Comm. Error Log Reports

Different types of Error Log reports may be generated and displayed for a HiSpeed WAN Comm. adapter:

- Auto-Tests Error Log Report, on page 5-4,
- Loop-Back Tests Error Log Report, on page 5-5,
- Boot Error Log Report, on page 5-7,
- bullx25 License Unavaibility Error Log Report, on page 5-8,
- Line Scanning Error Log Reports, five different reports may be generated:
  - ODM level reports, on page 5-9,
  - board level reports, on page 5-10,
  - packet level reports, on page 5-11,
  - frame level reports, on page 5-12,
  - physical reports, on page 5-13.

How to Display Error Log Reports

The HiSpeed WAN Comm. Error Log reports may be displayed:

- using **errpt** command

  ```
  errpt -a -N "fun<n>"
  ```

- using the **smit x25dat_test_report** command.

  Choose in the list the **Name of Device to get the Report for [ ]**.

Auto-Tests Error Log Report

```
ERROR LABEL:    FUN001
ERROR ID:       531261F4

Date/Time:       Tue May 10 09:51:31
Sequence Number: 328
Machine Id:      000082653500
Node Id:         rs1_vc
Error Class:     H
Error Type:      PERF
Resource Name:   fun0
Resource Class:  adapter
Resource Type:   mcfuthd4 (or mcfut)
Location:        00-02
VPD:

Error Description
RESOURCE UNAVAILABLE

Probable Causes
ADAPTER HARDWARE

Failure Causes
COMMUNICATIONS CONTROLLER CONTROL PROGRAM

        Recommended Actions
        RETRY
        CHECK PHYSICAL INSTALLATION
        REPLACE CARD

Detail Data
COMMAND
        funautotest
ERROR CODE
        0xxx
        one of the values listed hereafter
DIAGNOSTIC EXPLANATION
        description of the ERROR CODE,that is one of these messages:
        /*0x01*/    "Data bus error"
        /*0x02*/    "Address bus error"
        /*0x03*/    "RAM error"
        /*0x04*/    "Parity error"
        /*0x05*/    "Cache memory error"
        /*0x06*/    "SCIP2 register error"
        /*0x07*/    "SCIP2 timer error"
        /*0x08*/    "Processor error"
        /*0x09*/    "Error on first channel"
        /*0x0A*/    "Error on second channel"
        /*0x0B*/    "Error on third channel"
        /*0x0C*/    "Error on fourth channel"
        /*0x0D*/    "Unregistered error code"
```

The meaningful parameters are:

ERROR LABEL: FUN001, which distinguishes an auto-test error report concerning a HiSpeed WAN Comm. adapter

Resource Name, which designates the HiSpeed WAN Comm. adapter in error

Resource Type

`mcfuthd4` for a 4Port HiSpeed WAN Comm. adapter,
`mcfut` for a 1Port HiSpeed WAN Comm. adapter
`mcfutb` for a 1Port HiSpeed WAN Comm–B adapter
`atrfut` for a 1Port WAN Comm Adapter (ISA)

ERROR CODE

DIAGNOSTIC EXPLANATION

Loop-Back Tests Error Log Report

```
ERROR LABEL:    FUN002
ERROR ID:       5CBF645F

Date/Time:       Wed May 11 02:08:31
Sequence Number: 407
Machine Id:      000082653500
Node Id:         rs1_vc
Class:           H
Type:            PERM
Resource Name:   fun0
Resource Class:  adapter
Resource Type:   mcfuthd4
Location:        00-02
VPD:

Error Description
RESOURCE UNAVAILABLE

Probable Causes
LINE ADAPTER HARDWARE
DEVICE CABLE
LOOP CABLE

Failure Causes
LINE ADAPTER HARDWARE
CABLE LOOSE OR DEFECTIVE
LOOP CABLE

        Recommended Actions
        RETRY
        CHECK CABLES AND THEIR CONNECTIONS
        CHECK PHYSICAL INSTALLATION

Detail Data
COMMAND
       funbouchtest
ERROR CODE
       0xxx
       one of the values listed hereafter
DIAGNOSTIC EXPLANATION
        description of the ERROR CODE,that is one of these messages:
        /*0x01*/    "Data bus error"
        /*0x02*/    "Address bus error"
        /*0x03*/    "RAM error"
        /*0x04*/    "Parity error"
        /*0x05*/    "Cache memory error"
        /*0x06*/    "SCIP2 register error"
        /*0x07*/    "SCIP2 timer error"
        /*0x08*/    "Processor error"
        /*0x09*/    "Error on first channel"
        /*0x09*/    "error on first channel",
        /*0x0A*/    "error on second channel",
        /*0x0B*/    "error en third channel",
        /*0x0C*/    "error on fourth channel",
        /*0x0D*/    "unregistered error code"
```

The meaningful parameters are:

ERROR LABEL: FUN002
distinguishes a loop-back test error report concerning a HiSpeed WAN Comm. adapter

Resource Name

designates the HiSpeed WAN Comm. adapter in error

Resource Type

`mcfuthd4` for a 4Port HiSpeed WAN Comm. adapter,
`mcfut` for a 1Port HiSpeed WAN Comm. adapter
`mcfutb` for a 1Port HiSpeed WAN Comm–B adapter
`atrfut` for a 1Port WAN Comm Adapter (ISA)

ERROR CODE

DIAGNOSTIC EXPLANATION

Boot Error Log Report

At bootstrap, if an error due to HiSpeed WAN Comm. adapters or software configuration occurs, an Error Log report is generated.

```
ERROR LABEL:    FUN003
ERROR ID:       3991CF08

Date/Time:       Wed May 11 10:03:27
Sequence Number: 419
Machine Id:      000082653500
Node Id:         rs1_vc
Class:           S
Type:            TEMP
Resource Name:   fun0

Error Description
CONFIGURATION OR CUSTOMIZATION ERROR

Probable Causes
CONFIGURATION

Failure Causes
Configuration program failed
Invalid data exists in the configuration database

        Recommended Actions
        PERFORM PROBLEM RECOVERY PROCEDURES

Detail Data
COMMAND
       "<command name which causes error>"
DIAGNOSTIC EXPLANATION
       "<failure cause>"
ERROR RECOVERY PROCEDURE
       "<expected recovery procedure>"
```

The meaningful parameters are:

ERROR LABEL: FUN003
: distinguishes a boot error report concerning a HiSpeed WAN Comm. adapter

Resource Name
: designates the HiSpeed WAN Comm. adapter in error

COMMAND

DIAGNOSTIC EXPLANATION

ERROR RECOVERY PROCEDURE

bullx25 License Unavailability

If the bullx25 license is not available, an Error Log report is generated.

```
LABEL:          FUN004
IDENTIFIER:     536B2795

Date/Time:       Fri Jan  2 03:05:21
Sequence Number: 231
Machine Id:      000005593800
Node Id:         rs4
Class:           S
Type:            TEMP
Resource Name:   BULLX25 Driver

Description
UNAUTHORIZED ACCESS ATTEMPTED

Probable Causes
OBJECT ACCESS AUTHORIZATION

Failure Causes
COMMUNICATIONS SUBSYSTEM

        Recommended Actions
        PERFORM PROBLEM DETERMINATION PROCEDURES

Detail Data
DIAGNOSTIC EXPLANATION
       X25 Software: License is NOT AVAILABLE
```

ODM Level Report

```
ERROR LABEL: FUN005
ERROR ID: 14AC1D02

Date/Time: Fri Jan 13 14:30:11
Sequence Number: 8554
Machine Id: 000070564100
Node Id: lovex25
Class: H
Type: PERM
Resource Name: x25l0

Error Description
RESOURCE UNAVAILABLE

Probable Causes
LINE ADAPTER HARDWARE
CONFIGURATION

Failure Causes
LINE ADAPTER HARDWARE

       Recommended Actions
       PERFORM PROBLEM RECOVERY PROCEDURES

Detail Data
COMMAND
       funlmxd
DIAGNOSTIC EXPLANATION
       Two messages may be displayed :
       +line not available;
       +line stopped;
ERROR RECOVERY PROCEDURE
       Check board installation and/or configuration
```

The meaningful parameters are :

ERROR LABEL: FUN005
distinguishes an ODM level scanning error report concerning a HiSpeed WAN Comm. line

Resource Name
designates the HiSpeed WAN Comm. line in error

DIAGNOSTIC EXPLANATION

Board Level Report

```
ERROR LABEL: FUN006
ERROR ID: 476F111F

Date/Time: Fri Jan 13 14:30:11
Sequence Number: 8554
Machine Id: 000070564100
Node Id: lovex25
Class: H
Type: PERM
Resource Name: fun0

Error Description
RESOURCE UNAVAILABLE

Probable Causes
X.25 COMMUNICATIONS

Failure Causes
X.25 COMMUNICATIONS ERROR

       Recommended Actions
        PERFORM PROBLEM RECOVERY PROCEDURES

Detail Data
COMMAND
       funlmxd
DIAGNOSTIC EXPLANATION
       Several messages may be displayed in this section :
       +BOARD NOT READY : board configured;
       +BOARD NOT READY : board loaded;
       +BOARD NOT READY : CPU running;
       +BOARD NOT READY : FUN is waiting on board reset;
       +BOARD NOT READY : FUN is waiting command CMDMEMREG;
       +BOARD NOT READY : FUN is waiting command CMDPOSTREG;
       +BOARD NOT READY : parameters DEOS red;
       +BOARD NOT READY : FUN is waiting autotest end;
       +BOARD STOPPED with error NNNNNNNN;
                        where NNNNNNNN is the error number;
       +NO MORE BUFFER on the board;
       +TOO MUCH REQUESTS;
       +TIMEOUT;
       +FREEZE;
ERROR RECOVERY PROCEDURE
       Check board installation and/or configuration
```

The meaningful parameters are :

ERROR LABEL: FUN006
distinguishes a board level scanning error report concerning a HiSpeed WAN Comm. adapter

Resource Name
designates the HiSpeed WAN Comm. adapter in error

DIAGNOSTIC EXPLANATION

Packet Level Report

```
ERROR LABEL: FUN007
ERROR ID: F2BBF4F3

Date/Time: Fri Jan 13 14:30:11
Sequence Number: 8554
Machine Id: 000070564100
Node Id: lovex25
Class: H
Type: PERM
Resource Name: x25l0

Error Description
HIGH SPEED LINE ADAPTER DISCONNECTED

Probable Causes
PACKET LAYER CONTROL

Failure Causes
X.25 COMMUNICATIONS ERROR

      Recommended Actions
      PERFORM PROBLEM RECOVERY PROCEDURES

Detail Data
COMMAND
       funlmxd
DIAGNOSTIC EXPLANATION
       Several messages may be displayed :
       +CONNECTING;
       +RESETTING;
       +DISCONNECTED;
       ERROR RECOVERY PROCEDURE
       Check board installation and/or configuration
```

The meaningful parameters are :

ERROR LABEL: FUN007

distinguishes a packet level scanning error report concerning a HiSpeed WAN Comm. line

Resource Name

designates the HiSpeed WAN Comm. line in error

DIAGNOSTIC EXPLANATION

Frame Level Report

```
ERROR LABEL: FUN008
ERROR ID: A42CF416

Date/Time: Fri Jan 13 14:30:11
Sequence Number: 8554
Machine Id: 000070564100
Node Id: lovex25
Class: H
Type: PERM
Resource Name: x2510

Error Description
HIGH SPEED LINE ADAPTER DISCONNECTED

Probable Causes
LINK ACCESS PROTOCOL BALANCED

Failure Causes
X.25 COMMUNICATIONS ERROR

     Recommended Actions
     PERFORM PROBLEM RECOVERY PROCEDURES

Detail Data
COMMAND
       funlmxd
DIAGNOSTIC EXPLANATION
       Several messages may be displayed :
       +NO LINK TO UPPER LAYER;
       +DLSAP CONFIGURED;
       +DISCONNECTED; disconnected disabled;
       +CONNECTING;
       +DISCONNECTING;
       +RESETTING;
       +DISCONNECTED: disconnected enabled;
ERROR RECOVERY PROCEDURE
       Check board installation and/or configuration
```

The meaningful parameters are :

ERROR LABEL: FUN008
: distinguishes a frame level scanning error report concerning a HiSpeed WAN Comm. line

Resource Name
: designates the HiSpeed WAN Comm. line in error

DIAGNOSTIC EXPLANATION

Physical Level Report

```
ERROR LABEL: FUN009
ERROR ID: C676F815

Date/Time: Fri Jan 13 14:30:11
Sequence Number: 8554
Machine Id: 000070564100
Node Id: lovex25
Class: H
Type: PERM
Resource Name: x25l0

Error Description
HIGH SPEED LINE ADAPTER DISCONNECTED

Probable Causes
COMMUNICATION CONTROLLER

Failure Causes
X.25 COMMUNICATIONS ERROR

     Recommended Actions
     PERFORM PROBLEM RECOVERY PROCEDURES

Detail Data
COMMAND
     funlmxd
DIAGNOSTIC EXPLANATION
     Several messages may be displayed :
     +NOT INITIALIZED;
     +NO LINK TO UPPER LAYER;
     +DEACTIVATED; link to upper layer;
     +CONNECTING;
     +DIAGNOSTIC STATE; link to upper layer;
     +BEING DEACTIVATED; link to upper layer;
     +RESETTING;
ERROR RECOVERY PROCEDURE
     Check board installation and/or configuration
```

The meaningful parameters are :

ERROR LABEL: FUN008

distinguishes a physical level scanning error report concerning a HiSpeed WAN Comm. line

Resource Name

designates the HiSpeed WAN Comm. line in error

DIAGNOSTIC EXPLANATION

Problem Solving

You can perform these simple tasks:

- after having installed and configured a HiSpeed WAN Comm. adapter, in order to check that everything is working correctly,
- when an abnormal behaviour of a HiSpeed WAN Comm. adapter is detected, in order to determine which component is out of order or not configured correctly.

Refer to Appendix E. HiSpeed WAN Comm. Adapter and Port Numbering, for more information.

Check Hardware and Software Installation

The **lsdev** command lists the status ('Defined' or 'Available') of the HiSpeed WAN Comm. adapters installed in the system. The status must be 'Available'.

- For a 4Port HiSpeed WAN Comm. adapter

```
#lsdev -C -H -t mcfuthd4

   name   status    location description
   fun<n> Available 00-02    4port Hispeed WAN Comm Adapter
```

- For a 1Port HiSpeed WAN Comm. adapter

```
#lsdev -C -H -t mcfut

   name   status    location description
   fun<n> Available 00-03    1port Hispeed WAN Comm Adapter
```

- For a 1Port HiSpeed WAN Comm–B adapter

```
#lsdev -C -H -t mcfutb

   name   status    location description
   fun<n> Available 00-03    1port Hispeed WAN Comm Adapter - B
```

- For a 1Port WAN Comm Adapter (ISA)

```
#lsdev -C -H -t atrfut

   name   status    location description
   fun<n> Available 00-11    1port WAN Comm Adapter ISA
```

If the status is not 'Available', run the **errpt** command, in order to display the error code resulting from the auto-tests, see page 5-2.

Check Port Status

The **lsdev** command also lists the status of the HiSpeed WAN Comm. ports. The port status must be 'Available'.

If the port status is 'Defined', while the adapter status is 'Available', it means that the interface daughter-board is not plugged into the corresponding location or is out of order.

```
#lsdev -C -c x25l

   name     status    location    description
   x25l<n>  Available 00-02-01-00 Hispeed WAN Comm Adapter
   x25l<n>  Available 00-02-01-01 Hispeed WAN Comm Adapter
   x25l<n>  Available 00-02-01-02 Hispeed WAN Comm Adapter
   x25l<n>  Available 00-02-01-03 Hispeed WAN Comm Adapter
```

Check Adapter Operating State

The **funstat** command gives information about the operating state of a HiSpeed WAN Comm. adapter.

```
#funstat -l fun<n>

fun<n>: configured, loaded, running,
Total nb of buffers:                    17900
Nb of used buffers:                     1024    (5.72 %)
Max nb of used buffers:                 5811    (32.46 %)

Total nb of messages:                   100
Max nb of messages in send queue:       16      (16.00 %)
Max nb of messages in received queue:   1       (1.00 %)

Total nb of sent messages:              538138
Total nb of received messages:          535803

Error code of the board:              0
```

The meaningful information is:

- the operating state displayed on the first line,
- the error code displayed on the last line.

If the error code is null, no problem has been detected.

If the error code is not null, an error has been detected: you have to note this error code and continue as follows:

– run the **funsnap** command in order to gather all information necessary to analyze the problem and send the result to your BULL representative.

```
#funsnap -Dg -l fun<n>
```

– run the **funload** command in order to reload the HiSpeed WAN Comm. adapter with the last generated configuration and to re-initialize it.

```
#funload -l fun<n>
```

Check Status of the Physical, Frame and Packet Levels

The **xdmanage** command displays the status of layers 1, 2 and 3, that is physical, frame and packet levels, of all the available HiSpeed WAN Comm. lines.

```
#xdmanage

Port    Physical Layer  Frame Layer     Packet Layer
x25l<n> Connected       Connected       Connected
```

For each level, the status is indicated:

Connected the adapter is connected to the network.

Connecting the adapter is trying to establish the connection.

Disconnected no connection for the level, which implies a problem.

Unknown a major configuration error has been found.

If the physical level is not connected

There may be two reasons:

- Hardware installation
  - Check if adapter and port status are 'Available', if not checked previously,
  - Check if the cable plugged onto the channel is the right cable. The cable type and interface type must be the same.

    For a 4Port HiSpeed WAN Comm. the figure 24, on page 3-5, displays the correspondence between the cable and the interface daughter-board.

    For a 1Port HiSpeed WAN Comm. the figure 26, figure 27 and figure 28, on pages 3-7 and 3-8, display the correspondence between the cable and the interface type of the adapter.

    For a 1Port HiSpeed WAN Comm–B The figure 31, figure 32 and figure 33, on page 3-11, display the correspondence between the cable and the interface type of the adapter.

    For a 1Port WAN Comm Adapter (ISA), refer to the Installation documentation provided with the adapter.
- Configuration error
  - Check if the clock signal origin is correct (internal or external).

If the frame level is not connected

- Check the cabling:
  - is the modem on ?
  - are the physical signals on ?
- Check if the frame parameters have been correctly configured.
  The most important parameters are:
  - the type of line [DTE/DCE],
  - the frame window size,
  - the connection mode [active/passive].

If the packet level is not connected

- Check if the network parameters have been correctly configured.
  If you are connected to a public network, the configuration must correspond exactly to the subscription parameters. The most important parameter is:
  - Packet Level Mode [DTE/DCE].

Monitoring of the X.25 Traffic on an Adapter or on a Port

If the previous checks have not found the problem, run the **xdmonitor** tool in extended mode in order to display all the traffic on an adapter or on a specified line.

It may help you in the analysis of your problem.

```
#xdmonitor -frame -packet -e -l 64 x25l3 | tee /tmp/report
```

You get the corresponding report in the `/tmp/report` file.
The trace shows the information at level 2 and 3 over the line x25l3. The frames and packets are displayed on a length of 64 bytes and the X25 protocol is interpreted.

```
Time    Link Way      Size Type NR  NS  P/F Errs  Len Parameters
(Level 2)
Time    Link Way LCN  Size Type  R  PS  DQM Errs  Len Parameters
 (Level 3)

12:07:19  3  <--      2    RR   7       P/F
      | (RR) Receive Ready

12:07:24  3  -->      10   CALL                   5   y
      | (CALL) Call Request (or Incoming Call)
      | (y) Called  DTE address = 13456

12:07:24  3  <-- 6    7    CLEAR                  0   c(13)d(241)
      | (CLEAR) Clear Request (or Clear Indication)
      |  (c) Cause = Not Obtainable
      | (d) Diagnostic = Disconnection - normal

12:07:24  3  --> 6    5    CLR CF
      | (CLR CF) Clear Confirmation
```

Quick analysis of this report:

- At 12:07:24, a Call Request is sent over the network, the way is '—>' meaning outgoing from the HiSpeed WAN Comm. adapter.
  This trace has been obtained using the French Public Data Network (TRANSPAC) which does not accept the calling X25 address to be sent in the Call Request. Thus only the called address (13456) is sent in the Call Request packet.
- A Clear Request is then received on the Switched Virtual Circuit, whose Logical Channel Number (LCN) is 6, with a cause(13) and diagnostic(241) which are fully interpreted by the tool.
  This error was generated by calling a remote machine that did not exist.

Appendix A. Adapters and Systems

This table lists which HiSpeed WAN Comm. adapter can be installed in which DPX/20 system.

- A HiSpeed WAN Comm. adapter is referred to by an identification number, written on the board.
- The last three digits define the release state of the adapter:
  - if the release state is not specified (**xxx**), any release of the adapter may be used,
  - if the release is specified (for instance **003**), only this release and later releases of the adapter can be used.

	DPX/20 mono-processor	**DPX/20 ESCALA**	**DPX/20 ESTRELLA**
4Port HiSpeed WAN Comm.	**76 706 766–xxx**	**76 706 766–xxx**	no
1Port HiSpeed WAN Comm. – V24 – V35 – V11	 **76 706 763–xxx** **76 706 764–xxx** **76 706 765–xxx**	 **76 706 763–003** **76 706 764–003** **76 706 765–003**	 no no no
1Port HiSpeed WAN Comm–B	**76 729 218–xxx**	**76 729 218–xxx**	no
1Port WAN Comm Adapter (ISA) – V24 – V35 – V11	 no no no	 no no no	 **76 729 220–xxx** **76 729 221–xxx** **76 729 222–xxx**

Note: A 4Port HiSpeed WAN Comm. adapter cannot be installed in a DPX/20 1xx system for mechanical limitations.

Appendix B. Physical Interfaces

HiSpeed WAN Comm. Physical Interfaces

A physical interface (or physical layer) is made up of three functions:

- logical, which defines the signals or junctions needed in order to establish and maintain a physical connection,
- electrical, which defines the electrical characteristics of these signals,
- mechanical, which defines the connector type.

The logical and electrical functions conform to the standardized recommendations issued from CCITT (Europe) or EIA (US). In most cases CCITT and EIA recommendations are similar.

- CCITT distinguishes logical and electrical functions with different recommendations, named Vxx or Xxx,
- EIA generally groups logical and electrical functions into common recommendations, named RSxxx.

The mechanical functions are conform to standardized recommendations issued from ISO (Europe) or EIA (US). The differences are due to different locking type and thread-pitch.

On a HiSpeed WAN Comm. adapter, the physical interface is defined on each channel by two components:

- the daughter-board,
- the attachment cable.

To define the physical interface type of a channel, refer to How to Recognize the Interface Type of a HiSpeed WAN Comm. Channel on page B-3.

For any type of HiSpeed WAN Comm. adapters, the physical interfaces are described in the following table, where:

- the first column displays the daughter-board designation,
- the second column, the logical and electrical functions implemented on this board,
- the third column, the mechanical functions provided by the associated attachment cable,
- the fourth column, the designation of the physical interface thus implemented.

Daughter-Board	Logic	Electric		Connector	Attachment Cable	Physical Interface
V24	V24 equivalent to RS232	V28	(CCITT) (EIA)	ISO 2110	CBLG087–1900 CBLG110–1900 (4.)	V24/V28
V35	V24	V35 V28 (1.)	(CCITT)	ISO 2593 ISO std PTT/TRANSPAC EIA standard	VCW3666 VCW3657 VCW3660	V24/V35
V11	V24/X24 (2.) equivalent to RS485/RS422+RS423	V11 V10 (3.)	(CCITT) (EIA)	ISO 4903	CBLG095–1900	Leased X21

Figure 38. HiSpeed WAN Comm. Physical Interfaces

1. Only the data and clock signals are conform to V35 CCITT recommendation (differential signals), the other ones are conform to V28 CCITT recommendation.
2. The junctions provided by the V11 daughter-board are conform to V24, but the CBLG095–1900 attachment cable by strapping turn them into X24 junctions.
3. Only the data and clock signals are conform to V11 CCITT recommendation (differential signals), the other ones are conform to V10 CCITT recommendation.
4. The cable **CBLG087–1900** is used for 4Port HiSpeed WAN Comm. and 1Port HiSpeed WAN Comm–B adapter.

   The cable **CBLG110–1900** is used for 1Port HiSpeed WAN Comm. and 1Port WAN Comm Adapter (ISA).

How to Recognize the Interface Type of a HiSpeed WAN Comm. Channel

If the HiSpeed WAN Comm. adapter is not yet installed in the system

- For a 1Port HiSpeed WAN Comm. adapter, note the identification number written on the adapter and refer to 1Port HiSpeed WAN Comm. Components Identification, on page 3-6, in order to recognize the interface type.
- For a 1Port HiSpeed WAN Comm–B adapter, note the identification number written on the daughter-board and refer to 1Port HiSpeed WAN Comm–B Components Identification, on page 3-9, in order to recognize the interface type.
- For a channel of a 4Port HiSpeed WAN Comm. adapter, note the identification number written on the corresponding daughter-board and refer to 4Port HiSpeed WAN Comm. Components Identification, on page 3-2, in order to recognize the interface type of this channel.
- For a 1Port WAN Comm Adapter (ISA), note the identification number written on the adapter and refer to *1 Port WAN Comm Adapter (ISA) Installation Guide* provided with the adapter.

If the HiSpeed WAN Comm. adapter is installed and running

Use the **smit** command:

```
smit x25datp
```

Select in the available list the HiSpeed WAN Comm. channel and refer to the parameter **Physical Line Interface.** The result is:

V24 for a V24/V28 interface.

V35 for a V24/35 interface.

V11 for a Leased X21–X24/V11 interface.

Appendix C. Cables

HiSpeed WAN Comm. Cable Connector Diagrams and Pin-Out Information

All the attachment cables which can be connected on a HiSpeed WAN Comm. adapter are described hereafter:

Cable CBLG087–1900

System End Connector	Signal		Device End Connector
Pin (Male)	V24		Pin (Male)
1	104 RD	<——	3
3	115 SCR	<——	17
5	114 SCT	<——	15
8	103 TD	——>	2
10	113 SCTE	——>	24
11	107 DSR	<——	6
12	109 RSLD	<——	8
13	106 CTS	<——	5
14	142 TM	<——	25
15	108 DTR	——>	20
16	105 RTS	——>	4
17	101 PG	(shield)	1
18	102 SG	——	7
21	141 LL	——>	18

Figure 39. X.25 Attachment Cable: V24/V28 for 4Port HiSpeed WAN Comm. adapter

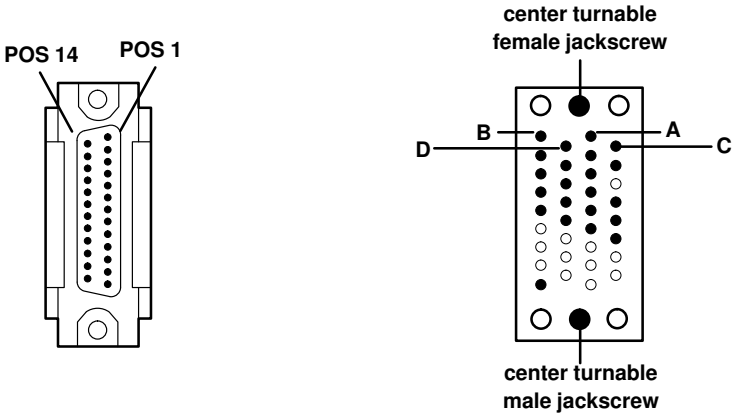
Cable CBLG110–1900

System End Connector	Signal		Device End Connector
Pin (Male)	V24		Pin (Male)
1	101 PG	(shield)	1
2	103 TD	——>	2
3	104 RD	<——	3
4	105 RTS	——>	4
5	106 CTS	<——	5
6	107 DSR	<——	6
7	102 SG	——	7
8	109 RSLD	<——	8
15	114 SCT	<——	15
17	115 SCR	<——	17
18	141 LL	——>	18
20	108 DTR	——>	20
21	140 RLBT	——>	21
22	125 RI	<——	22
23	111 HRS	——>	23
24	113 SCTE	——>	24
25	142 TM	<——	25

Figure 40. X.25 Attachment Cable: V24/V28 for 1Port HiSpeed WAN Comm. adapter

Note: This cable is entirely symmetrical.

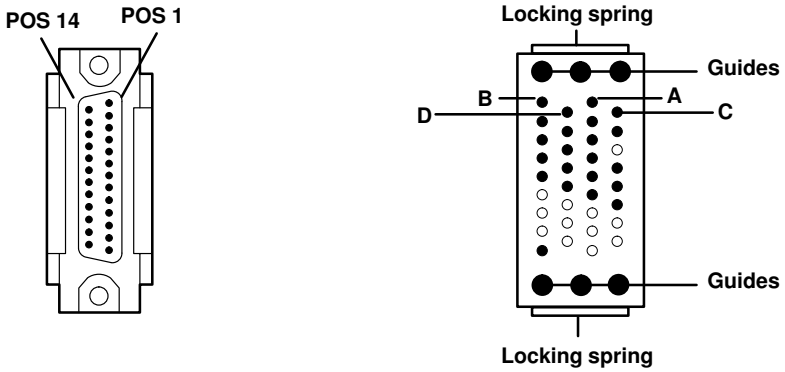
Cable VCW 3666



System End Connector	Signal			Device End Connector
Pin (Male)	V24			Pin (Male) Diameter = 1.6mm
1	104a	RDa	<——	R
2	104b	RDb	<——	T
3	115a	SCRa	<——	V
4	115b	SCRb	<——	X
5	114a	SCTa	<——	Y
6	114b	SCTb	<——	AA
7	103b	SDb	——>	S
8	103a	SDa	——>	P
9	113b	SCTEb	——>	W
10	113a	SCTEa	——>	U
11	107	DSR	<——	E
12	109	RSLD	<——	F
13	106	CTS	<——	D
14	142	TM	<——	NN
15	108	DTR	——>	H
16	105	RTS	——>	C
25	——	——	——	
18	102	SG	——	B
19	——	——	——	J
20	——	——	——	K
21	141	LL	——>	L
22	——	——	——	N
17	101	PG	shield	A

Figure 41. X.25 Attachment Cable: V24/V35 (ISO 2593)

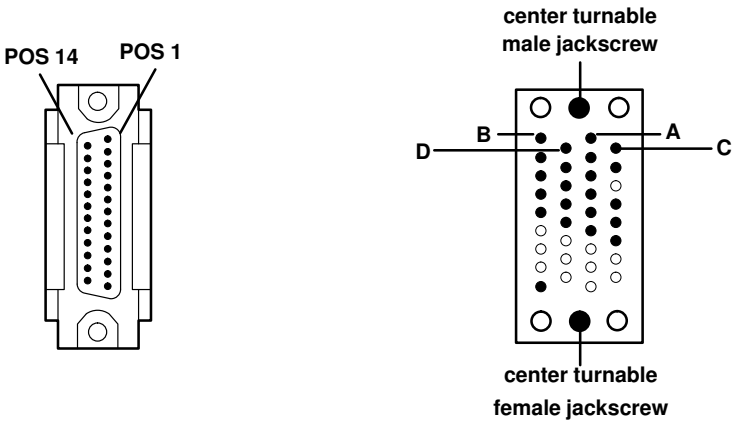
Cable VCW 3657



System End Connector	Signal			Device End Connector
Pin (Male)	V24			Pin (Male) Diameter = 1mm
1	104a	RDa	<——	R
2	104b	RDb	<——	T
3	115a	SCRa	<——	V
4	115b	SCRb	<——	X
5	114a	SCTa	<——	Y
6	114b	SCTb	<——	AA
7	103b	SDb	——>	S
8	103a	SDa	——>	P
9	113b	SCTEb	——>	W
10	113a	SCTEa	——>	U
11	107	DSR	<——	E
12	109	RSLD	<——	F
13	106	CTS	<——	D
14	142	TM	<——	NN
15	108	DTR	——>	H
16	105	RTS	——>	C
25	——	——	——	
18	102	SG	——	B
19	——	——	——	J
20	——	——	——	K
21	141	LL	——>	L
22	——	——	——	N
17	101	PG	shield	A

Figure 42. X.25 Attachment Cable: V24/V35 (TRANSPAC)

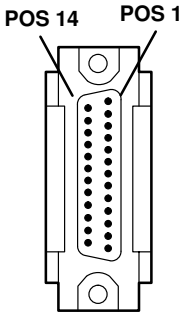
Cable VCW 3660

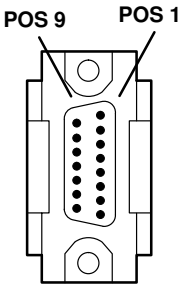


System End Connector	Signal			Device End Connector
Pin (Male)	V24			Pin (Male) Diameter = 1.6mm
1	104a	RDa	<——	R
2	104b	RDb	<——	T
3	115a	SCRa	<——	V
4	115b	SCRb	<——	X
5	114a	SCTa	<——	Y
6	114b	SCTb	<——	AA
7	103b	SDb	——>	S
8	103a	SDa	——>	P
9	113b	SCTEb	——>	W
10	113a	SCTEa	——>	U
11	107	DSR	<——	E
12	109	RSLD	<——	F
13	106	CTS	<——	D
14	142	TM	<——	NN
15	108	DTR	——>	H
16	105	RTS	——>	C
25	——	——	——	
18	102	SG	——	B
19	——	——	——	J
20	——	——	——	K
21	141	LL	——>	L
22	——	——	——	N
17	101	PG	shield	A

Figure 43. X.25 Attachment Cable: V24/V35 EIA Standard

Cable CBLG095–1900





System End Connector	Signal			Device End Connector
Pin (Male)	V24 turned into X24			Pin (Male)
8	103a	———>	Ta	2
7	103b	———>	Tb	9
1	104a	<———	Ra	4
2	104b	<———	Rb	11
16	105a	—> (☞)	Ca	3
13	106a	<— (☞)		
12	109a	<— (☞)	Ia	
14	105b	—> (☞)	Cb	10
22	106b	<— (☞)		
21	109b	<— (☞)	Ib	
3	115a	<— (☞)	Sa	6
5	114a	<— (☞)		
4	115b	<— (☞)	Sb	13
6	114b	<— (☞)		
10	113a	———>	Xa	7
9	113b	———>	Xb	14
11	107	<— (☞)		
15	108	—— (☞)		
18	102	———	SG	8
17		shield	PG	1

Note: (☞)
105a wrapped on 106a and on 109a
105b wrapped on 106b and on 109b
108 wrapped on 107
115a wrapped on 114a, 115b wrapped on 114b

Figure 44. X.25 Attachment Cable: Leased X21–X24/V11

Appendix D. Links

HiSpeed WAN Comm. Links

This appendix lists some basic links which may be implemented using HiSpeed WAN Comm. communications:

- between two Bull DPX/20 systems through a direct connection using a direct connection box. A direct connection box performs necessary strapping and connection between the signals issued from the two systems, such as transmitted data of one system to received data of the other system.

  The direct connection box is not part of the HiSpeed WAN Comm. kit, but it may be ordered through the Bull Sales Services.

Warning: In most of the cases, the direct connection box has to be configured by modifying straps or switches inside. This configuration is described for each type of link.

- between a Bull DPX/20 system and any other system through a X.25 network. In this case, only the connection from the Bull DPX/20 system to the network is described.

  The modem which allows connection to the network is provided by the network supplier in case of connection to a public network or may be ordered through the Bull Sales Services in case of connection to a private network.

Figure 45 explains the symbols used for each component in the diagrams of the different links given in this appendix.

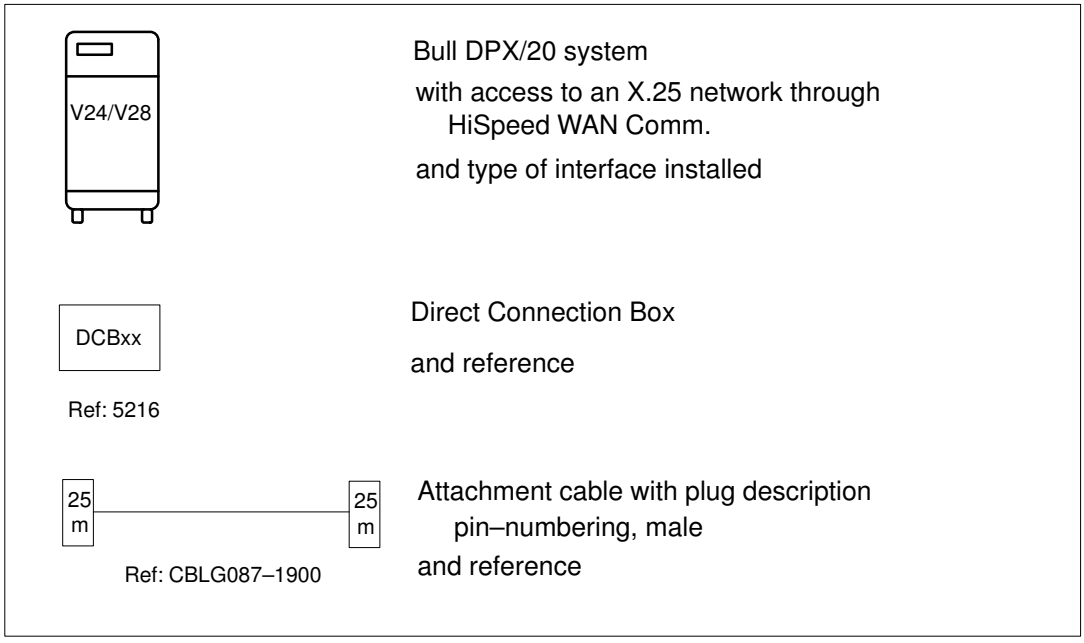


Figure 45. Legend for HiSpeed WAN Comm. Links

Note: DCE and DTE connection modes

1. **DCE** means that at configuration
   – it is mandatory that the frame parameter **Type of Line** is defined as DCE
   – it is recommended that the network parameter **Connection Mode** is defined as DCE.
2. **DTE** means that at configuration
   – it is mandatory that the frame parameter **Type of Line** is defined as DTE
   – it is recommended that the network parameter **Connection Mode** is defined as DTE.

Note: DCE and DTE connection modes and attachment cables

3. In DTE mode, a HiSpeed WAN Comm. channel needs only the standard attachment cable to work correctly.
4. In DCE mode, a HiSpeed WAN Comm. channel needs the standard attachment cable associated with a Direct Connection Box or any other specific adaptation device to work correctly.

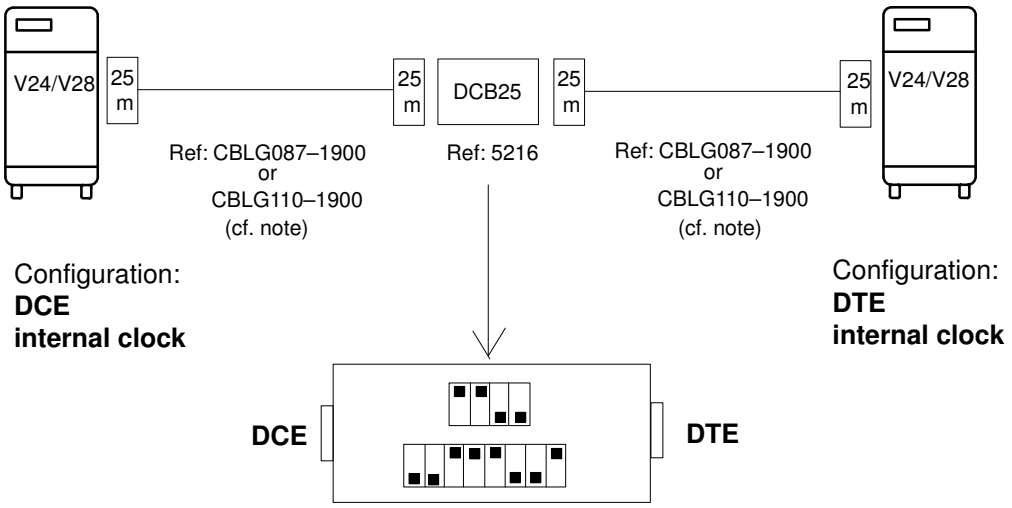
List of the links:

- V24/V28 Links, on page D-3,
- V24/V35 Links, on page D-5,
- Leased X21–X24/V11 Links, on page D-7.

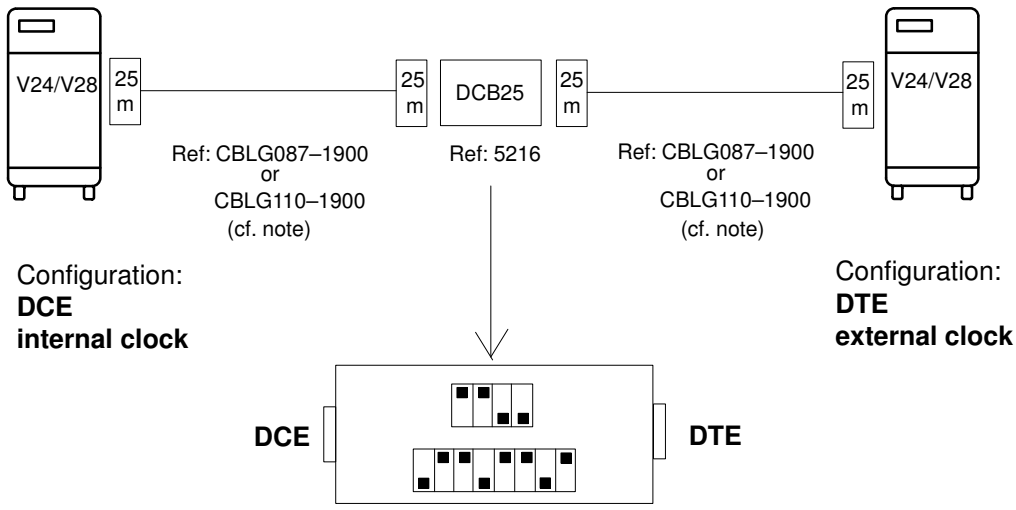
V24/V28 HiSpeed WAN Comm. Links

Using V24/V28 interface, two types of connection, direct connection or connection to a public X.25 network through a modem, can be implemented.

- **V24/V28 direct connection**



Switches configuration in DCB25



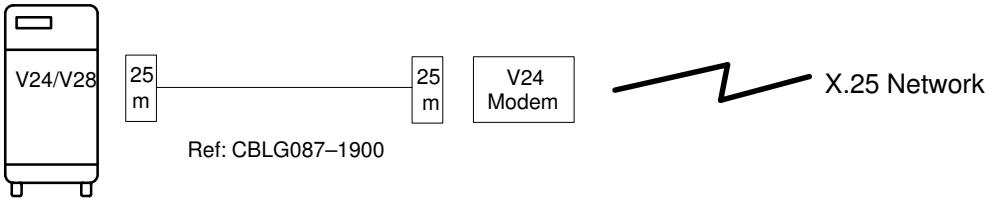
Switches configuration in DCB25

Figure 46. Two Configurations for V24/V28 Direct Connection Link

Note: CBLG087–1900 is used for a 4Port HiSpeed WAN Comm. or a 1Port HiSpeed WAN Comm–B. adapter.
CBLG110–1900 is used for a 1Port HiSpeed WAN Comm. adapter or a 1Port WAN Comm Adapter (ISA).

A direct connection can be established using equally a 4Port HiSpeed WAN Comm. or 1Port HiSpeed WAN Comm. adapter. Two configurations are possible, the first one is recommended.

- **V24/V28 connection to a network**



Configuration:
DTE
external clock

Figure 47. V24/V28 Connection to a Network

V24/V35 HiSpeed WAN Comm. Links

On V24/V35 interface, there are three different mechanical interfaces depending on the attachment cable which is used:

- V35/ISO2593 with the cable referenced VCW3666,
- V35/TRANSPAC with the VCW3657 cable for connection to the French TRANSPAC network,
- V35/EIA Standard with the VCW3660 cable.

Two types of connections, direct connection or connection to a public X.25 network through a modem, can be implemented.

- **V24/V35 direct connection**

Direct connection between two Bull DPX/20 systems can be implemented only if using a V35/EIA Standard cable.

Warning: Only 4Port HiSpeed WAN Comm. adapters can be used for direct connection using a standard DCB35 as shown. (On a 1Port HiSpeed WAN Comm. equipped with a V35 interface, the clock cannot be supplied internally.)

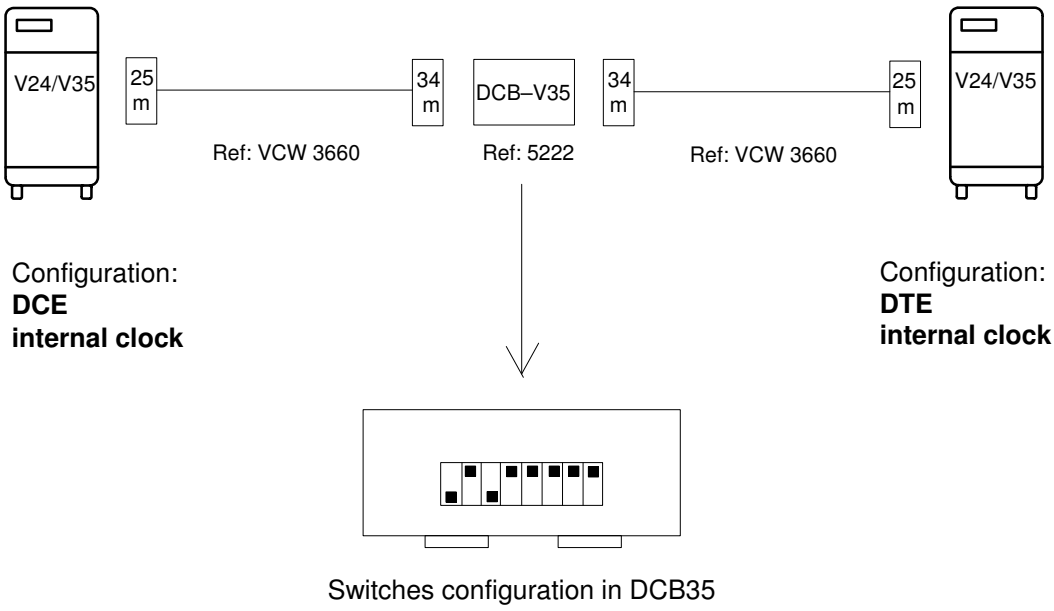


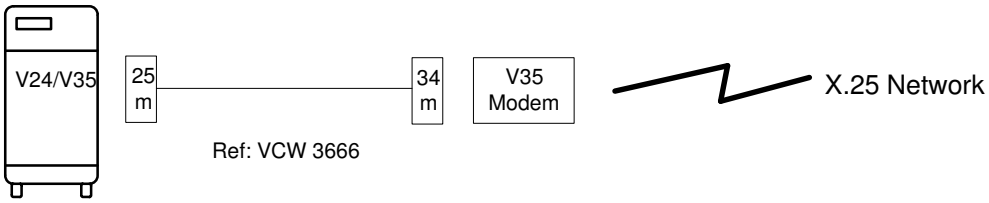
Figure 48. V24/V35 Direct Connection Link

The configuration of the switches in the DCB is the same for a direct connection between a HiSpeed WAN Comm. adapter and any other Bull X.25 adapter, DATANET included.

- **V24/V35 connection to a network**

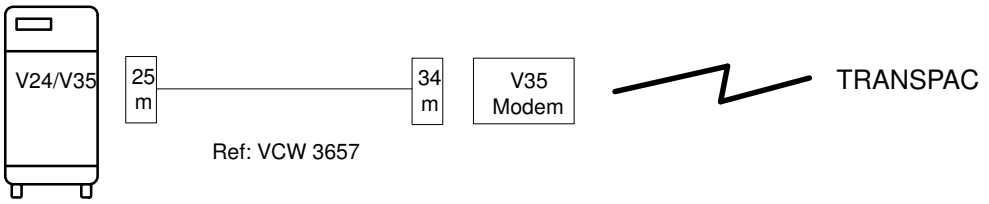
Three types of connection can be implemented:

  - Connection to a Public Network (ISO2593) except in France, see figure 49,
  - Connection to the French TRANSPAC Network, see figure 50,
  - Connection to a Public Network (EIA Standard), see figure 51.



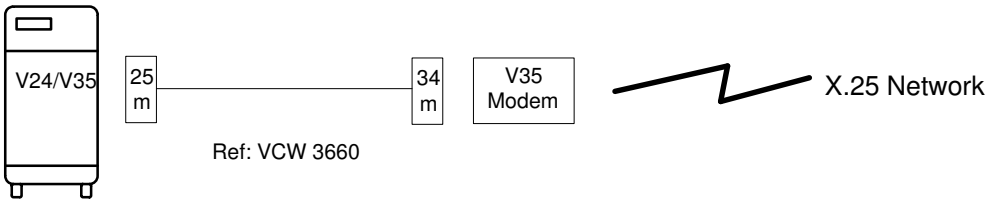
Configuration:
DTE
external clock

Figure 49. V24/V35 Connection to a Public Network (ISO2593)



Configuration:
DTE
external clock

Figure 50. V24/V35 Connection to TRANSPAC Network



Configuration:
DTE
external clock

Figure 51. V24/V35 Connection to a Public Network (EIA Standard)

Leased X21–X24/V11 HiSpeed WAN Comm. Links

Two types of connection, direct connection or connection to a public X.25 network through a modem, can be implemented.

- **Leased X21 direct connection**

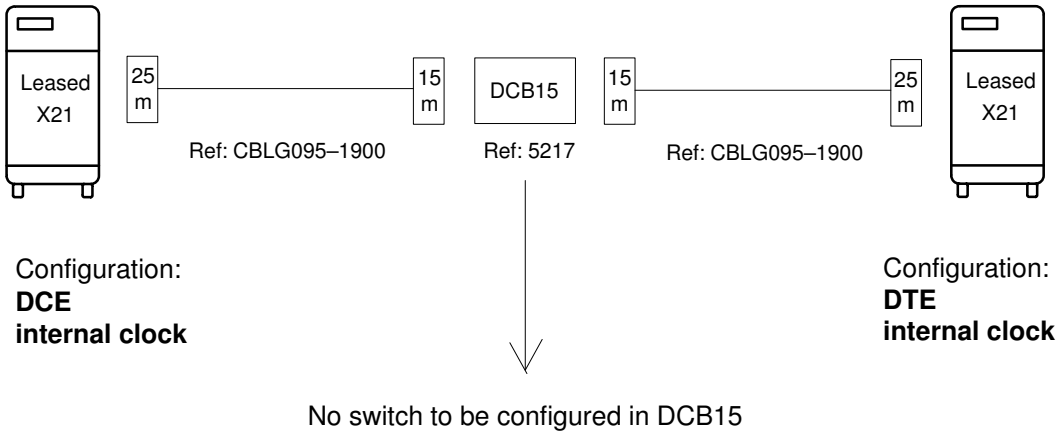


Figure 52. Leased X21 Direct Connection Link

A direct connection can be established using either a 4Port HiSpeed WAN Comm. or 1Port HiSpeed WAN Comm. adapter.

- **Leased X21 connection to a network**

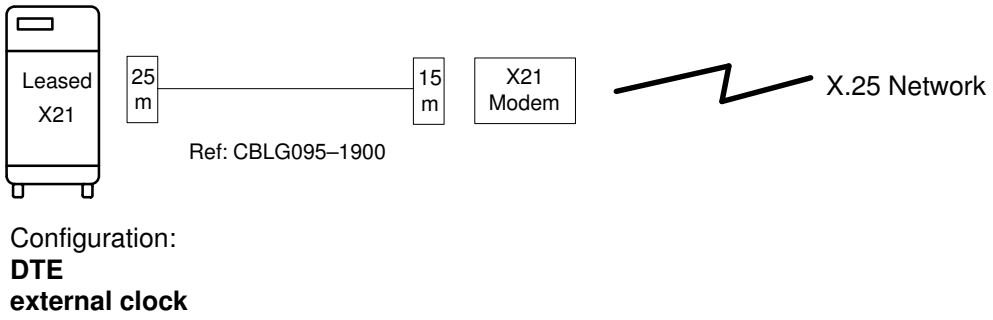


Figure 53. Leased X21 Connection to a Network

Appendix E. Numbering

HiSpeed WAN Comm. Adapter and Port Numbering

HiSpeed WAN Comm. Adapter Naming

All the operating HiSpeed WAN Comm. adapters:
- 4Port HiSpeed WAN Comm.,
- 1Port HiSpeed WAN Comm.,
- 1Port HiSpeed WAN Comm–B,
- 1Port WAN Comm Adapter (ISA)

are designated, using the prefix **fun**.

The name of a HiSpeed WAN Comm. adapter is **fun***x*, where *x* represents the chronological order of insertion of an adapter in a slot of the system. *x* is then linked to this slot.

Example:

1. A first HiSpeed WAN Comm. adapter is inserted in the slot number 3, it is designated as **fun0**,
2. A second HiSpeed WAN Comm. adapter is inserted in the slot number 2, it is designated as **fun1**,
3. The adapter **fun0** is removed from slot number 3 and inserted in slot number 1, it is then designated as **fun2**,
4. Because of a breakdown, the adapter **fun1** is removed from slot number 2, and a new adapter replaces it in slot number 2.
   If the new adapter is of the same type as the old one, it continues to be designated as **fun1**. If the new adapter is of another type as the old one, it is designated as **fun3**.

The **lsdev** command displays the link between a HiSpeed WAN Comm. adapter and the slot where it is inserted, as well as the state (Available or Defined) of the adapter.

Example:

```
lsdev -C -l fun0
    fun0 Available 00-03 1port Hispeed WAN Comm Adapter
```

The adapter `fun0` is inserted in the slot number 3 and is working correctly.

If the adapter is displayed as `Defined`, it means that the adapter has been removed from the system, or it is out of order or not configurated.

Example:

```
lsdev -C | grep fun
fun0    Available  00-03  1port Hispeed WAN Comm Adapter (OK)
fun1    Defined    00-04  4port Hispeed WAN Comm Adapter (removed)
fun2    Available  00-02  1port Hispeed WAN Comm Adapter-B  (OK)
fun3    Defined    00-01  1port Hispeed WAN Comm Adapter
                                                  (out of order)
```

In order to distinguish the type of HiSpeed WAN Comm. adapters, use the **–t** option of the **lsdev** command.

Example:

```
lsdev -C -t mcfuthd4     List of 4Port HiSpeed WAN Comm. adapters
lsdev -C -t mcfut        List of 1Port HiSpeed WAN Comm. adapters
lsdev -C -t mcfutb       List of 1Port HiSpeed WAN Comm–B adapters
lsdev -C -t atrfut       List of 1Port WAN Comm Adapter (ISA)
```

At bootstrap, for each adapter, the configuration of all the ports is loaded on each adapter. The configuration information is saved in a configuration file generated by the **genconf** command:

- /**etc**/**fun**/**mcfut***(x+1)***.conf** for the 1Port HiSpeed WAN Comm. adapter designated as **fun***x*
- /**etc**/**fun**/**mcfutb***(x+1)***.conf** for the 1Port HiSpeed WAN Comm–B adapter designated as **fun***x*
- /**etc**/**fun**/**mcfuthd4***(x+1)***.conf** for the 4Port HiSpeed WAN Comm. adapter designated as **fun***x*
- /**etc**/**fun**/**atrfut***(x+1)***.conf** for the 1Port WAN Comm Adapter (ISA) designated as **fun***x.*

HiSpeed WAN Comm. Port Numbering

All the HiSpeed WAN Comm. ports (associated with a 1Port HiSpeed WAN Comm. or 4Port HiSpeed WAN Comm. adapter) are designated, using the prefix **x25l**.

The name of a HiSpeed WAN Comm. port is **x25l***x*, where *x* represents the chronological order of insertion of the adapter in a slot of the system. *x* is then linked to this slot.

Example:

1. The first HiSpeed WAN Comm. adapter to be inserted is a 1Port HiSpeed WAN Comm. adapter, it is designated as **fun0** and the port **x25l0**,
2. The second HiSpeed WAN Comm. adapter to be inserted is a 4Port HiSpeed WAN Comm. adapter, it is designated as **fun1** and the four ports as **x25l1**, **x25l2**, **x25l3** and **x25l4**,
3. If this second adapter **fun1** is moved from a slot to another, it is then designated as **fun2** and the four ports as **x25l5**, **x25l6**, **x25l7** and **x25l8**.

The **lsdev** command displays the link between a HiSpeed WAN Comm. port and the slot where it is inserted, as well as the state (Available or Defined) of the port.

Example:

```
lsdev -C -l x25l0
    x25l0 Available 00-03-01-00
```

The port `x25l0` is the first port of the adapter inserted in the slot number 3. It is available.

If the port is displayed as `Defined`, it means that the adapter itself is in the state `Defined` or there is no daughter-board inserted on the corresponding port.

In order to list all the HiSpeed WAN Comm. ports, run the **lsdev** command:

Example:

```
lsdev -C -H -t x25l
    x25l0  Defined    00-03-01-00
    x25l1  Defined    00-03-01-01
    x25l2  Defined    00-03-01-02
    x25l3  Defined    00-03-01-03
    x25l4  Available  00-04-01-00
    x25l5  Available  00-04-01-01
    x25l6  Available  00-04-01-02
    x25l7  Available  00-04-01-03
    x25l8  Defined    00-02-01-00
    x25l9  Defined    00-02-01-01
    x25l10 Defined    00-02-01-02
    x25l11 Defined    00-02-01-03
```

Appendix F. Commands

- arpxd
- funautotest
- funload
- funsnap
- funstat
- genconf
- ifconfigxd
- rc.fun
- x25dxlate
- x25dstat
- xdclear
- xdconnect
- xdmanage
- xdmonitor
- xdping

arpxd Command

Purpose

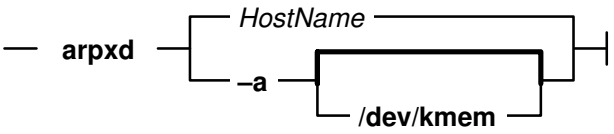
Displays and modifies address resolution for HiSpeed WAN Comm. interfaces.

arpxd has the same functions as **arp** but can be used only for the HiSpeed WAN Comm. interface.

Syntax

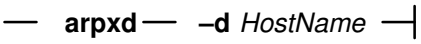
To Display ARP Entries

arpxd { *HostName* | **–a** [/**dev**/**kmem**] }



To Delete an ARP Entry

arpxd –d *HostName*



Description

The **arpxd** command displays and modifies the Internet-to-adapter (HiSpeed WAN Comm. adapters only) address translation tables used by the Address Resolution Protocol. The **arpxd** command displays the current ARP entry for the host specified by the *HostName* variable. The host may be specified by name or number, using Internet dotted decimal notation.

Flags

–a	Displays all of the current ARP entries. Use the **crash** command to look at KMEM or UMUnix variables. Specify the **–a** /**dev**/**kmem** flag to display ARP information for kernel memory.
–d *HostName*	Deletes an entry for the host specified by the *HostName* variable if the user has root user authority.

Examples

To delete a map table entry for the specified host with the **arpxd** command, enter:

```
arpxd -d host1 flag
```

Implementation Specifics

This command is part of bullx25, HiSpeed WAN Comm. Software.

Suggested Reading

Related Information

The **crash** command, **ifconfigxd** command, **x25dstat** command.

The **inetd** daemon.

TCP/IP Protocols in *AIX System Management Guide: Communications and Networks*.

funautotest Command

Purpose

Runs auto-tests on a HiSpeed WAN Comm. adapter.

Syntax

funautotest –l *AdapterName*

Description

The **funautotest** command tests the corresponding HiSpeed WAN Comm. adapter.
It updates in the ODM database the interface daughter-board types present on the adapter.
If a daughter-board is not present, the status of the corresponding channel is set to `Defined`.
If the auto-tests fail, the adapter status is set to `Defined` and a report is generated in the system ErrorLog. This error report may be displayed through the **errpt** command.

If the command is completed successfully, a value of 0 is returned.
If the command fails, a value of –1 is returned.

Warning:
Before running the funautotest command, the telecommunications applications (OSI stack and TCP/IP) must be stopped.

At the end of **funautotest**, a **funload** command is run to reinitialize the adapter so that it can be used by applications.

Root authority is required to use the **funautotest** command.

Flags

–l *AdapterName*

The *Adapter* parameter is in the form `fun<n>` where `n` is the number of a HiSpeed WAN Comm. adapter.

Example

```
funautotest -l fun0
```

tests the adapter `fun0`

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

Prerequisite Information

HiSpeed WAN Comm. Adapter and Port Numbering.

Related Information

The **funload** command.

The **errpt** command.

How to Stop and Restart TCP/IP Applications.

How to Stop and Restart OSI Applications.

funload Command

Purpose

Loads current configuration for a HiSpeed WAN Comm. adapter.

Syntax

funload –l *AdapterName*

Description

The **funload** command loads the configuration described in the file obtained with the command **genconf** applied to the corresponding HiSpeed WAN Comm. adapter.

Warning: Before running the funload command, the telecommunications applications (OSI stack and TCP/IP) must be stopped.

If the command is completed successfully, a value of 0 is returned.
If the command fails, a value of –1 is returned.

Root authority is required to use the **funload** command.

Flags

–l *AdapterName*

The *Adapter* parameter is in the form `fun<n>` where `n` is the number of a HiSpeed WAN Comm. adapter.

Example

```
funload –l fun0
```

loads the adapter with parameters defined in file /etc/fun/mcfuthd41.conf

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Files

Configuration files are saved in /etc/fun directory

/**etc**/**fun**/**mcfut***(x+1)***.conf** for the 1Port HiSpeed WAN Comm. adapter designated as **fun***x*
/**etc**/**fun**/**mcfutb***(x+1)***.conf** for the 1Port HiSpeed WAN Comm–B adapter designated as **fun***x*
/**etc**/**fun**/**mcfuthd4***(x+1)***.conf** for the 4Port HiSpeed WAN Comm. adapter designated as **fun***x*
/**etc**/**fun**/**atrfut***(x+1)***.conf** for the 1Port WAN Comm Adapter (ISA) designated as **fun***x.*

Suggested Reading

Prerequisite Information

HiSpeed WAN Comm. Adapter and Port Numbering.

Related Information

Generate Current Configuration for HiSpeed WAN Comm. Adapter.

Load HiSpeed WAN Comm. Adapter with Last Generated Configuration.

The **genconf** command.

How to Stop and Restart TCP/IP Applications.

How to Stop and Restart OSI Applications.

funsnap Command

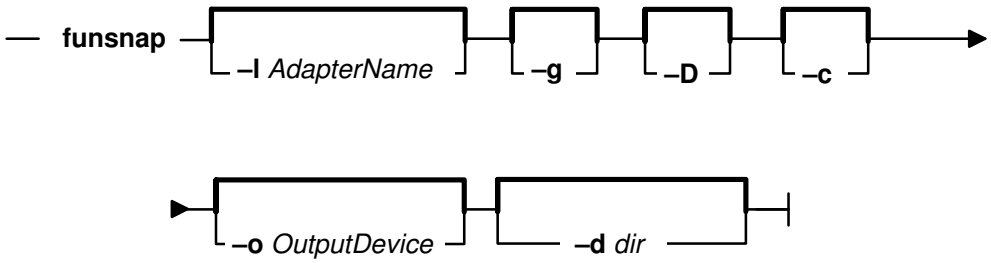
Purpose

Records, in files, information about HiSpeed WAN Comm. adapters just after a problem occurred, so that the Bull Technical Support can exploit this information and solve the problem using remote maintenance.

Syntax

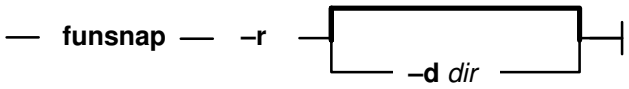
To Gather Information

funsnap [**–l** *AdapterName*]] [**–g**] [**–D**] [**–c**] [**–o** *OutputDevice*] [**–d** *dir*]



To Remove Old Information

funsnap –r [**–d** *dir*]



Description

This command gathers information about HiSpeed WAN Comm. adapters. The information (products and releases installed, card configuration parameters, card memory dump, etc..) is stored in files. These files may be compressed and saved in a **tar** format on a diskette or a streamer.

Flags

–l *AdapterName*
: The *AdapterName* parameter is in the form `fun<n>` where `n` is the number of a HiSpeed WAN Comm. adapter. If none, all the adapters are processed.

–g
: Gathers information and generates snap-files.
Default parameter, if the options **–c** and **–o** are not used.

–D
: Dumps adapter and produces debug information. It obtains more detailed information than **–g.**

–c
: Creates **tar** file.

–o *OutputDevice*
: Outputs information on the *OutputDevice.*

–d *dir*
: Creates the snap-files in the *dir* directory (the default directory is /**tmp**/**datfun**).

–r
: Removes old snap-files.

Examples

1. `funsnap -l fun0 -c -g -D -o /dev/rfd0`

   Gathers information about system and adapter `fun0`, generates snap-files in **/tmp/datfun**, creates a **tar** file from snap-files and sends it on the `rfd0` device.

2. `funsnap -r`

   Cleans the **/tmp/datfun** directory by removing the existing snap–files.

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Files

Snap-files created by default in the **/tmp/datfun** directory or in a specified directory. These files are exploited by Bull Technical Support.

conf/mcfut.load
conf/mcfut.map
conf/mcfutx.conf
conf/mcfutb.load
conf/mcfutb.map
conf/mcfutbx.conf
conf/mcfuthd2.load
conf/mcfuthd2.map
conf/mcfuthd2x.conf
conf/mcfuthd4.load
conf/mcfuthd4.map
conf/mcfuthd4x.conf
conf/atrfut.load
conf/atrfut.map
conf/atrfutx.conf
dump/fun.snap.1
general/fun.snap.fun
general/fun.snap.gen
general/README.fun#
general/BUS.out.bus0
general/BUS.out.bus1

Suggested Reading

Prerequisite Information

HiSpeed WAN Comm. Maintenance Tools.

HiSpeed WAN Comm. Adapter and Port Numbering.

funstat Command

Purpose

Display of HiSpeed WAN Comm. adapter operating state and statistics.

Syntax

funstat [**–n**] **–l** *AdapterName*

Description

The **funstat** command displays HiSpeed WAN Comm. adapter operating state and statistics.

Flags

–l *AdapterName*

The *AdapterName* parameter is in the form `fun<n>` where `n` is the number of a HiSpeed WAN Comm. adapter.

–n Verifies the availability of the bullx25 software license.

Examples

1. Displays fun0 adapter operating state and statistics

```
funstat -l fun0
```

```
board fun0: configured, loaded, running
Total nb of buffers:                    17900
Nb of used buffers:                     1024    (5.72%)
Max nb of used buffers:                 1037    (5.79%)

Total nb of messages:                   256
Max nb of messages in send queue:       3       (1.17%)
Max nb of messages in received queue:   2       (0.78%)

Total nb of sent messages:              11362
Total nb of received messages:          11288

Error code of the board:                0
```

2. Displays bullx25 license availability and fun0 adapter operating state and statistics

```
funstat -n -l fun0
```

```
Verification of the license mechanism:
The license verification mechanism is OK
The license is available (X25 Software, vrsn 02, id 1005)
```

```
board fun0: configured, loaded, running,
Total nb of buffers:                    3119
Nb of used buffers:                     200     (6.41 %)
Max nb of used buffers:                 208     (6.67 %)

Total nb of messages:                   2
Max nb of messages in send queue:       2       (100.00 %)
Max nb of messages in received queue:   1       (50.00 %)

Total nb of sent messages:              60
Total nb of received messages:          36

Error code of the board:                0
```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

Prerequisite Information

HiSpeed WAN Comm. Maintenance Tools.

HiSpeed WAN Comm. Adapter and Port Numbering.

Related Information

The **x25dstat** command.

genconf Command

Purpose

Generates current configuration of a HiSpeed WAN Comm. adapter (ODM information).

Syntax

genconf –l *AdapterName*

Description

The **genconf** command updates the file describing the configuration of the corresponding HiSpeed WAN Comm. adapter. This file is later used when reloading the adapter.

If the command is completed successfully, a value of 0 is returned.
If the command fails, a value of –1 is returned.

Root authority is required to use the **genconf** command.

Flags

–l *AdapterName*

The *Adapter* parameter is in the form `fun<n>` where `n` is the number of a HiSpeed WAN Comm. adapter.

Example

```
genconf -l fun0
```

update or create the file /etc/fun/mcfuthd41.conf

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Files

Configuration files are generated in /etc/fun directory

/**etc**/**fun**/**mcfut***(x+1)***.conf** for the 1Port HiSpeed WAN Comm. adapter designated as **fun***x*
/**etc**/**fun**/**mcfut***(bx+1)***.conf** for the 1Port HiSpeed WAN Comm–B adapter designated as **fun***x*
/**etc**/**fun**/**mcfuthd4***(x+1)***.conf** for the 4Port HiSpeed WAN Comm. adapter designated as **fun***x*

/**etc**/**fun**/**atrfut***(x+1)***.conf** for the 1Port WAN Comm Adapter (ISA) designated as **fun***x.*

Suggested Reading

Prerequisite Information

HiSpeed WAN Comm. Adapter and Port Numbering.

Related Information

Generate Current Configuration for HiSpeed WAN Comm. Adapter.

Load HiSpeed WAN Comm. Adapter with Last Generated Configuration.

The **funload** command.

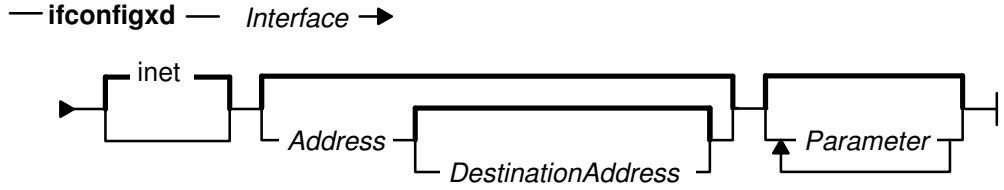
ifconfigxd Command

Purpose

Configures or displays network interface parameters for a network using TCP/IP on HiSpeed WAN Comm. adapter.
The **ifconfigxd** command has to be used instead of **ifconfig** command when using HiSpeed WAN Comm. adapters.

Syntax

ifconfigxd *Interface* [[inet] [*Address* [*DestinationAddress*]] [*Parameter ...*]]



Description

The **ifconfigxd** command can be used from the command line either to assign an address to a network interface or to configure or display the current network interface configuration information. The **ifconfigxd** command must be used at system startup to define the network address of each interface present on a machine. It can also be used at a later time to redefine an interface's address or other operating parameters. The network interface configuration is held on the running system and must be reset at each system restart.

A HiSpeed WAN Comm. interface can receive transmissions only from the DARPA-Internet (**inet**) family (**xns** is not supported).

For the DARPA-Internet family, **inet**, the address is either a host name present in the hostname database, that is, the /**etc**/**hosts** file, or a DARPA Internet address expressed in the Internet standard dotted decimal notation.

Note: While any user can query the status of a network interface, only a user who has root authority can modify the configuration of those interfaces.

Parameters

Interface — Mandatory parameter. It specifies the network interface whose configuration is to be displayed or changed. It must be in the format: xd followed by a numeral, for instance `xd0`.

inet — Optional parameter which specifies that the supported address family is **inet**.

Address — Specifies the network address for the network interface. It is either a host name or an Internet address in the standard dotted decimal notation.

DestinationAddress
Specifies the address of the correspondent on the remote end of a point-to-point link.

Parameter — Allows the following parameter values:

up
Marks an interface as active (**up**).
This parameter is used automatically when setting the first address for an interface. It can also be used to enable an interface after an **ifconfigxd down** command.

down
Marks an interface as inactive (**down**), which keeps the system from trying to transmit messages through that interface. If possible, the **ifconfigxd** command also resets the interface to disable reception of messages. Routes that use the interface, however, are not automatically disabled.

mtu *Value*
Sets the maximum IP packet size for this system.
The *Value* variable can be any number from 60 through 4096, depending on the network interface. The default value is 576.

detach
Removes an interface from the network interface list.
If the last interface is detached, the network interface driver code is unloaded.

netmask *Mask*
Specifies how much of the address to reserve for subdividing networks into subnetworks. The *Mask* variable includes both the network part of the local address and the subnet part, which is taken from the host field of the address. The mask can be specified as a single hexadecimal number beginning with 0x, in standard Internet dotted decimal notation, or beginning with a name or alias that is listed in the /etc/networks file.
The mask contains 1's (ones) for the bit positions in the 32-bit address that are reserved for the network and subnet parts, and 0s (zeros) for the bit positions that specify the host. The mask should contain at least the standard network portion, and the subnet segment should be contiguous with the network segment.

arp | **–arp**
Enables | Disables the **ifconfigxd** command to use the Address Resolution Protocol in mapping between network-level addresses and link-level addresses. This flag is in effect by default.

debug | **–debug**
Enables | Disables driver-dependent debug code.

Examples

1. To query the status of a HiSpeed WAN Comm. IP interface, enter the command in the following format:

   ```
   ifconfigxd xd0
   ```

   In this example, the interface to be queried is `xd0`. The result of the command looks similar to the following:

   ```
   xd0: flags=60<NOTRAILERS,RUNNING>
         inet 200.251.0.30 netmask 0xffffff00
   ```

2. To configure a HiSpeed WAN Comm. adapter interface, enter the command in the following format:

   ```
   ifconfigxd xd0 inet 200.251.0.30 up
   ```

3. To mark a HiSpeed WAN Comm. interface as down, enter the command in the following format:

   ```
   ifconfigxd xd0 inet down
   ```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

Prerequisite Information

Understanding Network Interfaces for TCP/IP.

Understanding Protocols for TCP/IP.

Understanding Routing for TCP/IP.

Understanding Addresses for TCP/IP.

Understanding Subnet Addresses for TCP/IP

in *Communication Concepts and Procedures*.

Related Information

TCP/IP Configuration on HiSpeed WAN Comm.

The **x25dstat** command.

The **hosts** and **networks** file formats.

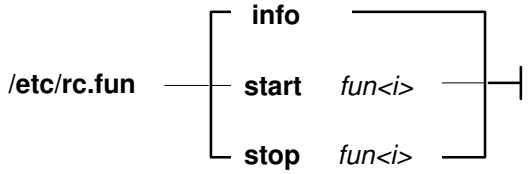
rc.fun Command

Purpose

Displays information about the usage of X25 HiSpeed WAN Comm. adapter or enables to stop all the applications using a X25 HiSpeed WAN communication adapter.

Syntax

/etc/rc.fun info | **start** *fun<i>* | **stop** *fun<i>*



Description

- **rc.fun info** displays the state ('defined' or 'available') of every X25 HiSpeed WAN communication adapter device and lines, together with the list of currently running X25 users (X25 tools, commuications stacks like OSI stack, TCP/IP, SNA and HVX, XX25 applications).
- **rc.fun start** turns the state of the device *fun<i>* from 'defined' to 'available'.
- **rc.fun stop** checks which applications are using the specified X25 adapter, tries to stop them and turns the adapter to the 'defined' state.

Examples

Command:

```
/etc/rc.fun info
```

Response:

```
Checking boards and lines ...
fun0    Available 00-02 4port Hispeed WAN Comm Adapter
x25l0   Available 00-02-01-00   Hispeed WAN Comm Adapter Line
x25l1   Available 00-02-01-01   Hispeed WAN Comm Adapter Line
x25l2   Available 00-02-01-02   Hispeed WAN Comm Adapter Line
x25l3   Available 00-02-01-03   Hispeed WAN Comm Adapter Line

fun1    Available 00-13 1port Hispeed WAN Comm Adapter - B
x25l4   Available 00-13-00      Hispeed WAN Comm Adapter Line

Checking the processes...
All the processes listed below may use or not one or more lines

OSI stack...
  root 7434     1 0 09:27:39    - 0:00 /usr/sbin/dat_x25
TCP-IP
  root 6350     1 0 17:41:44    - 0:00 /etc/datx25tcpd
```

x25dxlate Command

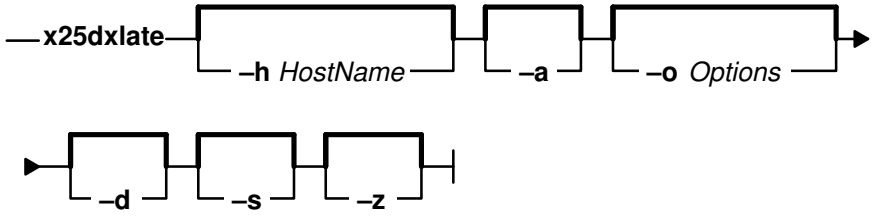
Purpose

Updates or displays translate information in the IP/X.25 HiSpeed WAN Comm. translate table.

The **x25dxlate** command has to be used instead of **x25xlate** command when using HiSpeed WAN Comm. adapters.

Syntax

x25dxlate [**–h** *HostName*] [**–a**] [**–o** *Options*] [**–d**] [**–s**] [**–z**]



Description

The **x25dxlate** command updates or displays IP/X25 translate information. The translate table allows Internet addresses used by the Internet Protocol (IP) to be mapped to specific X.25 virtual circuits with specific X.25 circuit characteristics. New entries and updates to existing entries are written to or deleted from the IP/X.25 High Performance translate table. This is only valid for IP over an HiSpeed WAN Comm. adapter.

Note: Users must have root authority to issue the **x25dxlate** command.

The **x25dxlate** command uses the **gethostbyname** subroutine to obtain the IP address of a specified host. Therefore, the host name specified must exist in the /**etc**/**hosts** file or be retrievable from a name server.

If the command is completed successfully, a value of 0 is returned.
If the command is unsuccessful, a value of –1 is returned.

The IP/X25 HiSpeed WAN Comm. translate table can be updated using the System Management Interface Tool (SMIT).

Flags

–a Adds or changes the specified options for the given host name.

–d Deletes the specified host.

–h *HostName* Specifies the host name to use for add, delete and show flags.

–o *Options* Specifies options for the given host name. Valid values are:

vc_type
Specifies the X.25 virtual circuit type. The two valid values are:
1 for a switched virtual circuit (SVC),
2 for a permanent virtual circuit (PVC).

The parameters for SVC and PVC are as follows:

SVC Parameters (vc_type=1)

remote_dte
Specifies the X.25 address of the remote DTE. Valid values consist of 1 to 15 ASCII decimal digits (X.121 address).

port_num
Specifies the HiSpeed WAN Comm. port number to be used for the SVC. Valid values are 0 through 31.

rcv_wndsiz
Specifies the maximum receive window size to be used with the virtual circuit. Valid values are 1 through 127.

xmit_wndsiz
Specifies the maximum transmit window size to be used with the virtual circuit. Valid values are 1 through 127.

rcv_pktsiz
Specifies the maximum receive packet size to be used with the virtual circuit. Valid values are 16, 32, 64, 128, 256, 512, 1024, 2048, 4096.

xmit_pktsiz
Specifies the maximum transmit packet size to be used with the virtual circuit. Valid values are 16, 32, 64, 128, 256, 512, 1024, 2048, 4096.

callusr_data
Specifies the optional user-defined facilities to be used in the call request packet. Valid values consist of 1 through 16 HEX digits, with digit values 0 through F.

cug_indx
Specifies the closed user group index to be used with the closed user group facility. Valid values are 0 through 9999.

cug_indxout
Specifies the closed user group index to be used with the closed user group outgoing access facility. Valid values are 0 through 9999.

PVC Parameters (vc_type=2)

logical_chann
Specifies the X.25 logical channel to be used for the PVC. Valid values are 1 through 4095.

–s Shows current options for the given host or displays a list of host names.

–z Displays output in dotted decimal format. This flag is not normally used if the command is issued from the command line.

Examples

1. To initialize the IP/X.25 HiSpeed WAN Comm. translate table, issue the following command:

   ```
   x25dxlate
   ```

2. To show the current IP/X25 HiSpeed WAN Comm. translate values for host `node1`, issue the following command:

   ```
   x25dxlate -h node1 -s
   ```

3. To add options to the host `node2`, issue the following command:

   ```
   x25dxlate -h node2 -a -ovc_type=1,port_num=0,remote_dte=310601064
   ```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

Prerequisite Information

X.25 Introduction.

Understanding Network Interfaces for TCP/IP.

Understanding Naming for TCP/IP in *Communication Concepts and Procedures*.

Related Information

TCP/IP on HiSpeed WAN Comm. Configuration.

The **gethostbyname** command.

The **hosts** file format.

x25dstat Command

Purpose

Displays HiSpeed WAN Comm. device driver statistics.

Syntax

x25dstat

Description

The **x25dstat** command displays the HiSpeed WAN Comm. device driver statistics. It is similar to the '**netstat –v**' command for the other device drivers. The statistics are given for all the configured HiSpeed WAN Comm. ports.

Display

Details about transmitted and received network and error data

`Transmitted/Received Data Bytes`
Specifies the total number of bytes correctly transmitted/received

`Transmitted/Received Data Packets`
Specifies the total number of packets correctly transmitted/received

`Transmitted/Received Received-Ready Packets`
Specifies the number of Received-Ready packets transmitted/received

`Transmitted/Received Received-Not-Ready Packets`
Specifies the number of Received-Not-Ready packets transmitted/received

`Transmitted/Received Reset Packets`
Specifies the number of Reset packets transmitted/received

`Transmitted/Received Call Packets`
Specifies the number of Call packets transmitted/received

`Transmitted/Received Clear Packets`
Specifies the number of Clear packets transmitted/received

`Transmitted/Received Information Frames`
Specifies the number of Information frames correctly transmitted/received

`Transmitted/Received Received-Ready Frames`
Specifies the number of RR frames correctly transmitted/received

`Transmitted/Received Received-Not-Ready Frames`
Specifies the number of RNR frames correctly transmitted/received

`Transmitted/Received Reject Frames`
Specifies the number of REJ frames correctly transmitted/received

`Transmitted/Received Frame Reject Errors`
Specifies the number of reject frames errors

Example

```
X.25 Statistics (x25l2)
                                                Transmitted        Received
Data Bytes                                                0             256
Data Packets                                              0               2
Receive-Ready Packets                                     2               2
Receive-Not-Ready Packets                                 0               0
Rest Packets                                              0               0
Call Packets                                              1               0
Clear Packets                                             0               1
Information Frames                                        5               7
Receive-Ready Frames                                   1047            1045
Receive-Not-Ready Frames                                  0               0
Reject Frames                                             0               0
Frame Reject Errors                                       0
```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

Prerequisite Information

X.25 Introduction.

HiSpeed WAN Comm. Maintenance Tools.

Related Information

The **netstat** command.

xdclear Command

Purpose

Clears the current configuration of a HiSpeed WAN Comm. line.

Syntax

xdclear –l *PortName*

Description

The **xdclear** command sets to their default values all the parameters:

- Physical Parameters
- Frame Parameters
- Network Parameters
- Default PVC Parameters
- Specific PVC Parameters
- Incoming Calls Routing

related to a HiSpeed WAN Comm. line.

Note: This may be useful before reconfiguring a HiSpeed WAN Comm. line.

Note: Users must have root authority to issue the **xdclear** command.

Flags

–l *PortName* Specifies the HiSpeed WAN Comm. line.

Examples

```
xdclear -l x25l0
```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

Prerequisite Information

HiSpeed WAN Comm. Adapter and Port Numbering

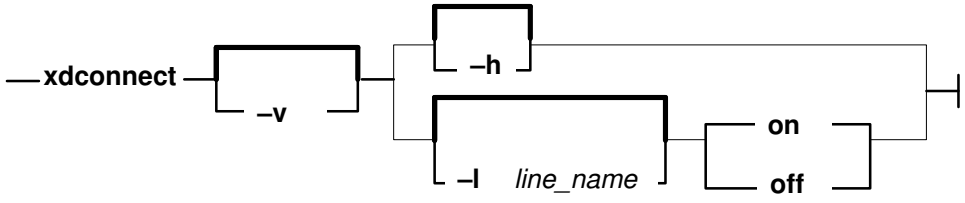
xdconnect Command

Purpose

Displays or changes the status of a HiSpeed WAN Comm. line.

Syntax

xdconnect [**–v**] { **–h** | **–l** *line_name* [”**on**” | ”**off**”] }



Description

The **xdconnect** command enables the administrator to change the set_up mode and display the status of a HiSpeed WAN Comm. line.

A line can be set–up (connect) or set–down (disconnect) according to the entered value (respectively ”**on**” or ”**off**”). As in this case the command runs in asynchronous mode, there is no response associated to the request. Therefore it is advisable to run the command in verbose mode (**–v** option) or to run a second command a few seconds later to get the state of the line.

If the verbose mode is set, a message is displayed on stdout. This message may be:

”connected”

”connect in progress”

”disconnect”

”restart in progress”

”unknown”

The command can be launched without any restriction and repeated more than once with different parameters.

Root authority is needed to use the **xdconnect** command.

Flags

–l *line_name* Displays the status of the HiSpeed WAN Comm. line *line_name.*

–l *line_name* **on**
Starts the X25 activity on *line_name.*

–l *line_name* **off**
Stops the X25 activity on *line_name.*

–v Sets the verbose mode.
The current state of the X25 layer is printed on stdout.

–h Used to display usage of the command.

line_name [x25]xx with xx in the range [0–31].

Exit Status and Returned errors

The command returns the following exit values:

0 Successful completion.

value>0 An error occured and a message is displayed on stderr.

The list of the returned errors, if this command is used in a shell script, is given below:

E_SYSTEM	1	root id expected.
E_ODMGET	6	adapter not found
E_ARGS	11	illegal option
E_OPEN	12	open failed
E_LNAME	13	Incorrect name
E_INVATTR	17	Error message received
E_NOATTR	33	Error message received
E_BADATTR	34	Error message received
E_DEVACCES	47	Driver access failed
E_STAT	57	The line is not available

Examples

1. To display the status of the line *x25l0:*

   Command:

   ```
   xdconnect -l x25l0
   ```

   Response:

   ```
   x25l0 set-up mode    : automatic
   x25l0 current state  : disconnected
   ```

2. To start a line *x25l0:*

   Command:

   ```
   xdconnect -v -l x25l0 on
   ```

   Response:

   ```
   x25l0 current state  : connected
   ```

3. To stop a line *x25l0:*

   Command:

   ```
   xdconnect -v -l x25l0 off
   ```

   Response:

   ```
   x25l0 current state  : disconnected
   ```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Suggested Reading

HiSpeed WAN Comm. Maintenance Tools.

HiSpeed WAN Comm. Adapters and Port Numbering

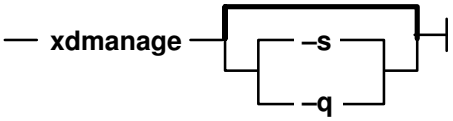
xdmanage Command

Purpose

Provides first level assistance to the network administrator to solve problems which may occur on X.25 networks.

Syntax

xdmanage [**–q** | **–s**]



Description

The **xdmanage** command is an interactive tool which displays information about **HiSpeed WAN Comm.** ports

- state (connected or disconnected) of layers 1, 2 and 3 of the X.25 lines,
- X.25 traffic monitoring relative to layers 2 and 3 of the X.25 lines (interactive call of the **xdmonitor** command).

and performs connection and deconnection of the line.

Root authority is required to use the **xdmanage** command.

Flags

–q Displays the title panel for 2 seconds.

–s Does not display the title panel.

Examples

To start the **xdmanage** command, enter:

```
xdmanage
```

Implementation Specifics

This command is part of bullx25, HiSpeed WAN Comm. Software.

Files

/usr/bin/xdmg.stat
Contains a shell script that redirects statistics output to a file

/usr/bin/xdmg.mon
Contains a shell script that creates monitoring output

/usr/bin/xdmg.view
Contains a shell script that enables you to view monitoring output

./PortName.**statlog**
Names the statistics output file, where the *PortName* variable is the name of the port for which the statistics are reported.

Suggested Reading

Prerequisite Information

X.25 Introduction.

HiSpeed WAN Comm. Maintenance Tools.

HiSpeed WAN Comm. Adapter and Port Numbering.

Related Information

The **xdmonitor** command.

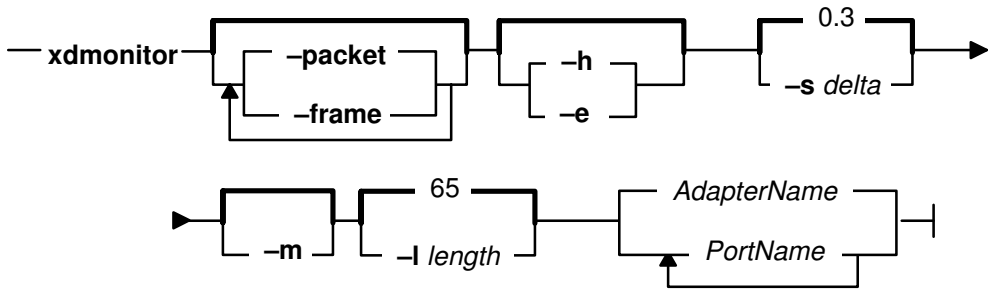
xdmonitor Command

Purpose

Enables monitoring of the X.25 traffic on a HiSpeed WAN Comm. adapter or on one or several ports of a HiSpeed WAN Comm. adapter.

Syntax

xdmonitor [**–packet**] [**–frame**] [**–h**] [**–e**] [**–s** *delta*] [**–m**] [**–l** *length*]
AdapterName | *PortName*



Description

The **xdmonitor** command enables you to monitor packet-level or frame-level activity (or both) on the named HiSpeed WAN Comm. adapter or ports.

The monitoring data are redirected on standard output.The **xdmonitor** command is stopped by typing Ctrl-C.

Specify the one or more *PortName* parameters (in the form **x25l**<**n**>) corresponding to the HiSpeed WAN Comm. ports you want to monitor, or specify the *AdapterName* (in the form **fun**<**n**>) corresponding to the adapter you want to monitor.

Root authority is required to use the **xdmonitor** command.

Flags

–packet	Starts packet-level monitoring. If neither **–packet**, nor **–frame** are entered, packet-level monitoring is started by default.
–frame	Starts frame-level monitoring.
–h	Displays packets and frames in hexadecimal.
–e	The display is extended.
–s *delta*	The sampling is done every delta seconds (0.3 second by default).
–m	Allows traces to be displayed in frames modulo 128 instead of 8.
–l *length*	Allows the length of traces to be modifyed (default = 65, min = 17, max = 513).

Examples

1. To monitor packet-level activity on port `x25l1`, enter:

   ```
   xdmonitor x25l1
   ```

2. To monitor frame-level activity on port `x25l2` and `x25l3` with a sampling time of 3 seconds, enter:

   ```
   xdmonitor –frame –s 3 x25l2 x25l3
   ```

3. To monitor frame- and packet-level activity on adapter `fun0` with an extended display, enter:

```
xdmonitor -frame -packet -e fun0
```

Example of displayed data in case of a call request packet with facilities and user data:

```
 Time  Link  Way  Lcn  Size Type PR PS DQM Errs Len  Parameters
10:45:29  3  -->   02  19   CALL               14   xyf[PsMk]u
      | (CALL) Call Request (or Incoming Call)
      | (x) Calling DTE address = 654321
      | (y) Called DTE address  = 12345
      | (f) Facilities
      |     (Ps) Packet size negociation
      |          From called DTE   = 128 bytes
      |          From calling DTE  = 128 bytes
      |     (Mk) Marker transpac
      | (u) Call User Data
      |     1 bytes
      |     02
```

4. To monitor packet-level activity on port `x25l2` with a trace length equal to `21` and on port `x25l3` with a trace length equal to `87`, enter:

```
xdmonitor -l 21 x25l2 -l 87 x25l3
```

Warning:
A slow display, such as an ASCII terminal, may fail to keep pace with output from the **xdmonitor** command. If running on a slow display, direct the output to a file to prevent disruption of data transfer.
There may be loss of data in case of high clock rate.

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Files

/usr/bin/xdmg.mon
: Contains a shell script that creates monitoring output.

/usr/bin/xdmg.view
: Contains a shell script that enables you to view monitoring output.

./PortName.trclog
: Specifies the monitoring output file, where the *PortName* variable names the HiSpeed WAN Comm. port.

/tmp/xdmonitorb<n>.lock
: Lock file used by **xdmonitor** to have only one xdmonitor call on a same HiSpeed WAN Comm. adapter at a time. **n** is the HiSpeed WAN Comm. adapter number.

Warning: This lock file has to be specifically removed in case of break of the **xdmonitor** command.

Suggested Reading

Prerequisite Information

X.25 Introduction.

HiSpeed WAN Comm. Maintenance Tools.

HiSpeed WAN Comm. Adapter and Port Numbering.

Related Information

The **xdmanage** command.

xdping Command

Purpose

Sends an echo request from one HiSpeed WAN Comm. link to another one.

No communication stack (OSI or TCP/IP) need be active.

Syntax

Test between two HiSpeed WAN Comm. Access Points

On server

xdping –r *nua*

On client

xdping –l *nua* **–r** *remote_nua* [**–s** *packet_size*]

Loopback Test on a single HiSpeed WAN Comm. Access Point

xdping –l *nua* [**–s** *packet_size*]

Description

The **xdping** command is useful to:

- test the X.25 subscription configuration, that is determine whether the X.25–2 and X.25–3 parameters of a HiSpeed WAN Comm. link are compatible with the subscription parameters provided by the public network operator,
- track and isolate hardware and software problems on a HiSpeed WAN Comm. line.

Two kinds of tests can be run:

- Test between two HiSpeed WAN Comm. access points:
  - a HiSpeed WAN Comm. link is used as server, its X.121 address is specified as *nua*,
  - the other HiSpeed WAN Comm. link is used as client, its X.121 address is specified as *nua* and the server X.121 address is specified as *remote_nua*.

  The server waits for an incomming call, then sends back on the opened SVC all data packets received and dies when it receives a clear indication.

  The client establishes an SVC, sends and receives data until an interrupt is received (Ctrl C). Then it sends a clear request and dies.
  For each data packet sent and received, duration and sequence number are displayed.
  At the end, the minimum, maximum and average values are displayed.

  If an SVC cannot be established, the cause and diagnostic fields of the clear indication are displayed according to ISO8208 standard.
- Loopback test on a single HiSpeed WAN Comm. access point:

  The HiSpeed WAN Comm. link is used as server and client on the same subscription, its X.121 address is specified as *nua*.

  A loopback test can be run only in case of a subscription allowing loopback calls, such as French TRANSPAC network.

Note: Only one **xdping** command can be run at a time.

Flags

–l *nua* X.121 address of the local subscription.

–r *nua* or *remote_nua*
nua = X.121 address of the local subscription (on server)
remote_nua = X.121 address of the remote subscription (on server).

–s *packet_size* Specifies the data packet size to be sent.
(The default value is 128, the range of values is 1 to 4096).

Examples

1. Test between two HiSpeed WAN Comm. access points:

   On server:

```
# xdping -r 54321
Getting ODM parameters....done
Starting server....done
Waiting for connection...done
#
```

   On client:

```
# xdping -l 13800991301 -r 13800990201
Getting ODM parameters....done
Connecting to 13800990201 from 13800991301...done
S/R of 128 bytes - seq :    0 time:   42 ms
S/R of 128 bytes - seq :    1 time:  356 ms
S/R of 128 bytes - seq :    2 time:  200 ms
S/R of 128 bytes - seq :    3 time:   37 ms
S/R of 128 bytes - seq :    4 time:  115 ms
S/R of 128 bytes - seq :    5 time:  245 ms

6 packets transmitted, 6 packets received, 0% packet loss
round-trip min/avg/max = 37/165/356 ms
#
```

2. Loopback test on a single HiSpeed WAN Comm. access point:

```
# xdping -l 13808088207
Getting ODM parameters....done
Starting Server....done
Connecting to 13808088207 from 13808088207...done
S/R of 128 bytes - seq :    0 time: 1254 ms
S/R of 128 bytes - seq :    1 time: 1214 ms
S/R of 128 bytes - seq :    2 time: 1223 ms
S/R of 128 bytes - seq :    3 time: 1232 ms
S/R of 128 bytes - seq :    4 time: 1215 ms
S/R of 128 bytes - seq :    5 time: 1197 ms
S/R of 128 bytes - seq :    6 time: 1223 ms
S/R of 128 bytes - seq :    7 time: 1194 ms
S/R of 128 bytes - seq :    8 time: 1192 ms
S/R of 128 bytes - seq :    9 time: 1190 ms
S/R of 128 bytes - seq :   10 time: 1188 ms
S/R of 128 bytes - seq :   11 time: 1185 ms
S/R of 128 bytes - seq :   12 time: 1177 ms
S/R of 128 bytes - seq :   13 time: 1172 ms
S/R of 128 bytes - seq :   14 time: 1180 ms

15 packets transmitted, 15 packets received, 0% packet loss
round-trip min/avg/max = 1172/1202/1254 ms
#
```

Implementation Specifics

This command is part of bullx25, **HiSpeed WAN Communications** Software.

Glossary

1Port HiSpeed WAN Comm.
1 Port High Performance X.25 Adapter

4Port HiSpeed WAN Comm.
4 Ports High Performance X.25 Adapter

A

adapter
See *communication adapter*

addressing
In data communications, the way in which a station selects the station to which it is to send data

B

Bull DPX/20 system
System of the Bull DPX/20 family, on which the HiSpeed WAN Comm. adapters may be installed

bullx25
HiSpeed WAN Comm. Software package

C

CCITT
Comité Consultatif International Télégraphique et Téléphonique

charging requesting service
Optional facility which specifies that charging information (segment count data, monetary unit data, or call duration data) is required

Closed User Group
Group of users who can communicate with other users in the group, but not with users outside the group. The CUG selection facility allows the DTE to specify which CUG it will be working with

communication adapter
Electronic circuit board with associated software which enables a processor, controller or other device to be connected to a network

CUG
Closed User Group

D

data packet
At the interface between a DTE and a DCE, a packet used to transmit user data over a virtual circuit

Data Terminal Equipment
Equipment which uses the network for communications

Data Circuit-Terminating Equipment
Equipment which provides access to the network, that is: establishes, maintains and ends the connections

Note: In a public network, a DTE is a user equipment which has information to communicate with another DTE, whereas a DCE is an equipment which provides DTEs with access to the network.

DCE
Data Circuit-Terminating Equipment

DTE
Data Terminal Equipment

F

facility
See *optional facilities*

fast select
Option of a virtual call facility which allows inclusion of data in call-setup and call-clearing packets

frame
Contiguous sequence of eight-bit bytes delimited by beginning and ending flags. Frames are used to perform control functions, data transfers and transmission checking on the link

frame layer
See *link layer*

frame window
Number of frames which can be outstanding without acknowledgment

H

HDLC
High-level Data Link Control

HiSpeed WAN Comm.
High Performance X.25 Adapter family. It includes the 4Port HiSpeed WAN Comm. and 1Port HiSpeed WAN Comm. adapters.

L

LAPB
Link Access Protocol Balanced. Synchronous and full-duplex procedure used in point-to-point communication. Once a link is started, either station can transfer information on its own initiative without waiting for permission from the other

link layer
Is responsible for the reliable transfer of blocks of data across the physical layer. It provides error detection, flow control and sequencing of blocks of data provided by and delivered to the network layer.

logical channel number
Number identifying the virtual circuit which is used by a DTE to communicate with another DTE. It is included in each packet sent

N

packet layer
Manages the establishment, maintenance and termination (routing) of connections while providing the upper layer with independence from the the data transmission and switching functions used to connect systems.

Network User Address
Number which identifies an X.25 line

NUA
Network User Address

O

optional facilities
Facilities which may or may not be offered by the network provider and to which customers choose whether or not to subscribe. See *Closed User Group*, *fast select*, *reverse charging* and *throughput-class negotiation*.

P

packet
Sequence of binary digits, including data and control signals, which is transmitted and switched as a whole. Independent unit which can be sent through any suitable path in the network.

packet layer
See *Network layer*

packet-switching network
In a packet-switching network, the data to be transmitted is combined in a packet with addressing and control information. The packets of many different communications can share the same physical routes and lines in the network.

packet window
Number of packets which can be outstanding without acknowledgement.

permanent virtual circuit
A virtual circuit which is permanently established between two DTEs. It ties up a logical channel permanently.

physical layer
Handles the mechanical, electrical and functional characteristics to access and transmit the bit stream over the physical medium. It activates, maintains and de-activates the physical circuit between a DTE and a DCE.

protocol
Set of semantic and syntactic rules which determines the behaviour of functional units in achieving communication

PVC
Permanent Virtual Circuit

R

reverse charging
Optional facility which allows a DTE to request that the cost of a call it makes, be charged to the called DTE

routing
1. The assignment of the path by which a message reaches its destination.
2. In X.25 the process by which a packet gets to the intended user.

S

SMIT
System Management Interface Tool

SPI
Subsequent Protocol Identifier. Used for routing incoming calls.

Subscribe
Rent an X.25 line to a network provider, specifying the required facilities

SVC
Switched Virtual Circuit

switched virtual circuit
A virtual circuit which exists only for the duration of the call, acting like a connection over the normal telephone network

T

TCP/IP
Transmission Control Protocol/Internet Protocol. A communications subsystem which allows to set up local area (LAN) and wide area (WAN) networks.

throughput class negotiation
Optional facility which allows a DTE to negotiate the speed at which its packets travel through the packet-switching network.

V

virtual call facility
User facility in which a call setup procedure and a call clearing procedure determine a period of communication between two DTEs during which user data is transferred in the network in the packet mode of operation.
All user data is delivered from the network in the order it is received by the network. It is the packet network equivalent of a dialled line.

virtual circuit
A logical connection established between two DTEs

W

window
Number of data packets a DTE or DCE can send across a logical channel before waiting for authorization to send another data packet. The window is the main mechanism of flow control of packets.

X

X.25
In data communication, a recommendation of the CCITT which defines the interface between DTE and packet-switching network.

X.25 network
A service providing packet-switched data transmission which conforms to Recommendation X.25.

X.25 line
Physical link between the DTE and the DCE, and the service used

Index

A

C

D

E

F

G

H

I

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