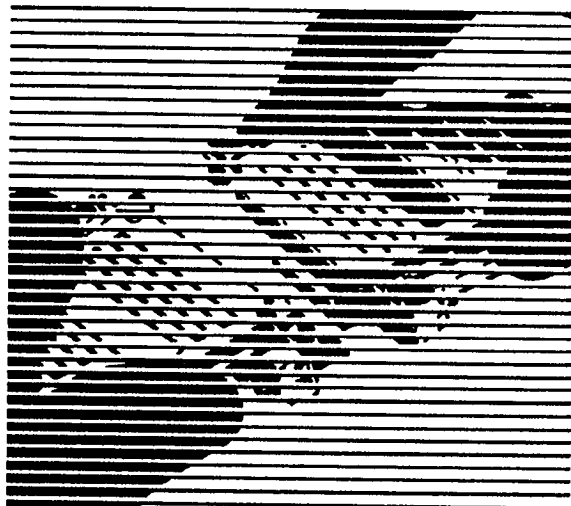6400 Flying Cloud Drive
Eden Prairie, MN 55344
(612) 943-9020

DigiBoard, GmbH
Schmittgasse 64
51143 Köln
Germany
49-2203-81083

**Operation
Manual**

for

**DigiBoard® SyncPort/X25R™
for the
DigiBoard SyncPort/X.25R™ Host Adapter
DBI 90028900A**

Table of Contents

Continues...

Continues...

DigiBoard Bulletin Board System

DigiBoard provides an electronic bulletin board service (BBS) for our customers. This bulletin board provides general and technical information about DigiBoard's products. The DigiBoard BBS allows users to download software drivers as soon as they become available. There is also a feature to allow users with problems or questions about DigiBoard products to leave priority messages to DigiBoard Technical Support.

Using the DigiBoard BBS is easy. Simply dial **(612) 943-0812** (9600 baud) or **(612) 943-4002** (1200, 2400 baud). The bulletin board accepts calls at 1200, 2400 or 9600 baud. V.32, HST 14.4, V.42 and V.42bis standards are supported, with full MNP class 1-5 error correction and data compression. The preferred modem communications parameters are 8 bits, no parity and one stop bit (8 N 1). Other settings may also work.

Download protocols include Zmodem, Xmodem, Ymodem, Kermit and others.

Internet FTP Server

DigiBoard has also set up an Anonymous FTP server for those with access to the Internet network. The address is **ftp.digibd.com (192.83.159.193)**. Drivers and installation tips are located in the **/digiline** directory.

DigiFAX Fax-Back Server

Technical information can also be obtained by fax. To use the Fax-Back server, simply call (612)-943-0447 on a touchtone phone.

DigiBoard Technical Support

If you experience difficulties with your SyncPort/X.25R™ Adapter, DigiBoard has a staff of technical support specialists who can help you. They can be reached at **(612) 943-9020.** (In Europe, call 49-2203-81083.)

When you call DigiBoard Technical Support, please call from a position where you can operate your system. Also, please fill out the form on the next page before calling, so your Technical Support representative can have a clear picture of your system and any potential conflicts between devices.

DigiBoard Technical Support can also be reached via Internet E-mail. Please send correspondences to **support@digibd.com**, and include your voice and FAX phone numbers.

DigiBoard Customer Service

DigiBoard also has a staff of Customer Service representatives to help you with software and documentation update requests, as well as Returned Merchandise Authorizations (RMAs) in case you need to return your board to DigiBoard for repair (see page *ix*). They can be reached at **(612) 943-9020.**

DigiBoard Customer Service can also be reached via Internet E-mail, at **cust_serv@digibd.com**. Include your voice and FAX phone numbers.

Technical Service Information

Please assist your Technical Support representative by filling in the following information:

Serial number of your SyncPort/X.25R adapter board:
_____

Make, model and clock speed of your computer: _____

How much RAM does your computer have? _____ MB

Hard disk controller: Type:_____   Memory addressed at: _____
                         I/O port used: _____   IRQ: _____

LAN card: Type:_____   Memory addressed at: _____
                         I/O port used: _____   IRQ: _____

Other: Type: _____   Memory addressed at: _____
          I/O port used: _____   IRQ: _____

Operating system: _____   Version: _____

DigiBoard device driver version: _____

**Serial
Number**

DigiBoard SyncPort/X25R™
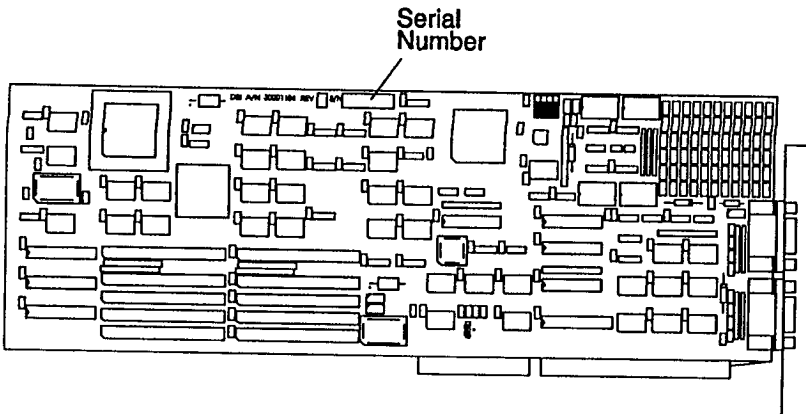
Return Procedures

All DigiBoard products have a five-year parts and labor warranty, and we are ultimately responsible for any defective parts, according to the limits specified in the warranty. However, many of the reported problems are due to factors other than defects in the product itself. To save you time and possibly additional cost, DigiBoard asks that you *first* try to resolve any difficulties by contacting our Technical Support representatives at **(612) 943-9020** *(Be sure to have the serial number of your DigiBoard adapter board at hand before calling Technical Support).*

Returns should be directed to the dealer or distributor from whom you purchased the product. If you need to return your board to Digi-Board for repair, it is first necessary to obtain an RMA (Returned Merchandise Authorization) number from DigiBoard, by speaking to a DigiBoard Customer Service representative. Authorized returns should be shipped to DigiBoard, 10000 West 76th St., Eden Prairie, MN 55344. The RMA number should appear on the shipping carton, on or near the address label.

NOTE: Products received without an RMA number clearly marked on the outside of the package will be returned, unopened, to the sender.

FCC/DOC Information to User

This equipment has been tested and found to comply with the limits for Class A digital devices pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
Only devices certified to comply with the limits for a Class A computing device may be attached to this equipment. Operation with noncertified device(s) is likely to result in interference with radio and TV reception.
This equipment is intended for commercial use only and is not suited for operation in Class B environments.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC rules.

Canadian DOC Notice
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Regulations.

Introduction

The DigiBoard X25/R communications system consists of an Sync-Port/X.25R™ host adapter and SyncPort/X25R™ driver software. The DigiBoard software works with Novell Connect, SAA, MPR 2.x and/or NACS environments to connect a Novell Network to X.25 Wide Area Network services. The DigiBoard SyncPort/X.25R host adapter board is used to make the physical synchronous connection to the X.25 service, while the SyncPort/X25R device driver software supplies the linking software for the physical, link and network layers.

The DigiBoard SyncPort/X.25R host adapter is an intelligent dual-channel synchronous communication board. The adapter features a 20 MHz IDT R3051 RISC processor, 1 megabyte of dual-ported RAM, 256K bytes of local memory and two channels to communicate with X.25 services, either high-speed RS-422 synchronous or low speed RS-232 synchronous.

The SyncPort/X25R software package includes an installation diskette that will streamline the software installation and configuration process under NetWare. Users with Connect, SAA or MPR 2.x use Novell's Internetwork Configuration utility (INETCFG) to set parameters. DigiBoard software supports configuration and operation under NACS.

Also included in the package (for NACS and Connect users only) is DigiBoard's SyncPort/X25R PAD program, a versatile terminal emulator for NACS or Connect users that fully supports the PAD functions defined in the X.3, X.28 and X.29 specifications. SyncPort/X25R PAD lets network users log in to the hosts available on a Wide Area Network (WAN) utilizing Novell AIO interfaces.

Parts of This Manual

The **Installation** section includes an overview of the decisions necessary before you install the SyncPort/X.25R board and DigiBoard software, then describes setting up and installing the board, and installing and configuring the software on the Netware server. This section applies to all four supported Novell environments (Connect, SAA, MPR 2.*x* and NACS).

The next two sections apply only to users of the NACS and Connect environments: **SyncPort/X25R PAD** Overview is an overview of the SyncPort/X25R PAD program and outlines the use of the different Operating Modes. **SyncPort/X25R PAD Commands** contains a detailed description of the available commands.

Troubleshooting details possible problems you might come up against and suggests solutions.

Appendix A lists the PSS V profile and CCITT standard parameter values.

Appendix B summarizes the available SyncPort/X25R PAD Commands.

Appendix C contains program and utility descriptions.

Appendix D lists mechanical and electronic specifications for the SyncPort/X.25R Adapter Board.

Appendix E shows wiring diagrams for connections with the SyncPort/X.25R Adapter Board.

SyncPort/X25R PAD Overview

Note: (SyncPort/X25R PAD is required for NACS; it is optional for Connect; and is not applicable for SAA and MPR 2.*x*)

The purpose of the SyncPort/X25R SyncPort/X25R PAD program is to allow users at workstations to Dial-Out to other computers with X.3-X.28-X.29 Packet Assembler Disassembler facilities over X.25 lines. SyncPort/X25R PAD can also optionally be used in the Connect environment; SAA and MPR 2.*x* users have other facilities.

X.3-X.28-X.29 is the CCITT recommendation for start-stop or async terminal interfaces on an X.25 network. Specific applications can also Dial-In from other hosts.

A computer can be located tens of thousands of miles away and a call can be made through the X.25 network to reach that computer on the X.25 network. X.25 Network providers such as British Telcom, or AT&T have worldwide connection capabilities.

The terminal emulation program running on the DOS workstation (Procomm Plus for Networks) goes through the NASI interface into the NACS running on the Netware 3.11 server. The DigiBoard X25/AIO driver offers available ports to the NACS interface. The user at the workstation picks a Digi X25/AIO port to converse through. (The port can be configured to be a DIAL-IN or DIAL-OUT port. Configuration is done with the DGPADCNF Utility included in the DigiX25 package.)

Note: All ports are defined as dial-out until configured as dial-in.

The DigiX25/AIO driver converses with the X.25 PAD interface on the SyncPort/X.25R adapter card. Call connections and particulars are handled at this level. At this point if the card is conversing with the network, calls can be attempted.

The interface layers look like this:

DOS Workstation
NASI
with network ProComm

Novell
Server
3.11

NACS

AIO

DGX25

X.25
Network

X.25 / XXX
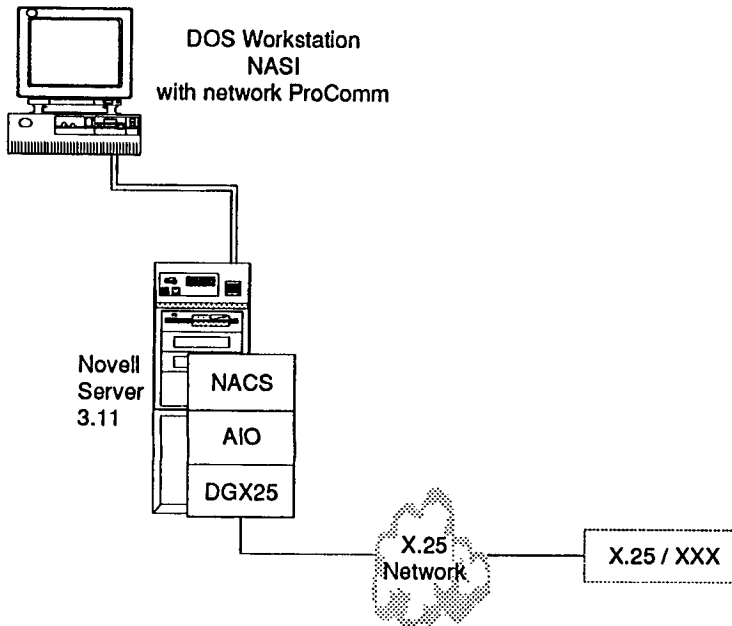
Once the network connection for the DigiX25/R card has been set up by the network administrator, the Procomm user can make a call as easily as using a modem, in some cases even easier. As with modems, there are plenty of command string options that can be used on Dial-Out connections to give flexibility where needed, but in most cases all that is required is the number of the machine you need to call, and the subnet-id (port on the card) that you wish to connect to.

If a connection is made to a machine that does NOT have PAD/X.3-X.28-X.29 services, then the Procomm user cannot hold a conversation with the other machine.

The syntax of the dialog session for Dial-Out lines conforms to the CCITT X.28 recommendation. Commands are further described in the Appendix B (page 52).

Installation

Configuring Your Network

Important! **Configuring your X.25 connection to the network is an important task that needs to be coordinated with your X.25 Network provider.**

Before you can begin to configure the ports on the SyncPort/X.25R board to talk to the network, there are a few preliminary decisions that must be made. It will be helpful to understand how the SyncPort/X25R software is constructed in relation to the CCITT software standard.

The CCITT X.25 architecture is comprised of three layers:
   3). Network
   2). Link Layer
   1). Physical Layer

Layer 1 is referred to as the *Physical Layer*, primarily because it connects to the physical outside world. In this layer the clock rate of the network connection is determined, anywhere from 2400 to 2048000 bits/second.

Layer 2 is referred to as the *Link Layer*. This layer is a software-oriented layer, and is specific to the protocol characteristics and requirements of the physical link. Attributes such as packet size, window size, link type, etc. are specified here. This layer is responsible for the negotiation of the physical link at start-up time, and insures that packets on the link-level are delivered in order. It

is also responsible for re-sending packets that have been detected as having been lost.

Layer 3 is referred to as the *Network Layer*. This layer, also software-oriented, includes specific characteristics of the Virtual Circuits (VC's) that make up the Network connections. All communication on the Network is done through a Virtual Circuit. The Physical and Link layers are to insure accurate delivery of the data that is passed down from the Network layer.

A Virtual Circuit has several properties associated with it. It negotiates with the other Virtual Circuit is it calling (or is being called by) to establish parameters for the conversation. This is the layer where Calls and Connections are made, negotiated, rejected (if that is the case), accepted, and broken. All user applications talk to this layer, including the SyncPort/X25R PAD terminal program.

Configuration of this layer is done in terms of general parameters that are negotiated during Call Setup. Since there are a great number of parameters for this layer, *great care should be exercised in configuring the software,* since a link can appear operational, even make a successful connection, but when data transfer starts to take place, there can be subtle problems that impede or reduce the flow of data.

Installing the SyncPort/X.25R Host Adapter

Important!

Before installing your DigiBoard SyncPort-/X.25R host adapter, be sure to write down the serial number of your board. The illustration below shows the location of the board's serial number.

Configuring the Host Adapter

The SyncPort/X.25R host adapter has one bank of four DIP switches (SW1--located at the top of the board) that are used to set the I/O port address of the host adapter. See *Figure 1* below.

SyncPort/X.25R Host Adapter
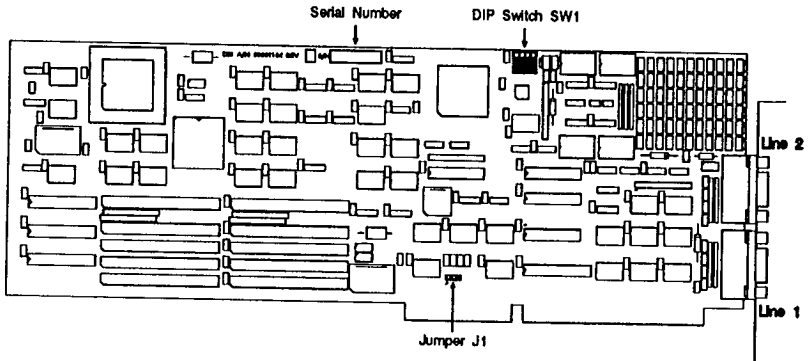
Setting the I/O Port Address

Before installing the host adapter, the board's I/O port starting address must be set on DIP switch SW1. The SyncPort/X.25R host adapter uses four contiguous bytes of address space on the host computer's I/O bus, starting with the address set by the DIP switch.

The individual switches SW1, SW2, and SW3 of DS1 (DIP switch 1) are used to select the start of the I/O Port address range. (SW4 must always remain ON.) To ensure flexibility, seven I/O port address ranges are available: 108h-10Bh, 118h-11Bh, 128h-12Bh, 208h-20Bh, 228h-22Bh, 308h-30Bh and 328h-32Bh.

Note: Address 108h will not be available, as it is reserved for use by the server software.

You may choose any I/O Port Address range not already in use on your PC. Remember which I/O Port start address you choose, as you will need it later when configuring the SyncPort/X25R software.

I/O Port Address: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ✎

Choose one of the starting addresses and set SW1-1, 2 and 3 as shown in the illustration on the next page.

DIP Switch Settings for I/O Port Address
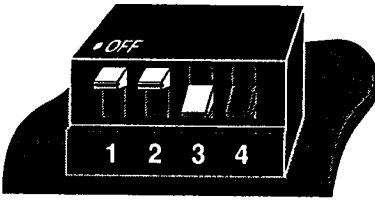
Switch setting for 108H
(Reserved)
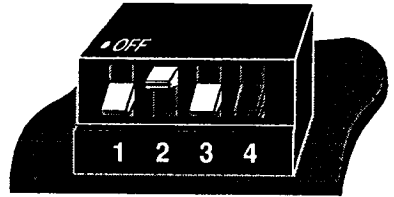
Switch setting for 228H
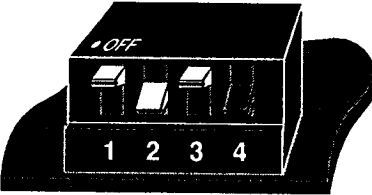
Switch setting for 118H
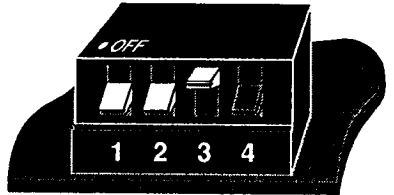
Switch setting for 308H
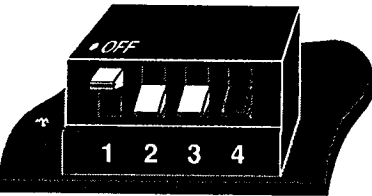
Switch setting for 128H
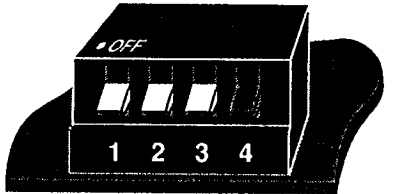
Switch setting for 328H
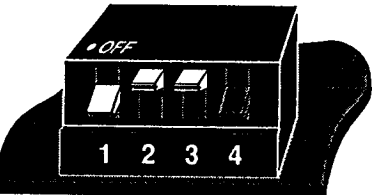
Switch setting for 208H

Factory-Set Jumper J1

There is one jumper, labeled J1, on the host adapter. This jumper is set in the factory, and must not be changed. The correct setting is pins 1 and 2 (the left and middle pins) jumpered together.

Installing the Host Adapter in your Computer

Step 1. Turn off your computer's power and remove the cover (refer to your computer's manual for instructions on cover removal and option board installation and cautions).

Step 2. Locate an available 16-bit AT slot in your computer and remove the slot plate.

Step 3. Plug the host adapter into the ISA slot and screw the endplate to the computer chassis.

Step 4. Replace your computer's cover.

SyncPort/X.25R Host Adapter Memory Window

The DigiBoard SyncPort/X.25R host adapter has 1 megabyte of on-board dual-ported RAM which is accessed through a 32K "window", which can be mapped into any 32K region in the computer's memory address space (32K byte boundaries end with either 0000h or 8000h).

The DigiBoard SyncPort/X25R device driver supports eight precon-figured 32K address ranges for the host adapter, beginning at C0000h, C8000h, D0000h, D8000h, C00000h, C80000h, D00000h or D80000h.

Most intelligent peripheral devices require some memory address space in this region for their ROM or shared memory. It is therefore necessary to insure that the memory address range chosen for the ISA host adapter does not conflict with the range used by any other device in your system.

Some typical sources of contention are:

Plug-in VGA and EGA cards, which have a ROM BIOS beginning at C0000h.

ESDI hard disk controllers, which typically have a ROM BIOS beginning at C8000h or CC000h.

SCSI interfaces, which have a ROM BIOS that may be located anywhere in the C0000h–DFFFFh range.

Consult the documentation for your peripheral devices to determine what (if any) memory addresses they may be occupying on the host memory bus.

Important! The ISA SyncPort/X.25R host adapter is a 16-bit board, and *no* 8-bit board can reside in the same 128K block as the address selected for the Sync-Port/X.25R memory window.

Installing the SyncPort/X25R Software

This page applies to *all* of the supported Novell environments (SAA, Connect, MPR 2.*x* and NACS). Watch for sections that specifically apply to your environment in the following pages.

Begin installing the SyncPort/X25R software in the Netware 3.11 server by typing (from the command console):

```
LOAD INSTALL
```

At the menu for *Installation Options* move the arrow keys to the *Product Options* field and press enter. You should see the *Currently Installed Products* menu. At this point you can press F1 for help or the Insert key to install a product.

At the menu *Enter drive and/or path to new product source media* the prompt of *>A:* should appear. *Set the drive letter to the drive that will load the SyncPort/X25R software disk.* Insert the diskette into that drive and press enter. The screen will go to the *System Console*. Press the Cntl and Esc keys at the same time. This will give you the *Current Screens* display. At the *Select screen to view:* prompt select the number that corresponds to the *Install Screen*.

At this point all the necessary files are installed in the server, and you can back out of the *Product Installation Menu*.

NACS   If you have NACS *only*, proceed to page 15 for software configuration instructions. If you have Connect, SAA or MPR 2.*x*, you must continue with the configuration instructions on the next page, even if you also have NACS.

Installing the SyncPort/X25R Software

This page applies to *all* of the supported Novell environments (SAA, Connect, MPR 2.*x* and NACS). Watch for sections that specifically apply to your environment in the following pages.

Begin installing the SyncPort/X25R software in the Netware 3.11 server by typing (from the command console):

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At the menu for *Installation Options* move the arrow keys to the *Product Options* field and press enter. You should see the *Currently Installed Products* menu. At this point you can press **F1** for help or the **Insert** key to install a product.

At the menu *Enter drive and/or path to new product source media* the prompt of *>A:* should appear. *Set the drive letter to the drive that will load the SyncPort/X25R software disk.* Insert the diskette into that drive and press **enter**. The screen will go to the *System Console*. Press the **Cntl** and **Esc** keys at the same time. This will give you the *Current Screens* display. At the *Select screen to view:* prompt select the number that corresponds to the *Install Screen*.

At this point all the necessary files are installed in the server, and you can back out of the *Product Installation Menu*.

NACS   If you have NACS *only*, proceed to page 15 for software configuration instructions. If you have Connect, SAA or MPR 2.*x*, you must continue with the configuration instructions on the next page, even if you also have NACS.

(Users with NACS as their sole environment go to page 15.)

Load and run the Novell setup program **Internetwork Configuration** (INETCFG).

Note: Also refer to your Novell documentation for information about installing adapter boards, X.25 links and other related subjects.

From the main menu, select **LAN and WAN Board Parameters**. Press the Insert key, and scroll down the list of products until you highlight **DGX25**. Press Enter to select **DGX25**.

Continue with the configuration and set the **I/O Base** address (that you previously set the SyncPort/X.25R adapter board to; see page 8) and a memory base address that does not conflict with other memory use. (The board will be configured to this address automatically, without any DIP switch setting necessary.)

Continue with the INETCFG software to the **Port Configuration** window. Select **DigiBoard X.25 Profile**, then select the port to be configured. Next, select the Profile that applies to your X.25 service. Also set the line speed (this depends on your X.25 service); generally, external clocking is chosen, since the modem or DSU/CSU will provide the clocking signals. Choose your interface type (V.11, V.24, V.35 or V.36).

There are two physical synchronous ports on the SyncPort/X.25R card. Port 1 is referred to as subnet-id "A," and Port two is referred to as subnet-id "B." This relationship is important to remember later when configuring the ports on the board.

Port 2
Subnet-ID "B"

Port 1
Subnet-ID "A"
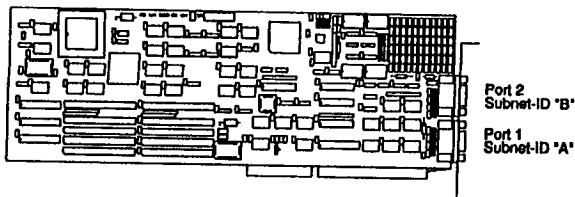
CONNECT

To bind Connect's AIOPAD facility with SyncPort/X25R, see *Configuring NetWare Connect for X.25 Support* in Chapter 8 of your Novell Connect documentation. The Logical Adapter name is DGX25.

(As an alternative, you may make the ports available as Sync-Port/X25R PAD ports—and use all the SyncPort/X25R PAD services—by adding the line

```
LOAD AIODGX25
```

after the "LOAD DGX25..." line in the file **AUTOEXEC.NCF**. This allows you to use AIO ports in conjunction with Novell's AIOPAD facilities.

SAA

See *Configuring for QLLC Attachment* in your Novell SAA documentation to configure a connection for QLLC attachment to a SNA host via X.25. The Logical Adapter name is DGX25.

MPR 2.*x*

The SyncPort/X25R driver is now available for use by various multiprotocol router services that use X.25 (e.g. IPX, Appletalk, IP, etc.). The Logical Adapter name is DGX25.

This concludes the primary installation procedure for SAA, CONNECT and MPR 2.0.

Configuring the SyncPort/X25R Software

Do not follow these instructions if you have configured your SyncPort/X25R adapter board and software using INETCFG. This section is for users with NACS *only*. When using NACS without MPR, SAA or Connect, INETCFG is not available, and you must tune the board using the DigiBoard NCF startup file and the various tuning facilities.

To get SyncPort/X25R running, you can include the **DIGIX25.NCF** file to be called out in the AUTOEXEC.NCF file. Or you can select certain pieces of the **DIGIX25.NCF** file and place them in the AUTOEXEC.NCF file. Or, finally, you can simply start Sync-Port/X25R manually by typing in `DIGIX25` at the System Console command line prompt.

Note: It is important that the I/O and memory address of the board are accurately set on the load line for DIGIX25.

DigiBoard SyncPort/X.25R Adapter
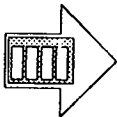
(Refer to the page 7 for specific information on how to set the adapter's I/O Port address.)

The SyncPort/X.25R board must be addressed to a non-cached 32K bytes of address space on the PC-BUS. It has a unique I/O address that is 8 bytes in length.

On the load line for the DigiX25 NLM, the **-p** parameter specifies the I/O port starting address (in Hex). The **-m** parameter specifies the location in memory to place the board (also in hex). *The addresses set in software must match the addresses that the board is set to.*

For example, the load line:

```
load digiX25 -p 118 -m d0000
```

configures the software with the board's memory addressed at
D0000h, and the I/O port starting address is set to 118h.

Port Configuration

There are two physical synchronous ports on the SyncPort/X.25R
card. Port 1 is referred to as subnet-id "A," and Port two is referred
to as subnet-id "B." This relationship is important to remember
when configuring the ports on the board.

Port 2
Subnet-ID "B"

Port 1
Subnet-ID "A"
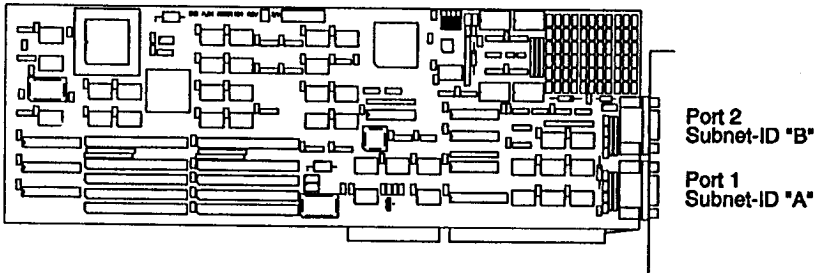
The method for configuring a port is done in three steps:

Step 1. Create or modify a template using the appropriate template configuration utility. For each layer in X.25 there are tunable parameters that need to be configured. Consequently, there is a template configuration utility for each layer in the CCITT X.25 model. These are:

- **wantemp** for Layer 1 (Physical Layer)

- **lapbtemp** for Layer 2 (Link Layer)

- **x25temp** for Layer 3 (Network Layer)

Step 2. Insert the template filename on the load line for the Tuning Utility. These utilities, called at boot-up time, take the configuration parameters that were specified in the templates and load them onto the board for the specified subnet. They are:

- **wantune** for Layer 1 (Physical Layer)

- **lltune** for Layer 2 (Link Layer)

- **X25tune** for Layer 3 (Network Layer)

Step 3. At bootup time, run the Tuning Utility that calls out the template.

There are several default templates included with the distribution software. These default templates can be used as a starting place for customizing the specific parameters of the Network provider. These templates are located in `SYS:\digi\template`.

For Layer 1 (Physical Layer) the templates are:

```
wan     wan.net
```

For Layer 2 (Link Layer) the templates are:

```
lapb      lapb.net
```

For Layer 3 (Network Layer) the templates are:

```
dce80.x25  dce84.x25  dce88.x25
dte80.x25  dte84.x25  dte88.x25
```

Example:

As an example. after conferring with the Network provider on the specifics of the physical layer, it is determined that there will be external clocking used, with module 8, and 262 packet sizes. You will be running on Port 1 of the SyncPort/X.25R board (Subnet A).

1. **wantemp** is run to generate a template that has the above-mentioned characteristics. It is called WANCONF.A and it is placed in the `SYS:\digi\template` directory.

2. The file name of the template is put in the load line for wantune for the subnet-A.:

    ```
    load wantunea -P -s A wanconf.A
    ```

    After conferring with the Network provider on the specifics of the Lapb layer (layer 2), a lapb template is configured:

3. **laptemp** is run to generate a template that has these characteristics. It is called LAPCONF.A and it is placed in the `SYS:\digi\template` directory.

4. The file name of the template is put in the load line for lltune for the subnet-A:

```
load lltunea -P -s A LAPCONF.A
```

After conferring with the Network provider on the specifics of the X.25 layer (layer 3), a x25 template is configured:

5. **x25temp** is run to generate a template that has these characteristics. It is called X25CONF.A and it is placed in the `SYS:\digi\template` directory.

6. The file name of the template is put in the load line for x25tune for the subnet-A:

```
load x25tunea -P -s A X25CONF.A
```

When these load utilities are completed at boot-up time another utility NLM is called to actually activate the subnet.

This utility is called **X25SNID**. The **X25SNID** utility activates the port after the configuration parameters have been set. It is the last NLM to be specified after the **wantune**.

7. `X25SNID -A DTE -B DTE`

This specifies whether the line is DCE or DTE configuration. (In the example above, both subnet A and subnet B have been set to DTE.)

SyncPort/X25R PAD Overview

The **SyncPort/X25R PAD** software fully supports the PAD functions defined in the X.3 / X.28 / X.29 recommendations. AIODGX25 is loaded at boot time via AUTOEXEC.NCF, making the SyncPort/X25R PAD program available.

X.3 defines a set of parameters that the PAD uses to identify and control the terminal (for example, echo or data forwarding). The parameter values can be preset, set by the terminal user and/or set by the remote host. A complete set of parameter values is called a *profile*.

X.28 defines control procedures, user commands, and the service signals sent by the PAD program to your terminal.

X.29 defines the control messages sent between the PAD program and the remote host. These messages are carried as X.25 Qualified data packets.

The SyncPort/X25R PAD program is used in one of two modes: **Command Mode** (waiting-for-command) or **Call Mode** (call-in-progress). In Command Mode, the SyncPort/X25R PAD program expects one of the commands described in *SyncPort/X25R PAD Commands* (page 28). In Call Mode, all the characters you enter are treated as data to be sent to the host you have called.

Note: The exception to this is the **breakin** sequence <Ctrl-P a>, which returns you to Command Mode.

SyncPort/X25R PAD User Interface

The user interface of the **SyncPort/X25R PAD** program provides the commands defined by the X.28 recommendation plus a set of more user-friendly commands. See *SyncPort/X25R PAD Commands* on page 28.

The concepts of Message, Native and Transparent modes are recognized. Use these commands to select a combination of X.3 parameter values. See *Selecting an Operating Mode* on page 23.

Editing Command Input

SyncPort/X25R PAD commands are recognized as complete words or as fixed abbreviations. The abbreviated form has exactly the same effect as the full command. You can also enter commands to the SyncPort/X25R PAD program in either upper case or lower case.

Upon opening the port, you automatically enter Command Mode. The Command Mode prompt is:

`PAD:`

If you make a mistake when typing a command, but notice it before pressing the Return key, you can correct the line as you go along. The SyncPort/X25R PAD program lets you delete the previous character in the command line in the normal way, by using the delete key (sometimes marked `<Del>` or `<RUBOUT>`). The effect of the `<BackSpace>` key varies according to the setting of your terminal.

Commands are not processed until you press the Return/Enter key.

Note: This manual often refers to "control characters"--these are single characters obtained by holding down the key marked **Ctrl** while pressing another key. For example, to get the **<Ctrl x>** combination, hold down **Ctrl** and press **x**.

Starting a Session

There are two steps in logging on to a host using SyncPort/X25R:

Step 1. When you select a port in AIO, the pad program prompt is displayed:

```
PAD:
```

Step 2. Call a host computer. Enter:

```
call subnet_ID.DTE-Address
```

where *subnet_ID* is either **A** or **B**, and *DTE.address* is a 15-digit number.

Selecting the Terminal Type

The SyncPort/X25R PAD program acts according to the terminal type setting defined by the profile being used. You can select the profile by means of the profile command. This lets you choose one of the standard profiles. Your Network administrator will know which profile is best for you. If you are using a display terminal, you can set the current terminal type by typing:

```
PAD: vdu
```

(See *SyncPort/X25R PAD Commands* on page 28.)

Selecting an Operating Mode

When you are making a call, you are connected from a terminal to a remote host and characters typed on the keyboard appear on your video screen. How do the characters get there?

This is known as "echoing" and depends on the type of host machine you are connected to and, in some cases, on the application program you are running. Some types of terminal output echo characters to the screen: this restricts the number of ways they can be used. Most terminals rely on the machine they are attached to for the "echo." There are a number of ways this can be achieved:

- If you are using a screen editor or similar application, the host application program must carry out all the screen formatting functions, so the SyncPort/X25R PAD software transfers the data directly, without interpreting it at all.

- With less critical applications, or simple command-line entry, the SyncPort/X25R PAD program itself can provide the echo and format the data, relieving the host computer of these tasks and reducing the load on the network.

For this reason, the SyncPort/X25R PAD software in SyncPort/X25R supports three kinds of Call Mode:

Message Message mode is the default mode of operation. It involves line-at-a-time exchange between the terminal and the host. In other words, sending everything you type on one line to the host after you press Return. The SyncPort/X25R PAD program is responsible for the detailed control of the terminal, including echoing typed input, input editing and output formatting.

Transparent Transparent output mode of operation may be needed in some cases where the host application controls all output formatting and no characters are intercepted or generated by the SyncPort/X25R PAD program.

Native Native mode of operation means that the characters you type are forwarded to the host immediately. The host has total control of the terminal, including echoing user input, input editing and output formatting.

From any of these modes, you can return to Command Mode by issuing the breakin sequence <Ctrl p> a (that is, press the Ctrl and p keys at the same time, then press the a key).

In normal operation you should not need to change the mode yourself. However, the application which you are running (on the currently connected host) may change the mode of operation--for example, a screen editor as described above can select Native mode. On exit, the application should reset the mode to its previous value.

The Message, Transparent and Native commands allow you to explicitly set the mode of operation as required: These commands are described in *SyncPort/X25R PAD Commands* on page 28.

Note: Setting the mode type affects the values of the following X.3 parameters:

Echo	(parameter number 2)
Data Forwarding Timeout	(parameter number 4)
Line Folding Width	(parameter number 10)
Local Editing	(parameter number 15)

The effects of mode changes on these parameters are shown in the following table:

Mode	Parameter Number			
	2	4	10	15
Native	0	1	0	0
Transparent	1	0	0	1
Message	1	0	80	1

Escape Code Sequences

Various escape code sequences are effective if you are currently in Message or Transparent mode. An escape code sequence consists of pressing the current breakin character (the default is <Ctrl p>), followed by one of the following characters:

a   enter SyncPort/X25R PAD command mode

b   send a break signal to the currently connected host

e   reverse the current echo state (until <RETURN> is typed)

r   reset the current call (if any)

t   forward the current buffered line

char   put the character into the buffer; used mainly for control characters DLE, DC2 and CAN.

Returning to Command Mode

To return to Command mode from Call mode and regain access to the user commands, use the BREAKIN sequence <Ctrl-p a>.

The BREAKIN sequence defaults to <Ctrl-p a> but can be altered to any other key sequence by using the **breakin** command. Refer to the description of this command in *SyncPort/X25R PAD Commands* on page 28.

Closing a Connection

An important point about closing a connection is that you may not need to, depending on the set up of the host you are connected to. Most hosts close the connection automatically when you log off.

So the most important thing about closing a connection is:

REMEMBER TO LOG OFF FROM THE HOST!

If you do not log off, the network resources on the host may get used up: eventually you cannot reconnect to the host unless your System Administrator sorts things out.

An alternative way of closing the connection is to press the **breakin** sequence to bring up the SyncPort/X25R PAD prompt and enter:

`clear`

This closes the connection. Now you can enter

`CALL`

to access another host.

As an alternative, you can close the connection and quit the SyncPort/X25R PAD program in one step by exiting the AIO session.

SyncPort/X25R PAD Commands

This section is an alphabetical list of the commands available to users of the SyncPort/X25R PAD program. Most commands have abbreviations, which are shown in parentheses after the command name. In this section, commands are presented in UPPER CASE. You can enter commands in upper or lower case.

- Where a command has an optional parameter, this is shown in lower case in square brackets.

- The command may be entered without a parameter--to report the current value--or with one of the parameter values indicated.

- Where two values are alternatives, these are shown separated by the vertical line symbol ("l").

The full command and the abbreviation shown (if any) are the *only* commands accepted.

In addition to the X.28 interface, a more "user friendly" command interface is provided.

The commands are:

BREAK

Abbreviation: **B**

This command sends a "break" signal to the currently connected host. The action depends on the setting of the **BREAKACTION** parameter.

BREAKACTION

Abbreviation: **BRA**

This command sets the action to be taken if you issue a break command. You do not normally have to set BREAKACTION, as the host should set the value it requires.

The syntax is:

BRA [*n*]

Where *n* is one of the following settings, causing the action described to be taken:

- 0   no action
- 1   send an interrupt signal
- 2   send a reset
- 5   send an interrupt signal and an indication of break (the default)
- 8   exit Call mode to Command Mode
- 2   send an interrupt signal and an indication of break, then discard output from the host

If you do not supply a parameter the current setting is displayed.

BREAKIN

Abbreviation: none

This command allows the user to alter the SyncPort/X25R PAD recall character (the default is **<Ctrl P>**). There is no abbreviation.

CALL

Abbreviation: C

This command attempts to set up a connection to the named host system with the requested facilities. Hosts can be specified by name or by address. The syntax is:

C host [~*CUD*] [*facilities*] [G|B[*CUG*]] [N NUI] [T RPOA]

The various fields are described below. The host part takes the following form:

addressing - WAN

For a call to a host on the WAN, the syntax is:

```
C S.DTE [[.N|X].NSAP] [~CUD] [facilities] [G|B[CUG]]
[N NUI] [T RPOA]
```

(Note that the above must all be typed in on one line.)

If your administrator has set up hostname-address equivalencies, you can use a hostname instead of explicit addressing, like this:

`C host [~CUD] [facilities] [G|B[CUG]] [N NUI] [T RPOA]`

Address components

The meanings of these fields are:

S   is the single character logical identifier which specifies the required subnetwork for the call. (This is either **A** or **B**.)

DTE   is an address of up to 15 decimal digits specifying the subnetwork point of attachment of the remote host. If X.25(88) TOA/NPI addressing is being used, the DTE may be up to 17 decimal digits.

N/X   An upper case N or X preceded by a period and followed by a period and (N) the NSAP or (X) the non-OSI address extension. This is not mandatory. If neither is given, the following field (if present) is read as an NSAP address.

NSAP   is an address of up to 40 hexadecimal digits specifying the point at which the Network Service is provided on the remote host.

~CUD   (Call User Data) is an optional parameter of up to 124 ASCII characters preceded by the character ~, which is passed to the host in the CALL request, following the X.29 protocol identifier bytes of 01000000.

Facility components

You can request any or all of the following facilities for the call. All these parameters are optional and your administrator will have set up general default values or specific defaults for the host you have specified. These values are used if you leave them unspecified. See your administrator for information on CUGs and other values for your system.

facilities facilities, entered as a string. These are:

packet size   to set both the incoming and outgoing sizes to 7, for example, use **p7/7**

window size   to set both the incoming and outgoing sizes to 2, for example, use **w2/2**

Fast Select   include **f** in the string

Reverse charge include **r** in the string

Fast Select and Reverse charge - include **fr** in the string

The string should resemble this - p7/7w2/2fr.

[G|B]CUG Closed User Group. Enter a closed user group number to make a call to the specified Closed User Group on the specified host. There are two classes of Closed User Group:

1. A multi-user closed user group: enter the CUG (a number of up to 4 digits) preceded by **G**.

2. A bilateral closed user group. This type of CUG has only two members. You can be a member of more than one bilateral CUG. Enter the CUG (a 4 digit number preceded by **B**).

N NUI   Network User Identifier. NUI is a string of up to 64
          alphanumeric characters, preceded by an **N**, used to
          identify your call for the purposes of security or
          billing.

T RPOA   Recognized Private Operating Agency. This provides
          the network with additional routing information about
          your call. Enter **T**, followed by up to four RPOA
          numbers of 4 digits each with no spaces.

CLEAR

Abbreviation: **CLR**

This command closes the current connection.

ECHO

Abbreviation: **E**

The syntax is:

   E [on/off]

Where:

   on   makes the PAD echo

   off means all echoing must come from the remote host.

If you do not supply a parameter, the current setting is displayed.
The default setting is **on**.

EMASK

Abbreviation: **EM**

Use this command to choose which characters are not echoed to the screen. The profile set by your administrator also determines which characters are echoed to the screen. You should not need to change the echo mask.

The syntax is:

EM [*n*]

Where *n* is a mask which stops specified characters being echoed:

mask	characters affected
1	CR
2	LF
4	VT, HT, FF
8	BEL, BS
16	ESC, ENQ
32	ACK, NAK, STX, SOX, EOT, ETB, ETX
64	DEL, CAN, DC2
128	all other control characters

For example, to instruct the PAD not to echo the BEL and BS characters, use:

    EM 8

To instruct the PAD not to echo a larger set of characters, add the values of the parameters. For example, if you do not want to echo VT, HT, FF or BEL or BS enter the following:

    EM 12

If no parameter is specified, the current value of the Echo Mask is reported. The default is 192 (128+64) so that "all other control characters" and DEL, CAN and DC2 are not echoed.

FLOW

Abbreviation: **F**

This enables or disables the local flow control processing of XOFF and XON characters by the PAD. The syntax is:

F [on|off]

where:

on   If Flow Control is set **on**, you can use an XOFF character, for example, **<Ctrl s>** to halt output to the terminal and the XON character, for example, **<Ctrl q>**, to restart it.

off   Flow Control must be set to off if you wish to use these control characters for any other purposes, for example, EMACS type editors.

If you do not supply a parameter, the current state of the flow parameter is reported. The default is **on**, which enables the processing of XOFF and XON characters.

FORWARD

Abbreviation: **FOR**

This selects the data forwarding characters. You do not normally have to change the setting of this parameter; your administrator should have decided on a sensible value for you.

The syntax is:

FOR [n]

The possible parameter settings are as follows:

0	No data forwarding characters
1	alphanumeric characters
2	CR
4	ESC, BEL, ENQ, ACK
8	DEL, CAN, DC2
16	ETX, EOT
32	HT, LF, VT, FF
64	all other control characters not mentioned above, except BS, XON, XOFF, DEL, CAN, DC2

Add two or more numbers together to forward a combination of the sets of characters. For example, to forward on alphanumeric characters (1) and ESC, BEL, ENQ and ACK (4) enter:

for 5

If you do not specify a parameter the current setting is displayed. The default is 48 (16+32) so that ETX, EOT, HT, LF, VT and FF are forwarding characters.

INT

Abbreviation: none

This command transmits an interrupt packet to the remote host. There is no abbreviation for this command.

LFINSERT

Abbreviation: LF

This command governs whether or not a linefeed (LF) is inserted after a carriage return (CR). You should not normally have to set this parameter as the host should set an appropriate value. The syntax is:

LF [n]

where n is one of the following:

0   no LF insertion
1   add LF after CR in the data from the host
2   add LF after CR in the data to the host
4   add LF after CR echoed

Add two or more numbers together to set forwarding for a combination of the conditions for LF insertion. For example, to set LF insertion after CR in the data to and from the host, enter the following:

LF 3

The value of this parameter has no effect in NATIVE mode unless echoing is on, in which case the setting of value 4 is allowed. (This is required since certain hosts operate in NATIVE mode but leave local echo enabled).

In TRANSPARENT mode the setting of value 1 has no effect.

If you do not supply a parameter, the current setting of the parameter is displayed. The default value is 6.

LOGHOST

Abbreviation: **LOG**

This command displays all incoming/outgoing X.29 messages from/to the host, for the purpose of fault diagnosis. You do not normally have to use this. The syntax is:

LOG [on|off]

Parameter numbers and values are specified as pairs of hexadecimal numbers, separated by a space. The format of the message displayed is as follows: X29 TX|RX Code <Par Value Par Value ....> TX is used to display values for transmitted messages, RX for received messages. The following are examples of messages:

X29 RX 4: 02 00 04 00 0F 00
   reads parameters 2, 4 and 15

X29 RX 2: 02 01 04 01 0F 01
   sets parameters 2, 4 and 15 to 1

X29 TX 0
   messages beginning like this are Parameter Indication messages, showing the current values of specified parameters.

MESSAGE

Abbreviation: **MES**

This command sets the mode of operation to MESSAGE mode. The parameter settings for MESSAGE mode are:

Mode	Parameter Number			
	2	4	10	15
Message	1	0	80	1

This means that echoing is **on**, the data forwarding timeout is **off**, the line folding width is 80, and local editing is allowed. For details of the modes see Selecting an Operating Mode on page 12.

This is the default mode of operation. Refer to the native and transparent commands for other operating modes.

NATIVE

Abbreviation: **NAT**

This sets the mode of operation to NATIVE mode. The parameter settings for NATIVE mode are:

Mode	Parameter Number			
	2	4	10	15
Message	0	1	0	0

This means that echoing is disabled, data forwarding timeout is enabled, there is no line folding and local editing is disabled. For more information about the different types of operating mode see *Selecting an Operating Mode* on page 23.

The default operating mode is MESSAGE.

PAGEWAIT

Abbreviation: **PW**

Use this command to make the display pause after n lines. The syntax is:

PW [*n*]

where *n* is the range for the pagewait parameter, 0 - 255. If n is set to 0, there is no pagewait and the display scrolls off the screen.

To continue after a page wait, press the space bar. All other characters, with the exception of the BREAKIN character, are ignored.

If you do not supply a parameter, the current setting is displayed. The default is 0, meaning that any display which is too long will scroll off the screen.

PARAM

Abbreviation: **PAR**

This command displays the current values of all the X.3 parameters in parameter number:value pairs. For example, when the default settings for the V5 profile are being used, PAR returns:

```
1:1 2:1 3:48 4:0 5:0 6:1 7:5 8:0 9:0 10:80 11:14
12:1 13:6 14:0 15:1 16:127 17:24 18:18 19:2 20:192
21:0 22:0
```

For an explanation of each of the parameters and their commonly used values, refer to Appendix A.
PAR? Displays the current values of the parameters you specify in number:value pairs. This call has no abbreviation.

The syntax is:

PAR? *<par list>*

where *<par list>* is one or more numbers from the list presented in Appendix A, separated by spaces or commas. For an explanation of the meaning and usage of the parameters, refer to Appendix A.

For example,

PAR? 2,4,10,15

returns: PAR 2:1, 4:0, 10:80, 15:1 Separate the list of parameters you request with commas or spaces. If you do not specify parameters all the parameters are displayed in number:value pairs.

PRINTER

Abbreviation: **PRT**

This is used to tell the PAD that you are using a hard-copy terminal. This command and the command vdu set parameter 19. If you want to see the current value, use the **par?** command. The value 1 is for a hard-copy terminal, the value 2 is for a VDU.

PROFILE

Abbreviation: **PROF**

This command selects a set of terminal options pre-defined as a profile. These profiles contain default values for the X.3 parameters. The syntax is:

PROF [*p*]

where *p* is the name of the profile in either upper or lower case. The following example sets the V2 profile:

PROF V2

The default profiles supplied are as detailed in Appendix A. Your network administrator can set the default profile and specify the set of usable profiles.

If you do not supply a parameter, the current profile will be displayed.

RESET

Abbreviation: **RST**

This command sends a Reset Request to the currently connected host.

SET

Abbreviation: none

Sets the parameters you specify to the values you supply. This command lets you change the setting of parameters from the value used in the selected profile. Your administrator can advise you about the profile and the parameter settings you should use. There is no abbreviation. The syntax is:

SET <par number:value, par number:value,...>

The number of the parameter is followed by a colon and the desired parameter value. For example, to set parameters 2, 10 and 13, enter:

SET 2:1, 10:72, 13:4

Number:value pairs in a list should be separated by commas or spaces.

If you supply the name of a parameter without a value, or with an invalid value (for example 13:8 rather than 13:4 in the above example) a message in the form PAR 13:INV is returned and the value of the parameter remains unchanged.

SET? Sets the parameters you specify to the values you give. Unlike the set call, this displays the parameters and the values you specify. The number of the parameter is followed by a colon and the setting you want the parameter to have. There is no abbreviation. The syntax is:

SET <par number:value, par number:value,...>

For example: **SET?** 2:1,10:72,13:4

returns: PAR 2:1,10:72,13:4

Number:value pairs in a list should be separated by commas or spaces.

If you supply the name of a parameter without a value, or with an invalid value (for example 13:8 rather than 13:4 in the above example) a message in the form **PAR 13:INV** is returned and the value of the parameter remains unchanged.

STATUS

Abbreviation: **STAT**

This command displays the status of the connection and the name of the host that you are connected to. If no parameter is specified, the current call connection status is reported. The syntax is:

STAT [all]

where parameter "all," produces further status information, for example:

Echo = ON, Echomask = 192, Flow = ON, Lfinsert = 6, Break-action = 5 Pagewait = 0, Width = 80, Forward = 48, Timeout = 0, Message Mode Profile = V3, Vdu, Loghost = OFF

Call Status: Call Connected Host: centralhost

TRANSPARENT

Abbreviation: **TRA**

This command sets the mode of operation to TRANSPARENT mode. The parameter settings for TRANSPARENT mode are as follows:

Mode	Parameter Number			
	2	4	10	15
Message	1	1	0	1

This means that echoing is **on**, data forwarding is disabled, there is no line folding and editing is enabled. For more details about the use of the different operating modes, see *Selecting an Operating Mode* on page 23.

The default operating mode is MESSAGE.

VDU

Abbreviation: none

This is used to tell the SyncPort/X25R PAD program that you are using a display terminal. There is no abbreviation.

This command and the command printer set parameter 19. If you want to see the current value, use the **par?** command. The value 1 is for a hard-copy terminal, the value 2 is for a VDU (the default).

WIDTH

Abbreviation: **WID**

This is used to define the width of the terminal screen in use. On output, when this width is reached, a "newline" is inserted. The syntax is:

WID [*n*]

where *n* is the screen width. The range for the parameter is 20 to 255. If you do not supply a parameter, the current setting is displayed. The default screen width is 80.

Troubleshooting

Connection Problems

If a connection to a host is rejected or disconnected, the SyncPort/X25R PAD program displays a message giving a reason for the call being cleared. The message includes a hexadecimal error code. There are two types of problems:

1. Problem with the network between the PAD and the remote host.

    This happens if a wrong NSAP address is called, or if the remote host is down or not switched on, or if the network between the host and the PAD is down. The message is: Call Cleared Out of Order (0900)

2. Rejection or disconnection caused by the remote host.

    In this case, the message is of the form:

    `Call Cleared By Remote (00E8)`

    In this case, the first two hexadecimal digits are 00 and the last two identify the reason for the rejection or disconnection.

Following are some of the more common reasons reported:

E1 & E2 The connection was disconnected. The remote host has gone down or the network between the SyncPort/X25R PAD program and the remote host has failed.

E3 & E4   The connection request was rejected by the remote host for unspecified reasons.

E7   The connection request was rejected. The called NSAP address on the remote host is busy.

E8   The connection request was rejected. The called NSAP address on the remote host is permanently unreachable. This code may be returned if the host name is passed to a gateway and the gateway cannot find the name in its tables.

EB   The connection request was rejected. The called NSAP address on the remote host is unknown.

F1   The connection was disconnected. Normal disconnection by the remote host.

F2   The connection was disconnected. Abnormal disconnection by the remote host.

F5   The X.29 services are not available on the called host.

Using a Hard Copy Terminal

If you are using a hard copy terminal, set the terminal type by typing:

`printer`

If you are on a hard copy terminal and you type **<Ctrl x>**, the sequence "XXX" followed by a newline is echoed. Also, when you delete characters, your data input may appear confused. The deleted characters are echoed between the "\" and "\" characters.

You can re-display the whole edited line by typing **<Ctrl r>**.

Appendix

This Appendix consists of the following sections:

Appendix A   Profiles and Parameters

The table below summarizes the PSS V profiles and CCITT standard
parameters (British only). For more information on the meanings of
parameters, refer to the CCITT X.3 Recommendation.

*   The line folding values differ depending on the V Profile
     number:

     V1=72   V2=120   V3=80   V4=132   V5=80

Appendix B   Command Summary

Command	Abbreviation	Action
BREAK	B	send break signal to the host
BREAKACTION [n]	BRA	set breakaction
BREAKIN		set PAD recall character
CALL *host*	C	set up a connection to the named *host*
CLEAR	CLR	close the current connection
ECHO [on|off]	E	enable/disable terminal echo
EMASK [n]	EM	set terminal echo mask to *n*
FLOW [on|off]	F	enable/disable terminal flow control
FORWARD [n]	FOR	set data forwarding conditions
INT		send an interrupt packet
LFINSERT [n]	LF	set linefeed insertion action
LOGHOST [on|off]	LOG	display X.29 messages
MESSAGE	MES	enable Message mode of operation
NATIVE	NAT	enable Native mode of operation
PAGEWAIT [n]	PW	set page wait to *n* lines
PARAM	PAR	display current X.3 parameters
PAR? [par list]		display specified X.3 parameters
PRINTER	PRT	define terminal as hardcopy device
PROFILE [p]	PROF	set terminal profile
RESET	RST	reset the current call
SET [par list]		set specified X.3 parameters
SET? [par list]		set & display specified X.3 parameters
STATUS [all]	STAT	list the status of the connection
TRANSPARENT	TRA	enable Transparent mode of operation
VDU		define terminal as display device
WIDTH [n]	WID	set terminal width to *n* characters

Appendix C Program and Utility Descriptions

DGPADCNF

NAME
DGPADCNF - Used to modify or create a DigiBoard AIO/X25 configuration file for Dial-In or Dial-Out port configurations.

SYNOPSIS
DGPADCNF [-f *filename*]

DESCRIPTION
This utility is used to modify the entries of an digi \padconf file. Each of the ports available can be displayed.

```
00 Null Entry:Dial-Out 01 Null Entry:Dial-Out
02 S01,X                03 Null Entry:Dial-Out
04 Null Entry:Dial-Out 05 S,X
06 Null Entry:Dial-Out 07 Null Entry:Dial-Out
08 Null Entry:Dial-Out 09 Null Entry:Dial-Out
10 Null Entry:Dial-Out 11 Null Entry:Dial-Out
12 Null Entry:Dial-Out 13 Null Entry:Dial-Out
14 Null Entry:Dial-Out 15 Null Entry:Dial-Out
```

In this example, display port 02 is a Dial-In port with Call User Data field that starts with 01 hex. The DTE address field is 'X' specifying "Don't Care." This entry listens for any DTE address that has a Call User Data field that starts with 01. (This is a typical Dial-In entry).

In this example, display port 05 is a Dial-In port with Call User Data field that starts with anything (wide open), and a DTE address field of 'X' specifying "Don't Care."

Ports defined as Null Entry: Dial-Out are defined to be Dial-Out and have an interactive dialog session started. Dial-Out calls are made through the user's SyncPort/X25R PAD interface.

The format for each Dial-In entry is:

Call User Data Field, DTE Called Address Field

   or:

```
<[(I | S) [bytes]] | X> , <[(I | S) (D | N)
[semi-octets] | X>
```

(The above must be typed in on one line.)

Valid entries for the Call User Data Field are:

call_user_data   First, this field is the hexadecimal value of the incoming Call User Data field. For X.28 sessions this field starts with the four bytes denoted as: 01000000. Any Specific call in Call User Data such as "Hello There" is included after these four bytes. (And the string is input as hexadecimal.)

S call_user_data   This specifies that the Call User Data Field starts with the specified call_user_data.

I call_user_data   This specifies that the Call User Data Field is an Exact Match with the specified call_user_data.

X   This specifies that the field is defined as "Don't Care."

Typically, this field is defined as a S01. This allows X.28 call in sessions with any accompanying call user data.

Valid entries for the DTE address Field are:

DTE address   First, this field is the hexadecimal address of the called in connection.

D   Specifies that the field is a X.25 DTE address.

N

Specifies that the field is a X.25 NSAP address.

I (D I N) DTE address

This specifies that the DTE Address Field is to Match Exactly with the Specified Address Field.

S (D I N) DTE address

This specifies that the DTE Address Field starts with the specified DTE Address.

X

This specifies that the field is defined as "Don't Care."

Examples of addresses are:

ID00001   X.25 Address with a match exact of 00001.
IN00003   X.25 NSAP Address with a match exact of 00001
SD00003   X.25 Address with Starts with 00003
SN00005   X.25 NSAP Address that Starts with 00005
X   Don't Care

Typically this field will be 'X', to allow all addresses to call in. For more secure installation, the other options are available.

If the newly created or modified file is saved it must be renamed at some point to aiodgx25.cfg and placed in SYS:\digi\padconf for the DGPADCNF NLM to be able to access it when the ports are acquired to determine Dial-In or Dial-Out status.

SEE ALSO

aiodgx25 aiodgx25.cfg digi\padconf

AIODGX25.NLM

NAME
AIODGX25 - The AIO call routines for the SyncPort/X25R PAD interface.

SYNOPSIS
AIODGX25

DESCRIPTION
AIODGX25 is an NLM that provides services for AIO to access SyncPort/X25R network services for X.25. It is run at initialization time before NACS or Connect is brought up. It can be unloaded and re-loaded with NACS running. It provides 16 AIO Dial-In/Dial-Out ports.

When a port is acquired a check is made of the **SYS:\digi\padconf** file to determine if a port is to be Dial-In or Dial-Out. If a port is determined to be Dial-Out, a DigiPAD dialog session is provided. If a port is determined to be a Dial-In, the listen parameters are sent to the SyncPort/X25R services layer to wait for a incoming call that meets the requirements of the listen parameters. If more than one port has the same listen parameters, then an incoming call that meets the listen qualifications will be randomly given to one of the ports. There is no dialog session provided with a Dial-In session.

SEE ALSO
digi\padconf

DIGIX25

NAME
digix25 - main X.25 NLM that loads the adaptor board and provides X.25 core services.

SYNOPSIS
digix25 [**-s** *slot_num*] [**-i** *io_port*] [**-m** *memory*] [**-b** *bios_file*] [**-x** *x25_file*]

DESCRIPTION
The **digix25** NLM loads the adaptor board at the specified locations. It stays resident and provides interfaces for the various services that use X.25, e.g., the **aiodgx25** support and utilities.

The options are:

-s *slot_num*	Specifies the slot num that the card is residing in. (Default is 1.)
-i *io_port*	Specifies the I/O port location of the board in hex. Valid values are 108, 118, 128, 208, 228, 308, and 328 hex. (Default is 118 hex).
-m *memory*	Specifies the memory location of the board in hex. Valid values are C0000, C8000, D0000, D8000 hex. (Default is D0000.)
-b *bios_file*	Specifies BIOS file to use. (Default is **sys:\system\dgx25bis.bin**.)
-x *x25_file*	Specifies X.25 image file to use. (Default is **sys:\system\dgx25fep.bin**.)

SEE ALSO ---

LAPBTEMPLATE

NAME

lapbtemplate - Description of LAPB configuration files.

DESCRIPTION

A LAPB configuration file contains 16 lines of various parameters. Configuration of the lapb driver is performed by *lltune* using files with this format. These parameters are detailed below:

1) **N2_VAL**   Maximum number of times that a Protocol Data Unit is sent following the expiration of the Acknowledgement Timer, the P-bit timer, or the Reject Timer. It also limits the number of times an RR with the P-bit set is sent when remote busy is true and the Busy timer expires.

2) **T1_VAL**   The time during which the LAPB expects to receive an acknowledgement to an outstanding I Protocol Data Unit(PDU) or an expected response to a sent unnumbered PDU. Value is in 0.1 second units.

3) **TPF_VAL**   The time during which the LAPB expects to receive a PDU with the F-bit set to 1 in response to a command with the P-bit set to 1. Value is in 0.1 second units and should be less than the value specified for the Acknowledgement Timer.

4) **TREJ_VAL**   The time interval during which the LAPB expects to receive a reply to a sent REJ TPDU. Value is in 0.1 second units.

5) **TBUSY_VAL** The time interval during which the LAPB waits for an indication of the clearance of a busy condition at the other LAPB. Value is in 0.1 second units.

6) **IDLE_VAL**   The time during which the LAPB expects to receive a PDU from the other LAPB. If it expires then the P/F cycle is initiated which may result in link disconnection. Value is in 0.1 second units.

7) **ACK_DELAY** The maximum delay in 0.1 second units before transmitting a delayed RR. This must be considerably less than the Acknowledgement Timer value.

8) **NOTACK_MAX**

The maximum number of unacknowledged received I PDUs before the RR acknowledging them all must be sent.

9) **LOC_WIND**   The number of unacknowledged I PDUs which may be sent.

10) **LOC_PROBE**

The position before the window is closed at which an I PDU is sent with the P-bit set to solicit an acknowledgement from the receiver.

11) **MAX_I_LEN** Maximum size of LAPB I frame. LAPB requires all incoming I frames above a certain size to be rejected by a FRMR. This parameter specifies the maximum size. It is constructed as (maximum X.25 data size + X.25 protocol length + LAPB protocol length).

12) **IGN_UA_ERROR**

When the connection is in ERROR state, this parameter defines whether or not to ignore any UA frames received.

---

13) FRMR_FRMR_ERROR

When the connection is in ERROR state, this parameter defines whether or not to re-transmit a frame reject if a frame reject is received.

14) FRMR_INVRSP_ERROR

When the connection is in ERROR state, this parameter defines whether or not to transmit a frame reject if an invalid frame response is received.

15) SFRAME_PBIT

This parameter defines whether or not to send a frame reject if an S-Frame is received without the P-bit set.

16) NO_DM_ADM

This parameter defines whether or not to send a DM on entry to ADM state after an N2 count expiration.

SEE ALSO

lltune.

LAPTEMP

NAME
laptemp - Creates or modifies a *lapbtemplate*.

SYNOPSIS
laptemp -f *filename*

DESCRIPTION
This utility creates or modifies a *lapbtemplate*. Input is requested
for each entry required in the template. Each entry in the template
is checked and validated. For each entry type a help line is
available.

laptemplates are used by **lltune** for configuring a sub-network.

SEE ALSO
lapbtemplate lltune

Note: (There is no actual program **LLTUNE** on the DigiBoard-supplied disk; rather, there are two identical programs, **LLTUNEA.NLM** and **LLTUNEB.NLM**. Two programs are provided so that they may be used concurrently.)

NAME

lltune - Sends/receives lapb tuning parameters to/from their respective drivers.

SYNOPSIS

lltune -s *subnet_id* -**P** [*filename*]
lltune -s *subnet_id* [-**G**] [-**f** *filename*]

DESCRIPTION

lltune is a utility which either *puts* a set of lapb parameters to the lapb driver, or *gets* a set of lapb parameters from the lapb driver. By default, a **get** operation is performed.

These parameters are on a per-subnetwork basis and thus, the subnetwork identifier must be specified. The options used in *lltune* are:

-**s** *subnet_id*   subnet_id is the subnetwork to be referenced (A or B).

-**G**   get parameters from the lapb driver. These are written to the standard output.

            Note: The -**G** (get) option is used as default and therefore is optional when a 'get' is required.

-**P**   put parameters to the lapb driver, giving sub-network *subnet_id* these values.

If the filename begins with a '/', then it is assumed to be the full pathname of the file. Otherwise, the file required is assumed to be in `SYS:\digi\template`. If filename is not found in the template directory, then LLTUNE will return a fail code.

SEE ALSO
  lapbtemplate

X25DUMP

NAME

x25dump - Allows a user to view a specified portion of the board's memory.

SYNOPSIS

x25dump -l *location* -i *io_port* -m *memory* [-f *filename*]

DESCRIPTION

This utility allows a user to view a specified area of the Sync-Port/X.25R adaptor board's memory. It is intended to be used a an aid for troubleshooting problems associated with the board.

An area of 224 bytes with hex and ascii equivalents is displayed. The options are:

-l *location*   Specifies the location, in hex, *on the board* to view. (Default is 0 hex.)

-i *io_port*   Specifies the location, in hex, of the I/O port of the board to view. (Default is 118 hex.)

-m *memory*   Specifies the location, in hex, of the adaptor card in the system. (C0000, or D0000, etc...)

-f *file_name*   Specifies a file name to put the formatted output. If this option is chosen, no output will appear on the display, but will be written to the file instead.

SEE ALSO

DGX25STS

NAME
dgx25sts - show status of X.25 network

SYNOPSIS
dgx25sts [-**p** *proto*] [-**s** *subnetwork*] ... [-**f** *filename*]

DESCRIPTION
The **dgx25sts** command symbolically displays the contents of various per-protocol statistics, which are held by various modules in the X.25 network. By default, X.25 packet level protocol (PLP) statistics are shown:

x25:

calls received	receiver ready received
calls sent	receiver ready sent
calls in established	resets received
calls out established	resets sent
data packets received	diagnostic packets received
data packets sent	diagnostic packets sent
restarts received	interrupt packets received
restarts sent	interrupt packets sent
receiver not ready received	PVCs in Data Transfer state
receiver not ready sent	SVCs in Data Transfer state

There is a separate block of statistics for each protocol.

The options in **dgx25sts** have the following meanings:

-**s** *subnetwork*   display statistics on a per-subnetwork basis (A or B).

Statistics on a per-network basis will be shown along with the default statistics unless the -**s** option is used in conjunction with the -**p** option.

-**p** *proto*   show statistics for a specified protocol *proto*; *proto* may be either "lapb" or "x25".

-**w**   display statistics relating to the WAN.

Output is of the form:

WAN:
   good frames transmitted
   good frames received
   transmit underruns
   receive overruns
   CRC/frame errors received
   received frames with no buffer
   received frames with no flow control
   receive buffer overflows
   receive aborts

-**z**   resets the statistics on a per-protocol basis. Thus, it must be used with the -**p** option. This option is only available to the super-user.

If an interval is specified, dgx25sts will continuously re-display the appropriate information or reset the statistics, pausing *interval* seconds between each action.

-**f** *filename*   Filename for statistics to be written to.

For "**lapb**," output is of the form:

```
Subnetwork  : A
Link Mode   : LC_LAPBDTE    Link State: NORMAL

   FRAMES    RX_CMD   RX_RSP    TX_CMD   TX_RSP
----------------------------------------------------
Supervisory:
   RR        118       84        83       118
   RNR       0         0         0        0
   REJ       0         0         0        0

Unnumbered:
   SABM      0                   1
   DISC      1                   4
   DM                  0                  0
   UA                  1                  0
   FRMR                0                  0

Information:
   I         1                   1
```

For "**x25**," output is of the form:

```
   4    calls received
   0    calls sent
   4    calls in established
   0    calls out established
5441    data packets received
5819    data packets sent
   2    restarts received
   3    restarts sent
   0    receiver not ready received
   0    receiver not ready sent
 515    receiver ready received
 501    receiver ready sent
   0    resets received
   0    resets sent
   0    diagnostic packets received
   0    diagnostic packets sent
   0    interrupt packets received
   0    interrupt packets sent
   0    PVCs in data transfer state
   1    SVCs in date transfer state
```

It should be noted that if this option is used in conjunction with the -s option, then the subnetwork's underlying protocol must be the same as the one specified.

X25TEMP

NAME
  X25temp - Creates or modifies a X25template.

SYNOPSIS
  x25temp -f *filename*

DESCRIPTION
  This utility creates or modifies an x25template. Input is requested
  for each entry required in the template. Each entry in the template
  is checked and validated. For each entry type a help line is
  available.

  x25templates are used by x25tune for configuring a sub-network.

SEE ALSO
  x25template x25tune

NAME

x25template - Description of X.25 configuration file format

DESCRIPTION

An X.25 configuration file consists of 80 parameters, one per line. Each parameter description (below) has three parts:

- a number, which corresponds to the line in the configuration file which holds the parameter,

- the name which the parameter is known by (this name does not appear in the X.25 configuration file),

- the description of the parameter.

These parameters are listed below:

1) NET_MODE

NET_MODE determines the various characteristics of the network protocol. Valid values are integers, as specified below, which refer to the networks listed:

X25_LLC ...	1	X25_88	2	X25_84	3
X25_80	4	PSS	5	AUSTPAC ..	6
DATAPAC ..	7	DDN	8	TELENET ...	9
TRANSPAC	10	TYMNET ..	11	DATEX_P ..	12
DDX_P	13	VENUS_P .	14	ACCUNET .	15
ITAPAC ...	16	DATAPAK .	17	DATANET .	18
DCS	19	TELEPAC ..	20	F_DATAPAC	21
FINPAC ..	22	PACNET ..	23	LUXPAC ..	24

2) X25_VERSION
    X25 Version determines the version of the X.25 protocol
    which is being used over the network.
        '80' -   indicates 1980
        '84' -   indicates 1984
        '88' -   indicates 1988

    Note that the NET_MODE of X25_LLC will override any
    value in this field to 1984.

3) L3PLPMODE
    L3PLPMODE indicates the DTE/DCE nature of the link.
        '0' -   indicates DCE,
        '1' -   indicates DTE,
        '2' -   indicates DXE - resolved using ISO 8208 for
                 DTE-DTE operation.

4) LPC
    LPC to HPC (below) is the range of Permanent Virtual
    Circuits (PVCs). LPC is represented by 3 Hex digits (max is
    FFF). Setting both LPC and HPC to zero means there are no
    PVCs.

5) HPC
    LPC (above) to HPC is the range of Permanent Virtual
    Circuits (PVC's). HPC is represented by 3 Hex digits (max is
    FFF).

6) LIC
    LIC to HIC (below) is the range of one-way incoming logical
    channels. LIC is represented by 3 Hex digits (max is FFF).
    Setting both LIC and HIC to zero means there are no one-way
    incoming logical channels.

7) HIC
    LIC (above) to HIC is the range of one-way incoming logical
    channels. HIC is represented by 3 Hex digits when (max is
    FFF).

8) **LTC**
LTC to HTC (below) is the range of two-way incoming logical channels. LTC is represented by 3 Hex digits (max is FFF). Setting both the LTC and HTC to zero means there are no two-way logical channels.

9) **HTC**
LTC (above) to HTC is the range of two-way logical channels. HTC is represented by 3 Hex digits (max is FFF).

10) **LOC**
LOC to HOC (below) is the range of one-way outgoing logical channels. LOC is represented by 3 Hex digits (max is FFF). Setting both the LOC and HOC to zero means there are no one-way out-going logical channels.

11) **HOC**
LOC (above) to HOC is the range of one-way outgoing logical channels. HOC is represented by 3 Hex digits (max is FFF).

12) **THISGFI**
THISGFI Indicates whether Modula 8 or 128 sequence numbering operates on the network. It takes one of two values:
       8 Modula 8
       128 Modula 128

13) **LOCMAXPKTSIZE**
LOCMAXPKTSIZE is the maximum size of data packets in the direction local-to-remote which are acceptable. That is, on any incoming X.25 call, a value for the packet size parameter greater than LOCMAXPKTSIZE will be negotiated down to this value when the call is accepted.

14) **REMMAXPKTSIZE**
REMMAXPKTSIZE is the maximum size of data packets in the direction remote-to-local which are acceptable. That is, on any incoming X.25 call, a value for the packet size parameter

greater than REMMAXPKTSIZE will be negotiated down to this value when the call is accepted.

15) LOCDEFPKTSIZE
On a particular subnetwork, LOCDEFPKTSIZE specifies the value of the default packet size for the direction local-to-remote, which may be nonstandard, provided the value is agreed between all communicating parties on the LAN or between the DTE and DCE. The usual standard value is 7 implying a default data packet size for each direction of transmission of 128 (1 << 7) octets.

16) REMDEFPKTSIZE
On a particular subnetwork, REMDEFPKTSIZE specifies the value of the default packet size for the direction remote-to-local, which may be nonstandard, provided the value is agreed between all communicating parties on the LAN or between the DTE and DCE. The usual standard value is 7 implying a default data packet size for each direction of transmission of 128 (1 << 7) octets.

17) LOCMAXWSIZE
LOCMAXWSIZE selects the maximum size of the X.25 window which is acceptable. That is, on any incoming X.25 call, a value for the window size parameter greater than LOCMAXWSIZE will be negotiated down to this value when the call is accepted. For Modula 8 networks, LOCMAXWSIZE is bounded in the range >2 and <7 while for Modula 128, the range is >2 and <127.

18) REMMAXWSIZE
REMMAXWSIZE selects the maximum size of the X.25 window which is acceptable. That is, on any incoming X.25 call, a value for the window size parameter greater than REMMAXWSIZE will be negotiated down to this value when the call is accepted. For Modula 8 networks, REMMAXWSIZE is bounded in the range >2 and <7 while for Modula 128, the range is >2 and <127.

19) **LOCDEFWSIZE**

On a particular subnetwork, LOCDEFWSIZE specifies the value of the default window size, which may be nonstandard provided the value is agreed between all communicating parties on the LAN or between the DTE and DCE. The usual standard value is 2. Note: the sequence numbering scheme (THISGFI), Modula 8 or 128 affects the range of this parameter.

20) **REMDEFWSIZE**

On a particular subnetwork, REMDEFWSIZE specifies the value of the default window size, which may be nonstandard provided the value is agreed between all communicating parties on the LAN or between the DTE and DCE. The usual standard value is 2. Note: the sequence numbering scheme (THISGFI), Modula 8 or 128 affects the range of this parameter.

21) **MAXNSDULEN**

MAXNSDULEN specifies a default maximum length beyond which concatenation will be stopped and the data currently held will be passed to the NS user.

22) **ACKDELAY**

ACKDELAY specifies the maximum number of ticks (0.1 second units) over which a pending acknowledgement is withheld.

23) **T20VALUE**

This specifies, in number of ticks (0.1 second units), the DTE timer parameter T20, the Restart Request Response Timer.

24) **T21VALUE**

This specifies, in number of ticks (0.1 second units), the DTE timer parameter T21, the Call Request Response Timer.

25) **T22VALUE**

This specifies, in number of ticks (0.1 second units), the DTE timer parameter T22, the Reset Request Response Timer.

---

26) T23VALUE

This specifies, in number of ticks (0.1 second units), the DTE timer parameter T23, the Clear Request Response Timer.

27) TVALUE

Tvalue is related, but does not correspond exactly, to the DTE Window Status Transmission Timer, T24. It specifies, in number of ticks (0.1 second units), the maximum time during which acknowledgements of data received from the remote transmitter will be withheld. When the timer expires, any withheld acknowledgements will be carried by an X.25 level 3 'Receiver-Not-Ready' control packet.

28) T25VALUE

This specifies, in number of ticks (0.1 second units), the DTE timer parameter T25, the Window Rotation Timer.

29) T26VALUE

This specifies, in number of ticks (0.1 second units), the DTE timer parameter T26, the Interrupt Response Timer.

30) IDLEVALUE

The Idle Value is the number of ticks (0.1 second units), during which a link-level connection associated with no connections will be maintained. If the link is to a WAN then this should be zero (infinity) - this timer is only used with X.25 on a LAN.

31) CONNECTVALUE

Connect value specifies the number of ticks (0.1 second units), over which the DTE/DCE resolution phase be complete; implemented in order to prevent the (unlikely) event that the two packet level entities cannot resolve their DTE/DCE nature. When this expires, the link connection will be disconnected and all pending connections aborted.

32) R20VALUE

R20 value specifies the DTE Restart Request Retransmission Count.

---

33) R22VALUE

R22 value specifies the DTE Reset Request Retransmission Count.

34) R23VALUE

R23 value specifies the DTE Clear Request Retransmission Count.

35) LOCALDELAY

LOCAL DELAY is, in milliseconds, the transit delay attributed to internal processing.

36) ACCESSDELAY

ACCESS DELAY is, in milliseconds, the transit delay attributed to the effect of the line transmission rate.

37) LOCMAXTHCLASS

LOCMAXTHCLASS is the maximum value of the throughput class Quality Of Service parameter which is supported. According to ISO 8208 this parameter is bounded in the range >3 and <12 corresponding to a range 75 to 48000 bits/second.

38) REMMAXTHCLASS

REMMAXTHCLASS is the maximum value of the throughput class Quality Of Service parameter which is supported. According to ISO 8208 this parameter is bounded in the range >3 and <12 corresponding to a range 75 to 48000 bits/second.

39) LOCDEFTHCLASS

In some networks, for example, TELENET, negotiation of throughput class is constrained to be towards a configured default throughput class. In such cases the flag tcneg_to_default (see below) is non-zero and LOCDEFTHCLASS is the default. In other PSDN's, LOCDEFTHCLASS should be set equal to the value of LOCMAXTHCLASS. Note that LOCMAXTHCLASS > LOCDEFTHCLASS.

40) REMDEFTHCLASS

In some networks, for example, TELENET, negotiation of throughput class is constrained to be towards a configured default throughput class. In such cases the flag tcneg_to_default (see below) is non-zero and REMDEFTH-CLASS is the default. In other PSDN's, REMDEFTHCLASS should be set equal to the value of REMMAXTHCLASS. Note that REMMAXTHCLASS > REMDEFTHCLASS.

41) LOCMINTHCLASS

According to ISO 8208, the throughput class parameter is defined in the range > 3 and < 12. Some PSDN's may provide a different mapping, in which case LOCMINTH-CLASS is the minimum value. Note that LOCMAXTH-CLASS > LOCDEFTHCLASS > LOCMINTHCLASS.

42) REMMINTHCLASS

According to ISO 8208, the throughput class parameter is defined in the range > 3 and < 12. Some PSDN's may provide a different mapping, in which case REMMINTH-CLASS is the minimum value. Note that REMMAXTH-CLASS > REMDEFTHCLASS > REMMINTHCLASS.

43) SUB_CUG

This specifies whether or not this DTE subscribes to Closed User Groups with no Outgoing or Incoming Access.

44) SUB_PREF

This specifies whether or not this DTE subscribes to a Preferential Closed User Group.

45) SUB_CUGOA

This specifies whether or not this DTE subscribes to Closed User Groups with Outgoing Access.

46) SUB_CUGIA
This specifies whether or not this DTE subscribes to Closed User Groups with Incoming Access.

47) CUG_FORMAT
CUG_FORMAT defines the maximum number of Closed User Groups that this DTE subscribes to. This will be one of two ranges: Basic (100 or fewer) or Extended (between 101 and 10000).

48) BAR_CUG_IN
This flag provides the means to force rejection of any incoming calls carrying the Closed User Group optional facility (which is necessary in some networks) for example DDN. When non-zero, such calls will be rejected, otherwise incoming Closed User Group facilities are ignored.

49) SUB_EXTENDED
Subscribe to extended call packets (Window and Packet size negotiation is permitted).

50) BAR_EXTENDED
Treat window and packet size negotiation in incoming packets as a procedure error.

51) SUB_FSELECT
Subscribe to fast select with no restriction on response.

52) SUB_FSRRESP
Subscribe to fast select with restriction on response.

53) SUB_REVCHARGE
Allow incoming calls to specify the reverse charging facility.

54) SUB_LOC_CHG_PREV
Subscribe to local charging prevention.

55) BAR_INCALL
Bar incoming calls.

56) BAR_OUTCALL
Bar outgoing calls.

57) SUB_TOA_NPI_FMT
Subscribe to TOA/NPI Address Format.

58) BAR_TOA_NPI_FMT
Bar incoming call set-up and clearing packets which use the
TOA/NPI Address Format.

59) SUB_NUI_OVERRIDE
Subscribe to NUI Override.

60) ACC_NODIAG
Allow the omission of the diagnostic byte in incoming
RESTART, CLEAR and RESET INDICATION packets.

61) USE_DIAG
Use diagnostic packets.

62) CCITT_CLEAR_LEN
Restrict the length of a CLEAR INDICATION to 5 bytes and
a CLEAR CONFIRM to 3 bytes.

63) BAR_DIAG
Bar diagnostic packets.

64) DISC_NZ_DIAG
Discard diagnostic packets on a non-zero LCN.

65) ACC_HEX_ADD
Allow DTE addresses to contain hexadecimal digits.

66) BAR_NONPRIV_LISTEN
Disallow a non-privileged user (i.e. one without superuser
privilege) from listening for incoming calls.

67) INTL_ADDR_RECOGN

INTL_ADDR_RECOGN determines whether outgoing international calls are to be accepted. The values and their interpretation are:

0 - International calls are NOT distinguished,

1 - The DNIC of the called DTE address is examined and compared to that held in the psdn_local members dnic1 and dnic2. A mismatch implies an international call.

2 - International calls are distinguished by having a '1' prefix on the DTE address eg. DATAPAC has this feature.

3 - International calls are distinguished by having a '0' prefix on the DTE address.

The main use of this field is in conjunction with the INTL_PRIORITISED field discussed below.

68) INTL_PRIORITISED

INTL_PRIORITISED determines whether some prioritization method is to be used for international calls and is used in conjunction with PRTY_ENCODE_CONTOL and PRTY_PKT_FORCED value. It has two values:

Zero: implies no priority.

non-Zero: implies an attempt to prioritize according to PRTY_ENCODE_CONTROL.

69) DNIC

This field contains the first four BCD digits of DNIC and is only used when INTL_ADDR_RECOGN has the value one. Note this field must contain exactly four BCD digits.

70) PRTY_ENCODE_CONTROL

PRTY_ENCODE_CONTROL describes how the priority request is to be encoded for this PSDN. The following are currently valid:

0 - No action taken,

1 - Encode the priority request using the DATAPAC priority bit(1976 version).

2 - Encode the priority request using the DATAPAC Traffic Class (1980 version which employs Calling Network facility marker).

71) PRTY_PKT_FORCED_VAL

If this entry is non-zero all priority call requests and incoming calls should have the associated packet size parameter forced to this value (Note that the actual packet size is 2 to the power of this parameter). A zero value implies no special action.

72) SRC_ADDR_CONTROL

SRC_ADDR_CONTROL provides a means to override or set the calling address in outgoing call requests for this PSDN. It takes the following values:

0 - No action. Calling DTE's are encoded as, and if, provided by the network service user.

1 - Force omission of the calling DTE address, even if the user supplied one.

2 - Force the calling DTE address to that contained in LOCAL_ADDRESS.

3 - Force the calling DTE address to that contained in LOCAL_ADDRESS, even if the network service user supplied one.

73) DBIT_ACCEPT_IN

The DBIT_ACCEPT_IN flag defines the action to take when a Call Accept is received with the D-bit set and there is no local D-bit support. It takes one of the following values:

0 - Leave the D-bit set and pass the packet on,

1 - Zero the D-bit and pass the packet on,

2 - Clear the call.

74) DBIT_ACCEPT_OUT

The DBIT_ACCEPT_OUT flag defines the action to take
when the remote user sends a Call Accept with the D-bit set
when the local user did not request use of the D-bit. It takes
one of the following values:

- 0 - Leave the D-bit set and pass the packet on,
- 1 - Zero the D-bit and pass the packet on,
- 2 - Clear the call.

75) DBIT_DATA_IN

The DBIT_DATA_IN flag defines the action to take when a
data packet is received with the D-bit set and the local user
did not request use of the D-bit. It takes one of the following
values:

- 0 - Leave the D-bit set and pass the packet on,
- 1 - Zero the D-bit and pass the packet on,
- 2 - Reset the call.

76) DBIT_DATA_OUT

The DBIT_DATA_OUT flag defines the action when the local
user send a data packet with the D-bit set, but the remote
party has not indicated D-bit support. It takes one of the
following values:

- 0 - Leave the D-bit set and pass the packet on,
- 1 - Zero the D-bit and pass the packet on,
- 2 - Reset the call.

77) THCLASS_NEG_TO_DEF

This accommodates certain network procedures which dictate
that negotiation of throughput class must be towards the
default value (e.g. TELENET), the default value being
configured into the members LOCDEFTHCLASS and
REMDEFTHCLASS. A non-zero value in this field requests
use of this option, zero implies non-use.

78) THCLASS_TYPE

THCLASS_TYPE is a means by which throughput class encodings can be used to assign packet and window sizes (according to THCLASS_PMAP and THCLASS_WMAP). It should be noted that some implementations of X.25 do not use the X.25 packet and window negotiation but instead rely on mapping the throughput class to these parameters (see THCLASS_TYPE 1, 2 and 3). THCLASS_TYPE should be employed on such PSDNs. Note also that the values of LOCMAXTHCLASS and REMMAXTHCLASS may have an effect on what is achieved through the mapping. The values currently assigned to indicate the mapping are:

0 - No special action is to be taken on throughput class,

1 - Use only the low nibble of the through put class parameter to map window and packet sizes in both directions.

2 - Use only the high nibble of the throughput class parameter to map window and packet sizes in both directions.

3 - Use both nibbles of the throughput class parameter to map window and packet sizes for the appropriate directions.

Values 1, 2 and 3 are intended for use on special X.25 PSDN implementations.

79) THCLASS_WMAP

THCLASS_WMAP is the mapping between throughput class and a window parameter. An entry of zero in this table indicates that the currently set or default value is to be used. The value must be entered as 10 integers separated by commas or full-stops. Each integer should be in the range 1 to MAXWSIZE (where MAXWSIZE is the lower of LOCMAXWSIZE and REMMAXWSIZE), with the absolute maximum being 127.

80) THCLASS_PMAP

THCLASS_PMAP is the mapping between throughput class and a packet parameter. An entry of zero in this table indicates that the currently set or default value is to be used. The value is required to be entered as 10 integers separated by commas or full-stops. Each integer should be in the range 4 to MAXPKTSIZE (where MAXPKTSIZE is the lower of LOCMAXPKTSIZE and REMMAXPKTSIZE), with the absolute maximum being 12.

SEE ALSO

x25tune

DGX25TRC

NAME
DGX25TRC - Allows a trace of line activity on a specified port.

SYNOPSIS
dgx25trc **-s** *subnet-id* **-p** *protocol* [**-f** *filename*]

DESCRIPTION
This utility allows a user to trace a given port for line activity. A break-out of packet types a packet specific information is made. The protocol specifies either lapb tracing or X.25 PLP level tracing. The trace output can be optionally written to a file. The file can then be reviewed at a later time, or distributed for problem resolution.

The use of this utility should be limited to debugging of problem lines or configurations. Also, since data can be inspected and observed, only authorized users should be allowed to use this utility.

The options have the following meaning:

-s *subnet-id*   Specifies which subnet (either **A** or **B**) should be traced.

-p *protocol*   Specifies which layer should be traced. Options are **lapb** or **x25**.

-f *filename*   Specifies the file to write the output of the trace to. This is optional.

NOTES
Running this utility slows down line utilization and performance. It should be used sparingly when attempting to debug network problems.

Note: (There is no actual program **X25TUNE** on the Digi-Board supplied disk; rather, there are two identical programs, **X25TUNEA.NLM** and **X25TUNEB.NLM**. Two programs are provided so that they may be used concurrently.)

NAME
X25TUNE - Sends/receives X.25 tuning parameters to/from X.25

SYNOPSIS
X25TUNE -s *subnet_id* -P [-a *local_address*] [*templatename*]
X25TUNE -s *subnet_id* [-G] [-d *device*] [-f *filename*]

(Template names are stored by default in SYS:/digi/template.)

DESCRIPTION
X25TUNE is a utility which either:

- puts a set of X.25 parameters to the X.25 module, or
- gets a set of X.25 parameters from the X.25 module.

By default, a **get** operation is performed.

These parameters are on a per-subnetwork basis, so the subnetwork identifier *must* be specified.

The options used in **X25TUNE** have the following meaning:

-s *subnet_id*   *subnet_id* is the subnetwork to be referenced.

-G   get parameters from X.25 subnetwork. These are written to the standard output.

-P	send parameters to the X.25 module, giving subnetwork *subnet_id* these values.
-a *address*	sets the X.25 address of the specified sub-network to be *address*. This address is either a DTE or an LSAP. This is only valid with the -P option.
-f *filename*	The filename, as used in the "send" option, specifies the file of parameters to be sent (put) to X.25. The values are read from the standard input but this can be overridden by specifying a file of parameters (see *x25template*).

If the filename begins with a "/" then it is assumed to be the full pathname of the file. Otherwise, the file required is assumed to be `SYS:\digi\template\`*templatename*. If *templatename* is not found in the template directory, then it is returned as invalid.

SEE ALSO
    x25template

WANTEMP

NAME
wantemp - Creates or modifies a *wanbtemplate*.

SYNOPSIS
wantemp -f *filename*

DESCRIPTION
This utility creates or modifies a *wanbtemplate*. Input is requested for each entry required in the template. Each entry in the template is checked and validated. For each entry type a help line is available.

wantemplates are used by **wantune** for configuring a sub-network.

SEE ALSO
wanbtemplate wantune

NAME
wantemplate - Description of WAN configuration file

DESCRIPTION
A WAN configuration file contains a set of parameters, each on a separate line, which are used by *wantune* to configure the WAN driver. Please note that the *x21* and *v25* timeout values will only appear in releases which support these interfaces.

These parameters are:

WAN_maxframe   Maximum size of WAN frame.

WAN_baud   The baud rate for the WAN line. If zero then an external clock must be provided.

WAN_translate   Specifies whether the supplied address should be translated into a format suitable for the class of interface.

WAN_phys_int   Specifies the type of physical interface of the WAN line.

WAN_connect_proc   Use specified calling procedures.

WAN_x21_T1   A timeout which specifies the time which the DTE will wait for the DCE to respond with "proceed-to-select" from a "call request."

WAN_x21_T2   A timeout which specifies the time that the DTE will wait for the DCE to enter data transfer state after an end-of-selection command has been issued to the DCE.

WAN_x21_T3A	A timeout which specifies the time which the DTE will wait for the DCE to respond with "call progress signals" or "DCE-provided information."
WAN_x21_T4B	A timeout which specifies the time which the DTE will wait for the DCE to signal "ready for data" after receiving a "call accept."
WAN_x21_T5	A timeout which specifies the time which the DTE will wait for the DCE to respond "DCE ready" to a "DTE clear request."
WAN_x21_T6	A timeout which specifies the time which the DTE will wait for the DCE to respond "DCE ready" to a "DTE clear confirmation."
WAN_v25_callreq	A timeout which is used if the network does not support call fail indications.

SEE ALSO

wantune

WANTUNE   (WANTUNEA.NLM or WANTUNEB.NLM)

Note: (There is no actual program **WANTUNE** on the Digi-Board supplied disk; rather, there are two identical programs, **WANTUNEA.NLM** and **WAN-TUNEB.NLM**. Two programs are provided so that they may be used concurrently.)

NAME
wantune - Sends/receives WAN tuning parameters to/from WAN

SYNOPSIS
wantune -P -s *subnet_id* [*templatename*]
wantune [**-G**] -s *subnet_id* [**-f** *filename*]

(Template names are stored by default in SYS:/digi/template.)

DESCRIPTION
wantune is a utility which either:

• puts a set of WAN parameters to the WAN module, or

• gets a set of WAN parameters from the WAN module.

By default, a **get** operation is performed.

These parameters are on a per-subnetwork basis, so the subnetwork identifier *must* be specified.

The options used in wantune have the following meaning:

-s *subnet_id*   *subnet_id* is the subnetwork to be referenced (A or B).

| -G | get parameters from the WAN module. These are written to the standard output. |
| | |

Note: The -G (get) option is used as default and therefore is optional when a get is required.

-P	send parameters to the WAN module, giving subnetwork *subnet_id* these values.
-f *filename*	The filename, as used in the "send" option, specifies the file of parameters to be sent (put) to WAN. The values are read from the standard input but this can be overridden by specifying a file of parameters (see *wantemplate*).

If the filename begins with a "/" it is assumed to be the full pathname of the file. Otherwise, the file required is assumed to be SYS:\digi\template*templatename*. If *templatename* is not found in the template directory, then it is returned as invalid.

SEE ALSO

wantemplate

Appendix D   Specifications

ISA Host Adapter

Power Requirements

+5 Volts ± 5%, 2.3 amps typical
+12 Volts ± 5%, 100 milliamps typical
-12 Volts ± 5%, 40 milliamps typical

Environmental

Temperature   10° C to 55° C
Relative Humidity 5% to 90%
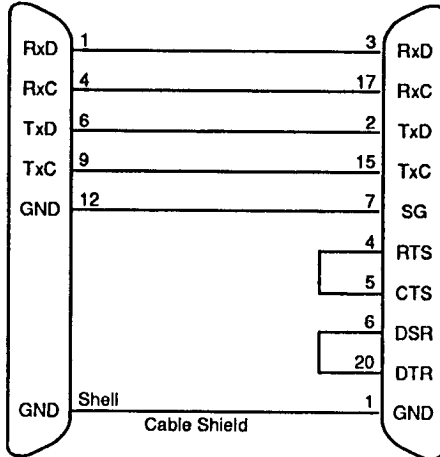Air Movement   30 CFM Forced
Altitude   0 to 12,000 Feet

Mechanical

Length: 13.1 inches   Width: .6 inches
Height: 4.5 inches   Weight: 12 ounces

at data rates of up to 2,048,000 bps.

Appendix E Cable Diagrams

SyncPort/X25R
Host Adapter
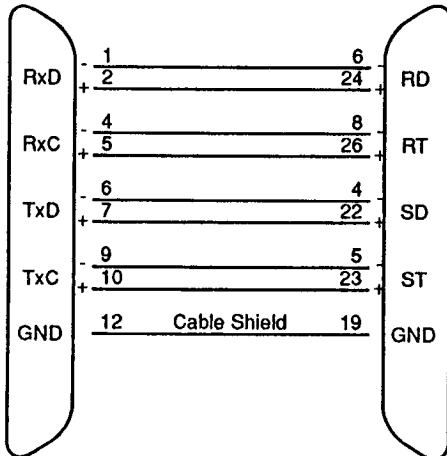Synchronous Port

RS-232
Synchronous
Modem

SyncPort/X25R		RS-232
RxD	1 —————— 3	RxD
RxC	4 —————— 17	RxC
TxD	6 —————— 2	TxD
TxC	9 —————— 15	TxC
GND	12 —————— 7	SG
	4	RTS
	5	CTS
	6	DSR
	20	DTR
GND	Shell ———— 1	GND
	Cable Shield	

HD-15 Male   DB-25 Male

SyncPort/X25R
Host Adapter
Synchronous Port

RS-422
Synchronous
Modem

SyncPort/X25R		RS-422
	– 1 —————— 6	
RxD	+ 2 —————— 24 +	RD
	– 4 —————— 8	
RxC	+ 5 —————— 26 +	RT
	– 6 —————— 4	
TxD	+ 7 —————— 22 +	SD
	– 9 —————— 5	
TxC	+ 10 —————— 23 +	ST
GND	12 Cable Shield 19	GND

HD-15 Male   DB-37 Male

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