SunLink™ SNA/X.25 9.1
Configuration and Administration Manual

The Network Is the Computer™

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Preface

The SunLink PU2.1 SNA server product provides traditional and peer-to-peer SNA communications and networking support for Sun™ Workstations™. The SunLink PU2.1 SNA product set includes:

- SNA interface, including SDLC, X.25, IBM Token Ring, and physical device drivers implemented in Unix® System V Streams
- A server that controls the SNA interface and provides SNA network access to its client applications
- Various client programs, including `sun3270`, `sun3770`, and `sunSNM`
- Application programming interfaces (API) for users who want to create client applications with SunLink LU0

This manual describes the configuration and operation of the X.25 interface to the SunLink PU2.1 SNA server through `QLLC`.

Who Should Use This Book

This book is a reference manual for the SunLink PU2.1 SNA server. System administrators should refer to this manual for installing, configuring, and operating the SunLink PU2.1 SNA server program when connecting to an X.25 network.

Note – If you are using a Token Ring or SDLC, the configuration and operation of the SunLink PU2.1 SNA server is described in *SunLink SNA PU2.1 9.1 Server Configuration and Administration Manual*.

The SunLink X.25 8.0.1 product is the connection between the X.25 network and the SunLink PU2.1 SNA server.

To carry out the system administration functions, two levels of expertise are required: a Unix system administrator to install the SunLink PU2.1 SNA server and build local configuration files; a network administrator to add new devices to the SNA host or peer network configurations. These system administrators must also coordinate the local configuration and the SNA host network configuration.

As a system administrator responsible for the SunLink PU2.1 SNA server installation and local configuration, you should be familiar with the Unix operating system, the configuration of device drivers, and the configuration of SNA and X.25 devices.

How This Book Is Organized

This book can be used as a reference for X.25/QLLC SunLink PU2.1 SNA server configuration and management procedures.

This manual is organized as follows:

Chapter 1, "Introduction to SunLink SNA 9.1," provides a conceptual overview of the SunLink PU2.1 SNA server and serves as background for subsequent chapters.

Chapter 2, "Getting Started with SunLink PU2.1," is designed to get X.25, the supported data link control interface, up and running. Sample configurations are provided along with step-by-step instructions.

Chapter 3, "SunLink PU2.1 Configuration," describes how to configure lines, network interfaces, physical units/line stations, and logical units for the SunLink PU2.1 SNA server when using X.25/QLLC.

Chapter 4, "SNA Host Configuration," describes how to configure lines, network interfaces, physical units/line stations, and logical units for the SNA host network configuration.

Appendix A, "SunLink PU2.1 Configuration Examples," includes a sample configuration file for an SNA/X.25 connection.

Related Documentation

Sun Documentation

- *SunLink SNA PU2.1 9.1 Server Configuration and Administration Manual (802-2673)*
- *SunLink SNA 3270 9.1 End Node Planning and Installation Manual (802-2665)*
- *SunLink Client 3270 9.1 Configuration and User's Manual (802-2667)*
- *SunLink X.25 8.0.1 Reference Manual (801-6285)*
- *SunLink X.25 8.0.1 Configuration Guide (801-6284)*

IBM Documentation

- *IBM Systems Network Architecture Concepts and Products (GC30-3072)*
- *IBM Systems Network Architecture Technical Overview (GC30-3073)*
- *IBM VTAM Installation and Resource Definition (SC23-0111)*
- *IBM Network Control Program Resource Definition Guide (SC30-3349)*
- *IBM 3174 Establishment Controller Planning Guide (GA27-3862)*
- *IBM VTAM Operation (SC23-0113)*
- *IBM NetView Operation (SC30-3364)*
- *IBM X.25 Network Control Program Packet Switching Interface, Planning and Installation Manual (SC30-3501)*

Typographic Conventions

The following table describes the typographic changes used in this book.

Typeface or Symbol	Meaning	Example
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output.	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output.	`% su` `Password:`
AaBbCc123	Command-line variable: replace with a real name or value.	To delete a file, type `rm` *filename.*
	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide.* These are called *class* options. You *must* be root to do this.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C shell, Bourne shell, and Korn shell.

Table P-1 Shell Prompts

Shell	Prompt
C shell	`machine_name%`
C shell superuser	`machine_name#`
Bourne shell and Korn shell	`$`
Bourne shell and Korn shell superuser	#

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Table P-2 SunExpress Contact Information

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United Kingdom	0800-89-88-88	0800-89-88-87
Canada	1-800-873-7869	1-800-944-0661
France	0800-90-61-57	0800-90-61-58
Belgium	02-720-09-09	02-725-88-50
Luxembourg	32-2-720-09-09	32-2-725-88-50
Germany	01-30-81-61-91	01-30-81-61-92
The Netherlands	06-022-34-45	06-022-34-46
Sweden	020-79-57-26	020-79-57-27
Switzerland	0800-55-19-26	0800-55-19-27
Holland	06-022-34-45	06-022-34-46
Japan	0120-33-9096	0120-33-9097

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- Email: `smcc-docs@sun.com`
- Fax: SMCC Document Feedback
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Introduction to SunLink SNA 9.1 1

The SunLink PU2.1 SNA server uses high-performance communications ports or IBM Token Ring network interface controllers to connect your computer to traditional or peer-to-peer IBM System Network Architecture (SNA) networks. The SunLink PU2.1 SNA server facilitates Unix-to-IBM connectivity by providing a full-function SNA node platform for client applications such as SunLink 3270 display and printer emulations, Sun 3770 Remote Job Entry (RJE), and programs you develop using the various application programming interfaces (API) such as SunLink LU0.

The SunLink PU2.1 SNA server may be attached to the SNA network via SDLC telecommunications lines, X.25 packet-switched data networks, and Token Ring local area networks.

Note – This manual deals with the X.25/QLLC connection only.

To the SNA network, the SunLink PU2.1 SNA server appears as one or multiple Physical Unit Type 2.1 (PU2.1). Client programs attach to the SunLink PU2.1 SNA server to gain access to IBM mainframe applications, such as JES2, TSO, POWER, IMS, CICS, and NetView. Figure 1-1 illustrates the relationship between the SunLink PU2.1 SNA server, the SNA network, and the client SNA programs when running on an X.25 public data switched network (PDSN).

The SunLink PU2.1 SNA server uses the client/server paradigm. The SunLink PU2.1 SNA server acts as a gateway to the SNA network for applications running anywhere in your local network.

The SunLink PU2.1 SNA server processes all lower-level SNA protocols and provides service management, so client programs can concentrate on sharing information with either IBM mainframe or SNA peer applications. The client interfaces are extremely flexible. Client applications can share data with either the IBM mainframe application through Logical Unit sessions (LU-LU), Logical Unit control sessions (SSCP-LU), or Physical Unit control sessions (SSCP-PU).

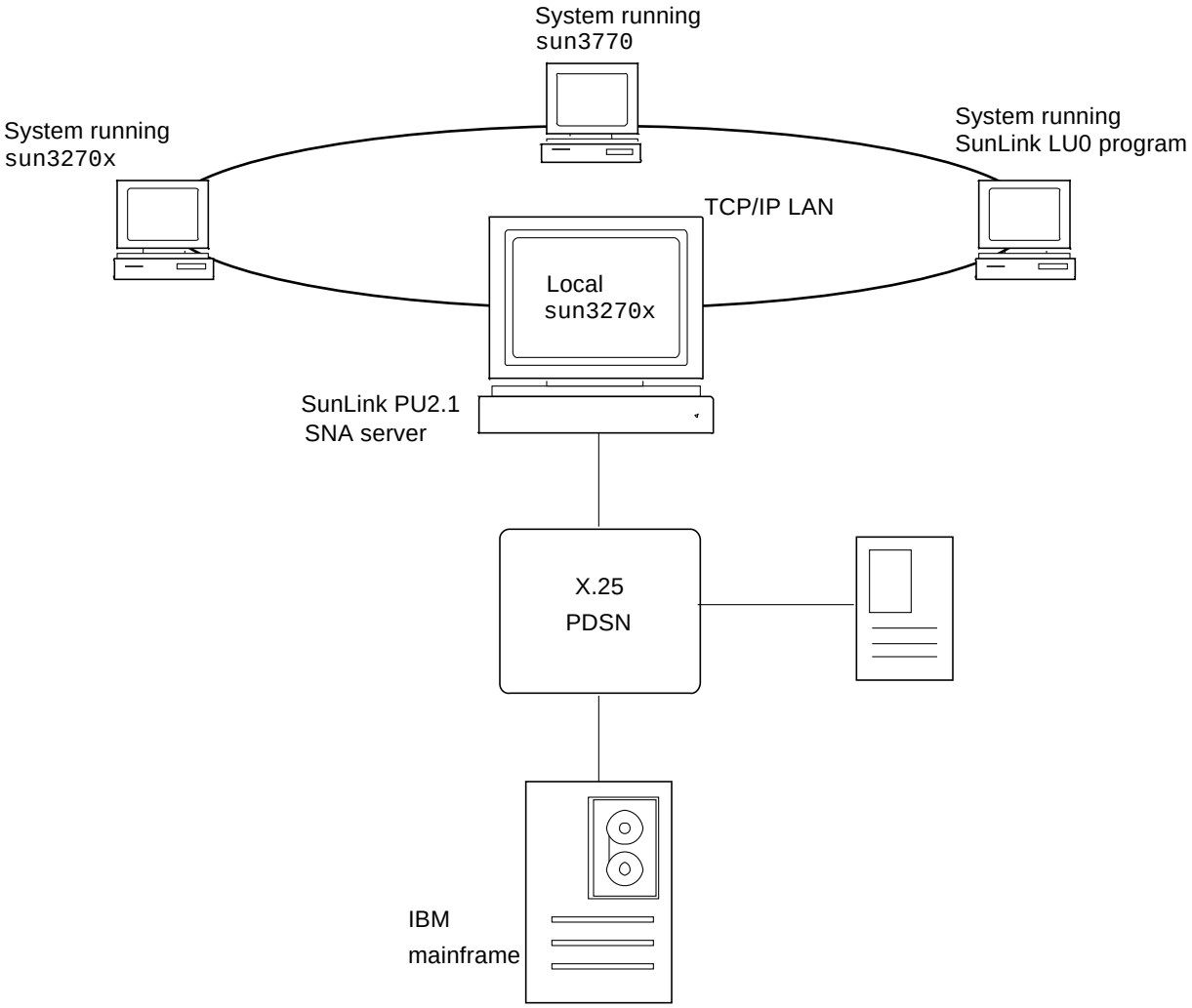

Figure 1-1 SunLink PU2.1 SNA Server Overview

1.1 SunLink PU2.1 Functions

The SunLink PU2.1 SNA server provides a consistent platform for client programs to access an SNA network. The SunLink PU2.1 SNA server functions include managing the physical connections, providing SNA node device emulation, servicing logical units, interfacing with client programs, and enabling you to control and monitor the local SNA resources.

1.1.1 SNA Physical Connection

For traditional hierarchical SNA, the SunLink PU2.1 SNA server connects to the SNA network through data link connection(s) to a Physical Unit Type 5 (PU5) such as an ES/9000 or 9370, to a PU4 device such as an IBM 3745 or 3725 communications controller, or to a PU2.1 device such as an IBM 3174 Token Ring Network 3270 Gateway. SNA supports data link connections over telecommunications lines, X.25 packet-switched data networks (PSDNs) and IBM Token Ring LANs.

1.1.1.1 X.25 PSDN

The SunLink PU2.1 SNA server may be connected to the communications controller over X.25 PSDNs using X.25 virtual circuits (VCs). The Qualified Logical Link Control (QLLC) protocol controls the transmission of data across the VC. Unlike SDLC, QLLC links only support point-to-point connection. For traditional SNA, the communications controller runs the IBM NCP Packet Switched Interface (NPSI) program. It is assumed that your network operates NPSI Version 2, Release 1 or higher.

To operate QLLC links, the Sun X.25 product, SunLink X.25 8.0.1 or later is required. The SunLink PU2.1 SNA server is actually a STREAMS client of SunLink X.25 and must run on the same Sun Workstation. However, both SunLink PU2.1 and X.25 may simultaneously use different ports on the same communications board(s). Other supported features include:

- X.25 permanent virtual circuits (PVCs)
- Dial-in and dial-out X.25 switched virtual circuits (SVCs)
- Packet- and window-size negotiation

1.1.2 Other Topics

Refer to the *SunLink SNA PU2.1 9.1 Configuration and Administration Manual* for a more complete discussion on:

- PU2.1 emulation
- LU emulation
- LU pooling
- Client services
- Operator control
- Sun Basic Message Database (BMD)
- PU2.1 components
- Client application

1.2 Product Installation

Installation of the SunLink SNA PU2.1 9.1 product is covered in the *SunLink SNA 3270 9.1 End Node Planning and Installation Guide.*

Installation of the SunLink X.25 8.0.12 or higher product is covered in its accompanying documentation.

Getting Started with SunLink PU2.1

2

This chapter is designed to get you up and running with the SunLink PU2.1 SNA server as fast as possible. For traditional, host-based SNA connectivity, you should first use one of the sample X.25 configurations, a single PU2.1, and a single client SNA program. Appendix A, “SunLink PU2.1 Configuration Examples” lists the sample configurations distributed with the SunLink PU2.1 SNA server. These sample configuration files are found in the `config` subdirectory of the installation directory. Once you are successfully connected to a remote application, you may extend your configuration to meet your specific requirements.

This chapter first describes the steps necessary to establish traditional, host-based SNA connectivity. It focuses on configuring and starting the `sunpu2.1` SNA server for X.25 Qualified Logical Link Control (QLLC). To start a client SNA program such as `sun3270x`, `sunsnm`, `sun3770`, and user-written programs, consult the associated user manual for that particular client SNA program.

Before your client SNA programs can communicate with IBM mainframe applications, you must correctly install, configure, and activate the `sunpu2.1` SNA server. Sun delivers the SunLink PU2.1 SNA server with installation scripts and sample configurations to ensure that you can begin communicating with IBM mainframe applications immediately.

2

2.1 Establishing SunLink X.25 Connectivity

After successfully completing these steps, ensure that the client SNA programs can access the IBM mainframe applications. Here is a summary of the installation steps:

1. Installing the SunLink products, `PU2.1` and `X.25`
2. Coordinating local and target network configurations.
3. Updating SunLink PU2.1 SNA server local configuration (`sunpu2.config`).
4. Starting the SunLink PU2.1 SNA server (`SunLink PU2.1`) and checking the status.
5. Starting client SNA programs.

Figure 2-1 illustrates a sample of generic configuration for the SunLink PU2.1 SNA server (refer to Appendix A, “SunLink PU2.1 Configuration Examples” for specific examples). The remaining sections use sample configurations based on this generic structure as basis for setting up configurations for one of the supported DLC interfaces. The sample configurations are for SunLink 3270 client SNA programs. Steps for starting other client SNA programs, are almost identical. The respective user manuals for the client SNA programs detail their required start-up procedures.

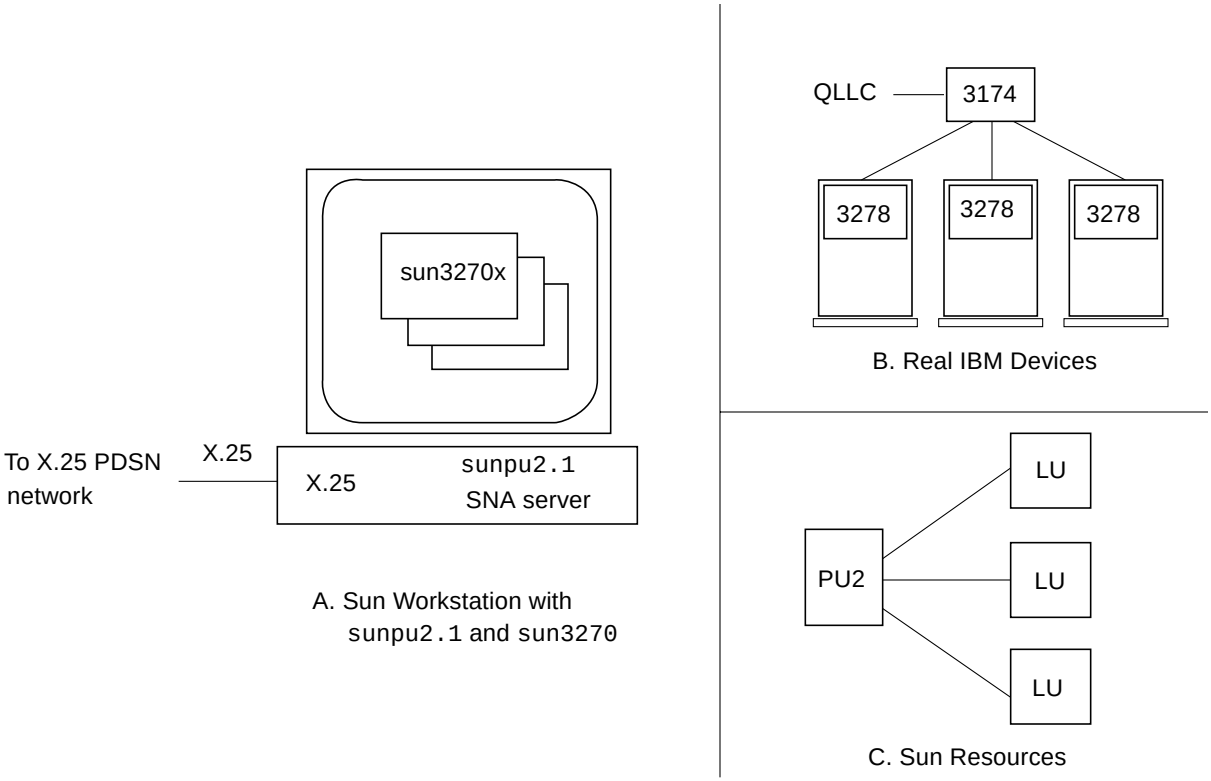

Figure 2-1 Sample Configuration

The sample configuration connects to the SNA network over a QLLC interface via the SunLink X.25 product, one Physical Unit Type 2 (PU2.1), and three SunLink 3270 client SNA programs (LUs). Note that only one SunLink 3270/LU is shown in Figure 2-1. The X.25 connection is connected to an X.25 Public Data Switched Network.

- Part A of Figure 2-1 illustrates the SunLink PU2.1 SNA server running on a Sun Workstation; X.25, as well as the client SNA program (sun3270x) is also running on the Sun Workstation.

- Part B of Figure 2-1 shows a parallel configuration composed of IBM devices.
- Part C of Figure 2-1 relates the SUN SNA resources to the IBM devices, where the SunLink PU2.1 SNA server represents the PU2.1 and attaches to the SNA network through a QLLC line (X.25, `sun3270` represents the LU).

If your configuration is different, refer to Chapter 3, "SunLink PU2.1 Configuration" for more detailed configuration information.

2.2 Installing SunLink PU2.1 and X.25

Refer to the SunLink X.25 8.0 and higher version for installation instructions for X.25 installation.

Refer to *SunLink SNA 3270 9.1 End Node Planning and Installation Manual* for 3270 installation instructions. An overview of installation process follows:

1. Install communications hardware and software, as necessary.
2. Install the SunLink X.25 9.1 or higher software.
3. Install the SunLink 9.1 SNA connectivity software.

You can also run client SNA programs on other systems in your network, using the system running the SunLink PU2.1 SNA server as a gateway to the SNA network. To install a remote client SNA program, move the client SNA program files to the remote system. The *SunLink SNA End Node Planning and Installation Manual* discusses the distribution of client SNA programs in your network. When you start a remote client SNA program, you must specify the name of the system running the SunLink PU2.1 SNA server.

2.3 Configuring X.25 QLLC

The SunLink PU2.1 SNA server connects to the X.25 PSDN and communicates over the X.25 PSDN using the services of SunLink X.25 8.0.1. Refer to the *SunLink X.25 8.0.1 Reference Manual.*

Figure 2-2 illustrates the network connectivity. As stated, the SunLink PU2.1 SNA server connects to the PSDN via SunLink X.25. The SNA mainframe hosts connect to the X.25 PSDN using the X.25 NCP Packet Switched Interface (NPSI) program product.

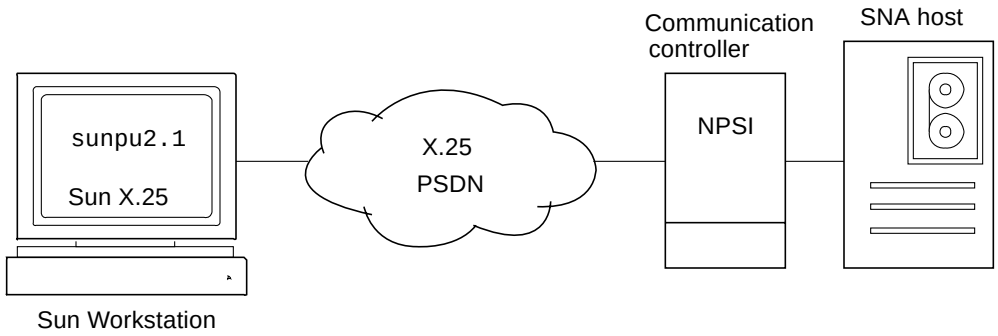

Figure 2-2 X.25 Network Connectivity

2.3.1 Integrating X.25 QLLC and PU2.1 Configurations

The SNA resources defined in the VTAM / NCP generation must also be defined to the SunLink PU2.1 SNA server; these resource definitions must be consistent. X.25 adds further complexity. SunLink X.25 must be configured to connect to the X.25 PSDN and to NPSI. The SunLink PU2.1 server must then be configured to access SunLink X.25. Table 2-1 identifies the particular parameters in each configuration that require coordination.

2.3.2 Sample X.25 QLLC Configuration

The sample configuration provided for getting started with X.25 QLLC defines a single PU2.1 and three LUs for use by SunLink 3270 terminal emulators. The PU2.1 is configured to establish and use a switched QLLC line to the NPSI communications controller over an X.25 PSDN. Figure 2-3 shows the overall configuration, and identifies the key resources.

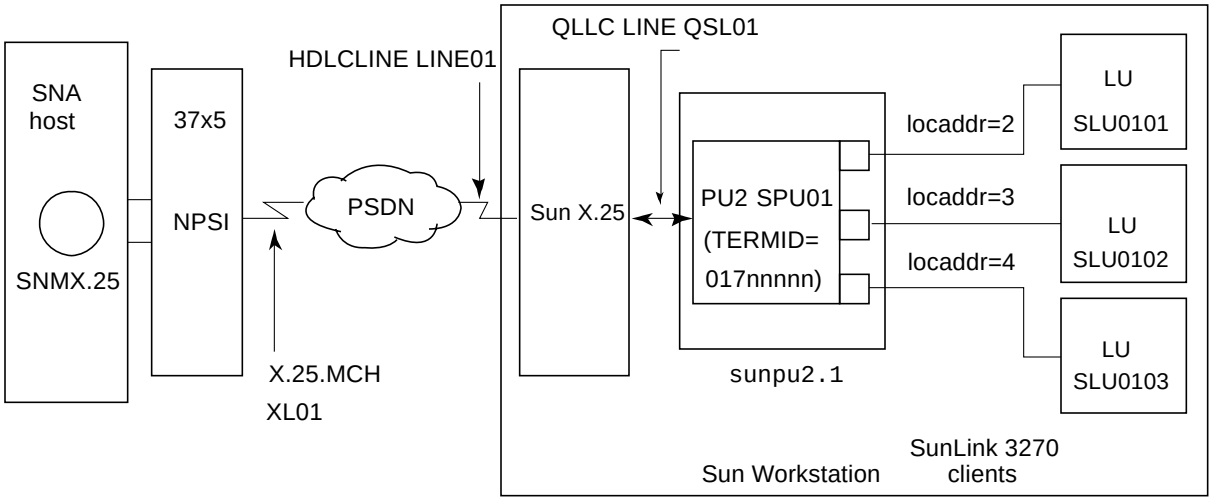

Figure 2-3 Sample X.25 QLLC Configuration

Several separate configuration files are used to define this configuration:

- `SMNX.25`, VTAM switched major node, which defines the switched PU, SPU01 to VTAM
- `NPSI` (as part of the overall NCP network definition), which defines the X.25 interface and the SNA resources that are accessed over the X.25 PSDN
- `sunpu2.config.x25svc`, the SunLink PU2.1 SNA server configuration, which defines the local SNA resources
- The files that make up the SunLink X.25 configuration

The SunLink PU2.1 SNA server configuration file is supplied in the software distribution and documented in Appendix A. Refer to Chapter 3, “SunLink PU2.1 Configuration” for detailed information on the SunLink PU2.1 SNA server configuration and SunLink X.25 8.0.1 for configuration and operational information on SunLink X.25.

The SunLink X.25 8.0.1 product is configured using the `x25tool` application. The `x25tool` application is distributed with the SunLink X.25 8.0.1 product. Instructions on how to use the `x25tool` and configure the SunLink X.25 8.0.1 product can be found in the *SunLink X.25 8.0.1 Configuration Guide.*

Chapter 4, “SNA Host Configuration” contains the VTAM SMNX.25 and NPSI configuration examples. Your SNA host system programmer is responsible for incorporating these sample configurations in the host VTAM/NCP network definition and making any necessary changes. If necessary, refer to the following IBM document: *IBM VTAM Installation and Resource Definition* for detailed information on the VTAM/NCP configuration, and the *IBM X.25 Network Control Program Packet Switching Interface, Planning and Installation Manual* for details on the NPSI configuration.

Your SNA network may already include defined resources that are identical, or at least very close, to this example. If this is the case, the simplest approach to getting started is to replace the defined PU2.1 with SunLink system. Once you have established the corresponding Sun configurations, restore the original PU2.1 and have your SNA host system programmer clone additional host resources. Otherwise, to use the sample configuration, you need to tailor the configurations for your own environment, and ensure that the configurations are coordinated. This will involve making minor changes to the above configuration files.

2.3.2.1 SunLink PU2.1 and VTAM SMN

Consult with the SNA host system programmer to determine values for the parameters listed in Table 2-1.

Table 2-1 VTAM vs. SunLink PU2.1 SNA Server Configuration Values

SunLink PU2.1 Directive	SunLink PU2.1 Parameter	VTAM Macro	VTAM Parameter
PU2	MAXDATA	PU	MAXDATA
	TERMID		IDBLK and IDNUM
	NAME		symbolicname
LU	LOCADDR	LU	LOCADDR
	TYPE		DLOGMOD
	NAME		symbolicname

The key association is TERMID vs. IDBLK/IDNUM. VTAM identifies the switched PU from this resource identification presented by the NCP when contact with the PU is established.

2.3.3 SunLink X.25 and NPSI

Consult with the SNA host system programmer to determine values for the parameters listed below in Table 2-2.

Table 2-2 NPSI vs. SunLink X.25 Configuration Values

x25tool Window	x25tool Parameter	NPSI Macro	NPSI Parameter
Throughput class and packet sizes	Remote maximum packet sizes	X25.VCCPT	MAXPTKL
	Remote maximum window size		VWINDOW
Closed user groups and facilities	Incoming reverse charging	X25.NET	RFAC=REVCHG
	Closed user group		RFAC=CUGB, CUGE
Network profile	Sequence numbering		PKTMODL

2.3.4 SunLink X.25 and the X.25 PSDN

Before you can configure SunLink X.25 to connect to the X.25 PSDN, you must confer with the X.25 PSDN administrator, who will need to establish your configuration and operational profile so that the network side of the X.25 interface can be configured.

2.3.4.1 SunLink PU2.1 and SunLink X.25

Having established suitable SunLink X.25 parameters for X.25 PSDN connection and end-to-end communication with NPSI, determine whether you need to modify the SunLink PU2.1 `QLLC` line directive.

Table 2-3 SunLink X.25 vs. SunLink PU2.1 SNA Server Configuration Values

SunLink PU2.1 Directive	SunLink PU2.1 Parameter	x25tool Window	x25tool Parameter
`QLLC` line	`HDLCLINE`	Interface configuration	Link
	`PACKET_SIZE`	Throughput class and packet sizes	Packet size
	`WINDOW_SIZE`		Window sizes

The configured `PACKET_SIZEs` must fit into the maximum HDLC frame size specified in the `PACKET_SIZEs`. The example assumes that the SunLink PU2.1 SNA server and the SunX.25 server are co-resident.

Using the information in Section 2.3.1, “Integrating X.25 QLLC and PU2.1 Configurations,” update `sunpu2.config.x25svc` and the SunLink X.25 configuration files to reflect your local parameter values.

2.4 Starting SunLink X.25

Your configuration should now be complete and you are ready to start. Since SunLink X.25 controls the physical lines, start SunLink X.25 before you start the SunLink PU2.1 SNA server.

- **Invoke SunLink X.25 using the SunLink `x25tool` and choose “Start X.25 network” in the Network Control menu.**

2.5 Starting SunLink PU2.1

After coordinating the SNA host network configuration and the local SunLink PU2.1 SNA server configuration, you are ready to start the SunLink PU2.1 SNA server. This chapter outlines starting the SunLink PU2.1 SNA server. See Chapter 4 for more start-up options.

The sunpu2.1 daemon process implements the functions of the SunLink PU2.1 SNA server. During initialization, sunpu2.1 reads the local configuration file to learn about its SNA resources.

♦ **To invoke the SunLink PU2.1 SNA server with the default configuration sunpu2.config using SunGMI, refer to the *SunLink SNA PU2.1 9.1 Server Configuration and Administration Manual*.**

The sunpu2.1 daemon will terminate immediately if an error is detected during initialization.

If initialization is successful, sunpu2.1 responds as follows:

```
PU200001 : Initializing SunPU2.1 SNA Server
PU200002 : Initialization Complete
```

The sunpu2.1 daemon automatically begins to listen for SNA connections during start-up, unless configured otherwise. If connection establishment fails or times out, sunpu2.1 continues to look for connection requests from the SNA network. Note that the SNA host (VTAM) must activate its connections to the SunLink PU2.1 SNA server. Refer to the IBM *NetView Operations* manual for activation, deactivation, and display commands for SNA resources.

2.5.1 Checking SunLink PU2.1 Status

Sun supplies a local operator interface called sunop. You can check the status of your links with the sunop application. The *SunLink SNA PU2.1 9.1 Configuration and Administration Guide* describes the sunop command set in detail.

♦ **To check the status of your SNA resources, enter the following command:**

```
% sunop
SunLink Controller
Attempting to connect to Host, Service_name
Connected to Host, Service_name
->
```

The sunop application prompts you for management requests (-> is the sunop prompt).

♦ **To view the PU2.1 status, use the `info` command:**

```
-> info ln all
(2) info ln all

Cnt    LINKNAME          DEVICE    LNSTATUS      LNTYPE
  1       BLN01       /dev/zbxa       ACTIVE        SDLC

Cnt    PUNAME          LINK          PUSTATUS     ADDR
  1    BPU011         BLN01            ACTIVE       01

Cnt    LUNAME            STATUS         ADDRESS   TYPE      PTNR_LU
  1    BlU011          ACT/ATT      199.32.1.3     2
  2    BlU012            ACTIVE                -      2            -
  3    BlU013            ACTIVE                -      3            -

Cnt    LUNAME            STATUS         ADDRESS   TYPE      PTNR_LU
  1    BRILU0         4 Sess's      199.32.1.3        6            -

03/01/94   01:06:12 PM
```

If the SNA host is successfully connected to the PU2.1, the Physical Unit status, PUSTATUS, is ACTIVE. If the SNA network is only physically connected to the SunLink PU2.1 (no SSCP-PU session exists), the Physical Unit status is CONTACTED. If a dependent LU was activated by the host, LUSTATUS is shown as ACTIVE. If a client has connected to the dependent LU, LUSTATUS is ACT/ACT (active and attached).

Note – Alternatively, you can use NetView to check the status of the SunLink PU2.1 physical unit (refer to the IBM *NetView Operations* manual).

2.6 Starting Client SNA Programs

After you successfully connect to the SNA network, you can start your client SNA programs to access IBM mainframe applications. Refer to the appropriate client SNA manual for the start-up procedures.

2.7 Stopping SunLink PU2.1

To stop the SunLink PU2.1 SNA use SunGMI. For more information on using SunGMI, refer to *SunLink SNA PU2.1 9.1 Server Configuration and Administration Manual.*

2.8 Changing SunLink PU2.1 Configuration

To change the SunLink PU2.1 SNA server configuration, use SunGMI. For more information on using SunGMI, refer to *SunLink SNA PU2.1 9.1 Server Configuration and Administration Manual.*

SunLink PU2.1 Configuration 3

The SunLink PU2.1 SNA server configuration specifies the operating characteristics of the local SNA resources. The configuration assigns attributes to ten types of logical resources:

The following local resources are covered in the *SunLink SNA PU2.1 9.1 Configuration and Administration Manual.*

- Data link control
- Control point
- Logical unit
- LU Pool
- Partner LU
- Mode
- Transaction program
- Security
- Security access
- Data link

Only the `QLLC` line (also referred to as QLLCLINE in this manual) directive is discussed in this chapter.

There are many possible configurations for the SunLink PU2.1 SNA server. In particular the server can support the three link types, SDLC, X.25 QLLC and IBM Token Ring. In the next section, the QLLC link type is discussed.

3

3.1 Configuring by Data Link Control Type

The SunLink PU2.1 SNA server can support SDLC, X.25 QLLC and IBM Token Ring external DLC interfaces. Each link interface is defined by its own 'line' directive(s): IBM Token Ring network interfaces are defined by `TRLINE` and LLC, while SDLC and X.25 lines are defined by one directive, `SDLCLINE` and `QLLCLINE`, respectively. For each link type, different configuration options are possible, and different host programming considerations must be made.

Note – SDLC and Token Ring are discussed in the *SunLink SNA PU2.1 9.1 Configuration and Administration Manual.*

3.1.1 X.25 QLLC

The SunLink PU2.1 SNA server connects to the X.25 PSDN and communicates with the PSDN using SunLink X.25 8.0.1. SNA hosts connect to the X.25 PSDN using the X.25 NCP packet-switched interface (`NPSI`) program product.

An X.25 SVC or PVC is established between `NPSI` and the `PU2.1`, and the Qualified Link Control protocol, `QLLC`, is used to control the transfer of data across the VC. The SunLink configuration of this connection requires the definition of a `QLLCLINE` resource in the SunLink PU2.1 SNA server configuration. The `QLLCLINE` parameters map onto elements of the SunLink X.25 configuration.

For traditional, host-based connectivity, the SunLink configuration must correlate with the VTAM / NCP configuration on the host side of the connection. The basis for IBM host X.25 connectivity is the X.25 NPSI product. NPSI maps X.25 VCs as LINE resources. An SVC is analogous to switched `SDLC LINE`; PVCs are analogous to leased SDLC lines. From the VTAM standpoint, there is no difference between `QLLC` and `SDLC` lines.

3.1.2 QLLCLINE Configurations

For each configured `QLLCLINE`, the SunLink PU2.1 SNA server establishes a STREAMs connection to the SunLink X.25 application. Each `QLLCLINE` supports the connection of one PU2.1 in the SunLink PU2.1 SNA server to the

SNA network. Other PU2.1 products, emulated by the SunLink PU2.1 server, may be simultaneously attached as stations on SDLC (or Token Ring) lines. Figure 3-1 shows the relationship between the two products.

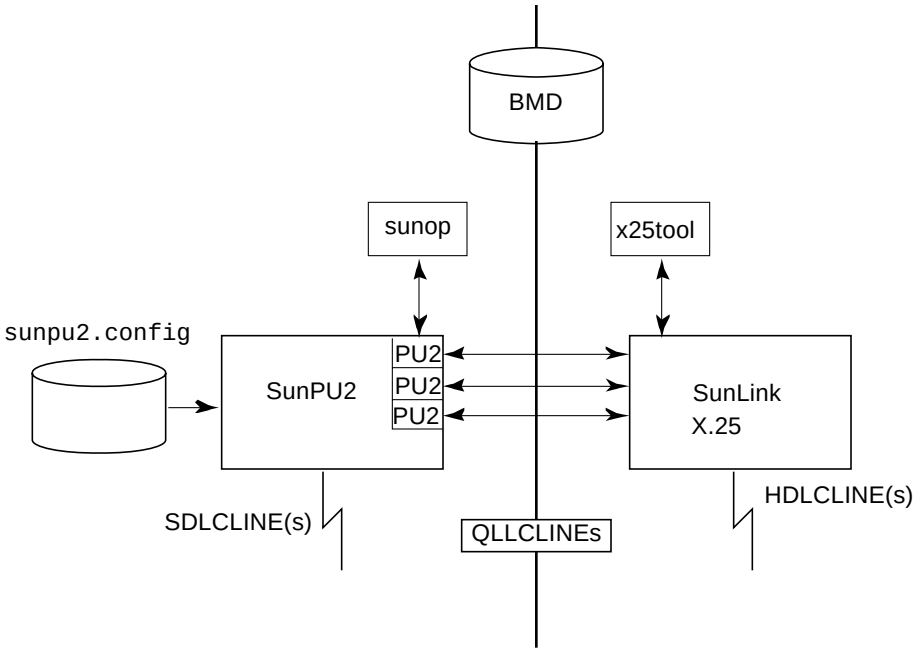

Figure 3-1 SunLink PU2.1 SNA Server and SunLink X.25

Figure 3-2 and Figure 3-3 show four possible `QLLC` configurations ranging from simple constructs to more complicated setups. Although multi-point connections are not supported, multiple PUs may be supported over a single telecommunications line. A `QLLC` line corresponds to an X.25 VC, and multiple VCs can be multiplexed over a single `HDLCLINE`. Each PU2.1 may be connected by its `QLLC` line to a different communications controller.

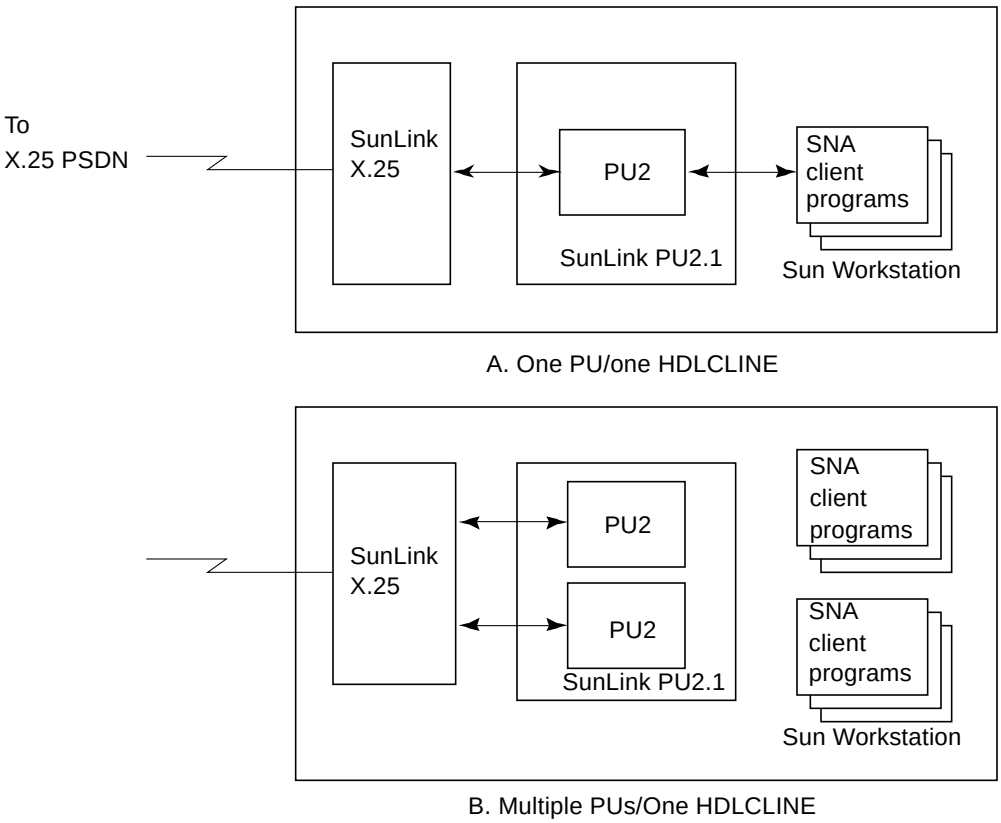

Figure 3-2 Sample SunLink PU2.1 QLLC Configurations

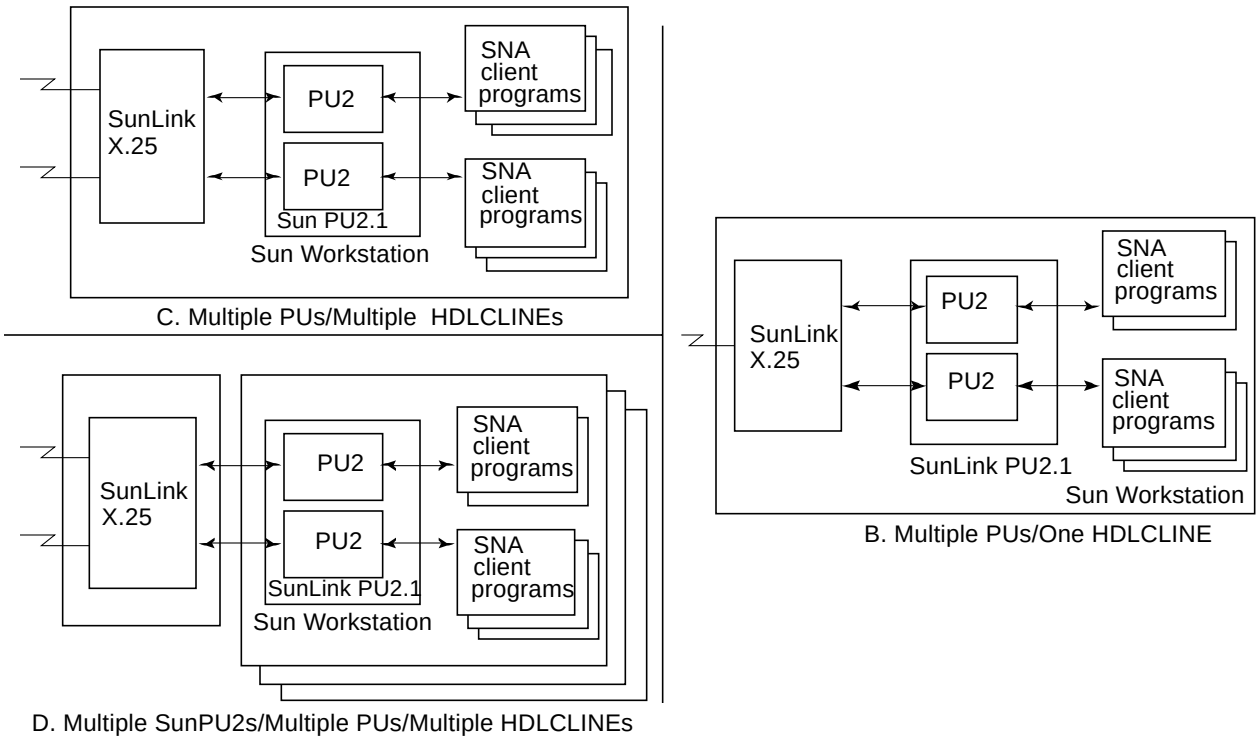

Figure 3-3 SunLink PU2.1 QLLC Configurations with Multiple PUs

3.1.3 VTAM/NCP Programming

NPSI X.25 macros are included directly in the NCP generation files. The NPSI macros fall into two basic categories:

- Macros (primarily `X25NET` and `X25MCH`) that define the characteristics of the X.25 interface. Some of these values must correlate to the SunLink X.25 configuration.

- Macros that are expanded into the familiar VTAM/NCP LINE, PU and LU macros. Switched connections are usually defined using the X.25VC macro, and leased connections by the X25LINE, X25PU and X25LU macros. These macros are correlated with the SunLink PU2.1 SNA server configuration.

There are a number of protocols that may be used to transport SNA over X.25, PSH_X25, QLLC, and ELLC. To specify QLLC, ensure that the X25MCH LLCLIST parameter lists LLC3 first, for example, LLCLIST=(LLC3,...).

3.1.4 SunLink PU2.1 SNA Server Configuration

Table 3-1 below associates SunLink PU2.1 SNA server directives and parameters with NPSI and VTAM/NCP macros and parameters.

In Table 3-1, a switched line is defined using the NPSI X25VC macro. The X25VC macro contains NCP LINE, PU and LU definitions, but the majority of the PU and LU parameters are defined in VTAM switched major nodes. VTAM identifies the switched PU from the TERMID and IDBLK resource identification presented by the NCP when contact with the PU is established.

Table 3-1 NPSI vs. SunLink PU2.1 SNA Server: Switched Lines

SunLink PU2.1 Directive	SunLink PU2.1 Parameter	NPSI Macro	NPSI Parameter	VTAM/NCP Macro	VTAM/NCP Parameter
*QLLCLINE	LINE=switched	X25VC	TYPE=S	LINE	DIAL=YES
*DLC	MAXDATA			PU	MAXDATA
	TERMID				IDBLK + IDNUM
	NAME				*symbolicname*
*LU	LOCADDR			LU	LOCADDR
	LUTYPE				DLOGMOD
	NAME				*symbolicname*

In Table 3-2, a leased line is defined using the NPSI X25VC macro. In this case, the VTAM/NCP macros are generated wholly from their NPSI equivalents. Note, the NCP parameter LLC defaults to LLC3 only if X25MCH LLCLIST = (LLC3,...).

Table 3-2 NPSI vs. SunLink PU2.1 SNA Server: Leased Lines

SunLink PU2.1 Directive	SunLink PU2.1 Parameter	NPSI Macro	NPSI Parameter	NCP Macro	NCP Parameter
*QLLCLINE	LINE=leased	X25LINE	TYPE=P	LINE	DIAL=NO
					(LLC=LLC3)
*DLC	ADDR	X25PU	ADDR	PU	ADDR
	MAXDATA		MAXDATA		MAXDATA
	NAME				*symbolicname*
*LU	LOCADDR	X25LU	LOCADDR	LU	LOCADDR
	LUTYPE				DLOGMOD
	NAME				*symbolicname*

* These values must match in both the SunLink PU2.1 SNA server and NPSI configurations.

Name your SunLink PU2.1 SNA server resources by the symbolic name for that resource in the SNA host network configuration. Although names only have local significance, troubleshooting is much simpler when you and the SNA host system programmer use the same names for the same SNA resources.

The LUTYPE field and the DLOGMOD values describe the attributes of the LU and the LU-LU session. The LUTYPE field only has local significance. It limits the type of client SNA programs that can be attached to a SunLink PU2.1 SNA server port: the client SNA programs check the validity of the DLOGMOD table entries passed when a LU-LU session is established. Refer to the appropriate client SNA program documentation for the expected or allowed DLOGMOD values.

Once the SNA host network configuration is updated, the SNA host activates them automatically or does so in response to a network operator command. Refer to the IBM *NetView Operations* manual for activation, deactivation, and display commands for SNA resources.

3.1.5 SunLink X.25 Configuration

Refer to the *SunLink X.25 Configuration Guide* for your particular release for detailed information on how to configure SunLink X.25. For SNA host programmers familiar with NPSI configuration, Table 3-3 maps the SunLink X.25 configuration directives and parameters onto their NPSI equivalents. It is not necessary, except for a few facilities (refer to Table 3-3), for SunLink X.25 and `NPSI` parameters to match. The configurations of the DTE and DCE for the X.25 interface must be consistent. If you want to connect the SunLink X.25 system and the NPSI communications controller directly without an intervening network, the parameters must correspond.

The SunLink X.25 product is configured using the OpenWindow™ tool, `x25tool`, which is distributed along with the product. Refer to the *SunLink X.25 8.0.1 Configuration Guide* for directions on how to use `x25tool`.

Table 3-3 NPSI vs. SunLink X.25 Configuration Values

`x25tool` **Window**	`x25tool` **Parameter**	`NPSI` **Macro**	`NPSI` **Parameter**
Throughput class and packet szes	Remote maximum packet size	`X25VCCPT`	`MAXPTKL`
	Remote maximum window size		`VWINDOW`
Closed user groups and facilities	Incoming reverse charging	`X25NET`	`RFAC=REVCHG`
	Closed user groups		`RFAC=CUGB, CUGE`
Network profile	Sequence numbering		`PKTMODL`

Table 3-4 compares NPSI and SunLink X.25 configuration parameters.

Table 3-4 NPSI Equivalents of SunLink X.25 Configuration Parameters

`x25tool` **Window**	`x25tool` **Parameter**	`NPSI` **Macro**	`NPSI` **Parameter**
X.25 Interface configuration	Link number	`X25MCH`	`symbolicname`
	Local Address		`ADDRESS`
WAN parameters	`TxClock`		`DIRECT`
	`TxClock`		`SPEED`

Table 3-4 NPSI Equivalents of SunLink X.25 Configuration Parameters *(Continued)*

x25tool **Window**	x25tool **Parameter**	NPSI **Macro**	NPSI **Parameter**
LAPB parameters	Max LAPB I-Frame	X25MCH	FRMLGTH
	Tx Window Size		MWINDOW
	Max Transmissions		NPRETRY
	Ack Timer		TPTIMER
Throughput class and packet sizes	Maximum Remote Packet Size	X25VCCPT	MAXPTKL
	Maximum Remote Window Size		VWINDOW
Network profile	Logical Channel Ranges	X25VC	CALL
	Logical Channel Ranges		CALL=IN
	Logical Channel Ranges		LCN(number1,number2)
	Logical Channel Ranges		CALL=INOUT
	Logical Channel Ranges		LCN(number1,number2)
	Logical Channel Ranges		CALL=OUT
	Logical Channel Ranges		LCN(number1,number2)
Closed user groups and facilities	Incoming Reverse Charging	X25NET	RFAC=REVCHG
Network profile	Closed User Groups		RFAC=CUGB, etc
	Sequence Numbering		PKTMODL
Timers, Counters, and Delays	Restart Response		T20
	Call Req Response		T21
	Reset Response		T22
	Clear Req Response		T23
	DTE Restart Request		R20
	DTE CLear Request		R22
	DTE Reset Request		R23

3.2 SunLink PU2.1 Configuration

There is one configuration file for the SunLink PU2.1 SNA server, which is processed by the `sunpu2.1` daemon process on start-up. The configuration file may exist anywhere on the system and the name is not restricted. The default name of the SunLink PU2.1 SNA server configuration file is `sunpu2.config`, and is located in the current working directory.

The SunLink PU2.1 SNA server configuration defines the locally emulated SNA resources and their operating characteristics. If the IBM host attempts to activate or deactivate an unconfigured resource, the SunLink PU2.1 SNA server rejects the request.

The SunLink PU2.1 SNA server configuration file contains the `QLLCLINE` configuration directive when using an X.25 QLLC connection.

Note – The other PU2.1 configuration directives are discussed in the *SunLink SNA PU2.1 9.1 Configuration and Administration Manual.*

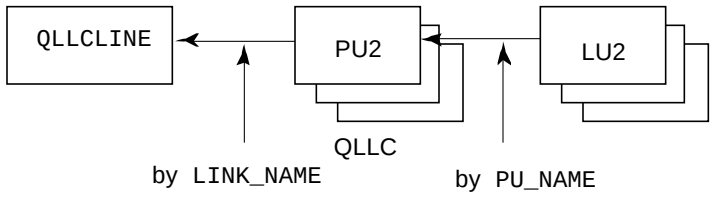

Figure 3-4 Links between Configuration Directives

3.2.1 QLLCLINE Directive

The QLLCLINE directive defines the physical level characteristics of the line and identifies the system device with which it is associated. Absent parameters take default values. The QLLCLINE syntax is outlined in Code Example 3-1.

Code Example 3-1

```
NAME=line_name,
[HDLCLINE=hdlc_line_name,]
[ISTATUS=Active | Inactive,]
[CONNECT_RETRIES=n,]
[RETRY_TIMEOUT=time,]
LINE=leased | switched,
[PVC_LCN=lcn,]
ACCEPT_CALL=YES | NO,
[PACKET_SIZE=pkt_size,]
[WINDOW_SIZE=win_size,]
HOST_DTE='NPSI_dte_addr',
[LOCAL_DTE='local_dte_addr',]
[NWUSID=nwusid,]
[REV_CHARGE=YES | NO,]
[CUG=cug_index,]
[RPOA=rpoa,]
;
```

Restrictions: line_name must be unique and must appear prior to any associated PU directives

Table 3-5 QLLC Line Arguments

Argument	Usage
NAME=line_name	line_name can be any alphanumeric string up to 8 characters. White space (tabs, spaces) is not allowed. NAME is used to identify this QLLCLINE.
HDLCLINE="line number"	PVC use only. This number corresponds to the PVC_LCN parameter that appears in the PVC Parameters window of x25tool (for example, HDLCLINE = "2").
ISTATUS=Active | Inactive	Defines whether the SunLink PU2.1 SNA server will attempt to connect to the SunLink X.25 server and establish the X.25 VC (Active), or whether it will wait for the operator to request link activation (Inactive). Default: Active
CONNECT_RETRIES=n	Specifies the number of times the SunLink PU2.1 SNA server will retry connection to the SunLink X.25 server before declaring the QLLCLINE inoperative. Default: 1.
RETRY_TIMEOUT=time	Time is delay in seconds between connect attempts. Default: 30 seconds.
LINE=LEASED | SWITCHED	line_type can be either LEASED or SWITCHED. Leased lines are X.25 PVCs and the PVC_LCN parameter must be specified. Switched lines are X.25 SVCs and ACCEPT_CALL must be specified. Only switched lines will respond to XID requests from the host. Default: LEASED.
PVC_LCN=lcn	lcn is the LCGN/LCN of the PVC to be used for the QLLCLINE. If a PVC is requested, HDLCLINE must be specified, and the remaining parameters are ignored.
ACCEPT_CALL=YES | NO	Specifies whether a SWITCHED line is established by an incoming call (YES) or an outgoing call from the PU2.1 (NO). The SunLink PU2.1 code uses the local DTE to register for incoming calls with the SunLink X.25 code. Default: NO.
PACKET_SIZE=pkt_size	pkt_size is the packet size requested for the SVC. Supported packet sizes are 16 - 4096. If pkt_size is not equal to the default X25LINE PACKET_SIZE parameter, then SunLink X.25 configuration constraints apply: HDLCST MAXDATA must be large enough (including overhead) and X25LINE L3FLOW_CTL_NEG must be ACCEPT to allow flow control negotiation. Default: X25LINE PACKET_SIZE.
WINDOW_SIZE=win_size	win_size is the window size requested for the SVC. Valid window sizes are 1-7 or 1-127, depending on the HDLC modulo. If win_size is not equal to the default X25LINE WINDOW_SIZE parameter, then SunLink X.25 configuration X25LINE l3flow_ctl_neg must be ACCEPT to allow flow control negotiation. Default: X25LINE WINDOW_SIZE.
LOCAL_DTE	This is required if ACCEPT_CALL =YES
HOST_DTE='NPSI_dte_addr'	NPSI_dte_addr is the X.25 PSDN address of the NPSI system. Up to 15 digits may be supplied. This parameter is required for switched lines.
NWUSID=nwusid	nwusid is used to specify an ASCII coded network user id in a call request. nwusid can be any alphanumeric string.

Table 3-5 QLLC Line Arguments *(Continued)*

Argument	Usage
REV_CHARGE=YES | NO	Specifies that reverse charging be requested in call requests.
CUG=cug_index	Requests that the specified cug_index be included in call requests. cug_index , if supplied, may be 2 or 4 digits. CUGs with outgoing access selection (CUGOAS) and bilateral CUGs cannot be selected.
RPOA=rpoa_list	Requests that the specified rpoa_list be requested in call requests. rpoa_list, if supplied, comprises one or more 4-digit RPOA codes.

3.2.2 QLLCLINE Example

Code Example 3-2 QLLCLINE Example

```
Switched line
     QLLCLINE      NAME=QLS01,                 // User defined name
                   LINE=switched,              // SVC
                   ACCEPT_CALL=no,             // place call
                   HOST_DTE='31065513',        // DTE Address of NPSI Host
                   PACKET_SIZE=128;            // Packet size to negotiate
                   WINDOW_SIZE=2,              // Window size to negotiate
                   REV_CHARGE=YES;             // Request reverse charging
Leased line
     QLLCLINE      NAME=QLL01,                 // User defined name
                   HDLCLINE=”02”,              // SunLink X25 HDLCLINE to use
                   LINE=leased,                // PVC
                   PVC_LCN=1;                  // PVC LCN
```

3

SNA Host Configuration 4

This chapter explains how to configure Sun SNA resources in the SNA host network configuration. This chapter pertains to the X.25 QLLC configuration only.

Note – Other host configurations are described in the *SunLink SNA PU2.1 9.1 Configuration and Administration Manual*.

4.1 Sample SNA X.25 Configuration

The following subsections describe the SunLink X.25/PU2.1 emulation, VTAM configuration values, and VTAM defintions.

4.1.1 SunLink X.25 PU2 Emulation with Dependent Logical Units

The sample configuration connects to the SNA network with one switched QLLC link, one Physical Unit Type 2 (PU2.1), and three SunLink 3270 client SNA programs (LUs). Figure 4-1 illustrates the sample configuration.

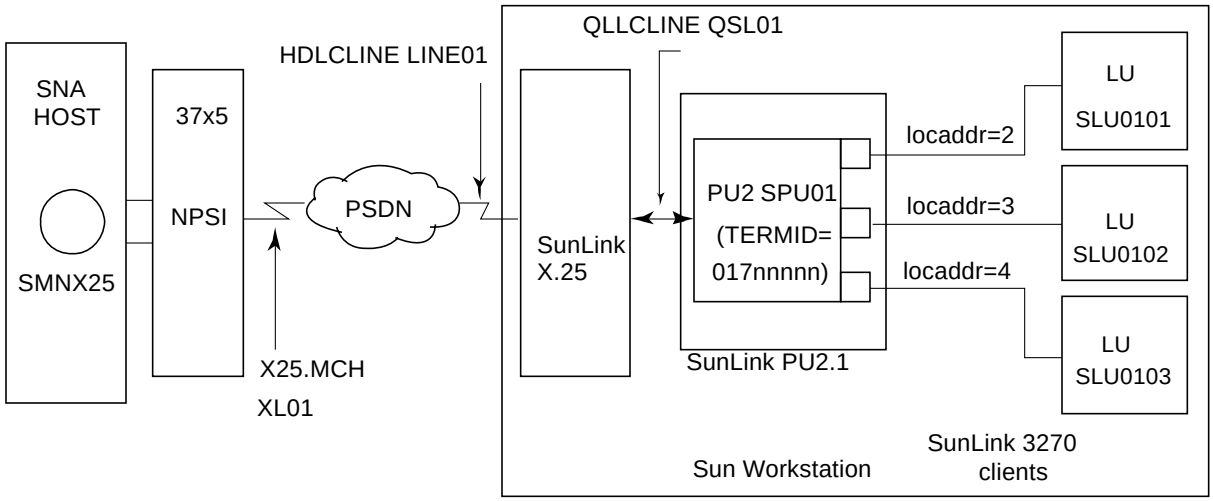

Figure 4-1 Example SNA X.25 `QLLC` Configuration

The SunLink PU2.1 SNA server emulates a 3174 establishment controller (`SPU01`). Three SNA 3270 emulators (`SLU0101`, `SLU0102`, and `SLU0103`) are also present on the Unix workstation. The NPSI communications controller connects to the X.25 PSDN via the physical multi-channel (XL01). The VTAM configuration values are described in Table 4-1. The NCP definitions are listed in Table 4-2.

Table 4-1 VTAM Configuration Values

VTAM Definition	VTAM Attribute	Value
VBUILD	TYPE	SWNET
PU	IDBLK	Matches value in SunLink PU2.1 configuration file for TERMID
	IDNUM	Matches value in SunLink PU2.1 configuration file for TERMID
	MAXDATA	Matches values in SunLink PU2.1 configuration file for TERMID
LU	LOCADDR=	2
LU	LOCADDR=	3
LU	LOCADDR=	4

Table 4-2 NPSI Configuration Values

NPSI Definition	NPSI Attribute	Value
X25.VCCPT	MAXPKTL	Match maximum possible packet data size
	VWINDOW	Match packet window size
X25.NET	RFAC	Match use of facilities
	PKTMODL	Match packet window modulus

The VTAM and NCP GEN (NPSI) directives for this configuration are described in Code Example 4-1.

Sample NPSI definitions for X.25 QLLC PU2.1, with dependent logical units, are provided in Code Example 4-2.

4.1.2 Sample VTAM Definitions for X.25 QLLC PU2 with Dependent Logical Units

Code Example 4-1 Sample VTAM Definitions

```
*********************************************************************
*
*  VBUILD - X.25 SWITCHED MAJOR NODE
*
*********************************************************************
SMNX25      VBUILD      TYPE=SWNET,MAXGRP=1,MAXNO=1
*********************************************************************
*
*  PU SPU01 - SWITCHED PU
*         3270 CU WITH 3 TERMINALS AND A PRINTER
*
*********************************************************************
SPU01         PU            ADDR=01,
                            PUTYPE=2,
                        IDBLK=017,
                        IDNUM=01234,       IDNUM REQUIRED
                        BATCH=NO,
                        DISCNT=NO,
                        IRETRY=YES,
                        ISTATUS=ACTIVE,
                        MAXDATA=265,
                        MAXOUT=7,
                        PASSLIM=7,
*********************************************************************
* LU OPERANDS MOVED UP TO PU MACRO
*********************************************************************
                           MODETAB=ISTINCLM,
                           SSCPFM=USSSCS,
                           USSTAB=HIS3270,
                           PACING=1,
                           VPACING=1
*********************************************************************
* LU MACROS
*********************************************************************
SLU0101       LU           LOCADDR=2,DLOGMOD=D4A32782
SLU0102       LU           LOCADDR=3,DLOGMOD=D4A32782
SLU0103       LU           LOCADDR=4,DLOGMOD=D4A32782
SLU0104        LU         LOCADDR=5,USSTAB=USSNO10
```

4.1.3 Sample NPSI Definitions for X.25 QLLC PU2 with Dependent Logical Units

Code Example 4-2 Sample NPSI Definitions *(1 of 2)*

```
*************************************************************************
*
* X.25 NPSI RELEASE 4.2 DEFINITION
*
*************************************************************************
X25BLD  X25BUILD        MAXPIU=4K,      MAXIMUM PIU LENGTH
                        MCHCNT=1,       1 PHYSICAL MULTI-CHANNEL
                        MODEL=3725      3725
                        SNAP=NO,        SNAP FACILITY OFF
                        VERSION=V4,     NPSI RELEASE 4.2 ONLY
                        TYPSYS=OS       MVS 3.8 WITH ACF/VTAM V3
*************************************************************************
*
* X25NET - X.25 PDSN CHARACTERISTICS
*
*************************************************************************
        X25NET          DM=YES,         LAPB DM COMMAND USED
                        NETTYPE=1,      TYPE 1 NETWORK
                        CPHINDX=3       3 ENTRIES IN VCC PARAM TABLE
                        OUHINDX=1       1 ENTRY IN OPTIONAL FACILITY TBL
*************************************************************************
*
* X25VCCPT - VIRTUAL CIRCUIT CONNECTION PARAMETERS TABLE
*
*************************************************************************
        X25VCCPT        INDEX=1,        TABLE ENTRY NUMBER
                        MAXPKTL=128,    MAX PACKET DATA SIZE
                        INSLOW=(25,0),  FREE BUFFER PERCENTAGE
                        VWINDOW=2       PACKET XMIT/RECV WINDOW SIZE
        X25VCCPT        INDEX=2,
                        MAXPKTL=256,
                        INSLOW=(25,0),
                        VWINDOW=2
        X25VCCPT        INDEX=3,
                        MAXPKTL=512,
                        INSLOW=(25,0),
                        VWINDOW=2
*************************************************************************
```

Code Example 4-2 Sample NPSI Definitions *(2 of 2)*

```
*
* X25OUFTT - OPTIONAL FACILITIES TABLE
*
************************************************************************
        X25OUFTT        INDEX=1,        TABLE ENTRY NUMBER


************************************************************************
*
* X25MCH XL01 - DEFINE LINK
*
************************************************************************
XL01    X25MCH          ADDRESS=01,     3725 FDX LINE ADDRESS
                        FRMLGTH=131,    MAX FRAME LENGTH
                        LCGDEF=(0,6),   LCGN 0, HIGH LCN=6
                        LCN0=NOTUSED,
                        MWINDOW=7,      FRAME WINDOW SIZE
                        NDRETRY=1,      ND/TP SEQUENCE EXECUTED
                        NPRETRY=7,      I OR U FRAME TIMEOUT RECOVERY
                        STATION=DTE,    NETWORK CONNECTION
                        TDTIMER=1,      ND RETRANSMIT TIMER IN SECS
                        TPTIMER=3,      X25 T1 TIMER IN SECS
                        ANS=CONTINUE,   AUTO NETWORK SHUTDOWN DECISION
                        DSABLTO=3,      DISABLE TIME OUT
                        ENABLTO=1632,   ENABLE TIME OUT
                        ISTATUS=ACTIVE, INITIAL STATUS ACTIVE
                        LLCLIST=LLC3,   PERIPHERAL QLLC
                        NCPGRP=NEW      GROUP NAME USED IN NCP GEN
************************************************************************
*
* X25VC - DEFINE SWITCHED VIRTUAL CIRCUITS
*
************************************************************************
        X25LCG          LCGN=0          LCGN 0
        X25VC           LCN=(1,6),      LCNS 1 THROUGH 6
                        TYPE=SWITCHED,  VC TYPE
                        VCCINDX=1,      VCC PARAM TABLE INDEX
                        CALL=INOUT,     INCOMING AND OUTGOING CALLS
                        ISTATUS=ACTIVE
        X25END
```

SunLink PU2.1 Configuration Examples

A

This appendix lists sample host-based SunLink PU2.1 SNA server configurations:

- X.25 QLLC switched line configuration
- X.25 QLLC leased line configuration

Note – Other configurations are described in the *SunLink SNA PU2.1 9.1 Configuration and Administration Manual.*

All the configurations for host connectivity define three LU resources with LUTYPE=2 for the SunLink 3270 client SNA program. If you are using a different client SNA program, update the LUTYPE value appropriately.

These configurations can be used with minimum changes. Normally you only need to update the PU2 ADDR. Refer to Chapter 3, “SunLink PU2.1 Configuration” for SunLink PU2.1 SNA server configuration parameters.

A

A.1 X.25 QLLC Switched Line Configuration

Figure A-1 shows a sample SNA connection configuration, and Code Example A-1 shows a sample X.25 QLLC configuration file.

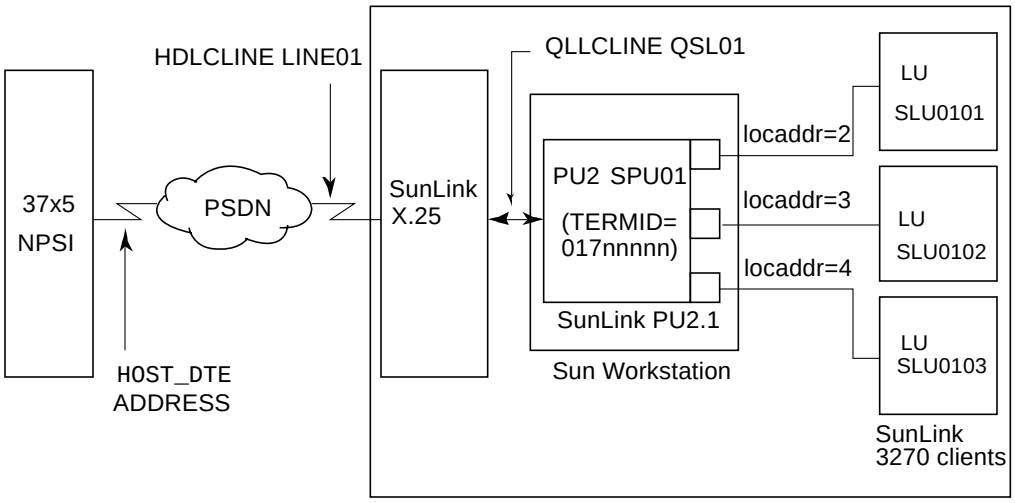

Figure A-1 X.25 QLLC Switched Line Configuration

Code Example A-1 Sample X.25 QLLC Configuration *(1 of 2)*

```
// SunLink SunPU2 SNA Server Sample Configuration for X.25 QLLC
//
// This sample configuration configures one switched QLLC Line (QLS01);
// one Physical Unit (SPU01); and three Logical Units (SLU0101-SLU0103).
//
// The SunPU2 SNA Server uses SunLink X.25 to access the X.25 PSDN.  SunLink X25
// is assumed to be running on the local system (QLLCLINE X25HOST).
// The SunPU2 SNA Server establishes the QLLCLINE by placing an X.25
// call request via SunX25.
// As configured, SunLink X.25 default PACKET_SIZE and
// WINDOW_SIZE are used for the call, and no facilities are selected.
//
// You will need to configure the following parameters:
// - QLLCLINE HOST_DTE
//
// Remember:
//    PU2 <--> VTAM PU macro, where PUTYPE=2
//    LU <--> VTAM LU macro
//


EOS      your_eos_string;          // Encoded options string

QLLCLINE NAME=QSL01,               // User defined name (8 char max)
          LINE=switched,           // switched line = X.25 SVC
          ACCEPT_CALL=no,          // no = place call
          HOST_DTE='00000000';     // DTE Address of NPSI Host
//        NWUSID="nwusid",         // Network User Id
//        REV_CHARGE=yes,          // Request reverse charging
//        PACKET_SIZE=256,         // Packet size to negotiate
//        WINDOW_SIZE=3,           // Window size to negotiate
//        RPOA='0000',             // RPOA facility IDs
//        CUG='00';                // CUG facility ID - basic format

PU2       NAME=SPU01,              // User defined name (8 char max)
          LINK_NAME=QSL01,         // Line name this station is on
          ADDR=x'01',              // Station address
          TERMID=x'01712345',      // TERMID = IDBLK=017 and IDNUM=12345
          MAXDATA=265,             // Max data size for frame on link
          ACTIVITY_TIMEOUT=0,      // Host activity timer -- none (in sec units)
```

Code Example A-1 Sample X.25 QLLC Configuration *(2 of 2)*

```
            RETRIES=10;                 // Max retransmissions

LU          NAME=SLU0101,               // User defined name (8 char max)
            PU_NAME=SPU01,              // PU2 this LU belongs to
             LUTYPE=2,                  // LU type 2 (3270)
             LOCADDR=2,                 // Local address of LU
             PACING=1;                  // Pacing window

LU          NAME=SLU0102,
            PU_NAME=SPU01,
             LUTYPE=2,
             LOCADDR=3,
             PACING=1;

LU          NAME=SLU0103,

            PU_NAME=SPU01,
             LUTYPE=2,
             LOCADDR=4,
             PACING=1;
```

A.2 X.25 QLLC Leased Line Configuration

Figure A-1 contains a sample configuration and defines the SNA connection listed in Code Example A-2.

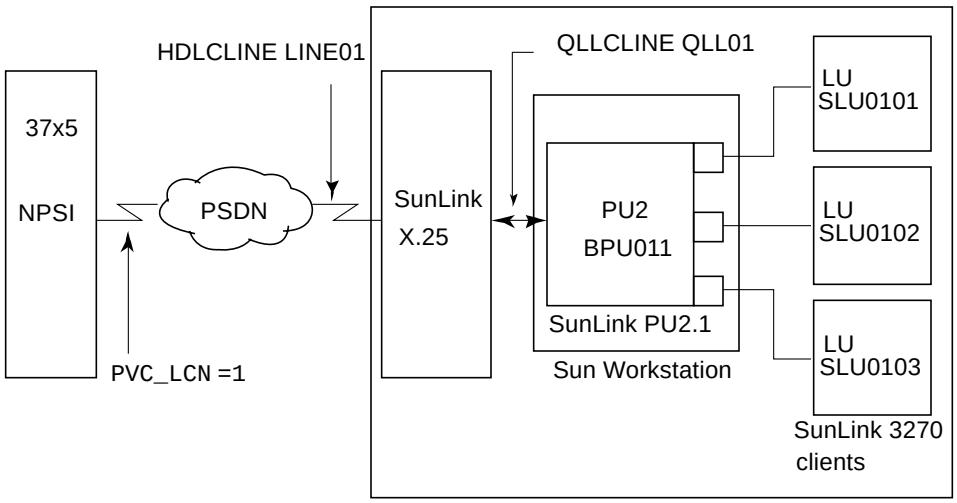

Figure A-2 X.25 QLLC Leased Line Configuration

Code Example A-2 X.25 QLLC Sample Configuration File *(1 of 2)*

```
// SunLink Sun PU2 SNA Server Sample Configuration for X.25 QLLC
//
// This sample configuration configures one leased QLLC Line
// (QLL01); one Physical Unit (BPU011); and three Logical Units
// (BLU01101-BLU01103).
//
// The SunPU2 SNA Server uses SunLink X.25 to access the X.25 PSDN.  SunX25
// is assumed to be running on the local system (QLLCLINE X25HOST).
// The SunPU2 SNA Server establishes the QLLCLINE by connecting to
// PVC LCN #1 on HDLCLINE LINE01.
//
// You will need to configure the following parameters:
//
// Remember:
//    PU2 <--> VTAM PU macro, where PUTYPE=2
//    LU <--> VTAM LU macro
//

EOS      your_eos_string;          // Encoded options string

QLLCLINE NAME=QLL01,               // User defined name (8 char max)
          HDLCLINE="1",            // HDLCLINE to use
          LINE=leased,             // leased line = X.25 PVC
         PVC_LCN=1;                // PVC LCGN/LCN#

PU2       NAME=BPU011,             // User defined name (8 char max)
          LINK_NAME=QLL01,         // Line name this station is on
          ADDR=x'C1',              // Station address
          TERMID=x'01712345',      // TERMID = IDBLK=017 and IDNUM=12345
          MAXDATA=265,             // Max data size for frame on link
          ACTIVITY_TIMEOUT=0,      // Host activity timer -- none (in sec units)
          RETRIES=10;              // Max retransmissions

LU       NAME=BLU01101,            // User defined name (8 char max)
         PU_NAME=BPU011,           // PU2 this LU belongs to
          LUTYPE=2,                // LU type 2 (3270)
          LOCADDR=2,               // Local address of LU
          PACING=1;                // Pacing window

LU       NAME=BLU01102,
```

Code Example A-2 X.25 QLLC Sample Configuration File *(2 of 2)*

```
            PU_NAME=BPU011,
             LUTYPE=2,
             LOCADDR=3,
             PACING=1;

    LU      NAME=BLU01103,
            PU_NAME=BPU011,
             LUTYPE=2,
             LOCADDR=4,
             PACING=1;
```

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