

Using SNA IMF Pass Thru
HP 3000 MPE/iX Computer Systems
Edition 1



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Preface

This manual describes Hewlett-Packard's Systems Network Architecture Interactive Mainframe Facility (SNA IMF) for both the MPE V (SNA IMF/V) and MPE XL (SNA IMF/XL) operating systems. Systems Network Architecture (SNA) is IBM's specification for distributed data processing networks. This manual describes the features and uses of Hewlett-Packard's SNA IMF, which communicates in an SNA environment.

NOTE

In this manual, the term **SNA IMF** is used when the information being given is true for both SNA IMF/V and SNA IMF/XL. The terms **SNA IMF/V** and **SNA IMF/XL** are used when a distinction between the two products is necessary.

SNA IMF allows interactive and programmatic communications between an HP 3000 computer and an IBM host computer. SNA IMF emulates an IBM 3274 cluster controller, with attached 3278 display stations and 3287 printers, functioning as a Type 2 node in an SNA network.

This manual describes **Pass Thru**, the interactive interface to SNA IMF.

SNA IMF intrinsics, the programmatic interface to SNA IMF, allow communication between applications on the HP 3000 and applications on the remote host. SNA IMF intrinsics are described in the *SNA IMF Programmer's Reference Manual*.

For information on installing, configuring, managing, and troubleshooting SNA IMF, see the *SNA IMF/XL Node Managers Guide* for SNA IMF/XL or *Installing and Troubleshooting SNA IMF* for SNA IMF/V.

Audience

This manual is for anyone involved in 3270-type data communications between an HP 3000 and an IBM host. It is for any of the following types of users:

- Interactive terminal users who use SNA IMF Pass Thru to access the host directly from a terminal attached to an HP 3000.
- HP 3000 application programmers who use SNA IMF Pass Thru to help develop and debug their SNA IMF programs.
- People responsible for training and supporting SNA IMF users.
- HP node managers or HP 3000 system managers responsible for HP 3000 data communications. The HP 3000 SNA node manager is responsible for overall HP-to-IBM data communications.

Some portions of this manual apply specifically to users of Asian terminals and printers with double-byte characters sets (DBCS).

Each of these audience types should be familiar with the pertinent operating characteristics of the host system in an SNA environment and have a working knowledge of Multiprogramming Executive (MPE), the operating system for the HP 3000.

Organization

This manual is divided into the following Chapters and Appendixes:

Chapter 1 , “Introducing SNA IMF,” gives an overview of SNA IMF, its capabilities, and its operating environment, including software and hardware requirements.

Chapter 2 , “Configuring Pass Thru,” explains how to create the file `PTCONFIG.PUB.SYS`, which SNA IMF Pass Thru uses to determine the functions of your rolling softkeys and various other Pass Thru options.

Chapter 3 , “Starting Pass Thru,” explains how to start up SNA IMF Pass Thru for terminals and printers.

Chapter 4 , “Stopping Pass Thru,” explains how to terminate a Pass Thru session for a terminal or a printer.

Chapter 5 , “Using Terminals with Pass Thru,” describes the Pass Thru characteristics and features of HP terminals and how they compare with IBM terminals. It also describes how to set terminal transmission speeds, how to display session status information on your terminal, and how to access the MPE command interpreter from a Pass Thru session.

Chapter 6 , “Using Printers with Pass Thru,” explains how to use Pass Thru to emulate an LU.T1 or LU.T3 printer.

Chapter 7 , “Pass Thru Over X.25,” explains how to use Pass Thru to communicate with the remote host from a PAD device in an X.25 network.

Appendix A , “Pass Thru Messages,” lists the messages that Pass Thru can generate, the probable causes of the messages, and the actions you can take to resolve problems.

Appendix B , “SNA Character String (SCS) Support,” describes SCS control codes and support for LU.T1 printers.

Appendix C , “Pass Thru Terminal and Printer Specifications,” lists the HP terminals and printers that you can use with Pass Thru.

Appendix D , “Sample PTCONFIG File,” provides a sample Pass Thru configuration file for you to use as a guideline when you create your own PTCONFIG file.

Appendix E , “3270 Bit Assignment and Character Translation Tables,” provides bit assignments for 3270 field attribute characters and write control characters (WCC); lists the Attention ID codes generated by SNA IMF; gives the command codes for the IBM cluster controller; supplies 3270 buffer control orders; and discusses character sets, character translation tables, and Native Language Support.

Appendix F , “Differences Between IMF/3000 and SNA IMF/V,” compares the similarities and differences between the two IMF

products. This appendix is useful if you are migrating from the IMF/3000 product to SNA IMF/V.

Appendix G , “HP and IBM Differences in DBCS Implementation,” describes how HP and IBM differ in their implementation of Asian Double-Byte Character Sets (DBCS).

Related Publications

You can find additional information about related topics in the following manuals:

- *Getting Started With SNA Node Management* (MPE V only)
- *SNA Link Services Reference Manual* (MPE V only)
- *SNA Link/XL Node Manager's Guide* (MPE XL only)
- *HP SNA Server/Access User's Guide*
- *Using the Node Management Services Utilities*
- *Installing and Troubleshooting SNA IMF* (MPE V only)
- *SNA IMF/XL Node Manager's Guide* (MPE XL only)
- *SNA IMF Programmer's Reference Manual*
- *SNA IMF/XL Taiwanese User Support Guide*
- *SNA IMF/XL Japanese User Support Guide*
- *SNA IMF/XL Korean User Support Guide*
- *IMF/3000 User/Programmer Reference Manual* (for IMF/3000 on MPE V)
- *MPE V Intrinsic Reference Manual*
- *MPE V Commands Reference Manual*
- *MPE XL Intrinsic Reference Manual*
- *MPE XL Commands Reference Manual*
- *Native Language Support Reference Manual*
- *HP SNA Products: Manager's Guide*
- *HP SNA Products: ACF/NCP and ACF/VTAM Guide*
- *HP SNA Products: IMS Guide*
- *HP SNA Products: CICS Guide*

This Chapter describes the SNA IMF/V and SNA IMF/XL products. It contains the following sections:

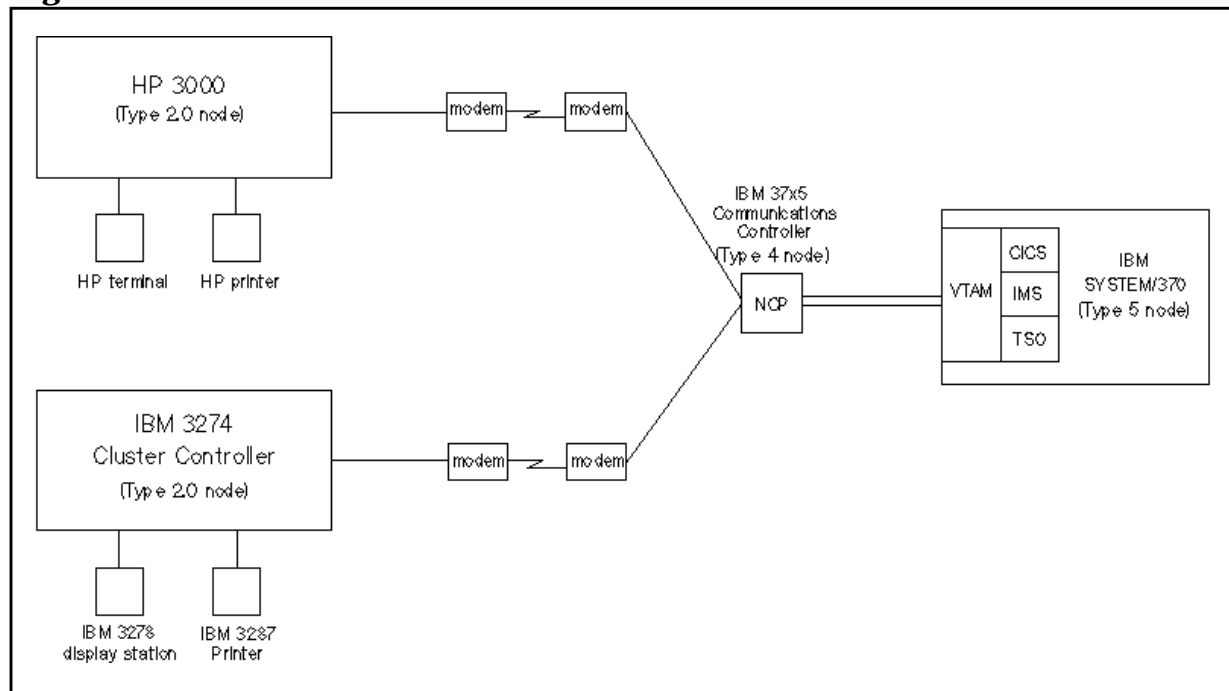
- **Overview of SNA IMF** describes SNA IMF and its role in the SNA network.
- **Programmatic Access and Pass Thru** describes the two modes in which you can use SNA IMF: programmatic mode and interactive (Pass Thru) mode.
- **Hewlett-Packard's IMF Products** describes the three Interactive Mainframe Facility products available from Hewlett-Packard: SNA IMF/V, SNA IMF/XL, and IMF/3000.
- **Features of SNA IMF** lists the capabilities and features available with SNA IMF.
- **Features of Asian SNA IMF** lists the special features available for Asian users of SNA IMF, like Double-Byte Character Set support and localizable message and help text.
- **IBM Host Applications** briefly describes the applications on the IBM host that you can access through SNA IMF.
- **The Functional Layers of SNA** lists the architected layers of an SNA network.
- **Structure of SNA IMF** describes the components of the SNA IMF and SNA link products.
- **Operating Environment** lists the hardware and software required to run SNA IMF, the programming languages supported by SNA IMF, and the equipment you need to establish the data communications link with the IBM host.

Overview of SNA IMF

Systems Network Architecture Interactive Mainframe Facility (SNA IMF) is a Hewlett-Packard software product based on IBM's Systems Network Architecture (SNA). SNA IMF allows an HP 3000 to communicate with a remote host in an IBM 3270 environment. Using SNA IMF, the HP 3000 functions as a Type 2.0 node in an SNA network. Devices attached to the HP 3000 emulate the functions of IBM 3278 display stations and IBM 3287 printers.

The HP 3000 plays the same role in an SNA network that the IBM 3276 or 3274 Cluster Controller plays in a remote IBM environment. Figure 1-1 shows how the HP 3000 fits into the IBM 3270 environment.

Figure 1-1 The HP 3000 in the IBM 3270 Environment



SNA IMF supports the “base set” of IBM 3274 Cluster Controller functions. The following 3274 functions are not supported:

- Extended color
- Structured fields and attribute processing
- APL/Text
- REQMS and RECFMS
- Operator-entry assist
- NetView support including the Alert function
- Magnetic-stripe readers and barcode readers
- Operator type-ahead feature
- Dual session support

SNA IMF allows HP 3000 programs and attached devices to exchange data with application subsystems on an IBM host. These IBM application subsystems include the **Customer Information Control System (CICS)**, **Information Management System (IMS)**, and **Time Sharing Option (TSO)**.

Programmatic Access and Pass Thru

SNA IMF supports two modes of communication between the HP 3000 and the host: **programmatic access mode** and **Pass Thru mode**.

SNA IMF's **programmatic access mode** consists of a set of subroutines called **intrinsic**s. Programs on the HP 3000 call these intrinsic's to establish communication and exchange data with application subsystems on the IBM host. SNA IMF intrinsic's can be called from programs written in BASIC, COBOL, COBOL II, FORTRAN, Pascal, and SPL. In addition to these languages, SNA IMF/XL also supports C. An HP 3000 program using SNA IMF intrinsic's appears to the IBM host as an IBM 3278 display station or an IBM 3287 printer.

Pass Thru mode is SNA IMF's interactive access mode. Through a program called **Pass Thru**, HP terminals and printers attached to your HP 3000 can look, to the IBM host, like IBM 3278 display stations or IBM 3287 printers attached to an IBM 3276 or 3274 Cluster Controller. The Pass Thru program calls the SNA IMF intrinsic's that are used for programmatic access mode. You can use Pass Thru for direct access to IBM host application subsystems, without programming the HP 3000. Pass Thru helps you develop and debug application programs that call SNA IMF intrinsic's.

Hewlett-Packard's IMF Products

Hewlett-Packard offers three different IMF products: SNA IMF/V on MPE V, SNA IMF/XL on MPE XL, and IMF/3000 on MPE V. SNA IMF/V and SNA IMF/XL use Synchronous Data Link Control (SDLC) protocol. IMF/3000, which runs only on MPE V, supports either Binary Synchronous Communications (BSC) or SDLC protocol. An HP 3000 running IMF/3000 functions as a Type 1 node.

You can migrate from IMF/3000 to SNA IMF/V (on MPE V) with minor modifications to your HP application programs. Appendix F, "Differences Between IMF/3000 and SNA IMF/V," of this manual describes the differences between IMF/3000 and SNA IMF/V.

NOTE IMF/3000 is currently supported only on MPE V.

This manual describes Pass Thru mode for both SNA IMF/V and SNA IMF/XL. Programmatic access mode for SNA IMF/V and SNA IMF/XL is documented in the *SNA IMF Programmer's Reference Manual*. The IMF/3000 product is documented in the *IMF/3000 User/Programmer Reference Manual*.

NOTE In this manual, the term **SNA IMF** is used when the information being given is true for both **SNA IMF/V** and **SNA IMF/XL**. The terms SNA IMF/V and SNA IMF/XL are used when a distinction between the two products is necessary.

The term **IMF/3000** refers to the IMF product on MPE V that supports BSC protocol.

Features of SNA IMF

The SNA IMF product has the following features:

- Allows the HP 3000 to function as a cluster controller, or Type 2 node, in an IBM SNA network.
- Allows terminals and printers attached to the HP 3000 to emulate IBM 3278 display stations (LU.T2) and IBM 3287 printers (LU.T1 and LU.T3).
- Provides a set of callable routines, called intrinsics, that allow programs on an HP 3000 to exchange data with applications on a host computer.
- Allows interactive access to host applications from HP terminals and printers, using a program called Pass Thru.
- Shares the same data communications line with other SNA Services, such as SNA NRJE and LU 6.2 API.
- Allows the HP 3000 to share multipoint communication lines with other SNA systems such as the IBM AS/400, System/34, System/36, System/38, and the 8100 processors.
- Supports concurrent communication to multiple hosts or multiple lines to a single host (if you install multiple INP or PSI cards).
- Provides **Native Language Support (NLS)**, which allows application programmers to create local language applications for end users.
- Lets you migrate from IMF/3000 to SNA IMF/V with minor modification of your HP application programs (MPE V only).

Features of Asian SNA IMF

In addition to the features listed above, SNA IMF/XL has the following features for Asian users:

- Provides 16-bit Double-Byte Character Set (DBCS) support for several Asian countries: Japan, Taiwan, and Korea. SNA IMF/XL's DBCS feature will support 8-bit only, 16-bit only, or 8-bit and 16-bit mixed characters in SNA IMF/XL's data.
- Supports English language and the default system language.
- Allows HP Asian terminals and printers attached to the HP 3000 to emulate IBM's PS/55 Asian 3270 product
- Allows 16-bit interactive and programmatic access to the Asian IBM host.
- Provides localizable error messages, online help text, and documentation in the country's native language.
- Supports DBCS characters (16-bit) with SNA IMF/XL's rolling softkeys.
- Provides 16-bit character mapping between HP (HP-15) and IBM (DBCS) data.

IBM Host Applications

Because SNA IMF supports interactive links between HP 3000s and IBM hosts, you can access transaction processing systems such as CICS and IMS, and interactive support programs such as TSO.

Transaction processing systems such as CICS are used for inquiry, inquiry with update capability, data entry, batch processing, and message switching applications.

IMS, another transaction processing system, can provide the following services: payroll and personnel file recording, manufacturing bill-of-materials control, inventory control, accounts receivable, and transaction processing.

Interactive support programs, such as TSO, provide interactive computing for large scale environments. TSO allows system programmers to maintain system libraries, catalogs, and procedure libraries. Application programmers use TSO to develop new applications and to maintain existing applications. TSO is used for batch and interactive communication and for data base/data communications (DB/DC).

Program librarians can use TSO to create, maintain, and control program libraries for development, support, and production. Through TSO, end users can access interactive programs, and problem solvers can use full operating system facilities.

The Functional Layers of SNA

An SNA network consists of a set of **Network Addressable Units** (NAUs) connected by a common path control network. The logical connection between NAUs is called a **session**. Each NUA is organized into functional layers. Each layer serves the next highest layer in its own node and relates to its peer layer on another node. Direct communication with another node occurs only at the lowest layer of a network. The functional layers of SNA implemented by the SNA IMF and SNA link products, beginning with the lowest level, are as follows:

- **Physical Control**, which sends and receives bits between nodes. It defines the mechanical and electrical interfaces and the bit-level data flow to the network.
- **Data Link Control**, which schedules and sends data across a link (physical connection) between two nodes and monitors errors that occur on the link.
- **Path Control**, which provides paths between end users (terminal operators, programs, or devices) and routes data between these end users.
- **Transmission Control**, which synchronizes and paces session-level data traffic, checks the sequence numbers of requests, and codes and decodes end user data.
- **Data Flow Control**, which monitors and controls the flow of data between two logically connected Network Addressable Units.
- **Presentation Services**, which formats data to be displayed or printed.
- **Application**, which provides services that directly support end users such as resource sharing, file transfers, remote file access, and data management on LU-LU sessions.

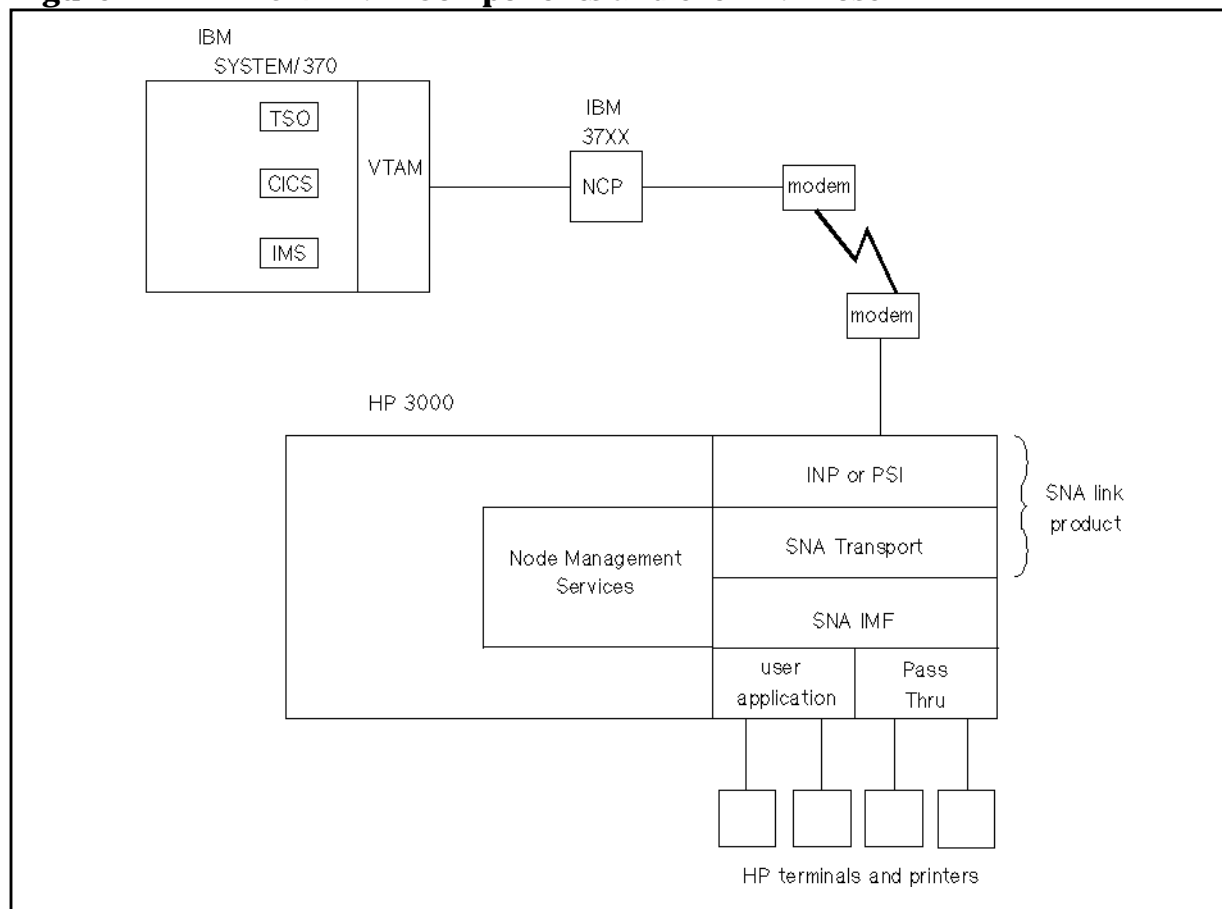
You can find introductory material about SNA and data communications in the *Communicating With IBM* primer and the *Getting Started with SNA Node Management* manual.

SNA IMF, along with the SNA link product, implements the seven functional layers of SNA.

Structure of SNA IMF

SNA IMF works with the SNA link product on the HP 3000. Figure 1-2 illustrates the components of SNA IMF on the HP 3000 and their relationship to the IBM host.

Figure 1-2 SNA IMF Components and the IBM Host



SNA IMF Product

SNA IMF is a software product that implements the upper three layers of SNA: the Data Flow Control, Presentation Services, and Application layers. In other documents you may see SNA IMF referred to as an SNA Service. An **SNA Service** is an HP data communications software product, like SNA IMF, SNA NRJE, or LU 6.2 API, which runs on top of the SNA link product.

SNA IMF stores data in the form of an **internal screen image**. The internal screen image contains the location and attributes of all the fields on the screen. It also contains any information that has been entered into the fields. Whenever an application or end user on the HP 3000 enters data to be transmitted to the IBM host, or whenever

the IBM host sends data to the HP 3000, SNA IMF modifies the internal screen image.

SNA Link Products

Hewlett-Packard offers three SNA link products: SNA Link/V, SNA/SDLC Link/XL, and SNA/X.25 Link/XL. SNA link products are bundled software and hardware products that permit a logical and physical connection from an HP 3000 into an SNA network. An SNA link product has two parts:

1. SNA Transport (software)
2. INP (MPE V hardware) or PSI (MPE XL hardware)

SNA Link/V has a third component: Node Management Services (software). On MPE XL, Node Management Services is part of the Fundamental Operating System (FOS) and is not bundled with SNA/SDLC Link/XL or SNA/X.25 Link/XL. The FOS is a collection of MPE programs, utilities, and subsystems bundled together for one price and supplied on a Master Installation Tape (MIT).

NOTE

In this manual, the term **SNA link product** is used when the information being given is true for all three SNA link products. The terms **SNA Link/V**, **SNA/SDLC Link/XL**, and **SNA/X.25 Link/XL** are used when a distinction between the SNA link products is necessary.

SNA Transport emulates an SNA Type 2 node. Through the Path Control and Transmission Control layers, it coordinates the communication sessions within the SNA network.

The hardware portion of the SNA link product is the **INP (Intelligent Network Processor)** card on MPE V, or the **PSI (Programmable Serial Interface)** card on MPE XL. The INP or PSI card implements the Physical Control and Data Link Control layers of SNA. It uses the SDLC protocol to control transmission over the communications line.

Node Management Services (NMS) is used by all the SNA Services (like SNA IMF and SNA NRJE) installed on the HP 3000. NMS handles configuration, link and node level startup and shutdown, logging, tracing, and diagnostic functions.

In both Pass Thru mode and programmatic mode, SNA IMF intrinsics call SNA link intrinsics whenever data is sent to or received from the host. SNA IMF and the SNA link product together implement all architectural layers of SNA.

A separate INP or PSI card is required for each communications line from the HP 3000 to an IBM host. With multiple INP or PSI cards, you can connect the HP 3000 to multiple IBM hosts, or you can run multiple communications lines to a single IBM host.

The same INP or PSI can be used by multiple SNA Services.

The PSI card can also be used to run Network Services (NS). The same PSI card can be used for both NS and SNA communications, but NS and SNA cannot be run concurrently on the same PSI card.

NOTE

The SNA link products are not supported as separate products independent of the SNA Services. Therefore, you must order and use SNA link products only with SNA Services.

Operating Environment

This section describes the hardware and software, on the IBM host and the HP 3000, required to run SNA IMF.

IBM Host Hardware Requirements

SNA IMF requires the following IBM host hardware

- An IBM host can be any IBM System/370-compatible computer that supports the IBM 3270 family of terminals and printers, such as a System/370, 30xx, 43xx, or compatible processor.

An IBM host can also be an IBM AS/400, System/36, or System/38.

NOTE

When you configure an AS/400, System/36, or System/38 to communicate with SNA IMF, you must configure the device type for LU.T2 sessions as 3277, not 3278.

Also, the `UNBIND` option in the `PTCONFIG` file must be set to `NO` (the default)

- An IBM 37xx Communications Controller that supports an IBM 3274 Cluster Controller with attached IBM 3278 display stations and IBM 3287 printers. The 37xx must support an SNA line.

IBM Host Software Requirements

SNA IMF requires the following IBM host software:

- Multiple Virtual Storage (MVS) or Disk Operating System/Virtual Storage Extended (DOS/VSE) operating system.
- Advanced Communications Function/Virtual Telecommunications Access Method (ACF/VTAM).
- Advanced Communications Function/Network Control Program (ACF/NCP).
- IBM 3270 host applications such as TSO, CICS, and IMS.

NOTE

HP supports certain versions, releases, modifications, and Program Temporary Fix (PTF) levels of the above software. Your HP representative can determine whether SNA IMF can be supported with your particular configuration.

HP 3000 Hardware Requirements

SNA IMF requires the following HP 3000 hardware:

- For **SNA IMF/XL**: An HP 3000 Series 9xx computer system with a PSI card.

For **SNA IMF/V**: an HP 3000 Series 37, 39, 40, 42, 44, 48, 58, 64, 68, or 70 computer system with an INP card and the following memory requirements: nine Segmented Library (SL) segments, including six Code Segment Table (CST) entries. Your HP representative can help you estimate your system memory requirements.

The SNA IMF/V memory requirement is a superset of the IMF/3000 memory requirement. IMF/3000 requires four SL segments, including one CST entry. If you are migrating from IMF/3000 to SNA IMF/V, be sure to consider the SL segments and CST entries no longer required for IMF/3000 when calculating your SNA IMF/V memory requirement.

- The HP terminals and printers used for emulation are connected through one of the following:

Datacommunications and Terminal Controller (DTC)
(MPE XL only) or

Asynchronous Data Communications Controller (ADCC)
(MPE V only) or

Asynchronous Terminal Processor (ATP) **(MPE V only)** or

Multipoint Terminal Software (MTS) communication line
(MPE V only) or

X.25 Packet Assembler/Disassembler (PAD) or

DS Network Services HP 3000 communications link **(HP 3000 to HP 3000 only)** or

HP Network Services (NS 3000/V) communications link **(HP 3000 to HP 3000 only)**.

NOTE

For SNA IMF/XL, Pass Thru is supported only on terminals connected to a Datacommunications and Terminal Controller (DTC).

- A data communications line (switched or leased) between the HP 3000 and the host.
- A block mode terminal supported by VPLUS for Node Management Services. See the *SNA Link Services Reference Manual* or the *SNA Link/XL Node Manager's Guide* for descriptions of NMS screens produced by VPLUS

NOTE

You may use Pass Thru with any of the printers listed in Appendix C , “Pass Thru Terminal and Printer Specifications,” to emulate an IBM 3287 printer. However, you cannot use a printer that is attached directly to an HP 23xx, 262x, 264x, or 700/9x terminal. Pass Thru requires that a printer be configured into MPE as a system printer. On MPE V, a system printer is directly connected through a port to the HP 3000; on MPE XL, a system printer is connected to the HP 3000 through a DTC.

HP 3000 Software Requirements

SNA IMF requires the following HP 3000 software:

- The HP 3000 Multiprogramming Executive (MPE V or MPE/XL) operating system.
- SNA IMF/V or SNA IMF/XL.
- SNA Link/V, SNA/SDLC Link/XL, or SNA/X.25 Link/XL.

Language Support

Application programs that call SNA IMF intrinsics can be coded in the following languages:

- BASIC
- COBOL
- COBOL II
- FORTRAN
- Pascal
- SPL
- C (SNA IMF/XL only)

When using no-wait MPE I/O, application programs must be coded in COBOL II, FORTRAN, Pascal, SPL, or C. Some of the intrinsics used with no-wait I/O return a functional value, pass parameters by value, allow a variable number of parameters, and set condition codes. Neither COBOL nor BASIC has these capabilities.

NOTE

If you are using an MPE XL system, be sure that your application programs that call SNA IMF intrinsics are in compatibility mode. SNA IMF/XL intrinsics and Pass Thru currently run only in compatibility mode.

The Communications Link

Data communications occurs over either a switched or a non-switched line. The line protocol is SDLC multipoint (non-contention). Connection to the line is through a modem that you must obtain and install. You must ensure that modems at the HP 3000 end and at the IBM host end are compatible with each other and properly configured.

SNA IMF can use the same modem and INP or PSI as other SNA Services. Also, multiple services can run concurrently using the same communications line. The communications line between the HP 3000 and the host is configured on the mainframe end for a Type 2 node. You can find configuration information in the *HP SNA Products: Manager's Guide*.

Transmission can occur at speeds of up to 64K bps on MPE XL, or up to 56K bps on MPE V.

NOTE

Only one SNA IMF control unit at a time may be configured to operate over a point-to-point line. However, multipoint lines can support multiple control units (one control unit per remote drop).

CAUTION

Hewlett-Packard has not verified the SNA IMF product with all possible combinations of host system software releases. We are continually certifying with new host system software releases. Check with your Hewlett-Packard representative for the most up-to-date list.

Hewlett-Packard does not require that the customer run on one of the verified versions. However, not doing so applies limits to Hewlett-Packard's liability in addition to the normal limits. Because of the certification problems imposed by the host system versions, Hewlett-Packard must restrict its support policy in the following ways. The resolution of all problems will fall into one of the categories listed below:

If a problem is caused by incorrect operation of the Hewlett-Packard product, Hewlett-Packard will repair the product.

If a problem is caused by incorrect operation at the host, Hewlett-Packard may require that the user change to a known working version of the software or may elect to change the Hewlett-Packard product to conform to the situation.

As always, Hewlett-Packard will in good faith attempt to solve the problem with the customer.

Configuring Pass Thru

Pass Thru allows terminals and printers attached to an HP 3000 to emulate IBM 3278 display stations and 3287 printers. You can use Pass Thru for direct access to IBM host applications, without programming the HP 3000.

This chapter explains how to create a Pass Thru configuration file, called PTCONFIG. The PTCONFIG file defines the functions of your configurable terminal function keys, or rolling softkeys. It also specifies other Pass Thru options, described in this chapter under “Elements of the PTCONFIG File.”

Rolling softkeys, their default functions, and their user-defined functions are described in Chapter 5 , “Using Terminals with Pass Thru.”

The PTCONFIG File

When Pass Thru is started, it looks for a configuration file called PTCONFIG, which specifies your rolling softkeys and other Pass Thru options. If this file is not found, the rolling softkeys are assigned the default functions. If the PTCONFIG file is not in your group and account, use a file equation to allow access to another PTCONFIG file.

See Appendix D , “Sample PTCONFIG File,” for a sample PTCONFIG file.

NOTE

Pass Thru printer sessions run as system processes and, therefore, always access PTCONFIG.PUB.SYS. If you specify a different PTCONFIG file (for printer sessions), it will have no effect.

You can use the PTCONFIG file to define all the functions, levels, and labels for your terminal function keys. Define these keys in a way that is most useful for you. When specifying function keys with levels, remember to include the rolling and jumping functions in each level to allow Pass Thru to change the level for you. If you use terminals without shifted function key support (8-function key terminals), define functions for eight function keys in your PTCONFIG file. If you use terminals that support shifted function keys (16-function key terminals), define functions for 16 function keys.

NOTE

If you use both 8- and 16-function key terminals, make sure you define the function keys for both types of terminals. The example in Appendix D , “Sample PTCONFIG File,” of this manual shows a PTCONFIG file for both 8- and 16-function key terminals. If you attempt to use a terminal without first configuring the correct set of function keys (8 or 16) in your PTCONFIG file, only the menu key for function key one will appear on your terminal.

PTCONFIG File Syntax

The following illustrates the syntax of the PTCONFIG file. Items in slanted type are replaced by user-supplied values. Items in square brackets are optional. The curly braces around the SOFTKEYS values indicate that you must select one of them.

The next section in this chapter, “Elements of the PTCONFIG File,” explains all the items in the syntax illustration. See Appendix D , “Sample PTCONFIG File,” for a sample configuration file.

```

SOFTKEYS:  {8}
           {16}
*LEVEL n (Comment, not part of the required syntax.)
BEGIN
Fn: softkey function  ["softkey label"]
Fn: softkey function  ["softkey label"]
           .
           .
           .
Fn: softkey function  ["softkey label"]
Fn: softkey function  ["softkey label"]
           .
           .
           .
END
*level n (Comment, not part of the required syntax.)
BEGIN
           .
           .
           .
END
*OPTIONS (Comment, not part of the required syntax.)
option: option value
option: option value
           .
           .
           .

```

NOTE

ASIAN USERS: Only the *softkey label* and comments in the PTCONFIG file may be translated into native language. The rest of the PTCONFIG file must remain in English.

Elements of the PTCONFIG File

This section describes all the softkey function definitions and the options that may be included in the PTCONFIG file.

SOFTKEYS: *n*

Required. Function key set selector. The value of *n* can be either 8 (for terminals with eight function keys) or 16 (for terminals with 16 function keys). Appendix C, "Pass Thru Terminal and Printer Specifications," lists

the number of function keys available for terminals that are supported by Pass Thru.

*LEVEL *n*

Comment indicating the level of softkey functions. The value of *n* can be an integer from 1 through 6, for terminals with 16 function keys, or from 1 through 12, for terminals with 8 function keys.

BEGIN

Required. Level begin indicator. All function key assignments listed before END are treated as one level. Those listed after END belong to the next level of function keys. You must put BEGIN and END statements around each level of softkey functions.

END

Required. Level end indicator. Any function key assignments listed before END are treated as one level. Those listed after END belong to the next level of function keys. You must put BEGIN and END statements around each level of softkey functions.

F*n*

Required. Function key indicator. The value of *n* is an integer from 1 through 8. (Only F2 through F8 are allowed).

SF*n*:

Shifted function key indicator. The value of *n* is an integer from 1 through 8. On terminals that support 16 function keys, the [SHIFT] key can be used with the eight function keys to allow an additional eight function keys. For example, the value SF2 indicates the shifted function key, [SHIFT]-[f2].

softkey function

A *softkey function* is the attention identifier (AID) or function of a function key. The softkey functions provided by Pass Thru are listed in Table 2-1.

softkey label

Optional function key label definition. If this value is not specified, the system default will be used. The default function key labels and functions are listed in Chapter 5, "Using Terminals with Pass Thru." Up to eight characters per function key are allowed. Enclose this value in double quotes.

*OPTION

Comment describing the effects of the configured options.

option: option value

The PTCONFIG file options and their values are listed in Table 2-2.

Table 2-1 Softkey Functions Provided by Pass Thru

CLEAR	IBM 3278 [CLEAR] key. Moves the cursor to home position, clears the screen, and sends a CLEAR KEY PRESSED message to the IBM host.
CLPRT	Closes the local print spool file (LOGIMF) and prints it while your session is still active. Then a new LOGIMF file is opened. This softkey function works independently of the PTCONFIG PRT option, described later in this chapter. If you need to send your output to a disc file instead of a spool file, enter the following file equation at the MPE colon prompt before you start your Pass Thru session: (This is the only file equation that works.) FILE LOGIMF,NEW;DEV=DISC;REC=-133,,,ASCII;NOCCTL;SAVE
EXIT	Ends Pass Thru for your terminal only and returns the terminal to MPE control.
LBNULL	Causes Pass Thru to convert leading blanks to nulls for transmission to the IBM host. This function is equivalent to the LB: NO option, described later in this section. See “Leading Blanks, Trailing Blanks, and Trailing Nulls,” later in this chapter.
LEVEL1	Rolls the function keys to level 1.
LEVEL2	Rolls the function keys to level 2.
.	.
.	.
.	.
LEVEL12	Rolls the function keys to level 12, if level 12 exists. If level 12 does not exist, this function rolls the function keys over to level 1.
MENU	Displays the Pass Thru softkey menu and prints this prompt on your terminal’s screen: ENTER 1–24, PA1, PA2, PA3, CLEAR, SRK, PRINT, CLPRT, and EXIT. Answer this prompt by entering the number of an IBM PF key or the character string for the softkey you want.
MPEXLCIP	SNA IMF/XL only. Suspends your Pass Thru session and creates an MPE XL command interpreter process. A colon prompt will appear on your screen, and you can enter MPE commands. To return to your suspended Pass Thru session, type EXIT at the MPE colon prompt. See “Using the MPE Command Interpreter from Pass Thru,” in Chapter 5 , “Using Terminals with Pass Thru.”
NEXT	Rolls the function keys to the next level.
PA1	IBM 3278 [PA1] (program aid 1) key.

Table 2-1 Softkey Functions Provided by Pass Thru

PA2	IBM 3278 [PA2] (program aid 2) key.
PA3	IBM 3278 [PA3] (program aid 3) key.
PF1	IBM 3278 [PF1] (program function 1) key.
PF2	IBM 3278 [PF2] (program function 2) key.
.	.
.	.
.	.
PF24	IBM 3278 [PF24] (program function 24) key.
PRINT	<p>Sends a copy of the internal screen image to a spooled output file called LOGIMF. The format of the internal screen image is determined by the <i>format</i> parameter you specify in the info string when you start Pass Thru. This function is equivalent to the IBM 3278 local print key.</p> <p>If you need to send your output to a disc file instead of a spool file, enter the following file equation at the MPE colon prompt before you start your Pass Thru session: (This is the only file equation that works.)</p> <pre>FILE LOGIMF,NEW;DEV=DISC;REC=-133,,ASCII;NOCCTL;SAVE</pre>
RESET	The IBM 3278 [RESET] key. This function unlocks the keyboard and enables input. This function issues the RESET3270 intrinsic, described in the <i>SNA IMF Programmer's Reference Manual</i> .
STATUS	Displays status information about your LU-LU session. See "Displaying SNA Session Status Information," in Chapter 5, "Using Terminals with Pass Thru."
SRK	BM 3278 [SYS REQ] (system request) key. Sends a special protocol sequence to the SSCP.
TBNULL	Causes Pass Thru to send trailing blanks for non-null characters sent by the host. This function is equivalent to the TB: YES option, described later in this section. See "Leading Blanks, Trailing Blanks, and Trailing Nulls," later in this chapter.
TNBLANK	Causes Pass Thru to convert trailing nulls to blanks before sending data to the host. This function is equivalent to the TN: YES option, described later in this section. See "Leading Blanks, Trailing Blanks, and Trailing Nulls," later in this chapter.

See Table 2-2 for PTCONFIG file options.

Leading Blanks, Trailing Blanks, and Trailing Nulls

IBM terminals make a distinction between null characters and blanks. The HP 700/94 terminal now has a ROM module (part #5062-1306) that allows it to support null characters, but all the older HP terminals represent null characters as blanks. Because older HP terminals cannot type nulls or distinguish between nulls and blanks in terminal memory, SNA IMF provides several softkey functions and PTCONFIG file

options to help resolve any communication difficulties caused by null character translation.

NOTE If you are using an HP 700/94 terminal with the ROM module for null support, you do not need any of the softkey functions or PTCONFIG file options described in this section.

Table 2-2 lists the PTCONFIG file options that affect null character translation.

Table 2-2 PTCONFIG File Options for Null Translation

PTCONFIG File Option	Effect
TB: YES (default)	Transmits trailing blanks for each non-null character that has been modified with a blank before transmitting the data to the host.
TB: NO	Converts all trailing blanks to nulls on a field-by-field basis before transmitting data to the host.
LB: YES	Transmits leading blanks as they are read from the HP terminal screen on a field-by-field basis.
LB: NO (default)	Converts leading blanks to nulls on a field-by-field basis before transmitting the data to the host.
TN: YES	Converts trailing nulls to blanks before sending the data to the host.
TN: NO (default)	Has no effect, since the user cannot type nulls.

Table 2-3 lists the softkey functions that affect null character translation. It also lists, for each softkey function, the PTCONFIG file option that has the same effect.

Table 2-3 Softkey Function for Null Translation

Softkey Function	Effect	Equivalent PTCONFIG File Option
LBNULL	Converts leading blanks to nulls on a field-by-field basis before transmitting the data to the host.	LB: NO
TBNULL	Transmits trailing blanks for each non-null character that has been modified with a blank before transmitting the data to the host.	TB: YES
TNBLANK	Converts trailing nulls to blanks before sending the data to the host.	TN: YES

The state of the LBNULL, TBNULL, and TNBLANK softkeys overrides the values specified for the LB, TB, and TN options in your PTCONFIG file. If

an asterisk appears on your terminal screen next to the softkey label, the softkey function is turned on. To turn it off, press the softkey, and the asterisk will disappear. To turn it back on, press the softkey again.

When the `LBNULL` softkey is turned on, it overrides the `BLANKS` parameter specified in the info string of the `RUN TTSSON` command that starts Pass Thru. The `BLANKS` parameter in the info string has the same effect as the `LB: YES` option in the PTCONFIG file. The `TB` and `TN` options cannot be specified in the info string. See Chapter 3, “Starting Pass Thru.”

In operations that use both the `TB` and `LB` options, the `TB` option is always processed before the `LB` option. Using both options can affect the integrity of a null or blank field. See Table 2-4 for information on how the `LB`, `TB`, and `TN` options interact.

LB, TB, and TN Options with MDT and Non-MDT Terminals

The `LB`, `TB`, and `TN` options can have different effects, depending on whether you are using an MDT (Modified Data Tag) terminal or a non-MDT terminal. (See Appendix C, “Pass Thru Terminal and Printer Specifications,” for a list of MDT and non-MDT terminals that can be used with Pass Thru.)

An MDT terminal has a tag associated with each field on the screen. When you type data into a field, the tag is set to indicate that data in that field has been modified. Then, when the HP 3000 receives data from the MDT terminal, it transmits to the IBM host only the data that has been modified.

The fields in a non-MDT terminal screen have no tags to indicate whether the data in them has been modified. When the HP 3000 receives data from a non-MDT terminal, it compares each field with its corresponding field in the internal screen image to see if any data has been changed. Then, it transmits to the IBM host any data that differs from the data in the internal screen image.

When the IBM host sends null characters, the nulls are translated to blanks for your HP terminal. If you are using a non-MDT terminal, and you type some blanks into a field that previously contained nulls, the HP 3000 compares the data from your terminal with the internal screen image and finds no difference. The data appears to be unchanged, so the HP 3000 transmits no data to the IBM host.

NOTE

A ROM module (part #5062-1306) is now available for the HP 700/94 terminal that allows it to support nulls just as an IBM 3278 display station does.

NOTE

If you are currently using non-MDT terminals, you should consider upgrading to MDT terminals. MDT terminals will transmit blanks that have been typed over nulls. They will also improve performance, because data from the terminal does not have to be compared with the internal screen image before it can be sent to the host.

Figure 2-1 shows part of an RU (Request/Response Unit) that the HP 3000 sends to the IBM host during a Pass Thru session.

The AID and the cursor position are always transmitted, even if no data is being sent. Therefore, when “no data” is sent to the IBM host, it means that only the AID and cursor position are sent.

If the Set Buffer Address order and the field address are transmitted along with the AID and cursor position, but no Start Field order follows the field address, the IBM host interprets it as the ERASE EOF function and erases the field (fills it with nulls). See Appendix E, “3270 Bit Assignment and Character Translation Tables,” for AID codes and 3270 Buffer Control Orders.

Figure 2-1 3270 Request/Response Unit (RU)

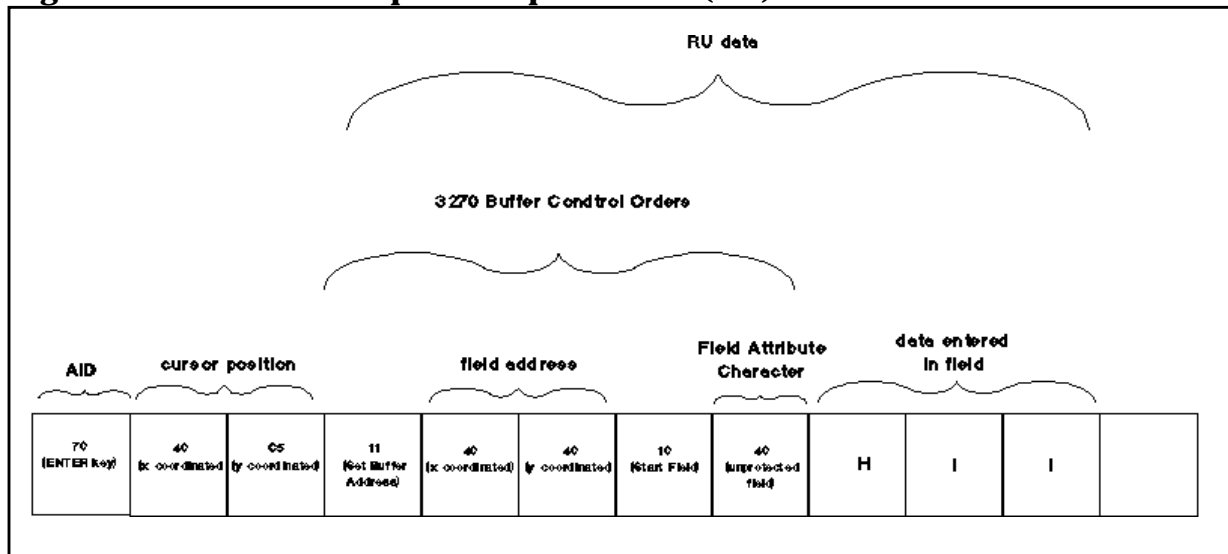


Table 2-4 shows the interaction among the LB, TB, and TN options on MDT and non-MDT terminals. The first column is the data that the HP 3000 receives from the IBM host. The second column is the data that the user types over the data from the host. The third and fourth columns show what the HP 3000 transmits back to the IBM host after the user at the terminal types in data and presses the [ENTER] key. The third column is from an MDT terminal, and the fourth column is from a non-MDT terminal.

Legend for Table 2-4:

ABC = the non-null, non-blank data transmitted by the host.
 XYZ = the non-blank data typed by the user.
 ~ = null
 ^ = blank

NOTE In Cases 6 and 8 (LB: YES and TN: YES), if a non-MDT terminal user presses the [ENTER] key after receiving host data and before typing any new data, a field of nulls (“~~~~~”) received from the IBM host will be transmitted back to the host as a field of blanks (“^^^^^^”). The data is changed whether or not the user types anything into the field.

In Cases 5 and 6, when TB: NO and TN: YES are specified, an MDT terminal can emulate the ERASE EOF function by typing “^^^^^^” (a field of blanks). ERASE EOF causes the IBM host to erase everything in the field (replace it with nulls).

Table 2-4 Interaction of LB, TB, and TN Options

	Data Received from IBM Host	Data Typed at HP Terminal	Data Sent to Host from HP MDT Terminal	Data Sent to Host from HP non-MDT Terminal
Case # 1: LB: NO TO: NO TN: NO	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~~ ABC^^^^ ^^ABC^^ ^^^^ABC ^^^^^^	XYZ^^^^ ^^XYZ^^ ^^^^XYZ ^^^^^^ XYZ^^^^ ^^XYZ^^ ^^^^XYZ ^^^^^^	XYZ XYZ XYZ ^^^^^^ XYZ XYZ XYZ ^^^^^^	XYZ XYZ XYZ No data XYZ XYZ XYZ No data
Case # 2: LB: YES TO: NO TN: NO	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~~ ABC^^^^ ^^ABC^^ ^^^^ABC ^^^^^^	XYZ^^^^ ^^XYZ^^ ^^^^XYZ ^^^^^^ XYZ^^^^ ^^XYZ^^ ^^^^XYZ ^^^^^^	XYZ ^^XYZ ^^^^XYZ ^^^^^^ XYZ ^^XYZ ^^^^XYZ ^^^^^^	XYZ ^^XYZ ^^^^XYZ No data XYZ ^^XYZ ^^^^XYZ No data
Case # 3: LB: NO TO: YES TN: NO	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~~ ABC^^^^ ^^ABC^^ ^^^^ABC ^^^^^^	XYZ^^^^ ^^XYZ^^ ^^^^XYZ ^^^^^^ XYZ^^^^ ^^XYZ^^ ^^^^XYZ ^^^^^^	XYZ XYZ XYZ ^^^^^^ XYZ^^^^ ^^XYZ ^^^^XYZ ^^^^^^	XYZ XYZ XYZ No data XYZ^^^^ ^^XYZ ^^^^XYZ No data

Table 2-4 Interaction of LB, TB, and TN Options

	Data Received from IBM Host	Data Typed at HP Terminal	Data Sent to Host from HP MDT Terminal	Data Sent to Host from HP non-MDT Terminal
Case # 4: LB: YES TO: YES TN: NO	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~ ABC^ ^^ABC^ ^^^ABC ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ ^^XYZ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ ^^XYZ ^^^XYZ No data XYZ^ ^^XYZ^ ^^^XYZ No data
Case # 5: LB: NO TO: NO TN: YES	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~ ABC^ ^^ABC^ ^^^ABC ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ XYZ^ XYZ ^^^^ XYZ XYZ XYZ ERASE EOF	XYZ^ XYZ^ XYZ No data XYZ XYZ XYZ No data
Case # 6: LB: YES TO: NO TN: YES	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~ ABC^ ^^ABC^ ^^^ABC ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ ^^XYZ ^^^XYZ ERASE EOF	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ ^^XYZ ^^^XYZ No data
Case # 7: LB: NO TO: YES TN: YES	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~ ABC^ ^^ABC^ ^^^ABC ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ^ XYZ^ XYZ ^^^^ XYZ^ XYZ^ XYZ ^^^^	XYZ^ XYZ^ XYZ No data XYZ^ XYZ^ XYZ No data
Case # 8: LB: YES TO: YES TN: YES	ABC~~~~ ~~ABC~~ ~~~~ABC ~~~~~ ABC^ ^^ABC^ ^^^ABC ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ ^^^^	XYZ^ ^^XYZ^ ^^^XYZ ^^^^ XYZ^ ^^XYZ^ ^^^XYZ No data
ABC = host-transmitted data XYZ = data typed by the user ~ = null ^ = blank				

General PTCONFIG File Rules

The following general rules apply to the PTCONFIG file:

- Invalid *softkey functions* are not accepted. If you specify an invalid *softkey function*, an error message will appear.
- You must specify a function key set selector (SOFTKEYS: 8 or SOFTKEYS: 16) at the beginning of each set of function key assignments. All function key assignments following the SOFTKEYS set selector are treated as one set until another SOFTKEYS set selector appears.
- A terminal with 16 function keys can have a maximum of 6 levels of softkey functions. A terminal with eight function keys can have a maximum of 12 levels of softkey functions.
- Each level of softkey functions is enclosed by BEGIN and END.
- The option assignment (*option: option value*) can appear anywhere.
- Comments are preceded by an asterisk (*). Characters between the asterisk and the end of the line are ignored. Blank lines are ignored and can be used to separate statements.
- You cannot assign a function to the [f1] key; it is reserved for the menu key. However, if your terminal supports shifted function keys, you can assign a function to the shifted [f1] key.
- If the PTCONFIG file defines only SOFTKEYS: 8, and you use Pass Thru on a terminal that supports 16 function keys, the menu key will be the only usable softkey. To avoid potential problems, always define both 8- and 16-function key sets in your PTCONFIG file.

NOTE

Pass Thru always reserves the [f1] key for the menu key and overwrites whatever you may have defined for [f1] in the PTCONFIG file.

Asian PTCONFIG File Considerations

The following considerations apply to PTCONFIG files created for Asian language users.

Localized Softkeys

When Pass Thru is started, the program looks for a file named PTCONFIG, which specifies your rolling softkeys and other Pass Thru options. If this file is not found, the softkeys are labeled with the default functions. The default softkey labels are in American English. If you want localized softkey labels, you must specify the labels in the PTCONFIG file. The localized 16-bit label (or mixed 8- and 16-bit label) can be up to 8 bytes long (or 4 DBCS characters long).

NOTE

ASIAN USERS: Only the *softkey label* and comments in the PTCONFIG file may be translated into native language. The rest of the PTCONFIG file must remain in English.

Here is an example of a small PTCONFIG file:

```
SOFTKEYS:8

*LEVEL ONE

BEGIN

F2:SRK                "localized label"
F3:CLEAR              "localized label"
F4:PRINT              "localized label"
F5:CLPRT             "localized label"
F6:STATUS            "localized label"
F7:TBNULL            "localized label"
F8:EXIT              "localized label"

END
```

You can customize the softkey labels by typing the *localized label* between the quotation marks (as shown in the above example) with an editor, using an Asian terminal in its Asian mode.

The softkey label is limited to 8 bytes or 4 DBCS characters in length. Mixing of 8- and 16-bit data is also allowed when the label does not exceed 8 bytes. See Appendix D , "Sample PTCONFIG File," for an example of a PTCONFIG file.

English and Asian Language Support

English-only applications are supported when the `DBCS: YES` option is specified in the PTCONFIG file. However, if you are using English-only applications, set Pass Thru to use a PTCONFIG file that specifies `DBCS: NO`. This practice ensures that your English-only applications perform at their best. Use separate PTCONFIG files to support English-only and Asian-only applications. Use file equations to redirect one of the PTCONFIG files. Here are some examples:

To run English-only Pass Thru, specify the following:

```
:FILE PTCONFIG.PUB.SYS=PTCONFIG.PUB.SYS  
:RUN TTSSON.PUB.SYS;INFO="CONFIG=node#class;DEVID=T"
```

To run Asian Pass Thru, specify the following:

```
:FILE PTCONFIG.PUB.SYS=PTCONFIG.ASIA.SYS
```

or

```
:FILE PTCONFIG.PUB.SYS=PTASIA.PUB.SYS  
:RUN TTSSON.PUB.SYS;INFO="CONFIG=node#class;DEVID=T"
```

Starting Pass Thru

The Pass Thru program resides in the file `TTSSON.PUB.SYS`. To start Pass Thru, you issue the `MPE RUN` command. The first parameter of the `RUN` command is the file `TTSSON.PUB.SYS`, and following it is an information string that contains all the parameters used by Pass Thru. Using the info string parameters described in this chapter, you can start Pass Thru sessions on your own terminal, someone else's terminal, a cluster of terminals, or a printer.

You can create a **User-Defined Command (UDC)** to simplify the `RUN` command that starts Pass Thru. It is useful to have several different UDCs in order to start Pass Thru on different devices or with different info string parameters.

This chapter describes the `MPE RUN` command and all the info string parameters used by Pass Thru. It tells you how to create and use UDCs, and it gives several example UDCs for starting Pass Thru on different devices.

Command Syntax for Starting Pass Thru

The info string of the MPE RUN command used for Pass Thru may contain the following parameters:

- CONFIG=*config* — SNA node name, and SNA LU class name (MPE V) or security class name (MPE XL)
- DEVID=*devid* — Device identifier (LU.T1, LU.T2, or LU.T3)
- LDEV=*ldev* — Logical device number(s) or device class
- FORMAT=*format* — Format for printing the internal screen image
- PRIORITY=*priority* — Output spool priority
- BLANKS — Disable translation of leading blanks to nulls
- ENHANCE=*enhance* — Display enhancements (brightness, underlining, inverse video)
- SPRIORITY=*spriority* — Spooler priority
- READTO=*readto* — Terminal timeout value
- TRACE — SNA IMF internal tracing
- PFN=*pfn* — Printer filename
- LJ2 — HP LaserJet Series II or Series III printer

Syntax

```
RUN TTSSON.PUB.SYS;INFO="CONFIG=config; DEVID=devid [;LDEV=ldev]  
[;FORMAT=format] [;PRIORITY=priority] [;BLANKS] [;ENHANCE=enhance]  
[;SPRIORITY=spriority] [;READTO=readto] [;TRACE] [;PFN=pfn] [;LJ2]"
```

Info String Parameters

The following parameters comprise the info string. The info string can be up to 256 characters long, including blanks. It must be enclosed in double quotes. Parameters are separated by semicolons.

config **Required.** A byte array that identifies the section of the Node Management Services configuration file used by SNA IMF.

On MPE V, *config* is the SNA node name (PU name) and the SNA class name. The syntax is as follows:

```
CONFIG=SNA node name#SNA class name
```


On MPE XL, *config* is the SNA node name (PU name) and the security class name. The syntax is as follows:

```
CONFIG=SNA node name#security class name
```

devid

Required. Device identification for printer or terminal. Possible values are as follows:

for 3278 display station (LU.T2) emulation:

D	(Display station)
T	(Terminal)
-2	(LU.T2)

for 3287 printer (LU.T1 or LU.T3) emulation:

P	(Printer)
-1	(LU.T1)
-3	(LU.T3)

For terminal emulation, D, T, and -2 can be used interchangeably. For LU.T1 or LU.T3 printer emulation, specifying -1 or -3 will make your startup time slightly shorter than specifying P. If you specify one type of printer session, and your first session turns out to be the other type, no error will occur. SNA IMF will start up the appropriate emulator.

If you specify a printer *ldev* and an LU.T2 bind is received, an error will occur. Likewise, if you specify a display station *ldev* and an LU.T1 or LU.T3 bind is received, an error will also occur.

ldev

Optional. MPE logical device number of the HP terminal or printer, or device class for printer emulation. The default is 0. Use 0 to represent your own terminal.

This parameter can be used to specify device classes for printer emulation. For example, the following info string causes Pass Thru to use the device class name "UNISPOOL" in the FOPEN call:

```
:RUN TTSSON;INFO="CONFIG=IBMNODE#LU3;  
DEVID=P; LDEV=UNISPOOL"
```

The file system will then be responsible for determining which logical device in the "UNISPOOL" class name to open. If the device class name you specify is not configured, or if you specify a device class name for a terminal, Pass Thru will return an error message.

format Optional parameter used for LUT2 and LUT3 sessions only. The *format* value tells SNA IMF which form of screen printing to use when you press the **PRINT** softkey. It is an integer from 1 through 4. The default is 2. Possible values are as follows:

- 1 Prints the contents of the internal screen image and the location and characteristic of each 3270 attribute character.
- 2 (Default) Prints the internal screen image in the same format in which it appears on a terminal. Attribute and null characters appear as blanks. This clean print is similar to the function of the IBM 3278 local print key.
- 3 Prints the contents of the internal screen image and the location and characteristic of each 3270 attribute character. Automatically prints the internal screen image that is created whenever Pass Thru calls the `TRAN3270` or `RECV3270` intrinsic for a particular device.
- 4 Prints the internal screen image in the same format in which it appears on a terminal. Attribute and null characters appear as blanks. Automatically prints the internal screen image that is created whenever Pass Thru calls the `TRAN3270` or `RECV3270` intrinsic for a particular device.

Unless a `FILE` command has been issued in MPE, pressing the **PRINT** softkey produces a copy of the internal screen image and sends it to an output spool file named `LOGIMF`. Use the following file equation to send the internal screen to disk: (This is the only file equation that works.)

```
:FILE LOGIMF,NEW;DEV=DISC;REC=-133,,,ASCII;NOCCTL;SAVE
```

A *format* value of 2 or 4 prints the exact contents of the internal screen image. Each screen image has a numeric border that numbers the rows and columns. Null characters are represented by tildes (~), or by hyphens on some terminals, to distinguish them from blanks. Attribute characters appear as overprints. The hexadecimal value of the first 16 attribute characters in

each row is printed to the right of the row. The cursor appears as an underline. The cursor position and state of the keyboard (enabled or disabled) are printed at the bottom of the screen image.

When you use the **PRINT** key with a *format* value of either 1 or 2, Pass Thru reads the terminal screen and updates the internal screen image with any recent data entered on the screen. Do not confuse the read for this **PRINT** operation with the one associated with the transmission of data to the host. To send data to the host, use either the **[ENTER]** key or a **PF** (program function) key.

A *format* value of 3 or 4 prints the internal screen image when you press the **PRINT** softkey, and it automatically prints the internal screen image that is created whenever Pass Thru calls the SNA IMF `TRAN3270` or `RECV3270` intrinsic for a particular device. Automatic printing is started when Pass Thru comes up and continues until you exit Pass Thru. For information on SNA IMF intrinsics, see the *SNA IMF Programmer's Reference Manual*.

A *format* value of 3 is useful for testing an SNA IMF application as you write it. It helps you determine two things: the location of 3270 attribute characters within a screen image, and whether the host is doing multiple writes to create a single screen image.

A *format* value of 4, which produces a clean print, helps create an automatic hard-copy log of transactions.

priority

Optional parameter used for `LU.T2` and `LU.T3` only. It is an integer from 1 through 13 specifying an output spool priority for the output file `LOGIMF`. The default is 7.

The `LOGIMF` file contains the output from the **PRINT** softkey or the SNA IMF `PRINT3270` intrinsic.

An output spool priority specified in an `MPE FILE` command overrides the value in this parameter.

`BLANKS`

Optional parameter used for `LU.T2` and `LU.T3` only. Informs Pass Thru to keep leading blanks. If `BLANKS` is not specified, all leading blanks in unprotected fields are converted to nulls, on a field-by-field basis, for transmission to the host. The `BLANKS` parameter does not affect embedded or trailing blanks; only leading blanks are affected.

Specifying the *BLANKS* parameter is equivalent to specifying the *LB: YES* option in the *PTCONFIG* file. You can use the *LBNULL* softkey to override the *BLANKS* parameter and the *LB: YES* option in the *PTCONFIG* file.

For more information on leading blanks, see “Leading Blanks, Trailing Blanks, and Trailing Nulls,” in Chapter 2 , “Configuring Pass Thru.”

enhance

Optional parameter used for *LU.T2* and *LU.T3* only. This is an integer from 0 through 3 specifying a display enhancement value. The default is 0. Table 3-1 lists the possible values and their effects.

Table 3-1 Display Enhancement Options

Option	3278 Normal Intensity Converted to	3278 High Intensity Converted to
0	264x half-bright or 23xx/262x normal (full-bright)	23xx/262x/264x normal (full-bright)
1	23xx/262x/264x normal (full-bright)	23xx/262x/264x underline
2	23xx/262x/264x normal (full-bright)	23xx/262x/264x inverse video
3	23xx/262x/264x inverse video	23xx/262x/264x normal (full-bright)

If you are using an HP 264x terminal, you must have the Display Enhancements option installed, because half-bright and underline are not standard features. Without the Display Enhancements option, if you specify *ENHANCE=0* (the default), all characters appear at normal intensity. Half-bright is not available on the 23xx or 262x terminals.

You cannot turn off inverse video for part of a field on an HP terminal. Therefore, if you choose inverse video, the white strip of the inverse video occupies the entire field, regardless of where the end of your data falls in the field. Display enhancement options 2 and 3 use inverse video. (See Table 3-1.)

spriority

Optional parameter used to specify the spooler priority. This is an integer from 1 through 13. The default is 8.

<i>readto</i>	Optional parameter used to set the terminal timeout value in seconds. The value must be an integer between 10 and 255. The default is 10 seconds. You may need to specify a value greater than 10 if your terminal's response time is longer than 10 seconds. Long response time can be caused by a remote connection through multiple HP 3000 systems and can be complicated by modem connections and slow line speeds.
TRACE	<p>Optional parameter used to turn on SNA IMF internal tracing. If TRACE is not specified, internal tracing is turned off by default.</p> <p>Internal tracing degrades performance and should be specified only at the request of your HP representative. It is used to collect data for problem determination.</p> <p>Trace data is sent to a trace file named IMF_{nn}T_{xx}, where <i>nn</i> is the NAU number and <i>xx</i> is a unique two-digit identifier for the trace file. The file will reside in the current group and account of the user running Pass Thru. (For acquired terminals or printers, the file will reside in PUB.SYS.)</p>
<i>pfn</i>	Optional parameter used to specify a printer file name other than the default value. The printer file name must be an alphanumeric string of up to 8 characters, beginning with an alphabetic character. The default printer file name is a string of blank characters. This parameter is valid only in LU.T1 or LU.T3 printer sessions.
LJ2	Optional parameter used to inform Pass Thru that printer output files will be directed to an HP LaserJet Series II or Series III printer. If LJ2 is not specified, Pass Thru defaults to the former method of printing output files on impact and high-end laser printers. LJ2 can be used only in an LU.T1 or LU.T3 printer session.

Creating and Using UDCs

You can use a one-word User-Defined Command (UDC) to start Pass Thru, instead of the long command string described in “Command Syntax for Starting Pass Thru,” earlier in this chapter. UDCs are easy to create and are handy for repetitive tasks. This section tells you how to use the MPE editor and the `SETCATALOG` command to create UDCs for starting Pass Thru. The next section, “UDCs for Starting Pass Thru,” gives example UDCs that start Pass Thru for your own terminal, for someone else’s terminal, for a cluster of terminals, and for a printer.

Following are the steps for creating a UDC that starts Pass Thru:

1. If you already have a file that contains your UDCs, make it available for write access by entering the following command at the MPE colon prompt:

```
:SETCATALOG
```

You cannot modify your UDC file until you issue the `SETCATALOG` command. When you issue the `SETCATALOG` command without any parameters, it removes all your UDCs from the catalog.

2. Start the MPE editor by entering the following command at the colon prompt:

```
:EDITOR
```

The following message will appear on your screen, followed by a slash, which is the prompt for the MPE editor:

```
HP32201A.07.17  EDIT/3000  MON, AUG 20, 1990, 10:06 AM  
(C) HEWLETT-PACKARD CO. 1985  
/
```

3. If you already have a file containing your UDCs, call up the file by entering the following editor command at the slash prompt:

```
/T udcfile
```

4. To enter text into your file, type the following editor command at the slash prompt:

```
/ADD
```

If you are editing an existing UDC file, the line number that appears on your screen is the number of the first blank line at the end of the file. If you are creating a new UDC file, the number 1 appears on your screen, indicating that you are at the first line in the file.

5. UDCs in a file must be separated by a row of asterisks, so if you are editing an existing UDC file, type a row of asterisks on a line by itself. (In this example, the line number is 12.)

```
12  *****
```

6. Enter the name of the UDC you are creating. This is the command you will type to invoke the UDC. In the following example, the name of the UDC, and the command that invokes it, is `SNAIMF`. The line number in the example is 1, but if you are editing an existing UDC file, the line number will be the number of the first blank line at the end of the file.

```
1  SNAIMF
```

7. On the next line following the UDC name (or the next several lines), enter the command that invokes Pass Thru. The info string of the `MPE RUN` command can be up to 256 characters long, counting blanks.

You can break the `RUN` command up into several lines if you end each line with an ampersand (&). The ampersand causes line breaks to be ignored; lines separated by ampersands are read as one long line.

The following command starts Pass Thru for the terminal from which the command is issued. The SNA node name is `SNAPU`, and the SNA class name or security class name is `IMFCLASS`. The device ID is `D` (Display station), and the `ldev` number is 0, specifying the terminal from which the command is issued. All the other info string parameters have default values.

```
2  RUN TTSSON.PUB.SYS; &
3  INFO="CONFIG=SNAPU#IMFCLASS;DEVID=D;LDEV=0"
```

8. On the line following your UDC, type several asterisks to mark the end of the UDC. Then, on the next line, type 2 slashes to indicate that you are finished entering text.

```
4  *****
5  //
```

9. Save your UDC file by entering the following editor command at the slash prompt:

```
/KEEP udcfile
```

10. If you are editing an existing UDC file, the editor will ask you if you want to purge the old version and replace it with the edited version. Verify that you want to keep the edited file by entering `YES`.

```
PURGE OLD? YES
```

11. Leave the editor by entering the following editor command at the slash prompt:

```
/EXIT
```

12. Set the new *udcfile* by entering the following command at the MPE colon prompt:

```
:SETCATALOG udcfile
```

NOTE

When you issue the `SETCATALOG` command with no arguments, it removes all your UDCs, in all your UDC files, from the catalog. To reset all your UDCs, you must issue the `SETCATALOG` command once for every file that contains UDCs.

Listed together, the lines that make up the preceding example look like this: (The text that you enter is in boldface type.)

```
:SETCATALOG
:EDITOR
HP32201A.07.17 EDIT/3000 MON AUG 20, 1990, 10:06 AM
(C) HEWLETT-PACKARD CO. 1985
/T UDCFILE
/ADD
1 SNAIMF
2 RUN TTSSON.PUB.SYS;&
3 INFO="CONFIG=SNAPU#IMFCLASS;DEVID=D;LDEV=0"
4 *****
5 //
/KEEP UDCFILE
/EXIT

END OF SUBSYSTEM
:SETCATALOG UDCFILE
```

Once the UDC is set, you can simply type `SNAIMF`, and a Pass Thru session will be started for your terminal. Typing `SNAIMF` will have the same effect as typing the MPE `RUN` command that you entered in the UDC file.

For more information about MPE commands and UDCs, see the *MPE V Commands Reference Manual* or the *MPE XL Commands Reference Manual*.

The next section, "UDCs for Starting Pass Thru," gives example UDCs that start Pass Thru for your own terminal, for someone else's terminal, for a cluster of terminals, and for a printer.

UDCs for Starting Pass Thru

You can start Pass Thru for the following devices:

- Your own terminal
- Someone else's terminal
- A cluster of terminals
- A printer

This section gives example UDCs for each of the four ways you can start Pass Thru. For step-by-step instructions on editing UDC files and setting UDCs, see "Creating and Using UDCs," earlier in this chapter. For more information about UDCs, see the *MPE V Commands Reference Manual* or the *MPE XL Commands Reference Manual*.

For Your Own Terminal

You can create a UDC to start Pass Thru on your own terminal by entering the following lines in your UDC file:

```
PTMYTERM
RUN TTSSON.PUB.SYS;&
INFO="CONFIG=SNAPU#IMFCLASS;DEVID=D;LDEV=0"
*****
```

Be sure to replace "SNAPU#IMFCLASS" with the SNA node name and the SNA class name or security class name configured for SNA IMF on your system.

Once this UDC is set, you can start a Pass Thru session on your terminal by typing the following at the MPE colon prompt:

```
:PTMYTERM
```

This UDC uses the default values for *format*, *priority*, *BLANKS*, *enhance*, *spriority*, *readto*, *TRACE*, *pfn*, and *LJ2*.

For Someone Else's Terminal

The UDC that starts Pass Thru for your own terminal can be modified to start Pass Thru for another terminal. You just have to change the LDEV value. For example, the UDC to start Pass Thru for logical device 25 would look like this:

```
PFTERM25
RUN TTSSON.PUB.SYS;&
INFO="CONFIG=SNAPU#IMFCLASS;DEVID=D;LDEV=25"
*****
```

To start Pass Thru for logical device number 25, you would type the following at the MPE colon prompt:

```
:PTTERM25
```

You can also create a UDC with optional parameters. If you make certain parameters optional, you can use the same UDC to start Pass Thru for various devices just by entering different parameters when you enter the command. In the following example, CONFIG, DEVID, and LDEV are set up as optional parameters. The values in quotation marks are the defaults.

```
SNAIMF CONFIG="SNAPU#IMFCLASS",DEVID="D",LDEV="0"  
RUN TTSSON.PUB.SYS;&  
INFO="CONFIG=!CONFIG;DEVID=!DEVID;LDEV=!LDEV"  
*****
```

After you have set the UDC, you can type

```
:SNAIMF
```

at the MPE colon prompt, and the values in quotation marks will be used for the CONFIG, DEVID, and LDEV parameters. A Pass Thru session will be started for your own terminal, because the default LDEV value is 0. However, you can change the default parameter values by typing different ones when you enter the command. For example, to start Pass Thru for logical device 25, just enter

```
:SNAIMF LDEV=25
```

and Pass Thru will begin on the terminal associated with logical device 25.

For a Cluster of Terminals

You can create a UDC to start Pass Thru for a cluster of terminals or a cluster of printers. All devices in a cluster must be the same type (either all printers or all terminals). The following UDC starts Pass Thru for the terminals associated with logical device numbers 25 through 30:

```
PTCLUSTER  
RUN TTSSON.PUB.SYS;&  
INFO="CONFIG=SNAPU#IMFCLASS;DEVID=D;&  
LDEV=25,26,27,28,29,30"  
*****
```

After the UDC is set, you can type

```
:PTCLUSTER
```

and Pass Thru will start for logical devices 25 through 30. With this type of UDC, you can bring up all the terminals on a node with a single command.

This UDC uses the default values for *format*, *priority*, *BLANKS*, *enhance*, *spriority*, *readto*, *TRACE*, *pfn*, and *LJ2*.

You can also use the UDC with the optional parameters to start Pass Thru for a cluster of devices:

```
SNAIMF CONFIG="SNAPU#IMFCLASS",DEVID="D",LDEV="0"  
RUN TTSSON.PUB.SYS;&  
INFO="CONFIG=!CONFIG;DEVID=!DEVID;LDEV=!LDEV"  
*****
```

To start Pass Thru for the cluster of devices associated with logical device numbers 25 through 30, enter the following command at the MPE colon prompt:

```
:SNAIMF LDEV="25,26,27,28,29,30"
```

For a Printer

The following UDC starts Pass Thru for the printer associated with logical device number 6:

```
PRTRUP CONFIG="SNAPU#IMFCLASS",DEVID="P",LDEV="6"  
RUN TTSSON.PUB.SYS;&  
INFO="CONFIG=!CONFIG;DEVID=!DEVID;LDEV=!LDEV"  
*****
```

This UDC uses the default values for *format*, *priority*, *BLANKS*, *enhance*, *spriority*, *readto*, *TRACE*, *pfn*, and *LJ2*.

If you enter only

```
:PRTRUP
```

at the MPE colon prompt, a Pass Thru session will be started for the printer associated with logical device number 6. However, you can use the same UDC to start Pass Thru for a different printer by specifying a different logical device number when you enter the command. For example, to start Pass Thru for the printer associated with logical device number 8, you would enter the following command:

```
:PRTRUP LDEV=8
```

Starting Pass Thru
UDCs for Starting Pass Thru

4

Stopping Pass Thru

After a Pass Thru session, how you stop Pass Thru and return a device to MPE control depends on whether the device is a terminal or a printer.

NOTE

Before you exit Pass Thru, make sure you exit the IBM host application program you are running. Once you exit your Pass Thru session, you cannot get back into it to exit the IBM host application.

For a Terminal

If your HP terminal is emulating an IBM 3278 display station, you can exit Pass Thru by pressing the **[f8]** (*EXIT*) function key. You cannot use either **[BREAK]** or **[CTRL]-Y** to exit Pass Thru because both are disabled when Pass Thru gains control of your terminal.

For a Printer

If your HP printer is emulating an IBM 3287 printer, you can exit Pass Thru by issuing the MPE command `SNACONTROL STOPSESS` from a terminal. This command terminates the LU-LU session associated with Pass Thru. The syntax for the `SNACONTROL STOPSESS` command is as follows:

```
SNACONTROL STOPSESS;NODE=SNA node name;NAU=NAU number on  
MPE V, or
```

```
SNACONTROL STOPSESS;NODE=SNA node name;LUNAME=LU name on  
MPE XL.
```

You can obtain the SNA node name and the NAU number or LU name for your LU-LU session by pressing the `STATUS` softkey. See Chapter 2, “Configuring Pass Thru,” for information about configuring the `STATUS` softkey. See “Displaying SNA Session Status Information,” in Chapter 5, “Using Terminals with Pass Thru,” for information about the `STATUS` display.

See the *SNA Link Services Reference Manual* or the *SNA Link/XL Node Manager's Guide* for a complete description of the `SNACONTROL STOPSESS` command.

This chapter explains how to use SNA IMF Pass Thru from a terminal. A terminal in a Pass Thru session emulates an IBM 3278 display station (LU.T2).

This chapter contains the following sections:

- **HP and IBM Terminal Keys** discusses the differences and similarities between the keys on an HP terminal and the keys on an IBM 3278 display station. It describes the default and user-defined softkey functions available with Pass Thru, and it lists the Pass Thru softkeys used to emulate 5250 key functions for communicating with applications on an IBM AS/400.
- **HP and IBM Terminal Characteristics** discusses the differences and similarities between HP and IBM terminal functions and screen displays.
- **Setting Terminal Transmission Speeds** tells you how to set the correct baud rate for your terminal.
- **Displaying SNA Session Status Information** tells you how to display information about your LU-LU session on your terminal and how to read the display.
- **Using the MPE Command Interpreter from Pass Thru** tells you how to suspend your Pass Thru session, issue MPE XL commands from your terminal, and then return to your suspended Pass Thru session.

See Appendix C , “Pass Thru Terminal and Printer Specifications,” for a list of the terminals you can use with Pass Thru.

HP and IBM Terminal Keys

Some keys on an IBM 3278 have no corresponding key on an HP terminal. Sometimes, you can substitute keys on an HP terminal for keys on an IBM terminal. This section describes the differences and similarities between the keys on an HP terminal and the keys on an IBM 3278 display station.

Table 5-1 compares the keyboard functions of IBM and HP terminals.

Table 5-1 IBM and HP Keyboard Functions

IBM 3278 Keyboard Function	HP Terminal Keyboard Function
[ALT CURSR]	Not available
Audible click	Not available
(BACKSPACE) moves the cursor one column to the left. If the cursor is in column 0, it puts the cursor in the last character position on the screen (bottom right).	[BACKSPACE] moves the cursor one column to the left. If the cursor is in column 0, it remains there.
(BACKTAB)moves the cursor to the previous unprotected field.	[SHIFT]-[TAB] operates on one line at a time. If a field extends over three lines, and your cursor is at the end of the field, one [SHIFT]-[TAB] moves the cursor to column 1 of the same row; a second [SHIFT]-[TAB] moves the cursor to column 1 of the previous row; and a third [SHIFT]-[TAB] moves the cursor to the start of the field. If the first character of a field is in the same row as your cursor, [SHIFT]-[TAB] works just like the (BACKTAB) key on a 3278.
[CURSR BLINK]	Not available
[CURSR SELECT]	Not available
[DEV CNCL]	Not available
[DUP]	Not available
[ERASE EOF] Puts nulls in the character position occupied by the cursor and all later character positions in the field (if the cursor is within an unprotected field). Sets the MDT for the field on. If the cursor is within a protected field, [ERASE EOF] inhibits input and does not change any characters.	[CLEAR DISPLAY] for a 264x terminal or [CLEAR LINE] for a 23xx/262x terminal puts blanks in the character position occupied by the cursor and all later character positions in the field (if the cursor is within an unprotected field). If the cursor is in a protected field or on an attribute character when you press [CLEAR DISPLAY], it moves the cursor to the start of the next unprotected field and clears that field and subsequent fields. It also sets the MDT if the field was not already blank.

Table 5-1 IBM and HP Keyboard Functions

IBM 3278 Keyboard Function	HP Terminal Keyboard Function
[ERASE INPUT] sets all unprotected character positions to nulls, resets the MDT to 0, and resets the cursor to the first position on the screen.	[CLEAR DISPLAY] clears and fills with blanks (or nulls, on a 700/94 terminal with null support) all unprotected fields, from the cursor position to the end of terminal memory. It sets the MDT if the field was not already null.
[FIELD MARK]	Not available
[IDENT]	Not available
[INSERT] inserts new characters at the cursor position. Shifts all characters from the right of the cursor position one position to the right until the field is full. After that, [INSERT] inhibits input	[INSERT CHAR] inserts new characters at the current cursor position. Shifts all characters from the right of the cursor one position to the right. Characters that are moved past the right margin of the screen are lost. Therefore, you are limited to inserting one row of characters at a time.
[PRINT]	Available as a softkey function (see Chapter 2 , "Configuring Pass Thru.")
(RETURN) returns the cursor to column 0 of the following line on the screen. If you are on the last line, this key moves the cursor to column 0 of the first line.	[RETURN] key (with auto-linefeed set) returns the cursor to column 0 of the following line on the screen.
[SYS REQ]	Available as a softkey function (see Chapter 2 , "Configuring Pass Thru.")
(TAB) moves the cursor to the start of data in the next unprotected field.	[TAB] moves the cursor either to the start of data in the next unprotected field or to the first position of the next row if the field wraps multiple lines and the HP terminal supports MDTs (currently 2624, 2625, 2394, and 150).
[TEST/SRK]	Available as a softkey function (see Chapter 2 , "Configuring Pass Thru.")

HP Terminal Keys that Function Normally in Pass Thru

The following HP terminal keys perform their normal functions in Pass Thru:

- [CAPS LOCK]
- [INSERT CHAR]
- [DELETE CHAR]
- [CLEAR DISPLAY]

- [HOME UP]
- [RESET]
- Cursor position keys

If you press the [RESET] key once on any HP terminal except the 2640B, 2640N, and 2640S, a soft reset occurs. A *soft* reset is similar to the function of the [RESET] key on an IBM 3278 display station, so you can use the [RESET] key on your HP terminal the way you would use the [RESET] key on an IBM 3278 display station.

CAUTION

Do not use the [RESET] key on the HP 2640B, 2640N, and 2640S because it causes a hard reset. You may not be able to recover from a hard reset. Also, do not press the [RESET] key more than once within 0.5 seconds because 264x terminals treat such a sequence as a hard reset.

HP Terminal Keys that Function Differently in Pass Thru

The following keys do not perform their normal functions in Pass Thru:

- The [BREAK] key is always disabled. Use the EXIT softkey to end Pass Thru for your terminal.
- Use [CTRL]-R to recover from a hard reset. The [TAB] key moves the cursor to the next unprotected field. Use the [CLEAR DISPLAY] key to clear all unprotected fields from the screen.
- The [CTRL]-Y function is ignored. Use the EXIT softkey to end Pass Thru for your terminal.
- Use the [ENTER] key instead of the [RETURN] rather than in line mode. In Pass Thru, the [RETURN] key only moves the cursor; no data is transferred to the host. To send data through the HP 3000 to the IBM host, you must press [ENTER] or a softkey corresponding to one of the following IBM 3278 keys: [PA1], [PA2], [PA3], [CLEAR], or [SYS REQ].

Function Keys (Softkeys)

A set of eight keys on HP 3000 terminals, called **function keys** or **softkeys**, can be configured to perform various terminal operating functions, such as I/O device operations and data transfer operations. The function keys are [f1], [f2], [f3], [f4], [f5], [f6], [f7], and [f8].

SNA IMF provides a set of default functions for your softkeys. You can use the default configuration, or you can specify a different set of softkey functions in your PTCONFIG file when you configure Pass Thru. For more information on softkey functions and configuration, see Chapter 2 , “Configuring Pass Thru.”

If you are using a 264x terminal, you can get an SNA IMF Function Key Template (7120-8716) to label the functions of your softkeys.

When you press a function key, SNA IMF sends an attention ID (AID) code to the IBM host, telling it what key you pressed. The AID codes associated with the function keys on your HP terminal are the same AID codes associated with certain keys on an IBM 3278 display station. The AID codes generated by SNA IMF are listed in Appendix E , “3270 Bit Assignment and Character Translation Tables.”

Default Softkey Functions

The default softkey functions on HP 23xx, 264x, and 262x terminals are shown in Figure 5-1. These functions correspond to certain keyboard functions on an IBM 3278 display station.

Figure 5-1 **Default Softkey Functions**

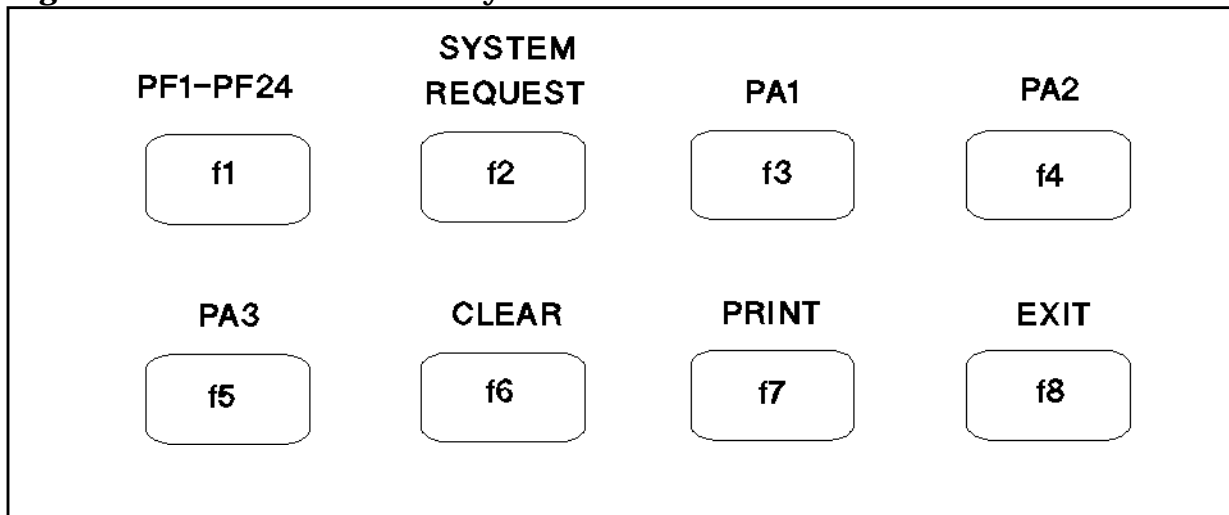


Table 5-2 describes the default softkey functions for 23xx, 262x, and 264x terminals.

Table 5-2 **Default Softkey Functions**

Key	Function
[f1]	PF1–PF24 — The [f1] key represents the 24 Program Function (PF) keys of an IBM 3278. When you press [f1], the current contents of your terminal’s buffer is temporarily stored, and the following prompt appears on your screen: PROGRAM FUNCTION KEY NUMBER? Respond by entering the number of the IBM PF key you want; then press the [ENTER] key. The modified, unprotected data from your screen image is sent to the host, along with the AID of the PF key you specified.
[f2]	SYSTEM REQUEST — The [f2] key sends a special protocol sequence to the host. Use this key to communicate with the System Services Control Point (SSCP) . The SSCP controls the resources of an SNA domain and enables you to do such things as log on and off.
[f3], [f4], [f5]	(PA1, PA2, and PA3) — The host application program defines the functions of these keys. When you press the [f3], [f4], or [f5] key, SNA IMF notifies the host that you pressed that key.
[f6]	(CLEAR) — Pressing [f6] clears the screen, moves the cursor to the home position, and sends a CLEAR KEY PRESSED message to the host.
[f7]	(PRINT) — Pressing the [f7] key makes a copy of the internal screen image and sends it to an output file. The format of the internal screen image is determined by the <i>format</i> parameter in the info string when Pass Thru is started. (See Chapter 3 , “Starting Pass Thru.”)
[f8]	(EXIT) — Pressing the [f8] key at a terminal ends Pass Thru only for that particular terminal and returns the terminal to the control of MPE.

User-Defined Softkey Functions

An IBM 3278 Display Station has 24 function keys, and an HP terminal has 8 function keys. Although HP terminals do not have as many function keys as IBM terminals, an HP feature called **rolling softkeys** allows you to create several levels of softkey functions, so a function key can perform different functions at different levels. The rolling softkeys feature lets you map your HP terminal function keys to the function keys on an IBM 3278 display station.

The first HP terminal function key ([f1]) is reserved for the main softkey menu; you can define the functions of the other seven function keys in the PTCONFIG file. See Chapter 2 , “Configuring Pass Thru,” for more information about configuring your rolling softkeys.

SNA IMF provides a set of default functions for your softkeys. (See “Default Softkey Functions,” earlier in this chapter.) You can use the defaults, or you can configure a set of softkeys that suits your own needs.

The rolling softkeys feature allows you to do the following:

- Configure a function key to perform a single softkey function, or configure it as a menu key, which brings up a new set of softkey functions for all the function keys.
- Label the functions of your softkeys in windows on the terminal screen.
- On certain HP terminals, double the number of emulated softkeys by using the **[SHIFT]** key to produce uppercase and lowercase softkeys.

The rolling softkeys feature allows you to map several sets of variable softkeys to your 8 function keys. For a terminal that supports shifted function keys (a 16-function key terminal), you can define up to 6 levels of softkeys. For a terminal that does not support shifted function keys (an 8-function key terminal), you can define up to 12 levels of softkeys. In each level, you must define at least one softkey for changing levels. The `NEXT` and `LEVEL n` softkey functions are for changing levels.

Table 5-3 describes the user-definable softkey functions for 23xx, 262x, and 264x terminals. For more information on softkey functions and configuring your function keys, see Chapter 2 , “Configuring Pass Thru.”

Table 5-3 User-Defined Softkey Functions

Key	Function
CLEAR	Emulates the IBM 3278 [CLEAR] key. Moves the cursor to home position, clears the screen, and sends a CLEAR KEY PRESSED message to the IBM host.
CLPRT	Closes your local print spool file (LOGIMF) and prints it while your session is still active. Then a new LOGIMF file is opened. If you need to send your output to a disc file instead of a spool file, enter the following file equation at the MPE colon prompt before you start your Pass Thru session: (This is the only file equation that works.)
	FILE LOGIMF,NEW;DEV=DISC;REC=-133,,ASCII;NOCCTL;SAVE
EXIT	Ends Pass Thru for your terminal only and returns the terminal to MPE control.
LBNULL	Tells Pass Thru to convert leading blanks to nulls before transmitting data to the IBM host. For more information, see “Leading Blanks, Trailing Blanks, and Trailing Nulls,” in Chapter 2 , “Configuring Pass Thru.”
LEVEL n	Rolls the softkeys to the specified level. The value of n can be 1 through 6, for terminals that support shifted function keys, or 1 through 12, for terminals that do not support shifted function keys. If level 12 does not exist, this function rolls the function keys over to level 1.

Table 5-3 User-Defined Softkey Functions

Key	Function
MENU	Displays the Pass Thru softkey menu and prints this prompt on your terminal's screen: ENTER 1-24, PA1, PA2, PA3, CLEAR, SRK, PRINT, CLPRT, and EXIT. Answer this prompt by entering the number of an IBM PF key or the character string for the softkey you want.
MPEXLCIP	(SNA IMF/XL only) Suspends your Pass Thru session and creates an MPE XL command interpreter process. A colon prompt appears on your screen, and you can enter MPE commands. To return to your Pass Thru session, type EXIT at the MPE colon prompt. See "Using the MPE Command Interpreter from Pass Thru," later in this chapter.
NEXT	Rolls the function keys to the next level of softkey functions.
PA1, PA2, and PA3	Specifying one of these keys notifies the host that you pressed that key. The IBM host application defines the functions of these keys.
PF1-PF24	These softkey functions correspond to the 24 PF keys of an IBM 3278 display station.
PRINT	Sends a copy of the internal screen image to an output file. The format of the internal screen image is determined by the <i>format</i> parameter you specify in the info string when you start Pass Thru.
RESET	Emulates the 3278 [RESET] key. It unlocks the keyboard and enables input. This function issues the RESET3270 intrinsic, described in the <i>SNA IMF Programmer's Reference Manual</i> .
STATUS	Displays status information about your LU-LU session on your terminal screen. See "Displaying SNA Session Status Information," later in this chapter
SRK	(System Request Key) Pressing the SRK key sends a special protocol sequence to the host. Use this key to communicate with the System Services Control Point (SSCP). The SSCP controls the resources of an SNA domain and enables you to do such things as log on and off.
TBNUL	This key tells Pass Thru to send trailing blanks for non-null characters sent by the IBM host. See "Leading Blanks, Trailing Blanks, and Trailing Nulls," in Chapter 2, "Configuring Pass Thru."
TNBLANK	This key tells Pass Thru to convert trailing nulls to blanks before sending data to the IBM host. See "Leading Blanks, Trailing Blanks, and Trailing Nulls," in Chapter 2, "Configuring Pass Thru."

Chapter 2, "Configuring Pass Thru." tells you how to specify your own rolling softkeys by creating a configuration file called PTCONFIG. If you use another name for your configuration file, you must equate that name to the name PTCONFIG using an MPE file equation. You can assign softkey functions to keys [f2] through [f8]. You cannot define the [f1] function key, because it is reserved for the softkey menu; however, you can define the shifted [f1] key.

In the PTCONFIG file, you can also define the softkey labels that appear on your screen, telling you which functions your softkeys have at the current level.

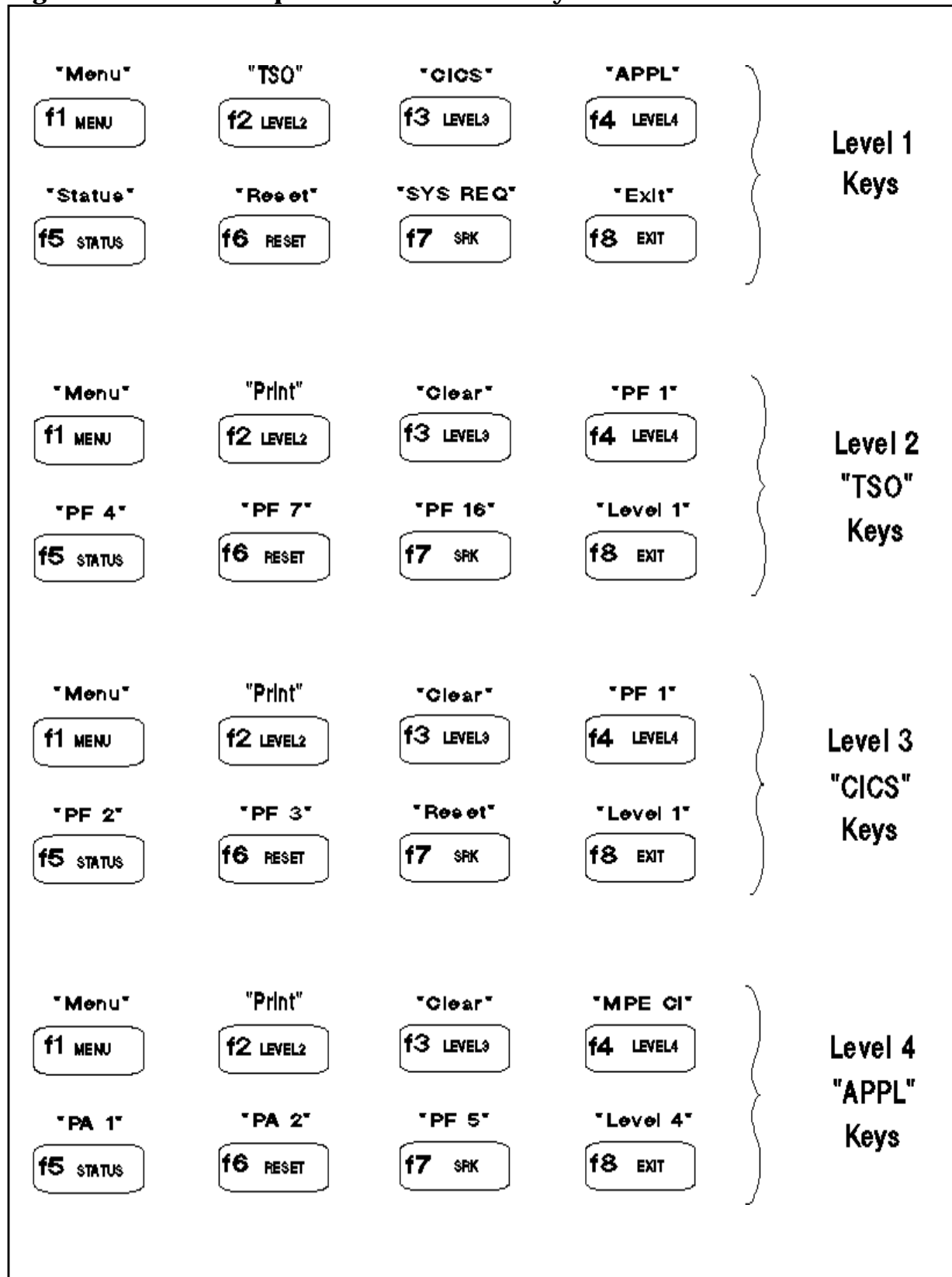
Figure 5-2 illustrates an example softkey configuration. This configuration defines four levels of softkeys. The lowest level (level 1) has softkeys that take you to the other three levels. Each of the upper levels has one softkey that takes you back to the lowest level. The [f1] key is the menu key in all four levels.

The upper three levels of softkeys in this configuration correspond to three IBM host applications: TSO, CICS, and a user application called APPL. Each application requires a slightly different set of softkeys, so a different level is assigned to each application. In this example, only 8 softkeys are defined in each level; however, if your terminal supports shifted function keys, you can define up to 16 softkeys for each level.

When you start Pass Thru, the softkey labels on your screen indicate that you are on level 1. If you started Pass Thru to communicate with CICS, you would press the softkey labeled "CICS." The function assigned to the "CICS" softkey is LEVEL3, so pressing the softkey labeled "CICS" would take you to level 3.

The quoted strings in Figure 5-2 are the softkey labels configured for each softkey function. Softkey labels appear on your screen, telling you which functions your softkeys have at the current level.

Figure 5-2 Example User-Defined Softkeys Functions



Softkeys for 3270-to-5250 Communication

When you use Pass Thru to communicate with an application on an IBM AS/400, your 3270 data stream must be translated to 5250 data. The 3270 emulation software on the AS/400 provides a mapping between Pass Thru's softkey functions and 5250 key functions. Table 5-1 lists the 5250 key functions and the 3270 softkeys that you push to send 5250 keys to the AS/400.

Table 5-4 AS/400 5240 to Pass Thru 3270 Mappings

5250 Key Function	3270 Softkeys Pressed to Select 5250 Function
Help	[PF1]
3270 Help	[PF2]
Clear	[PF3]
Print	[PF4]
Display Embedded Attributes	[PF5]
Test Request	[PF6]
Roll Down	[PF7]
Roll Up	[PF8]
Error Reset	[PF10]
System Request	[PF11]
Record Backspace	[PF12]
[F1] through [F12]	Press [PA1], wait for system to respond, then press the desired function key ([PF1] through [PF12]).
[F13] through [F24]	Press [PA2], wait for system to respond, then press the desired function key ([PF13] through [PF24]). If your keyboard does not have keys [PF13] through [PF24], use keys [PF1] through [PF12]. For example, to send [F15], press [PA2], then [PF3].
Field Exit	[Clear Line], then [TAB].
Attention	[SYS REQ], then [PA1].

HP Terminal Keys That Are Invalid in Pass Thru

Do not use the following HP terminal keys with Pass Thru:

- Graphic keys on the 2648A terminal.
- [ESC], [MEMORY LOCK], [DISPLAY FUNCTION], [NEXT PAGE], and [PREVIOUS PAGE].

- **[RESET]** pressed once on the 2640B, 2640N, and 2640S terminal, or the **[RESET]** key pressed twice within 0.5 seconds (a hard reset), on either the 2645 or 2648 terminals. Both of these actions will cause a hard reset.

CAUTION

Do not do a hard reset on an HP terminal that is operating under Pass Thru; you may not be able to recover from it. You can produce a hard reset in two ways. The first way is by pressing the **[RESET]** key once on the HP 2640B, 2640N, and 2640S. Because Pass Thru does not lock the keyboard on these terminals, RESET is unnecessary. The other way to produce a hard reset is by pressing the **[RESET]** key twice within 0.5 seconds on either the HP 2645 or 2648 terminal. This clears the special environment created on the terminal when Pass Thru took control. As with the first type of hard reset, there is no guarantee of recovery.

HP and IBM Terminal Characteristics

HP terminals and IBM 3278 display stations differ in some of their characteristics and functionality. This section describes the differences between HP and IBM terminals.

Non-Display Input Fields

On an IBM 3278 display station, you can enter data into a non-display unprotected field, and the data does not appear on the screen. Although HP terminals do not support non-display fields, SNA IMF has several ways of implementing the non-display feature.

1. SNA IMF supports security video on the following HP terminals:

2624A	2624B	2620A	2626A
2392A	2392X	2394A	2397A
150A	700/92	700/94	

Security video emulates the non-display feature of 3278 terminals. Data that you type into a non-display field is retained in terminal memory, but it is not displayed on the screen.

2. On terminals that do not support security video, SNA IMF/V displays meaningless symbols from alternate character set C in non-display fields. If your HP terminal does not have a character set C, but it has an A or B character set, no symbols are displayed and the terminal functions like a 3278 display station. If your HP terminal does not have an alternate character set, but has only the standard character set, the emulated IBM 3278 non-display feature is not available with SNA IMF/V; anything you type in a non-display field is printed on the screen.

If you are using non-display input fields with a 264x terminal, slot C must be empty.

Press the terminal [TEST] key to determine whether your terminal has an alternate character set. The resultant test pattern displays any alternate character sets that are installed in your terminal.

3. On HP graphics terminals, data that you type into non-display fields is printed black-on-black.

If the IBM host sends data to a non-display unprotected field, SNA IMF does not send the data to an HP terminal. Anything you type into a non-display field on an HP terminal replaces the original data from the IBM host. An IBM 3278 changes only that part of the field in which data has been entered. This can be a problem for some applications.

Cursor Addressing

When an IBM 3278 display station user presses the transmit key, the current cursor address is sent to the IBM host. If your HP terminal is connected to the IBM host over a Datacommunications and Terminal Controller (DTC), an Asynchronous Data Communications Controller (ADCC), or an Asynchronous Terminal Processor (ATP), the current cursor address is sent to the host when you press the transmit key.

For SNA IMF/V, HP terminals connected to the HP 3000 over a multipoint line always send the cursor address as though the cursor were positioned in the upper left corner of the screen; that is, buffer position (0,0). This pseudo cursor address causes problems if the IBM host application is expecting to receive the exact cursor address. For example, Pass Thru cannot support the split screen mode of the IBM Structured Programming Facility (SPF) on multipoint terminals.

Cursor Positioning

On an IBM 3278 display station, the IBM host can position the cursor within a protected field after you enter the first character of input. Pass Thru cannot place the cursor within a protected field. If the IBM host attempts to position the cursor within a protected field, Pass Thru positions the cursor at the start of the next unprotected field before enabling input. This produces the same results as pressing the [TAB] key as the first character on an IBM 3278 display station.

If you type a character into the last position on the screen (the lower right-hand corner), your HP terminal temporarily rolls the screen up one line. If you type another character, the screen rolls back down to its correct position. The cursor homes, and your character is placed correctly in the first character position on the screen (the upper left-hand corner). However, if you cause the screen to roll up, you must home the cursor before you send the screen's data to the host. If you attempt to send data while the screen is rolled up, you will receive an error message, and no data will be sent to the host.

Unprotected Fields

Typing a character into an unprotected field of an IBM 3278 display station sets the Modified Data Tag (MDT) for that field. Later, when you press the transmit key, only the fields with the MDT set are sent to the host.

Hewlett-Packard makes both MDT and non-MDT terminals. MDT terminals have a Modified Data Tag associated with each field, just like IBM 3278 display stations. Non-MDT terminals do not support Modified Data Tags.

MDT and non-MDT terminals differ in the way they handle null and blank characters. The HP 700/94 terminal now has a ROM module

(part #5062-1306) that allows it to support null characters, but all of the older HP terminals represent null characters as blanks. For more information on null character translation on MDT and non-MDT terminals, see “Leading Blanks, Trailing Blanks, and Trailing Nulls,” in Chapter 2 , “Configuring Pass Thru.”

Unprotected Fields on HP MDT Terminals

When you type a character into an unprotected field on an HP MDT terminal, the terminal sets the Modified Data Tag for that field. Only the fields with the MDT set are transmitted to the HP 3000 when you press a transmit key. If you type identical data over the existing data in the field, it is transmitted to the HP 3000.

Unprotected Fields on HP Non-MDT Terminals

Striking a transmit key on an HP non-MDT terminal that is under Pass Thru control causes the HP 3000 to read all unprotected fields in the screen. Pass Thru then sets the Modified Data Tags for the unprotected fields. Each unprotected field received from the terminal is compared with the unprotected field last written to the terminal by Pass Thru. If the data in a field has changed, the MDT is set for that field, and the field is then sent to the IBM host. If you type identical data over the existing data in a field, the HP 3000 compares it with the original data, finds no difference, and does not transmit it to the IBM host.

Displayed Symbols

All characters written to an HP Pass Thru terminal by an IBM program must correspond to ASCII characters (40 through 377 octal, or 20 through FF hexadecimal). If they do not, the HP terminal cannot display them. Certain characters displayed on an HP terminal will differ from those displayed on an IBM display station. Table 5-5 summarizes these differences.

Table 5-5 IBM to HP Character Display Differences

IBM Display Station Character	EBCDIC Values		HP Terminal Character	ASCII Values	
	Octal	Hex		Octal	Hex
¢ (cent sign)	112	4A	[(left bracket)	113	5B
! (exclamation)	132	5A] (right bracket)	135	5D
(logical OR)	117	4F	! (exclamation)	041	21
(not sign)	137	5F	^ (caret)	136	5E

NOTE

IBM host programs should not send characters that equate either to HP terminal escape sequences or to control characters that perform device-dependent functions on HP terminals.

Transmitted Printer Commands

The IBM host can send printer commands within a data stream to an IBM 3278 display station. New Line (NL), End of Message (EM), Carriage Return (CR), and Form Feed (FF) are examples of printer commands. When the IBM host transmits printer commands to an IBM display station, the display station displays either a blank or a character (depending on the display station model and the command sent). If the display station sends the printer command back to the host within a modified field, the host receives the correct code for the printer command.

If a printer command is sent to an HP terminal during a Pass Thru session, SNA IMF saves the printer command in the internal screen image and displays a character on the HP terminal screen. The character displayed on the HP terminal may not be the same as the character displayed on an IBM display station.

If you modify a field that contains a printer command, when SNA IMF transmits that field to the host, it will transmit the character representing the printer command, not the printer command itself.

You cannot enter a FIELD MARK (FM) in Pass Thru. If the host sends an FM, Pass Thru displays it as a semicolon (;). An IBM 3278 display station also displays a semicolon for FM. However, if you send a semicolon within a modified field back to the host, the host receives a semicolon instead of the FM code.

Intensified Fields

Unlike IBM display stations, HP terminals cannot turn off inverse video for part of a field. The white stripe of inverse video extends the full length of the field, even if the data does not fill the field.

Blinking Cursor

The cursor of an HP terminal always appears as a blinking underline. The user of an IBM 3278 display station may choose to have the cursor appear as a solid underline, a box, a blinking underline, or a blinking box.

Function Indicators

An IBM 3278 display station has a row of indicator symbols, including (1) SYSTEM AVAILABLE, (2) INSERT MODE, and (3) INPUT INHIBITED, at the bottom of the display station screen. This row of symbols is called the operator information area. The HP indicator light associated with the [INSERT CHAR] key is the only equivalent to the IBM operator information area.

Numeric Fields

Unlike IBM terminals, HP terminals do not differentiate between numeric fields and alphanumeric fields. Pass Thru treats numeric and alphanumeric fields the same. Pass Thru does not provide a numeric-only check in fields defined as numeric, so you are responsible for making sure the data you enter in numeric fields is numeric data.

Field Manipulations

On an HP terminal, you should not do any explicit field manipulations, such as FORMAT MODE ON, START FIELD, or STOP FIELD. Pass Thru does not support such field manipulations.

Automatic Skip

An HP terminal's automatic skip feature does not function the same as the IBM 3278 display station's automatic skip feature.

On an IBM display station, the automatic skip feature positions the cursor at the next field. On an HP terminal, the automatic skip feature positions the cursor at the next unprotected field.

Card Reader, Light Pen, and Cursor Select

An HP terminal does not have a magnetic card reader, auxiliary card reader, light pen, or cursor select function.

Screen Sizes

The IBM host specifies the screen size of an HP terminal as 480, 1920, or 3440 characters. No other screen sizes can be emulated. IBM application programs can use the ERASE/WRITE ALTERNATE command of the IBM 3278 display station to change screen sizes from 480, 1920, or 3440 characters (the defaults) to 960, 2560, or 3564 characters. This feature does not work on HP Pass Thru terminals. ERASE/WRITE ALTERNATE commands received from the IBM host by SNA IMF are not supported; however, they are not rejected. ERASE/WRITE ALTERNATE commands are mapped to ERASE WRITE commands.

Setting Terminal Transmission Speeds

The **baud rate** switch in the upper left corner of the 264x keyboard controls the rate at which a terminal sends and receives data. Baud rates for an asynchronous point-to-point terminal such as the 264x vary from 110 to 9600 bits per second. Baud rates for other supported terminals can vary from 110 to 19200 bits per second.

Be sure to set the baud rate at a speed that corresponds to the declaration in the MPE I/O configuration. This is important. If the configured speed differs from the setting on your terminal, Pass Thru will not be able to communicate with your terminal. For example, if MPE has logical device 29 configured to 9600 bps, and logical device 29 is physically set to 19200 bps, the terminal cannot be acquired.

NOTE

Do not change the baud rate for your terminal during a Pass Thru session. If you do change the terminal setting, Pass Thru will stop performing properly. If this happens, you should manually reset the terminal to the correct speed.

Displaying SNA Session Status Information

You can display status information about your SNA LU-LU session while you are running Pass Thru. Configure the `STATUS` softkey in your `PTCONFIG` file, as shown in Chapter 2 , “Configuring Pass Thru,” and in Appendix D , “Sample `PTCONFIG` File.”

Once your `STATUS` softkey is configured, you can press it while running Pass Thru, and status information will appear on your terminal’s screen.

Here is an example of the type of information that might appear on your screen:

```
S N A   S E S S I O N   S T A T U S   I N F O R M A T I O N
SNA NODE          PU3000E              NAU NAME          LU0004
SNA CLASS         IMFCCLASS           NAU NUMBER        4
HOST LU NAME      LU30004E
SESSION TYPE      UNOWNED                HP LOGICAL DEVICE NUMBER 32
SEGMENTS RECEIVED SINCE LAST INQUIRY              0
SEGMENTS SENT SINCE LAST STATUS INQUIRY           0
```

Press The ENTER Key To Refresh Previous Screen

The `STATUS` display has the following fields:

SNA NODE :

The configured SNA node name you are using to communicate with the IBM host.

SNA CLASS :

The configured SNA class name you are using in the HP 3000 network.

HOST LU NAME :

The host LU name you are using in the HP 3000 network.

SESSION TYPE :

Indicates whether you are in an LU-LU or unowned session.

Using Terminals with Pass Thru
Displaying SNA Session Status Information

NAU NAME :

The NAU name you are using in the HP 3000 network.

NAU NUMBER :

The NAU number you are using in the HP 3000 network.

HP LOGICAL DEVICE NUMBER :

The logical device number you are using in the HP 3000 network.

SEGMENTS RECEIVED SINCE LAST INQUIRY :

The number of packets received since the last status inquiry.

SEGMENTS SENT SINCE LAST STATUS INQUIRY :

The number of packets transmitted since the last status inquiry.

Using the MPE Command Interpreter from Pass Thru

If you are running SNA IMF/XL, you can use the `MPEXLCIP` softkey to suspend your Pass Thru session and enter MPE commands. The `MPEXLCIP` softkey suspends your Pass Thru session and creates an MPE XL command interpreter process. The MPE colon prompt appears on your screen, and you can enter MPE commands.

To use the `MPEXLCIP` softkey, you must first configure it in the `PTCONFIG` file. For more information on configuring softkeys and Pass Thru options, see Chapter 2 , “Configuring Pass Thru.”

To return to your Pass Thru session from the MPE command interpreter, type `EXIT` at the MPE colon prompt.

When you press the `MPEXLCIP` softkey, if Pass Thru is not successful in creating the MPE command interpreter process, a warning message will be displayed, and you will be returned to your Pass Thru process.

CAUTION

If a link failure occurs, on the IBM side or the HP side, while your Pass Thru session is suspended, the SNA link product will hang. You must then issue the `EXIT` command at the MPE colon prompt to allow the SNA link product to resume its shutdown procedure.

Using Terminals with Pass Thru
Using the MPE Command Interpreter from Pass Thru

Spoolable HP printers supported by MPE can emulate IBM 3287 printers. You can use Pass Thru with any of the printers listed in Appendix C , “Pass Thru Terminal and Printer Specifications.” However, you cannot use a printer that is attached directly to a terminal. Pass Thru requires that a printer be configured into MPE as a system printer.

Pass Thru acquires MPE ownership of HP 3000 printers. Then, for each write from the host application to a printer, SNA IMF formats data and sends it to a spool file destined for the corresponding printer. The default name of the printer file is a string of blank characters, but you can specify a different name for the printer file in the *PFN* parameter of the command that starts Pass Thru. (See Chapter 3 , “Starting Pass Thru.”)

After your Pass Thru session has started, you can enter printer commands and send emulated IBM 3287 keys by issuing the following MPE command:

```
:RUN TTSSON.PUB.SYS, COMMAND; INFO="info string"
```

The *info string* may contain one or more printer commands. See “Entering Printer Commands and Adjusting Page Length,” later in this chapter.

SNA IMF supports both LU.T1 and LU.T3 printers. It accepts both LU.T1 and LU.T3 sessions on the same printer.

LU.T1 printers use the SNA Character String (SCS) data stream and SCS control codes. SCS control codes allow you to define horizontal and vertical formatting of paper forms. Appendix B , “SNA Character String (SCS) Support,” lists the SCS control codes emulated by Pass Thru.

In an LU.T1 printer session you can emulate pressing the IBM 3287 [HOLD PRINT], [PA1], [PA2], [CANCEL], and [ENABLE PRINT] keys. You cannot emulate these keys in an LU.T3 printer session. See “Entering Printer Commands and Adjusting Page Length,” later in this chapter.

Restrictions on 3287 Printer Emulation

SNA IMF allows printers attached to an HP 3000 to emulate IBM 3287 printers, with the following restrictions:

- SNA IMF does not emulate extensions to the SCS data stream. Appendix B , “SNA Character String (SCS) Support,” lists the SCS control codes emulated by Pass Thru.
- You cannot emulate pressing the IBM 3287 **[HOLD PRINT]**, **[PA1]**, **[PA2]**, **[CANCEL]**, and **[ENABLE PRINT]** keys in an LU.T3 printer session.
- SNA IMF supports platen widths of 40, 64, 80, and 132 columns for an LU.T3 printer. For an LU.T1 printer, SNA IMF uses the Set Horizontal Format (SHF) SCS control code to define a platen width less than or equal to 132 columns. The default is 132 columns.
- SNA IMF cannot emulate the extended character set of the IBM text print feature. Therefore, it cannot emulate the Suppress Index (SI) feature of an IBM 3287 printer.
- SNA IMF does not support the local copy (**[PRINT]** key) function of IBM 3278 display stations. Two printer options are available to take the place of the local copy feature:
 1. You can use the `PRINT` softkey to send a copy of the internal screen image to a spooled printer file called LOGIMF. Use a LOGIMF file equation to identify the device class you want to use. The LOGIMF file equation defaults to device class LP. See Chapter 2 , “Configuring Pass Thru,” for information on the `PRINT` softkey.
 2. The HP 2645 and later model terminals support printers slaved directly to them. You can use your terminal softkeys to do local printing; however, the Pass Thru `PRINT` softkey cannot be used to send data to a slaved printer.
- SNA IMF represents four HP terminal characters (the left bracket, right bracket, exclamation point, and caret) differently on an HP printer than on an IBM printer. See Table 5-4 for a comparison of how these four characters are represented by HP and IBM devices.
- Appendix C , “Pass Thru Terminal and Printer Specifications,” lists the HP printers that can be used with Pass Thru.

Printing During a Pass Thru Session

When you are running Pass Thru for a spooled printer, there are three ways you can close your spool file and send it to the printer without interrupting your Pass Thru session:

1. The `PRT` option, which you specify in the `PTCONFIG` file, sets a receive timer (from 0 through 28800 seconds) for the HP 3000 printer. If the timer expires before data has been received from the IBM host for that printer, Pass Thru closes the current spool file and opens a new spool file to continue receiving data from the host. Output from the closed spool file can then be printed. The `PRT` option is used with `LU.T1` and `LU.T3` sessions. The `PRT` option is described in Chapter 2 , “Configuring Pass Thru.”
2. The `CLPRT` softkey, which you configure in the `PTCONFIG` file, closes the current spool file and opens a new one. The `CLPRT` softkey is used with `LU.T2` sessions. See “User-Defined Softkey Functions,” in Chapter 5 , “Using Terminals with Pass Thru,” for information on the `CLPRT` softkey. For information on configuring the `CLPRT` softkey, see Chapter 2 , “Configuring Pass Thru.”
3. The `SEND CLOSE` request, described later in this chapter under “Entering Printer Commands and Adjusting Page Length,” closes the current spool file and opens a new one. The `SEND CLOSE` request is used with `LU.T1` and `LU.T3` sessions.

SNA IMF automatically closes the spool file when an `UNBIND` is received for the `LU-LU` session.

On MPE V, if a system line printer is acquired by SNA IMF/V as unspooled, no other MPE user may access that printer until either the SNA IMF communication line to the host is shut down or the Pass Thru program ends or is released. SNA IMF/XL does not support unspooled printers.

Entering Printer Commands and Adjusting Page Length

Printer commands for LU.T1 and LU.T3 printer sessions are entered in the info string of the MPE RUN command, as follows:

```
RUN TTSSON.PUB.SYS,COMMAND;INFO="command [ ;command]..."
```

where *command* is one of the following:

```
SHOW NAU
```

Sends a message to the terminal from which the command was issued, listing the Network Addressable Units (NAUs) currently engaged in Pass Thru sessions. Use this command to check the status of an NAU (OPEN or ACTIVE).

The value of *NAU* can be an LU name configured in the file NMCONFIG.PUB.SYS, or it can be ALL, which specifies all LUs engaged in LU.T1, LU.T2, or LU.T3 sessions

```
SEND HOLD TO NAU
```

(LU.T1 only) Emulates pressing the [HOLD PRINT] key for the specified *NAU*. The [HOLD PRINT] key suspends processing of host data by the printer. If you wish to transmit one of the PA keys or the [CANCEL] key, you must first emulate pressing the [HOLD PRINT] key. This command can be issued for sessions in OPEN or ACTIVE state.

The value of *NAU* can be an LU name configured in the file NMCONFIG.PUB.SYS, or it can be ALL, which specifies all LUs engaged in LU.T1 sessions.

If the printer is left in the HOLD PRINT state, a 10-minute timer will notify the host that the device requires intervention.

When an HP printer is set up to accept both LU.T1 and LU.T3 Pass Thru sessions, you are not required to enter the SEND HOLD command before, and the SEND ENABLE command after, the SEND PA1, SEND PA2, or SEND CANCEL command. However, if you enter the SEND HOLD or SEND ENABLE command, no error will occur.

```
SEND ENABLE TO NAU
```

(LU.T1 only) Emulates pressing the [ENABLE PRINT] key for the specified *NAU*. Use the SEND ENABLE command to reenable the printer after you issue a SEND

HOLD command. The `SEND ENABLE` command can be issued for sessions in `OPEN` or `ACTIVE` state.

The value of `NAU` can be an LU name configured in the file `NMCONFIG.PUB.SYS`, or it can be `ALL`, which specifies all LUs engaged in `LU.T1` sessions.

`SEND PA1 TO NAU` or `SEND PA2 TO NAU`

(LU.T1 only) Emulates sending the `[PA1]` or `[PA2]` key to the specified `NAU`. The `[PA1]` and `[PA2]` keys have different functions depending on which host application you are running. This command can be issued only for sessions in `ACTIVE` state.

The value of `NAU` can be an LU name configured in the file `NMCONFIG.PUB.SYS`, or it can be `ALL`, which specifies all LUs engaged in `LU.T1` sessions.

`SEND CANCEL TO NAU`

(LU.T1 only) Emulates sending the `[CANCEL]` key for the specified `NAU`. Cancels the job that is currently printing. This command can be issued only for sessions in `ACTIVE` state.

The value of `NAU` can be an LU name configured in the file `NMCONFIG.PUB.SYS`, or it can be `ALL`, which specifies all LUs engaged in `LU.T1` sessions.

`SEND CLOSE TO NAU`

Closes the spooled printer file for the specified `NAU` and opens a new spool file. Use the `SEND CLOSE` command to close the spool file and print it without interrupting your Pass Thru session. This command can be issued only for sessions in `ACTIVE` state.

The value of `NAU` can be an LU name configured in the file `NMCONFIG.PUB.SYS`, or it can be `ALL`, which specifies all LUs engaged in `LU.T1` or `LU.T3` sessions.

`SET PAGE = n FOR NAU`

Sets printer page length to `n` lines for the printer specified by `NAU`. The value of `n` can be from 1 through 99 for `LU.T3` printers, or from 1 through 102 for `LU.T1` printers. This command can be issued for sessions in `OPEN` or `ACTIVE` state.

The value of `NAU` can be an LU name configured in the file `NMCONFIG.PUB.SYS`, or it can be `ALL`, which specifies all LUs engaged in `LU.T1` or `LU.T3` sessions.

SNA IMF will execute the commands in the order presented. Errors encountered by Pass Thru while sending new printer page length information or transmitting a key to the host will be logged on the console, just as other printer emulation errors are logged. Parsing errors will be reported on the terminal (\$STDLIST) of the user who entered the command.

UDCs for Entering Printer Commands

You can create UDCs for entering the printer commands described in the last section. The steps to creating a UDC are as follows:

1. Issue the MPE SETCATALOG command at the MPE colon prompt.

```
:SETCATALOG
```

2. Use the MPE editor to add the UDC to your UDC file. Add a row of asterisks (*) to separate UDCs in the same file.

3. Issue the MPE SETCATALOG command to reset your UDC file.

```
:SETCATALOG udcfile
```

See “Creating and Using UDCs,” in Chapter 3, “Starting Pass Thru,” for step-by-step instructions for creating or modifying a UDC file.

For Sending Any Printer Command

This example UDC allows you to enter any printer command, with fewer key strokes than it would take to enter the entire MPE RUN command. Following are the lines you would add to your UDC file to create this UDC:

```
PTRCMND COMMAND  
RUN TTSSON.PUB.SYS,COMMAND;INFO="COMMAND"  
*****
```

This UDC has one parameter: *COMMAND*. To send a printer command, you would type the name of the UDC (PTRCMND) followed by the command you wanted to send. For example, typing

```
:PTRCMND SEND PA1 to IL26104P
```

would send the [PA1] key to the LU whose configured name is 1126104P. It would have the same effect as typing

```
:RUN TTSSON.PUB.SYS,COMMAND;INFO="SEND PA1 to IL26104P"
```

For Sending the PA1 Key

This example UDC provides a shorthand way of entering the SEND PA1 printer command. Following are the lines you would add to your UDC file to create this UDC:

```
PA1 NAU  
RUN TTSSON.PUB.SYS,COMMAND;INFO="SEND PA1 to !NAU"  
*****
```

This UDC has one parameter: *NAU*. To send the [PA1] key to LUs IL26104P and IL22164P, you would type the following:

```
:PA1 IL26104P  
:PA1 IL22164P
```

This would have the same effect as typing the following commands:

```
:RUN TTSSON.PUB.SYS,COMMAND;INFO="SEND PA1 to IL26104P"  
:RUN TTSSON.PUB.SYS,COMMAND;INFO="SEND PA1 to IL22164P"
```

For Checking NAU Session Status

If you wanted to find out which NAUs were engaged in OPEN or ACTIVE sessions (LU.T1, LU.T2, or LU.T3), you could create a UDC to issue the SHOW command. Following are the lines you would add to your UDC file to create this UDC:

```
SHOW NAU  
RUN TTSSON.PUB.SYS,COMMAND;INFO="SHOW !NAU"  
*****
```

This UDC has one parameter: *NAU*. To receive a list of all LUs currently in OPEN or ACTIVE sessions, you would type the following:

```
:SHOW ALL
```

This would have the same effect as typing

```
:RUN TTSSON.PUB.SYS,COMMAND;INFO="SHOW ALL"
```

A message listing all LUs currently in OPEN or ACTIVE sessions would appear on your screen.

Terminals and printers connected by an X.25 network to an HP 3000 can use Pass Thru as if they were directly connected to the HP 3000. You can invoke Pass Thru from a remote PAD terminal, or you can log onto a directly connected terminal and start Pass Thru on someone else's remote device.

NOTE

When you configure PAD devices, the nodename of each PAD device is explicitly mapped to an LDEV on the HP 3000. This LDEV-to-nodename mapping allows you to start Pass Thru on someone else's remote terminal by issuing an outgoing call from the HP 3000 and specifying the LDEV of the terminal you wish to acquire.

However, when you start Pass Thru from a remote terminal by issuing an incoming call to the HP 3000, the LDEV-to-nodename mapping is ignored, and your call is given to the next available LDEV in a pool of LDEVs reserved for incoming calls.

An error occurs if you issue an outgoing call to a PAD device that has already issued an incoming call and is engaged in a session. The LDEV that is explicitly configured for that PAD device is available, but the device itself is connected to an LDEV from the pool. You must wait until the remote device terminates the current session before you can start another session.

Running Pass Thru over an X.25 network differs between MPE V and MPE XL systems. The sections "Configuration for SNA IMF/V" and "Configuration for SNA IMF/XL," later in this chapter, describe the different hardware and software requirements and configuration.

NOTE

Running Pass Thru over X.25 is supported only for SNA IMF. It is not supported for IMF/3000 (BSC or SDLC).

Supported Terminals

Only the following terminals may be used as PAD terminals for Pass Thru over X.25:

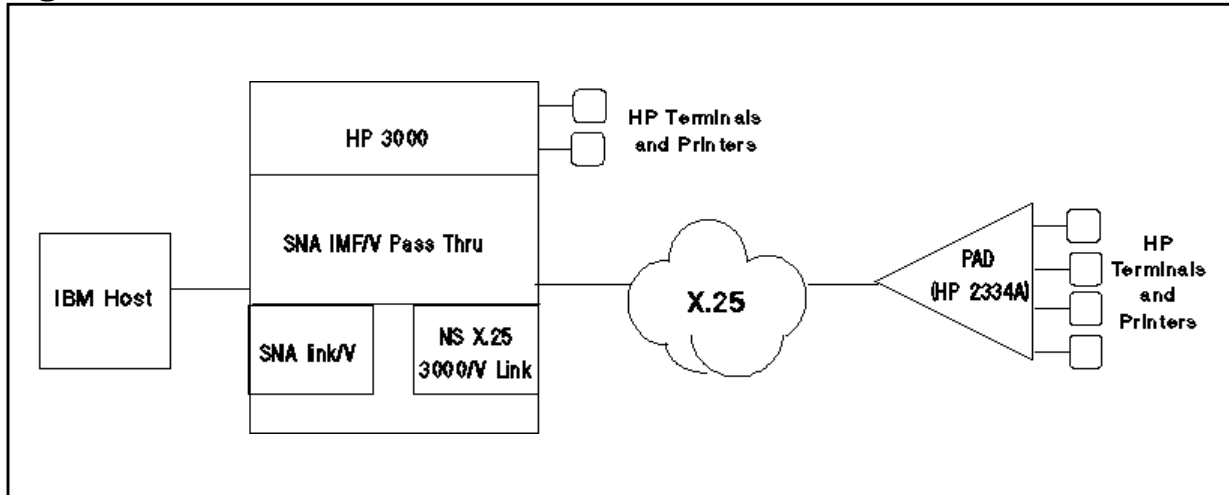
- HP 700/9x
- HP 2394A
- HP 2392A
- HP 150A

The `RecvPace` and `XMITPace` terminal options must be set to on any PAD terminal that will run Pass Thru over X.25.

Configuration for SNA IMF/V

Figure 7-1 illustrates the relationship among devices configured to run SNA IMF/V Pass Thru over X.25 and SNA networks.

Figure 7-1 SNA IMF/V Pass Thru Over an X.25 Network



NOTE To run SNA IMF/V Pass Thru over X.25, you must have the NS X.25 3000/V Link product, release V.4 or later.

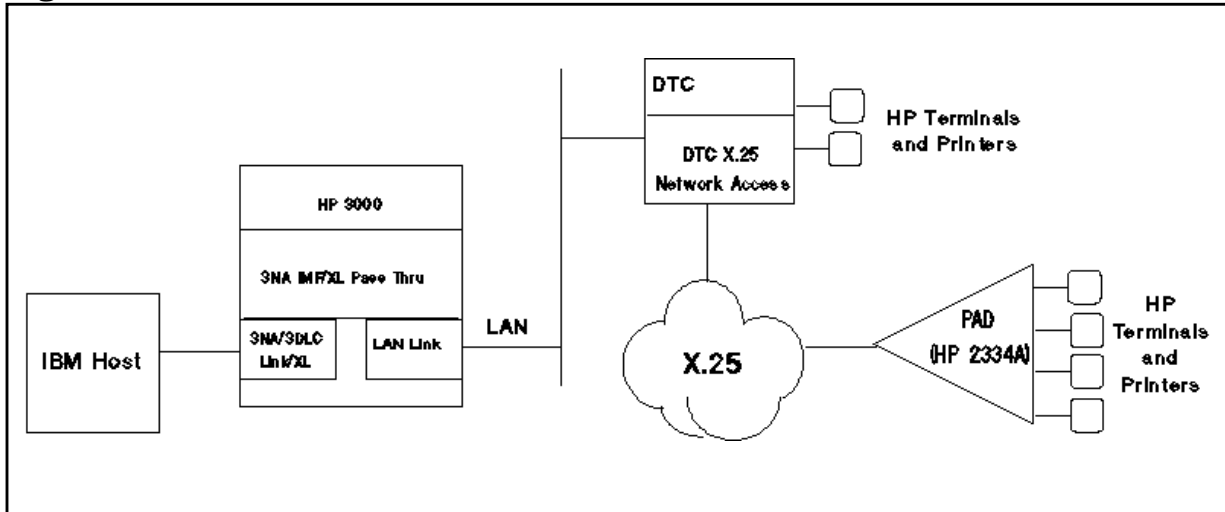
No special configuration is required to run Pass Thru over an X.25 network; however, make sure all necessary information is properly configured in each of the following areas:

1. **MPE V I/O Configuration.** Use the SYSDUMP utility to verify that all PAD terminals and printers are correctly configured for I/O. In the *NS X.25 3000/V Link Guide*, see “NS X.25 Installation and System Configuration,” for I/O configuration of PAD devices.
2. **NS X.25 Node Configuration.** Use the NMMGR utility to verify that all PAD terminals and printers are correctly configured in the Network Configuration File. In the *NS X.25 3000/V Link Guide*, see “NS X.25 Node Configuration,” for configuration of PAD devices.
3. **PAD Terminal Configuration.** Make sure any PAD terminals that will be used to run Pass Thru are configured properly. In the *NS X.25 3000/V Link Guide*, see “X.25 PAD Support,” for proper configuration of PAD terminals.

Configuration for SNA IMF/XL

Figure 7-2 illustrates the relationship among devices configured to run SNA IMF/XL Pass Thru over X.25 and SNA networks.

Figure 7-2 SNA IMF/XL Pass Thru Over an X.25 Network



No special configuration is required to run Pass Thru over an X.25 network; however, make sure all necessary information is properly configured in each of the following areas:

1. **LAN configuration.** Make sure the Datacommunications and Terminal Controller (DTC) is a properly configured node on the Local Area Network. See the *NS 3000/XL Local Area Network Configuration Guide* for information on LAN configuration.
2. **DTC X.25 Network Access configuration.** Make sure that DTC X.25 Network Access is properly configured to communicate with the PAD devices on the X.25 network. For information on configuring DTC X.25 Network Access, see the *X.25 XL System Access Configuration Guide* and *Using OpenView DTC Manager*.

NOTE

You must have the X.25 XL System Access software installed on each MPE XL system that will be connected to the X.25 network.

3. **PAD Terminal Configuration.** Make sure any PAD terminals that will be used to run Pass Thru are configured properly. For information on PAD device configuration, see *Configuring Systems for Terminals, Printers, and Other Serial Devices* and *Using OpenView DTC Manager*.

For an overview of DTC functionality, and for a list of documentation related to DTC configuration and operation, see *Getting Started with the DTC: An Overview*.

This appendix lists the messages that can be generated by Pass Thru. Following each message is a short description of the cause of the message and the action you should take to resolve any problems.

The last section of this appendix, “Suppressing Localized Message and Help Text,” tells Asian users of Pass Thru how to redirect the Asian message catalog to its English equivalent.

Six types of messages can be sent to Pass Thru devices. In some cases, these messages can also be sent to the system console.

- **Warning** messages are identified by the prefix `PTWARN xx`, where `xx` is a number. The `PTWARN` and `PTERR` messages are listed together. They are listed in order by number.
- **Fatal error** messages are identified by the prefix `PTERR xx`, where `xx` is a number. The `PTERR` messages are listed with the `PTWARN` messages. They are listed in order by number.
- **Info string** messages are identified by the prefix `PTINFOERR xx`, where `xx` is a number. Info string messages indicate errors in the `RUN` command used to start Pass Thru or issue printer commands. The `PTINFOERR` messages are listed by number.
- **Command** messages are identified by the prefix `PTMSG xx`, where `xx` is a number. The `PTMSG` messages are listed with the `PTCOMACK` messages. They are listed in order by number.
- **Command acknowledgment** messages are identified by the prefix `PTCOMACK xx`, where `xx` is a number. The `PTCOMACK` messages are listed with the `PTMSG` messages. They are listed in order by number.
- **SNA Transport** messages are identified by the prefix `SNAERR xx`, where `xx` is a number. SNA Transport messages are not generated by Pass Thru but by SNA Transport, the software portion of the SNA link product. The `SNAERR` messages for MPE V and those for MPE XL are listed in order by number.

All error messages, whether warning or fatal, are preceded by this header:

```
IMF Pass Thru Error, Host NAU:nau, Device LDEV:yy
```

where *nau* is the host Network Addressable Unit identified in the node management configuration file used to start the SNA link you are using, and *yy* is the logical device number of the HP line printer or terminal that is doing the emulation.

If the error involves an MPE file system error, the message includes a third line that explains the file system error. File system errors have the prefix `FSERR xx`.

NOTE

Although this appendix focuses on Pass Thru diagnostic messages, you may encounter other messages while using SNA IMF. Refer to the *SNA Link Services Reference Manual* or *Using the Node Management Services Utilities* for generic messages produced by the NMMGR, NMMAINT, and NMDUMP utilities.

Warning and Fatal Error Messages (PTWARN and PTERR)

The following warning and fatal error messages can appear on Pass Thru devices when problems occur.

- PTERR 1 **MESSAGE: Device not open. (PTERR 1)**
CAUSE: An internal error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 9 **MESSAGE: Host modified screen since last receive request. (PTERR 9)**
CAUSE: An internal screen error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 10 **MESSAGE: Internal error; attempt made to update protected field. (PTERR 10)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 11 **MESSAGE: Internal error; non-existent field number specified. (PTERR 11)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTWARN 12 **MESSAGE: One or more fields with exclamation marks contained invalid character(s). Please correct and reenter. (PTWARN 12)**
CAUSE: One or more fields with exclamation marks contained one or more invalid characters.
ACTION: Change the contents of the field and reenter it.
- PTERR 13 **MESSAGE: Internal error; field length specified for WRITEFIELD is too long. (PTERR 13)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.

- PTERR 14 **MESSAGE: Internal error; attempt made to update a field or transmit from a printer. (PTERR 14)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTWARN 15 **MESSAGE: Invalid program function key number. Please reenter. (PTWARN 15)**
CAUSE: You entered an invalid program function key number (less than 0 or greater than 24).
ACTION: Reenter a valid number (an integer from 0 through 24).
- PTWARN 16 **MESSAGE: Incorrect cursor address; reposition cursor and reenter. (PTWARN 16)**
CAUSE: The cursor was not located within a valid portion of the screen when you pressed the [ENTER] key or some other special function key.
ACTION: Reposition the cursor and reenter the key.
- PTERR 17 **MESSAGE: Internal error; attempt made to write to a field where input is inhibited. (PTERR 17)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 21 **MESSAGE: Internal error; field offset out of range. (PTERR 21)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 23 **MESSAGE: Keyboard enable timeout has occurred. (PTERR 23)**
CAUSE: The host failed to enable the keyboard within the time limit specified in the *timeout* parameter of the OPEN3270 intrinsic.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 24 **MESSAGE: Response timeout has occurred. (PTERR 24)**
CAUSE: The host failed to send data to a device within the transmit/receive time limit set by the *timeout* parameter of the OPEN3270 intrinsic.
ACTION: Note the circumstances and report them to your HP representative.

- PTERR 25 **MESSAGE: Internal error; intrinsic call made in split stack mode. (PTERR 25)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 26 **MESSAGE: Internal error; intrinsic call made with parameter value out of bounds. (PTERR 26)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 27 **MESSAGE: Internal error; could not open device. Insufficient virtual memory was available. (PTERR 27)**
CAUSE: An internal software error has occurred.
ACTION: Before trying to open the device again, check with the system manager to be sure there is enough virtual memory on your system. Note the circumstances and report them to your HP representative.
- PTERR 28 **MESSAGE: Internal error; could not open device. Insufficient real memory was available. (PTERR 28)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 29 **MESSAGE: Internal error; called an intrinsic with a request already outstanding. (PTERR 29)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 30 **MESSAGE: Internal error; IMF intrinsic error occurred. (PTERR 30)**
CAUSE: An internal software error has occurred in SNA IMF.
ACTION: A file named IMF'DUMxx was created in your group and account or in the PUB group of the SYS account. Save this file for your HP representative. Note the circumstances and report them to your HP representative.
- PTERR 42 **MESSAGE: Internal error; specified MAXINBUFLEN is too large. (PTERR 42)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.

- PTERR 43 **MESSAGE: Internal error; transparent mode not requested for LU.T1 emulation. (PTERR 43)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 44 **MESSAGE: Internal error; WRITESTREAM called during an LU.T1 session. (PTERR 44)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 49 **MESSAGE: Internal error; value specified for the INBUF parameter is too small to hold the entire data stream. (PTERR 49)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 100 **MESSAGE: Attempt to open file on terminal failed. (PTERR 100)**
CAUSE: Your attempt to open a file on the terminal has failed. Refer to the file system error message that follows this message for the reason why the FOPEN command of the terminal failed.
ACTION: Correct the problem and try again.
- PTERR 101 **MESSAGE: Call to FGETINFO failed. (PTERR 101)**
CAUSE: The file system was unable to return information. Refer to the file system error message that follows this message for more information about the error.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 102 **MESSAGE: Emulation attempted on non-terminal device. (PTERR 102)**
CAUSE: You may emulate only display station functions using an HP 239x, 262x, or 264x terminal. The device you chose was not a terminal.
ACTION: Choose another logical device number and try again.
- PTERR 103 **MESSAGE: Attempt to allocate terminal failed. (PTERR 103)**
CAUSE: The terminal allocation request (call to FCONTROL) failed. Refer to the file system error message that follows this message for more information about the error.
ACTION: Correct the problem and try again.

- PTERR 104 **MESSAGE: Call to FWRITE failed. (PTERR 104)**
CAUSE: Refer to the file system error message that follows this message for more information about the problem.
ACTION: Correct the problem and try again.
- PTERR 105 **MESSAGE: 239x, 262x, or 264x terminal needed for emulation. (PTERR 105)**
CAUSE: The terminal specified is not supported by Pass Thru.
ACTION: Refer to Appendix C , “Pass Thru Terminal and Printer Specifications,” of this manual for a complete list of terminals supported by Pass Thru.
- PTERR 106 **MESSAGE: 2640 terminal must be strapped for page mode. (PTERR 106)**
CAUSE: Your terminal is an HP 2640; it must be strapped for page mode to operate correctly. The D strap must be out (open).
ACTION: Remove the D strap, do a hard terminal reset, and try again.
- PTERR 107 **MESSAGE: 2640 or 2645 terminals must have the H strap in. (PTERR 107)**
CAUSE: Your HP 2640 or 2645 terminal must be strapped for the proper handshaking mode.
ACTION: Replace the H strap (in or closed), do a hard terminal reset, and try again.
- PTERR 108 **MESSAGE: An expected DC2 was not received from the terminal. (PTERR 108)**
CAUSE: An expected DC2 was not received during the handshaking that is required to send a screen of data from the HP 264x to the HP 3000. Most likely, the terminal [RESET] key was pressed while a screen was displayed, or the protected fields of the screen were modified.
ACTION: Try again without disturbing any fields other than unprotected fields.
- PTERR 109 **MESSAGE: Too many data overruns from the terminal. (PTERR 109)**
CAUSE: After four retries, the program still could not read the screen of data without data overruns occurring on the HP 3000. Most likely, the HP 3000 is severely overloaded.
ACTION: If this happens again, note the circumstances and report them to your HP representative.
- PTERR 110 **MESSAGE: Too many data errors from the terminal. (PTERR 110)**
CAUSE: After four retries, the program could not read the screen of data without data errors.

ACTION: Have your system operator check the communications line between the HP 3000 and your terminal because of data errors.

- PTERR 111** **MESSAGE: Too many timeouts from the terminal. (PTERR 111)**
- CAUSE:** After four retries, Pass Thru could not read the screen of data without timing out on its call to the `FREAD` intrinsic. Because the timeout value is about 20 seconds, the HP 3000 is probably overloaded.
- ACTION:** If this happens again, note the circumstances and report them to your HP representative.
- PTERR 112** **MESSAGE: Call to FREAD failed. (PTERR 112)**
- CAUSE:** Refer to the file system error that follows this message for an explanation of why `FREAD` failed.
- ACTION:** Correct the problem and try again.
- PTERR 113** **MESSAGE: Terminal needs at least 8K of memory for emulation. (PTERR 113)**
- CAUSE:** The terminal does not have a minimum of 8K memory. Your terminal needs at least 8K of configured memory to work properly with Pass Thru.
- ACTION:** Make sure the terminal you are using for Pass Thru has at least 8K of memory.
- PTERR 114** **MESSAGE: This terminal may not be used for IMF Pass Thru. (PTERR 114)**
- CAUSE:** An unsupported terminal was used with Pass Thru.
- ACTION:** Refer to Appendix C , “Pass Thru Terminal and Printer Specifications,” of this manual for a complete list of terminals supported with Pass Thru.
- PTERR 115** **MESSAGE: 2640B terminal must have the F strap out. (PTERR 115)**
- CAUSE:** An HP 2640B terminal does not have the F strap out.
- ACTION:** If you are using an HP 2640B terminal, make sure the F strap is out (open). After removing the F strap, do a hard terminal reset, and try again.
- PTERR 116** **MESSAGE: Call to FFILEINFO failed. (PTERR 116)**
- CAUSE:** The file system was unable to return information. Refer to the file system error message that follows this message for more information about the error.
- ACTION:** Correct the problem and try again.

- PTERR 117 **MESSAGE: Missing user and account for 3287 printer emulation. (PTERR 117)**
CAUSE: The user and account specification is missing from your info string.
ACTION: Enter the user and account in brackets after the node name in your info string when invoking a printer on a LAN. Refer to the *HP SNA Server/Access User's Guide* for more information.
- PTERR 118 **MESSAGE: Session terminated, no input received. (PTERR 118)**
CAUSE: The TIMEOUT input timer in the PTCONFIG file has expired. The Pass Thru session was automatically terminated.
ACTION: None. The timeout feature is working as configured. See Chapter 2 , "Configuring Pass Thru," of this manual for a description of the TIMEOUT input timer.
- PTERR 122 **MESSAGE: Host application did not receive requested key input from operator for nau. (PTERR 122)**
CAUSE: The host application requested that the [PA1] or [PA2] key be entered for the Network Addressable Unit identified. The printer's request for this input from the console operator failed.
ACTION: Restart the printer for the NAU identified and respond to the host application's request when queried.
- PTWARN 123 **MESSAGE: The Host was notified intervention is required. (PTWARN 123)**
CAUSE: The emulated [HOLD PRINT] key was sent to the Pass Thru printer, and more than 10 minutes have expired without activity.
ACTION: Resume printing when you are ready by sending the emulated [ENABLE PRINT] key to the printer identified by the *nau* shown in the message that precedes this message on your display screen.
- PTERR 128 **MESSAGE: MPE XL HPCIGETVAR or HPCIPUTVAR intrinsic error. (PTERR 128)**
CAUSE: MPE XL HPCIGETVAR or HPCIPUTVAR intrinsic returned a status code other than zero. (Zero means successful completion.)
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 150 **MESSAGE: Could not open emulating device. (PTERR 150)**
CAUSE: Refer to the file system error message that follows this message for the reason the FOPEN request failed.
ACTION: Correct the problem and try again.

- PTERR 151 **MESSAGE: Internal error; buffer sizes larger than 3440 are not allowed. (PTERR 151)**
CAUSE: An internal software error has occurred.
ACTION: Note the circumstances and report them to your HP representative.
- PTERR 152 **MESSAGE: Could not receive mail from spawning process. (PTERR 152)**
CAUSE: No info string was specified in the RUN command, or an internal software error has occurred.
ACTION: Make sure a valid info string was specified in the RUN command. See Chapter 3, "Starting Pass Thru," of this manual for information about preparing a valid info string. If the info string is not the problem, note the circumstances and report them to your HP representative.
- PTERR 153 **MESSAGE: Unsuccessful write to terminal device. (PTERR 153)**
CAUSE: Refer to the file system error message that follows this message for the reason the FWRITE failed.
ACTION: Correct the problem and try again.
- PTERR 154 **MESSAGE: Emulating device is not a terminal or printer. (PTERR 154)**
CAUSE: You must use either an HP 3000 printer or terminal to emulate an IBM printer. You have specified some other device type.
ACTION: Determine the correct logical device number and try again.
- PTWARN 155 **MESSAGE: Incompatible software - versions do not match. (PTWARN 155)**
CAUSE: Incompatible software; mismatched versions. Fixes have been made to your SNA IMF Pass Thru software.
ACTION: Check with your system manager to verify that this is a normal message for your patch level.
- PTERR 200 **MESSAGE: Missing message catalog, CATIMF.PUB.SYS. (PTERR 200)**
CAUSE: The message catalog, CATIMF.PUB.SYS, was not found.
ACTION: Check with your system manager to ensure the message catalog has the correct name and resides in the PUB group of the SYS account. If the message catalog is missing, PTERR 201 reports the error.
- PTERR 201 **MESSAGE: GENMESSAGE failed, internal error. (PTERR 201)**
xx yy zz (MPE V and releases of MPE XL prior to 2.1)
CAUSE: If the message catalog CATIMF.PUB.SYS is missing, all fatal errors are reported in this format. xx is the Pass Thru error number (PTERR xx); yy is the file system error message number (zero if no file

system error was involved); and *zz* is the reason the GENMESSAGE intrinsic failed.

ACTION: Make sure SNA IMF is installed on your system. If SNA IMF is installed, make sure the message catalog, CATIMF.PUB.SYS, is installed properly and is a valid catalog. If any changes have been made to the catalog (such as customizing the unowned screen), the MAKECAT utility must be run again.

PTERR 201 **MESSAGE: CATREAD failed, internal error. (PTERR 201) *xx yy zz* (MPE XL, release 2.1 or later)**

CAUSE: If the message catalog CATIMF.PUB.SYS is missing, all fatal errors are reported in this format. *xx* is the Pass Thru error number (PTERR *xx*); *yy* is the file system error message number (zero if no file system error was involved); and *zz* is the reason the CATREAD intrinsic failed.

ACTION: Make sure SNA IMF is installed on your system. If SNA IMF is installed, make sure the message catalog, CATIMF.PUB.SYS, is installed properly and is a valid catalog. If any changes have been made to the catalog (such as customizing the unowned screen), the GENCAT utility must be run again.

PTWARN 202 **MESSAGE: Please press the block mode key. (PTWARN 202)**

CAUSE: You failed to press the [BLOCK MODE] key.

ACTION: With an HP 2640B, you must press the [BLOCK MODE] key to continue. This message repeats every two seconds. An audible beep sounds between messages.

PTERR 209 **MESSAGE: Unsuccessful write to printer device. (PTERR 209)**

CAUSE: Call to FWRITE failed.

ACTION: Refer to the file system error message that follows this message for an explanation of the problem. Correct the problem and try again.

PTERR 210 **MESSAGE: Unable to open PRINT3270 spool file. (PTERR 210)**

CAUSE: You attempted to use the Pass Thru function. However, SNA IMF could not open the output spool file LOGIMF.

ACTION: Check for other errors at the printer or with the spooler. If the error cannot be corrected, contact your HP representative.

PTERR 212 **MESSAGE: Unable to write to PRINT3270 spool file. (PTERR 212)**

CAUSE: You attempted to use the Pass Thru PRINT function. However, SNA IMF could not write to the output spool file LOGIMF.

ACTION: Check the file size (the file may be full). If using a file equation, make sure the file is equated properly.

- PTERR 214 **MESSAGE: Unable to close PRINT3270 spool file. (PTERR 214)**
CAUSE: After using the Pass Thru PRINT function, SNA IMF attempted to close the output spool file LOGIMF. However, the file could not be closed.
ACTION: Refer to the file system error message that follows this message for an explanation of the problem. Correct the problem and try again.
- PTWARN 216 **MESSAGE: SCREEN IN RECEIVE MODE: Data may not be sent to the host because your SNA session is in receive state. (PTWARN 216)**
CAUSE: The host has not finished sending data to your session, so SNA IMF is not in a send state.
ACTION: Wait for the host to finish sending data and then try again. If you still continue to receive this error message, note the circumstances and contact your HP representative.
- PTERR 217 **MESSAGE: SCREEN UNOWNED: Data may not be sent because your screen is unowned. Press the System Request key to enter logon. (PTERR 217)**
CAUSE: The screen is unowned and a key other than the [SYSTEM REQUEST] key was pressed. No other program function or program attention keys (or the [ENTER] key) can be used while the screen is unowned.
ACTION: Use the [SYSTEM REQUEST] key to toggle the screen to the LU-SSCP session. You can then enter your logon and transmit it to the host.
- PTWARN 219 **MESSAGE: SESSION NOT ACTIVE: Your SNA session has not been activated, or it has been deactivated. Try again when it is active. (PTWARN 219)**
CAUSE: Session not active. Your SNA session has not been activated, or it has been deactivated.
ACTION: Check with your system administrator or IBM operator to make sure the NAUs on the HP 3000 have been properly activated, then try again.
- PTERR 220 **MESSAGE: PTCONFIG evaluation failed. (PTERR 220)**
CAUSE: One or more syntax errors were detected when parsing your specified PTCONFIG file.
ACTION: Refer to specific error messages reported before this message for an explanation of the problem. Correct the problems indicated by those messages.
- PTERR 221 **MESSAGE: Unable to open PTCONFIG file. (PTERR 221)**
CAUSE: The FOPEN has failed for reasons other than file not found.

ACTION: If you specified the PTCONFIG file, make sure you specified the proper file equation for it.

PTERR 222 **MESSAGE: Invalid AID option or positive integer. (PTERR 222)**

CAUSE: Unrecognizable data was present after a colon, or you specified an invalid keyboard enable timer value.

ACTION: Check the PTCONFIG file line listed for syntax errors or illegal option values. See Chapter 2 , “Configuring Pass Thru,” of this manual for PTCONFIG file syntax and valid option values. Correct your file and try again.

PTERR 223 **MESSAGE: Invalid PF key value. (PTERR 223)**

CAUSE: An invalid program function (PF) key value was specified. For IBM 3278 display stations, PF values between PF1 and PF24 are valid (PF10 for example).

ACTION: Use a valid PF key value: PF1 through PF24.

PTERR 224 **MESSAGE: Invalid PA key value. (PTERR 224)**

CAUSE: Expecting the [PA1], [PA2] or [PA3] key. Any other value following “PA” will generate this error.

ACTION: Use a valid PA key value: PA1, PA2, or PA3.

PTERR 225 **MESSAGE: Invalid keyboard enable timer value. (PTERR 225)**

CAUSE: The keyboard enable timer value was expected after the colon.

ACTION: The value must be a positive integer from 0 through 28800. See the PTCONFIG file discussion in Chapter 2 , “Configuring Pass Thru,” for additional information about the keyboard enable timer.

PTERR 226 **MESSAGE: Found end of record. Data was expected. (PTERR 226)**

CAUSE: Found no data following the colon.

ACTION: Check the PTCONFIG file for function key definition.

PTERR 227 **MESSAGE: Missing colon in statement. (PTERR 227)**

CAUSE: Expected to find a colon separating the function key specification from the softkey function (AID).

ACTION: Add a colon to the statement.

PTERR 228 **MESSAGE: Read of PTCONFIG file failed. (PTERR 228)**

CAUSE: The FREAD to the PTCONFIG file failed.

ACTION: Make sure the PTCONFIG file contains data in the correct format with no non-display characters. If you used a file equation, make sure your PTCONFIG file was equated to the proper file.

- PTWARN 229** **MESSAGE: Invalid entry. Please reenter. (PTWARN 229)**
- CAUSE: You have entered an incorrect value with the menu key [F1]. See Table 5-2 in this manual for valid [F1] key values.
- ACTION: Check entry and try again.
- PTWARN 231** **MESSAGE: Invalid function key specification. (PTWARN 231)**
- CAUSE: The text after “PF” is invalid. The number must be from 1 through 24 for IBM 3278 display stations.
- ACTION: Correct text and try again.
- PTERR 233** **MESSAGE: In CONSTRUCT'FIELD: newfldptr bounds violation. (PTERR 233)**
- CAUSE: Internal software error. Pass Thru will terminate if this message is generated.
- ACTION: Note the circumstances and report them to your HP representative. If you are using an HP 2624 terminal, take a trace of the problem using the TRACE keyword in the info string. If you have a 2645, 2626, or any other terminal that does not support Transmit Only Fields (MDTs), attempt to reproduce the problem that occurred on the 2624 and print the internal screen image by pressing the PRINT softkey with the FORMAT parameter in the info string set to 1.
- PTERR 234** **MESSAGE: In CONSTRUCT'FIELD: old'fld'start'ptr bounds violation. (PTERR 234)**
- CAUSE: Internal software error. Pass Thru will terminate if this message is generated.
- ACTION: Note the circumstances and report them to your HP representative. See PTERR 233 for more explanation.
- PTERR 236** **MESSAGE: Missing BEGIN statement. (PTERR 236)**
- CAUSE: You must have a BEGIN statement at the beginning of each level in your PTCONFIG file. See Chapter 2 , “Configuring Pass Thru,” of this manual.
- ACTION: Add the missing BEGIN statement to your PTCONFIG file and try again.
- PTERR 237** **MESSAGE: Number of legal levels exceeded. (PTERR 237)**
- CAUSE: The number of function key levels allowed in your PTCONFIG file was exceeded. A maximum of 6 levels is allowed for a terminal with 16 function keys. A maximum of 12 levels is allowed for a terminal with 8 function keys.
- ACTION: Reduce the number of levels specified so the number falls within the accepted range.

- PTERR 238 **MESSAGE: Invalid function key indicator. (PTERR 238)**
CAUSE: Only terminals that support shifted function keys can use more than eight function key indicators.
ACTION: Specify either 8 or 16 in your PTCONFIG file. See Chapter 2 , “Configuring Pass Thru,” of this manual for more information. See Appendix C , “Pass Thru Terminal and Printer Specifications,” for a list of 8- and 16-function key terminals.
- PTERR 239 **MESSAGE: No shifted function key assignment allowed. (PTERR 239)**
CAUSE: Invalid use of [SHIFT] function key.
ACTION: Do not use the SF assignment in your PTCONFIG file because your terminal does not support shifted function keys.
- PTERR 240 **MESSAGE: Invalid assignment separator/delimiter. (PTERR 240)**
CAUSE: An invalid assignment separator or delimiter was specified in the PTCONFIG file.
ACTION: Be sure to use the correct delimiter within the assignment syntax. See Chapter 2 , “Configuring Pass Thru,” of this manual for more information.
- PTERR 241 **MESSAGE: Too many parameters. (PTERR 241)**
CAUSE: Too many parameters were specified in the PTCONFIG file.
ACTION: Check the syntax of the PTCONFIG file to find out which parameters are extraneous. See Chapter 2 , “Configuring Pass Thru,” in this manual for more information.
- PTERR 242 **MESSAGE: Invalid option assignment. (PTERR 242)**
CAUSE: Options defined in PTCONFIG file are invalid.
ACTION: See Chapter 2 , “Configuring Pass Thru,” in this manual. Correct the option assignments and try again.
- PTERR 243 **MESSAGE: Missing option assignment. (PTERR 243)**
CAUSE: Option is missing from PTCONFIG file.
ACTION: See Chapter 2 , “Configuring Pass Thru,” in this manual. Correct the option assignments and try again.
- PTERR 244 **MESSAGE: Invalid token assignment. (PTERR 244)**
CAUSE: A softkey function assignment in the PTCONFIG file was not a valid softkey function.
ACTION: Make sure all softkey function assignments are valid. See Chapter 2 , “Configuring Pass Thru,” for valid softkey functions.
- PTERR 245 **MESSAGE: Not a valid number for option. (PTERR 245)**
CAUSE: Invalid keyboard enable timer value.

ACTION: Make sure the keyboard enable timer is a positive integer from 1 through 28800 seconds. Thirty seconds is the recommended time.

PTERR 246 **MESSAGE: Invalid PTCONFIG record for parsing. (PTERR 246)**

CAUSE: This type of PTCONFIG record cannot be parsed.

ACTION: See Chapter 2 , “Configuring Pass Thru,” in this manual. Check the syntax of the PTCONFIG file and try again.

PTERR 247 **MESSAGE: Missing END statement. (PTERR 247)**

CAUSE: You must have a corresponding END statement for every BEGIN statement. An END statement marks the end of a level of softkeys in the PTCONFIG file.

ACTION: Add an END statement to your PTCONFIG file and try again.

PTERR 248 **MESSAGE: Invalid label description length. (PTERR 248)**

CAUSE: Softkey label description length exceeds eight characters.

ACTION: The label defining the function key is optional. If you specify a label, its length cannot exceed eight characters.

PTERR 249 **MESSAGE: Invalid program function key number. (PTERR 249)**

CAUSE: The program function (PF) key number specified is invalid.

ACTION: Make sure the function key indicator is from function key 1 through function key 8 or shifted function key 1 through shifted function key 8.

PTWARN 250 **MESSAGE: Missing message catalog, CATIMF.PUB.SYS. Could not format requested SNA status information. (PTWARN 250)**

CAUSE: The STATUS softkey was pressed, but SNA IMF could not find the message catalog, CATIMF.PUB.SYS, which is used to format the status display screen.

ACTION: Check with your system manager to ensure the message catalog has the correct name and resides in the PUB group of the SYS account. If the message catalog is missing, PTERR 201 reports the error.

PTERR 251 **MESSAGE: Could not open NMCONFIG.PUB.SYS. (PTERR 251) (MPE XL only)**

CAUSE: The configuration file could not be opened because either it doesn't exist or something is wrong with the file.

ACTION: Check with your system manager to ensure the configuration file has the name NMCONFIG and resides in the PUB group of the SYS account.

- PTERR 252 **MESSAGE: Could not read from NMCONFIG.PUB.SYS. (PTERR 252) (MPE XL only)**
- CAUSE: An unexpected error occurred while attempting to read from the configuration file.
- ACTION: Check the configuration file with the validation option in the NMMGR program. If NMMGR does not reveal the problem, then note the circumstances and report them to your HP representative.
- PTERR 253 **MESSAGE: Could not close NMCONFIG.PUB.SYS. (PTERR 253) (MPE XL only)**
- CAUSE: An error occurred while attempting to close the configuration file.
- ACTION: Note the circumstances and report them to your HP representative.
- PTERR 254 **MESSAGE: Invalid SNA node name. (PTERR 254) (MPE XL only)**
- CAUSE: The node name passed in the *snalnkinfo* parameter of the OPEN3270 or ACQUIRE3270 intrinsic is not configured under SNANODE or IMF in the file NMCONFIG.PUB.SYS.
- ACTION: Add the node to the configuration file or use another node that is currently configured.
- PTERR 255 **MESSAGE: Invalid security class name. (PTERR 255) (MPE XL only)**
- CAUSE: The security class name passed in the *snalnkinfo* parameter of the OPEN3270 or ACQUIRE3270 intrinsic is not configured under SNANODE or IMF in the file NMCONFIG.PUB.SYS.
- ACTION: Add the security class to the configuration file or use another security class that is currently configured.
- PTERR 256 **MESSAGE: Security class not properly configured. (PTERR 256) (MPE XL only)**
- CAUSE: No LUs were found in the configuration file for the specified security class.
- ACTION: Add LUs to the security class or use a security class that is properly configured.
- PTERR 257 **MESSAGE: Program not authorized to use this security class. (PTERR 257) (MPE XL only)**
- CAUSE: Your program is not included in the PGMLIST for the security class specified.
- ACTION: Add your program to the PGMLIST for the security class or use another security class that is already configured properly for use with your program.

- PTERR 258 **MESSAGE: User is not authorized to use this security class. (PTERR 258) (MPE XL only)**
- CAUSE: The user trying to run the program is not included in the USERLIST for the security class specified.
- ACTION: Add the user's name to the USERLIST for the security class, or use a security class that is already configured for use by that user.
- PTERR 259 **MESSAGE: 16-bit data is not allowed in this field. (PTERR 259)**
- CAUSE: You attempted to enter 16-bit data in a field that has been defined by the host to allow only 8-bit data.
- ACTION: Check and modify the data to contain only 8-bit characters. Enter the data again.
- PTERR 260 **MESSAGE: 8-bit data is not allowed in this field. (PTERR 260)**
- CAUSE: You attempted to enter 8-bit data in a field that has been defined by the host to allow only 16-bit data.
- ACTION: Check and modify the data to contain only 16-bit characters. Enter the data again.
- PTERR 261 **MESSAGE: Exceeding the maximum length of the field. (PTERR 261)**
- CAUSE: Shifts between 8-bit and 16-bit characters are signaled by SO/SI control characters. These control characters take up space in the field and are displayed as blanks. Pass Thru needs to insert SO/SI characters if they do not already exist, and they can cause the data to exceed the maximum length of the field.
- ACTION: Check and modify the data. Enter the data again.
- PTERR 262 **MESSAGE: 16-bit data is not allowed at the location specified. (PTERR 262)**
- CAUSE: You may not write a 16-bit character between two 8-bit characters. You may only write a 16-bit character next to another 16-bit character.
- ACTION: Check and modify the data. Enter the data again.
- PTWARN 272 **MESSAGE: CREATEPROCESS intrinsic error: Attempt to allocate MPE XL CI son process failed. (PTWARN 272)**
- CAUSE: MPE XL CREATEPROCESS intrinsic failed.
- ACTION: Note the circumstances and report them to your HP representative.

Info String Error Messages (PTINFOERR)

The following PTINFOERR error messages appear whenever an error occurs in the info string of the RUN command used to start Pass Thru or issue printer commands. If a PTINFOERR message is generated, correct the info string and reenter the command.

- PTINFOERR 2 **MESSAGE: Configuration file parameter omitted. (PTINFOERR 2)**
- CAUSE: The configuration file (*config*) parameter was omitted from the info string.
- ACTION: See Chapter 3 , “Starting Pass Thru,” for information about info string parameters, and then reenter your command.
- PTINFOERR 3 **MESSAGE: Invalid configuration file parameter specified. (PTINFOERR 3)**
- CAUSE: The configuration file parameter (*config*) specified in the info string is invalid.
- ACTION: See Chapter 3 , “Starting Pass Thru,” for information about info string parameters, and then reenter your command.
- PTINFOERR 4 **MESSAGE: Invalid LDEV parameter. (PTINFOERR 4)**
- CAUSE: The *ldev* parameter specified in the info string is invalid.
- ACTION: See Chapter 3 , “Starting Pass Thru,” for information about info string parameters, and then reenter your command.
- PTINFOERR 5 **MESSAGE: Invalid DEVID parameter. (PTINFOERR 5)**
- CAUSE: The *devid* parameter specified in the info string is invalid.
- ACTION: See Chapter 3 , “Starting Pass Thru,” for information about info string parameters, and then reenter your command.
- PTINFOERR 10 **MESSAGE: Node Management Monitor (NMMON) was unable to create Pass Thru. (PTINFOERR 10)**
- CAUSE: The Node Management Monitor (NMMON) was unable to create Pass Thru.
- ACTION: See Chapter 3 , “Starting Pass Thru,” for information about info string parameters, check your info string, and then reenter your command.
- PTINFOERR 11 **MESSAGE: The FORMAT parameter must be 1, 2, 3 or 4. (PTINFOERR 11)**
- CAUSE: The *format* parameter specified in the info string is invalid.
- ACTION: The *format* parameter must be 1, 2, 3 or 4.

- PTINFOERR 12 **MESSAGE: The PRIORITY or SPRIORITY parameter must be an integer between 1 and 13. (PTINFOERR12)**
- CAUSE: Either the *priority* or *spriority* parameter specified in the info string is invalid.
- ACTION: The *priority* and *spriority* parameters must be integers from 1 through 13. Modify your info string and try again.
- PTINFOERR 13 **MESSAGE: The ENHANCE parameter must be 0, 1, 2, or 3. (PTINFOERR 13)**
- CAUSE: The *enhance* parameter specified in the info string is invalid.
- ACTION: The *enhance* parameter must be 0, 1, 2, or 3. Modify your info string and try again.
- PTINFOERR 14 **MESSAGE: The READTO parameter must be an integer between 10 and 255. (PTINFOERR 14)**
- CAUSE: The *readto* parameter specified in the info string is invalid.
- ACTION: The *readto* parameter must be an integer from 10 through 255. Modify your info string and try again.
- PTINFOERR 17 **MESSAGE: An HP LAN nodename must be from one to eight characters in length and begin with an alphabetic character. (PTINFOERR 17)**
- CAUSE: The HP LAN node name that was specified is invalid.
- ACTION: Modify the node name so it begins with an alphabetic character and is not more than eight characters in length. Refer to the *HP SNA Server/Access User's Guide* for more information.
- PTINFOERR 18 **MESSAGE: The SNA Server must be installed properly to use this feature. (PTINFOERR 18)**
- CAUSE: You entered either a colon and a node name, or both, in your info string, but the SNA Server cannot provide service because it is not properly installed.
- ACTION: Check with your HP representative to make sure the SNA Server is properly installed. Refer to the *HP SNA Server/Access User's Guide* for more information.
- PTINFOERR 19 **MESSAGE: A user and account must be specified for printer emulation on a LAN. (PTINFOERR 19)**
- CAUSE: The node name and logical device number in your info string must be qualified by a logon to that system.
- ACTION: Specify a user and account in brackets after the node name in the *ldev* specification of your info string. Refer to the *HP SNA Server/Access User's Guide* for more information.

- PTINFOERR 20 **MESSAGE: Unable to find “]” indicating end of user and account logon. (PTINFOERR 20)**
- CAUSE: SNA IMF was unable to find “]” character indicating end of user and account logon.
- ACTION: Enter the right-hand bracket (]) after your user and account specification. Refer to the *HP SNA Server/Access User’s Guide* for more information.
- PTINFOERR 21 **MESSAGE: Too many characters were specified for user and account. Up to 62 characters may be entered. (PTINFOERR 21)**
- CAUSE: More than 62 characters were used to specify your user and account logon. Only 62 characters are allowed for *session, user.account.group*.
- ACTION: Use 62 characters or less to specify your user and account logon in the *ldev* parameter.
- PTINFOERR 22 **MESSAGE: A command must be SHOW, SEND, or SET. (PTINFOERR 22)**
- CAUSE: The SHOW, SEND, or SET command was expected.
- ACTION: Issue a SHOW, SEND, or SET command as specified in Chapter 6 , “Using Printers with Pass Thru,” of this manual, under “Entering Printer Commands and Adjusting Page Length.”
- PTINFOERR 23 **MESSAGE: The request must be one of HOLD, ENABLE, PA1, PA2, CANCEL, or CLOSE. (PTINFOERR 23)**
- CAUSE: One of the following keys was expected: [HOLD], [ENABLE], [PA1], [PA2], [CANCEL], or [CLOSE].
- ACTION: Issue a SEND command as specified in Chapter 6 , “Using Printers with Pass Thru,” of this manual under “Entering Printer Commands and Adjusting Page Length.”
- PTINFOERR 24 **MESSAGE: An NAU must be from one to eight characters in length and begin with an alphabetic character. (PTINFOERR 24)**
- CAUSE: Your NAU name was greater than eight characters in length or began with a digit or a special character.
- ACTION: Modify your NAU name so it is from one through eight characters in length and begins with a letter (a through z). See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.
- PTINFOERR 25 **MESSAGE: Invalid SEND parameter(s). The syntax is SEND key TO nau. (PTINFOERR 25)**
- CAUSE: Incorrect syntax was specified for the request when attempting to send a key to an LU.T1 printer.

ACTION: Correct the syntax of the request and try again. See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.

PTINFOERR 26 MESSAGE: Invalid SHOW parameter(s). The syntax is SHOW nau. (PTINFOERR 26)

CAUSE: Incorrect syntax was specified for the request when attempting to display printer session status.

ACTION: Correct the syntax of the request and try again. See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.

PTINFOERR 27 MESSAGE: Invalid SET parameter(s). The syntax is SET variable = value FOR nau. (PTINFOERR 27)

CAUSE: Incorrect syntax was specified for the request when attempting to use the SET command for an SNA IMF printer.

ACTION: Correct the syntax of the request and try again. See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.

PTINFOERR 28 MESSAGE: The SET variable must be PAGE. (PTINFOERR 28)

CAUSE: Invalid syntax used in the SET command. PAGE is the only valid variable.

ACTION: Correct the syntax of the request and try again. See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.

PTINFOERR 29 MESSAGE: The SET value is out of range. (PTINFOERR 29)

CAUSE: The value specified for the SET function is out of range.

ACTION: Correct the value specified and try again. See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.

PTINFOERR 30 MESSAGE: Your request was not sent because the NAU(s) specified could not be found. (PTINFOERR 30)

CAUSE: The SEND or SET command could not be executed because an invalid NAU was specified.

ACTION: Obtain the correct NAU number via the SHOW command and try again.

PTINFOERR 31 MESSAGE: The specified NAU(s) could not be found. (PTINFOERR 31)

CAUSE: The NAU specified in your printer command could not be found.

ACTION: Verify the NAU numbers via the SHOW command and try again.

Command and Command Acknowledgment Messages (PTMSG and PTCOMACK)

The following command and command acknowledgment messages will appear on Pass Thru devices, requesting that you enter commands, or requesting or acknowledging printer key entry.

PTCOMACK 119 **MESSAGE: Request entered for nau. (PTCOMACK 119)**

CAUSE: The command was processed or the key you entered was sent to the printer. This message does not necessarily indicate that the printer has executed the request.

ACTION: None.

PTCOMACK 120 **MESSAGE: Nau not accepting commands. (PTCOMACK 120)**

CAUSE: The Network Addressable Unit listed was not in a state to receive commands.

ACTION: Check your request and enter the command or key again.

PTMSG 121 **MESSAGE: Enter PA1 or PA2 for printer nau. (PTMSG 121)**

CAUSE: The [PA1] or [PA2] key for your LU.T1 printer must be entered.

ACTION: Enter the [PA1] or [PA2] key for the printer with the Network Addressable Unit (NAU) listed in the message. The message that appears on the console will look something like this:

```
14:25/27/Enter PA1 or PA2 for printer nau. (PTMSG 121)
```

In this example, 14:25 is the current time; 27 is the Process Identification Number (PIN) for SNA IMF. To enter the [PA1] or [PA2] key, type the following reply at the console:

```
REPLY n, key
```

where *n* is the PIN of the console message and *key* is the [PA1] or [PA2] key.

Example: REPLY 27, PA1

PTMSG 124 **MESSAGE: Nau is in an LU.Tn session. (PTMSG 124)**

CAUSE: You entered the SHOW command. This message informs you that the NAU name in the message is in an active LU-LU session.

ACTION: Use the NAU name that appears in the message to SEND LU.T1 commands to the Pass Thru process in an LU.T1 session. You may send the SET PAGE command to a Pass Thru process in an LU.T3 session. Pass Thru processes in LU.T2 sessions will not receive command input.

PTMSG 126

MESSAGE: Nau is opened for an LU.Tn session. (PTMSG 126)

CAUSE: You entered the `SHOW` command. This message informs you that the NAU named in the message has been powered on for an LU-LU session of the type listed in this message.

ACTION: Use the NAU name that appears in the message to send printer commands or adjust printer page length. See “Entering Printer Commands and Adjusting Page Length,” in Chapter 6 , “Using Printers with Pass Thru,” of this manual.

MPE V SNA Transport Error Messages (SNAERR)

The following SNA Transport messages can appear on Pass Thru devices or, in some cases, the system console.

- SNAERR 1 **MESSAGE: Illegal DB register. (SNAERR 1)**
CAUSE: The DB register was pointing to an extra data segment on a call to an SNA Link intrinsic.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 2 **MESSAGE: Invalid session. (SNAERR 2)**
CAUSE: You probably passed an SNA IMF intrinsic an invalid terminal identifier parameter.
ACTION: Be sure you used the terminal identifier returned by OPEN3270.
- SNAERR 3 **MESSAGE: Invalid SNA catalog file. (SNAERR 3)**
CAUSE: The parameter was omitted on a call to an SNA Link intrinsic.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 4 **MESSAGE: Security violation. (SNAERR 4)**
CAUSE: You tried to invoke Pass Thru by specifying a class name that you were not authorized to use.
ACTION: Specify a class name that you are authorized to use. Check with your system administrator to determine which classes are available. This can be determined by the user and program.
- SNAERR 5 **MESSAGE: Parameter bounds violation. (SNAERR 5)**
CAUSE: SNA IMF passed SNA Link an out-of-bounds parameter.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 6 **MESSAGE: Invalid flag parameter. (SNAERR 6)**
CAUSE: SNA IMF passed an invalid flag parameter to an SNA Link intrinsic.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 7 **MESSAGE: Session is active. (SNAERR 7)**
CAUSE: The NAU has been activated.
ACTION: None.

- SNAERR 8 **MESSAGE: Session is inactive. (SNAERR 8)**
CAUSE: You attempted to send data on the LU-SSCP session, but the LU had not been activated by the host.
ACTION: Try again after the node has been activated from the host side.
- SNAERR 9 **MESSAGE: No available AFT entry. (SNAERR 9)**
CAUSE: There were not enough available file table (AFT) entries in the process control block extension for SNA IMF to complete the initialization for the Pass Thru session.
ACTION: Too many files may have been opened by your program; try again.
- SNAERR 10 **MESSAGE: Bad PI in RH. (SNAERR 10)**
CAUSE: Invalid Pacing Indicator in Request/Response Header.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 11 **MESSAGE: Bad BCI in RH. (SNAERR 11)**
CAUSE: Invalid Begin Chain Indicator in Request/Response Header.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 12 **MESSAGE: Bad ECI in RH. (SNAERR 12)**
CAUSE: Invalid End Chain Indicator in Request/Response Header.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 13 **MESSAGE: Bad EDI in RH. (SNAERR 13)**
CAUSE: Invalid Enciphered Data Indicator in Request/Response Header.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 14 **MESSAGE: Reserved bits in RH must be set to zero. (SNAERR 14)**
CAUSE: SNA IMF failed to initialize reserved bits in the Request/Response Header.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 15 **MESSAGE: Internal Error. (SNAERR 15)**
CAUSE: An internal error has occurred in the SNA Link software, most likely causing the node to shut down.
ACTION: Note the circumstances and report them to your HP representative.

- SNAERR 16 **MESSAGE: Invalid RU size. (SNAERR 16)**
CAUSE: SNA IMF passed an SNA Link intrinsic an RU which exceeded the allowable size for this session.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 17 **MESSAGE: NAU is inactive. (SNAERR 17)**
CAUSE: The NAU is not active.
ACTION: Ensure that the NAU has been activated on the host side.
- SNAERR 18 **MESSAGE: Invalid Plabel. (SNAERR 18)**
CAUSE: The SNAControl intrinsic was passed an invalid PLabel by SNA IMF.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 19 **MESSAGE: LU-SSCP message pending. (SNAERR 19)**
CAUSE: A message on the LU-SSCP session is pending and must be completed before proceeding further.
ACTION: Issue a call to RECV3270 before proceeding.
- SNAERR 20 **MESSAGE: RU buffer too small. (SNAERR 20)**
CAUSE: The RU size used by SNA IMF is too small to contain the data to be returned by SNA Link.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 21 **MESSAGE: Invalid class name. (SNAERR 21)**
CAUSE: You specified an invalid class name in the Pass Thru info string, or the class is not associated with the specified node.
ACTION: Invoke Pass Thru and specify a correct class name. Check with your system manager for the valid classes configured in the configuration file for the requested node name.
- SNAERR 22 **MESSAGE: Invalid session type. (SNAERR 22)**
CAUSE: An invalid session type parameter was passed to SNA Link.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 23 **MESSAGE: Negative LU-SSCP response. (SNAERR 23)**
CAUSE: A negative response occurred on the LU-SSCP session.
ACTION: Make sure the IBM host application that you are trying to access is operational. If it is, note the circumstances and contact your HP representative.

- SNAERR 24 **MESSAGE: Invalid configuration access. (SNAERR 24)**
CAUSE: The node manager (NMMGR) configuration file name (NMCONFIG) is incorrect, or the file is corrupt or missing. The SNA Link software encountered an error accessing data in the configuration file, so SNA IMF could not start the Pass Thru session.
ACTION: Have the system manager verify the accuracy of the configuration file, and try again.
- SNAERR 25 **MESSAGE: Request pending. (SNAERR 25)**
CAUSE: A request is already pending.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 26 **MESSAGE: No available NAU. (SNAERR 26)**
CAUSE: All the NAUs configured in the SNA class specified in the info string are currently in use.
ACTION: Try again later when the system is less busy, or specify another class name if one is configured.
- SNAERR 27 **MESSAGE: I/O pending. (SNAERR 27)**
CAUSE: A previous I/O request has not been completed.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 28 **MESSAGE: Invalid function code. (SNAERR 28)**
CAUSE: SNA IMF passed SNA Link an invalid function code parameter.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 29 **MESSAGE: Inactive node or invalid node name. (SNAERR 29)**
CAUSE: You specified an invalid node name in the Pass Thru info string, or the node you specified has not been activated on the HP 3000.
ACTION: Verify the accuracy of the info string and check with the system manager to make sure the node you specified has been activated on the HP 3000.
- SNAERR 30 **MESSAGE: Illegal call. (SNAERR 30)**
CAUSE: SNA IMF and SNA Link are not synchronized with respect to the type of session established.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 31 **MESSAGE: Invalid error code. (SNAERR 31)**
CAUSE: SNA IMF passed SNAErrMsg an invalid error code parameter.

ACTION: Note the circumstances and report them to your HP representative.

SNAERR 32 **MESSAGE: Privilege mode required. (SNAERR 32)**

CAUSE: An SNA Link intrinsic was called that required Privilege Mode capability.

ACTION: Note the circumstances and report them to your HP representative.

SNAERR 33 **MESSAGE: Invalid InfoWanted parameter. (SNAERR 33)**

CAUSE: SNA IMF passed `SNA_Sess_Info` an invalid *InfoWanted* parameter.

ACTION: Note the circumstances and report them to your HP representative.

SNAERR 35 **MESSAGE: No request pending. (SNAERR 35)**

CAUSE: There are no requests pending.

ACTION: None.

SNAERR 36 **MESSAGE: Link shutdown occurred. (SNAERR 36)**

CAUSE: The node that you specified in the info string when Pass Thru was invoked has been shut down. An `SNACONTROL STOP` command was issued or a link error has occurred; your session has been terminated.

ACTION: Try again later when the HP 3000 node has been reactivated with the `SNACONTROL START` command.

SNAERR 37 **MESSAGE: Protocol shutdown requested. (SNAERR 37)**

CAUSE: The node on which you are running has been shut down by the system manager with the `SNACONTROL STOP` command.

ACTION: Try again later when the HP 3000 node has been reactivated with the `SNACONTROL START` command.

SNAERR 38 **MESSAGE: Quiesce shutdown requested. (SNAERR 38)**

CAUSE: The node on which you are running has been shut down by the system manager with the `SNACONTROL STOP` command. The SNA node is being restrained from starting new jobs. As current jobs finish, the system gradually winds down until jobs are no longer running.

ACTION: Try again later when the HP 3000 node has been reactivated with the `SNACONTROL START` command.

SNAERR 39 **MESSAGE: Invalid parameters. (SNAERR 39)**

CAUSE: The message catalog `CATSNA.PUB.SYS` is invalid.

ACTION: Inform your system manager.

- SNAERR 40 **MESSAGE: No stack space. (SNAERR 40)**
CAUSE: The SNA Link subsystem could not process a request made by the SNA IMF Pass Thru process due to insufficient stack space.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 41 **MESSAGE: Invalid request. (SNAERR 41)**
CAUSE: Invalid request.
ACTION: Try again later.
- SNAERR 42 **MESSAGE: Invalid trace element. (SNAERR 42)**
CAUSE: An invalid trace element was encountered by SNA Link.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 43 **MESSAGE: Invalid trace state. (SNAERR 43)**
CAUSE: An invalid trace state was encountered by SNA Link.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 44 **MESSAGE: Invalid subclass. (SNAERR 44)**
CAUSE: SNA Link encountered an invalid subclass.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 45 **MESSAGE: Invalid entry. (SNAERR 45)**
CAUSE: An invalid entry was detected by SNA Link.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 46 **MESSAGE: Maximum data too small. (SNAERR 46)**
CAUSE: SNA IMF passed SNA Link an invalid *MaxData* parameter.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 47 **MESSAGE: Invalid action code. (SNAERR 47)**
CAUSE: SNA IMF passed SNA Link an invalid *ActionCode* parameter.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 48 **MESSAGE: Invalid data offset. (SNAERR 48)**
CAUSE: SNA IMF passed SNA Link an invalid data offset parameter. It was probably negative or longer than the length of the message.
ACTION: Note the circumstances and report them to your HP representative.

- SNAERR 49 **MESSAGE: Invalid FunctionParm. (SNAERR 49)**
CAUSE: SNA IMF passed *SNAControl* an invalid function parameter. Legal values range from 0 through 6.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 50 **MESSAGE: Invalid buffer length. (SNAERR 50)**
CAUSE: SNA IMF passed an invalid buffer length to an SNA Link intrinsic.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 51 **MESSAGE: Link Failure occurred. (SNAERR 51)**
CAUSE: The node on which you are running has shut down due to a link failure, and your session has been terminated.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 52 **MESSAGE: Transport Internal Error Shutdown. (SNAERR 52)**
CAUSE: The SNA Link software has encountered an internal error, and the node has been shut down.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 53 **MESSAGE: Hierarchical Shutdown. (SNAERR 53)**
CAUSE: The host has deactivated your NAU, so your session has been terminated.
ACTION: Try again after the host has reactivated the NAU, or contact the IBM system manager to have the NAU reactivated.
- SNAERR 55 **MESSAGE: Bad Maxinfo length parameter. (SNAERR 55)**
CAUSE: SNA IMF passed SNA Link an invalid *MaxInfoLength* parameter.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 100 **MESSAGE: Expedited response pending. (SNAERR 100)**
CAUSE: An expedited response is pending and must be completed before proceeding.
ACTION: Note the circumstances and report them to your HP representative.

- SNAERR 101 **MESSAGE: Data traffic inactive. (SNAERR 101)**
CAUSE: The host has not sent the necessary command sequence to activate your session.
ACTION: Check with your system administrator or IBM operator to make sure the NAUs on the HP 3000 have been properly activated, then try again.
- SNAERR 102 **MESSAGE: SDT request not received. (SNAERR 102)**
CAUSE: The host has not sent the necessary command sequence to activate your session.
ACTION: Check with your system administrator or IBM operator to make sure the NAUs on the HP 3000 have been properly activated, then try again.
- SNAERR 103 **MESSAGE: Invalid session control protocol. (SNAERR 103)**
CAUSE: An internal error has occurred in the SNA Link subsystem, or an illegal request was received from the host.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 104 **MESSAGE: RQR request pending. (SNAERR 104)**
CAUSE: SNA IMF has requested recovery for the session.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 105 **MESSAGE: STSN request not pending. (SNAERR 105)**
CAUSE: There is no STSN pending.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 106 **MESSAGE: Pacing not allowed. (SNAERR 106)**
CAUSE: An invalid attempt was made to use pacing.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 107 **MESSAGE: Unsupported CRV request/response. (SNAERR 107)**
CAUSE: The primary requested an unsupported function. SNA Link does not support Cryptography Verification (CRV).
ACTION: Change the host application's BIND to turn off cryptography.
- SNAERR 108 **MESSAGE: Unsupported session control request. (SNAERR 108)**
CAUSE: An unsupported session control request was attempted.
ACTION: Note the circumstances and contact your HP representative.

- SNAERR 109 **MESSAGE: Unsupported session control response. (SNAERR 109)**
CAUSE: An unsupported session control response was detected by SNA Link.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 110 **MESSAGE: No such deact req (UNBIND,DACTLU,DACTPU) rcvd. (SNAERR 110)**
CAUSE: No deactivation request has been received.
ACTION: Note the circumstances and contact your HP representative.
- SNAERR 111 **MESSAGE: No such act req (BIND,,ACTPU) rcvd. (SNAERR 111)**
CAUSE: No activation request has been received for your NAU.
ACTION: Ensure that the NAU has been activated on the host.
- SNAERR 112 **MESSAGE: CLEAR request not received. (SNAERR 112)**
CAUSE: The primary session control has not sent a CLEAR.
ACTION: Note the circumstances and contact your HP representative.

MPE XL SNA Transport Error Messages (SNAERR)

The following SNA Transport messages can appear on Pass Thru devices or, in some cases, the system console.

- SNAERR 0 **MESSAGE: Successful Completion. (SNAERR 0)**
CAUSE: The SNA Transport intrinsic was successfully completed.
ACTION: None.
- SNAERR 1 **MESSAGE: Illegal DB register. (SNAERR 1) call to an SNA Transport intrinsic was made in split stack.**
CAUSE: An SNA subsystem made a call to an SNA Transport intrinsic while in split stack mode.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 2 **MESSAGE: Invalid session. (SNAERR 2) A call was made to an SNA Transport intrinsic with a bad session number.**
CAUSE: A call to an SNA Transport intrinsic was made, specifying an invalid session number parameter.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 3 **MESSAGE: Missing Completer Parameter. (SNAERR 3) An SNA Transport completion occurred with a missing parameter.**
CAUSE: The SNA completer was activated with an invalid *Cstation*, *Xfercount*, or *TargetFlag* parameter.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 4 **MESSAGE: Security violation. (SNAERR 4) User or program not authorized to use this SNA class.**
CAUSE: An SNA subsystem, or the user, is not authorized to use this SNA class.
ACTION: Specify a class name the subsystem or user is authorized to use. Check with your system administrator to determine the correct class to use.
- SNAERR 5 **MESSAGE: Parameter bounds violation. (SNAERR 5) An out-of-bounds parameter was passed to an SNA Transport intrinsic.**
CAUSE: An SNA subsystem passed an out-of-bounds parameter to an SNA Transport intrinsic.

- ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 6 **MESSAGE: Invalid flag parameter. (SNAERR 6) An invalid flag parameter was passed to an SNA Transport intrinsic.**
- CAUSE: The *Flag* parameter passed to the *SNARcv* or *SNAPreview* intrinsic was invalid.
- ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 7 **MESSAGE: Session is active. (SNAERR 7)**
- CAUSE: The LU-SSCP session for this NAU is active.
- ACTION: None.
- SNAERR 9 **MESSAGE: No available AFT entry. (SNAERR 9) No room left in current stack segment for another AFT.**
- CAUSE: An *SNAOpenuser* was attempted, but no room for another AFT entry is available in the current stack segment.
- ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 10 **MESSAGE: Bad PI in RH. (SNAERR 10) The pacing indicator was set in the RH sent to SNA Transport.**
- CAUSE: The Pacing Indicator (PI) was set in the RH passed to one of the *SNA Send* intrinsics.
- ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 11 **MESSAGE: Bad BCI in RH. (SNAERR 11) An improper chaining sequence occurred.**
- CAUSE: The Begin Chain Indicator (BCI) was not set in the RH passed to one of the *SNA Send* intrinsics when sending a response.
- ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 12 **MESSAGE: Bad ECI in RH. (SNAERR 12) An improper chaining sequence occurred.**
- CAUSE: The End Chain Indicator (ECI) was not set in the RH passed to one of the *SNA Send* intrinsics when sending a response.
- ACTION: Note the circumstances and report them to your HP representative.

- SNAERR 13 **MESSAGE: Bad EDI in RH. (SNAERR 13) Attempt was made to send enciphered data.**

CAUSE: The Enciphered Data Indicator (EDI) was set in the RH passed to one of the SNA `Send` intrinsics when sending a request.

ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 14 **MESSAGE: Reserved bits in RH must be set to zero. (SNAERR 14)**

CAUSE: Various reserved bits in the RH were incorrectly set by the calling SNA subsystem when making a call to the SNA `Send` intrinsics.

ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 15 **MESSAGE: Internal Error. (SNAERR 15) An SNA Transport Internal Error occurred.**

CAUSE: A serious error occurred in SNA Transport.

ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 16 **MESSAGE: Invalid RU size. (SNAERR 16) An attempt was made to send an RU longer than the Max RU size.**

CAUSE: A call to the SNA `Send` intrinsics was made, specifying a buffer length larger than the one specified in the Half Session Control Block (HSCB) for that session.

ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 17 **MESSAGE: NAU is inactive. (SNAERR 17) The LU-SSCP session for this NAU is inactive.**

CAUSE: A call to `SNAOpenuser` to open an LU-LU session was made, and the corresponding LU-SSCP session is not yet active.

ACTION: Ensure that the LU-SSCP session has been activated on the host side. If it has not been activated, activate it and try again.
- SNAERR 18 **MESSAGE: Invalid Plabel. (SNAERR18) An Invalid plabel was passed to the SNAControl intrinsic.**

CAUSE: A call to the `SNAControl` intrinsic (with `FunctionCode = 1`) passed a bad `Plabel` for the software interrupt procedure.

ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 19 **MESSAGE: LU-SSCP message pending. (SNAERR 19)**

CAUSE: A message on the LU-SSCP session is pending and must be completed before a `Send` can be issued.

- ACTION:** A call to `SNARcv` or `SNARcvfromSSCP` must be made before any calls to the SNA Send intrinsics are made.
- SNAERR 20 **MESSAGE: RU buffer too small. (SNAERR 20) An RU received was larger than the buffer provided.**
- CAUSE:** An SNA Receive completed, but the RU received was larger than the buffer provided in the `SNARcv`, `Preview`, or `RcvfromSSCP` call.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 21 **MESSAGE: Invalid class name. (SNAERR 21) The Class name specified does not exist.**
- CAUSE:** A call to `SNAOpenuser` to open an LU-LU session was made, but the class name specified in the call is not configured for this node.
- ACTION:** Check with your system manager for the valid classes configured for the requested node.
- SNAERR 22 **MESSAGE: Invalid session type. (SNAERR 22) An attempt was made to open a non LU-LU session.**
- CAUSE:** A call to `SNAOpenuser` was made to open a session, specifying an invalid session type parameter.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 23 **MESSAGE: Negative LU-SSCP response. (SNAERR 23) A negative response was sent by the host in response to a request.**
- CAUSE:** An SNA subsystem received a negative response as a result of a call to the `SNASendtoSSCP` intrinsic.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 24 **MESSAGE: Invalid configuration access. (SNAERR 24) SNA Transport was unable to access the required configuration data.**
- CAUSE:** A call to `NMConfgetdata` failed.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 25 **MESSAGE: Request pending. (SNAERR 25) An SNA Transport Receive request is already pending.**
- CAUSE:** A call to an SNA Transport Receive intrinsic was made while a current request is outstanding.
- ACTION:** Note the circumstances and report them to your HP representative.

- SNAERR 26 **MESSAGE: No available NAU. (SNAERR 26) All LUs in the specified SNA class are currently in use.**
CAUSE: All LUs in the specified SNA class are currently in use.
ACTION: Try again later when the system is less busy, or try using another SNA class.
- SNAERR 27 **MESSAGE: IO pending. (SNAERR 27)**
CAUSE: A call to the `SNAClose` or `SNAControl` intrinsic was made while a send or receive is pending.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 28 **MESSAGE: Invalid function code. (SNAERR 28)**
CAUSE: An SNA subsystem passed a bad function code to the `SNAControl` or `SNASessinfo` intrinsic.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 29 **MESSAGE: Inactive node or invalid node name. (SNAERR 29)**
CAUSE: A call to the `SNAOpenuser` intrinsic was made, specifying an invalid node name.
ACTION: Ensure that the specified node is a valid SNA node that is currently active.
- SNAERR 30 **MESSAGE: Illegal call. (SNAERR 30) An attempt was made to access an LU-SSCP session in an LU-LU session.**
CAUSE: A call to the `SNASendtoSSCP` or `SNARcvfromSSCP` intrinsic was made on an LU-LU session.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 31 **MESSAGE: Invalid error code. (SNAERR 31)**
CAUSE: An invalid error code was passed to the `SNAErrmsg` intrinsic.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 32 **MESSAGE: Privilege mode required. (SNAERR 32)**
CAUSE: An attempt to call an SNA Transport intrinsic was made while in user mode.
ACTION: Note the circumstances and report them to your HP representative.

- SNAERR 33 **MESSAGE: Invalid InfoWanted parameter. (SNAERR 33)**
CAUSE: A call to the SNA`Sessinfo` intrinsic was made, specifying an invalid `InfoWanted` parameter.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 35 **MESSAGE: No request pending. (SNAERR 35)**
CAUSE: An attempt to abort an SNA `Receive`, `RcvFromSSCP`, or `SendtoSSCP` was made when no such request was outstanding.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 36 **MESSAGE: Link shutdown occurred. (SNAERR 36)**
CAUSE: A link shutdown has been requested via the `SNACONTROL STOP` command, and all sessions are being notified.
ACTION: Wait until the link has been restarted and then continue.
- SNAERR 37 **MESSAGE: Protocol shutdown requested. (SNAERR 37)**
CAUSE: A protocol shutdown has been requested via the `SNACONTROL STOP` command, and all sessions are being notified.
ACTION: Wait until the link has been restarted and then continue.
- SNAERR 38 **MESSAGE: Quiesce shutdown requested. (SNAERR 38)**
CAUSE: A quiesce shutdown has been requested with the `SNACONTROL STOP` command. New sessions will not be started, and all current active sessions are to complete their current activities and close in an orderly fashion.
ACTION: Wait until the link has been restarted and then continue.
- SNAERR 39 **MESSAGE: Invalid Msg Catalog. (SNAERR 39) SNA Transport was unable to access its catalog file.**
CAUSE: The SNA Transport message catalog file, `CATSNA.PUB.SYS`, is missing, invalid, or locked by another process.
ACTION: Replace the catalog file with a valid SNA catalog file.
- SNAERR 40 **MESSAGE: Out of Stack Space. (SNAERR 40)**
CAUSE: A call was made to an SNA Transport intrinsic without enough stack space available or with the data segment frozen in memory.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 48 **MESSAGE: Invalid data offset. (SNAERR 48)**
CAUSE: A call to an SNA Transport intrinsic was made, specifying an invalid offset into the given data segment.

ACTION: Note the circumstances and report them to your HP representative.

- SNAERR 51** **MESSAGE: Link Failure occurred. (SNAERR 51)**
CAUSE: A link failure has occurred, and all sessions are being notified.
ACTION: Wait until the node has been reactivated and then try again.
- SNAERR 52** **MESSAGE: SNA Transport Internal Error Shutdown. (SNAERR 52)**
CAUSE: An SNA Transport internal error has occurred, and all sessions are being notified.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 53** **MESSAGE: Hierarchical Shutdown. (SNAERR 53)**
CAUSE: A hierarchical shutdown is occurring, and all sessions are being notified.
ACTION: Wait until the node has been reactivated and then try again.
- SNAERR 55** **MESSAGE: Bad Maxinfo length parameter. (SNAERR 55)**
CAUSE: A call to the *SNASessinfo* intrinsic was made, specifying an invalid *MaxInfoLength* parameter.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 100** **MESSAGE: Expedited response pending. (SNAERR 100)**
CAUSE: An attempt to send an expedited request was made while in a state that does not allow it.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 101** **MESSAGE: Data traffic inactive. (SNAERR 101)**
CAUSE: An attempt to send a request was made before a Start Data Traffic (SDT) had been received, or the positive response has been sent.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 102** **MESSAGE: SDT request not received. (SNAERR 102)**
CAUSE: A response to a Start Data Traffic (SDT) is being sent, but no SDT was received from the host.
ACTION: Note the circumstances and report them to your HP representative.
- SNAERR 103** **MESSAGE: Invalid session control protocol. (SNAERR 103)**
CAUSE: An invalid sequence of session control events has occurred.

- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 104 **MESSAGE: RQR request pending. (SNAERR 104)**
- CAUSE:** An attempt to send an RQR request was made while in a state other than Reset.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 105 **MESSAGE: STSN request not pending. (SNAERR 105)**
- CAUSE:** A response to an STSN request is being sent, but no corresponding STSN request has been received.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 107 **MESSAGE: Unsupported CRV request/response. (SNAERR 107)**
- CAUSE:** An attempt to send a CRV request or response was made.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 108 **MESSAGE: Unsupported session control request. (SNAERR 108)**
- CAUSE:** An attempt to send an unsupported Session Control (SC) request was made.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 109 **MESSAGE: Unsupported session control response. (SNAERR 109)**
- CAUSE:** An attempt to send an unsupported Session Control (SC) response was made.
- ACTION:** Note the circumstances and report them to your HP representative.
- SNAERR 110 **MESSAGE: No such deactivation request (UNBIND,DACTLU,DACTPU) received. (SNAERR 110)**
- CAUSE:** An SNA service is trying to send a response to a deactivation request (UNBIND, DACTLU, or DACTPU), but no such deactivation request has been received.
- ACTION:** The SNA service should examine the situations in which a deactivation response is sent, and verify that a response is sent only after a deactivation request has been received.

- SNAERR 111 **MESSAGE: No such activation request (BIND,ACTLU,ACTPU) received. (SNAERR 111)**
- CAUSE: An SNA service is trying to send a response to an activation request (UNBIND, DACTLU, or DACTPU), but no such activation request has been received.
- ACTION: The SNA service should examine the situations in which an activation response is sent, and verify that a response is sent only after an activation request has been received.
- SNAERR 112 **MESSAGE: The target parameter passed to iowait is too small. (SNAERR 112)**
- CAUSE: A target parameter passed in a call to the IOWAIT intrinsic is too small to receive sense data. The size of the target parameter is checked only when a non-waited call to the SendToSSCP intrinsic completes.
- ACTION: Ensure that the size of the target parameter (the second parameter) that was passed to the IOWAIT intrinsic is at least 4 bytes.

Suppressing Localized Message and Help Text

Under some circumstances, applications designed for English-speaking users may need to communicate with DBCS data. An example of this might be a situation in which American users, connected to an HP 3000, are communicating with an Asian host.

The American users will want to read error messages and help text in English, not in the Asian language. You can suppress the Asian-language messages and help text by using a file equation to redirect the Asian message catalog and help text files to their English equivalents. This process will allow the English-speaking users to read messages and help text in English.

Here are some examples of file equations:

Traditional Chinese

```
:FILE CATIM211.PUB.SYS=CATIMF.PUB.SYS
:FILE IMFHE211.PUB.SYS=IMFHELP.PUB.SYS
:RUN TTSSON.PUB.SYS;INFO="CONFIG=node#class;DEVID=T"
```

Japanese

```
:FILE CATIM221.PUB.SYS=CATIMF.PUB.SYS
:FILE IMFHE221.PUB.SYS=IMFHELP.PUB.SYS
:RUN TTSSON.PUB.SYS;INFO="CONFIG=node#class;DEVID=T"
```

Korean

```
:FILE CATIM231.PUB.SYS=CATIMF.PUB.SYS
:FILE IMFHE231.PUB.SYS=IMFHELP.PUB.SYS
:RUN TTSSON.PUB.SYS;INFO="CONFIG=node#class;DEVID=T"
```

Pass Thru Messages
Suppressing Localized Message and Help Text

B

SNA Character String (SCS) Support

SNA IMF supports SNA Character String (SCS) control codes, allowing certain HP printers to operate as LU.T1 (SCS mode) printers. SNA IMF also supports the 3270 data stream, so HP printers can also operate as LU.T3 (3270 mode) printers. Only one mode can be active at a time. Printers in SCS mode use the EBCDIC character set and dual case printing.

SCS control codes allow Pass Thru to call the `TRAN3270` to emulate the following IBM 3287 printer keys:

- [PA1]
- [PA2]
- [HOLD PRINT]
- [ENABLE PRINT]
- [CANCEL PRINT]

These keys are used to communicate with the host application program to suspend, resume, or cancel print operation.

The SCS data stream has fifty-six control codes. The IBM 3287 printer supports 18 of the SCS control codes, and HP printers support 17 of those 18 control codes. The Set Attribute (SA) SCS control code is the only code supported by the IBM 3287 that HP printers do not support. The SA control code is an extension of the SCS data stream and is considered an option by IBM. Also considered optional SCS extensions are the Structured Field and Attribute Processing (SFAP) features. SNA IMF does not support these options.

Unsupported codes, if received, are rejected with sense code `X'1003'` (function not supported). Table B-1 contains a brief description of each SCS code supported by SNA IMF.

NOTE

An LU.T1 session can support only a screen image of 3870 bytes and an RU size of 3584 bytes. If you exceed this RU limit, the screen image will be overwritten.

For a complete description of the 17 supported SCS codes, refer to the *IBM 3287 Printer Models 1 and 2 Component Description* (IBM P/N GA26-3153).

SCS control codes and parameters can span request unit (RU) boundaries within the same RU chain. However, if SCS control codes or parameters span RU chains, the printer will stop processing SCS parameters and send a negative response `X'1005'` (parameter error). Upon receipt of the first in chain, it will return to SCS data processing.

As with the IBM 3287 printer, you must physically align paper forms at the first line to be printed when you insert forms into the printer. This

action will ensure correct feeding of the forms. Also, any change in format (SHF, SLD, SVF) must be followed by the appropriate synchronizing function (CR, NL, FF) in order to maintain format integrity.

Table B-1 describes the SCS control codes as emulated by Pass Thru.

Table B-1 SCS Codes Emulated by Pass Thru

SCS Code	EBCDIC (hex)	SCS Name	Pass Thru's Action
CR	0D	Carriage Return	Moves the print position horizontally to the left margin on the same line. If the print position is already at the left margin, then Pass Thru does nothing.
LF	25	Line Feed	Moves the print position vertically down to the next line.
NL	15	New Line	Moves the print position horizontally to the left margin and vertically down to the next line.
BS	16	Back Space	Moves the print position horizontally one position to the left without regard to the left margin. If the print position is already at column one, then Pass Thru does nothing.
FF	0C	Form Feed	Moves the print position to the top left margin of the next form. If the maximum print position has not been set, a default value of one is used, and the print position moves to the left margin of the next line.
HT	05	Horizontal Tab	Moves the print position horizontally, from left to right, to the next tab stop. A space is printed if there are no horizontal tab stops set to the right of the current print position. If the maximum print position has been passed, a New Line is performed.
VT	0B	Vertical Tab	Moves the print position vertically down to the next vertical tab stop. A line feed is printed if there are no vertical tab stops below the current print position. If the bottom margin has been passed, a Form Feed is performed.
SHF	2BC1	Set Horizontal Format	Sets the maximum print position, left margin, right margin, and horizontal tab stops. The format of the parameters and the defaults are the same as those specified in the <i>IBM 3287 Printer Models 1 and 2 Component Description</i> .
SVF	2BC2	Set Vertical Format	Sets the maximum print line, top margin, bottom margin, and vertical tab stops. The format of the parameters and defaults are the same as those specified in the <i>IBM 3287 Printer Models 1 and 2 Component Description</i> .

Table B-1 SCS Codes Emulated by Pass Thru

SCS Code	EBCDIC (hex)	SCS Name	Pass Thru's Action
SLD	2BC6	Set Line Density	The emulator accepts this code, but performs no function. The default density of 6 LPI is always used. An IBM 3287 allows densities of 3, 4, 6, or 8 LPI.
VCS	04nn	Vertical Channel Select	Causes a Line Feed to be performed. This is the same operation an IBM 3287 performs. The IBM 3287 does not support skipping using the VCS code.
TRN	35	Transparent	Provides for transmitting data in transparent mode. Transparent data is not checked for SCS codes. The print position moves one character position as each data byte is interpreted. Valid graphics are printed and invalid graphics are printed as hyphens (-). (Invalid graphics are identified by hyphens in the <i>IBM 3287 Printer Models 1 and 2 Component Description</i> .) Note that the first byte following the TRN code is a binary value defining the number of bytes of transparent data to follow. This length does not include the length byte.
IRS	1E	Interchange Record Separator	Causes a New Line to be performed. This response is identical to the response of an IBM 3287 printer.
BEL	2F	Bell	The emulator accepts this code but performs no function. An IBM 3287 rings the bell.
INP	24	Inhibit Presentation	The emulator accepts this code, but performs no function. This response is identical to the response of an IBM 3287 printer.
ENP	14	Enable Presentation	he emulator accepts this code, but performs no function. This response is identical to the response of an IBM 3287 printer.
GE	08nn	Graphics Escape	Causes a hyphen to be printed for the graphics escape character. The character that follows the graphics escape character is printed using the base character set. This is identical to what the IBM 3287 does when the APL Text feature is not installed.

C

Pass Thru Terminal and Printer Specifications

This appendix lists the terminals and printers you can use with Pass Thru. MPE V uses DC1/DC2/DC1 handshaking, while MPE XL uses XON-XOFF handshaking.

Terminals That Can Be Used with Pass Thru

Any terminal supported by Pass Thru requires 8K of memory. Multipoint terminals require 12K of memory for Pass Thru: 4K for multipoint itself and 8K for Pass Thru. This section is divided into the following sections:

Features of Pass Thru Terminals describes some of the features that Pass Thru terminals may have. The tables in this section that list the terminals supported by Pass Thru also indicate which features each terminal has.

Multipoint Terminals lists the terminals supported by Pass Thru that work with the Multipoint Terminal Software (MTS) product.

Asynchronous Data Communications Terminals lists the point-to-point terminals supported through a connection to an Asynchronous Data Communications Controller (ADCC) or Asynchronous Terminal Processor (ATP).

Datacommunications and Terminal Controller Terminals lists the point-to-point terminals supported through a connection to a Datacommunications and Terminal Controller (DTC). Both English-language and Asian-language DTC terminals are listed.

Features of Pass Thru Terminals

This appendix contains a set of tables listing the terminals that can be used with Pass Thru. For each terminal listed, these tables indicate whether the following features are supported in Pass Thru:

- Security Video
- Shifted Function Keys
- Softkey Label Display
- Auto Keyboard Lock and Send Cursor Position
- Modified Data Tags

Security Video

Pass Thru supports security video for non-display input fields on

certain HP terminals. With security video, data typed in a non-display field is not displayed on the screen. The “Security Video” column in Tables C-1, C-2, C-3, and C-4 indicates whether a terminal supports security video. See “Non-Display Input Fields,” in Chapter 5 , “Using Terminals with Pass Thru,” for more information on security video.

Shifted Function Keys

HP terminals have 8 function keys. Some HP terminals allow you to use the [SHIFT] key to create uppercase and lowercase function keys, giving you 16 instead of 8. The “Number of Function Keys,” column in Tables C-1, C-2, C-3, and C-4 indicates the number of function keys a terminal supports (8 or 16).

Softkey Label Display

Some HP terminals will display softkey labels in windows on the screen, to tell you which softkey functions your function keys have at the current level. These softkey labels have defaults, or you can configure them in the PTCONFIG file (see Chapter 2 , “Configuring Pass Thru.”) The “Softkey Label Display” column in Tables C-1, C-2, C-3, and C-4 indicates whether a terminal will display softkey labels on the screen.

Auto Keyboard Lock and Send Cursor Position

Some HP terminals have a feature called Auto Keyboard Lock. When you press the [ENTER] key on one of these terminals to transmit data, the keyboard is automatically locked until a response is received from the IBM host. Then, the HP 3000 sends an instruction to the terminal that unlocks the keyboard. Terminals with the Auto Keyboard Lock feature also have a feature called Send Cursor Position. When data is transmitted from these terminals, the exact cursor position is sent with the data, telling the IBM host where the cursor was when the keyboard was locked. The “Auto Keyboard Lock/Send Cursor Position” column in Tables C-1, C-2, C-3, and C-4 indicates whether a terminal supports the Auto Keyboard Lock and Send Cursor Address features.

Modified Data Tags

When using Pass Thru, you should keep in mind the differences between a terminal with the Modified Data Tag (MDT) feature and a non-MDT terminal.

An MDT terminal transmits all changed data fields, including data fields that are overwritten by identical data. A non-MDT terminal transmits only those fields that are different from the internal screen image, which contains the data last written to the terminal by Pass Thru. Fields on a non-MDT terminal that have been overwritten with identical data are not sent to the host, because the data does not differ from the data in the internal screen image.

When the IBM host sends null characters, the nulls are translated to blanks for your HP terminal. If you are using a non-MDT terminal, and you type some blanks into a field that previously contained nulls, the HP 3000 compares the data from your terminal with the internal screen image and finds no difference. The data appears to be unchanged, so the HP 3000 transmits no data to the IBM host.

NOTE

If you are currently using non-MDT terminals, you should consider upgrading to MDT terminals. MDT terminals will transmit blanks that have been typed over nulls. They will also improve performance, because data from the terminal does not have to be compared with the internal screen image before it can be sent to the host.

If you are using an HP 700/94 terminal, a ROM module (part #5062-1306) is now available that allows it to support null characters just like an IBM 3278 display station.

In Tables C-1, C-2, and C-3, the “MDT/Non-MDT” column indicates whether a terminal supports the Modified Data Tag (MDT) feature. Currently, all HP Asian terminals and PCs function as non-MDT terminals.

Multipoint Terminals

Table C-1 lists the terminals supported by Pass Thru that work with the Multipoint Terminal Software (MTS) product. Multipoint terminals require 12K of memory to run Pass Thru: 4K for multipoint and 8K for Pass Thru.

A 264x terminal must have the Display Enhancements option installed, and if non-display fields are used, slot C must be empty.

The HP 2626A cannot display characters in half-bright.

Table C-1 MTS Terminals Supported by Pass Thru

Terminal Name	Security Video	Number of Function Keys	Softkey Label Display	Auto Keyboard Lock/Send Cursor Position	MDT/ Non-MDT
HP 2624B	Yes	16	Yes	No	MDT
HP 2625A	No	8	Yes	No	Non-MDT
HP 2626A	Yes	8	Yes	No	Non-MDT
HP 2628A	No	8	Yes	No	Non-MDT
HP 2645A	No	8	No	No	Non-MDT
HP 2647A	No	8	No	No	Non-MDT
HP 2648A	No	8	No	No	Non-MDT

Asynchronous Data Communications Terminals

Table C-2 shows the point-to-point terminals supported through a connection to an Asynchronous Data Communications Controller (ADCC) or Asynchronous Terminal Processor (ATP). If an asterisk (*) appears after a terminal's name in Table C-2, that terminal is used in conjunction with an emulator program, like HP AdvanceLink.

When the HP 2645A terminal is used as a point-to-point terminal, strap H must be in on the Keyboard Interface PCA.

The HP 150 terminal is supported as a 24-line terminal only.

Table C-2 Pass Thru-Supported ADCC and ATP Terminals

Terminal Name	Security Video	Number of Function Keys	Softkey Label Display	Auto Keyboard Lock/Send Cursor Position	MDT/ Non-MDT
HP 120	No	8	Yes	No	Non-MDT
HP 125	No	8	Yes	No	Non-MDT
HP 150	Yes	16	Yes	Yes	MDT
HP 2382A	No	8	Yes	No	Non-MDT
HP 2392A	Yes	8	Yes	Yes	Non-MDT
HP 2394A	Yes	16	Yes	Yes	MDT
HP 2397A	Yes	8	Yes	Yes	Non-MDT
HP 2622A	No	8	Yes	No	Non-MDT
HP 2623A	No	8	Yes	No	Non-MDT
HP 2624A	Yes	8	Yes	No	MDT
HP 2624B	Yes	16	Yes	No	MDT
HP 2625A	No	8	Yes	No	Non-MDT
HP 2626A	Yes	8	Yes	No	Non-MDT
HP 2626W	No	8	Yes	No	Non-MDT
HP 2627A	No	8	Yes	No	Non-MDT
HP 2628A	No	8	Yes	No	Non-MDT
HP 2640B	No	8	No	No	Non-MDT
HP 2642A	No	8	Yes	No	Non-MDT
HP 2645A	No	8	No	No	Non-MDT
HP 2647A	No	8	No	No	Non-MDT
HP 2648A	No	8	No	No	Non-MDT

Table C-2 Pass Thru-Supported ADCC and ATP Terminals

Terminal Name	Security Video	Number of Function Keys	Softkey Label Display	Auto Keyboard Lock/Send Cursor Position	MDT/ Non-MDT
HP 2649A*	No	8	No	Yes	Non-MDT
HP 98x6*	No	8	Yes	Yes	Non-MDT
HP 700/92	Yes	16	Yes	Yes	Non-MDT
HP 700/94	Yes	16	Yes	Yes	MDT
HP Vectra*	Yes	8	Yes	Yes	Non-MDT
* with Advancelink product					

Datacommunications and Terminal Controller Terminals

Table C-3 shows the point-to-point terminals supported through a connection to a Datacommunications and Terminal Controller (DTC). If an asterisk (*) appears after the terminal's name in Table C-3, the terminal is used in conjunction with an emulator program, like HP AdvanceLink.

The HP 150 terminal is supported as a 24-line terminal only.

Table C-3 DTC Terminals Supported by Pass Thru

Terminal Name	Security Video	Number of Function Keys	Softkey Label Display	Auto Keyboard Lock/Send Cursor Position	MDT/ Non-MDT
HP 150	Yes	16	Yes	Yes	MDT
HP 2392A	Yes	8	Yes	Yes	Non-MDT
HP 2394A	Yes	16	Yes	Yes	MDT
HP 2397A	Yes	8	Yes	Yes	Non-MDT
HP 2622A	No	8	Yes	No	Non-MDT
HP 2624B	Yes	16	Yes	No	MDT
HP 2627A	No	8	Yes	No	Non-MDT
HP 700/92	Yes	16	Yes	Yes	Non-MDT
HP 700/94	Yes	16	Yes	Yes	MDT
HP Vectra*	Yes	8	Yes	Yes	Non-MDT
* with AdvanceLink product					

Table C-4 lists HP Asian-language terminals that are supported through a DTC connection. If an asterisk (*) appears after the terminal's name in Table C-4, the terminal is used in conjunction with an emulator program, like HP AdvanceLink.

Currently, all HP Asian terminals and PCs function as non-MDT terminals.

Table C-4 Asian DTC Terminals Supported by Pass Thru

Terminal Name	Security Video	Number of Function Keys	Softkey Label Display	Auto Keyboard Lock/Send Cursor Position	MDT/ Non-MDT
HP C1010T/K/J	Yes	16	Yes	Yes	Taiwan, Korea, Japan
HP 724X5A* (Asian Vectra)	Yes	8	Yes	Yes	Taiwan, Korea
HP Vectra AX	Yes	8	Yes	Yes	Japan
* with Asian AdvanceLink product					

Terminals That Cannot Be Used with Pass Thru

You cannot use any of the following terminals with Pass Thru:

- HP 2607
- HP 2621A
- HP 2621P
- HP 2640A
- HP 2640N
- HP 2640S
- HP 2641A
- HP 2644A
- HP 2645R
- IBM 3278

NOTE

The above terminal restrictions apply only to terminals used with Pass Thru. As an HP 3000 user, you still can log on to any system-supported terminal to run your applications that access the SNA IMF intrinsics.

Printers That Can Be Used with Pass Thru

Following are the MPE XL-supported printers you can use with SNA IMF/XL Pass Thru to emulate an IBM 3287 printer:

- HP 2686A
- HP 2934A

NOTE

You may use Pass Thru with any of the printers listed in this appendix to emulate an IBM 3287 printer. However, Pass Thru requires that a printer be connected directly to the HP 3000 and configured into MPE as a system printer. You cannot use a printer that is attached directly to an HP 23xx, 262x, 264x, or 700/9x terminal.

SNA IMF/XL supports the following Asian-language printers:

- HP 41063A (Taiwan and Japan)
- HP C1200A Asian System Printer (Taiwan, Korea, and Japan)
- HP C1202A (Taiwan, Korea, and Japan)

Following is a list of the MPE V-supported printers you can use with SNA IMF/V Pass Thru to emulate an IBM 3287 printer:

- HP 2563A
- HP 2565A
- HP 2566A
- HP 2608A
- HP 2608S
- HP 2613A
- HP 2619A
- HP 2631B
- HP 2680
- HP 2687
- HP 2688
- HP 2933A
- HP 2934A

NOTE

Under no circumstances can you use the HP 2607 as a Pass Thru printer. Any printer you use must be a spoolable device.

D

Sample PTCONFIG File

This appendix is a sample PTCONFIG file for emulating an IBM 3278 display station. For more information on creating a PTCONFIG file, see Chapter 2 , “Configuring Pass Thru.”

This PTCONFIG file has three parts:

1. Function key definitions for terminals that use 16 function keys (shifted function keys).
2. Function key definitions for terminals that use 8 function keys.
3. Pass Thru options.

```
*****
*      This part of PTCONFIG defines a terminal      *
*              with 16 function keys.              *
*****
```

```
SOFTKEYS:16
```

```
*LEVEL ONE
```

```
BEGIN
```

```
F2:SRK      "SYS REQ"
```

```
F3:CLEAR    "CLEAR "
```

```
F4:PRINT    "PRINT "
```

```
F5:CLPRT    "CLPRT "
```

```
F6:LBNULL   "LB "
```

```
F7:TBNULL   "TB "
```

```
F8:TNBLANK  "TN "
```

```
SF1:EXIT    "EXIT "
```

```
SF2:PA1     "PA1 "
```

```
SF3:PA2     "PA2 "
```

```
SF4:PA3     "PA3 "
```

```
SF5:STATUS  "STATUS "
```

```
SF6:LEVEL2  "PF1 - 12 "
```

```
SF7:LEVEL3  "PF13 - 24 "
```

```
SF8:LEVEL4  "SPF KEYS "
```

```
END
```

```
*LEVEL TWO
```

```
BEGIN
```

```
F2:PF1      "PF1 "
```

```
F3:PF2      "PF2 "
```

```
F4:PF3      "PF3 "
```

```
F5:PF4      "PF4 "
```

```
F6:LEVEL1   "IBM AID "
```

```
F7:LEVEL3   "PF13-24 "
```

```
F8:LEVEL4   "SPF KEY "
```

```
SF1:PF5     "PF5 "
```

```
SF2:PF6     "PF6 "
```

```
SF3:PF7     "PF7 "
```

```
SF4:PF8     "PF8 "
```

```
SF5:PF9     "PF9 "
```

```
SF6:PF10    "PF10 "
```

Sample PTCONFIG File

```
SF7:PF11      "PF11"  
SF8:PF12      "PF12"  
END
```

```
*LEVEL THREE  
BEGIN  
F2:PF13      "PF13"  
F3:PF14      "PF14"  
F4:PF15      "PF15"  
F5:PF16      "PF16"  
F6:LEVEL1    "IBM AID"  
F7:LEVEL2    "PF 1-12"  
F8:LEVEL4    "SPF KEY"  
  
SF1:PF17     "PF17"  
SF2:PF18     "PF18"  
SF3:PF19     "PF19"  
SF4:PF20     "PF20"  
SF5:PF21     "PF21"  
SF6:PF22     "PF22"  
SF7:PF23     "PF23"  
SF8:PF24     "PF24"  
END
```

```
*LEVEL FOUR  
BEGIN  
F2:PF3       "SPF END"  
F3:PF1       "SPF HELP"  
F4:PF7       "SCROL UP"  
F5:PF8       "SCROL DN"  
F6:LEVEL1    "IBM AID"  
F7:LEVEL2    "PF 1-12"  
F8:LEVEL3    "PF 13-24"  
  
SF1:PF10     "CLEAR"  
SF2:PF2      "SPLIT SC"  
SF3:PF9      "SWAP SC"  
SF4:PF10     "SCROL LF"  
SF5:PF11     "SCROL RT"  
SF6:PA1      "PA1"  
SF7:PA2      "PA2"  
SF8:PA3      "PA3"  
END
```

```
*****  
*           This part of PTCONFIG defines a terminal           *  
*                   with 8 function keys.                   *  
*****
```

```
SOFTKEYS:8
```

```
*LEVEL ONE  
BEGIN  
F2:LEVEL4    "PF1 - 6"  
F3:LEVEL5    "PF7 -12"  
F4:LEVEL6    "PF13-18"  
F5:LEVEL7    "PF19-24"  
F6:LEVEL3    "PA1 - 3"  
F7:LEVEL2    "IBM AID"
```

```
F8:LEVEL8      "SPF KEY"  
END
```

```
*LEVEL TWO  
BEGIN  
F2: CLEAR      "CLEAR"  
F3: SRK        "SYS REQ"  
F4: CLPRT     "CLPRT"  
F5: LBNULL    "LB"  
F6: TBNULL    "TB"  
F7: TNBLANK   "TN"  
F8: LEVEL1    "LEVEL 1"  
END
```

```
*LEVEL THREE  
BEGIN  
F2: PA1        "PA1 "  
F3: PA2        "PA2 "  
F4: PA3        "PA3 "  
F8: LEVEL1    "LEVEL 1 "  
END
```

```
*LEVEL FOUR  
BEGIN  
F2: PF1        "PF1 "  
F3: PF2        "PF2 "  
F4: PF3        "PF3 "  
F5: PF4        "PF4 "  
F6: PF5        "PF5 "  
F7: PF6        "PF6 "  
F8: LEVEL1    "LEVEL 1 "  
END
```

```
*LEVEL FIVE  
BEGIN  
F2: PF7        "PF7 "  
F3: PF8        "PF8 "  
F4: PF9        "PF9 "  
F5: PF10       "PF10 "  
F6: PF11       "PF11 "  
F7: PF12       "PF12 "  
F8: LEVEL1    "LEVEL 1 "  
END
```

```
*LEVEL SIX  
BEGIN  
F2: PF13       "PF13 "  
F3: PF14       "PF14 "  
F4: PF15       "PF15 "  
F5: PF16       "PF16 "  
F6: PF17       "PF17 "  
F7: PF18       "PF18 "  
F8: LEVEL1    "LEVEL 1 "  
END
```

```
*LEVEL SEVEN  
BEGIN  
F2: PF19       "PF19 "  
F3: PF20       "PF20 "
```

Sample PTCONFIG File

```
F4:PF21      "PF21"
F5:PF22      "PF22"
F6:PF23      "PF23"
F7:PF24      "PF24"
F8:LEVEL1    "LEVEL 1"
END

*LEVEL EIGHT
BEGIN
F2:PF3       "SPF END"
F3:PF1       "SPF HELP"
F4:PF2       "SPLIT SC"
F5:PF9       "SWAP SC"
F6:PF7       "SCROL UP"
F7:PF8       "SCROL DN"
F8:LEVEL1    "LEVEL 1"
END

*****
*
*       This part of PTCONFIG defines Pass Thru       *
*       options CLSCR, DBCS, KET, LB, PAGE, PRT,      *
*       TB, TIMEOUT, TN, and UNBIND.                  *
*
*****
CLSCR  : 14   * Clear Screen count = 14 lines.
DBCS   : NO   * Disable Asian Double-Byte Character Set.
KET    : 30   * Keyboard Enable Timer = 30 seconds.
LB     : NO   * Convert trailing blanks to nulls on a
              * field-by-field basis before transmitting
              * data to the host.
PAGE   : 66   * Printer page length = 66 lines.
PRT    : 60   * Receive timer for the printer = 60 seconds.
TB     : YES  * Transmit leading blanks as read from the
              * HP terminal on a field-by-field basis.
TIMEOUT: 600  * Input timer = 600 seconds (10 minutes).
              * If no input is received from the terminal
              * during this interval, Pass Thru
              * will terminate.
TN     : NO   * No effect, since you cannot type nulls.
UNBIND : YES  * Send UNBIND (instead of LUSTAT)
              * if Pass Thru is terminated while
              * host session is still active.
```

E

3270 Bit Assignment and Character Translation Tables

This appendix contains the following tables related to 3270 data stream communication:

1. 3270 Write Control Character (WCC) bit assignment.
2. Attention ID (AID) codes generated by SNA IMF.
3. 3270 command codes for IBM control units.
4. Bit assignment for the 3270 Field Attribute Character.
5. 3270 buffer control orders.

Information about ASCII and EBCDIC character translation tables and HP 3000 Native Language Support (NLS) is also provided at the end of this appendix.

Table E-1 3270 Write Control Character Bit Assignment

Bits	Meaning
0	Value is determined by the contents of bits 2–7.
1 RESERVED	Always a 1.
2–3 Line length	Defines line length in printout as follows: 00 = 132-character line when orders are not present. The NL, EM, and CR orders in the data stream determine printed line length. 01 = Printed line is 40 characters. 10 = Printed line is 64 characters. 11 = Printed line is 80 characters.
4 Start printer	When set to 1, bit 4 starts printing at the completion of the write operation.
5 Alarm	When set to 1, bit 5 sounds an alarm at a selected output device as soon as an operation ends.
6 Keyboard enable	When set to 1, bit 6 reenables the keyboard of a selected device so that it will accept input.
7 MDT reset	When set to 1, bit 7 resets all modified data tag (MDT) bits in the data in the existing buffer of the selected device before writing any data or executing any orders.

Table E-2 Attention ID Codes Generated by SNA IMF

AID	Decimal Code	ASCII Code (Octal/Hex)	EBCDIC Code (Hexadecimal)	Graphic Character
ENTER	39	047/27	7D	' (Apostrophe)
PF 1	49	061/31	F1	1
PF 2	50	062/32	F2	2
PF 3	51	063/33	F3	3
PF 4	52	064/34	F4	4
PF 5	53	065/35	F5	5
PF 6	54	066/36	F6	6
PF 7	55	067/37	F7	7
PF 8	56	070/38	F8	8
PF 9	57	071/39	F9	9
PF 10	58	072/3A	7A	:
PF 11	35	043/23	7B	#
PF 12	64	100/40	7C	@
PF 13	65	101/41	C1	A
PF 14	66	102/42	C2	B
PF 15	67	103/43	C3	C
PF 16	68	104/44	C4	D
PF 17	69	105/45	C5	E
PF 18	70	106/46	C6	F
PF 19	71	107/47	C7	G
PF 20	72	110/48	C8	H
PF 21	73	111/49	C9	I
PF 22	91	133/5B	4A	[(ASCII) c (EBCDIC)
PF 23	46	056/2E	4B	. (period)
PF 24	60	074/3C	4C	<
PA 1	37	045/25	6C	%
PA 2	62	076/3E	6E	>

Table E-2 Attention ID Codes Generated by SNA IMF

AID	Decimal Code	ASCII Code (Octal/Hex)	EBCDIC Code (Hexadecimal)	Graphic Character
PA 3	44	054/2C	6B	, (comma)
CLEAR	95	137/5F	6D	_ (underscore)
SYSTEM REQUEST	48	060/30	F0	0

NOTE SNA IMF does not support attention ID codes for the card reader and light pen.

Table E-3 Command Codes for IBM Control Units

Command	ASCII Code (Octal/Hex)	EBCDIC Code (Hexadecimal)	Graphic Character
Erase All Unprotected	77/3F	6F	?
Erase/Write	65/35	F5	5
Erase/Write Alternate	75/3D	7E	=
Read Buffer	62/32	F2	2
Read Modified	66/36	F6	6
Write	61/31	F1	1
Read Modified All	76/3E	6E	>

NOTE SNA IMF does not support the Write Structured Field command.

Table E-4 3270 Field Attribute Character Bit Assignment

Bits	Field Description
0	Value is determined by the contents of bits 2–7.
1 RESERVED	Always a 1.
2 U/P	0 = Unprotected 1 = Protected
3 A/N	0 = Alphanumeric 1 = Numeric
NOTE	When bits 2 and 3 are both on, an automatic skip occurs.
4–5 D	Display indicator 00 = Normal display 01 = Normal display and light pen detectable 10 = Intensified display and light pen detectable 11 = Non-display and non-print
6 RESERVED	Set to 0 by the host
7 MDT	Modified data tag (MDT) indicates whether the field associated with this attribute character has been modified. 0 = Field has not been modified. 1 = Field has been modified either by the terminal operator or by the host program when it sent this attribute character to the terminal.

Table E-5 3270 Buffer Control Orders

	Byte 1	Byte 2	Byte 3	Byte 4
Order	Order Code (EBCDIC Hex/ ASCII hex)			
Start Field (SF)	1D/1D	Field attribute character		
Set Buffer Address (SBA)	11/11	Address (1st byte)	Address (2nd byte)	
Insert Cursor (IC)	13/13			
Program Tab (PT)	05/09			
Repeat to Address (RA)	3C/14	Address (1st byte)	Address (2nd byte)	Character to be repeated
Erase Unprotected to Address (EUA)		Address (1st byte)	Address (2nd byte)	

NOTE

SNA IMF does not support the following 3270 buffer control orders:

- Start Field Extended
- Set Attribute
- Modify Field
- Graphic Escape

Character Sets

Every computer uses a standard or default character set. A character set is a collection of graphic and control characters. Each character is normally represented by a unique 7- or 8-bit code. The standard character set for a particular computer is used throughout that computer system. Terminals, printers, and communications controllers, as well as sort utilities, editors, compilers, and command interpreters, must agree on a standard code.

The standard code for the HP 3000 is the American Standard Code for Information Interchange (ASCII). IBM computers use the Extended Binary Coded Decimal Interchange Code (EBCDIC).

SNA IMF provides automatic translation between EBCDIC, the code used over the communications line to the host, and ASCII, the code used for the terminal screen and printer buffers on the HP 3000 side.

SNA IMF uses **Native Language Support (NLS)** translation tables to perform the ASCII-to-EBCDIC and EBCDIC-to-ASCII translations. NLS features allow the application programmer to create local language applications for end users. These features include architecture and peripheral support, as well as software facilities within the operating systems and subsystems. NLS addresses the internal functions of a program (for example, sorting) as well as the user interface (for example, message formats).

NLS system utilities are available that allow you to add languages to your system, or delete them, and to modify local formats. NLS tables are available for each of the foreign languages supported by the HP 3000. These NLS tables reside on the system. For more information about NLS, refer to the *Native Language Support Reference Manual*.

F

Differences Between IMF/3000 and SNA IMF/V

If you are migrating from IMF/3000 to SNA IMF/V on an MPE V system, you may find the information in this appendix helpful. IMF/3000 uses either BSC or SDLC protocol in a Node Type 1 environment. SNA IMF uses only SDLC protocol in a Node Type 2 environment.

NOTE

If you are migrating from IMF/3000 to SNA IMF/V, the following IMF/3000 components are not required: INP download, IMF Monitor, Pseudo Driver, and IMF Manager.

Unlike IMF/3000, which is a complete subsystem that incorporates functions from the user level down to and including the INP, SNA IMF runs entirely on the user's stack. SNA IMF exists once for each user who invokes the SNA IMF intrinsics.

NOTE

IMF/3000 is currently supported only on MPE V.

This appendix compares and contrasts IMF/3000 with SNA IMF/V in these areas:

- Product structure
- Configuration file parameter
- Starting Pass Thru
- Screen sizes
- Display screen ownership

Product Structure

Both IMF/3000 and SNA IMF perform the same basic function: they support interactive communication between an HP 3000 and an IBM host. Both products emulate the operation of a remote cluster controller with attached display stations and printers. However, the two products have different components that allow them to accomplish this common goal.

IMF/3000

IMF/3000 supports both Binary Synchronous Communications (BSC) and Synchronous Data Link Control (SDLC) line protocols. The SDLC protocol used by IMF/3000 supports a 3271 Model 11 Communications Controller, which uses a subset of SNA functions in a Node Type 1 environment. IMF/3000 includes functions from the user level all the way down to and including the INP. The major components of IMF/3000 are as follows:

- Pass Thru
- IMF Intrinsic
- Pseudo Driver
- IMF Monitor
- INP Driver

Pass Thru is an application program that uses IMF/3000 intrinsic to make HP terminals and printers attached to an HP 3000 appear to the IBM host as IBM 3278 display stations and IBM 3287 printers.

IMF/3000 intrinsic allow an application programmer to exchange screens of data with the host using 3270 screen images. Once the intrinsic obtain the necessary information from you, they use the Pseudo Driver to pass the data to the IMF Monitor for processing.

The Pseudo Driver allows IMF/3000 intrinsic and the IMF Manager programs, running on many different user stacks, to queue requests to the IMF Monitor for processing.

The IMF Monitor processes data that comes from either the Pseudo Driver or the INP Driver. Also, the IMF Monitor translates and formats 3270-type screens.

The INP Driver refers to the INP download file and the INP. The INP Driver carries on the actual conversation with the IBM host. The INP takes data from the IMF Monitor through CS (Communication Services) buffers, places the necessary Data Link/Path Control level information into the data, and sends the data to the host.

The IMF/3000 components are not discussed in detail in this manual. Refer to the *IMF/3000 User/Programmer Reference Manual* for more information about IMF/3000.

SNA IMF

SNA IMF uses HP terminals and printers to emulate IBM 3278 display stations and 3287 printers attached to an IBM remote control unit in an SNA Node Type 2 environment.

SNA IMF does not have an INP download, does not use Communication Services (although SNA Link/V does), does not have an IMF Monitor, and does not have a Pseudo Driver. Also, SNA IMF does not have an IMF Manager program because SNA IMF no longer controls the node. The node is managed by the physical unit (PU), which is controlled by the Node Management Services (NMS) software. In contrast, IMF/3000 starts and stops the node and selects the appropriate configuration file.

NOTE

SNA IMF software includes the Pass Thru program and the IMF intrinsics. When both IMF/3000 and SNA IMF/V are running on the same HP 3000, they share the same Pass Thru program file (TTSSON.PUB.SYS) and IMF intrinsic SL segments.

Configuration File Parameter

The configuration file parameter (*config*) that you specify in the info string when you start Pass Thru has a different meaning depending on which IMF product you use. The parameter occupies the same position in the parameter list, and it is still a byte array, but its meaning differs between IMF/3000 and SNA IMF.

IMF/3000

For IMF/3000, the configuration file parameter represents the name of the configuration file used by the IMF/3000 user.

SNA IMF

For SNA IMF/V, the configuration file parameter is the name of an SNA node and an SNA LU class configured in the configuration file `NMCONFIG.PUB.SYS`. The node and class names identify the parts of the NMCONFIG configuration file that the SNA Link product uses for configuration.

Node Management Services, a part of the SNA Link/V product, creates, accesses, and manages the NMCONFIG configuration file.

For SNA IMF/XL, the configuration file parameter is the name of an SNA node and a security class listed in the NMCONFIG configuration file. Node Management Services manages the NMCONFIG configuration file. On MPE XL, Node Management Services is part of the Fundamental Operating System.

Starting Pass Thru

Pass Thru is started differently for SNA IMF than for IMF/3000.

IMF/3000

For IMF/3000, you can start Pass Thru automatically, from an MPE session, or from the IMF Manager program.

SNA IMF

For SNA IMF, you can start Pass Thru for your terminal, for someone else's terminal, for a cluster of terminals, or for an LU.T1 and LU.T3 printer. As described in Chapter 3 , "Starting Pass Thru," you can create and use a single User Defined Command (UDC) to start Pass Thru.

Screen sizes

This section explains the differences between IMF/3000 screen sizes and SNA IMF screen sizes.

IMF/3000

Screen size is specified either by the IBM host or in the configuration file on the HP 3000. After Pass Thru is started, the screen size is assumed to be whatever was configured in the IMF/3000 configuration file.

SNA IMF

Like IMF/3000, SNA IMF allows the host to set the screen size. However, screen size cannot be specified on the HP 3000. As part of SNA protocol, the IBM host sends a `BIND` command at the beginning of a session. The `BIND` command, which is transparent to the user, establishes the screen size for SNA IMF. A screen must be 480, 1920, or 3440 characters; otherwise, SNA IMF rejects it.

Display Screen Ownership

When you use IMF/3000, you need not be aware of who owns the display screen at any particular time. With SNA IMF, however, knowing who owns the display screen at a particular time can help you determine the state of your session and which keys or commands you should enter.

IMF/3000

To use IMF/3000, you do not need to be aware of who owns the display screen.

SNA IMF

To use SNA IMF, you need to be aware of how screen ownership is handled.

A session is the logical connection between Network Addressable Units (NAUs). Three types of NAU sessions exist: SSCP-PU, SSCP-LU, and LU-LU. During session initiation, display screen ownership passes through three stages: (1) unowned; (2) owned by an SSCP-LU session; and (3) owned by the LU-LU session.

For example, if you are using the Time Sharing Option (TSO), you will receive four different types of screens before completing your logon to the host:

1. **An unowned screen.** After the first `RECV3270` intrinsic call, you receive an unowned screen that contains the SNA IMF banner. Send the `[SYS REQ]` key now. Sending the `[SYS REQ]` key affects screen ownership. Pressing the `[SYS REQ]` key also clears the screen image and sets the cursor to the top of the screen.
2. **A blank SSCP screen.** This screen appears after the `[SYS REQ]` key is pressed. The blank screen is produced internally by SNA IMF. Screen ownership switches to the SSCP-LU session. After receiving this screen, enter your logon to the host.
3. **An LU-LU owned BIND screen.** The host receives this screen after TSO determines that your LU will be permitted to start a TSO session.
4. **An unowned screen.** This screen is produced by SNA IMF whenever an `UNBIND` is received. TSO sends a `BIND-UNBIND-BIND` sequence when establishing a session. The unowned screen appears immediately after the SSCP-LU `BIND` screen and before your TSO session is created.

5. **An LU-LU owned screen.** This screen contains three items: logon messages from the host, an indication of whether logon was successful, and the READY message.

NOTE Pressing the [SYS REQ] key while using a full screen-oriented application destroys the integrity of your screen image. Once this happens, the host application must recover the screen image.

Table F-1 lists the three states of display screen ownership, what each state means, and how you can change display screen ownership.

Table F-1 Display Screen Ownership

Display Screen Ownership	Meaning	How to Change Screen Ownership
Unowned	Either Pass Thru has just come up or you have logged off the host.	Press the [SYS REQ] key to transfer screen ownership to the SSCP-LU session if Pass Thru has just come up.
Owned by an SSCP-LU session	You have pressed the [SYS REQ] key, which changes the screen ownership from unowned (the previous screen) to SSCP-LU ownership (the current screen). You can now log on to the system.	If there is no LU-LU session, press the [SYS REQ] key to make the screen unowned. If an LU-LU session exists, press the [SYS REQ] key to transfer screen ownership back to the LU-LU session.
Owned by an LU-LU session	An SSCP-LU session was the owner of the previous screen. Logon was completed successfully	Either press the [SYS REQ] key to transfer screen ownership to the SSCP-LU session or log off to make the screen unowned.

The display screen is unowned when Pass Thru is first started.

The SSCP-LU session enables you to create an LU-LU session, which allows communication between two end users (application programs, devices, or people). Once you enter the logon message followed by the [SYS REQ] key, the newly created LU-LU session allows you to exchange data with the IBM host through 3270-type screen images.

When a terminal receives a BIND from the host, the terminal's screen is put into an LU-LU session. Receipt of an UNBIND from the host puts the screen into an unowned state.

HP and IBM Differences in DBCS Implementation

This appendix describes how Hewlett-Packard and IBM differ in their implementations of Asian Double-Byte Character Sets (DBCS). It covers the following topics:

- User input error checking
- Characters spanning rows
- Shift-out/shift-in control character handling
- Control character mapping
- Undefined and user-defined DBCS characters

User Input Error Checking

When users type data and press the [ENTER] key, errors are sometimes detected by the terminal. IBM display stations and HP terminals process errors differently. The following list summarizes these differences:

- HP terminals perform input-data error checking after the user presses the [ENTER] key or a valid function (AID) key.
- If multiple input errors are detected in more than one field, Pass Thru reports one error at a time starting with the first occurrence.
- Error messages are displayed at the bottom of the screen.
- The cursor is positioned at the beginning of the erroneous field.
- The erroneous field is redisplayed with the user's input data.

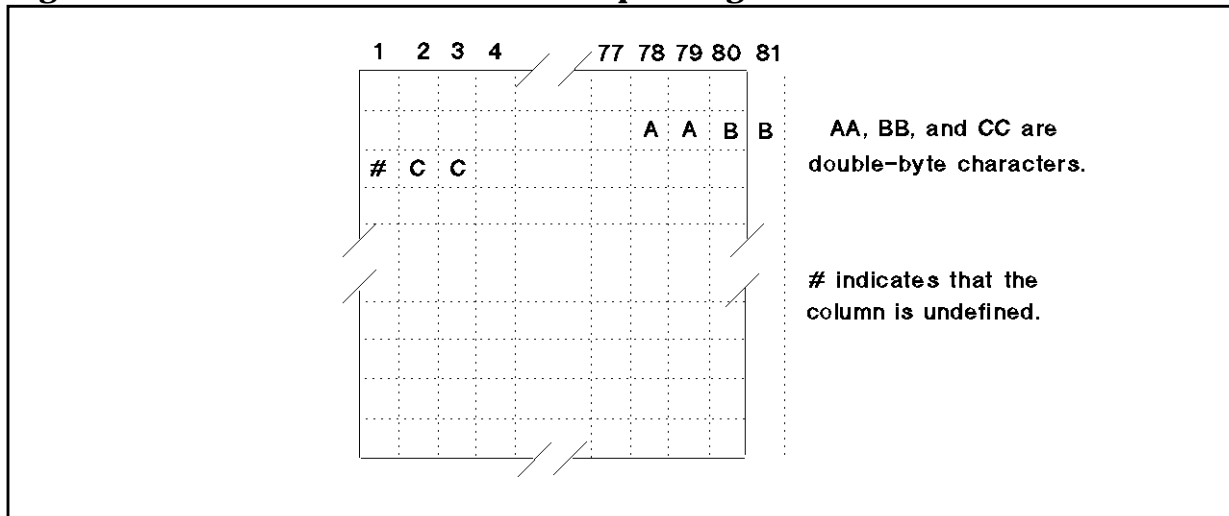
Characters Spanning Rows

When a data field spans rows on the screen, a 16-bit DBCS character may span rows in the character data buffer. Consequently, the first half of the character is on one line in the rightmost column, and the second half of the character is on the next line in the leftmost column. Hewlett-Packard and IBM use different approaches to solving this problem.

IBM's Implementation

The IBM PS/55 PC uses an additional (81st) column on the screen, as shown in Figure G-1. This solution allows the PS/55 PC to display the character on one line, with the second byte in the 81st column. The logical screen size is still 80 columns, so the application will not have access to column 81.

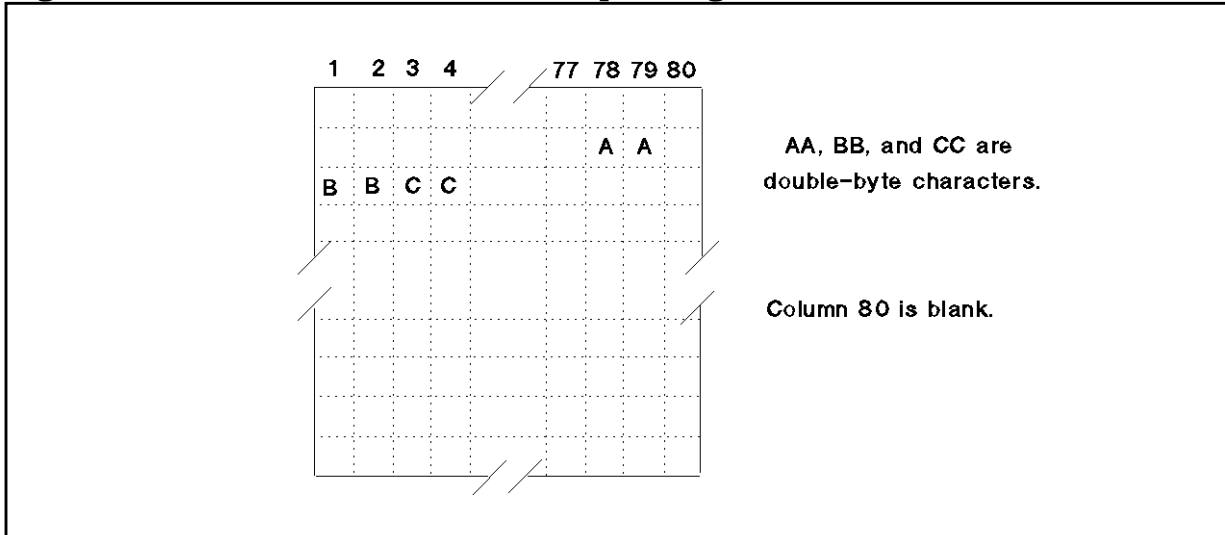
Figure G-1 IBM DBCS Character Spanning Rows



Hewlett-Packard's Implementation

When a 16-bit character is to be displayed in column 80, Hewlett-Packard solves the problem by putting a blank character in column 80 and displaying the Asian character in columns 1 and 2 of the next line (see Figure G-2). The extra blank in column 80 will be ignored by Pass Thru when the user presses the [ENTER] key, so data integrity in that field will be preserved.

Figure G-2 HP DBCS Character Spanning Rows



NOTE

Hewlett-Packard's solution will cause data in the current field to be truncated if the current field is already full when 16-bit characters are moved from the previous line.

Shift-Out/Shift-In Control Character Handling

The shift-out/shift-in (SO/SI) control characters are handled slightly differently between the Asian HP terminal and the IBM Asian display station. They are not used to enable and disable the DBCS characters on HP terminals. Here is a description of the differences when a user is inputting data and when data is displayed on the user's terminal.

Differences During User Input of Data

Unlike the IBM PS/55 display station, HP terminals do not update the screen with SO and SI control characters when the user types DBCS data. Pass Thru does not process the DBCS data until the user presses the [ENTER] key, because Pass Thru uses HP "block mode" terminal protocol, where the terminal does not interrupt the HP 3000 after each character is typed.

Pass Thru inserts SO and SI control characters around the DBCS characters and performs DBCS syntax checking of all the DBCS fields on the screen. If a field is already full, and Pass Thru attempts to insert SO and SI control characters around the DBCS characters, data overflow may occur, because Pass Thru has no room to insert the additional SO and SI control characters. Pass Thru will truncate data at the end of the field to make room for the SO and SI characters. A warning message will be sent to the user's terminal and will appear at the bottom of the screen.

Differences on User's Terminal Screen

Instead of displaying the SO and SI control characters directly on the HP terminal, Pass Thru will map the SO and SI characters to a single-byte blank and display them as blanks on the HP terminal screen.

Control Character Mapping

The double-byte null character will be displayed as two single-byte blanks in Pass Thru. Double-byte printer control codes in the LU.T2 data stream will be displayed as two single-byte characters, each character based on eight of the 16 bits.

Undefined DBCS Characters

Some infrequently used HP DBCS characters are not translated to IBM DBCS equivalents because they do not exist in the IBM character set. Likewise, some IBM DBCS characters are not translated to HP DBCS characters, because they do not exist in the HP character set. The HP and IBM DBCS character sets differ slightly. Currently, the HP NLS conversion intrinsic will map an undefined character to either a user-configurable character (hexadecimal “40FE” to hexadecimal “FFFE”) or the default character (a double-byte blank). See the *Native Language Support Reference Manual* for more information.

Table G-1 lists the default mapping characters from the HP-IBM and IBM-HP tables for Japanese, Korean, and Traditional Chinese.

Table G-1 Default Mapping of Undefined Characters

Language	IBM-to-HP	HP-to-IBM
Japanese	HP-15 blank (hex “8140”)	DBCS blank (hex “4040”)
Korean	HP-15 blank (hex “A1A1”)	DBCS blank (hex “4040”)
Traditional Chinese	HP-15 blank (hex “F5D1”)	DBCS blank (hex “4040”)

User-Defined DBCS Characters

User-defined characters on the HP 3000 will be supported if the translation tables are correctly updated. Your HP 3000 system manager can modify the ASCII-to-EBCDIC translation tables by running the NLS utility program `LANGINST.PUB.SYS`. To make the changes, the system manager should run `LANGINST.PUB.SYS` and select option 3 (Modify Native Format). See the *Native Language Support Reference Manual* for detailed information.

User-defined characters on the Asian IBM host should be handled by the IBM system programmer.

Glossary

A

ACF/NCP Advanced Communications Function for the Network Control Program. An IBM program product that resides in the 37xx Communication Controller and supports single and multiple domains.

ACF/VTAM Advanced Communications Function for the Virtual Telecommunication Access Method. An IBM program on the host that provides single-domain SNA network capability, and optionally, multiple-domain capability.

B

baud A measure of signaling speed equal to the number of signal changes or events per second. Baud often refers to bits per second.

BIND A request to activate a session between two logical units. A BIND is an SNA request sent by the host to SNA IMF. A BIND request specifies the detailed protocol that SNA IMF accepts before initiating an LU-LU session.

C

CICS Customer Information Control System. An IBM interactive subsystem that acts as an interface between terminal

users and a host's application programs and databases. CICS also includes facilities for building, using, and maintaining databases.

cluster controller A programmable device that supports one or more terminals or printers. A cluster controller communicates with the host either through a local channel attachment or through a communications controller, modems, and phone lines. The HP 3000 emulates a cluster controller in an SNA network

communications controller A type of front-end processor, such as an IBM 3705, 3720, or 3725, that communicates between the communications facilities and a host computer. IBM supports both programmable and non-programmable communication controllers. Hewlett-Packard's INP and PSI are kinds of communications controllers.

control unit (CU) A device that controls input and output for one or more devices such as printers or display stations.

D

data stream mode *See* transparent mode.

DBCS Double-Byte Character Set. A character set that includes one- and two-byte characters, used by many Asian countries.

E

end user A person at a terminal, a device, or a program running in a processor that interacts with the network to obtain a service provided by the network. An end user is the source and destination of application data flowing through the network.

extra data segment (XDS) An MPE V extra data segment, which SNA IMF/V uses to maintain data structures related to the internal screen image, half sessions, and message units in an LU-LU session.

F

FMD Function Management Data Services. A generic term that describes both session presentation and session network services.

function keys The HP terminal keys [f1] through [f8], or the IBM 3278 keys [PF1] through [PF24].

H

half session A component of an SNA network that provides FMD services and data flow and transmission control for one of the sessions of an NAU.

HDLC High-level Data Link Control. A bit-oriented data link protocol used in full-duplex communications. HDLC was developed by the International Standards Organization.

host A central computer that provides services for other computers and terminals attached to it.

I

IMF/3000 An HP Interactive Mainframe Facility product (like SNA IMF) that runs only on MPE V. IMF/3000 supports both BSC and SDLC protocols. It emulates a Node Type 1 in an SNA network.

IMS Information Management System (IMS). An IBM program product that provides data communication interfaces between application programs and terminals and between application programs and databases.

INP Intelligent Network Processor. A hardware portion of SNA Link/V that implements the Physical Control and Data Link Control layers of SNA.

internal screen image A data handling technique used by SNA IMF. When using non-transparent mode, the internal screen image holds a character-by-character image of an IBM 3278 screen. When using transparent mode, your application program can obtain the untranslated data stream from the internal screen image.

intrinsic A subprogram provided by Hewlett-Packard to perform common functions such as

opening files, opening communication lines, or sending and receiving data over a communication line.

L

link The physical or logical connection between two devices in a network.

Logical Unit (LU) A program or a set of programs within a node that provides access to an SNA network for an end user. A Logical Unit can support two types of sessions: LU-to-SSCP sessions and LU-LU sessions.

LU class Logical Unit class. A set of Logical Units on the HP 3000. For SNA IMF, an LU class may contain multiple LUs. For NRJE, each LU class may contain only one LU.

LU-LU A connection between two LUs.

LU.T1 Logical Unit Type 1. A program or set of programs within a node that provides communication between application programs and data processing programs using interactive or batch data transfer. Character oriented printer devices, batch support (RJE), and the SNA Character String (SCS) are supported.

LU.T2 Logical Unit Type 2. A program or set of programs within a node that provides application program to 3270-type

display station communication using interactive data transfer. IBM 3270 data stream capability and 3270-type display station support is provided.

LU.T3 Logical Unit Type 3. A program or set of programs within a node that provides application program to printer communication. IBM 3270 data stream capability is provided. Many devices support both LU.T1 and LU.T3 print requests.

M

MPE V Multiprogramming Executive V. An operating system for the Hewlett-Packard 3000 computer, Series 37 through 70. MPE V consists of programs that handle exchanges between HP terminals, printers, and executing programs and the internal HP 3000 Communications Services.

MPE XL Multiprogramming Executive XL. An operating system for the Hewlett-Packard 3000 computer, Series 930 and 950. MPE XL consists of programs that handle exchanges between HP terminals, printers, and executing programs.

MVS Multiple Virtual Storage. An IBM operating system that is an extension of OS/MVT. MVS also is called OS/VS2 Release 2.

MVT Multiprogramming with a Variable number of Tasks. An IBM operating system that

supports multiple programming with a variable number of tasks on the System/360.

N

Native Language Support (NLS) An HP product that allows the HP 3000 to produce localized application programs for end users without reprogramming for each language or country.

NAU Network Addressable Unit. Either a program or a group of programs that represents the source and destination of data in a network. The three kinds of network addressable units are SSCP, LU, and PU.

NCP *See* **ACF/NCP**

NLS *See* **Native Language Support.**

NM capability Node Management capability. An MPE user capability required for SNA IMF operator tasks. The node manager configures an SNA service on the HP 3000.

node A basic component of an SNA network, which consists of a set of hardware devices and associated software that are at the end of a data link. Specifically, nodes within an SNA network can be distributed or host processors, communications controllers, cluster controllers, or terminals.

Node Management Services (NMS) A set of utilities on the HP 3000 that handles link and node level startup and shutdown, logging, tracing, and diagnostic functions. On MPE V, NMS is part of the SNA Link/V product. On MPE XL, NMS is part of the Fundamental Operating System.

Node Type 1 A terminal or printer.

Node Type 2 A cluster controller, such as the IBM 3274.

Node Type 4 A communications controller such as the IBM 3705, 3720, and 3725.

Node Type 5 A host processor with a System Services Control Point (SSCP).

non-transparent mode A mode of SNA IMF operation in which the internal screen image holds a character-by-character image of an IBM 3278 screen. This image is accessible by the SNA IMF intrinsics.

NRJE Network Remote Job Entry. A Hewlett-Packard product that uses IBM's SNA/SDLC protocol to emulate an IBM 8100 Distributed Processing Program RJE workstation. This emulation allows users on the HP 3000 to submit batch jobs, through an SNA network, to an IBM host or compatible mainframe for processing. The host can then

send the output back to the HP 3000 for printing or storing on disk.

P

Pass Thru An SNA IMF application program that uses SNA IMF intrinsics to allow certain HP terminals attached to an HP 3000 to emulate, with some differences, IBM 3278 display stations and IBM 3287 printers connected to an IBM host.

physical unit (PU) A set of SNA components that provide services that manage and monitor the resources of a node. Each node, whether a control unit, terminal, controller, or processor, contains one physical unit.

programmatic access mode A form of programmatic communication using SNA IMF that allows programs on the HP 3000 to access host programs such as CICS, IMS, and TSO through a set of high-level intrinsics. To the host, the HP 3000 program using SNA IMF intrinsics looks like either an IBM 3278 display station or an IBM 3287 printer.

PSI Programmable Serial Interface. A hardware portion of SNA/SDLC Link/XL and SNA/X.25 Link/XL that implements the Physical Control and Data Link Control layers of SNA.

R

Request Unit (RU) A message unit that contains control information such as a request code or function management headers, end-user data, or both.

Response Unit (RU) A message unit that acknowledges a Request Unit. If positive, the Response Unit may contain additional information (such as session parameters in response to BIND SESSION), or if negative, contains sense data defining the exception condition.

rolling softkeys A feature of SNA IMF that allows you to define several levels of softkey functions, giving you up to 96 softkey functions for your 8 (or 16) terminal function keys.

S

SCS *See SNA Character String.*

SDLC Synchronous Data Link Control. A protocol for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be full-duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop.

security video An SNA IMF feature that emulates the non-display feature of an IBM

3278 display station. Security video allows you to type data into a non-display field without having the data appear on your screen.

session A logical connection between Network Addressable Units.

Shift-In (SI) The control code with the hexadecimal value of "0F" that is used in the data stream to signal the end of a sequence of Asian (DBCS) characters.

Shift-Out (SO) The control code with the hexadecimal value of "0E" that is used in the data stream to signal the beginning of a sequence of Asian (DBCS) characters.

SNA Systems Network Architecture. A comprehensive specification for distributed data processing developed by IBM in 1974. SNA defines rules, procedures, and a layered protocol for communication and control within a network.

SNA Character String (SCS) A character string composed of EBCDIC control characters, optionally intermixed with end-user data, that is carried within a Request Unit (RU).

SNA IMF SNA Interactive Mainframe Facility. An HP product that emulates a remote IBM 3274 Cluster Controller with attached IBM 3278 display

stations and IBM 3287 printers. SNA IMF provides interactive communication between an HP 3000 and an IBM host computer in an IBM SNA environment.

SNA Link/V Bundled software and hardware that provides a logical and physical connection between an HP 3000, with MPE V, and an SNA network. SNA Link/V consists of the following:

- Node Management Services (NMS) – software
- SNA Transport – software
- INP and cable – hardware

SNA/SDLC Link/XL Bundled software and hardware that provides a logical and physical connection between an HP 3000, with MPE XL, and an SNA network. SNA/SDLC Link/XL consists of the following:

- SNA Transport – software
- PSI and cable – hardware

SNA NRJE *See NRJE*

SNA Service A Hewlett-Packard software product that provides the user interface to an SNA network. An SNA Service implements the upper three SNA layers; Data Flow Control, Function Management Data Services, and NAU Services Manager. SNA IMF, SNA NRJE, and LU 6.2 API are examples of SNA services.

SNA Transport Software residing immediately below SNA IMF that provides the functions of the Path Control and Transmission Control layers and manages all the sessions with the host SSCP. SNA Transport is part of the SNA link product.

softkey The application-dependent function of a terminal function key. Softkeys for SNA IMF are configured in the PTCONFIG file.

split order A condition that occurs when SCS control codes or parameters span RU boundaries within an RU chain.

SSCP Systems Services Control Point. A part of the SNA host node that helps to manage configurations, does problem solving, controls network operations, and provides other session services for end users. An SSCP exists only in the host and is exercised by the host's communications access method.

T

Time Sharing Option (TSO)

An IBM communications monitor. TSO lets you develop programs and edit text by logging on to a remote terminal that is connected to an IBM system.

transparent mode A mode of SNA IMF operation that allows your application program to obtain the untranslated data

stream when transferring data between the host and the HP 3000.

U

User-Defined Command

(UDC) A command that you define in a file on MPE and set with the SETCATALOG command. Once you have set the UDC, you can type its name at the MPE colon prompt, and MPE will carry out the instructions in the file.

V

VM Virtual Machine. An operating system that allows an IBM mainframe to run simultaneously several different operating systems, including multiple copies of CMS. These different operating systems run under VM.

VTAM *See* ACF/VTAM

X

XDS *See* extra data segment.

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