

**HP 3000 Business Servers Networking**

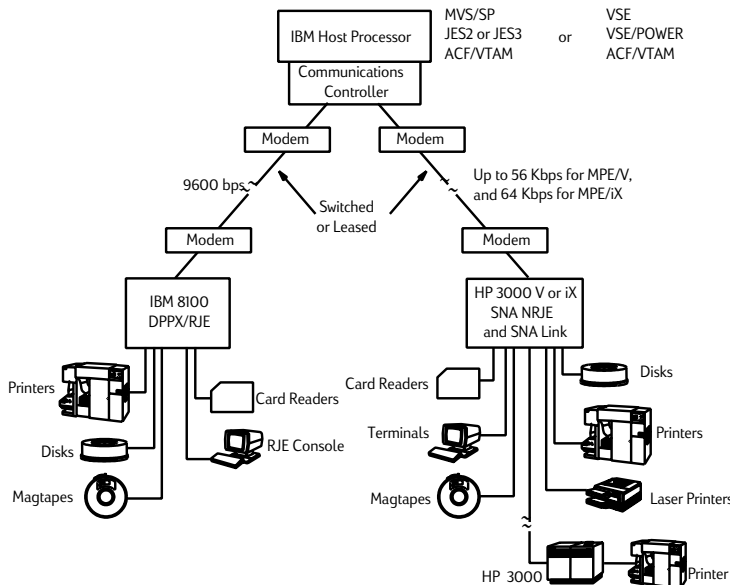
**HP SNA Services (30292B):**

- SNA NRJE Network Remote Job Entry
- SNA IMF/iX Interactive Mainframe Facility
- LU 6.2 Application Programming Interface
- SNA Distributed Host Command Facility/iX

**SNA NRJE Network Remote Job Entry**

This paragraph describes System Network Architecture Network Remote Job Entry (SNA NRJE) for both the MPE V (SNA NRJE/V) and MPE/iX (SNA NRJE/iX) operating systems. The term SNA NRJE is used to refer to both SNA NRJE/V and SNA NRJE/iX. The terms SNA NRJE/V and SNA NRJE/iX are used when a distinction is necessary.

SNA NRJE/V on the HP 3000 Series 37-70 or SNA NRJE/iX on the HP 3000 Series 900 provides enhanced batch data communications between the HP 3000 and an IBM Systems/370-compatible mainframe in a System Network Architecture (SNA) environment. SNA NRJE emulates the major features of an IBM 8100 DPPX/RJE workstation using an SNA Physical Unit Type 2 (PU 2), Logical Unit Type 1 (LU 1) device.



**Features**

- SNA NRJE is able to communicate with JES2, JES3, and VSE/POWER host job entry subsystems.
- Automatically route job output based on destinations selected by the user at the time of job submittal - "Job Management"
- Automatically route output based on user-selected IBM host forms - "Output Management"
- Process batch jobs originated by a user on an IBM Mainframe - "Reverse NRJE"
- Provide Native Languages Support - for data only. NLS 16-bit character mapping; interactive and programmatic access; and data integrity are not supported for languages such as Japanese, Korean, Simplified Chinese, and Traditional Chinese.
- Host output can be sent to any supported output device on an HP 3000 such as disk files, tape files, printers, or user-written programs.
- Multiple HP 3000 users can concurrently access the host for batch processing.
- Jobs are submitted into the transmission queue independent of the line status.
- Users can submit jobs and receive output without operator intervention.
- Other HP 3000 applications run concurrently with SNA NRJE.
- SNA NRJE can share an SNA link with other HP SNA service products.
- Customizable error and help message facilities are provided.
- Host console commands can be sent and host console data can be received.
- Data compression and character code translation are configurable.
- SNA NRJE and SNA Link support communications at up to 56 KB/s on MPE V and 16 MB/s on MPE/iX.
- SNA NRJE can take advantage of SNA/SDLC Link's Auto-dial capability.

SNA NRJE/iX requires the installation and use of SNA/SDLC Link/iX (30291A), SNA/Token Ring Link/iX (J2249A, requires MPE/iX Release 5.0 or later) or SNA/X.25 Link/iX (30298A), SNA NRJE/V requires SNA Link/V (30246A). SNA/SDLC Link/iX, SNA/Token Ring Link/iX, SNA X.25 Link/iX, and SNA Link/V (referred to jointly as SNA Link) manage the physical link to the host and implement protocols in the lower three layers of SNA. Each link product contains software, a hardware interface card, and a cable. SNA NRJE can run simultaneously with other HP SNA services (for example, SNA IMF) on both the MPE V or MPE/iX systems. In addition, all SNA services can run simultaneously over the same SNA Link.

### Functional Description

SNA NRJE must be used with an SNA Link product, which implements protocols in the lower three layers of SNA and provides physical connectivity to the IBM host via leased/dial-up lines or LAN. SNA Link supports line speeds up to 56 KB/s on MPE V and 16 MB/s on MPE/iX as well as simultaneous batch and interactive communications to an IBM host over a single line.

SNA NRJE supports up to eight workstations on an HP 3000. When these workstations are used to communicate with different hosts, each workstation must use a different SNA Link.

The SNA NRJE user interface has commands for submitting jobs, directing the output to specific devices, directing the output to specific predefined file equations, displaying job status, and canceling jobs (see table of Selected User Commands on next page for other commands). These commands can be issued interactively through a terminal, or issued as part of an HP 3000 program

executing NRJE intrinsics. MPE commands can be executed in the middle of SNA NRJE operations. The HP 3000 will concurrently process user applications and data communications with an IBM mainframe.

In addition to SNA NRJE user commands, an operator with Node Manager (NM) capability has commands to start and stop the batch workstations, obtain the host remote console, start and stop tracing and other functions. These commands may be issued either interactively or through a batch job.

Operation of the user or operator interface is independent of the status of the data communications line. Submitted jobs are held in a transmission queue and automatically sent to the host when the line becomes available.

Similarly, job output is held at the host and sent to the HP 3000 when the line connection is made.

The Job Management feature of SNA NRJE allows users, at time of submittal, to specify the particular device to which their job output is to be directed. If no device is specified, output is directed to a default destination, according to the configuration of SNA NRJE by the NodeManager. No further user intervention is required.

**Note:** *Job Management is not available to anyone communicating with a host using the VSE/POWER job entry subsystem.*

Output can be received on any standard output device on the HP 3000 such as tape units, disks, and printers. Similarly, jobs can be input device such as terminals, card readers, or disk.

The Output Management feature of SNA NRJE allows users to have job output routed based on the form selected by the user's host JCL and a Lookup Table which provides a mapping between host form names and HP 3000 file equations. Again default forms will be used if none are indicated.

Reverse NRJE allows a user connected to an IBM mainframe (or a user on a separate HP 3000 attached to the IBM) to start a job on an HP 3000 if SNA NRJE on the HP 3000 is active.

**Note:** *The user must use the special form CMD that causes SNA NRJE to stream a received data set rather than route the data set using file equation attributes.*

Using SNA NRJE and SNA Link, an HP 3000 with an HP 2680 Laser Printer can act as a remote or local (though still requiring a 37xx communications controller) print station for an IBM host. HP 3000 users can direct print output data sets to the laser printer. Users can specify an environment file that indicates predefined forms, character fonts and formats - data set by data set.

Native Language Support allows users to select alternative Native Language Ids for translation of user data. Only data going to the host or coming from the host will be translated, commands and messages will still be in native 3000. Each reader, printer, and punch can be configured with a different language. NLS 16-bit character mapping; interactive and programmatic access; and data integrity are not supported for languages such as Japanese, Korean, Simplified Chinese, and Traditional Chinese.

## Product Requirements

Both SNA NRJE/iX and SNA NRJE/V require an IBM System/370-compatible mainframe (Model 370, 30xx or 43xx) with an IBM 37xx communications controller. The following software must be running on the host and communications controller:

- Job Entry Subsystem: JES2 or JES3 running under
  - Operating System: MVS
- or**
- Job Entry Subsystem: VSE/POWER running under
  - Operating System: VSE
  - ACF/VTAM
  - ACF/NCP

## Selected User Commands

Command	Function
ALTER*	Revises the priority of a submitted job, or jobs.
CANCEL*	Cancels previously submitted jobs and causes data sets returning from transmitted jobs to be deleted.
DISPLAY	Provides information about a workstation.
EXIT	Causes the user to exit from the NRJE command interpreter (CI), and returns control to the process from which the CI was run.
##FD	"File Definition" used within a job to include the contents of the file specified in the command.
HELP	Provides you with information about subsystem commands.
NRJE	Invokes the subsystems command interpreter. It is also an NRJE subsystem command, so that you can switch to a different default workstation.
REDO	Modifies and executes the previous NRJE subsystem command.
RUN	Executes a prepared program.
SHOW*	Provides information about jobs you have submitted.
SUBMIT	Prepares a batch input job stream for transmission to a host system.

\* This command has NRJE Manager extensions.

HP will support certain versions, releases, modifications, and Product Temporary Fix (PTF) levels of the above software. The Network Implementations Support Plan (NISP) will help the customer engineer determine support requirements in advance of SNA NRJE in a particular network.

#### **SNA NRJE/iX Product Requirements**

- An HP 3000 Series 900 computer system running a supported release of MPE/iX.
- HP 30291A SNA/SDLC Link/iX, J2249A SNA/Token Ring Link/iX, or HP 30298A SNA/X.25 Link/iX

#### **SNA NRJE/V Product Requirements**

- An HP 3000 Series 37-70 and MPE V operating system
- HP 30246A SNA Link/V

### **Functional Specifications**

SNA NRJE provides the HP 3000 with the major functions of an IBM 8100 DPPX/RJE workstation operating as a remote node in an SNA network.

The maximum RU size supported by NRJE is 768 bytes.

SNA NRJE supports a record length up to 252 bytes (or characters) for JES2 and JES3 and 128 bytes (or characters) for VSE/POWER when sending data from the HP 3000 to an IBM host. Records up to 225 bytes in length may be received from the host.

NRJE supports up to eight workstations, each of which may support up to 16 LU-LU sessions, with a maximum of 64 total LU-LU sessions.

### **Installation and Configuration Policy**

SNA NRJE is customer installable. However, Hewlett-Packard will perform minimum configuration of SNA NRJE in order to verify minimum product functionality. These tasks performed by HP are included in the product purchase price.

For product configuration tailored to the customer's specific needs, or for a complete HP implementation, HP offers a comprehensive range of integrated and flexible support services. Please refer to the Network Support data sheets in this guide for more information on these services.

#### **Customer Responsibility**

Prior to having HP personnel onsite to perform minimum configuration of SNA NRJE, the customer is responsible for the following:

- Providing HP with the information necessary to complete the Network Implementation and Support Plan (NISP) including:
  - System configurations
  - Logical network map identifying relevant traffic flow
  - Physical network map identifying relevant network hardware components.
- Verifying that the necessary host mainframe software is installed and configured to support SNA NRJE. The customer should contact their HP Sales Representative for typical host parameter values or consult the "HP SNA Products Remote System Configuration Guide (J2220-61025).
- Verifying that SNA Link/V, SNA/SDLC Link/iX, SNA/Token Ring Link/iX, or SNA/X.25 Link/iX is properly installed and configured prior to the installation of SNA NRJE unless an SNA Link will be installed at the same time.

- Updating the HP 3000 system to the proper release level and installing the SNA NRJE software using AUTOINST. Refer to the HP 3000 MPE/iX Installation and Update Manual (36123-90001) for MPE/iX systems or the HP 3000 Software Update Manual (32033-90036) for MPE V systems.
- Verifying that all of the necessary software modules have been successfully installed by AUTOINST and are at the correct version levels using the NMMMAINT.PUB.SYS utility.
- Performing full system backups as necessary and ensuring that the HP 3000 system and personnel with HP 3000 system management knowledge are available when HP is onsite to complete the INP card installation and minimum configuration of SNA NRJE.

The customer is also responsible for completing the configuration in order to fully integrate SNA NRJE into the existing customer network after HP has completed the minimum configuration of the SNA NRJE.

#### **HP Responsibility**

Following the installation of SNA NRJE, HP is responsible for the following:

- Confirming that all of the necessary software modules have been installed and are at the correct version level.
- Configuring the SNA NRJE product to a minimum configuration (1 LU) in order to verify software and hardware functionality.
- Verifying the SNA NRJE configuration by issuing the NRJECONTROL START command and ensuring that the LU-to-LU session becomes active.

These steps complete HP's portion of the installation and minimum configuration of SNA NRJE.

HP effort spent on problems that are not caused by HP installation and configuration activities is considered HP Consulting Support and is billable to the customer at normal HP time-and-materials rates.

#### **System Environment**

SNA NRJE/iX, SNA SDLC Link/iX, and SNA/X.25 Link/iX are available on the HP 3000 Series 900 with currently supported releases of the MPE XL or MPE/iX operating system. SNA/Token Ring Link/iX requires MPE/iX release 5.0 or later. SNA NRJE/V and SNA Link/V are available on the HP 3000 Series 37-70 computers with the MPE V operating system.

#### **Documentation**

The following documentation is for both SNA NRJE/V and SNA NRJE/iX:

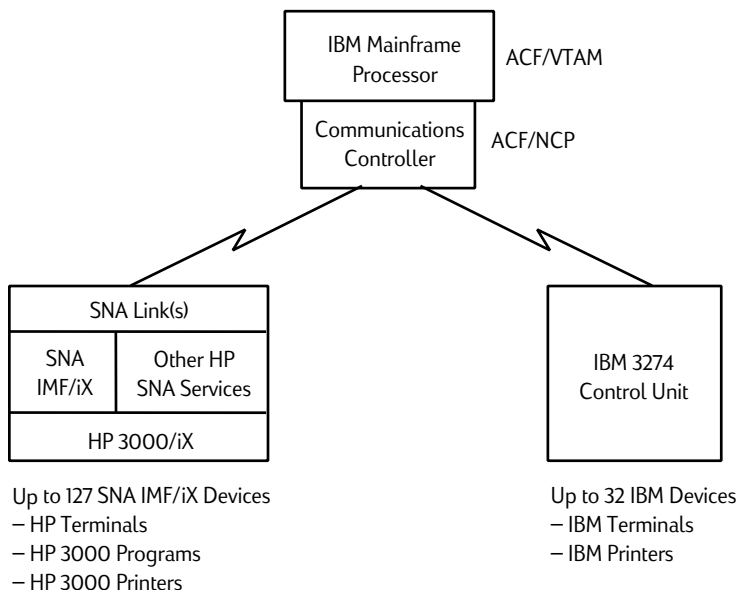
- 30292-61001 SNA NRJE User Programmer Reference Manual
- 30292-61000 SNA NRJE Node Manager's Guide
- J2220-61025 HP SNA Products Remote System Configuration Guide
- 5958-8544 HP SNA Products: Job Entry Subsystem (JES) Guide

## SNA IMF/iX Interactive Mainframe Facility

The SNA Interactive Mainframe Facility/iX (SNA IMF/iX) product provides IBM 3270 device emulation for Hewlett-Packard terminals, printers, and HP 3000 Series 900 systems. (SNA IMF/V, P/N 30247A, provides similar functionality for MPE V systems.)

SNA IMF/iX on an HP 3000 Series 900 allows interactive communications between the HP 3000 and an IBM System/ 370-compatible mainframe using SNA 3270 protocols. SNA IMF/iX emulates the base function set of an IBM 3270 control unit using SNA Physical Unit Type 2 (PU2 or 2.1), Logical Unit Types 1,2,3 (LU1, 2,3) protocols. HP terminals, printers, and applications on the HP 3000 running SNA IMF/iX emulate IBM terminal and printer functions.

SNA IMF/iX allows access to 3270 subsystems on the mainframe (such as TSO, CICS, and IMS) through a set of high-level intrinsics. There are two modes of operation. In programmatic mode, customer-written application programs on the HP 3000 emulate IBM 3270 terminals and printers, exchanging data with the host



### Features

- SNA IMF/iX and an SNA Link product allow the HP 3000 to emulate the base function set of an IBM 3270 control unit using SNA (PU2 or 2.1, LU1, 2, 3) protocols.
- Other HP SNA service products can all be supported simultaneously over one SNA/SDLC Link/iX or SNA/X.25 Link/iX. The maximum datacomm line speed is 64 KB/s.
- SNA IMF/iX supports up to 127 devices (terminals, printers, and application programs) concurrently. With MPE/iX Release 4.0 or later, SNA IMF/iX supports up to 127 devices per SNA Link.
- The Pass Thru capability of SNA IMF/iX allows HP 3000-attached printers and terminals to emulate the base function set of IBM 3270 printers and terminals.
- SNA IMF/iX Pass Thru takes advantage of the Modified Data Tag feature of selected HP terminals (such as the HP 700/94) and supports a write optimization feature that limits screen updating to modified rows only. These features significantly reduce response time.
- SNA IMF/iX provides a “rolling softkeys” feature that allows the user to define and label multiple levels of terminal function keys to be their most frequently used IBM 3270 program function keys. Users can also define various “menus” of function keys that are clearly displayed in the terminal screen. The SNA IMF Programmer’s Reference Manual documents the terminals supporting this feature, some of which provide up to 16 softkeys on the screen at a time.
- Terminals/printers being used in the PassThru mode do not have to be dedicated. The user may access either the HP 3000 or the remote host from the same terminal.



applications via intrinsics. The customer's application program decides which intrinsics to call. In Pass Thru mode, an HP-written application program on the HP 3000 also emulates IBM 3270 terminals and printers, exchanging data with host applications via intrinsics. In Pass Thru mode, the selection of which intrinsics to call is fixed.

SNA IMF/iX requires the installation and use of SNA/SDLC Link/iX (30291B), SNA/Token Ring Link/iX (J2167B)\* or SNA/X.25 Link/iX (36939B). The SNA Link products manage the physical link to the host and implement protocols in the lower three layers of SNA.

*\* SNA/Token Ring Link/iX (J2167B) requires MPE/iX release 5.5 Express 7 or later; or MPE/iX release 6.0 Express 1 or later.*

Asian options also supported include:

- HP Asian Vectra PCs
- HP Asian Terminals
- HP Asian Printers
- Asian IBM environments

## Functional Description

SNA IMF/iX is a software product that allows an HP 3000 and attached devices to emulate the base function set of an IBM 3274 control unit and attached devices, which does not include graphics, programmed symbols, color, or extended highlighting.

SNA IMF/iX requires SNA/SDLC Link/iX, SNA/Token Ring Link/iX or SNA/X.25 Link/iX. These links manage the communications link and implement lower-level SNA (PU2 or 2.1) protocols. SNA IMF/iX provides interactive and programmatic 3270 communications with a mainframe and can run simultaneously along with other SNA services such as SNA NRJE/iX and LU6.2 API/iX on MPE/iX systems.

In the programmatic mode, user-written programs on the HP 3000 can communicate with programs on the host. HP 3000 programs may be written in C, FORTRAN, COBOL, COBOL II, BASIC, Pascal, or SPL.

## Features (continued)

- SNA IMF/iX allows programs on an HP 3000 to communicate with programs on the host system, through a set of high-level intrinsics. Programs may be written in C, FORTRAN, COBOL, COBOL II, BASIC, Pascal, or SPL.
- Most host application programs designed to work with IBM 3270 terminals can usually be used with minimal change.
- SNA IMF/iX runs concurrently with other HP 3000 applications and can be accessed from other systems via HP's Network Services.
- SNA IMF/iX supports HP's Native Languages Support (NLS 8-bit character mapping), which allows application programmers to create local language applications for end users. NLS 16-bit character mapping; interactive and programmatic access; and data integrity are not supported for languages such as Japanese, Korean, Simplified Chinese, and Traditional Chinese.
- SNA IMF/iX supports IBM applications with 480, 1920, or 3440 character screen sizes.
- For Asian options only:
  - SNA IMF/iX (ASIAN) supports IBM's DBCS protocol to ensure 16-bit data integrity communication between the HP 3000 and the Asian host.
  - SNA IMF/iX (ASIAN) allows both 16-bit interactive as well as programmable access to the Asian IBM host.
  - SNA IMF/iX (ASIAN) provides 16-bit character mapping between the HP (HP-15) and the IBM (DBCS) data.
  - SNA IMF/iX (ASIAN) supports languages such as Japanese, Korean, and Traditional Chinese.

Program access is accomplished through use of a set of intrinsics that are powerful procedures, which perform the low-level task of decoding the data streams.

(Table 1 provides a list of available intrinsics.) The intrinsics can be used with the intrinsics of other HP 3000 facilities such as IMAGE/3000, VPLUS/3000, KSAM/3000, or NS/3000. The high-level, easy-to-use nature of these intrinsics results in improved programmer productivity.

Because programmatic mode works by exchanging information through screen images, most host applications that have been

written for use with IBM 3270 controllers will work with SNA IMF/iX with little or no modification. For customers who are in the process of changing from centralized to distributed processing, this feature helps provide a smooth transition.

The Pass Thru mode of SNA IMF/iX provides users the capability of using HP 3000 attached printers and DTC attached terminals for interactive access to a host computer.

In this mode, SNA IMF/iX users can directly access host software such as CICS or IMS, or they can use TSO for program development.

**Table 1. SNA IMF/iX Intrinsics Summary**

Intrinsic	Function
ABORT3270	Aborts an outstanding no-wait REC3270 or TRAN3270 request.
ACQUIRE3270	Provides the SNA IMF/iX users the capability to start PASS Thru on an HP 3000 terminal or printer programmatically.
ATTRLIST	Returns the locations of attribute characters with all or a subsection of a screen.
CLOSE3270	Equivalent to turning off the specified device.
ERR3270	Returns the error message associated with a given intrinsic error number.
EXTFIELDATTR	Returns information about the attribute information of the Double Byte
FIELDATTAR	Returns information about the attributes of the specified field.
IOWAIT3270	Informs the user program that a previous I/O operation has completed.
IDONTWAIT3270	Waits for a previous no-wait I/O request to complete.
OPEN3270	Equivalent to turning on the power of a 3270 Display Station or Printer. It allocates the internal screen buffer used by SNA IMF/iX.
PRINT3270	Prints a copy of the internal screen image to a spool file.
READFIELD	Reads a field of data from the internal screen buffer and returns the data to an HP application program.
READSCREEN	Reads all or part of the internal screen buffer and returns this data to the HP application program.
RECV3270	Allows the user program to receive the screen after modification by the host.
RESET3270	Equivalent to pressing the RESET key on an IBM 3270 Display Station keyboard.
SCREENATTR	Returns information about the attributes of the screen image currently in the internal buffer.
STREAM3270	Equivalent to typing a Series of keystrokes in a 3270 Display Station keyboard. Provides a mechanism for performing "special function key" operations from the HP application program. Also allows more than one field of data to be updated in one Intrinsic call.
TRAN3270	Equivalent to pressing a transmit key in the 3277 or 3278 Display Station keyboard. It causes modified data to be transmitted to the host the next time the host polls the device.
VERS3270	Returns the number if the version of SNA IMF/iX that is being executed in the HP 3000.
WRITEFIELD	Writes data from the HP application program into an unprotected field if the internal screen buffer.
READSTREAM	Reads all or part of the untranslated host data stream.
WRITESTREAM	Creates the data stream that an HP application program sends to the IBM host.



Using the Pass Thru mode does not require the use of dedicated terminals.

The Pass Thru mode of SNA IMF/iX is not intended as a replacement for real IBM 3270 devices.

For HP terminals being used in the Pass Thru mode, the response time will be longer than that of IBM terminals:

- The data transmission rate between the HP 3000 and the terminals is slower than that between the IBM 3270 controller and its attached terminals.
- For terminals not supported by the write optimization feature, the screens on the HP 3000 and Pass Thru terminals are rewritten any time a change is made. For small changes, this contributes to an increase in response time
- SNA IMF/iX uses the Modified Data Tag feature of the HP 700/94, HP 2394A, and HP 150 terminals in order to accurately and flexibly handle null and blank characters. In addition, this may result in improved response time when compared to other HP terminals.
- For applications where response time is critical, please consult your HP Sales Representative for more information.
- Although the principle functions of IBM 3270 terminal keyboards are implemented - including Program Function (PF) keys and Program Attention (PA) keys - there are some differences:
- Some keys are in different positions, some keys have different labels, and some keys are not implemented. Table 2 lists the major differences between IBM 3270 terminals and HP 2392 terminals.

There are minor logical differences in the way HP terminals behave. Differences include:

- With Pass Thru mode, only unprotected fields in which one or more characters have actually been changed are transmitted to the host. If a Pass Thru user "modifies" an

**Table 2.**

<b>3270 Typewriter Keyboard</b>	<b>HP 700/96 Keyboard</b>
Program Function Keys	User specifies by typing desired program function number or through user-defined configuration of HP function keys.
FIELD MARK, TEST REQ, CURSOR BLINK, ALT CURSOR, IDENT, DEV CNCL, DUP, CLOCK, PRINT and CURSOR SELECT Keys	No equivalent on HP terminals
PA1, PA2, PA3, CLEAR, SYSTEM REQUEST	Keys are in different locations (Softkeys are used)
SYSTEM AVAILABLE, INSERT MODE, INPUT INHIBITED Indicators	Indicators not provided
ERASE INPUT, ERASE EOF, TAB, BACKTAB, NEWLINE, RESET INSERT Keys	Equivalent functions provided
3270 Characters	Corresponding to HP Terminal Characters
cent sign ¢	[
!	]
solid vertical bar	!
"NOT" sign	^

unprotected field by replacing the field with exactly the same characters as it had previously; the field would NOT be transmitted to the host with SNA IMF/iX, since no characters had changed. A real 3270-type terminal will transmit such modified fields whether or not any characters are actually changed.

- Leading blanks can be converted to nulls based on a configuration option at Pass Thru startup.
- Trailing blanks can be converted to nulls based on a configuration option at Pass Thru startup.
- Trailing nulls can be converted to blanks based on a configuration optional Pass Thru startup.
- Magnetic card reader, auxiliary card reader, and light pen are not provided in HP terminals using Pass Thru mode.

- SNA IMF/iX does not support the numeric lock feature.
- Pass Thru mode does not support slave printers (printers attached to terminals).

### Functional Specifications

- SNA IMF/iX emulates the base function set of the IBM 3274 terminal controller; the base set does not include color, graphics, programmed symbols, or extended highlights.
  - SNA IMF/iX supports communications to an IBM System/370 (or compatible) mainframe running either the MVS/SP, MVS/XA, DOS/VSE, or VM operating systems with ACF/VTAM through an IBM 37xx communications processor running ACF/NCP.
  - SNA IMF/iX supports communications with an IBM S/36 running SSP or an IBM/38 running CPF or an IBM AS/400 running OS/400.
  - The SNA Link/iX product supports Physical Unit Type 2 or 2.1 protocols; SNA IMF/iX provides Logical Unit Type 1, 2, and 3 emulation over the link. The SNA Link/iX or SNA/Token Ring Link/iX can support interactive (SNA IMF/iX and SNA DHCF/iX), batch (SNA NRJE/iX), and programmatic (LU6.2 API/iX) communications simultaneously over a single link to an IBM host.
  - In Pass Thru mode, SNA IMF/iX emulates the IBM 3278-2, 3278-3 and 3278-4 display stations and IBM 3287 printers.
  - SNA IMF/iX supports up to 127 devices (terminals, printers, or application programs) concurrently per SNA link with MPE/iX Release 4.0 or later.
  - The HP 700/94 terminal is recommended for use with SNA IMF/iX in Pass Thru mode as it offers the greatest performance and functionality. SNA IMF/iX also supports null suppression mode on HP 700/94 terminals which result in further performance improvements.
  - The following terminals support Modified Data Tags and, consequently, provide a 10-50% performance improvement in Pass Thru mode and greater functionality over other terminals.
    - HP 700/96
    - HP Vectra
    - PC with Reflection 7 PLUS Version 3.3 (or later)
  - In Pass Thru mode, non-MDT terminals are not supported with all host applications that are sensitive to nulls and blanks. In these circumstances, an MDT terminal will function properly and is strongly recommended to be the terminal of choice.
  - The following terminals are supported with HP 3000 MPE/iX systems in Pass Thru mode via the DTC attachment.
    - HP 700/92
    - HP Vectra PC with Advance Link 2392
    - HP Vectra PC Reflection 7 PLUS, Version 3.3 (or later)
  - SNA IMF/iX supports the write optimized feature for improved performance in Pass Thru mode with the following terminals:
    - HP 700/92
  - With the HP X.25/iX Network Link (36939B) and NS 3000/iX Network Services (36920B), SNA IMF/iX supports these terminals when they are directly attached to an HP 2334A Plus or HP 2335 PAD.
- This feature is supported on SNA IMF/iX or SNA IMF/V (30247A) only and is NOT supported on the IMF/V (30250A) product. Other Pass Thru-supported terminals configured to be one of the terminals listed above are NOT supported.
- The HP 700/94, HP 2394A, HP 150, HP 700/92, and HP 2392A terminals support a 19.2 KB/s connection to the HP 3000.
  - The following terminals support multiple levels of “rolling softkeys” allowing up to 96 user-definable function keys.
    - HP 700/94
    - HP 2394A
  - SNA IMF/iX supports any HP system printer.

- Link Level Message encoding:
  - SNA IMF/iX supports both NRZ and NRZI encoding.
- Access to the SNA IMF/iX intrinsics in programmatic mode is provided in capability-mode as well as native-mode with the use of HP-provided switch stubs.
- In Pass Thru mode, terminals configured as consoles are not supported.

### Product Requirements

- SNA IMF/iX requires an IBM System/370 or compatible mainframe (models 370, 30xx, or 43xx) with an IBM 37xx communications controller. The following software must be running on the IBM host and communications controller:
  - MVS/SP, MVS/XA, DOS/VSE, or VM
  - ACF/VTAM
  - ACF/NCP
- For communications to an IBM S/36, IBM S/38, or IBM AS/400 minicomputer, the following software must be running on the IBM systems:
  - SSP (S/36) Release 5
  - CPF (S/38) Release 7.0
  - OS/400 (AS/400) Release 2 and the HP 3000 must be running MPE/iX Release 4.0 or later.
- HP will support certain versions, releases, modifications, and PTF levels of the above software. Your HP Sales Representative or Systems Engineer can determine whether SNA IMF/iX can be supported with your particular configuration. The Network Implementation Support plan (NISP) will help the customer engineer determine support requirements in advance of the installation of SNA IMF/iX in a particular network.
- SNA IMF/iX Product Requirements
  - HP 3000 Series 900 computer system
  - HP 30291B SNA/SDLC Link/iX

**or**

  - J2167B SNA/Token Ring Link/iX
  - HP 36939B SNA/X.25 Link/iX

### Installation and Configuration Policy

The customer is responsible for loading the SNA IMF/iX software onto the system.

Hewlett-Packard will perform minimum configuration of SNA IMF/iX in order to verify minimum product functionality. This activity is included in the product purchase price.

### Customer Responsibility

Prior to having HP personnel onsite to perform minimum configuration of SNA IMF/iX, the customer is responsible for the following:

- Providing HP with the information necessary to complete the Network Implementation and Support Plan (NISP), including:
  - system configurations
  - logical network map identifying relevant traffic flow
  - physical network map identifying relevant network hardware components
- Verifying that the necessary host mainframe software is installed and configured to support SNA IMF/iX. The customer should contact the HP Sales Representative for typical host parameter values or consult the “HP SNA Products Remote System Configuration Guide” (J2220-61025) for details.
- Verifying that the SNA/SDLC Link/iX, SNA/Token Ring Link/iX, or SNA/X.25 Link/iX is properly installed and configured prior to the installation of SNA IMF/iX unless the link product will be installed at the same time.
- Updating the HP 3000 system to the proper release level and installing the SNA IMF/iX software using AUTOINST. Refer to the HP 3000 MPE/iX Installation and Update Manual (36123-90001).

- Verifying that all of the necessary software modules have been successfully installed by AUTOINST and are at the NMMMAINT.PUB.SYS utility.
- Performing full system backups as necessary and ensuring that the HP 3000 system and personnel with the HP 3000 system management knowledge are available when HP is onsite to complete the minimum configuration of SNA IMF/iX.

The customer is also responsible for completing the configuration in order to fully integrate SNA IMF/iX into the existing customer network after HP has complete the minimum configuration of SNA IMF/iX.

#### HP Responsibility

Following the installation of SNA IMF/iX, HP is responsible for the following:

- Confirming that all of the necessary software modules have been installed and are at the correct version level.
- Configuring the SNA IMF/iX product to a minimum configuration in order to verify software and hardware functionality.
- Verifying the SNA IMF/iX configuration by issuing the RUN TTSSON.PUB.SYS command with the appropriate parameters and entering the IBMTEST command. This test verifies the LU to SSCP session.

These steps complete HP's portion of the installation and minimum configuration of SNA IMF/iX.

#### Additional Implementation Assistance

For implementation needs that go beyond installation, the customer can either provide self-support or can purchase additional services from HP. These services included Network Startup and HP ConsultLine. In addition, the customer can also purchase service from HP on a time-and-materials basis.

Network Startup includes implementation scheduling and coordination assistance, network configuration and verification testing, and network documentation.

#### System Environment

SNA IMF/iX is available on all HP 3000 Series 900 systems with currently supported releases of the MPE/iX operating system.

SNA IMF/iX requires installation and operation of HP 30291B and A5563A SNA/SDLC Link/iX, J2167B SNA/Token Ring Link/iX, or HP 36939B SNA/X.25 Link/iX.

#### Support Products

HP offers a spectrum of support service products to help plan, implement, operate, and manage your multivendor network throughout the network lifecycle.

For more information, contact your HP Sales Representative, or refer to the HP data sheets for specific support services.

#### Documentation

The following documentation is for SNA IMF/iX:

- 30293-61000 SNA IMF/iX Node Manager's Guide
- 30293-61005 SNA IMF Programmer's Reference Manual
- 30293-61008 Using SNA IMF Pass Thru
- J2220-61025 HP SNA Products remote System Configuration Guide
- 30293-60211 SNA IMF/iX: User Support Guide (For use in Taiwan)
- 30293-60221 SNA IMF/iX: User Support Guide (For use in Japan)
- 30293-60231 SNA IMF/iX: User Support Guide (For use in Korea)

## LU 6.2 Application Programming Interface

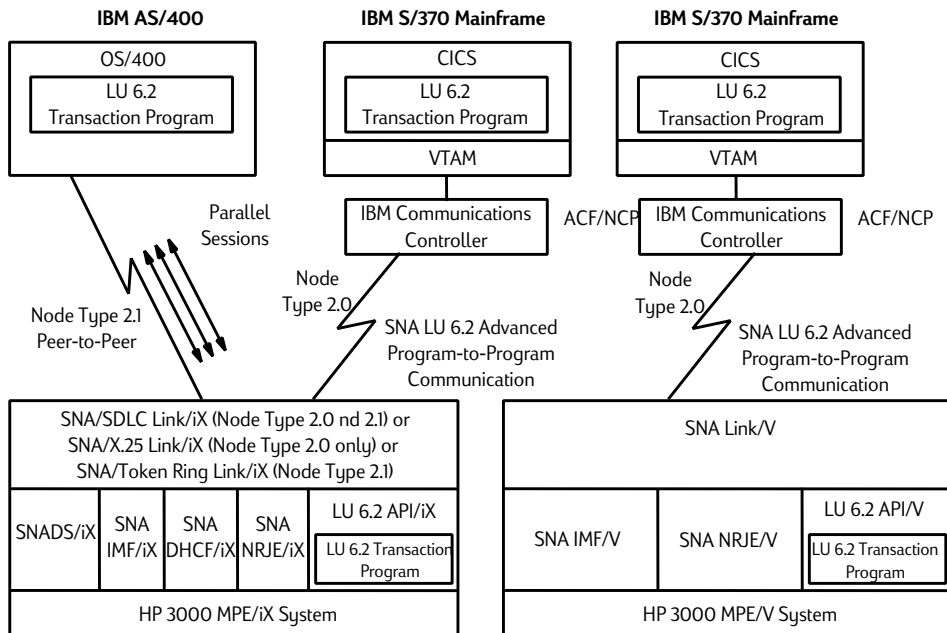
This data sheet describes HP LU 6.2 API (Application Programming Interface) for both MPE V and MPE/iX operating systems. The term HP LU 6.2 API is used to refer to both HP LU 6.2 API/V and HP LU 6.2 API/iX products. The terms HP LU 6.2 API/V and HP LU 6.2 API/iX are used when a distinction is necessary.

HP LU 6.2 API/V on an HP 3000 Series 37 through 70 or HP LU 6.2 API/iX on an HP 3000 Series 9xx provides HP 3000 users with a way to program HP 3000 application programs for program-to-program communication in an SNA environment.

HP LU 6.2 API implements the LU 6.2 “mapped conversation verbs” for what IBM has named “advanced program-to-program communications” (APPC). Users may write “transaction programs” that use these verbs (or high-level intrinsics as HP has implemented them) in order to communicate with each other, even though these programs may be executing on different systems within the SNA network.

### Features

- HP LU 6.2 API provides:
- High-level Intrinsics
- Support for Major Languages
- Support for IBM Applications
- Multiple Sessions
- Peer-to-peer Connectivity
- Parallel Sessions
- Support for Remote Attach
- Compatibility with Other SNA Services
- Trace Facility
- Logging Facility
- User Controlled Sessions Management from Program or CI (CNOS)
- Enhanced Communication Rates
- Efficient and easy-to-program problem detection and recovery procedures.
- As with all HP SNA services, customized error and help facilities are provided.
- X.25 Connectivity



## HP LU 6.2 API provides

- **High-level Intrinsic:** HP 3000 programmers can use a set of high-level intrinsic to implement program-to-program communication in an SNA network.
- **Support for Major Languages:** Application programs on the HP 3000 can be written in COBOL II, Transact, or Pascal. For LU 6.2 API/iX, C language applications are also supported.
- **Support for IBM Applications:** HP LU 6.2 API supports Mapped Conversations with CICS in an MVS or DOS/VSE environment and Mapped Conversations with VTAM in an MVS environment. With MPE/iX Release 4.0 or later, HP LU 6.2 API/iX supports Mapped Conversations in an OS/400 environment.
- **Multiple Sessions:** An HP 3000 application program using LU 6.2 API/V intrinsic may have up to 8 LU-LU sessions running simultaneously. With MPE/iX Release 4.0 or later, an HP 3000 application program using LU 6.2 API/iX intrinsic may have up to 256 LU-LU sessions running simultaneously. Each session is responsible for a separate communication task or for adding additional bandwidth to a single communication task.
- **Peer-to-peer Connectivity:** With MPE/iX Release 4.0 or later, LU 6.2 API/iX provides peer-to-peer connectivity to an IBM AS/4000 over Node Type 2.1. an HP 3000 may establish LU-LU sessions with an IBM AS/400 over Node Type 2.1 without having to go through a mainframe node.
- **Parallel Sessions:** With MPE/iX Release 4.0 or later, LU 6.2 API/iX provides support for parallel sessions over Node Type 2.1. An HP 3000 may establish multiple, simultaneous LU-LU sessions over a single LU-LU pair over Node Type 2.1.
- **Support for Remote Attach:** Remote Attach is the ability of a remote LU 6.2 application to start running and begin communication with it.
- **Compatibility with Other SNA Services:** The HP LU 6.2 API is completely compatible with other SNA services offered

for the HP 3000. These HP SNA products may all be running simultaneously over the same SNA Link/V, SNA/SDLC Link/iX, SNA/Token Ring Link/iX\* or SNA/X.25 Link/iX to the SNA network. The SNA Link products manage the physical link to the IBM host and implement protocols in the lower three layers of SNA.

**Note:** *HP LU 6.2 API/iX supports Native-mode HP 3000 applications only.*

- **Trace Facility:** An easy-to-use trace facility that allows HP 3000 application programmers to track all LU 6.2 intrinsic calls and executions within applications being developed, serving as a valuable debugging aid during program development.
- **Logging Facility:** A comprehensive logging facility that records all online LU 6.2 API session messages to aid in problem identification and resolution.
- **User Controlled Sessions Management from Program or CI (CNOS):** With MPE/iX Release 5.5 Express 7 or later, or MPE/iX Release 6.0 Express 1 or later, Programmatic or interactive user-controlled session management allows users to change session limits (over Node Type 2.1).
- **Enhanced Communication Rates:** The maximum datacomm line speed between the HP 3000 and the IBM mainframe host is 56 KB/s on MPE V and 16 MB/s on MPE/iX.
- Efficient and easy-to-program problem detection and recovery procedures.
- As with all HP SNA services, customized error and help facilities are provided.
- **X.25 Connectivity:** HP LU 6.2 API/iX can communicate to an IBM mainframe over an X.25 connection. The SNA/X.25 Link/iX product (HP 30298A) can be used in place of SNA/SDLC Link/iX, or SNA/Token Ring Link/iX\* but SNA/X.25 Link/iX emulates a Type 2.0 node, not a Type 2.1 node. Therefore if you run LU 6.2 API/iX over SNA/X.25 Link/iX, you cannot communicate, peer-to-peer with a Type 2.1 node like an IBM AS/400.

\* *SNA/Token Ring Link/iX requires MPE/iX release 5.0 or later.*



## Functional Description

HP LU 6.2 API provides a set of high-level intrinsics for application programmers to use for program-to-program communication between an HP 3000 application program and an application program running on an IBM host mainframe. HP LU 6.2 API/iX also provides communication to an IBM AS/400. These intrinsics are responsible for initiating LU 6.2 conversations so that data can be sent or received over these conversations on behalf of program pairs needing to communicate to complete a "transaction." Examples of transaction are database updates and file transfers. LU 6.2 API consists of a set of user-callable intrinsics that implement the set of LU 6.2 defined mapped verbs along with the following option sets:

Option Sets	IBM-Defined Verbs
PIP data (both local and remote support)	
Flush the LU's send buffer	MC_FLUSH
Prepare to receive (including long locks)	MC_PREPARE_TO_RECEIVE
Post on receipt	MC_POST_ON_RECEIPT
Wait for posting to occur	WAIT
Test for posting or request-to-send received	MC-TEST
Receive immediate	MC_RECEIVE_IMMEDIATE
Get conversation attributes	MC_GET_ATTRIBUTES

LU 6.2 API intrinsics are summarized in the following table.

### LU 6.2 API Intrinsics Summary

Intrinsics	Function
MCALLOCATE	Establishes a mapped conversation between two TPs.
MCCONFIRM	Sends a confirmation request to the remote TP and waits for reply.
MCDEALLOCATE	Ends a mapped conversation between TPs.
MCGETALLOCATE	Receives the request from a remote TP to start a conversation and then establishes the conversation.
MCGETATTR	Returns information pertaining to a mapped conversation.
MCFLUSH	Flushes the LU's send buffer.
MCPOSTONRCPT	Causes LU 6.2 API to post the conversation when information arrives.
MCPREPTORCV	Informs the remote TP that the HP 3000 resident TP (the local TP) is ready to receive data over the mapped conversation.
MCRCVANDWAIT	Waits for information to arrive on the mapped conversation and then receives the information. The information can be data, conversation status, or request establishes the conversation.
MCRCVNOWAIT	Receives any information available on the mapped conversation with out waiting.
MCREQTOSEND	Notifies the remote TP that the local TP is requesting to send data for the mapped conversation.
MCSENDERERROR	Informs the remote TP that the local TP has detected an error.
MCTEST	Tests the conversation for the receipt of information.
MCWAIT	Waits for the receipt of information on one or more conversations.

## Product Requirements

Requirements for IBM mainframe hardware and software are the same for both HP LU 6.2 API/V and HP LU 6.2 API/iX.

### IBM Mainframe Hardware Requirements:

- An IBM System/370 mainframe. This may be any IBM plug-compatible mainframe that supports 370 architecture.
- A port on an IBM 37xx or compatible communications controller that supports an SNA line. The HP 3000 can also be connected to the Communications Controller via an IBM 3710 Network Controller. (Please check with your HP Sales Representative for specific Communication Controller model support.)

### IBM Mainframe Software Requirements:

- Advanced Communication Function for the Virtual Telecommunications Access Method (ACF/VTAM) applications are supported with:
  - Mapped LU 6.2 conversations only
  - ACF/VTAM version 3.2 or later
  - MVS operating system
  - Advanced Communication Function for the Network Control Program (ACF/NCP) remote transmission control program version 3.1 or later.
- Customer Information Control System (CICS) applications are supported with:
  - Mapped LU 6.2 conversions only
  - CICS version 1.7 or later
  - ACF/VTAM version 2.1 or later
- MVS or DOS/VSE operating system

### IBM AS/400 Hardware Requirements:

- An IBM AS/400.
- A port on the AS/400 that supports an SNA line.

### IBM AS/400 Software Requirements:

- OS/400 Version 1.2 or later.

### HP 3000 product requirements:

- For HP LU 6.2 API/iX:

### If connecting to an IBM mainframe:

An HP 3000 Series 900 running a supported release of MPE/iX. The SNA/SDLC Link/iX product (30291A), SNA/Token Ring Link/iX product (J2167B) or the SNA/X.25 Link/iX product (36939B).

### If connecting to an IBM AS/400:

An HP 3000 Series 900 running MPE/iX Release 5.5 or later operating system. The SNA/SDLC Link/iX (30291B and A5563A) or SNA/Token Ring Link/iX product (J2167B).

- A full-or half-duplex data communications line (switched or leased) between the HP 3000 and the IBM mainframe or IBM AS/400. A pair of synchronous modems.

#### **or**

An X.25 connection to the IBM mainframe (X.25 not supported to IBM AS/400).

- A block mode terminal that is supported by VPLUS/3000 for configuration.
- A COBOL II, PASCAL, C (HP LU 6.2 API/iX only), or Transact compiler.

## Installation and Configuration Policy

The Customer is responsible for loading the HP LU 6.2 API software onto the system.

Hewlett-Packard will perform minimum configuration of HP LU 6.2 API in order to verify minimum product functionality. This activity is included in the product purchase price.

### Customer Responsibility

The customer is responsible for performing the following tasks in order to successfully install and configure HP LU 6.2 API:

- Providing HP with the information necessary to complete the Network Implementation and Support Plan (NISP), including:
  - System configurations
  - Logical network map identifying relevant traffic flow

- Physical network map identifying relevant network hardware components.
- Verifying that the necessary host mainframe or AS/400 software is installed and configured to support HP LU 6.2 API. The customer should consult the “HP SNA Products Remote System Configuration Guide” (P/N J2220-61025), or the “HP SNA Products: AS/400 Guide” (P/N 5960-1629) for details.
- Verifying that SNA Link/V, SNA/SDLC Link/iX, or SNA/X.25 Link/iX is properly installed and configured prior to the installation of HP LU 6.2 API.
- Updating the HP 3000 system to the proper release level and installing the HP LU 6.2 API software using AUTOINST. Refer to the HP 3000 MPE/iX Installation and Update Manual (36123-90001) for MPE/iX systems or the HP 3000 Software Update Manual (32033-90036) for MPE V systems.
- Verifying that all of the necessary software modules have been successfully installed by AUTOINST and are at the correct version levels using the NMMMAINT.PUB.SYS utility.
- Configuring HP LU 6.2 API in order to fully integrate HP LU 6.2 API into the existing customer network.

#### HP Responsibility

Following the installation of HP LU 6.2 API, HP is responsible for the following:

- Confirming that all of the necessary software modules have been installed and are at the correct version level.
- Configuring 1 LU with ‘Unsolicited Bind’ equal to ‘Y’.
- Starting the APPC subsystem and verifying that the LU is in a PENDING or ACTIVE state.

These steps complete HP’s portion of the installation and minimum configuration of HP LU 6.2 API.

#### Additional Implementation Assistance

For implementation needs that go beyond installation, the customer can either provide self-support, or can purchase additional services from HP. These services include Network Startup and HP ConsultLine. In addition, the customer can also purchase service from HP on a time-and-materials basis.

Network Startup includes implementation scheduling and coordination assistance, network configuration and verification testing, and network documentation.

#### Support Products

HP offers a spectrum of support service products to help plan, implement, operate, and manage your multivendor network throughout the network lifecycle.

For more information, contact your HP Sales Representative, or refer to the HP data sheets for specific support services.

#### Documentation

##### For both HP LU 6.2 API/V and HP LU 6.2 API/iX:

- J2220-61025 HP SNA Products Remote System Configuration Guide
- 30294-61000 HP LU 6.2 API:
- Application Programmer’s Reference Manual

##### For HP LU 6.2 API/iX:

- 5960-1629 HP SNA Products: AS/400 Guide
- 30294-61002 APPC Subsystem on MPE/iX Node Manager’s Guide

##### For HP LU 6.2 API/V:

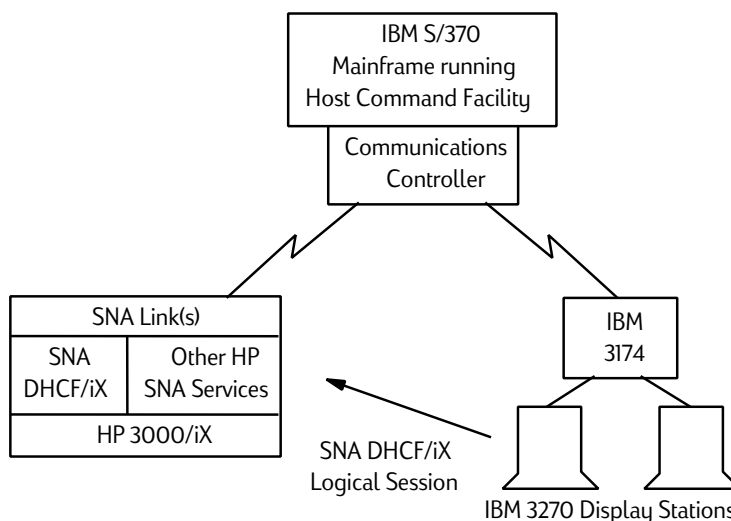
- 30253-90002 LU 6.2 API/V Node Manager’s Guide
- 30253-90004 APPC Subsystem on MPE V Node Manager’s Guide

## SNA Distributed Host Command Facility

The HP SNA Distributed Host Command Facility/iX (HP SNA DHCF/iX) software product provides IBM mainframe users who use IBM 3270 display stations with interactive access to an HP 3000 Series 900 system. Together with the IBM Host Command Facility (HCF Version 2) product on the IBM mainframe system, SNA DHCF/iX gives IBM 3270 display station users the capability to run many applications on the HP 3000 system. These applications include TTY-mode and VPLUS applications.

SNA DHCF/iX provides the data conversion services that translate output between applications on the HP 3000 and the IBM 3270 datastream required by IBM display stations. SNA DHCF/iX enables IBM 3270 display station users to access the HP 3000 system over their existing SNA, Token Ring, or X.25 network. SNA DHCF/iX requires the installation and use of the SNA/SDLC Link/iX (30292B and A5563A), SNA/Token Ring/iX (J2167B)\*, or the SNA/X.25 Link/iX (36939B) product (referred to jointly as SNA Link). SNA Link products manage the physical link to the IBM mainframe and implement the datacomm protocols in the lower three layers of SNA.

\* SNA/Token Ring Link/iX (J2167B) requires MPE/iX release 5.5 Express 5 or later; or MPE/iX release 6.0 Express 1 or later.



### Features

- SNA DHCF/iX provides IBM 3270 display stations with HP terminal capabilities including support for TTY-mode (simple ASCII) applications and many VPLUS applications.
- VPLUS has been optimized for applications used with SNA DHCF/iX; VPLUS forms can be compiled into IBM 3270 terminal formats prior to runtime.
- SNA DHCF/iX provides HP terminal emulation support for screen sizes of 24, 32, or 43 lines for TTY-mode applications. VPLUS applications are supported with screens of up to 24 lines less any lines required for a window line or softkeys.
- In VPLUS applications, SNA DHCF/iX supports HP terminal softkeys (as PF keys) and a "window" line on IBM 3270 display stations using the bottom three lines of the screen.
- One MPE/iX session is provided for every SNA DHCF/iX user; each SNA DHCF/iX session appears as a Network Services Virtual Terminal (NS VT) session.
- SNA DHCF/iX supports the HP "Break" and "Control-Y" keys.
- SNA DHCF/iX can support up to 64 simultaneous sessions per SNA Link node. Using multiple SNA Link nodes, SNA DHCF/iX's session count is limited only by the number of LDEVs available on the HP 3000.
- Other HP SNA Service products are supported over the same SNA Link; each SNA Link can support up to 64 Logical Unit (LU) sessions. The maximum line speed supported by SNA Link is 64 KB/s.
- SNA DHCF/iX users can access HP MM II applications on the HP 3000.
- SNA DHCF/iX provides a full screen, ISPF-like editor for use by HP DeskManager users.
- SNA DHCF/iX contains a comprehensive and flexible logging facility that records SNA DHCF/iX session and error messages.

## Functional Description

HP SNA DHCF/iX is a software product that provides an IBM 3270 display station with access to applications on an HP 3000. SNA DHCF/iX emulates many features of a remotely attached HP terminal; thus, it appears as if the IBM 3270 display station has a direct connection to the HP 3000 computer. SNA DHCF/iX can be operated across an existing SNA or X.25 network.

SNA DHCF/iX communicates with Host Command Facility (HCF) on the IBM mainframe in order to exchange data between the user's MPE session and the IBM terminal. To the HP 3000 system, each SNA DHCF/iX session appears as a NS VT session. For IBM 3270 display stations, SNA DHCF/iX provides access to two primary groups of applications on the HP 3000 Series 900 system.

- TTY-mode applications are characterized by their simple use of terminal control characters (carriage return, line feed, form feed, tab, bell). SNA DHCF/iX translates the data as output being sent to the IBM terminal. This group of applications includes the basic MPE/iX CI (Command Interpreter) commands.
- VPLUS applications are characterized by the use of the VPLUS forms subsystem that is included with the MPE FOS. VPLUS has been enhanced so that an applications programmer can design VPLUS-based applications for the IBM 3270 display station in addition to other HP terminals. Consequently, IBM 3270 display station users can be provided with access to many VPLUS-based applications using SNA DHCF/iX.

When developing VPLUS applications for use with SNA DHCF/iX, the application designer can develop and modify VPLUS forms using techniques similar to those for HP terminals.

When the VPLUS forms have been designed and are ready to be compiled, the applications designer will select the "IBM 3270" box in the Terminal Selection Menu of FORMSPEC, in addition to any HP terminal options normally selected, in order to include the IBM 3270 format in the VPLUS forms file. Please note that, in an existing application, some VPLUS forms may need to be modified due to limitations of the IBM 3270 display station. Many of the VPLUS forms may require no changes.

## Usage Considerations

HP SNA DHCF/iX is not a complete replacement for HP terminals such as the HP 700/92 and HP 700/94 terminals. Due to limitations of the IBM 3270 display station, SNA DHCF/iX cannot support all HP 3000 applications. In addition, some HP 3000 applications may require modifications prior to use with SNA DHCF/iX. Please refer to the SNA DHCF/iX Application Programmer's Guide for information on usage considerations discussed here.

The HP keyboard differs from the IBM keyboard. The chart below shows some differences.

HP Terminals	IBM Terminals
HP Function Keys	IBM PF Keys 1-8 (VPLUS Applications only)
Security fields, Full-Bright and Half-Bright fields	Equivalent functions provided
Previous Page Key, Next Page Key, Insert Line Key, and Delete Line Key	No equivalent functions provided for IBM terminals
HP terminal characters:	IBM Terminal mapping:
Break	PA1
Control-Y	PA2
Hard RESET	CLEAR

HP 3000 applications that use special screen-mode or block-mode features that are specific to HP terminals are not supported. Some of these restrictions include:

- HP terminal escape sequences used for cursor positioning, terminal strap settings, programmable softkeys, etc.
- Screen enhancements such as inverse video, blinking, underlining, etc.

SNA DHCF/iX can provide universal access to HPDESK for an integrated office automation solution.

Within VPLUS applications, SNA DHCF/iX supports all of the VPLUS intrinsics except for VPRINTSCREEN and VPRINTFORM. Due to limitations of the IBM 3270 display station, VPLUS forms caching is not supported with SNA DHCF/iX. In addition, several points need to be considered in VPLUS forms design including:

- Prior to using a VPLUS application with SNA DHCF/iX, the VPLUS forms file must be recompiled using the 'IBM 3270' terminal option.
- When using FORMSPEC to design VPLUS forms, an HP terminal such as the HP 700/94 is required.
- Unlike HP terminals, IBM 3270 display stations require an actual space on the screen for an attribute byte that describes the attributes of the following field.
- Each field on the IBM display station needs to be preceded by this attribute byte; consequently, back-to-back fields are not allowed on the IBM 3270.
- With SNA DHCF/iX, a VPLUS form can have at most 24 lines; if features such as softkeys (two lines) or a window line (one line) are used in the application, then the available lines for the form are reduced by the number of lines required by these features.

If the target application violates any of these restrictions, then it is not supported by SNA DHCF/iX. An error condition will be returned to the application when an unsupported feature is used. Prior to installation of SNA DHCF/iX, target HP 3000 applications should be qualified to ensure that they meet these restrictions.

When using SNA DHCF/iX, IBM 3270 display station users may experience different performance and functionality than HP terminal users. For IBM 3270 display stations, response times may be somewhat greater than an HP terminal due to the SNA network overhead.

## Functional Specifications

- SNA DHCF/iX supports many of the basic functions of HP terminals. Please refer to the Usage Considerations section for features that are not supported. Supported features include:
  - Modified Data Tags
  - Security Fields
- SNA DHCF/iX supports three different display enhancements for IBM 3270 display stations: full-bright, half-bright, and non-display. (Non-display is for security fields.)
- SNA DHCF/iX supports those IBM devices officially supported by IBM for the Host Command Facility, Version 2. Please refer to IBM's HCF Product Specification Guide (GC27-0647) for a complete listing.
- Each SNA DHCF/iX session appears as a Virtual Terminal session. The pool of Virtual Terminal sessions available for other users will be reduced by the number of SNA DHCF/iX sessions that are currently active.
- SNA DHCF/iX can support multiple simultaneous sessions, depending upon the number of VT sessions or LDEVs (depending on the MPE/iX release) distributed across multiple SNA Links.
- Each SNA Link can support up to 64 concurrent sessions distributed among the various SNA/iX services.



- Using an HP 3000 Series 900 and SNA DHCF/iX as a gateway system, IBM 3270 display stations can access only TTY-mode applications on other HP 3000 MPE/iX systems. Access to other systems requires the NS Network Service and Link products.
- SNA DHCF/iX supports “reverse VT” functionality; this permits an HP application to acquire remote IBM 3270 display stations provided that the SNA DHCF/iX session has already been established.

### Product Requirements

- Hewlett-Packard System Requirements
  - HP 3000 Series 900 Computer System
  - A supported release of MPE/iX
  - SNA/SDLC Link/iX (30292B and A5563A), SNA/Token Ring Link/iX (J2167A), or SNA/X.25 Link/iX (36939B)
- SNA DHCF/iX requires an IBM System/370 or compatible mainframe with an IBM 37xx communications controller. SNA DHCF/iX has been certified with the following minimum levels of IBM software for the IBM mainframe and communications controller:
  - MVS (OS/VS2 Release 3.8)
  - ACF/VTAM Release 3.2 or later
  - ACF/NCP Release 5.2 or later
  - HCF
- For communication to an IBM S/36 the following software must be running on the IBM system:
  - SNA 3270 Emulation
- HCF V2 (Host Command Facility, Version 2 - IBM P/N 5668-985) must be installed on the IBM host. IBM supports HCF V2 under MVS as well as OS/VS1 and DOS/VSE (see below) operating environments.
- Although IBM supports HCF V2 under the OS/VS1 Release 7.0 and DOS/VSE Release 35 operating environments, HP SNA DHCF/iX has not been tested or certified with these operating systems.

HP will support certain versions and later releases of the above software. Your HP support representatives must determine whether SNA DHCF/iX can be supported with your network configuration. The Network Implementation Support Plan (NISP) will assist the HP account team in determining support requirements prior to the installation of SNA DHCF/iX.

### Installation and Configuration Policy

The customer is responsible for loading the SNA DHCF/iX software onto the system.

Hewlett-Packard will perform minimum configuration of SNA DHCF/iX in order to verify minimum product functionality. This activity is included in the product purchase price.

### Customer Responsibility

Prior to having HP personnel onsite to perform minimum configuration of SNA DHCF/iX, the customer is responsible for the following:

- Providing HP with the information necessary to complete the Network Implementation and Support Plan (NISP) including:
  - system configurations
  - logical network map identifying relevant traffic flow
  - physical network map identifying relevant network hardware components.
- Verifying that the necessary host mainframe software is installed and configured to support SNA DHCF/iX. The customer should contact their HP Sales Representative for typical host parameter values or consult the “HP SNA Products Remote System Configuration Guide” (J2220-61025) for details.

- Verifying that SNA Link is properly installed and configured prior to this installation of SNA DHCF/iX unless SNA Link will be installed at the same time.
- Updating the HP 3000 system to the proper release level and installing the SNA DHCF/iX software using AUTOINST. Refer to the HP 3000 MPE/iX Installation and Update Manual (36123-90001).
- Verifying that all of the necessary software modules have been successfully installed by AUTOINST and are at the correct version levels using the NMAINT.PUB.SYS utility.
- Performing full system backups as necessary and ensuring that the HP 3000 system and personnel with HP 3000 system management knowledge are available when HP is onsite to complete the minimum configuration of SNA DHCF/iX.

The customer is also responsible for completing the configuration in order to fully integrate SNA DHCF/iX into the existing customer network after HP has completed the minimum configuration of SNA DHCF/iX.

#### HP Responsibility

Following the installation of SNA DHCF/iX, HP is responsible for the following:

- Confirming that all of the necessary software modules have been installed and are at the correct version level.
- Configuring the SNA DHCF/iX product to a minimum configuration (1 LU) in order to verify software and hardware functionality.
- Verifying the SNA DHCF/iX configuration by issuing the DHCFCONTROL START command and ensuring that the LU to SSCP session becomes active for the LU that was configured.

These steps complete HP's portion of the installation and minimum configuration of SNA DHCF/iX.

#### Additional Implementation Assistance

For implementation needs that go beyond installation, the customer can either provide self-support or can purchase additional services from HP. These services include Network Startup and HP ConsultLine. In addition, the customer can also purchase service from HP on a time-and-materials basis.

Network Startup includes implementation scheduling and coordination assistance, network configuration and verification testing, and network documentation.

#### Ordering Information

Product/Option Number	Description
A5563A	SNA Link Interface Card
010	RS-232-C Synchronous Modem Connection
020	V35 Synchronous Modem Connection
025	Autodial Connection
0D1	Factory Integration

Required for SNA/SDLC, SNA/Services bundle, NS Point-to-Point, RJE, BSC/iX Softwares (option 001 CIB/CIO become obsolete)

Product/Option Number	Description
30292B	SNA Services License, Software and Documentation
310	Tier 1 License (also applies to 315, 320 Tier 2, 3 systems)
330	Tier 4 License (also applies to 335 Tier 5 systems)
340	Tier 6 License (also applies to 350 Tier 7 systems)
0CD	Upgrade credit Tier 1
0CF	Upgrade credit Tier 4

Requires A5563A.

Includes former 30202A, 30293A, 30294A, and 36935A.

Customers must also order the MPE media product (51543B) on MPE/iX 5.5 Express 7 or later, or MPE/iX 6.0 Express 1 or later. This is required to receive software for this product.

## Support Products

HP offers a spectrum of support service products to help plan, implement, operate, and manage your multivendor network throughout the network lifecycle.

For more information, contact your HP Sales Representative, or refer to the HP data sheets for specific support services.

## Documentation

The following documentation is for SNA DHCF/iX:

- 36935-61001 HP SNA DHCF/iX User Support Guide
- 36935-61002 HP SNA DHCF/iX Node Manager's Guide
- 36935-61003 HP SNA DHCF/iX Application Programmer's Manual
- 36935-61004 HP SNA DHCF/iX Diagnostic Message Manual
- J2220-61025 HP SNA Products Remote System Configuration Guide

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