# HP AdvanceNet
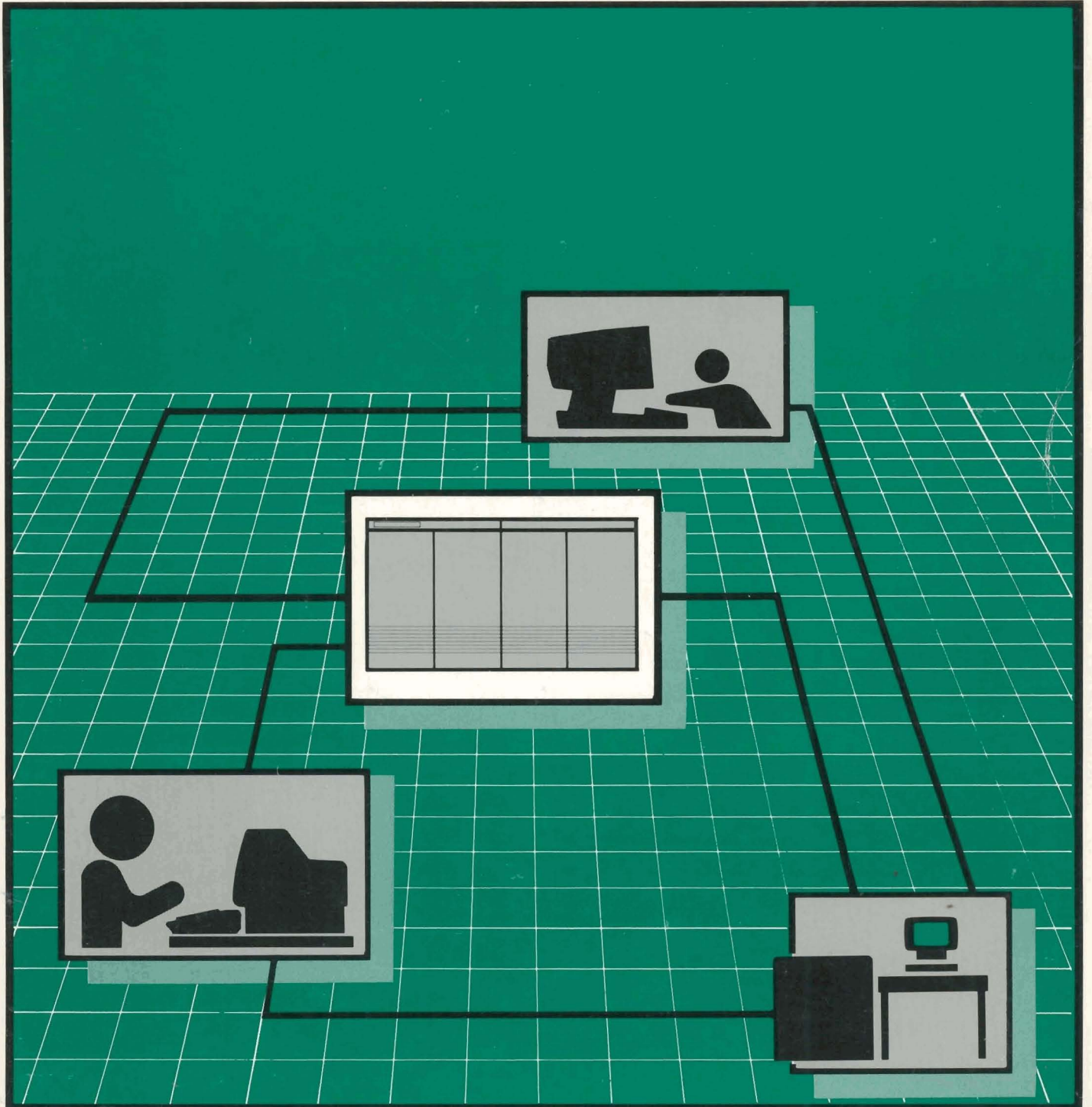
HP 3000 Data Communications Products
Specification Guide

Effective Date
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# HP AdvanceNet

Data Communications Networking Products
for the HP 3000 Computer System Family

## Specification Guide

# HP 3000 Data Communications Hardware Products

# Network Link and Service Product Structure Overview

## HP AdvanceNet

In keeping with Hewlett-Packard's continuing efforts to make Data Communications easier to understand and order, we are introducing a new, streamlined product structure. The products in this Specification Guide reflect this new structure.

In the past, anywhere from three to six hardware and software products were required in order to provide a set of networking capabilities for an HP 3000. With the new structure at most two products are required to establish a networking connection, a Network Link and/or a Network Service.

The **Network Service** products provide the entire user interface to the network in one product. These products are comprised entirely of software, and provide the user interface for accomplishing batch job submittals, file transfers, virtual terminal access, or whatever services are available.

The **Network Link** products provide everything needed to connect the HP 3000 system to the network under one product number. This includes software (such as drivers, protocol modules and transports), system interface cards, cables and adapters.

So, in order to equip an HP 3000 with a Data Communications capability, in most cases only two products are necessary — the appropriate Network Link and the corresponding Network Service that provides the desired functionality.

Generally a Network Service requires at least one Network Link in order to be useful, and at least one Network Service product is necessary to be able to use a Network Link. None of the Network Links provide direct user access to the software in the Link. However, the X.25 Link can be used stand alone for PAD terminal communications.

## Features of DS Network Services on the HP 3000

- Multiple network access methods are available, providing the appropriate set of capabilities for the specific task at hand:
  - Network Database Access
  - Network File Access
  - Network Peripheral Access
  - Network File Transfer
  - Network Terminal Access
  - Network Inter-Program Communication
- Every DS Network Services capability is supported on all current HP 3000 processors.
- Major DS Network Services capabilities are supported between HP 3000s and HP 1000, HP 250, and HP 9845 processors.
- DS Network Services are used with one or more network link products.
- Every DS Network Services capability operates transparently across each Network Link alternative:
  - Point-to-Point Hardwired Link
  - Point-to-Point Modem Link
  - X.25 Network Link
  - Satellite Communication Link
- Selectable data compression capability permits more efficient line utilization, decreasing transmission times and increasing throughput.
- DS Network Services capabilities are integrated with their MPE counterparts, providing accessibility from applications in any language, including COBOL, COBOL II, FORTRAN, BASIC, PASCAL, and SPL.

## Functional Description

DS Network Services is a product designed to be particularly useful in applications that involve transaction processing and are geographically or functionally dispersed. Any local-system command may be executed remotely through a simple extension to that command. Many operating system intrinsics are extended in a similar fashion. The terminal user or application programmer requires no knowledge of the communication protocol or physical link used. Every application-level capability operates transparently across each connection-level alternative.

DS Network Services on the HP 3000 provides facilities for point-to-point connections between processors. Communication lines may be switched (dial-up), leased, or hardwired, and may be mixed throughout the network. Applications may easily obtain access to systems more than one "hop" away, through multiple ":REMOTE HELLO" logons. In addition, HP 3000 computers may connect to X.25 packet-switched networks and communicate across those networks with HP 1000 or other HP 3000 computers. In fact, DS Network Services can maintain concurrent connections to multiple remote systems, and/or multiple connections to the same remote system, over a single physical link to the X.25 network.

DS Network Services requires users to pass all the security checks imposed by MPE, such as passwords when logging on to a remote system. DS Network Services also provides additional security features applicable only to a network environment. For example, the system operator may restrict incoming or outgoing access to the communication link.

## HP 3000-to-HP 3000 Capabilities

The descriptions in the following paragraphs apply only to DS Network Services running between two HP 3000s. The next section summarizes the capabilities available when communicating between an HP 3000 and another type of Hewlett-Packard computer.

*Network Database Access*

MPE provides a set of intrinsics (DBOPEN, DBGET, DBPUT, etc.) that allow a utility or application program to access an IMAGE database. DS Network Services transparently extends these intrinsics to permit manipulation of an IMAGE database residing on a remote system. The same security provisions apply to remote access as apply to local access: the user must have logged on the system(s) and must also provide any required passwords to the IMAGE database.

The user first specifies the location of the database. An MPE ":FILE" equation, executed either just before invoking the application program, or from inside the application program via the MPE COMMAND intrinsic, is one way to provide this information. The first method completely removes any knowledge of the database location from the application program, but not from the user. The second removes the knowledge from the user, and embeds it in the application program.

To isolate both the user and the application program from needing to know the database location, IMAGE allows the database administrator to create a directory, called a database access file, which defines the location of the database and the authorized users. Only the administrator need be concerned with actual locations; IMAGE and DS Network Services handle the rest. This flexibility allows the administrator to relocate databases without affecting the users' operating procedures or changing any application programs.

*Network File and Peripheral Access*

With DS Network Services the user gains access to files and peripheral devices on the remote system as easily as access to files and peripheral devices on the local system. MPE provides a set of intrinsics for local file manipulation — FOPEN, FREAD, FWRITE, etc. — and since MPE treats peripherals similarly to files, the same intrinsics are used to handle local peripheral devices. DS Network Services transparently extends the operation of these intrinsics to files and peripherals residing on a remote HP 3000. DS Network Services implements the extensions at the intrinsic level, in cooperation with the operating system. For this reason, user applications written in most languages, as well as most HP-provided utility programs, gain this ability to access remote files and peripherals.

DS Network Services and MPE must know the actual location of the file or device to be accessed. The user provides this information with a simple ":FILE" equation. Logon and password security and the use of ":FILE" commands, described in the preceding section for databases, also apply here for files and peripherals.

*Network File Transfer*
The standard MPE file copy program, FCOPY, uses a record-by-record transfer scheme. Using the Network File Access capability, FCOPY can transfer a file from one system to another across a communication link. However, for larger disc files, DS Network Services provides a more efficient mechanism. The DSCOPY utility program will transfer files from one system to another in large buffers containing multiple records. This reduces the DS Network Services overhead and makes more efficient use of the communication line capacity, compared to using FCOPY.

DSCOPY can be invoked from a session, a job, or a program. The source file node, the destination file node, or both may be remote from the node on which the transfer is initiated. (Source and destination nodes may also be identical.) The terminal user or program must already be logged on to the remote system(s).

*Network Terminal Access*
From a terminal on a local HP 3000, a user may log on to a remote HP 3000 and conduct an interactive session as if the terminal were directly connected to the remote system. This capability is called Network Terminal Access (or Virtual Terminal). There is no distinct command language to learn; to execute a command on the remote system, simply prefix it with ":REMOTE..." For example, to log on the remote system, enter ":REMOTE HELLO user.account." To execute a stream of commands on the remote system, the keyword ":REMOTE" by itself connects the terminal to the remote system until the user requests a return to the local system. Using the MPE intrinsic "COMMAND," programs may also communicate with the remote operating system command interpreter.

*Network Inter-Program Communication*
DS Network Services provides two ways for programs to cooperate in performing a user's application. The first makes use of the MPE intrinsics that allow peer-to-peer (send message and receive message) communication between processes on the same system. DS Network Services extends the operation of these intrinsics, so messages may be exchanged between processes executing on different HP 3000 systems. To use these message files remotely, only an MPE ":FILE" equation is required to identify a program on another system.

DS Network Services provides a second set of intrinsics for Program-TO-Program communication, the PTOP intrinsics. These intrinsics are designed for inter-system communication and do not support intra-system PTOP. PTOP communication is master-slave (request-response). The master program always initiates the slave, and message exchange is always synchronized.

Inter-program communication is the ideal means for implementing efficient distributed applications. For example, an application program might be needed to post frequent transactions to a remote database. The communication overhead needed for the DS Network Services transparent extensions of the low-level IMAGE intrinsics might impose a performance penalty. Sending the transaction to a cooperating application program, which performs the database accesses locally and returns only the final result, would use the communication line more efficiently.

## Summary of HP 3000-to-Other-HP System Capabilities
DS Network Services on the HP 3000 treats other computers in a DS network as if they were HP 3000s, regardless of processor type. Thus, for those capabilities that are implemented on the other computer, the HP 3000 DS Network Services are as described in the preceding sections. However, not every capability has been implemented on every computer family, and a different set of options may be provided for a particular capability. For greater detail, please consult the appropriate product reference manuals.

*HP 1000*
DS on an HP 1000 technical computer system provides several capabilities when communicating to DS Network Services on an HP 3000:

> *Virtual Terminal Access:* A user at a terminal on the HP 1000 may log on to the HP 3000 and maintain an interactive session, as if the terminal were a character-mode terminal directly connected to the HP 3000. A terminal user on the HP 3000 may attach to the HP 1000, as if directly connected to the HP 1000, and execute system-level commands (though not interactive subsystems).

> *Network File Transfer:* The HP 1000 can initiate file transfers to or from the HP 3000.

> *Program-TO-Program:* PTOP intrinsics may be used by either the HP 1000 or the HP 3000, acting as a master, to initiate, converse with, and control a slave program on the other system.

> *Use of some intrinsics:* An HP 3000 process may read and write records from HP 1000 files or I/O devices, and an HP 1000 process may read and write records from an HP 3000 file or peripheral.

*HP 250*
DS on the HP 250 small business computer provides two capabilities for communication with the HP 3000:

> *Virtual Terminal* allows a user at a terminal on the HP 250 to log on the HP 3000 and maintain an interactive session as if the terminal were a character-mode terminal directly connected to the HP 3000.

> *Network File Transfer* allows a user on the HP 250 to initiate file transfers to or from the HP 3000.
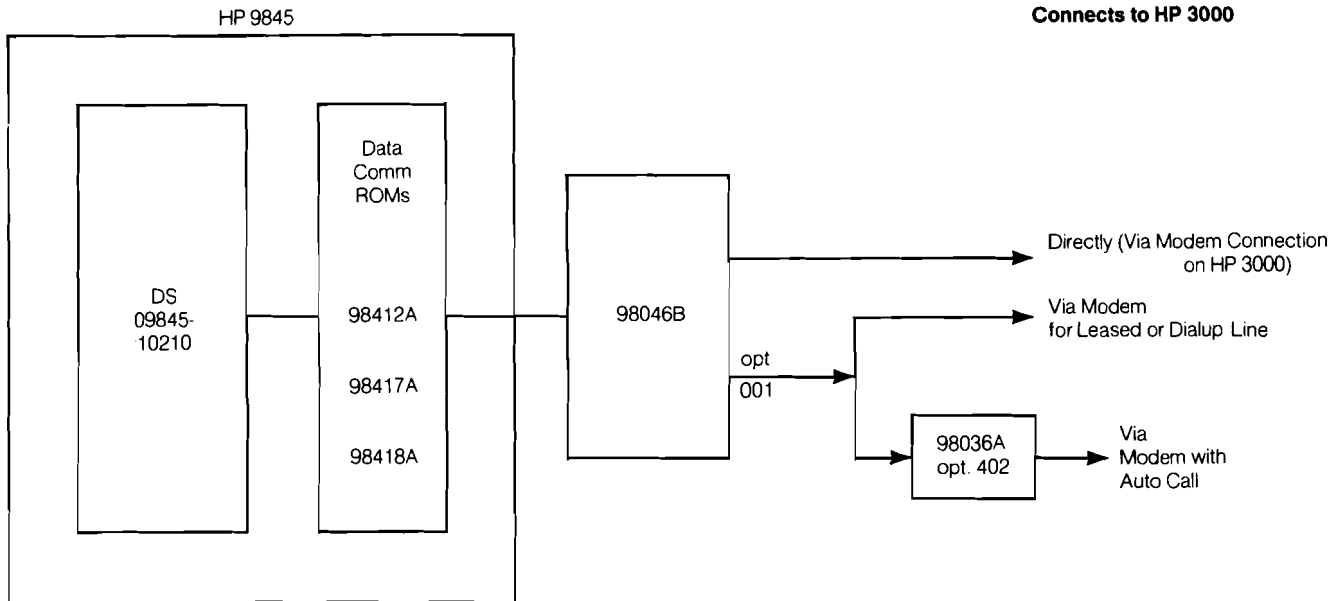
**HP 9845 DS Products for Connection to HP 3000**

## Network Capacity and Performance

The maximum number of communication lines and separate conversations with other nodes that a single processor can support, and the peak user data rates achievable on each link, are complex functions of many interrelated variables. Among these are the type and speed of each communication line, the type of DS Network Services capability being used, the main memory and speed of each processor that is a party to the conversation (and its peripherals), and the load on each system from non-network applications.

Because of the number and complexity of these factors, it is difficult to make accurate broad generalizations about capacity and performance. Hewlett-Packard Systems Engineers, Data Communications Specialists, and Network Consultants are available to consult in network design. They have extensive data on the system and network parameters that affect network operation. With this information and an accurate understanding of the target environment, they can assist in designing an effective network.

One upper limit on performance is the maximum bit transfer rate allowed by the hardware. The Network Links are listed in the table below. The line speeds listed are the maximums supported by DS Network Services and Network Links; specific modems or a particular network application may impose a lower limit.

| Network Link Product | Maximum Data Rate |
|---|---|
| Point-to-Point Hardwired Link (RS 422) | 56,000 bits/second. |
| Point-to-Point Modem Link (RS-232C, CCITT V.24 or X.21) | 19,200 bits/second (modem dependent). |
| (CCITT V.35 Digital Phone Network) | 56,000 bits/second (modem dependent). |
| X.25 Network Link | 56,000 bits/second (modem dependent). |
| Satellite Communication Link | 56,000 bits/second. |

## System Environment

DS Network Services is available on all members of the HP 3000 processor family executing current versions of the MPE operating system.

## Network Link Requirements

Use of DS Network Services on the HP 3000 requires at least one Network Link product. Each Network Link product includes software, hardware, and cables. The DS Network Link products are:
- Point-to-Point Hardwired Link, for direct connection to HP 1000 or HP 3000.
- Point-to-Point Modem Link, for connection to leased line modem, manual dial modem, auto-dial modem, or Digital Phone Network modem.
- X.25 Network Link, for connection to an X.25 network.
- Satellite Communication Link, for connection to satellite earth station equipment.

See the appropriate Network Link product data sheet for more details.

## Installation Policy

Hewlett-Packard will provide software installation of Distributed Systems for customers with Account Management Support (AMS). Installation of the 32185M and 32185R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

## Customer Installation Responsibility

Prior to the installation of DS Network Services on the HP 3000, the customer is responsible for installation of any extender cables, switched or leased lines with modems, or X.25 service connections and modems desired. It is the customer's responsibility to conduct appropriate tests to ensure that the line and non-HP modems are functioning properly.

Installation of DS Network Services and Links at multiple sites should normally be coordinated.

Immediately prior to installation of DS Network Services and any Network Links, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of the data communications software, interface card, and cables.

Customer personnel should be available on site at the time the HP 3000 data communications products are installed. These personnel should be trained in the use of DS Network Services and Links. HP can provide this training, with a separate charge to the customer.

## HP Installation Responsibility

During the installation of DS Network Services, HP will:
- Perform a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the Network Link hardware into the I/O software configuration, and configure it in accordance with the customer's intended use.

- Connect the Network Link cable to the customer's communication line (only if available).
- Verify that the product properly opens the line when started by command.

**NOTE: At this point, installation of the DS Network Services product is complete.**

However, if all necessary facilities not a part of DS Network Services are available for testing HP will attempt to perform a test that demonstrates product operation in the customer's communication environment. If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of the HP data communications products will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## Ordering Information

| | |
|---|---|
| 32185A | DS Network Services Right-to-Use on HP 3000 |
| 32185M | DS Network Services Additional Site License |
| 32185R | DS Network Services Right-to-Copy and Sublicense |

Requires at least one Network Link (30270A, 30271A, 32187A, and/or 32188A). *Select one Processor Option.*

*Processor Options*
| | |
|---|---|
| 310 | For Series 30/33/37 |
| 320 | For Series III/39/40/42/44/48 |
| 330 | For Series 64/68 |

## Network Link Products

| | |
|---|---|
| 30270A | Point-to-Point Hardwired Link. |
| 30271A | Point-to-Point Modem Link (leased or dial-up line). |
| 32187A | X.25 Network Link. |
| 32188A | Satellite Network Link. |

The appropriate software, hardware interface card, and cables are included in each Network Link product. For more information, consult the appropriate data sheet.

## Support Products

| | |
|---|---|
| 32185A +S00 | Software Material Subscription (SMS) for DS Network Services |
| 32185A +W00 | Extended SMS for DS Network Services |

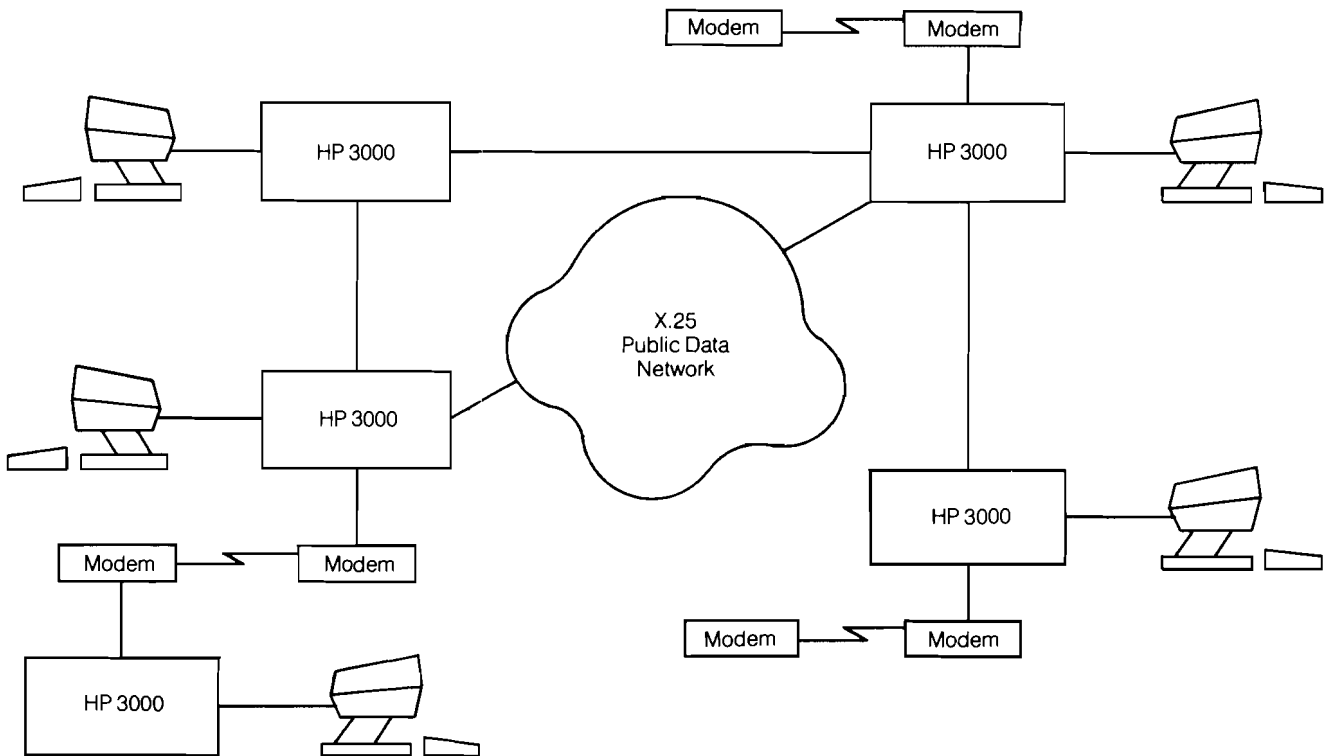## Documentation

| | |
|---|---|
| 32189-90001 | DSN/DS for HP 3000 User's Manual |
| 32189-90002 | DSN/DS Network Administrator's Manual |
| 32189-90005 | HP 3000 to HP 1000 DSN/DS Reference Manual for HP 3000 Users |

# Distributed Systems and HPDeskManager

**HP AdvanceNet**

HPDeskManager is a software product that runs as a subsystem on any HP 3000 computer system supporting MPE IV or MPE V. The product offers users the ability to exchange messages, documents, and MPE system files with other HPDeskManager users on the same system. Users can also file and retrieve HPDeskManager items that have been exchanged. To use HPDeskManager, all a user needs is access to any HP 3000-compatible terminal.

In conjunction with Distributed Systems Network Services and Links, HPDeskManager also provides the same capabilities for HPDeskManager users on different systems. When a particular site is entered into a system's HPDeskManager directory, the HPDeskManager administrator defines the actual route to that destination. The administrator may also enter remote HPDeskManager users into the directory. The sender mails a message to "user name" if the recipient has been entered in the directory, otherwise to "user name/location." HPDeskManager handles the transmission, possibly through intermediate nodes in a network of HP 3000s, and delivers the mail to the designated user or to the "General Delivery" mailroom at the remote location.

HPDeskManager is designed to be used by managers and professionals as well as by administrative support staff. It provides each user at a CRT with a set of software tools that map onto the traditional elements of the desk:

- An INTRAY—for receiving incoming mail
- An OUTTRAY—for sending outgoing mail
- A PENDING TRAY—for monitoring the progress of mail
- A FILING CABINET—for storing messages and documents
- A WORK AREA—for composing and editing
- A LIST AREA—for creating and storing distribution lists
- A CALENDAR/DIARY—for managing appointments

## Features of HPDeskManager with DS

- Use of any HP 3000-compatible terminal to access HPDeskManager
- Mail progress tracking
- Confidentiality
- Auto-forward of mail
- Auto-answer to mail
- General system file transmission
- Transparent through-node multi system routing
- Routing across direct, dial, leased, or Public Data Network connections
- Terminal access to HPDeskManager across X.25 Public Data Networks (requires 32187A X.25 software)

## Ordering Information

For detailed information about Distributed Systems, consult the DS Network Services and Network Links data sheets in this booklet. For additional information about HPDeskManager, consult the HPDeskManager data sheet or a Hewlett-Packard Sales Representative.

36570A    HPDeskManager Right-to-Use on HP 3000
36570M    HPDeskManager Additional Site License
36570R    HPDeskManager Right-to-Copy and Sublicense

## Documentation

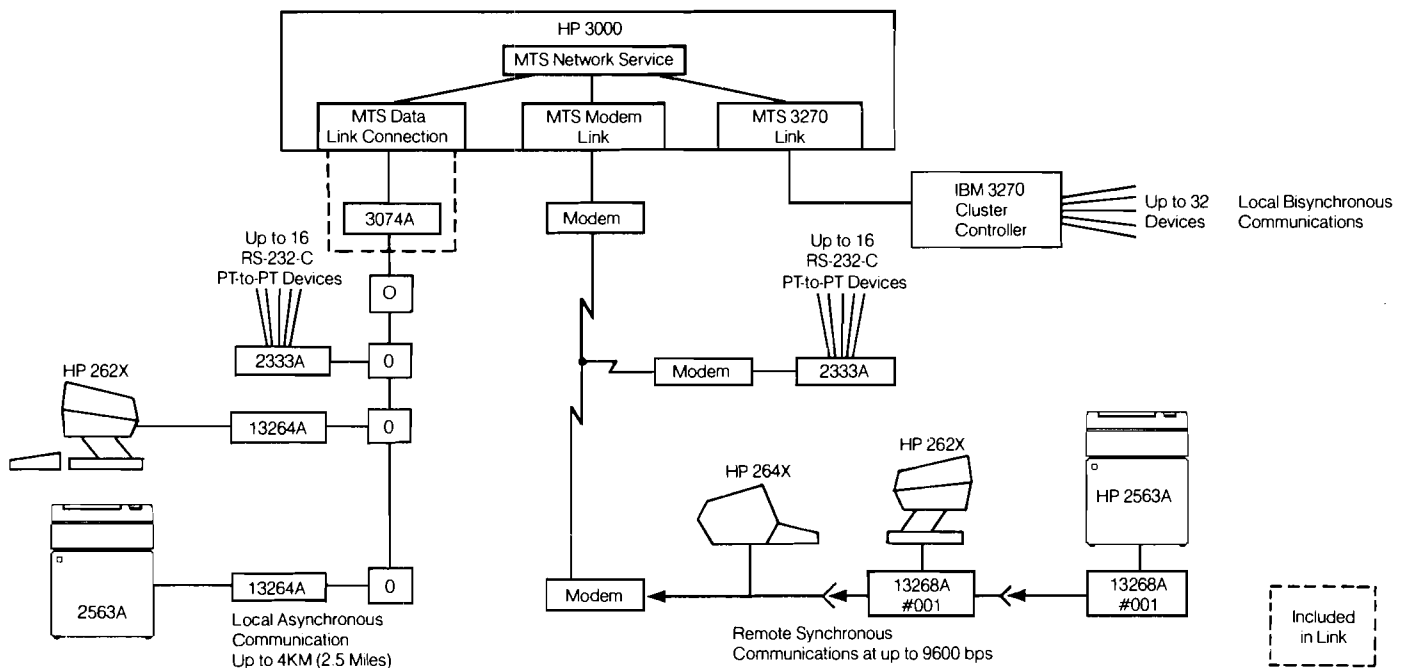36570-90001 *HPDeskManager Reference Guide (pack of 10)*

36570-90002 *HPDeskManager Reference Guide*

36570-90004 *HPDeskManager Administration Manual*

# Multipoint Terminal Support Service

HP AdvanceNet

Product Number 32025A/M/R
For HP 3000 Computer Systems



Multipoint Terminal Support Service (MTS) is the user level software which enables an HP 3000 to communicate with multiple multipoint devices via a single communications line. A variety of terminals and printers can be connected directly to an MTS communications line or through the 2333A Multipoint Cluster Controller. These devices can be hardwired to the HP 3000 (local access) or they can be connected to the computer by means of a modem (remote access).

## Features
- Multiple devices share a single communications line.
- Automatic error detection and retransmission of data provides excellent data integrity.
- Provides a direct connection to the multipoint line for the 2933A/34A, 2563A and 2608S printers.
- Support of serial printers (HP 2601A/02A/31B and 2932A/33A/34A) and the 2563A 300 lpm printer on the HP 2333A Multipoint Cluster Controller for shared printer applications.

- Printers can be configured as Remote Spooling Printers for job queuing or as Dedicated Mode Printers for application program control of the printer.
- Provides a checkpoint-restart capability for high-speed remote system printing (2563A and 2608S)
- Full page mode operation for page mode terminals.
- Transmission speeds of up to 19,200 bps.
- Compatible with VPLUS/3000 screen formatter, Materials Management/3000, Production Management/3000 and Financial Accounting/3000.
- System operator control over the frequency and order of polling.
- Support of local and remote devices.
- Comprehensive test program locates configuration errors and simplifies maintenance.
- Works in conjunction with the MTS Data Link (32026A), the MTS Synchronous Modem Link (32027A) and the MTS 3270 Device Link (32028A)

## Functional Description

Multipoint devices can be connected in a wide variety of network configurations. In all multipoint networks, an HP 3000 is the control station and regulates all transmissions, while the devices are tributary stations that share the same local or remote communications line. Communications occur between the HP 3000 and one device at a time while all other devices in the network remain in a passive, monitoring state. The devices communicate only with the control station, never with each other.

MTS uses both group and individual polling. The group poll allows devices in a group to be queried with just one message from the HP 3000. Each device with data to transmit responds in turn to the poll. After the last device is through sending data, the group transmits an End-of-Transmission (EOT) character to indicate it has finished.

With individual polling, the HP 3000 steps through individual addresses in a poll list and asks each device whether it has any data to transmit. As each device finishes sending data, it signals the control station to step to the next address in the poll list.

MTS makes it possible for you to use MPE commands and file system intrinsic calls to communicate with numerous devices that are physically connected into a data communication network in a multipoint environment. Typically, you can use multipoint communication with little or no extra programming effort and no data communications or multipoint knowledge.

MTS uses a sophisticated error checking algorithm that detects data transmission errors, and if necessary, retransmits the data. Data is not accepted by either the HP 3000 system or the multipoint device until it has been verified to be free of errors.

The system operator has control over the multipoint network configuration. Devices may be added to, or deleted from, the poll list at any time without reconfiguring the system. The operator also has control over the order and frequency of polling the devices in the network. This allows for configuration flexibility and improved device response as desired.

## Printer Support

MTS supports both spooled printers and printers under the direct control of an application program in a multipoint workstation networking environment. With this support, printers can be locally dispersed within a building or they can be located at a remote site. Users can place printers wherever they are needed within a multipoint workstation network and obtain hard-copy output.

Printers can be connected to the HP 3000 in one of three ways: (1) directly connected to the multipoint line using an MTS interface in the printer, (2) through an HP 2333A Multipoint Cluster Controller using a standard RS-232-C interface in the printer, or (3) to the second port of an HP 2624B terminal (connected directly to a multipoint line) using the Bypass Mode of the HP 2624B and a standard RS-232-C interface in the printer. Printers and terminals can be linked together to form a workstation network using either the MTS Data Link Conncetion or the MTS Synchronous Modem Link.

The HP 2563A, HP 2608S, HP 2933A and HP 2934A printers, with their respective multipoint interfaces, can all be attached directly to a multipoint line. The HP 3000 Series III, 30 and 33 only support the HP 2608S printer. Using the HP 2563A or the HP 2608S in this configuration provides a high-speed remote printing capability. A dedicated line of at least 9600 baud is recommended to achieve up to 300 lpm with the 2563A and a 19,200 baud line is recommended to achieve up to 400 lpm with the 2608S. (For further information on printer throughput, please see the *HP 3000 Performance Guide*.) In this configuration the auto reset, Vertical Format Control (VCF), operator notification and checkpoint-restart features can be used by the 2563A and 2608S printers. The checkpoint-restart feature allows the printer to send a checkpoint message regularly to the HP 3000 system. If there is an interruption in data transmission, only data that has been sent from the last checkpoint will be reprinted. This provides a high degree of recoverability for large volume printing.

The HP 2333A Multipoint Cluster Controller provides local or remote control for up to 16 RS-232-C point-to-point devices (or 32 3081A terminals connected to 8 Port Current Loop Interface cards) when used in conjunction with either the MTS Data Link Connection or the MTS Synchronous Modem Link. The HP 2563A, HP 2601A/02A/31B, and the HP 2932A/33A/34A printers with RS-232-C interfaces are supported by the HP 2333A as XON-XOFF printers. As with direct connect multipoint printers, printers on an HP 2333A can either be spooled or under the control of an application program. Additionally, auto reset, Vertical Format Control and operator notification features are utilized with the HP 2563A, HP 2631B and HP 2932A/33/34A printers. The HP 3000 Series III, 30 and 33 do not support printers connected to an HP 2333A.

Another way in which printers are supported in an MTS environment is through connection to the second port of an HP 2624B terminal. This is an RS-232-C printer connection that allows the user to work at a terminal while other users can access the printer by taking advantage of the Bypass Mode feature of the HP 2624B. Both spooling and dedicated application usage are supported. Character printers (as opposed to line printers) are supported in this configuration, and for the HP 2631B and HP 2932A/33A/34A printers auto reset, Vertical Format Control, and operator notification features are utilized. This is an ideal configuration for users in multipoint environment who are not usings the HP 2333A Cluster Controller, but who want a character printer for hard-copy output. Printers using the Bypass Mode of the 2624B are not supported by the HP 3000 Series III, 30 and 33.

For examples a few of the possible configurations utilizing printers in an MTS environment, please refer to the following diagram.

**Example of Printer Configurations**
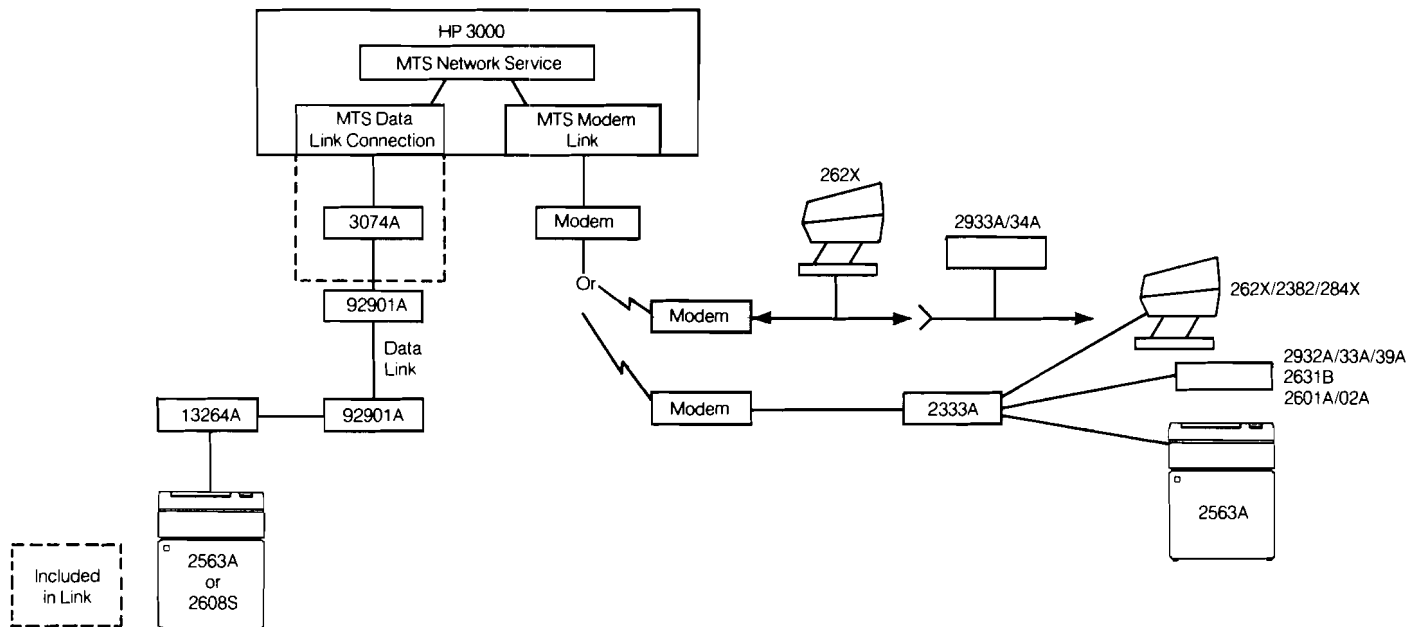


**Possible MTS configurations with printers**

## HP 2333A Multipoint Cluster Controller Support

The HP 2333A is a Multipoint Cluster Controller that can be used locally or remotely to connect up to 16 point-to-point devices to a multipoint line. The 16 ports are RS-232-C interfaces that will operate at speeds up to 9600 bps. The HP 2333A supports the HP 262X, HP 264X, HP 307X, 2382A and 2392 families of terminals and the HP 2563A, HP 2601A/02A/31B and HP 2932A/33A/34A printers. Additionally, the current loop interface card that is available for the HP 2333A allows support of up to 32 HP 3081A factory data collection terminals.

The HP 2333A Multipoint Cluster Controller automatically converts the multipoint format to a point-to-point format and vice versa. This allows it to work with terminals and printers that do not have multipoint interfaces. This operation is transparent to the point-to-point terminals, MPE subsystems and user applications, all of which function as if the terminals are connected to a point-to-point port.

MTS support of terminals connected to an HP 2333A is available on the HP 3000 Series III, 30, 33, 39, 40, 42, 44, 48, 64, and 68. Support of printers on an HP 2333A is available on the HP 3000 Series 39, 40, 42, 44, 48, 64, and 68.

HP 3000 — MTS Network Service — MTS Data Link Connection — MTS Modem Link — 3074A — Modem — Modem — 92901A — 92901A — 92901A — HP 2333A — HP 2333A — HP 2333A — Up to 32 3081A Terminals With Current Loop Interfaces — Up to 16 devices — Up to 16 devices — Included in Link
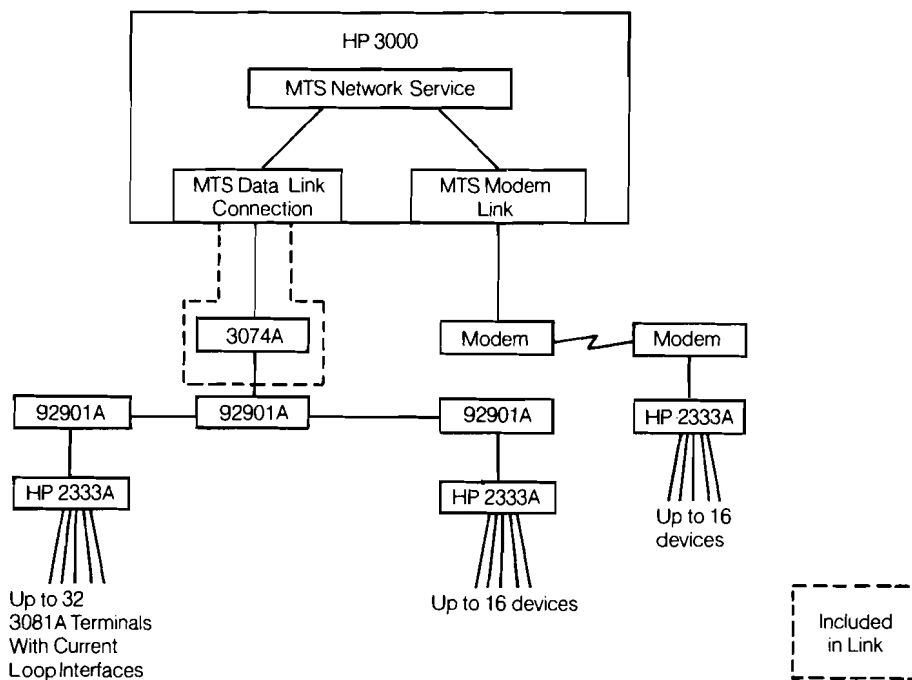
## Terminal Operation

When a terminal is configured on a multipoint line using a multipoint interface, it runs only in Block Mode. When a terminal is configured with the HP 2333A Multipoint Cluster Controller, it can run in either Character or Block Mode.

## MTS Functional Specifications

- Data transfers at up to 19,200 bps.
- Two-way, half duplex operation.
- Multipoint Bisynch protocol is similar to IBM Binary Synchronous Communication.
- Terminals Supported (directly connected to a multipoint line): 2641A, 2642A, 2645A/N/S, 2647A, 2648A, 2624B, 2625A, 2626A/W, 2628A, 3075A, 3076A, 3077A.
- Printers Supported (directly connected to a multipoint line): 2563A, 2608S, 2933A, 2934A.
- Multipoint Cluster Controller: HP 2333A.
- CRC-16 error checking on messages.
- Subsystem Support: HPSlate, TDP, MM, PM, FA, DSG, EZChart, HPDraw, HPSpell, HPWord III, VPlus, IMF, HPDesk, Report, Transact, Dictionary and Inform.

## Performance Considerations

The user terminal response time is dependent on the line speed, the frequency of use of the terminals and printers, the modem training time, the system processing load, and the amount of data being transferred.

When connecting printers to a multipoint line there are several considerations to keep in mind. Limit the number of printers on a multipoint line to four, with a maximum of 16 MTS printers per system. The aggregate baud rate of the printers should not exceed the baud rate of the multipoint line to which they are attached. The perfomance of the printer(s) on a multipoint line is dependent on the speed of that line, the printer's priority, the traffic pattern, and the processor load. For additional information consult the MTS Reference Manual and the *HP 3000 Performance Guide.*

## Product Requirements

- MTS Service for HP 3000 (32025A/M/R).
- MTS Data Link Connection (32026A), MTS Synchronous Modem Link (32027A) and/or MTS 3270 Device Link (32028A).
- HP 3000 System with at least 512K bytes of memory.
- Multipoint devices with multipoint interfaces, or the HP 2333A for point-to-point devices.
- 264X multipoint terminals require at least 8K bytes of display memory.

## Installation Policy

Hewlett-Packard will provide software installation of HP 32025A for customers with Account Management Support (AMS). Installation of the HP32025M and HP32025R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

## Customer Responsibility

Prior to the installation of MTS on the HP3000, the customer is responsible for installation of a switched or non-switched communication line between the HP3000 system and the multipoint devices. A matched pair of modems, certified for use on the HP3000, at each end of the line is required if remote installation is planned. The customer should also conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of the MTS on the HP3000, the customer should provide for electrical outlets for the multipoint devices, purchase and install signal cables to which the devices are to be connected, install strap and configure HP multipoint devices, and install and verify the operation of any 3270 type devices.

The customer should ensure that there are customer personnel available on site at the time of installation of MTS, and that these personnel are trained in the use of MTS. HP can provide this training, with a separate charge to the customer, under standard training agreements. For "R" and "M" products, the installation is available on a time and material basis.

## HP Installation Responsibility

During the MTS installation, HP will perform the following tasks:
- Do a System Update to add the product software modules to the system
- Add the Link hardware into the I/O software configuration, and configure the product in accordance with the customer's intended use.
- Verify that the correct number and version of the software modules have been installed.
- Verify that the product properly opens the line when started by command.

NOTE: At this point, installation of the MTS product is complete.

However, if all necessary facilities not a part of MTS are available for testing, HP will attempt to perform a test that demonstrates product operation in the customer's environment.

If problems are encountered during the operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of MTS will be considered HP consulting support, and billable to the customer at normal HP consulting rates.

## Ordering Information

| | |
|---|---|
| 32025A | MTS Multipoint Terminal Support for the HP3000 Requires a 32026A, 32027A or 32028A Link |

*Select one Processor Option*

*Processor Options*

| | |
|---|---|
| 310 | For Series 30 and 33 |
| 320 | For Series III, 39, 40, 42, 44 and 48 |
| 330 | For Series 64 and 68 |

| | |
|---|---|
| 32025M | "Right -to-Copy" 32025A without sublicense Requires a 32026A, 32027A or 32028A Link |

*Select one Processor Option*

*Processor Options*

| | |
|---|---|
| 310 | For Series 30 and 33 |
| 320 | For Series III, 39, 40, 42, 44 and 48 |
| 330 | For Series 64 and 68 |

| | |
|---|---|
| 32025R | "Right-to-Copy" 32025A with sublicenses Requires a 32026A, 36027A or 32028A Link |

*Select one Processor Option*

*Processor Options*

| | |
|---|---|
| 310 | For Series 30 and 33 |
| 320 | For Series III, 39, 40, 42, 44 and 48 |
| 330 | For Series 64 and 68 |

## Support Products

| | |
|---|---|
| HP32025A+S00 | Software Material Subscription (SMS) for MTS |
| HP32025A+W00 | Extended SMS for MTS |

(RCS and AMS customers also need to order the appropriate Data Communications Category support. A given category only needs to be ordered once for all products in that category)

## Documentation

For additional technical information, consult the following Hewlett-Packard manuals:
32193-90002 Multipoint Terminal Software Reference Manual
32193-90007 MTS Installation Manual
HP 3000 Product Information Guide
02333-90001 HP 2333A Reference Manual

# Workstation Configurator Software for ATP and ADCC

HP AdvanceNet

## Data Sheet

The Workstation Configurator software (WSC) allows an HP 3000 user to configure connection parameters for a given asynchronous port and device. Using WSC, characteristics such as flow control handshakes, parity setting, block mode operation, read trigger characters, special function characters, and control functions can be specified and saved as workstation type files. The software driver uses the workstation types in communicating with the attached devices. This allows a user to effectively manage his I/O serial ports for interfacing to a wide variety of asynchronous devices with different datacomm needs.

## Features

■ Provides a Workstation Configurator utility routine for an interactive, menu-driven interface to create, modify, and manipulate workstation type files.
■ Supports Advanced Terminal Processor (ATP) or Asynchronous Data Communication Controller (ADCC) hardware.
■ Choice of three workstation flow control protocols: Enquiry/Acknowledge or Delay handshakes controlled by the software driver; XON/XOFF mechanism controlled by the attached device.
■ Supports block mode workstations by allowing the user to define the block mode alert and trigger characters.
■ Special characters can be defined for system attention, backspace, cancel line, end-of-record, or subsystem break.
■ Control setting can be specified for echo, line feed, backspace response, or parity.
■ A set of characters can be defined to be stripped and ignored by the serial I/O driver.
■ Printer control information such as initialization string and Vertical Format Control can be defined.

## Functional Description

When operating a serial I/O device with the HP 3000, there is a set of communication characteristics, including such things as echo and parity, which are collectively known as the "terminal type" for the port to which the device is connected. These terminal types determine how the HP 3000 communicates with the device.

HP supports a predefined set of terminal types (see Terminal Type Table in the ATP or ADCC data sheet), each with a different combination of characteristics. With WSC, a user is free to define his own workstation types beyond the predefined ones and save the information in files for future usage. This gives the user the flexibility to configure I/O ports for interface to a wide variety of devices with different communication characteristics.

WSC provides a friendly interface for the user to configure a particular workstation type. An interactive, menu-driven session allows a user to create or modify a workstation type. The user-defined type can then be saved as a disc file and assigned to a particular I/O port at system configuration time. It can also be used at log-on time to override any pre-configured workstation type.

Three flow control handshakes are available to the user: Enquiry/Acknowledge, Delay, or XON/XOFF. The Enquiry/Acknowledge protocol allows the user to define the Enq/Ack characters, block size, and Timeout option. The Delay protocol allows the user to specify delay value for Carriage Return, Line Feed, and Form Feed. Time out value can be defined with the XON/XOFF protocol.

WSC allows a user to specify if block mode support is needed and what characters are used for alerting and triggering a block read. I/O driver specific characters such as MPE console attention, backspace, cancel line, end-of-record, and subsystem break can all be redefined using WSC. A set of characters which has no special function other than to be removed from the input data can also be defined. Other definable characteristics in WSC include control setting such as echo, backspace response, parity, and the initialization string and Vertical Format Control for printers.

## Functional Specification

| Function | User Definable Parameters |
|---|---|
| Flow Control | Enquiry/Acknowledge, Delay, XON/XOFF |
| Enq/Ack | Enq/Ack Characters, Block Size, Timeout Option (Send next block, Send another Enq, Send error message) |
| Delay | Delay value for CR, LF, FF |
| XON/XOFF | Timeout value (1 to 255 seconds) |
| Read Trigger | None or ASCII character (default: DC1) |
| Block Mode | None or Alert character (default: DC2) Trigger character (default: DC1) |
| Special Characters | Console Attention (default: Control-A) Backspace (default: Control-H) Cancel Line (default: Control-X) End-of-Record (default: CR) Subsystem Break (default: Control-Y) |
| Stripped Characters | A set of ASCII characters |
| Control | Initial Echo (on, off) Form Feed on Output (yes, no) Line Feed on Input (yes, no) Backspace Response (Nothing, Control-Y, Line Feed, Slash, Erase Character) Parity (None, Odd, Even, 0, 1) |
| Printer Control | Initialization string Vertical Format Control Sequences |

## Product Requirements
- Current version of the MPE-VE Operating System.
- Workstation Configuration Software (30239A/M/R).
- Advanced Terminal Processor hardware (30144A, 30145A, and 30155A) or Advanced Terminal Processor for the Series 37 hardware (30460A) or Asynchronous Data Communication Controller hardware (30018A and 30019A)

## Product Support
HP support is limited to the WSC software only and not for support of any non-HP devices on the HP 3000. Using the WSC, an HP 3000 I/O port may be configured to operate with a wide variety of characteristics. This variety gives WSC users the ability to operate many different devices or device modes on the HP 3000. However, proper and efficient operation of devices using a customer-defined terminal type is not HP's responsibility. It is the customer's responsibility to ensure device compatibility with the terminal controller hardware and the WSC software.

Support of the WSC is limited to verifying that the action performed by the HP 3000 hardware and software corresponds to the specifications in the *Workstation Configurator Reference Manual* (P/N 30239-90001) and the *Point-To-Point Workstation I/O Reference Manual* (P/N 30000-90250). The effect of using a non-HP device on the HP 3000 or an HP device in an unsupported mode remains the responsibility of the customer.

NOTE: Major HP 3000 Subsystem software products have been tested with user-defined workstation type files in effect. However, product features which require specific terminal type numbers might not operate properly with user-defined workstation types; a warning message will be given in such cases.

## Installation Policy
Hewlett-Packard will provide software installation of 30239A for customers with Account Management Support (AMS). Installation of the 30239M and 30239R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Prior to the WSC installation, customers must perform an HP 3000 system backup, including MPE, and @.PUB.SYS, and make the HP 3000 system available for WSC installation and test.

During the WSC installation, HP will add the product software modules to the system and verify that the WSC utility runs properly.

NOTE: At this point, installation of the WSC product is considered complete.

## Ordering Information

| Product | Description |
|---|---|
| 30239A | Workstation Configurator *(Select one Processor Option)* |
|  | *Processor Options* 310 Series 37 320 Series 39, 42 and 48 330 Series 68 |
| 30239M | "Right-to-Copy" 30239A without sublicense *(Select one Processor Option)* |
|  | *Processor Options* 310 Series 37 320 Series 39, 42 and 48 330 Series 68 |
| 30239R | "Right-to-Copy" 30239A with sublicense *(Select one Processor Option)* |
|  | *Processor Options* -310 Series 37 -320 Series 39, 42 and 48 -330 Series 68 |

## Documentation

For detail usage and technical information, please consult the following reference manuals:

| | |
|---|---|
| 30239-90001 | *The Workstation Configurator Reference Manual* |
| 30000-90250 | *The Point-to-Point Workstation I/O Reference Manual* |

## Support Services

The following support packages are available for the Workstation Configurator. Depending on what support category is ordered for the operating system different support alternatives are available for the Workstation Configurator.

| Operating System Support Category | Product Number | Workstation Configurator Support |
|---|---|---|
| SMS | 30239A + S00 | SMS-Workstation Configurator |
| | 30239A + W00 | Extended SMS-Workstation Configurator |
| RCS or AMS | The above plus: | |
| | 99084B + C00 | Utility SUP/3000 |
| | + Q00 | MUS-Utility SUP/3000 |
| | + V00 | Extended Utility SUPT/3000 |

# HP 3000-to-IBM Communications

**HEWLETT PACKARD**

The table below provides a general overview of IBM hardware and software supported by current HP 3000-to-IBM data communications products: SNA NRJE, MRJE, RJE and IMF. For more detailed product and supportability information, please refer to the specific section on each product in this Specification Guide.

OVERVIEW OF SUPPORTED CONFIGURATIONS

| Hardware | IBM Software | HP 3000 Subsystem | | | |
| --- | --- | --- | --- | --- | --- |
| | | SNA NRJE | MRJE | RJE | IMF |
| 43XX 30XX 370's or Plug Compatible Mainframe | IMS | n/a | n/a | n/a | S |
| | TSO | n/a | n/a | n/a | S |
| | CICS | n/a | n/a | n/a | S |
| | CMS/VM | n/a | n/a | n/a | S |
| | JES2 | S | S | S | n/a |
| | JES3 | N[2] | S | S | n/a |
| | ASP | N | S | S | n/a |
| | HASP, HASP II | N | S | S | n/a |
| | RSCS | N | S[1] | S | n/a |
| | POWER | N[2] | N | S | n/a |
| | RES (JES1) | N | W[1] | S | n/a |
| System/34 | | N | N | W | N |
| System/36 | | N | N | W | N |
| System/38 | | N | N | W | N |

KEY: S — Supported

W — Works generally but all features may not be supported.
Contact your HP System Engineer for details in specific configuration.

N — Not supported.

[1]Job management feature not supported.

[2]Planned to be supported on future release.

# SNA NRJE Network Remote Job Entry

Computer Museum

## HP AdvanceNet

Model Number 30245A
For HP 3000 Computer Systems
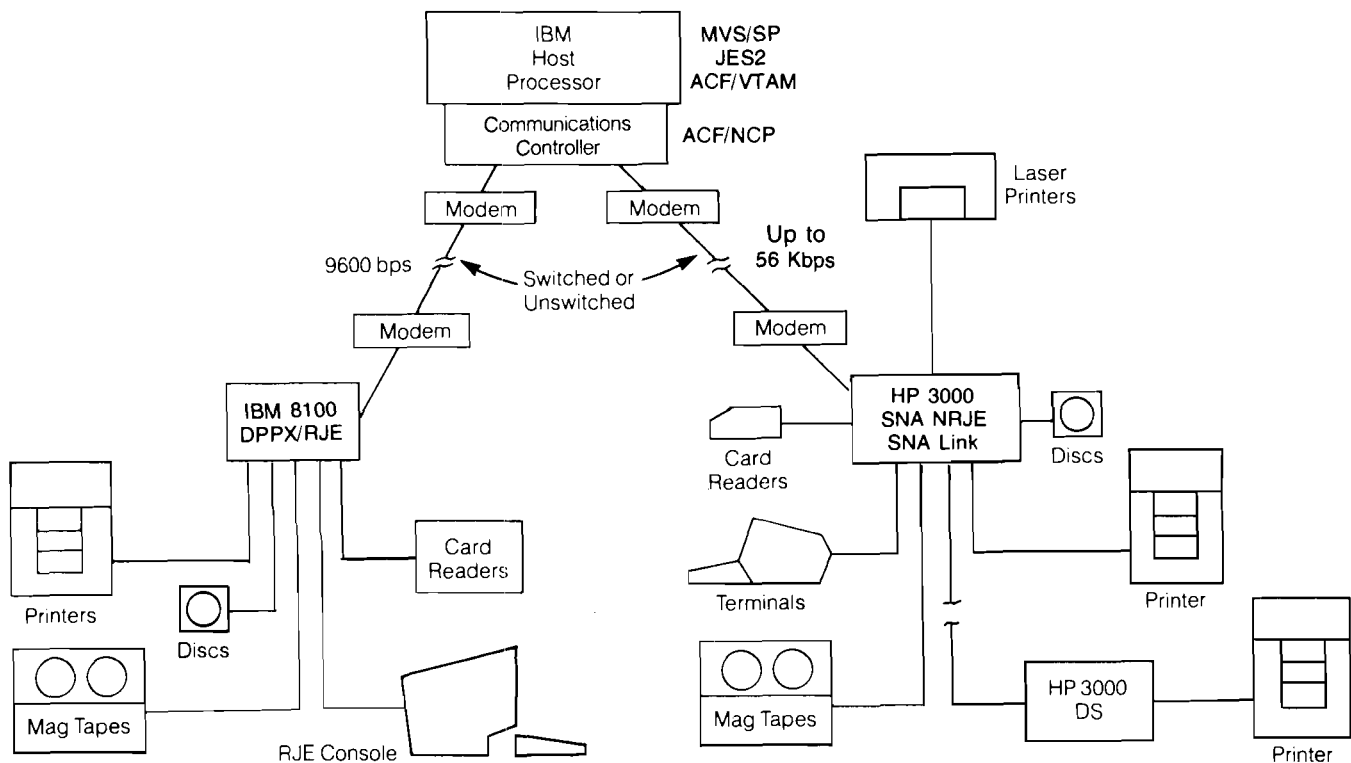


SNA NRJE Network Remote Job Entry and SNA Link provide batch data communications between the HP 3000 and an IBM System/370-compatible mainframe in a System Network Architecture environment. System Network Architecture (SNA) is IBM's comprehensive specification for distributed data processing networks.

SNA NRJE has a wide variety of applications. Users can submit batch jobs for processing under JES2 on an SNA host processor, and receive job output for printing or output on a supported HP 3000 peripheral. As an example, the results of HP 3000 processing can be transmitted to the SNA host for updating a central data base(s). Also, information from the updated central data base(s) can be sent down to the HP 3000.

SNA NRJE allows an HP 3000 to emulate the RJE workstation functions of an IBM 8100 with a DPPX operating system. It is used with SNA Link, which provides the SNA network connection. Architecturally, SNA NRJE and SNA Link make the HP 3000 appear as a Physical Unit type 2, Logical Unit type 1, SNA node.

### Features
- The HP 3000 emulates the functions of an IBM 8100 DPPX/RJE workstation.
- 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.

- Job output can be sent to supported HP 3000 output devices through the Output Management Interface.
- Other HP 3000 applications run concurrently with SNA data communications.
- The HP 3000 with an HP 2680, is an economical remote printer for an SNA mainframe.
- Customizable error and help message facilities are provided.
- Host console commands can be sent and received.
- Data compression and character code translation is configurable.

## Functional Description

SNA NRJE allows HP 3000 Series 37, 39, 4X and 6X systems to emulate the functions of an IBM 8100 DPPX/RJE workstation. Multiple users can concurrently gain access to an IBM System/370-compatible mainframe for batch data processing. SNA NRJE requires the services of SNA Link, which provides the connection to the IBM (or plug-compatible) mainframe. The HP 3000 appears as an SNA Physical Unit type 2, Logical Unit type 1 (PU-2, LU-1) node in the SNA network.

The SNA NRJE user interface has commands for submitting jobs, displaying job status, canceling jobs and other functions. 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 NRJE operations. The HP 3000 will concurrently process user applications and data communications with an IBM mainframe (and other HP systems).

Operation of the user 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 Output Management Interface of SNA NRJE can be used to change the ultimate disposition of job output from the host. Job output is routinely governed by parameters set to default values in the configuration file. With Output Management, a user-written program can override some of these values to change the ownership of the job, job priority, and the peripheral to which the job is sent. This allows users the flexibility to route job output to a destination in a manner that best fits their operation.

Using SNA NRJE and SNA Link, an HP 3000 with an HP 2680 Laser Printer can act as a remote (or local) 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. For most print jobs, the high print speed of the laser printer is utilized with a 56 Kbps Dataphone Digital Service (DDS) line.

The NRJE operator can control job activity by issuing host console commands; either interactively through the NRJE subsystem, or as part of an HP 3000 program executing intrinsics.

## Table of Selected User Commands

| Command | Function |
|---------|----------|
| NRJE | Invoke the NRJE interface |
| SUBMIT | Send a job file to the host |
| DISPLAY | Display workstation status and other information |
| SHOW | Display information about jobs previously submitted |
| ALTER | Change the priority of job(s) previously submitted |
| CANCEL | Cancel job(s) submitted but not transmitted to the host |
| HELP | Provide information about every NRJE command |
| REDO | Edit and re-execute the last NRJE command |
| EXIT | Return the user to MPE |

## Functional Specifications

SNA NRJE and SNA Link provide the HP 3000 with the functions of an IBM 8100 DPPX/RJE workstation, operating as a remote node in an SNA network — a Physical Unit type 2, Logical Unit type 1 (PU-2, LU-1) node.

SNA NRJE and SNA Link have been tested and are certified to operate with IBM System/370-compatible systems (370, 303X, 308X, or 434X) running MVS/SP, JES2 and ACF/VTAM, through an IBM 3705 or 3725 communications controller running ACF/NCP.

The maximum block size supported by NRJE is 512 bytes.

## Product Requirements
- An HP 3000 Series 37, 39, 4X or 6X and MPE V with Pascal SL.
- HP 30246A SNA Link
- HP recommends additional memory with SNA NRJE and SNA Link for good performance. Requirements vary by application. Generally, we recommend approximately 1 MB in addition to what would be required without NRJE. (Each system should have at least 2 MB of memory.) See your HP System Engineer to help determine your requirements.
- SNA NRJE requires an IBM 370-compatible mainframe (Model 370, 303X, 308X or 43XX) with an IBM 3705 or 3725 communications controller.
- The following software must be running on the host and communications controller:

  MVS/SP
  JES2
  ACF/VTAM
  ACF/NCP

  HP will support certain versions, releases, modifications and PTF levels of the above software. Your HP Sales Representative or System Engineer can determine whether NRJE can be supported with your particular configuration. The Network Configuration Checkout service offered by HP's Information Networks Division will help the System Engineer determine support requirements in advance for NRJE in a particular network.

## Installation Policy
Hewlett-Packard will provide software installation of 30245A for customers with Account Management Support (AMS). Installation of the 30245M and 30245R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

## Customer Installation Responsibility
Prior to the installation of SNA NRJE and SNA Link on the HP 3000, the customer is responsible for installation of a switched or nonswitched line between the HP 3000 system and the communications controller on the host system — with a matched pair of synchronous modems that are certified for use with HP 3000 systems at each end of the line. The customer should conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of SNA NRJE and SNA Link, the customer should arrange installation of the necessary host mainframe system software and hardware to support SNA NRJE and SNA Link, and arrange generation of the host mainframe software in a manner compatible with the intended use of SNA NRJE and SNA Link. Contact your local HP System Engineer for typical host parameter values.

Non-standard modifications to host system software may prevent operation of SNA NRJE, and should always be discussed with HP's Systems Engineering organization well in advance of SNA NRJE and SNA Link installation to determine the impact of any modifications.

Customer personnel should be available on site at the time of installation of SNA NRJE and SNA Link. These personnel should be trained in the use of SNA NRJE. HP can provide this training, with a separate charge to the customer, under standard training agreements.

The customer must also provide a brief job or test procedure, and make the host system available for test at the agreed-upon time for installation of SNA NRJE and SNA Link.

Prior to installation of SNA NRJE and SNA Link, the customer must perform an HP 3000 backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of NRJE and SNA Link software, interface card and cable.

## HP Installation Responsibility
During the SNA NRJE and SNA Link installation, HP will:
- Do a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the SNA Link hardware into the I/O software configuration, and configure the SNA Link product in accordance with the customer's intended use.
- Connect the SNA Link hardware to the customer's communications line (only if available at installation).
- Verify that the product properly opens the line when started by command.

  NOTE: At this point, installation of the SNA NRJE and SNA Link products is complete.

  If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of SNA NRJE and SNA Link will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## System Environment
SNA NRJE and SNA Link are available on the HP 3000 Series 37, 39, 4X and 6X with MPE V.

**Note: SNA NRJE requires installation and operation of HP 30246A, SNA Link.**

## Ordering Information

| | |
|---|---|
| 30245A | SNA NRJE Network Remote Job Entry |
| | Requires 30246A SNA Link |
| | *Select one Processor Option* |

**Processor Options**

| | |
|---|---|
| 310 | For Series 37* |
| 320 | For Series 39 through 48 |
| 330 | For Series 64 and 68 |
| 30245M | "Right-to-Copy" 30245A without sublicense |
| | Requires 30246A SNA Link |
| | *Select one Processor Option* |

**Processor Options**

| | |
|---|---|
| 310 | For Series 37* |
| 320 | For Series 39 through 48 |
| 330 | For Series 64 and 68 |
| 30245R | "Right-to-Copy" 30245A with sublicenses |
| | Requires 30246A SNA Link |
| | *Select one Processor Option* |

**Processor Options**

| | |
|---|---|
| 310 | For Series 37* |
| 320 | For Series 39 through 48 |
| 330 | For Series 64 and 68 |

\* Supported on Series 37 only up to 9600 bps.

## Support Products

30245A+S00 Software Material Subscription (SMS) for SNA NRJE
30245A+W00 Extended SMS for SNA NRJE

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)
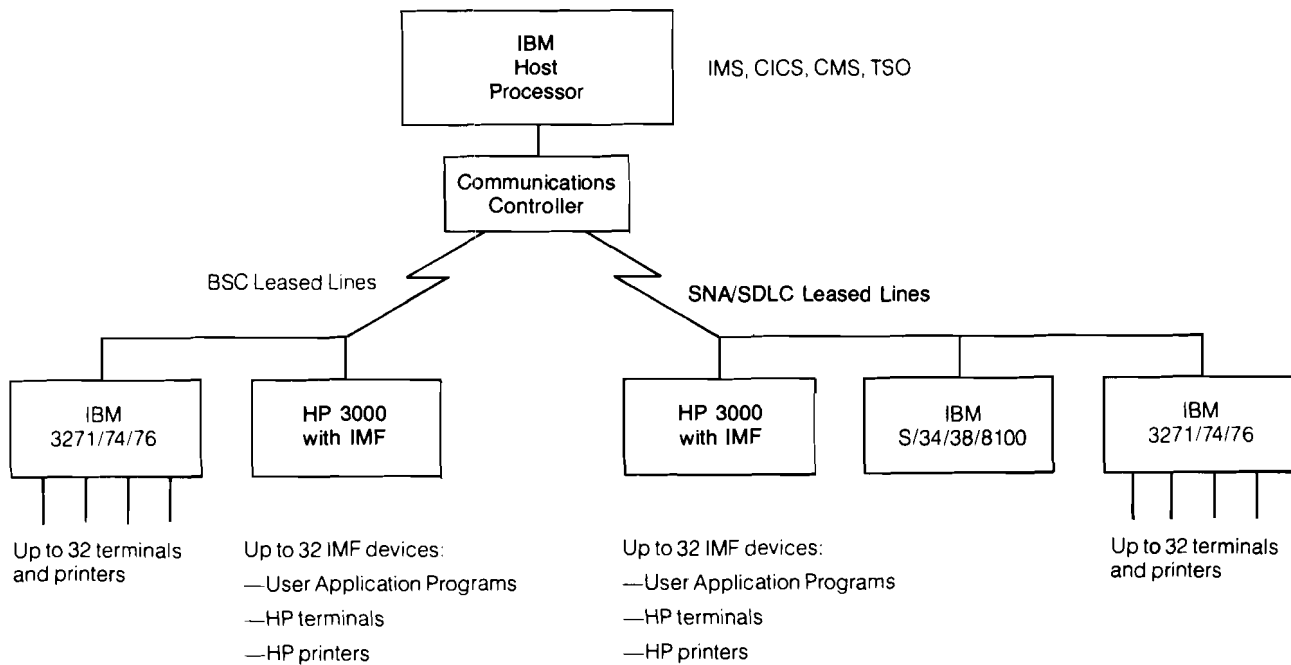
## Documentation

30245-90001 SNA NRJE Reference Manual

# IMF Interactive Mainframe Facility

HP AdvanceNet

MODEL NUMBER 30250A
For HP 3000 Computer Systems

```
                    ┌──────────────┐
                    │     IBM      │
                    │     Host     │      IMS, CICS, CMS, TSO
                    │   Processor  │
                    └──────────────┘
                      ┌──────────────┐
                      │Communications│
                      │  Controller  │
                      └──────────────┘

     BSC Leased Lines                  SNA/SDLC Leased Lines

┌──────────┐  ┌──────────┐    ┌──────────┐  ┌──────────┐  ┌──────────┐
│   IBM    │  │  HP 3000 │    │  HP 3000 │  │   IBM    │  │   IBM    │
│3271/74/76│  │ with IMF │    │ with IMF │  │S/34/38/8100│ │3271/74/76│
└──────────┘  └──────────┘    └──────────┘  └──────────┘  └──────────┘
```

| Up to 32 terminals and printers | Up to 32 IMF devices: | Up to 32 IMF devices: | Up to 32 terminals and printers |
|---|---|---|---|
| | —User Application Programs | —User Application Programs | |
| | —HP terminals | —HP terminals | |
| | —HP printers | —HP printers | |

IMF/Interactive Mainframe Facility and BSC Link allow an HP 3000 to communicate interactively with an IBM System/370-compatible mainframe computer system using BSC or SDLC (pu-1) 3270 protocols. IMF allows programs on the HP 3000 to access host program products such as CICS, IMS, CMS, and TSO through a set of high-level easy-to-use intrinsics. User terminals connected to the HP 3000 may also use IMF to send and receive data from the host system.

IMF requires the installation and use of BSC Link. BSC Link manages the data communications protocol and link between the HP 3000 and the IBM-compatible mainframe and communications controller. It contains software, a hardware interface card and a cable.

## Features

- IMF and BSC Link allow an HP 3000 system to emulate the major features of an IBM 3271 control unit using BSC or SDLC protocol.
- Using the SDLC protocol, IMF allows the HP 3000 to be a Physical Unit type one (pu-1) node in an IBM SNA network.
- IMF allows programs on an HP 3000 to communicate with programs on the host system, through a set of 21 high-level intrinsics. Programs may be written in FORTRAN, COBOL, COBOL II, BASIC, PASCAL or SPL.
- The IMF user interface is transparent to the protocol being used, thus changing from a BSC to SDLC environment requires little or no modification to the HP 3000 application programs.
- The Pass-Thru capability of IMF allows HP 3000 attached printers and terminals to emulate the major features of IBM 3270 printers and terminals.

- IMF takes advantage of the modify data tag feature of HP 150, 2624A,B and 2628A terminals, reducing response time.
- IMF allows the user to define terminal function keys to be their most-used IBM program function keys.
- Terminals/printers being used in the Pass-Thru mode do not have to be dedicated. The user may access either the HP 3000 or the remote host from the same terminal.
- In addition to the security features provided by MPE, access of the IMF subsystem is controlled through the ALLOW feature of a IMF configuration file—this allows only designated users, programs, terminals or printers to use the IMF subsystem.
- The Auto Acquire capability of IMF makes it possible for designated terminals to be turned on in the Pass-Thru mode without any user commands.
- IMF may be accessed remotely via DS3000.
- Most host application programs designed to work with IBM 3270 terminals can usually be used without change.

## Functional Description

IMF is a software product that allows an HP 3000 to emulate the major facilities and capabilities of the IBM 3271 control unit. IMF requires HP 30251A, BSC Link, which provides communications link management services. They provide HP 3000 users the ability to communicate interactively with host processors. IMF has two modes of operation: Program Access mode and Pass-Thru mode.

In the Program Access mode user-written programs on the HP 3000 can communicate with programs on the host. HP 3000 programs may be written in FORTRAN, COBOL, COBOL II, BASIC, PASCAL or SPL. Program access is accomplished through use of a set of intrinsics that are powerful procedures that 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 DS/3000. The high-level easy-to-use nature of these intrinsics results in improved programmer productivity.

TABLE 1 IMF INTRINSICS SUMMARY

| INTRINSIC | FUNCTION |
|---|---|
| IMF Intrinsics Used With Standard MPE I/O | |
| ACQUIRE3270 | Provides the IMF users the capability to start Pass Thru on an HP 3000 terminal or printer programatically. |
| ATTRLIST | Returns the locations of attribute characters within all or a sub-section of a screen. |
| CLOSE3270 | Equivalent to turning off the specified device. |
| ERR3270 | Returns the error message associated with a given Intrinsic error number. |
| FIELDATTR | Returns information about the attributes of the specified field. |
| OPEN3270 | Equivalent to turning on the power of a 3270 Display Station or Printer. It allocates the internal screen buffer used by IMF. |
| 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 on 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 on 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 of the version of IMF that is being executed on the HP 3000. |

| INTRINSIC | FUNCTION |
|---|---|
| WRITEFIELD | Writes data from the HP application program into an unprotected field of the internal screen buffer. |
| IMF Intrinsics for transparent data stream transfer with standard or MPE no-wait I/O using the SDLC protocol | |
| READSTREAM | Allows programs to access uninterpreted data streams from the host. |
| WRITESTREAM | Allows programs to create and transmit data streams from the HP 3000 to the host. |
| DSN/IMF intrinsics used with MPE no-wait I/O | |
| ABORT3270 | Aborts an outstanding no-wait RECV3270 or TRAN3270 request. |
| IODONTWAIT | Informs user program that a previous I/O operation has completed, or returns before completing, when using no-wait I/O |
| IOWAIT | Waits for completion operations for a previous no-wait I/O request. |
| NOTE: IOWAIT and IODONTWAIT are callable only from SPL, COBOL II, and FORTRAN programs or procedures. | |

Because Program Access Mode works by exchanging information thru screen images, most host applications that have been written for use with the IBM 3270 controllers will work with IMF without modification.

For customers that are in the process of changing from centralized to distributed processing, this feature helps provide a smooth transition.

The Pass Thru mode of IMF provides users the capability of using HP 3000 attached terminals and printers for interactive access to a host computer. In this mode IMF users can directly access host software such as CICS or IMS or they can use CMS or TSO for program development. Using the Pass Thru mode does not require the use of dedicated terminals.

**The Pass Thru mode of IMF 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.

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.

IMF takes advantage of the modify data tag feature of HP 150, 2624A,B and 2628A terminals. This may result in improved response time when compared to other HP terminals.

For applications where response time is critical please consult your Hewlett-Packard representative for more information.

Although the principal 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 2645 terminals.

TABLE 2
KEYBOARD DIFFERENCES
BETWEEN HP TERMINALS USING PASS-THRU
AND IBM 3270 TERMINALS

| 3270 Typewriter Keyboard | HP 2645A Keyboard |
|---|---|
| Program Function Keys | User specifies by typing desired program function number or thru user-defined configuration of HP function keys |
| FIELD MARK, TEST REQ, CURSOR BLINK, ALT CURSOR, IDENT, DEV CNCL, DUP, CLICK, PRINT and CURSOR SELECT Keys | No equivalent on HP terminals |
| PA1, PA2, PA3, CLEAR,SYSTEM REQUEST | Keys are in different locations (Soft keys 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<br><br>cent sign¢<br>!<br>solid vertical bar \|<br>"NOT" sign ⌐ | Corresponding HP Terminal Characters<br><br>[<br>]<br>!<br>∧ |

There are minor logical differences in the way HP terminals and IBM 3270 terminals behave. Differences include:

1. 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 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 IMF, since no characters had changed. A real 3270-type terminal will transmit such modified fields whether or not any characters are actually changed.

   This minor difference will be of no consequence for most customers' applications.

2. Trailing blanks are converted to nulls if the host sent nulls in those character locations. Trailing blanks are sent as blanks if the host sent anything other than nulls.

3. Leading blanks can be converted to nulls based on a configuration option at Pass-Thru start-up.

4. Magnetic card reader, auxiliary card reader, and light pen are not provided on HP terminals using Pass-Thru mode.

5. Only 1920 or 480 character screen sizes are allowed with IMF.

6. When using Pass-Thru mode with the Multipoint Terminal Software capability, activities that require knowledge of the cursor position (such as IBM's TSO/Structured Programming Facility in the split screen mode, or VSPC) cannot be performed except with the 2625A or terminals connected to a 2333A Cluster Controller.

7. IMF does not support the numeric lock feature.

As with the IBM 3270 controllers, using IMF one can run 32 concurrent sessions — either Program Access or Pass-Thru to terminals and printers.

## Functional Specification
- The following terminals are supported in Pass-Thru mode with the Multipoint Terminal Software.
  HP 2624B
  HP 2625A
  HP 2626A
  HP 2628A
  HP 2645A
  HP 2647A
  HP 2648A

- The following terminals are supported in Pass-Thru mode via ATC, ADCC or ATP attachment.

| | |
|---|---|
| HP 120 | HP 2640B |
| HP 125 | HP 2641A |
| HP 150 | HP 2642A |
| HP 2382A | HP 2645A |
| HP 2392A | HP 2647A |
| HP 2622A | HP 2648A |
| HP 2623A | HP 2649A with emulator |
| HP 2624A, B | program |
| HP 2625A | HP 98X6 with emulator |
| HP 2626A | program |
| HP 2627A | |
| HP 2628A | |

- In general, HP terminals which support block mode operation are supported by IMF. Your HP Sales Representative can help you determine supportability of your particular terminal configuration. The 2621B terminal does not support block mode and is not supported by IMF.
- The following terminals have the modified data tags feature and as a consequence provide 10–50% performance improvement over other terminals depending on the application.
  HP 150
  HP 2624A,B
  HP 2625A
  HP 2628A
- HP 264X terminals running Pass-Thru must have at least 8K of memory.
- IMF Pass-Thru supports any HP system printer.
- IBM BSC control units emulated:
  IBM 3271 Models 1 & 2
- IBM SDLC controllers emulated:
  IBM 3271 Models 11 & 12
- Message Encoding:
  IMF uses the NRZ
  (Non Return to Zero) encoding.
  IMF does not permit NRZI
  (Non Return to Zero Inverted) encoding.

## Product Requirements
- An HP 3000 running the current version of the MPE Operating System.
- Minimum of 512 Kb of memory.
- HP 30251A BSC Link.
- A data communications line — must be a non-switched (leased) line.

## Installation Policy
Hewlett-Packard will provide software installation of 30250A for customers with Account Management Support (AMS). Installation of the 30250M and 30250R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

## Customer Installation Responsibility

Prior to the installation of IMF and BSC Link on the HP 3000, the customer is responsible for installation of a non-switched (leased) line between the HP 3000 system and the communications controller on the host system — with a matched pair of synchronous modems that are certified for use with HP 3000 systems at each end of the line. The customer should conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of IMF and BSC Link, the customer should arrange installation of the necessary host mainframe system software and hardware to support IMF and BSC Link, and arrange generation of the host mainframe software in a manner compatible with the intended use of the IMF and BSC Link.

Non-standard modifications to host system software may prevent operation of IMF, and should always be discussed with HP's Systems Engineering organization well in advance of IMF and BSC Link installation to determine the impact of any modifications.

Customer personnel should be available on site at the time of installation of IMF and BSC Link. These personnel should be trained in the use of IMF. HP can provide this training, with a separate charge to the customer, under standard training agreements.

The customer must also provide a brief job or test procedure, and make the host system available for test at the agreed-upon time for installation of IMF and BSC Link.

Prior to installation of IMF and BSC Link, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of IMF and BSC Link software, interface card and cable.

## HP Installation Responsibility

During the installation of IMF and BSC Link, HP will:

- Do a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the BSC Link hardware into the I/O software configuration, and configure the BSC Link product in accordance with the customer's intended use.
- Connect the BSC Link hardware to the customer's communications line (only if available at installation).
- Verify that the product properly opens the line when started by command.

**NOTE: At this point, installation of the IMF and BSC Link products is complete.**

If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of IMF and BSC Link will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## System Environment

IMF is available on the entire HP 3000 product line running MPE-IV or V.

**NOTE: IMF requires installation and operation of HP 30251A BSC Link.**

## Ordering Information

| | | |
|---|---|---|
| 30250A | | IMF Interactive Mainframe Facility |
| | | Requires 30251A BSC Link |
| | | *Select one Processor Option* |
| | | *Processor Options* |
| | 310 | For Series 30, 33 and 37 |
| | 320 | For Series III and 39 through 48 |
| | 330 | For Series 64 and 68 |
| 30250M | | "Right-to-Copy" 30250A without sublicense |
| | | Requires 30251A BSC Link |
| | | *Select one Processor Option* |
| | | *Processor Options* |
| | 310 | For Series 30, 33 and 37 |
| | 320 | For Series III and 39 through 48 |
| | 330 | For Series 64 and 68 |
| 30250R | | "Right-to-Copy" 30250A with sublicenses |
| | | Requires 30251A BSC Link |
| | | *Select one Processor Option* |
| | | *Processor Options* |
| | 310 | For Series 30, 33 and 37 |
| | 320 | For Series III and 39 through 48 |
| | 330 | For Series 64 and 68 |

## Support Products

| | |
|---|---|
| 30250A + S00 | Software Material Subscription (SMS) for IMF |
| 30250A + W00 | Extended SMS for IMF |

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)
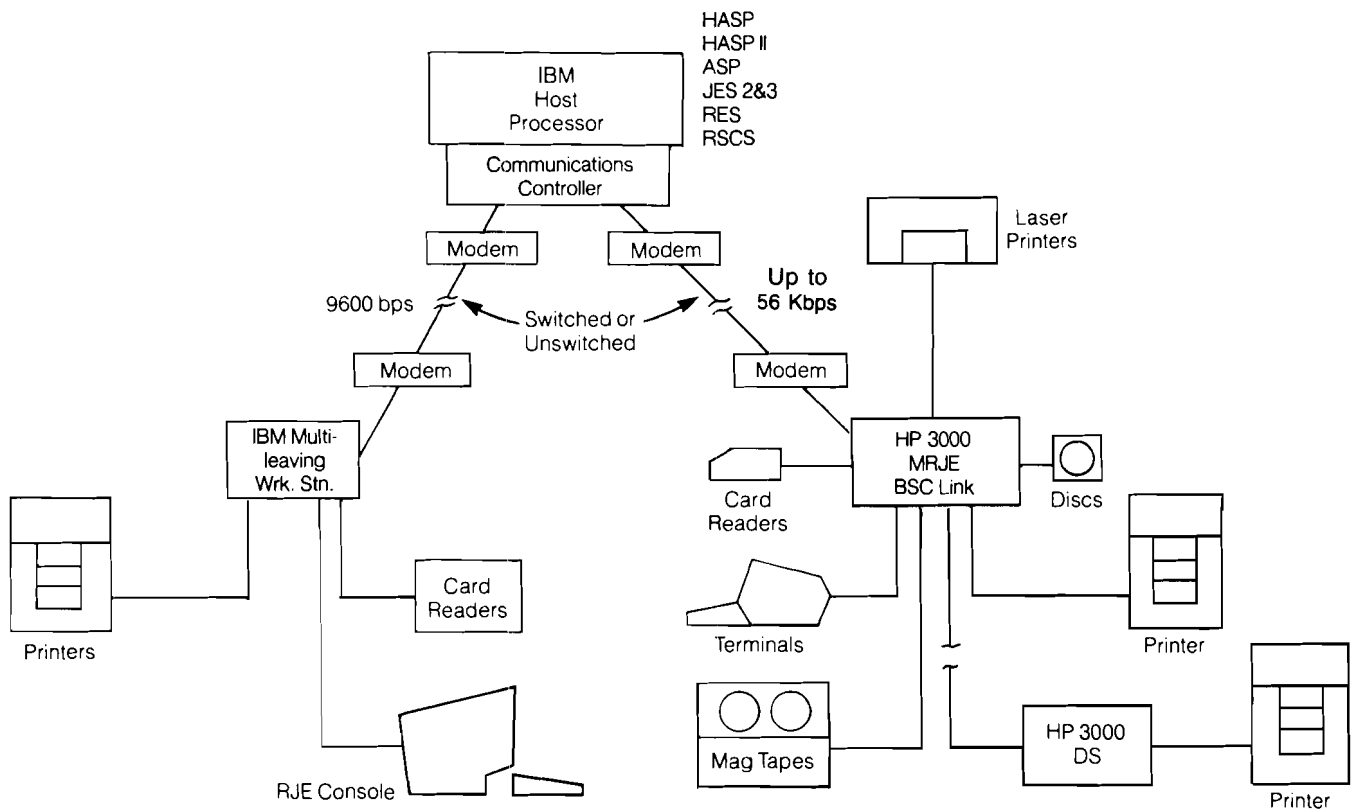
## Documentation

32229-90001 IMF Reference Manual

# Multileaving Remote Job Entry

**HP AdvanceNet**

Model Number 30249A
For HP 3000 Computer Systems



MRJE Multileaving Remote Job Entry and BSC Link allow multiple users to submit batch jobs to or receive output from a host. With the MRJE facility, the HP 3000 emulates workstations that work with one of the following job entry systems on the host: HASP, HASP II, ASP, JES2, JES3, RSCS, and RES.

MRJE requires the installation and use of BSC Link. BSC Link manages the data communications protocol and link between the HP 3000 and the IBM-compatible mainframe and communications controller. It contains software, a hardware interface card, and a cable.

## Features

- Allows multiple HP 3000 users simultaneous batch access to the host.
- Provides for automatic management of job output.

- Allows for concurrent use of all the processing facilities of the HP 3000 such as Program Development, Data Base Management and Transaction Processing.
- Allows any supported I/O device on the HP 3000 to be used for I/O including the HP 2680 Laser Printer.
- Allows MRJE or IBM host users to specify output spoolfile characteristics.
- Allows routing of unsolicited output to any destination device or file.
- MRJE can operate across distributed networks consisting of HP 3000 systems.
- Allows host console commands to be issued from any session.
- Has easy-to-use commands for job control.
- Allows users to schedule jobs even while the communications lines are down.
- Allows specification of Native Language Support for data transmission.

## Functional Description

MRJE and BSC Link allow an HP 3000 to emulate a workstation operating with HASP, HASP II, JES2, JES3 or ASP Job Entry Systems on the host. With this facility, multiple HP 3000 users can submit batch jobs to or receive output from a host system simultaneously. Use of the MRJE facility does not require the dedication of the entire system; all other processing facilities of the HP 3000 such as Data Base Management and Transaction Processing can be used concurrently with MRJE and BSC Link.

An HP 3000 and an HP 2680 or 2688 Laser Printer can use MRJE and BSC Link to act as a print station for a host computer. Remote sites with an HP 3000 Series 40, or newer model, can get the maximum printer output by using a 56 Kbps Dataphone Digital Service (DDS) line with an external 56 Kbps clock signal.

Both MRJE and IBM host users can direct their output to HP 2680 and 2688 laser printers and specify spool file output characteristics including: output priority, number of copies, output device class, and environment file. Environment files define special predefined forms, character fonts, and formats.

MRJE allows for automatic job management under a standard IBM Job Entry System; users can, at the time of job submittal, specify the particular device to which their job outputs are to be directed. No further user intervention is required.

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

Unsolicited output can be routed via host "Special Forms" names to any destination device or file (such as a disc file or a deferred spool file).

With MRJE, users can issue host console commands for controlling job activity. Host console commands can be entered interactively or may be issued as part of an IBM Job Control Language (JCL) deck; the commands must conform to the formats specified by the host system. Through the configuration file the MRJE manager can control the set of commands that a particular user can issue.

As an example of the host console command, the JES2 $DA command can be issued to display active jobs or a $DQ command may be issued to display job queues.

In addition to the host console commands, MRJE has easy-to-use commands for job control. These commands may be used for cancelling jobs, displaying job status and submitting jobs. All such commands may be issued either interactively through a terminal or through a batch job. A list of such commands is provided in Table 1.

With MRJE, jobs can be submitted whether the communication line between the host and the HP 3000 is open or closed. Jobs submitted when the line is closed are spooled on the HP 3000 and automatically transmitted when the connection is made. Output from the host is also automatically sent to the HP 3000 and directed to the user-specified output device.

### TABLE 1. SUMMARY OF MRJE USER COMMANDS

| COMMAND | | FUNCTION |
|---|---|---|
| C[ANCEL] [JOB]] | job#<br>jobname<br>joblist | Cancels one or more jobs. |
| D[ISPLAY] { H[OST]]<br>J[OBLOG]<br>S[TATUS]<br>C[ONFIG] | ,job#<br>,jobname<br>,joblist<br><br>,item#<br>,itemlist | Displays job status, host machine configuration information, and line status (connected or disconnected). |
| E[XIT] | | Terminates MRJE and returns control to MPE |
| H[OST] [hostid] | | Specifies the host machine that will be referenced by subsequent commands. |
| S[UBMIT] infile 1[(N)] [,infile2[(N)]]. . .[infile 5[(N)]]<br>[;R[EADER] = pseudo reader] [;PR[INT] = printfile[(N)]]<br>[;PU[NCH] = punchfile[(N)]] [;F[ORMS] = formfile [(N)]] | | |
| | | Enters a job for transmission to the current host. (N) specifies "no translation." |

## Functional Specifications

MRJE and BSC Link operate with the following IBM Job Entry Systems:

    HASP Version 3.1
    HASP II Version 4 (or later)
    JES2
    JES3
    ASP

For the following IBM Job Entry Systems automatic output routing via the SUBMIT command is not supported:

    RES
    VM/RSCS*

* Note: However automatic output routing can be performed through a mapping of the IBM host "Special Forms" name to an MPE "FILE" equation provided that the customer creates and supports a simple procedure to be called from an HP supplied exit. Consult the MRJE Reference Manual (30249-90001) for the specification of the required procedure.

The MRJE product is compatible with only the standard (default) generation of IBM Job Entry Systems. When in doubt, confirm MRJE support of your Job Entry System through your local Hewlett-Packard representative.

There can be 22 devices configured on the HP 3000. (However, the host will only support a total of 8 printers and punches at any one time.)
    7 card readers
    7 printers
    7 card punches
    1 console

## Product Requirements
- An HP 3000 running the current version of the MPE operating system.
- HP 30251A BSC Link.
- A data communications line—either switched or leased-between the HP 3000 and the host.
- The host must support one of the following job entry systems:
    HASP Version 3.1
    HASP II Version 4 (or later)
    JES 2
    JES 3
    ASP
    RSCS
    RES

## Installation Policy
Hewlett-Packard will provide software installation of 30249A for customers with Account Management Support (AMS). Installation of the 30249M and 30249R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

## Customer Installation Responsibility
Prior to the installation of MRJE and BSC Link on the HP 3000, the customer is responsible for installation of a switched (dial-up) or non-switched (leased) line between the HP 3000 system and the communications controller on the host system—with a matched pair of synchronous modems that are certified for use with HP 3000 systems at each end of the line. The customer should conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of MRJE and BSC Link, the customer should arrange installation of the necessary host mainframe system software and hardware to support MRJE and BSC Link, and arrange generation of the host mainframe software in a manner compatible with the intended use of MRJE and BSC Link.

Non-standard modifications to host system software may prevent operation of MRJE, and should always be discussed with HP's Systems Engineering organization well in advance of MRJE and BSC Link installation to determine the impact of any modifications.

Customer personnel should be available on site at the time of installation of MRJE and BSC Link. These personnel should be trained in the use of MRJE. HP can provide this training, with a separate charge to the customer, under standard training agreements.

The customer must also provide a brief job or test procedure, and make the host system available for test at the agreed upon time for installation of MRJE and BSC Link.

Prior to installation of MRJE and BSC Link, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of MRJE and BSC Link software, interface card and cable.

## HP Installation Responsibility
During the installation of MRJE and BSC Link, HP will:
- Do a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the BSC Link hardware into the I/O software configuration, and configure the BSC Link product in accordance with customer's intended use.
- Connect the BSC Link hardware to the customer's communications line (only if available at installation).
- Verify that the product properly opens the line when started by command.
    Note: At this point, installation of the MRJE and BSC Link products is complete.

If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of MRJE and BSC Link will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## System Environment
MRJE and BSC Link are available on the entire HP 3000 product line running MPE IV or V.

## Ordering Information

| | |
|---|---|
| 30249A | MRJE Multileaving Remote Job Entry |
| | Requires 30251A BSC Link |
| | *Select one Processor Option* |
| | *Processor Options* |
| 310 | For Series 30, 33 and 37 |
| 320 | For Series III and 39 through 48 |
| 330 | For Series 64 and 68 |
| 30249M | "Right-to-Copy" 30249A without sublicense |
| | Requires 30251A BSC Link |
| | *Select one Processor Option* |
| | *Processor Options* |
| 310 | For Series 30, 33 and 37 |
| 320 | For Series III and 39 through 48 |
| 330 | For Series 64 and 68 |
| 30249R | "Right-to-Copy" 30249A with sublicenses |
| | Requires 30251A BSC Link |
| | *Select one Processor Option* |
| | *Processor Options* |
| 310 | For Series 30, 33 and 37 |
| 320 | For Series III and 39 through 48 |
| 330 | For Series 64 and 68 |

## Support Products

30249A+S00 Software Material Subscription (SMS) for MRJE
30249A+W00 Extended SMS for MRJE

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

## Documentation

30249-90001 MRJE Reference Manual.

# RJE/Remote Job Entry

**HEWLETT PACKARD**

## HP AdvanceNet
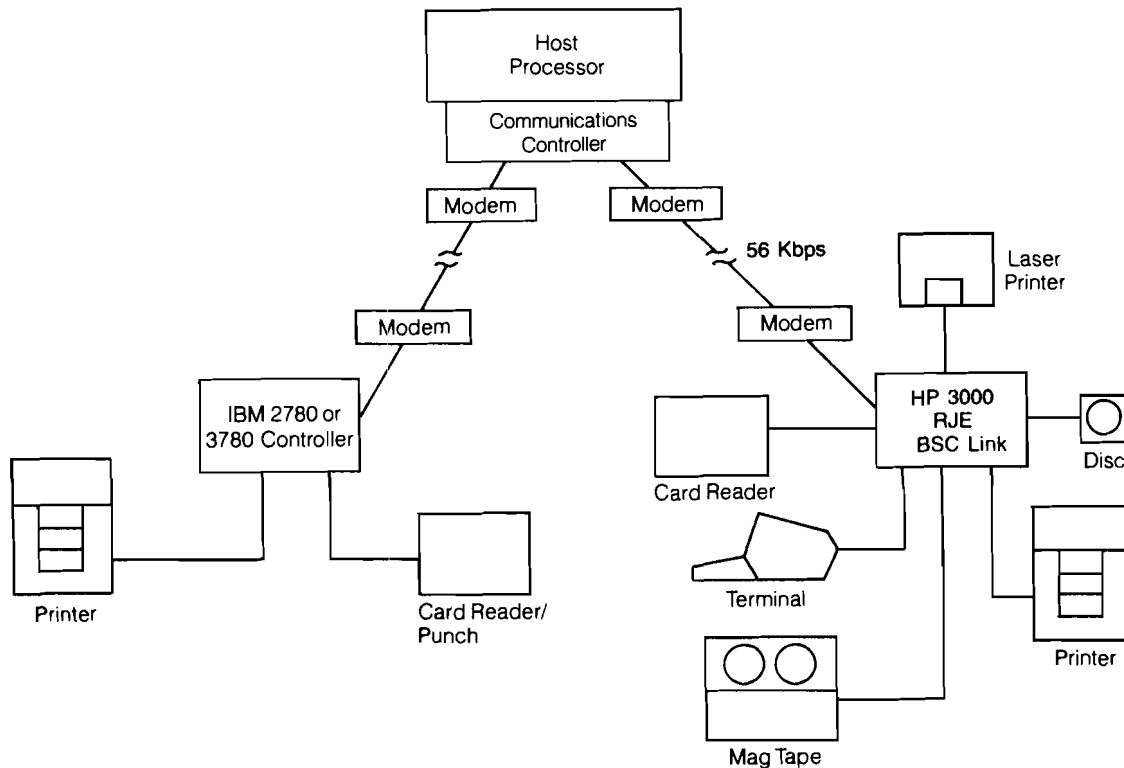
RJE/Remote Job Entry and BSC Link allow an HP 3000 system to emulate the major functions of an IBM 2780 or IBM 3780 workstation. RJE can transmit batch jobs to, and receive output from, a host processor that can support standard IBM 2780/3780 devices. Additionally, RJE can exchange files between an HP 3000 and many other processors that emulate standard IBM 2780/3780 devices.

RJE requires the installation and use of BSC Link. BSC Link manages the data communications protocol and link between the HP 3000 and the IBM-compatible mainframe and communications controller. It contains software, a hardware interface card and a cable.

## Features
- Allows the HP 3000 to emulate an IBM 2780 or 3780 workstation, using a point-to-point connection to the host.
- Provides a way of exchanging files between HP 3000's and many other systems that emulate standard IBM 2780 or 3780 devices.
- Allows users to submit jobs and receive output programmatically.
- Provides flexibility with regard to the devices used for input and output; any HP 3000 I/O device may be used.
- Can be used concurrently with other HP 3000 applications.
- Works over X.21 circuit switched networks in Europe.
- Optionally performs data compression.
- Optionally allows transparent mode transmission, thus allowing transmission of any arbitrary binary data stream.
- Allows specification of Native Language Support for data transmission.

## Functional Description

RJE and BSC Link allow an HP 3000 system to emulate the major features of an IBM 2780 or IBM 3780 workstation. Using RJE one can transmit batch jobs to, and receive output from, a host processor that can support standard IBM 2780/3780 devices. Additionally, one can use RJE and BSC Link to exchange files between an HP 3000 and many other processors that emulate standard IBM 2780/3780 devices.

An HP 3000 and an HP 2680 Laser Printer can use RJE and BSC Link to act as a high-speed print station for a host computer. Remote sites with an HP 3000 Series 40, or newer model, can get the maximum printer output by using a 56 Kbps Dataphone Digital Service (DDS) line and an external 56 Kbps clock signal.

RJE makes it possible for multiple users to submit jobs and receive output programmatically. Users can create files consisting of a set of commands; a user written program can then submit the names of these command files to a message file. The RJE Subsystem sequentially scans the message file and executes commands encountered in each of the command files. The RJE Subsystem can be set up to go into a continuous receive mode after it has finished executing all the command files.

Users can continue to use the RJE Subsystem in a single-user-at-a-time manual mode, if desired.

RJE and BSC Link can operate concurrently with all the other processing facilities of the HP 3000. This allows HP 3000 users to perform such functions as the Data Base Management, Transaction Processing, Data Collection and program development locally, while being able to transmit collected data (orders, payroll, etc.) or large CPU bound jobs, to a remote host for further processing.

By setting appropriate parameters RJE allows transmission of binary data streams (including control characters), and compression of successive and trailing blanks. Successive blanks are replaced by a two byte sequence — a control character and the number of blanks. This makes job transmission more efficient — particularly at a lower speed.

In an IBM 2780 system an end of medium (EM) mark is required before the trailing blanks in each record. RJE truncates trailing blanks by setting a parameter — no EM marks are required. However, when these are present they perform the intended function.

RJE accepts both horizontal tabulation and vertical forms control codes. It recognizes host carriage control characters and translates them to the corresponding characters for the HP 3000 printers. This makes it possible to print specially formatted forms. However, when special forms are used, output must be manually directed to the printer on which the appropriate form is mounted.

## Functional Specification

RJE emulates all standard features of the IBM 2780/3780 systems except it does not accept the six-bit transcode.

RJE has a set of high-level user commands that make it easy to use. The following is a list of these commands:

| COMMAND | FUNCTION |
|---------|----------|
| #RJCMDFILE | Causes RJE to take its commands from another file. |
| #RJCOMMENT | Provides a method for inline comments. |
| #RJCONTINUE | Enables user to provide a procedure to evaluate errors and provide limited direction for error handling. |
| #RJLINE | Defines the characteristics of the communications line. |
| #RJIN | Transmits input data from your HP 3000 Computer System to the remote processor. |
| #RJOUT | Requests and processes routed output from the remote processor. |
| #RJIO | Initiates transmission of a one-line message to the remote processor. |
| #RJINFO | Initiates a file display printing of the communications line. |
| #RJLIST | Requests and processes unrouted list output from the remote processor. |
| #RJPUNCH | Requests and processes unrouted punched output from the remote processor. |
| #RJEOD | Transmits an EOT control character (end-of-file) to the remote processor. |
| #RJEND | Terminates the HP RJE subsystem. |
| #RJSTAT | Provides statistical information on frequency of subsystem command use, elapsed times, and tallies of data transmitted and received. |

## Product Requirements

- An HP 3000 running the current version of the MPE Operating System.
- HP 30251A BSC Link.
- An IBM 370-compatible host running a job entry subsystem that supports 2780/3780 (RJE) protocols.
- A data communications line between the HP 3000 and the host—this can be either non-switched (leased) or switched (dial-up).

## Installation Policy

Hewlett-Packard will provide software installation of 30248A for customers with Account Management Support (AMS). Installation of the 30248M and 30248R products is not included with AMS support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

## Customer Installation Responsibility

Prior to the installation of RJE and BSC Link on the HP 3000, the customer is responsible for installation of a switched (dial-up) or non-switched (leased) line between the HP 3000 system and the communications controller on the host system—with a matched pair of synchronous modems that are certified for use with HP 3000 systems at each end of the line. The customer should conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of RJE and BSC Link, the customer should arrange installation of the necessary host mainframe system software and hardware to support RJE and BSC Link, and arrange generation of the host mainframe software in a manner compatible with the intended use of RJE and BSC Link.

Non-standard modifications to host system software may prevent operation of RJE, and should always be discussed with HP's Systems Engineering organization well in advance of RJE and BSC Link installation to determine the impact of any modifications.

Customer personnel should be available on site at the time of installation of RJE and BSC Link. These personnel should be trained in the use of RJE. HP can provide this training, with a separate charge to the customer, under standard training agreements.

The customer must also provide a brief job or test procedure, and make the host system available for test at the agreed-upon time for installation of RJE and BSC Link.

Prior to installation of RJE and BSC Link, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of RJE and BSC Link software, interface card and cable.

## HP Installation Responsibility

During the RJE and BSC Link installation, HP will:
- Do a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the BSC Link hardware into the I/O software configuration, and configure the BSC Link product in accordance with the customer's intended use.
- Connect the BSC Link hardware to the customer's communications line (only if available at installation).
- Verify that the product properly opens the line when started by command.

**NOTE: At this point, installation of the RJE and BSC Link products is complete.**

If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of RJE and BSC Link will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## System Environment

RJE and BSC Link are available on the entire HP 3000 product line running MPE IV or V.

## Ordering Information

| | | |
|---|---|---|
| 30248A | | RJE Remote Job Entry |
| | | Requires 30251A BSC Link |
| | | *Select one Processor Option* |
| | | |
| | | *Processor Options* |
| | 310 | For Series 30, 33 and 37 |
| | 320 | For Series III and 39 through 48 |
| | 330 | For Series 64 and 68 |
| 30248M | | "Right-to-Copy" 30248A without sublicense |
| | | Requires 30251A BSC Link |
| | | *Select one Processor Option* |
| | | |
| | | *Processor Options* |
| | 310 | For Series 30, 33 and 37 |
| | 320 | For Series III and 39 through 48 |
| | 330 | For Series 64 and 68 |
| | | *Processor Options* |
| | 310 | For Series 30, 33 and 37 |
| | 320 | For Series III and 39 through 48 |
| | 330 | For Series 64 and 68 |

**Note: RJE requires installation and operation of HP 30251A BSC Link.**
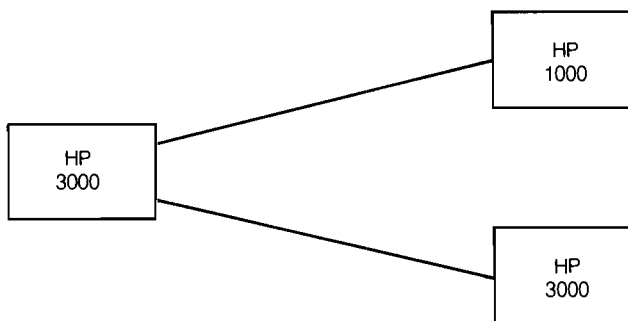
## Support Products

30248A + S00 Software Material Subscription (SMS) for RJE
30248A + W00 Extended SMS for RJE

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

## Documentation

30000-90047 RJE Reference Manual.

# Point-to-Point Hardwired Link

**HEWLETT PACKARD**

HP AdvanceNet

Model Number 30270A
For HP 3000 Computer Systems



The Point-to-Point Hardwired Link (Product Number 30270A) provides the local network connection for an HP 3000 system running DS (Distributed Systems) Network Services software, to connect to another HP 3000 or an HP 1000. Point-to-Point Hardwired Link provides the lower level protocol management software, a hardware interface card, and cables. Point-to-Point Hardwired Link fully supports the operation of HP 32185A/R/M DS Network Services.

## Features

- Consists of software, a hardware interface card (the Intelligent Network Processor), and cables.
- Supports direct local connection ("hardwired") between an HP 3000 computer system and either another HP 3000 system with DS Network Services, or an HP 1000 system with DS and the corresponding hardware.
- Uses a programmable microprocessor-driven line controller that reduces the HP 3000 overhead associated with communications line handling.
- For connection to current HP 3000 or HP 1000 series, has an RS-422 interface to an external interconnect cable (Product Number 30224L is required for HP 3000 to HP 3000 connection).
- Utilizes the contention bisynchronous communication protocol.
- Supports a line speed up to 56 Kbps (for communication with an HP 3000 Series III with SSLC, line speed is limited to 9.6 Kbps).

## Functional Description

Point-to-Point Hardwired Link provides the network link between an HP 3000 and another HP system (HP 3000 or HP 1000) with DS Network Services. It manages the bisynchronous protocol for a direct connection with a data transfer rate up to 56 Kbps.

Maximum data transfer rates and cable lengths are given in the table below.

| Connection from HP 3000 to | Cable Option | Data Interface | Maximum Speed | Maximum Cable Length |
|---|---|---|---|---|
| HP 3000 Series III | _35 | RS 422 | 56,000 bps | 1220 m (4000 ft) |
| SSLC | _40 | RS 232 | 9,600 bps | 15.2 m (50 ft) |
| HP 1000 | _45 | RS 422 | 56,000 bps | 1220 m (4000 ft) |

Point-to-Point Hardwired Link provides support for operaton of HP 32185A/R/M DS Network Services. It does not support user access to link intrinsics.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the Point-to-Point Hardwired Link product. Its architecture accommodates various protocols, interfaces and line speeds.

### Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of buffered data during a power failure
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards

The Direct Memory Access (DMA) on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates. Also contributing to the high throughput rate is the INP's ability to transfer the last correctly received block of data to the HP 3000 CPU as it is also processing and buffering the next block of data coming from the communication channel.

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, bisync protocol management, frame/block management, and data buffering are all performed by the INP. The INP thus frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

When the Point-to-Point Hardwired Link is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: The time limit on the battery back-up capability depends upon the user's system configuration.)

The maximum *total* number of INP's on a processor is given in the table below:

| HP 3000 Processor | Maximum Total INP's |
| --- | --- |
| Series III | 7 |
| 30,37,39,40,42 | 3 |
| 33,44,48 | 7 |
| 64,48 | 24 |

## System Environment

Point-to-Point Hardwired Link is available on all members of the HP 3000 processor family with current versions of the MPE-IV, MPE-V or MPE-V/R operating system. An INP requires a single Series 30, 33, 37, 39, 40, 42, 44, 48, 64, or 68 I/O slot. It requires two I/O slots for the Series III.

## Installation Policy

Hewlett-Packard will provide software installation of Point-to-Point Hardwired Link for customers with Account Management Support (AMS). For customers not covered by AMS, Hewlett-Packard software installation is available on a time and material basis.

Installation of the Point-to-Point Hardwired Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of 30270A.

## Customer Installation Responsibility

Prior to the installation of DS Point-to-Point Hardwired Link on the HP 3000, the customer is responsible for installation of the external interconnect cable between the HP 3000 systems (or to the HP 1000 system).

Immediately prior to installation of Point-to-Point Hardwired Link and DS Network Services, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of the data communications software, interface card, and cable.

Customer personnel should be available on site at the time the HP 3000 data communications products are installed. These personnel should be trained in the use of DS Network Services and Links. HP can provide this training, with a separate charge to the customer.

## HP Installation Responsibility

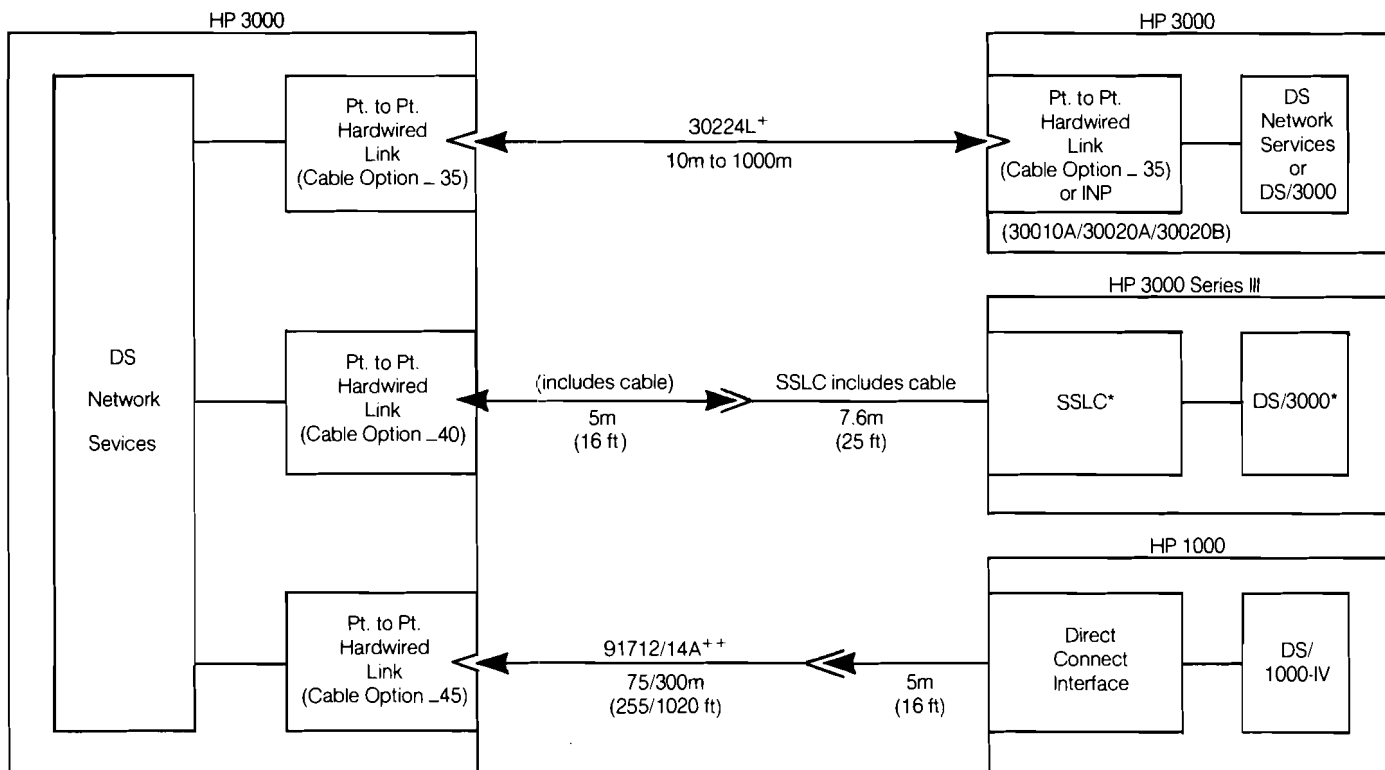During the installation of Point-to-Point Hardwired Link and DS Network Services, HP will:

- Install and verify the operation of the Point-to-Point Hardwired Link hardware and the direct connect cable.
- Perform a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the Point-to-Point Hardwired Link hardware into the I/O software configuration, and configure it in accordance with the customer's intended use.
- Connect the Point-to-Point Hardwired Link hardware to the customer's external interconnect cable (only if available).
- Verify that the product properly opens the line when started by command.

**NOTE: At this point, installation of the HP 3000 data communications products is complete.**

However, if all necessary facilities not a part of DS are available for testing, HP will attempt to perform a test that

demonstrates product operation in the customer's communication environment. If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of the HP data communications products will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.



\* The SSLC and DS/3000 (Model No. 32190) are no longer available; DS Network Services (32185) and a Network Link must be ordered

+ Must be ordered separately

++ Optional

Point-to-Point Hardwired Link

# Ordering Information

30270A    Point-to-Point Hardwired Link for HP 3000. Requires HP 32185A/M/R DS Network Services. *Select one combination Processor/Cable Option.*

*Processor Options*
1__    For Series 37
2__    For Series III
3__    For Series 30, 39, 40, 42
4__    For Series 33, 44 through 68

190    For Series 37, no hardware
290    For Series III, no hardware
390    For Series 30, 39, 40, 42, no hardware
490    For Series 33, 44 through 68, no hardware

*Cable Options*
_35    For connection to HP 3000 (External Interconnect Cable 30224L must be ordered separately)
_40    For connection to HP 3000 Series III with SSLC
_45    For connection to HP 1000

Additional Cable
30224L    External Interconnect Cable (required for HP 3000 to HP 3000 direct connection.) Standard length is 10 meters (33 ft).

*Length Options*
001    25 m (82.5 ft)
002    50 m (165 ft)
003    100 m (330 ft)
004    250 m (825 ft)
005    500 m (1650 ft)
006    1,000 m (3300 ft)

45

## Support Products

30270A +S00  Software Material Subscription (SMS) for Point-to-Point Hardwired Link

30270A +W00  Extended SMS for Point-to-Point Hardwired Link

(RCS and AMS customers must also order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

Customers with hardware support agreements must add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

## Documentation

30020-90005—Intelligent Network Processor Installation and Service Manual

# Point-to-Point Modem Link

**HEWLETT PACKARD**

HP AdvanceNet

Model Number 30271A
For HP 3000 Computer Systems
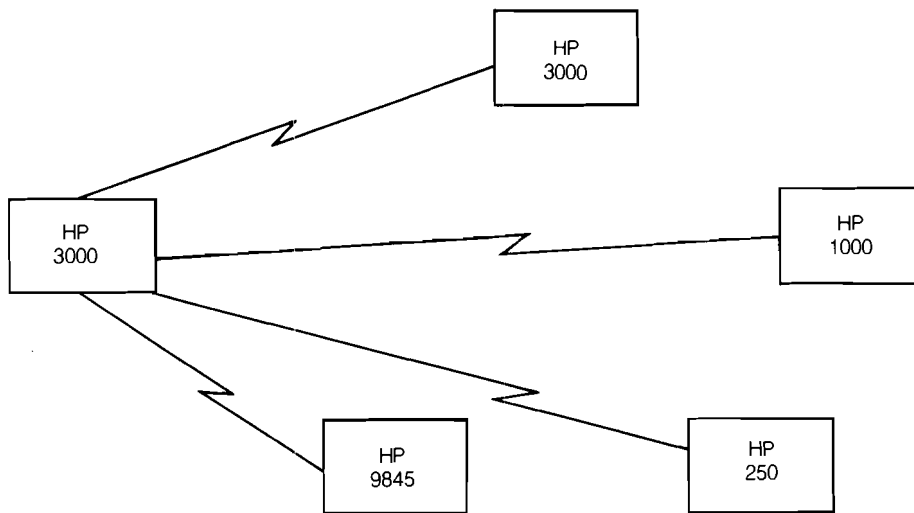


The Point-to-Point Modem Link (Product Number 30271A) provides the network connection for an HP 3000 system running DS (Distributed Systems) Network Services software, to communicate with another HP 3000 or an HP processor with DS (HP 1000, HP 250, or HP 9845). The connection can be made using a leased line with modem, switched line with manual dial modem, switched line with auto-dial modem, or Digital Phone Network modem. Point-to-Point Modem Link provides the lower level protocol management software, a hardware interface card, and cables. Point-to-Point Modem Link supports only the operation of HP 32185A/R/M DS Network Services software.

## Features
- Consists of software, a hardware interface card (the Intelligent Network Processor), and cables.
- Includes a 10 m (33 ft) cable for connection to the user's modem.
- Supports dial-up, auto-dial, leased line, X.21, and Digital Phone Network modems.
- Supports communication between an HP 3000 system and either another HP 3000 system with DS Network Services or an HP 1000, HP 250, or HP 9845 system with DS and the corresponding hardware.

- Uses a programmable microprocessor-driven line controller that reduces the HP 3000 overhead associated with communications link handling.
- Utilizes the contention bisynchronous communication protocol.
- Supports an RS-232-C (CCITT V.24/V.28) half or full duplex modem with line speed up to 19.2 Kbps, or CCITT V.35 Digital Phone Network synchronous modem with line speed up to 56 Kbps (speed is modem dependent).

## Functional Description
Point-to-Point Modem Link provides the network connection between two HP 3000s with DS Network Services, or between an HP 3000 and another HP system (HP 1000, HP 250, or HP 9845) with DS and the appropriate hardware. It manages the bisynchronous protocol for a modem connection to a leased line, switched line, X.21 circuit switched or V.35 Digital Phone Network.

The following modems are supported:

| | |
|---|---|
| Bell 201C | 2400 bps |
| Bell 208A/B | 4800 bps |
| Bell 209A | 9600 bps |
| Bell 2024A | 2400 bps |
| Bell 2048A | 4800 bps |
| Bell 2096A | 9600 bps |
| HP 37230A | up to 19.2 Kbps |
| Bell 500B | up to 56 Kbps |

Auto Dial capability: Bell 801C Auto Call Unit

Point-to-Point Modem Link provides support for operation of HP 32185A/R/M Distributed Systems Network Services. It does not support user access to link intrinsics.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the Point-to-Point Modem Link product. Its architecture accommodates various protocols, interfaces and line speeds.

## Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of buffered data during a power failure
- Compatible with HP and common Telco/PTT modems in full and half duplex modes
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards
- Auto Call capability, compatible with EIA RS-366, CCITT V.25 standard. (Not available on the Series III)

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates. Also contributing to the high throughput rate is the INP's ability to transfer the last correctly received block of data to the HP 3000 CPU as it is also processing and buffering the next block of data coming from the communication channel.

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, bisync protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

Additional flexibility is achieved with auto call capability. By connecting a INP to a modem and auto call unit and adding a phone number to the Link configuration file, a remote connection in a dial-up environment can occur anytime without the intervention of a human operator.

When the Point-to-Point Modem Link is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: The time limit on the battery back-up capability depends upon the user's system configuration.)

The maximum *total* number of INP's on a processor is given in the table below:

| HP 3000 Processor | Maximum Total INP's |
|---|---|
| Series III | 7 |
| 30,37,39,40,42 | 3 |
| 33,44,48 | 7 |
| 64,68 | 24 |

## System Environment

Point-to-Point Modem Link is available on all members of the HP 3000 processor family with current versions of the MPE-IV or MPE-V operating system. An INP requires a single Series 30, 33, 37, 39, 40, 42, 44, 48, 64, or 68 I/O slot. It requires two I/O slots for the Series III.

## Installation Policy

Hewlett-Packard will provide software installation of Point-to-Point Modem Link for customers with Account Management Support (AMS). For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Installation of the Point-to-Point Modem Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of 30271A.

## Customer Installation Responsibility

Prior to the installation of Point-to-Point Modem Link on the HP 3000, the customer is responsible for installation of the switched or leased line between the HP systems. A matched pair of synchronous modems that are certified for use with HP systems at each end of the line are required; it is the customer's responsibility to install any non-HP modems and auto-call units, and to conduct appropriate tests to ensure that the line and non-HP modems are functioning properly.

Immediately prior to installation of Point-to-Point Modem Link and DS Network Services, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of the data communications software, interface card, and cable.

Customer personnel should be available on site at the time the HP 3000 data communications products are installed. These personnel should be trained in the use of DS Network Services and Links. HP can provide this training, with a separate charge to the customer.

## HP Installation Responsibility

During the installation of Point-to-Point Modem Link and DS Network Services, HP will:

- Install and verify the operation of the Point-to-Point Modem Link hardware and modem cable.
- Perform a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.

- Add the Point-to-Point Modem Link hardware into the I/O software configuration, and configure it in accordance with the customer's intended use.
- Connect the modem cable to the customer's modem (only if available).
- Verify that the product properly opens the line when started by command.

NOTE: At this point, installation of the HP 3000 data communications products is complete.

However, if all necessary facilities not a part of DS are available for testing, HP will attempt to perform a test that demonstrates product operation in the customer's communication environment. If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of the HP data communications products will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.



Point-to-Point Modem Link

## Ordering Information

30271A     Point-to-Point Modem Link for HP 3000.
Requires 32185A/M/R Network Services
Product. *Select one combination Processor/Cable
Option.*

*Processor Options*

| | |
|---|---|
| 1__ | For Series 37 |
| 2__ | For Series III (Note: option 225 is not available) |
| 3__ | For Series 30, 39, 40, 42 |
| 4__ | For Series 33, 44 through 68 |

| | |
|---|---|
| 190 | For Series 37, no hardware |
| 290 | For Series III, no hardware |
| 390 | For Sries 30, 39, 40, 42, no hardware |
| 490 | For Series 33, 44 through 68, no hardware |

*Cable Options*

| | |
|---|---|
| _10 | For connection to synchronous modem |
| _15 | For connection to X.21 circuit switched network |
| _20 | For connection to V.35 digital phone network |
| _25 | For connection to synchronous modem with auto call |

## Support Products

30271A + S00    Software Material Subscription (SMS) for
Point-to-Point Modem Link
30271A + W00    Extended SMS for Point-to-Point Modem
Link

(RCS and AMS customers must also order the appropriate
Data Communications Category support, if it has not
already been purchased. A given category only needs to be
purchased once for all products in that category.)

Customers with hardware support agreements must add
the appropriate level of coverage (SMMC or BMMC) for
this Link product to their support agreement.

## Documentation

30020-90005 — Intelligent Network Processor Installation
and Service Manual

# X.25 Link

## HP AdvanceNet
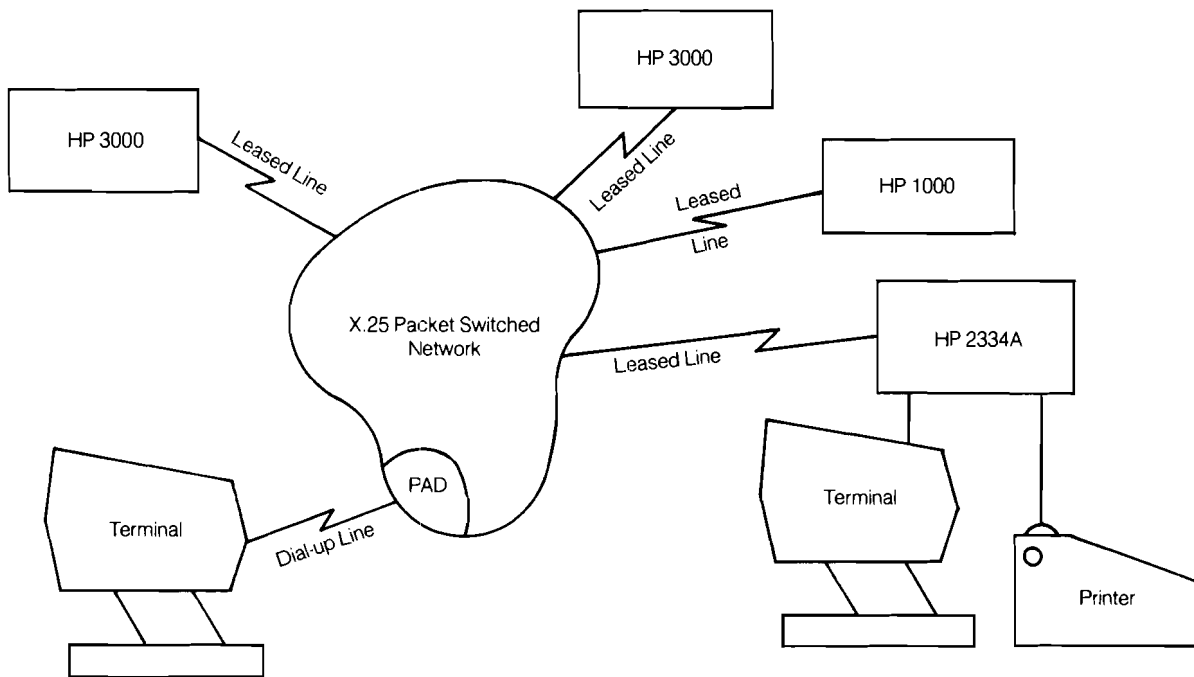
X.25 software and hardware communication products provide extensive communications capabilities between Hewlett-Packard computer systems, personal computers, and terminals over X.25 Packet Switched Networks (PSNs). The three main communications capabilities provided over X.25 PSNs are 1) system to system communications; 2) system to dial-up terminal communications; and 3) system to leased-line remote terminal cluster communications.

For HP 3000 system-to-system communications, X.25 provides the lower level transport for the Distributed Systems (DS) networking software. All of the features of DS such as file transfer, remote database access, program-to-program communication, and remote file and peripheral access are supported transparently over the X.25 communication link.

Terminals can dial-up the Packet Switched Network Packet Assembler/Disassembler (PAD) or connect to the HP 2334A X.25 Cluster Controller for access to the host HP 3000 computer system running X.25 software. A variety of HP terminals and personal computers can communicate

with the host HP 3000 computer in both character mode and/or block mode using HP VPLUS forms handling.

## Features

- All DS system-to-system capabilities supported transparently over X.25 Packet Siwtched Networks.
- Dial-up terminal access over the X.25 Packet Switched Networks via the network PAD to a host HP 3000 computer system. Both character mode and HP VPLUS applications are supported.
- Remote terminal cluster access via an HP 2334A X.25 cluster controller using a single leased line over an X.25 Packet Switched Network to a host HP 3000 computer system. Both character mode and VPLUS applications are supported.
- HP printers supported on an HP 2334A X.25 cluster controller.
- Both system-to-system and system-to-terminal communications are supported over a single X.25 link on the HP 3000 computer.
- Compatible with the November 1980 CCITT X.25 recommendation for X.25/X.3/X.28/X.29.

## Functional Description

*SYSTEM-TO-SYSTEM:* HP 3000 computers may connect to X.25 Packet Switched Networks and communicate across those networks with geographically dispersed HP 1000 computers and HP 3000 computers. The HP 3000 computer is connected to the X.25 PSN via a leased-line with a modem. The local PSN provides the leased line and modems. The X.25 software provides the lower level transport. DS communications software (P/N 32185A) must be installed on the HP 3000 computers for full HP 3000 system-to-system communications. All DS capabilities, such as file transfer, remote database access, program-to-program communication, and remote file and peripheral access, are available (and identically accessed) over the X.25 PSN as they are in a local network configuration. A user need not learn new access methods to use DS over the X.25 PSNs. Refer to the DS data sheet for a full description of the DS capabilities. Note: X.25 does NOT provide Level 3 user access to X.25 Packet Switched Networks. The maximum speed at which the HP 3000 communicates with a PSN depends on the speed of the PSN and the physical link between the HP 3000 and the PSN. If an HP 3000 is connected to a PSN via RS-232-C cable, X.25 supports speeds up to and including 19.2 Kbps. If the HP 3000 is connected to the PSN via RS-422 cable, X.25 supports speeds up to and including 56 Kbps or the maximum data rate permitted by the PSN; whichever is lower.

*SYSTEM-TO-DIAL-UP-TERMINAL:* The X.25 communications software allows asynchronous terminals to communicate with HP 3000 computers via the X.3/X.28/X.29 conventions. For geographically dispersed terminal applications, X.25 allows users at remote sites to access, and communicate with, any HP 3000 connected to the X.25 Packet Switched Network. As shown in Figure 1, the remote terminal connects first to a Packet Switched Network facility called a Packet Assembler Disassembler (PAD), usually by a local phone call, and then attaches to any connected HP 3000 computer system across the X.25 Packet Switched Network. Both character mode and applications using HP VPLUS block mode are supported over the system-to-PAD terminal connection. For a complete and current list of supported HP software subsystems, consult your local Hewlett Packard Representative. A list of the supported HP terminals can be found in Table 3.

*SYSTEM-TO-REMOTE TERMINAL CLUSTER:* For applications where there are a number of terminals at single remote location, the HP 2334A X.25 cluster controller allows up to 16 asynchronous RS-232 point-to-point devices to communicate over a single X.25 leased line with an HP 3000 computer system connected to the X.25 PSN. Both character mode and HP VPLUS block mode are supported on several HP terminals at a maximum baud rate of 9600. A list of the terminals which can be connected to the 2334A X.25 cluster controller can be found in Table 3. In addition to its support of the various HP terminals, the HP 2334A X.25 cluster controller also supports the HP 293X, 2631B, HP 2601A, and 2602A printers. Refer to the 2334A X.25 cluster controller data sheet for additional information.

## X.25 Network Parameters

X.25 protocol suport is provided for connection to X.25 Packet Switched Networks on which HP has certified its products. A list of the certified PSNs can be found in Table 4. Consult your local Hewlett Packard Representative for the most current list of certified PSNs. In addition to support of X.25 over the certified networks, X.25 may also be used over direct point-to-point configured networks.

The specific Level 1, Level 2, and Level 3 capabilities supported by X.25 on HP 3000 computer systems are listed in Table 1. More detailed information is available in the X.25 for the HP 3000 Reference Manual (P/N 32191-90001).

*TABLE 1: SUPPORTED X.25 NETWORK PARAMETERS*

LEVEL 1 — X.21 bis (RS-232-C, CCITT V.24).
    *X.25 is not supported over X.21 circuit-switched networks.
LEVEL 2 — LAB-B protocol.
    *LAP protocol is not supported.
    — Modulus 8 sequence numbering.
    — Window sizes: 1-7.
    — Frame sizes: as required for Level 3 packet sizes.
LEVEL 3 — Switched Virtual Circuits (SVCs) only.
    *Permanent Virtual Circuits (PVCs) are not supported.
    *Datagrams are not supported.
    — Modulus 8 and 128 sequence numbering.
    — Window sizes: 1-7 (mod 8).
                1-15 (mod 128).
    — Packet sizes: 32-1024 bytes.
    *Even numbers of bytes only.
    *REJect packets sent to directly connected computers, not to PSNs, only.
    *D-bit is not supported.
    — Facilities: Determined at subscription time.
    *Negotiation is not supported (see "X.25 Facilities" section).

## X.25 Facilities

"Facility" is the name that the PSN Administrations give to features such as Abbreviated Addressing (a non-standard address shorter than the standard fourteen digits). There are two classes of facilities: international, which are identified by standard codes across all networks (though not offered by all); and national, which are identified (and offered) only by a particular national network. A host computer may request a facility at the time it arranges for service (subscription time), and that facility will apply to all virtual circuits available to that host. One example is the default packet size on a link. Alternatively, a host may request a facility at the time it places or accepts a call (negotiated), and that facility will apply only to that one virtual circuit. One example is reverse charging. X.25 communication software supports no facilities which require per-call negotiation by the host computer (except reverse charging, see Table 2).

The basic international facilities are listed in Table 2, with comments regarding X.25 support. National facilities are too numerous, too diverse, and change too frequently to list here. Consult with your PSN Administrator to determine whether a particular facility requires per-call negotiation. For further information regarding the X.25 Facilities, refer to the X.25 for the HP 3000 Computer Systems Reference Manual (P/N 32191-90001).

*TABLE 2: X.25 FACILITIES & X.25*

| Facility Name | CCITT X.25 REFERENCE | SUPPORT |
|---|---|---|
| Extended Packet Sequence Numbering | 7.1.1 | Yes |
| Non-Standard Default Window Sizes | 7.1.2 | Yes (1) |
| Default Throughput Classes Assignment | 7.1.3 | Yes |
| Packet Retransmission (REJ) | 7.1.4 | Yes (2) |
| Incoming Calls Barred | 7.1.5 | Yes (3) |
| Outgoing Calls Barred | 7.1.6 | Yes (3) |
| One-Way Outgoing | 7.1.7 | No |
| One-Way Incoming | 7.1.8 | No |
| Closed Usr Group | 7.1.9 | No (4) |
| Closed User Group Outgoing | 7.1.10 | No |
| Closed User Group Incoming | 7.1.11 | No |
| Closed Group Incoming Barred | 7.1.12 | Yes (4) |
| Closed Group Outgoing Barred | 7.1.13 | Yes (4) |
| Bilateral Closed User Group | 7.1.14 | No |
| Bilateral Closed Outgoing | 7.1.15 | No |

| Facility Name | CCITT X.25 REFERENCE | X.25 SUPPORT |
|---|---|---|
| Reverse Charging | 7.1.16 | Yes (5) |
| Reverse Charging Acceptance | 7.1.17 | Yes (3) |
| RPOA Selection | 7.1.18 | No |
| Nonstandard Default Packet Sizes | 7.2.1 | Yes |
| Flow Control Negotiation | 7.2.2 | No |
| Throughput Class Negotiation | 7.2.3 | No |
| Fast Select | 7.2.4 | No |
| Fast Select Acceptance | 7.2.5 | No |
| D-bit Modification | 7.2.6 | No |
| Abbreviated Address | 7.3.1 | No |
| Datagram Queue Length Select | 7.3.2 | No |
| Datagram Service Signal Channel | 7.3.3 | No |
| Datagram Non-Delivery Confirmation | 7.3.4 | No |
| Datagram Delivery Confirmation | 7.3.5 | No |

(1) X.25 supports window sizes of 1 to 7 for modulo 8 numbering and 1 to 15 for modulo 128 numbering data packets.
(2) REJECT packets sent to directly connected computers only.
(3) The user may set it up with the PSN administration.
(4) This is supported only for one closed user group and must be agreed upon by the PSN administration.
(5) X.25 will accept reverse-charge calls only from the network PADs; all other reverse charge calls are rejected.

## Supported Systems & Peripherals

*Systems:* X.25 communications software is supported on any HP 3000 computer system running the VP&VE Operating Systems. Consult your local Hewlett Packard Representative for information regarding X.25 support on HP 3000 computer systems running MPE-VR.

*Terminals/Personal Computers:* The following terminals are supported for connection to host HP 3000 computers over X.25 Packet Switched Networks.

*TABLE 3: SUPPORTED HP TERMINALS & PERSONAL COMPUTERS*

Character Mode Supported Terminals:
  2382A
  2392A
  262X
  264X
  HP 100 Series Personal Computers

VPLUS Mode Supported Terminals
  2624B*      2623A
  2622A*      2625A
  2627A       2392A
  2628A
  HP 150

*These terminals require current firmware. Consult your local HP representative to determine if your terminals will require a firmware upgrade.

*Supported Printers:* The HP 2601A, 2602A, 2631B and 293X printers are supported in a non-spooled environment when connected to the 2334A X.25 cluster controller only. The 2631B and 293X printers are supported in a spooled environment with the release of MPE-VP Delta 2 and MPE-VE Delta 1.

## Supported X.25 Packet Switched Networks

Table 4 lists the Packet Switched Networks which have been, or are in the process of being, tested and certified by both Hewlett Packard and the PSN for the support of X.25 communication software. This list is current as of April 1984. Consult your Hewlett Packard Representative for the current list of certified PSNs.

*TABLE 4: X.25 CERTIFICATION STATUS*

| Country | Network | STATUS |
|---|---|---|
| Austria | Datex-P | In progress |
| South Africa | Saponet-P | In progress |
| Italy | Itapac | In progress |
| Finland | Datapak | In progress |
| Mexico | | In progress |
| US | Telenet | Certified |
| US | Tymnet | Certified |
| US | Uninet | In progress |
| UK | PSS | Certified |
| Germany | Datex-P | Certified |
| France | Transpac | Certified |
| Canada | Datapac | Certified |
| Netherlands | DN1 | Certified |
| Japan | DDX | **Certified |
| | Venus-P | Certified |
| Belgium | DCS | Certified |
| Switzerland | Telepac | Certified |
| Spain | Iberpac | In progress |
| Singapore | Telepac | Certified |
| Australia | Austpac | Certified |
| Argentina | Arpac | Certified |
| Hong Kong | | In progress |
| New Zealand | | In progress |
| Sweden | Telepak | In progress |

**Block mode not possible because PSN is not up to November 1980 CCITT Recommendations.

## Supported User Applications

All subsystems using character mode are supported for use on X.25 Packet Switched Networks. All applications which use HP VPLUS (Version B.03.15 or later) are supported for use on HP block mode terminals connected to X.25 PSNs. Testing for other user applications is continuing; consult your Hewlett Packard Representative for the current list of supported software subsystems.

# X.25 Communication Hardware & Software Requirements

Figure 2 below indicates the required hardware and software components. Refer to the DS and 2334A X.25 cluster controller data sheets for additional information. Modem support varies with each local X.25 Packet Switched Network. Consult the local PSN for a list of compatible modems.

The software required on the HP 3000 computer for system-to-system communications are X.25 (P/N 32187A) and DS (P/N 32185A). The software required for system to PAD terminals is X.25 only. The software required for system to remote terminal cluster is X.25 only.

HP 3000

DS 32185A

X.25 Link 32187A

Modem

HP 1000

91750A

91751A

12075A

Modem

Leased Line

X.25 Packet Switched Network

Leased Line

Modem

Cable included with 2334A.

2334A

RS-232 Modem Cables

PAD

Dial-up Lines

Modem

2382A/2392A 262X/264X HP 100 Series

RS-232 Modem Cable

Character Mode Terminals

Modem

13222N/M

2622A/2632A 2624B/2625A 2627A/2628A 2392A/HP 150

Block Mode Using VPLUS Terminals

2382A/2392A 262X/264X HP 100 Series

Character Mode Terminals

2601A 2602A 2631B 293X

Non-spooled Printers

293X 2631B

Spooled Printers

2622A/2632A 2624B/2625A 2627A/2628A 2392A/HP 150

Block Mode Using VPLUS Terminals

## Link Contents

The X.25 Link consists of protocol handling software, an interface card and a modem cable.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the X.25 Link product. Its architecture accommodates various protocols, interfaces and line speeds.

## Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of data during a power failure
- Modem and hardwired interfaces up to 56kbps
- Compatible with HP and common Telco/PTT modems in full and half duplex modes
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards
- Auto Call capability, compatible with EIA RS-366, CCITT V.25 standard. (Not available on the Series III)

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates. Also contributing to the high throughput rate is the INP's ability to transfer the last correctly received block of data to the HP 3000 CPU as it is also processing and buffering the next block of data coming from the communication channel.

## Frees the HP 3000 for Other Tasks

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, X.25 protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

Additional flexibility is achieved with auto call capability. By connecting a INP to a modem and auto call unit and adding a phone number to the Link configuration file, a remote connection in a dial-up environment can occur anytime without the intervention of a human operator.

## High Data Integrity

When the X.25 Link is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: There is a time limit on the battery back-up capability. This depends upon the user's system configuration.)

## System Environment

Protocol management software is downloaded to the INP from the HP 3000 CPU when subsystem activity is initiated. A single INP can be used by two Link products, but not concurrently.

An INP requires a single Series 30, 33, 37, 39, 40, 42, 44, 48, 64 or 68 I/O slot. It requires two I/O slots for the Series III.

## Functional Specifications

Modem and Direct Connect Interfaces: EIA RS-232-C and RS-422, CCITT V.24/V.28 and V.35 (DDS)

Auto Call Interface: EIA RS-366, CCITT V.25
Data Transfer Rates:*

| | |
|---|---|
| Modem | — Up to 19.2kbps RS-232-C, V.24/V.28 (half or full duplex mode) |
| | — Up to 56kbps for V.35 connections |
| Hardwired | — Up to 56 kbps for HP3000-to-HP3000 |
| | — Up to 9600 bps for connections to an SSLC |
| | — Up to 56kbps for HP 3000-to-HP 1000 connections |

*Maximum data transfer rate depends on the Network Service product being used.

Modem Capability:   HP 37230A, Bell 201C, 208A, 208B, and 209A. CCITT V.35, Dataphone II.
Auto Dial Capability: Bell 801C Auto Call Unit
Maximum user data buffer size: 2 Kbytes
Power Fail Protection:   Buffered data is protected during power failure

## Installation Policy

Hewlett-Packard will provide software installation of X.25 Link for customers with Account Management Support. For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Installation of the X.25 Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of 32187A.

## Customer Responsibility

Prior to the installation of X.25 on the HP3000, the customer is responsible for installation of a switched or non-switched communication line between the HP3000 system and the public data network.

The customer should ensure that there are customer personnel available on site at the time of installation of X.25, and that these personnel are trained in the use of X.25. HP can provide this training, with a separate charge to the customer, under standard training agreements. For "R" and "M" products, the installation is billed to the customer on a time and material basis.

## HP Installation Responsibility

During the X.25 installation, HP will perform the following tasks:

- Do a System Update to add the product software modules to the system
- Add the Link hardware into the I/O software configuration, and configure the product in accordance with the customer's intended use.
- Connect the INP hardware to the customer's communication line (only if available).
- Verify that the correct number and version of the software modules have been installed.
- Verify that the product properly opens the line when started by command.

**Note: At this point, installation of the X.25 product is complete.**

However, if all necessary facilities not a part of X.25 are available for testing, HP will attempt to perform a test that demonstrates product operation in the customer's environment.

If problems are encountered during the operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of X.25 will be considered HP consulting support, and billable to the customer at normal HP consulting rates.

## Ordering Information

32187A    X.25 Network Connection for HP 3000 running, V/R, V/E or V/P. Requires HP32185A/M/R Network Services unless used solely for X.25 terminal I/O. *Select one Processor/ Cable Option.*

*Processor Options*

| | |
|---|---|
| 1__ | Series 37 |
| 2__ | Series III |
| 3__ | Series 30, 39, 40, 42 |
| 4__ | Series 33, 44, 48, 64, 68 |
| 190 | Series 37, no hardware |
| 290 | Series III, no hardware |
| 390 | Series 30, 39, 40, 42, no hardware |
| 490 | Series 33, 44, 48, 64, 68, no hardware |

*Cable Options*

| | |
|---|---|
| __10 | RS-232-C Interface Cable |
| __20 | V.35 Interface Cable |
| __35 | Direct Connect Interface Cable |

## Support Products

32187A + S00    Software Material Subscription (SMS) for X.25 Link

32187A + W00    Extended SMS for X.25 Link.

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

Customers with hardware support agreements will need to add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

# Satellite Network Link

## HP AdvanceNet
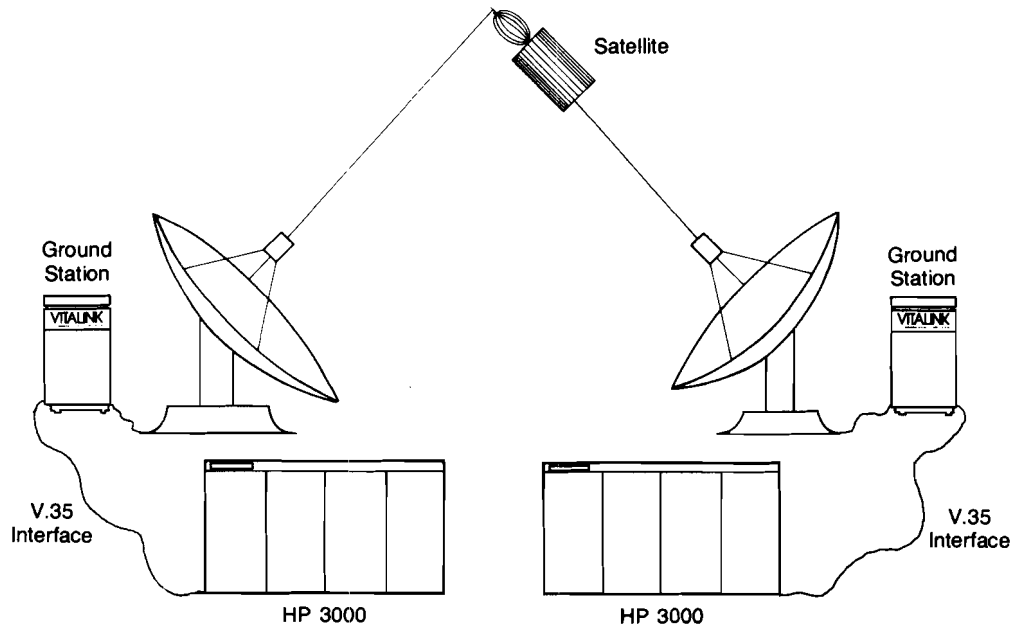
## HP 32188A

The Satellite Network Link interface provides the HP 3000 computer system user with the ability to link remote site HP 3000's via space segment at data rates up to 56 Kbps. The space segment is implemented by connecting an HP 3000 Series 4X or 6X to a Vitalink Communications Corporation earth station. The user may then operate any DS supported application over the space segment. HP certification of this interface provides a user with the confidence that HP has fully tested Vitalink's earth station equipment with various satellites and assures the proper operation of HP systems and applications over these links. HP certification also assures that if a problem arises, the customer can rely on HP to provide standard support services of the HP portions of the network. HP has, in addition, defined agreements with Vitalink to implement support procedures covering all equipment involved in Satellite Network Link.

The Satellite Network Link includes all of the hardware and software required to implement a satellite link in conjunction with an HP 3000 and a Vitalink earth station.

Vitalink Communications Corporation will supply the earth station equipment and sell the satellite transponder (transmitter/receiver on the satellite) time required to operate a space segment.

## Features

Using the Vitalink earth station in conjunction with the HP 3000 computer system provides the following features:

- High-reliability point-to-point remote processor connections
- Data transmission rates up to 56 Kbps over unlimited distance in the United States
- Bit error rates of typically less than 1 in $10^7$
- Multipoint transmission using the Vitalink Codamux
- Complete transparency to the HP 3000 system user in that no modifications will be required to existing DS based applications
- Full support of networking capabilities over the space segment

# Functional Specification

## Vitalink Equipment

Contact Vitalink Communications Corp., 1350 Charleston Rd., Mountain View, CA 94043; (415) 968-5465 for complete data on the required earth station equipment. Typically a user will require an earth station at each site which includes:

— 1 Antenna (5, 7 or 9.2 meter diameter)
— 2 Transmit Field Replaceable Units (FRU)
— 2 Receive FRU's
— 2 RF VREM's
— 1 RF Enclosure
— 1 4-Port Orthomode Junction
— 2 Transponder Select Downconverters
— 2 Transponder Select Upconverters
— 2 Power Supplies
— 1 IF Enclosure
— 2 Modulators
— 2 Demodulators
— 1 Office Equipment Monitor
— 1 Antenna De-icer (optional)
— 1 Codamux (optional)

Redundancy is provided in each earth station by Vitalink's fail-soft space segment architecture which includes two satellite channels which can work independently or in tandem to provide a highly reliable data communication link. Should one side of the earth station fail, the Vitalink monitoring equiment automatically shuts it down, re-routing all data through the remaining operational side of the earth station.

## Communications Hardware and Software Requirements

The following hardware and software are required to implement a satellite link:

The HP hardware required to operate a space segment between HP 3000 computer systems include the Satellite Network Interface Hardware and a V.35 interface cable which plugs directly into the Vitalink earth station IF module (this hardware is included in the 32188A product).

The Satellite Network Link software includes the highly efficient LAP-B driver. In order to implement communications between HP 3000's over a space segment, DS (P/N 32185A) is required to provide communication services.

## Supported Systems

The Satellite Network Link is supported by the HP 3000 Series 39, 40, 42, 44, 48, 64 and 68. An I/O Channel/Device slot must be available.

## Suported HP Applications

All HP applications software packages that are supported through DS (P/N 32185A) are supported by the Satellite Network Link.

# Installation Policy

## HP's Responsibility

HP will install the HP 3000 and the Satellite Network Interface Hardware and Software according to normal system installation procedures. Network consulting is also available to assist in the design and implementation of the satellite network.

## Vitalink's Responsibility

The customer will receive implementation assistance and testing of the earth station and satellite portions of the network from Vitalink.

## Customer Responsibility

The customer will be responsible for ordering the earth station equipment, acquiring the proper building and broadcasting permits and buying transponder time from Vitalink or another satellite vendor. The customer will also be responsible for purchasing service and support contracts from HP and Vitalink.

## Support Procedures

HP support is available to provide the user with the trouble-shooting and application assistance needed to fully utilize the satellite network. Support can (as a customer special) include end-to-end fault clearing coordination by HP in concert with Vitalink.

## Ordering Information

| | |
|---|---|
| 32188A | Satellite Network Link for an HP 3000 running MPE IV (Q2), VE, VP. Requires HP32185A/M/R Network Services Product. *Select one processor option.* |

| | Processor Options |
|---|---|
| 300 | Series 39, 40, 42 |
| 400 | Series 44, 48, 64, 68 |
| 390 | Series 39, 40, 42, no hardware |
| 490 | Series 44, 48, 64, 68, no hardware |

## Support Products

| | |
|---|---|
| 32188A + S00 | Software Material Subscription (SMS) for Satellite Network Link |
| 32188A + W00 | Extended SMS for Satellite Network Link |

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

Customers with hardware support agreements will need to add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.
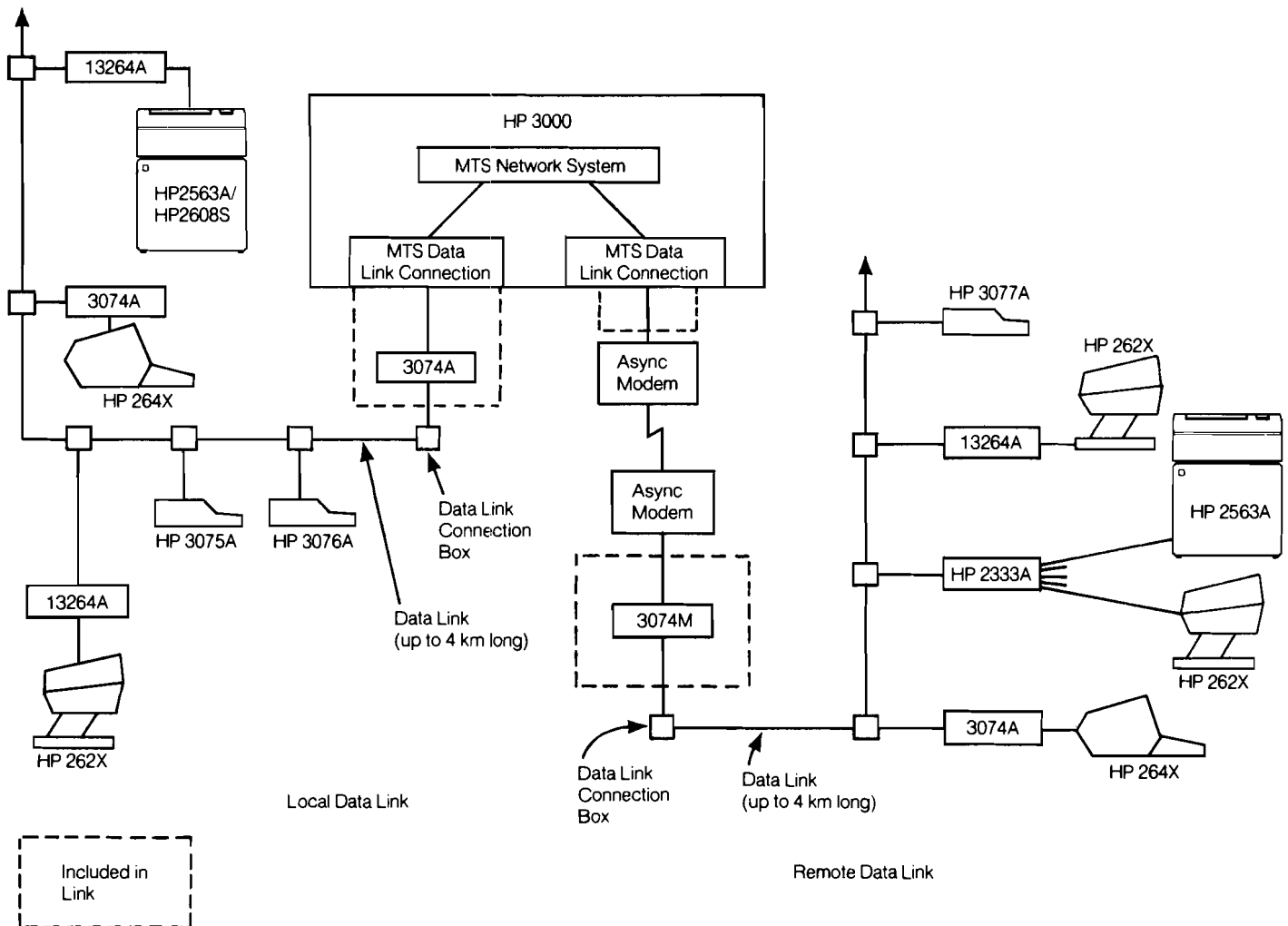
## Documentation

Information concerning the earth station should be requested from Vitalink. See the DS Data Sheet in the Data Communication Specification Guide for information on DS communication services.

# MTS Data Link Connection

**HP AdvanceNet**

Model Number 32026A
For HP 3000 Computer Systems



The MTS Data Link Connection enables an HP 3000 running Multipoint Terminal Support (MTS) Service to connect to and communicate with MTS devices and/or HP 2333A Multipoint Cluster Controllers connected to a local or remote Data Link. MTS Data Link Connection provides the lower level network connection, including the protocol management software, an interface card, a Data Link adapter and cables.

MTS Data Link Connection requires, and is used with, HP 32025A/M/R Multipoint Terminal Support (MTS) Service. A separate MTS Link product is required for each concurrently operated multipoint line.

## Features
- MTS Data Link Connection consists of software, an interface card, a Data Link Adapter, and cables — everything required, exclusive of modems, to connect an HP 3000 to a connection box (HP 92901A) on a Data Link.

- The interface card is a down-loadable, intelligent interface that runs in parallel with the CPU and reduces CPU overhead.
- User applications run concurrently with MTS Data Link Connection data communications.
- Transmission speeds up to 19,200 bps.
- Multiple MTS devices share a single communication line and Data Link.
- The HP 3000 can support multiple MTS Links concurrently.
- Automatic error detection and retransmission of data.
- MTS Data Link Connection supports switched (dial-up), leased line or hardwired connection to a Data Link.
- Up to 4 Km (2.5 miles) between computer (local) or modem (remote) and MTS devices.

## Functional Description

MTS Data Link Connection provides an asynchronous connection between an HP 3000 and a local or remote Data Link. Everything needed to connect the HP 3000 to a local or remote Data Link (exclusive of asynchronous modems) is included in the MTS Data Link Connection.

Each MTS Modem Link connects directly to a Data Link, or indirectly via switched or leased data communications line. The HP 3000 supports multiple MTS Data Link Connections with the maximum number of Links supported by specific models shown in the table below:

| HP 3000 Model | Maximum Number of MTS Data Link Connections* |
|---|---|
| Series III | 7 |
| Series 30, 39, 40 and 42 | 3 |
| Series 33, 44 and 48 | 7 |
| Series 64 and 68 | 24 |

* I/O expansion may be required to reach these maximums

MTS Data Link Connection provides support for the operation of HP 32025A MTS Network Service. It cannot be used as a stand alone product; it must be used in conjunction with MTS.

## Data Link Capability

The Data Link is a low-cost system that is very simple to install and modify. It consists of a single, shielded, twisted-pair cable together with one connection box for the MTS Data Link Connection and each multipoint device or cluster of devices.

Its characteristics enable up to 64 devices to be connected anywhere along the same link, with the link having an overall length of up to 4 Km (2.5 miles).

Because of its high noise immunity, the Data Link is suitable for use in harsh environments. The use of optical isolators and floating, differential signal lines enable the link to be operated through machine shops, welding shops, or electrically noisy environments while maintaining data integrity.

The HP 2333A, some HP printers and the HP Data Capture terminals can be connected directly to the Data Link. For other HP multipoint devices, a Data Link Adapter is required to interface the electrical levels of the link to RS-232-C levels. These adapters also provide power-on/off detection to ensure that when a device is switched on or off it cannot generate random data on the link.

System reconfiguration and maintenance is simplified by the ability to connect/disconnect devices from their Data Link Connection Boxes while the link is still operating. First, if a terminal is switched off, all other terminals on the link continue to function normally, without interruption. Second, a terminal can be moved from one connection box to another, while data transmission is still in progress.

## Functional Specifications

MTS Data Link Connection provides the connection between an HP 3000 and a local or remote Data Link. It manages the bisynchronous, half duplex protocol over asynchronous modems through a switched (dial-up) or leased communications line for remote connections. For local applications, 11 meters (36 feet) of cable are provided to connect the HP 3000 to a connection box on the Data Link. For remote applications the provided HP 3000 to local modem cable is 10 meters (33 feet), and the remote modem to Data Link connection box cable length is 8.6 meters (28 feet).

When the remote installation is over a long distance (greater than 10 miles), standard full-duplex asynchronous modems over switched (dial-up) or leased lines should be used. In these installations the speed of operation is limited by the type of line and modem used (maximum speed is typically 1200 bps for most asynchronous modems).

When the Data Link is remotely installed within a relatively short distance from the HP 3000, limited distance modems over leased or private lines can be used. In these cases the transmission speed is determined by the distance, the particular limited distance modem and the gauge of wire used. With 26 awg telephone lines, at 9600 bps, the range is typically under 11 Km (7 miles).

## Product Requirements

- An HP 3000 running the current version of the MPE Operating System.
- A copy of HP 32025A/M/R MTS Service or HP 32193A/M/R MTS.
- A pair of asynchronous modems and a switched or leased communication line is required for remote MTS Data Link Connection configurations.

## Link Contents

The MTS Data Link Connection contains protocol management software, an interface card, a local or remote Data Link Adapter and appropriate cables to connect the Data Link to the HP 3000.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the MTS Data Link Connection link product. Its architecture accommodates various protocols, interfaces and line speeds.

### Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of data during a power failure
- Modem and hardwired interfaces up to 56kbps
- Compatible with HP and common Telco/PTT modems in full and half duplex modes
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards
- Auto Call capability, compatible with EIA RS-366, CCITT V.25 standard. (Not available on the Series III)

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates.

### Frees the HP 3000 for Other Tasks

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, bisync protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

Additional flexibility is achieved with auto call capability. By connecting a INP to a modem and auto call unit and adding a phone number to the Link configuration file, a remote connection in a dial-up environment can occur anytime without the intervention of a human operator.

### High Data Integrity

When the MTS Data Link Connection is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery backup is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: There is a time limit on the battery back-up capability. This depends upon the user's system configuration.)

## System Environment

Protocol management software is downloaded to the INP from the HP 3000 CPU when subsystem activity is initiated. A single INP can be used by two Link products, but not concurrently.

An INP requires a single Series 30, 33, 39, 40, 42, 44, 48, 64 or 68 I/O slot. It requires two I/O slots for the Series III.

## Functional Specifications

Modem and Direct Connect Interfaces: EIA RS-232-C and RS-422, CCITT V.24/V.28 and V.35 (DDS)

Auto Call Interface:    EIA RS-366, CCITT V.25

Data Transfer Rates:*

| | |
|---|---|
| Modem | — Up to 19.2kbps RS-232-C, V.24/V.28 (half or full duplex mode)<br>— Up to 56kbps for V.35 connections |
| Hardwired | — Up to 56kbps for HP3000-to-HP3000<br>— Up to 9600 bps for connections to an SSLC<br>— Up to 56kbps for HP 3000-to-HP 1000 connections |

*Maximum data transfer rate depends on the Network Service product being used.

Modem Capability:   HP 37230A, Bell 201C, 208A, 208B, and 209A. CCITT V.35, Dataphone II.
Auto Dial Capability:   Bell 801C Auto Call Unit
Maximum user data buffer size:   2 Kbytes
Power Fail Protection:   Buffered data is protected during power failure

## Installation Policy

Hewlett-Packard will provide software installation of HP32026A for customers with Account Management Support (AMS). For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Installation of the MTS Data Link Connection hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of HP32026A. Installation of remote Data Link Adapters is not included.

### Customer Responsibility

Prior to the installation of MTS Data Link Connection on the HP3000, the customer is responsible for installation of a switched or non-switched communication line between the HP3000 system and the multipoint devices. A matched pair of modems, certified for use on the HP3000, at each end of the line is required if remote installation is planned. The customer should also conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of the MTS Data Link Connection product on the HP3000, the customer should provide for electrical outlets for the multi-point devices, purchase and install signal cables to which the devices are to be connected, and install, strap and configure HP multipoint devices.

The customer should ensure that there are customer personnel available on site at the time of installation of MTS Data Link Connection, and that these personnel are trained in the use of MTS Data Link Connection. HP can provide this training, with a separate charge to the customer, under standard training agreements.

## HP Installation Responsibility

During the MTS Data Link Connection installation, HP will perform the following tasks:

- Do a System Update to add the product software modules to the system
- Add the Link hardware into the I/O software configuration, and configure the product in accordance with the customer's intended use.
- Connect the INP hardware to the customer's communication line (only if available).
- Verify that the correct number and version of the software modules have been installed.
- Verify that the product properly opens the line when started by command.

**NOTE:** At this point, installation of the MTS Data Link Connection product is complete.

However, if all necessary facilities not a part of MTS Data Link Connection are available for testing, HP will attempt to perform a test that demonstrates product operation in the customer's environment.

If problems are encountered during the operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of MTS Data Link Connection will be considered HP consulting support, and billable to the customer at normal HP consulting rates.

## Ordering Information

32026A    MTS Data Link Connection for HP3000
Requires 32025A MTS Service
*Select one Processor/Power Option*

*Processor Options*
2__    For Series III
3__    For Series 30 and 39 through 42
4__    For Series 33 and 44 through 68
290    For Series III, no hardware
390    For Series 30 and 39 through 42, no hardware
490    For Series 33 and 44 through 68, no hardware

*Data Link Adapter Power/Locale Options*
_12    110/120 volt, local operation
_14    110/120 volt, remote operation*
_24    220/240 volt, local operation
_26    220/240 volt, remote operation*

\* Compliance with datacommunications regulations should be checked in each country before purchasing this option for use over *public* switched (dial-up) or leased lines.

## Support Products

HP32026A + S00    Software Material Subscription (SMS) for MTS Data Link Connection
HP32026A + W00    Extended SMS for MTS Data Link Connection

(RCS and AMS customers also need to order the appropriate Data Communications Category support. A given category only needs to be ordered once for all products in that category.)

Customers with hardware support agreements will need to add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

# MTS Modem Link

**HEWLETT PACKARD**

**HP AdvanceNet**

Model Number 32027A
For HP 3000 Computer Systems
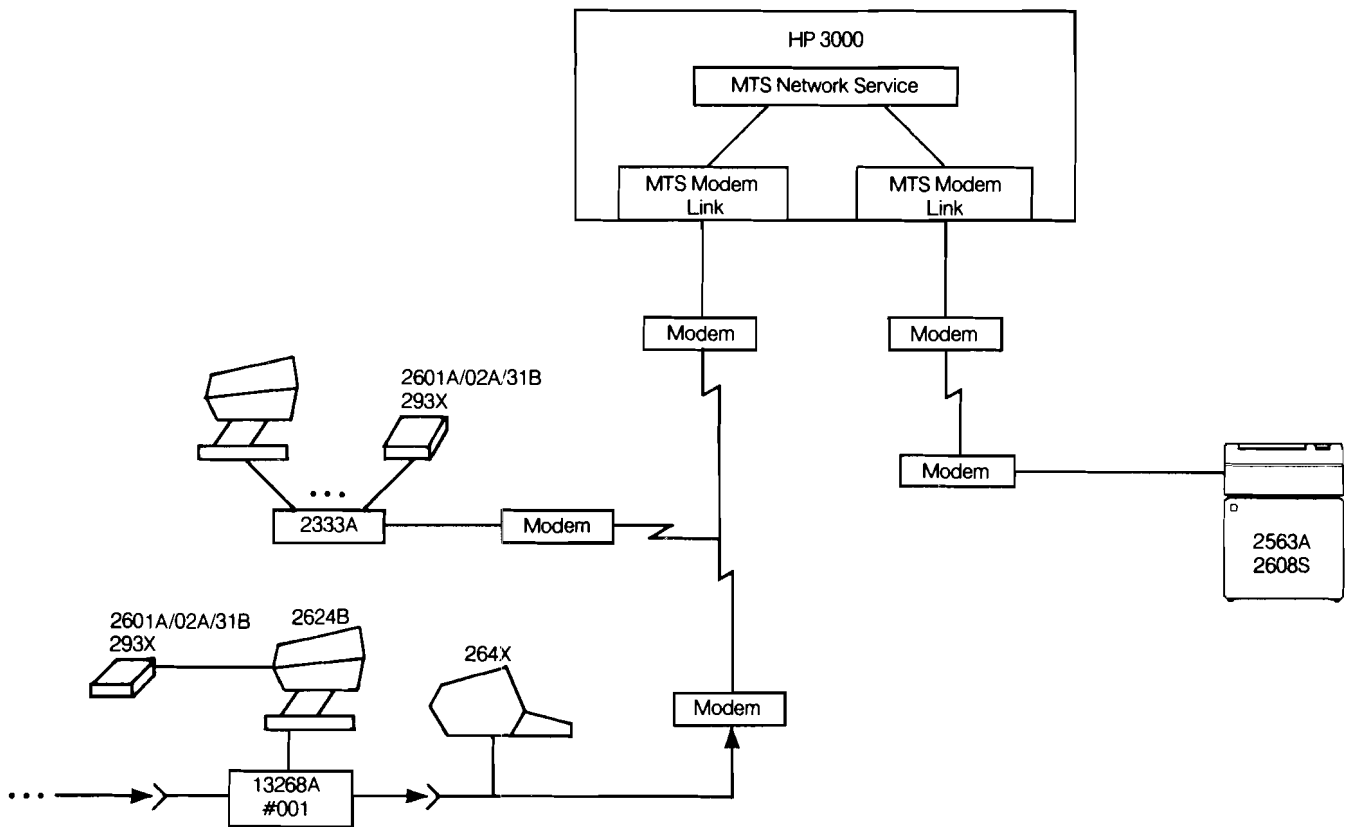


The MTS Modem Link enables an HP 3000 running Multipoint Terminal Support Service (MTS) to connect to and communicate with a remote cluster of MTS devices or an HP 2333A Multipoint Cluster Controller. The MTS Modem Link provides the lower level network connection, including the protocol management software, an interface card and a modem cable.

MTS Modem Link requires, and is used with, HP 32025A/M/R Multipoint Terminal Support Service. A separate MTS Link product is required for each concurrently operated multipoint line.

## Features
- MTS Modem Link consists of software, an interface card, and a modem cable.
- The interface card is a down-loadable, intelligent interface that runs in parallel with the CPU and reduces CPU overhead.
- User applications run concurrently with MTS Modem Link data communications.
- Transmission speeds up to 19,200 bps.
- Multiple MTS devices share a single communication line.
- The HP 3000 can support multiple MTS Links concurrently.
- Automatic error detection and retransmission of data.
- MTS Modem Link works with switched (dial-up) or leased lines.

## Functional Description

MTS Modem Link provides a synchronous connection between an HP 3000 and a remote cluster of daisy chained MTS devices or an HP2333A Multipoint Cluster Controller. It additionally supports multidropped clusters of MTS devices and/or HP 2333As. Everything needed to connect the HP 3000 to a synchronous modem is included in the MTS Modem Link.

Each MTS Modem Link connects to a switched (dial-up) or leased data communications line. The HP 3000 supports multiple MTS Modem Links, with the maximum number of Links supported by specific models shown in the table below:

| HP 3000 Model | Maximum Number of MTS Modem Links* |
|---|---|
| Series III | 7 |
| Series 30, 40 and 42 | 3 |
| Series 33, 44 and 48 | 7 |
| Series 64 and 68 | 24 |

*I/O expansion may be required to reach these maximums

MTS Modem Link provides support of operation of HP 32025A MTS Network Service. It cannot be used as a stand alone product; it must be used in conjunction with MTS.

## Functional Specifications

MTS Modem Link provides the connection between an HP 3000 and a remote cluster of MTS devices or an HP 2333A. It manages the bisynchronous protocol over synchronous modems through a switched (dial-up) or leased communications line. The cable provided with the MTS Modem Link that runs between the HP 3000 and the synchronous modem is 10 meters (33 feet) long.

The following modems are supported:

| | |
|---|---|
| HP 37230A | (up to 19.2 Kbps) |
| Bell 201C | (2400 bps) |
| Bell 208A/B | (4800 bps) |
| Bell 209A | (9600 bps) |
| Bell 2024A | (2400 bps) |
| Bell 2048A | (4800 bps) |
| Bell 2096A | (9600 bps) |

## Product Requirements

- An HP 3000 running the current version of the MPE Operating System.
- A copy of HP 32025A/M/R MTS Service or HP 32193A/M/R MTS.
- A pair of supported synchronous modems and a switched or leased communication line is required between the MTS Modem Link and the remote cluster of MTS devices or HP 2333A Multipoint Cluster Controller.

## Link Contents

The MTS Modem Link consists of protocol management software, an interface card and a modem cable.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the MTS Modem Link product. Its architecture accommodates various protocols, interfaces and line speeds.

## Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of data during a power failure
- Modem and hardwired interfaces up to 56kbps
- Compatible with HP and common Telco/PTT modems in full and half duplex modes
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards
- Auto Call capability, compatible with EIA RS-366, CCITT V.25 standard. (Not available on the Series III)

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates.

## Frees the HP 3000 for Other Tasks

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, bisync protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

Additional flexibility is achieved with auto call capability. By connecting a INP to a modem and auto call unit and adding a phone number to the Link configuration file, a remote connection in a dial-up environment can occur anytime without the intervention of a human operator.

## High Data Integrity

When the MTS Modem Link is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This ensures the user that no data will be lost in the event of a power failure or brown-out. (Note: There is a time limit on the battery back-up capability. This depends on the user's system configuration.)

## System Environment
Protocol management software is downloaded to the INP from the HP 3000 CPU when subsystem activity is initiated. A single INP can be used by two Link products, but not concurrently.

An INP requires a single Series 30, 33, 39, 40, 42, 44, 48, 64 or 68 I/O slot. It requires two I/O slots for the Series III.

## Functional Specifications
Modem and Direct Connect Interfaces: EIA RS-232-C and RS-422, CCITT V.24/V.28 and V.35 (DDS)
Auto Call Interface: EIA RS-366, CCITT V.25
Data Transfer Rates:*

| | | |
|---|---|---|
| Modem | — | Up to 19.2kbps RS-232-C, V.24/V.28 (half or full duplex mode) |
| | — | Up to 56kbps for V.35 connections |
| Hardwired | — | Up to 56kbps for HP3000-to-HP3000 |
| | — | Up to 9600 bps for connections to an SSLC |
| | — | Up to 56kbps for HP 3000-to-HP 1000 connections |

*Maximum data transfer rate depends on the Network Service product being used.

Modem Capability: HP 37230A, Bell 201C, 208A, 208B, and 209A. CCITT V.35, Dataphone II.
Auto Dial Capability: Bell 801C Auto Call Unit
Power Fail Protection: Buffered data is protected during power failure

## Installation Policy
Hewlett-Packard will provide software installation of HP32027A for customers with Account Management Support (AMS). For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Installation of the MTS Modem Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of HP32027A.

## Customer Responsibility
Prior to the installation of MTS Modem Link on the HP 3000, the customer is responsible for installation of a switched or non-switched communication line between the HP 3000 system and the multipoint devices. A matched pair of modems, certified for use on the HP 3000, at each end of the line is required. The customer should also conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of the MTS Modem Link product on the HP 3000, the customer should provide for electrical outlets for the multipoint devices, purchase and install signal cables to which the devices are to be connected, and install, strap and configure HP multipoint devices.

The customer should ensure that there are customer personnel available on site at the time of installation of MTS Modem Link, and that these personnel are trained in the use of MTS Modem Link. HP can provide this training, with a separate charge to the customer, under standard training agreements.

## HP Installation Responsibility
During the MTS Modem Link installation, HP will perform the following tasks:
- Do a System Update to add the product software modules to the system
- Add the Link hardware into the I/O software configuration, and configure the product in accordance with the customer's intended use.
- Connect the INP hardware to the customer's communication line (only if available).
- Verify that the correct number and version of the software modules have been installed.
- Verity that the product properly opens the line when started by command.

**Note: At this point, installation of the MTS Modem Link product is complete.**
However, if all necessary facilities not a part of MTS Modem Link are available for testing, HP will attempt to perform a test that demonstrates product operation in the customer's environment.

If problems are encountered during the operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of MTS Modem Link will be considered HP consulting support, and billable to the customer at normal HP consulting rates.

## Ordering Information
32027A   MTS Synchronous Modem Link for HP 3000
Requires 32025A MTS Service
*Select one Processor Option*

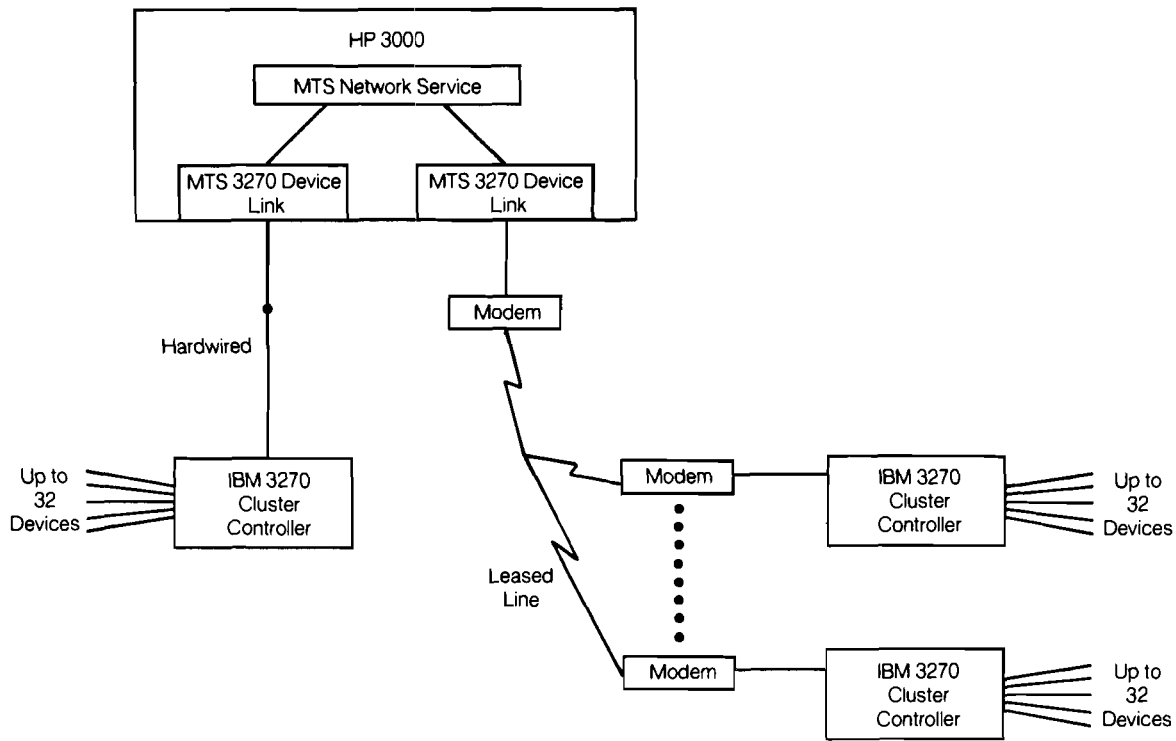| | *Processor Options* |
|---|---|
| 200 | For Series III |
| 300 | For Series 30 and 39 through 42 |
| 400 | For Series 33 and 44 through 68 |
| 290 | For Series III, no hardware |
| 390 | For Series 30 and 39 through 42, no hardware |
| 490 | For Series 33 and 44 through 68, no hardware |

## Support Products
HP32027A+S00   Software Material Subscription (SMS) for MTS Modem Link
HP32027A+W00   Extended SMS for MTS Modem Link

(RCS and AMS customers also need to order the appropriate Data Communications Category support. A given category only needs to be ordered once for all products in that category.)

Customers with hardware support agreements will need to add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

# MTS 3270 Device Link

**HEWLETT PACKARD**

**HP AdvanceNet**

Model Number 32028A
For HP 3000 Computer Systems



The MTS 3270 Device Link enables an HP 3000 running Multipoint Terminal Support (MTS) Service to communicate with local or remote IBM 3270 devices on a multipoint line. The MTS 3270 Device Link provides the lower level network connection, including the protocol management software, an interface card and an interface cable.

MTS 3270 Device Link requires, and is used with, HP 32025A/M/R Multipoint Terminal Service. A separate MTS Link product is required for each concurrently operated multipoint line.

## Features

- MTS 3270 Device Link consists of software, an interface card, and an interface cable.
- The interface card is a down-loadable, intelligent interface that runs in parallel with the CPU and reduces CPU overhead.
- User applications run concurrently with MTS 3270 Device Link data communications.
- Transmission speeds of up to 19,200 bps.
- Supports IBM 3271, 3274, and 3276 cluster controllers.
- The HP 3000 can support multiple MTS Links concurrently.
- Automatic error detection and retransmission of data.
- MTS 3270 Device Link supports local (hardwired), and switched (dial-up) or leased communications lines for remote applications.

## Functional Description

MTS 3270 Device Link provides a synchronous connection between an HP 3000 and a local or remote IBM 3270 cluster controller, and the 3270 devices attached to it. The Link additionally supports multidropped IBM cluster controllers. Everything needed to connect the HP 3000 to a synchronous modem, or to the cable from the IBM cluster controller is included in the MTS 3270 Device Link.

Each MTS 3270 Device Link connects to a switched (dial-up) or leased data communications line, or to the IBM cluster controller cable. The HP 3000 supports multiple MTS Modem Links, with the maximum number of Links supported by specific models shown in the table below:

| HP 3000 Model | Maximum Number of MTS 3270 Device Links* |
|---|---|
| Series III | 7 |
| Series 30, 39, 40 and 42 | 3 |
| Series 33, 44 and 48 | 7 |
| Series 64 and 68 | 24 |

**\*I/O expansion may be required to reach these maximums**

MTS 3270 Device Link provides support for operation of HP 32025A MTS Network Service. It cannot be used as a stand alone product; it must be used in conjunction with MTS.

## Functional Specifications

MTS 3270 Device Link allows for the physical connection of IBM 3270 devices to the HP3000 computer system. It manages the bisynchronous protocol over either hardwired connections, or via synchronous modems through a switched (dial-up) or leased communications line. The cable provided with the MTS 3270 Device Link to connnect to either the IBM 3270 cluster controller cable, or to the synchronous modem is 10 meters (33 feet) long.

The connection to the IBM 3270 devices is made through a 3271, 3274, or 3276 Control Unit, which is linked to the HP3000 via the MTS IBM 3270 Device Link. The control units supported are 3271 Model 1 and 2; 3274 Model 1c (BSC), and 3276 Model 1, 2, 3, and 4. Any 3270 device (terminals and printers) that can attach to one of the control units listed can communicate with the HP 3000 in a multipoint environment. (Note: Although IBM 3270's and HP multipoint devices may be used on the same HP3000 they cannot share the same Link — the MTS 3270 Device Link supports IBM 3270 devices only, and the MTS Data Link Connection and the MTS 3270 Device Link supports HP multipoint devices.)

The MTS 3270 Device Link supports 3270 devices in two modes of operation: Edited Mode, which is the default mode, and Unedited Mode. Edited Mode is designed for the operation of display stations, primarily in interactive sessions. When in this mode, the user is able to access most HP 3000 system resources from the 3270 in the same way as from the HP 262x or 264x multipoint terminals. In Unedited mode, the communication link only is provided; the user's application is responsible for initiating data transfer and control operations through calls to the MPE File System intrinsics. MTS allows the development of application programs without detailed knowledge of multipoint data communications (The execution and design of VPlus/3000 screens is not provided).

The following modems are supported:

| | |
|---|---|
| HP 37230A | (up to 19.2 Kbps) |
| Bell 201C | (2400 bps) |
| Bell 208A/B | (4800 bps) |
| Bell 209A | (9600 bps) |
| Bell 2024A | (2400 bps) |
| Bell 2048A | (4800 bps) |
| Bell 2096A | (9600 bps) |

## Product Requirements

- An HP 3000 running the current version of the MPE Operating System.
- A copy of HP 32025A/M/R MTS Service or HP 32193A/M/R MTS.
- A pair of supported synchronous modems and a switched or leased communication line is required between the MTS 3270 Device Link and the 3270 control unit for remote applications.

## Link Contents

The MTS Data Link Connection consists of protocol handling software, an interface card and modem or direct connect cable.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the MTS 3270 Link product. Its architecture accommadates various protocols, interfaces and line speeds.

## Features

—16 bit microprocessor and LSI circuitry
—Data communications protocol handling
—Character handling and buffer storage capability
—Built-in diagnostics and self test
—On-line diagnostics run under MPE
—Collects data volume and error statistics
—Battery back-up prevents loss of data during a power failure
—Modem and hardwired interfaces up to 56kbps
—Compatible with HP and common Telco/PTT modems in full and half duplex modes
—Bisync and HDLC/SDLC protocol compatible
—EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards
—Auto Call capability, compatible with EIA RS-366, CCITT V.25 standard. (Not available on the Series III)

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates.

## Frees the HP 3000 for Other Tasks

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, bisync protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must suill process message formats and higher level procedures.)

Additional flexibility is achieved with auto call capability. By connecting a INP to a modem and auto call unit and adding a phone number to the Link configuration file, a remote connection in dial-up environment can occur any time without the intervention of a human operator.

## High Data Integrity

When the MTS 3270 Device Link is initialized, the INP performs a hardware selftest. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: There is a time limit on the battery back-up capability. This depends upon the user's system configuration.)

## System Environment

Protocol management software is downloaded to the INP from the HP 3000 CPU when subsystem activity is initiated. A single INP can be used by two Link products, but not concurrently.

An INP requires a single Series 30, 33, 39, 40, 42, 44, 48, 64, or 68 I/O slot. It requires two I/O slots for the Series III.

## Functional Specifications

Modem and Direct Connect Interfaces: EIA RS-232-C and RS-422, CCITT V.24/V.28 and V.35 (DDS)
Auto Call Interface:   EIA RS-366, CCITT V.25
Data Transfer Rates:*

| | |
|---|---|
| Modem | —Up to 19.2kbps RS-232-C, V.24/V.28 (half or full duplex mode) |
| | —Up to 56kbps for V.35 connections |
| Hardwired | —Up to 56kbps for HP3000-to-HP3000 |
| | —Up to 9600 bps for connections to an SSLC |
| | —Up to 56kbps for HP 3000-to-HP 1000 connections |

* Maximum data transfer rate depends on the Network Service product being used.

Modem Capability:   HP 37230A, Bell 201C, 208A, 208B, and 209A.
   CCITT V.35, Dataphone II.
Auto Dial Capability:   Bell 801C Auto Call Unit
Maximum user data buffer size:   2 Kbytes
Power Fail Protection:   Buffered data is protected during power failure

## Installation Policy

Hewlett-Packard will provide software installation of HP 32028A for customers with Account Management Support (AMS). For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on time and material basis.

Installation of the MTS 3270 Device Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of HP32028A.

## Customer Responsibility

Prior to the installation of MTS 3270 Device Link on the HP3000, the customer is responsible for installation of a switched or non-switched communication line between the HP3000 system and the 3270 devices. A matched pair of modems, certified for use on the HP3000, at each end of the line are required if remote installation is planned. The customer should also conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of the MTS 3270 Device Link product on the HP3000, the customer should provide for electrical outlets for the 3270 devices, purchase and install signal cables to which the devices are to be connected and install and verify the operation of any 3270 type devices.

The customer should ensure that there are customer personnel available on site at the time of installation of MTS 3270 Device Link, and that these personnel are trained in the use of MTS 3270 Device Link. HP can provide this training, with a separate charge to the customer, under standard training agreements.

71

## HP Installation Responsibility

During the MTS 3270 Link installation, HP will perform the following tasks:

- Do a System Update to add the product software modules to the system
- Add the Link hardware into the I/O software configuration, and configure the product in accordance with the customer's intended use.
- Connect the INP hardware to the customer's communication line (only if available).
- Verify that the correct number and version of the software modules have been installed.
- Verify that the product properly opens the line when started by command.

NOTE: At this point, installation of the MTS 3270 Link product is complete

However, if all necessary facilities not a part of MTS 3270 Link are available for testing, HP will attempt to perform a test that demonstrates product operation in the customer's environment.

If problems are encountered during the operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of MTS 3270 Device Link will be considered HP consulting support, and billable to the customer at normal HP consulting rates.

## Ordering Information

| | |
|---|---|
| 32028A | MTS 3270 Device Link for HP3000 |
| | Requires 32025A MTS Service |
| | *Select <u>one</u> Processor/Cable Option* |
| | *Processor Options* |
| 2__ | For Series III |
| 3__ | For Series 30, and 39 through 42 |
| 4__ | For Series 33, and 44 through 68 |
| 290 | For Series III, no hardware |
| 390 | For Series 30, and 39 through 42, no hardware |
| 490 | For Series 33 and 44 through 68, no hardware |
| | *Cable Options* |
| _10 | For Synchronous Modem connections |
| _30 | For Local Hardwired Connection |

## Support Products

| | |
|---|---|
| HP32028A + S00 | Software Material Subscription (SMS) for MTS 3270 Link |
| HP32028A + W00 | Extended SMS for MTS 3270 Link |

(RCS and AMS customers also need to order the appropriate Data Communications Category support. A given category only needs to be ordered once for all products in that category)

SMMC or BMMC hardware support should be ordered to cover the hardware components of this Link.

# SNA Link

**HEWLETT PACKARD**

## HP AdvanceNet

MODEL NUMBER 30246A
For HP 3000 Computer Systems
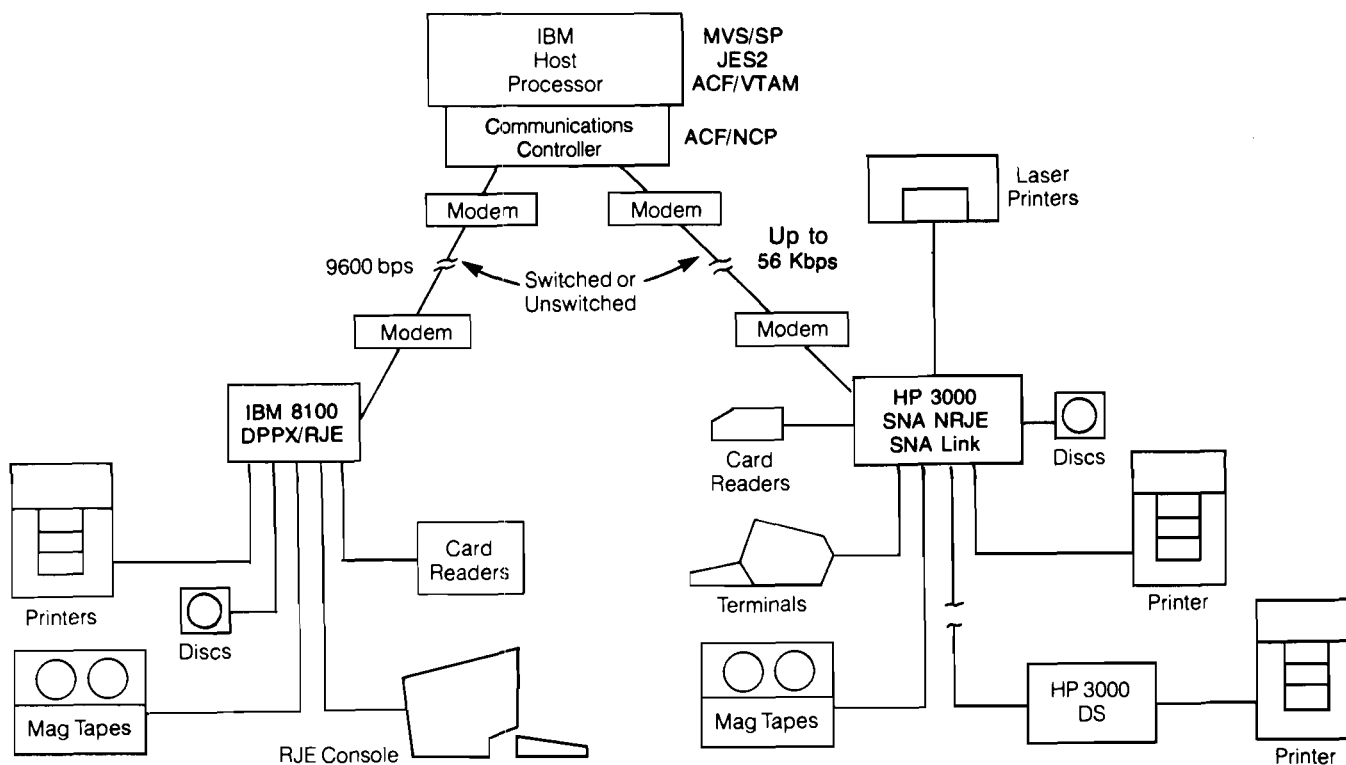


SNA Link provides the network connection for SNA NRJE to connect to an IBM System/370-compatible host processor in an IBM System Network Architecture environment. System Network Architecture (SNA) is IBM's comprehensive specification for distributed data processing networks. SNA Link emulates the functions of the Transmission Control, Path Control, and Data Link Control SNA layers on an HP 3000.*

SNA Link only supports operation of HP 30245A/R/M, SNA NRJE. Architecturally, SNA NRJE and SNA Link make the HP 3000 appear as a Physical Unit type 2, Logical Unit type 1, SNA node.

## Features

- The SNA Link emulates the functions of the lower 3 SNA layers.
- SNA Link consists of software, a hardware interface card and a cable.
- The hardware interface card in SNA Link reduces CPU overhead.
- User applications run concurrently with SNA data communications.
- Each SNA Link connects to a separate data communications line, either dial-up or leased.
- Multiple SNA Links allow concurrent connection to multiple hosts, or multiple lines to a single host.
- A maximum data communications line speed of 56 Kbps is supported.
- Node management provides a friendly interface for configuration, event tracing and logging.

## Functional Description

SNA Link provides the connection to an IBM System/370-compatible mainframe in an SNA network, through an IBM 3705 or 3725 communications controller. SNA Link allows HP 3000 Series 37, 39, 4X and 6X systems with MPE V to emulate the functions of the Transmission Control, Path Control and Data Link Control SNA layers.

SNA NRJE and SNA Link provide the HP 3000 with the functions of an IBM 8100 DPPX/RJE workstation in an SNA network — a Physical Unit type 2, Logical Unit type 1 (PU-2, LU-1) node.

SNA Link provides support for operation of HP 30245A/R/M, SNA NRJE. It does not support user access to SNA Link intrinsics. A special product, available from the Hewlett-Packard Network Consulting Department, provides user access to SNA Link intrinsics.

Each SNA Link connects to a single switched or non-switched data communications line. The HP 3000 supports multiple SNA Links for connection to multiple IBM mainframes, or multiple data communications lines to a single mainframe. The maximum line speed supported is 56 Kbps.

The Node Management interface provides the Network Manager with an easy-to-use tool for configuration, event logging and event tracing.

## Functional Specifications

SNA Link provides the connection between an HP 3000 Series 37, 39, 4X or 6X and an IBM-370-compatible host processor in an SNA network. It manages the SNA/SDLC protocol for a switched or non-switched data communications line, through synchronous modems. A maximum line speed of 56 Kbps is supported for a non-switched line.

SNA Link and SNA NRJE have been tested and are certified to operate with IBM 370-compatible systems (370, 303X, 308X, or 434X) running MVS/SP, JES2 and ACF/VTAM, through an IBM 3705 or 3725 communications controller running ACF/NCP.

The following modems are supported:

| | |
|---|---|
| HP 37230A | (up to 19.2 Kbps) |
| Bell 201C | (2400 bps) |
| Bell 208A/B | (4800 bps) |
| Bell 209A | (9600 bps) |
| Bell 2024A | (2400 bps) |
| Bell 2048A | (4800 bps) |
| Bell 2096A | (9600 bps) |
| Bell 500B | (up to 56 Kbps) |

## Link Contents

The SNA Link consists of protocol handling software, an interface card and a modem cable.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the SNA Link product. Its architecture accommodates various protocols, interfaces and line speeds.

## Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of data during a power failure
- Modem and hardwired interfaces up to 56kbps
- Compatible with HP and common Telco/PTT modems in full and half duplex modes
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards

**Note: A single INP may be used by two Link products, but not concurrently.**

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communications devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates. Also contributing to the high throughput rate is the INP's ability to transfer the last correctly received block of data to the HP 3000 CPU as it is also processing and buffering the next block of data coming from the communication channel.

## Frees the HP 3000 for Other Tasks

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, SDLC protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

## High Data Integrity

When the SNA Link is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: There is a time limit on the battery back-up capability. This depends upon the user's system configuration.)

## Product Requirements

- An HP 3000 Series 37, 39, 4X or 6X and MPE V with Pascal SL.
- HP 30245 A/M/R SNA NRJE
- HP recommends additional memory with SNA NRJE and SNA Link for good performance. Requirements vary by application. Generally, we recommend approximately 1 MB in addition to what would be required without NRJE and SNA Link. (Each system should have at least 2 MB of memory.) See your HP System Engineer to help determine your requirements.
- A terminal supported by V/3000 (in addition to the system console) is required for the HP 3000 Node Management software.
- A switched or non-switched data communications line is required between the SNA Link and the host communications controller.
- An external clock signal must be provided for operation at 56 Kbps.
- SNA Link requires an IBM 370-compatible mainframe (Model 370, 303X, 308X, 43XX) with an IBM 3705 or 3725 communications controller.
- The following software must be running on the host and communications controller:
  MVS/SP
  ACF/VTAM
  ACF/NCP
  JES2 is also required for SNA NRJE

  HP will support certain versions, releases, modifications and PTF levels of the above software. Your HP Sales Representative or System Engineer can determine whether SNA Link can be supported with your particular configuration.

## Installation Policy

Hewlett-Packard will provide software installation of 30246A for customers with Account Management Support (AMS). For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Installation of the SNA Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of 30246A.

## Customer Installation Responsibility

Prior to the installation of SNA NRJE and SNA Link on the HP 3000, the customer is responsible for installation of a switched or non-switched line between the HP 3000 system and the communications controller on the host system — with a matched pair of synchronous modems that are certified for use with HP 3000 systems at each end of the line. The customer should conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of SNA Link, the customer should arrange installation of the necessary host mainframe system software and hardware to support SNA NRJE and SNA Link, and arrange generation of the host mainframe software in a manner compatible with the intended use of SNA NRJE and SNA Link. See your local HP System Engineer for typical host parameter values.

Non-standard modifications to host system software may prevent operation of SNA Link, and should always be discussed with HP's Systems Engineering organization well in advance of SNA Link installation to determine the impact of any modifications.

Customer personnel should be available on site at the time of installation of SNA Link. These personnel should be trained in the use of SNA Link. HP can provide this training, with a separate charge to the customer, under standard training agreements.

The customer must also provide a brief job or test procedure, and make the host system available for test at the agreed-upon time for installation of SNA Link.

Prior to installation of SNA Link, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of SNA Link software, interface card and cable.

## HP Installation Responsibility

During the SNA Link installation, HP will:
- Do a System Update to add the product software modules to the system.
- Verify that the correct number and version of the software modules have been installed.
- Add the SNA Link hardware into the I/O software configuration, and configure the SNA Link product in accordance with the customer's intended use.
- Connect the SNA Link hardware to the customer's communications line (only if available at installation).
- Verify that the product properly opens the line when started by command.

NOTE: At this point, installation of the SNA Link product is complete.

If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of SNA NRJE and SNA Link will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## System Environment

SNA NRJE and SNA Link are available on HP 3000 Series 37, 39, 4x and 6x with MPE V.

**Note: SNA Link requires HP 30245A/R/M SNA NRJE. SNA Link does not support user access to its intrinsics. See your local HP office for information about an HP special product for this purpose.**

## Ordering Information

30246A      SNA Link
Requires service contract for hardware
*Select one Processor/Cable Option*

Processor Options
1__      For Series 37*
3__      For Series 39 through 42
4__      For Series 44 through 68
190      For Series 37, no hardware
390      For Series 39 through 42, no hardware
490      For Series 44 through 68, no hardware

Cable Options
_10      For Synchronous Modem connections
_20      For High Speed Connection to V.35 Digital Phone Network (up to 56 kbps)

*Not available until the second release of MPE for Series 37.

## Support Products

30246A+S00      Software Material Subscription (SMS) for SNA Link
30246A+W00      Extended SMS for SNA Link

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

Customers with hardware support agreements will need to add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

## Documentation

30246-90001 SNA Link Node Management Reference Manual

# BSC Link

HEWLETT PACKARD

HP AdvanceNet

MODEL NUMBER 30251A
For HP 3000 Computer Systems

HP 3000



Data Communications Lines (up to 56 Kbps for RJE and MRJE)
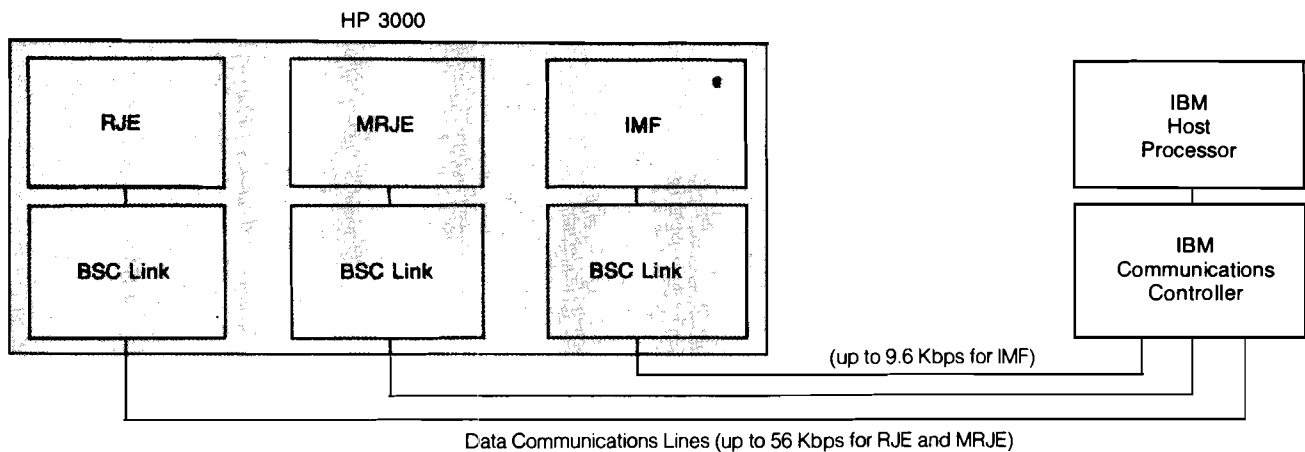
BSC Link provides the network connection to an IBM System/370-compatible host processor using bisynchronous (BSC) protocol. (BSC Link also supports SDLC-PU1 protocol with IMF.) BSC Link provides the lower level network connection, including the protocol management software, a hardware interface card and a cable.

BSC Link only supports operation of HP 30248A/R/M RJE, 30249A/R/M MRJE, or 30250A/R/M IMF. A separate BSC Link product and data communications line is required for concurrent operation of IMF and RJE or MRJE.

## Features
- BSC Link consists of software, a hardware interface card, and a cable; and provides the network connection to the IBM Host processor.
- The hardware interface in BSC Link reduces CPU overhead.
- User applications run concurrently with BSC data communications.
- Each BSC Link connects to a separate data communications line, either dial-up or leased. (IMF requires a leased line.)
- Multiple BSC Links allow concurrent connection to multiple hosts, or multiple lines to a single host.
- A maximum data communications line speed of 56 Kbps is supported with an HP 3000 Series 37, 39, 4X or 6X.

## Functional Description
BSC Link provides the network connection to an IBM System/370-compatible mainframe using bisynchronous protocol. The BSC Link interface card and cable connect to an IBM 3705 or 3725 communications controller on the host, through a pair of synchronous modems. The maximum line speeds supported by RJE, MRJE, IMF and BSC Link are shown below:

|  | HP3000 S/II,III, 30,33 with MPE IV | HP3000 S/37,39,4X, 6X with MPE IV, V | Type of Line |
|---|---|---|---|
| RJE | 19.2 Kbps | 56 Kbps | Dialup & Leased |
| MRJE | 9.6 Kbps | 56 Kbps | Dialup & Leased |
| IMF | 9.6 Kbps | 9.6 Kbps | Leased Only |

Each BSC Link connects to a single switched or non-switched data communications line. The HP 3000 supports multiple BSC Links for connection to multiple IBM mainframes, or multiple data communications lines to a single mainframe — 56 Kbps maximum.

BSC Link provides support for operation of HP 30248A/R/M RJE, 30249A/R/M MRJE, and 30250A/R/M IMF. It does not support user access to BSC Link intrinsics.

## Functional Specifications

BSC Link provides the network connection between an HP 3000 and an IBM System 370-compatible host processor. It manages the bisynchronous protocol for a switched or non-switched data communications line, through synchronous modems. A maximum line speed of 56 Kbps is supported, depending on the data communications package and the HP 3000 processor that it runs on.

The following modems are supported:

| | |
|---|---|
| HP 37230A | (up to 19.2 Kbps) |
| Bell 201C | (2400 bps) |
| Bell 208A/B | (4800 bps) |
| Bell 209A | (9600 bps) |
| Bell 2024A | (2400 bps) |
| Bell 2048A | (4800 bps) |
| Bell 2096A | (9600 bps) |
| Bell 500B | (up to 56 Kbps) |

## Link Contents

The BSC Link contains protocol handling software, an interface card and a modem cable.

## Intelligent Network Processor

The Intelligent Network Processor (INP) is a serial communications controller included with the BSC Link product. Its architecture accommodates various protocols, interfaces and line speeds.

## Features

- 16 bit microprocessor and LSI circuitry
- Data communications protocol handling
- Character handling and buffer storage capability
- Built-in diagnostics and self test
- On-line diagnostics run under MPE
- Collects data volume and error statistics
- Battery back-up prevents loss of data during a power failure
- Modem and hardwired interfaces up to 56kbps
- Compatible with HP and common Telco/PTT modems in full and half duplex modes
- Bisync and HDLC/SDLC protocol compatible
- EIA RS-232-C, RS-422, CCITT V.24 and V.35 interfacing standards
- Auto Call capability, compatible with EIA RS-366, CCITT V.25 standard. (Not available on the Series III)

Note: A single INP may be used by two Link products, but not concurrently.

The Direct Memory Access (DMA) controller on the INP provides three high speed channels. The DMA channels link data buffers in on-board RAM with the HP 3000 interface and data communication devices. DMA moves data between external devices and on-board RAM concurrent with microprocessor operation. This ability to transfer data concurrently with instruction execution enables the INP to achieve high throughput rates. Also contributing to the high throughput rate is the INP's ability to transfer the last correctly received block of data to the HP 3000 CPU as it is also processing and buffering the next block of data coming from the communications channel.

## Frees the HP 3000 for Other Tasks

Since the INP microprocessor performs all of the communication data link protocol management, the HP 3000 is relieved of that task. Specifically, serialization, BSC protocol management, frame/block management, and data buffering are all performed by the INP. The INP frees the HP 3000 to perform other tasks, making it a more efficient resource. (Note: the HP 3000 CPU must still process message formats and higher level procedures.)

Additional flexibility is achieved with auto call capability. By connecting an INP to a modem and auto call unit and adding a phone number to the Link configuration file, a remote connection in a dial-up environment can occur anytime without the intervention of a human operator.

## High Data Integrity

When the BSC Link is initialized, the INP performs a hardware self-test. This ensures the hardware is functional and will perform the job properly. When data is transmitted, parity checking is enabled. If data is transmitted incorrectly, retransmission occurs. In addition, battery back-up is provided for the user's data buffers. This assures the user that no data will be lost in the event of a power failure or brown-out. (Note: There is a time limit on the battery back-up capability. This depends upon the user's system configuration.)

## Product Requirements

- An HP 3000 running the current version of the MPE operating system.
- A switched or non-switched data communications line is required between the BSC Link and the host communications controller.
- An external clock signal must be provided for operation at 56 Kbps.
- BSC Link requires an IBM 370-compatible mainframe. (Model 370, 303X, 308X, 43XX) with an IBM 3705-compatible communications controller.
- Because of the symmetrical nature of RJE communications, BSC Link with RJE can support communications (simple file transfer) with other systems running RJE emulators, e.g. other minicomputers. Your HP System Engineer can help you determine whether RJE and BSC Link will support your application.

## Installation Policy

Hewlett-Packard will provide software installation of 30251A for customers with Account Management Support (AMS). For customers not covered by an AMS support plan, Hewlett-Packard software installation is available on a time and material basis.

Installation of the BSC Link hardware components, and connection of the Link to the customer's communication line (only if the line is available at installation) is included in the purchase of 30251A.

## Customer Installation Responsibility

Prior to the installation of BSC Link on the HP 3000, the customer is responsible for installation of a switched or non-switched line between the HP 3000 system and the communications controller on the host system — with a matched pair of synchronous modems that are certified for use with HP 3000 systems at each end of the line. The customer should conduct appropriate tests to ensure that the line and modems are functioning properly.

Also prior to installation of BSC Link, the customer should arrange installation of the necessary host mainframe system software and hardware to support BSC Link and the higher level data communications products, and arrange generation of the host mainframe software in a manner compatible with the intended use.

Non-standard modifications to host system software may prevent operation of RJE, MRJE, IMF or BSC Link, and should always be discussed with HP's Systems Engineering organization well in advance of installation to determine the impact of any modifications.

Customer personnel should be available on site at the time the HP 3000 data communications products are installed. These personnel should be trained in the use of the products to be installed. HP can provide this training, with a separate charge to the customer, under standard training agreements.

The customer must also provide a brief job or test procedure, and make the host system available for test at the agreed-upon time for installation of the HP 3000 data communications products.

Prior to installation of BSC Link, the customer must perform an HP 3000 system backup, including MPE and @.PUB.SYS, and make the HP 3000 available for installation of the data communications software, interface card and cable.

## HP Installation Responsibility

During the installation of data communications products, HP will:

■ Do a System Update to add the product software modules to the system.

■ Verify that the correct number and version of the software modules have been installed.

■ Add the BSC Link hardware into the I/O software configuration, and configure the BSC Link product in accordance with the customer's intended use.

■ Connect the BSC Link hardware to the customer's communications line (only if available at installation).

■ Verify that the product properly opens the line when started by command.

NOTE: At this point, installation of BSC Link is complete.

If problems are encountered during this operation, HP will, at the customer's option, attempt to resolve them. HP effort expended against problems related to facilities not a part of the HP data communications products will be considered HP consulting support, and is billable to the customer at normal HP time and material rates.

## System Environment

RJE, MRJE, IMF and BSC Link are available on the entire HP 3000 product line running MPE IV or V.

Note: BSC Link requires HP 30248A/M/R RJE, 30249 A/M/R MRJE or 30250A/M/R IMF. BSC Link does not support user access to its intrinsics.

## Ordering Information

| | |
|---|---|
| 30251A | BSC Link |
| | For use with 30248A/M/R RJE, 30249A/M/R MRJE, or 30250A/M/R IMF |
| | Requires service contract for hardware |
| | *Select one Processor/Cable Option* |

| | Processor Options |
|---|---|
| 1__ | For Series 37 |
| 2__ | For Series III (Note: no option 225) |
| 3__ | For Series 30 and 39 through 42 |
| 4__ | For Series 33 and 44 through 68 |
| 190 | For Series 37, no hardware |
| 290 | For Series III, no hardware |
| 390 | For Series 30 and 39 thru 42, no hardware |
| 490 | For Series 33 and 44 through 68, no hardware |

| | Cable Options |
|---|---|
| _10 | For Synchronous Modem connections |
| _15 | For X.21 Connection (For use with RJE only) |
| _20 | For High Speed Connection to V.35 Digital Phone Network (up to 56 kbps) |
| _25 | For Connection to Synchronous Modems with Auto Call (not for use with IMF) |

## Support Products

| | |
|---|---|
| 30251A + S00 | Software Material Subscription (SMS) for BSC Link |
| 30251A + W00 | Extended SMS for BSC Link |

(RCS and AMS customers also need to order the appropriate Data Communications Category support, if it has not already been purchased. A given category only needs to be purchased once for all products in that category.)

Customers with hardware support agreements will need to add the appropriate level of coverage (SMMC or BMMC) for this Link product to their support agreement.

# Data Link

HP AdvanceNet                                    For HP 3000 Computer Systems
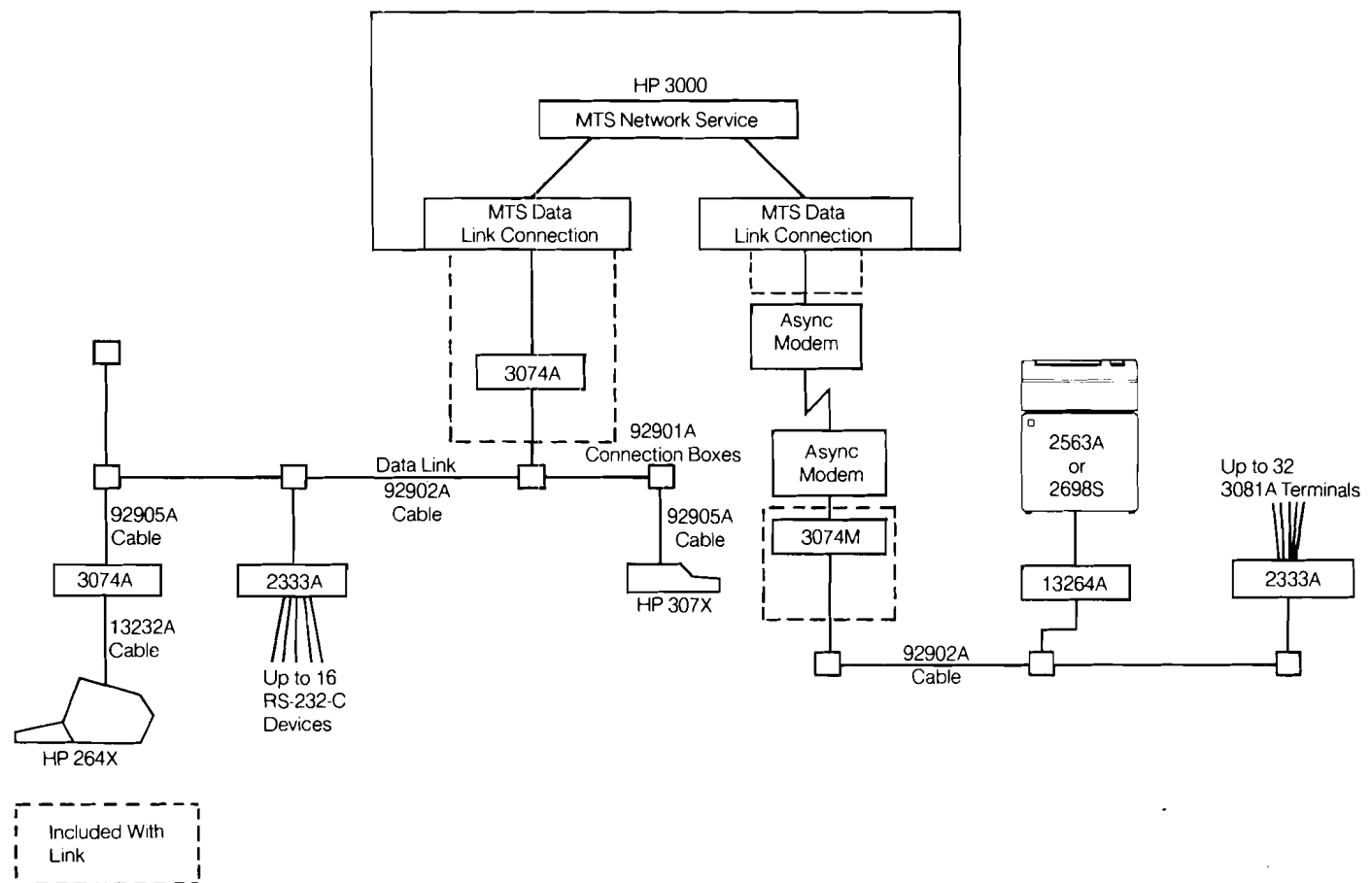


## Features

- High Noise Immunity
- Up to 4 Km (2.5 miles) long
- Ease of Installation, Modification, and Use.

## Functional Description

The Data Link is a data communications capability used to interface an HP 3000 (the primary station) and several widely distributed devices (the secondary stations). The HP 3000 initiates all data transfers to and from the devices using Multipoint Terminal Support (MTS) Service and the MTS Data Link Connection.

The Data Link is a shielded, twisted-pair cable onto which terminals and printers are connected in parallel. Devices can be connected anywhere along the same link, with no restriction on spacing. The maximum distance between the two most distant devices (the HP 3000 may be one of these devices) can be up to 4000 meters (2.5 miles). The installation can easily be changed or upgraded if necessary, thus increasing its versatility. The use of floating, differential signal lines (balanced voltages) and optical isolators in the link drivers/receivers ensures a high level of noise immunity and enables the Data Link to be operated in electrically noisy environments. All connected devices operate independently of each other and can be powered on or off, and connected or disconnected from the link without disturbing data transmission.

81

All of the devices on a Data Link communicate at the same speed. Thus the maximum data transmission rate is highest speed that all of the multipoint devices have in common (the speeds of devices connected to a HP2333A are independent from the Data Link transmission rate).

Because several devices are allowed to share one communication line, each device in the multipoint network is assigned a unique address. This allows the HP 3000 to talk to devices on the communication line as individual units.
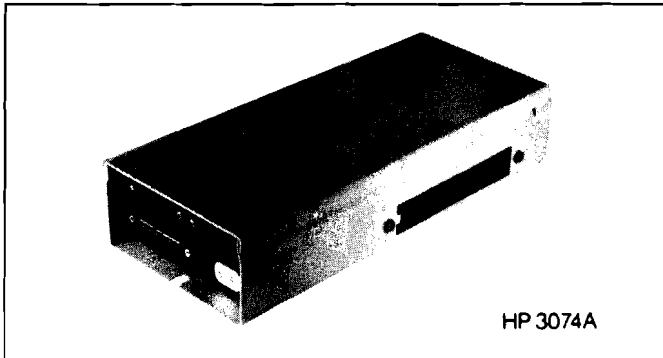


HP 3074A

The HP 3074A allows hardwired connection of asynchronous 264x multipoint terminals to the Data Link. It is also part of the MTS Data Link Connection in local applications. When used to connect an asynchronous HP 264x terminal to the link, its power on/off detection feature eliminates transients coming from the terminal to the link. Excellent electrical isolation (1000 V) between the terminal and the link is ensured by optocouplers. The HP 3074A also converts the RS-232-C standard electrical levels of the terminal or the MTS Data Link Connection to the Data Link standard levels and vice-versa.

The HP3074M is part of the MTS Data Link Connection for remote applications. It converts the RS-232-C electrical signal levels of a modem to the Data Link levels.

When the remote installation is over a long distance (greater than 10 miles), standard full-duplex asynchronous modems over switched (dial-up) or leased lines should be used. In these installations the speed of operation is limited by the type of line and modem used (maximum speed is typically 1200 bps for most asynchronous modems).

When the Data Link is remotely installed within a relatively short distance from the HP 3000, limited distance modems over leased or private lines can be used. In these cases the transmission speed is determined by the distance, the particular limited distance modem and the gauge of wire used. With 26 awg telephone lines, at 9600 bps, the range is typically under 11 Km (7 miles).



HP 13264A

The 13264A provides multipoint HP 262x terminals and HP2608S and HP2563A printers with the capability of interfacing to the Data Link. It converts the RS-232-C standard electrical levels coming from the connected device to the Data Link standard levels and vice versa.

The 13264A also protects the link from transients coming from the connected device so that data on the link is not corrupted. It also protects the device from induced noise on the link.

Easy visual monitoring of the presence of traffic on the link is provided by the LED indicators. Transmission speed is the same as the connected device.

One end of the 13264A plugs into the datacomm port connector of the 262x terminal or 2608S/2563A printer, and the other end plugs into the Data Link connection box (HP 92901A). Power for the adapter is supplied by the connected device; no power cord is needed.

The HP 2333A Multipoint Cluster Controller can be connected to a local or remote Data Link. It has the ability to control up to 16 asynchronous point-to-point devices. The HP 2333A provides RS-232-C ports that operate at speeds up to 9600 bps. Also up to 32 HP 3081A can be connected via current loop interface to the HP 2333A.

The HP 2333A automatically converts the multipoint format to the point-to-point format and vice versa. This allows the HP 2333A to accept data from the HP 3000 over the Data Link and transmit the data to one of the point-to-point devices connected to it.

The HP 2333A (when ordered with option 021) connects directly to the Data Link via a connection box. Its ability to communicate at speeds up to 19,200 bps makes it an excellent means of connecting slower devices to a Data Link, without having to reduce the speed of the Data Link. The HP 2333A is also capable of supporting a "second host" port. This 9600 bps port could be attached to a second Data Link on the same, or a different, HP 3000, enabling any terminal on the HP 2333A to have access to either Data Link and/or system.

## HP 92901A — Data Link Connection Boxes

One connection box (part number 92901A for a pack of five) is required for each device not directly wired into the Data Link. In addition, spare boxes can be installed on the link in convenient locations, either for moving devices around or for adding additional devices later. The box is constructed of plastic and contains a set of six metal contacts with screw terminators (three contacts for "cable in," and three for "cable out"). The contacts are make-before-break type and allow the plug to be inserted and removed without disturbing the link communications. The twin cable (92905A), when connected, extends the Data Link to the device (or adapter). Twice the length (from the Data Link to the device and back) must be added to the overall Data Link length for each cable used.

## HP 92902A — Data Link Cable

The Data Link cable is a shielded, twisted-pair cable which can be ordered in lengths of 100 or 300 meters. For longer distances, additional 100 or 300 meter sections may be ordered and added to the link through the use of the Data Link Connection Boxes.

The very long length specification of the link is achieved through a combination of good quality 20 gauge transmission cable, a driver which transmits data at an electrical level which is twice that transmitted by the RS-422 standard, and a receiver which is more sensitive and has a higher input impedance than RS-422.

The Data Link Cable is not intended to be run outside a building. Even when it is run inside a raceway and buried, damaging transients can be induced by lightning strikes.

## HP 92905A — Data Link-to-Device Cable

Connections to the Data Link should be made in such a manner that no unterminated lengths of cable remain. This means that either the device should be physically installed on the cable or connected to it via a connection box (92901A) and a twin cable (92905A).

## Functional Specifications

- Each device on the link has a unique address.
- All data transmission is asynchronous.
- Maximum length: 4 Km (2.5 miles).
- Maximum data rate: 19,200 bps.
- Data Link interface circuit electrical characteristics: Floating differential signals (balanced voltage).
- Electrical insulation provided by adapters: 1000 V DC.
- Common mode noise immunity: 500 mV.
- Differential noise immunity: 100 mV.

# Multipoint Cluster Controller 2333A

HP AdvanceNet

Product Number HP2333A
For the HP 3000 Computer
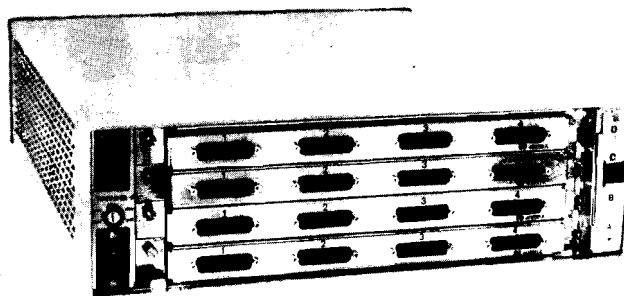




The HP 2333A is a modular multipoint cluster controller.

It permits a group of up to 16 point-to-point devices to communicate with the host HP 3000 either via the versatile Data Link, or via modems and phone lines.

## Features
- Controls up to 16 point-to-point RS-232-C devices.
- Workstation spooled printers support (maximum 4 printers per MTS line)
- Communicates with HP 3000 via HP MTS multipoint protocol.
- Functions with modems and phone lines as a remote cluster controller.
- Supports multidrop modem line configuration
- Allows versatile Data Link cabling for a local cluster.
- Operation of terminals is similar to that of point-to-point terminals connected via point-to-point links.
- Optional second computer port.
- Programmable configuration to suit a wide variety of devices.
- Configuration stored in permanent memory.
- Expandable from 4 to 16 terminals in group of 4.
- Tabletop or rack mounting.

## Functional Description
The HP 2333A is a cluster controller for up to 16 point-to-point RS-232-C devices on a multipoint line. The HP 2333A can be connected to the HP 3000 locally via the Data Link or remotely via modems used over point-to-point or multidrop lines.

The dual HP 3000 Computer link is an option that will allow a second HP 3000 Computer connection to be implemented independently of the first link. A terminal user now has the choice of accessing either system. Alternatively, this capability also provides a redundant communication link to an HP 3000 system.
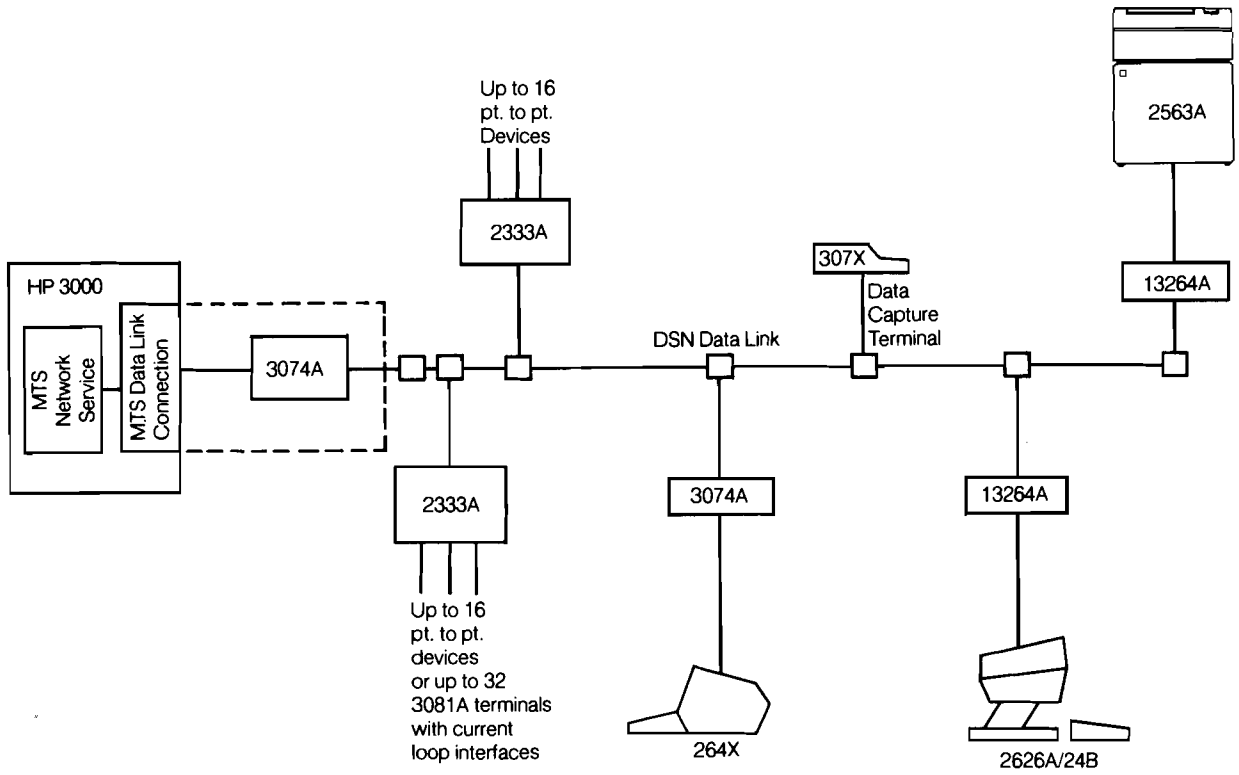
## Installation & Customer Responsibility
The customer is responsible for installation of a data communication line and modems between the HP 3000 system and any remote devices. If a remote installation is planned, a matched pair of modems certified for use with the HP 3000 is required. The customer is responsible for conducting the appropriate tests to ensure that the line and modems are functioning properly.
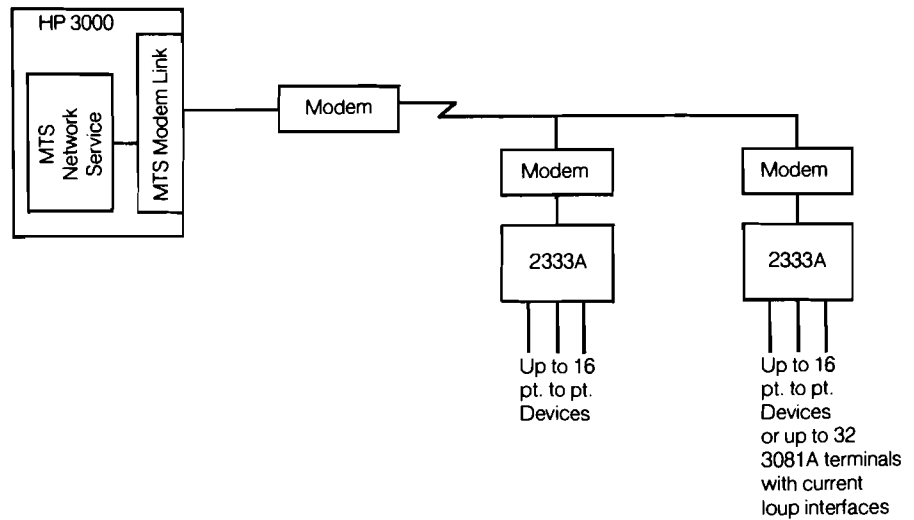
The HP Customer Engineer will install and verify the operation of the HP 2333A, if it is included in the HP 3000 system installation.

## System Environment
The HP 2333A is available for HP 3000 Series III, 30, 33, 39, 40, 42, 44, 48, 64 and 68 computer systems executing current versions of MPE and MTS.

Up to 16
pt. to pt.
Devices

2333A

HP 3000

MTS Network Service | MTS Data Link Connection

3074A

2333A

Up to 16
pt. to pt.
devices
or up to 32
3081A terminals
with current
loop interfaces

DSN Data Link

307X
Data
Capture
Terminal

3074A

264X

13264A

2626A/24B

2563A

13264A

HP 2333A Data Link Configuration

HP 3000

MTS Network Service | MTS Modem Link

Modem

Modem

2333A

Up to 16
pt. to pt.
Devices

Modem

2333A

Up to 16
pt. to pt.
Devices
or up to 32
3081A terminals
with current
loup interfaces

HP 2333A Synchronous Remote Configuration

## Functional Specification
## HP 2333A Connection to HP 3000:

Connection: Data Link or modem (RS-232-C; CCITT V.24). The HP 40251A provides a second, fully independent HP 3000 port, for users that require redundancy or access to a second HP 3000.

Protocol: Asynchronous or synchronous HP multipoint, including group poll feature.

Speed: Port 1: 1200, 2400, 4800, 9600, 19,200 bps. Port 2 (optional): 9600 bps.

Modems: Full duplex synchronous or asynchronous modems. Bell 201/208, HP 37230A, Bell 202T/212A

Support: HP 3000 with INP interface and MTS Multipoint Subsystem.

## HP 2333A Connection to Point-to-Point Devices.

Connection: Via a four port RS-232-C serial interface card. Alternately an eight port Current Loop interface card can be used for the connection of HP 3081A terminals. Up to four interface cards can be installed in the HP2333A to support up to 16 or 32 devices respectively. A mix of RS-232-C and Current Loop interface cards is permissible.

Terminals cannot be connected to the HP2333A via modems, PBX or data switches requiring modem control signals.

Supported Devices: All HP terminals and HP100 Series of Personal Computers. With MTS release A.07.00 or A.57.00, or later, the HP2601A, HP2602A, HP2631B, HP293X and HP2563A printers are also supported.

A maximum of four printers per MTS line and 16 printers per HP3000 is supported. The aggregate baud rate of the printers should not exceed the baud rate of the MTS line they are connected to.

## Supported Subsystems

The following HP3000 software subsystems are supported: TDP, MM, PM, FA, DSG, EZChart, HPDraw, HPSpell, VPlus, IMF, HPDesk, HPSlate, Report, Transact, Dictionary and Inform. The 2333A only supports Terminal Type 10; user or HP applications requiring other terminal types are not supported.

## Power Requirements

Input voltage: 115 V ac (+ 10%, −25%)
    With Opt 015: 230 V ac (+ 10%, −25%)
Input frequency: 47 to 63 Hz
Power consumption: typical 75 watts

## Environmental

Temperature free space ambient:
    Operating: 0 to 55° Centigrade
    Non operating: −40 to 75° Centigrade
Relative humidity (non condensing):
    Operating: 5% to 95% at 40° Centigrade
    Non operating: 90% at 65° Centigrade to 95% at 40° Centigrade.
Altitude:
    Operating: 4,600 meters
    Non operating: 15,300 meters
Vibration:
    Up to 0.38 mm p-p, 5-55-5 Hz, 3 axis for 15 minutes. Dwell 10 minutes.
Shock:
    Bench handling: 102 mm tilt drop.
    Transportation handling: 762 mm drop. 30G for 11 ms.

## Ordering Information

HP2333A: Multipoint Cluster Controller, 115 volts AC. Includes power cord and operating manual. Requires at least one option 122, 40250A or 40253A interface, and either option 021 or option 022.

- Option 015: 220 Volt AC unit
- Option 021: Data Link interface to HP 3000 (includes 2 meter Device to Data Link cable)
- Option 022: RS-232-C interface to HP3000 (includes 5 meter RS-232-C Modem cable)
- Option 122: Four Port Serial Interface card, factory installed in the HP2333A. Standard modem cables must be used to connect the devices, and are not included.

HP40250A: Four Port Serial Interface Card.
Up to four 40250A interfaces may be plugged into one 2333A, allowing a total of 16 devices to be connected. Standard modem cables must be used to connect the devices, and are not included.

HP40251A: Second Host System Adapter for 2333A. Adapter card plugs into 2333A and allows a second link to a HP3000 to be connected.

- Option 021: Data Link adapter to the HP 3000. (includes 2 meter Device to Data Link cable)
- Option 022: RS-232-C adapter to HP3000. (includes 5 meter RS-232-C Modem cable)

HP40253A: Eight Port Current Loop Interface card for support of the 3081A Industrial Workstation Terminal.
Up to four 40253A interfaces may be plugged into one 2333A, allowing a total of 32 HP3081A terminals to be connected. Current loop cabling not included. One 2314A Power Unit is required per 2333A with any 40253A interfaces, and must be ordered separately.

HP2314A Power Unit for HP2333A and HP3081A. Provides power for current loop terminals (HP3081A) attached to an HP2333A. Only one is required per HP2333A.

- Option 015: 220/V 50 Hz
- Option 016: 115/V 50 Hz

Rack mounting accessories.

| Part Number | Description |
|---|---|
| 5061-0089: | Front handles kit. |
| 5061-0077: | Rack mounting kit without front handles. |
| 5061-0083: | Rack mounting kit with front handles. |

## Documentation
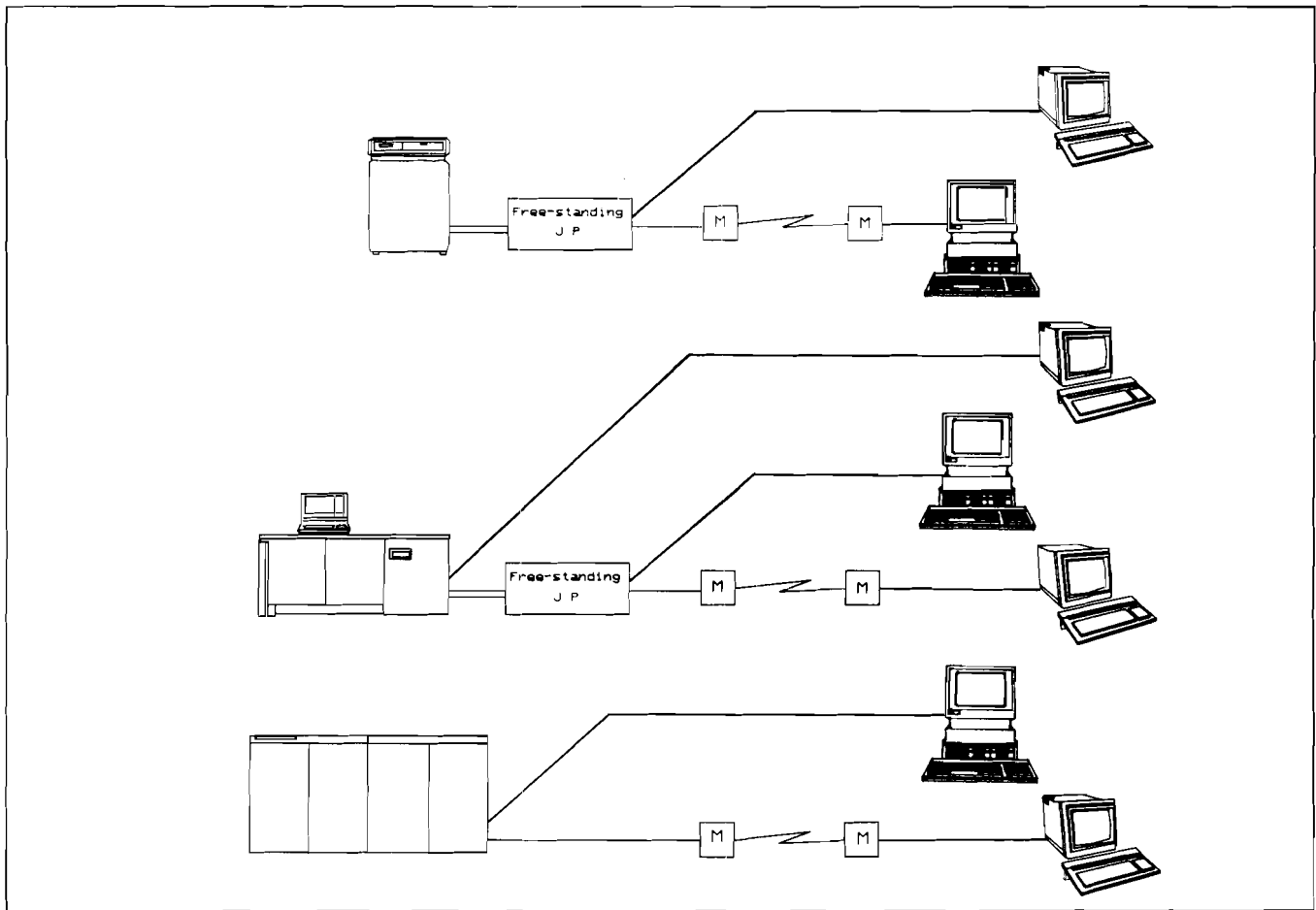
For further information refer to:
2333A Reference and service manual. (02333-90001)

# Advanced Terminal Processor

**HP AdvanceNet**

ATP point-to-point Workstation Connections.

The Advanced Terminal Processor (ATP) is designed to interface asynchronous workstations to the HP 3000 Series 39, 4x, 6x in a point-to-point configuration. Interfaces are available to allow workstations to be connected either directly (for local communications) or through full-duplex modems (for remote communications).

The ATP is an intelligent workstation controller which offloads character processing from the HP 3000 CPU by transferring data directly to and from the HP 3000's memory. It allows workstations to transmit and receive in either character or block mode.

## Features

— Interfaces:
   Local connections: RS-422 (5-pin)
   RS-232-C (3-pin)
   Remote connections: RS-232-C (CCITT V.24)
— Full-duplex modem support
— Data transfer rates up to 19.2K bps
— Speed sensing up to 19.2K bps
— Direct Memory Access (DMA)
— Hardware data buffering
— Character and block mode support
— Remote on-line diagnostics.

## Technology

The ATP makes extensive use of LSI technology with a separate microcomputer chip for each workstation port. Each chip is an 8-bit microprocessor with 128 bytes of RAM, 2 Kbytes of ROM and an asynchronous receiver/transmitter to handle data transmission and reception. An additional microcomputer for every 12 modem ports handles the modem control signals.

## Product Structure

The ATP consists of up to five products:
— ATP System Interface Board (SIB): HP 30144A
— ATP Direct Connect Port Controller: HP 30145A
— ATP Modem Port Controller: HP 30155A
— ATP Direct Connect Expansion Package: HP 30273A
— ATP Modem Expansion Package: HP 30274A

## ATP Subsystem

The minimum ATP subsystem consists of one System Interface Board (SIB) and one Direct Connect or Modem Port Controller. It requires two I/O slots and supports up to 12 workstations.

The maximum ATP subsystem, consisting of one SIB and several Direct Connect and/or Modem Port Controllers, varies according to the HP 3000 system type on which it is installed (see Table 2).

Each additional Port Controller requires one I/O slot and supports 12 additional workstations. A single HP 3000 computer may have multiple ATP subsystems installed, limited by the physical characteristics of the system (DC power, I/O slots, junction panel space) (see Table 3).

## ATP System Interface Board

The System Interface Board (SIB) provides the hardware interface to the HP 3000 Inter-Module Bus (IMB) and performs the byte packing and unpacking which is necessary to optimize utilization of the IMB. In addition, the SIB controls the Direct Memory Access (DMA) data transfer to the HP 3000's memory. This eliminates interruptions of the HP 3000's CPU for workstation character processing. The SIB supports up to 8 (Direct Connect or Modem) Port Controllers.

## ATP Port Controllers

The Direct Connect and Modem Port Controllers provide the physical interfaces for connecting local and remote workstations to the HP 3000. Each port controller supports up to 12 workstations.

The port controllers also handle the handshaking between the system and the workstations, provide data buffering and control speed sensing, special character detection and character echoing functions.
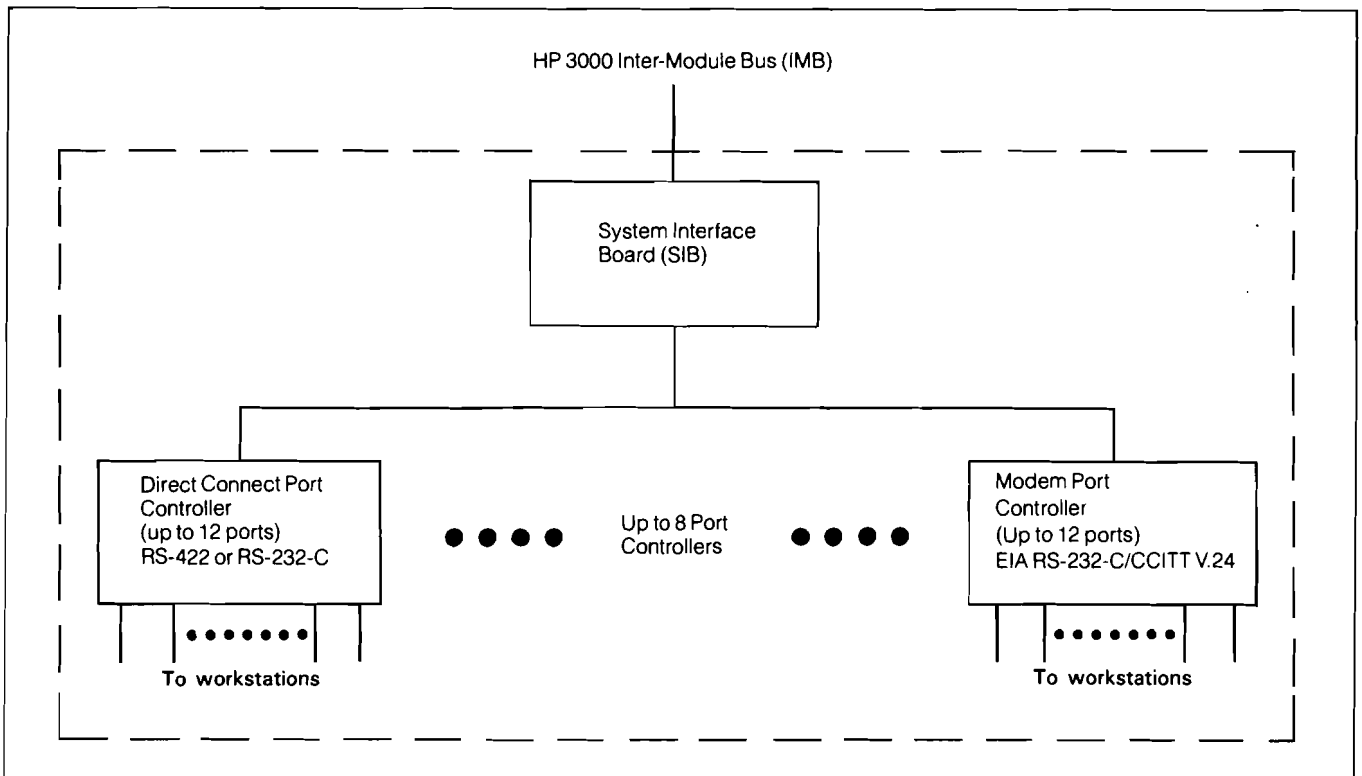


ATP Subsystem Structure.

## ATP Direct Connect Port Controller

The Direct Connect Port Controller connects local workstations to the system. Two types of interfaces are available and these may be combined on the same Direct Connect Port Controller by specifying the appropriate options when ordering.

1. HP-Direct Connect Type 422: Allows workstations operating at speeds up to 19.2K bps to be connected to the Direct Connect Port Controller with cables up to 1220 meters (4,000 ft.) long.

   HP-Direct Connect Type 422 is Hewlett-Packard's implementation of the EIA RS-422 standard. The electrical characteristics conform to the RS-422 standard, but the interface uses a five-pin connector which is unique to HP.

   The connecting cable requires one twisted pair of wires for Data-In, one twisted pair of wires for Data-Out and a single wire for signal Ground. A shield is strongly recommended and is provided on all HP supplied cables.

This interface has been designed to provide a very high degree of protection from Radio Frequency Interference (RFI), Electromagnetic Interference (EMI) (including lightning) and Electro-Static Discharge (ESD).

2. HP-Direct Connect Type 232: Allows workstations operating at speeds up to 19.2K bps to be connected to the Direct Connect Port Controller with cables up to 15 meters (50 ft.) long.

   HP-Direct Connect Type 232 is Hewlett-Packard's implementation of the EIA RS-232-C standard. The electrical characteristics conform to the RS-232-C standard, but the interface uses a 3-pin connector which is unique to HP. HP cables (or cables designed to HP's specifications) adapt the 3-pin connector to an RS-232-C compatible 25-pin connector. The connecting cable requires three wires, one each for Data-In, Data-Out and signal Ground. A shield is strongly recommended.
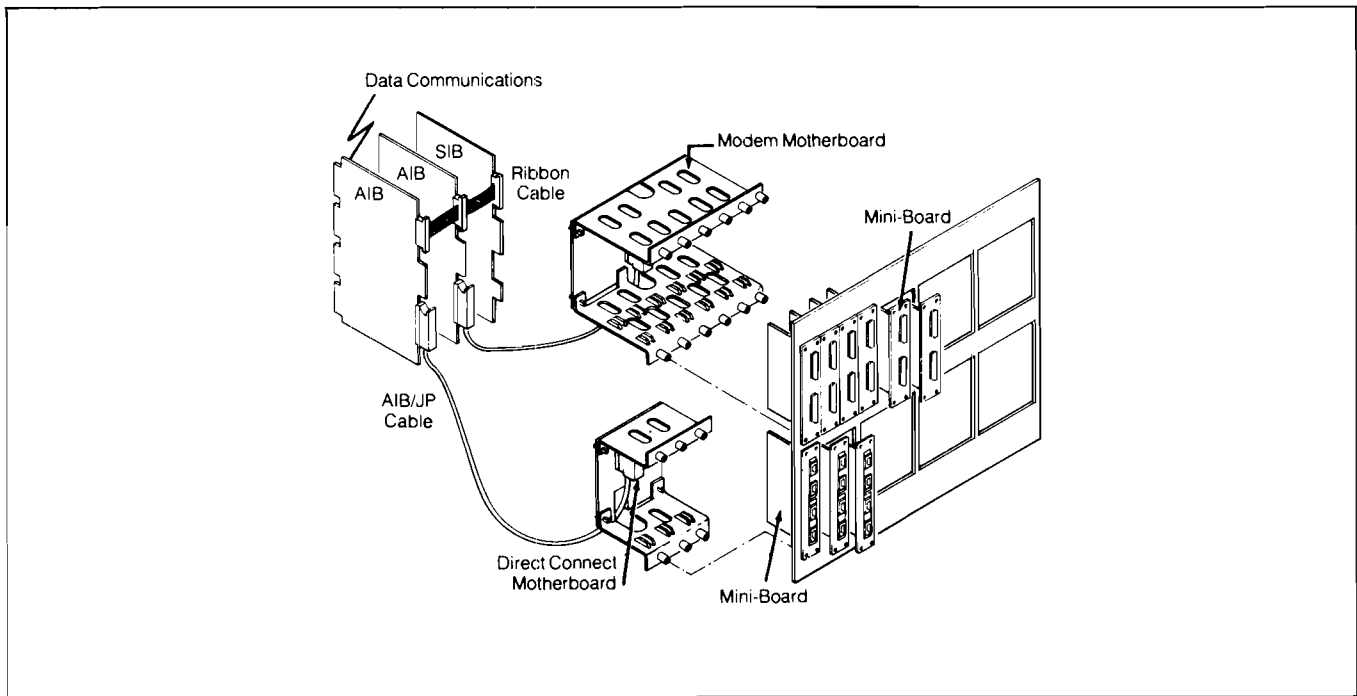


ATP Subsystem Assembly.

## ATP Modem Port Controller

The Modem Port Controller has one interface for connecting remote workstations to the system. Local workstations may also be connected.

The HP-Modem Connect Type 232 Interface allows asynchronous, full-duplex modems to be connected to the Modem Port Controller with cables up to 15 meters (50 ft) long. The speed of workstation operation will be limited by the maximum speed at which the asynchronous modem can transfer data.

The HP-Modem Connect Type 232 Interface also allows workstations to be connected through HP-certified PBXs.

HP-Modem Connect Type 232 is Hewlett-Packard's implementation of the EIA RS-232-C (CCITT V.24) standard. The electrical characteristics and the 25-pin connector conform to the RS-232-C (CCITT V.24) standard but the pin assignments on the connector are unique to HP. HP cables (or cables designed to HP's specifications) re-route signals to provide a fully RS-232-C (CCITT V.24) compatible output connector.

Local workstations operating at speeds up to 19.2K bps can be connected to the Modem Port Controller using the standard 25-pin RS-232-C connector. The connecting cable is subject to the 15 meter (50 ft.) limitation of the RS-232-C standard.

## ATP Expansion Packages

The Direct Connect Expansion Package is a package containing one SIB, one Direct Connect Port Controller and one free-standing Junction Panel.

The Modem Expansion Package is a package containing one SIB, one Modem Port Controller and one free-standing Junction Panel.

The free-standing Junction Panel is a cabinet which contains an ATP junction panel. It can be placed up to 4.57 meters (15 ft.) from the system. The free-standing Junction Panel offers junction panel space for up to:

    4 Direct Connect Port Controllers
or 2 Direct Connect Port Controllers and
    1 Modem Port Controller
or 2 Modem Port Controllers

On the HP 3000 Series 39, 40, 42 a free-standing Junction Panel (part of the Expansion Package) is required to install Direct Connect and Modem Port Controllers.

On the HP 3000 Series 44, 48 a free-standing Junction Panel (part of the Expansion Package) is required to install Modem Port Controllers and may be used to install Direct Connect Port Controllers. The system side Junction Panel may also be used to install Direct Connect Port Controllers.

On the HP 3000 Series 64, 68, the system Junction Panels must be used to install all Direct Connect and Modem Port Controllers. The free-standing Junction Panel (part of the Expansion Package) is not required and not supported.

## Console Support

On the HP 3000 Series 64, 68, the Console must be connected to the system via an ATP Direct Connect or Modem Port Controller.

On the HP 3000 Series 39, 40, 42 and Series 44, 48, the Console must be connected to the system via an ADCC (HP 30018A). The Console cannot be connected via an ATP Port Controller.

## Workstation Configuration

The ATP allows various types of workstations to be connected to the HP 3000. When contact is established, the MPE operating system must determine certain characteristics of the workstation in order to maintain communication integrity. These characteristics include input speed, output speed and data flow control. This information is provided by assigning a terminal type that identifies a workstation's I/O needs (see Table 4: ATP Terminal Type Table). During system configuration, the system manager determines the most commonly used workstation at each port and assigns that terminal type as the default value for that port. Should different I/O characteristics be required, the default type may be overridden via a parameter in the log-on command.
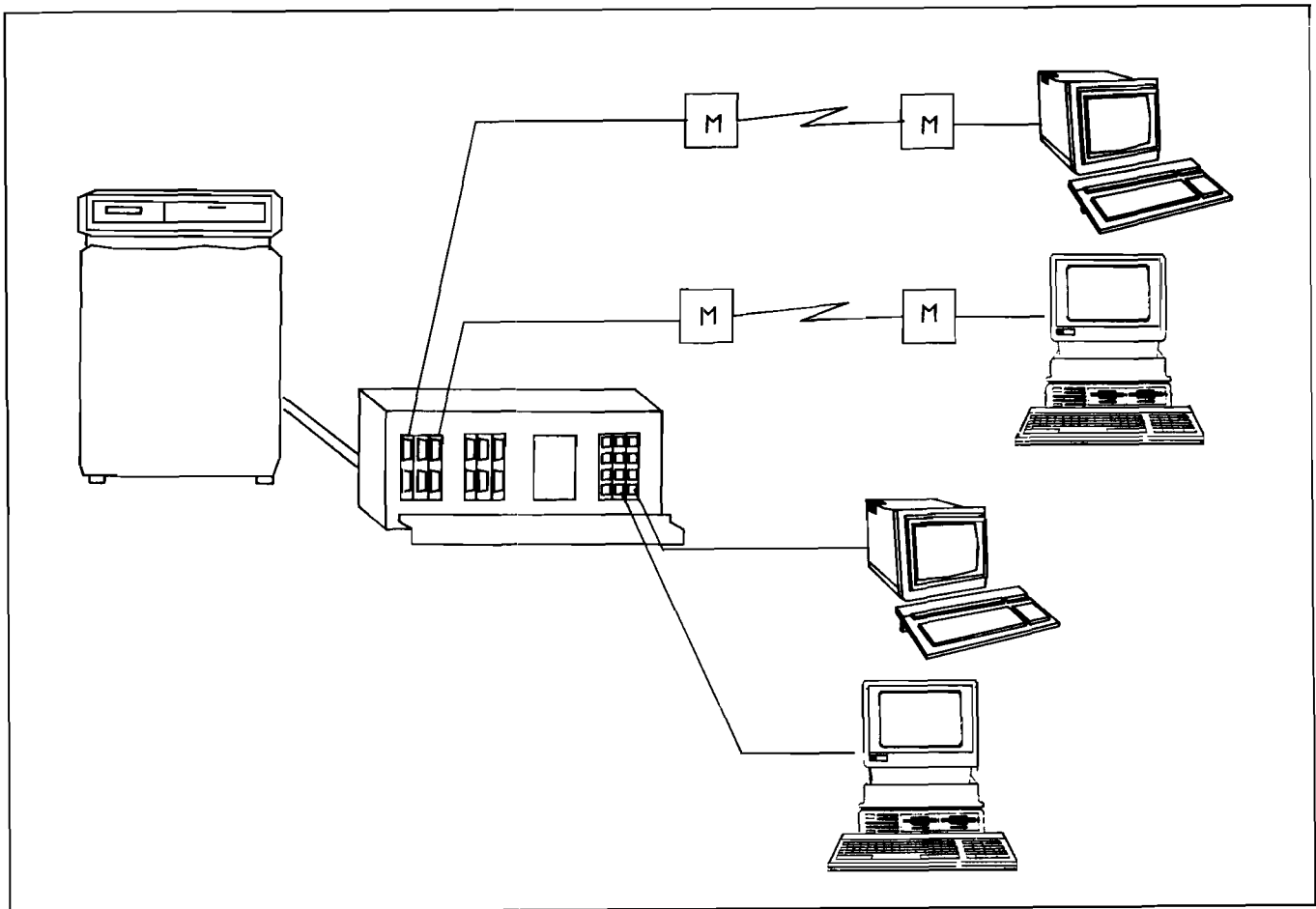
ATP Expansion Package with one add-on Port Controller.

## Functional Specifications

— Data Transfer Rates (bps): 300, 600, 1200, 2400, 4800, 9600, 19200.
— Speed Sensing at (bps): 300, 600, 1200, 2400, 4800, 9600, 19200.
— Asynchronous transmission of data.
— Character and block mode support.
— Parity   : Log-on—pass-thru or even
               Program Control—none (0), none (1), even
               or odd
— Interfaces:
   Direct    : RS-422 (5-pin)
                RS-232-C (3-pin)
   Remote  : RS-232-C (CCITT V.24)
                (25-pin/HP pin-assignment)
                Compatible with full-duplex
                asynchronous modems (see Table 6: ATP Compatible Modems).
                Half-duplex modems are not supported.

## Installation and Customer's Responsibility

Hewlett-Packard Customer Engineers will install and verify the operation of the ATP.

Table 5 lists the workstations which are supported by HP for use with the ATP. Other devices may be connected but it is the customer's responsibility to ensure device compatibility with the ATP hardware and software.

# Ordering Information

## Product # : Product Description

**HP 30144A : ATP SYSTEM INTERFACE BOARD (SIB).**
Supports up to 8 ATP Port Controllers. For use on HP 3000 Series 44, 48, 6X.

**HP 30145A : ATP DIRECT CONNECT PORT CONTROLLER.**
Provides 12 direct connect RS-422 (5-pin) workstation ports. For use on HP 3000 Series 39, 4X, 6X.

Option 001 : ASSEMBLY IN SERIES 6X FIRST I/O BAY.
Provides Series 6X first I/O bay junction panel. Deletes AIB/JP cable (replaced by DCU datacomm cable provided with Series 6X system). Pre-assembles ATP subsystem. Order once per Series 6X system.

Option 002 : RS-232-C OPTION.
Replaces quantity 4 direct connect RS-422 (5-pin) workstation ports with quantity 4 direct connect RS-232-C (3-pin) workstation ports.

*To convert all 12 ports to RS-232-C, three Options 002 have to be ordered.*

Option 003 : ASSEMBLY IN SERIES 6X SECOND I/O BAY
Provides Series 6X second I/O bay junction panel. Pre-assembles ATP subsystem in second I/O bay. Order at most once per Series 6X system.

Option 042 : SERIES 39, 40, 42 EXP PACK AIB/JP CABLE
Replaces standard AIB/JP cable with Exp Pack AIB/JP cable, necessary for installation of DC Port Controller on Exp Pack free-standing junction panel on the Series 39, 40, 42.

*Every 30145A ordered for use on a Series 39, 40, 42 has to be ordered with one Option 042.*

Option 048 : SERIES 44, 48 EXP PACK AIB/JP CABLE
Replaces standard AIB/JP cable with Exp Pack AIB/JP cable, necessary for installation of DC Port Controller on Exp Pack free-standing junction panel on the Series 44, 48.

*A 30145A ordered for use on a Series 44, 48 should not be ordered with Option 048 if it will be installed on the Series 44, 48 system junction panel.*

*A 30145A ordered for use on a Series 44, 48 should be ordered with one Option 048 if it will be installed on the ATP Exp Pack free-standing junction panel.*

**HP 30155A : ATP MODEM PORT CONTROLLER**
Provides 12 modem RS-232-C (CCITT V.24) (25-pin) ports. For use on the HP 3000 Series 39, 4X, 6X.

Option 001 : ASSEMBLY IN SERIES 6X FIRST I/O BAY
Provides Series 6X first I/O bay junction panel. Deletes AIB/JP cable (replaced by DCU datacomm cable provided with Series 6X system). Pre-assembles ATP subsystem. Order once per Series 6X system.

Option 003 : ASSEMBLY IN SERIES 6X SECOND I/O BAY
Provides Series 6X second I/O bay junction panel. Pre-assembles ATP subsystem in second I/O bay. Order at most once per Series 6X system.

Option 042 : SERIES 39, 40, 42 EXP PACK AIB/JP CABLE
Replaces standard AIB/JP cable with Exp Pack AIB/JP cable, necessary for installation of Modem Port Controller on Exp Pack free-standing junction panel on the Series 39, 40, 42.

*Every 30155A ordered for use on a Series 39, 40, 42 has to be ordered with one Option 42.*

Option 048 : SERIES 44, 48 EXP PACK AIB/JP CABLE
Replaces standard AIB/JP cable with Exp Pack AIB/JP cable, necessary for installation of Modem Port Controller on Exp Pack free-standing junction panel on the Series 44, 48.

*Every 30155A ordered for use on a Series 44, 48 has to be ordered with one Option 048.*

# Ordering Information

## Product # : Product Description

**HP 30273A : ATP DIRECT CONNECT EXPANSION PACKAGE**

Provides 12 direct connect RS-422 (5-pin) workstation ports. Includes one SIB, one ATP DC Port Controller, and one free-standing junction panel. For use on HP 3000 Series 39, 4X.

Option 001 : DELETE SIB.

For use by Series 44, 48 users who already have an SIB installed in their system.

Option 002 : RS-232-C OPTION

Replaces quantity 4 direct connect RS-422 (5-pin) workstation ports with quantity 4 direct connect RS-232-C (3-pin) workstation ports.

*To convert all 12 ports to RS-232-C, three Options 002 must be ordered.*

Option 042 : SERIES 39, 40, 42 EXP PACK AIB/JP CABLE

Provides Exp Pack AIB/JP cable, necessary for installation of DC Port Controller on Exp Pack free-standing junction panel on Series 39, 40, 42.

*Every 30273A ordered for use on a Series 39, 40, 42 has to be ordered with one Option 042.*

Option 048 : SERIES 44, 48 EXP PACK AIB/JP CABLE

Provides Exp Pack AIB/JP cable, necessary for installation of DC Port Controller on Exp Pack free-standing junction panel on Series 44, 48.

*Every 30273A ordered for use on a Series 44, 48 has to be ordered with one Option 048.*

**HP 30274A : ATP MODEM EXPANSION PACKAGE**

Provides 12 modem RS-232-C (CCITT V.24) (25-pin) workstation ports. Includes one SIB, one ATP Modem Port Controller, and one free-standing junction panel. For use on HP 3000 Series 39, 4X.

Option 001 : DELETE SIB.

For use by Series 44, 48 useres who already have an SIB installed in their system.

Option 042 : SERIES 39, 40, 42 EXP PACK AIB/JP CABLE

Provides Exp Pack AIB/JP cable, necessary for installation of Modem Port Controller on Exp Pack free-standing junction panel on Series 39, 40, 42.

*Every 30274A ordered for use on a Series 39, 40, 42 has to be ordered with one Option 042.*

Option 048 : SERIES 44, 48 EXP PACK AIB/JP CABLE

Provides Exp Pack AIB/JP cable, necessary for installation of Modem Port Controller on Exp Pack free-standing junction panel on Series 44, 48.

*Every 30274A ordered for use on a Series 44, 48 has to be ordered with one Option 048.*

## ADCC to ATP Upgrade

HP 3000 Series 39, 40, 42 and Series 44, 48 users get a return credit towards the purchase price of the ATP Direct Connect Port Controller, the ATP Modem Port Controller, the ATP Direct Connect Expansion Package or the ATP Modem Expansion Package, when returning a total of up to three ADCC Main (HP 30018A) or ADCC Extender (HP 30019A) products.

To receive this credit, order the products listed below as they apply: (total quantity should be max three per purchased ATP product for which a return credit is requested).

Product # :   Product Description.

HP 30018AN : Return credit for ADCC-Main. The option 040, 044 cable must be returned to receive the credit.

HP 30019AN : Return credit for ADCC-Extender. The option 040, 044 cable must be returned to receive the credit.

**Table 1. Max # of Free-Standing Junction Panels (FS JP) per System**

| System | #FS JPs | Usage of the FS JPs |
|---|---|---|
| Series 39/40/42 | 1 | Required for ATP direct and modem connections. |
| Series 44/48 | 2 | Required for ATP modem connections. May be used for ATP direct connections. |
| Series 64/68 | 0 | Not required. Not supported. |

**Table 2. Max # of Port Controllers per ATP Subsystem**

| System | Max # of Direct Connect Port Controllers | Max # of Modem Port Controllers | Max # of (Direct Connect + Modem) Port Controllers |
|---|---|---|---|
| Series 39/40/42 1 FS JP | 4 | 2 | * |
| Series 44/48 0 FS JP | 6 | 0 | 6 |
| 1 FS JP | 8 | 2 | 8 |
| 2 FS JPs | 8 | 4 | 8 |
| Series 64/68 0 FS JP | 8 | 8 | 8 |

* The maximum ATP subsystem on the HP 3000 Series 39/40/42 consists of:
  4 Direct Connect Port Controllers
  or 2 Direct Connect Port Controllers and
  1 Modem Port Controller
  or 2 Modem Port Controllers

**Table 3. Max # of ATP Subsystems per System**

| System | Max. # of ATP Subsystems |
|---|---|
| Series 39/40/42 | 1 |
| Series 44/48 | 1 |
| Series 64 | 2* |
| Series 68 | 4* |

* On the HP 3000 Series 64 the second ATP subsystem is limited to 4 Port Controllers; on the HP 3000 Series 68 the fourth ATP subsystem is limited to 4 Port Controllers.

# Table 4. ATP Terminal Type Table

| Term Type | Flow Control | | | Typical Workstation | Block Mode Support | Backspace Reply | Comments (e,f) |
|---|---|---|---|---|---|---|---|
| | ENQ/ ACK | X-ON/ X-OFF (a) | System Outputs Delay | | | | |
| 4 | No | Opt | No | Datapoint | No | C + 1-Y (em) No Display | Series 39/4x/6x: Subtypes 0,1 |
| 6 | No | Opt | Yes | Non-HP Hardcopy (b) | Yes (c,d) | LF | |
| 9 | No | Opt | Yes | Nòn-HP CRT (b) | No | None | ESC A, ESC E, through ESC H, ESC J and ESC K are not stripped from input. |
| 10 | Yes | Opt | No | HP2392A HP262x | Yes (d) | None | |
| 12 | Yes | Opt | No | HP2645K 8-bit data | Yes (d) | None | |
| 13 | No | Opt | No | Character Mode Term. attached thru P.D.N. | No | None | No echo. |
| 15 | Yes | Opt | No | HP-Hardcopy (2635B) 8-bit Data | Yes (c,d) | LF | |
| 16 | Yes | Opt | No | HP-Hardcopy (2635B) 7-bit data | Yes (c, d) | LF | |
| 18 | No | Opt | No | Non-HP Terminal (b) | No | None | |
| 19 | No | Yes | No | | No | N/A | |
| 20 | No | Yes | No | HP2631B, HP293X, or compatible printer | No | N/A | ESC ? DC1 used to acquire status. |
| 21 | No | Yes | No | | No | N/A | |
| 22 | No | Yes | No | | No | N/A | |

(a) If workstation is using X-ON/X-OFF handshaking, the system will respond correctly.

(b) General Non-HP device type. It is the customer's responsibility to ensure compatibility with ATP hardware and software.

(c) The system supports block mode for this term type. However, the HP 2635B and most non-HP workstations do not support the DC1/DC2 handshake.

(d) Block mode may be turned on by application program (e.g. VPLUS/3000) using escape sequences.

(e) A DC1 trigger is transmitted to mark the start of a read on all term types except 18.

(f) Parity: During log-on:

| If Workstation generates: | Then CPU action is: |
|---|---|
| No parity | All 8 bits passed thru |
| Even parity | Generate even parity on output |
| | Check for even parity on input |
| Odd parity | All 8 bits passed thru |
| | No parity checked or generated |
| | (Note: The CPU assumes the data is 8 bit ASCII and will misinterpret the data). |

Parity generation and checking may also be controlled through the HP 3000 File System.

## Table 5. Workstations Supported by the ATP

| Workstations | Direct Connect RS-232-C | Direct Connect RS-422 | Modem RS-232-C |
|---|---|---|---|
| **Personal Computers** | | | |
| HP150 | Yes | Yes | Yes |
| HP12x | Yes | No | Yes |
| HP9000/200 Term Emulator | Yes | No | Yes |
| **Terminals** | | | |
| 262x CRT | Yes | Yes (1) except 2621 | Yes |
| 264x CRT | Yes | Yes (1) | Yes |
| 2382A | Yes | No | Yes |
| 2392A | Yes | Yes | Yes |
| 2635A/B | Yes | No | Yes |
| 307x | Yes | No | Yes |
| **Printers** | | | |
| 2601A/02A | Yes | No | No |
| 2631B | Yes | No | Yes |
| 2932A/33A/34A (2) | Yes | Yes | Yes |
| 2687A | Yes | Yes | No |
| 2563A | Yes | No | No |

(1) Specify option 035 for RS-422 interface on new terminals. Adapter kits (HP13266E/HP13260E) are available to convert already installed terminals (HP262x/HP264x) to RS-422 interface.
(2) 2932A/33A/34A printers must be set for 2631B compatibility mode.

## Table 6. ATP Compatible Modems

| Modem | Baud rates supported | Notes |
|---|---|---|
| BELL 103J | 300 | Dial-up, auto-answer |
| BELL 202T | 300, 600, 1200 | 4-wire leased line. |
| BELL 212A | 300, 1200 | Dial-up, auto-answer. |
| HP35016A | 300, 1200 | Dial-up. Compatible with Bell 103, 212 and Racal-Vadic VA 3400 modems. |
| HP35141A (HP Remote Support) | 300, 1200 | Auto-answer. Compatible with Bell 103 and 212 modems. |
| HP92205A | 300, 1200 | Hayes Smartmodem 1200. Auto-answer. Compatible with Bell 103 and 212 modems. |
| VA3400 | 1200 | Dial-up or 2-wire leased line. |
| VADIC 34xx Series | 300, 1200 | |

## Table 7. ATP Custom Cable Components

| Connection Type | Product # | Description |
|---|---|---|
| 232 | 92224A | 3-pin male connectors (includes 4 connectors) |
| 232 | 92224B | 3-pin female connectors (includes 4 connectors) |
| 232 | 92179C | 3-wire shielded cable (sold by the meter) |
| 422 | 92225A | 5-pin male connectors (includes 4 connectors) |
| 422 | 92225B | 5-pin female connectors (includes 4 connectors) |
| 422 | 92179D | 5-wire shielded cable (sold by the meter) |
| 232/422 | 92229A | Crimp tool for connecting cable shield to the connector. |

Note : The 92229A crimp tool is required to connect the cable shield to the 232 or 422 connectors.
Pins are attached to the wires with a standard connector pin crimp tool. This tool is not available through CSO.

## Table 8. ATP to Workstation Connection Cables

HP-Direct Connect Type 232:

| Workstation model | Product # | Description |
|---|---|---|
| 262x (port 1)/ HP125 (port 1) | 13222X | 3-pin/50-pin m/m 5m (16 ft) |
| 262x (port 2)/ 2621/2382A/ HP125 (port 2)/ HP120/HP150 | 13242X | 3-pin/25 pin m/m 5m (16 ft) |
| 264x | 13232X | 3-pin/30 pin m/f 5m (16 ft) |
| 2392A | 40242X | 3-pin/25 pin m/m 5m (16 ft) includes RFI filter |

HP-Direct Connect Type 422:

| Workstation model | Product # | Description |
|---|---|---|
| 262x | 13222P | 5-pin/50-pin m/m 5m (16 ft) |
| 264x | 13232I | 5-pin/30 pin m/f 5m (16 ft) |
| 2392A | 40242P | 5-pin/25 pin m/m 5m (16 ft) includes RFI filter |

## Table 9. ATP Accessory Cables

| Product # | Description |
|---|---|
| 30153A | 3-pin/3-pin m/f 15 m (50 ft) Direct Connect Type 232 extension cable |
| 30152A | 3-pin/25-pin m/f 5 m (16 ft) Direct Connect Type 232 to RS-232-C adapter cable |
| 30154A | 5-pin/5-pin m/f 30 m (100 ft) Direct Connect Type 422 extension cable |
| 30062B | 25-pin/25-pin m/m 7.6 m (25 ft) ATP to Modem connection cable |
| Option 001 | 25-pin/25-pin m/m 15.2 m (50 ft) ATP to Modem connection cable |

# Advanced Terminal Processor for the Series 37

**HEWLETT PACKARD**

HP AdvanceNet

Model Number 30460A
For HP 3000 Series 37

The Advanced Terminal Processor for the HP 3000 Series 37 (ATP37) is a communication interface board designed for the HP 3000 Series 37 that provides the connection of up to 7 asynchronous workstations to the system in a point-to-point configuration. HP personal computers, HP terminals and HP workstation printers are supported on the ATP37. The devices can be connected directly (for local communications) on all seven prts; one of these ports can alternatively be used for remote connection of these devices through asynchronous full-duplex modems. This remote port may also serve as the connection of the HP 3000 Series 37 to HP Tele-Support service through a full-duplex modem.

The ATP37 is an intelligent micro-processor based interface which offloads the host CPU by performing handshaking and character processing for the attached workstations, as well as transferring data directly to and from the HP 3000 Series 37. It allows workstations to transmit and receive data on either a character-by-character basis or block-at-a-time basis.

## Features
- Six direct connect RS-232-C ports for local workstation interfaces
- One full modem RS-232-C (CCITT V.24) port for remote workstations
- Data transfer line speeds at up to 19.2 Kbps
- Speed sensing
- Offloads host CPU via direct memory access data transfers
- Hardware buffering reduces possibility of data overruns
- Supports character and block mode workstations
- Remote on-line diagnostics
- Software compatible with HP Advanced Terminal Processor

## Functional Description
The ATP37 makes extensive use of VLSI technology with a separate microcomputer chip for each workstation port. Each chip is an 8-bit microprocessor with 128 bytes of RAM, 2 Kbytes of ROM, and an asynchronous receiver/transmitter to handle data transmission and reception.

The ATP37 consists of three parts:
- the main interface board with one RS-232-C full modem port

- two connector mini-boards each providing three HP Direct Connect Type 232 ports.

When placed in the HP 3000 Series 37 system card cage or in the I/O extender card cage, the seven connectors are placed to appear directly on the back-panel.

The direct connect ports are designed to connect local workstations to the system using the HP Direct Connect Type 232 interface. This interface allows local asynchronous workstations operating at speeds up to 19.2 Kbps to be connected to the ATP37 with cables up to 15 meters (50 feet) long.

HP Direct Connect Type 232 is Hewlett-Packard's implementation of the EIA RS-232-C standard. The electrical characteristics conform to the RS-232-C standard, but the interface uses a three pin connector which is unique to HP. HP cables (or cables designed to HP's specifications) perform an adaptation from the 3-pin connector to a RS-232 compatible 25-pin connector. The connecting cable requires three wires, one each for Data In, Data Out and signal ground.

The RS-232-C full modem port, using a 25-pin connector, is designed to connect asynchronous, full duplex modems to the system. Local workstaions may also be connected to the modem port.

(1) HP Modem Connect Type 232: allows asynchronous full duplex modems to be connected to the modem port with cables up to 15 meters (50 feet) long. The speed of workstation operation will be limited by the maximum speed at which the asynchronous modem can transfer data.

HP Modem Connect Type 232 is Hewlett-Packard's implementation of the EIA RS-232-C (CCITT V.24) standard. The electrical signal characteristics conform to the RS232-C (CCITT V.24) standard, but the pin assignments on the connector are unique to HP. HP cables (or cables designed to HP's specifications) re-route signals to provide a fully RS-232-C (CCITT V.24) compatible output connector.

(2) RS-232-C Local Direct Connection to Modem Port: allows local workstations operating at speeds up to 19.2 Kbps to be connected to the ATP37 modem port using the standard 25-pin RS-232-C connector. The connecting cable is subject to the 15 meter (50 feet) limitation of the RS-232-C standard.

## Workstation Configuration

The ATP37 allows numerous types of asynchronous workstations to be connected to the HP 3000 Series 37. When contact is established, the MPE operating system must determine certain characteristics of the workstation in order to maintain communication integrity. These characteristics include input speed, output speed, and data flow control. This information is provided by assigning a "terminal" type that identifies a workstation's I/O needs. Terminal types may either be HP standard types (See Table 1. ATP Software Terminal Types) or designed by the customer using the HP Workstation Configurator product (#30239A).

## ATP37 Functional Specifications

- Data Transfer Rates: 300, 600, 1200, 2400, 4800, 9600, 19.2K baud.
- Speed sensing at all speeds
- Asynchronous transmission
- Parity: Log-on . . . pass-thru or even
  Program control . . . even, odd, none(1) or none(0)
- Support of block and character mode workstations
- Interface Compatibility:
  Local:   6 direct connect ports with HP Direct Connect Type 232 (RS-232-C with unique HP 3-pin connector)
  Remote:  1 full modem port with HP Modem Connect Type 232 (RS-232-C (CCITT V.24) with unique HP connector-pin assignment). Compatible with full-duplex asynchronous modems (Bell 103A/212A, HP35141A, HP37212A, HP92205A, VA3451). Half-duplex modems are not supported.
- Flow control: ENQ/ACK or X-ON/X-OFF (software configurable)

## Supported Devices

The following devices are supported by HP for connection to the ATP37. Other devices may be connected to an HP 3000 Series 37, but it will be the customer's responsibility to ensure device compatibility with the ATP37 hardware and software.

Personal Computers
    HP150   Touchscreen Personal Computer

Terminals
    2392A   Interactive Display Terminal
    2623A   Interactive Graphics Display Terminal
    2624B   Office Display Terminal
    2625A   Dual System Terminal
    2628A   Word Processing Station

Printers
    2601A   40cps Daisywheel Printer
    2602A   20cps Daisywheel Printer
    2932A   200 cps Dot Matrix Office Printer
    2933A   200 cps Dot Matrix Factory Printer
    2934A   100/200 cps Dot Matrix Office Printer
    2686A   8 page/minute Desktop Laser Printer

Cables for connection of the workstations to the ATP37 must be ordered separately either as options on the workstations (See Workstation Data Sheets) or as separate parts from HP's Computer Supplies Operation.

## Installation Responsibility

One ATP37 Subsystem is included with the basic system. Hewlett-Packard Customer Engineers will install and verify the operation of the additional ATP37 Subsystems.

## System Environment

The ATP37 is supported on the HP 3000 Series 37 under MPE-V/E. One interface is included with the basic system. Up to three additional ATP37s can be added for a maximum of 28 ports.

## Ordering Information

30460A ATP for the HP 3000 Series 37

This provides the Interface Card Assembly that is installed in the HP 3000 Series 37 backplane. Cables to connect the workstations must be ordered separately, or as options to the workstations. The software required to interface MPE to the ATP37 is provided with MPE.

## TABLE I. ATP SOFTWARE TERMINAL TYPES

| Term Type | Flow Control | | | Typical Terminal | Block Mode Support | Backspace Reply | Comments (c, d) |
|---|---|---|---|---|---|---|---|
| | ENQ/ ACK | X-ON/ X-OFF (a) | System Outputs Delay | | | | |
| 10 | Yes | Opt | No | HP2392A HP262X | Yes(b) | None | |
| 18 | No | Opt | No | Non-HP Terminal(e) | No | None | No DC1 sent to start read. |
| 19 | No | Yes | No | HP293X or Compatible printer | No | N/A | ESC ? DC1 used to acquire status |
| 20 | No | Yes | No | | No | N/A | |
| 21 | No | Yes | No | | No | N/A | |
| 22 | No | Yes | No | | No | N/A | |

(a) If terminal is using X-ON/X-OFF handshaking, the system will respond correctly.
(b) Block mode may be turned on by application program (e.g. VPLUS/3000) using escape sequences.
(c) A DC1 trigger is transmitted to mark the start of a read on all term types except 18.
(d) Parity: During long-on:
(e) For non-HP devices it is the customer's responsibility to ensure compatibility between the ATP37 and the device.

| If Terminal Generates: | Then CPU Action is: |
|---|---|
| No parity | All 8 bits passed thru |
| Even parity | Generate even parity on output Check for even parity on input |
| Odd parity | All 8 bits passed thru No parity checked or generated (Note: The CPU assumes the data is 8 bit ASCII and will misinterpret the data). |

Parity generation and checking may also be controlled through the HP 3000 File System

## TABLE 2. ATP37 WORKSTATION CONNECTION CABLES

| Workstation | Cable | Description |
|---|---|---|
| 262X Terminal | 13222X | 3-pin/50-pin m/m 5m (16ft) |
| HP 150 Personal Computer 2601A/2602A Printer 2932A/2933A/2934A Printer | 13242X | 3-pin/25-pin m/m 5m (16ft) |
| 2392A Terminal | 40242X | 3-pin/25-pin m/m 5m (16ft) includes RFI filter |
| 2686A Laser Page Printer | 92218D | 3-pin/25-pin m/m 5m (16ft) |

## TABLE 3. ATP37 ACCESSORY CABLES

| Cable Product | Description |
|---|---|
| 30153A | HP Direct Connect Type 232 Extension Cable 3-pin/3-pin m/f 15m (50ft) |
| 30152A | HP Direct Connect Type 232 to RS-232-C Adapter Cable 3-pin/25-pin m/f 5m (16ft) |
| 30062B option 001 | ATP37 to Modem Cable 25-pin/25-pin m/m 7.6m (25ft) 25-pin/25-pin m/m 15.2m (50ft) |

## TABLE 4: CONNECTORS, BULK CABLE AND CRIMP TOOL REQUIRED TO MANUFACTURE CABLES

Available through the Computer Supplies Operation

| CONNECTION TYPE | PRODUCT # | DESCRIPTION |
|---|---|---|
| 232 | 92224A | 3 pin male connectors (includes 4 connectors) |
| 232 | 92224B | 3 pin female connectors (includes 4 connectors) |
| 232 | 92179C | 3 wire shielded 232 cable (sold by the meter) |
| 232 | 92229A | Crimp tool for attaching cable shield to the connector |

Note—The 92229A crimp tool is required to attach the cable shield (if the cable is shielded) to the connectors.

Pins are attached to the wires, as they have been in the past, with a standard connector pin crimp tool. This tool is not available through CSO.

# Asynchronous Data Communications Controller

HP AdvanceNet
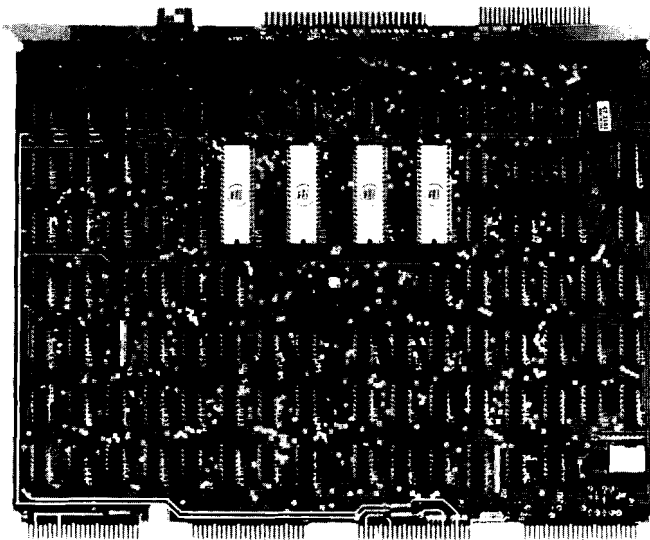
The Asynchronous Data Communications Controller (ADCC) is designed to interface local and remote point-to-point display terminals, printing terminals, and character printers to the HP 3000 Series 30/33/39/40/42/44 and 48 computer systems.

## Features

- Opration at speeds up to 9600 bps.
- Speed sensing for up to six standard data rates.
- EIA RS-232-C and CCITT V.24 interfacing standards compatible.
- Automatic break detection.
- Automatic answering.
- Full and half-duplex transmission modes.
- Parity generation and checking.

## Functional Description

The ADCC provides a bit-serial data interface between the HP 3000 Series 30/33/39/40/42/44 and 48 computer systems and external peripherals. All data is transmitted and received asynchronously.

The ADCC consists of two boards. The first board is referred to as the ADCC-Main and the second is referred to as the ADCC-Extender. The ADCC-Main provides four RS-232-C (V.24) ports, each of which contain the serial input and output data lines, and the control lines necessary to interface with full-duplex and EIA half-duplex

asynchronous modems*. The ADCC-Extender is added to the ADCC-Main to provide an additional four ports, for a total of eight RS-232-C ports plus one CCITT V.24 half-duplex asynchronous modem* control signal. Control for the ADCC-Extender is located on the ADCC-Main, therefore the ADCC-Extender is essentially a slave to the ADCC-Main. If more than eight ports are needed, a second ADCC-Main must be installed in the system.

The ADCC interfaces between the Inter-Module Bus and the RS-232-C lines to provide an orderly flow of data between the computer and devices connected to the communication lines.

The ADCC allows numerous types of devices to be connected to the HP 3000. When contact is first established with the system, the MPE operating system must be able to determine, for its own use, certain characteristics about a particular device in order to maintain communication integrity. These characteristics include such elements as input speed, output speed, and data flow control. This information is provided by assigning a terminal type that describes a devices I/O needs. (See Terminal Type Table.)

*Half-duplex modems are not supported on the HP 3000 Series 39/40/42/44 and 48.

| Term Type | Typical Terminal | Term. Protocol | | | Parity | | Carriage Control | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | ENO/ACK | X ON/X OFF | Block Mode | Check (b) | Type (c) | Cursor Back-space | CTL-H Reply | Form Feed Reply | |
| 4 | Datapoint 3300; HP 2600; 2672 | No | Yes | No | Yes | 1,2 | Yes / No display. | Ctl-Y (EM) | LF reply used | |
| 6 | Terminet 300 | No | Yes | No | Yes | 1,2 | Yes | LF | Yes | |
| 9 | Minibee 2615 | No | Yes | No | Yes | 1,2 | Yes | null | Yes | ESC-A–ESC-E, ESC-H, ESC-J, and ESC-K are stripped from input. |
| 10 | HP 2640B/44/45; HP2626; HP2675 | Yes (a) | Yes | Yes | Yes | 1,2 | Yes | null | Yes | |
| 11 | HP2640A full enter | Yes (a) | Yes | Yes | Yes | 1,2 | Yes | null | Yes | Use of this term is not recommended. Not supported on HP 3000 Series 40 and 44. |
| 12 | HP 2645K 8 bit word w/o parity | Yes (a) | Yes | Yes | No 8 data bits | 5 | Yes | null | Yes | |
| 13 | Telnet Pseudo-Terminal | No | Yes | No | Yes | 9 | Yes | null | Yes | No echo. |
| 15 | HP 2635 8 bit word w/o parity | Yes (a) | Yes | Yes | No 8 data bits | 5 | Yes | LF | Yes | |
| 16 | HP 2635 7 bit word | Yes (a) | Yes | No | Yes | 1,2 | Yes | LF | Yes | |
| 18 | General Non-HP Terminal | No | Yes | No | Yes | 1,2 | Yes | null | Yes | No DC1 sent to start read. |
| 19 | HP 2631B | No | Yes | No | Yes | 1 | n/a | n/a | Yes | Output devices only |
| 20 | HP 2631B | No | Yes | No | No 8 data bits | 5 | n/a | n/a | Yes | Output devices only |
| 21 | HP 2631B | No | Yes | No | Yes | 1 | n/a | n/a | Yes | Remote spooled printers with embedded escape sequences allowed • |
| 22 | HP 2631B | No | Yes | No | No 8 data bits | 5 | n/a | n/a | Yes | Output devices only |

(a) Uses ENQ/ACK handshake when write to terminal is greater than 80 characters

(b)

| | Terminal generates | CPU generates |
|---|---|---|
| ADCC | No parity | No parity |
| | Even parity | Even parity; input checked. |
| | Odd parity | cannot be used for log-on. |

Parity verification is controlled by using the HP 3000 file system to enable and disable parity checking, binary transfers, and to set parity. All of these are accomplished using the FCONTROL intrinsic, and may be used on all but logon terminal types 12, 15, and 19.

(c) Types =
1  odd
2  even
3  7 data, 8 = 0
4  7 data, 8 = 1
5  8 data bits, no parity
6  8 data bits, odd parity for Bisync control characters.
7
8
9  block checking

During system configuration, the system manager determines the most commonly used terminals at each port and assigns that terminal type as the default value for that port. Should different I/O characteristics be required, the terminal type may be overridden via a parameter in the log on command.

## Functional Specification

- Data transfer rates: 110, 150, 300, 600, 1200, 2400, 4800, 9600 bps
- Speed sensing at 110, 150, 300, 600, 1200, 2400 bps
- Asynchronous transmission of data
- Parity: Log-on—pass-thru or even
      Program control—none (0), none (1), even or odd
- RS-232-C and CCITT V.24 interface compatible
- Modem compatibility: Bell 202T, 212A, 103A, HP35016A

## Installation and Customer's Responsibility

An HP Customer Engineer will install and verify the operation of the ADCC's.

Non-HP terminals may be connected to an HP 3000; however, it is the customer's responsibility to ensure terminal compatibility with the terminal types detailed above.

## System Environment

The ADCC is available for use on HP 3000 Series 30/33, 39/40/42, and 44/48 systems.

## Ordering Information

30018A — ADCC Main (must specify option)
opt. 030 — for Series 30 system
opt. 033 — for Series 33 systems
opt. 040 — for Series 39/40/42 systems
opt. 044 — for Series 44/48 systems
30019A — ADCC Extender (must specify option)
opt. 030 — for Series 30 systems
opt. 033 — for Series 33 systems
opt. 040 — for Series 39/40/42 systems
opt. 044 — for Series 44/48 systems

# RS-232-C (V.24) to Fiber Optic Multiplexer and Fiber Optic Cable

**HEWLETT PACKARD**

Multiplexer Model Number 39301A
Cable Model Number 39200B

```
                    ┌──────────────────┐
                    │     HP 3000      │
                    ├──────────────────┤
                    │ ATC, ADCC, or ATP│
                    └──────────────────┘
                         ● ● ●   Up to 16 Channels
                       ┌────────┐
                       │ 39301A │
                       └────────┘
                          ●
                          ●   39200B up to 1250m (4100 ft.)
                          ●
                          ●
                       ┌────────┐
                       │ 39301A │
                       └────────┘
                                    Up to 16 Devices

  ┌──────────┐              ┌──────────┐              ┌──────────┐
  │ Terminal │ ●●●●●●●●●●●● │ Printer  │ ●●●●●●●●●●●● │ Terminal │
  └──────────┘              └──────────┘              └──────────┘
```
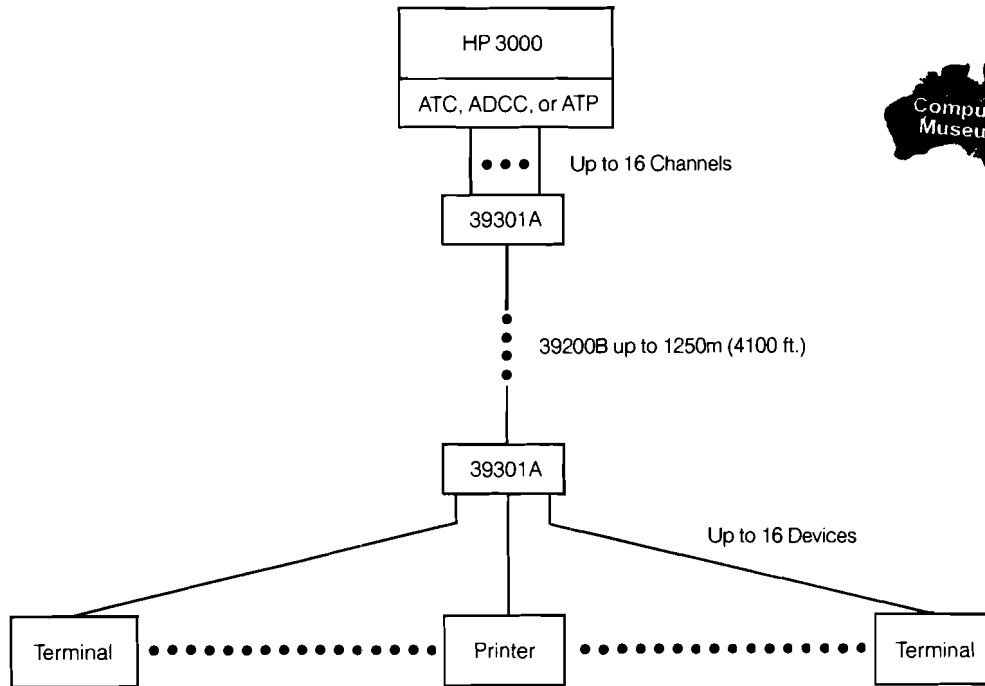
The HP 39301A multiplexer provides an easy way to incorporate the advantages of fiber optic communications into local area terminal communications links. These advantages include immunity to electromagnetic interference of all types from lightning strikes to noisy electric motors, and freedom from static discharge and crosstalk. The fiber optic cable also provides security for your data as it will not radiate electromagnetic signals. In volatile atmospheres there is no need for special shielding for the cable because no sparks can be generated by this totally dielectric medium.

A pair of HP 39301A's interconnected with 39200B fiber optic cable allow the interconnection of a remote cluster of up to 16 EIA RS-232-C/CCITT V.24 devices at distances up to 1250m (4100ft). Each of the 16 full duplex channels can accommodate asynchronous data at rates up to 19,200 bps. The HP 39301A is compatible with all 3000 family point-to-point EIA RS-232C/CCITT V.24 terminal interfaces including the ATC, ADCC and ATP. Any HP 3000 supported point-to-point EIA RS-232-C/CCITT V.24 terminal, printer, or plotter device may be connected with the HP 39301A.
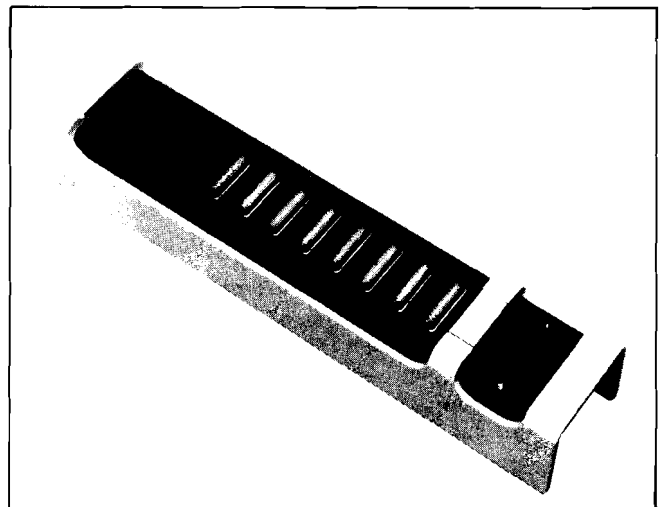
## Features

- A pair of Fiber Optic Multiplexers interconnected by HP 39200B fiber optic cable provides:
  - —Complete immunity to EMI sources; such as crosstalk, lightning strikes, static discharges or electric motors.
  - —Secure, non-radiative, data transmission
  - —Eliminates spark hazards in volatile atmospheres
- Extend up to 16 RS-232C/V.24 channels to 1250m (4100ft).
- Handles asynchronous data up to 19200 bps on each of 16 channels simultaneously
- Light weight fiber optic cable cuts installation costs
- Compatible with direct connect RS-232-C/V.24 ports on ATC, ADCC and ATP
- Built-in fault isolation facilities

## Functional Description

A pair of HP 39301A Fiber Optic Multiplexers establishes eight full duplex RS-232-C/V.24 data links over HP 39200B optical fiber cables. Each channel may operate any asynchronous protocol up to 19,200 bps; with a maximum pulse distortion of +/−6 μsec. Each port may be used independently with different protocols and different data rates without any adjustments on the multiplexer.

The Fiber Optic multiplexer accepts inputs on the primary Transmitted Data (TD) inputs of the eight RS-232-C/V.24 connectors. The TD signals are sampled at a rate of 200kHz and the resulting data are serialized and transmitted in real time over the HP 39200B optical fiber cable to a companion HP 39301A where the serial bit stream is reconverted to parallel RS-232-C lines on the equivalent primary Received Data pins of the eight RS-232-C/V.24 connectors. Each HP 39301A contains both the transmit and receive circuitry necessary to provide full duplex capability.

A diagnostic loopback switch is provided to help isolate failures to the proper system subassembly. With this switch, a fiber optic loopback cable provided, and the Carrier Received status light, failures can be isolated to either multiplexer, to the cable, or to the interconnected data processing equipment. This allows easy troubleshooting of any link failure.

## Functional Specifications

**System Performance:** (A system consists of two 39301As interconnected with a 39200B fiber optic cable assembly).

System Bit Error Rate: One error in $10^{-9}$ typical
Pulse Width Distortion: ±6μs Maximum (Operated with RS-232-C load of 3k Ohms and 2500pF)

### Electrical Channel Interface

Electrical: Conforms to EIA Standard RS-232-C Section 2 (CCITT V.24)
Electrical Connector: Female 25 Pin Subminiature "D"
Pin Assignments:

| PIN # | EIA RS-232-C | | CCITT V.24 | | NOTES |
|---|---|---|---|---|---|
| 1 | Protective Ground | GND | Earth Common | 101 | 2 |
| 2 | Transmitted Data | TD | Transmitted Data | 103 | 1 |
| 3 | Received Data | RD | Received Data | 104 | 1 |
| 6 | Data Set Ready | DSR | Data Set Ready | 107 | 3 |
| 7 | Signal Ground | SG | Signal Ground | 102 | 1,2 |
| 14 | Secondary Transmitted Data | STD | Transmitted Backward Channel Data | 118 | |
| 16 | Secondary Received Data | SRD | Received Backward Channel Data | 119 | |

| Note 1. | For the HP 3000 system environment, these are the only pins needed for a hardwired connection to the system. |
|---|---|
| 2. | Pins 1 and 7 are internally connected. |
| 3. | Pin 6 is internally connected to +12V through a 316 ohm resistor. |

### Optical Channel Interface

Transmitter Optical Output Flux: 50μW minimum at 820nm
Receiver Optical Input Flux: 0.8μW minimum at 820nm
Fiber Optic Port Connector: HFBR-4000 supplied installed on HP 39200B Cables

**Indicators and Switches:**
AC Line Indicator: When on indicates that AC power is on.
Carrier Received Indicator: When on, indicates that the 39301A is receiving a modulated signal from the remote transmitter.
Loopback Switch: In the TEST position, enables an electrical loopback at the interface between the multiplexer electronics and the fiber optic transceiver circuitry. The "Carrier Received Indicator" is disabled when this switch is in the Test position.

**Environmental:**
Storage Temperature: −40°C to +75°C
Operating Temperatures: 0°C to +55°C
Relative Humidity: 95%

**Physical Characteristics:**
Size: 42.5 x 8.9 x 7.2 cm (16.75 x 3.5 x 2.85 inches)
Weight: 2.2 kg (4.75 lbs)
Power Requirements: 18VA Maximum
Power Cord Length: 2.3m (7.5 ft.)

# Support Products for the 39301A

■ **HP 39200B Fiber Optic Cable Assembly**
The fiber optic multiplexer operates only with the HP 39200B fiber optic interconnecting cable assembly. The HP 39200B cable is supplied in any length up to 1250m (4100 ft). Each HP 39200B cable is supplied with installed fiber optic connectors (opt. 001/HFBR-4000) and two cable coupling hardware sets (HFBR-3099).

This cable coupling hardware is used to extend an installed link for system reconfiguration. Note: The total link length limitations must be observed when using the cable coupling hardware (HFBR-3099). A table specifying these distance limitations is provided on the following page.

**Dimensions:**
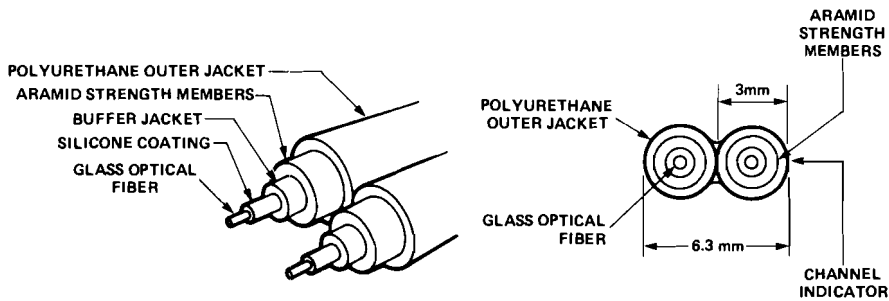


**39200B Cable**
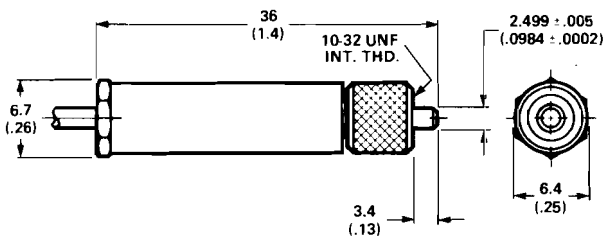


Notes: 1. Dimensions are in mm (inches).

**Installed HFBR-4000 CONNECTOR (One Per Channel End)**
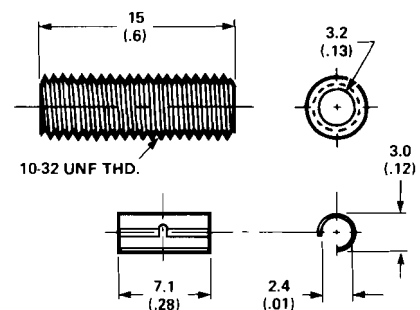
**HFBR-3099
CABLE COUPLING HARDWARE**

**Environmental:**
  Storage Temperature Range: −40°C to +85°C
  Operating Temperature Range: −20°C to +70°C
  Relative Humidity 95% at +70°C

**Physical Characteristics:**
Each channel of the HP 39200B cable is constructed of
a single partially graded index glass fiber contained
within a buffer jacket, wrapped with aramid strength
members, and covered with a scuff-resistant, flame
retardant polyurethane outer jacket. These channels
are joined together with an integral polyurethane web.

The optical waveguide is a fused silica glass, partially
graded index fiber which gives low attenuation and a
wide bandwidth. The silicone coating and buffer

jackets protect the fiber from being scratched and
provide a base for the helically wrapped aramid
strength members.

The aramid strength members have high tensile
strength, and a high strength to weight ratio. The
tough polyurethane outer jacket provides flexibility,
scuff-resistance and flame retardancy yielding a
strong, lightweight, flame resistant cable.

Installation Bend Radius: 25mm (1 in.) Minimum
Installation Tensile Load: 600 Newtons (135 lb.)
  Maximum
Weight per Unit Length: 17 kg/km (1.1 lb./100 ft.)
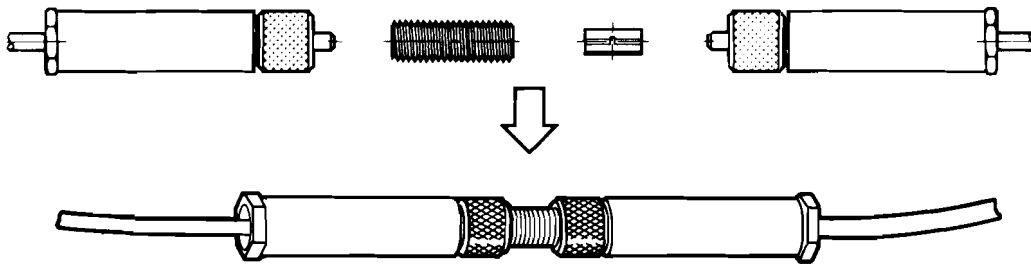


39200B Cables Interconnected With HFBR-3099 Cable Coupling Hardware (see Table 1)

## TABLE 1

| Transmission Distance Limitations: (Applicable when using HFBR-3099 Cable Coupling Hardware) |
| --- |
| No In-line HFBR-3099 Couplers 1250m (4100 ft) Maximum |
| One In-line HFBR-3099 Coupler 1000m (3280 ft) Maximum |
| Two In-line HFBR-3099 Couplers 750m (2460 ft) Maximum |
| Three In-line HFBR-3099 Couplers 500m (1640 ft) Maximum |
| Four In-line HFBR-3099 Couplers 250m (820 ft) Maximum |

■ **Fiber Optic Loopback Cable:**
  This 0.5m (1.7 ft.) cable is provided standard with
  each 39301A. It is used during the troubleshooting
  procedure for the 39301A.
■ **Mounting Hardware:** (The Fiber Optic Multiplexer
  may not be rack mounted in an HP 3000 system
  cabinet)
    Rack/Surface Mounting Hardware:
      This hardware is provided standard with each
      39301A. It allows mounting to any flat surface or
      EIA standard (19 in.) width racks.
    Recessed Rack Mounting Hardware:
      This hardware is provided as option 001. It
      allows the 39301A to be recessed (3 in.) behind
      the closed door of a standard rack without
      damage to the connected cables.

## Installation and Customer Responsibility

HP will install the 39301A on a time and materials basis on HP 3000 Systems. Customers can, if they wish, install the multiplexers themselves. Complete instructions are provided in the Operating and Service manual supplied with each 39301A.

The 39200B interconnecting fiber optic cable must be installed by the customer. Hewlett-Packard 39200B Fiber Optic cable is designed so that when pulled through conduit, accepted wire pulling methods and tools, such as a cable grip, can be used. However, a few precautions for optical cable are necessary: the cable must not be bent tighter than its minimum bend radius; the tensile strength of the cables should not be exceeded (a cable lubricant can be used to minimize the drawing force); tensile load should be applied only to the cable and not the connector. Further information on installation of HP 39200B cable is contained in the HP 39301A Operating and Service manual.

## System Environment

The Fiber Optic Multiplexer is available for use on HP 3000 Series III, 30, 33, 37, 39, 40, 42, 44, 48, 64 and 68 systems. Also available for use on the HP 1000 Series M, E, F, L and A systems.

## Ordering Information

HP 39301A   RS232/V.24 to Fiber Optic Multiplexer
Two are required per link. Each 39301A is supplied with a fiber optic loopback cable for self test and rack/surface mount hardware.*

Option 001   Optional recessed rack mount hardware.*

*(The Fiber Optic Multiplexer can not be mounted in the HP 3000 cabinet.)

**Required Power Supply Option** (order one option only)
| | | |
|---|---|---|
| Option 210 | 100V | 50/60Hz Operation |
| Option 212 | 120V | 50/60Hz Operation |
| Option 222 | 220V | 50/60Hz Operation |
| Option 224 | 240V | 50/60Hz Operation |

**Required Fiber Optic Interconnecting Cable Assembly**

39200B   Dual Channel Cable Assembly—one required per link
Quantity specifies cumulative length of cable ordered in metres. Two each HFBR-3099 Cable Coupling Hardware are provided with each HP 39200B Cable ordered.

Option 001   Factory installed fiber optic connectors compatible with 39301A optical ports. Quantity specifies number of connectored cable assemblies ordered.

## Optional Cable

8120-3569   Dual Channel Adapter Cable permits the connection of two RS-232-C devices to a single RS-232-C port on a 39301A Multiplexer (making use of the secondary transmitted data and secondary received data pins). Eight 8120-3569 cables per 39301A Multiplexer provides 16 channels.

## Documentation

For further technical information, consult the following Hewlett-Packard Manual:
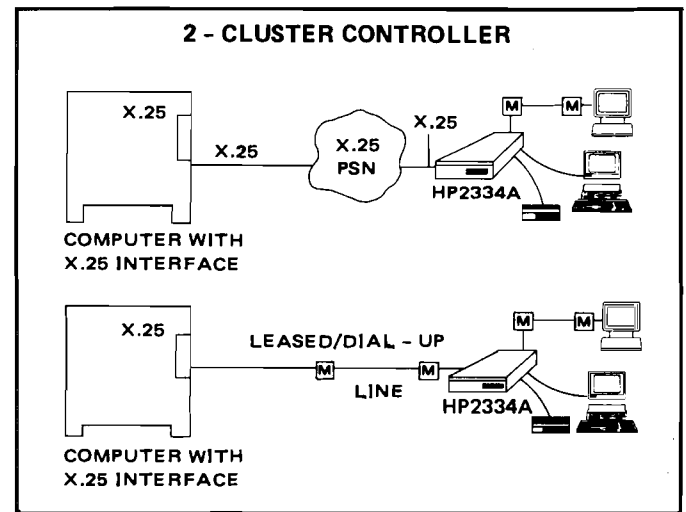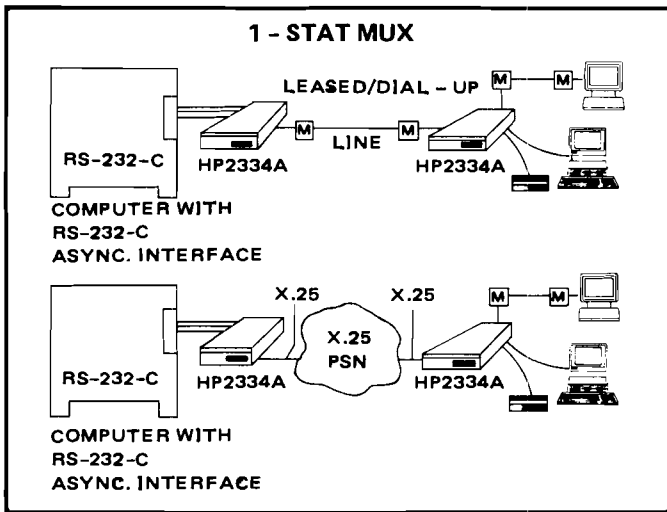HP 39301A RS-232-C/V.24 to Fiber Optic Multiplexer Operating and Service Manual (39301-90001)

# MULTIMUX
# Statistical Multiplexer

HP AdvanceNet

MODEL NUMBER 2334A





The HP 2334A MULTIMUX is designed to connect up to 16 remote workstations (terminals, personal computers, printers, plotters) to a host computer.

It can be used over analog or digital leased line, dial-up line or X.25 Packet Switching Network (PSN).

Two types of configuration are supported for each 2334A port: stat mux and cluster controller.

## Features
- Remote connection of up to 16 RS-232-C workstations
- Expandable from 4 to 16 terminals in groups of 4
- Support analog/digital leased line, dial-up line and X.25 PSN
- Support of HP 3000 and HP 1000 computer
- Remote connection of spooled printers with the HP 3000 computer
- Most HP 3000 application subsystems support with HP 2334A stat mux configuration
- Implementation of X.25/X.3/X.28/X.29/X.121 Nov 1980 CCITT recommendations
- Certification with most X.25 public PSNs
- Connection to non-HP computers
- Computer switching and port contention
- Menu driven configuration accessible remotely
- Comprehensive diagnostic and self-tests

## Functional Description and Specifications
**Asynchronous Ports Connection:** The HP 2334A uses a four-port interface that supports full-duplex, asynchronous RS-232-C, CCITT V.24/V.28 point-to-point connection at 110, 150, 300, 600, 1200, 2400, 4800 or 9600 bps.

Two different RS-232-C four port interfaces are available: 4 port direct connect interface and 4 port modem control interface.

The 4 port direct connect interface supports 3 signals (TX, RX, and ground). The 4 port modem control interface supports 7 signals (TX, RX, ground, RTS, CTS, DCD and DTR) allowing asynchronous modem or PBX/Data Switch and other devices connection requiring modem control signals.

The HP 92205J (also known as HP 35016A) and RACAL-MILGO MPS 1222 asynchronous full-duplex modems have been successfully tested for connections over a dial-up line at 1200 baud.

Up to four interfaces (direct connect and/or modem control) can be installed in the same HP 2334A, allowing up to 16 connections. These connections can be between the HP 2334A and workstations, or HP 2334A and host computer ports. Each port of the HP 2334A port interface can be used for a workstation connection or a computer port connection.

113

Workstations can be connected using either one of the two interfaces, but the 4 port modem control interface is recommended for its performance and its possible remote configuration access.

The HP 2334A used in stat mux configuration and connected to HP 3000 computer ports using "switching connection methods" (see details further) is only supported by HP with 4 port modem control interfaces.

Auto-parity (odd, even) and auto-speed (up to 9600 bps) are available on each HP 2334A port. ASCII code is supported.

X-ON/X-OFF or HP ENQ/ACK flow control methods can be chosen.

Binary transfer with no flow control should be done in blocks of maximum 128 bytes.

**Synchronous Composite Interface:** HP 2334A has one RS-232-C, CCITT V.24/V.28 synchronous full duplex composite interface to connect the HP 2334A to a modem via analog leased line, digital leased line (DDS), dial-up line or X.25 PSN access. Change from one transmission media to another one does not require any hardware or firmware modification in the HP 2334A.

This interface is supported at any speed between 1200 bps and 19200 bps with external clocking. Speed of 4800, 9600 or 19200 bps can be selected with internal clocking.

BELL 2096A, CODEX LSI 96, and RACAL-MILGO ALPHA 96 synchronous full-duplex modems have been successfully tested for connections over a leased line at 9600 bps.

The HP 92205J (also known as HP 35016A) and RACAL-MILGO MPS 1222 synchronous full-duplex modems have been successfully tested for connections over a dial-up line at 1200 bps. However, this speed limits the throughput and should be used only occasionally. Use of a 4800 bps dial-up line is preferable.

Hardwired connection for the synchronous composite link is not supported, synchronous full-duplex short-haul modems or modem eliminator should be used.

HP 2334A is using X.25 protocols, which provide excellent error detection and correction and a choice of flow control parameters.

## X.25 Packet Switching Network Parameters

The HP 2334A has a X.25 interface which is fully compatible with the November 1980 version of the CCITT X.25 recommendation for levels 1, 2 and 3.

Level 1: Physical interface
- X.21 bis (RS-232-C, CCITT V.24/V.28) at any speed from 1200 to 19200 bits/second for PSN connection
- Operate as DTE

Level 2: Data link protocol
- LAP-B protocol
- Modulo 8 sequence number
- Window size: 1-7
- Operate as DCE or as DTE

Level 3: Packet level
- Switched Virtual Circuit (SVCs)
- Permanent Virtual Circuits (PVCs)
- Up to 17 Virtual Circuits simultaneously
- Window size: 1-7
- Maximum packet size: 128 bytes
- Support of D, M and Q bits

## X.25 facilities

"Facility" is the name that the PSN administrations give to some network features.

| Facility Name | CCITT X.25 Reference | 2334A Support |
|---|---|---|
| Extended Sequence Numbers | 7.1.1 | No |
| Non-Standard Default Window sizes | 7.1.2 | Yes |
| Default Throughput Class | 7.1.3 | Yes |
| Packet Retransmission (REJ) | 7.1.4 | No |
| Incoming Calls Barred | 7.1.5 | Yes |
| Outgoing Calls Barred | 7.1.6 | Yes |
| One-Way Outgoing | 7.1.7 | Yes |
| One-Way Incoming | 7.1.8 | Yes |
| Closed User Group | 7.1.9 | Yes |
| Closed User Group Outgoing | 7.1.10 | Yes |
| Closed User Group Incoming | 7.1.11 | Yes |
| Closed Group Incoming Barred | 7.1.12 | Yes |
| Closed Group Outgoing Barred | 7.1.13 | Yes |
| Bilateral Closed User Group | 7.1.14 | Yes |
| Bilateral Closed Outgoing | 7.1.15 | Yes |
| Reverse Charging Request | 7.1.16 | Yes |
| Reverse Charging Acceptance | 7.1.17 | Yes |
| RPOA Selection | 7.1.18 | No |
| Default Packet Sizes | 7.2.1 | Yes (1) |
| Flow Control Negotiation | 7.2.2 | Yes |
| Throughput Class Negotiation | 7.2.3 | Yes |
| Fast Select | 7.2.4 | No |
| Fast Select Acceptance | 7.2.5 | No |
| D-bit Modification | 7.2.6 | No |
| Abbreviated Address | 7.2.7 | No |
| Datagram Facilities | 7.3 | No |

(1) Only 128 bytes.

**X.3/X.28/X.29 Implementation:** The HP 2334A supports the November 1980 version of CCITT X.3/X.28/X.29 recommendations which allow the controller to act as a private Packet Assembler/Disassembler (PAD). The standard 18 parameters defined in the X.3 recommendation are supported, plus additional HP defined local parameters are available for enhanced functionality with HP devices. These programmable parameters are used to configure the operational characteristics for each port to the device or the application.

Basic defined set of parameters (or profiles) are stored permanently in the HP 2334A. In addition user-definable profiles can be defined in the HP 2334A configuration, retained in non-volatile memory and automatically loaded at power-up.

## Supported Public Packet Switching Networks

The table below lists the public Packet Switching Networks (PSN) which have been, or are in the process of being certified, as of December 1984. Consult your Hewlett-Packard Representative for the most recent list of certified Packet Switching Networks:

| Country | PSN | 2334A |
|---------|-----|-------|
| Australia | Austpac | In progress |
| Austria | Datex-P | In progress |
| Belgium | DCS | Certified |
| Canada | Datapac | In progress |
| France | Transpac | Certified |
| Germany | Datex-P | Certified |
| Ireland | Eirpac | In progress |
| Italy | Itapac | In progress |
| Japan | Venus-P | Certified |
| Netherlands | DN-1 | Certified |
| Norway | Datapak | Certified |
| South Africa | Saponet | Certified |
| Spain | Iberpac | Certified |
| Sweden | Datapak | Certified |
| Switzerland | Telepac | Certified |
| Taiwan | PACNET | Certified |
| UK | PSS | Certified |
| US | Telenet | Certified |
| US | Tymnet | Certified |
| US | Uninet | Certified |

## HP 2334A Additional Capabilities

The following capabilities are available with the HP 2334A.

- The HP 2334A in stat mux configuration supports the following "switching connection methods":
  - Host computer switching from the same remote terminal over leased/dial-up line or X.25 PSN
  - Host computer port contention, allowing connection of more remote terminals than computer ports (connected to HP 2334A)
  - Host computer access via X.25 PSN using Switched Virtual Circuits

The "switching connection methods" used with HP 3000 computers are only supported by HP if modem ATP/ADCC cards and HP 2334A 4 port modem control interfaces are used. PBX, Data Switch, or X.25 Node Switch may also require that the HP 2334A 4 port modem control interfaces be used.

The following features are offered:
- Incoming call support (for remote printer) with HP 3000 computer
- Automatic dial of PAD selection command
- Port disabling for call barring
- Symbolic host computer addressing (up to 16 names)
- Callable port-pool for sharable connections
- Local user group (saving the cost of public PSN closed user group facility service) via 16 filters with don't care value place holders
- User definable 2334A port profile, retained in non-volatile memory
- Test port (password protected) accessible by any connected terminal, for remote on-line configuration, tests and statistics

- Indexed sub-addressing compatible with X.25 Node Switch connection
- User defined welcome message (20 characters)
- User defined PAD message header (10 characters)

## Configuration and Tests

### Local Operations
- The HP 2334A configuration can be set and modified off-line from a terminal connected to the 2334A by using the HP 2334A menus.
- The following tests can be performed off-line by using the HP 2334A switches:
  - Internal power-on automatic self-test
  - Switches test
  - Closed loop self diagnostic test
  - Terminal loop-back test
  - Modem loop-back test (when authorized by the network administration and available on the modem)
- The following status can be seen on-line by using some of the 21 LEDs of the HP 2334A:
  - X.25 levels 1 and 2 status
  - HP 2334A internal memory buffer use
  - Asynchronous port ready
  - Virtual Circuit status
  - X.25 level 2 activity
- Also 2334A manual reset and 2334A port disabling are available.

### Remote Operation
- The HP 2334A configuration can be modified remotely in two ways:
  - On-line via the HP 2334A synchronous interface over the communication line or X.25 PSN using the test port.
    **Warning:** Care must be exercised when some X.25 parameters are modified on-line.
  - Off-line via a HP 2334A modem control asynchronous port over a dial-up line at 1200 bits/second.
- The 2334A displays the following informations on-line via the test port:
  - X.25 level 2 statistics on communication line quality
  - HP 2334A identification
  - 128 bytes of HP 2334 memory for status of connected ports
  - HP 2334A ROM part numbers for verification of HP 2334A firmware revision
- The 2334A performs on-line the following operations via the test port:
  - HP 2334A reset
  - HP 2334 port disabling
  - Communication test

## Computer Support

### HP 3000 Computer Support
- HP 2334A in stat mux configuration

The HP 2334A in stat mux configuration is supported when connected to HP 3000 computer used with MPE-VE and ATP/ADCC interface cards.

Modem ATP/ADCC cards are required when the HP 2334A is used with "switching connection methods" described previously.

This configuration supports the following workstations:
- Terminals: HP 2621B, 2622A, 2623A, 2624B, 2625A, 2626A, 2627A, 2628A, 2382A, 2392A, 2645A, 2648A.
- Personal computers: HP 150, HP 110.
- Spooled printers: HP 2932A, 2933A, 2934A, 2563A, 2686A, 2687A, 2631B.
- Plotters: HP 7470A, 7475A, 7550A.
- Graphics tablet: HP 17623A connected to HP 2627A.

All workstations should be used as TERMTYPE 10, except remote printers which should be used as TERMTYPES 18, TTPCL18N, or 22.

This configuration supports the following HP 3000 application subsystems with the indicated release number (or later release): HPDRAW (A.03.00), HPEASYCHART (A.03.00), DSG/3000 (A.04.00), HPMENU (A.01.00), HPLIST (A.00.02), ADVANCELINK (A.01.02), DSNLINK (A.01.01), VPLUS (B.03.25), IMF/3000 (A.51.90), HPMESSAGE 150 (A.00.00), HPMESSAGE/IBM (A.00.00), HPTELEX (A.02.00), HPDESK (A.03.00), HPSLATE (A.04.03), TDP (A.03.11) DICTIONARY (A.02.00), HPMNT (A.00.00), TOOLSET (A.01.00), IFS (A.02.01), IDS (A.01.00), VISICALC/3000 (A.00.02), RAPID (A.01.09), PM and MM. Check with your HEWLETT-PACKARD Representative for the most recent list of supported HP 3000 application subsystems.

**Warning:** HPDESK imposes some restrictions to HPSLATE used within HPDESK (see HPDESK Data Sheet for more details).

The HP 2334A, like any other stat mux, is causing performance degradation to the use of HPSLATE and TDP.

HPWORD and HPTELEX interface unit are not supported with the HP 2334A.

- HP 2334A in cluster controller configuration

The HP 2334A in cluster controller configuration is supported when connected to HP 3000 computer used with MPE-VE or MPE-VP and X.25 NETWORK LINK (HP 32187A).

This configuration supports:
- Limited VPLUS/3000 application subsystem (version B. 03.25 or later) using only the following workstations with their indicated date code: HP 2622A (2313), 2623A (2335), 2624B (2249), 2625A, 2627A, 2628A, 2392A, and HP 150.
- DSNLINK (A.01.01) and ADVANCELINK (A.01.02) with HP 150.
- Character mode applications with any HP terminal or HP 150/110.
- Spooled printers: HP 2932A, 2933A, 2934A, 2563A, 2686A, 2687A, 2631B with MPE-VE T-MIT or later release.

**HP 1000 Computer Support:** The HP 2334A in stat mux configuration is supported when connected to HP 1000 computer used with RTE-A (A-Series) or RTE-6/VM (E-F Series) and HP 12040B or HP 12792B interface cards.

The HP 2334A in cluster controller configuration is supported when connected to HP 1000 computer used with RTE-A (A-Series) or RTE-6/VM (E/F Series), LAP-B interface card (HP 12075A/12250A) and HP 91751A X.25 Software.

These two configurations support exclusively character mode applications with all HP terminals or personal computers.

The following printers are supported in stat mux configuration: HP 2932A, 2933A, 2934A, 2563A, 2686A, 2687A and 2631B.

Remote printers are not supported in cluster controller configuration.

**HP Personal Computer Support:** The HP 150 is supported with the HP 2334A as a terminal or as personal computer (PC). In PC mode, the HP 150 can transfer files to the HP 3000 computer or to another HP 150 PC connnected to a different HP 2334A by using DSNLINK (A.01.01) or ADVANCELINK (A.01.02) software.

The HP 110 is only supported as a terminal.

**Non-HP Computer Connection:** The non-HP computer can be connected either to the local HP 2334A via a RS-232-C interface (for stat mux configuration) or via a X.25 interface (supporting X.29) which complies with the 1980 CCITT recommendations (for cluster controller configuration).

Application packages on non-HP computers are the customer's responsibility.

## Customer installation and configuration
The customer is responsible for installation for the HP 2334A. The HP 2334 reference and service manual (02334-90001) provides the information needed to install and configure the HP 2334A.

The initial configuration can be set by a Hewlett-Packard System Engineer by ordering HP 2334A Option 100. Later modifications to the configuration are not included but may be purchased as consulting time.

Before installing the HP 2334A, the customer should obtain, install and verify the correct operation of any communication line, X.25 PSN access or any other equipment and facilities necessary to interface to the HP 2334A.

Hewlett-Packard is liable only for correct execution of the loop-back and self-diagnostic tests (i.e. HP 2334A functionality). All hardware and software connections to the communication line or X.25 PSN and non-HP computers are the customer's responsibility.

The four port interfaces (option 122 or 123) are factory installed only when ordered with the HP 2334A. Add-on HP 40260A and HP 40261A four port interfaces may be installed by the customer or by a Hewlett-Packard Customer Engineer on a time and material basis.

## Environmental

### Temperature Free Space Ambient
- Operating: 0° to + 55°C
- Non-operating: −40° to +75°C

### Relative Humidity (non condensing)
- Operating: 5% to 95% at 40°C
- Non-operating: 90% at 65° to 95% at 40°C

### Altitude
- Operating: 4,600 meters (14,700 ft)
- Non-operating: 15,300 meters (49,000 ft)

### Vibration
- Up to 0.38 mm p-p, 5-55-5 Hz, 3 axis for 15 minutes
- Dwell 10 minutes

### Shock
- Bench handling: 102 mm bench drop
- Transport handling: 762 mm drop 30 g for 11 ms

## Physical

### Dimensions
135 mm H (140 mm with feet) x 425 mm W x 540 mm L
(5.25 in. H (5.45 in.) x 16.75 in. W x 21.25 in. L)

**Net Weight:** 13 kg (29 lbs)

**Shipping Weight:** 17 kg (38 lbs)

**Power Requirements**

**Input Voltage:** 86 to 127 volts

**With option 015:** 195 to 253 volts

**Input Frequency:** 47.5 to 66 Hz

**Power Consumption:** typical 115 watts

## Approvals
The HP 2334A has passed the following approvals: RFI (Radio Frequency Interference)
- VDE 0871 level A
- FCC class A

Configurations including peripherals with high RFI levels may not be supported or may require on site verification in some countries.

### Safety Approvals
- UL 478, UL 114 for EDP and Office Equipment.
- CSA C22.2-154 for EDP Equipment.
- VDE 0730 part 2P for EDP and Office Equipment.
- Complies with IEC standards for EDP and Office Equipment.

### Data Communication Approvals
- Complies with CCITT requirements.
- Australian, Belgian, British, German, Japan and Scandinavian datacomm certification pending.

- Some datacomm regulations may restrict the use of all possible HP 2334A connections. Check with your local datacomm regulation agency.

## Ordering Information

| | |
|---|---|
| **HP 2334A** | HP MULTIMUX. 1 to 4 options 122 or 123 must be ordered. Network modem cable supplied (5m). Customer installed. |
| **Opt. 015** | 220 Volts AC unit. |
| **Opt. 100** | HP 2334A initial configuration done by HP AEO. Includes labor and travel. |
| **Opt. 122** | 4 port direct connect interface. Factory installed. Cannot be used for asynchronous modem or computer port connection requiring modem control signals (e.g. "switching connection methods"), use instead option 123. |
| **Opt. 123** | 4 port modem control interface. Factory installed. |
| **Opt. X.25** | X.25 manual for each HP 2334A connected to an X.25 PSN. |
| **HP 40260A** | Additional 4 port direct connect interface for an installed HP 2334A. Customer installed. Cannot be used for asynchronous modem or computer port connection requiring modem control signals. |
| **HP 40261A** | Additional 4 port modem control interface for an installed HP 2334A. Customer installed. |
| **Opt. 001** | HP 2334A 4 port modem control adapter. To upgrade an installed HP 2334A MULTIMUX 4 port direct connect interface to an HP 2334A MULTIMUX 4 port modem control interface. Customer installed. |

- Direct connection of workstations to HP 2334A must be done by using standard terminal modem cables.
- An asynchronous modem or computer port must be connected to the HP 2334A by using HP 40220A (5m) modem cable for each HP 2334A port. HP 31391A (+5m) or HP 31391B (+10m) extension cables can be used with HP 40220A.

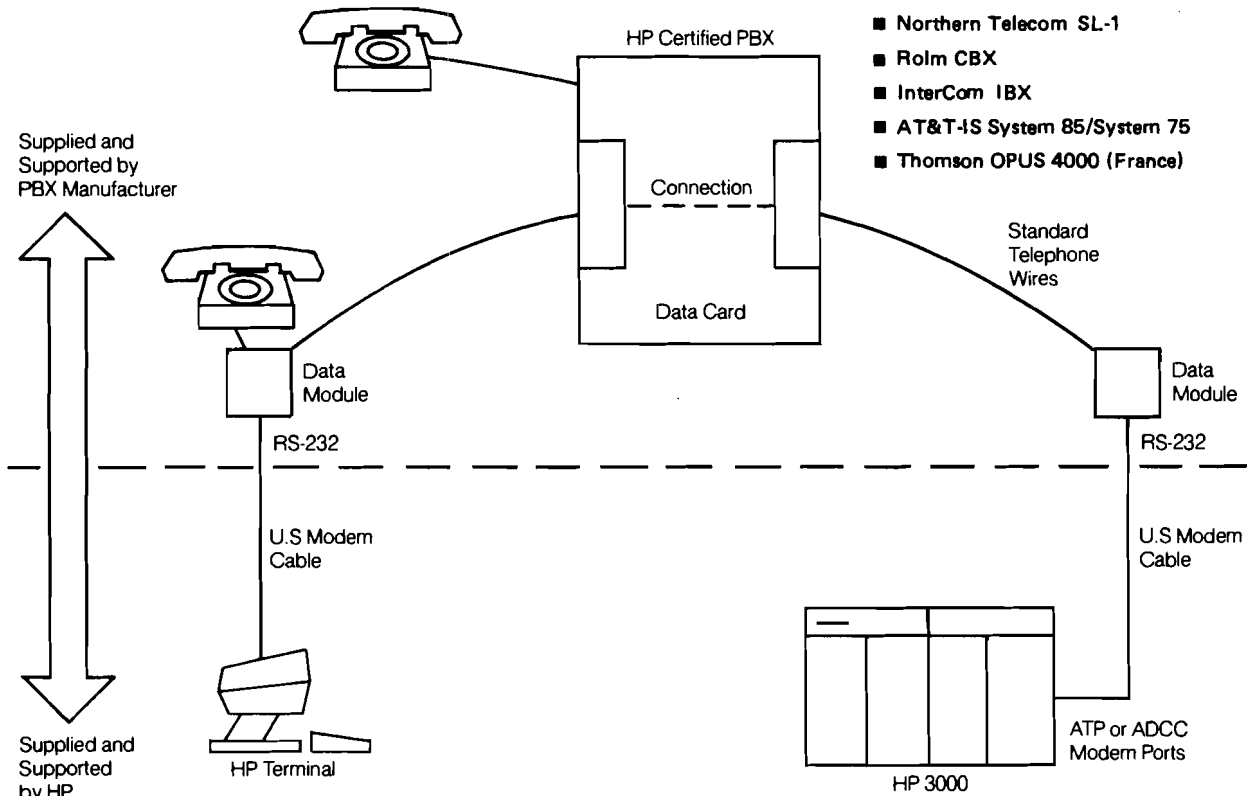ATP direct connect needs HP 30152 cable in addition to HP 40220A cable.

### Rack Mounting Accessories

| Part Number | Description |
|---|---|
| 5061-0089 | Front handles kit |
| 5061-0077 | Rack mounting kit without front handles |
| 5061-0083 | Rack mounting kit with front handles |

## Documentation
For further information refer to:
HP 2334A Reference and Service Manual (02334-90001).

# PBX Certification

**HP AdvanceNet**

Related Products
30018A, 30019A, 30144A, 30155A



- Northern Telecom SL-1
- Rolm CBX
- InterCom IBX
- AT&T-IS System 85/System 75
- Thomson OPUS 4000 (France)

The PBX Data Communications Interface Certification provides the HP 3000 computer system users with the opportunity to utilize their PBX telephone systems (PBX, Private Branch Exchange) for asynchronous data transmission between the host HP 3000 and HP terminals and personal computers.

HP certification of this interface provides a user with the confidence that HP has fully tested a particular manufacturer's PBX with HP computers and terminals in a variety of configurations, and guarantees the proper operation of HP systems. This guarantee includes full HP support of its products when using these connections. Support for the actual PBX and its associated equipment remains the responsibility of the customer and its PBX supplier. HP certification assures that if a problem arises, the customer can use their normal fault clearing procedures. Either HP or the PBX vendor may be called first. HP is defining agreements with the certified PBX

manufacturers that explicitly govern how support issues that involve both HP and the PBX company should be dealt with.

The PBX Data Communications Interface allows the interconnection of HP 3000 computer systems to a telephone system. The PBX provides the physical connection between an HP 3000 computer system and an HP workstation. It provides this capability with existing HP point-to-point asynchronous terminal communications controllers, such as the ADCC or ATP with modem control. *No additional hardware or software is required for the HP 3000 computer system.* The PBX manufacturers that have data communications capability and are certified for connection to HP computer systems are: Northern Telecom's SL-1 PABX line, Rolm Corporation's CBX line, InteCom's S/40 IBX, AT&T-IS' DIMENSION System 85/System 75, and Thomson Opus 4000 (France). HP does not supply the PBX equipment needed to interface with the HP 3000.

## Features

The PBX certification provides the user with:

- Full HP support of the PBX interface as specified under the "Support Specification" below.
- The assurance that HP has tested the PBX interfaces with the ADCC and ATP terminal controllers and that the interfaces are compatible.
- The confidence that support issues between HP and the PBX vendor will be solved smoothly without the users' involvement being needed.

Using the data capability of a PBX for connecting HP terminals to HP 3000 computer systems provides the following features:

- Connects *large* numbers of terminals to *multiple* systems.
- Decreases the installation and the maintenance cost since the existing cables can be used.
- Allows users to use their telephones while the data module is being used for workstation communications — simultaneous voice and data transmission.
- Saves money by allowing computer ports to be shared.
- Allows access to PBX data communications features such as port contention, queuing, hunting groups, and access groups.
- Increases the distance allowable between HP terminals and HP systems — 3500 to 5000 feet depending on the PBX.
- Is supported on HP 3000 Series 39/40/42/44/48/64 and 68 running the MPE operating system with workstation speeds up to 19200 bits per second.
- Is completely transparent to the HP 3000.

## Support Specification

### Joint Support Plans

HP and the PBX vendors are cooperatively developing joint support plans that guarantee that any potential support issue regarding the supported configurations will be handled by the companies in such a fashion that the users is isolated from the process of resolving the issue. The support plan defines the list of certified equipment (new equipment will be added over time), who the appropriate contacts in HP and the PBX company are, what procedures should be followed during installation, and what the problem escalation and resolution procedures are.

NOTE: These plans are currently being defined. Please contact your HP or PBX representative for more information.

## PBX manufacturer's equipment

Contact your local PBX vendor's sales office for specifications on their respective data modules. Table 1 is a list of the currently supported PBXs with their supported data modules.

Table 1: Certified PBX equipment

| Manufacturer | PBX model | Data Module |
|---|---|---|
| Northern Telecom | SL-1A, SL-1M SL-1LE, SL-1VLE SL-1XL, SL-IS, SL-1MS, SL-IN, SL-1XN, SL-1L, SL-IVL | Add-on Data Module (ADM) QMT-7, QMT-8 AIM, MCDS |
| ROLM Corporation | VSCBX, SCBX MCBX, VLCBX | Data Terminal Interface (DTI) RolmPhone 400*, 240*, 120* |
| Thomson | OPUS 4000 | |
| InteCom, Inc. | IBX S/40 | Intelligent Telephone Equipment (ITE) Data Interface Unit (DIU) |
| AT&T-IS | DIMENSION System 85 System 75 | Data Modules PDM, DTDM |

*currently under test

## HP Equipment (ATP, ADCC, and Workstations)

For the HP System Performance, electrical channel interface, environmental, and physical characteristics, consult the ATP and ADCC data sheets*.

When the HP 3000's terminal ports are used with a PBX's data module, the HP 3000's terminal ports should be configured as modem ports, as if connected to a Bell 103 type modem. The PBX data interface must be configured to monitor Data Terminal Ready (DTR) from the HP computer and HP terminals. HP cannot support any other configurations since *HP cannot guarantee MPE security without the use of modem ports.*

*Supported HP System Interfaces*

- Asynchronous Data Communications Controller (ADCC)*
  Model numbers 30018A and 30019A
- Advanced Terminal Processor (ATP)*
  ATP System Interface Board, model number 30144A
  ATP Modem Port Controller, model number 30155A

*Supported HP Workstations (peripherals)*

All workstations and peripherals supported by the ADCC and ATP are supported by PBX Data Communications Interface Certification. Refer to the ADCC and ATP data sheets* for a list of supported devices.

*Please refer to the ADCC and ATP data sheets in this specifications guide.

Programmatic devices which are opened by an application program that is run independently by the device must have a permanent connection to the HP 3000 ports to qualify for support. When using a PBX with programmatic devices, the PBX is required to establish a permanent condition, and the PBX's data module must be strapped to ignore DTR and keep DSR ready.

## Physical Connection
Referring to Figure 1, the PBX requires two main devices to connect HP terminals and HP systems: a data module, which connects the workstation and the HP 3000 to the PBX, and a data module interface card which connects the data module to the PBX. The ADCC or ATP is connected to the PBX's data module by a standard HP U.S. modem cable. The data module for workstation-to-PBX and for PBX-to-System could be the same type of module or different depending on the PBX. Please contact your PBX representative for the appropriate data modules for your PBX. Since the connection to the data module is RS-232-C, the maximum distance between the data module and the HP workstation or computer system is 15 meters (50 feet). The PBX's data module is connected to the PBX equipment with standard telephone twisted pair cabling. Speeds supported by PBX Data Communications Interface are from 300 up to 19200 bits per second.

Once the HP 3000 and HP terminals are connected with the PBX, all of the PBX's data communications features can be accessed. Some of these features include: port contention, queuing, hunting groups, and access groups. Please refer to the PBX manufacturers' data sheets to find out which features are supported.

The log on procedure for a workstation connected to the HP 3000 through a PBX is different than being directly connected, and different for each PBX. Please consult the data module user guide provided by the PBX manufacturer.

When logging off of the HP 3000, the MPE :BYE command is used as usual. The PBX will disconnect the workstation and HP 3000 system automatically. If the user releases the data call before a :BYE command typed, MPE will abort that user's session. This is necessary to maintain MPE security.

# Installation Responsibility

## HP's Responsibility
HP will install HP terminals to the PBX data modules on a time and materials basis on HP 3000 systems. Customers can, if they wish, intall the terminals themselves.

## Customer Responsibility
The customer is responsible for the installation of the PBX equipment or authorize the work to be done by their PBX vendor. This includes providing, or having the PBX vendor provide, the cabling work, and ancillary equipment for the PBX. The customer is responsible for all scheduling and installation of the PBX equipment. Once the PBX equipment is installed the customer should conduct the appropriate tests to see that it is operating properly. When the PBX equipment is operating properly, the customer can connect the HP equipment.

## Ordering Information
Consult ATP and ADCC Data Sheets for ordering information, and contact the PBX manufacturer for the PBX related equipment.

## Documentation
Information concerning the PBX equipment should be requested from your PBX vendor. See ATP and ADCC Data Sheets for documentation on these products.

## Additional Information
For additional information regarding the latest update of supported devices and information regarding the joint support plans please contact either your HP or your PBX representative.

# Alphabetical Index

# Product Number Index