

HP AdvanceNet

HP2350A LSM LOCAL SERVER MANAGER

Reference Manual



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List of Effective Pages

The List of Effective Pages gives the date of the current edition and of any pages changed in updates to that edition. Within the manual, any page changed since the last edition is indicated by printing the date the changes were made on the bottom of the page. Changes are marked with a vertical bar in the margin. If an update is incorporated when an edition is reprinted, these bars are removed but the dates remain. No information is incorporated into a reprinting unless it appears as a prior update. To verify that your manual contains the most current information, check that the date printed at the bottom of the page matches the date listed below for that page.

Effective Pages

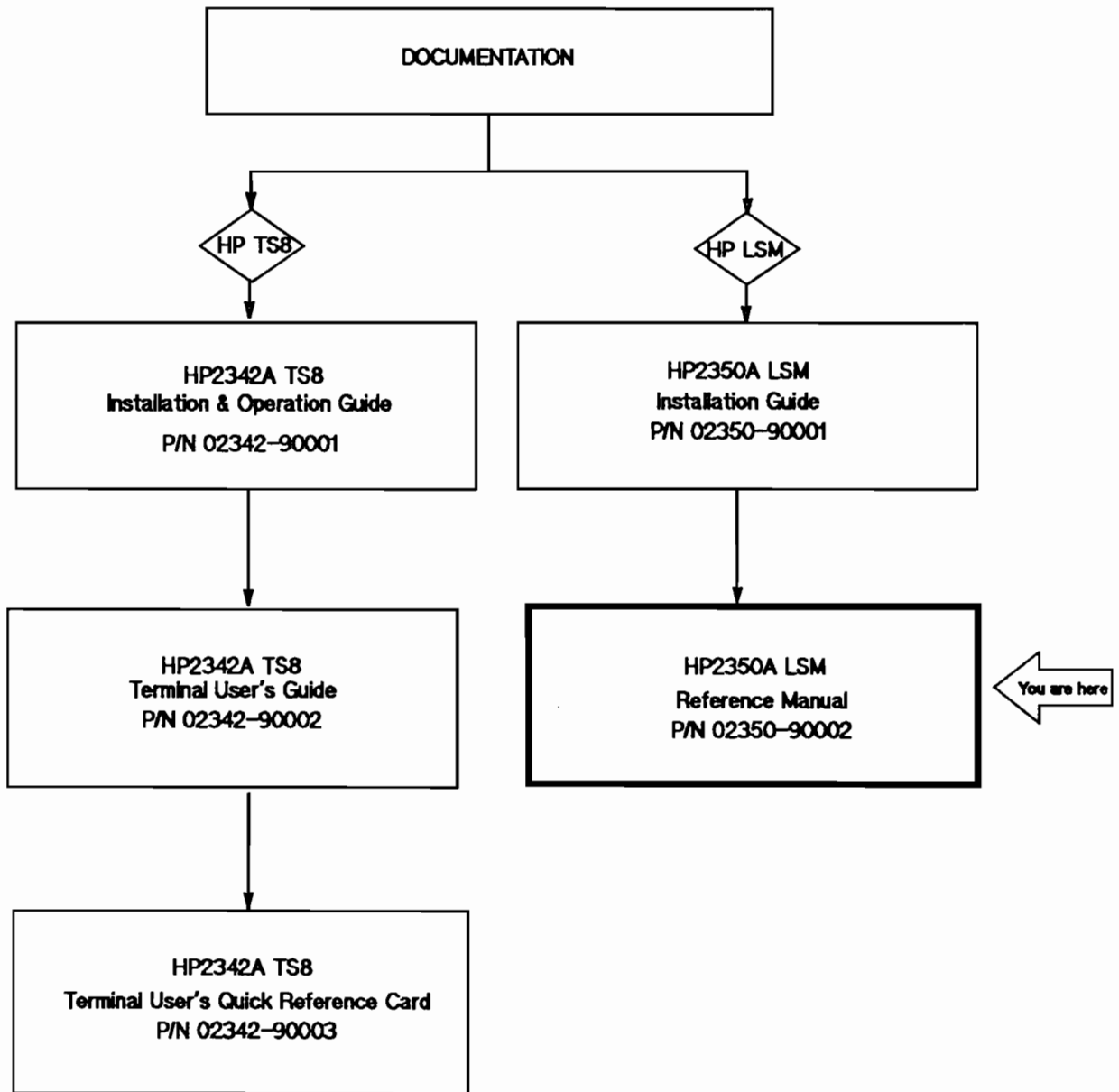
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Documentation Map

The following documentation map is intended to be a general guideline to the manuals containing information related to the product described in this manual. You may need information from one or all the manuals listed here.





Conventions

NOTATION

DESCRIPTION

nonitalics

Words in syntax statements which are not in italics must be entered exactly as shown. Punctuation characters other than brackets, braces and ellipses must also be entered exactly as shown. For example:

EXIT;

italics

Words in syntax statements which are in italics denote a parameter which must be replaced by a user-supplied variable. For example:

CLOSE *filename*

[]

An element inside brackets in a syntax statement is optional. Several elements stacked inside brackets means the user may select any one or none of these elements. For example:

[A]
[B] User may select A or B or C or none.
[C]

{ }

When several elements are stacked within braces in a syntax statement, the user must select one of those elements. For example:

{A}
{B} User must select A or B or C.
{C}

...

A horizontal ellipsis in a syntax statement indicates that a previous element may be repeated. For example:

[, *itemname*]...;

In addition, vertical and horizontal ellipses may be used in examples to indicate that portions of the example have been omitted

Conventions (Continued)

Δ When necessary for clarity, the symbol Δ may be used in a syntax statement to indicate a required blank or an exact number of blanks. For example:

```
SET[modifier] Δ (variable)
```

underlining

Brackets, braces or ellipses appearing in syntax or format statements which must be entered as shown will be underlined. For example:

```
LET var[[subscript]] = value
```

Output and input/output parameters are underlined. A notation in the description of each parameter distinguishes input/output from output parameters. For example:

```
CREATE (parm1, parm2, flags, error)
```

shading

Shading represents user input on the terminal's screen. For example:

```
NEW NAME? ALPHA
```

[Key Cap]

A string in bold font enclosed by brackets or a box may be used to indicate a key on the terminal's keyboard. For example, **[Enter]** indicates the carriage return key.

[CTRL]-char.

Control characters are indicated by **[CTRL]** followed by the character. For example, **[CTRL] y** means the user presses the control key and the character **y** simultaneously.

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Introduction

Product description

This chapter describes the HP LSM hardware and software, and its supported configurations.

The name "LSM" is an acronym for "Local Server Manager". It is a PC-based network control product for HP AdvanceNet, used as a tool for managing HP TS8 units on the network. An HP TS8 is an HP2342A terminal server with 8 asynchronous RS-232-C ports.

The HP2350A LSM Installation kit consists of:

- a PCLSM: an HP Vectra interface card that provides access to the LAN.
- Six 5 1/4" floppy disks, containing the HP LSM software and standard configuration profiles
- LAN loopback hood, used for diagnostics, to allow HP LSM to send packets to itself.
- LAN connection adapter, used to connect HP LSM to AUI or Thin MAU (see LAN Connection Options, below, for more details of AUI and Thin MAU).

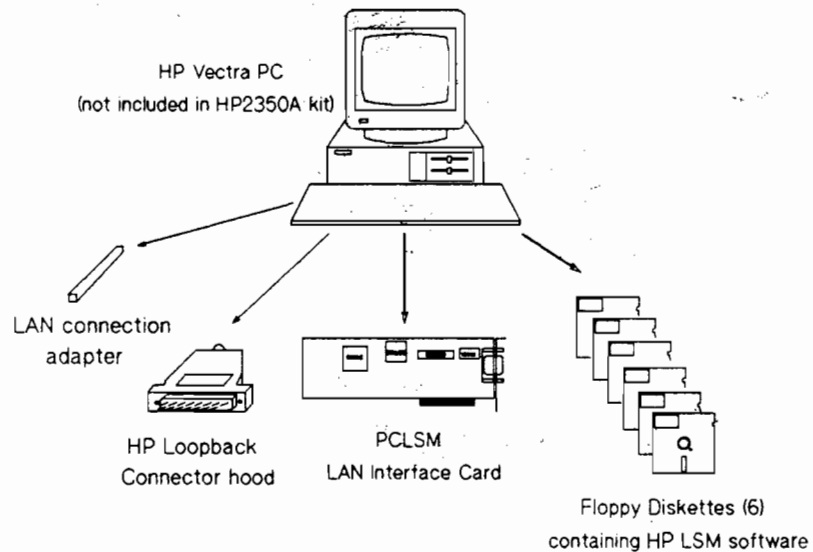


Figure 1-1: HP LSM Product Description

LAN Connection Options

The following options are also available:

- option 240: Backbone LAN connection. This consists of an FEP AUI (Attachment Unit Interface) cable (6m) and a MAU (Medium Attachment Unit) assembly with co-axial cable tap.
- option 242: ThinLAN connection. This consists of a ThinMAU assembly with a BNC Tee Connector and plastic boot.

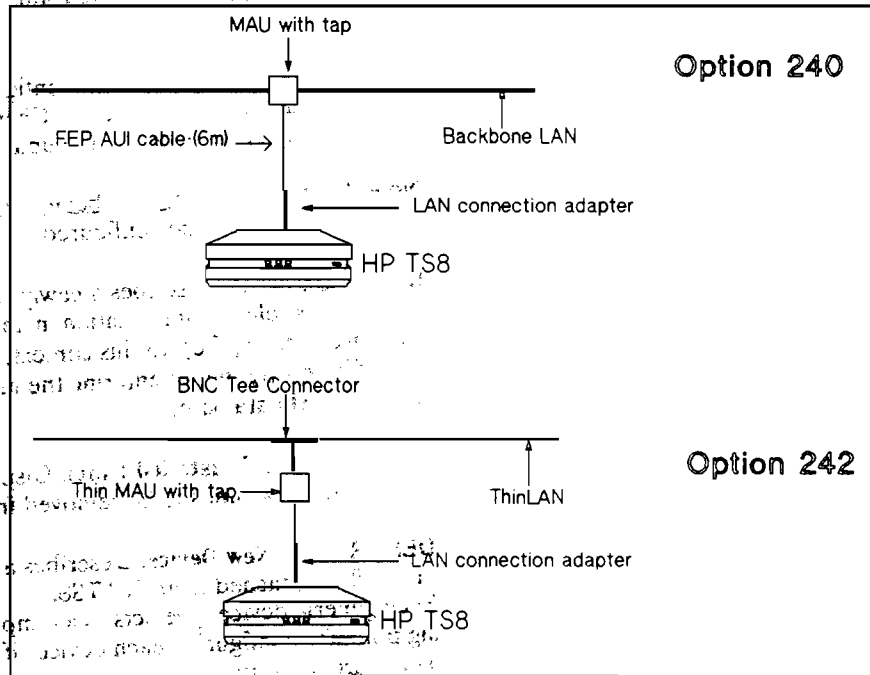


Figure 1-2: LAN Connection Options

Only ThinMAU (HP28641A) with datecode \geq A2804 is supported. See *LAN Cable and Accessories Manual* (part number 5955-7680) for more details about options for AUIs and LAN cables.

HP LSM Main Menu Functions

The HP LSM program gives you access to several network management functions. Its most important features are:

- It is the only way of installing and configuring an HP TS8 on the network.
- It provides menus through which you can monitor and gather statistics on HP TS8s on the network.

- It downloads operating software and configuration parameters to any HP TS8 on the network requesting download service.
- It allows dynamic HP TS8 port configuration

Appendix E lists the files created and modified by HP LSM.

A brief description of each of the Menu Options available under HP LSM is provided below. You can run any of these options from HP LSM's Main Menu, which appears when you start the program and enter your HP LSM password.

CONFIGURE: Enables you to configure an HP TS8 or PCLSM unit, and creates configuration files (Load Characteristics, LC, files) which will be subsequently downloaded to the unit.

Note that the unit must have been installed (see INSTALL A UNIT, below) before it can be configured.

INSTALL A Unit: Describes a newly acquired HP TS8 or PCLSM unit and records relevant information in an installation data file (Load Specification, LS, file). In this context, "install" refers not to the installation of hardware, but to entering the unit's type and network location in the HP LSM data base.

SHOW/DELETE Installed Units: Displays list of all units installed on HP LSM, and allows units to be removed from the list.

DESCRIBE A New Device: Describes a general type of device (ie generic) that will be attached to an HP TS8. Each generic device type acts as a template which may be used as a starting point for configuring each device (if the default device types supplied by HP are not suitable).

DOWNLOAD Server: Sends operational code and data to HP TS8s that request a download of their operational software.

MODIFY an Operating Port: Changes the parameters used by a specific port on an operating unit and resets the port, without reloading the unit. These changes are only temporary, and do not alter the data files in the database. The changes are lost at the next HP TS8 download.

BROADCAST Notification: Sends broadcast and multicast messages to HP TS8 ports that are configured to allow it.

NETWORK Resources Monitor: Provides statistics on the HP TS8s on the network. It displays data link statistics, network layer statistics and virtual circuit statistics, in raw format or graphic format.

DEBUG An Operating Unit: For use only by Hewlett-Packard Customer Engineers (CEs).

SET Network Date and Time: Broadcasts the date and time to the network's "town criers." Town criers then continue to inform other units of the date and time at regular intervals.

GET Unit Software Date: Returns the HP software date code and Eprom version number of the specified HP TS8.

CHANGE Main Menu Password: Changes the HP LSM program's password.

EXIT Main Menu: Exits to MSDOS.

The order in which you would use these functions is:

1. Install a Unit
2. Describe A New Device (but this step may be skipped if you use HP supplied device profiles - listed in Appendix C)
3. Configure Units
4. Download Server
5. Other functions, if and when required.

A step-by-step procedure for configuring an HP TS8 unit is given in Appendix B.

Network Structure

This section describes how your TCP/IP network may be structured.

Note that in this manual, the term "network" is used to refer to the LAN network on which your HP LSM is installed. The term "internet" is used to refer to a group of LAN networks connected by routers or gateways.

Configurations

Two HP TS8 configurations are supported: Back-to-back and TCP/IP direct access.

- **Back-to-Back**

The back-to-back configuration allows terminals connected to an HP TS8 terminal server to access any computer linked to another HP TS8 on the LAN via an RS-232-C interface. See Figure 1-3.

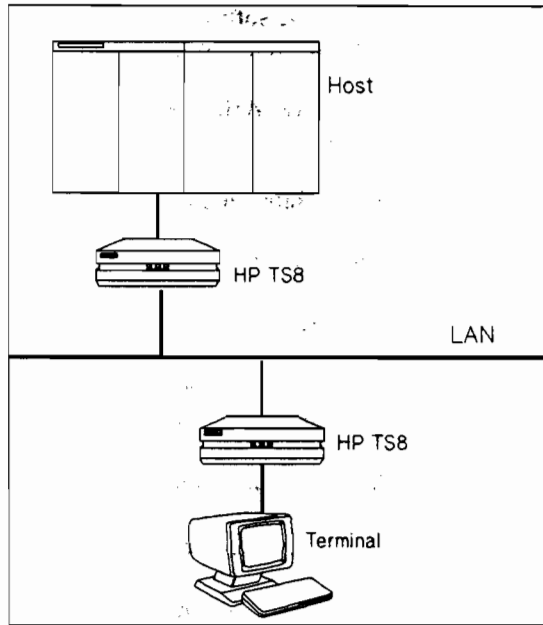


Figure 1-3 Back to Back configuration

- **TCP/IP Direct Access**

The TCP/IP direct access configuration allows terminals connected to an HP TS8 terminal server to access any device connected to the LAN through an Ethernet interface and TCP/IP services. See Figure 1-4.

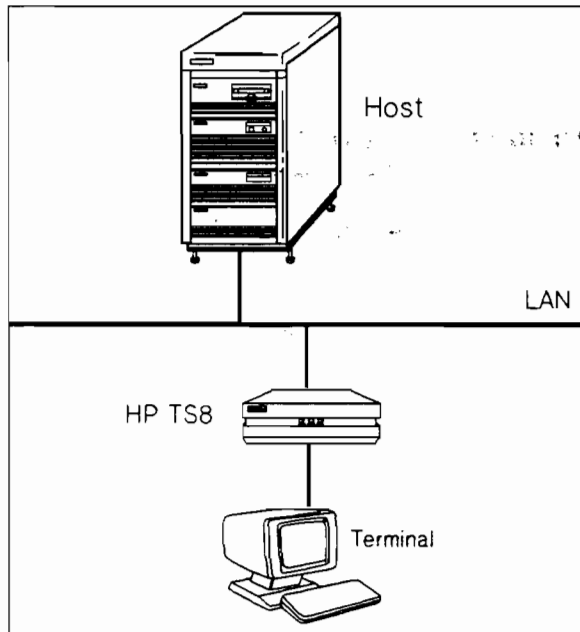


Figure 1-4 Direct Access Configuration

Printer access in direct access configuration requires a special program that runs on the host. See "Configuring an HP9000 host" and "Configuring a Printer", in Appendix D, for more details.

Multiple HP TS8s

One HP Vectra can handle as many HP TS8 units as its disk capacity permits: the disk must contain 2 files (together these do not exceed 3.5 KBytes) per HP TS8. A more important limitation is the acceptable time for downloading if all HP TS8s request download at the same time (eg after a general facility power failure). HP LSM's Network Resource Monitor can monitor a maximum of 64 units for statistics collection.

Several HP LSMs on the same network

You may have more than one HP LSM installed on a network.

Note

The segments making up a "network", in this context, must have the same network IP (Internet Protocol) address, and may be connected by bridges but **not** by gateways or IP Routers.

There are several reasons why you might wish to install multiple HP LSMs on the same network:

- It allows you to perform administrative functions on one system (eg installing units and configuring devices) while another system is running the Download Server.
- It gives a network some resistance to failure (ie provides redundancy)
- If a single network covers a wide geographic area, having two or more HP LSM systems may make it more convenient for you to control the network no matter where you are.

Note

Two or more HP LSM systems on a given network should never run the Download Server at the same time.

Each installed HP LSM must have its own database (created by using the HP LSM menu options). This data base represents the network and contains information such as:

- Device descriptions (from "DESCRIBE A New Device")
- HP TS8 installation information (from "INSTALL A Unit")
- Device configuration information (from "CONFIGURE Units")

You can either build a separate, local data base on each HP LSM system (by running the HP LSM program options), or build a single, centralized data base, then copy the appropriate parts of it to each HP LSM system.

There are several advantages to building a centralized data base:

- It offers the physical convenience of maintaining the entire data base in one place.
- It lets you list or display information about all of your units and devices from one data base.
- It lets you use a single set of generic device types for devices on all network segments, eliminating duplication of work and promoting network-wide consistency.

If you build a centralized database, you can copy:

- the generic device definitions (Once you have copied the device types, you may run "INSTALL A Unit" and "CONFIGURE Units" on the target system).
- the generic device definitions and definitions of installed units
- the generic device definitions and definitions of installed units and of configured units

The procedures for copying definitions from one HP LSM system to another is given below:

To copy **generic device descriptions** from one HP LSM system to another, copy:

- All the files in the subdirectory \TCP\DEV. (For each generic device type you create with the "DESCRIBE a New Device" Option, HP LSM automatically creates a corresponding *.DEV* file, and places it in this directory.)

To copy **definitions of installed units** from one HP LSM system to another, copy:

- The file *NIUNAMES*
- The LC files for the units. For information about the names and locations of LC files, see Appendix E.

To copy **definitions of configured devices** from one HP LSM system to another, copy:

- The files required to copy the definitions of the associated units (a device can be configured only after its unit has been installed)
- The LS files for the devices.

For information about the names and locations of LS files and all other files mentioned in this section, see Appendix E.

Multiple networks

Just as it is possible to have several HP LSM systems on a single network, it is possible to have several HP LSM systems on various networks (connected by gateways or IP routers) on an internet. However, if you want HP LSM to serve more than one network, you must install it on a station (ie HP Vectra PC) on each network.

The procedures for copying definitions from one HP LSM system to another are the same within between networks as they are within a network.

Supported Topologies

HP LSM is compatible with IEEE 802.3 LAN specification.



Requirements

Hardware Requirements

The baseband LAN cable plant must already be installed and operational, before installing and running HP LSM.

HP LSM runs on an HP Vectra Personal Computer with the following minimum configuration:

- 1 disk controller interface (HP 45985A) with 20 MByte Winchester disk
- a single- or double-density 5 1/4" floppy disk drive
- 512Kbytes memory
- 1 PC expansion slot for the PCLSM card

The PCLSM is supported for the following PCs and fitted accessories:

PCs

- HP Vectra/ES
- HP Vectra/ES 12
- HP Vectra/CS
- HP Vectra A Plus (from datecode = 2621)

Accessories

Monitors:	Multimode, black & white, color, EGA or VGA
Interface Cards:	serial-parallel (2450A), dual serial (24541A), or integrated serial-parallel
disk controller interface:	45985A, with 20 or 40MByte hard disk

Note

HP LSM is NOT supported with interface cards other than those listed above.

The setting of hardware interrupts on the PCLSM card will depend on the accessory cards installed and on the model of HP Vectra. You should refer to the *HP2350A LSM Installation Guide* (p/n 02350-90001) for more details.

Before running the HP LSM program, you should have loaded the HP LSM software onto your hard disk (using the TINSTALL program), and installed and configured the PCLSM card in your HP Vectra. These procedures are described in the *HP2350A LSM Installation Guide* (p/n 02350-90001).

Software Requirements

To make use of HP LSM, you must have MS-DOS version 3.1 or higher.

We recommend that the HP LSM is used as a dedicated station: after configuring the network, it should be left in download server mode. This will permit automatic downloading of operating software to HP TS8s after a reset or power fail.

Other software may be installed on your HP Vectra, however we strongly advise you not to repeatedly disconnect the HP Vectra from the LAN.

For a TCP/IP direct access connection (described in Chapter 1), ARPA services must already be installed on your host system, and the LAN driver must be correctly configured. For more information, you should consult your host system documentation.

Running HP LSM

Before you read this chapter, you should have loaded the HP LSM software onto your hard disk (using TINSTALL), and installed and configured the PCLSM card in your HP Vectra. The procedures for this are described in the *HP LSM HP2350A LOCAL SERVER MANAGER Installation Guide* (Part number 02350-90001).

This chapter describes how to run the HP LSM program, how to select a menu item, and how to enter and edit answers, and to display choices.

Caution

Do not run the HP LSM program remotely (through the network). This will crash the HP Vectra and will require re-booting. Only run the HP LSM program directly from the HP LSM system's console.

Starting the HP LSM Program

The procedure for running HP LSM is described below:

Note

In this section, user input is shaded to distinguish it from HP LSM-generated messages or prompts that appear on the screen.

1. Start HP LSM by entering:

```
C:\TCP> lsm
```

2. Enter password to access HP LSM Main Menu, when prompted.

The password is 'lsm' until you change this password using the HP LSM "CHANGE Main Menu Password" menu function.

Note

The password is sensitive to case; you must type 'lsm' in lower case letters.

If you get an error message such as "Error opening password file", there may be a problem with your CONFIG.SYS or AUTOEXEC.BAT files. Refer to the *HP2350A LSM Installation Guide* (p/n 02350-90001) for more details.

3. You will then see the following screen:

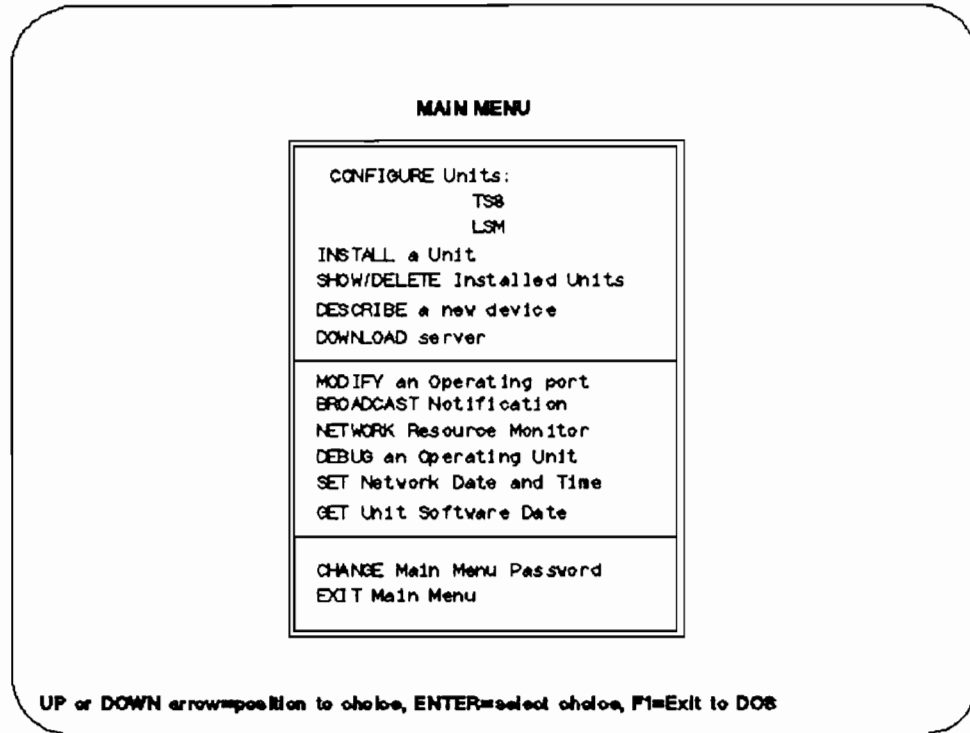


Figure 3-1: HP LSM Main Menu

Selecting a Main menu function

The HP LSM Main Menu (Figure 3-1) lists HP LSM's major functions. (For a detailed discussion of each of these functions, turn to the corresponding chapter in this manual.)

To run a function, press the or keys until the choice you want is highlighted. Then press the **[Return]** key.

Using HP LSM Screens

Each HP LSM screen consists of prompts and data fields. A **prompt** shows you what kind of information you are required to enter. The associated **data field** either provides you with options to select among, or gives you space to type in a response.

In many cases a **default** answer will appear in a field. You may either accept it, by leaving it unchanged and advancing the cursor to the next field (with the key), or change it by typing or choosing a new answer.

Note

HP LSM determines which fields are 'relevant' from the information you have already entered. Therefore, some fields will be displayed with no prompts and no values, and the cursor will skip over them so that you cannot enter values.

When You Need Help

The Help feature for each screen provides you with explanations about each screen's specific function keys.

Press the **[?]** key to request help any time you are in an HP LSM program option: one or more help screens will be displayed (if available).

Entering and Editing an Answer

Fields that require you to enter a response are accompanied by a message at the bottom of the screen, telling you what type of response is required. Some fields require you to type in an answer (eg **Unit Name**). Others are "multiple-choice" fields that ask you to choose a value from a list of available options (eg **Baud**).

When you are required to type in a response, four editing keys are available:

[Ins]

Enters or leaves insert mode (**[Ins]** is a "toggle": one press puts HP LSM in insert mode, and the next takes it out of insert mode).

In insert mode, any character you enter is inserted before the character at the cursor. When HP LSM is not in insert mode (the normal state of affairs), any character you enter replaces the character at the cursor.

[Del]

Deletes the character at the cursor.

[Esc]

Erases the current value of the field. This permits you to enter a completely new value.

[Bkspc]

Erases the character before (to the left of) the cursor.

For multiple-choice fields, the following keys are available:

- F10** or **F9** Changes the field value to display the possible choices one at a time (**F9** displays choices in reverse order).
- +** Lists all the field's possible values at the bottom of the screen. The current choice is displayed in reverse video. (Use the **F9** and **F10** keys to change the current choice). Note that the **[+]** key is found on your keyboard's numeric keypad.

To select a value, simply choose it (using **F9** or **F10**) and move to another field.

Moving to another field

After you enter (or select) information in a data field, the cursor moves to the next data field. However, you can also move the cursor from field to field by pressing the following keys:

- or **←** moves cursor forward to next field
- RETURN** moves cursor forward to next field
- ←** moves cursor backward to previous field
- ↓** moves cursor to first field of next row
- ↑** moves cursor to first field of previous row
- Pg Up** moves to the next screen
- Pg Dn** moves to previous screen

Note

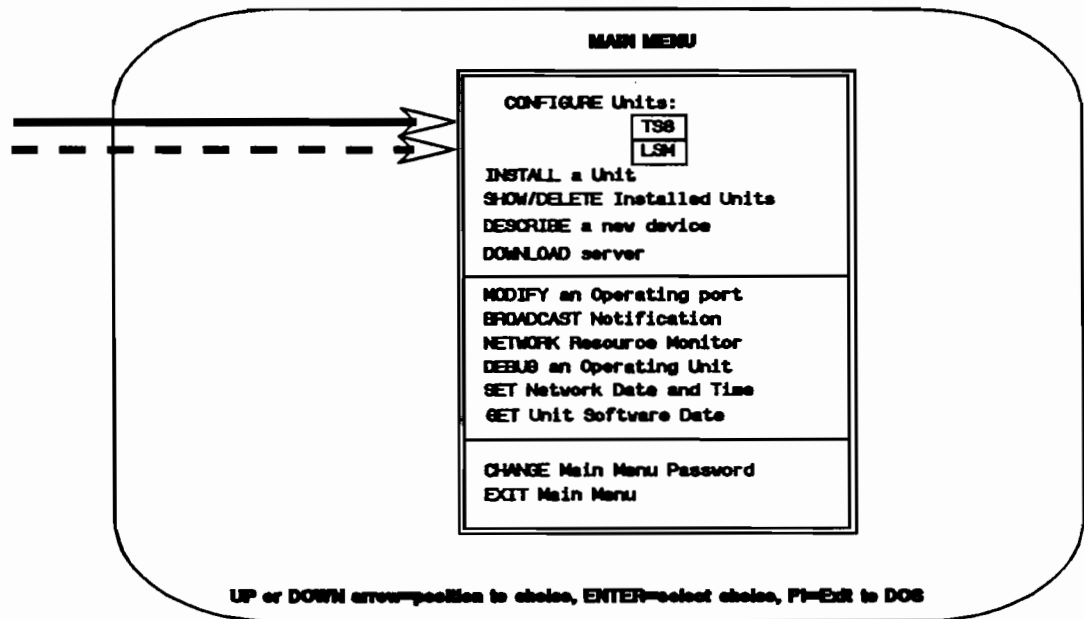
Some fields are "forced-entry", which means that you must enter a value before you can move to another field.

Other Keys

In addition to the cursor movement keys, HP LSM uses some function keys that work differently for different options. For example, pressing **F3** in "CONFIGURE Units" saves current port information and displays the next port. However, pressing **F3** in "MODIFY An Operating Port" abandons the current port (without saving anything) and allows you to examine another port.

The functions keys that vary for each option are displayed (with their "action") at the bottom of the screen of your selected option.

CONFIGURE Units



When you configure a unit, you specify the overall unit parameters and the device characteristics associated with each port of the unit.

Before you configure a unit, you must:

1. Install the unit using the "INSTALL a Unit" function of the Main Menu (see Chapter 5).
2. Define device types for the devices that will be attached to the unit. (Some standard device profiles are provided by HP). If appropriate device types have not previously been defined, run the "DESCRIBE A New Device" option of the Main Menu (see Chapter 7).

You do not need an exact definition of each device on the terminal server unit. If you have an existing definition that is reasonably close to a device, you can tailor it to the device's exact requirements during configuration.

There are two configuration options.

- TS8
- LSM

Select the appropriate option from the main menu.

Note

The HP LSM card must be configured for successfully downloading the HP TS8 software. Assume that it has 1 port, and that it can be configured like a standard HP terminal.

Quick Summary

Below is a summary of the steps that you need to follow to configure a unit:

1. Enter UNIT NAME
2. Enter SIMILAR UNIT NAME (If configuring a new unit, and if a similar unit name has already been installed and configured)
3. Select PORT NUMBER
4. Press **[F9]/[F10]** to change DEVTYPE (if necessary).
5. Modify displayed parameters (if necessary), using **[PGUP]/[PGDN]** to move between screens.
6. Press **[F3]** to select next port and repeat steps 3-6 (if required)
7. Press **[F2]** to save configuration.
8. Press **[F1]** to return to HP LSM Main Menu.

The remainder of this chapter describes the Configuration screens and explains each of the fields in detail.

Configure Screens

The Configure option has nine screens, each corresponding to a group of items that you can specify for each port on a unit. The screens are:

- TCP/IP Information
- Specific Port Parameters
- Service Characteristics
- Device Characteristics (hardware-related parameters)
- In-Circuit Parameters

- Telnet Control Characters
- Password Options
- Permitted Commands
- Unsolicited Messages

Only the first two screens, "TCP/IP Information" and "Specific Port Parameters," are discussed in detail in this section. The other screens are identical to the screens in "DESCRIBE A New Device", and are discussed in Chapter 7.

Remember, to move between screens, you use the **Pgup** and **Pgdn** keys.

TCP/IP Information Screen

This screen enables you to enter data that concerns the unit's position in the internet and its relationship to a Domain Name Server and RARP server. The screen is illustrated in Figure 4-1.

```

UNIT CONFIGURATION      NAME: HPCLASS
5432
TCP/IP INFORMATION
UNIT IP Address:
Gateway IP Address:
Name Server IP Address:
Backup Name Server:
Net/Subnet Mask:      8 hex
Broadcast Addr Format:
TCP Time Wait to Close: (seconds) RARP

Enter Unit Name
F2=write unit info, PgDn=go to next menu, ?=help, F1=main menu

```

Figure 4-1

Note

Some specialized terminology is used in this section (eg "LAN product," "IP address," "domain name"). Neither these terms nor the concepts behind the terminology are explained in this chapter. For more information about the terminology and concepts, see the Glossary, and consult your host reference documentation.

Name/Unit#

This field must be filled with the unit name as previously specified at the installation of the unit. HP LSM then displays the unit number corresponding to that name. This enables you to cross-check, to ensure that you have entered the right name. If you enter the wrong name, you will see the following error message displayed:

Unit is not installed

Similar Unit Name

If the current unit has previously been configured, the **Similar Unit Name** field will not be displayed. Instead, HP LSM displays the unit's existing port parameters and allows you to modify them.

If this is the first time that this unit has been configured, as soon as you enter the name of the current unit, a window will be displayed, prompting you to enter a **Similar Unit Name**.

If another unit has previously been installed and configured (and assigned a name), the user has the possibility of specifying this name in the displayed **Similar Unit Name** field. This will configure all 8-ports of the current HP TS8 with the same configuration as the named unit. You may then modify specific fields if you wish (for example, the **Unit IPAddress**, and the **Port Names**). If you enter the name of unit that has not been installed, or installed but none of its ports configured, you will see the following error message:

Similar Unit is not installed

Note

Some unit profiles have been supplied with your software. So you may enter one of these in the **Similar Unit Name** field. See Appendix B.

If you enter a unit name, HP LSM fills in the remaining fields of the screen with the data associated with the specified unit. You can change the values of any fields that are not correct for the current unit that you are defining (such as Port Names, and Unit IPAddress).

The **Similar Unit Name** is useful, for example, if you were changing a faulty HP TS8 box: to configure the new HP TS8, you would simply enter the unit name for the faulty HP TS8 in the **Similar Unit Name** field.

Note

To find out what units have already been installed, select "SHOW/DELETE Installed Units" from the HP LSM Main Menu (see Chapter 6).

If no similar unit has previously been configured, just press **Enter**. The window will disappear, and HP LSM will set the remaining fields of the screen to a set of default values. You must then fill in all port parameters through the keyboard.

In either case, the **Similar Unit Name** prompt is then erased.

UNIT IP Address

This parameter specifies the IP address of the unit (previously entered in the "Install a Unit" screen). The address displayed in this field may be modified.

This parameter is required if the **RARP** field (below) is set to "Never" or "Attempt"; HP LSM requires you to enter a default IP address through the menu before saving the installation parameters. The parameter is optional if RARP is set to "Always"; its value is ignored in this case, but may be set for later use (ie if the value of RARP is changed).

Note

HP LSM does not check the IPAddress for format errors. Therefore, special care must be taken, when entering an IPAddress, to ensure that the address is valid. IP Addresses are explained in more detail in the in Net/Subnet Mask section of this chapter, and in Chapter 5.

Gateway IP Address

This field is only relevant if a gateway is installed on your network. A gateway is needed to connect this network to another network of a different type.

This field specifies the IP address of the gateway. It must be set correctly to allow communication with other networks. If you do not have one, leave this field blank.

Note

HP LSM does not check the IPAddress for format errors. Therefore, special care must be taken, when entering an IPAddress, to ensure that the address is valid.

Name Server IP Address

This field is only relevant if a Domain Name Server is installed on your network. If not, leave this field blank.

In back-to-back access, a host can be referred to by the resource name configured for its HP TS8 port. However, in direct access to an ARPA/Telnet host, this is not possible (since the host is not connected to an HP TS8). Instead, the host must be referred to by its IPAddress, unless a "Name Server" is present. A Name Server is an application that stores IP addresses in its database, and supplies the IP address of a target resource. This allows an ARPA/Telnet host, in direct access, to be referred to by a generic name instead of its IPAddress.

The Name Server IP Address field specifies the IP address of a name server. If a Name server is used, this field **must** be correctly set. Note that HP LSM does not check the IPAddress for format errors. Therefore, special care must be taken, when entering an IPAddress, to ensure that the address is valid.

Any name service compatible with DNS (Domain Name Service) specifications will be supported.

Note

The name server need not be on the same network as a the terminal server that uses it. Several name server hosts may coexist on the same network or internet. (Each unit "sees" only one name server, determined by the value of this parameter).

Backup Name Server

This field is only relevant if a Backup Name Server is installed on your network. (If not, leave this field blank). This field specifies the IP address of a backup name server host. This name server will be interrogated if its primary name server is installed and cannot find the address.

Net/Subnet Mask

This field is only relevant if your LAN is connected to another network. If your network does not have subnets, use the default.

This parameter specifies which parts of the unit's IP address identify its local level of network (net/subnet address), and which parts its address within the network (station address within the subnet).

Masked bits represent the net/subnet address; unmasked bits represent the station address.

The parameter is an 8-digit hexadecimal number: each digit corresponds to 4 bits of a 32-bit IP address.

The proper value for the mask is defined by the class of the unit's IP address. The internet standard recognizes three important classes:

- class A (many hosts on few networks)
- class B (a medium distribution of hosts and networks)
- class C (few hosts on many networks).

If the IP address is expressed in standard four-part notation. Each part being one byte (valued 0-255) and separated by a dot, eg 192.1.2.10.

The unit's class may be determined from the value of the first part of the address, as shown in Table 4-2.

Table 4-2. IP Address, Class, and Net/Subnet Mask

First Address Part Range	Address Class	Net/Subnet Mask
0-127	A	FF000000
128-191	B	FFFF0000
192-255	C	FFFFFF00

In other words, an address 128.2.2.4 would be class B, and 192.101.17.1 would be class C, and so on.

These addresses are not assigned arbitrarily. They represent a hierarchical structure of the physical network. Only the more local parts of the IP address (station address) may be assigned by your organisation. The global parts (net/subnet address) are assigned by your DDN Network Information Centre (or equivalent organisation).

A virtual circuit can only be established between two devices having the same network address, unless a gateway links the two networks.

Broadcast Address Format

This field describes how the destination IP Address of outgoing broadcast packets are formed.

The possible values for this field are:

- **HOST-1's**: the station address portion of the IP address will be set to all 1s.
- **ALL-1's**: the entire IP address is set to all 1s.
- **HOST-0's**: the station address portion of the IP address will be set to all 0s

The default is **HOST-1's**.

THIS FORMAT MUST BE CONSISTENT FOR EVERY HOST ON THE NETWORK.

TCP Time Wait to Close

This parameter specifies the length of time that the unit will delay, after a network connection is nominally closed, before closing the connection.

This delay ensures that, if another connection is established immediately afterward between the same two points, "lost" messages that belonged to the old connection will not be mis-delivered to the new one.

If the time wait interval is too short, you run the risk of mis-delivered messages. If the time interval is too long, network programs may take too long to terminate.

If you enter non-numeric characters, you will see the following message displayed:

Numeric Characters Only

The default is 4 seconds. The maximum TCP Time Wait to Close is 65535 seconds. If you enter a number greater than this, you will see the following message displayed:

Number is too large

RARP Reverse Address Resolution Protocol

This field is only relevant if a RARP server is present on the network. If not, leave this field set to NEVER, the default.

RARP is an acronym for "Reverse Address Resolution Protocol." RARP enables a target unit to determine its own IP address when it is reset by asking the RARP server (another network resource) to translate its Ethernet address (a permanent characteristic of the unit) to an IP address.

The advantage of using RARP is that it makes a network easier to re-configure. Any unit's IP address may be changed by changing the corresponding entry in the RARP server's data base; the HP LSM station's configuration files need not be changed.

The disadvantages of using RARP are that a RARP server must be installed on the same network as the units that use it, and the RARP server's data base must be maintained. If the "only" value is chosen for a unit's RARP installation parameter, that unit cannot be started if the RARP server is down.

The RARP installation parameter has three possible values:

- **ALWAYS:** the unit uses only RARP to find its IP address. If the RARP server is down or cannot find the address, the unit will not start. This makes the target unit dependent on the RARP server, but tightens control of the target's IP address.
- **ATTEMPT:** the unit attempts to use RARP to find its IP address. If the RARP server is down or cannot find the address, the unit takes the IP address from its downloaded configuration data (the LC file).
- **NEVER:** the unit never uses RARP. It takes the IP address from the downloaded configuration data (LC file).

Specific Port Parameter Screen

The default is NEVER.

HP TS8 has eight ports (the PCLSM has one). HP LSM's Specific Port Parameters screen allows you to modify port parameters for each port in turn, one port per screen display.

Figure 4-2 shows the "Specific Port Parameters" screen.

The screenshot shows a terminal window titled "UNIT CONFIGURATION" with "NAME: TS8-1" in the top right. The main area is titled "SPECIFIC PORT PARAMETERS" with a "1" in the top right corner. On the left side, there are three input fields: "128951" (unit number), "PORT #: 1" (port number), and "DEV-TYPE: NONE". The main configuration area contains the following fields:

STATUS:	ONLINE	IP Address:	197.11.12.3
NAME1:	128951A1	ROTOR?	NO
NAME2:		ROTOR?	NO
NAME3:		ROTOR?	NO
NAME4:		ROTOR?	NO

At the bottom of the screen, there is a legend: "Enter Port Number", "F2=write unit", "F3=save port, display next", "F6=modify port", "?=help", "F1=main menu".

Figure 4-2

NAME Unit Name

The NAME field displays the name (that you assigned when you installed the unit) of the unit being configured.

UNIT#

Above the PORT # field, HP LSM displays the unit number that corresponds to that name. Make sure that the correct unit number is displayed to be cross-check that you have entered the right name.

This is the first field that the cursor returns to for each port number. The NAME fields may be used only when you first enter the "Specific Port Parameters" screen.

PORT# Port Number

This field displays the number of the port currently being configured and allows you to choose any port number to be configured at any time.

To modify port 3, for example, enter 3 in the field.

Valid port numbers are 1-8 for an HP TS8, and 1-2 for an HP LSM. If you enter a number out of these ranges, you will see the following message displayed:

Invalid Port

If you enter non-numeric characters, you will see the following message displayed:

Numeric Characters Only

DEVTYPE

The **DEVTYPE** field specifies the generic device type of the device that will be attached to this port.

DEVTYPE is a multiple-choice field. You may select any of the device types that you defined with "DESCRIBE a New Device," or supplied by HP as standard device profiles. (Remember, you use + to display a list of choices, and **F9** or **F10** to select one). You may select NONE, which effectively "disables" the port.

Note

The parameters from the specified **DEVTYPE** profile are read when the Unit's configuration is "written" (by pressing **F2**). Therefore, changes subsequently made to the **DEVTYPE** profile will NOT be taken into account, and will NOT affect the behaviour of a configured unit. See Chapter 7 for more details.

STATUS Port Status

The **STATUS** field can have one of three values:

- **ONLINE:** port can be accessed by a user or resource
- **OFFLINE:** port cannot be accessed by a user or resource. For example, you can designate as OFFLINE a port for a resource (such as a printer) that is not working. When the device has been repaired, change the port status back to ONLINE.
- **DISABLE:** port cannot be accessed by a user or resource. A port is automatically "disabled" by the unit software when a login (or password solicitation) fails more than a set number of times and the fail action is set to disable the port. The terminal user will see the following message displayed:

This port has been disabled for security reasons.

The network administrator must enable the port by setting the port status to ON-LINE.

If a user attempts to attach a device to a disabled port, he will get an error message.

IP Address

This field displays the IP Address of the HP TS8. You may modify this by changing the value of the fourth part of the address if you wish to identify each port by a separate IP address. This must be done if a port is to be accessed as a specific resource on the network.

Note

HP LSM does not check the IPAddress for format errors. Therefore, special care must be taken, when entering an IPAddress, to ensure that the address is valid.

PORT NAMES

A port may have up to four names, specified by the fields NAME1, NAME2, NAME3, and NAME4. A port name may be used to refer to a port in HPAdvanceNet commands (eg `CONNECT portname`).

A port name may contain up to 20 alphanumeric characters. The first character must be either a letter or number. Punctuation characters are allowed anywhere in a name except in the first character.

However, blank spaces and the following characters are not allowed anywhere in a user-defined port name:

* / \$ @ + ?

The program assigns a port's first name a default value determined by the unit serial number, processor board number, and port number. For example, port 3 on processor board 1, unit 12345, is assigned the default name "12345A3." (Currently supported units have only one processor board, so the processor board letter is always 'A'.)

You may change a port's first name if you wish (although we recommend that you leave it unchanged). You must enter a port's second through fourth names if you want them to be defined; they have no defaults.

ROTOR? Rotoring Port Names

You can make each port name rotored or unique with the ROTOR field. Choose "YES" for a rotored name, or "NO" for a unique name.

- A **unique** name identifies a single, unique resource attached to a specific unit port.
- A **rotored** name represents a resource that is duplicated on the network (eg a host port), or a resource such as a large computer that provides more than one port.

When a user specifies a connection to a device by using the rotored name, HPAdvanceNet automatically selects an available port on the

HP TS8 unit that uses that name. Rotored ports may only be used on the ports of the same unit.

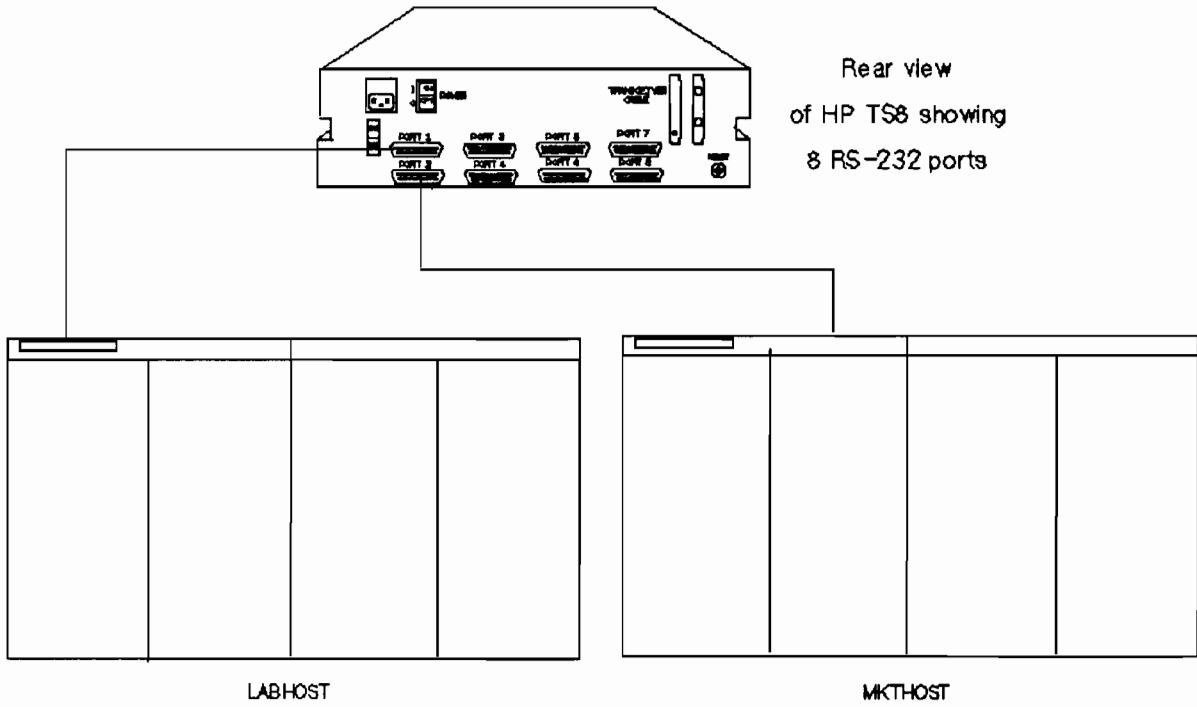


Figure 4-3: Rotored Port Name Example

In the example illustrated, ports 1 and 2 could be configured as follows:

Port 1:	Name 1: 45678A1	Rotor? NO
	Name 2: port1	Rotor? NO
	Name 3: HOST	Rotor? YES
Port 2:	Name 1: 45678A2	Rotor? NO
	Name 2: port2	Rotor? NO
	Name 3: HOST	Rotor? YES

This means that one of these ports can be specifically requested when issuing an HP TS8 command, by entering one of its UNIQUE names, for example:

```
CONNECT port1
```

or

```
CONNECT 45678A1.
```

Alternatively, if you wished to connect to either resource (the first available one), you could enter the ROTOR name as in:

```
CONNECT HOST
```

This is useful for defining a "pool" of similar devices such as printers, modems, or a group of ports on a host.

Note

Remember that HPAdvanceNet associates the name you assign with a **port**, not a resource. If you move a resource to a different port, you must enter the names that refer to that resource among the new port's port names, and delete them from the old port's names. You must also repeat the process of assigning port names if you replace the unit to which the device is attached.

Other Configure Screens

Configuring other Ports

The remaining 6 screens are identical to the screens in "DESCRIBE A New Device", and are discussed in Chapter 7.

F3 saves port and displays configuration of next port

To display configuration of a particular port, enter new port number in **PORT#** field.

Modifying a Port

F6 temporarily saves configuration modifications for the displayed port. These modifications will not be downloaded. They are effective only if the user leaves the "CONFIGURE Units" function then enters "MODIFY An Operating Port", and from there restarts the port.

Leaving the CONFIGURE function

1. Press **[F2]** to store data, and save the configuration information for all ports.

This must be done before you leave the "CONFIGURE Units" function. It may also (but need not) be done after each port has been modified. It then returns you to the first CONFIGURE Units screen.

Note

When you try to save the data, HP LSM may display the following error message:

can't create configuration file

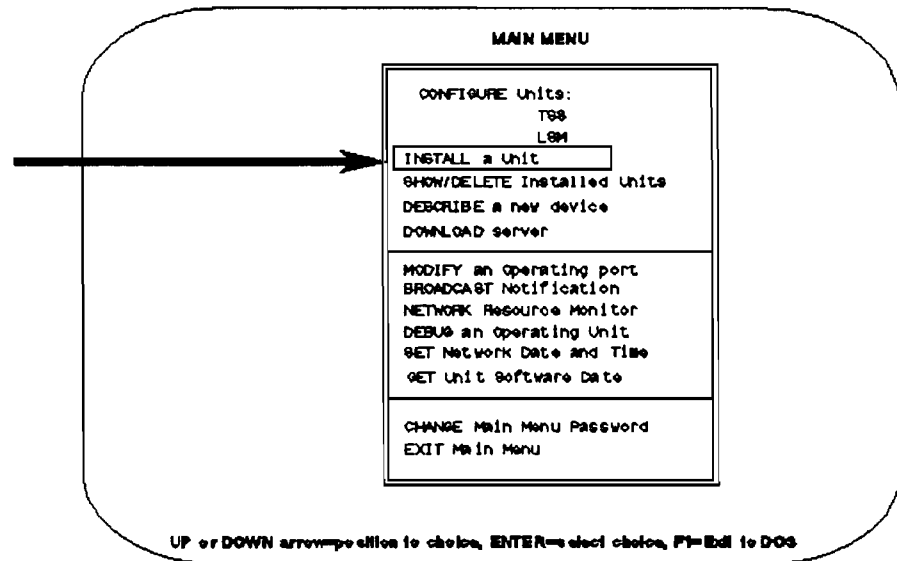
The most likely reason for this is that the value of FILES in your CONFIG.SYS file is too low. To correct this you must:

- a. Leave HP LSM and return to MS-DOS
 - b. Edit the file CONFIG.SYS (in your root directory)
 - c. Increase the value of FILES
 - d. Reboot the Vectra (**[CTRL][ALT][DEL]**)
 - e. Start again!
-

2. Press the **[F1]** key to leave the "CONFIGURE Units" function and return to the HP LSM Main Menu.



INSTALL A Unit



Each HP TS8 unit (and the PCLSM) must be installed before it can be configured. If you try to configure a unit that has not been installed, HP LSM displays the error message:

Unit is not installed.

("Installed," in this context, refers to running the "INSTALL A Unit" function to enter the unit's network location in HP LSM's data base.)

The INSTALL A Unit function creates an LS (Load Specification) file which contains the unit number and unit type of the installed unit, and a list of the files that are downloaded to it. This file is saved in the \LSn sub-directory (where n = the last digit of the unit number). For example, an HP TS8 with unit number 65432 will have its LS file stored in the directory \LS2.

These load specification files are described in more detail in Appendix E.

Note

When a unit is installed, the UCS (User Configurable Strings) file specified at in the install a unit screen is read. If this file is subsequently modified, the changes WILL NOT affect the unit (it will have to be RE-INSTALLED). Therefore, we recommend that you examine the BANNER.UCS file (it is listed in Appendix H), and if necessary modify it and copy it to a new filename. Do this BEFORE installing your HP TS8 units so that you can specify the new filename in the UCS field.

The "INSTALL A Unit" Screen

The INSTALL A Unit screen is shown in Figure 5-1.

The screenshot shows a terminal window titled "INSTALL A UNIT". At the top, there is a field labeled "UNIT #:" followed by a blacked-out input area. Below this is a larger box containing four fields: "UNIT Name:" with a blacked-out input, "UNIT Type:" with a short blacked-out input, "IP Address:" with a blacked-out input, and "UCS File:" with a blacked-out input. At the bottom of the screen, the following text is displayed: "ENTER UNIT SERIAL NUMBER ([TR-] 1-7 decimal digits)" and "F2=write unit info, ?=help, F1=main menu".

Figure 5-1

Unit

"Unit #" (Unit Number) refers to the HP TS8 or PCLSM identification number and uniquely identifies each unit on the LAN. This number is printed on a label, which is located on the rear panel of the HP TS8 (see Fig 5-2), and on the metal bracket (endplate) of the PCLSM.

If the number is entered in the wrong format, the following error message will be displayed:

Invalid unit #

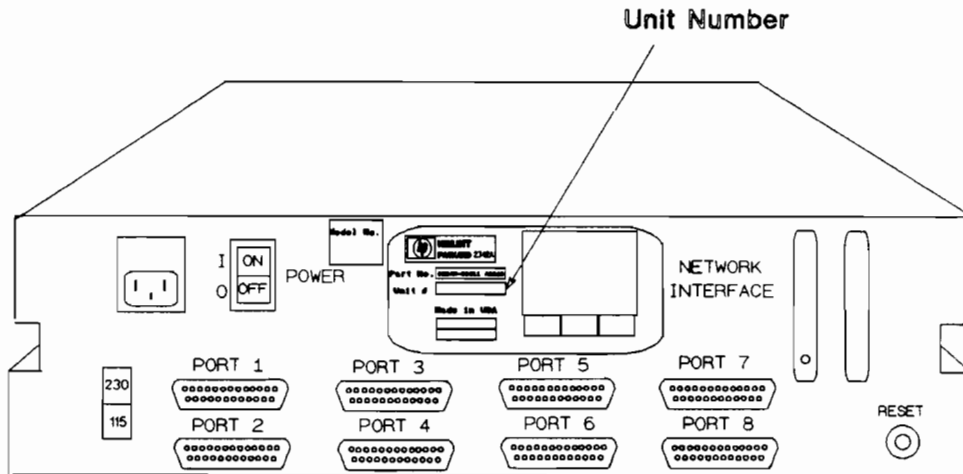


Figure 5-2: Unit#

Unit Name

Once you have installed an HP TS8, you may refer to it by its "Unit Name." You may choose any name, but we recommend that it bears a relationship to the unit's location or function, since this will make the name easier to remember. You may also use the unit's identification number as its name.

The unit name may be up to 20 characters long, including numerals and punctuation. Note that case is significant in the unit name: if you define a unit's name in lower case letters, you must always enter it in lower case.

To get a list of currently installed units, you must exit to MS-DOS and display the contents of the file NIUNAMES (using a text editor). This file contains the names and installation information for all the terminal server units that are installed. It may be edited, it is strongly recommended that you not edit it without assistance from Hewlett-Packard personnel.

Unit Type

Choose the correct Unit type for the unit you are installing, either TS8 or LSM (use **F9** and **F10**).

IP Address

This field specifies the IP address of the unit. This address uniquely identifies the unit on the network.

Note

HP LSM does not check the IPAddress for format errors. Therefore, special care must be taken, when entering an IPAddress, to ensure that the address is valid.

An IP address is a 32-bit unsigned integer. Externally it is expressed with one to four decimal numbers separated by dots, for instance:

172.17.11.3

The right-most number determines the unit's address within its network. The other numbers determine the network's location in successively more global parts of the internetwork.

See "NET/SUBNET MASK", in Chapter 4, for more information about IP addresses.

If you need to know the IP Address of a previously installed unit, use the SHOW/DELETE option from the HP LSM Main Menu.

UCS File

The User Configurable Strings (UCS) file contains additional configuration information and a set of strings used by the command interpreter on the unit. It allows you to customize the messages and prompts used by the command interpreter. One advantage of this is being able to localize the messages displayed on terminals attached to an HP TS8 into another language.

A default UCS file named BANNER.UCS is distributed with the system. However, you can create your own file, giving it a different name (but with the .UCS extension).

To install a custom file, create the file in the \TCP directory, giving it the filename extension .UCS. Then, when you install the unit, specify this filename (without the extension) in the UCS File field.

Note

If, after installing a unit, you modify the UCS file, these modifications will NOT be effective. To put them into effect, you will have to re-install the unit with the new UCS file.

A UCS file is assigned to an entire unit, ie all ports. It is not possible to assign a different UCS file to a particular port.

If a non-existent UCS file name is entered, the following error message will be displayed:

Warning...UCS file does not exist.

The UCS file has 16 logical records terminated by a carriage return. The total number of bytes (including spaces and carriage returns) must not exceed 368 bytes. (A carriage return = 2 bytes.)

Appendix H, UCS File Format, describes the format of the UCS files.

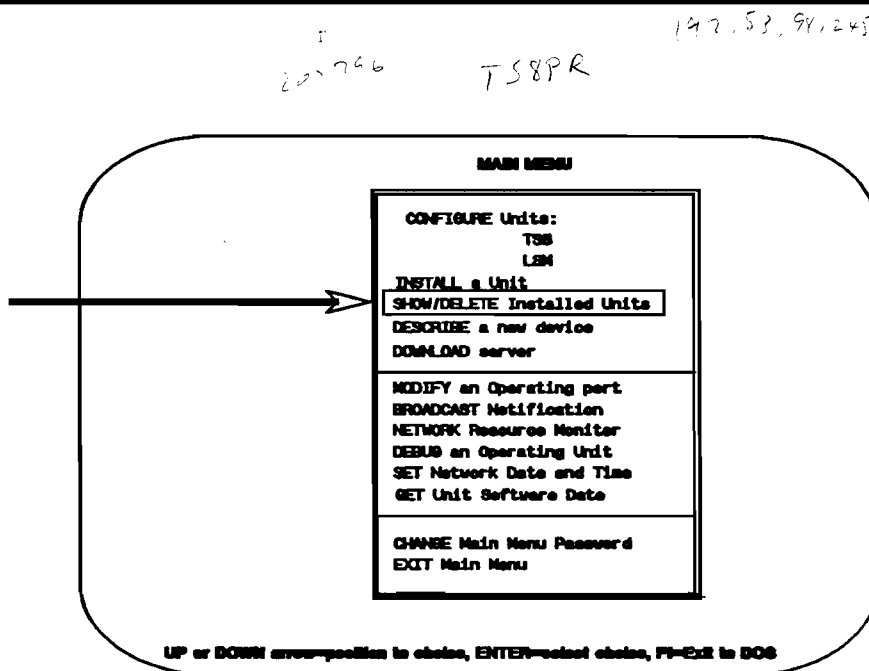
Leaving the "Install a Unit" Function

When you have finished entering data for a unit, press **F2** to store the data. HP LSM then clears the screen, allowing you to install another unit.

If you do not want to install another unit, press **F1** to return to the HP LSM Main Menu.



SHOW/DELETE Installed Units



This option displays a list of installed units (PCLSMs and HP TS8s), and enables units to be removed from the list (if, for example, they are no longer controlled by this HP LSM). Deleting an HP TS8 from the list has the effect of removing its name from the NIUNAMES file and deleting the LC and LS files (see Appendix E for more information about these files).

The following fields are displayed:

Number	displays the unit number
Name	displays the unit name
Type	displays the unit type (ie LSM or TS8)
IPAddress	displays the unit's IPAddress
UCS file	displays the name of the UCS file associated with that unit.

These fields are configured in the "INSTALL a Unit" option. See Chapter 5 for more details.

SHOW/DELETE INSTALLED UNITS

Number	Name	Type	IP Address	UCS File
.....
.....
.....
.....
.....
.....

Name/Number Search Pattern:

F3=enter search pattern; Del=delete UNIT; ?=help; F1=Main Menu

Figure 6-1

Searching for a Unit Name

To search through the list for a specific unit, press **F3** .

Then enter a search pattern next to the "Name/Number Search Pattern" prompt. The search pattern can consist of the whole string, or part of a string with a wildcard ("*"). For example, to search for a unit named MKTTTS8, you could enter any of the following:

MKTTTS8

M*8

M*

MKT*

If more than one unit matches the entered string, the first unit encountered on the list will be highlighted. To find subsequent matches, press **F3** again.

If no match is found matching the string, the following error message is displayed:

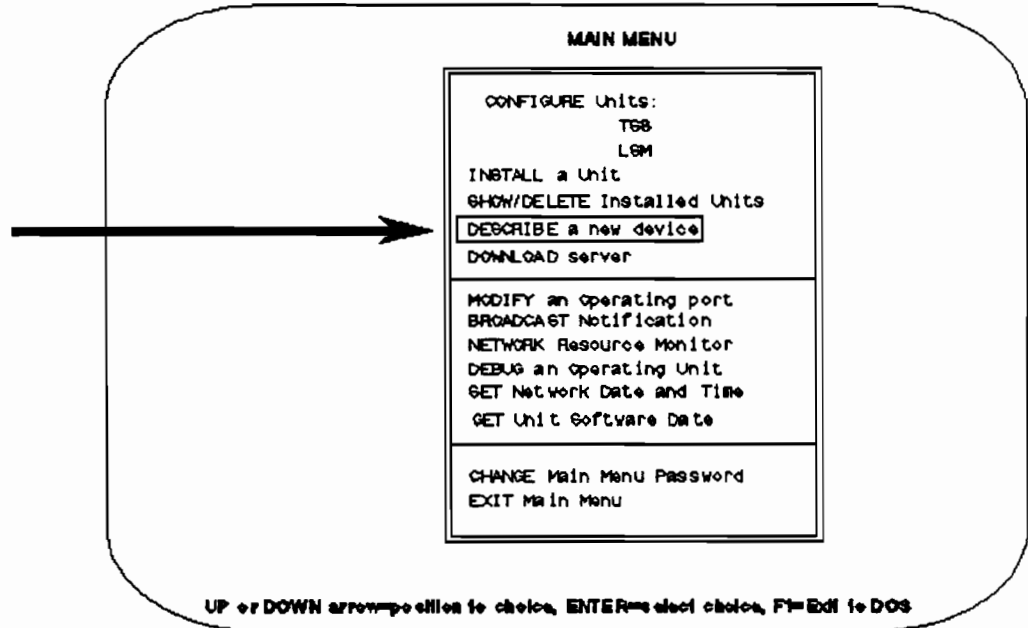
No Matching substring found.

Deleting a Unit

To delete a unit, first highlight it (using arrow keys, or by entering a search pattern). Once the unit name is highlighted, press **DEL** ; then confirm your request by pressing "."; or cancel by pressing **ESC** .



DESCRIBE A New Device



Generic Device Definition

Before you attach a new device (eg a terminal, printer or host port) to an HP TS8 unit, the device's operating parameters and other characteristics must be supplied.

Several generic device definitions (known as DEV-TYPE profiles) have already been created for you, and are provided with your software. These profiles apply to the most common HP supported devices and are listed below:

- **HPTERM:** for terminals, with speed-sensing, TELNET enabled
- **PRINTER:** for printers operating at 9600 baud, 8 bit, no parity, binary mode not enabled, no modem signals.
- **MODEM:** for asynchronous modems, operating at 1200 baud, only DCD monitored.
- **HOSTEQAK:** for host configured for ENQ/ACK flow control, operating at 9600 bd, 8 bits, no parity, with modem signals (no modem present), and binary mode not enabled.

- **HOSTD1D3:** for `host` configured for XON/XOFF flow control, operating at 9600 bd, 8 bits, no parity, with modem signals (no modem present), and binary mode not enabled.
- **HOSTPR:** for host port in permanent connection to dedicated printer; operating at 9600bd, 8 bits, no parity, binary mode not enabled, no modem signals. **YOU WILL NEED TO CHANGE THE TARGETNAME FIELD.**

Full listings of each profile are provided in Appendix C. If none of these profiles are suitable for the device you wish to connect, you can create a new user-defined device profile to add to the device library, using the "DESCRIBE A New Device" function.

Screens

"DESCRIBE A New Device" has seven screens in all.

Not all of these screens will necessarily be accessible, depending on the values you enter in certain fields.

Use the **PgDn** and **PgUp** keys to move between screens.

The screens are:

- **Service Characteristics** sets the characteristics for virtual circuit service for the device, and allows you to adjust some parameters used by the command interpreter.
- **Device Characteristics** specifies hardware-related parameters of the device.
- **In-Circuit Parameters** determines the parameters for virtual circuit service for the device.
- **Telnet Control Characters** set the parameters that affect the operation of the command interpreter in Telnet mode (for direct access only).
- **Password Options** allows you to specify whether or not you want the user to enter a password, and how often.
- **Permitted Commands** allows you to select the commands to be recognized by the command interpreter.
- **Unsolicited Messages** determines the behavior of the device during network broadcasts and multicasts.

All the fields in each screen contain default values. Most of these can be left unchanged. The most important screens are the first two (Service characteristics, and Device characteristics). These are the screens that will determine whether or not the connection will work. You should refer to the operator's manual for the device you are defining, in order to supply the correct information.

Note

Changing a field's value in one screen may automatically change other values in other screens. So, if you modify a field, take care to review subsequent screens to see if they also change.

Service Characteristics Screen

When you select "DESCRIBE A New Device," HP LSM displays the first data entry screen, "Service Characteristics".

This screen is used to define:

- the type of devices connected to the HP TS8
- the type of connection between the device attached to the HP TS8 port and its target resource
- the type of commands (if any) that it may use to establish connections.

The screenshot shows a terminal window titled "DEVICE DESCRIPTION" with a sub-window titled "SERVICE CHARACTERISTICS". The sub-window contains several fields: "DEVTYPE:" followed by a blacked-out field; "CMD/DATA:" followed by a blacked-out field; "VC-INIT:" followed by a blacked-out field; "CI-CMD9:" followed by a blacked-out field; "TARGET NAME:" followed by a blacked-out field; "HEARTBEAT:" followed by a blacked-out field; "DEMAND-WAKEUP:" followed by a blacked-out field; "RETRY TIME:" followed by a blacked-out field; "MAXVC9:" followed by a blacked-out field; "ALLOW INCOMING CALLS:" followed by a blacked-out field; "WHEN-IN-VC?" followed by a blacked-out field; "WHEN-IN-CMD?" followed by a blacked-out field; "Command Interpreter Parameters" section with "WAKEUP:" followed by a blacked-out field and "TIMEPUT:" followed by a blacked-out field. At the bottom of the terminal window, it says "Enter name of Device Type" and "F2=write file, ?=help, F1=main menu".

Figure 7-1: Service Characteristics Screen

Devtype

Enter a mnemonic of your choice in the **DEVTYPE** field to name the generic device that you are defining.

Some examples might be HP2645 and VT200 for terminals; HP3000 and HP9000 for computers; and DIABLO and HPLASER for printers. However, you may enter any mnemonic you feel is appropriate when you define a new type of device.

If you enter an existing device type, the values currently defined for the device type appear, and can be modified.

If you enter a new name, HP LSM displays the message "New file will be created" in the upper left corner of the screen to inform you that this is a new device type. Default values then appear in the data fields.

Device types are registered in files of type .DEV, and stored, in the \TCP\DEV directory.

Note

If you alter an existing device description, the modifications will only affect ports SUBSEQUENTLY configured with this DEVTYPE. If you want these modifications to affect ports already configured, you will have to:

1. Reconfigure the port (using the Configure Units option),
 2. Change the DEVTYPE to "NONE" (to clear existing values),
 3. Change the DEVTYPE back to the original name. This will cause the "new" parameters to be read and put into effect.
-

CMD/DATA Virtual Circuit Device Type

The CMD/DATA field specifies whether the device is a command device, a data device, or both:

- **Command devices (CMD)** can initiate virtual circuits (ie connections to other resources). In particular, they can issue commands to the command interpreter. However, a command device cannot receive data or connection requests. A terminal would usually be configured as a command device. Host ports (when connecting to a printer) are also usually configured as CMD (but with VC-INIT set to PERM, and DISC and HOLD set to NO. These fields are described later in this chapter).
- **Data devices (DATA)** can only accept incoming virtual circuit connections. Thus they can function only in virtual circuit mode (ie they can receive connections) or idle mode (no connection). A data device cannot initiate a connection. A host computer and a printer are usually configured as a data device. A terminal would only be configured as a data device if it did not need access to the command interpreter: for example if it was to be used purely for displaying messages from a host. In order for a port to send a "host goodbye" string (see Appendix H), the CMD/DATA field must be set to DATA.

Usually a port configured as data is configured for only one virtual cir-

cuit (see MAXVCS field), since they are not normally ports capable of multi-sessions.

- **BOTH** (CMD/DATA) devices can both initiate and accept requests for virtual circuit connections. This is the default. A terminal might be configured as a command/data device. If you want a terminal to be called, you should also set the ALLOW INCOMING CALLS field to YES (this screen) and the INCOMING-CALLS field (Unsolicited Messages screen) to YES. These fields will enable the terminal user to be notified of an incoming connection.

Table 7-1 summarizes the operation of the different virtual circuit device types.

The value selected for the CMD/DATA field will determine which fields in the following screens are relevant to the new device.

Note

Changing this field may cause other fields (eg TELNET, in "Permitted Commands" screen) to return to their default value. Therefore, if you modify this value, remember to check fields in subsequent screens for changes.

Table 7-1 Virtual Circuit Device Types

VC Device Type	Initiate a Virtual Circuit?	Accept a Connection Request?	Examples
CMD	Yes	No	terminal, host
DATA	No	Yes	printer, host
BOTH	Yes	Yes	terminal

Note

Depending on what value you choose for this field, the rest of the screen's fields may or may not be displayed.

VC-INIT Virtual Circuit Initiation

A Virtual Circuit is a logical connection between two resources.

The VC-INIT field determines how virtual circuits get initiated by HP LSM. This field does not apply to data-only devices since only command and command/data devices can initiate requests for virtual circuit service.

Choices for this field are:

- **CI:** Requests for virtual circuit connections are initiated by the operator through the command interpreter. This choice allows the user to establish a virtual circuit to any data device or command/data device on the network. This enables back-to-back and direct access (Telnet) connections to be established.
- **PERM (Permanent circuit):** a single virtual circuit is initiated by the unit whenever this is reset, or the circuit is broken. Perm limits the port user to establishing a circuit to a single authorized destination (ie the port is always connected to the same device). There is no access to the HP TS8 command interpreter. This means that, for a permanent circuit, the **Disc** and **Hold** fields must be set to **NQ** in the "In-Circuit Parameters" Screen (otherwise you will be able to put a session on hold without being able to recall it). Permanent circuits can only be made in "back-to-back" connections (NOT in TELNET direct access). Messages cannot be broadcast to ports configured as PERM.
- **DEMAND (Demanded circuit):** a single virtual circuit is initiated by the operator by striking the Demand-Wakeup key (see "Bound Virtual Circuit Initiation [DEMAND-WAKEUP]"). There is no access to the HP TS8's command interpreter. So, it is important to set the **Disc** and **Hold** fields to **NO** in the "In-Circuit Parameters" Screen (otherwise you will be able to put a session on hold without being able to recall it). As for a permanent connection, this choice limits the device's user to establishing a circuit to a single authorized destination. However, it makes more efficient use of ports at the destination than PERM. Also, demanded circuits can only be made in "back-to-back" connections (NOT in TELNET direct access).

If the attempt to establish the connection is unsuccessful (eg if the resource is "busy" or "disabled"), then the user must again press the Wakeup character to retry.

Messages can be broadcast to ports configured as DEMAND .

- **PERSIST (Persistent circuit):** same as DEMAND with continuous retries (without operator intervention) until connection is successful. The interval between retries is determined by the **RETRY-TIME** parameter. Persist circuits can only be made in "back-to-back" connections (NOT in TELNET direct access).
- **INIT (Initial circuit):** a single virtual circuit is initiated by the unit each time this is reset, but if the circuit is broken, the HP TS8 does not attempt to re-establish the connection. Subsequent connections must be initiated by the operator through the command interpreter. This choice gives the user the convenience of an automatic connection to the most-used destination, but also the freedom to break that connection and establish a new connection to any location, as in CI.

In order for bound circuit devices (ie permanent, demanded, persistent and initial circuit devices) to know the destination for connection requests, you must specify the TARGET-NAME field. In addition, demanded circuit devices use the character selected in the DEMAND-WAKEUP field. Initial circuits can only be established in a back-to-back connection. However direct access (Telnet) connections can also be made from the command interpreter, once the initial circuit has been put on hold or broken.

The default is CI.

The choice of connection type will depend on the user and on the device. For example, you would not normally establish a permanent connection to a printer as this is usually a shared "floating" resource. You might wish to establish an initial connection to a host if this is to be the most commonly used connection.

CI-CMDS Command Interpreter Commands

The CI-CMDS field specifies the commands recognized by the command interpreter. This enables you to customize the command set to suit the level of experience of the device's users. You can reduce the risk that inexperienced users will create problems for themselves by denying them access to unnecessary commands, and you can extend the list for more experienced users.

Note

This field does not apply to data-only devices, or to command devices initiating a permanent or demanded circuit.

Choices in the field are:

- **STD** the standard command set consists of the following nine commands: CONNECT, DISCONNECT, GET, HELP, LIST STATUS, LOGOUT, QUIT, RECALL, SET BINARY and SET FLOW.
- **CUSTOM** allows you to use the "Permitted Commands" screen (refer to "Permitted Commands" in this section) to choose the commands that make up your command set. It consists of the standard command set plus TELNET, or a subset of the standard command set.

The default is STD. However, if you change any values in the "Permitted Commands" Screen, the value of the CI-CMDS field automatically changes to CUSTOM.

For more information on the HP TS8 command interpreters, and for descriptions of the commands, refer to the *HP 2342A 8-Port Terminal Server Terminal User's Guide*. (Part Number 02342-90002).

TARGET-NAME

You do not need to fill this field if you selected CI for the INIT field. However, if you chose any other value, you must enter the name of the

resource that will be the target for the automatic virtual circuit service request. For back-to-back connections, the target name is the HP TS8 Port Name attached to the target device (this port name is given in the "Specific Port Parameters" Screen of the target HP TS8's configuration). For Telnet direct access connections, no target name can be given (unless a name server is present), since this field does not accept an IP Address. For this reason, BOUND CIRCUITS (ie permanent, demanded, persistent) ARE NOT POSSIBLE IN DIRECT ACCESS CONNECTIONS.

There is no default value.

HEARTBEAT

This field can be set to YES or NO. If set to YES, it implements a circuit assurance timer. This means that a "heartbeat" packet is sent at fixed intervals to check that the connection (virtual circuit) is still working.

The circuit assurance timer's value is 5 minutes (and is not configurable).

The default is NO, but HP recommends that you set this field to YES for both sides of a back-to-back connection. This will cause the virtual circuits on both sides to be released if ever one of the HP TS8's is reset (eg after a power-fail). If HEARTBEAT is set to NO, and terminal's HP TS8 is reset, the virtual circuit to the host will remain open until the Idle T/O time-out has elapsed (if configured), or until the host's HP TS8 is reset.

DEMAND-WAKEUP

Note

This field is only relevant if you select the DEMAND or PERSIST value in the VC-INIT field.

The DEMAND-WAKEUP field determines the event that will initiate a demanded circuit connection to the target resource. The default demand-wakeup character, <NUL>, means that striking any key (followed by a carriage return) will request a demanded circuit.

This behavior will be the same as if the VCINIT field was set to INIT. Therefore, the Demand-wakeup character is only meaningful if it is set to a "non-nul" value.

You might want to set it to <DC1>, which means [CTRL]Q, as many other applications use this.

RETRY-TIME

Bound circuits (whose VCINIT value is PERM, DEMAND, or INIT) attempt to establish virtual circuits with a target device.

The RETRY-TIME field determines the period of time that will elapse before the unit re-attempts to establish a virtual circuit after a failed attempt.

A value of zero (the default) specifies that no additional attempts at reconnection will be made. A non-zero value represents a retry time, in seconds: the unit will re-attempt a connection every **RETRY-TIME** seconds until successful.

In choosing a value for **RETRY-TIME**, consider the number of users who are likely to be competing for a connection. If the number is high, choose a larger value, since frequent unsuccessful retries will load the network without producing useful results. Also consider whether a person is standing by, waiting for the connection to be established. If so, choose a smaller value, since a long retry interval will make the person wait longer. A value of 10 seconds is appropriate for circuits with a person standing by and without an unusually large amount of competition.

MAXVCS Maximum Number of Virtual Circuits

The **MAXVCS** field specifies the maximum number of active virtual circuits (1, 2, or 3) allowed for the device.

Choose a value based on how many virtual circuits you want a user to be able to establish.

The default is 3.

A terminal port can be configured to 3 to benefit from multi-sessions, but an HP printer or HP host port must be configured to 1.

There is no significant performance penalty associated with allowing the maximum number of active virtual circuits. However, you may wish to restrict the number of virtual circuits allowed, to prevent users from consuming excessive resources on your network.

Also it makes no sense, for example, to give a value of 2 or 3 to a device you are configuring for permanent connections.

ALLOW INCOMING CALLS WHEN-IN-VC/CMD

It is not usual for one user to connect to another, but these fields allow this type of connection to be made.

ALLOW INCOMING CALLS WHEN-IN-VC determines whether the device will honor attempts by another device to establish a connection with this device while it is in virtual circuit mode (ie conducting communications between the device and the other end of the circuit).

Note that only 1 session can be active at a time. To accept an incoming call when in a virtual circuit, the current connection will have to be suspended.

Similarly, **ALLOW INCOMING CALLS WHEN-IN-CMD** determines whether the device will honor attempts by another device to establish a connection with this device while it is in command mode (ie conducting communications between the device and the command interpreter).

If you set both of these fields to NO, the device will honor another device's connection attempts only when it is idle.

If you set these fields to YES, you should also set the "Incoming Call" field to YES (in "Unsolicited Messages" Screen).

The default is NO for **WHEN-IN-VC**, and NO for **WHEN-IN-CMD**.

Command Interpreter Parameters

The operation of the command interpreter is determined by the parameters at the bottom of the "Device Characteristics" screen. These parameters are only meaningful for devices that use the command interpreter (CMD or CMD/DATA in the CMD/DATA field and CI or INIT in the VCINIT field).

WAKEUP

The **WAKEUP** field specifies the character that must be entered by the user to start or restart the command interpreter after the "IDLE" message appears. This field applies if you entered any value other than **DEMAND** or **PERSIST** in the **INIT** field.

The default **WAKEUP** character is `<NUL>`, which means that striking any key restarts the command interpreter.

Note

If a fixed baud rate is configured (see next screen), the wakeup character is echoed on the terminal screen).

TIMEOUT Command Interpreter Timeout

The value of the **TIMEOUT** field defines the length of time (in seconds) that a device can be "unused" (ie no commands issued to the command interpreter, and no virtual circuits active) before the unit port reverts to the idle state.

A value of zero (the default) indicates that command interpreter timeouts are disabled and the port reverts to the idle state only if a **QUIT** or **LOGOUT** command is issued.

Device Characteristics Screen

Figure 7-2 shows the "Device Characteristics" screen. This screen describes hardware parameters for the device you are defining.

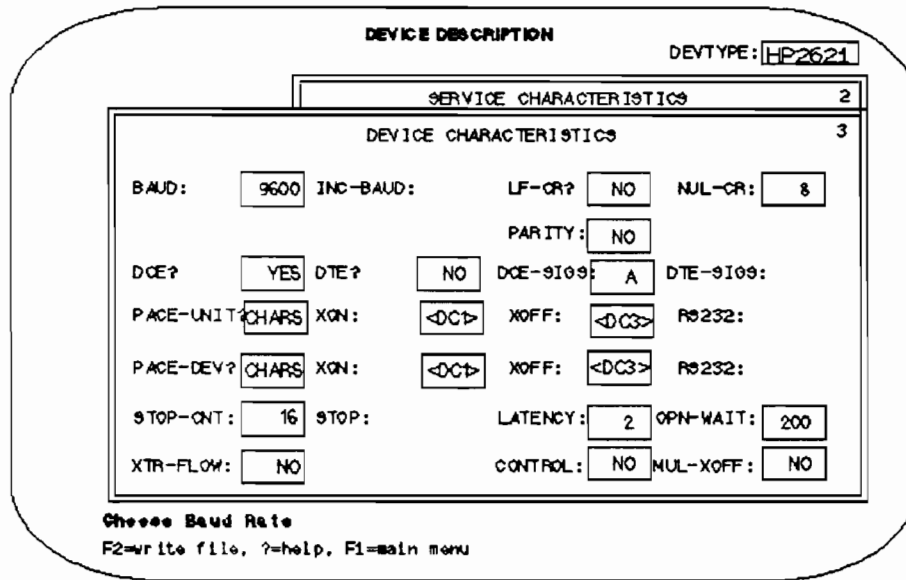


Figure 7-2: Device Characteristics Screen

BAUD/INCBAUD Data Transfer Rate

The HP TS8 supports a wide range of data transfer rates (baud rates) as shown in Table 7-2. The **BAUD** field controls the data transfer rate used by the HP TS8 to communicate with the device. In order for this communication to take place the baud rate set for the device's port on the HP TS8 must match the rate set on the device itself.

In other words, if you connect a terminal to port 1 of the HP TS8, the baud rate set at the terminal must be the same as that entered in this field. However, the baud rate of the host can differ from that of the terminal or printer to which it will be connected.

Note

In binary mode, ensure that the printer baud rate is faster than that of the host (since there is no HP TS8 flow control in binary mode), to avoid loss of data.

Table 7-2. Data Transfer Rates

(all values are in bits/second)

300	600	1200	2400
4800	9600	19200	

Instead of a data transfer rate shown in Table 7-2, you can select AUTO, which specifies automatic baud rate detection. The unit will automatically detect the baud rate for data coming in from the device. This is a useful option when the data transfer rate of the device is variable, for example for a host port that needs to communicate with a number of different terminals operating at different transmission rates..

When you select AUTO, you must select the incoming baud rate in the INCBAUD field. This is the HP TS8 port speed used to communicate with the device for network-originated calls received before the terminal server has had the opportunity to detect the device's data transfer rate.

The default for BAUD is 9600 (in which case INC-BAUD is not applicable, and cannot be selected).

Note

When a port is in idle mode, its baud rate is 7200. It cannot therefore accept broadcast messages in idle mode, as "garbage" will be displayed.

LF-CR Line Feed Insertion

The unit can be configured to insert a line feed (<LF>) after each carriage return in data received through the network from a remote device.

The options are:

- NO - no linefeed is inserted after a carriage return.
- ECHO - Linefeeds are inserted into the echo-only data stream
- INPUT - Linefeeds are inserted into the data stream delivered to the network
- OUT - Linefeeds are inserted into the data stream arriving from the network
- E + I - Combines ECHO and INPUT options (see above)
- E + O - Combines ECHO and OUT options (see above)
- I + O - Combines INPUT and OUT options (see above)
- E + I + O - Combines ECHO, INPUT and OUT options (see above)

Note

A linefeed will always be echoed back to the device sending data to the network if the ECHO-CHARS field (Screen 4, IN-CIRCUIT PARAMETERS) is set to YES. This is regardless of whether the LF-CR field is set to INPUT, I + O, or E + I + O.

The value of the LF field on the sending unit must be co-ordinated with the value of LF-CR on the receiving unit so that the receiving end inserts line feeds if, and only if, the sending end strips them.

If the two values are not co-ordinated, data will be received without line feeds (every line overwriting the preceding one) or with doubled line feeds (a spurious empty line appearing between every two real lines). If this happens, the correct values at the two ends of the circuit may be found by trial and error.

The default is NO.

DATABTS/PARITY Character Format

Asynchronous communication between the HP TS8 and the device uses the character format shown in Figure 7-3. Here, the character (data) is "sandwiched" between a start bit and a stop bit. An optional parity bit can be added to the data bits. Only the data bits are transferred across the network; the HP TS8 is responsible for padding and peeling the extra bits.

When a character with a parity error is received from the device, HPAdvanceNet discards the character.

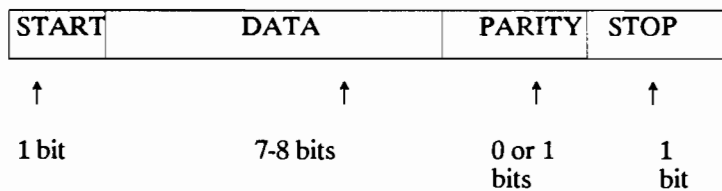


Figure 7-3. Asynchronous Character Format

If a device is to communicate with the unit, the serial interface parameters set for the device's port on the unit must match the parameters set on the device itself.

DATABTS determines the number of data bits per byte used by the unit. It may be 7 or 8. (The default is 8).

PARITY determines the type of parity used by the unit. It may be set to the following values:

- ODD (odd parity sent and expected),
- EVEN (even parity sent and expected),
- NO (no parity bit sent or expected),
- ZERO (parity bit 0 sent and expected),
- IGNOR (parity bit 0 sent, incoming parity bit ignored),
- ONE (parity bit 1 sent and expected).

Note

If DATABTS is 8, PARITY must be NO.

DCE/DTE Port Configuration

The hardware (cabling) of the ports of an HP TS8 is always DCE (Data Communications Equipment). However, each of its ports may be configured either as a DCE or a DTE (Data Terminal Equipment), provided that the appropriate cables are used. The list of supported cables can be found in the *HP TS8 Installation & Operation Manual* (p/n 02342-90001).

The HP TS8 port should be configured to complement the configuration of the device connected to it; ie if the device is DCE the HP TS8 port should be configured as DTE, and vice-versa. (However, if the port is configured as DTE it must be connected to a modem via an HP TS8 modem cable (HP40231A). DTE should be set to YES only for connection to a modem. If in doubt, you should refer to the user manual of the device.

The default for DCE is YES, and DTE is NO. See Table 7-3 for explanation of settings.

Table 7-3 DCE/DTE Port Configuration

DCE Field	DCE Field	Type of device
YES	YES	Terminal, computer port, or printer
NO	NO	Modem (but HP TS8 modem cable MUST be attached)
YES	YES	Possible, but NOT recommended

DCE-SIGS/DTE-SIGS RS-232-C Signal Behavior

The **DCE-SIGS** field determines RS-232-C signal behavior for a DCE port. The **DTE-SIGS** field determines RS-232-C signal behavior for a DTE port.

A choice of 4 different signals behavior is offered for a DCE port, and 7 for a DTE port. These values are single letters (A, B, C, etc). Each letter represents a complete system of signal behavior. Tables 7-4 and 7-5 describe the meanings of the letters.

Appendix F gives more detailed information.

Table 7-4: RS-232-C Signal Behavior For DCE port

A	Direct connect. This is the default.
B	Direct connect + RI
C	Modem connect.
D	Modem connect with SQ

Table 7-5 RS-232-C Signal Behavior For DTE port

A	Direct connection This is the default.
B	Direct connect (but HP TS8 looks for DCD)
C	Simplified connection to modem (DCD is monitored)
D	Simplified connection to modem (DCD and RI are monitored)
E	Connection to modem (DCD is monitored)
F	Connection to modem (DSR is monitored)
G	Connection to European modem (DSR, CTS, and DCD are monitored)

For DCE and DTE ports, use A or B only for "direct" connections (without modem signals control and monitoring).

If your device is attached to a modem use one of the other options (the exact choice will depend on the modem type), and set **DTE** to YES, and **DCE** to NO. You must also attach a special HP TS8 modem cable (HP 40231A).

The default is A for the DCE port and A for the DTE port. This means that if you have no modem and a direct connection, you will use DCE = YES, and DCESIGS A. However, we recommend the use of modem signals (see examples below) whenever possible.

Example

1. To configure a port to use modem signals (with NO modem present), the HP TS8 port should be configured as follows:
DCE: YES, DTE = NO, DCESIGS: C.
This way, the circuit will be automatically released when the user enters the LOGOFF sequence ("BYE" on the HP3000) when in virtual circuit mode. (The user does not need to enter the Disconnect Sequence). Also, the host session will be automatically closed if the virtual circuit is disconnected (by resetting the port or entering Disconnect Sequence). HP recommends the use of modem signals (with a 25-pin cable), whenever possible, for host connections.
2. To configure a port to use modem signals and TO CONNECT TO A MODEM (a European modem in this example), the HPTS8 port should be configured as follows: **DCE: NO, DTE = YES, DTESIGS: G** and an HP TS8 modem cable must be used.

PACE-UNIT/PACE-DEV Flow Control

"Flow control" defines rules for regulating the flow of data between the device and the HP TS8, so that they can communicate without data loss or bottlenecks even if they have different buffering capabilities. Flow control should normally be requested for both the HP TS8 and the device, unless the device is one that does not support flow control (eg certain unusual kinds of terminals) or does not need it (eg a PC connected to the network through a PCLSM).

Flow control is defined by two fields (see Fig 7-4):

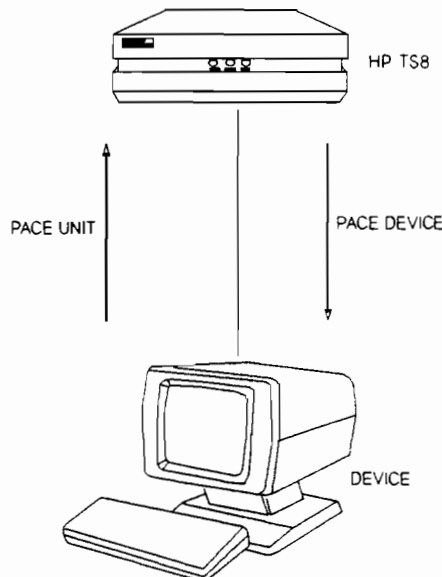


Figure 7-4: Flow Control

PACE-UNIT: if set to YES, the device paces the HP TS8 to prevent it from transmitting data from the network faster than the device can accept it.

PACE-DEV: if set to YES, the HP TS8 paces the device to prevent it from transmitting data to the network faster than the HP TS8 can accept it.

Each field may have the following values:

- NO flow control in this direction is disabled.
- CHARS flow-pacing end asserts flow control with the XON (transmit on) and XOFF (transmit off) characters. Data transmission is started on receipt of an XON character, and stopped on receipt of an XOFF character. If you select this option, you must define the flow-control characters in the XON and XOFF fields.
- SIGS the flow-pacing end asserts flow control through RS-232-C lines. When you choose this option, you must pick the appropriate set of control lines with the RS232 option (either CTS:RTS or DSR:DTR). If you pace both the HP TS8 and the device with RS-232 signals, you need to select the same set of signals for both. Few HP applications use this method of flow control.
- ENQAK the flow-pacing end asserts flow control by sending an "enquiry" character (ENQ) at the end of each line and waiting for the device to respond with an "acknowledge" character (ACK), meaning that it is ready to accept the next line, and a fixed length block of characters. (Note that for a given port PACE-DEV and PACE-UNIT will never both be configured to ENQAK). See STOP-CNT field for details of ENQ-ACK buffer handling. ENQAK is useful for communication with an HP3000/MPE(V) and an HP1000 host. If a host uses ENQ-ACK handshaking, its HP TS8 port must be configured as PACE-DEV:ENQAK, and PACE-UNIT:NO (see Fig 7-5).

Note

If you are configuring a PCLSM, you must choose NO or CHARS for PACE-UNIT. However, the PACE-DEV and STOP-CNT fields are not relevant, since there is no flow control for a PCLSM.

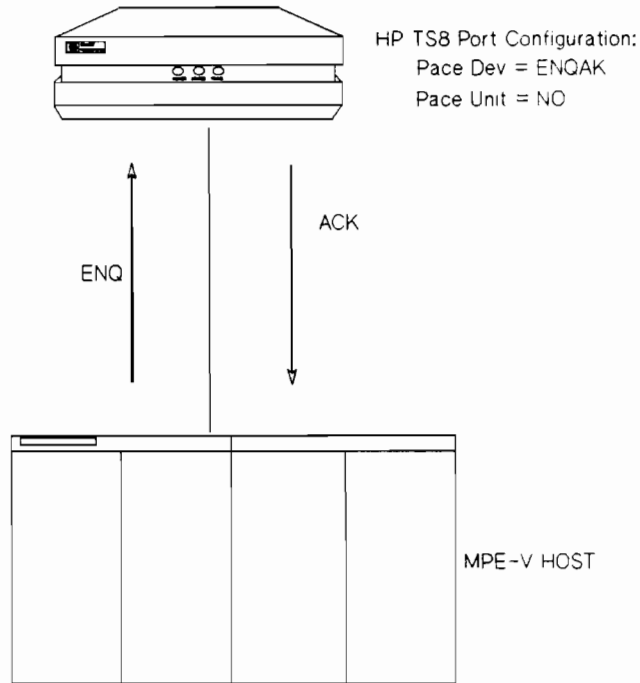


Figure 7-5: Enq-Ack Flow Control

The default for **PACE-UNIT** and **PACE-DEV** is **CHARS**.

XON/XOFF Flow

If you pace the device or the HP TS8 with XON/XOFF characters (by setting **PACE-UNIT/DEV** to **CHARS**), you must define these characters with the corresponding **XON** and **XOFF** fields. In this case, the corresponding **RS232** field does not apply.

The default for **XON** is **<DC1>** and for **XOFF** **<DC3>**.

RS232 Flow Control Signals

If you pace the device or the unit with RS-232-C lines (by setting **PACE-UNIT/DEV** to **SIGS**), you must select the set of lines to be used in the corresponding **RS-232** field. The choices are "CTS:RTS" and "DSR:DTR." If you pace both the HP TS8 and the device with RS-232-C signals, you must select the same set of signals for both.

To use RS-232 modem signals, you must use the correct cable (ie not 3-wire). A complete list of supported cables can be found in the *HP TS8 Installation & Operation Manual* (p/n 02342-90001).

STOP-CNT Receive Buffer Stop Count

If you pace the device (by setting **PACE-DEV** to **CHARS**, **SIGS** or **ENQAK**), you must enter a stop count in the **STOP-CNT** field.

The stop count is a threshold for the receive buffer of the HP TS8. It is the number of bytes remaining before a buffer is full.

When **PACE-DEV** is **CHARS** or **SIGS**, the HP TS8 sends a "stop transmission" signal to the device when the number of bytes remaining in this buffer falls below the stop count. This signal will be the **XOFF** character or the indicated RS-232 signal. This stops data transmission. As the HP TS8 processes data from the receive buffer, it frees more space in the buffer. When there is enough space in the buffer (more than **STOP-CNT** bytes), the HP TS8 releases flow control to the device by sending the appropriate "start transmission" signal, allowing data transmission to resume.

When **PACE-DEV** is **ENQAK**, the HP TS8 will not respond to an **ENQ** from a device as long as the number of bytes remaining in the receive buffer is below the stop count. This stops data transmission. When the amount of free buffer space exceeds the stop count threshold, the HP TS8 sends an **ACK** in response to the next **ENQ** from the device, allowing data transmission to resume. However, after sending an **ENQ**, if a host does not receive an **ACK** within 10 seconds, it resumes data transmission. Therefore we recommend that for communication to MPE-V host using **ENQ-ACK**, the **XTR-FLOW** field is set to **YES**: this will allow multiple **XOFFs** to be sent to the host to stop data transmission.

The default is 16 is large enough for all but exceptional devices (but see note below). Setting a smaller value may produce a marginal improvement in performance, but raises some risk of buffer overflow and lost data.

Note

For an HP TS8 port connected to an HP3000/MPE V port configured as Termtype 10, the **STOP-CNT** must be set to 80.

STOP Terminal Server Stop Recognition

If you choose to pace the unit with RS-232-C signals (by setting **PACE-UNIT** to **SIGS**), the flow control signals are asynchronous to the data stream, and there is a certain amount of latency (delay) between the receipt of a stop signal and the actual end of data transmission from the unit to the device. You can adjust the amount of latency with the **STOP** field.

Possible values for the **STOP** field are:

- **STD** the standard operating mode; gives optimal performance. Use this value unless it produces data overruns (transmission continuing when the device cannot accept data) with a particular combination of host, devices, and units.
- **FAST** at most 2 characters will be transmitted after a "stop" signal is received. This yields a slight decrease in performance.
- **FASTEST** only the remaining bits of the current character (if any) will be transmitted after a "stop" signal is received. This can yield a significant decrease in performance.

The default is **STD**.

There is no way to know at the outset which value is the most appropriate. This is a "trial-and-error" field.

LATENCY **RS-232-C Signal** **Hold-down Time**

LATENCY is the RS-232-C signal hold-down time in tenths of a second. This is the length of time for which the HP TS8 must hold its signals down (off) before raising them. In other words it represents the minimum delay between signal transitions.

This hold-down time is needed because changes in the status of the HP TS8 software when signals are raised or dropped must be indicated to the attached host or device via RS-232-C signaling. It may take time for the attached host or device to recognize a change in these signals. This field determines the minimum delay between signal transitions.

Examples of events that cause signals to be raised or dropped include the establishment and disconnection of an incoming virtual circuit; the resetting of a port by the network administrator (and its subsequent re-starting).

There is no corresponding parameter for how long the unit must hold its signals up (on) before dropping them. This is done automatically by the HP TS8 software for time periods exceeding any minimum latency that a host or device might require.

The default is 2.

OPN-WAIT **Open Wait**

This field is meaningful only for serial devices with RS-232-C signaling capabilities.

The OPN-WAIT field defines the length of time, in tenths of a second, that the HP TS8 should wait for device to become ready (ie to raise its leads) when it receives a connection request. After this time is exceeded, if the RS-232 signals are not raised, the connection to the device is dropped.

A value of 0 means that the connection will be held open indefinitely. This setting is useful for devices such as printers where it may take a long time for a problem (eg out of paper) to be corrected. With a value of zero, the connection will be held open for as long as it takes to fix the device.

The default value for OPN-WAIT is 200.

XTR-FLOW

In normal operation, when an HP TS8 receives an XOFF character, it stops all further transmission to a device, until an XON character is received. When an XOFF or XON character is received, extra XON, XOFF characters are "ignored" and have no effect on the HP TS8, and are not transmitted.

For some applications, however, these XOFF and XON characters may need to be passed through the network (for example block mode applications using <D1> as a read-trigger). The XTR-FLOW field determines

whether or not the HP TS8 will pass these extra XON/XOFF characters through the virtual circuit after you have entered an XOFF:

If **XTR-FLOW** is set to YES, the first XOFF character the HP TS8 receives stops transmission to the device. Any additional XOFFs are passed through the network until the next XON is received. Similarly, any additional XONs received after the first XON will also be transmitted through the network until the next XOFF. This is useful when communicating with a host using ENQ-ACK flow control, see explanation in STOP-CNT section.

If **XTR-FLOW** is set to NO (the default), additional XON or XOFF characters (after the first XOFF) are "trapped" by the HP TS8, and are not transmitted through the network.

Note

This field must be set to YES for a connection to a host using XON/XOFF flow control.

CONTROL

Some devices, such as intelligent modems, need to receive commands from the HP TS8 before they can set up an outgoing connection. However, an HP TS8 will not transmit data to a modem until the device control line (eg DCD) is TRUE; and, under RS-232 conventions, a modem will not set the device control line to TRUE until a call (ie an outside connection) is made. This means that, normally, instructions (for example, a phone number) cannot be sent from a network user to the modem before an outside call is made.

If the **CONTROL** field is set to YES, this enables the HP TS8 to make a connection to a device even if the device control signal is FALSE. This means that a network user can send commands to the modem before the modem makes its outside call.

If the **CONTROL** field is set to NO, characters are not passed between the HP TS8 and the modem until the device control signal goes TRUE.

The default is NO.

MUL-XOFF

Some devices require the receiving device to send multiple XOFF characters before the sender will stop transmitting data. The HP TS8, however, normally sends only a single XOFF. This means that, if a device requires more than one XOFF to stop transmissions, data can be lost between the device and the HP TS8.

If the **MUL-XOFF** field is set to YES, the HP TS8 will send extra XOFF characters until data stops (approximately one XOFF is sent for every four characters it receives, until transmission stops).

The default is NO. This is correct for most devices.

In-Circuit Parameters Screen

Figure 7-6 shows the "In-circuit Parameters" screen. With this screen you can define how the HP TS8 will handle certain device actions while the device is connected to a virtual circuit.

The screenshot shows a terminal window with the following content:

```

DEVICE DESCRIPTION                                DEVTYPE: HP2621
-----
SERVICE CHARACTERISTICS                          2
DEVICE CHARACTERISTICS                            3
IN-CIRCUIT PARAMETERS                             4
-----
DISC: CHARS DISC-SEQ: <ESC>OP SEND-BYE? NO
HOLD: CHARS HOLD-SEQ: <ESC>OQ SEQ-T/O: 0
DLE: <DLE> RCV-BREAKS? NO BRK-TIME:
ECHO-CHARS? OFF IDLE-T/O: 0 NMT? YES OUT-TIME: 5
BIN-MODE? NO SPCL-MODES? NONE LF? NO HOST-ECHO? YES

Choose Virtual Circuit Disconnect Method
F2=write file, ?=help, F1=main menu
  
```

Figure 7-6: In-Circuit Parameters Screen

DISC/DISC-SEQ, HOLD/HOLDSEQ Disconnect and Hold Sequences

The DISC field defines the event (if any) that causes the unit to terminate the current virtual circuit when received from the device. Similarly, the HOLD field defines the event that suspends the current virtual circuit.

The disconnect and hold events are processed by the HP TS8 and are not transmitted through the network.

Possible values for both fields are:

- NO no event will disconnect/hold the virtual circuit. DISC and HOLD must be set to NO if the VC-INIT field is set to PERM or DEMAND (see "Service Characteristics" screen, in this chapter); otherwise a session may be put on hold, with no means to recall it.

- **BREAK:** pressing the "break" key, <SOH>, will disconnect/hold the virtual circuit.

If you are configuring a PCLSM, do not specify BREAK for the disconnect or hold sequence.

- **2 BREAKS:** pressing the "break" key twice will disconnect/hold the virtual circuit.

Note

The SEQ-T/O field determines how much time can elapse between BREAKS before the sequence is ignored. For 2BREAKS to work, the SEQ-T/O field **MUST** be configured to a non-zero value large enough to enable you to press the Break key twice (a value of 5000 (ie 5 seconds) should be enough). If the SEQ-T/O value is not large enough, "garbage" will appear on the terminal screen when the first Break key is pressed, and the HP TS8 port may have to be reset.

- **CHARS:** this option requires you to enter a sequence of up to 4 characters in the DISCSEQ or HOLDSEQ field. (A one character sequence is **NOT** recommended as it may be entered by mistake.) This sequence, when encountered in the data stream, will disconnect/hold the virtual circuit.

Obviously, the disconnect sequence must be different from the hold sequence. Also the sequences must be unusual; ie do not configure them to be common sequences such as a carriage return, otherwise every time a host sends this character you will be disconnected. Note also that these sequences are case sensitive: if the sequence is configured as <ESC> DI, <ESC> di won't work. Other restrictions on your choices of disconnect and hold sequences are described in Appendix G.

Care should be taken if you program your softkeys as hold or disconnect sequences when running block mode applications. Backing up your softkeys, in this case, will cause your circuits to be disconnected or suspended.

Also, do not enter a hold sequence while data is being transmitted to a device. This may result in data loss.

Note

TELNET users are recommended to set the Disconnect Sequence to **[CTRL]D**, since in direct access it is better to close the session on the HP TS8 rather than on the host. This is because the Time Wait to Close is 4 seconds on the HP TS8 (compared with 2 minutes on the host). If you do modify your disconnect sequence in this way, remember to alter the GO-AHEAD sequence in the "Telnet Control Characters" screen (which is also set to **[CTRL]D**).

SEND-BYE

This field determines whether the "Host-Goodbye" string (defined in UCS file - record #14) is output to the device attached to this port when the virtual circuit is disconnected. (See Appendix H for UCS file).

The default is NO. If you are not using modem signals between the host and the HP TS8, we recommend that you change this field to YES and modify the host-goodbye string in the UCS file (see Appendix H).

This host-goodbye string must be defined in the UCS file before the unit is installed (using the Install a Unit option). If the UCS file is subsequently modified, the changes will not be effective unless the unit is re-installed.

SEQ-T/O

Sequences, such as the disconnect and hold sequences, consist of 3 to 4 characters. This field specifies how much time is allowed between characters before the sequence is ignored by the HP TS8 and the characters entered so far are sent through the network as ordinary data. (SEQ T/O does not apply to 2-character sequences).

The sequence recognition timeout value is in milliseconds. The default is 0.

Note

For 2BREAKS to work, the SEQ-T/O field MUST be configured to a non-zero value large enough to enable you to press the Break key twice (a value of 5000 (ie 5 seconds) should be enough). If the SEQ-T/O value is not large enough, "garbage" will appear on the terminal screen when the first Break key is pressed, and the HP TS8 port may have to be reset.

DLE Data Link Escape Character

The data link escape character causes the character that follows it to be treated as a simple data character by the network software. The device may use the data link escape character to send through the virtual circuit a character that might otherwise be interpreted by the network software as "special," eg the first character of a disconnect sequence, or the XON and XOFF characters.

This could be used in the following way, to provide "end-to-end" flow control:

1. Enter **[CTRL]P** (<DLE>) at terminal (this tells the HP TS8 to "ignore" the next character)
2. Now enter **[CTRL]S**. This will then be interpreted directly by the host.
3. To resume transmission, enter **[CTRL]P**, then **[CTRL]Q**.

The default is **[CTRL]P** .

The value <NUL> specifies that no data link escape character is defined.

RCV-BREAKS/ BRK-TIME

Receiving Break Signals

The **RCV-BREAKS** field determines whether the HP TS8 should forward break signals from the network to the device (YES) or filter them out (NO).

If you set **RCV-BREAKS** to YES, you must enter the break time, in milliseconds, in the **BRK-TIME** field. When the HP TS8 issues a **BREAK** to the device, the break condition is asserted for the duration of the break time, to ensure that the device has recognized the **BREAK**.

The defaults are NO (for **RCV-BREAKS**) and 250ms (for **BRK-TIME**, if **RCV-BREAKS** is set to YES).

ECHO-CHARS

Character Echoing

The **ECHO-CHARS** field determines whether characters sent by the device to the network should be echoed by the HP TS8 back to the device.

If you set **LOCAL**, be sure that the target resource does not also echo characters back to the device.

It is usually meaningful only for **CMD** or **CMD/DATA** devices.

A terminal's HP TS8 uses **ECHO-CHARS** when it negotiates echoing with the host's HP TS8 during the establishment of the Telnet connection.

The field has three possible values.

- **LOCAL** the terminal server requests to be allowed to do the echoing
- **REMOTE** the terminal server requests that the host (or host HP TS8) does the echoing.
- **OFF** Same as Remote but the terminal server will not echo even if the outcome of negotiation nominally requires it to do so.

The default is **LOCAL**.

IDLE-T/O

Virtual Circuit Timeout

The **IDLE-T/O** field specifies the time, in minutes, that a virtual circuit may be idle (no data transferred) before the network software will close the circuit.

If the field is set to 0 a circuit will not be closed when the device becomes idle.

IDLE-T/O is similar to **TIMEOUT**, but monitors and closes individual virtual circuits. **TIMEOUT** monitors the entire device (ie all virtual circuits), and resets the port to the idle state when its timeout occurs.

The default is 0 (disabled).

NVT Network Virtual Terminal

This field determines whether the HP TS8 will use the Network Virtual Terminal (NVT) protocol to communicate over virtual circuits established for this device.

NVT must be set to YES if communicating in direct access using TELNET between a terminal and a host.

NVT is a layer of protocol above TCP. Telnet translates the characters used by the terminal into the character set of the NVT and delivers the NVT characters to the host. The Telnet service on the host then translates the NVT characters into ones used by the host.

If the user has control over the use of NVT protocol at both ends of the connection, it is recommended to configure both ends to use NVT.

If NVT is set to NO, the terminal server uses only the underlying TCP protocol, so no Telnet negotiation is possible. This would be useful to increase speed if the attached device is a printer.

The default is YES.

OUT-TIME Out-of-Service Time

If a port is taken out of service by HP LSM (because of an apparent malfunction) it will be put back into service as soon as the Out-of-Service time has elapsed. The OUT-TIME field defines this length of time, in minutes.

The purpose of the OUT-TIME interval is to save the network administrator the effort of putting the port back in service manually. It is expected that the network administrator will normally correct the problem that caused the port to be taken out of service before the OUT-TIME interval expires. Therefore OUT-TIME should be set to a value comparable to the time-to-repair for most port problems in your network. A high degree of competition for free ports may induce you to set a smaller OUT-TIME value.

The default is 5 mins. A value of 0 means that a port will not be taken out of service at all.

Note

while a device is out of service the HP TS8 will offer it in response to a rotated (ie "Find Free") request. However, the HP TS8 will not offer it in response to a non-rotated name connection request.

BIN-MODE Enter Binary Transfer Mode

Binary mode is used to transfer any type of data (including non-ASCII data, such as graphics) without interpreting them. Any of the 256 possible values of an eight-bit character can be sent or received (except for the BREAK). Binary mode is compulsory for transferring files in some applications, for instance the HP3000 applications HPWORD and HPAdvanceLink require the ports to be configured in binary mode.

The **BIN-MODE** field determines whether a virtual circuit is automatically placed in binary transfer mode when it is established:

YES is appropriate for devices that are normally or exclusively used in binary mode.

NO is appropriate for devices which are normally used in character mode, such as all HP peripherals, and most terminals and servers used by terminals. The default is **NO**.

Note

Any **HOLD** or **DISCONNECT** sequence is ignored while the port is in binary transfer mode. The Break key must be used to put the circuit on hold.

Special care must be taken in binary mode to avoid data loss due to buffer overflow. This is due to the fact that flow control in binary mode is "end-to-end" with no HP TS8 intervention. When the terminal sends the host an **XOFF** in binary mode, the host will halt its transmission, however the internal buffers of the intervening HP TS8 (or HP TS8s) will continue to empty towards the terminal. Therefore, to prevent data loss, you should increase the buffer threshold of the terminal or increase its baud rate so that it operates at a higher speed than the host.

Caution

The maximum baud throughput on an HP TS8 unit is 96kbaud for its 8 ports. If this is exceeded, data may be lost.

With the **SET BINARY** command, the terminal user can modify his port configuration and that of the remote resource (since **TELNET** automatically configures the remote resource if negotiation is successful). For more information about the **SET BINARY** command, see the *HP2342A TS8 Terminal User's Guide* (p/n 02342-90002).

SPCL-MODE Special Mode

This field is used to specify data transfer modes needed by certain non-HP devices.

For most devices, the default value, **NONE**, is appropriate.

Other possible values are **US2DG**, **DPPAR**, and **U + D**. Your HP CE will advise you when it is necessary to set one of these values.

LF Line Feed Stripping

The **LF** determines whether line feeds (s) will be stripped from carriage return/line feed (<CR> <LF>) sequences sent through the network by the device. This field is necessary because some protocols that Hp-AdvanceNet TCP/IP uses to transmit data between terminals and hosts require that LFs be stripped before transmission and re-inserted after.

An incorrect LF setting causes output to be displayed without line feeds (every line overwriting the preceding one) or with doubled line feeds (a spurious empty line appearing between every two real lines). If this happens, the correct values of LFCR and LF at the two ends of the circuit may be found by trial and error.

The default for this field is NO.

HOST-ECHO

The **HOST-ECHO** field determines whether data received by the HP TS8 from a device will be echoed back to the device.

In general, **HOST-ECHO** on the host's HP TS8 should be YES. When a virtual circuit is established, the host's HP TS8 will then inform the terminal's HP TS8 that the host is echoing, and that the terminal's HP TS8 need not do so. **HOST-ECHO** on the terminal's HP TS8 should be NO.

The default is NO.

Telnet Control Characters Screen

This screen allows you to specify the keystrokes that the user of a device must enter to send various Telnet commands to the host at the other end of a virtual circuit (direct access only). See Figure 7-7.

DEVICE DESCRIPTION DEVTYPE: HP2621

TELNET CONTROL CHARACTERS 5

NOP (No Operation)	<SO>	SYNCH (Data Mark)	<SYN>
BRK (Break)	<STX>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI>	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS>	EL (Erase Line)	<CAN>
OA (Go Ahead)	<EOT>		

Enter ASCII Equivalent for "Synch" (Data Mark)
F2=write file, ?=help, F1=main menu

Figure 7-7: Telnet Control Characters Screen

Note

These commands are meaningful only when the Telnet protocol is being used. In other words, NVT should be set to YES and TELNET set to YES in the "Permitted Commands" Screen.

Each field's value must be a single keystroke. These keystrokes are usually control characters. The fields and their associated Telnet commands are:

- **NOP** sends a No-Operation command. The default is **[CTRL] N (<SO>)**
- **SYNCH** - performs a Synchronisation operation, ie it delivers preceding data and Telnet commands to the host without a delay. The default is **[CTRL] V (<SYN>)**.
- **BRK** - sends a request to host for a break or for attention. The default is **[CTRL] B (<STX>)**. For HP terminals, you should change this to **<NUL>**
- **IP** - sends an Interrupt-Process command to interrupt the current application program. The default is **[CTRL] C (<ETX>)**
- **AO** - sends an Abort-Output command. Continues running the user process but does not send its output to the terminal. The default is **[CTRL] O (<SI>)**.
- **AYT** - sends an Are-You-There command. Requests the host to confirm that it is still running and connected. The default is **[CTRL] G (<BE>)**.
- **EC** - sends an Erase-Character command. This erases the last character entered. The default is **[CTRL] H (<BS>)**.
- **EL** - sends an Erase-Line command. This erases the line currently being entered. The default is **[CTRL] X (<CAN>)**.
- **GA** - sends a Go-Ahead command. This indicates that data transmission is complete. The default is **[CTRL] D (<EOT>)**.

According to the system and application you are using, certain of these control characters will have to be re-defined to avoid conflicts.

Password Options Screen

One password per port is provided for end-user security.

The screenshot shows a terminal window with the following content:

```
DEVICE DESCRIPTION                                DEVTYP: HP2621
-----
TELNET CONTROL CHARACTERS                        5
-----
PASSWORD OPTIONS                                6
-----
LOGIN-TYPE:  NONE  LOGIN-TRIE@:
PORT-PASSWD:
FAIL-ACTION:      WAIT-TIME:

Choose type of login
F2=write file, ?=help, F1=main menu
```

Figure 7-8: Password Options Screen

LOGIN-TYPE

This field defines whether or not a password will be required at port level before access is allowed to the command interpreter.

NONE means that no login or password features are performed; no other fields in this screen need to be entered.

PORT means that the HP TS8 will ask for a password and will use the other parameters defined in this screen.

The default is NONE.

LOGIN AND PASSWORD PARAMETERS

LOGIN TRIES This specifies the number of login tries that are allowed. The default is 3. After this number of login tries are exceeded, the action taken is determined by the **FAIL ACTION** field.

PORT-PASSWD This specifies the password required for the port. The password may contain up to 8 alphanumeric characters.

Note

These parameters are used only with the **PORT** option.

FAIL ACTION

This field determines the action that will be taken after the number of incorrect logins specified in the **LOGIN-TRIES** field. The options available are:

- **RESET** The HP TS8 drops the RS-232 line, if enabled, and re-enters idle mode.
- **WAIT** This is the same as **RESET**, but does not allow the user to retry for a period of time determined by the **WAIT-TIME** field.
- **DISABLE** This disables the port until the network administrator resets it. The following message is displayed at the terminal:

This port has been disabled for security
reasons.

WAIT-TIME

This field determines the period of time (in seconds) that must elapse before another login attempt can be made. (This field is only valid if **WAIT** is selected in the **FAIL-ACTION** field).

Permitted Commands Screen

The "Permitted Commands" screen (Figure 7-9) shows the commands available to the command interpreter.

The screenshot shows a terminal window titled "DEVICE DESCRIPTION" with "DEVTYPE: HP2621" in the top right. Below this are three stacked menu boxes:

- TELNET CONTROL CHARACTERS** (5): A box with the number 5 in the top right corner.
- PASSWORD OPTIONS** (6): A box with the number 6 in the top right corner.
- PERMITTED COMMANDS** (7): A box with the number 7 in the top right corner, containing the following options:
 - CONNECT? YES
 - DISCONNECT? YES
 - RECALL? YES
 - GET? YES
 - QUIT? YES
 - SET-BIN? YES
 - SET-FLOW? YES
 - LIST-STATUS? YES
 - TELNET? NO
 - LOGOUT? YES

Below the menu boxes, the text reads: "Choose whether Connect command is allowed" and "F2=write file, ?=help, F1=main menu".

Figure 7-9: Permitted Commands Screen

This screen is only displayed if the VCINIT field is set to CI or INIT (ie if the port is configured for access to the HP TS8 command interpreter).

HP LSM allows you to customize the HPAdvanceNet command set for a device. Set each command to YES to include it in the device's custom command set, or NO to exclude it. If you set TELNET to NO, the port will be unable to make direct access connections. If you set CONNECT and GET to NO, the port will be unable to make back-to-back connections.

For information on the function of each command, see the *HP2342A TS8 Terminal User's Guide* (p/n 02342-90002.)

Unsolicited Messages Screen

An unsolicited message is a transmission that is sent to a device when the device is in command mode or virtual circuit mode, but is not a message from the command interpreter or the other end of the circuit. Since unsolicited messages may interfere with the use of the device, you have the option of selecting what kinds of messages are allowed, and when they will be accepted. Figure 7-10 shows the "Unsolicited Messages" screen.

DEVICE DESCRIPTION DEVTYPE: HP2621

UNSOLICITED MESSAGES 8

ACCEPT BROADCAST?	<input type="checkbox"/> NO	WHEN-IDLE?	<input type="checkbox"/> NO
ACCEPT MULTICAST?	<input type="checkbox"/> NO	WHEN-LOGGING-IN?	<input type="checkbox"/> NO
MULTICAST-ID?		WHEN-IN-CIRCUIT?	<input type="checkbox"/> NO

Allowed In-Circuit Notification upon:

GET-COMPLETION?	<input type="checkbox"/> NO	INCOMING-CALL?	<input type="checkbox"/> NO
-----------------	-----------------------------	----------------	-----------------------------

Choose whether Broadcasts can be received
F2=write file, ?=help, F1=main menu

Figure 7-10: Unsolicited Messages Screen

The following fields determine what types of messages, if any, are allowed.

ACCEPT BROADCASTS YES makes the device accept broadcast messages (messages sent to all nodes on the network).

ACCEPT MULTICASTS YES makes the device accept multicast messages (messages sent to a specific group of nodes on the network).

MULTICASTID specifies the multicast ID that a multicast message must have to be accepted. Required if (and meaningful only if you set **ACCEPT MULTICASTS** to YES).

If you elect to receive broadcast or multicast messages, the device will receive them when in HPAdvanceNet mode (when ready to accept Command Interpreter commands). You can also specify whether the device is to receive these messages during the following events.

WHEN-IDLE YES enables the device to receive messages when idling. However, we recommend that this is set to NO, as an idle port operates at 7200 bd, and "garbage" would be displayed.

WHEN-LOGGING-IN YES enables the device to receive messages during login.

WHEN-IN-CIRCUIT YES enables the device to receive messages when in a virtual circuit session.

In-Circuit Notifications

An in-circuit notification is a message sent to a device by its HP TS8 while the device is communicating with a virtual circuit. Its purpose is to notify a user of an event that has occurred outside the virtual circuit currently in use.

You can allow or disallow in-circuit notifications. The fields concerned are:

GET-COMPLETION determines whether the device will accept a notification that a get command has established a connection. (A "GET" command gives the HP TS8 a standing request to attempt to establish a new virtual circuit. It continuously retries to establish a connection, while leaving you access to the command interpreter). If this is set to NO, the only way the user will know if a connection has been made is by verifying the Status with the LIST-STATUS command.

INCOMING-CALL determines whether the device will accept a notification that the HP TS8 has received a connection request for the device. (This is analogous to "call waiting" on a telephone system.)

In each field, YES makes the HP TS8 forward notification to the device immediately. NO makes the unit defer notifying the device until the device leaves virtual circuit mode.

The default for all these fields is NO.

Saving Device Description

When you have finished describing a device, press **F2** to save the device description on disk. (You may press **F2** before displaying the last screen if you have no information to enter into the fields of that screen.)

This creates a file of file type .DEV containing this configuration information, stored in the C:\TCP\DEV directory.

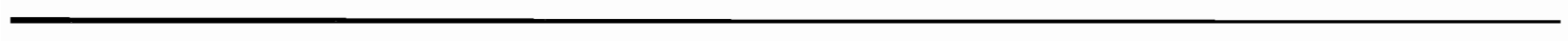
After HP LSM saves the device description on disk, it returns to the first screen (Service Characteristics), clears it, and re-displays the **DEVTYPE** (Device Type) prompt. This enables you to enter another device description.

If you do not have another device description to enter, press **F1** to return to the HP LSM Main Menu.

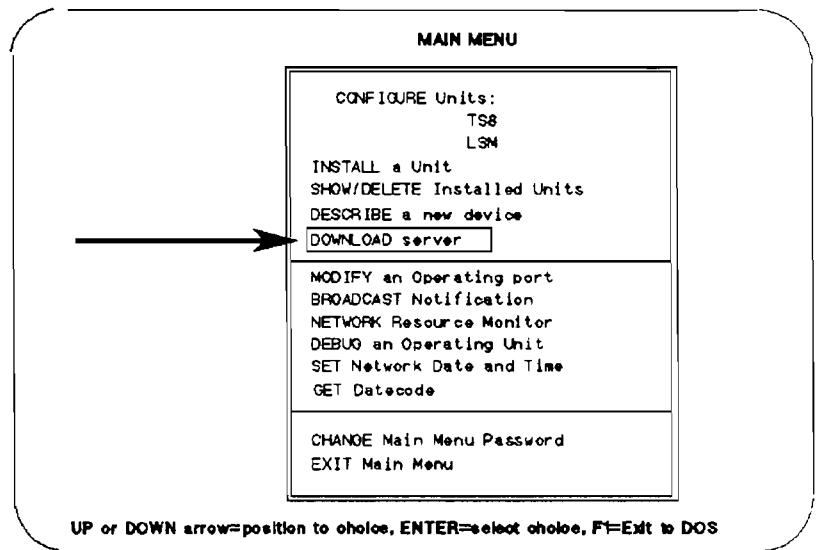
Deleting A Device Description

To delete a device description:

1. Press **F1** from the HP LSM Main Menu, to leave the program and return to DOS.
2. Move to the C:\TCP\DEV directory. This contains all the device descriptions in files with the file type .DEV.
3. Use the DOS **DELETE** command to delete the device description you no longer want.



DOWNLOAD Server



The Download Server takes the configuration data you have built with HP LSM and downloads it to the network's HP TS8s. This information is saved in Load Characteristics (LC) files, created during the "CONFIGURE Units" Option, and Load Specifications (LS) files, created during the "INSTALL A Unit" Option. (See Appendix E for more information about these files.) When a download request from an HP TS8 is received by the Download Server, it searches its data base for the appropriate files for the requesting HP TS8. When the files are located, the Download Server transmits the files to the unit. The files transmitted are:

1. The loader from \TCP\LOADERS that is specified by the LS file for the requesting HP TS8.
2. The operating software that is specified by the LS file for the requesting HP TS8
3. The LC file for the requesting HP TS8

Note

The Download Server is only supported to serve HP TS8s on the same network as the HP LSM (ie it may not necessarily work over bridges/routers).

Using the Download Server

To invoke the Download Server choose this function from the HP LSM main menu, or type `dls` from DOS.

If any download requests are pending, they will appear on the screen.

To stop the Download Server and return to the HP LSM main menu, enter **[CTRL]C**.

We recommend that you leave the HP LSM console in Download Server mode during normal operation. This will enable the HP TS8s to be automatically downloaded after a reset or a power failure of the HP TS8. We also recommend that you do not attempt concurrent downloading (from more than one HP LSM console at the same time).

Only units that have been configured and installed will be downloaded upon request. (They must also be attached to the LAN and powered on.)

Download Server Messages

While the download server is running, it displays messages on the screen to keep you informed of its activity. Following are descriptions of the messages that the "DOWNLOAD Server" function can display.

Each message start with DLS--, sometimes followed by a three part number: "DLS" is an abbreviation for "Download Server", and the number is a time stamp, which enables you to track the duration of a download.

Note

Some messages may contain the letters "NIU". This stands for Network Interface Unit, and is synonymus with HP TS8.

MESSAGE Awaiting request

CAUSE the Download Server is not transmitting software to a unit now. It is waiting for a download request.

ACTION none necessary.

MESSAGE Board ID not found in file LS nnn

CAUSE LS file $nnnA$ does not contain information for the board that is requesting a download. This happens if you gave the wrong unit model type in the "CONFIGURE Units" function.

ACTION Use the "CONFIGURE Units" function to create a new LS file for the unit.

MESSAGE Cannot parse file LS nnn

CAUSE The information in LS file $nnn\Delta$ is not in the correct form. The file has somehow been altered.

ACTION Use the "CONFIGURE Units" function to create a new LS file for the HP TS8.

MESSAGE Can't open file LS nnn

CAUSE One of the second-stage loader files that should be in the directory \TCP\LOADERS is missing.

ACTION Check the files in the directory \TCP\LOADERS. Restore the missing file(s) from the HP LSM distribution diskettes.

MESSAGE Can't open file LS nnn

CAUSE LS file $nnn\Delta$ does not exist.

ACTION Use the "INSTALL a Unit" function to create an LS file for the HP TS8.

MESSAGE Can't read loader file.

CAUSE the Download Server cannot read the loader file.

ACTION Check the files in the directory \TCP\LOADERS.

MESSAGE Can't send loader

CAUSE You might have a serious problem with the Download Server.

ACTION Reboot the computer and restart HP LSM. If the problem persists, contact your Hewlett-Packard representative immediately.

MESSAGE Checksum error in load file

CAUSE The data in the loader file contains an error.

ACTION Contact your HP CE.

MESSAGE Download requested: $net/unit\#$, load type n

CAUSE an HP TS8 has sent a download request to the Download Server. The message shows the network ID, the unit number, and the load type requested.

For example, "Download requested: 1/1138A, Load type 0" indicates that network number 1, Unit number 1138, processor board 1 (A) have requested a download.

"Load type" indicates a particular set of entries in the LS that the HP TS8 has requested. Load type 0 is the load type that an HP TS8 initially requests when it has been configured to run initial diagnostics. For subsequent loads, or for all loads if the HP TS8 has been configured not to run diagnostics, the HP TS8 requests load type 1.

ACTION none necessary.

MESSAGE **Insufficient string space for this download**

CAUSE The Download Server has run out of space in which to expand tokens (file names) taken from the LS file.

ACTION Use the "CONFIGURE Units" function to create a new LS file for the unit.

MESSAGE **Load completed
n retries on n packet(s)
false timeout**

CAUSE These messages indicate the normal end of a download. The Download Server reports correctable errors with the "retry" and "false timeout" messages.

ACTION If you often see the "false timeout" message, it may indicate a problem with your system. Contact your HP CE. If you see any "retry" messages (even only one) it means that a packet has been lost, and indicates that your network may be in trouble. You should check you MAU, Thin MAU, and AUI connections.

MESSAGE **Load type not found in file LSnnn**

CAUSE Causes: The requested load type cannot be found in the LS file for the HP TS8 (unit number *nnn*) that is asking for a download.

ACTION Action: Use the "INSTALL a Unit" function to create a new LS file for the HP TS8.

MESSAGE **Bootstrap requested: net/unit# Loader type n**

CAUSE a unit has sent a loader request to the Download Server. The message shows the network ID, the unit number, and the load type requested.

A loader request is the first stage of a two-stage load required by some units. This is usually followed by the "Download requested" message.

ACTION none necessary.

MESSAGE Bootstrap sent

CAUSE this is the normal response to the "Bootstrap requested" message.

ACTION none necessary.

**MESSAGE Loading files:
ETxxx.XFM
\LSn\xxxx.LC**

CAUSE This message appears when files are being downloaded to the HP TS8. The Download Server displays the name of each file as it begins to download the file.

ACTION none necessary.

MESSAGE Unit number not found in file LSnnn

CAUSE The LS file for unit number *nnn* does not begin with the sequence of data that indicates a valid LS file with the proper unit number. The file has somehow been altered.

ACTION Use the "INSTALL A Unit" function to create a new LS file for the unit. (This function will replace, not modify, the invalid file.)

MESSAGE No appropriate tokens found in file LSnnn

CAUSE The Download Server located the HP TS8, board, and load-type indicators in the LS file for unit number *nnn*, but no files exist in the LS load-file list.

ACTION Use the "INSTALL A Unit" function to create a new LS file for the unit.

MESSAGE Offer to load not accepted

CAUSE You have more than one Download Server running in the network, and the HP TS8 that broadcasts a download request has accepted a download offer from another Download Server. This Download Server has timed out waiting for a response.

ACTION none necessary.

MESSAGE SYSTEM ERROR WHILE PROCESSING LS FILE FOR nnn

CAUSE You might have a serious problem with the Download Server.

ACTION Reboot the computer and restart HP LSM. If the problem persists, contact your HP CE immediately.

MESSAGE **String overflow while processing file LSnnn**

CAUSE The Download Server has run out of space in which to store tokens and expandable tokens (file names) taken from the LS file.

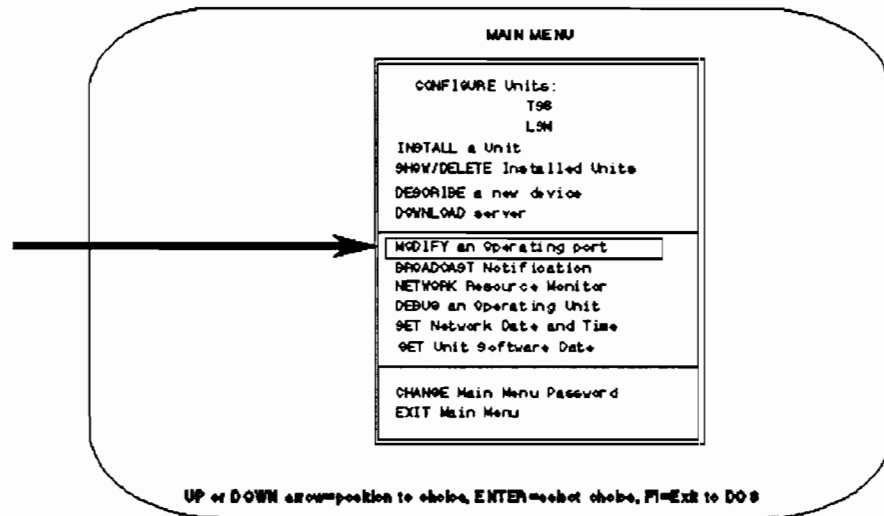
Use the "INSTALL A Unit" function to create a new LS file for the HP TS8.

MESSAGE **Wrong record type in loader file.**

CAUSE Record types are coded into the loader files. A correct loader file name was found, but the contents are invalid.

ACTION Contact your HP CE.

MODIFY An Operating Port



The "MODIFY An Operating Port" function temporarily changes the operating parameters and other characteristics of an operating unit. It cannot, however, be used to change port or unit IP Addresses. (These must be changed using "Configure Units", then the unit must be re-downloaded).

"Modify an Operating Port" changes characteristics without reloading the unit. This has the advantage of not affecting other users of the unit when you change one port's characteristics.

Caution

The changes you make are not permanent. The original characteristics will be re-established the next time the unit is reloaded. To make these changes "permanent", use the "CONFIGURE Units" option of the HP LSM main menu.

"MODIFY an Operating Port" can be used to modify any unit on the internet, not just a unit on the HP LSM's network. However, the files describing the unit whose port is to be modified **MUST** be available on the HP LSM. This means that the unit must have been installed on the HP LSM (using "INSTALL a Unit") before using "MODIFY an Operating Port" on that HP LSM. Otherwise, the program displays the error message.

Unit is not installed

Note

We recommend that you avoid modifying the same unit from two or more HP LSMs at the same time.

The "Modify an Operating Port" function has eight screens:

- Specific Port Parameters
- Service Characteristics
- Device Characteristics (Hardware Parameters)
- In-Circuit Parameters
- Telnet Control Characters
- Password options
- Permitted Commands
- Unsolicited Messages

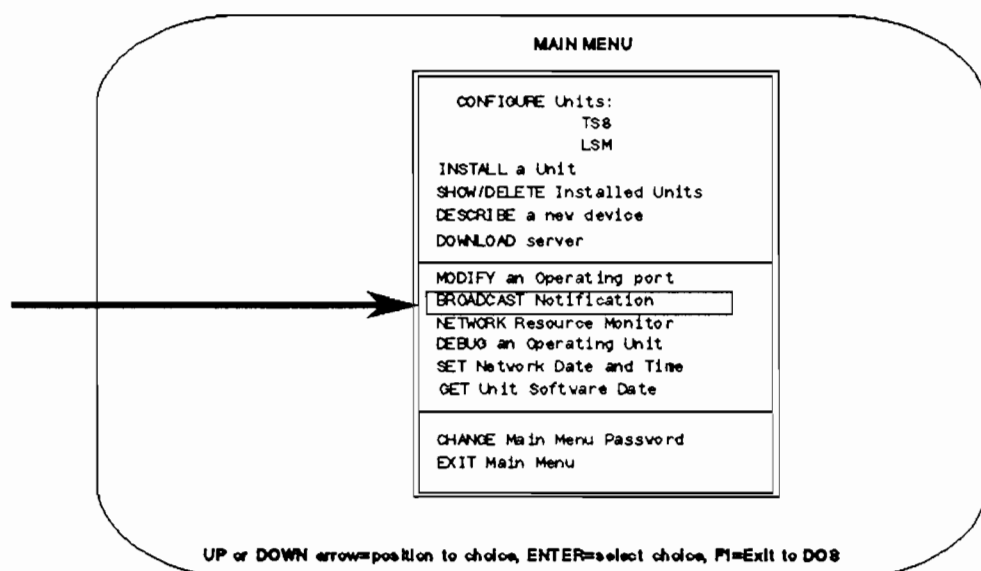
The first screen is identical to the Specific Port Parameters screen in the "CONFIGURE Units" function, and is described in Chapter 4. The remaining screens are identical to the screens of the "DESCRIBE a New Device" function, and are explained in Chapter 7.

Restarting the Port

Once you have modified a port's characteristics:

1. Press the **[F2]** key to download the new characteristics to the unit
2. Then press the **[F4]** key to reset the port. This forces the port into idle mode, from which it can then restart with the new parameters.

BROADCAST Notification



The "BROADCAST Notification" function allows the network administrator to send messages to terminals and to workstations operating in terminal emulation mode.

A broadcast message is sent to all eligible users. A multicast message is sent only to designated groups of users, not necessarily on the same HP TS8 units..

Note

Ports configured for a PERMANENT connection will not receive broadcast or multicast messages.

The units that receive broadcast or multicast messages do not necessarily need to be installed on the HP LSM you are using, however they must be on the same local network segment. Also, before a device can receive a broadcast or multicast message, you must specify that the TS8 is eligible to receive such messages. (This is done through the "CONFIGURE Units" function, in the "Unsolicited Messages" Screen).

The "BROADCAST Notification" function has one screen (see Fig10-1).

BROADCAST NOTIFICATION

Multicast IDs

ID1: ID2: ID3: ID4:

Message:

Enter message (1 to 80 characters)
F2=send message, ?=help, F1=main menu

Figure 10-1

Sending a Multicast Message

To send a multicast message:

1. Enter up to four multicast IDs. These designate up to four different groups of users to whom you want to send the message. (These IDs are assigned in the MULTICAST-ID field of the Unsolicited Messages screen - see Chapter 7).
2. Enter the message you wish to send in the Message field. This message will be sent to all ports that were configured to receive multicast messages for each of the specified multicast IDs.
3. Press **[F2]**.

Sending a Broadcast Message

To broadcast a message to ALL eligible users (not only multicast groups):

1. Leave the **Multicast ID** fields blank .
2. Enter the message in the **Message** field (with a maximum length of 80 characters).
3. Press **[F2]**.

Receiving a Broadcast or Multicast Message

Depending on how the device is configured, it can accept or refuse either broadcast or multicast messages (see **Unsolicited Messages** in Chapter 7).

A device usually receives messages while in command interpreter mode. However, it can also receive messages when idle, during login, and even during a virtual circuit session.

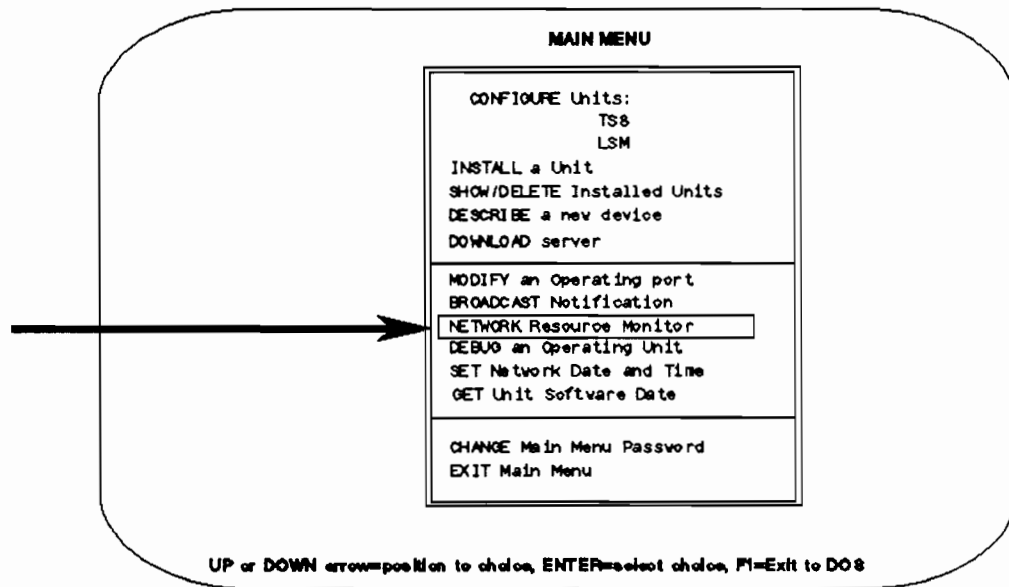
All messages are "queued", even if they cannot immediately be transmitted to the ports.

Note

We recommend that you set the **WHEN-IDLE** field to **NO**. Otherwise, any ports configured to accept a message in idle mode will display garbage when a message is broadcast, and require your port to be reset.



Network Resource Monitor



The "Network Resource Monitor" (NRM) function gathers information about the behavior of any HP TS8 or PCLSM on the network. It displays data link statistics, network layer statistics, and virtual circuit statistics. It also enables you to reset a unit, and to restart, enable or disable a unit port.

These statistics can indicate how effectively a unit configuration meets user demands. For example, the statistics on port activity can show whether or not certain ports are available when they are needed, and how often certain ports are used. This information can help you evaluate or modify your current unit configuration or plan for network expansion.

You must have installed a unit, using the "INSTALL A Unit" function, before you can use the "Network Resource Monitor" function on it. However you can monitor a unit installed on another HP LSM provided you have its LC and LS files stored on your HP LSM.

Starting NRM from DOS

The Network Resource Monitor can be selected from the HP LSM Main Menu or invoked from MSDOS; with the following command:

NRM [-0 or -1][-F[filename.sav]][-A{Address1}{Address2}...{Address11}]

-0 or -1 selects an adapter number on which the Network Resource Monitor will run (on systems having multiple network cards). The default is 0 (one network adapter card fitted). If you specify 1 but do not have multiple network cards fitted, the following error message is displayed:

NET INITIALIZATION ERROR:23

-F[filename.sav] -F, when used without a filename, loads the Network Resource Monitor with configuration information (for the selected resource) saved from the previous session. This information is stored in a file called NRM.SAV.

If another filename is specified, -F will cause the Network Resource Monitor to load the configuration information from the file specified.

-A{AddressN} specifies the unit number of up to 11 resources, and enters them into the resource table (ie the initial NRM screen). Do NOT use this option with the -F option.

Examples

1. To invoke the Network Resource Monitor on Adapter 0 with no file containing previously selected resources, simply enter the command:

NRM

2. To invoke the Network Resource Monitor on Adapter 0 with the selected resources contained in the NRM.SAV file. This file would have been automatically generated by the Network Resource Monitor during the previous session (if there was one). Enter the command:

NRM -F

3. To invoke the Network Resource Monitor on Adapter 0 with the selected resources contained in the file SARASAVE (created during a previous session), enter:

NRM -F SARASAVE

4. To invoke the Network Resource Monitor with two resources, with unit numbers 10567 and 11435, enter:

NRM -A 10567, 11435

Initial Network Resource Monitor screen

The first screen displayed by the Network Resource Monitor is illustrated in Fig 11-1. This screen presents several fields in which you may enter unit names or numbers of units you want to monitor.

If NRM was chosen from the HP LSM Main menu, or if it was evoked from DOS without specifying a filename or address, the screen will have no values entered. It will allow you to enter up to 16 units. To enter more, press the **PgDn** key. This displays 3 more screens (identical to the first). This enables a total of 64 units to be entered, i.e. 512 connections (8x64).

This acts as a "resource table" from which you may then select the unit(s) that you want to monitor among the names you have entered.

If NRM was invoked with one or more addresses, these will be placed in

```
Network Resource Monitor
Thursday Feb 4, 1988 Time 10:09:07 Elapsed Time 0:00:00 Update 0:00:00
Page 1

Name: hpclass Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0
Name: Address:0 Type: IPAdr:0

Type ? for Help!
F1=Exit Prgm F2=Utility Menu F3=Clear Stats F4=Monitor all F5=Select
F7=Elapsed Time F8=Update Time F10=Print
```

Figure 11-1: Initial NRM Screen

the address fields. However, you may enter other units on this screen if you wish.

If NRM was invoked with a filename (or with the default NRM.sav filename), the units previously entered and saved in this file will be displayed in the resource table.

The names of the units entered are saved to a default file called NRM.SAV whenever you exit NRM. However, to save to a specific file (of your own choice), use **F2** (described later in this chapter)

Note

A help facility is provided with NRM. It can be invoked by pressing ? from any screen. However, some of the fields described in the help screens are not implemented in the current version of NRM, and should be ignored. These fields are: TPPSA, TPPSB, UTILZ, SBADP, RBR, and HRBR.

Name

Enter the name of the unit you wish to monitor in this field. The unit must previously have been installed on the current HP LSM using the "INSTALL a Unit" function. Alternatively, leave the name field blank, and fill in the Address field with the Unit#.

Note

Before overwriting an existing name, press the **DEL** key, then enter the new name.

Address

This field is automatically filled with the unit number of the unit identified in the Name field. Alternatively, if the name field was left blank, fill in the Address field (up to 6 digits) with the unit#.

Type

This field displays the unit type (LSM or TS8) of the specified unit.

IPAdr

This field displays the IPAddress of the specified unit.

Note

The TYPE and IPADR fields are not filled in immediately. They are filled in once you select a unit to monitor, then return to this screen.

Function Keys

Displayed at the bottom of the screen is a list of 10 function keys. They are briefly described below:

F1

Returns to Previous Menu. Can be pressed from any screen.

F2

Utility Menu- Reads or writes an NRM file, sets up a logfile, or returns to HP LSM main menu.

Other Commands

- | | |
|------------|---|
| F3 | Zeros and resets the values of all fields on the current screen. Valid for every Network Resource Monitor screen except the MONITOR ALL Screen. |
| F4 | Monitors all <u>selected</u> resources. Displays MONITOR ALL Screen. Valid from any Network Resource Monitor screen. |
| F5 | Selects the field that is highlighted. From the initial Network Resource Monitor screen this selects the unit to be monitored (and displays the DATA LINK STATISTICS screen); from other screens it selects a statistic to be graphed or logged. |
| F6 | Displays the port and connection statistics for a host. Not valid from the first Network Resource Monitor screen. |
| F7 | Clears elapsed time for the Network Resource Monitor "stopwatch" function. |
| F8 | Enters a new value for the period of time between updates to the current screen or graph. |
| F9 | Graphs a selected statistic, updating it according to the value in Update Time. Valid only from a statistics screen, not from the initial Network Resource Monitor screen. |
| F10 | Prints the screen to a file or to a designated printer. |
| DEL | Deletes a unit from the NRM resource table. Use from the first NRM field. Highlight the name or address of the unit to be removed, then press the DEL key. |
| ? | Displays context-sensitive HELP screens. |

Figure 11-2 summarizes the main statistics that can be displayed by Network Resource Monitor, and the usual sequence in which they are performed.

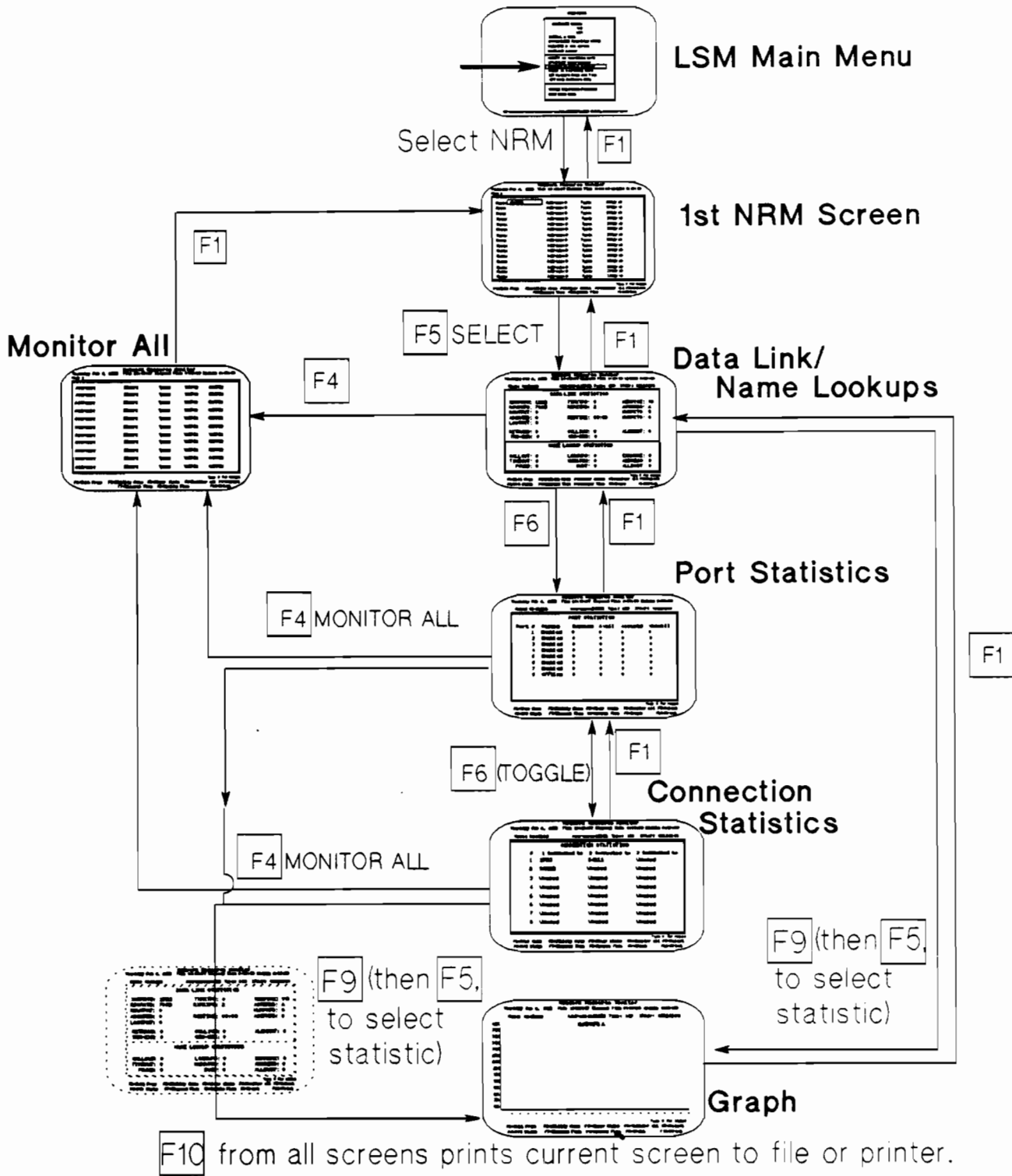


Figure 11-2 Summary of NRM functions

SELECT a Unit to Monitor (F5)

When you have entered all the units you wish to monitor in the initial NETWORK Resource Monitor screen, select a unit (by highlighting it and pressing **F5**) and moving the cursor to the appropriate row (with the **↑** and **↓** keys. This reads the NIUNAMES file, and displays datalink and name lookup statistics on the selected unit.

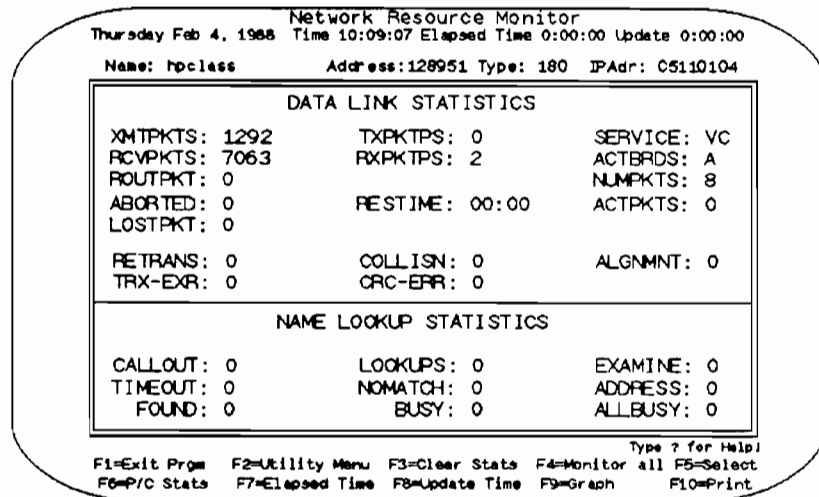


Figure 11-3: Data Link and Name Lookups Screen

If you attempt to select a non-existent name, the following error message is displayed:

No NIUNAMES File Entry and NO Name Server Entry.

To Reset a Unit

From the Data Link & Name lookups screen, press **K** to reset ("Kill") the selected unit. This will have the same effect as pushing the RESET button on the HP TS8 unit, which will then request a new download from the network.

Data Link Statistics

The Network Resource Monitor displays a summary of various events to enable you to view the actions of a given unit. The following events are displayed for the unit being monitored:

Information on Packets:

XMPKTS

the number of packets sent by the unit to the network

RCVPKTS	the number of packets received by the unit from the network
ROUTPKT	the number of internet routing packets received by the unit
ABORTED	the number of packets that were aborted due to shortage of available transmit buffers: this would be due to excess collisions on the Ethernet or loss of modem signals on the serial link. This count is not added to the XMTPKTS count.
LOSTPKT	the number of packets received but later discarded by the unit due to lack of system resources (ie shortage of receive buffers), or if the packets are of illegal length. This count is not added to the RCVPKTS count.
RETRANS	the number of re-transmissions that have occurred - not yet implemented in NRM, so value will be 0.
TRX-EXR	the number of times the receiver has exhausted its resources - not yet implemented in NRM, so value will be 0.
TRXPKTPS	the average number of transmit packets per second.
RXPKTPS	the average number of received packets per second.
COLLISN	the total number of collisions that occurred during the unit's transmissions. This number depends on the network load.
CRC-ERR	the total number of packets discarded by this unit due to Cyclic Redundancy Check (CRC) errors (but with a length that was an integral number of bytes). This indicates a possible hardware problem: if it occurs on 1 unit, the fault probably lies on the receive path between the unit processor board and the cable tap. If it occurs on a pair of units, the fault probably lies on the transmit path.
ALGNMNT	the total number of alignment errors detected. This is the number of packets received by this HP TS8 with a bad CRC (but with a length that was NOT an integral number of bytes) - not yet implemented on NRM, so value will be 0.

Information on Unit:

RESTIME	the response time in seconds. This represents the amount of time that elapses between sending a command and responding to it.
SERVICE	the type of service supported by the unit. For the HP TS8, this will always be VC (Virtual Circuit).
ACTBRDS	list of currently active boards used by the unit (For the HP TS8 this will always be 'A').
NUMPRTS	the total number of ports associated with the unit
ACTPRTS	the total number of currently active ports on the unit

Note

HP LSM continues accumulating statistics on the selected unit, but does not update the display spontaneously. The display is updated automatically at intervals determined by "Update Time", and whenever the Return key is pressed. To make unit clear the accumulated statistics and start collecting them again, press **F7**.

Name Lookups

A Name Lookup is performed when a user attempts to connect to a named resource. The Name Lookup activity consists of one or more broadcast packets containing the question "where is this resource located?" A unit that receives such a packet checks to see if the requested name is recorded in its name table.

If a unit has a device by the requested name, it will respond to the question by volunteering the device's port number, along with an indication of whether the named resource is busy or free. A unit which has multiple devices known by the same name will favor free devices in its response.

Because Name Lookups are broadcast, a copy goes to each unit in the segment. In order to compensate for Name Lookups or unit responses that may be lost in transit, broadcasts are often repeated. Thus, multiple broadcasts of a Name Lookup are sometimes needed to find a particular resource.

To monitor Name Lookups sent and received by a unit, the Network Resource Monitor displays the following information about the unit being monitored:

Name Lookups Sent:

- CALLOUT** the number of name lookups performed by this unit in attempting to call out. When a connection is attempted, one **CALLOUT** is recorded. The results of that connection are recorded as either **FOUND**, **TIMEOUT**, or **BUSY**.
- In order to get a general indication of how busy the ports are, compare the **FOUND** and **BUSY** fields to the total number of attempts. For example, if the value of **BUSY** is much larger than that of **FOUND**, it may indicate that more ports are needed on the network.
- FOUND** the number of times a name lookup by this unit found a free resource
- TIMEOUT** the number of times a name lookup by this unit found no resource
- BUSY** the number of times a name lookup by this unit found only a busy resource (ie engaged in a connection, or "offline")

Name Lookups Received:

- LOOKUPS** the number of broadcast name lookups broadcast by the unit. This count is incremented whenever a Name Lookup request is received.
- NOMATCH** the number of attempted name lookups not recognized by the resource. This count is incremented if the requested name is not present in the unit's name table.
- ALLBUSY** the number of times **all** ports with the same specified name were busy (since a rotated name may refer to more than one port on the units being monitored)
- EXAMINE** the number of inquiries from other units concerning port status. **EXAMINE** is incremented when the unit receives an inquiry regarding the status of one of its ports.
- ADDRESS** number of name lookups mapping port numbers to addresses (ie unit numbers).

The last two fields, **ADDRESS** and **EXAMINE**, show how often users are requesting information about certain ports. This can indicate which ports are needed most by users.

Monitor All (F4)

This function surveys all the resources selected on the first NRM screen. It is invoked by pressing **F4** from any Network Resource Monitor screen. However, when you have finished, pressing **F1** from this screen will always return you to the initial NRM screen, and you will have to re-select a unit to monitor.

The following screen is displayed.

```
Network Resource Monitor
Thursday Feb 4, 1988 Time 10:09:07 Elapsed Time 0:00:00 Update 0:00:00
Page 1

Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:
Address:      IPAdr:      Type:      TXPPS:      RXPPS:

Type ? for Help
F1=Exit Prgm  F2=Utility Menu  F4=Monitor all
F7=Elapsed Time  F8=Update Time  F10=Print
```

Figure 11-4: Monitor All Screen

The **Address**, **IPAdr**, and **Type** fields are the same as on the first Network Resource Monitor screen.

TXPPS The number of transmitted packets per second.

RXPPS The number of received packets per second.

When there is more than one screenful of resources, the Network Resource Monitor will scroll from screen to screen and will return to the first screen following the display of the last one.

Note

Scrolling is carried out according to the value of **Update Time**.

Port/Connection Statistics

The Network Resource Monitor displays eight sets of per-port statistics representing ports 1 through 8 on the unit being monitored.

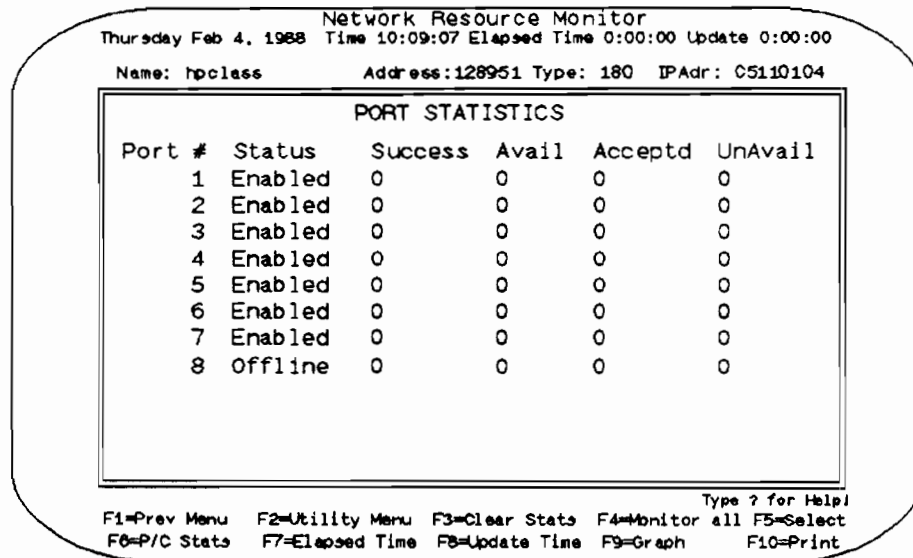


Figure 11-5: Port Statistics Screen

The port statistics can be useful for assessing the level of demand for specific ports. It is particularly useful for assessing the adequacy of a group of rotored ports. If the higher-numbered ports are almost never used, for example, you may wish to reduce the network's use of resources (eg communication lines) by reducing the number of devices in the rotored group. If the highest-numbered port is often used, on the other hand, you may wish to increase the number of devices in the rotored group to make it less likely that a user will attempt to connect to the rotored group and find all ports busy.

The per-port statistics are:

STATUS

the status of the port:

- ENABLED,
- DISABLED or
- OFFLINE.

To change this status, enter **R** (to Reset), **E** (to Enable), or **D** (to Disable). The displayed prompt is then:

Enter Port#:

Enter the number of the port to be affected and press **Return**. An action taken on a port will disconnect all active connections.

It is also possible to reset a unit (all ports) with the **K** command.

The above commands (**R**, **E**, **D**, **K**) can also be issued from the "Connection Statistics" screen.

SUCCESS

the total number of outbound connections successfully completed by this port. Each time a user on the given unit tries to make an outbound connection, and is successful in connecting to a resource, **SUCCESS** is incremented for that port.

AVAIL

the number of times the port responded "free" to a name lookup

ACCEPTD

the total number of successful inbound connections accepted by this port

UNAVAIL

the number of times the port responded "busy" to a name lookup

When a unit receives a Name Lookup request, it searches its name table for the requested name. If the name is found, the unit checks the port to see if it is available for a connection. If the port is free, the unit responds, and **AVAIL** is incremented. If the port is busy, **UNAVAIL** is incremented, and the unit searches again for a free port.

If a connection attempt to the free port is made, and is successful, **ACCEPTD** is incremented.

This information can be interpreted in a number of ways. For example, if certain ports are unavailable more often than they are free, you may not have enough ports allocated to the busiest resources. Similarly, if certain ports have very few connection requests and are always free, the resource to which they are connected may not need all the ports you have allocated to it.

Connection Statistics (F6)

Pressing **F6** from the PORT STATISTICS Screen displays the CONNECTION STATISTICS screen. Press **F6** again to return to the PORT STATISTICS Screen.

The Connection Statistics screen displays the destination resource name for ports that have initialized a virtual circuit. However, if a port is itself the "receiver" of a connection, the field is left blank.

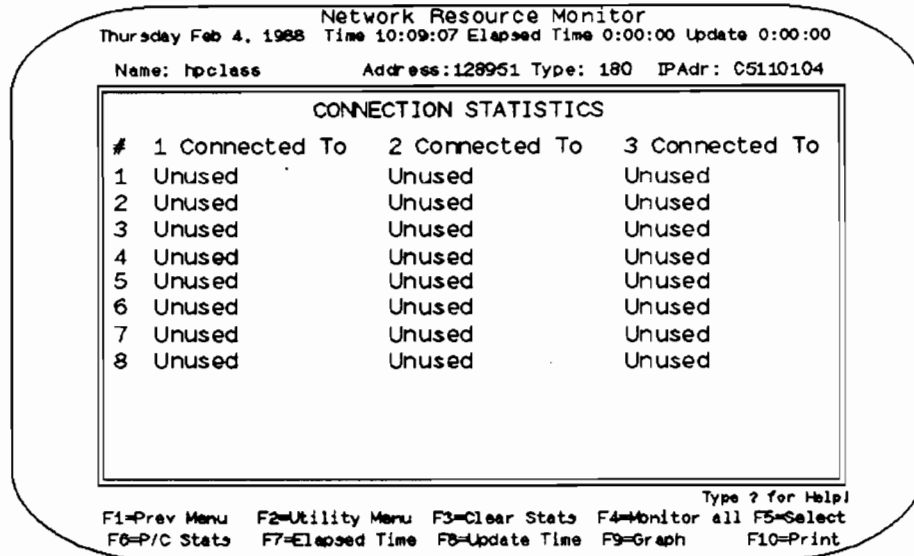


Figure 11-6: Connection Statistics

Graph (F9)

When a statistics screen is displayed, hitting **F9** will display the Data Link & Name Lookup screen, and allow you to select a statistic to be graphed. The following prompt is displayed:

Type F1 to Abort, and F5 or Return to Select

Move the cursor to the statistic to be graphed (with the **↑** and **↓** keys), then select it (by pressing **Return** or **F5**).

The Network Resource Monitor automatically generates the graph and adds points, from left to right (where the x axis is time, determined by UPDATE TIME field, and the Y axis is the number of packets).

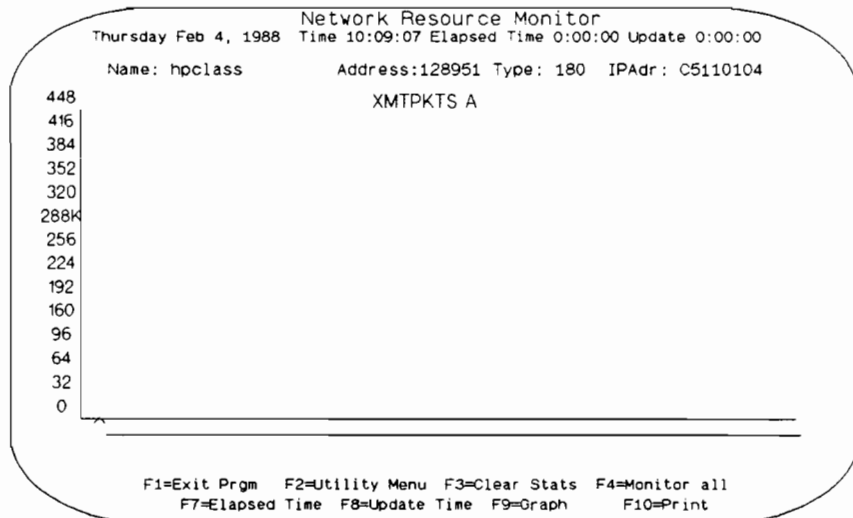


Figure 11-7: Graph Screen

The position of the current plot insertion point is indicated by a caret (^) character on the bottom of the screen. When all the columns available on the screen are filled, the plot insertion point wraps to column 1 and the graph begins overwriting previously displayed information.

The graph updates the display according to the value of UPDATE TIME, and whenever you press **Return**. If UPDATE TIME is 10 seconds, the time increments on the x axis will be 10 seconds. It may be convenient to change the scale on the x axis to adjust the appearance of the graph.

Pressing **F1** takes you back to the Data Link & Name Lookups screen.

Utility Menu (F2)

This menu can be invoked from any NRM screen (by pressing **F2**).

The following prompt will be displayed:

A: LSM
B: MENU FILE
C: LOG FILE

- **A: LSM** allows you to exit NRM and return to HP LSM main menu.
- **B: MENU FILE** creates or accesses a file containing the resources to be selected for the Network Resource Monitor program. By default, a file called NRM.SAV is created each time NRM is used and a resource name is entered.

- **C: LOG FILE** creates a file containing a logfile (ie a record) of specified events.

To select an option, simply press A, B or C, or highlight the option with the cursor and press **Return** , (or **[F5]**).

Creating a Menu File

The **Menu File** option creates or calls up a file containing the selected resources to use in addition to - or in place of - the default NRM.SAV file. The file created will contain all the resource names entered in the first NRM screen (up to 64).

Note

Every time you exit NRM, the default NRM.SAV file is automatically updated. Therefore we recommend that you use this option to create a file of a different name if you wish to save your network configuration.

You will see a series of prompts:

Read/Save a File

1. Highlight "Read" or "Save" with the cursor and press **[Return]** to select it. "Save" will save a file for retrieval at a later date. "Read" will load a previously saved file into NRM.

Enter a Filename:

2. Type the name of the file to be retrieved (for READ) or created (for SAVE), and press Return.
3. The Network Resource Monitor will then return to the Utility Menu. Press **[F1]** to return to the initial Network Resource Monitor screen. If you selected "Read", you will now see that the NRM resource table will have been filled in.

Creating a Log File

The **Log File** function creates a file containing a record of specific events, or prints this record. Use the Log File function only with currently selected units. In other words, you must first select a unit from the initial Network Resource Monitor screen. (This is the unit that the logfile will track.)

When you select the Log File option, a series of prompts will be displayed:

Open/Close/PRN

1. Select "Open" (to open a file in which events will be recorded), "Close" (to close the file opened by "Open" or "PRN"), or "PRN" (to print the record) and press **[Return]**.

Note

If the print function is selected, make sure that the printer is connected to the standard printer port, and is switched on. If not the program will "hang". Also, we recommend the use of a parallel printer, rather than a serial one. If you use a serial printer, use the DOS MODE command to configure it correctly.

If you selected "Open", you will see the following prompt:

Enter a Filename:

2. Type the name of the file to be opened. You should specify .SAV as the filename extension

Max Samples/Circular

3. Select **Max Samples** to limit the size of the file created. Network Resource Monitor will then cease writing to the file when it reaches the limit specified in the **Samples** field.

Otherwise, select **Circular**: the Network Resource Monitor will continue writing to the file while it is open, and if the limit specified in the **Samples** field is reached, it will overwrite previous entries (beginning with the first one).

Samples

4. Enter the maximum number of entries that should be saved or reported.

Enter Resource Address:

5. Enter the unit number of the resource to be monitored. This unit number must have been entered and "selected" on the initial NRM screen.

The Data Link Statistics Screen is then displayed.

6. Position the cursor over the statistic to be included, and press [F5] (or Return) to select it.
7. This step may be repeated to select up to 6 statistics. However, to select less than 6 events, press [F1] when you have finished.

Each time the screen updates, NRM will write the statistics selected in the previous step to the logfile. The logfile will remain open and continue to log statistics until you close the log file by selecting "Close" from the Log File menu, or by exiting NRM.

Note

To examine the contents of the log file, exit NRM, and PRINT or TYPE the file from MS-DOS.

When the logfile function is complete, the Network Resource Monitor creates an ASCII logfile containing the Menu Table string, the date and time the file was created, and the selected statistics. Examples of Logfiles are given below:

```
Name: left           Address: 54901
Type: TS8           IPAdr: C019BAB4
Tuesday Apr 19, 1988  Time 20:09:04   Update 0:00:01
TimeXMTPKTS      TXPKTPS      RCVPKTS      RXPKTSPS
20:09:55288755      29           286385       32
20:09:56 288775      20           286407       22
20:09:57 288790      15           286422       15
20:09:58 288824      34           286453       31
20:09:59 288853      29           286480       27
20:09:50 288625      29           286257       31
20:09:51 288635      10           286268       11
20:09:52 288664      29           286295       27
20:09:53 288698      34           286326       31
20:09:54 288726      28           286353       27
```

Example of "Circular" logfile (size = 10)

(note "times" in left-hand column)

```
Name: left           Address: 54901
Type: TS8           IPAdr: C019BAB4
Tuesday Apr 19, 1988  Time 20:06:25   Update 0:00:01
Time XMTPKTS      TXPKTPS      RCVPKTS RXPKTSPS
20:07:11 285644      32           283295       30
20:07:12 285671      27           283321       26
20:07:13 285700      29           283351       30
20:07:14 285720      20           283371       20
20:07:15 285743      23           283394       23
20:07:16 285774      31           283422       28
20:07:17 285801      27           283452       30
20:07:18 285817      16           283469       17
20:07:19 285849      32           283498       29
20:07:20 285877      28           283525       27
```

Example of "Max Size" logfile (size = 10)

Elapsed Time (F7)

This function provides an on-screen stopwatch function. Pressing **F7** resets the Elapsed Time parameter at the top of the screen.

Update Time (F8)

This changes the update time parameter which is the value that the Network Resource Monitor program uses in incrementing its display of statistics. The default Update Time is 10 seconds.

When you press **F8** the following prompt is displayed:

Enter the update time:xx:xx:xx

Update time may be a value from zero seconds to 24 hours. In addition to update time, the Network Resource Monitor will update the statistics display whenever Return is pressed.

It is not necessary to type nulls to fill in the entire format when only part of the parameter will be used. For instance, to change the update time to 2 seconds, simply press **F8** , and type 2.

Print (F10)

This prints a copy of the current screen to a file or a printer.

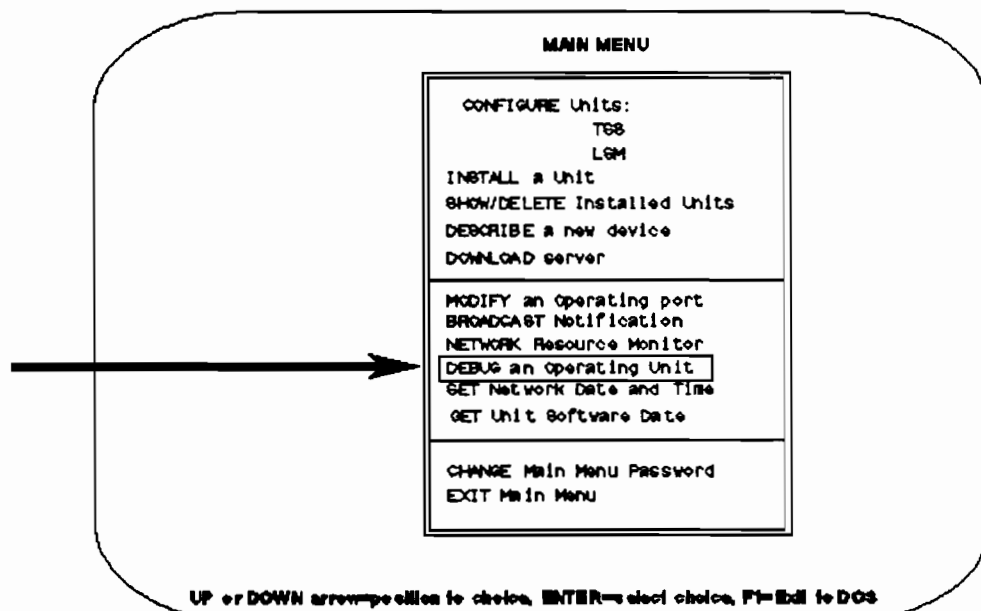
Note

It is not possible to save a file directly onto a floppy disk. It must be saved onto the hard disk (then you can use the DOS copy command to transfer it to a floppy).

We recommend the use of a parallel printer, rather than a serial one for printing screens in NRM. If you use a serial printer, use the DOS **MODE** command to configure it correctly.



DEBUG An Operating Unit



The Network Debugger is a Hewlett-Packard trouble-shooting tool, which enables a Hewlett-Packard Customer Engineer (CE) to monitor the operation of the HP AdvanceNet software while it is executing on a unit.

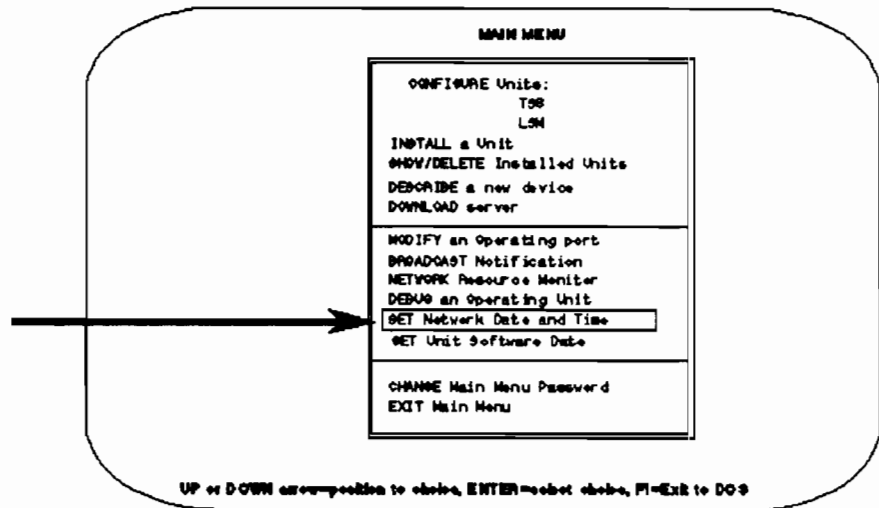
The debugger displays information about the status of the software and lets you alter the contents of the unit's memory.

Note

This option is not at present available for customers. It is documented in the HP Computer Based Training (CBT) Course for the HP TS8 and HP LSM, and in the *HP2350A LSM CE Handbook*.



SET Network Date and Time



The "SET Network Date and Time" function (from the HP LSM main menu) passes the current date and time from DOS to the PCLSM, which may then broadcast it to the network.

Note

Before running the "SET Network Date and Time" function make sure that the HP Vectra's date and time settings are correct (and change them if necessary).

To Set the Hardware Clock of the HP Vectra

The HP Vectra personal computers supported with this product all have battery powered hardware clocks. (Other computers may be equipped with add-on boards containing such clocks).

Set the date and time on the HP Vectra hardware clock by entering the commands **TIME** and **DATE** from DOS, then restart the computer by entering **CTRL****ALT****DEL**). This enables the prior date and time (updated to allow for time elapsed) to be reset. The new date and time settings will then be immediately and permanently effective.

The Role of the PCLSM

HP LSM does not broadcast the date and time directly to other computers. Rather, it passes them to the PCLSM. This then broadcasts the date and time continually, along with its other functions. These values are displayed at a terminal in the following form using the LIST-STATUS command:

It is hh:mm:ss on mm,dd,yyyy

Designating a Town Crier

In order to broadcast the date and time to the network segment, the PCLSM must be designated a "town crier."

Other units may also be designated town criers, but there is ordinarily no reason why they should be.

To designate a unit as a town crier, you must edit record #3 in its UCS file and set the town crier flag as follows:

- Bytes # 1, 2 and 3 are constant; their value is TC =
- Byte# 4 is the town crier flag. Its value must be set to Y (to designate it as a town crier) or N.
- Bytes # 5 and 6 are the CRLF, which is the usual indication that the record has ended.

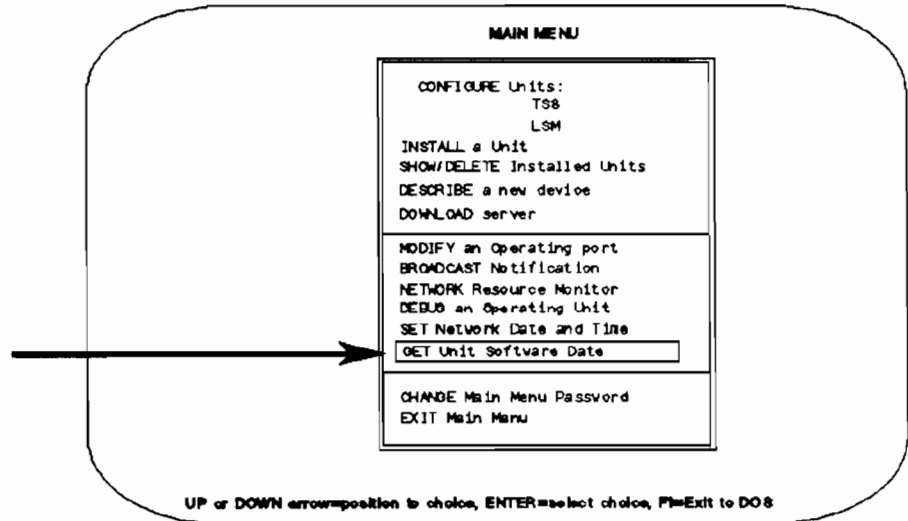
Appendix H contains more information about UCS file formats.

Note

Town criers operate only within a network (ie not across bridges/routers). Thus the date and time may not be the same for all networks on an internet.

If any records of the UCS file are modified in this way, the unit will have to be RE-INSTALLED, specifying the new UCS file in the UCS field. This is because a unit reads the contents of the UCS file at the time of installing the Unit (with the INSTALL A Unit option). If the UCS file is subsequently changed, the new parameters will not be effective, unless the unit is re-installed, and re-downloaded.

GET Unit Software Date



This option gets the date of the software and the EPROM revision number for PCLSM card and the HP TS8 units. This enables the Hewlett-Packard Customer Engineer to find out which software release you have installed.

Using the Menu Option

In **Unit Name** field you must specify the unit name of the HP TS8 or PCLSM from which you wish to get the software date.

HP LSM then displays the Software date (mm/dd/yy) and the following EPROM revision numbers:

- Even/Low Prom Revision : 0xXXnn
- Odd /High Prom Revision: 0xXXnn

Returning to HP LSM Main Menu

When the date and revision number has been displayed, you will be prompted to press any key. This will return you to the HP LSM main menu.

Using the DOS Command

The GET DATECODE option can also be invoked by entering one of the following MSDOS commands, from the C:\TCP directory:

= GETDATE -n *unitname*

where *unitname* is the name of the unit specified when it was installed

= GETDATE -# *unit number*

The same information is displayed as when using the menu option.

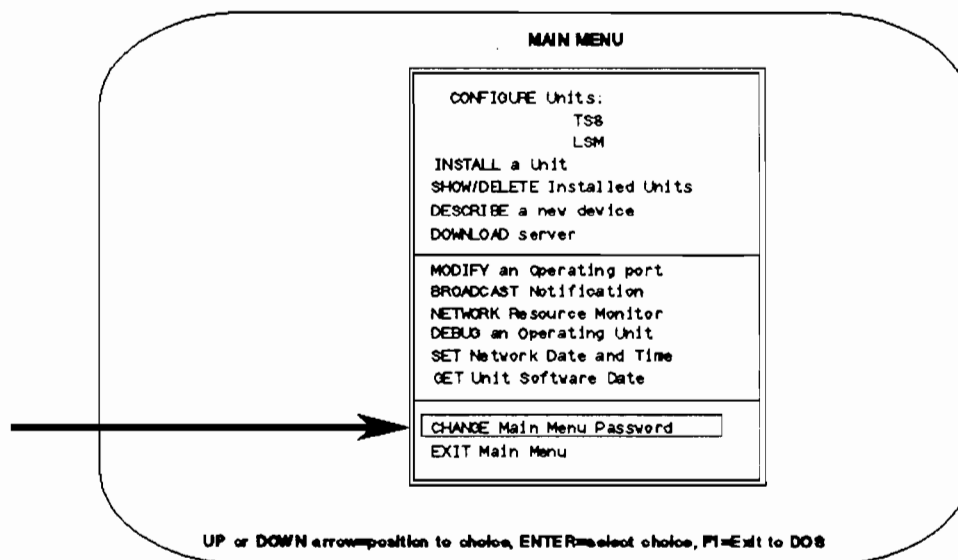
If you are not in the correct directory the following error message is displayed:

Error opening NIUNAMES file!

If you enter the unit name containing a blank space, you will see the error message:

Too Many Arguments.

CHANGE Main Menu Password



The "CHANGE Main Menu Password" function allows a network administrator to change HP LSM's password.

The initial password is **lsm** (note that it must be entered in **lower case** characters). We strongly recommend that you change it the first time you run the HP LSM program to prevent unauthorized access.

Changing the Password

"Change Main Menu Password" has one screen. It asks you to do three things:

1. Enter the old password
2. Enter the new password
3. Enter the new password again, to confirm it.

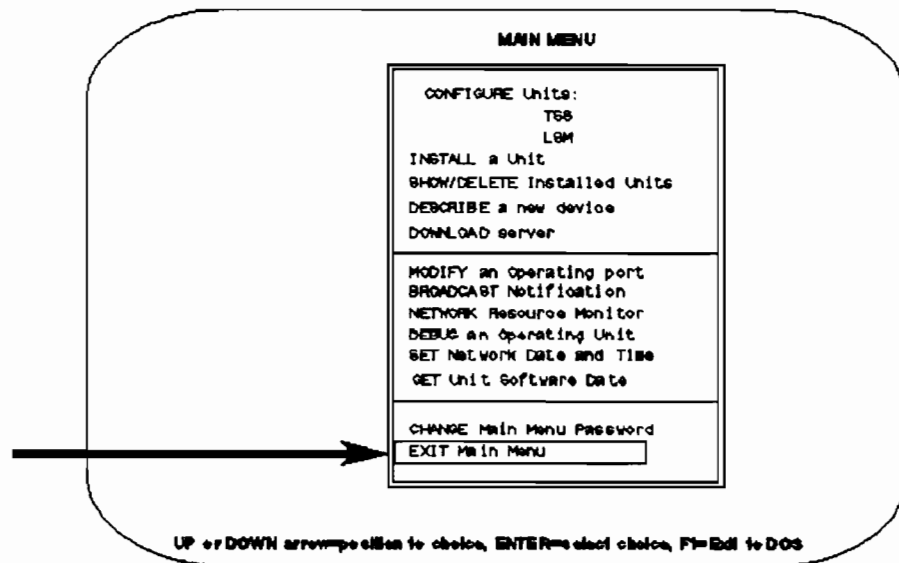
A password may have up to 8 characters, including letters, numbers, or symbols (eg '\$', '*', or '#'). It is case sensitive. The password cannot be left blank.

After the new password is verified, the password is changed. The function then returns to the HP LSM Main Menu.

Note

The password is encrypted in a file called PASSMM. If you keep a copy of the original PASSMM file on floppy disk, you can use this to overwrite subsequently created PASSMM files, if, for some reason the password is forgotten.

EXIT Main Menu



The "EXIT Main Menu" function terminates HP LSM and returns to MS-DOS.

You may also return to MS-DOS in the following ways:

- From the HP LSM Main Menu by pressing **[F1]** or **[CTRL] C**
- From "DOWNLOAD Server" function by pressing **[CTRL] C**
- From all functions by pressing **[CTRL] C** once or twice.

When you see the MS-DOS prompt, you may enter any MS-DOS command.



Configuration Worksheets

This appendix provides a worksheet to assist you with keeping a record of units configured and installed on your HP LSM.

We recommend that you photocopy the worksheet provided, and use one worksheet per unit.

CONFIGURATION WORKSHEET

Network ID
 Unit Type
 Unit Number

Physical location of Unit _____
 Unit Name
 IP Address

PORT NUMBER	DEVICE TYPE	COMMENTS (eg special device characteristics)	PORT IP ADDRESS (if any)	PORT NAMES	ROTOR Y/N
1				1	
				2	
				3	
				4	
2				1	
				2	
				3	
				4	
3				1	
				2	
				3	
				4	
4				1	
				2	
				3	
				4	
5				1	
				2	
				3	
				4	
6				1	
				2	
				3	
				4	
7				1	
				2	
				3	
				4	
8				1	
				2	
				3	
				4	

Quick Configuration Guide

Before you read this appendix, you should have installed the PCLSM card in your HP Vectra, and loaded the HP LSM software onto your hard disk. For information about loading software and installing the PCLSM card in your HP Vectra, refer to the *HP LSM HP2350A LOCAL SERVER MANAGER Installation Guide* (Part number 02350-90001).

This appendix describes the procedure for installing an HP TS8, and for configuring its ports using pre-defined configuration profiles (listed in Appendix C). It just lists the steps you should follow. The other chapters of this manual provide more detailed reference information on each option of the HP LSM Main Menu.

"Step-by-Step" Procedure

1. From MSDOS, enter the C:\TCP directory, under which the HP LSM software is installed.
2. Type LSM, from MSDOS, to run the HP LSM program.
3. Enter the program password. (This will be `lsm` [note lower case] until you change the password - see Chapter 15).
4. You will see the following menu.

MAIN MENU

CONFIGURE Units: TS8 LSM INSTALL a Unit SHOW/DELETE Installed Units DESCRIBE a new device DOWNLOAD server
MODIFY an Operating port BROADCAST Notification NETWORK Resource Monitor DEBUG an Operating Unit SET Network Date and Time GET Unit Software Date
CHANGE Main Menu Password EXIT Main Menu

UP or DOWN arrow=position to choice, ENTER=select choice, F1=Exit to DOS

To select a menu option, move the cursor using \uparrow or \downarrow until the option you want is highlighted, and press the **[Return]** key.

5. Select the **INSTALL A Unit** Option. The following screen will be displayed (Press the **[Return]** key to move from field to field):

The screenshot shows a terminal window titled "INSTALL A UNIT". At the top, it says "ENTER UNIT SERIAL NUMBER ([TR-] 1-7 decimal digits) F2=write unit info, ?=help, F1=main menu". Below this, there are five input fields, each with a callout label to its right: (i) points to "UNIT #:", (ii) points to "UNIT Name:", (iii) points to "UNIT Type:", (iv) points to "IP Address:", and (v) points to "UCS File:". Each field contains a blacked-out area representing user input.

- i. Enter the **UNIT #**. This is printed on a label located on the rear panel of the HP TS8 (see Fig 5-2, Chapter 5), and on the metal bracket (endplate) of the PCLSM.
- ii. Enter a **Unit Name**. This is a name that you assign to the unit (up to 20 characters long, containing no blank spaces).
- iii. Choose the correct **Unit Type** by pressing **[F9]**, to select TS8 (for a TS8) or LSM for a PCLSM.
- iv. Enter the **IP address** of the unit (assigned by your organisation).
- v. Leave the UCS file as **BANNER** unless you wish to:
 - a. Customise Command Interpreter prompts or messages
 - b. Designate unit as a broadcaster of date and time on network
 - c. send a "host goodbye string" to automatically disconnect host sessions after an abnormal disconnection.

If you want to do any of these things, you will need to copy the **BANNER.UCS** file to another filename (in DOS), edit it (see Appendix H), AND REINSTALL the unit with the new filename in the **UCS File** field.

- vi. Press **[F2]** to store the data. HP LSM then clears the screen, allowing you to install another unit.
- vii. To install a new unit, repeat steps (i) to (vii). If you do not want to install another unit, press **[F1]** to return to the HP LSM Main Menu.

6. This step enables you, if required, to create a device profile. For most devices, you may skip this step (go to step 7), as HP has created a number of pre-defined device profiles which you can use (see below). A detailed listing of each of these profiles is provided in Appendix C.

- **HPTERM:** for terminals, speed-sensing, TELNET enabled
- **PRINTER:** for printers operating at 9600 baud, 8 bit, no parity, binary mode not enabled, no modem signals.
- **MODEM:** for asynchronous modems, operating at 1200 baud, only DCD monitored.
- **HOSTEQAK:** for host configured for ENQ/ACK flow control, operating at 9600 bd, 8 bits, no parity, with modem signals (no modem present), and binary mode not enabled.
- **HOSTD1D3:** for host configured for XON/XOFF flow control, operating at 9600 bd, 8 bits, no parity, with modem signals (no modem present), and binary mode not enabled.
- **HOSTPR:** for host port in permanent connection to dedicated printer; operating at 9600vs, 8 bits, no parity, binary mode not enabled, no modem signals. **YOU WILL NEED TO CHANGE THE TARGETNAME FIELD.**

If, however, you wish to create a new device profile, select **Describe a New Device** from the HP LSM Main Menu.

Seven screens of fields will be displayed (use **[Pageup]** and **[Pagedn]** to move between them). All fields have default values which you may change using the **[F9]** and **[F10]** keys, or by entering a value at the keyboard. When you have finished creating your device profile, press the **[F2]** key to save the profile. Then press **[F1]** to return to the HP LSM Main Menu.

For more information on each of the fields in "Describe a New Device", refer to Chapter 7 of this manual.

7. Select **Configure a Unit** (either TS8 or LSM). You will see the following screen:

(ii) →

UNIT CONFIGURATION NAME: HPCLASS

TCP/IP INFORMATION

UNIT IP Address: [REDACTED]

Gateway IP Address: [REDACTED]

Name Server IP Address: [REDACTED]

Backup Name Server: [REDACTED]

Net/Subnet Mask: [REDACTED] & hex

Broadcast Addr Format: [REDACTED]

TCP Time Wait to Close: [REDACTED] (seconds) RARP [REDACTED]

Enter Unit Name
F2=write unit info, PgDn=go to next menu, ?=help, F1=main menu

- i. Enter **UNIT NAME** (defined in step 5 - Install a Unit)
- ii. The **Unit#** of the installed unit will be displayed.

(iii) →

UNIT CONFIGURATION NAME: HPCLASS

TCP/IP INFORMATION

UNIT IP Address: [REDACTED]

Gateway IP Address: [REDACTED]

Name Server IP Address: [REDACTED]

Backup Name Server: [REDACTED]

Net/Subnet Mask: [REDACTED] & hex

Broadcast Addr Format: [REDACTED]

TCP Time Wait to Close: [REDACTED] (seconds) RARP [REDACTED]

SIMILAR UNIT NAME [REDACTED]

Enter Similar Unit Name (press Enter if none)
F2=write unit info, PgDn=go to next menu, ?=help, F1=main menu

- iii. Enter **SIMILAR UNIT NAME** (prompt displayed only if configuring a **NEW** unit).

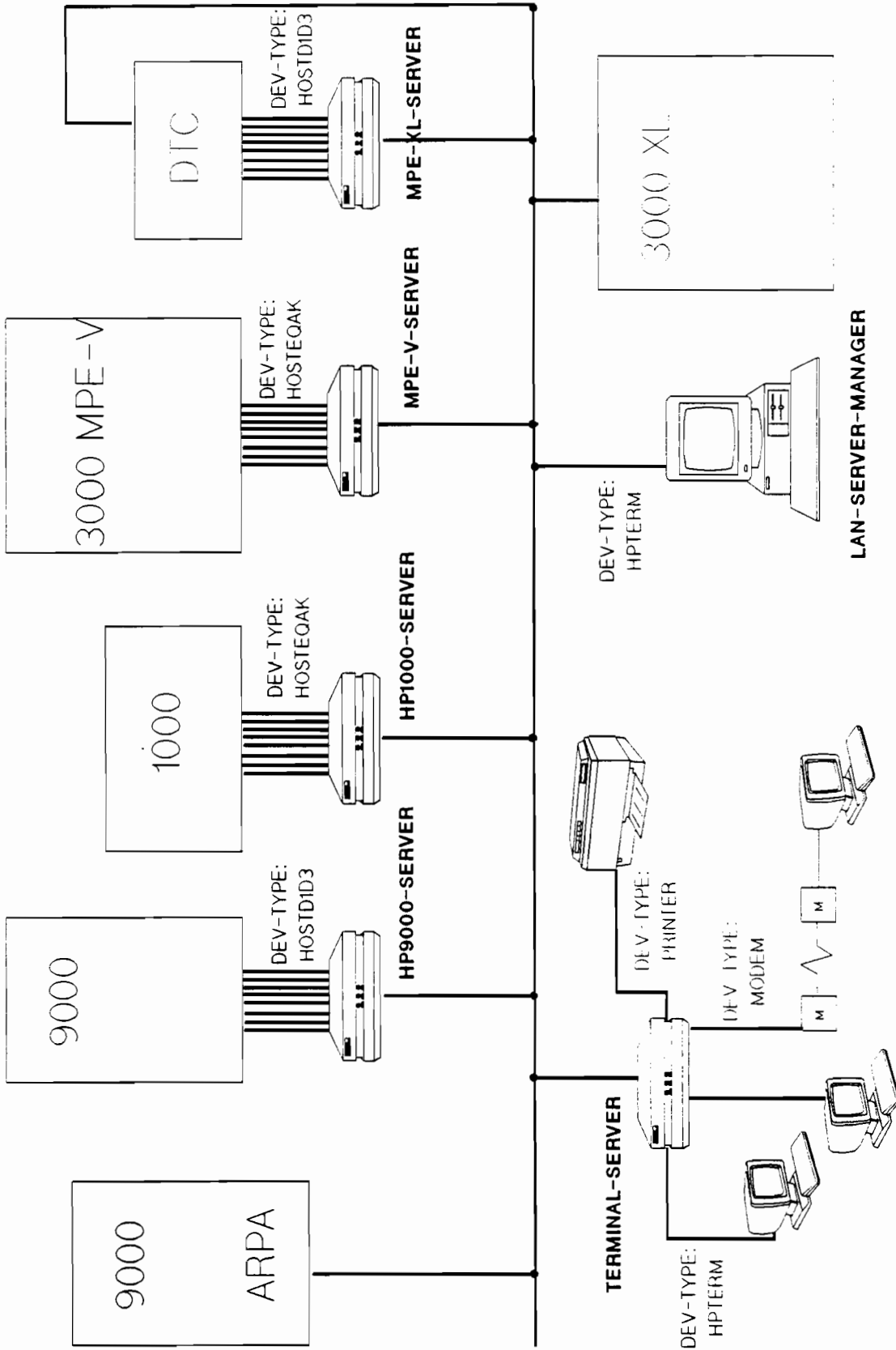
If you have already configured another HP TS8 unit, and wish to copy (and then modify) its configuration, enter its unit name in this field.

Alternatively, some "Similar Unit" Profiles which you can use are provided by HP. These are listed in Table B-1, and Figure B-1.

Table B-1: Similar Unit Profiles

To configure unit as aenter this name in the SIMILAR UNIT NAME field:	DEV-TYPE
LAN Server Manager	LAN-SERVER-MANAGER	HPTERM
Terminal server	TERMINAL-SERVER	HPTERM
HP 9000 Host Server (for back-to-back access)	HP9000-SERVER	HOSTD1D3
HP 1000 host server	HP1000-SERVER	HOSTEQAK
HP 3000 (MPE-V) host server	MPE-V-SERVER	HOSTEQAK
HP3000 (MPE-XL) host server (via DTC)	MPE-XL-SERVER	HOSTD1D3

Figure B-1: Similar Unit Profiles



This configures all ports of your unit with device profiles (pre-defined by you or supplied by HP - see step 7) to enable you to get your unit up and running with the minimum of configuration changes. See Table B-2 for summary of configuration information associated with each SIMILAR UNIT profile.

Table B-2: DEVTYPES associated with Unit profiles

SIMILAR UNIT Name	Unit Type	Unit #	IP Address assigned to ports	Number of Configured ports
Lan-Server-Manager	LSM	23420	10.1.1.01	1
Terminal -Server	TS8	23421	10.1.1.10	1 to 8
MPE-V-Server	TS8	23422	10.1.1.20	1 to 8
MPE-XL-Server	TS8	23423	10.1.1.30	1 to 8
HP9000-Server	TS8	23424	10.1.1.40	1 to 8
HP1000-Server	TS8	23425	10.1.1.50	1 to 8

(Note: If you do NOT want to configure a unit with a SIMILAR UNIT profile, you can leave this field blank and press **[Return]**. In this case, the prompt will disappear, and the remaining fields will be filled with default values or left blank.)

- 8.** The **Similar Unit** prompt will disappear, and some fields, such as the **Unit IP Address** will be filled in. These do not normally need to be altered.

Press the **[PageDn]** key for next screen:

UNIT CONFIGURATION NAME:

128951

(i) → PORT #: 1

DEV-TYPE

(ii) → NONE

(iii) → NAME2: NAME3: NAME4:

SPECIFIC PORT PARAMETERS 1

STATUS: ONLINE IP Address: 197.11.12.3 ← (iv)

NAME1: 128951A1 ROTOR? NO

NAME2: ROTOR? NO

NAME3: ROTOR? NO

NAME4: ROTOR? NO

Enter Port Number
F2=write unit F3=save port, display next. F6=modify port. ?=help. F1=main menu

- i. Press **[Return]** or enter new **PORT NUMBER**, (1-8 for an HP TS8, 1-2 for a PCLSM). **ALL PORTS TO WHICH A DEVICE IS TO BE ATTACHED MUST BE CONFIGURED**. If an HP defined similar unit profile was used, all prots will be identically configured, and will need to be modified.
- ii. Press **[F9]/[F10]** to change **DEV-TYPE** (if necessary). The **DEV-TYPE** is the name of the pre-defined device profile associated with a port.
- iii. Modify or enter additional Port Names, ie **Name1 to Name4**. These are the resource names which you will specify with the **CONNECT** command to establish a virtual circuit (in back-to-back).
- iv. Modify **IP address** of the port so that it is unique. (This field is initially filled with the IP address supplied by the Similar Unit profile). This is important if using Telnet.
- v. Modify other displayed parameters (if necessary), using **[PGUP]/[PGDN]** to move between the 9 screens. These screens are described in Chapter 7 of this manual. The fields you might need to modify will depend on the characteristics of the device connected to the port. Appendix D describes guidelines for doing this.
- vi. Press **[F3]** to save port information and select next port. Then repeat steps (i) to (iv) (if required)
- vii. Press **[F2]** to save configuration and write it to disk.
- viii. Press **[F1]** to return to HP LSM Main Menu.

9. Install and Configure other units (by repeating steps 5 to 8, above).

10. Select "Download Server" to download configuration software to units, which must be connected to LAN and powered on.



Standard Configuration Profiles

This appendix provides listings of the default device profiles supplied by HP. The use of these profiles is described in Appendix B (Quick Configuration Guide).

HPTERM

SERVICE CHARACTERISTICS				2
CMD/DATA:	BOTH	VC-INIT:	CI CI-CMDS: CUSTOM	
TARGET-NAME:		HEARTBEAT:	YES	
DEMAND-WAKEUP:		RETRY-TIME:	10 MAXVCS: 3	
ALLOW INCOMING CALLS:	WHEN-IN-VC?	NO	WHEN-IN-CMD?	NO
Command Interpreter Parameters				
WAKEUP:	<CR >	TIMEOUT:	0	

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3	
BAUD:	AUTO	INC-BAUD:	9600	LF-CR?	NO	DATA-BTS:	8
				PARITY:	NO		
DCE?	YES	DTE?	NO	DCE-SIGS:	A	DTE-SIGS:	
PAGE-UNIT CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:		
PAGE-DEV CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:		
STOP-CNT:	20	STOP:		LATENCY:	2	OPN-WAIT:	200
XTR-FLOW:	YES			CONTROL:	NO	MUL-XOFF:	NO

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
------------------------	--	--	--	--	--	---

IN-CIRCUIT PARAMETERS								4
DISC:	CHARS	DISC-SEQ:	<ESC>OP			SEND-BYE?	NO	
HOLD:	CHARS	HOLD-SEQ:	<ESC>OQ			SEQ-T/O:	0	
DLE:	<DLE>	RCV-BREAKS?	YES			BRK-TIME:	250	
ECHO-CHARS?	LOCAL	IDLE-T/O:	0	NVT?	YES	OUT-TIME:	5	
BIN-MODE?	NO	SPCL-MODES?	NONE	LF?	NO	HOST-ECHO?	NO	

TELNET CONTROL CHARACTERS

5

NOP (No Operation)	<SO >	SYNCH (Data Mark)	<SYN>
BRK (Break)	<NUL>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI >	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS >	EL (Erase Line)	<CAN>
GA (Go Ahead)	<EOT>		

TELNET CONTROL CHARACTERS

5

PASSWORD OPTIONS

6

LOGIN-TYPE: NONE LOGIN-TRIES:
 PORT-PASSWD:
 FAIL-ACTION: WAIT-TIME:

TELNET CONTROL CHARACTERS

5

PASSWORD OPTIONS

6

PERMITTED COMMANDS

7

CONNECT? YES	DISCONNECT? YES	RECALL? YES
GET? YES	QUIT? YES	SET-BIN? YES
SET-FLOW? YES	LIST-STATUS? YES	TELNET? YES
	LOGOUT? YES	

UNSOLICITED MESSAGES

8

ACCEPT BROADCASTS? YES	WHEN-IDLE? NO
ACCEPT MULTICASTS? NO	WHEN-LOGGING-IN? YES
MULTICAST-ID:	WHEN-IN-CIRCUIT? YES
Allow In-Circuit Notifications upon:	
GET-COMPLETION? NO	INCOMING-CALL? NO

HOSTEQAK

SERVICE CHARACTERISTICS				2
CMD/DATA:	DATA	VC-INIT:	CI-CMDS:	
TARGET-NAME:		HEARTBEAT:	YES	
DEMAND-WAKEUP:		RETRY-TIME:	MAXVCS:	1
ALLOW INCOMING CALLS:	WHEN-IN-VC?	NO	WHEN-IN-CMD?	
Command Interpreter Parameters				
WAKEUP:		TIMEOUT:		

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
BAUD:	9600	INC-BAUD:	LF-CR?	NO	DATA-BTS:	8
			PARITY:	NO		
DCE?	YES	DTE?	NO	DCE-SIGS:	C	DTE-SIGS:
PACE-UNIT	NO	XON:	XOFF:	RS232:		
PACE-DEV	ENQAK	XON:	XOFF:	RS232:		
STOP-CNT:	80	STOP:	LATENCY:	2	OPN-WAIT:	200
XTR-FLOW:		CONTROL:	NO	MUL-XOFF:		

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
------------------------	--	--	--	--	--	---

IN-CIRCUIT PARAMETERS							4
DISC:	NO	DISC-SEQ:		SEND-BYE?		NO	
HOLD:	NO	HOLD-SEQ:		SEQ-T/O:		0	
DLE:	<DLE>	RCV-BREAKS?	YES	BRK-TIME:		250	
ECHO-CHARS?	OFF	IDLE-T/O:	0	NVT?	YES	OUT-TIME:	5
BIN-MODE?	NO	SPCL-MODES?	NONE	LF?	NO	HOST-ECHO?	YES

TELNET CONTROL CHARACTERS

5

NOP (No Operation)	<SO >	SYNCH (Data Mark)	<SYN>
BRK (Break)	<NUL>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI >	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS >	EL (Erase Line)	<CAN>
GA (Go Ahead)	<EOT>		

UNSOLICITED MESSAGES

8

ACCEPT BROADCASTS?	NO	WHEN-IDLE?	NO
ACCEPT MULTICASTS?	NO	WHEN-LOGGING-IN?	
MULTICAST-ID:		WHEN-IN-CIRCUIT?	NO
Allow In-Circuit Notifications upon:			
GET-COMPLETION?		INCOMING-CALL?	NO

HOSTD1D3

SERVICE CHARACTERISTICS				2
CMD/DATA:	DATA	VC-INIT:	CI-CMDS:	
TARGET-NAME:			HEARTBEAT:	YES
DEMAND-WAKEUP:		RETRY-TIME:	MAXVCS:	1
ALLOW INCOMING CALLS:	WHEN-IN-VC?	NO	WHEN-IN-CMD?	
Command Interpreter Parameters				
WAKEUP:		TIMEOUT:		

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
BAUD:	9600	INC-BAUD:	LF-CR?	NO	DATA-BTS:	8
			PARITY:	NO		
DCE?	YES	DTE?	NO	DCE-SIGS:	C	DTE-SIGS:
PACE-UNIT CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
PACE-DEV CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
STOP-CNT:	20	STOP:	LATENCY:	2	OPN-WAIT:	200
XTR-FLOW:	YES		CONTROL:	NO	MUL-XOFF:	NO

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
------------------------	--	--	--	--	--	---

IN-CIRCUIT PARAMETERS							4
DISC:	NO	DISC-SEQ:		SEND-BYE?		NO	
HOLD:	NO	HOLD-SEQ:		SEQ-T/O:		0	
DLE:	<DLE>	RCV-BREAKS?	YES	BRK-TIME:		250	
ECHO-CHARS?	OFF	IDLE-T/O:	0	NVT?	YES	OUT-TIME:	5
BIN-MODE?	NO	SPCL-MODES?	NONE	LF?	NO	HOST-ECHO?	YES

TELNET CONTROL CHARACTERS

5

NOP (No Operation)	<SO >	SYNCH (Data Mark)	<SYN>
BRK (Break)	<NUL>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI >	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS >	EL (Erase Line)	<CAN>
GA (Go Ahead)	<EOT>		

UNSOLICITED MESSAGES

8

ACCEPT BROADCASTS?	NO	WHEN-IDLE?	NO
ACCEPT MULTICASTS?	NO	WHEN-LOGGING-IN?	
MULTICAST-ID:		WHEN-IN-CIRCUIT?	NO
Allow In-Circuit Notifications upon:			
GET-COMPLETION?		INCOMING-CALL?	NO

PRINTER

SERVICE CHARACTERISTICS				2
CMD/DATA:	DATA	VC-INIT:	CI-CMDS:	
TARGET-NAME:		HEARTBEAT:	YES	
DEMAND-WAKEUP:		RETRY-TIME:	MAXVCS:	1
ALLOW INCOMING CALLS:	WHEN-IN-VC?	NO	WHEN-IN-CMD?	
Command Interpreter Parameters				
WAKEUP:		TIMEOUT:		

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS				3		
BAUD:	9600	INC-BAUD:	LF-CR?	NO	DATA-BTS:	8
			PARITY:	NO		
DCE?	YES	DTE?	NO	DCE-SIGS:	A	DTE-SIGS:
PACE-UNIT CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
PACE-DEV CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
STOP-CNT:	20	STOP:	LATENCY:	2	OPN-WAIT:	200
XTR-FLOW:	YES		CONTROL:	NO	MUL-XOFF:	NO

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS				3
------------------------	--	--	--	---

IN-CIRCUIT PARAMETERS				4			
DISC:	NO	DISC-SEQ:	SEND-BYE?	NO			
HOLD:	NO	HOLD-SEQ:	SEQ-T/O:	0			
DLE:	<DLE>	RCV-BREAKS?	YES	BRK-TIME:	250		
ECHO-CHARS?	OFF	IDLE-T/O:	0	NVT?	NO	OUT-TIME:	5
BIN-MODE?	NO	SPCL-MODES?	NONE	LF?	NO	HOST-ECHO?	NO

TELNET CONTROL CHARACTERS

5

NOP (No Operation)	<SO >	SYNCH (Data Mark)	<SYN>
BRK (Break)	<NUL>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI >	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS >	EL (Erase Line)	<CAN>
GA (Go Ahead)	<EOT>		

UNSOLICITED MESSAGES

8

ACCEPT BROADCASTS?	NO	WHEN-IDLE?	NO
ACCEPT MULTICASTS?	NO	WHEN-LOGGING-IN?	
MULTICAST-ID:		WHEN-IN-CIRCUIT?	NO
Allow In-Circuit Notifications upon:			
GET-COMPLETION?		INCOMING-CALL?	NO

HOSTPR

SERVICE CHARACTERISTICS				2
CMD/DATA:	CMD	VC-INIT:	PERM CI-CMDS:	
TARGET-NAME:	PRINTER		HEARTBEAT:	YES
DEMAND-WAKEUP:		RETRY-TIME:	10	MAXVCS: 1
ALLOW INCOMING CALLS:		WHEN-IN-VC?		WHEN-IN-CMD?
Command Interpreter Parameters				
WAKEUP:		TIMEOUT:		0

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
BAUD:	9600	INC-BAUD:	LF-CR?	NO	DATA-BTS:	8
			PARITY:	NO		
DCE?	YES	DTE?	NO	DCE-SIGS:	A	DTE-SIGS:
PACE-UNIT CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
PACE-DEV CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
STOP-CNT:	20	STOP:	LATENCY:	2	OPN-WAIT:	200
XTR-FLOW:	YES		CONTROL:	NO	MUL-XOFF:	NO

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
------------------------	--	--	--	--	--	---

IN-CIRCUIT PARAMETERS							4
DISC:	NO	DISC-SEQ:		SEND-BYE?		NO	
HOLD:	NO	HOLD-SEQ:		SEQ-T/O:		0	
DLE:	<DLE>	RCV-BREAKS?	YES	BRK-TIME:		250	
ECHO-CHARS?	OFF	IDLE-T/O:	0	NVT?	NO	OUT-TIME: 5	
BIN-MODE?	NO	SPCL-MODES?	NONE	LF?	NO	HOST-ECHO? NO	

TELNET CONTROL CHARACTERS

5

NOP (No Operation)	<SO >	SYNCH (Data Mark)	<SYN>
BRK (Break)	<NUL>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI >	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS >	EL (Erase Line)	<CAN>
GA (Go Ahead)	<EOT>		

UNSOLICITED MESSAGES

8

ACCEPT BROADCASTS?	NO	WHEN-IDLE?	NO
ACCEPT MULTICASTS?	NO	WHEN-LOGGING-IN?	
MULTICAST-ID:		WHEN-IN-CIRCUIT?	NO
Allow In-Circuit Notifications upon:			
GET-COMPLETION?		INCOMING-CALL?	

MODEM

SERVICE CHARACTERISTICS				2
CMD/DATA:	BOTH	VC-INIT:	CI CI-CMDS: CUSTOM	
TARGET-NAME:		HEARTBEAT:	YES	
DEMAND-WAKEUP:		RETRY-TIME:	10 MAXVCS: 3	
ALLOW INCOMING CALLS:	WHEN-IN-VC?	NO	WHEN-IN-CMD?	NO
Command Interpreter Parameters				
WAKEUP:	<CR >	TIMEOUT:	0	

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
BAUD:	1200	INC-BAUD:	LF-CR?	NO	DATA-BTS:	8
			PARITY:	NO		
DCE?	NO	DTE?	YES	DCE-SIGS:	DTE-SIGS:	G
PACE-UNIT CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
PACE-DEV CHARS	XON:	<DC1>	XOFF:	<DC3>	RS232:	
STOP-CNT:	20	STOP:	LATENCY:	2	OPN-WAIT:	200
XTR-FLOW:	YES		CONTROL:	NO	MUL-XOFF:	NO

SERVICE CHARACTERISTICS				2
-------------------------	--	--	--	---

DEVICE CHARACTERISTICS						3
------------------------	--	--	--	--	--	---

IN-CIRCUIT PARAMETERS							4
DISC:	CHARS	DISC-SEQ:	<ESC>OP		SEND-BYE?	NO	
HOLD:	CHARS	HOLD-SEQ:	<ESC>OQ		SEQ-T/O:	0	
DLE:	<DLE>	RCV-BREAKS?	YES		BRK-TIME:	250	
ECHO-CHARS?	LOCAL	IDLE-T/O:	0	NVT?	YES	OUT-TIME:	5
BIN-MODE?	NO	SPCL-MODES?	NONE	LF?	NO	HOST-ECHO?	NO

TELNET CONTROL CHARACTERS

5

NOP (No Operation)	<SO >	SYNCH (Data Mark)	<SYN>
BRK (Break)	<NUL>	IP (Interrupt Process)	<ETX>
AO (Abort Output)	<SI >	AYT (Are You There)	<BEL>
EC (Erase Character)	<BS >	EL (Erase Line)	<CAN>
GA (Go Ahead)	<EOT>		

TELNET CONTROL CHARACTERS

5

PASSWORD OPTIONS

6

LOGIN-TYPE: NONE LOGIN-TRIES:
 PORT-PASSWD:
 FAIL-ACTION: WAIT-TIME:

TELNET CONTROL CHARACTERS

5

PASSWORD OPTIONS

6

PERMITTED COMMANDS

7

CONNECT? YES	DISCONNECT? YES	RECALL? YES
GET? YES	QUIT? YES	SET-BIN? YES
SET-FLOW? YES	LIST-STATUS? YES	TELNET? YES
	LOGOUT? YES	

UNSOLICITED MESSAGES

8

ACCEPT BROADCASTS? YES	WHEN-IDLE? NO
ACCEPT MULTICASTS? NO	WHEN-LOGGING-IN? YES
MULTICAST-ID:	WHEN-IN-CIRCUIT? YES
Allow In-Circuit Notifications upon:	
GET-COMPLETION? NO	INCOMING-CALL? NO



Device Configuration

This appendix describes guidelines for modifying the DEV-TYPE profiles (listed in Appendix C), highlighting the most important fields that will require attention, and possible alteration.

It is organised into sections according to the type of device that you wish to connect to the HP TS8 port.

For each of the devices listed, it describes:

- the most appropriate DEV-TYPE profile. This is entered in the 1st "Configure Units" Screen on a port-by-port basis.
- the fields displayed in "Configure Units" or "Describe a New Device" that are most likely to require checking or modifying for a particular type of device. Fields other than those listed here can - of course - also be modified. Full descriptions of all fields are given in Chapters 4 and 7. This appendix simply highlights the most important fields to change for a given type of device, to enable you to configure a device quickly.

Configuring a TERMINAL

DEV-TYPE: If connecting a terminal to an HP TS8 port, enter **HPTERM** in the DEV-TYPE field.

The HPTERM Profile allows multi-sessions (3 virtual circuits), and TELNET (direct access) capability. A full listing of this profile is given in Appendix C.

Note that "multi-session" means that several virtual circuits can be established, but only ONE may be active at a given time. (The others must be on hold).

Important Fields: **CMD/DATA**

If you do not want the device to be called (ie to accept connection request), change this field to CMD. If you do want the device to be called, set this field to BOTH or DATA, and change the Allow Incoming Calls field (in a later screen) to YES.

VCINIT

If dedicated connection is required, change this field to DEMAND, and enter the destination HP TS8 portname in the TARGETNAME field and assign a value to the DEMAND WAKEUP field.

MAXVCS

If "multi-session" capability is not required, change this field to 1.

BAUD

If speed-sensing is not required, change this field to a fixed baud rate.

PARITY

If your application requires parity-checking, change this field.

DATABITS

If your application requires fewer databits than 8, change this field.

DCESIGS

If modem signals are required, change this field to C.

DTE

If a modem is present, change DCE to NO, and DTE to YES, then set DTESIGS field to F or G. Note also that a special HP TS8 modem cable is needed (HP40231A) if DTE is set to YES (See *HP 2342 TS8 Installation & Operation Guide* (p/n 02342-90001) for more details on cables.)

XTR-FLOW

Change this field to NO if you do not want to allow the transmission of extra characters to the network after an XOFF. (If set to NO, flow control on REMOTE HP TS8 is not possible). See Chapter 7 for more information about this field.

DISC-SEQ/HOLD-SEQ

This profile provides a Disconnect sequence of [ESC]OP, and a Hold sequence of [ESC]OQ. Change these if required (rules for legal sequences are given in Appendix G). For example, UNIX users may wish to change the disconnect sequence to [CTRL]D (< EOT >).

LOGIN TYPE/PORT PASSWORD

This profile has no port access security set. Change **Login Type** to port and assign a password if required.

TELNET

Telnet (direct access) is enabled by this profile. Change this field to NO if not required (this will then allow access to back-to-back connections only).

CONNECT

To allow access via Telnet only (not back-to-back), set this field to NO, and leave TELNET set to YES.

Configuring a MODEM

DEV-TYPE

If connecting a modem to an HP TS8 port, enter **MODEM** in the DEV-TYPE field.

The MODEM Profile allows multi-sessions (3 virtual circuits), operates at 1200 baud and monitors only DCD modem signals. It is suitable for a modem connecting to a terminal. A full listing of this profile is given in Appendix C.

Important Fields

CMD/DATA

If you do not want the device to be called (ie to accept connection request), change this field to **CMD**. If you do want the device to be called, set this field to **BOTH** or **DATA**, and change the **Allow Incoming Calls** field (in a later screen) to **YES**.

If the modem is connected to a host (rather than a terminal), change the **CMD/DATA** field to **DATA**. If **CMD/DATA** field is set to **DATA**, you must set **DISC** and **HOLD** fields to **NO**.

VCINIT

If dedicated connection is required, change this field to **DEMAND**, and enter the destination HP TS8 portname in the **TARGETNAME** field and assign a value to the **DEMAND WAKEUP** field.

MAXVCS

If "multi-session" capability is not required, (eg if modem is connected to a host rather than a terminal) change this field to 1.

BAUD

If the modem operates at a different baud rate, modify this field.

PARITY

If your application requires parity-checking, change this field.

DATABITS

If your application requires fewer databits than 8, change this field.

DTESIGS

Depending on the type of modem used, you may need to change DTESIGS to C, D, E or F. Consult Appendix F for more information. Note also that a special HP TS8 modem cable (HP40231A) is needed if DTE is set to YES (See *HP 2342 TS8 Installation & Operation Guide* (p/n 02342-90001) for more details on cables.)

XTR-FLOW

Change this field to NO if you do NOT want to permit the transmission of extra characters to the network after an XOFF. (If set to NO, flow control on REMOTE HP TS8 is not possible). See Chapter 7 for more information about this field.

DISC-SEQ/HOLD-SEQ

This profile provides a Disconnect sequence of [ESC]OP, and a Hold sequence of [ESC]OQ. Change these if required (rules for legal sequences are given in Appendix G). For example, UNIX users may wish to change the disconnect sequence to [CTRL]D (<EOT>).

LOGIN TYPE/PORT PASSWORD

This profile has no port access security set. Change **Login Type** to port and assign a password if required.

TELNET

Telnet (direct access) is enabled by this profile. Change this field to NO if required, and allow access only to back-to-back connections.

CONNECT

To allow access only via Telnet (not back-to-back), set this field to NO, and leave TELNET set to YES.

Configuring a PRINTER

DEV-TYPE

If connecting a printer to an HP TS8 port, enter **PRINTER** in the DEV-TYPE field.

The **PRINTER** profile sets up a data connection (receives but does not initiate connection request), for a 9600 baud device, without modem signals, and without Disconnect and Hold Sequences. A full listing of this profile is given in Appendix C.

In back-to-back connections, a printer must be configured as a "dedicated" resource: it cannot be shared by several host systems. A host port that will send data to the printer must therefore be configured for a permanent connection towards a unique TARGETNAME, the portname of its target printer. Therefore, a DEV-TYPE profile called **HOSTPR** has been created for the host side of the permanent connection. See Figure D-1.

In direct access (TELNET) connections, a printer can be shared by several HP9000s (or other TELNET hosts, but not by other back-to-back hosts).

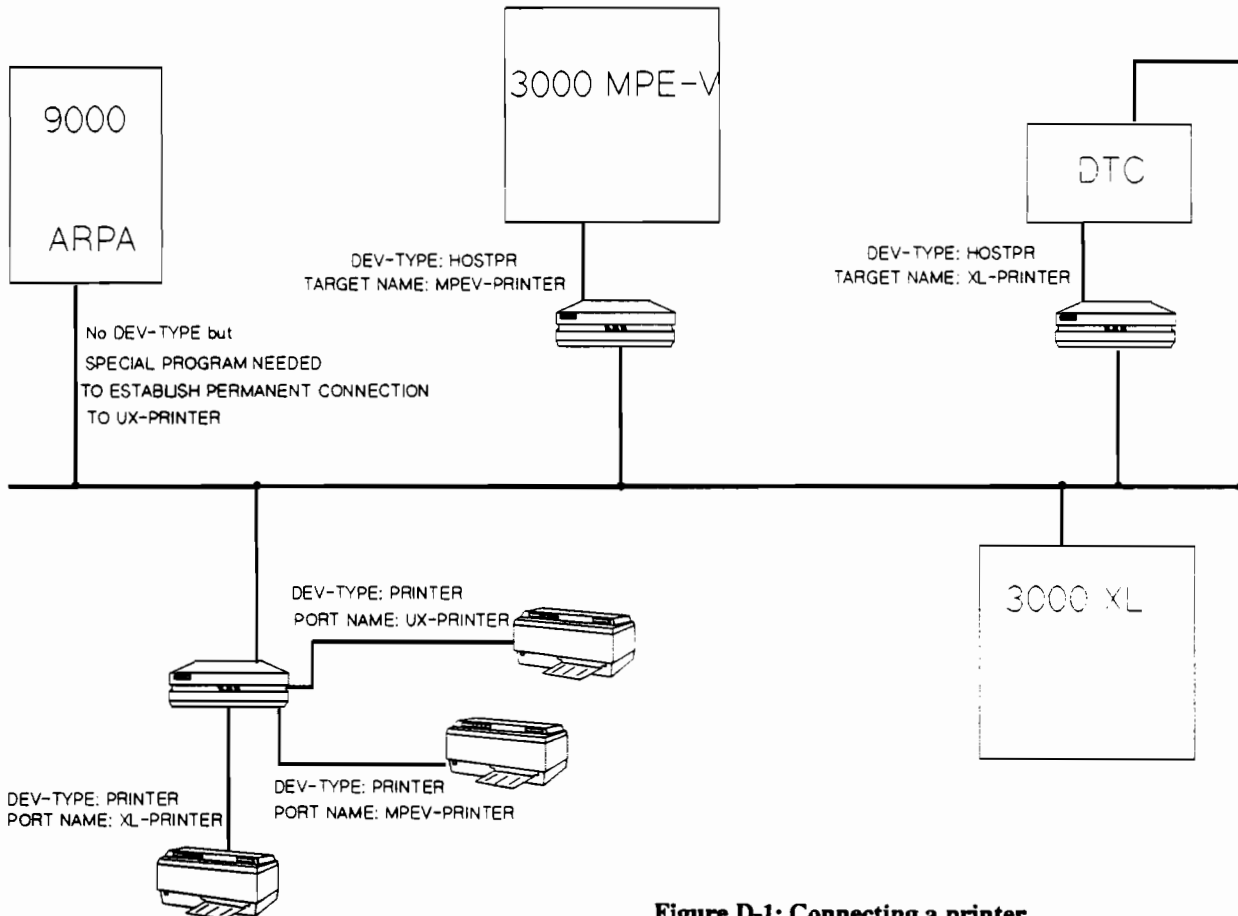


Figure D-1: Connecting a printer

Note

To access a printer from a host that is connected to the LAN in direct access (via TELNET), a special program must be run on the host to allow addressing. See HP 9000 Host Section, later in this chapter, for details.

Important Fields**BAUD/DATABITS**

These are device-dependent parameters. Check your printer's hardware configuration and documentation to set these fields correctly.

DCESIGS

If modem signals are required, change this field to DCESIGS = C.

Flow Control

If you are using Flow control other than XON-XOFF, modify this field accordingly.

XTR-FLOW

Change this field to NO if you do NOT want to permit the transmission of extra characters to the network after an XOFF. (If set to NO, flow control on REMOTE HP TS8 is not possible). See Chapter 7 for more information about this field.

Configuring a PCLSM (LAN Server Manager)

DEV-TYPE If configuring the PCLSM card, enter **HPTERM** in the DEV-TYPE field.

The HPTERM profile is suitable for operation at 9600 bps, without modem signals, 8 bits and no parity.

This profile will not normally need to be changed to configure a LAN Server Manager.

Configuring an HP 3000 MPE-V Host

PRINTER Connection:

DEV-TYPE **HOSTPR**

If connecting a host port that will establish a printer connection, enter **HOSTPR** in the DEV-TYPE field.

The **HOSTPR** profile configures a port for operation at 9600 bd, without modem signals, and for a single permanent virtual circuit to another port with resource name *PRINTER*. (This will need to be modified to a unique resource name, since printers must be configured as "dedicated" resources, and cannot be shared by several host systems. A host port that will send data to the printer must therefore be configured for a permanent connection towards a unique TARGETNAME, the portname of its target printer. See Figure D-1.

XON-XOFF Flow control is configured.

Other ports:

DEV-TYPE **HOSTEQAK**

If connecting other host ports, enter **HOSTEQAK**.

The **HOSTEQAK** profile configures a port for operation at 9600 bd, with modem signals (no modem present), for a single virtual circuit (received, not initiated), using ENO/ACK flow control. No disconnect and hold sequences are configured.

The fields described below refer to the **HOSTEQAK** profile (not **HOSTPR**). A listing of these DEV-TYPE profiles is given in Appendix C.

Important Fields

BAUD

This value may be altered, but we recommend that you configure a fixed value (not "auto"-baud).

CMD/DATA

If you have an application that requires the host to initialize the connection, change this field to **BOTH**.

DCE/DCESIGS

If modem signals are not required, change DCESIGS field to A.

If a modem is to be attached, change DCE to NO, and DTE to YES. Then set DTESIGS field to F or G. You will also have to connect an HP TS8 Modem Cable (HP40231A) to the HP TS8 port.

STOP-CNT

Leave this field set at 80 for ENQ-ACK flow control.

Configuring an HP 3000 MPE-XL Host

PRINTER Connection DEV-TYPE

If connecting a host port that will establish a printer connection, enter **HOSTPR** in the DEV-TYPE field.

The **HOSTPR** profile configures a port for operation at 9600 bd, without modem signals, and for a single permanent virtual circuit to another port with resource name *PRINTER*. This will need to be modified to a unique resource name, since printers must be configured as "dedicated" resources, and cannot be shared by several host systems. A host port that will send data to the printer must therefore be configured for a permanent connection towards a unique TARGETNAME, the portname of its target printer. See Figure D-1. XON-XOFF Flow control is configured.

Other ports: DEV-TYPE

If connecting other host ports, enter **HOSTD1D3**. The **HOSTD1D3** profile configures a port for operation at 9600 bd, with modem signals (no modem present), for a single virtual circuit (received, not established), using XON/XOFF flow control. No disconnect and hold sequences are configured.

The fields described below refer to the **HOSTD1D3** profile (not **HOSTPR**). A listing of these profiles is given in Appendix C.

Important Fields

BAUD

This value may be altered, but we recommend that you configure a fixed value (not "auto"-baud).

CMD/DATA

If you have an application that requires the host to initialize the connection, change this field to **BOTH**.

DCE/DCESIGS

If modem signals are not required, change DCESIGS field to **A**.

If a modem is to be attached, change DCE to **NO**, and DTE to **YES**. Then set DTESIGS field to **F** or **G**. You must also attach an HP TS8 Modem Cable (HP40231) to the HP TS8 port.

Configuring an HP 9000 Host: Direct Access (TELNET)

In direct access, the HP 9000 host is not connected to an HP TS8, so there is no DEV-TYPE profile. To establish a connection from a terminal to a TELNET host, the OPEN command is used, with the host's IP address.

To establish a connection to a printer from a TELNET host, the Unix LP command is used, but a special program must be installed and run on the host (see below for description).

The printer can be shared between HP9000 systems, but not shared by other non-TELNET hosts (eg HP3000).

Printer configuration can be done using the **PRINTER DEV-TYPE** profile (see earlier section in this appendix)

The method of distribution, and the procedure for installing the printer access program is described in a file called UXPRINT.DOC. This will be in the C:\TCP directory, and can be printed or typed from DOS.

Direct Access Printer Program Features

The printer access program supports the following UNIX features:

- spool access
- classes
- lp and lpadmin commands
- status and error message logging
- user access to model script
- automatic disabling of printer in case of printer problem
- file protection checking

Configuring an HP 9000 Host (for Back-to-Back)

Same as for HP 3000 MPE-XL Host.

Configuring an HP 1000 Host

Same as for HP 3000 MPE-V Host.



Files and Directories

About the Tables

Table E-1, "Subdirectories" describes the subdirectories created on your fixed disk in the course of the installation process.

Table E-2, "Data Files Created or Modified by HP LSM" describes the data files that are placed in \TCP and its subdirectories when HP LSM is installed.

Table E-3, "Help Files for HP LSM functions" lists the help files that are placed in \TCP and its subdirectories when HP LSM is installed.

Table E-4, "Other HP LSM Files," describes other files (eg program files) that are placed in \TCP and its subdirectories when HP LSM is installed.

Table E-5, "Terminal-Host Services Files" describes the files that are placed in all of the directories when the Terminal-Host Services product is installed.

Each table lists files in alphabetic order by filename extension, then by filename. As in wildcard notation, "*" means "any character or characters" and "?" means "any single character."



Table E-1 Subdirectories

Subdirectory Name	Description
\TCP	Contains the HPAdvanceNet software. The name \TCP is only a convention; any subdirectory may be used.
\TCP\DEV	Contains generic device descriptions (in files of type .DEV) generated by the "DESCRIBE A New Device" function.
\TCP\EXPTABLE	Contains expansion tables that translate entries in an LS file into lists of names of files to be downloaded to the HP TS8
\TCP\LC0 to LC9	Contain load characteristic (LC) files that specify the operating parameters and other characteristics of units. The files themselves are downloaded to the units. These directories are created by HP LSM as needed; you do not need to create them. The last digit is the last digit of the unit number. For example the LC file for an HP TS8 whose unit number is 54326 would be stored in directory \TCP\LC6.
\TCP\LOADERS	Contains loaders (LDR17) which are downloaded to units, and which manage reception of the downloaded operating software.
\TCP\LS0 to LS9	Contain load specification (LS) files that specify what software to download to each unit. These directories are created by unit as needed; you do not need to create them. The last digit is the last digit of the unit number. For example the LS file for an HP TS8 whose unit number is 54326 would be stored in directory \TCP\LS6. See below for an example of an LS File listing.

Example of LS File Listing

#54901 &A \$0 TERM180 G1* \$1 TEST180

Table E-2. Data Files Created or Modified by HP LSM

File Name	Description
<hr/> \TCP\NIUNAMES	Information about units that have been defined with "INSTALL A Unit." Information from this file is displayed with "SHOW/DELETE Installed units" (see Chapter 6).
<hr/> \TCP*.DEV	Generic device descriptions created by the "DESCRIBE A New Device" function.
<hr/> \TCP\LCn*.LC	Load Characteristic (LC) files containing operating parameters for units.
<hr/> \TCP\LSn*.LS	Load Specification (LS) files identifying the HP TS8 software to be downloaded to units.

Table E-3 . Help files for HP LSM functions

File Name	Description
BRO.HLP	Help files for "BROADCAST A Message" function.
DBG.HLP	Help files for "DEBUG An Operating Unit" function.
FIG.HLP	Help files for "CONFIGURE A TS8" function.
FIGPC.HLP	Help files for "CONFIGURE A PCLSM" function.
GEN.HLP	Help files for "DESCRIBE A New Device" function.
INS.HLP	Help files for "INSTALL A Unit" function.
MOD.HLP	Help files for "MODIFY An Operating Port" function.
SHOWNIUS.HLP	Help files for "SHOW/DELETE Installed Units" function.

Table E-4. Other HP LSM Files

File Name	Description
*.BCI	Screen definitions for HP LSM.
BANNER.UCS	Standard UCS file.
BROAD.EXE	Implements the "BROADCAST Notification" function.
CHGPASS.EXE	Implements the "CHANGE Main Menu Password" function.
CONFIG.EXE	Implements the "CONFIGURE A Unit" function.
DBG.EXE	Implements the "DEBUG An Operating Unit" function.
DLS.EXE	Implements the "DOWNLOAD Server" function.
DUMPLC.EXE	Command to copy configuration parameters to a files. (Useful for HP Customer Engineer to analyse customer configuration problems). This program is documented in the <i>HP2350A LSM CE Handbook</i> , and in the HP LSM Computer Based Training.
GENERIC.EXE	Implements the "DESCRIBE A New Device" function.
LOADNIU.EXE	Command to download PCLSM/ex software
INSTALL.EXE	Implements the "INSTALL A Unit" function.
LSM.EXE	Implements the HP LSM main menu.
LSSTRING.TXT	Working storage file used by the "INSTALL A Unit" function.
MOD.EXE	Implements the "MODIFY An Operating Port" function.
NRM.EXE	Implements the "Network Resource Monitor" function.

Table E-4 (cont'd): Other HP LSM Files

Filename	Description
PASSMM	File containing encrypted password for LSM.
RELID	ASCII file containing the release ID (version number) for this version of HP LSM. Displayed by VERSION.EXE.
SETTIME.EXE	Implements the "Set Network Date and Time" function.
SHOWNIUS.EXE	Implements the "SHOW/DELETE Installed Units" function.
TCPBIOS.EXE	Command to initiate TCPBIOS on PCLSM/ex
TINSTALL.BAT	Installation file for Basic Management Services software.
VERSION.EXE	Implements the "GET Unit Software Date" function.

All of the files in the table above are kept in \TCP.

Table E-5. Terminal-Host Services Files

File Name	Description
ET180T.XFM	Downloadable software for an HP TS8 unit
ETNIUW.XFM	Downloadable software for an HP TS8 unit
LEGEND	ASCII file containing a copyright notice. Displayed by TCPLOAD.BAT.
MASTER.INS	Installation software.
OPTIONS	Installation software.
PROTOCOL	ASCII file containing list of protocols.
SERVICES	ASCII file containing list of services.
TINSTALL.BAT	Installation file for Terminal-Host Services software.
USERDISK.INS	Installation software.

All of the files in the table above are kept in \TCP.



RS-232-C Signal Behavior Options

This Appendix provides detailed information about the systems of RS-232-C handshaking behavior that HPAdvanceNet supports when a device is attached to an HP TS8.

RS-232-C Signal Behavior Options

The following RS-232-C handshaking signals are available to any device attached to an HP TS8:

- CTS - Clear To Send,
- RTS - Request To Send,
- DTR - Data Terminal Ready,
- DSR - Data Set Ready,
- RI - Ring Indicator,
- DCD - Data Carrier Detection,
- SQ - Signal Quality.

HPAdvanceNet supports several systems of behavior for the handshaking signals. You must select one of these systems with the DCESIGS field (for DCE ports) or the DTESIGS field (for DTE ports) when you specify the characteristics of a port in the "DESCRIBE A New Device" or "CONFIGURE A Unit" function.

The remaining subsections describe the systems of signal behavior that you may choose: first for a DCE port, then for a DTE port.

Each subsection lists the systems by letter: A, B, C, etc. To select a given system of behavior, enter its letter in the corresponding SIGS field. For example, if the port is configured as DCE (DCE set to YES and DTE set to NO), and you want to select system B, set the DCESIGS field to 'B'.

Signal Behavior Options for a DCE Port

The four signaling options for a DTE device (non-modem) attached to a DCE port simulate various modem and terminal interactions. Use the information in Table F-1 to choose the appropriate option. Typically, option A works best for devices that are directly connected to an HP TS8 (no monitoring of modem signals). Option C works best for devices that are connected to an HP TS8 using modem signals (without a modem).

We recommend that modem signals are monitored, to allow automatic breaking of virtual circuit in the case of an HP TS8 Power-fail or Reset.

Table F-1. DCE Port RS-232 Signaling Options

Option	Originate Circuit-Request	Receive Circuit-Request
A - Direct Connect	HP TS8 raises DSR, CTS, DCD, and SQ; ignores all leads that the DTE device controls.	HP TS8 raises DSR, CTS, DCD, and SQ; ignores all leads that the DTE device controls.
B - Direct Connect + RI	HP TS8 raises RI, DSR, CTS, DCD, SQ, then drops RI; ignores all leads that the DTE device controls.	HP TS8 raises DSR, CTS, then DCD, SQ, and RI. ignores all leads that the DTE device controls.
C - ModemConnect	HP TS8 raises RI and looks for DTR from the DTE device, then drops RI and raises DSR, CTS, DCD, and SQ. When the DTE device drops DTR, the virtual circuit is broken.	HP TS8 raises RI, then looks for DTR from device. When DTR is received, HP TS8 drops RI, then raises CTS. When the DTE device drops DTR, the virtual circuit is broken.
D - ModemConnect with SQ	HP TS8 raises DSR, DCD, and SQ, then looks for DTR from the DTE device. When DTR is received, HP TS8 raises CTS. When the DTE device drops DTR, the virtual circuit is broken.	HP TS8 raises DSR, DCD, SQ and RI, then waits for DTR from the DTE device. When HP TS8 receives DTR, it drops RI and raises CTS. When DTE device drops DTR, the virtual circuit is broken.

The default is C.

Signal Behavior Options for a DTE Port

The DTE port signaling options simulate various modem and terminal interactions for ports connected to a DCE device (modem). Use the information in Table F-2 to choose the option that is appropriate for the device that you are defining. Typically, options F and G work best for devices that connect to an HP TS8 using modem signals (with a modem present). Option E usually works for devices that use auto-answer modems. Note that if port configured as DTE, an HP TS8 modem cable (HP40231A) MUST be used.

Table F-2. DTE Port RS-232 Signaling Options

	Originate Circuit-Request	Receive Circuit-Request
A - Direct Connect	HP TS8 raises DTR and RTS; ignores all leads that the DCE device controls.	HP TS8 raises DTR and RTS; ignores all leads that the DCE device controls.
B - Direct Connect	HP TS8 raises DTR and RTS, then looks for DCD from the DCE device.	HP TS8 raises DTR and RTS, then looks for DCD from the DCE device; ignores all leads that the DCE device controls.
C - Simplified Connection to Modem (DCD is monitored)	HP TS8 raises DTR and RTS, then looks for DCD from the DCE device. When the DCE device drops DCD, virtual circuit is broken.	HP TS8 raises DTR and RTS, then looks for DCD from the DCE device. When device drops DCD, virtual circuit is broken.
D - Simplified Connection to Modem (DCD and RI are monitored)	HP TS8 waits for the DCE device to raise RI and DCD, then it raises DTR and RTS. When the DCE device drops DCD, the virtual circuit is broken.	HP TS8 raises DTR and RTS, then looks for DCD from the DCE device. When device drops DCD, virtual circuit is broken.
E - Connection to Modem (DCD is monitored)	HP TS8 raises DTR and RTS, then waits for the DCE device to raise DCD and RI. When device drops DCD, virtual circuit is broken.	HP TS8 raises DTR and RTS, then waits for the DCE device to raise DCD. When the DCE device drops DCD, virtual circuit is broken.
F - Connection to Modem (DSR is monitored)	HP TS8 raises DTR and RTS then waits for the DCE device to raise RI and DSR. When device drops DSR, the virtual circuit is broken.	HP TS8 raises DTR and RTS then waits for the DCE device to raise DSR. When device drops DSR, the virtual circuit is broken.
G - Connection to European Modem (DSR, CTS, and DCD are monitored)	HP TS8 raises DTR and RTS then waits for the DCE device to raise DSR, CTS and DSD. When device drops DSR or CTS, the virtual circuit is broken.	HP TS8 raises DTR and RTS then waits for the DCE device to raise DSR, CTS and DCD. When device drops DSR or CTS, the virtual circuit is broken.

The default is A.



Disconnect and Hold Sequences

Purpose

The disconnect sequence is a sequence of one to four characters which, when encountered in the data stream, will cause the HP TS8 to disconnect the virtual circuit. The disconnect sequence is defined by the **DISCSEQ** field; it has meaning only when the **DISC** field is set to **CHARS**.

Similarly, the hold sequence is a sequence of one to four characters which, when encountered in the data stream, will cause the HP TS8 to put the virtual circuit on hold. The hold sequence is defined by the **HOLDSEQ** field; it has meaning only when the **HOLD** field is set to **CHARS**.

Note

The sequences are case sensitive: if they are defined as upper case, they must always be entered as upper case.

The disconnect and hold sequences must NOT be the same. Furthermore, they should be unique sequences, which are unlikely to be sent unintentionally.

Recommended Use of Disconnect Sequence

In a back-to-back connection:

We recommend that you close your session on the host before entering the disconnect sequence (which closes your virtual circuit).

In a direct Telnet connection:

- We recommend that you close your virtual circuit (using the disconnect sequence) without closing session on the host. This is because there is a shorter **TIMEOUT** timer on the HP TS8 port than on the host port. **UNIX** users may wish to set the disconnect sequence to **<EOT>** (**[CTRL]D**). However, if you do this you must remember to change the value of the **GOAHEAD** sequence (see **Telnet Control Characters**, Chapter 7).
- You cannot use the hold or disconnect sequences to suspend a connection while it is being opened (using the **OPEN** command). If you

have entered an incorrect IP Address, you will have to wait 5 minutes before you will be able to enter other HP TSS commands.

When NOT to Configure a Disconnect Sequence

1. In a DATA connection: If your port is configured as DATA (ie it accepts rather than initiates a connection request) such as a printer, then you should you should disable the hold and disconnect sequences.
2. In Binary mode: when a device is sending binary data, any character combination can occur in the data stream. In such cases it is best not to define either a disconnect or a hold sequence. This ensures that a connection will not be broken or suspended accidentally. Then the device user can only disconnect or suspend the circuit if the **[Break]** key is defined to disconnect or suspend the circuit.

Rules for Legal Sequences

To be legal, the disconnect and hold sequences must follow these rules:

1. The first character in either sequence must not appear anywhere in the other sequence (except for the first character). For example, if the disconnect sequence is 'ABLE', 'CAT' is not a valid hold sequence, because the letter that begins 'ABLE' appears within 'CAT'.
2. The first character in either sequence must not appear later in the same sequence. For example, 'ABLE' is a legal disconnect sequence, but 'AABL' is not, because the first character, 'A', appears again in the sequence.
3. As an exception to rule (2), either sequence may consist of two to four identical characters. For example, ZZZZ is a valid sequence.
4. If the disconnect and hold sequences are both defined, they may not be identical. If they are unequal in length, they may not be identical up to the point where the shorter one ends. For example, if the disconnect sequence is 'ABLE', the hold sequence cannot be 'ABL'.

Some Examples

If the disconnect sequence is 'ABLE'. 'ZZZ' is a legal hold sequence, under rule (3), but 'AAA' is not, because it violates rule (1).

Suppose the disconnect sequence is 'BCDE'. The hold sequences 'BQQQ' and 'BCDQ' are both legal; the first character of each sequence is not repeated either in that sequence or in the other.

UCS File Format

When you install an HP TS8 or PCLSM you must enter the name of a user configurable strings (UCS) file. The default is BANNER.UCS. This file contains messages and prompt strings used by the command interpreter, and additional configuration information.

To customize the operation of the unit you are installing, you can create your own UCS file and enter its name in the UCS File field.

However, a unit reads the contents of the UCS file at the time of installing the Unit (with the INSTALL A Unit option). If the UCS file is subsequently changed, the new parameters will not be effective, unless the unit is re-installed, and re-downloaded.

UCS File Format

The UCS file can have any filename, but its filename extension must be UCS.

The UCS file consists of 16 logical records; each record must be terminated by a carriage return/linefeed (two bytes). The format for each record in the UCS file is given below.

The first four records set additional configuration parameters for the unit.

Record 0 Target Network record.

- TARGETNET - Specifies the network ID of the next network to search for a name if the name is not found on the local network. 20 bytes, left-justified, padded with zeros on the left. Not supported in this version of the software.
- Carriage Return/Linefeed 2 bytes.

Record 1 Event Logger record.

- Event Logger Name - 20 bytes, left-justified, padded with blanks on the right. Port name of a port connected to an event logger. Case sensitive. The Event Logger is not yet supported in HP AdvanceNet TCP/IP; therefore this field should be filled with blanks.
- Event Logger Net ID - 10 characters, blank.

Record 2 Validation Server record.

- Validation Server Name 20 bytes, left-justified, padded with blanks on the right. The Validation Server is not yet supported in HPAdvanceNet TCP/IP; therefore this field should be filled with blanks.
- Validation Server Net ID - 10 characters, blank.
- Carriage Return/Linefeed 2 bytes.

Record 3 Town Crier record.

- Constant 3 bytes, value must be 'TC = '.
- Yes/No Flag 1 byte, value must be 'Y' or 'N', indicating whether or not the unit should be a Town Crier. This means that it will broadcast the date and time to the network. If this is set to YES, you should also use the "SET Network Date and Time" function from the HP LSM main menu. (See Chapter 13 for more details).
- Carriage Return/Linefeed 2 bytes.

The remaining ten records contain strings used by the command interpreter when sending messages to the device. The character sequence '%s' is translated to a carriage return/linefeed when the strings are sent to the device.

Record 4 Initial Greeting. This string is output when the command interpreter wakes up. The string may be null.

Record 5 Log-in Greeting. This string is output (after the initial greeting, if there is one) if login is required. The default message is "#sPlease log in %s".

Record 6 Command Greeting. This string is displayed each time the device returns to the HPAdvanceNet command interpreter. The default message is "#sYou may now enter commands."

Record 7 HELP Heading. This string is displayed at the start of the HELP message. The default value is "The commands are:".

Record 8 Editing Characters Heading. This string is displayed at the start of the Editing Characters message. The default value is "The command editing keys are:".

Record 9 Idle Message. This string is sent to the device when the port reverts to an idle state. The default value is "%s IDLE%s".

Record 10 Command Prompt. This is the prompt for the command interpreter. The default value is "%sHP TS8>".

Records 11 to 13 contain strings that are used to generate a status message similar to the following:

You are using port 4 of HP TS8 number 11005A, on network 123.
Port 4's name is "110054A4." HP TS8 11005A's name is "ENGR-TS8."

Record 11 This string is the "HP AdvanceNet" part of the above messages, and may be null. If this string is not null, it must end with a blank.

Record 12 This string is the "TS8" part of the above messages. The default value is '%c', which is translated to the value given in the UNIT TYPE field for the unit (see Section 5). This string may not be null.

Record 13 This string is the "unit" part in the second line of the above messages. The default value is '%g', which is translated to 'TS8' or 'LSM', as determined by the UNIT TYPE field for the Unit (see Section 5). This string may not be null.

Record 14 Host Goodbye String - This record defines the string that is sent by an HP TS8 to the host when a connection is broken, to instruct the host to end all jobs and close the session (ie log off). This should be used for a direct connection (ie 3 pins) to a host such as the 3000.

Note

Individual HP TS8 ports must be configured to send the Host Goodbye String by setting the SEND-BYE field to YES (see "In-Circuit Parameters" screen, in Chapter 7). The port must also be configured as DATA in the CMD/DATA field.

The following sequences can be used in the Host Goodbye String:

- %N - sends 6 NULLS to the host.
- %T - sends a BREAK to the host. It must be the first character in the string. Multiple %T sequences in a string do NOT send multiple BREAKS.
- %O - sends an ASCII <RS> (1E Hex) to the host.
- %S - sends a carriage-return/Linefeed to the host.
- ^ - represents a CTRL character, as in:

^ A LOGOUT %s

(This example sends [CTRL]A, LOGOUT, and a carriage return). ASCII equivalents of CTRL characters are given in the *TS8 Terminal User's Guide* (part no 02342-90002).

For example to terminate a session with a BREAK, followed by the BYE command, record 14 would look like this:

%TBYE%s

Record 15 Network Names String - defines network-wide list of abbreviations for network IDs. For example you can associate a network ID such as netid = 45 with a "real" name such as New York). This is not supported in this version of the software.

The Default UCS File

The default UCS file, BANNER.UCS, is shown in Figure H-1.

Figure H-1. HPADVANCENET.UCS: the Default UCS File

TARGETNET = 0000000000	←	Record 0
\$LOGGER 0000000000	←	Record 1
\$VS 0000000000	←	Record 2
TC=N	←	Record 3
	←	Record 4 (blank)
%s Please login.%s	←	Record 5
%sYou may now enter commands.%s	←	Record 6
The commands are:	←	Record 7
The command editing keys are:	←	Record 8
%s IDLE%s	←	Record 9
%sHP TS8>	←	Record 10
HP AdvanceNet	←	Record 11
%c	←	Record 12
%g	←	Record 13
	←	Record 14 (blank)
	←	Record 15 (blank)

Glossary

A

address in networking, a numerical identifier defined and used by a particular protocol and associated software to distinguish one node from another.

AUI Attachment Unit Interface. Cable that connects MAU to HP TS8. Used with Thick LAN (Backbone LAN) only.

B

binary transfer mode a mode in which a virtual circuit may be used to transfer binary data. The opposite of character mode.

bridge device that connects LAN to another network, providing protocol translation at physical and data-link layers.

broadcast to send a message to every network station that is configured to accept one. In HPAdvanceNet TCP/IP, messages may be broadcast only within a network (not between networks belonging to an internet. Messages are broadcast with HP LSM's "BROADCAST Notification" function.

BROADCAST Notification one of HP LSM's major functions; both broadcasts and multicasts messages over the network.

C

CHANGE Main Menu Password one of HP LSM's major functions; changes the HP LSM program's password.

character mode a mode in which a virtual circuit may be used to transfer only ASCII character data. The opposite of binary transfer mode.

command device a device that can initiate virtual circuits, but cannot accept incoming virtual circuit connections. A dumb terminal is an example of a command device.

command mode one of three possible operating modes for an unit port. In command mode, the device connected to the port communicates with the unit's command interpreter. The user may enter HPAdvanceNet commands; the

command interpreter displays HPAdvanceNet prompts and responses to commands. The other two modes are virtual circuit mode and idle mode.

command/data device a device that can either initiate virtual circuit connections or accept incoming connections. A host computer is an example of a command/data device.

CONFIGURE one of HP LSM's major functions; specifies the operating parameters of an unit and its ports, and records them in a file.

console mode one of two modes in which HP LSM can run. In console mode you can control the network through HP LSM's menus. The other mode is download server mode.

CRC Cyclic Redundancy Check. A method of error checking that derives a constant from the message bit pattern.

D

data device a device that can accept incoming virtual circuit connections, but cannot initiate connections. A printer is an example of a data device.

DCE Data Circuit Terminating Equipment. Carrier equipment, installed on the user's premises, that provides all the functions required to establish, maintain, and terminate a connection. It provides signal conversion and coding between the data terminal equipment and the common carrier's line.

DESCRIBE a New Device one of HP LSM's major functions. Describes a generic device that will be attached to a unit.

device general term for a computer system, terminal or printer connected as a user to the LAN.

disconnect sequence a sequence of characters which, when entered through a terminal in virtual circuit mode, places the terminal in command mode and breaks the connection. See also "hold sequence."

download server mode one of two modes in which HP LSM can run. In download server mode HP LSM functions as a download server. HP LSM displays a description of its activity, but gives you no immediate control over the operation of the network. The other mode is console mode.

download server a network station that fulfills other network devices' requests for downloads of operating software and configuration parameters. One of HP LSM's functions is to act as a download server.

DTE Data Terminal Equipment. User equipment; the end-user machine (eg terminal, computer) which plugs into a unit that is the termination point the communications circuit. (see also DCE).

F

flow control

a set of rules for regulating the flow of data between the device and the unit, so that they can communicate without data loss. HP AdvanceNet TCP/IP supports the following types of flow control: NO (none); CHARS (XON/XOFF); and SIGS (RS-232C status lines).

G

gateway

A special device (or pair of devices) that interfaces two dissimilar networks and provides protocol translation between them at all levels. A gateway is often called an IP Router.

generic device

a class of devices that may be attached to a network through units, which share similar characteristics and operating parameters. A generic device definition is created by the "DESCRIBE a New Device" function.

H

hold sequence

a sequence of characters which, when entered through a terminal in virtual circuit mode, places the terminal in command mode without breaking the connection. This effectively puts the connection "on hold." See also "disconnect sequence."

Host

A computer, particularly a source or destination of messages on a communications network.

I

- idle mode** one of three possible operating modes for a unit port. In idle mode, the port is waiting for either a wakeup character from the device or a connection request from the network. The other two modes are command mode and virtual circuit mode.
- insert mode** a mode in which characters that you type into a field in an HP LSM screen are inserted before the character at the cursor, pushing that and following characters to the right. You enter and leave insert mode by pressing the Ins key. When HP LSM is in insert mode, the cursor appears as a blinking box that fills the entire line. The opposite of insert mode is replace mode.
- INSTALL a unit** one of HP LSM's major functions; to record information about a unit, including its characteristics and location, in a file. You must install an unit before configuring it.
- internetwork** (also internet); a set of interconnected, logically independent networks. The constituent networks are usually managed separately and may be composed of different transmission media.
- IP** Internet Protocol - a protocol used to provide routing. Corresponds to layer 3, the network layer, in the OSI model.
- IP address** a number that identifies a station connected to an internet. Internally it is stored as a 32-bit unsigned integer. Externally it is most often represented as a sequence of four decimal integers separated by dots, like this: '195.3.18.12'.

L

- LAN** Local Area Network - A network connecting various electronic devices in a localized geographical area such as an office building or a campus.
- latency** the length of time that an RS-232C signal should be held down when it goes down to ensure that the device at the other end of the line notices the "down" event.
- loopback** the routing of messages originating from a node to that node itself.

M

- Main Menu** a menu that HP LSM displays when you start it and enter its password. The main menu allows you to execute each of HP LSM's major functions.
- MAU** Medium Attachment Unit. Device that transmits and receives data to and from the network, using CSMA/CD. On Thin LAN it is part of LANIC board; on Thick LAN is a PC board connector.
- MODIFY Operating Port** one of HP LSM's major functions; changes the parameters used by a specific port on an operating unit, without resetting the unit.
- multicast ID** a character string associated with one or more unit ports on a network. A multicast message is sent to the devices attached to only those ports that have a specified multicast ID (or one of a group of specified IDs).
- multicast** to send a message to every member of a specified group of network stations that is configured to accept one. The group is defined by a multicast ID. every network station may have a multicast ID; when you multicast a message you specify the multicast ID(s) to receive it. Messages are multicast with HP LSM's "BROADCAST Notification" function.

N

- Name Service** service that maps user-defined names onto network addresses.
- NETWORK Resource Monitor** one of HP LSM's major functions; provides statistics on the behavior of the units in the internet.
- Network Virtual Terminal (NVT)** defined in the Telnet protocol; specifies a standard form for ASCII representation and for certain other characteristics of a simple canonical terminal.

P

- password** a secret word that you must enter after starting HP LSM to gain admission to the HP LSM main menu. The password in a newly installed HP LSM system is 'lsm'. The password is sensitive to case; you must type 'lsm' in lower case letters.
- port** one source/destination for data on a unit. On serial-interface units like HP TS8, each port may be connected to one serial interface device such as a terminal or printer.

port name a name associated with a port on an unit. Users customarily refer to a network device by a port name associated with the port the device is connected to. A single port may have up to four port names; conversely, a port name (if rotoed) may be associated with any number of distinct devices on any number of units.

Protocol A set of rules and conventions that govern the orderly and meaningful exchange of information between or among communicating parties. Both hardware and software protocols can be defined.

R

RARP an acronym for "Reverse Address Resolution Protocol." RARP enables an unit to determine its own IP address when it is reset by asking another network resource (the RARP server) to translate its Ethernet address (a permanent characteristic of the unit) to an IP address.

reload to download a new copy of an unit's operating software and characteristics. This resets the unit to the state it was in when the unit was first started. Any virtual circuits that the unit was maintaining are broken.

repeater a device used to extend a BUS by connecting segments. It continues signals from 1 segment of cable to another, restoring the signal to its original shape and strength, and re-synchronizing data. LAN segments connected by repeaters are considered to be part of the same heterogeneous network.

restart to cause an unit to start running its software from the beginning. An unit is restarted after the "MODIFY an Operating Port" function is performed on it; this makes the modified port characteristics take effect. Restarting, unlike reloading, does NOT change the software that the unit is running. Any virtual circuits that the unit was maintaining are not broken.

replace mode a mode in which each character that you type into a field in an HP LSM screen replaces the character at the cursor. You enter and leave replace mode by pressing the Ins key. When HP LSM is in replace mode, the cursor appears as a blinking box that fills the upper half of the line. The opposite of replace mode is insert mode.

reverse address resolution protocol see "RARP."

rotoed port name a port name associated with two or more ports. When a user requests a connection to a rotoed port name, any available port associated with that name may be provided.

router synonym for gateway.

run diagnostics diagnostic programs that are downloaded to an unit whenever the unit is reset. Not all types of units support run diagnostics.

S

- Server** A processor that provides a specific service to the network. Examples include terminal server, printer server, name server, and file server.
- SET Network Date and Time** one of HP LSM's major functions; broadcasts the date and time to the network's "town criers."
- specific function key** a function key that has a unique purpose in a specific screen, such as F2 in "BROADCAST Notification" which sends a broadcast or multicast message.

T

- Telnet** TELEcommunication NETWORK. An upper layer protocol used typically by terminal servers and hosts to provide interactive access by terminal users to host application programs.
- TCP** Transmission Control Protocol - a network protocol that establishes and maintains connections between nodes.
- town crier** a unit which receives the current date and time from HP LSM when the "Set Network Date and Time" function is executed, then informs other units of the date and time at regular intervals.

U

- UCS file** user configurable strings file: a file that allows you to customize the messages and prompts used by the command interpreter. HP AdvanceNet TCP/IP's default UCS file is named BANNER.UCS. You may define other UCS files with any file name and the filename extension UCS.
- unit** a control device that connects one or more computers or peripheral devices to a network. The HP TS8 and the PCLSM are both units that must be installed and configured using HP LSM main menu functions.
- unit name** a name used to identify a unit, defined when the unit is installed. Once you have installed an unit, you may refer to it by its unit name.
- unit number** the number of an unit that uniquely identifies it. It is printed on a label found on the back panel of the HP TS8 and on the metal plate of the PCLSM.

unsolicited message

a message sent to a device when the device is in command mode or virtual circuit mode that is not a message from the command interpreter or the other end of the circuit.

V

virtual circuit

a connection between two stations on a network that permits a continuous, sequenced, bi-directional flow of information. A specific network device may maintain several simultaneous virtual circuits to different destinations.

virtual circuit mode

one of three possible operating modes for an unit port. In virtual circuit mode, the device connected to the port communicates with another network device through a virtual circuit. The other two modes are command mode and idle mode.

W

wakeup character

a character that the user must enter on a terminal to shift a port from idle mode to command mode.

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