HEWLETT PACKARD

HP 37900D
Signaling Test Set
Monitor Guide

HP 37900D Signaling Test Set

Monitor Guide

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1. IF THIS INSTRUMENT IS TO BE ENERGISED VIA AN AUTO-TRANSFORMER MAKE SURE THAT THE COMMON TERMINAL OF THE AUTO-TRANSFORMER IS CONNECTED TO THE NEUTRAL POLE OF THE POWER SOURCE.
2. THE INSTRUMENT MUST ONLY BE USED WITH THE MAINS CABLE PROVIDED. IF THIS IS NOT SUITABLE, CONTACT YOUR NEAREST HP SERVICE OFFICE. THE MAINS PLUG SHALL ONLY BE INSERTED IN A SOCKET OUTLET PROVIDED WITH A PROTECTIVE EARTH CONTACT. THE PROTECTIVE ACTION MUST NOT BE NEGATED BY THE USE OF AN EXTENSION CORD (POWER CABLE) WITHOUT A PROTECTIVE CONDUCTOR (GROUNDING).
3. BEFORE SWITCHING ON THIS INSTRUMENT:
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   b. Ensure that all devices connected to this instrument are connected to the protective (earth) ground.
   c. Ensure that the line power (mains) plug is connected to a three-conductor line power outlet that has a protective (earth) ground. (Grounding one conductor of a two-conductor outlet is not sufficient).
   d. Check correct type and rating of the instrument fuse(s).

How to Use This Guide

The Monitor Guide provides information on monitoring signaling traffic with the HP 37900. It is organized in four main chapters:

Chapter 1 describes how to startup and operate the HP 37900.

Chapter 2 describes how to configure the interface cards and connect them to the network.

Chapter 3 describes how to perform the following tasks in Monitor Mode:

- Set up the signaling conditions.
- Start monitoring and select the appropriate real-time display.
- Analyze previously logged data.

Chapter 4 describes how to set up and use Remote Control and how to transfer files.

To quickly locate information in this guide, use the following summary table. The left hand column identifies items of information. The section headings in the right hand column show where to find example operating instructions.

Where to find;	Example Operating Instructions
Interface Configuration	The "Setting Up the Interface Card" sections in Chapter 2.
Cabling	The "Cabling to the Signaling Link" sections in Chapter 2.
Status LEDs	The "Level 1 STATUS Indicators" sections in Chapter 2.
Channel Attributes	"Checking channel Attributes (personality)" in Chapter 3.
Start and Stop Triggers	"Defining the Logging Conditions" in Chapter 3.
Logging Filters	"Defining the Logging Conditions" in Chapter 3.
Select Links	"Selecting the Links to be Monitored" in Chapter 3.
Monitoring	"Monitoring the Signaling Traffic" in Chapter 3.
Real-Time Decoding	"Monitoring the Signaling Traffic" in Chapter 3.
Decoding Logged Data	"Searching the Logged Data" in Chapter 3.
ISDN Call Generating	"Setting Up for Monitor Mode Call Generation" in Chapter 2.
Remote Control	"Remote Control" in Chapter 4.
File Transfer	"Transferring Files Using HP-Kermit" in Chapter 4.

Contents

Figures

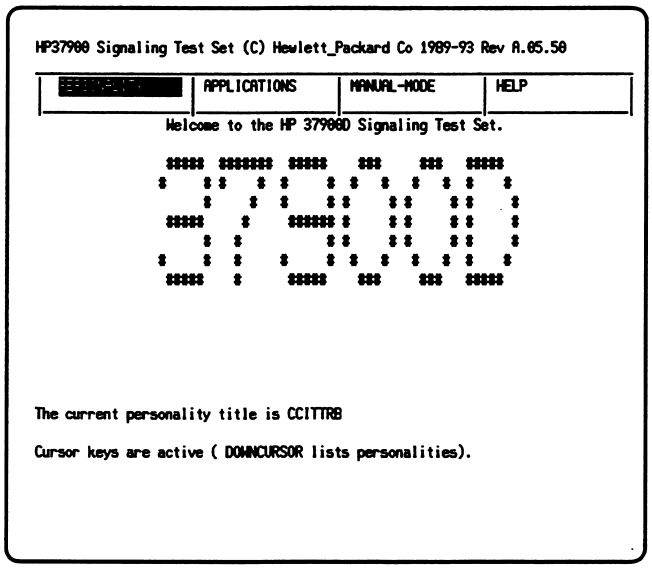
1

Operating the HP 37900

Getting Started

When you switch on the HP 37900 Signaling Test Set (STS) and it has finished self-test, the HP 37900 Welcome Screen is displayed.

Example;



Use the ◀/▶ keys to move between modes.

Use the ▲/▼ keys to display and select the available options.

Use the Return key to activate the selected option.

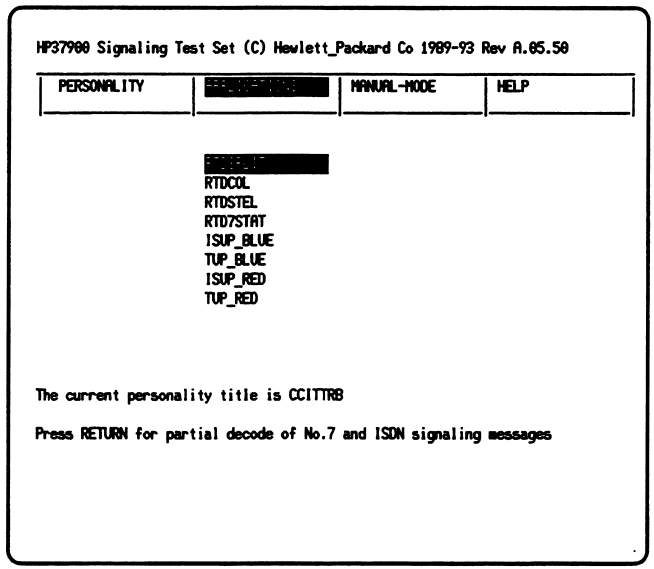
If your startup screen looks different:

The above initial startup screen is displayed when the HP-provided default personality file is used. The initial screens can be altered by an entry in the current personality file (for example the personality file UNKNOWN). Refer to "Alternative Startup Screens" later in this chapter for information.

To Run an Applications Test (from the Welcome Screen)

If you accept the default personality file;

1. Press [▶] to select APPLICATIONS mode. The available applications are displayed. Example;

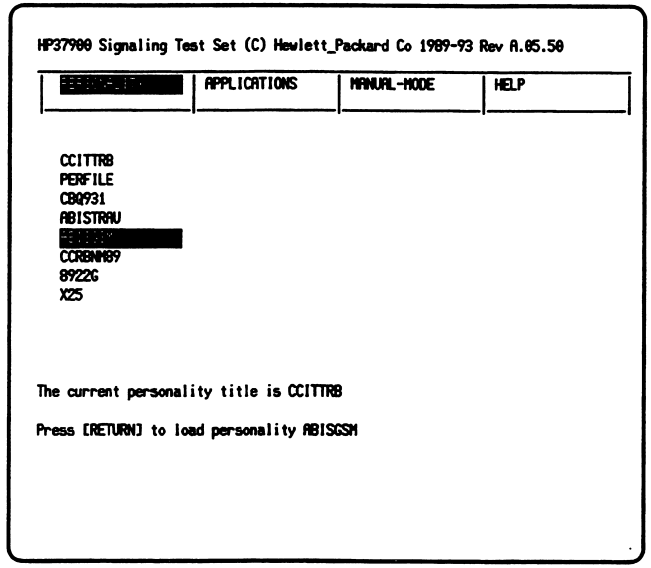


2. Select the application test you want to run. A brief description of the selected application is displayed at the bottom of the display.
3. Press [Return] to start the test. The HP 37900 starts to monitor. The traffic is displayed in the format defined in the application you selected.
4. Use the N (Next) key to step through the available formats.
5. Use the [Space] bar to freeze the display.
6. With the display frozen, use the cursor keys to highlight a message of interest and press D to obtain a text decode of the message, as described in Chapter 3.

If you want to use a different personality file;

1. Press [▼] to display the first eight of the available personalities.
2. Scroll down to select the personality you want to use.

   Example:



3. Press [Return] to temporarily load the selected personality file. The next time you reboot, the default personality file will be loaded. (The default personality file can be changed using the File Manager and Editor facility.)
4. Press [▶] to display the applications available with the selected personality.
5. Select and start the application you want as already dsecribed.

MANUAL MODE

In MANUAL MODE you can perform tasks not available in APPLICATIONS MODE.

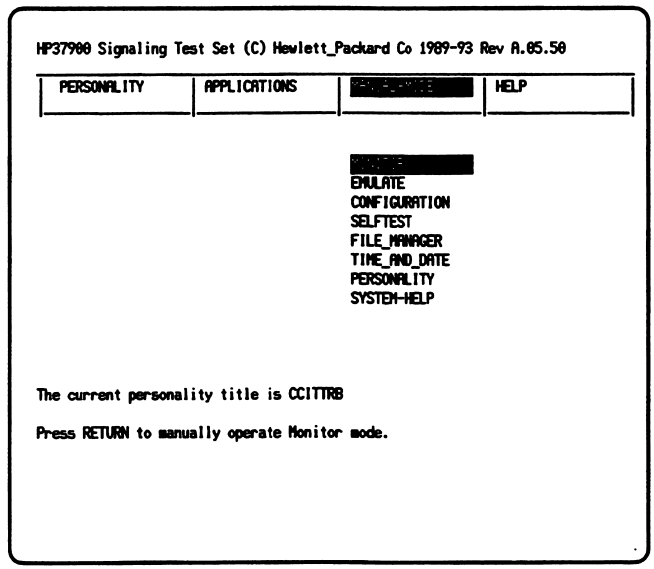
For example, to monitor a link you can;

- Configure an interface card in Configuration Mode.
- Set up the triggers/filters and other test conditions in Monitor Mode.
- Start monitoring, controlling the real-time display.
- Decode the logged data when the test is finished.

When you enter MANUAL MODE the list of available options is displayed, for example;

- `MONITOR` (Monitor Mode of operation, see Chapter 3).
- `CONFIGURATION` (Configure interface cards, see Chapter 2).
- `SELFTEST`
- `FILE MANAGER`
- `TIME AND DATE`
- `PERSONALITY`

To Perform a Task in MANUAL Mode



- Press ▼ to highlight the required mode or task.
- Press Return to start the required task.

You control the HP 37900 from the keyboard by menu selection or data entry. At each step of every task, you are prompted for the response required from you.

Alternative Startup Screens

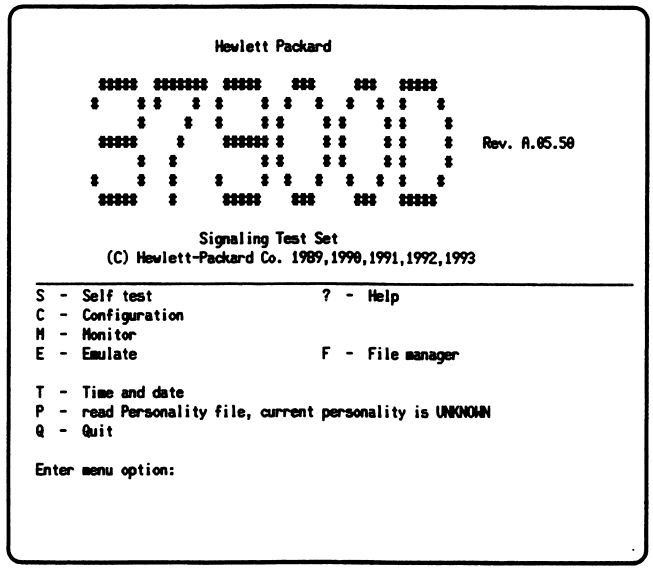
The startup screens are governed by the APP and TITLE entries in the active personality file. There are three valid conditions. Using the CCITTRB example:

The APP and Title commands are present. For example; APP CCITTRB Adopt personality CCITTRB and enable its applications. TITLE CCITTRB Display the current personality title CCITTRB) The startup displays are as described earlier. If you accept the default personality file, you can go straight to the list of applications and start your test.
The APP command is present but the TITLE command is omitted or commented out. For example; APP Do not adopt a personality file. The initial startup screen is as described earlier, but the personality title is UNKNOWN and the APPLICATIONS column header is blank. You must select and activate a personality before you can start testing.
The APP command (and TITLE command) are omitted. The initial startup screen is the HP 37900 Main Menu as described below.

HP 37900 Main Menu

The following Main Menu is available if the APP command is omitted from the active personality file.

When you press the appropriate character to select an option it has the same effect as activating the equivalent option from the Applications MANUAL MODE menu.



The lower part of the display is the HP 37900 Main Menu.

`Emulation` and `Quit` are available if your version of the HP 37900 includes these facilities.

2

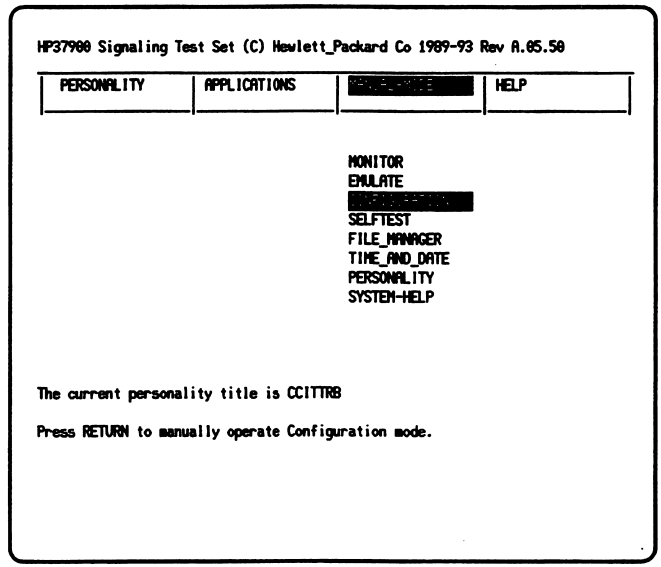
MANUAL Configuration

This chapter briefly describes;

- How to configure the interface cards.
- How to connect the HP 37900 to a signaling link.

Starting Configuration Mode

From the startup screen, select `CONFIGURATION` from the MANUAL MODE menu or press `C`.



Press ▼ to highlight `CONFIGURATION`, then press Return.

Configuring the 2.048 Mbit/s CEPT Interface

From the Configuration Mode menu, press **M** and select the slot containing the interface you want to check. A typical configuration is shown below.

```
                    2.048 Mbit/s CEPT INTERFACE (Sig. Card)

SLP                              Port A                    Port B
Slot     Card      +-------------------------+-------------------------+
3                  |No Card                  |No Card                  |
2                  |No Card                  |No Card                  |
1                  |No Card                  |No Card                  |
0 2.048 Mbit/s Sig|HDB3 TS- 16/xx/ 4   M    |HDB3 TS- xx/16/ 4   M    |
                   +-------------------------+-------------------------+
-------------------------------------------------------------------------------

                          CURRENT SETTING
S * connection Setup   >> BRIDGE MONITOR          >> BRIDGE MONITOR
V * Voice setup        >> LISTEN                  >> LISTEN
L * Line|voice code    >> HDB3 |A Law/ADI         >> HDB3 |A Law/ADI
C - Clock source       >> RECOVERED               >> RECOVERED
T * Timeslots          >>  16/xx /  4             >> xx / 16/  4
M - terMination        >> Unbal Bridged           >> Unbal Bridged
    Idle code          >> NOT INSERTED            >> NOT INSERTED
N * National bits      >>                         >>
D * Data inversion     >> Normal                  >> Normal
F * Framing            >> None                    >> None
O-Other port A-Auto_conf other port Q-Quit R-alaRms G-diG cont E-lEds PtstamP
Enter menu option:
```

Figure 2-1. The 2.048 Mbit/s CEPT INTERFACE Menu

For example, to use an external clock to timestamp messages;

1. Press **P**. A new menu is displayed listing the available options and showing the current setting.
2. Press **E** to select External. You are returned to the above menu.

Refer to the *HP 37900 Reference Manual* for a description of each menu option.

Setting the Level 1 Alarm Indicators

The HP 37900D has STATUS indicators on the left side of the front panel, one for each port of each card slot.

Green means there are no alarm conditions on this link which need your attention.
Red means there is an alarm condition on this link.

Use the `E - lEds` option from the above menu to specify which fault conditions will cause the LEDs to light red.

When you press `E`, a new screen is displayed listing the alarms and directing you on how to respond.

Cabling to the Signaling Link

In the following examples:

- The HP 37900 can be connected and disconnected without affecting the signaling link.
- All cables are accessory parts and must be ordered separately.
- For Balanced connections;

  All signal connections are Siemens - Siemens 3-pin.
  Only use the HP 15511A for unprotected monitor points.

- For Unbalanced connections;

  All signal connections are BNC - BNC.
  Use the HP 15703A for unprotected monitor points a large distance from the HP 37900.

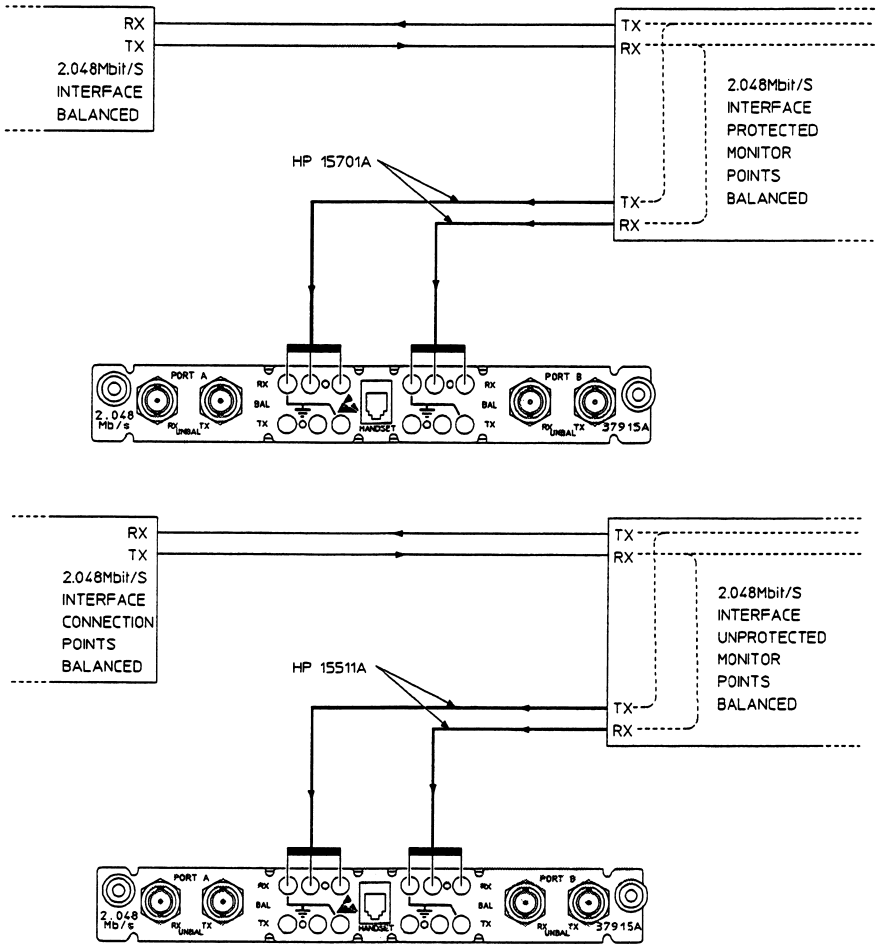


Figure 2-2.
2.048 Mbit/s Interface Bridged Monitor - Balanced Connection

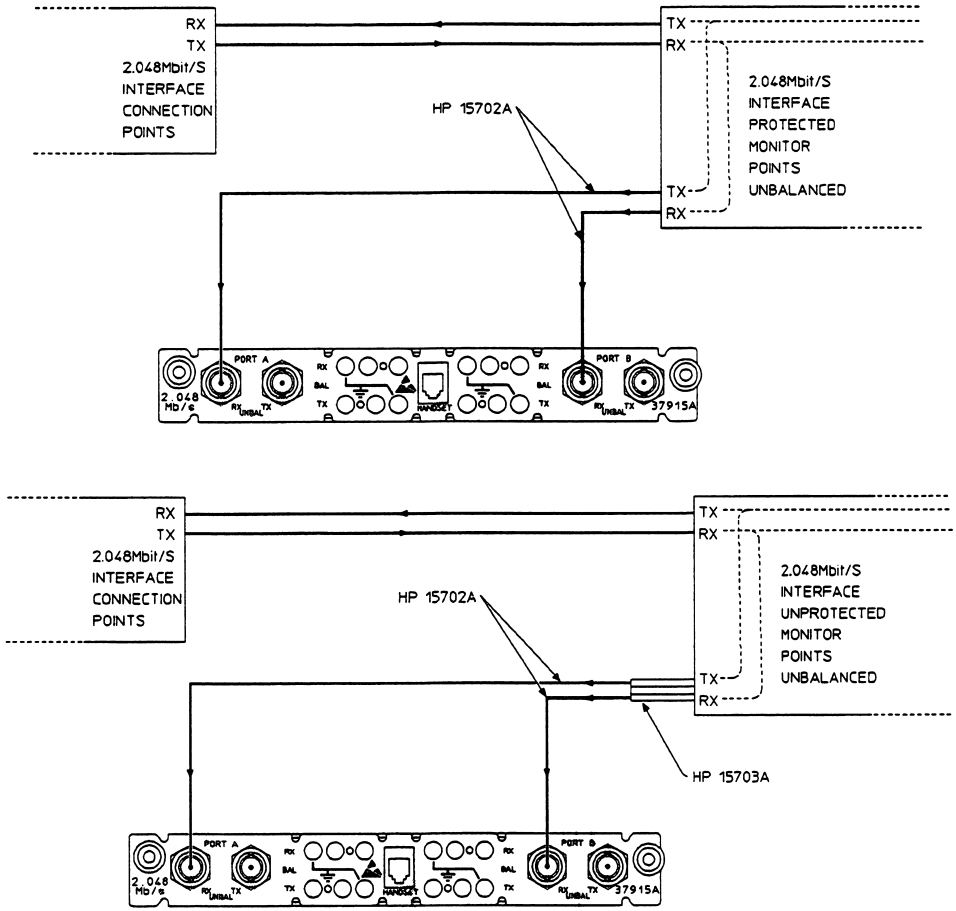


Figure 2-3. 2.048 Mbit/s Interface Bridged Monitor - Unbalanced Connection

Level 1 STATUS Indicators

The signaling link STATUS indicators are on the left side of the front panel of a HP 37900D.

- **Green** means there are no alarm conditions which need your attention.
- **Red** means there is an alarm condition. Check your cabling. If the cabling is correct, use the following procedure to obtain the LEVEL 1 ALARMS DISPLAY in Configuration Mode:
  From the CONFIGURATION MODE menu,

```
Press  M  and enter the slot number

Press  R
```

```
                ---------------------------------------------------------------
Slot = 1        |Alarm Type           | Status | Alarm Type           | Status |
Port = A        ===============================================================
                |CRC4 Multiframe Loss | N/A    | Signal Loss          | CLEAR  |
                ---------------------------------------------------------------
                |CAS  Frame Loss      | N/A    | Remote Alarm         | CLEAR  |
                ---------------------------------------------------------------
                |AIS                  | ALARM  | Frame Sync Loss      | CLEAR  |
                ---------------------------------------------------------------

[Q] To quit
```

Figure 2-4. Example LEVEL 1 ALARMS DISPLAY

Status	Meaning
ALARM	This condition has occurred.
CLEAR	This condition has not occurred.
N/A	Not Applicable. This condition cannot cause an alarm with this configuration.

Telephone Handset

The HP 37915A 2.048 Mbit/s Interface Card provides a voice connection. If required, connect the handset (for example Accessory Number HP 15722A) to the rear-panel of the interface card.

Configuring the ISDN Basic Rate Interface (BRI)

Setting Up the Interface Card

From the Configuration Mode menu, press **M** and select the slot containing the BRI card. The resulting display shows a summary of the current settings for all installed interfaces, and the menu used to change the current settings for the BRI interface. The default settings shown below are the normal settings for monitoring ISDN Basic Rate traffic.

Note

The BRI card has only one signaling port (with two connectors connected in parallel). In the summary display at the top of the screen Port B is not applicable.

```
                          ISDN BASIC RATE INTERFACE

SLP                              Port A                    Port B
Slot     Card       +-------------------------+-------------------------+
 3 ISDN BRI         |TEI AUTO                M|                         |
 2                  |No Card                  |No Card                  |
 1                  |No Card                  |No Card                  |
 0 2.048 Mbit/s Sig|HDB3 TS- 16/xx/ 4   M    |HDB3 TS- xx/16/ 4   M    |
                    +-------------------------+-------------------------+

------------------------------------------------------------------------------
                                        CURRENT SETTING

  S - connection Setup                  >> MONITOR
  H - Handset connection                >> B1
  C - Coding law                        >> A LAW
  M - terMination                       >> HIGH IMPEDANCE

  G - call Generate configuration


  Q - Quit

  Enter menu option:
```

Figure 2-5. ISDN BASIC RATE INTERFACE Menu

The menu options `S, H, C, M` allow you to change the displayed configuration settings. For example to change the terMination;

```
Press M
```

A new menu is shown listing the available options. When you have selected an option you are returned to the above menu.

The `G` option allows you to set up the interface for Call Generate in Monitor Mode. This means you can generate a call while simultaneously monitoring the signaling traffic.

S - connection Setup
Configures the interface to either Monitor only or to Emulate a signaling device. `Emulate` is not valid unless your HP 37900 has this optional facility.

H - Handset connection
Connects the telephone handset to either the B1 channel or B2 channel, or switches it off.

C - Coding law
Selects the Voice Coding to be either A Law (CCITT version) or μ-Law (North American version).

M - terMination
Selects between 100Ω termination or high impedance (20 kΩ).

G - call Generate configuration
This displays the CALL GENERATE CONFIGURATION menu, described below. The Call Generate facility allows you to generate a call while simultaneously monitoring the signaling traffic.

This option is not valid if the connection setup is set to Emulate.

Setting Up for Monitor Mode Call Generation

Selecting option G from the ISDN BASIC RATE INTERFACE menu displays the CALL GENERATE CONFIGURATION screen. This shows the current settings and allows you to change any of the displayed parameters.

The following diagram shows the default settings. When telephone numbers have been added they are also shown in this screen.

```
                        CALL GENERATE CONFIGURATION

SLP                              Port A                    Port B
Slot     Card          +-------------------------+-------------------------+
 3 ISDN BRI            |TEI AUTO                M|                         |
 2                     |No Card                  |No Card                  |
 1                     |No Card                  |No Card                  |
 0 2.048 Mbit/s Sig|HDB3 TS- 16/xx/ 4   M    |HDB3 TS- xx/16/ 4   M    |
                       +-------------------------+-------------------------+

-------------------------------------------------------------------------------
                                    CURRENT SETTING

  C - call Channel                  >> B1
  T - call Type                     >> VOICE
  M - Q921 Modulus                  >> MODULO 128
  S - call control SAPI             >>   0
  P - Q931 PD                       >>   8
  E - TEI                           >> AUTOMATIC
  N - phone Number                  >>

  Q - Quit
  Enter menu option:
```

Figure 2-6. CALL GENERATE CONFIGURATION Menu

The menu options C, T, M, S, P, E allow you to change the displayed configuration settings. For example to change the call Type;
Press T

A new menu is shown listing the available options. When you have made a selection you are returned to the above menu.

The `N` option allows you to set up or change the telephone number(s) to be used when you generate calls in Monitor Mode.

C - call Channel
Configures the calls to be placed on B1 channel, B2 channel, or either channel. (This selection can be changed when monitoring.)

T - call Type
Selects voice call or data call. (This selection can be changed when monitoring.)

M - Q921 Modulus
Selects the address fields to be either Modulo 128 or Modulo 8. Modulo 8 is not supported by the CCITT Blue Book.

S - call control SAPI
Assigns a value for the Service Access Point Identifier. A new screen displays an explanation and the valid range of values.

D - Q931 PD
Assigns a value for the Q931 Protocol Discriminator. A new screen displays an explanation and the valid range of values.

E - TEI
Selects the TEI assignment to be automatic (assigned by the NT) or non-automatic. If you select non-automatic, a new screen displays an explanation and the valid range of values.

N - phone Number
The following screen is displayed.

```
                                1. 0313311000
                                2. 0313311001
                                3. 0313311002
                                4. 0313311003

A - Add number
D - Delete number
P - select current Phone number

Q - Quit

Enter menu option:
```

Figure 2-7. Example DESTINATION PHONE NUMBERS Screen

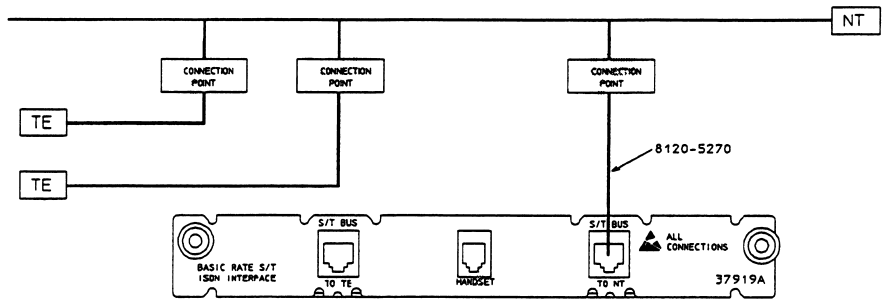
This screen allows you to add to or delete from a list of up to four telephone numbers. These are the destination numbers to be used when generating calls in Monitor Mode.

You can also select which number is to be the "current" number by pressing P to step through the numbers. The current number is highlighted. This is the number selected by default when a call is initiated in Monitor Mode. (This selection can be changed when monitoring.)

Cabling to the Signaling Link

The Basic Rate Interface (BRI) card has one signaling port. Its connectors are connected in parallel. If there is an unused connection to the link, use Method A using either connector.

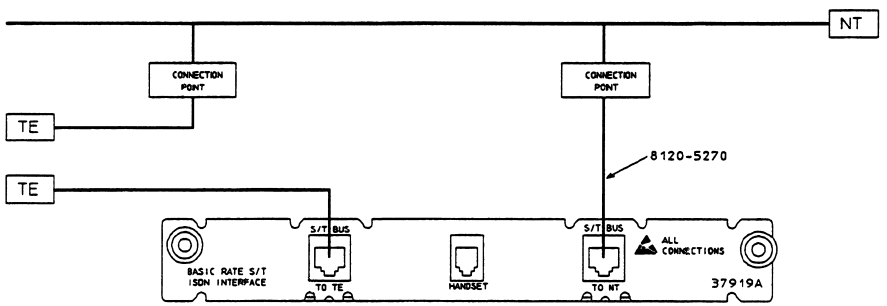
If there is no unused connection, pass the link passively through the card as shown in Method B.



ALL NETWORK CONNECTIONS RJ45 (ISO8877)

CONNECTORS INTERCHANGEABLE

Method A



ALL NETWORK CONNECTIONS RJ45 (ISO8877)

CONNECTORS INTERCHANGEABLE

Method B

Level 1 STATUS Indicators

The LED indicators on the left side of the front panel of a HP 37900D indicate the Level 1 status of the link. Each pair of LEDs represents the status of one link.

Link 3 O O
Link 2 O O
Link 1 O O
Link 0 O O

The following table shows how a pair of LEDs represents the status of its associated link. For example, if the left LED (nearest the edge of the front panel) is red and the right LED is off it means the TE is operational and the NT is not operational.

Pair of LEDs		TE	NT
OFF	OFF	Not Operational	Not Operational
RED	OFF	Operational	Not Operational
OFF	RED	Not Operational	Operational
GREEN	GREEN	Operational	Operational

Telephone Handset

The HP 37919A Basic Rate Interface Card has a connection for a telephone handset. If required, connect the handset (for example Accessory Number HP 15722A) to the rear-panel of the interface card.

From the ISDN BASIC RATE INTERFACE menu, select
`H - Handset connection`
and set to B1 or B2 as required.

3

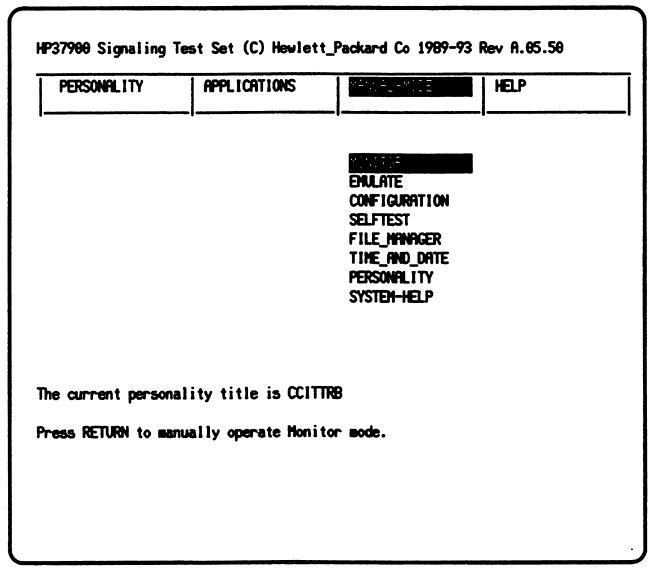
MANUAL Monitoring

This chapter describes briefly how to perform tasks not predefined as application tests. This includes:

1. How to set up the HP 37900 Monitor conditions.
2. How to selectively monitor the traffic on the link.
3. How to decode the logged data.

Starting Monitor Mode

From the startup screen, select MONITOR from the MANUAL MODE menu or press M.



Press Return to obtain the Monitor Mode main menu.

Setting Up the Monitoring Conditions

```
                                MONITOR MODE

M - Monitor signaling link(s)

D - Display logged data

S - Select signaling links

W - Write logged data/logging conditions to disc
R - Read logged data/logging conditions from disc
F - File manager

B - change Buffer attributes
A - change channel Attributes (personality)

T - Trigger/filter setup  (overlay menus)
C - Change logging conditions
V - View logging conditions

Q - Quit menu


Enter menu option:
```

Figure 3-1. The MONITOR MODE Menu

Work through the examples in this chapter to obtain an overall guide to using the HP 37900 in Monitor Mode. The following assumptions are made:

- Your HP 37900 has already been configured to monitor a signaling link. If not, refer to Chapter 2.
- A suitable signaling link is available to be monitored. If not, omit the section headed "Monitoring the Signaling Traffic".
- The network uses the ISDN User Part (ISUP) service of the No7 protocol.
- The active personality file is CCITTRB.P. If you are not sure;
  - Quit from Monitor Mode to the HP 37900 Welcome Screen.
  - Enter APPLICATIONS MODE and ensure CCITTRB is selected.

Checking channel Attributes (personality)

The HP 37900 links are each assigned a personality by the active personality file.

Use the MONITOR MODE menu option
`A - change channel Attributes (personality)`
to check that the correct channel attributes are assigned for Link 1. A screen is displayed showing the current assignment and allowing you to reassign links.

Checking Buffer Attributes

The log buffer is an area of memory reserved for storing logged data. This option allows you to:

- Change the amount of memory allocated for log buffer use.
- Define whether the log buffer operates in LINEAR or CYCLIC mode.

  LINEAR — When the log buffer is full logging stops.

  CYCLIC — When the log buffer is full logging continues, overwriting the data already logged.

- Select the log buffer to be in computer memory (RAM) or on disc.

  RAM — The log buffer is held in RAM (Random Access Memory) in the computer.

  DISC — The log buffer is held in the STSS: volume on hard disc. **Note:** In this mode, the log buffer cannot be stored to flexible disc.

  More memory is available on disc. RAM has a faster response, assuring you that all traffic is logged.

Any changes made to the log buffer configuration cause all data to be cleared from the log buffer.

Defining the Logging Conditions

Basically this consists of defining the required set of trigger and filter conditions. You create a set of signaling data templates. When a received message matches a template, the appropriate action is taken.

There are two methods available in the HP 37900.

1. "High-Level Triggers and Filters", available with the HP 37900 software revisions A05.50 and A06.00 and at least 8 Mbytes of memory. You *select* a protocol, then *select* the fields of interest as defined in that protocol. The HP 37900 translates your selections into a message template. The approach is;

   a. Define the trigger/filter template, using a quick and easy method of selecting the fields/octets you want to define.

   b. Assign the template to the required channel(s) as a start trigger, stop trigger or filter.

   You can save and later re-use the template as required, if your version of the HP 37900 includes this facility.

   This method is also the more comprehensive, allowing access to octets not accessible using the "standard" method.

2. The "standard" method, also available with all previous software revisions. You manually *define* the values of all fields of interest. The approach is shown in the following example;

   a. Select the channel of interest.

   b. Specify *Start Triggers*

   c. Specify *Add trigger*.

   d. Specify *Level 3 information*.

   e. Choose *Mnemonic* or *Hexadecimal* definition.

   f. Follow a predefined sequence of menus, entering the values of each field.

High-Level Triggers and Filters Setup

Note

If your terminal is set to HP mode there can be some shortening of highlighting bars in the high-level displays. You can improve this by setting the terminal to ANSI mode.

From the MONITOR MODE Menu;

Press `C` to display the CHANGE LOGGING CONDITIONS menu.
Press `H` to display the SET-UP HIGH-LEVEL TRIGGERS AND FILTERS menu and the current catalog of triggers and filters. This is the setup used when you start to monitor.

If the top part of the display is blank, showing that no triggers or filters are currently defined, you can read a previously saved catalog or create a new one by defining new message templates.

In general, to create message templates:

1. Press `A` to display the first of a series of boxed menus. This lists the available protocols. See the example following.
2. Use the [▲]/[▼] keys to select a menu option.
3. Use the [◀]/[▶] keys to move down to the next level of selectable options, or return to the previous level.

Use [Return] to define a field (or `D` to delete a previous selection).

There is also an `Override` facility allowing you to redefine the value of an octet.

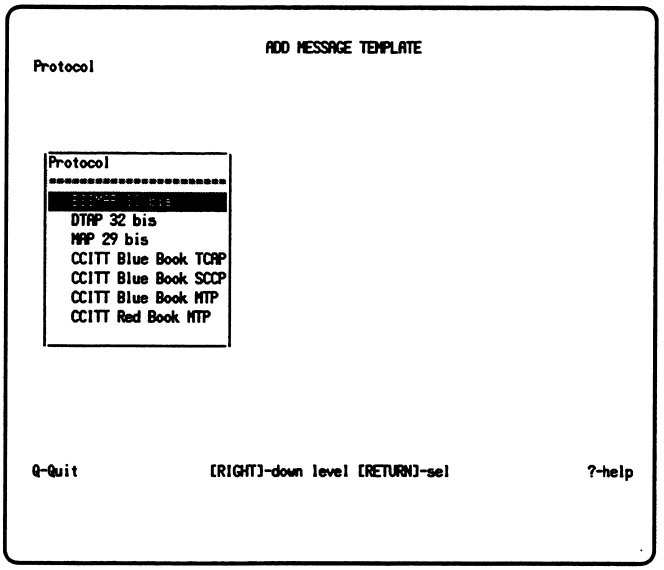
The control options available at a particular time are shown in the help line at the bottom of the display.

>> Two chevrons beside a field shows that a value has been defined at a lower level.

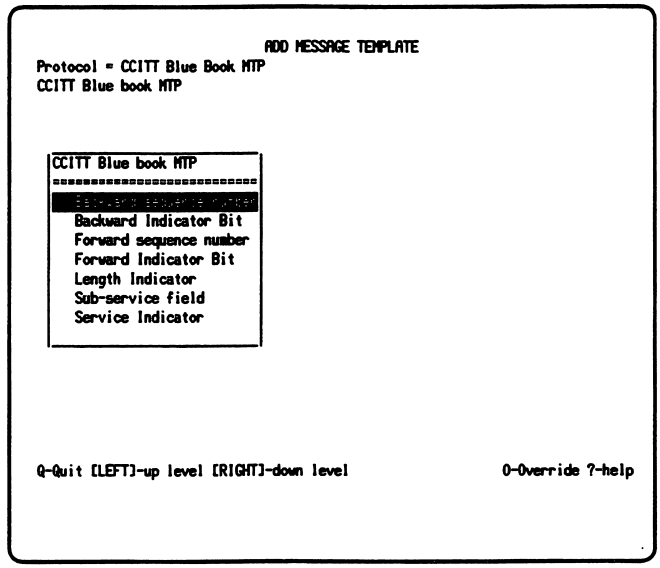
** Two asterisks beside a field shows that a value has been specified for this field.

Example. Use the following example to gain familiarity in setting up message templates:

1. Select **High-level triggers and filters** from the CHANGE LOGGING CONDITIONS menu.
2. Select **Add message template** from the **SET-UP HIGH-LEVEL TRIGGERS AND FILTERS** menu.

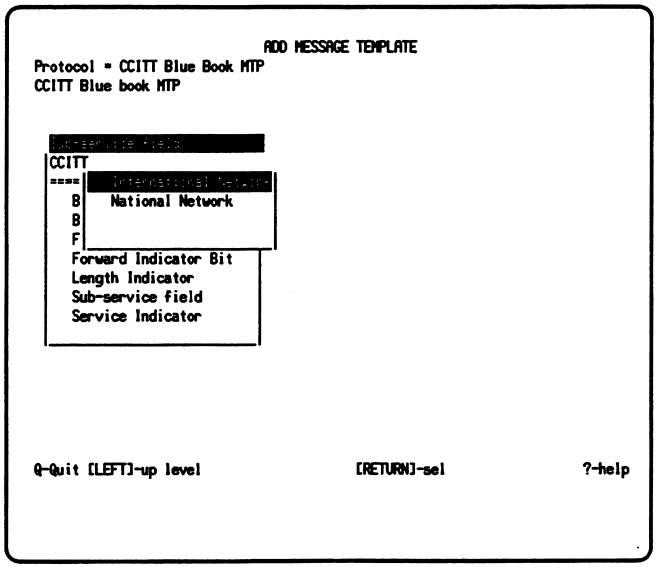


3. Use the ▼ key to highlight **CCITT Blue Book MTP** and press the ▶ key to display the fields used in this protocol.



This selection is added to the record of your previous selections above the first box.

4. Display the `Sub-service field` box.

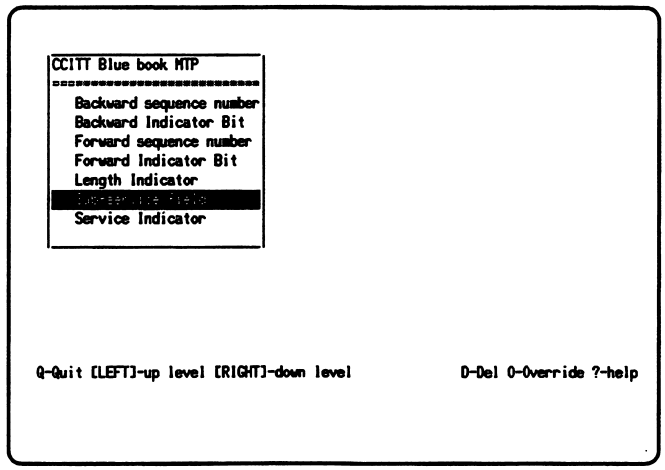


There are no lower level choices, so pressing the ▶ key has no effect at this time.

5. Press Return to specify `International Network`.

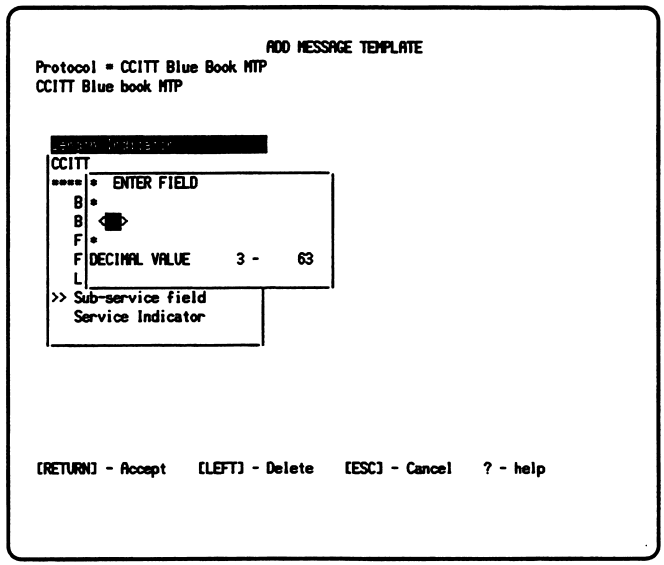
   The two asterisks (**) show that this value has been selected.

6. Use the ◀ key to return to the previous box.



The two chevrons (>>) show that a value has been specified in this field (at a lower level).

7. Display the `Length Indicator` box.

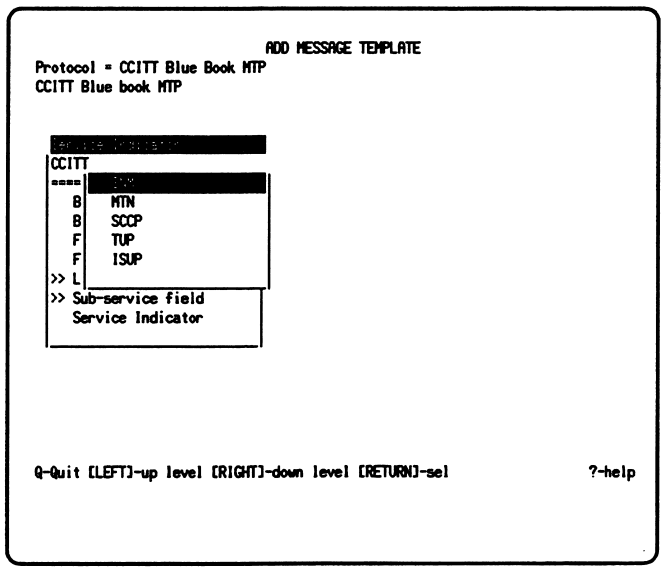


Enter a value. The valid range of values is shown in the box.

Pressing [Return] accepts the displayed value and returns you to the previous box.

In value entry boxes, the [◀] key is used to erase previously entered values. If you want to return to the previous box without making a change, press [ESC].

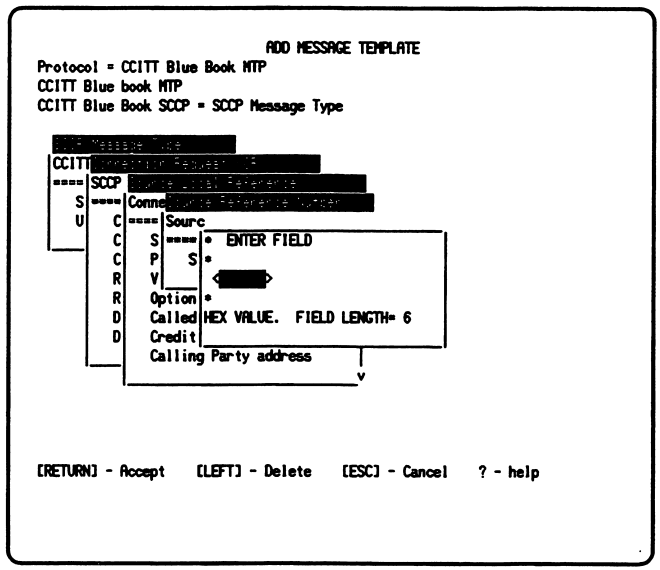
8. Display the `Service Indicator` box.



9. Use the following example selection path to see how to specify a User Data value (in this case a Source Reference Number).

   Select;

   SCCP
   Signaling Information
   SCCP Message Type
   Connection Request (CR)
   Source Local Reference
   Source Reference Number



   Although the first two boxes are no longer displayed, you can still see the complete selection path.

10. Enter your value and press Return.
11. Use the ◀ key to retrace your steps to the **Connection Request elements** box. Assign a value to the **Protocol Class**.
12. Follow similar selection paths to become familiar with the format.

13. When you have finished setting up your template, press `Q` to quit the selection process.
    - To save your template, press `Q`.
    - To abandon the template, press `A`.
    - To avoid quitting and continue defining the template, press `C`.
14. Press `Q` and give your template a title.
15. Use the assignment menu to assign your template to be a start trigger, stop trigger or filter.
16. Assign it to one or more channels. You can also quit without assigning, and assign it later.

(You can later use the `H` option from the `SETUP HIGH-LEVEL TRIGGERS AND FILTERS` menu to re-assign a template.)

Standard Triggers and Filters Setup

From the MONITOR MODE Menu;

Press C to display the CHANGE LOGGING CONDITIONS menu.

```
                    CHANGE LOGGING CONDITIONS

   S - Start triggers
   E - stop (End) triggers
   M - Messages logged after stop trigger
   C - trigger combination between channels

   F - logging Filters

   H - High-level triggers and filters

   T - call Trace

   R - automatic Repetition

   P - PCR filtering

   Q - Quit menu


   Enter menu option:
```

Figure 3-2. The CHANGE LOGGING CONDITIONS Menu

From this menu you can either set up a call trace (which logs only the messages associated with a specified telephone call) or set up individual start triggers, stop triggers and filters.

To Set Up a Call Trace

From the CHANGE LOGGING CONDITIONS menu;

```
Press T to obtain the CALL TRACE DEFINITION menu
```

The following screen is displayed.

```
                        CALL TRACE DEFINITION

Call Trace number        : >> Not selected <<

log buffer full          : >> Not selected <<
continuous measurement   : >> Not selected <<
call trace timeout       : >> Not selected <<

--------------------------------------------------------------------------------

S - Select call trace
D - Deselect call trace

B - select/deselect log Buffer full
C - select/deselect Continuous measurement
T - specify call trace Timeout

F - change call trace File

Q - Quit

Enter menu option:
```

Figure 3-3. The CALL TRACE DEFINITION Menu

```
Press  S  to select call trace
Specify the call to be traced.
```

The information required is described on the screen. In this exercise you are asked for the destination telephone number.

You can also;

`D - Deselect call trace`
When you press `D`, selections previously made from this menu are deleted. Monitoring reverts to the default logging conditions.

`B - select/deselect log Buffer full`
When `selected`, monitoring stops when one of the channel log buffers is full. All logged data is retained. When `deselected`, the data in a buffer is overwritten when that buffer is full. `C - select/deselect Continuous measurement`
When `selected`, successive calls to the selected telephone number are traced until monitoring is stopped manually. When one call is being traced, all others are excluded. When the call sequence is complete, monitoring resumes for the next call.

When `deselected`, monitoring stops on completion of the first call.

`T - specify call trace Timeout`
The timeout interval starts when the first message of the call is detected. If the last message of the call is not detected within this interval the trace is stopped.

When you press `T` a new screen is displayed explaining this facility and showing the valid range.

`F - change call trace File`
Pressing `F` shows the call trace files currently associated with the active personality file. Instructions are displayed on how to replace either or both files.

If you select a different file, call trace is automatically deselected. This means that you must select call trace again to read the new files.

Some Call Trace files (for example SWISUP) enable further selection by allowing you to specify DPC, OPC, CIC, Calling Party Category.

If you want to use a mnemonic to specify DPC or OPC, it must be defined in the appropriate Point Code (PC) file.

When you have defined the trace, press `Q` twice to return to the MONITOR MODE menu and press `M` to start monitoring.

To Set Up Individual Triggers and Filters

The following examples show how to set up triggers and filters.

Data logging will begin on both channels on receipt of an Initial Address Message (IAM) from Signaling Point 1 and end when a Release Clear Message

(RLC) is received from Signaling Point 2. All ISUP traffic between the two signaling points will be logged during this interval.

Start Trigger. This example shows how to set up an MSU template for an Initial Address Message (IAM).

To begin the "add start trigger" procedure:

```
Press  S  to obtain the CHANGE START TRIGGERS menu
```

(The current-settings part of the display is always set to Channel 1 Link 1 on selecting any of the "CHANGE ... " menus).

1. To start to define a level 3 trigger.

   ```
   Press  A  to obtain the DEFINE START TRIGGERS menu
   ```

2. To define an MSU template, specify level 3 information.

   ```
   Press  3
   ```

   You are asked:

   ```
   How should the level 3 information be specified?
   (Mnemonic/Hexadecimal):
   Press  M  to select Mnemonic
   ```

   The HP 37900 starts to prompt you for the information needed to create the start trigger. The SUB-SERVICE FIELD screen is displayed.

   ```
   Type  NN  [ Return ] to select the National Network
   ```

   You are asked for the Service Indicator.

   ```
   Type  ISUP  [ Return ]
   ```

   You are asked for the ROUTING LABEL, which consists of DPC, OPC, CIC, SLS. Select each of the options in turn and enter the values shown below, or values appropriate for your signaling link. (Remember to press Return each time).

   DPC ... **456**
   OPC ... **123**
   CIC ... **2**
   SLS ...

   Do not select SLS. This means the value of this parameter is not important. Press `Q` when you are finished.

You are shown a list of message types, and prompted to enter one.

Type IAM (Return)

The LEVEL 3 and 4 INFORMATION screen is displayed, showing you the trigger you have defined.

LEVEL 3 AND 4 INFORMATION

Service Information Octet -> Heading Code in binary, mnemonic and hexadecimal:

MT	CIC	SLS	OPC	DPC	SSF SI
00000001	000000000010	XXXX	00000001111011	00000111001000	10000101
IAM	2	XX	123	456	NN ISUP
1	2	X	7B	1C8	8 5

----------->>>--Transmission direction-->>>----------

Does the value of any other octets of the SIF matter? (Y/N):

Figure 3-4. LEVEL 3 AND 4 INFORMATION

For this example no other octets matter in the SIF.

Press N

You are asked if the information is correct.

If it is correct, press Y

If it is not correct, press N and follow the prompts

You have defined a start trigger for Channel 1.

3. The DEFINE START TRIGGERS menu is displayed again to allow you to add up to four more start triggers on Channel 1. For this example only one trigger is required.

   Press Q to return to the CHANGE START TRIGGERS menu

4. To define the same start trigger for Channel 2:

   Select C - Copy triggers

Copy from Channel 1 to Channel 2.

When you are asked if you want to swap point codes on even channels, answer `Y`.

On completion, you are returned to the CHANGE START TRIGGERS menu. Use `S - Select channel` to change to Channel 2 and check that the trigger you set up for Channel 1 is now also defined for Channel 2.

```
Press  Q  to return to the CHANGE LOGGING CONDITIONS menu
```

Stop Trigger.

1. Adding stop triggers is done in the same way as adding start triggers.

   From the CHANGE LOGGING CONDITIONS menu;

   ```
   Press  E  to obtain the CHANGE STOP TRIGGERS menu
   ```

   (The current settings for Channel 1 are displayed.)

2. Repeat the procedure with the following exceptions.
   Use the following values for the routing label;
   DPC ... **123**
   OPC ... **456**
   CIC.... **2**
   SLS ...

   Do not select SLS.

   The stop trigger message type is RLC.

Number of Messages logged after stop trigger.

1. You can define that a number of messages (between 0 and 1000) will be logged after the stop trigger.

   From the CHANGE LOGGING CONDITIONS menu;

   ```
   Press  M
   ```

   The following screen is displayed.

```
                    MESSAGES LOGGED AFTER STOP
TRIGGER

Enter the channel number and the number of messages
to be logged after that
channel has received its stop trigger, terminated by
[RETURN]/[ENTER].

The channel number should either be an integer
between 1 and 8, or A for All
the channels that have level 2/3 stop trigger(s)
defined.

The number of messages should be an integer between 0
and 1000.


Channel number:
Number of messages:
```

Figure 3-5. MESSAGES LOGGED AFTER STOP TRIGGER Example

Define 100 for Channel 1 and 100 for Channel 2. (Press Return after each entry.)

Press Return to return to the CHANGE LOGGING CONDITIONS menu.

Combination of Triggers between Channels.

1. There are three options.

   - Independant
     Each channel responds only to a trigger received on that channel.
   - OR
     All channels respond simultaneously to a trigger received on ANY ONE channel.
   - AND
     All channels respond simultaneously when ALL channels have received a trigger.

For this example, define the OR combination. This means that when either channel 1 or channel 2 receives a start or stop trigger, both channels will respond simultaneously.

From the CHANGE LOGGING CONDITIONS menu;

```
Press C to obtain the TRIGGER COMBINATION BETWEEN CHANNELS menu
Press O to select the OR function
```

You are returned to the CHANGE LOGGING CONDITIONS menu.

You have finished setting up the triggering conditions.

Logging Filters.

1. Having defined the conditions which will start the logging period and end the logging period, specify the SUs to be logged during that period. This means defining the logging filters. The method is the same as for adding triggers.

   From the CHANGE LOGGING CONDITIONS menu;

   ```
   Press F to obtain the CHANGE LOGGING FILTERS menu
   Press A to obtain the DEFINE LOGGING FILTERS menu
   ```

```
                        DEFINE LOGGING FILTERS

Channel 1 (Link 1)
   No logging filters have been defined.
   All SUs will be logged.




--------------------------------------------------------------------------------
M - log all MSUs
O - omit matching MSUs
I - include matching MSUs


F - log all FISUs
L - log all LSSUs
E - log all Erroneous SUs

Q - Quit menu

Enter menu option:
```

Figure 3-6. DEFINE LOGGING FILTERS Example

Log only the messages described in the following table in channel 1 (CH1) and channel 2 (CH2).

	CH1	CH2
Sub-Service Field (SSF)	NN	NN
Service Indicator (SI)	ISUP	ISUP
Originating Point Code (OPC)	123	456
Destination Point Code (DPC)	456	123
Circuit Identification Code (CIC)	2	2
Signaling Link Selection (SLS)	X[1]	X[1]

1 X = don't care.

Before you can define your filters, you have to tell the HP 37900 whether to *include* or *omit* the MSUs you are going to define.

```
Select  I - Include matching MSUs
```

The ADD LOGGING FILTER screen is displayed.

```
Press  A  to begin adding a filter
```

2. Use the same procedure as for adding triggers to set up the filter for channel 1. The message type doesn't matter, just press Return.

   When you have finished, return to the CHANGE LOGGING FILTERS menu.

3. Copy the filter from channel 1 to channel 2, swapping OPC/DPC.

   You have now finished defining your Logging Conditions.

4. Return to the MONITOR MODE menu, by pressing `Q` repeatedly.

Selecting the Links to be Monitored

The HP 37900 monitors on all selected links. If your HP 37900 has three interfaces and you only want to monitor on two, use this facility to deselect the third interface.

1. From the MONITOR MODE menu;

   ```
   Press  S
   ```

   The SELECT SIGNALING LINKS menu is displayed.

```
                    SELECT SIGNALING LINKS

                Link          Current state

                  4           NOT PRESENT
                  3           SELECTED
                  2           SELECTED
                  1           SELECTED


S - Select signaling link
D - Deselect signaling link

? - HELP

Q - Quit menu


Enter menu option:
```

Figure 3-7. The SELECT SIGNALING LINKS Menu

If Link 3 is to be deselected,

Press D

You are asked for the number of the link to deselect.

Press 3 Return

Link 3 is now shown as DESELECTED.

Press Q

Monitoring the Signaling Traffic

1. If you have access to a signaling link, ensure that the HP 37900 is correctly cabled to it and that the STATUS indicators for link 1 are green.

   If you are using a HP 37919A ISDN Basic Rate Interface Card you can generate a call (as described at the end of this chapter) and monitor the resulting signaling messages.

2. To start monitoring from the MONITOR MODE menu;
   `Select M - Monitor signaling link(s)`

Call Trace

1. If you have set up a call trace, a screen in the following format is displayed.

```
                              CALL TRACE

Telephone number selected      : 031331- ---
Telephone number traced        : 0313311000
User Port / CIC / OPC / DPC    : ISUP / 10 / 2752778 / 2752788
Trace status                   : start of call detected

  Date 26.06.89          Start 14:22:10          Stop

| Message | Rel Time | Channel | Message | Rel Time | Channel |
|---------|----------|---------|---------|----------|---------|
|   IAM   |    20    |    1    |   ACM   |    40    |    2    |
|         |          |         |   ANN   |    68    |    2    |
|         |          |         |   CBK   |    94    |    2    |

1..4 - detailed link display        M - Multi-link display
   R - Real time decode display
   S - Stop current measurement
Enter menu option
```

Figure 3-8. An Example Real-Time Call Trace Display

The menu options are described under "Normal Monitoring".

You can select a real-time decode to format the messages as required.

The traced messages are also logged in the log buffer, so you can decode the messages when the trace has finished.

When a call has been traced, the trace can be repeated continuously using the same call specification.

Normal Monitoring

1. If call trace is not selected an overview display of the signaling traffic on the link is displayed. (All links being monitored are displayed on this screen.)

   Other options are added for the appropriate conditions. For example **G - call-Gen menu** and **F - call-gen conFig** if your HP 37900 contains an ISDN Basic Rate Interface card configured for Monitor. These are described later in this chapter under "Generating a Call in Monitor Mode".

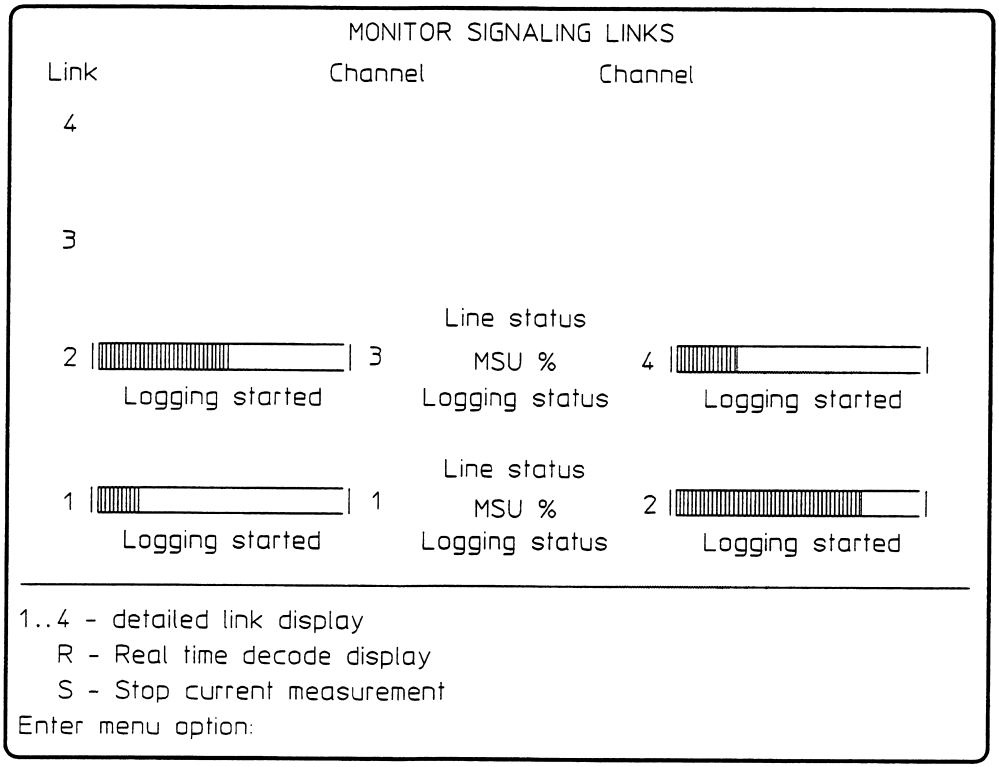


Figure 3-9. The Multi-Link (Overview) Display Example

2. **Press 1 to obtain a detailed report on Link 1**
   The following form of screen is displayed.

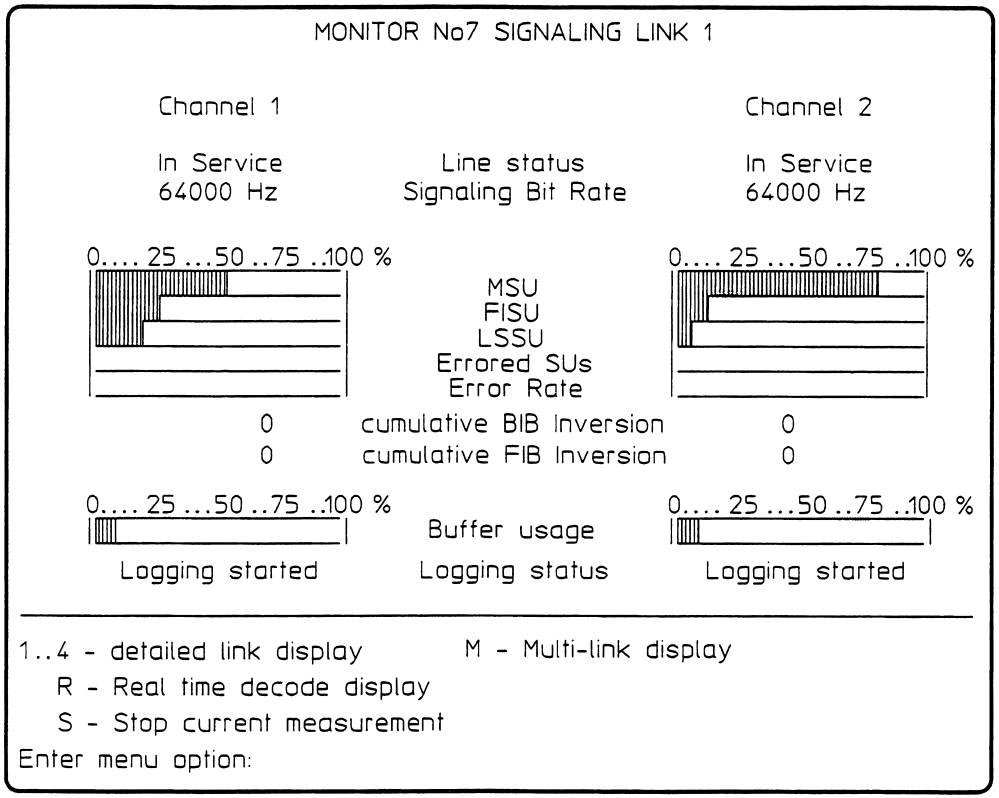


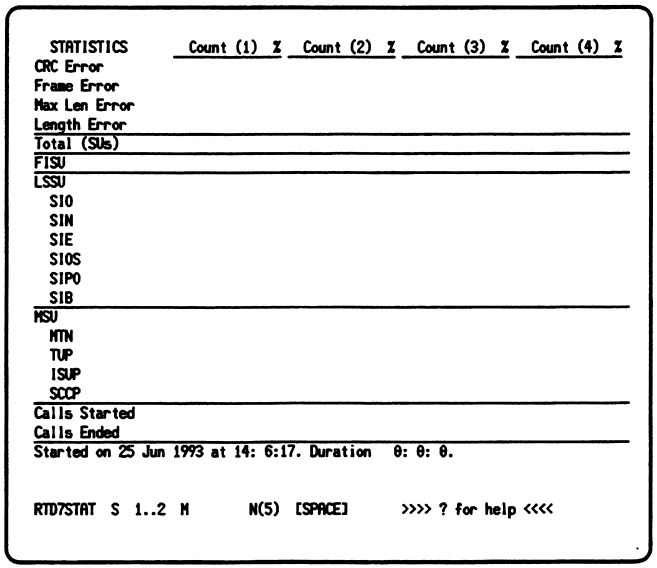
Figure 3-10. The Single-Link (Detailed) Display Example

3. **`Press R to obtain a real-time display`**

   The personality file defines up to eight real-time decodes (RTDs).

   `Press N to select each decode in turn`

   The following is an example of the display provided by the decode RTD7STAT.



Only the control character of the relevant options are displayed.

The help screen identifies the options.

4. Use the N (Next) key to step through the available formats.
5. Use the Space bar to freeze the display.
6. With the display frozen, use the cursor keys to highlight a message of interest and press D to obtain a text decode of the message, as described in "Decoding a Message".
7. When the test has been completed (the stop trigger received) you are prompted to press Q to return to the MONITOR MODE menu.

Note

Monitoring can be stopped at any time by pressing S. Do not use the Stop key (this clears all logged data from the log buffer).

Searching the Logged Data

- If, during this session, you *have* monitored a signaling link:

  From the MONITOR MODE menu
  ```
  Press  D  to display the logged data
  ```

- If you *have not* monitored a signaling link, read a logged data file from disc as follows:

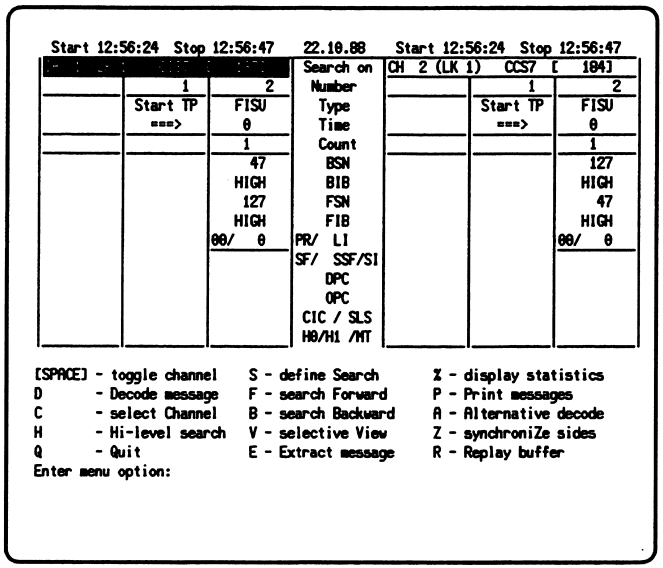
  From the MONITOR MODE menu
  ```
  Press  R  to read the file from disc into the log buffer
  ```
  The logging conditions used to log this data are also retrieved.

  A sample file suitable for these exercises is CCITT.000. For a list of available files;

  Enter File Manager.
  List the files by type.
  Select "Monitor log files".

  ```
  Press  D to display the logged data
  ```

The data in the log buffer is displayed.



The Level 2/3 Decode Display Example

As for setting up the logging conditions, there are two alternative search methods.

- The "High-Level" method, using option `H - Hi-level search`.
- The "Standard" method, using option `S - define Search`.

High-Level Search Setup

Select `H - Hi-level search` from the Level 2/3 Decode menu.

You can either set up message templates in the current catalog as described below or, if your version of the HP 37900 includes this facility, read a previously saved catalog from disc.

1. From the SET-UP HIGH-LEVEL SEARCH/SELECTIVE VIEW menu, select `Add message template`.
2. Set up your search templates as described earlier under "High-Level Triggers and Filters Setup".
3. When you have finished setting up your template, press `Q` to quit the selection process.
   - To save your template, press `Q`.
   - To abandon the template, press `A`.
   - To avoid quitting and continue defining the template, press `C`.
4. Press `Q` and give your template a title.
5. If your version of the HP 37900 includes this facility, you can save the current catalog to disc for future use.
6. If you have defined a number of templates, use the cursor to select the one you want to use in the search.
7. Quit to the Level 2/3 Decode menu.
8. Use the `F` and `B` options to search forward and backward for messages matching your template.

Standard Search Setup

1. Select `S - define Search` from the Level 2/3 Decode menu.

   The available search mnemonics are displayed. These correspond to the parameters in the centre window of the screen.
2. If for example you want to search for IAM messages;
3. Type `MT` (Return) to search by Message Type.
4. Type `IAM` (Return). You are returned to the Level 2/3 Decode menu.

Searching for Matching Messages

When you have defined your search template and returned to the Level 2/3 Decode menu;

Press `F` to search forward.

The first matching message found in the log buffer of the selected channel is displayed in the middle window of the highlighted channel. If there is not an IAM message in channel 1, use the Space bar to select channel 2 and repeat the search by pressing `F` again.

Use the ▼ and ▲ keys to scroll through the message.

Use `A-Alternative decode` to obtain a number of optional view facilities.

Use `D` to obtain a text decode of the selected message.

Selective View

Press `V` to select messages to be displayed or hidden. The approach is;

1. Define the template(s). You can use;
   - The "High-level" method.
     Select `V - define high-level View`.
   - The "Standard" method.
     Select `D - Define view`.
   - Call-trace.
     Select `T - call Trace`.
2. Specify that all matching messages are hidden, or only matching messages displayed.

For example, using the standard method to specify that FISUs are not displayed;

1. From the Level 2/3 Decode menu, press `V`.
2. Press `D` to start defining the messages.
3. Type `TY` Return to select by message TYpe.
4. Type `FIS` Return to specify FISUs.

5. Press `H` to Hide all FISUs.

6. Press `C` to specify the currently selected channel.

The FISUs remain in the log buffer, but they are not displayed. If you later write the data in the log buffer to a disc file (`W` in the MONITOR MODE menu) the View conditions are also saved, and will be reasserted when the file is retrieved.

To redisplay the FISUs;

1. Press `R` in the Selective View menu.

2. Press `Q` to return to the Level 2/3 Decode screen.

Decoding a Message

To view the text decode of the message currently displayed in the middle window of the selected channel;

```
Press D
```

The message is now displayed in the format below. The binary values of the octets are shown on the left. A brief description or label is shown for each octet.

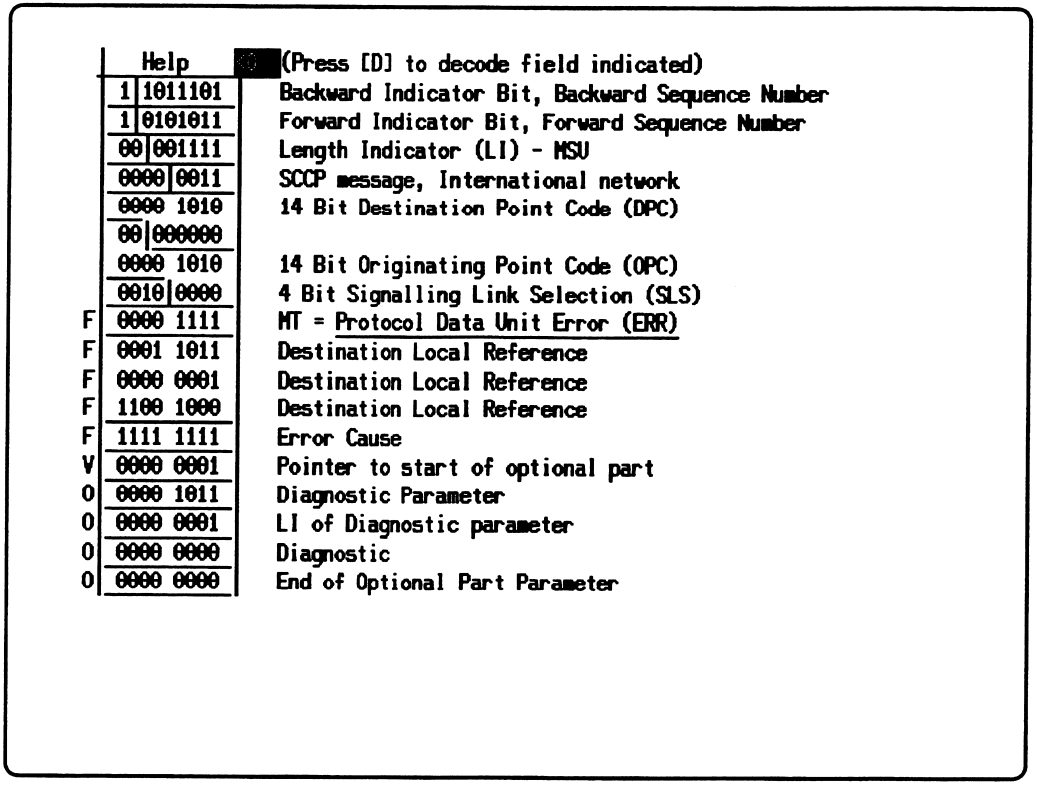


Figure 3-11. Message Decode Screen Example

With the highlighted cursor against `Help`,
`Press D` for information on further decoding an octet.
`Press Q`

Use the ▼ and ▲ keys to select an octet and press `D` again.

The binary representation is unchanged, but the decode text now describes in detail the field containing the octet you selected.

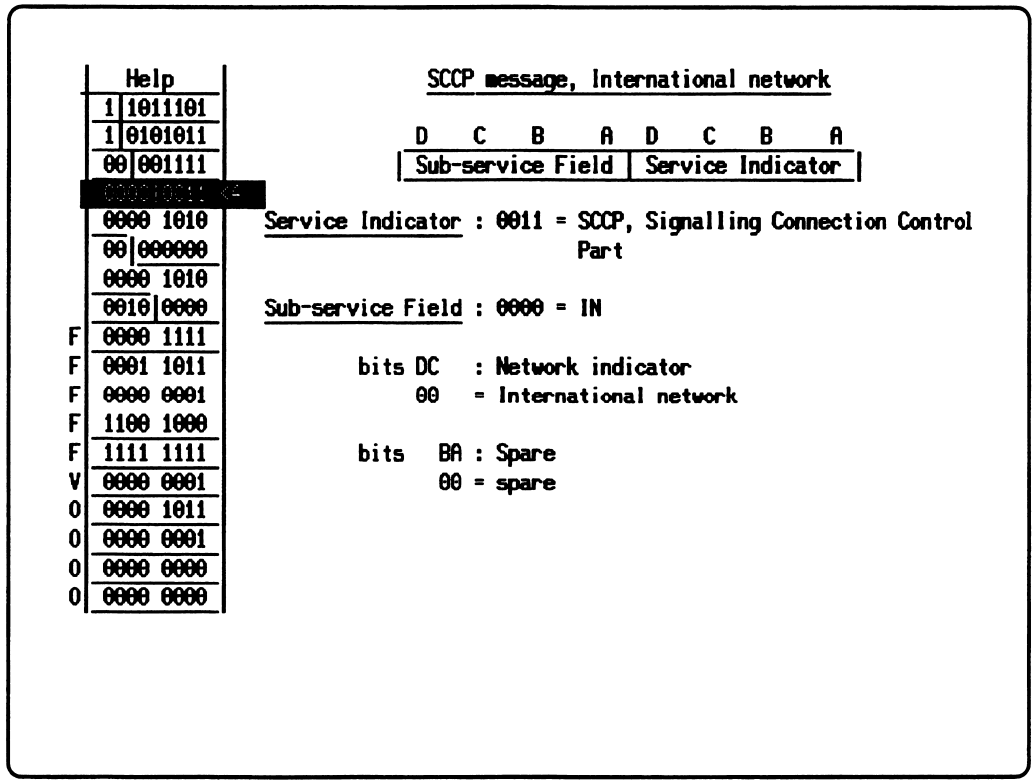


Figure 3-12. Field Decode Screen Example

To return to the Message Decode Screen, press ▼ or ▲.

To return to the MONITOR MODE menu press Q twice.

Reboot the HP 37900 to return to the default settings (press Shift CTRL Reset simultaneously).

Generating a Call in Monitor Mode

If you are using an ISDN Basic Rate Interface card, you can generate a call directly from any of the real-time monitor screens. The destination telephone numbers first have to be set up in Configuration Mode, as described earlier under "Configuring the ISDN Basic Rate Interface (BRI)" in Chapter 2.

The following options are included in the real-time monitor menus.

```
F - call-gen conFig
G - call-Gen menu
```

The Call-Gen Configuration Screen

Pressing F produces the following call-generator configuration screen. This shows the current configuration and allows you to change the displayed parameters.

```
                    CONFIGURE BASIC RATE CALL GENERATE
37919 on Link 3   Channel Id   B1     Call type  VOICE
                  Telephone numbers  0313311000   0313311001
                                     0313311002   0313311003




B - change B channel                  V - change Voice/data parameter
P - select Phone number
Q - Quit
```

B - change B channel
This steps the channel between B1, B2, and either B1 or B2.

P - select Phone number
This steps through the telephone numbers set up in Configuration Mode to select the "current" number. The currently selected number is highlighted.

V - change Voice/data parameter
This switches the type of call between VOICE and DATA.

Pressing G produces the call-generator menu, which allows you to control the status of the HP 37900 with regard to the signaling link, and to generate or terminate the call.

```
C - Connect call-generator              G - Generate call
D - Disconnect call-generator           H - call on-Hook
                                        Q - Quit
```

The C option connects the call generator to the link.

The G option connects the call generator to the link and makes the call.

The H option clears the call. The call generator remains connected to the link.

The D option disconnects the call generator from the link.

4

Remote Control and File Transfer

Remote Control

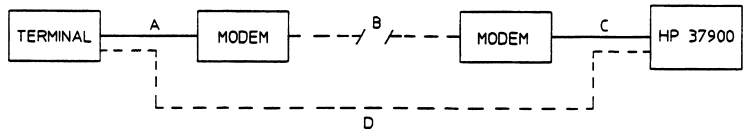
The HP 37900 Signaling Test Set can be controlled by a terminal located at a remote site. When a communication path has been established, operation of the HP 37900 via the terminal is identical to that described in the other chapters of this manual.

This chapter describes how to:

- Install and configure the communication path.
- How to establish control of the HP 37900 from the terminal.
- How to transfer files over a hardwired RS-232 link.

Overview

The terminal can be connected by a hardwired link directly to the HP 37900 or through modems and telephone lines.



A: RS-232-C
B: PHONE LINK, DIAL-UP OR LEASED LINE
C: RS-232-C
D: DIRECT-CONNECT LINK USING RS-232-C INTERFACES

Figure 4-1. Remote Control Communication Path

The system supports link speeds up to 9600 bit/s.

The terminal can be:

- Any Hewlett-Packard terminal.
- Any device which can emulate Hewlett-Packard terminal functions, for example an HP Vectra PC running AdvanceLink software.
- Any terminal compatible with ANSI X3.64-1979.

Note **High-Level Triggers and Filters**

If your terminal is set to HP mode there can be some shortening of highlighting bars in the high-level displays. You can improve this by setting the terminal to ANSI mode.

Modems must have:

- Full-duplex capability for dial-up or leased lines.
- RS-232-C or V.24 interface.
- Asynchronous operation.
- Auto-answer capability at the Remote Site.
- Error correcting operation (strongly recommended).

The maximum length of a hardwired link is 15 m (50 ft). There is no limit for a modem link.

Installation of a Hardwired Link

Assumed Equipment

Terminal — HP 700/92 Display Terminal (recommended).

Cable D
- HP 37900B: HP 92221P (1.5m modem bypass cable) plus HP 31391A (5m) or plus HP 31391B (10m).
- HP 37900C or HP 37900D: HP 40242Z (5m modem bypass cable) plus HP 13242M (5m).

Software — The HP 37900 includes software for remote control operation.

Procedure

Note

The following information assumes the recommended equipment is installed. However, terminal and modem configuration details are included to assist in configuring other suitable equipment.

Link D in Figure 4-1 represents the communication path.

1. Install the HP 37900 as described in the Installation and Maintenance Manual.
2. Install the terminal according to its User Manual.
3. Configure the terminal from the keyboard using the Datacomm Configuration menu. The settings are as follows:

```
                    DATACOMM CONFIGURATION

BaudRate 2400      Parity/DataBits EVEN/7          EnqAck NO

Asterisk OFF           Chk Parity YES              SR (CH) LO

RecvPace Xon/Xoff      XmitPace   Xon/Xoff     CS (CB) Xmit NO
```

Note

For slow terminals, set **RecvPace** to "none" to avoid the XOFF clash problem. Refer to "Problems With The Communication Link" later in this chapter.

4. Ensure **Remote Mode** is activated (indicated by an asterisk on the softkey function label). Refer to the terminal's User Manual for set-up instructions.
5. Connect the combined RS-232-C cable between the rear-panel of the HP 37900 and the terminal.

   If you do not have the combined RS-232-C cable specified, use a cable which provides the critical pin connections shown below:

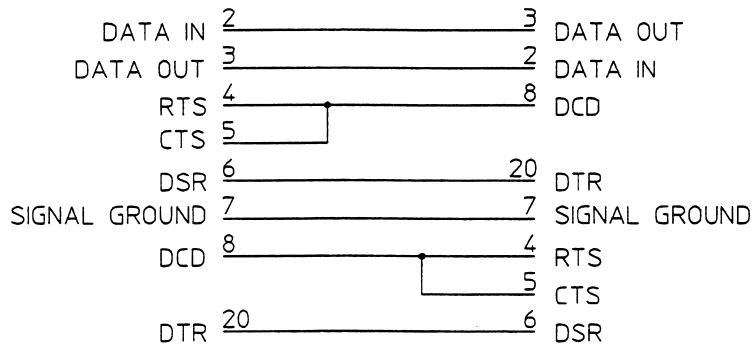


Figure 4-2. RS-232-C Cable for Hardwired Link

6. Go to "The Remote Configure File (rmtconfig.TEXT)" later in this chapter. Configure the RS-232-C port of the HP 37900, if required, for hardwired operation.

   The HP 37900 is factory-set for a hardwired link running at 2400 bit/s.
7. Go to "The Login File (rmtpass.TEXT)" later in this chapter and ensure that password details are correct.
8. Now go to "Establishing Remote Control" later in this chapter.

Installation of a Dial-Up Link

Links A, B, and C in Figure 4-1 represent the communication path, where link B is a dial-up telephone line.

Assumed Equipment

Terminal	HP 700/92 Display Terminal (recommended).
Modem	HP 37212B
Cables	■ Cable A: HP 13242M (5m). ■ Cable C: HP 13242M (5m). If you are using a HP 98628A Datacomms Card in an HP 37900B, use HP 13222M (5m).
Software	The HP 37900 includes software for remote control operation.

Note

Hewlett-Packard recommend error-correcting modems. See "Problems With The Communication Link" later in this chapter.

Installation at the HP 37900 Site

1. Install the HP 37900 according to the INSTALLATION chapters in this manual.
2. Install the HP 37212B modem according to its User Manual.
3. Set the Configuration Switch, located on the rear-panel of the modem, as follows:

Segment :	1	2	3	4	5	6	7	8	9	10	11	12
Setting :	1	0	0	0	0	0	1	1	1	0	1	1

To help set up any other modem, the above configuration represents:

a. Asynchronous operation with 10 bit word length (7 data, 1 parity, 1 start and 1 stop bits).
b. Computer mode (no unsolicited status messages from the modem).
c. Error correction and XON/XOFF flow control selected.
d. DSR/DCD/CTS controlled by the modem to RS-232-C definition.

e. DTR controlled by the HP 37900 to RS-232-C / V.24(108/2) definition.

4. Press in the modem's AUTO ANS push-button (front-panel).
5. Connect the RS-232-C cable between the modem and the HP 37900.
6. Connect the telephone cable from the wall outlet to the TELCO (not HANDSET) connector at the rear-panel of the HP 37212B.

Caution

In most countries, it is unlawful to connect a modem to the telephone network unless the local telephone authority has approved the modem type.

---

7. Go to "The Remote Configure File (rmtconfig.TEXT)" later in this chapter. Configure the RS-232-C port of the HP 37900 for modem operation.
8. Now go to "The Login File (rmtpass.TEXT)" and ensure that the password details are correct.

The HP 37900 is factory-set for a hardwired link running at 2400 bit/s.

Installation at the Terminal Site

1. Install the terminal according to its User Manual.
2. Configure the terminal from the keyboard using the Datacomm Configuration menu. The settings are as follows:

```
                    DATACOMM CONFIGURATION

BaudRate 2400      Parity/DataBits EVEN/7          EnqAck NO

Asterisk OFF           Chk Parity YES          SR (CH) LO

RecvPace Xon/Xoff      XmitPace   Xon/Xoff   CS (CB) Xmit NO
```

Note

For slow terminals, set `RecvPace` to "none" to avoid the XOFF clash problem.

Refer to "Problems With The Communication Link" later in this chapter.

3. Ensure `Remote Mode` is activated (indicated by an asterisk on the softkey function label).
4. Install the HP 37212B modem according to its User Manual.
5. Set the Configuration Switch on the rear-panel of the HP 37212B as follows:

Segment :	1	2	3	4	5	6	7	8	9	10	11	12
Setting :	0	0	0	0	0	0	1	1	1	0	1	1

To help set up any other modem, the above configuration represents:

a. Asynchronous operation with 10 bit word length (7 data, 1 parity, 1 start and 1 stop bits).
b. Terminal mode (friendly interaction with the modem).
c. Error correction and XON/XOFF flow control selected.
d. DSR/DCD/CTS controlled by the modem to RS-232-C definition.
e. DTR controlled by the HP 37900 to RS-232-C definition.

6. Connect the RS-232-C cable between the modem and the HP 37900.
7. Connect the telephone cable from the wall outlet to the TELCO (not HANDSET) connector at the rear-panel of the HP 37212B.

Caution

In most countries, it is unlawful to connect a modem to the telephone network unless the local telephone authority has approved the type.

---

8. Verify the communication path between the two sites as described below, then go to "Establishing Remote Control" later in this chapter.

Verification of the Dial-Up Link

When the equipment at both sites has been installed, verify the communication path as follows:

1. Press the Return key on the terminal a few times. The following is displayed:

```
HP 37212B MODEM
2400 BPS
>
```

   This verifies the communication path between the terminal and its modem.

   If there is no response from the modem, check the cable connections are good. If this does not find the problem, refer to the terminal and modem User Manuals.

2. At the > prompt, type in the phone number of the HP 37900 site. The terminal displays messages showing the progress of the call. If communication is established, the terminal displays:

```
HP 37212B MODEM
2400 BPS
>phone number
 DIALLING:phone number
 ANSWER TONE
 ON LINE 2400
```

Installation of a Leased Line Telephone Link

Links A, B, and C in Figure 4-1 represent the communication path, where link B is a leased telephone line.

Note The HP 37212B uses a 2-wire (not 4-wire) leased line.

---

1. Install the HP 37212B modem in accordance with its User Manual.
2. Set up the Configuration Switch on the rear of both HP 37212Bs as follows:

Segment :	1	2	3	4	5	6	7	8	9	10	11	12
Setting :	1	0	1	0	0	0	1	0	1	0	1	0

   To help set up any other type of modem, the above configuration represents:

   a. Asynchronous operation with 10 bit word length (7 data, 1 parity, 1 start and 1 stop bits).
   b. Leased line mode.
   c. Error correction with XON/OFF flow control selected.
   d. DSR/DCD/CTS controlled by the modem to RS-232-C definition.
   e. DTR permanently read as true by modem.

3. On both HP 37212Bs, select 2400 bit/s operation on the front panel. At the HP 37900 site, set the HP 37212B AUTO ANS button IN. At the terminal site, set the HP 37212B AUTO ANS button OUT.
4. Connect the phone lines from the wall sockets to the TELCO sockets on the HP 37212Bs. When the physical connection is made, the modems immediately attempt to establish communucation. It can take up to 15 seconds for the modems to complete the handshake.
5. Connect the terminal and the HP 37900 to their modems using the cables described in "Installation of a Dial-up Link".
6. Go to "The Remote Configure File (rmtconfig.TEXT)" later in this chapter. Configure the RS-232-C port of the HP 37900 for hardwired operation.

   The HP 37900 is factory-set for a hardwired link running at 2400 bit/s.

7. Go to "The Login File (rmtpass.TEXT)" and ensure that the password details are correct.

Verification of the Leased Line Link

Press Return on the terminal a few times. The modem-to-modem link is working if the Tx indicator on the terminal end modem and the Rx indicator on the HP 37900 end modem blink on.

Establishing Remote Control

Logging In

At the Terminal Site;

- Press (CTRL)-D. A few seconds later the `LOGIN:` prompt is displayed.

The terminal assumes control of the HP 37900 when the login and password entries are entered successfully on the terminal.

Note

1. If this is the first time the procedure is being performed, use the factory login `HP37900` at the login prompt and press (Return) at the password prompt. See "The Login File (rmtpass.TEXT)" for instructions on setting up a login and password.
2. Remember that the login and password entries are case sensitive.
3. The (Backspace) key is disabled during this function.

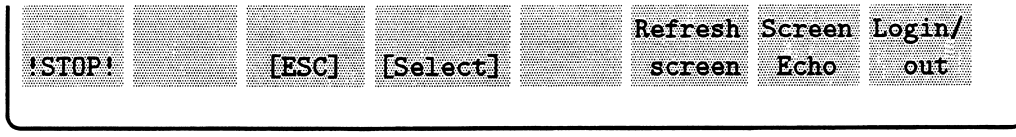
---

1. At the `LOGIN:` prompt, type your login then press (Return).
2. At the `PASSWORD:` prompt, type your password then press (Return).

   The login you typed is displayed, the password is not.

   If a valid login and password are entered correctly, the terminal displays
   `Login correct`
   and the HP 37900 Welcome Screen (or Main Menu) is displayed.

   The softkey function labels are displayed on the terminal screen, but not on the HP 37900 screen. (For ANSI terminals, see "Notes on the Login_file of rmtpass.TEXT" later in this chapter.)



The `!STOP!` softkey performs the same function as the HP 37900 Stop key (aborts the current activity). Use only in Emulation Mode.

The `[ESC]` softkey performs the same function as the HP 37900 ESC key. Use the softkey instead of the keyboard key whose normal function is altered when remote control is established.

The `[Select]` softkey performs the same function as the HP 37900 Select key. Use the softkey instead of the keyboard key whose normal function is altered when remote control is established.

The `Refresh screen` softkey causes the HP 37900 to retransmit its current display to the terminal.

The `Screen Echo` softkey acts as a toggle switch to either maintain the same display on the terminal as that present on the HP 37900, or transmit only keyboard entered characters.

The `Login/out` softkey acts as a toggle switch to either exit remote control mode thereby deactivating the terminal keyboard (`logout`), or enter remote control mode and activate the terminal keyboard (`login`).

If the login is not successful, the message
`Login incorrect`
is displayed on the terminal. An unsuccessful login can be the result of an invalid login or password being entered. Re-dial if necessary, then either press the `Login/out` softkey (if the softkey function labels are present) or press CTRL and D simultaneously. When the `LOGIN:` prompt re-appears, correct the login and password entries using the correct (UPPER or lower) case. Remember also that Backspace is disabled.

3. Type `X` for `eXecute`.

   `Execute what file?` is displayed.

If it is not displayed, press the `Screen Echo` softkey then type `X` again.

4. Type `*STS` and the HP 37900 Welcome Screen (or Main Menu) is redisplayed on both the terminal and HP 37900 screen.

Remote control of the HP 37900 is now established.

Caution

The keyboard at the HP 37900 site is still active. To avoid accidental interference, lock and close the keyboard, and fix a suitable warning notice.

Logging Out

You can break remote control of the HP 37900 from the Terminal Site at any time by logging out. When you log out, the HP 37900 remains in the same state until logged into again.

To log out at the Terminal Site, either;

- Press softkey [f8] if the softkey function labels are present.

OR

- Press [CTRL] and [D] simultaneously, if the softkey function labels are not present.
  If your modems do not have error correction active, the terminal displays spurious characters generated as the modem carrier dies. These characters can cause the terminal to "hang up". Try a soft reset. If this does not cure the problem, refer to "Problems With The Communication Link" later in this chapter.

To log in again:

1. Ensure the communication link is present.
2. Either press softkey [f8] (if the softkey function labels are present).

   OR

   Press [CTRL] and [D] simultaneously.
3. Enter your login and password.

   If the login and password entries are valid, the terminal screen is updated with the same display as that present on the HP 37900. (If the HP 37900 display contains highlighted information, the highlights do not initially appear on the terminal screen. Exit and then re-enter that screen to replace the highlights.)

User Accessible Files

The Remote Configure File (rmtconfig.TEXT)

The remote control link from the terminal connects to the HP 37900 RS-232-C port. Details of the configuration of this port for remote control operation are contained in rmtconfig.TEXT.

To modify the contents of this file:

1. Select File Manager.
2. Press `N`.
3. Type `rmtconfig` Return.
4. Press `E`. A listing of the file is displayed.
5. Use the ▼ key to move down to the four lines which do not begin with "&". (Lines beginning with "&" are comment lines.) The first word in each of these lines is the configuration definition. Each one is followed by a comment explaining the meaning of the entry.
6. Do not change `slave`.
   Do not change the select code 9, which is the built-in interface of the HP 37900.
   To set the baud rate, go to the Remote and Printer Manager (refer to the Installation and Maintenance Manual, Chapter 5). The following example shows the factory settings.

```
slave                & 'slave' is used for remote communications
9                    & 9 is the select code for the built in interface
2400                 & 2400 baud rate
true                 & link type. 'true' for hardwired; 'false' for modem
&END
```

rmtconfig.TEXT Modifiable Entries

7. To change text;
   a. If the new text has the same number of characters as the original text;
      i. Position the cursor under the first character of the text to be changed.
      ii. Select Overwrite mode by pressing [Insert char].
      iii. Overwrite the text with your new text.
   b. If the new text has a different number of characters from the original text, use Insert mode to insert the new text, and the [Delete char] key to delete the old text.
8. When you have finished editing, press [Select] to change to command mode.
9. Ensure that the Save command is highlighted in the top line, and press [Return].
10. Press [Return] again to save the file to the same filename. Press Y.
11. Return to command mode and quit the editor.
12. Quit the File Manager.
13. Return to "Establishing Remote Control" earlier in this chapter.

The HP 37900 now is ready for remote operation.

The Login File (rmtpass.TEXT)

Login, password and terminal information is kept in the password file rmtpass.TEXT
To set up, delete or modify entries in this file;

1. Return to the Pascal Main Command Line.
2. Type `E` for the `Editor` command.

   ```
   Edit what file?
   ```

3. Type `rmtpass` and the contents of the password file are displayed. To change the text in any line of the file, refer to list item 7 under "The Remote Configure File (rmtconfig.TEXT)" earlier in this chapter.

Each line of rmtpass.Text is one password sequence in the format:

name/password/terminal_type/login_file/reserved/comment

name	user login name (case sensitive).
password	user password (case sensitive).
terminal_type	`HP` or `ANSI`. (If you want to use Filecopy to transfer files between two HP 37900s, set to `none`.)
login_file	filename of a text file which is sent to the terminal when you log in. This can be used to set up soft keys on an ANSI mode terminal, as in the example below. See "Notes on the Login_file of rmtpass.TEXT" below.
reserved	reserved for future development.
comment	comments describing this line.

Example of a typical password file:

```
RICK/8080/HP///  User name and password
Steve/evetS/HP///No comment
zzz/////         No password required
HP37900//HP///   factory-set login.
                 No password required. UPPER CASE.
hp37900//HP///   factory-set login.
                 No password required. lower case.
```

```
att/secret/ANSI/KEYS.TEXT// AT&T 2254 Terminal.
                        Softkeys defined in KEYS.TEXT
```

Each line must be left-justified and neither the **name** nor the **password** can contain the slash character (/). Any comments can follow the last slash character. Multiple passwords can be configured for the same login (using a different line for each password).

Note

If this is the first time the HP 37900 is being controlled by a terminal, the *factory* password sequence is displayed (see the above example). If you log in using UPPER CASE, the upper case version is displayed. If you use lower case, the lower case version is displayed.

Delete both versions immediately and replace them with your own password sequence.

Notes on the Login_file of rmtpass.TEXT.

Note 1 Each password sequence in the rmtpass.TEXT file can (optionally) contain the name of the log_in file, the contents of which get sent from the HP 37900 to the terminal at login. This feature allows you, at login, to set up any aspect of the terminal, including the display of helpful messages.

The name you give to the log_in file must match the name specified in the password sequence in both CASE and EXTENSION.

Note 2 In addition to alphanumeric characters, the log-in file can contain non-printing characters. The HP 37900 recognises a backslash character "\" in the file as an escape-from-text character, that is, it converts the character following "\" (or the next 3 characters if numeric) into a non-printing ASCII character. For example, when the HP 37900 reads "\n" in the log_in file, it sends the ASCII character for newline to the terminal. In addition to non-printing characters, "\" is also used with some hard-to-print characters, such as the printing character "\" itself.

When used with non-numeric characters, the escape-from-text sequence comprises "\" followed by a single character. The following sequences are defined:

```
\b   backspace          (ASCII code value 8 sent)
\n   newline             (ASCII code value 10 sent)
\r   carriage return    (ASCII code value 13 sent)
\t   tab                   (ASCII code value 9 sent)
\\   backslash          (ASCII code value 92 sent)
```

When used with numeric characters, the escape sequence comprises "\" followed by three decimal digits which give the ASCII value of the character sent by the HP 37900. For example, "\027" sends the ASCII character ESC.

Note 3 If text sent to the terminal requires a new line, this must be stated in the log_in file using "\n" or "\010" (new lines used when creating the log_in file itself are ignored).

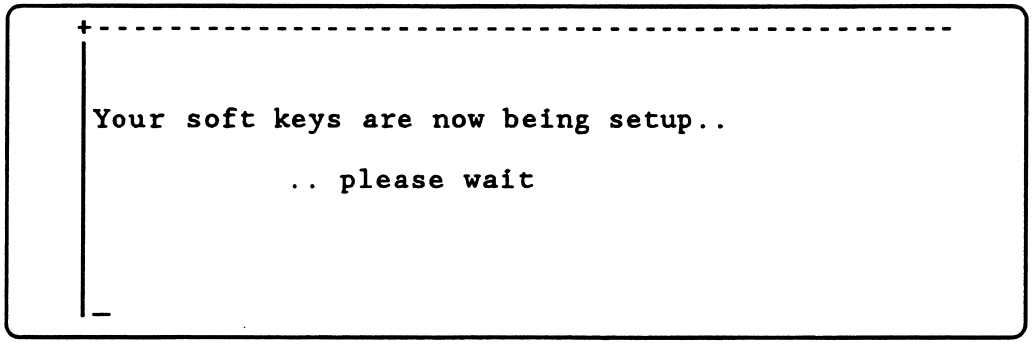
To enter comments, use the character "#". All text following "#" on the line is ignored.

Example

To set up a softkey on an ANSI terminal:

```
# Put a message on the display
\027[H\027[2J # Home and clear screen
\n\n
Your soft keys are now being set up . .
                      . . please wait\n\r\n\n\n
# The next line sets up softkey 1
\027P0;1|1/Key 1 sends this string;\027/
\n\n
```

The screen displays:



- The first line is comment.
- The second line sends escape sequence ESC,[,H, followed by another escape sequence ESC,[,2,J, followed by comment.
- The third line sends two newline characters.
- The fourth line sends a string of ASCII characters.
- The fifth line sends a string of ASCII characters followed by newline, carriage return and three newline characters.
- The sixth line is comment.
- The seventh line sends the character sequence for setting up softkey 1.

The Logging History File (LOGHIST.TEXT)

Each time you log in or log out, a time-stamped entry is added to the `LOGHIST.TEXT` file.

To check the contents of this file:

1. Quit from the HP 37900 software to obtain the Pascal Main Command Line.
2. Type `E` for `Editor`.

   You are asked for the filename.
3. Type `LOGHIST.TEXT` (all in UPPER case) and the contents of this file is displayed. For example:

```
RICK (remote) port:9 13:54:32 28-NOV-89 successful
USER_LOGOUT 13:58:47 28-NOV-89 logout/port switch
RICKK (remote) port:9 14:30:19 28-NOV-89 failure
LOGIN_FAILURE (-2,0) (remote) port:9 14:36:22 28-NOV-89 failed
STEVE (remote) port:9 16:27:01 29-NOV-89 successful
USER_LOGOUT 17:08:27 29-NOV-89 logout/port switch
```

The *first* line in the example is the login entry, in the format:

<login> <(remote) port:X> <time> <date> <result>

<login> is the user login. (The user password is not displayed).
<(remote) port:X> specifies the HP 37900 port number to which the RS-232-C cable is connected.
<time> is in the format `hour:min:secs`.
<result> is either `successful` (as in line 1), or `failure` if either the login or password entries are invalid.

The *second* line is the logout entry, and is in the format:

<Reason for logout> <time> <date> <logout/port switch>

<Reason for logout> has three possible entries:
`USER_LOGOUT`
`TIMEOUT_LOGOUT`
`CONNECTION_LOST`
<logout/port switch> confirms the user has logged out.

The *third* line is an example of an invalid login, in this case a typing error.

The *fourth* line is an example of an unsuccessful attempt to log in, due (for example) to a communication link fault. (The `(-2,0)` relates to the nature of the fault, and is used to assist in fault finding. The `-2` relates to the `escapecode`, the `0` to the `IOresult`. Refer to the Pascal 3.2 Workstation System Manual for further information on these values.)

The *fifth* and *sixth* lines are successful login and logout entries.

Caution

When the file is full, any subsequent entry causes the file to be cleared of all previous entries, leaving the new entry the first in the file.

ANSI Terminal Escape Sequences

If you are using an ANSI-compatible terminal for remote control, the terminal MUST support the following escape sequences for the software to run correctly.

Function	Escape Sequence
Cursor Up	ESCAPE [A
Cursor Down	ESCAPE [B
Cursor Forward	ESCAPE [C
Cursor Backward	ESCAPE [D
Cursor Home	ESCAPE [H
Cursor Position	ESCAPE [<y pos.>;<x pos.> H
Scroll Up	ESCAPE [S
Clear To End Of Screen	ESCAPE [J
Clear Entire Screen	ESCAPE [2J
Erase In Line	ESCAPE [K
Attributes Off	ESCAPE [0m
Underscore On	ESCAPE [4m
Inverse On	ESCAPE [7m
Underscore Inverse On	ESCAPE [4;7m
Insert Line	ESCAPE [L

Note: Many ANSI terminals do not support scrolling.

Problems With The Communication Link

XOFF Clash

This can occur when XON/XOFF flow control is active in both directions on the communication link. (In remote control mode, XON/XOFF flow control is permanently enabled at the HP 37900 end.)

When using an auto-repeating key, the HP 37900 receives a continuous stream of characters from the terminal and echoes them back to the terminal. If the HP 37900 and the terminal assert XOFF at nearly the same time, it can cause blockage of XON from either end.

Note: This problem most commonly occurs when the link speed is high, and is not encountered when using a terminal such as the HP 700/92 which can continuously receive data at a high speed.

There are two workarounds to the problem:

- On the terminal, disable the receive XON/XOFF (but keep the transmit XON/XOFF enabled). If overflow occurs, the display can get corrupted.

  Correct this by pressing the `Refresh screen` softkey.

- Keep full XON/XOFF flow control enabled on the terminal. If XOFF lockup occurs, perform a soft reset on the terminal (hold down Shift and press Reset). On a Hewlett-Packard terminal, a soft reset releases XOFF but does not affect the display or softkeys. For other terminals, check that a soft reset has the same effect.

Occasional Terminal Hangup

This can occur when, at the end of a remote control session, you log off from the terminal using Ctrl D. This triggers off call disconnection from the HP 37900 (remote) end. As the modem carrier collapses, spurious characters are sent from the modem to the terminal (and are displayed on the screen). This can cause the terminal to hang up.

The only cure for this type of hangup is a hard reset of the terminal.

Hewlett-Packard recommend the use of error correcting modems to avoid the problem.

Recovery after Modem Link Failure

If Ctrl D was not used, and communication is broken because of, for example, phone line failure or inadvertent disconnection at the modem front panel, recovery can require two attempts to redial the call. This depends on whether spurious characters were sent back to the HP 37900 as the modem carrier collapsed.

Dial the HP 37900 from the terminal. One of two situations occurs:

1. The modem link comes up and the terminal displays the `LOGIN:` prompt. Log in as normal.
2. The modem link comes up but, when you try to log in, the HP 37900 drops the call. Various messages can be displayed on the terminal screen.

   Re-dial the HP 37900. This time the terminal displays the `LOGIN:` prompt. Log in as normal.

Error Correcting Modems

Hewlett-Packard recommend the use of error correcting modems. This provides more efficient control of the remote HP 37900. It avoids spurious characters being generated when the modem link is disconnected or fails (see "Occasional Terminal Hangup" and "Recovery after Modem Link Failure" above).

Transferring Files Using HP-Kermit

Files can be transferred in either direction between:

- A Workstation and a HP 37900 connected by an RS-232 link. (Not under remote control.)
- Two HP 37900s connected by an RS-232 link. (Not under remote control.)
- A controlling Workstation and a remote HP 37900.

In general the rules are the same in all cases.

1. Ensure both ends have the correct communication setup (baud rate and so on). If the default setup is not suitable for you, you can change it and, if required, save the modified setup for future transfers.
2. Ensure both ends are set up for the *type* of file you are going to transfer (TEXT, CODE, and so on).
3. Instruct the source end to send **and** instruct the receiving end to receive. Repeat this as required, always remembering the type of file.

Note

1. In this section, the HP 700 UNIX Workstation is used as the example workstation. For another workstation or PC, refer to the appropriate documentation using the setup information in this section as a guide.
2. The generally accepted term "File Transfer" means the file is *copied*, it is not removed from the source instrument. If it is no longer required in the source instrument, delete it after the transfer.

The HP 37900 uses a version of Kermit to transfer files. The following options are available in the HP 37900 version of Kermit, referred to as "HP-Kermit".

`WRITE`	save current configuration to file.
`READ`	read configuration from file.
`CONNECT`	terminal emulator (not available in Remote version).
`SET`	set up the configuration. Parameters include:

```
DataBit
StopBit
Speed
Parity
File
Transfer
Debug
Verbosity
Overwrite
Volume
```

`SHOW`	view configuration.
`SEND`	transmit a file (send).
`RECEIVE`	receive a file.
`EXIT`	exit from HP-Kermit.
?	display help information.

Note

Default Communication Setup

The following configuration is provided with the HP 37900 software.

HP 37900D

Speed	2400
Data Bit	7
Parity	EVEN
Stop Bit	1

Check your current configuration. If you make changes, save your new configuration before attempting file transfer.

- Use the HP-Kermit `SHOW` command to view the current configuration.
- Use the HP-Kermit `SET` command to change the configuration if required.
- Use the HP-Kermit `WRITE` command to save the modified configuration for future use. This becomes the default configuration.

The following workstation configuration corresponds to the above HP 37900D configuration.

HP 700 WS

Line	/dev/tty00
Speed	2400
Parity	EVEN

File Type Configuration

Each type of file to be transferred requires different settings, as shown in the table below. For each type of file, set up `File` and `File Transfer` in the HP 37900 and `File Type` in the Workstation.

	.TEXT	.CODE	.MG .MK .000
HP 37900D			
File Transfer	TEXT ASCII	CODE BINARY	DATA BINARY
HP 700 WS			
File Type	TEXT	BINARY	BINARY

`.MG and .MK are the message catalog files.`
`.000 is a log buffer file.`

Transferring Files

Note the following points before transferring files.

- When using HP-Kermit remotely, if you do not use the default login `HP37900` with no password, edit the login and password lines in the file `SYS:KER_CFIG.TEXT` to allow HP-Kermit to correctly log you back in after file transfer.
- When using HP-Kermit remotely, HP-Kermit must use the same Baud-rate, Parity and Data-Bits settings as Remote Control.
- Multiple files may be sent or received by use of the wildcard "=" , which represents any string of 0 characters or more (e.g. SEND A = .TEXT).

  Use of the SET Volume command will determine which volume is copied from or copied to.

Caution

If Overwrite is set OFF , you cannot overwrite existing files and if it is set ON, the existing file will be overwritten without any warning.

- HP-Kermit can be executed from the filer as well as from the PASCAL Command line.
- Remote Control must be un-installed for local use of HP-Kermit.
- If you make changes to the local HP-Kermit configuration when a remote connection exists, you can lose the connection.
- Ensure both communicating HP-Kermit configurations are the same, and appropriate for the type of file being transferred.
- If either HP-Kermit fails, exit and start again to ensure no internal settings have been corrupted.
- HP-Kermit, when receiving, adopts the filename of the sent file, not the name entered with the command.
- HP-Kermit waits indefinitely to RECEIVE a file, as there is no time-out. You can overcome this by sending any file.

- HP-Kermit resends a Send packet every few seconds if no reply is received. It stops after 10 attempts.

Note

The following procedures require you to quit from the HP 37900 software to the Pascal Command Line. If your version of the HP 37900 does not have this facility, press CTRL-X from any of the startup screens.

Between a HP 37900 and a Workstation (not remote control)

Ensure the remote HP 37900 is displaying the Applications Screen or the Main Menu, and the Workstation is ready to execute HP-Kermit on Unix.
To disable and re-enable the Remote mode, refer to the Installation and Maintenance Manual, Chapter 5, Remote and Printer Manager.

At the HP 37900:

To:	Type this:
1. Quit to the PASCAL Command line:	`QY`
Ensure Remote mode is disabled, if required.	
2. Execute HP-Kermit:	`X*KERMIT`
The `HP-Kermit>` prompt appears.	
3. Set file configuration if required:	`SET FILE <parameter>` `SET TRANSFER <parameter>`
Ensure the Workstation is set up as described below.	
4. Send or Receive a file:	`SEND <file> | REC <file>`
5. Wait for transfer to complete. Repeat from 3. as required.	
6. Exit from HP-Kermit:	`EXIT`
Ensure Remote mode is re-enabled, if required.	
7. Return to Applications Screen or Main Menu:	`X*STS`

Note

When receiving, HP-Kermit adopts the filename of the sent file, not the name entered with the `REC` command.

Other versions of Kermit may use the filename entered with the `REC` command.

At the Workstation:

To:	Type this:
1. Execute HP-Kermit:	`kermit`
2. Set Line Type:	`set line /dev/tty00`

3. Set configuration if required:	`show`
	`set speed 2400`
	`set parity even`

4. Set file configuration if required:	`set file type binary`
5. Send or Receive file:	`send <file> | rec <file>`
Wait for transfer to complete. Repeat from 4. as required.	
6. Exit HP-Kermit on WorkStation:	`exit`

Between Two HP 37900s (not remote control)

Action is required at both keyboards.

Ensure both HP 37900s are displaying the Applications Screen or the Main Menu.
To disable and re-enable the Remote mode, refer to the Installation and Maintenance Manual, Chapter 5, Remote and Printer Manager.

At both HP 37900s:

To:	Type this:
1. Quit to the PASCAL Command line:	`QY`
Ensure Remote mode is disabled, if required.	
2. Execute HP-Kermit:	`X*KERMIT`
The `HP-Kermit>` prompt appears.	
3. Set file configuration if required:	`SET FILE <parameter>` `SET TRANSFER <parameter>`
4. Send from one HP 37900, Receive from other HP 37900:	`SEND <file>` | `REC <file>`
Wait for transfer to complete. Repeat from 3. as required.	
5. Exit from HP-Kermit :	`EXIT`
Ensure Remote mode is re-enabled, if required.	
6. Return to Applications Screen or Main Menu:	`X*STS`

Note

When receiving, HP-Kermit adopts the filename of the sent file, not the name entered with the `REC` command.

Between a Controlling Workstation and a Remote HP 37900

Ensure the remote HP 37900 is displaying the Applications Screen or the Main Menu, and the Workstation is ready to execute HP-Kermit on Unix.

At the Workstation:

To:	Type this:
1. Execute HP-Kermit:	`kermit`
2. Set Line Type:	`set line /dev/tty00`

3. Set configuration if required:	`show`
	`set speed 19200`
	`set parity even`

4. Enter Terminal Mode:	`connect`
You are now controlling the Remote HP 37900.	

5. Remote login:	CTRL-D
	`<login>`
	`<password>`

6. Quit to the PASCAL Command line:	`QY`
7. Execute HP-Kermit:	`X*KERMIT`
The `HP-KermitRemote>` prompt appears.	
8. Set file configuration if required:	`SET FILE CODE` `SET TRANSFER BINARY`
9. Send or Receive a file:	`SEND <file> | REC <file>`
The remote connection is temporarily closed to allow file transfer.	
10. Exit Terminal Mode:	CTRL-\ `C`
You are now controlling the Local HP-Kermit.	

To:	Type this:
11. Set file configuration if required:	`set file type binary`
12. Send or Receive file:	`send <file> | rec <file>`
When the transfer is complete, re-connect to the remote HP 37900.	
13. Enter Terminal Mode:	`connect`
You are again controlling the Remote HP 37900. Repeat from 8. as required.	
14. Exit HP-Kermit on remote HP 37900 and return it to the Applications Screen or Main Menu:	`EXIT` `X*STS`
15. Remote Logout:	CTRL-D
16. Exit Terminal Mode:	CTRL-\ `C`
You are now controlling the Local HP-Kermit.	
17. Exit HP-Kermit on WorkStation:	`exit`

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