

User's Guide  
PDH/SDH  
Operation

**HP 37718A  
Communications  
Performance Analyzer**

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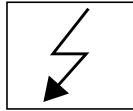
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EN 60825 1991

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# HP 37718A Communications Performance Analyzer

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# About This Book

This book tells you how to select the features that you want to use for your test.

The selections available are presented in the following groups:

- Transmit and receive interfaces
- Test features, for example, the addition of errors and alarms to the test signal
- Measurements including test timing
- Storing, logging and printing results with general printer information
- Using instrument and disk storage
- Using the “Other” features.

**The selections available will depend on the options fitted to your instrument. The examples given in this book cover all options and therefore may include selections which are not available on your instrument.**

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## **Setting the Interfaces**

This chapter tells you how to set the instrument interfaces to match the network being tested.

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# Setting the Interfaces

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## Setting PDH Transmit Interface

### *Description*

PDH transmit interface settings should match network equipment settings of Rate, Termination and Line Code and determine the Payload to be tested.

### *TIP:*

To set the Transmitter and Receiver to the same interface settings choose **OTHER** **SETTINGS CONTROL** **COUPLED**.



### *HOW TO:*

- 1 Choose the required SIGNAL rate.  
If Option 010 is fitted, rates of 2, 8, 34 and 140 Mb/s are available.  
If Option 011 is fitted rates of DS1, DS3, 2 Mb/s and 34 Mb/s are available.
- 2 Choose the required CLOCK SYNC (clock synchronization source).
- 3 If DS1 or DS3 is chosen, choose the required interface level.
- 4 If you have chosen 2 Mb/s as the SIGNAL rate, choose the required TERMINATION. (At all other signal rates the impedance is fixed).

## Setting the Interfaces

### Setting PDH Transmit Interface

- 5 If you have chosen 2 Mb/s, DS1 or 8 Mb/s as the SIGNAL rate, choose the required LINE CODE. (At 34 Mb/s, 140 Mb/s and DS3 coding is fixed.)
- 6 If required, choose the FREQUENCY OFFSET value.  
See “Adding Frequency Offset to SDH Signal” page 33.
- 7 Choose the required PAYLOAD TYPE.  
If STRUCTURED is required FRAMED must be chosen.  
If Structured is chosen the PDH test signal must be set up. See “Setting Transmit Structured Payload/Test Signal” page 39.  
If you have chosen 2 Mb/s, DS1 or DS3 as the PDH/DSn signal rate, the Framed choice is expanded to provide a menu of framing types.
- 8 Choose the PATTERN type and the PRBS POLARITY.

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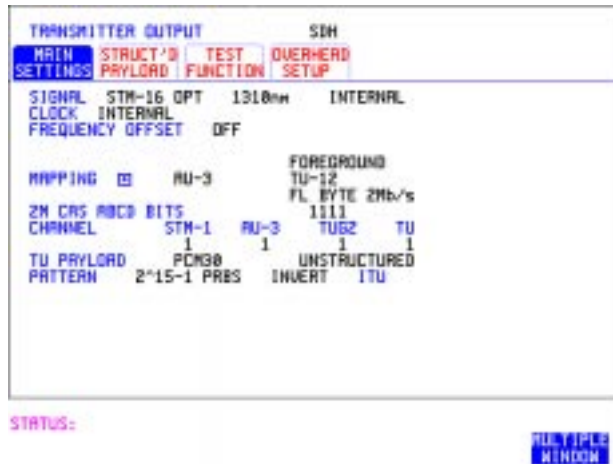
## Setting SDH Transmit Interface

### Description

SDH transmit interface settings should match the network equipment settings of Rate, Wavelength and Mapping, determine the payload to be tested and set background conditions to prevent alarms while testing.

### TIP:

If you wish to set the HP 37718A transmitter and receiver to the same interface settings choose **OTHER** **SETTINGS CONTROL** **COUPLED**.



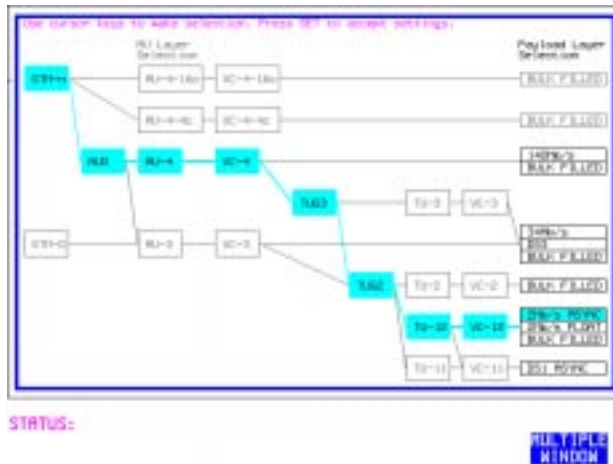
### HOW TO:

- 1 Make your choice of SIGNAL rate.  
If Option 106, Dual Wavelength optical module, is fitted and an optical rate is chosen, choose the required wavelength (1550) or (1310).  
If STM-0 is chosen, choose the required interface level.  
Choose INTERNAL unless THRU MODE is required. If THRU MODE is chosen, see "Setting SDH THRU Mode " page 15.
- 2 Make your choice of CLOCK synchronization source. The RECEIVE clock sync choice depends on the SDH Receive Interface choice.  
EXTERNAL allows a choice of MTS, BITS or 10 MHz clocks.
- 3 If required choose the FREQUENCY OFFSET value. See "Adding Frequency Offset to SDH Signal" page 33.
- 4 Choose FOREGROUND **F/G MAPPING**, BACKGROUND **B/G MAPPING** MAPPING and type of payload.

## Setting the Interfaces

### Setting SDH Transmit Interface

Mapping may be selected from a pictorial display by moving the cursor to MAPPING and pressing **SET**.



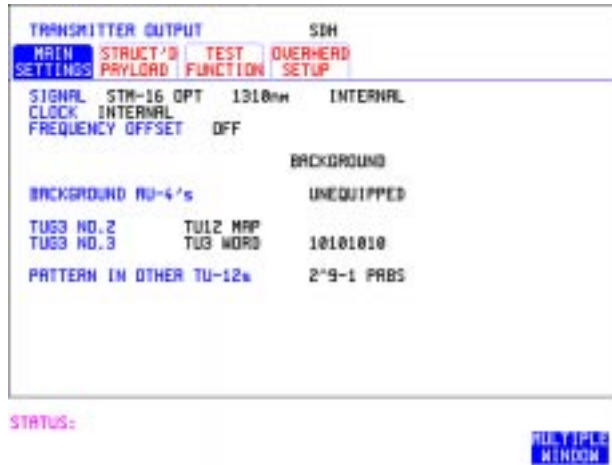
Use **→** and **←** to move between AU Layer Selection, TU Layer Selection and Payload Layer Selection. Use **↑** and **↓** to set the mapping and **SET** to set your selection.

- 5 If TU-2 mapping is chosen, TU CONCATENATION selection is enabled, choose OFF or the tributary at which the concatenation begins, TU2-2C through TU2-6C.  
The BACKGROUND, PATTERN IN OTHER TU2's is fixed at NUMBERED, that is, each TU-2 contains a unique number to allow identification in case of routing problems.
- 6 If required, choose DS1/2M/34M/DS3/140M OFFSET value. See "Adding Frequency Offset to SDH Signal" page 33
- 7 If TU-3, TU-2, TU-12 or TU-11 mapping is chosen, choose the test tributary CHANNEL, including the STM-1 for an STM-4/STM-16 signal.
- 8 Choose the payload framing under PAYLOAD TYPE or TU PAYLOAD. If STRUCTURED is required FRAMED must be chosen. If STRUCTURED is chosen, the Payload test signal must be set up. See "Setting Transmit Structured Payload/Test Signal" page 39. If INSERT is chosen, see "Inserting an External PDH Payload/Test Signal" page 45.  
If you have chosen 2 Mb/s, DS1 or DS3 under Mapping, the Framed choice is expanded to provide a menu of framing types.

## Setting the Interfaces

### Setting SDH Transmit Interface

- 9 If 2 Mb/s framing PCM30 or PCM30CRC is chosen, set the CAS ABCD bit value. See "Setting up Signaling Bits " page 36
- 10 Choose the PATTERN type and PRBS polarity.



- 11 Choose the mapping required in the background (non-test) TUG-3s. Refer to Appendix A for a table of background patterns for AU-3 and TUG-3.
- 12 If TU-12 mapping is chosen for the test TUG-3, choose the PATTERN IN OTHER TU-12s.

---

## Setting SDH THRU Mode

### **Description**

THRU mode is used to non-intrusively monitor SDH lines where no protected monitor points are available.

As THRU mode locks some user settings, you must set SIGNAL RATE, AU rate, AU-3 CHANNEL (if appropriate) before selecting THRU mode.

The entire frame can be errored at a user defined rate if PAYLOAD OVERWRITE and SOH+POH CHANNEL OVERWRITE are both set to OFF. If either overwrite is enabled the ENTIRE FRAME ERROR RATE function is disabled.

### **STM-0, STM-1**

You can substitute a new payload, Section overhead (SOH) and Path overhead (POH) in the received STM-0/1 signal for testing.

### **STM-4, STM-16**

The overhead and payload may be overwritten for AU-4 and AU3. PAYLOAD OVERWRITE is not available for AU-4-4c or AU-4-16c. SOH overwrite is available for AU-4-4C and AU-4-16c.



### **HOW TO:**

- 1 Make the required SIGNAL RATE, MAPPING and CHANNEL choices on the SDH **TRANSMIT** and **RECEIVE** displays. See "Setting SDH Transmit Interface " page 12 and "Setting SDH Receive Interface " page 21.

## Setting the Interfaces

### Setting SDH THRU Mode

- 2 Make the PAYLOAD OVERWRITE choice required.  
If AU-4, AU-3, TU-3, TU-2 or TU-12 is chosen, the B1, B2 and B3 BIPs are recalculated before transmission and the Mapping, Selected TU, TU Payload, Pattern, Tributary Offset and Pattern in other TU's settings are displayed. To choose the settings in these, See "Setting SDH Transmit Interface " page 12, steps 4 through 10.
- 3 Make the SOH+POH OVERWRITE choice required.  
You can only modify those overhead bytes available under **TRANSMIT**  
**SDH TEST FUNCTION SDH**: Errors & Alarms, Sequences, Overhead BER, APS Messages and DCC Insert.  
The B1, B2 and B3 BIPs are recalculated before transmission.



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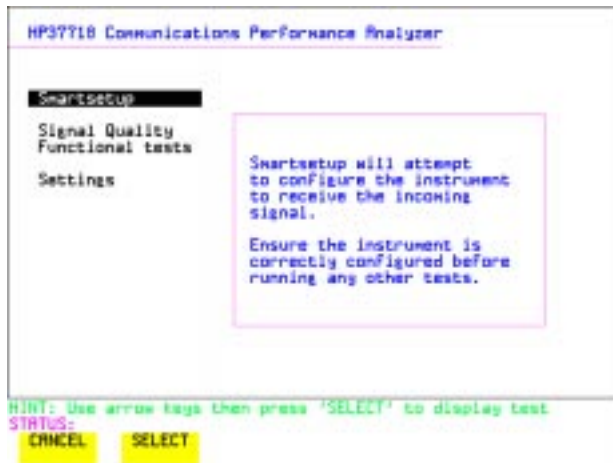
## Using Smart Test

### *Description*

The Smart Test function can help speed-up configuring the instrument in two ways.

- 1 A **Smartsetup** feature that will attempt to configure the instrument to receive the incoming signal.
- 2 A series of “links” that provide quick access to some of the most frequently used features of the instrument. Note that these tests are run with the instrument in its current configuration, no attempt is made to set the instrument to the requirements of the test.

**Smartsetup** can help the user by attempting to identify the incoming signal structure and detect mixed payload signal structures.



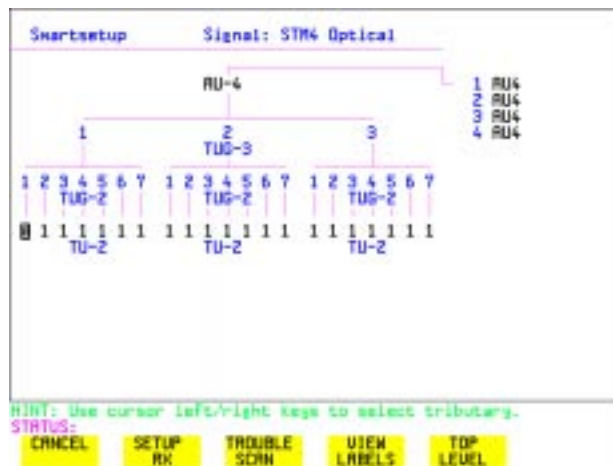
### *HOW TO USE SMARTSETUP:*

- 1 Connect the HP 37718A to the network and choose if necessary the required SDH **RECEIVE** interface on the HP 37718A (Smartsetup will select PDH or SDH/SONET, but can not select between SDH and SONET).
- 2 Press **SMART TEST**.  
The display will show the Smart Test menu above.
- 3 Press either **SET** or **SELECT**.

## Setting the Interfaces

### Using Smart Test

- 4 In **SDH** mode the incoming signal will be identified on the top line of the display, and under this the payload mappings, the J1 Trace and C2 byte indicators are displayed on the bottom lines.
- 5 Use the **↑** and **↓** keys to display the J1 Trace information for each AUG. When the AUG of interest has been identified choose either **VIEW PAYLOAD** or **PRBS SEARCH**.
- 6 Choosing **VIEW PAYLOAD** will identify and display the payload mapping of the TUG structured signal, as shown below. Choose the required tributary using **→** and **←**.



- 7 There are four choices available at this point:
  - SETUP RX** which sets the receiver to receive the selected tributary.
  - TROUBLE SCAN** which sets the receiver to receive the selected tributary, exits to the **RESULTS TROUBLE SCAN** display and starts gating.
  - VIEW LABELS** which displays the C2/V5/J1/J2 trace information for the selected tributary.
  - TOP LEVEL** which returns the display to the AUG selection window.
- 8 Choosing **PRBS SEARCH** at Step 5 will prompt you for additional information about patterns and which mapping to search. When the required data has been entered press **GO**.
- 9 When the search is complete a tributary display appears, with any tributaries containing the required PRBS indicated with a "P". Choose the required tributary using **→** and **←**.

---

## Setting PDH Receive Interface

### *Description*

PDH Receive interface settings should match the network equipment settings of Rate, Termination and Line Code and determine the Payload to be tested.

### *TIP:*

To set the transmitter and receiver to the same interface settings choose **OTHER SETTINGS CONTROL COUPLED**.



### *HOW TO:*

- 1 Choose the required SIGNAL rate.
- 2 If you have chosen 2 Mb/s as the SIGNAL rate, choose the required TERMINATION. (At all other rates the impedance is fixed.)
- 3 If you have chosen 2 Mb/s, DS1 or 8 Mb/s as the SIGNAL rate, choose the required LINE CODE. (At 34Mb/s, 140 Mb/s and DS3 coding is fixed.)
- 4 If you are measuring at the network equipment monitor point, set the LEVEL field to MONITOR. In this case the received signal will be 20 to 30 dB below the normal level.  
Choose the GAIN required to return the received signal to normal.  
Choose EQUALIZATION to compensate for cable losses if required.

## Setting the Interfaces

### Setting PDH Receive Interface

- 5 Choose the PAYLOAD TYPE.  
If STRUCTURED is required FRAMED must be chosen.  
If STRUCTURED is chosen, the PDH test signal must be set up. See “Setting Transmit Structured Payload/Test Signal” page 39.  
If you chose 2 Mb/s, DS1 or DS3 as the PDH/DSn SIGNAL rate, the FRAMED choice is expanded to provide a menu of framing types.
- 6 Choose the PATTERN type and the PRBS POLARITY required.

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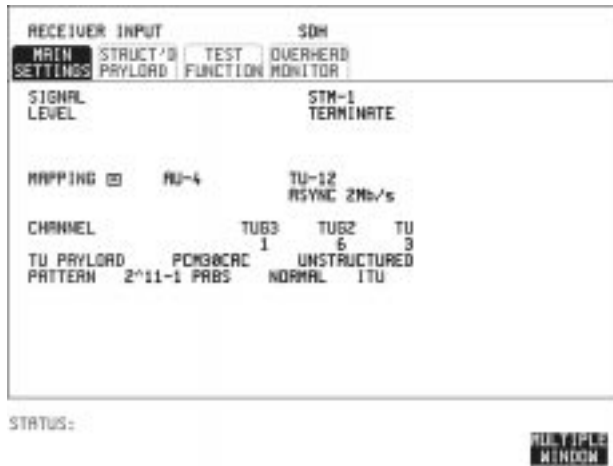
## Setting SDH Receive Interface

### **Description**

SDH Receive interface settings should match the network equipment settings of Rate and Mapping, and determine the payload to be tested.

### **TIP:**

If you wish to set the HP 37718A transmitter and receiver to the same interface settings, choose **OTHER** **SETTINGS CONTROL** **COUPLED**.



### **HOW TO:**

- 1 Choose the required SIGNAL source.  
If STM-0 or STM-1 electrical is chosen, choose the required LEVEL.  
If the LEVEL chosen is MONITOR choose the required GAIN.
- 2 Choose mapping and type of payload.
- 3 If TU-2 mapping is chosen, and CONCATENATION is enabled, choose the tributary at which the concatenation begins.  
If TU-2, TU-3, TU-12 or TU11 mapping is chosen, choose the test tributary under CHANNEL.
- 4 Choose the payload framing under PAYLOAD TYPE or TU PAYLOAD.  
If STRUCTURED is required FRAMED must be chosen.  
If STRUCTURED is chosen the Payload test signal must be set up. See "Setting Receive Structured Payload/Test Signal" page 41.  
If DROP is chosen, see "Dropping an External Payload/Test Signal" page 48.
- 5 Choose the PATTERN type and PRBS polarity.

Setting the Interfaces  
**Setting SDH Receive Interface**

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## Selecting Test Features

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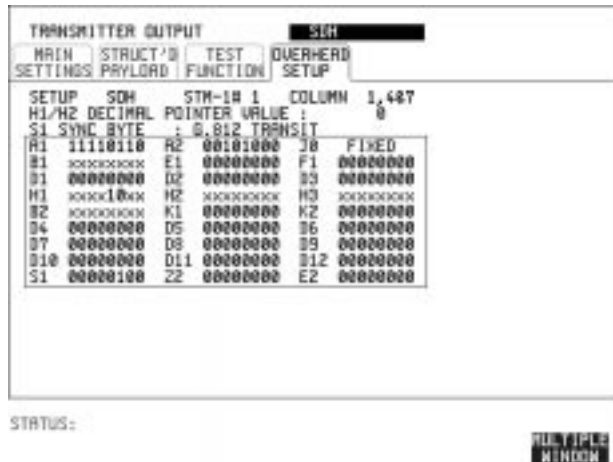
# Selecting Test Features

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## Using Transmit Overhead Setup

### *Description*

You can set an overhead byte to a known static state to aid troubleshooting, for example to quickly check for "stuck bits" in path overhead bytes. Section Overhead, Path Overhead, Trace Messages and Labels can be set using this feature.





### *HOW TO:*

- 1 Set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12.
- 2 Choose the type of overhead to SETUP.  
If STM-4 OPT or STM-16 OPT is chosen as the SDH interface, choose the STM-1 you wish to set up.  
DEFAULT - Use to set all overhead bytes to the standard values defined by ITU-T.  
If a test function is active then the overhead byte value is determined by the choices made in the Test Function. For example if APS Messages is chosen, the K1K2 value is determined by the APS Messages setup.



## Selecting Test Features

### Using Transmit Overhead Setup

- 3 If SOH (Section Overhead) is chosen, choose the COLUMN to be displayed. Many bytes in COLS 2,5,8 and 3,6,9 are unlabeled as the other overhead functions have not yet been defined.  
If ALL COLUMNS is chosen, the hexadecimal value of all 81 bytes of the STM-1 section overhead selected are displayed (all 324 bytes of an STM-4 or 1,296 bytes of an STM-16 are displayed 81 bytes at a time by selecting each STM-1 in turn). The value of the bytes can be set using **DECREASE DIGIT** **INCREASE DIGIT**  .  
If BYTE NAMES is chosen, the labels for the ALL COLUMNS overhead bytes are displayed.
- 4 If POH (Path Overhead) is chosen, choose the TYPE of overhead within STM-1 under test to be setup.  
J1 and J2 bytes can be set under Path Overhead or Trace Messages.  
H4 byte has a choice of sequences for TU-12, TU11 and TU-2 mapping:  
**Full Sequence** - 48 byte binary sequence.  
**Reduced Sequence** - Binary count sequence of 0 to 3 i.e. 111111(00 to 11).  
**COC1 Sequence** - Binary count sequence of 0 to 3 i.e. 110000(00 to 11).
- 5 If TRACE MESSAGES is chosen, see "Setting Overhead Trace Messages " page 28.

---

#### NOTE

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Any bit of an overhead byte which is displayed as x or s cannot be set at any time. All other bits can be set to 0 or 1.

#### TIP:

You can set all overhead bytes to the default state by selecting **SETUP** **DEFAULT**.

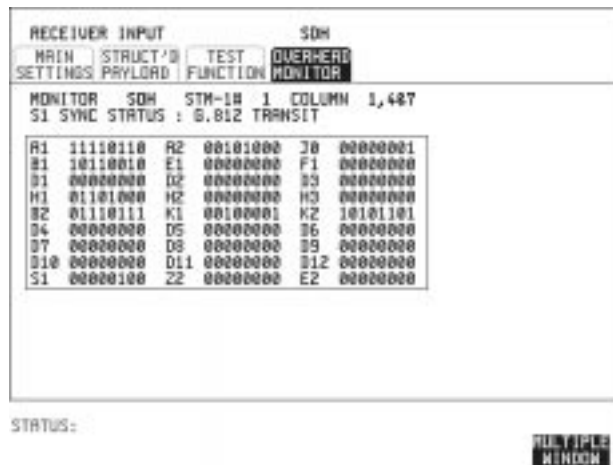
You can set all overhead bytes and test functions to the default state by recalling Stored Settings [0] on the **OTHER** display.

## Using Receive Overhead Monitor

### Description

When first connecting to a SDH network, a start up confidence check can be made by viewing the behavior of all the overhead bytes. If the SDH network shows alarm indications, some diagnosis of the problem may be gained from viewing all the overhead bytes. The OVERHEAD MONITOR display is updated once per second (once per 8000 frames) approximately.

A snapshot of the received overhead can be logged to the chosen logging device. See "Logging on Demand " page 100.



### HOW TO:

- 1 Set up the receive SDH interface and payload as required. See "Setting SDH Receive Interface" page 21.
- 2 Choose the type of overhead to MONITOR.
- 3 If SOH (Section Overhead) is chosen, choose the STM-1 number and COLUMN to be displayed.

Many bytes in COLS 2,5,8 and 3,6,9 are unlabeled because the other overhead functions have not yet been defined.

If ALL COLUMNS is chosen, the hexadecimal value of all 81 bytes of section overhead is displayed (all 324 bytes of an STM-4 or 1,296 bytes of an STM-16 are displayed 81 bytes at a time by selecting each STM-1 in turn). The value of the bytes can be set using **DECREASE DIGIT**

**INCREASE DIGIT**  .

## Selecting Test Features

### Using Receive Overhead Monitor

If BYTE NAMES is chosen, the labels for the ALL COLUMNS overhead bytes are displayed.

- 4 If POH (Path Overhead) is chosen, choose the source of the overhead VC-4, VC-3, VC-2, VC-12 or VC-11.  
J1 and J2 bytes can be monitored under Path Overhead or Trace Messages
- 5 If TRACE MESSAGES is chosen, you can monitor a data message to verify portions of the network.  
If the 16 byte CRC7 message structure is detected, the 15 characters within the message are displayed.  
If the CRC7 structure is not detected in J1, the 64 byte message format is assumed and displayed.  
If the CRC7 structure is not detected for J0 or J2, all 16 bytes are displayed.
- 6 If LABELS is chosen, the S1 sync status, HP path label (C2) and the LP Path label (V5) are monitored.
- 7 If APS MESSAGES is chosen, choose the TOPOLOGY, **LINEAR** (G.783) or **RING** (G.841). The K1 and K2 bits are monitored.

**TIP:**

If any abnormal behavior is observed on a particular path or section overhead byte, or an associated group of bytes (3XA1,3XA2; D1 - D3), the **RECEIVE TEST FUNCTION** display of **OVERHEAD CAPTURE** can be used to "Zoom" in on the suspect byte or bytes on a frame by frame basis. See "Using Receive Overhead Capture " page 31.

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## Setting Overhead Trace Messages

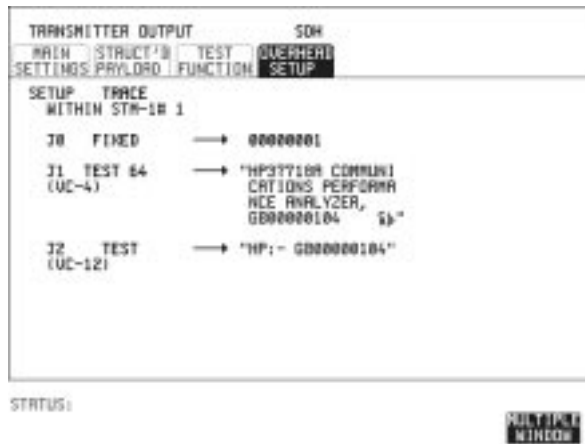
### Description

You can insert a data message to verify portions of the network:

J0 verifies the regenerator section overhead.

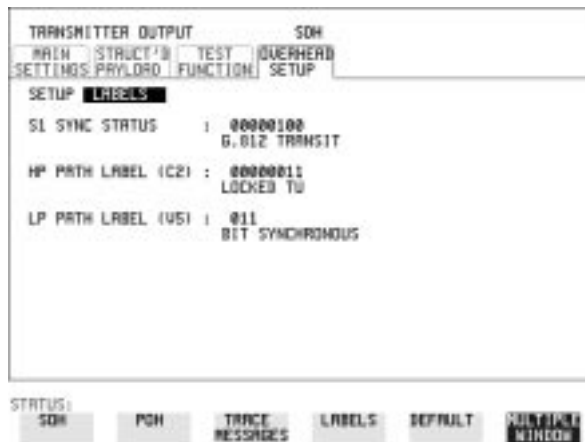
J1 verifies the VC-3 or VC-4 path connection.

J2 verifies the VC-2, VC-12 or VC-11 path connection.



### HOW TO:

- 1 Choose the message for insertion in the chosen trace channel. Choosing LABELS in TRACE MESSAGES allows the setting of the S1 SYNC STATUS, HP PATH LABEL (C2) and LP PATH LABEL (V5).



---

## Generating Overhead Sequences

### Description

You may insert a pattern into a functional group of overhead bytes for testing or troubleshooting purposes.



### HOW TO:

- 1 Set up the SDH transmit interface and payload required. See “Setting SDH Transmit Interface” page 12.
- 2 Choose the type of sequence required.  
SINGLE RUN - runs the sequence once and then stops.  
REPEAT RUN - runs the sequence repeatedly until STOPPED is chosen.
- 3 Choose the overhead type as required.  
RSOH- Regenerator Section Overhead  
MSOH- Multiplexer Section Overhead  
POH - Path Overhead
- 4 Choose the byte or bytes of overhead required.
- 5 Set up the required number of data patterns and the number of frames in which each data pattern should appear.  
Your sequence is derived from up to 5 blocks of hexadecimal data. Each block can be transmitted in up to 64,000 frames.  
The data and the number of frames are set using **DECREASE DIGIT** **INCREASE DIGIT** **←** **→**.

Selecting Test Features  
**Generating Overhead Sequences**

6 Start the sequence by choosing **START**.

---

**NOTE**

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When you start the sequence illustrated, one Out of Frame alarm and one Loss of Frame alarm should occur every eight seconds.

---

## Using Receive Overhead Capture

### *Description*

Regenerator section, Multiplexer section and Path overhead provide network support functions, responding dynamically to network conditions and needs. It is therefore useful to capture overhead activity on a frame by frame basis.

The Overhead Capture display can be logged to the chosen logging device. See "Logging on Demand " page 100.

DATA	FRAME COUNT
F6F6F6282828	48048
090909070707	3848
F6F6F6282828	64000
F6F6F6282828	64000
F6F6F6282828	64000
F6F6F6282828	64000
F6F6F6282828	13636
090909070707	1

STATUS: MULTIPLE WINDOW

### *HOW TO:*

- 1 Set up the receive SDH interface and payload as required. See "Setting SDH Receive Interface" page 21.
- 2 Choose the overhead type as required.  
RSOH- Regenerator Section Overhead  
MSOH- Multiplexer Section Overhead  
POH- Path Overhead
- 3 Choose the Byte or bytes of overhead to be captured.

Choose the TRIGGER to determine the start point of the capture.

**OFF** - starts immediately the capture is initiated. Can be used to provide a frame by frame monitor of the chosen byte or bytes.

**ON** -captures activity after your specified overhead state has occurred. Can be used for transient detection from a specified expected state.

## Selecting Test Features

### Using Receive Overhead Capture

**ON NOT** - captures activity after the first occurrence of a deviation from your specified overhead state. Can be used for transient detection from a specified expected state.

- 4 Up to 16 records of overhead state are provided. Each record will represent between 1 and 64,000 frames. A capture is started by pressing CAPTURE **START** and terminates when up to 16 records have been captured. The capture can be terminated earlier by pressing CAPTURE **STOP**.

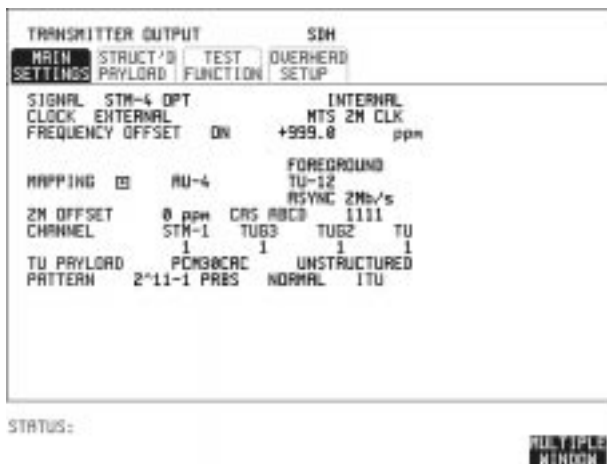


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## Adding Frequency Offset to SDH Signal

### *Description*

Frequency offset can be added to the SDH interface rate signal and to the payload signal.



### *HOW TO:*

#### **SDH Line Rate Offset**

- 1 Choose the amount of frequency offset required.  
You can set the Frequency Offset in the range -999 ppm to +999 ppm in 1 ppm steps using **DECREASE DIGIT** **INCREASE DIGIT** and . The amount of applied Frequency Offset can be varied while measurements are taking place.  
If the value of the SDH line rate offset chosen is sufficient to cause the maximum stuff rate to be exceeded, the asynchronous payload is offset to prevent bit errors occurring and the maximum stuff rate is maintained. When Floating Byte 2 Mb/s is chosen, in conjunction with SDH line rate offset, the chosen tributary will be offset as the line rate is offset. (No pointer movements).

#### **Tributary Offset $\pm 100$ ppm**

- 1 Choose the amount of tributary offset required.  
You can set the Offset in the range -100 ppm to +100 ppm in 1 ppm steps using **DECREASE DIGIT** **INCREASE DIGIT** and . The amount of applied Frequency Offset can be varied while measurements are taking place.

## Selecting Test Features

### **Adding Frequency Offset to SDH Signal**

Tributary offset affects the stuff rate but does not cause pointer movements and can be used to test mapping jitter. If the combined value of SDH line rate offset and tributary offset chosen is sufficient to cause the maximum stuff rate to be exceeded the payload is offset to prevent bit errors occurring and the maximum stuff rate is maintained.

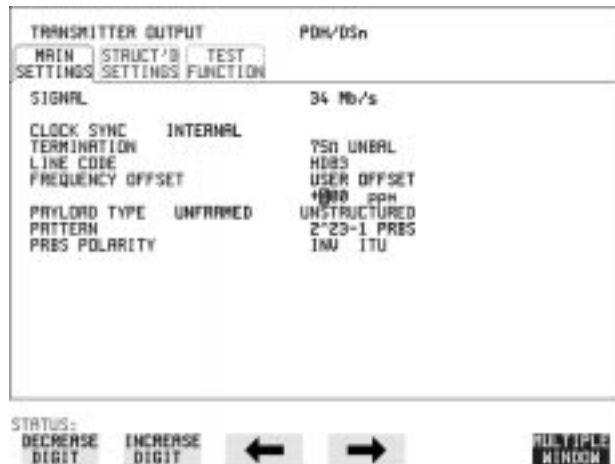
---

## Adding Frequency Offset to the PDH Signal

### *Description*

You can add frequency offset to the interface PDH SIGNAL at all rates. Frequency Offset can be added at preset ITU values or as User defined values in the range  $\pm 100$  ppm. The preset values change with the SIGNAL rate chosen as shown:

DS-1 (1.544 Mb/s)	+ 32 ppm	-32 ppm
2 Mb/s (E1)	+ 50 ppm	-50 ppm
8 Mb/s (E2)	+30 ppm	-30 ppm
34 Mb/s (E3)	+ 20 ppm	-20 ppm
DS-3 (44.736 Mb/s)	+ 20 ppm	-20 ppm
140 Mb/s (E4)	+15 ppm	-15 ppm



### *HOW TO:*

- 1 Choose the FREQUENCY OFFSET required.
- 2 If you choose USER OFFSET, you can set the frequency offset to be between -100 ppm and +100 ppm in 1 ppm steps. Select the field immediately below USER OFFSET and use **DECREASE DIGIT**, **INCREASE DIGIT**, **←** and **→** to set the frequency offset. (The amount of frequency offset can be varied while measurements are taking place.)

---

## Setting up Signaling Bits

### Description

When transmitting 2.048 Mb/s signals with timeslot-16 CAS (PCM30 or PCM30CRC) multiframing the state of A,B,C,D signaling bits can be set. The signaling bits of all timeslots are set to the user-defined 4 bit value.

When transmitting a DS1 framed, structured signal the values of the A,B signaling bits for D4 and SLC-96 payloads, and A,B,C,D signaling bits for ESF payloads can be defined.

### HOW TO

#### Transmit a 2 Mb/s signal with user-defined signaling bits PDH Operation



- 1 Choose **PDH/DSn** on the **TRANSMIT** display.
- 2 Choose SIGNAL **2 Mb/s** and PAYLOAD TYPE **PCM30** or **PCM30CRC** on the **MAIN SETTINGS** display.
- 3 If UNSTRUCTURED is chosen set the 2M CAS ABCD bits value on the **MAIN SETTINGS** display.  
If STRUCTURED is chosen set the 2M CAS ABCD bits value on the **STRUCTURED SETTINGS** display.

## Selecting Test Features

### Setting up Signaling Bits

### SDH Operation



- 1 Choose **SDH** on the **TRANSMIT** display
- 2 Choose MAPPING **ASYNC 2Mb/s** or **FL BYTE 2Mb/s** and TU PAYLOAD to **PCM30** or **PCM30CRC** on the **MAIN SETTINGS** display.
- 3 If UNSTRUCTURED is chosen set the 2M CAS ABCD bits value on the **MAIN SETTINGS** display.  
If STRUCTURED is chosen set the 2M CAS ABCD bits value on the **STRUCTURED SETTINGS** display.

### HOW TO

Transmit a DS1 payload signal with user-defined signaling bits

### PDH Operation



- 1 Choose **PDH/DSn** on the **TRANSMIT** display.

## Selecting Test Features

### Setting up Signaling Bits

- 2 Choose SIGNAL **DS1** or **DS3**, and PAYLOAD TYPE **STRUCTURED** on the **MAIN SETTINGS** display
- 3 Choose TEST SIGNAL **56 kb/s** or **Nx56 kb/s** on the **STRUCTURED SETTINGS** display.
- 4 Set the A,B bits (for D4 and SLC-96) and A,B,C,D bits (for ESF) as required.

### SDH Operation

- 1 Choose **SDH** on the **TRANSMIT** display.
- 2 Choose MAPPING **ASYNC DS1** or **DS3** and TU PAYLOAD **STRUCTURED** on the **MAIN SETTINGS** display
- 3 Choose TEST SIGNAL **56 kb/s** or **Nx56 kb/s** on the **STRUCTURED SETTINGS** display .
- 4 Set the A,B bits (for D4 and SLC-96) and A,B,C,D bits (for ESF) as required.

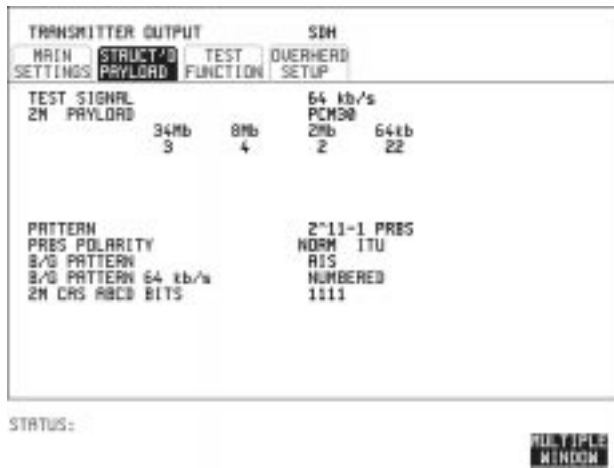
## Setting Transmit Structured Payload/Test Signal

**Description**

Structured PDH Payload/Test Signal settings determine the SDH payload or the PDH test signal to be tested and set any background (non test) conditions to prevent alarms while testing.

**TIP:**

If you wish to set the HP 37718A transmitter and receiver to the same Payload settings, choose **OTHER** **SETTINGS CONTROL** **COUPLED**.



**HOW TO:**

- 1 Choose the required TEST SIGNAL rate. If Nx64 kb/s is chosen, see "Setting Transmit N x 64 kb/s/N x 56 kb/s Structured Payload/Test Signal " page 42.
- 2 Choose the PAYLOAD framing pattern.  
If the TEST SIGNAL chosen was 2Mb/s, the **INSERT 2 Mb/s** choice is added to PAYLOAD menu. See "Inserting an External PDH Payload/ Test Signal " page 45.
- 3 Choose the test tributary in the structured payload, under 34Mb, 8Mb, 2Mb, 64 kb/s or DS2, DS1.
- 4 Choose the PATTERN type and PRBS POLARITY.
- 5 Choose the B/G PATTERN.  
The B/G PATTERN in the non test 64 kb/s timeslots is fixed as NUMBERED, that is, each timeslot contains a unique number to allow identification in case of routing problems.

Selecting Test Features

## Setting Transmit Structured Payload/Test Signal

### Signaling

- 6 If a 2 Mb/s PAYLOAD with PCM30 or PCM30CRC framing, or 56 kb/s or Nx56kb/s Test Signal is chosen. See, "Setting up Signaling Bits " page 36.



## Setting Receive Structured Payload/Test Signal

**Description**

Structured PDH Payload/Test Signal settings determine the SDH payload or the PDH test signal to be tested.

**TIP:**

If you wish to set the HP 37718A transmitter and receiver to the same Payload settings, choose **OTHER** **STORED SETTINGS** **COUPLED**.



**HOW TO:**

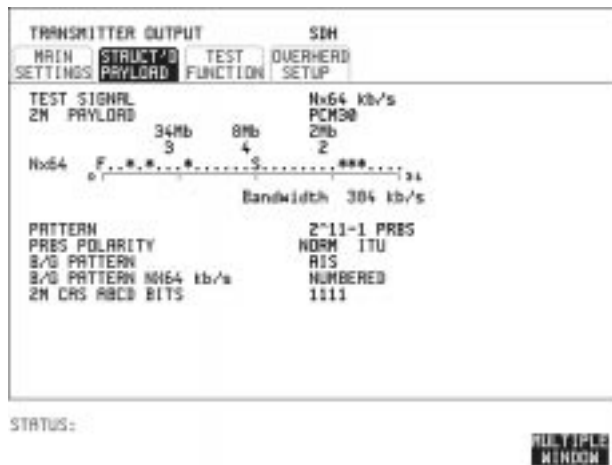
- 1 Choose the required Test Signal rate. If N x 64 kb/s or N x 56 kb/s is chosen, see "Setting Receive N x 64 kb/s/N x 56 kb/s Structured Payload/Test Signal " page 44.
- 2 Choose the Framing pattern of the PAYLOAD.  
If 2 Mb/s TEST SIGNAL is chosen, **DROP 2 Mb/s** is added to the menu.  
See "Dropping an External Payload/Test Signal " page 48.
- 3 Choose the tributary within the structured payload, under 34Mb, 8Mb, 2Mb, 64 kb or DS2, DS1.
- 4 Choose the PATTERN type and PRBS polarity.

## Setting Transmit N x 64 kb/s/N x 56 kb/s Structured Payload/Test Signal

### Description

Wideband services such as high speed data links and LAN interconnection require a bandwidth greater than 56/64 kb/s but less than DS1/2 Mb/s for example 128 kb/s or 384 kb/s. These wideband signals are sent in a DS1/2 Mb/s frame by sharing the signal between multiple timeslots.

N x 64kb/s/N x 56 kb/s structured payload allows a test pattern to be inserted across a number of timeslots even if the chosen timeslots are non-contiguous.



### HOW TO:

- 1 Choose the required Test Signal rate.
- 2 Choose the Framing pattern of the 2M or DS1 PAYLOAD.
- 3 Choose the test timeslots within the structured payload using **DESELECT ALL**, **DESELECT**, **SELECT** (←) and (→) softkeys. As each timeslot is selected, an \* marks the chosen timeslot. In the example above Timeslots 3, 5, 9, 25, 26, 27 are selected for test.
- 4 Choose the PATTERN type and PRBS polarity.
- 5 Choose the B/G PATTERN.
- 6 The B/G PATTERN in the non-test 64 kb/s timeslots is fixed as NUMBERED, that is, each timeslot contains a unique identification number.

Selecting Test Features

**Setting Transmit N x 64 kb/s/N x 56 kb/s Structured Payload/Test Signal**

**Signaling**

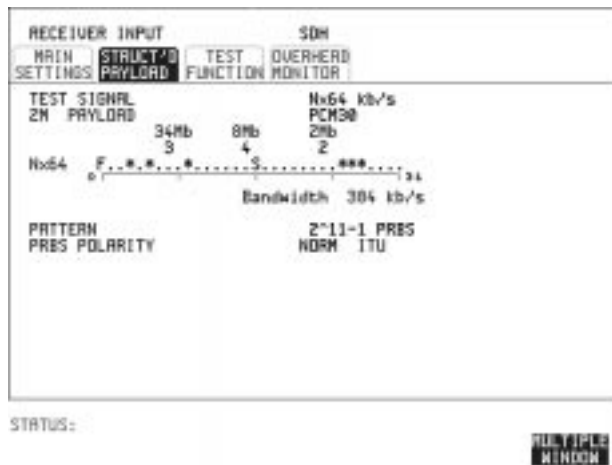
- 7 If a 2 Mb/s PAYLOAD with PCM30 or PCM30CRC framing, or 56 kb/s or Nx56kb/s Test Signal is chosen. See, "Setting up Signaling Bits " page 36.

## Setting Receive N x 64 kb/s/N x 56 kb/s Structured Payload/Test Signal

### Description

Wideband services such as high speed data links and LAN interconnection require a bandwidth greater than 56/64 kb/s but less than DS1/2 Mb/s e.g. 128 kb/s or 384 kb/s. These wideband signals are sent in a ds1/2 Mb/s frame by sharing the signal between multiple timeslots.

N x 64kb/s and N x 56 kb/s structured payload/test signal allows the test Timeslots to be chosen for error measurement even when the Timeslots are non contiguous.



### HOW TO:

- 1 Choose the required Test Signal rate.
- 2 Choose the Framing pattern of the 2M or DS1 PAYLOAD.
- 3 Choose the test timeslots within the structured payload using **DESELECT ALL**, **DESELECT**, **SELECT** (←) and (→) softkeys. As each timeslot is chosen an \* marks the chosen timeslot. In the example above Timeslots 3, 5, 9, 25, 26, 27 are chosen for test.
- 4 Choose the PATTERN type and PRBS polarity.

## Inserting an External PDH Payload/Test Signal

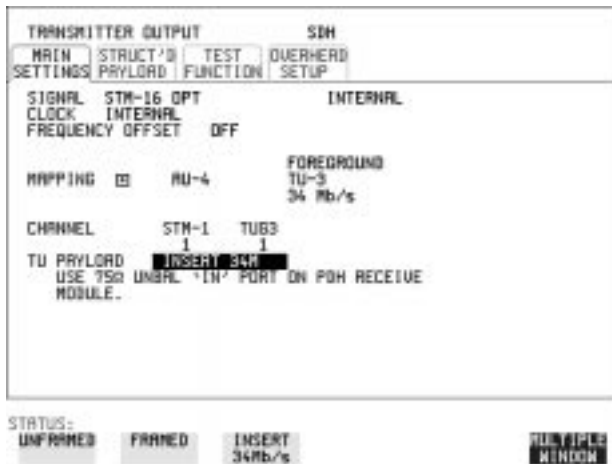
### Description

Depending on the 37718A option fitted, you can insert a PDH signal from external equipment into the SDH signal, or you can insert 2 Mb/s or DS1 into the structured PDH signal, as shown in the table below. 140Mb/s, 34Mb/s, DS3 and 34 Mb/s can only be inserted if SDH is chosen as the receive interface. 2 Mb/s or DS1 can be inserted from a structured or non-structured SDH payload and from a structured PDH signal.

RATE	Availability	Option
140 Mb/s	SDH Only	010 Only
DS3	SDH & SONET	011 Only
34Mb/s	SDH & SONET	010 and 011
2Mb/s	PDH, SDH & SONET	010 and 011
DS1	PDH, SDH & SONET	011 Only

### HOW TO:

#### Insert 34 Mb/s, DS3 & 140 Mb/s



- 1 Connect the external payload to the 75Ω IN port of the PDH/DSn receive module.
- 2 Set up the required transmit SDH interface, and choose TU PAYLOAD **INSERT 140 Mb/s**, **INSERT 34 Mb/s** or **INSERT DS3** as required.

## Selecting Test Features

### Inserting an External PDH Payload/Test Signal

#### Insert 2 Mb/s or DS1 (Unstructured SDH Payload)



- 1 Connect the external payload to the MUX port of the PDH Transmit module.  
If 2 Mb/s connect to 75Ω MUX port. If DS1 connect to 100Ω MUX port.
- 2 Set up the required transmit SDH interface, and choose TU12 MAPPING or TU11 MAPPING and TU PAYLOAD **INSERT 2 Mb/s** or **INSERT DS1**.

#### Insert 2 Mb/s or DS1 (Structured SDH Payload or Structured PDH)



- 1 Connect the external payload to the MUX port of the PDH Transmit module.  
If 2 Mb/s connect to 75Ω MUX port. If DS1 connect to 100Ω MUX port.

## Inserting an External PDH Payload/Test Signal

### Structured SDH Payload

- 2 Set up the required transmit SDH interface. See "Setting SDH Transmit Interface " page 12.
- 3 Set up the SDH structured payload. See "Setting Transmit Structured Payload/Test Signal " page 39.
- 4 Choose 2M PAYLOAD/DS1 PAYLOAD **INSERT 2 Mb/s** or **INSERT DS1**.
- 5 Choose the LINE CODE.

### Structured PDH

- 6 Set up, the required transmit PDH interface, See "Setting PDH Transmit Interface " page 10.
- 7 Set up the PDH Test Signal interface. See "Setting Transmit Structured Payload/Test Signal " page 39
- 8 Choose 2M PAYLOAD/DS1 PAYLOAD **INSERT 2 Mb/s** or **INSERT DS1**.
- 9 Choose the LINE CODE.

## Dropping an External Payload/Test Signal

### *Description*

Depending on the 37718A option fitted, you can drop a PDH signal from the received payload or drop 2 Mb/s or DS1 from the structured PDH signal to external equipment as shown in the table below. 140Mb/s, 34Mb/s, DS3 and 34 Mb/s can only be dropped if SDH is chosen as the receive interface. 2 Mb/s or DS1 can be dropped from a structured or non-structured SDH payload and from a structured PDH signal.

RATE	Availability	Option
140 Mb/s	SDH Only	010 Only
DS3	SDH & SONET	011 Only
34Mb/s	SDH & SONET	010 and 011
2Mb/s	PDH, SDH & SONET	010 and 011
DS1	PDH, SDH & SONET	011 Only

### **HOW TO:**

#### **Drop 34 Mb/s, DS3 & 140 Mb/s**



- 1 Connect the 75Ω OUT port of the PDH Tx module to the external equipment.



## Selecting Test Features

### Dropping an External Payload/Test Signal

- 2 Set up the receive SDH interface, and choose TU PAYLOAD **DROP 140 Mb/s**, **DROP 34 Mb/s** or **DROP DS3**.  
If **DROP DS3** is chosen, choose the DS3 output level.

### Drop 2 Mb/s /DS1 (Unstructured SDH Payload)

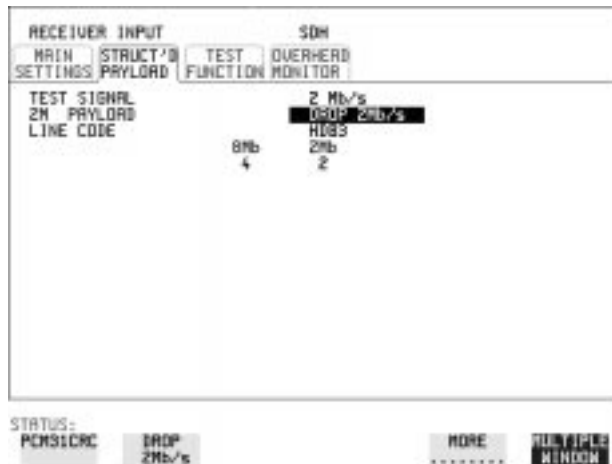
The screenshot shows a configuration window for 'RECEIVER INPUT' and 'SDH'. It includes tabs for 'MAIN SETTINGS', 'STRUCT'D PAYLOAD', 'TEST FUNCTION', and 'OVERHEAD MONITOR'. The 'SIGNAL' is set to 'STM-16 OPT'. Under 'MAPPING', 'TU-11 ASYNC DS1' is selected. The 'CHANNEL' section shows 'STM-1' with 'TU 3' selected, and 'TUB3' with 'TU 2' selected. The 'TU PAYLOAD' is set to 'DROP DS1'. The 'LINE CODE' is 'NRZ'. A note at the bottom says 'USE 'DEMUX' PORT ON PDH RX MODULE'. At the bottom, there is a 'STATUS:' section with buttons for 'UNFORMED', 'D4', 'ESF', 'SLC-96', 'DROP DS1', and 'MULTIPLE WINDOW'.

- 1 Connect the DEMUX port of the PDH module to the external equipment.
- 2 Set up the required receive SDH interface, and choose TU12 MAPPING or TU11 MAPPING and TU PAYLOAD **DROP 2 Mb/s** or **DROP DS1**.
- 3 Choose the required LINE CODE.

## Selecting Test Features

### Dropping an External Payload/Test Signal

#### Drop 2 Mb/s/DS1 (Structured SDH Payload or Structured PDH



- 1 Connect the DEMUX port of the PDH module to the external equipment.  
If 2 Mb/s connect to 75Ω DEMUX port. If DS1 connect to 100Ω DEMUX port.

#### Structured SDH Payload

- 2 Set up the required receive SDH interface. See "Setting SDH Receive Interface " page 21.
- 3 Set up the SDH structured payload. See "Setting Receive Structured Payload/Test Signal " page 41.
- 4 Choose 2M PAYLOAD/DS1 PAYLOAD **DROP 2 Mb/s** or **DROP DS1** .
- 5 Choose the LINE CODE.

#### Structured PDH

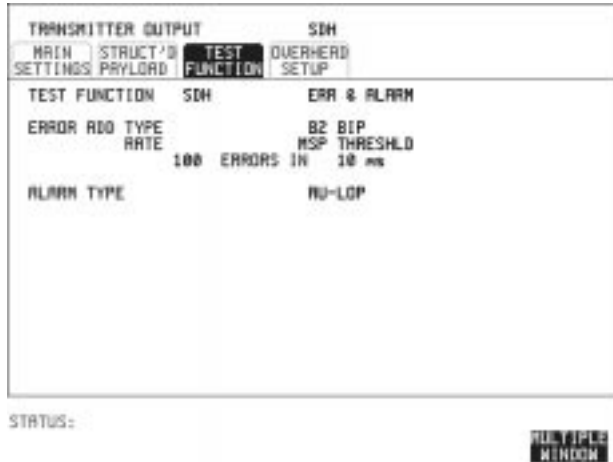
- 6 Set up, the required receive PDH interface, See "Setting PDH Receive Interface " page 19.
- 7 Set up the PDH Test Signal interface. See "Setting Receive Structured Payload/Test Signal " page 41
- 8 Choose 2M PAYLOAD/DS1 PAYLOAD **DROP 2 Mb/s** or **DROP DS1** .
- 9 Choose the LINE CODE.

---

## Adding Errors & Alarms at the SDH Interface

### **Description**

Errors and alarms can be added to the SDH interface signal during testing.



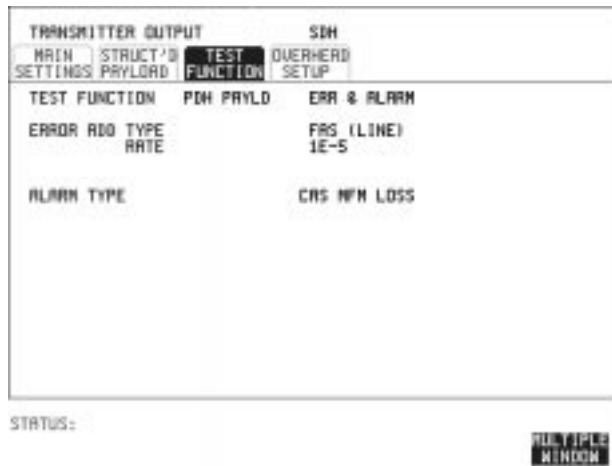
### **HOW TO:**

- 1 Set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12.
- 2 Choose the ERROR ADD TYPE and RATE required.  
Errors can be added at preset rates and at USER programmable rate. With the exception of ENTIRE FRAME and A1A2 FRAME, errors can be added at ERROR ALL rate.  
If B2 BIP errors are chosen errors can be added to trigger an MSP THRESHOLD. This takes the form of N errors in T time period. N and T are both selectable.
- 3 Choose the ALARM TYPE  
Errors and Alarms can be added at the same time.

## Adding Errors & Alarms to the PDH Interface/ PDH Payload

### *Description*

Errors and alarms can be added to the PDH interface/payload signal during testing.



### *HOW TO:*

- 1 If SDH interface is chosen, set up the SDH transmit interface and payload required. See “Setting SDH Transmit Interface” page 12. If PDH interface is chosen, set up the PDH interface and payload required. See “Setting PDH Transmit Interface” page 10.
- 2 Choose the ERROR ADD TYPE and RATE on the Transmitter **TEST FUNCTION** display. The RATE can be selected from a fixed value or is user programmable. If you select USER PROGRAM you can select the error rate before enabling the errors. This feature is useful for error threshold testing.
- 3 Choose the ALARM TYPE.  
Errors and Alarms can be added at the same time.

---

## Using FEAC Codes

---

### NOTE

FEAC codes are only available if Option 011 is fitted.

### Description

The third C-Bit in subframe 1 is used as a FEAC channel, where alarm or status information from the far-end terminal can be sent back to the near-end terminal. The channel is also used to initiate DS3 and DS1 line loopbacks at the far-end terminal from the near-end terminal.

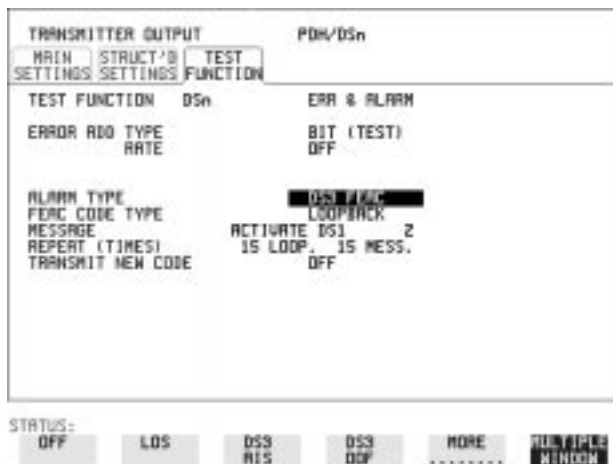
The codes are six digits long and are embedded in a 16 bit code word; the format is 0XXXXXX01111111.

There are two types of code, Loopback and Alarm Status.

Loopback provides a choice of two DS1 messages and two DS3 Messages. The DS1 Messages can be sent in ALL DS1 channels or in a SINGLE channel. The message can be repeated up to 15 times.

Alarm Status provides 13 preset codes and a USER programmable code function. These codes can be transmitted continuously or in bursts.

The new code is transmitted by choosing **BURST** or **ON**.



### HOW TO:

#### Transmit an FEAC code

- 1 Choose SIGNAL **DS3** and PAYLOAD TYPE **CBIT** on the **TRANSMIT MAIN SETTINGS** display.

## Selecting Test Features

### Using FEAC Codes

- 2 Choose **TRANSMIT TEST FUNCTION** and ALARM TYPE **DS3 FEAC**. When a FEAC code is not being transmitted, an all ones pattern is transmitted.
- 3 Choose the FEAC CODE TYPE.
- 4 Choose the MESSAGE from the choices displayed.  
If you chose a DS1 message an additional field to the right of the DS1 MESSAGE is displayed. Position the cursor on this field and choose **ALL** or **SINGLE CHANNEL**.  
If you choose **SINGLE CHANNEL** use the EDIT keys to select a channel from 1 to 28. Press **END EDIT** when finished.
- 5 If **LOOPBACK** is chosen, choose the REPEAT (TIMES) LOOP and MESS, in the range 1 to 15.
- 6 If **ALARM/ STATUS** is chosen, choose the BURST LENGTH (TIMES).
- 7 Choose TRANSMIT NEW CODE **BURST** or **ON** to transmit the selected FEAC message.

#### **TIP:**

#### **To View FEAC Messages**

The received FEAC message can be viewed on the **RESULTS** display.



---

## Setting PDH Spare Bits

### *Description*

Certain Spare Bits will cause the occurrence of a minor alarm when received as a logical "0".:

140 Mb/s - FAS Bit 14

34 Mb/s - FAS Bit 12

8 Mb.s - FAS Bit 12

2 Mb/s - NFAS Timeslot (timeslot 0 of NFAS frame) Bit 0

TRANSMITTER OUTPUT		SDH
MAIN	STRUCT'D	TEST OVERHEAD
SETTINGS	PAYLOAD	FUNCTION SETUP
TEST FUNCTION	PDH PAYLD	SPARE BITS
140M: FAS BITS 14-16		111
34M: FAS BIT 12		1
8M: FAS BIT 12		1
2M: S1 BITS CRC4 FRAME E-BITS		11
S2 BITS (NFAS T/S BITS 4-8)		11111
S3 BIT SEQUENCE 11111111 IN BIT 4		
SEND SEQUENCE		OFF

STATUS:

MULTIPLE WINDOW

### *HOW TO:*

- 1 If SDH interface is chosen, set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12. If PDH interface is chosen, set up the PDH transmit interface and payload required. See "Setting PDH Transmit Interface " page 10.
- 2 Set the value of the spare bits required for testing. If a BIT SEQUENCE is required, choose SEND SEQUENCE **ON** to transmit the sequence.

---

## Adding Pointer Adjustments

### *Description*

The transmitted AU or TU pointer value can be adjusted for testing purposes.



### *HOW TO:*

- 1 Set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12.
- 2 Choose the POINTER TYPE.
- 3 Choose the ADJUSTMENT TYPE required.  
**BURST** - You determine the size of the burst by the number of PLACES chosen. If, for example, you choose 5 PLACES the pointer value will be stepped 5 times in unit steps e.g. 0 (start value), 1, 2, 3, 4, 5 (final value). The interval between steps is as follows:  
For AU and TU-3, the minimum spacing between adjustments is 500 us. For TU except TU-3, the minimum spacing between adjustments is 2 ms.  
Choose ADJUST POINTER [ON] to add the chosen burst.

**NEW POINTER** - You can choose a pointer value in the range 0 to 782 with or without a New Data Flag.

The current pointer value is displayed for information purposes.

Choose ADJUST POINTER [ON] to transmit the new pointer value.



## Selecting Test Features

### Adding Pointer Adjustments

**OFFSET** - You can frequency offset the line rate or the VC/TU rate, relative to each other, thus producing pointer movements. If you offset the AU pointer, an 87:3 sequence of pointer movements is generated. The available configurations are listed in the following table. If you are currently adding Frequency Offset to the SDH interface or payload, pointer OFFSET is not available.

Pointer Type	Line Rate	AU Payload (VC) Rate	TU Payload (TU) Rate
AU	Constant	Offset	Tracks AU Payload
AU	Offset	Constant	Constant
TU	Constant	Constant	Offset
TU	Offset	Tracks Line Rate	Constant

**G.783** - Provides pointer movements according to ITU-T G.783: Choose the G.783 ADJUSTMENT TYPE. Choose the POLARITY, INTERVAL and PATTERN (where applicable) for the selected sequence. Choose POINTER SEQUENCES **START INIT** to generate the selected G.783 sequence and **STOP INIT** to stop the pointer sequences.

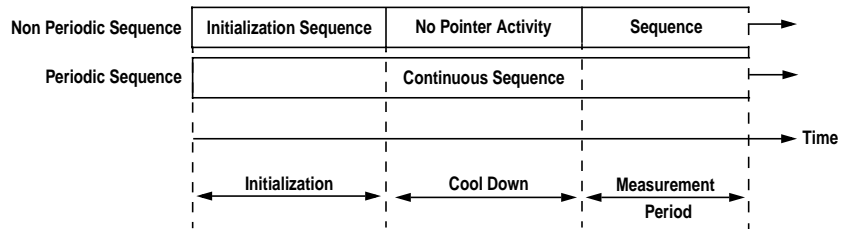
### G.783 Pointer Sequences Explained

In addition to the BURST, NEW POINTER and OFFSET pointer movements described, the HP 37718A can also generate pointer sequences (pointer movements) according to ITU-T G.783, T1.105.03 and GR-253. Note that T.105.03/GR-253 sequences are explained in the SONET version of this User's Guide.

Before running a pointer sequence you can elect to run an initialization sequence, followed by a cool down period, and then run the chosen sequence. This is selected using the **START INIT** key shown in the display on the previous page. Initialized pointer sequences are made up of three periods: the *Initialization Period*, the *Cool Down Period*, and the *Sequence (Measurement) Period*, illustrated in the following figure:

## Selecting Test Features

### Adding Pointer Adjustments



Note: SINGLE (e), BURST (f) and PHASE TRANSIENT are Non Periodic Sequences.

### Initialization Period

For SINGLE (e), BURST (f) and PHASE TRANSIENT sequences the initialization sequence consists of 60 seconds of pointer adjustments applied at a rate of 2 adjustments per second and in the same direction as the specified pointer sequence.

### Cool Down Period

A period following the initialization period which for SINGLE (e), BURST (f) and PHASE TRANSIENT sequences is 30 seconds long when no pointer activity is present.

### Sequence (Measurement) Period

The period following the Cool Down period where the specified pointer sequence runs continuously.

### Periodic Test Sequences

For periodic test sequences (for example "PERIODIC ADD g/h") both the 60 second initialization and 30 second cool down periods consist of the same sequence as used for the subsequent measurement sequence. If the product of the period T and the selected optional background pattern (87+3 or 26+1) exceeds 60 seconds then the longer period is used for the initialization. For example, if T is set for 10 seconds then the initialization period may be extended to 900 seconds.

The HP 37718A displays a message indicating which phase (initialization, cool down or measurement) the transmitter is currently generating.

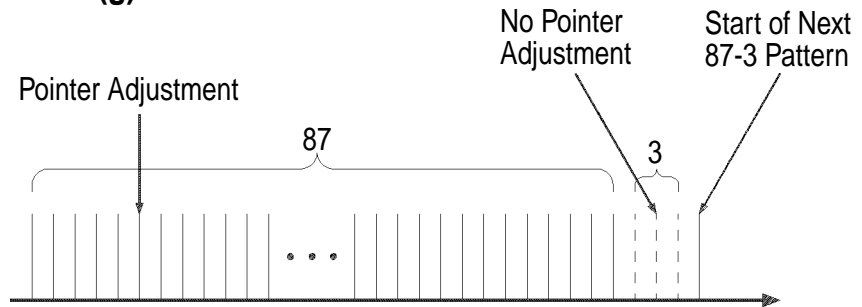
Selecting Test Features  
**Adding Pointer Adjustments**

**NOTE**

The following conditions apply for pointer sequence generation:  
 The sequences can only be applied to the AU pointer when the AU does not contain a TU structure, otherwise it is applied to the TU pointer.  
 Pointer sequence generation is not available when a frequency offset is being applied to the Line Rate.

The following figure gives an example of a G.783 (g) 87-3 Pointer Sequence.

**G.783(g) 87-3 Pattern**



**An Example of a Pointer Sequence**

Pointer Sequence	Description
<b>G.783(a) PERIODIC SINGLE</b>	Periodic Single adjustments, each with opposite polarity to the preceding adjustment. The interval between pointer adjustments is user selectable (see Note 1 page 62).
<b>G.783 (b) PERIODIC ADD</b>	Periodic Single adjustments, with selectable polarity and added adjustment (1 extra). The spacing between the added adjustment and the previous adjustment is set to the minimum, (see Note 2 page 62). The interval between pointer adjustments is user selectable (see Note 1). Added adjustments occur every 30 seconds.
<b>G.783 (c) PERIODIC CANCEL</b>	Periodic Single adjustments, with selectable polarity and cancelled adjustment (1 less). The interval between pointer adjustments is user selectable (see Note 1 page 62). Cancelled adjustments occur every 30 seconds.

Selecting Test Features  
**Adding Pointer Adjustments**

Pointer Sequence	Description
<b>G.783(d) PERIODIC DOUBLE</b>	Periodic Double adjustments (pair of adjustments). The pair alternate in polarity. The spacing between pairs of adjustments, of like polarity is set to the minimum (see Note 2). The interval between pointer adjustments is user selectable (see Note 1).
<b>G.783 (e) SINGLE</b>	Periodic Single adjustments, all of the same polarity which is selectable. Separation between pointer adjustments is fixed at approximately 30 seconds.
<b>G.783 (f) BURST</b>	Periodic bursts of 3 adjustments, all of the same polarity which is selectable. The interval between bursts is fixed at approximately 30 seconds. The interval between adjustments within a burst is set to the minimum (see Note 2 page 62).
<b>PHASE TRANSIENT</b>	Phase transient pointer adjustment burst test sequence. All adjustments are of the same polarity, which is selectable. The interval between bursts is fixed at 30 seconds. Each burst consists of 7 pointer movement. The first 3 in each burst are 0.25 s apart, and the interval between the 3 and 4 movement, and each remaining movement 0.5 seconds.
<b>G.783 (g) PERIODIC NORMAL (87-3 Pattern)</b>	An 87-3 pattern is selected. The sequence pattern is 87 pointer movements followed by 3 missing pointer movements. Pointer polarity is selectable and the time interval between pointer adjustments settable (see Note 1 page 62).
<b>G.783 (g) PERIODIC ADD (87-3 Pattern)</b>	An 87-3 pattern is selected. The sequence pattern is 87 pointer movements followed by 3 missing pointer movements with an added pointer movement after the 43rd pointer. The spacing between the added adjustment and the previous adjustment is set to the minimum, (see Note 2 page 62). Pointer polarity is selectable. The time interval between pointer adjustments can be set (see Note 1). Added adjustments occur every 30 seconds or every repeat of the 87-3 pattern, whichever is longer.

Selecting Test Features  
**Adding Pointer Adjustments**

Pointer Sequence	Description
<b>G.783 (g) PERIODIC CANCEL (87-3 pattern)</b>	An 87-3 pattern is selected. The sequence pattern is 87 pointer movements followed by 3 missing pointer movements with a cancelled pointer movement at the 87th pointer. Pointer polarity is selectable, and the time interval between pointer adjustments can be set (see Note 1). Cancelled adjustments occur every 30 seconds or every repeat of the 87-3 pattern, whichever is longer.
<b>G.783 (h) PERIODIC NORMAL (Continuous Pattern)</b>	Provides a continuous sequence of pointer adjustments. The polarity of the adjustments is selectable, and the time interval between adjustments can be set (see Note 1).
<b>G.783 (h) PERIODIC ADD (Continuous Pattern)</b>	Periodic Single adjustments, with selectable polarity and added adjustment (1 extra). The spacing between the added adjustment and the previous adjustment is set to the minimum, (see Note 2). The time interval between pointer adjustments can be set (see Note 1). Added adjustments occur every 30 seconds or every repeat of the 87-3 pattern, whichever is longer.
<b>G.783 (h) PERIODIC CANCEL (Continuous Pattern)</b>	Periodic Single adjustments, with selectable polarity and cancelled adjustment (1 less). The time interval between pointer adjustments can be set (see Note 1). Cancelled adjustments occur every 30 seconds or every repeat of the 87-3 pattern, whichever is longer.
<b>PERIODIC NORMAL (26-1 Pattern)</b>	This selection is only available if you have selected TU11 mapping, or TU12 with ASYNC DS1 selected. The sequence pattern is 26 pointer movements followed by 1 missing pointer movement. Pointer polarity is selectable and the time interval between pointer adjustments programmable to 200 ms, 500 ms, 1 s, 2 s, 5 s or 10 seconds.

Selecting Test Features  
**Adding Pointer Adjustments**

Pointer Sequence	Description
<b>PERIODIC ADD (26-1 Pattern)</b>	This selection is only available if you have selected TU11 mapping, or TU12 with ASYNC DS1 selected. The sequence pattern is 26 pointer movements followed by 1 missing pointer movement. The added adjustment occurs 2 ms after the 13th pointer adjustment. Pointer polarity is selectable and the time interval between pointer adjustments programmable to 200 ms, 500 ms, 1 s, 2 s, 5 s or 10 s. Added adjustments occur every 30 seconds or every repeat of the 26-1 pattern, whichever is longer.
<b>PERIODIC CANCEL (26-1 pattern)</b>	This selection is only available if you have selected TU11 mapping, or TU12 with ASYNC DS1 selected. The sequence pattern is 26 pointer movements followed by 1 missing pointer movement. The cancelled adjustment is the 26th pointer adjustment, that is the one before the regular gap of 1. Pointer polarity is selectable and the time interval between pointer adjustments programmable to 200 ms, 500 ms, 1 s, 2 s, 5 s or 10s. Cancelled adjustments occur every 30 seconds or every repeat of the 26-1 pattern, whichever is longer.

**Pointer Sequence Notes**

**Note 1:** For AU and TU-3, the sequence interval is selectable from:  
 7.5 ms, 10, 20, 30, 34 ms  
 40 to 100 ms in 10 ms steps, 100 to 1000 ms in 100 ms steps  
 1, 2, 5, 10 seconds.  
 For TU except TU-3, the sequence interval is selectable from:  
 200 ms, 500 ms, 1, 2, 5 and 10 seconds.

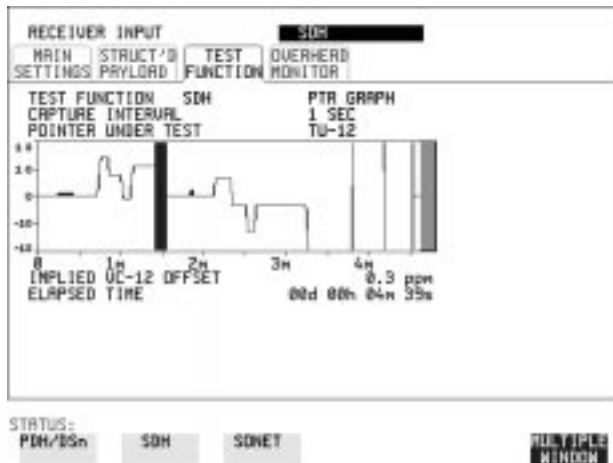
**Note 2:** For AU and TU-3, the minimum spacing between adjustments is 500 us.  
 For TU except TU-3, the minimum spacing between adjustments is 2 ms.

---

## Using Pointer Graph Test Function

Pointer Graph shows the relative offset during the measurement period. This allows the time relationship of AU or TU pointer movements to be observed. Up to 4 days of storage allows long term effects such as Wander to be observed. If an alarm occurs during the measurement period, a new graph starts at the centre of the display (offset zero) after recovery from the alarm.

The Pointer Graph display can be logged to the chosen logging device. See "Logging on Demand " page 100.



**TIP:** The graph can also be viewed on the **RESULTS** **SDH RESULTS** display at the end of the measurement.

- HOW TO:**
- 1 Set up the receive SDH interface and payload as required. See "Setting SDH Receive Interface" page 21.
  - 2 Choose the CAPTURE INTERVAL required.  
The capture interval determines the time between captures. Low values of capture interval should be chosen when a high degree of pointer movements is expected.  
High values of capture interval should be chosen when a low degree of pointer movements is expected, for example Wander over 1 day, use 5 MINS and Wander over 4 days, use 20 MINS.

## Selecting Test Features

### Using Pointer Graph Test Function

If, during a long term measurement (4 days), an event occurs at a particular time each day, a short term measurement can be made at the identified time to gain more detail of the event.

- 3 Choose the POINTER UNDER TEST type.
- 4 Press **RUN/STOP** to start the measurement.

***TIP:***

If the event occurs outside normal working hours, a Timed Start measurement can be made.

1 SEC - display window of approximately 5 minutes.

5 SECS - display window of approximately 25 minutes.

20 SECS - display window of approximately 1 hour 40 minutes.

1 MIN - display window of approximately 5 hours.

5 MIN - display window of approximately 1 day.

20 MIN - display window of approximately 4 days.



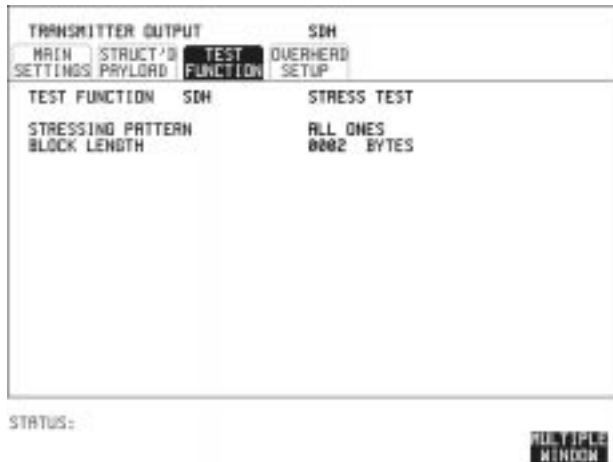
---

## **Stressing Optical Clock Recovery Circuits**

### ***Description***

Ideally clock recovery circuits in the network equipment optical interfaces should recover the clock even in the presence of long strings of 0's. You can check the performance of your optical clock recovery circuits using the STRESS TEST test function.

The stress test is available at all optical rates.



### ***HOW TO:***

- 1 Set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12.  
Choose the required STRESSING PATTERN.  
The G.958 test pattern consists of 7 consecutive blocks of data as follows:  
the first row of section overhead bytes, ALL ONES, a PRBS, the first row of section overhead bytes, ALL ZEROS, a PRBS and the first row of section overhead bytes.
- 2 If you choose ALL ONES or ALL ZEROS as the stressing pattern, choose the number of bytes in the BLOCK LENGTH.

---

## Generating Automatic Protection Switch Messages

### *Description*

You can program the K1 and K2 bytes to exercise the APS functions for Both LINEAR (ITU-T G.783) and RING (ITU-T G.841) topologies.



### *HOW TO:*

- 1 Set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12.
- 2 Choose the ITU-T TOPOLOGY required.
- 3 Choose the message to be transmitted.  
If LINEAR topology is chosen, choose the CHANNEL, the BRIDGED CHANNEL NO., the ARCHITECTURE and the RESERVED bits you require.  
If RING topology is chosen, choose the DESTINATION NODE ID, the SOURCE NODE ID, the type of PATH and the status code (K2 Bits 6->8)  
The current TX and RX, K1 and K2, values are displayed for reference only.
- 4 Choose **DOWNLOAD** to transmit the new K1/K2 values.

## Inserting & Dropping Data Communications Channel

### **Description**

The Data Communications Channel (DCC) of the regenerator and multiplexer section overhead can be verified by protocol testing. The Insert and Drop capability provides access to the DCC via the RS-449 connector on the front panel of the SDH module.

DCC INSERT is available on the **TRANSMIT**, **SDH**, **TEST FUNCTION** display.

DCC DROP is available on the **RECEIVE** **SDH** **TEST FUNCTION** display.



### **HOW TO:**

- 1 Connect the Protocol Analyzer to the DCC port on the Multirate Analyzer module.
- 2 Choose the required DCC.

Selecting Test Features

**Inserting & Dropping Data Communications Channel**

---

**Making Measurements**

---

## Using Overhead BER Test Function

### *Description*

You can perform a Bit Error Rate test on chosen bytes of the regenerator section, multiplexer section and path overhead bytes.

You can access the transmit Overhead BER on the **TRANSMIT** **SDH** **TEST FUNCTION** display.

The screenshot shows a terminal window with the following content:

```
RECEIVER INPUT          SDH
MAIN STRUCT'0          TEST OVERHEAD
SETTINGS PAYLOAD       FUNCTION MONITOR

TEST FUNCTION SDH OVERHEAD BER
MEASURE PRBS FROM O/H BYTE RSDH EL

ERROR COUNT                4
ERROR RATIO                1.953E-06
ERROR FREE SECONDS        23
ERROR FREE SECONDS        07.500
PATTERN LOSS SECONDS      0

ELAPSED TIME              00d 00h 00m 32s
```

STATUS: **MULTIPLE WINDOW**

### *HOW TO:*

- 1 Set up the SDH transmit interface and payload required. See "Setting SDH Transmit Interface " page 12.
- 2 Set up the receive SDH interface and payload as required. See "Setting SDH Receive Interface " page 21.
- 3 Choose the overhead byte to be tested on the **RECEIVE** **SDH** **TEST FUNCTION** display.
- 4 Choose the overhead byte to be tested on the **TRANSMIT** **SDH** **TEST FUNCTION** display.
- 5 Press **RUN/STOP** to start the test.
- 6 The PRBS pattern can be errored by pressing **SINGLE**.

---

## Test Timing

### *Description*

There are two aspects to test timing:

- Error results may be displayed as short term or cumulative over the measurement period. If short term error measurements are required, the short term period may be selected.
- The period of the test may be defined or controlled manually.



### *HOW TO:*

- 1 Choose **TIMING CONTROL** on the **RESULTS** display.
- 2 Choose the SHORT TERM PERIOD to the timing required for short term results.
- 3 Choose the type of TEST TIMING required:  
For manual control with **RUN/STOP** choose **MANUAL**.  
For a single timed measurement period started with **RUN/STOP**, choose **SINGLE** and choose the Test duration.  
For a timed period starting at a specified time, choose **TIMED**, choose the Test duration and the test START date and time.

---

## Making SDH Analysis Measurements

### Description

G.826 analysis results are provided for all relevant SDH error sources.

In addition the following results are provided:

- Cumulative error count and error ratio
- Short Term error count and error ratio
- Alarm Seconds
- Frequency
- Pointer Values
- Pointer Graph



### HOW TO:

- 1 Set up the receive SDH interface and payload required. See "Setting SDH Receive Interface " page 21.
- 2 If required set up the SDH transmit interface and payload. See "Setting SDH Transmit Interface " page 12.
- 3 Press **RUN/STOP** to start the measurement.
- 4 You can view the analysis results on the **RESULTS SDH ANALYSIS** display.

### TIP:

The measurement will not be affected if you switch between the different results provided.



---

## Making PDH Analysis Measurements

### *Description*

G.821, G.826, M.2100, M.2110 and M.2120 analysis results are provided for all relevant PDH and PDH Payload error sources. In addition the following results are provided:

- Cumulative error count and error ratio
- Short Term error count and error ratio
- Alarm Seconds
- SIG/BIT Monitor. See "Monitoring Signaling Bits " page 78.

RESULTS	PDH	ERROR ANALYSIS		
G.821	G.826	M.2100	M.2110	M.2120
FRS 140 Mb/s				
EC	0			
ES	9		4.68750%	
EPS	183		95.31250%	
SES	9		4.68750%	
LHMU	0		0.00000%	
BEG MIN	0		0.00000%	
CODE ES	N/A			
ELAPSED TIME			00d 00h 03m 12s	

STATUS: MULTIPLE WINDOW

### *HOW TO:*

- 1 If SDH is chosen as the interface, set up the Receive Interface and Payload required. See "Setting SDH Receive Interface " page 21. If required set up the Transmit Interface and Payload. See "Setting SDH Transmit Interface " page 12.
- 2 If PDH is chosen as the interface, set up the PDH receive interface. See "Setting PDH Receive Interface " page 19. If required set up the PDH transmit interface. See "Setting PDH Transmit Interface " page 10.
- 3 Press **RUN/STOP** to start the measurement.
- 4 If SDH is chosen as the interface, you can view the analysis results on the **RESULTS** **PDH PAYLOAD** **ERROR ANALYSIS** display  
If PDH is chosen as the interface, you can view the analysis results on the **RESULTS** **PDH** **ERROR ANALYSIS** display.

## Measuring Frequency

### *Description*

The signal frequency and the amount of offset from ITU-T standard rate can be measured to give an indication of probability of errors.



### *HOW TO:*

- 1 Connect the signal to be measured to the IN port of the PDH/DSN RECEIVE module or the IN port of the Multirate Analyzer module (SDH electrical) or the IN port of the Optical Interface module (SDH optical).

---

### **NOTE**

Frequency measurement is always available even if test timing is off.

---

## Measuring Optical Power

### ***Description***

Optical power measurement can be performed on the SDH signal connected to the STM-1/STM-4 In port.



### ***HOW TO:***

- 1 Connect the SDH optical signal to the IN port of the Optical Interface module.
- 2 Choose the received input signal rate on the **RECEIVE** **SDH** display.

---

### **NOTE**

Optical power measurement is always available even if test timing is off.

---

## Measuring Round Trip Delay

**Description:**

The time taken for voice traffic to pass through the network is very important. Excessive delay can make speech difficult to understand. The Round Trip Delay feature of the HP 37718A measures the delay in a 64 kb/s timeslot.

A test pattern is transmitted in the 64 kb/s timeslot and a timer is set running. A loopback is applied to the network equipment to return the test signal. The received pattern stops the timer and the Round Trip Delay is calculated.



---

**NOTE**

You can only measure Round Trip Delay on a 64 kb/s test signal obtained from a 140 Mb/s, 34 Mb/s, 8 Mb/s or 2 Mb/s PDH/DSn interface or PDH/DSn payload signal.

---

**HOW TO:**

- 1 If measuring on an SDH interface, set up the SDH transmit and receive interfaces and payloads required. See "Setting SDH Transmit Interface" page 12 and "Setting SDH Receive Interface" page 21.
- 2 If measuring on a PDH interface, set up the PDH transmit and receive interfaces and payloads required. See "Setting PDH Transmit Interface" page 10 and "Setting PDH Receive Interface" page 19.
- 3 Connect a loopback to the network equipment.

## Making Measurements

### Measuring Round Trip Delay

- 4 Choose ACTION **ON** to start the measurement.  
If measuring on an SDH interface, the results are available on the **RESULTS PDH PAYLOAD** display.  
If measuring on a PDH interface, the results are available on the **RESULTS PDH** display.

The Round Trip delay measurement range is up to 2 seconds. The resolution varies with the received interface signal rate:

<b>2 Mb/s</b>	1 microsecond
<b>8, 34, 140 Mb/s</b>	10 microseconds
<b>STM-0,STM-1</b>	0.5 milliseconds
<b>STM-4, STM-16</b>	0.5 milliseconds

---

## Monitoring Signaling Bits

### **Description**

The HP 37718A receiver can be used to monitor the state of signaling bits in received 2 Mb/s signals with timeslot-16 CAS multiframing (PCM30 or PCM30CRC) and DS1 structured signals.

### **2.048 Mb/s Results**

For 2 Mb/s signals with timeslot-16 CAS multiframing a table showing the values of A,B,C,D signaling bits in all 30 channels is given.

### **DS1 Results**

#### **D4 and SLC-96 payloads**

A table simultaneously showing the state of the A and B signaling bits in the 6th and 12th frames of a superframe is given. Each frame contains 24 timeslots. In SLC-96 mode A and B choices are 0, 1 or alternating. If you set bit A or B to alternate, the displayed bit changes to an A, to indicate that the bit is alternating from 1 to 0. The same signaling is transmitted in all channels.

#### **ESF Payloads**

A table simultaneously showing the state of the A, B, C and D signaling bits in the 6th, 12th, 18th and 24th frames of a superframe is given. Each frame contains 24 timeslots.

TS	ABCD	TS	ABCD	TS	ABCD	TS	ABCD
1	1100	7	1111	13	1111	19	1111
2	1111	8	1111	14	1111	20	1111
3	1111	9	1111	15	1111	21	1111
4	1111	10	1111	16	1111	22	1111
5	1111	11	1111	17	1111	23	1111
6	1111	12	1111	18	1111	24	1111

STATUS:  
ERROR SUMMARY   CUMUL-RTIME   SHORT TERM   ERROR ANALYSIS   MORE .....   FUNCTION WINDOW

---

## Measuring Service Disruption Time

**Description:**

Protection switching ensures that data integrity is maintained and revenue protected when equipment failure occurs. The speed of operation of the protection switch can be measured.

The sequence of events involved in measuring the switching time is:

- Pattern Synchronization (no errors) is achieved.
- The protection switch is invoked - Pattern Synchronization is lost.
- The standby line is in place - Pattern Synchronization is regained.

The time interval between pattern sync loss and pattern sync gain is a measure of the disruption of service due to protection switching.



Service Disruption is chosen on the **RESULTS** page except for the following configuration:

- If you choose a PDH or SDH/SONET interface and an ANSI (DS1, DS3) framed, unstructured payload you must select Service Disruption on the Transmitter and Receiver **TEST FUNCTION** display.

## Making Measurements

### Measuring Service Disruption Time



---

#### NOTE

At DS1 and DS3, Service Disruption results are only available for Unstructured payloads.

#### Error Burst Definition

Error bursts start and finish with an error. Bursts of less than 10 us are ignored.

Bursts are assumed to have completed when >2000ms elapses without any errors being received.

The longest burst detected is 2 seconds.

#### Accuracy

300 us for DS1, 2Mb/s and 34Mb/s signals.

60 us for DS3 signals.

#### HOW TO:

- 1 If interfacing at SDH set up the SDH transmit and receive interfaces and payloads required. See "Setting SDH Transmit Interface " page 12 and "Setting SDH Receive Interface " page 21.
- 2 If interfacing at PDH/DSn set up the PDH/DSn transmit and receive interfaces and payloads as required. See "Setting PDH Transmit Interface " page 10 and "Setting PDH Receive Interface " page 19.
- 3 If you choose a DS1 or DS3 framed unstructured payload, choose **SERVICE DISRUPT** on the **TRANSMIT** and **RECEIVE TEST FUNCTION** displays.



## Making Measurements

### Measuring Service Disruption Time

- 4 Press **RUN/STOP** to start the measurement.
- 5 Invoke the protection switch.
- 6 View the results on the **RESULTS** **SRVC DISRUPT** display.

### Results Displayed

**LONGEST** - Longest burst of errors during measurement.

**SHORTEST** - Shortest burst of errors during measurement.

**LAST** - Length of last burst of errors detected during measurement.

---

## Performing an SDH Tributary Scan

### *Description*

Tributary Scan tests each tributary for error free operation and no occurrence of Pattern Loss. A failure is indicated by highlighting the tributary in which the failure occurred. The **TRANSMIT SDH MAIN SETTINGS** mapping setup determines the tributary structure. The HP 37718A will configure the Transmitter to the Receiver and the PATTERN is forced to the payload it will fill.

The SDH Tributary Scan display can be logged to the chosen logging device. See "Logging on Demand " page 100.



### *HOW TO:*

- 1 Set up the transmit and receive SDH interfaces and payload as required. See "Setting SDH Transmit Interface " page 12 and "Setting SDH Receive Interface " page 21.
- 2 Choose the required BIT ERROR THRESHOLD.  
This determines the error rate above which a failure is declared.
- 3 Choose the required TEST TIMING.  
The value you choose is the test time for each individual tributary and not the total test time.  
For example, 63 TU-12 tributaries in an AU-4 - the time taken to complete the Tributary Scan will be 63 X TEST TIMING choice.

## Making Measurements

### Performing an SDH Tributary Scan

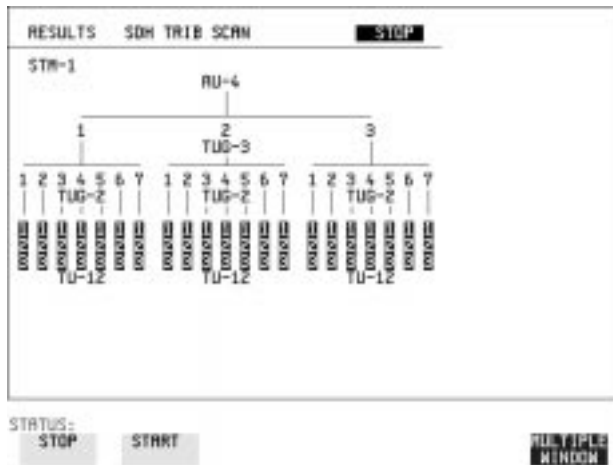
- The Tributary Scan results can be viewed on the **RESULTS** **SDH TRIBSCAN** display.  
The Scan can be started on the **TRANSMIT** **SDH** **TEST FUNCTION** display or the **RESULTS** display by choosing **START**.  
If the Scan is started on the **TRANSMIT** **SDH** **TEST FUNCTION** display, the HP 37718A changes to the **RESULTS** display.  
If a single path, for example, **SIGNAL [STM-1] MAPPING AU-4 [VC-4]** is chosen, then Tributary Scan is disabled.

---

#### NOTE

---

The keyboard is locked during tributary scan.



---

## Performing an SDH Alarm Scan

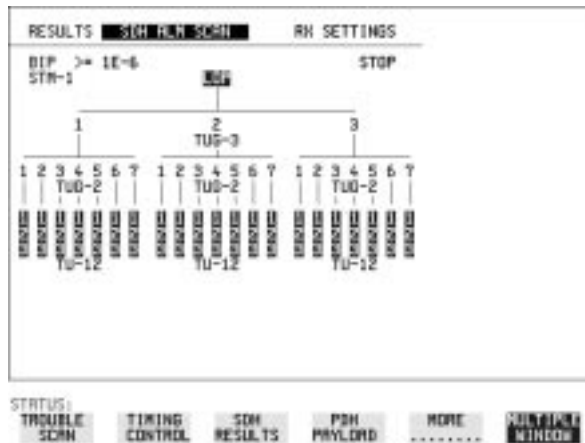
### Description

SDH Alarm Scan tests each channel for alarm free operation and identifies and indicates any Unequipped channels. You can configure the Scan to check for the occurrence of any Path layer BIP errors above a chosen threshold.

The channel in which an alarm occurred is highlighted if any of the following alarms occur:

AU-LOP, HP-RDI, AU-AIS, H4 Loss of Multiframe,  
TU-AIS, LP-RDI, TU-LOP

The SDH Alarm Scan display can be logged to the chosen logging device. See "Logging on Demand " page 100.



### HOW TO:

- 1 Set up the receive SDH interface and payload as required. See "Setting SDH Receive Interface" page 21.
- 2 Choose **SDH ALM SCAN** on the **RESULTS** display.
- 3 Choose AUTO or RX SETTINGS.  
**RX SETTINGS:** The scan checks the structure set on the **RECEIVE SDH** display.  
**AUTO:** The scan checks the structure being received. This can be particularly useful when receiving mixed payloads.
- 4 Choose the BIP error threshold.
- 5 Choose **START** to start the Alarm Scan.

---

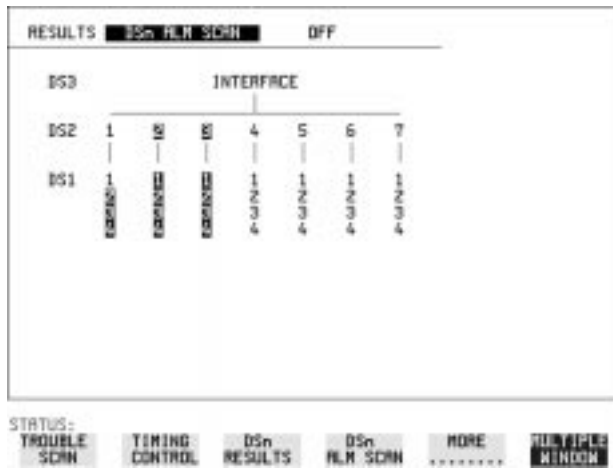
## Performing a PDH/DSn Alarm Scan

### *Description*

PDH Alarm Scan tests each channel for the following alarms:

- Frame Loss
- RAI
- AIS

The channel in which an alarm occurs is highlighted.



### *HOW TO:*

- 1 Set up the receive PDH interface as required. See “Setting PDH Receive Interface” page 19.
- 2 Choose **ON** to start the Alarm Scan.

Making Measurements  
**Performing a PDH/DSn Alarm Scan**

---

## **Storing, Logging and Printing**

---

## Saving Graphics Results to Instrument Store

### *Description*

Graphical representation of measurement results is very useful particularly during a long measurement period. It provides an overview of the results and can be printed for record keeping.

Graphics results can be stored in instrument graph storage or on floppy disk.



### *HOW TO:*

- 1 Before starting your measurement, choose the GRAPH STORAGE resolution and location.  
The resolution chosen affects the ZOOM capability when viewing the bar graphs. If 1 MIN is selected, 1 MIN/BAR, 15 MINS/BAR and 60 MINS/BAR are available. If 15 MINS is selected, 15 MINS/BAR and 60 MINS/BAR are available. If 1 HOUR is selected, 60 MINS/BAR is available.  
The graphics results can be stored in the instrument - INTERNAL or stored on DISK. Storage to disk will use a default file name unless a file name is specified on the **OTHER FLOPPY DISK** display. See "Saving Graphics Results to Disk" page 126.
- 2 Press **RUN/STOP** to start the measurement. Graphical results will be stored in the chosen location.



---

## Recalling Stored Graph Results

### *Description*

Results stored from a previous measurement can be recalled to the graphics displays for viewing and printing.

STORED	STORED	STORED	STORED	STORED
DISK	DATE	TIME	DATE/TIME	USE
-9				
-8				
-7				
-6				
-5				
-4				
-3				
0	10-JUL-1997	15:20	16h 20m 34s	2%
-1	11-JUL-1997	07:50	00h 01m 04s	<1%
LAST	12-JUL-1997	07:51	00h 01m 19s	1%
STORAGE 1 SEC			TOTAL USED	2%
RESOL'N COMPRESSED			RAM FREE	98%
FREE STORE 19626 EVENTS				

STATUS:  
GRAPH RESULTS    TEXT RESULTS    DELETE STORE    DELETE ALL    MULTIPLE WINDOW



### *HOW TO:*

- 1 If currently viewing the bar graph display, select **TEXT RESULTS** then **STORE STATUS**. If currently viewing the error or alarm summary, select **STORE STATUS**.
- 2 Using **↑** and **↓**, move the highlighted cursor to the store location which contains the required results.  
If the required results are stored on Disk, move the highlighted cursor to DISK and choose RECALL GRAPHICS on the FLOPPY DISK display. See "Recalling Graphics Results from Disk" page 131.
- 3 Choose **GRAPH RESULTS** if you wish to view the bar graphs.  
The display will change to the bar graph display of the highlighted results.
- 4 Choose **TEXT RESULTS** if you wish to view the error and alarm Summaries.  
The display will change to the text results display of the highlighted results.  
**DELETE STORE** deletes the results in the highlighted store.  
If **DELETE ALL** is chosen, a **CONFIRM DELETE**; **ABORT DELETE** choice prevents accidental deletion of all the stored results.

## Storing, Logging and Printing

### Recalling Stored Graph Results

The top row of the display comprises five fields:

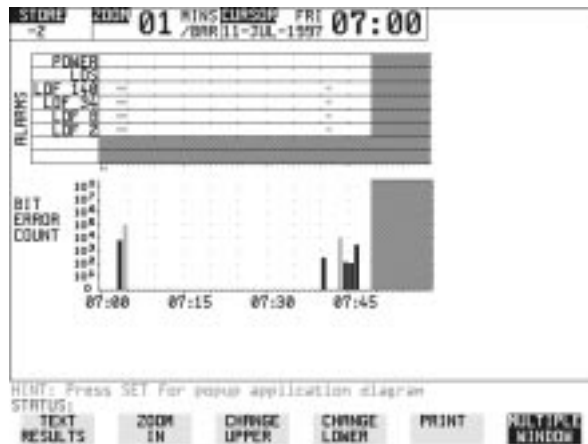
<b>Store</b>	Memory location in which the displayed bar graph data is stored. Move the highlighted cursor, to the STORE location desired, using  and  .
<b>Start Date</b>	The start date of the test, which produced the stored results.
<b>Start Time</b>	The start time of the test, which produced the stored results.
<b>Test Duration</b>	The duration of the test, which produced the stored results.
<b>Store Use</b>	The percentage (%) of the overall storage capacity occupied by each set of stored results. The TOTAL percentage used and the percentage still FREE is provided at the bottom of the STORE USE column.

---

## Viewing the Bar Graph Display

### *Description*

All the graphic results obtained during the measurement are available for viewing. Identify a period of interest and zoom in for more detailed examination.





### *HOW TO:*

- 1 To view the current bar graphs, press **GRAPH** and use **CHANGE UPPER** and **CHANGE LOWER** to obtain the bar graphs required.
- 2 To view previously stored graphs, see "Recalling Stored Graph Results " page 89.
- 3 For more detailed inspection of the bar graph, position the cursor centrally within the area of interest using **→**, **←** and select **ZOOM IN** to reduce the time axis to 15 MINS/BAR. This is only possible if the graphics results were stored with a STORAGE resolution of 1 SEC,1 MINS or 15 MINS.  
For further reduction of the time axis to 01 MINS/BAR or 01 SECS/ BAR, position the cursor centrally within the area of interest and select **ZOOM IN** until the required time axis is obtained.

The top row of the display comprises three fields:

**Store** Memory location in which the displayed bar graph data is stored. Store can only be changed when the status of stored results is displayed. See "Recalling Stored Graph Results " page 89.

Storing, Logging and Printing  
**Viewing the Bar Graph Display**

- Zoom** The width, in minutes, of each "bar" in the bar graph, controlled by **ZOOM IN** / **ZOOM OUT**.
- Cursor** The cursor position in terms of time and date, controlled by  and . The cursor position changes in steps of 1 second, 1 minute, 15 minutes or 60 minutes dependent upon the ZOOM setting. The cursor is physically located between the two graphs.

---

## Viewing the Graphics Error and Alarm Summaries

### Description

The error and alarm summaries of the measurement chosen are displayed on the **TEXT RESULTS** display. The error summary or alarm summary can be viewed at any time.

The screenshot shows a terminal-style display with the following data:

	COUNT	RATIO
BIT	261855	1.423E-04
BPU	202187	3.715E-06
B53 FRAME	838	2.369E-06
B51 FRAME	12	1.877E-06
P-BIT	224151	4.197E-06
C-BIT	50271	3.424E-07
FEFE	16981	3.202E-07
CRC	N/A	N/A

At the bottom of the screen, there is a row of buttons: STATUS, STORE STATUS, GRAPH RESULTS, PRINT, NEXT SUMMARY, ALARM SUMMARY, and MULTIPLE WINDOW.

### HOW TO:

- 1 To view the error or alarm summary associated with the current bar graphs, press **GRAPH** then **TEXT RESULTS**.
- 2 To view the error or alarm summary associated with previously stored bar graphs, see "Recalling Stored Graph Results " page 89.
- 3 To view the Alarms which have occurred during the measurement, select **ALARM SUMMARY**. Use **NEXT SUMMARY** to view the PDH/DSn; and SDH Alarm Summaries in turn if applicable.
- 4 To view the Errors which have occurred during the measurement select **ERROR SUMMARY**. Use **NEXT SUMMARY** to view the PDH/DSn; and SDH Error Summaries in turn if applicable.

The top row of the display comprises three fields:

**Store** Memory location in which the bar graphs, error summary and alarm summary are stored. Store can only be changed when the status of stored results is displayed. See "Recalling Stored Graph Results " page 89.

Storing, Logging and Printing

## Viewing the Graphics Error and Alarm Summaries

**Start**                    The start time and date of the test, that produced the displayed results.

**Stop**                    The stop time and date of the test, that produced the displayed results.

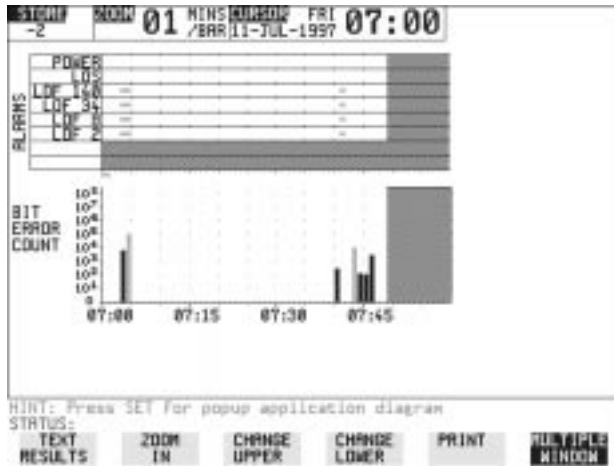
---

## Logging Graph Displays

### *Description*

The bar graphs and error and alarm summaries can be logged to the disk for printing at a later date.

If Option 601, Remote Control, is fitted, the bar graphs and error and alarm summary can be logged to an external HP DeskJet printer at the end of the test period. If a printer is not immediately available, the graphics results remain in memory and can be logged at a later time when a printer becomes available.



### *HOW TO:*

#### Log to an External Printer

- 1 Connect an external RS-232-C HP DeskJet printer to the HP 37718A RS232 port. See "Logging Results to RS-232-C Printer " page 105 or connect an external HP-IB HP DeskJet printer to the HP 37718A HP-IB port. See "Logging Results to HP-IB Printer " page 103 or connect a Parallel DeskJet printer to the HP 37718A Parallel port. See "Logging Results to Parallel (Centronics) Printer " page 102.
- 2 Make the required selections on the **OTHER LOGGING** display: LOGGING PORT [HPIB] or [RS232] or [PARALLEL] and LOGGING [ON].
- 3 To log the Error and Alarm summaries, the displayed Bar graphs and the Alarm graph to the printer, choose **PRINT** on the bar graph display.

## Logging Graph Displays

- 4 Choose to confirm or abort the print.  
To confirm the print and only print the portion of the graph displayed and the summaries choose **THIS SCREEN**.  
To confirm the print and print the graph for the whole measurement period and the summaries choose **CURSOR TO END**.  
To abort the print choose **ABORT**.
- 5 To log the selected Error and Alarm summaries to the printer, choose **PRINT** on the Text Results display.

### **HOW TO:**

#### **Log to the Disk Drive**

- 1 Insert a floppy disk in the disk drive.
- 2 Choose LOGGING PORT **DISK** on the **OTHER LOGGING** display.  
Enter a filename on the **OTHER FLOPPY DISK** display. See "Saving Data Logging to Disk " page 128.
- 3 To log the Error and Alarm summaries, the displayed Bar graphs and the Alarm graph to the disk, choose **PRINT** on the bar graph display.
- 4 Choose to confirm or abort the print.  
To confirm the print and only print the portion of the graph displayed and the summaries choose **THIS SCREEN**.  
To confirm the print and print the graph for the whole measurement period and the summaries choose **CURSOR TO END**.  
To abort the print choose **ABORT**.
- 5 To log the selected Error and Alarm summaries to the disk, choose **PRINT** on the Text Results display.



---

## Logging Results

### *Description*

#### **Test Period Logging**

If degradations in system performance can be observed at an early stage, then the appropriate remedial action can be taken to maximize circuit availability and avoid system crashes. Test period logging allows you to monitor the error performance of your circuit. At the end of the test period the selected results are logged. Results can be logged at regular intervals during the test period by selecting a LOGGING PERIOD of shorter duration than the test period. An instant summary of the results can be demanded by pressing **PRINT NOW** without affecting the test in progress.

#### **Error Event Logging**

Manual tracing of intermittent faults is time consuming. Error event logging allows you to carry out unattended long term monitoring of the circuit. Each occurrence of the selected error event is logged.

The results obtained during the test are retained in memory until they are overwritten by the next set of results. The results can be logged at any time during the test period and at the end of the test period. The results required are selected using **OTHER LOGGING LOGGING SETUP CONTROL**.

Any Alarm occurrence results in a timed and dated message being logged.

BER and Analysis results can be selected by the user.

Cumulative and Period versions of the results are calculated and can be selected by the user.

**Period**            The results obtained over a set period of time during the test. The Period is defined by the LOGGING PERIOD selection.

**Cumulative**     The results obtained over the time elapsed since the start of the test.

## Logging Results

The results can be logged to the following devices, selectable using **OTHER** **LOGGING** LOGGING SETUP **DEVICE**:

- Optional Internal printer fitted into the instrument front cover (Option 602)
- External HP-IB printer (option 601)
- External RS-232-C printer (option 601)
- External Parallel Port printer (option 601)
- Disk Drive

FUNCTION		LOGGING
LOGGING SETUP		CONTROL
LOGGING PERIOD		ON
RESULTS LOGGED		USER PROGRAM
WHEN		10 MINS
CONTENT		SELECTED
		PERIOD EC>0
		ER & ANAL
		PER & CUMUL
LDS AT END OF TEST		ON
LDS ON DEMAND		ALL RESULTS
		RESULTS

STATUS: STORED SETTINGS FLOPPY LOGGING MORE TURN OFF WINDOW  
SETTINGS CONTROL DISK \*\*\*\*\*

### HOW TO:

- 1 Choose LOGGING [ON] - enables the logging of results and alarms.
- 2 Choose LOGGING PERIOD - determines how regularly the results and alarms are logged.  
USER PROGRAM provides a choice of 10 minutes to 99 hours.
- 3 Choose RESULT LOGGED - allows you to log all results to or choose only those results you require.
- 4 Choose WHEN - allows you to choose to only log when the error count for the logging period is greater than 0. If the error count is 0 then the message NO BIT ERRORS is displayed.
- 5 Choose CONTENT - allows you a choice of error results to be logged. Error Results, Analysis or Error and Analysis (ER & ANAL) and Period, Cumulative or Period and Cumulative (PER & CUMUL).

**Logging Results**

- 6 If LOG ERROR SECONDS [ON] is chosen a timed and dated message is logged each time an error second occurs (excessive occurrences of error seconds during the logging period will result in heavy use of printer paper).
- 7 Choose the logging DEVICE.  
If RS232 is chosen, see "Logging Results to RS-232-C Printer " page 105.  
If HPIB is chosen, see "Logging Results to HP-IB Printer " page 103.  
If PARALLEL is chosen, see "Logging Results to Parallel (Centronics) Printer " page 102.  
If DISK is chosen, see "Saving Data Logging to Disk" page 128.  
If Option 602, Internal Printer, is fitted and INTERNAL is chosen, see "Logging Results to Internal Printer " page 104.

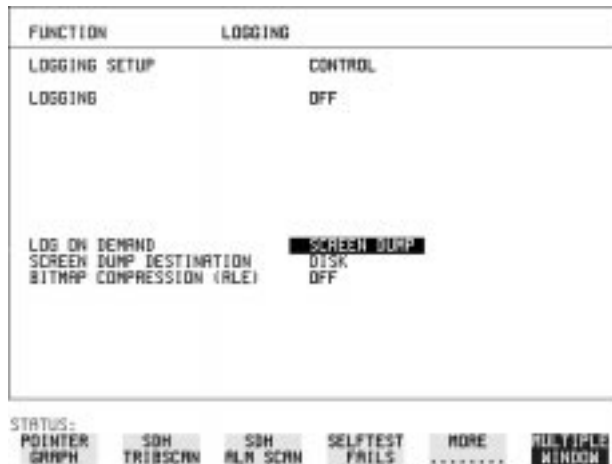
---

## Logging on Demand

### *Description*

When **PRINT NOW** is pressed the chosen results are logged to the chosen logging device. The choice of results for logging is:

- RESULTS SNAPSHOT - last recorded measurement results
- OVERHEAD SNAPSHOT - last recorded overhead values of the chosen STM-1
- OVERHEAD CAPTURE - Overhead Capture display
- SCREEN DUMP - allows logging of the chosen display
- POINTER GRAPH - Pointer Graph display
- SDH TRIBUTARY SCAN - SDH Tributary Scan display
- SDH ALARM SCAN - SDH Alarm Scan display
- SELTEST FAILS - Last recorded selftest failures



### *HOW TO:*

- 1 Choose LOG ON DEMAND to determine results to be logged when **PRINT NOW** is pressed.  
SCREEN DUMP allows you to log the selected display when **PRINT NOW** is pressed. (Logging or Disk displays cannot be logged using this feature).
- 2 Choose the logging DEVICE.  
If RS232 is chosen, see "Logging Results to RS-232-C Printer " page 105.  
If HP-IB is chosen, see "Logging Results to HP-IB Printer " page 103.

## Storing, Logging and Printing

### **Logging on Demand**

If PARALLEL is chosen, see "Logging Results to Parallel (Centronics) Printer " page 102.

If DISK is chosen, see "Saving Data Logging to Disk" page 128.

If Option 602, Internal Printer, is fitted and INTERNAL is chosen, see "Logging Results to Internal Printer " page 104.

## Logging Results to Parallel (Centronics) Printer

### *Description*

If Option 601, Remote Control Interface, is fitted, you can log the results and alarms to an external Parallel printer connected to the PARALLEL port. The Parallel port provides a standard IEEE 1284-A compatible interface.



---

### **CAUTION**

Damage to the instrument may result if a serial connection is made to this port.

### **HOW TO:**

- 1 Connect the Parallel printer to the PARALLEL port. See "Connecting an HP DeskJet Printer to a Parallel Port " page 107.
- 2 If a non HP printer is connected choose ALT PRINTER. Choose **NORMAL** 80 character column width or **COMPRESS** 40 character column width according to the capabilities of your printer.
- 3 Choose LOGGING SETUP **CONTROL** and set up the display as required. See "Logging Results " page 97 or "Logging on Demand " page 100.

## Logging Results to HP-IB Printer

### *Description*

If Option 601, Remote Control Interface, is fitted, you can log the results and alarms to an external HP-IB printer connected to the HP-IB port.



### *HOW TO:*

- 1 Connect an HP-IB printer to the HP-IB port.

---

### **NOTE**

---

Choosing HP-IB external printer for logging prevents the use of HP-IB remote control.

- 2 Choose the LOGGING SETUP **CONTROL** and set up the display as required. See "Logging Results " page 97 or "Logging on Demand " page 100.

## Logging Results to Internal Printer

### *Description*

If Option 602, Internal Printer is fitted, you can log the results and alarms to the in-lid printer.

FUNCTION	LOGGING
LOGGING SETUP	DEVICE
LOGGING PORT	INTERNAL
REMOTE CONTROL PORT	HP1B

STATUS:

INTERNAL	RS232	HP1B	DISK	PARALLEL	MULTIPLE WINDOW
----------	-------	------	------	----------	-----------------

### *HOW TO:*

- 1 Choose the LOGGING SETUP **CONTROL** and set up the display as required. See "Logging Results " page 97.



---

## Logging Results to RS-232-C Printer

### *Description*

If Option 601, Remote Control Interface, is fitted, you can log the results and alarms to an external RS-232-C printer connected to the RS232 port.

FUNCTION	LOGGING
LOGGING SETUP	DEVICE
LOGGING PORT	RS232
REMOTE CONTROL PORT	LAN
PRINTER TYPE	ALT. PRINTER
MODE	NORMAL
SPEED	5000 BAUD
PROTOCOL	NON/NOFF

STATUS: RS232 HP18 DISK PARALLEL MULTIPLE WINDOW

### *HOW TO:*

- 1 Connect an RS-232-C printer to the RS232 port.

---

### **NOTE**

---

Choosing RS232 external printer for logging prevents the use of RS-232-C remote control.

- 2 If a non HP printer is connected choose ALT PRINTER.  
Choose **NORMAL** 80 character column width or **COMPRESS** 40 character column width according to the capabilities of your printer.
- 3 Choose the LOGGING SETUP **CONTROL** and set up the display as required. See "Logging Results " page 97 or "Logging on Demand " page 100.

## **Printing Results from Disk**

***Description***

The results and alarms you logged to Disk can be printed by removing the Disk from the HP 37718A and inserting it into a personal computer (PC).

***HOW TO:***

**Print from DOS Prompt**

copy/b a:\<filename> <printer name>

***HOW TO:***

**Print from Windows**

- 1 Choose the required file from Filemanager.
- 2 Choose FILE - COPY FILE TO  
<*printer name*>

---

## Connecting an HP DeskJet Printer to a Parallel Port

***Description***

If Remote Control Option, 601, is fitted, the HP 37718A has the capability of interfacing with an HP DeskJet printer or, an alternative suppliers printer, via the PARALLEL port.

---

**CAUTION**

Do not connect a serial printer e.g. RS-232-C or HPIB to the HP 37718A Parallel port as this will damage the interface.

---

***HOW TO:***

- 1 Connect the HP 37718A Parallel port to the HP DeskJet Parallel port using printer cable HP part number 24542D.

---

## Changing Internal Printer Paper

### ***Description***

The printer accepts rolls of thermal paper with the following dimensions:

**Width:** 216 mm (8.5 in) or 210 mm (8.27 in) (A4)  
tolerance +2.0 mm - 1.0 mm

**Maximum Outside Diameter:** 40 mm

**Inside Core Diameter:** Between 12.5 mm and 13.2 mm

Suitable rolls of paper are available from Hewlett Packard, Part Number 9270-1360.

---

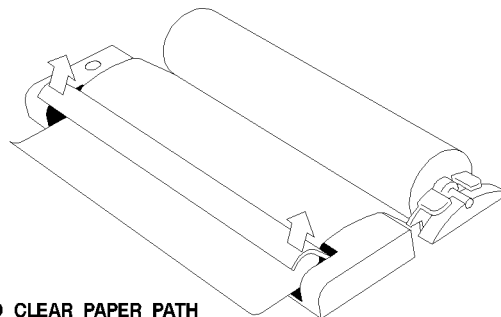
### **WARNING**

**The paper tear-off edge is SHARP. This edge is exposed when the printer cover is raised. Note the  CAUTION SHARP EDGE label on the cover.**

---

### ***HOW TO:***

- 1 Raise the two locking tabs on the sides of the printer cover and then raise the cover.
- 2 Raise the printer mechanism front cover. This releases the paper drive. Remove any remaining paper from the front (in the normal direction of operation).



- 3 Lift out the spindle. Adjust the paper width adaptor to the width of the paper being used.

Storing, Logging and Printing  
**Changing Internal Printer Paper**

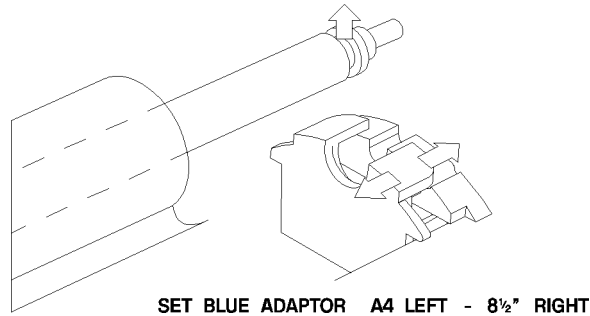
- Put the paper roll on the spindle such that the sensitive side will be on the underside of the print mechanism. Ensure that the relocation of the spindle locks the blue width adaptor in position.

---

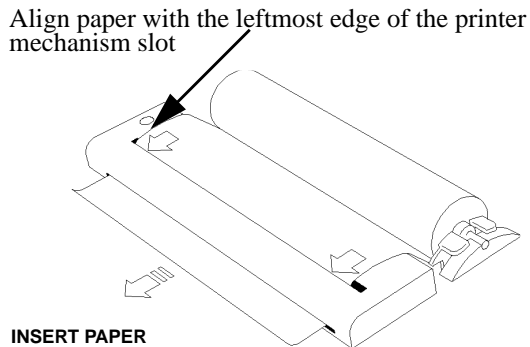
**NOTE**

The paper must be installed such that when it is in the print mechanism, the sensitive side (slightly shiny) is the underside. The illustrations here show the correct fitting for HP 9270-1360 paper which has the sensitive side on the outside of the roll.

---



- Feed the paper into the upper entry of the print mechanism. When the front cover of the print mechanism is closed, the printer should automatically feed the paper through until there is approximately 2.5 cm (1 in) clear at the front of the print mechanism.



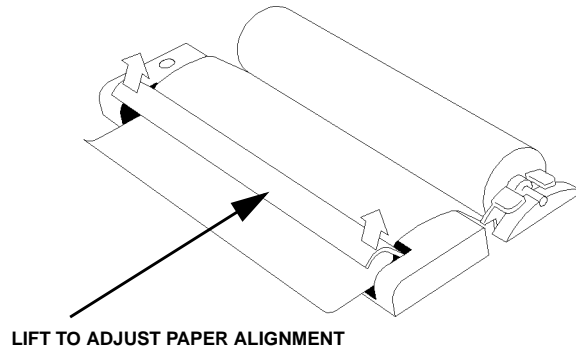
---

**CAUTION**

Do not close the outer cover until the automatic paper feed is complete.

Storing, Logging and Printing  
**Changing Internal Printer Paper**

- 6 If the printer paper is incorrectly aligned, raise the printer mechanism front cover to releases the paper drive and realign the paper.



## **Cleaning Internal Printer Print Head**


### ***Description***

The print head should be cleaned when broken or light characters occur in a vertical line on the page. To maintain a high quality print, clean the print head after 200 to 300 prints.

The print head is cleaned with a special cleaning paper which is supplied with the instrument.

---

### **WARNING**

**The paper tear-off edge is SHARP. This edge is exposed when the printer cover is raised. Note the  CAUTION SHARP EDGE label on the cover.**

---

### ***HOW TO:***

- 1 Open the printer as for changing the paper. See "Changing Internal Printer Paper " page 108.  
If printer paper is fitted, remove it from the printer.
- 2 Feed the cleaning paper into the top entry of the print mechanism with the rough black side, which contains the cleaning material, towards the rear of the printer.
- 3 When the automatic feed is complete and the paper stops moving use the instrument front panel key **PAPER FEED** to move the cleaning paper through the print mechanism.
- 4 Remove the cleaning paper and replace the normal printer paper. See "Changing Internal Printer Paper " page 108.

---

### **NOTE**

Retain the cleaning paper. It is designed to last for the life of the printer.

Storing, Logging and Printing

**Cleaning Internal Printer Print Head**



---

**Using Instrument and Disk Storage**

---

## Storing Configurations in Instrument Store

### *Description*

You can store measurement settings which are used regularly and recall them with a single operation.

One preset store is provided which cannot be overwritten, STORED SETTING NUMBER [0]. This store is used to set the instrument to a known state, the FACTORY DEFAULT SETTINGS.



### *HOW TO:*

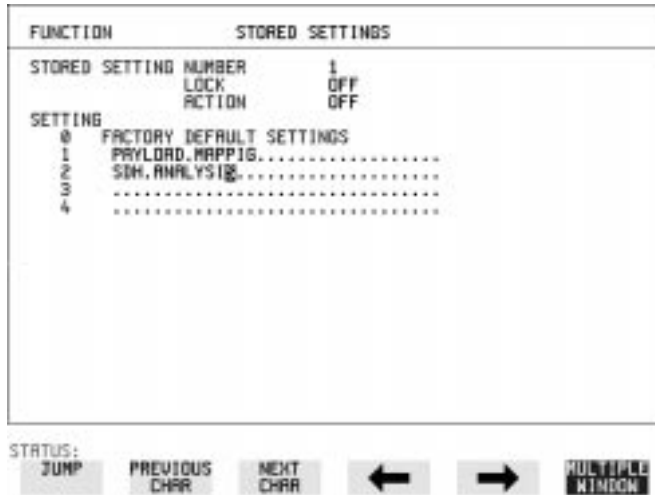
- 1 Set the HP 37718A to the configuration you wish to store.
- 2 Choose the STORED SETTING NUMBER to receive the configuration.
- 3 Choose LOCK **OFF**.
- 4 Choose ACTION **SAVE** to store the configuration in the chosen store.
- 5 To add a descriptive title see "Titling Configuration in Instrument Store " page 115.

---

## Titling Configuration in Instrument Store

### *Description*

When storing configurations, you can give them an easily remembered title for identification at a later date.



### *HOW TO:*

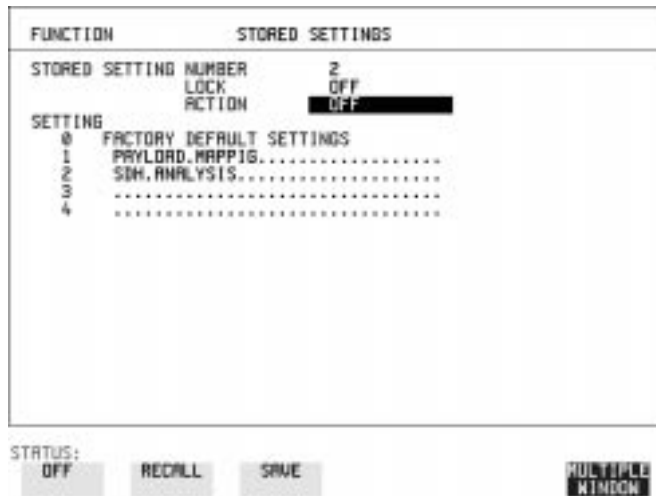
- 1 Choose the STORED SETTING NUMBER which contains the stored configuration.
- 2 Choose LOCK **OFF**.
- 3 Use **JUMP**; **NEXT CHAR**; **PREVIOUS CHAR**; **→** and **←** to title the settings.

---

## Recalling Configurations from Instrument Store

### *Description*

Having stored a configuration for future use, you must be able to recall that configuration in the future.



### *HOW TO:*

- 1 Choose the STORED SETTING NUMBER which contains the stored configuration.
- 2 Choose ACTION **RECALL** to recall the stored configuration. The recall operation can be verified by checking the relevant display settings.

---

## Formatting a Disk

**Description**

Only 1.44M, MS-DOS compatible disks can be used in the HP 37718A. Any other format or capacity will result in a disk access error being displayed.

**NOTE**

Disks can be formatted in an IBM compatible PC (1.44M, MS-DOS only) but it is recommended that the disk is formatted in the HP 37718A as this will ensure full compatibility with the Floppy Disk power fail recovery included in the HP 37718A.

**HOW TO:**

- 1 Choose DISK OPERATION **DISK FORMAT**.
- 2 Insert the Disk into the Disk drive.
- 3 Choose **OK** to Format the disk.  
 A warning that this operation will erase all data is displayed and asks "do you wish to continue".  
 If YES is selected, all the data on the Disk will be erased and the disk will be formatted.  
 If NO is selected, the operation is aborted. This allows you to view the data on the Disk and verify that it is no longer needed.

## Labeling a Disk

### *Description*

You can label your disks for ease of identification.

FUNCTION	FLOPPY DISK
DISK OPERATION LABEL	DISK LABEL MY DISK
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL: MY DISK	FREE: Bytes

STATUS:

OFF

OK

MULTIPLE WINDOW

### *HOW TO:*

- 1 Choose DISK OPERATION **DISK LABEL**.
- 2 Label the Disk using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET** and use the pop-up keypad.
- 3 Choose **OK** to confirm the label is correct.  
The label is displayed at the bottom of the display to confirm the operation has taken place.

---

## Managing Files and Directories on Disk

### *Description*

File and Directory structures can be important in speeding up the transfer of data between the instrument and the disk drive. It is recommended that you create a directory structure as an aid to efficient file management particularly when the disk is moved to a PC.

### Creating a Directory on Disk

FUNCTION	FLOPPY DISK	
DISK OPERATION	FILE CREATE DIRECTORY	
NAME	SDH	
Select OK to perform operation	OFF	
A:\ LABEL:	FREE:	Bytes

STATUS:  
OFF      OK

MULTIPLE  
WINDOW

### *HOW TO:*

- 1 Choose DISK OPERATION **FILE CREATE DIRECTORY** on the **OTHER FLOPPY DISK** display.
- 2 Enter the directory name using **PREVIOUS CHAR** **NEXT CHAR** **←** **→** or press **SET** and use the pop-up keypad. The directory name can contain up to 8 alphanumeric characters.
- 3 To create the directory choose **OK**. This will create a sub directory of the directory displayed at the bottom of the display. In this example A:\SDH will be created.

Using Instrument and Disk Storage  
**Managing Files and Directories on Disk**

## Accessing Directories and Files

- 1 Choose DISK OPERATION **SAVE**.
- 2 Choose FILE TYPE you wish to view.  
This acts as a filter on the filename extension:  
**CONFIGURATION** - .CNF filter, **GRAPHICS** - .SMG filter,  
**DATA LOGGING** - .PRN filter, **SCREEN DUMP** - .BMP filter.
- 3 Move the highlighted cursor to the NAME field and press **SET**.

---

### NOTE

---

- . <**DIR**> - Current Directory.
- .. <**DIR**> - Parent directory. Move highlighted cursor to this line and press **SET** to move to parent directory.

- 4 Move the highlighted cursor to  
.. <**DIR**> and press **SET** to move to parent directory.
- 5 Move the highlighted cursor to the directory required and press **SET**  
to move to that directory. (The directory name will appear on the  
display).  
Only the files with the file extension chosen in FILE TYPE will be  
displayed.



- 6 Move the highlighted cursor up and down the display using **↑** and **↓**.



## Using Instrument and Disk Storage

### Managing Files and Directories on Disk

---

#### NOTE

**Title Bar** - File types displayed and current directory. (cannot be highlighted).

. <**DIR**> - Current Directory.

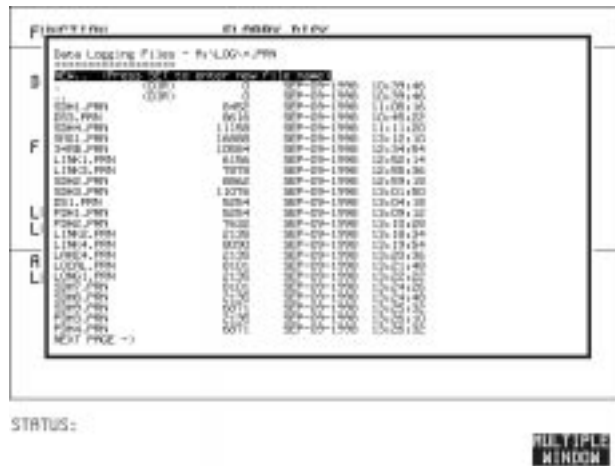
.. <**DIR**> - Parent directory. Move highlighted cursor to this line and press **SET** to move to parent directory.

**SDH1.PRN** - File (with named extension) in current directory. Move highlighted cursor to this line and press **SET** to select the file. The display will return to the **SAVE** display and the selected file name will appear in the FILE NAME field.

**NEXT** - Move highlighted cursor to this line and press **SET** to access the next page of file names.

**PREV** - Move highlighted cursor to this line and press **SET** to access the previous page of file names.

---



- NEW** - Allows entry of new file name using pop-up keypad. Press **SET** to obtain the pop-up keypad display. Enter the new filename, Choose **END** and press **SET** to return to the file manager display.
- Press **CANCEL** to return to the **SAVE** display.  
The filename entered via the keypad appears on the **SAVE** display.  
The file extension is added automatically.  
The Directory name and the disk Label appear at the bottom of the display.

## Renaming a File on Disk

### Description

Files can be renamed as an aid to efficient file management.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE RENAME
FROM:NAME	FILENAME.CNF
TO: DIRECTORY NAME	A:\ FILENAME.CNF
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE: Bytes

STATUS:  
 OFF  OK

MULTIPLE  
WINDOW

### HOW TO:

- 1 Choose DISK OPERATION **FILE RENAME**.
- 2 Enter the FROM filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or  
Choose the directory which contains the file to be renamed. See "Accessing Directories and Files " page 120. Move the highlighted cursor to the file to be renamed and press **SET** to return to the **FILE RENAME** display.  
The filename, with extension, can contain up to 12 alphanumeric characters.
- 3 Choose the directory in which to locate the renamed file (it will appear on the display). See "Accessing Directories and Files " page 120.
- 4 Enter the TO filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET** twice and use the pop-up keypad.  
The filename can contain up to 8 alphanumeric characters.  
The file extension is fixed to the FROM filename extension.
- 5 To rename the file choose **OK**.  
If you have entered a filename which already exists, a warning "File exists - are you sure" you wish to continue is displayed.  
If YES is selected, the data in the file will be overwritten. If NO is selected, the operation is aborted.  
This allows you the opportunity to verify before renaming.

## Deleting a File on Disk

### *Description*

Obsolete files can be deleted as an aid to efficient file management.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE DELETE DELETE FILE
NAME	FILENAME.EXT
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE:            Bytes

STATUS:

OFF

OK

MULTIPLE  
WINDOW

### *HOW TO:*

- 1 Choose DISK OPERATION **FILE** **DELETE** **DELETE FILE**.
- 2 Choose the directory containing the file to be deleted. See "Accessing Directories and Files " page 120.
- 3 Enter the filename to be deleted using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET**, highlight the file to be deleted on the file manager display, and press **SET**.  
The file name can contain up to 12 alphanumeric characters, including the filename extension.
- 4 To delete the file choose **OK**.  
A warning "Are you sure you wish to continue" is displayed.  
If YES is selected, the file is deleted.  
If NO is selected, the operation is aborted.  
This prevents accidental deletion of a wanted file.

Using Instrument and Disk Storage  
**Managing Files and Directories on Disk**

## Deleting a Directory on Disk

### *Description*

Obsolete Directories should be deleted as an aid to efficient file management.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE DELETE DELETE DIRECTORY
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE:      Bytes

STATUS:  
 OFF     OK

MULTIPLE  
WINDOW

---

### NOTE

---

A directory cannot be deleted until all the files within the directory have been deleted. See "Deleting a File on Disk " page 123.

### *HOW TO:*

- 1 Choose the directory you wish to delete (it will appear on the display). See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION  FILE  DELETE  DELETE DIRECTORY .
- 3 To delete the directory choose  OK .  
A warning "Are you sure you wish to continue" is displayed.  
If YES is selected, the directory is deleted.  
If NO is selected, the operation is aborted.  
This prevents accidental deletion of a wanted directory.  
If the directory is not empty the messages "delete directory failed"  
"directory is not empty" are displayed.
- 4 If files need to be deleted to prepare the directory for deletion. See "Deleting a File on Disk " page 123.

## Adding Descriptors to Disk Files

### *Description*

When storing configurations or graphics on disk, you can give them an easily remembered descriptor for identification at a later date.

Descriptors can be added to .CNF and .SMG files.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE PROPERTIES
DISPLAY OPTION	<b>FILE DESCRIPTOR</b>
FILE NAME	FILENAME.CNF
DESCRIPTOR	.....
Press SET to select filename popup	
Select OK to perform operation	OFF
A:\ LABEL:	FREE: Bytes

STATUS:

**TIME & DATE**

**FILE DESC**

**MULTIPLE WINDOW**

### *HOW TO:*

- 1 Choose the directory containing the file you wish to add the descriptor to. See "Accessing Directories and Files " page 120.
- 1 Choose DISK OPERATION **FILE PROPERTIES** and DISPLAY OPTION **FILE DESCRIPTOR**.
- 2 Move the highlighted cursor to the FILE NAME DESCRIPTOR field. Enter the file descriptor using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET**, highlight the file required on the file manager display, and press **SET**.
- 3 Move the highlighted cursor to Select OK to perform operation and choose OK.  
The File List will show the descriptor instead of the TIME and DATE information as long as FILE DESCRIPTOR is selected.

### **NOTE**

This slows down the updating of the display.

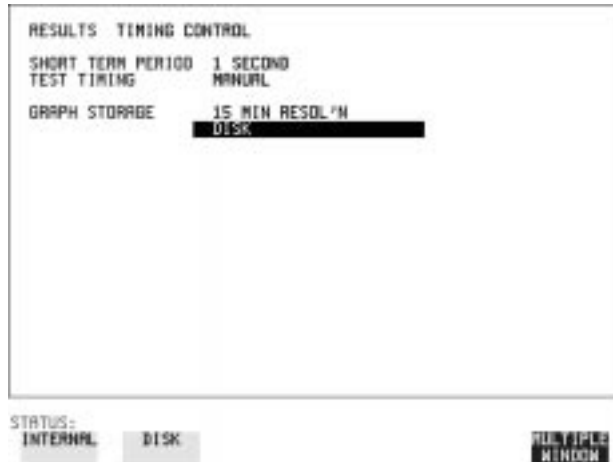
---

## Saving Graphics Results to Disk

### *Description*

Graphics results can be saved to a file on disk. Two methods of naming the file, which is created when the measurement is started, are available:

- Automatic**      A filename in the form meas001 is created automatically without any action from you.
- Your Choice**    You can input a filename of your choice which will override the automatically generated filename. This must be entered before the measurement is started. If the filename you enter already exists, graphics results will be saved to the automatically generated filename. This prevents existing files from being overwritten each time the measurement is started.



### *HOW TO:*

- 1 Choose GRAPH STORAGE **DISK** and the Graph Storage resolution required on the **RESULTS** display. See “Saving Graphics Results to Instrument Store” page 88.  
If you wish to use the automatically generated filename no further action is required and the graphics results will be saved on Disk when the measurement is completed.

## Using Instrument and Disk Storage

### Saving Graphics Results to Disk

FUNCTION	FLOPPY DISK
DISK OPERATION	SAVE
FILE TYPE	<b>GRAPHICS</b>
NAME	FILENAME.SMG
A:\ LABEL:	FREE: Bytes

STATUS:

CONFIG-  
URATION

**GRAPHICS**

DATA  
LOGGING

MULTIPLE  
WINDOW

- 2 Choose the directory in which to save the graphics results. See "Accessing Directories and Files " page 120.
- 3 If you wish to enter your own choice of filename, choose DISK OPERATION **SAVE** FILE TYPE **GRAPHICS**.
- 4 Move the highlighted cursor to NAME and enter the filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET** twice and use the pop-up keypad.  
The filename can contain up to 8 alphanumeric characters.  
The filename extension is fixed as .SMG.  
The graphics results will be saved on Disk at the end of the measurement.

---

## Saving Data Logging to Disk

### *Description*

Data Logging can be saved to a file on disk. The disk can be transferred to a personal computer (PC) and the logging investigated at a later date.

FUNCTION	FLOPPY DISK	
DISK OPERATION	SAVE	
FILE TYPE NAME	DATA LOGGING FILENAME.PRN APPEND TO FILE	
A:\ LABEL:	FREE:	Bytes

STATUS:

OVER-  
WRITE

APPEND  
TO FILE

MULTIPLE  
WINDOW

### *HOW TO:*

- 1 Choose the directory in which to save the logging results. See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION **SAVE** FILE TYPE **DATA LOGGING** and enter your choice of filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET** twice and use the pop-up keypad. The filename can contain up to 8 alphanumeric characters. The filename extension is fixed as .PRN.
- 3 If you wish to add the data logging to a file which already exists, choose APPEND TO FILE. The data logging is added to the named file on Disk in the available free space. If you wish to overwrite the contents of the named file with the data logging, choose OVERWRITE.
- 4 Set up the **OTHER** **LOGGING** display. See "Logging Results" page 97. When the named file is opened, data logging is saved on the disk:
  - As each logging output occurs during the measurement or
  - **PRINT NOW** is pressed.



---

## Saving Configurations to Disk

### *Description*

You can store a large number of measurement settings which are used regularly and recall them when required.

Configurations can be stored to a file on the floppy disk. The floppy disk can be used in other instruments which have the same option structure.

FUNCTION	FLOPPY DISK
DISK OPERATION	SAVE
FILE TYPE NAME	CONFIGURATION SIGNAL.CNF
Select OK to perform operation	OFF
R:\	
LABEL: no label	FREE: 1148928 Bytes

STATUS: CONFIGURATION GRAPHICS DATA LOGGING SCREEN DUMP MULTIPLE WINDOW

### *HOW TO:*

- 1 Set the HP 37718A to the configuration you wish to store.
- 1 Choose the directory in which you wish to save the HP 37718A configuration. See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION **SAVE**, FILE TYPE **CONFIGURATION** and enter the filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET** twice and use the pop-up keypad.  
The filename extension is fixed as .CNF.  
The filename can contain up to 8 alphanumeric characters.
- 3 Choose **OK** to save the current configuration to disk.  
If you have entered a filename which already exists, a warning "File exists - are you sure you wish to continue" is displayed.  
If YES is selected, the configuration will be saved.  
To cancel, change OK to OFF and enter new filename. See "Accessing Directories and Files " page 120.

---

## Recalling Configuration from Disk

### *Description*

If a configuration has been stored on disk, you will need to recall it at some time in the future to configure the instrument.

FUNCTION	FLOPPY DISK	
DISK OPERATION	RECALL	
FILE TYPE NAME	CONFIGURATION FILENAME.CNF	
Select OK to perform operation	OFF	
A:\ LABEL:	FREE:	Bytes

STATUS:  
CONFIG-  
URATION

GRAPHICS

MULTIPLE  
WINDOW

### *HOW TO:*

- 1 Choose the directory that contains the configuration file to be recalled. See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION **RECALL** FILE TYPE **CONFIGURATION** and enter your choice of filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←**.  
The filename can contain up to 8 alphanumeric characters.  
The filename extension is fixed as .CNF.
- 3 To recall the configuration from disk to instrument, choose **OK**.  
The recall operation can be verified by checking the relevant display settings.

---

## Recalling Graphics Results from Disk

### *Description*

If graphic results have been stored on disk, you will need to recall them in able to view the results on the **GRAPH** display.

FUNCTION	FLOPPY DISK
DISK OPERATION	RECALL
FILE TYPE NAME	GRAPHICS FILENAME.SMG
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE: Bytes

STATUS:

OFF

OK

MULTIPLE  
WINDOW

### *HOW TO:*

- 1 Choose the directory that contains the graphics file to be recalled. See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION **RECALL** FILE TYPE **GRAPHICS** and enter your choice of filename using **PREVIOUS CHAR** **NEXT CHAR**  
**→** **←**  
The filename can contain up to 8 alphanumeric characters.  
The filename extension is fixed as .SMG.
- 3 To recall the graphics results from disk to instrument, choose **OK**.
- 4 To view the graphics results, see "Recalling Stored Graph Results" page 89.

---

## Copying Configuration from Instrument Store to Disk

### *Description*

If you have a configuration stored in the instrument store that you wish to use on another instrument, you can copy it to disk. The configuration can then be downloaded from the disk in to another HP 37718A with the same options as the original instrument.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE COPY CONFIGURATION
FROM: 1 ATM27.....	
TO: NAME	FILENAME.CNF
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE: Bytes

STATUS:  
 OFF  OK

MULTIPLE WINDOW

### *HOW TO:*

- 1 Choose the directory to receive the configuration file. See "Accessing Directories and Files " page 120.
- 1 Choose DISK OPERATION **FILE COPY CONFIGURATION** and enter the Instrument Store number using **DECREASE DIGIT** and **INCREASE DIGIT** or press **SET** and use the pop-up keypad. The Stored Settings description appears alongside the store number. If required the description can be modified using **JUMP NEXT CHAR PREVIOUS CHAR** **← →** or press **SET** and use the pop-up keypad. The description can contain up to 24 alphanumeric characters.
- 2 Enter the chosen filename using **PREVIOUS CHAR NEXT CHAR** **← →** or press **SET** twice and use the pop-up keypad. The file name can contain up to 8 alphanumeric characters. The filename extension is fixed as .CNF.

Using Instrument and Disk Storage

### **Copying Configuration from Instrument Store to Disk**

- 3** To copy the configuration from instrument to Disk choose **OK**.  
If you have entered a filename which already exists, a warning "File exists - are you sure you wish to continue" is displayed.  
If YES is selected, the data on the Disk will be overwritten.  
If NO is selected, the operation is aborted.

---

## Copying Configuration from Disk to Instrument Store

### *Description*

If you have a configuration stored in the instrument store that you wish to use on another instrument, you can copy it to Disk. The configuration can then be downloaded from the disk in another HP 37718A with the same options as the original instrument.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE COPY CONFIGURATION
TO:	4 ATMTTEST.....
FROM:	NAME FILENAME.CNF
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE: Bytes

STATUS:  
 OFF  OK

MULTIPLE WINDOW

### *HOW TO:*

- 1 Choose the directory containing the configuration file. See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION **FILE COPY CONFIGURATION** and enter the Instrument Store number using **DECREASE DIGIT** and **INCREASE DIGIT** or press **SET** and use the pop-up keypad. Enter a description of the configuration using **PREVIOUS CHAR NEXT CHAR** **→** **←** or press **SET** and use the pop-up keypad. The description can contain up to 24 alphanumeric characters.
- 3 Enter the filename the configuration is to be copied from using **PREVIOUS CHAR NEXT CHAR** **→** **←** or press **SET**, highlight the file to be copied on the file manager display and press **SET**. The file name can contain up to 8 alphanumeric characters. The filename extension is fixed as .CNF.

**Copying Configuration from Disk to Instrument Store**

- 4 To copy the configuration from Disk to instrument, choose **OK**.  
If you have entered a instrument store number which already contains a configuration, a warning "Are you sure you wish to continue" is displayed.  
If YES is selected, the data in the instrument store will be overwritten.  
If NO is selected, the operation is aborted.

---

## Copying Graphics Results from Instrument Store to Disk

### *Description*

You can copy Graphics Results from the instrument store to the Disk. This is useful under the following conditions:

- If you have graphics results stored in the instrument that you wish to prevent from being overwritten by a future measurement (only 10 store locations in the instrument)
- If you wish to retrieve the graphics results for viewing via a spreadsheet.

FUNCTION	FLOPPY DISK
DISK OPERATION	FILE COPY GRAPHICS
FROM: STORE	-9
TO: NAME FORMAT	FILENAME.SMG NORMAL
Select OK to perform operation	<input type="checkbox"/> OFF
A:\ LABEL:	FREE: Bytes

STATUS:  
 OFF  OK

MULTIPLE WINDOW

### *HOW TO:*

- 1 Choose the directory to receive the graphics file. See "Accessing Directories and Files " page 120.
- 2 Choose DISK OPERATION  FILE  COPY  GRAPHICS and enter the Instrument Store number using  DECREASE DIGIT and  INCREASE DIGIT or press  SET and use the pop-up keypad.
- 3 Enter the filename the graphic results are to be copied to using  PREVIOUS CHAR  NEXT CHAR  →  ← or press  SET twice and use the pop-up keypad.  
The file name can contain up to 8 alphanumeric characters.  
The filename extension is fixed as .SMG.



### Copying Graphics Results from Instrument Store to Disk

- 4 If you wish to view the graphic results at a later date via a spreadsheet, choose FORMAT **CSV**. CSV is Comma Separated Variable.  
If you wish to view the graphic results at a later date on an HP 37718A, choose FORMAT **NORMAL**.
- 5 To copy the configuration from instrument to Disk, choose **OK**.  
If you have entered a filename which already exists, a warning "File exists - are you sure you wish to continue" is displayed.  
If YES is selected, the data on the Disk will be overwritten.  
If NO is selected, the operation is aborted.  
This allows you the opportunity to view the data on the Disk and verify that it is no longer needed.

Using Instrument and Disk Storage

**Copying Graphics Results from Instrument Store to Disk**

---

**Selecting and Using "Other" Features**

## Coupling Transmit and Receive Settings

### *Description*

When generating and measuring at the same interface level, you can have the transmit and receive settings coupled together. Any settings change made on the transmit display will automatically occur on the receive display. Any settings change made on the receive display will automatically occur on the transmit display.

This function is available on the **OTHER** **SETTINGS CONTROL** display.



### HOW TO:

- 1 Choose TRANSMITTER AND RECEIVER **COUPLED**.

---

## Setting Time & Date

### *Description*

When making Bit error measurements and recording results you can have certain events timed chronologically, for example, Alarms; Error Seconds.

The capability to set the Time and Date is provided on the **OTHER** **TIME & DATE** display.



### *HOW TO:*

- 1 Choose CLOCK MODE **SETUP** and set the Time and Date using **↑**; **↓**; **←**; **→**; **INCREASE DIGIT** and **DECREASE DIGIT**.
- 2 Choose CLOCK MODE **RUN** to complete the setting of Time and Date.

---

## Enabling Keyboard Lock

### *Description*

You can protect the measurement settings from interference during a test.

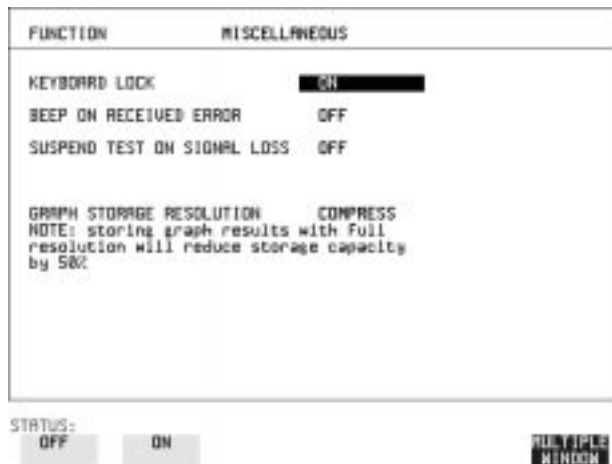
This function is provided in the HP 37718A on the **OTHER** **MISCELLANEOUS** display.

The following keys are not affected by Keyboard Lock:

- Display keys **TRANSMIT**; **RECEIVE**; **RESULTS**; **GRAPH**; **OTHER**
- cursor keys **←** **↑** **↓** and **→**
- **SHOW** **PAPER FEED** **LOCAL** **SMART TEST**

The following display functions are not affected by Keyboard Lock:

- RESULTS type on the **RESULTS** display
- KEYBOARD LOCK on the **OTHER** display



### HOW TO:

- 1 Choose KEYBOARD LOCK **ON**.

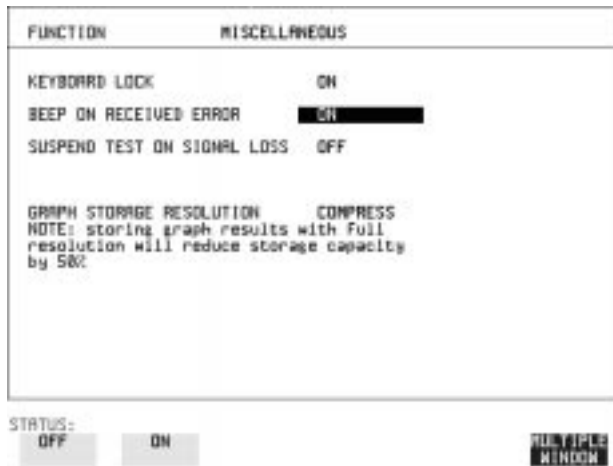
---

## Enabling Beep on Received Error

### *Description*

You can have an audible indication of an error which is particularly useful when the display on the test set is hidden from view.

This function is provided in the HP 37718A on the **OTHER** **MISCELLANEOUS** display.



**HOW TO:**            1 Choose BEEP ON RECEIVED ERROR **ON**.

---

## Suspending Test on Signal Loss

When running a test, you can choose to suspend the test during periods of signal loss.

This function is available on the **OTHER** **MISCELLANEOUS** display.



### HOW TO:

- 1 Choose SUSPEND TEST ON SIGNAL LOSS **ON**.

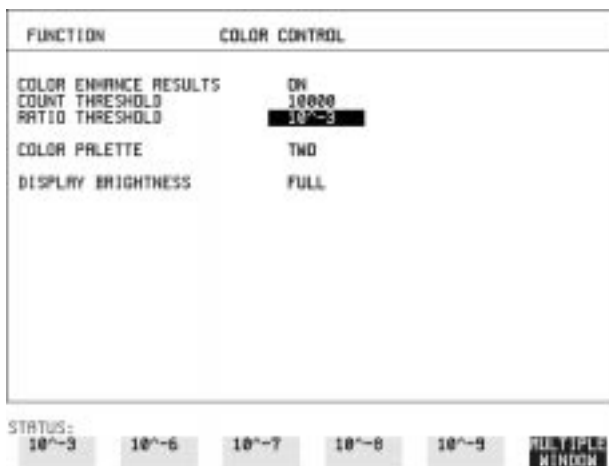


## Setting Error Threshold Indication

### *Description*

When making error measurements, you can have an indication of when an error count or error ratio threshold has been exceeded. You can set the HP 37718A to indicate this by a color change, from yellow to red, of the bar on the **GRAPH** display and the result on the **RESULTS** display. You can choose the thresholds at which the color change occurs. The Count and Ratio selections are independent.

This function is available on the **OTHER** **COLOR CONTROL** display.



### *HOW TO:*

- 1 Choose COLOR ENHANCE RESULTS **ON**.
- 2 Choose the COUNT THRESHOLD and RATIO THRESHOLD.

---

## Setting Screen Brightness and Color

### *Description*

The HP 37718A screen can be set to single or two color using the COLOR PALETTE selection on the **OTHER**, **COLOR CONTROL** display.

The screen brightness can be set to full or half brightness. The half brightness setting is used when the room brightness is such that half brightness is desirable and will also prolong the life of the screen.

If the brightness is set to FULL and there have been no key presses in the last hour, then the screen automatically dims to the half brightness level and the status message "Display set to half brightness" is shown. Any key press will return the screen to full brightness.

This function is available on the **OTHER** **COLOR CONTROL** display.



### *HOW TO:*

- 1 Choose the DISPLAY BRIGHTNESS to suit the operating environment.

---

## Dumping Display to Disk

### *Description*

The chosen display may be stored on disk in bitmap format using the Screen Dump feature of the HP37718A. Logging and Floppy Disk must be set up for screen dump. The current display is stored on disk when **PRINT NOW** is pressed.



### *HOW TO:*

- 1 Choose LOGGING SETUP **DEVICE** and LOGGING PORT **DISK** on the **OTHER**, **LOGGING** display.
- 2 Choose LOGGING SETUP **CONTROL** LOG ON DEMAND **SCREEN DUMP** on the **OTHER**, **LOGGING** display.
- 3 If compression is required to save disk space, select BITMAP COMPRESSION (RLE) **ON**.

## Selecting and Using "Other" Features

### Dumping Display to Disk

FUNCTION	<b>FLOPPY DISK</b>
DISK OPERATION	SAVE
FILE TYPE NAME	SCREEN DUMP FILENAME.BMP
BMP DIR : R:\	
BMP FILE: SDUMP029.BMP	
R:\	
LABEL: no label	FREE: unknown Bytes

STATUS: STORED SETTINGS FLOPPY LOGGING MORE **PRINT NOW**

- 4 Choose the directory in which to save the Screen Dump. See "Accessing Directories and Files " page 120.
- 5 If you wish to enter your own choice of filename, choose DISK OPERATION **SAVE** FILE TYPE **SCREEN DUMP**.

---

#### NOTE

You have the option of an auto generated filename or entering your chosen filename.

The file name can have a maximum of 8 characters.

The file extension is fixed as .BMP.

The file name must satisfy DOS requirements, that is, there must be no spaces or other illegal characters.

- 6 Move the highlighted cursor to NAME and enter the filename using **PREVIOUS CHAR** **NEXT CHAR** **→** **←** or press **SET** twice and use the pop-up keypad.
- 7 Choose the display you want to store on disk and press **PRINT NOW**. After a few second the message "SAVING SCREEN DUMP . . . (XX% COMPLETE)" is displayed.

## Running Self Test

### *Description*

Before using the HP 37718A to make measurements, you can run Self Test ALL TESTS to ascertain the integrity of the HP 37718A. These tests take between at least 1 hour to complete depending on the options fitted.

Alternatively you can run Confidence Tests which only takes 2 to 3 minutes to complete. This is not a full verification but performs BER measurements with internal and external loopbacks fitted.



### *HOW TO:*

Run ALL TESTS

- 1 Choose TEST TYPE **ALL TESTS** on the **OTHER** **SELF TEST** display.
- 2 Insert a formatted disk into the instrument disk drive.
- 3 Make the loopback connections listed below:
  - Connect Transmit module 75Ω OUT to Receive module 75Ω IN
  - Connect Transmit module 100/120Ω OUT to Receive module 100/120Ω IN
  - Connect Transmit module 75Ω MUX to Receive module 75Ω DEMUX
  - Connect Transmit module 100/120Ω MUX to Receive module 100/120Ω DEMUX
  - Connect Multirate Analyser IN to OUT
  - Connect Optical OUT to Optical IN via a 15 dB attenuator.

## Selecting and Using "Other" Features

### Running Self Test

---

#### NOTE

---

If any or all of these connections are not made the HP 37718A will FAIL Self Test.

- 4 Press **RUN/STOP** to activate the Self Test. TEST STATUS RUNNING will be displayed.

The information pertaining to TEST TYPE, TEST NUMBER and SUBTEST NUMBER will change as the Self Test progresses.

If the HP 37718A is functioning correctly, after a time of at least 1 hour, TEST STATUS PASSED is displayed.

If TEST STATUS [FAIL nnn] is displayed, the HP 37718A should be returned to a service office for repair.



#### HOW TO:

##### Run Confidence TESTS

- 1 Choose TEST TYPE **CONF. TESTS** on the **OTHER** **SELF TEST** display.
- 2 Insert a formatted disk into the instrument disk drive.
- 3 Make the loopback connections listed below:  
Connect Transmit module 75Ω OUT to Receive module 75Ω IN  
Connect Transmit module 100/120Ω OUT to Receive module 100/120Ω IN  
Connect Transmit module 75Ω MUX to Receive module 75Ω DEMUX  
Connect Transmit module 100/120Ω MUX to Receive module 100/120Ω DEMUX  
Connect Multirate Analyser IN to OUT  
Connect Optical OUT to Optical IN via a 15 dB attenuator.

## Selecting and Using "Other" Features

### Running Self Test

- 4 Press **RUN/STOP** to activate the Self Test. TEST STATUS RUNNING will be displayed.

The information pertaining to TEST TYPE, TEST NUMBER and SUBTEST NUMBER will change as the Self Test progresses.

If the HP 37718A is functioning correctly, after a time of 2 to 3 minutes, TEST STATUS PASSED is displayed.

If TEST STATUS [FAIL nnn] is displayed, the HP 37718A should be returned to a service office for repair.

---

#### NOTE

Each individual self test requires unique loopback connections. To obtain a list of the connections required move the highlighted cursor to CABLING INFO and press **SET**. The Loopbacks list will appear on the display.

---



Selecting and Using "Other" Features  
**Running Self Test**



---

# Appendix A

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## AU-3/TUG-3 Background Patterns

The following tables list the background patterns available when selecting specific foregrounds.

## AU-3/TUG-3 Background Patterns

**Table 1 AU-3 Background Patterns**

Foreground	Background choice in Foreground AU-3	Background choice in other AU-3s
AU-3	-----	TU-11, TU-12 Mapping or AU-3 Word (8 bit user programmable word).
TU-2	Pattern in other TU-2s is numbered. They contain the word 11NNNNNx, where NNNNN is the binary number of the TU.	TU-11, TU-12 Mapping or AU-3 Word (8 bit user programmable word).
TU-12 (2 Mb/s) Unframed	TU-12 structure, unframed with 2E15-1, 2E9-1 PRBS or 1100 word pattern in all information bits.	TU-12, TU-11 Mapping or AU-3 Word (8 bit user programmable word).
TU-12 (2 Mb/s) Framed	TU-12 structure, framed with 2E15-1, 2E9-1 PRBS, NUMBERED or 1100 word pattern. In Numbered mode, each timeslot contains the pattern 0NNNNNNX where NNNNNN is the binary number of the TU. The least significant digit (X) is alternated between 0 and 1 in successive frames.	TU-12, TU-11 Mapping or AU-3 Word (8 bit user programmable word).
TU-11 (DS1) Unframed	TU-11 structure, D4 framed with 2E15-1, 2E9-1 PRBS or 1100 Word pattern in other TU-11s.	TU-12, TU-11 Mapping or AU-3 Word (8 bit user programmable word).
TU-11 (DS1) Framed	TU-11 structure, DS1, D4 framed with 2E15-1, 2E9-1 PRBS, NUMBERED or 1100 word pattern in other TU-11s. In Numbered mode, each timeslot contains the pattern 1NNNNNN1 where NNNNNN is the binary number of the TU. Framing type will be the same as the foreground except when SLC96 is selected. In this case, D4 framing is inserted in the background	TU-12, TU-11 Mapping or AU-3 Word (8 bit user programmable word).

AU-3/TUG-3 Background Patterns

**Table 2 TUG-3 Background Patterns**

Foreground	Background choice in Foreground TUG-3	Background choice in other TUG-3s
TUG-3	-----	TU-11, TU-12 Mapping or TU-3 Word (8 bit user programmable word).
TU-2	Pattern in other TU-2s is numbered. They contain the word 11NNNNNx, where NNNNN is the binary number of the TU.	
TU-12 (2 Mb/s) Unframed	TU-12 structure, unframed with 2E15-1, 2E9-1 PRBS or 1100 word pattern in all information bits.	TU-12, TU-11 Mapping or TU-3 Word (8 bit user programmable word).
TU-12 (2 Mb/s) Framed	TU-12 structure, framed with 2E15-1, 2E9-1 PRBS, NUMBERED or 1100 word pattern. In Numbered mode, each timeslot contains the pattern 0NNNNNX where NNNNN is the binary number of the TU. The least significant digit (X) is alternated between 0 and 1 in successive frames.	TU-12, TU-11 Mapping or TU-3 Word (8 bit user programmable word).
TU-11 (DS1) Unframed	TU-11 structure, D4 framed DS1 with 2E15-1, 2E9-1 PRBS or 1100 Word pattern in other TU-11s.	TU-12, TU-11 Mapping or TU-3 Word (8 bit user programmable word).
TU-11 (DS1) Framed	TU-11 structure, framed with 2E15-1, 2E9-1 PRBS, NUMBERED or 1100 word pattern in other TU-11s. In Numbered mode, each timeslot contains the pattern 1NNNNN1 where NNNNN is the binary number of the TU. Framing type will be the same as the foreground except when SLC96 is selected. In this case, D4 framing is inserted in the background	TU-12, TU-11 Mapping or TU-3 Word (8 bit user programmable word).

## AU-3/TUG-3 Background Patterns

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# Appendix B

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## ETSI/ANSI Terminology

A table of ETSI terms with their ANSI equivalents.

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## ETSI/ANSI Conversion and Equivalent Terms

### Introduction

The terminology used on the instrument display can be ETSI (SDH) or ANSI (SONET) terminology. Refer to the table given in this appendix for an explanation of equivalent SDH/SONET terms.

ETSI: European Telecommunications Standards Institute.

ANSI: American National Standards Institute.

---

**Table 3** ETSI / ANSI Terminology

ETSI Term	ANSI Term
AU-3	STS-1 SPE + H1, H2, H3
AU-4	STS-3c SPE + H1, H2, H3
BIP (Bit Interleaved parity)	CV (Code Violation)
High Order Path (HP / HO)	STS Path
I-n Intra Office, (n=STM-n level)	Intermediate Reach (IR)
L-n.1 or L-n.2 long haul	LR long reach
Low Order Path (LP / LO)	VT Path
LP-REI	REI-V
M.S.P	A.P.S
Multiplexer Section (MS)	Line
Multiplexer Section Protection	Automatic Protection Switching
MS-AIS	Line AIS / AIS-L
MS-BIP	Line CV / CV-L
MS-DCC	Line DCC / DCC-L
MS-REI	Line FEBE / REI-L

ETSI/ANSI Terminology  
**ETSI/ANSI Conversion and Equivalent Terms**

**Table 3** **ETSI / ANSI Terminology , continued**

ETSI Term	ANSI Term
MS-RDI	Line FERF / RDI-L
Multiplexer Section Overhead	Line Overhead
Network Node Interface	Line Interface
OOF	SEF (severely errored frame defect)
Path AIS / AU-AIS	AIS-P
Path REI / HP REI	REI-P
Path FERF / HP RDI	RDI-P
Path IEC / AU-IEC	IEC-P
Path Overhead	Path Overhead
Regenerator	Repeater
Regenerator Section (RS)	Section
Regenerator Section Overhead	Section Overhead
Remote Alarm Indicator	RAI
RS-DCC	Section DCC (DCC-S)
Section Overhead (SOH)	Transport Overhead (TOH)
S-n.1 or S-n.2 short haul	Short Reach (SR)
SOH	TOH
STM-m	OC-n / STS-n (where $m = n \div 3$ for $m \geq 1$ )
STM-0	STS-1
STM-1	OC3c / STS-3c
STM-4	OC-12 / STS-12
STM-16	OC-48 / STS-48
Tributary Unit (TU)	Virtual Tributary (VT)

**Table 3** **ETSI / ANSI Terminology , continued**

ETSI Term	ANSI Term
TU	VT
TU-11	VT 1.5
TU-12	VT 2
TU-2	VT 6
TU-3	NONE
TU BIP	VT BIP (CV-V)
TU RDI / LP-RDI	RDI-V
TUG	VT Group
TUG2	VT Group (12 columns)
TUG3	VT Group (86 columns)
TU multiframe	VT superframe
TU PATH AIS	VT AIS (AIS-V)
VC	SPE
VC4	STS3C SPE
Virtual Container (VC)	Synchronous Payload Envelope (SPE)

NOTE: VC is an ETSI abbreviation for Virtual Container and an ETSI / ANSI abbreviation for (ATM) Virtual Channel. The context of VC must therefore be taken into account when converting between standards.



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This book tells you how to select and use the various instrument functions available.

