User's Guide
DSn/SONET
Operation

HP 37718A
Communications
Performance Analyzer

HP Part No. 37718-90004

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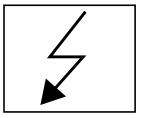

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HP 37718A Communications Performance Analyzer

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.

1 Setting the Interfaces

2 Selecting Test Features

5 Using Instrument and Disk Storage

1

Setting the Interfaces

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

Setting the Interfaces

Setting DSn Transmit Interface

Description DSn 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.
   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).
5. If you have chosen 2 Mb/s or DS1 as the SIGNAL rate, choose the required LINE CODE. (At 34 Mb/s and DS3 coding is fixed.)

6 If required, choose the FREQUENCY OFFSET value.
See “Adding Frequency Offset to SONET Signal” page 33.

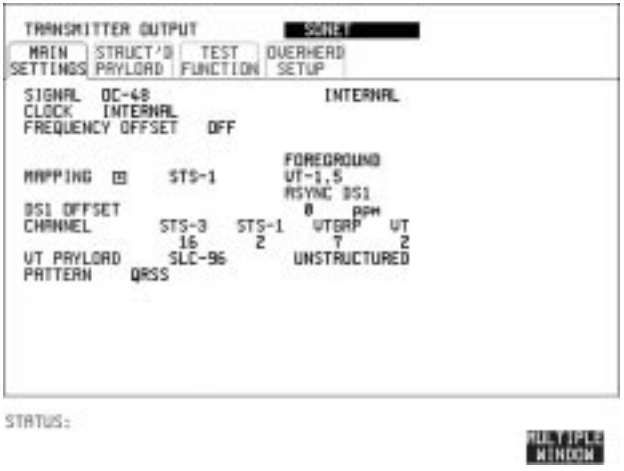
7 Choose the required PAYLOAD TYPE.
If STRUCTURED is required FRAMED must be chosen.
If Structured is chosen the DSn test signal must be set up. See “Setting Transmit Structured Payload/Test Signal” page 39.
If you have chosen 2 Mb/s, DS1 or DS3 as the DSn signal rate, the Framed choice is expanded to provide a menu of framing types.

8 Choose the PATTERN type and the PRBS POLARITY.

Setting SONET Transmit Interface

Description SONET 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.

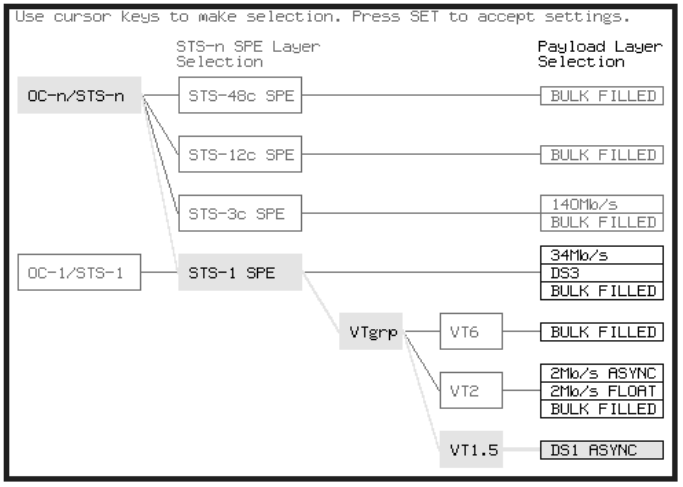


HOW TO:

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 STS-1 is chosen, choose the required interface level.
   Choose INTERNAL unless THRU MODE is required. If THRU MODE is chosen, see "Setting SONET THRU Mode " page 15.
2. Make your choice of CLOCK synchronization source. The RECEIVE clock sync choice depends on the SONET 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 SONET Signal” page 33.

4 Choose FOREGROUND **F/G MAPPING**, BACKGROUND **B/G MAPPING** MAPPING and type of payload.

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



Use → and ← to move between STS Layer choice, VT Layer choice and Payload Layer choice. Use ↑ and ↓ to choose the mapping.
Use **SET** to confirm your choice and return to the **SONET MAIN SETTINGS** display.

5 If VT-6 mapping is chosen, VT CONCATENATION selection is enabled, choose OFF or the tributary at which the concatenation begins, VT6-2C through VT6-6C.
The BACKGROUND, PATTERN IN OTHER VT-6's is fixed at NUMBERED, that is, each VT-6 contains a unique number to allow identification in case of routing problems.

6 If required, choose DS1/2M/34M/DS3 OFFSET value. See "Adding Frequency Offset to SONET Signal" page 33

7 If FULL SPE, VT-6, VT-2 or VT-1.5 mapping is chosen, choose the test tributary CHANNEL, including the STS-3 for an OC-12/OC-48 signal.

8 Choose the payload framing under PAYLOAD TYPE or VT 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 DSn 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.

9 Choose the PATTERN type and PRBS polarity.

10 Choose the mapping required in the background (non-test) STS's.

11 If VT mapping is chosen for the test STS, choose the PATTERN IN OTHER VT's.

Setting SONET THRU Mode

Description

THRU mode is used to non-intrusively monitor SONET lines where no protected monitor points are available.
As THRU mode locks some user settings, you must set SIGNAL RATE, STS rate, STS-1 SPE CHANNEL (if appropriate) before selecting THRU mode.
The entire frame can be errorred at a user defined rate if PAYLOAD OVERWRITE and TOH+POH CHANNEL OVERWRITE are both set to OFF. If either overwrite is enabled the ENTIRE FRAME ERROR RATE function is disabled.

OC-1/STS-1, OC-3/STS-3
You can substitute a new payload, Section and Line Overhead (TOH) and Path overhead (POH) in the received OC-1/STS-1 or OC-3/STS-3 signal for testing.

OC-12, OC-48
The overhead and payload may be overwritten for STS-3c SPE and AU3. PAYLOAD OVERWRITE is not available for STS-12C or STS-48C. TOH+POH CHANNEL overwrite is available for STS-12C and STS-48C.

HOW TO:

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

2 Make the PAYLOAD OVERWRITE choice required.
If STS-3c SPE, STS-1 SPE, VT-6, VT-2 or VT-1.5 is chosen, the Section, Line and Path CVs are recalculated before transmission and the Mapping, Selected VT, VT Payload, Pattern, Tributary Offset and Pattern in other VT's settings are displayed. To choose the settings in these, See "Setting SONET Transmit Interface " page 12, steps 4 through 10.

3 Make the TOH+POH CHANNEL OVERWRITE choice required.
You can only modify those overhead bytes available under **TRANSMIT** **SONET** **TEST FUNCTION** **SONET**: Errors & Alarms, Sequences, Overhead BER, APS Messages and DCC Insert.
The Section, Line and Path CVs are recalculated before transmission.

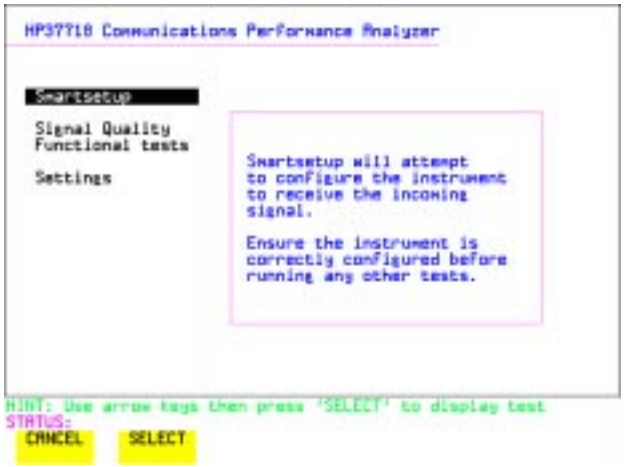
Using Smart Test

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.



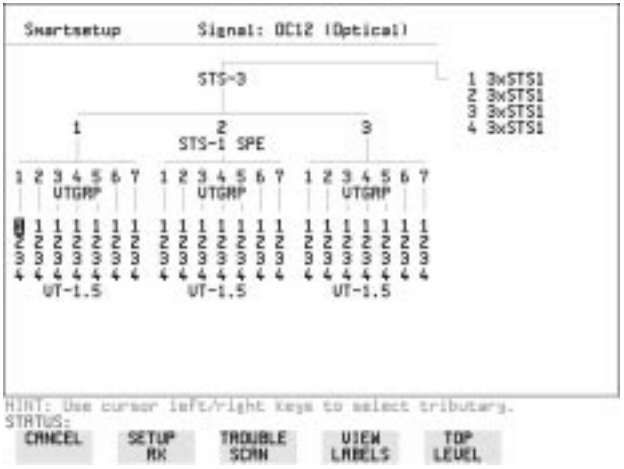
HOW TO USE SMARTSETUP:

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

4 In **SONET** 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 STS SPE. When the STS SPE 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 STS SPE 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 DSn Receive Interface

Description DSn 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 or DS1 as the SIGNAL rate, choose the required LINE CODE. (At 34Mb/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.

5 Choose the PAYLOAD TYPE.
If STRUCTURED is required FRAMED must be chosen.
If STRUCTURED is chosen, the DSn 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 DSn/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.

Setting SONET Receive Interface

Description SONET 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 STS-1 or STS-3 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 VT-6 mapping is chosen, and CONCATENATION is enabled, choose the tributary at which the concatenation begins.
   If VT-6, VT-2 or VT-1.5 mapping is chosen, choose the test tributary under CHANNEL.
4. Choose the payload framing under PAYLOAD TYPE or VT 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.

2

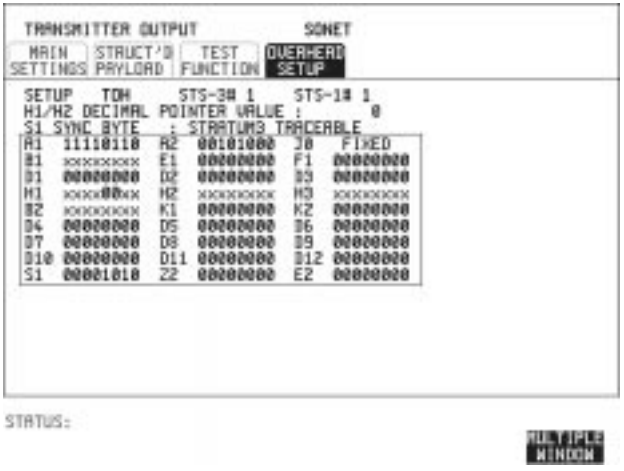
Selecting Test Features

Selecting Test Features

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. Transport Overhead, Path Overhead, Trace Messages and Labels can be set using this feature.



HOW TO:

1. Set up the SONET transmit interface and payload required. See "Setting SONET Transmit Interface " page 12.
2. Choose the type of overhead to SETUP.
   If OC-12 or OC-48 is chosen as the SONET interface, choose the STS-3# and STS-1# you wish to set up.
   If STS-3 is chosen as the SONET interface, choose the STS-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. If APS Messages is chosen, for example, K1K2 value is set by the APS Messages setup.

If **TOH** (Transport Overhead) is chosen, choose the STS-1 to be displayed. Many bytes in **STS-1# 2** and **STS-1#3** are unlabeled as the other overhead functions have not yet been defined.
If **STS-1# 1,2,3** is chosen, the hexadecimal value of all 81 bytes of the STS-3 section & line overhead selected are displayed (all 324 bytes of an OC-12 or 1,296 bytes of an OC-48 are displayed 81 bytes at a time by selecting each STS-3 in turn). The value of the bytes can be set using **DECREASE DIGIT** **INCREASE DIGIT** ◄ ►.
If BYTE NAMES is chosen, the labels for the **STS-1# 1,2,3** overhead bytes are displayed.

3 If POH (Path Overhead) is chosen, choose the TYPE of overhead within STS-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 VT-2, VT-1.5 and VT-6 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).
H4 byte is transmitted as all zero's for 34 Mb/s and DS3.

4 If TRACE MESSAGES is chosen, see "Setting Overhead Trace Messages " page 28.

NOTE 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.

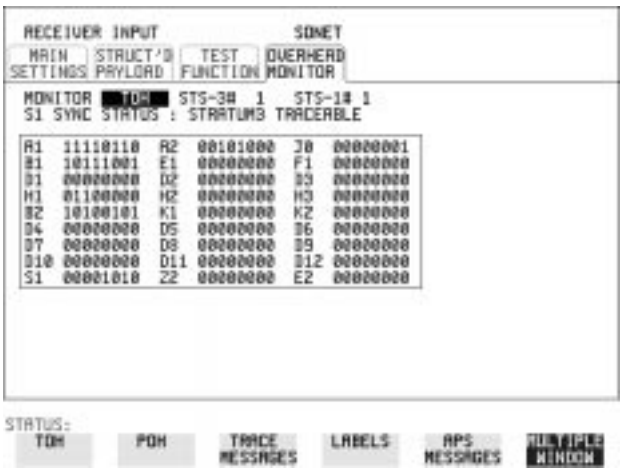
TIP: You can set all overhead bytes to the default state by selecting SETUP **DEFAULT**.

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 SONET network, a start up confidence check can be made by viewing the behavior of all the overhead bytes. If the SONET 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.

TIP: 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 SONET interface and payload as required. See “Setting SONET Receive Interface” page 21.
2. Choose the type of overhead to MONITOR.
3. If **TOH** (Transport Overhead) is chosen, choose the STS-3 # and STS-1# to be displayed.
   Many bytes in **STS-1# 2** and **STS-1#3** are unlabeled because the other overhead functions have not yet been defined.
   If **STS-1# 1,2,3** is chosen, the hexadecimal value of all 81 bytes of section overhead is displayed (all 324 bytes of an OC-12 or 1,296 bytes of an OC-48 are displayed 81 bytes at a time by selecting each STS-3 in turn).The value of the bytes can be set using **DECREASE DIGIT** **INCREASE DIGIT** ← →.

If BYTE NAMES is chosen, the labels for the **STS-1# 1,2,3** overhead bytes are displayed.

4 If POH (Path Overhead) is chosen, choose the source of the overhead, SPE or VTSPE.
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, STS path label (C2) and the VT Path label (V5) are monitored.

7 If APS MESSAGES is chosen, choose the TOPOLOGY, **LINEAR** (GR-253) or **RING** (GR-1230). 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.

Setting Overhead Trace Messages

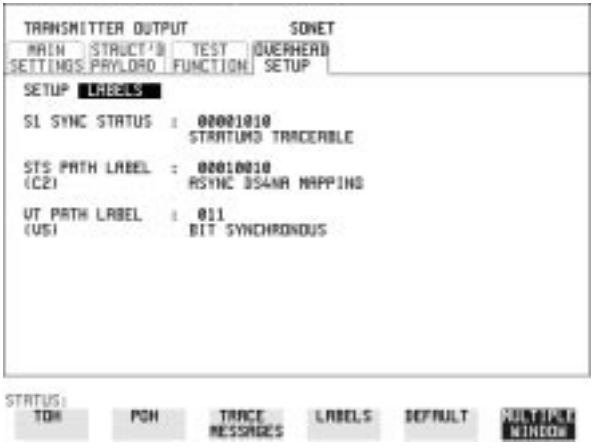
Description

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

J0 verifies the section overhead.
J1 verifies the STS-1 SPE or STS-3c SPE path connection.
J2 verifies the VT SPE path connection.

HOW TO:

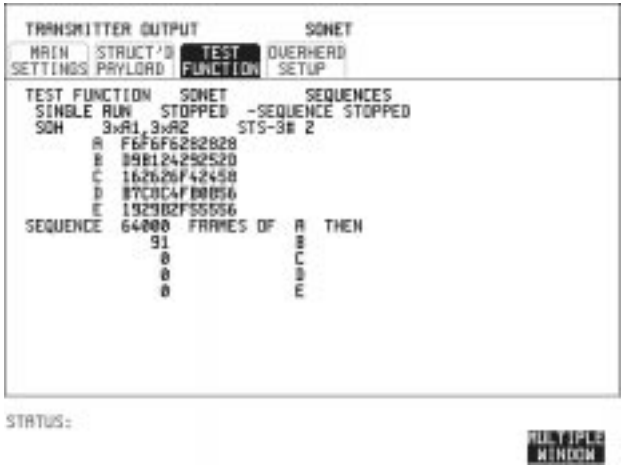
1 Choose the message for insertion in the chosen trace channel. Choosing LABELS in TRACE MESSAGES allows the setting of the S1 SYNC STATUS, STS PATH LABEL (C2) and VT PATH LABEL (V5).



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 SONET transmit interface and payload required. See "Setting SONET 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.
   SOH- Section Overhead
   LOH- Line 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** ◄ ►.

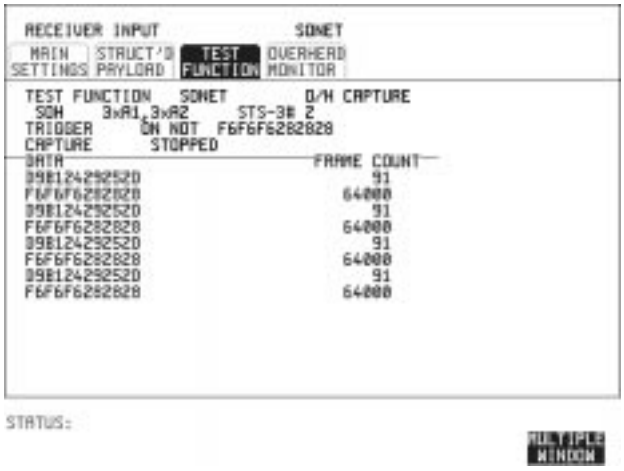
6 Start the sequence by choosing **START**.

NOTE 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 Section, Line 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.

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



HOW TO:

1. Set up the receive SONET interface and payload as required. See “Setting SONET Receive Interface” page 21.
2. Choose the overhead type as required.
   SOH- Section Overhead
   LOH- Line 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.

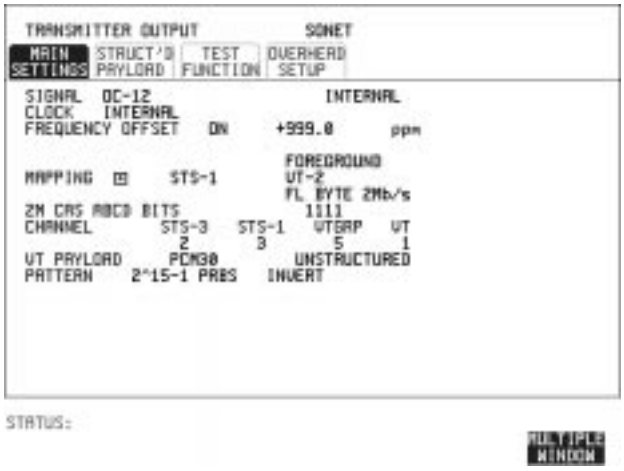
ON NOT - captures activity after the first occurrence of a deviation from your specified overhead state. Can be used for transient detection from a specified expected state.

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**.

Adding Frequency Offset to SONET Signal

Description

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



HOW TO:

SONET 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 SONET 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 SONET line rate offset, the chosen tributary will be offset as the line rate is offset. (No pointer movements).

Tributary Offset ±100 ppm

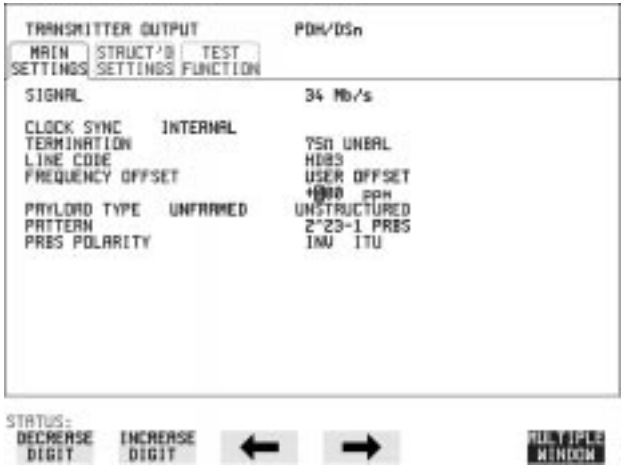
1 Choose the amount of tributary offset required.
You can set the Offset in the range -100 ppm to +100 ppm in 1 ppm steps using **DECREASE DIGIT** **INCREASE DIGIT** ⬅ and ➡.
The amount of applied Frequency Offset can be varied while measurements are taking place.
Tributary offset affects the stuff rate but does not cause pointer movements and can be used to test mapping jitter. If the combined value of SONET 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 DSn Signal

Description

You can add frequency offset to the interface DSn SIGNAL at all rates. Frequency Offset can be added at preset ITU values or as User defined values in the range ±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
34 Mb/s (E3)	+ 20 ppm	–20 ppm
DS-3 (44.736 Mb/s)	+ 20 ppm	–20 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

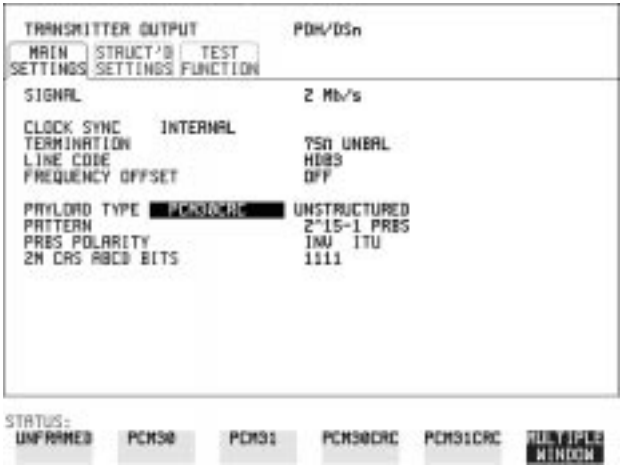
When transmitting 2.048 Mb/s signals with timeslot-16 CAS (PCM30 or PCM30CRC) multiframing the state of A,B,C,D signaling bits can be set. The signaling bits of all timeslots are set to the user-defined 4 bit value.

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

DSn 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.

SONET Operation

1 Choose **SONET** on the **TRANSMIT** display

2 Choose MAPPING **ASYNC 2Mb/s** or **FL BYTE 2Mb/s** and VT PAYLOAD **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**

DSn Operation

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

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.

SONET Operation

1 Choose **SONET** on the **TRANSMIT** display.

2 Choose MAPPING **ASYNC DS1** or **DS3** and VT PAYLOAD **STRUCTURED** on the **MAIN SETTINGS** display

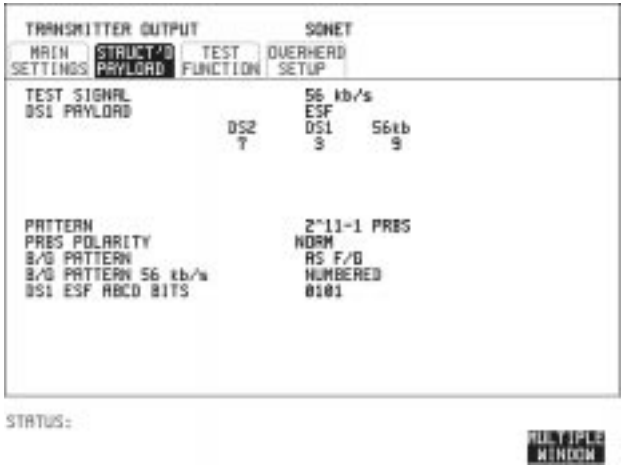
3 Choose TEST SIGNAL **56 kb/s** or **Nx56 kb/s** on the **STRUCTURED SETTINGS** display .

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 DSn Payload/Test Signal settings determine the SONET payload or the DSn 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 or N X 56 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 TEST SIGNAL 2Mb/s is chosen **INSERT 2 Mb/s** is added to the PAYLOAD menu. See "Inserting an External DSn Payload/Test Signal " page 45.
   If TEST SIGNAL DS1 is chosen **INSERT DS1** is added to the menu. See "Inserting an External DSn Payload/Test Signal " page 45.
3. Choose the test tributary in the structured payload, under 34Mb, 8Mb, 2Mb, 64 kb/s or DS2, DS1, 56 kb/s.
4. Choose the PATTERN type and PRBS POLARITY.

5 Choose the B/G PATTERN.
The B/G PATTERN in the non test 56/64 kb/s timeslots is fixed as NUMBERED, that is, each timeslot contains a unique number to allow identification in case of routing problems.

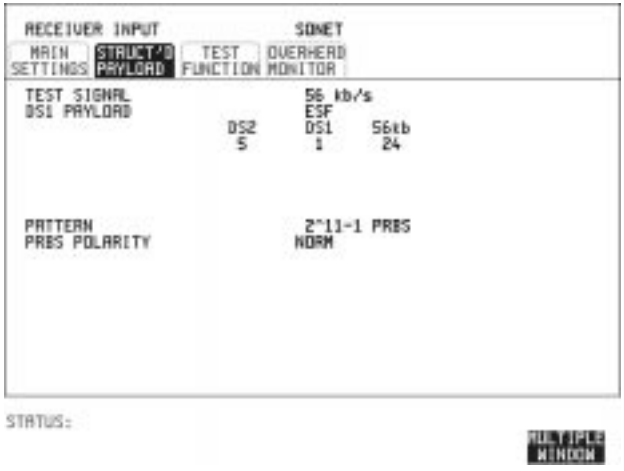
Signaling

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 DSn Payload/Test Signal settings determine the SONET payload or the DSn 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:

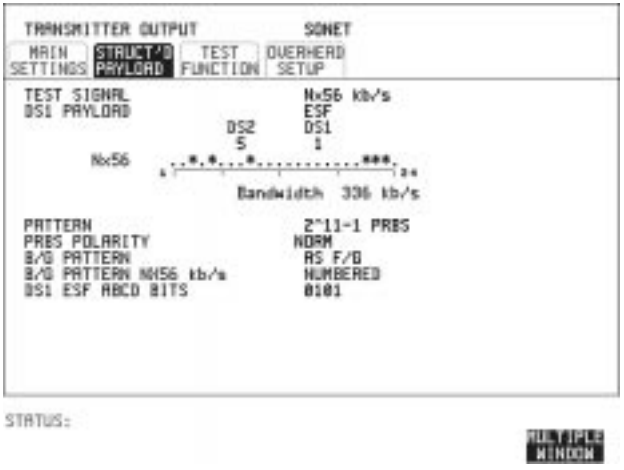
1. Choose the required Test Signal rate. If N x 64 kb/s or N x 56 kb/s is chosen, see "Setting Receive N x 64 kb/s/N x 56 kb/s Structured Payload/Test Signal " page 44.
2. Choose the Framing pattern of the PAYLOAD.
   If TEST SIGNAL 2 Mb/s is chosen, **DROP 2 Mb/s** is added to the menu. See "Dropping an External Payload/Test Signal " page 48.
   If TEST SIGNAL DS1 is chosen, **DROP DS1** is added to the menu. See "Dropping an External Payload/Test Signal " page 48.
3. Choose the test tributary within the structured payload, under 34Mb, 8Mb, 2Mb, 64 kb or DS2, DS1, 56 kb/s.
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 112 kb/s or 336 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, 21, 22, 23 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 56/64 kb/s timeslots is fixed as NUMBERED, that is, each timeslot contains a unique identification number.

Signaling

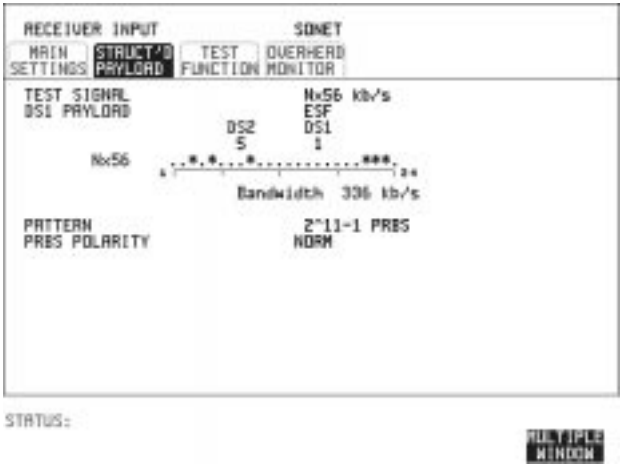
7 If a 2 Mb/s PAYLOAD with PCM30 or PCM30CRC framing, or 56 kb/s or Nx56kb/s Test Signal is chosen. See, "Setting up Signaling Bits " page 36.

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. 112 kb/s or 336 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, 21, 22, 23 are chosen for test.
4. Choose the PATTERN type and PRBS polarity.

Inserting an External DSn Payload/Test Signal

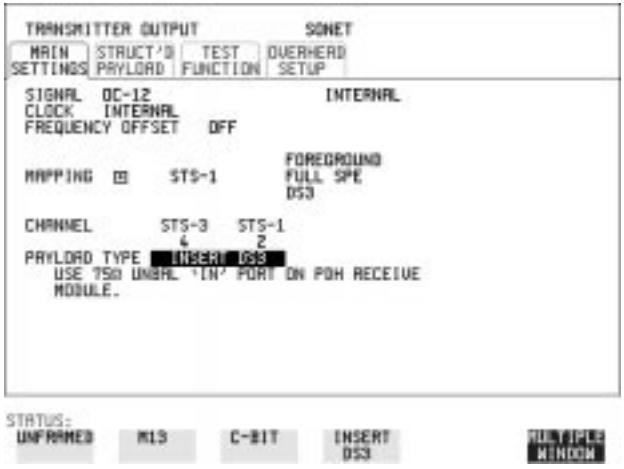
Description

You can insert a DSn signal from external equipment into the SONET signal, or you can insert 2 Mb/s or DS1 into the structured DSn signal, as shown in the table below. DS3 and 34 Mb/s can only be inserted if SONET is chosen as the receive interface. 2 Mb/s or DS1 can be inserted from a structured or non-structured SONET payload and from a structured DSn signal.

RATE	Availability	Option
DS3	SONET	011 Only
34Mb/s	SONET	010 and 011
2Mb/s	DSn & SONET	010 and 011
DS1	DSn & SONET	011 Only

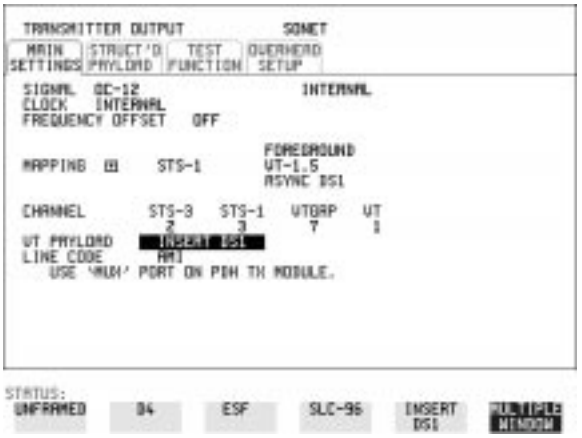
HOW TO:

Insert 34 Mb/s & DS3



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

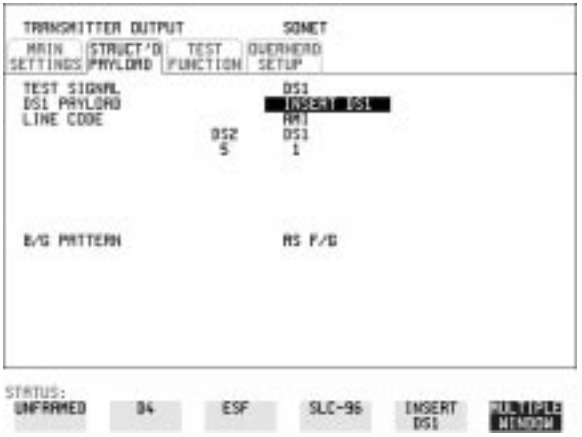
Insert 2 Mb/s or DS1 (Unstructured SONET Payload)



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

2 Set up the required transmit SONET interface, and choose VT-2 or VT-1.5 MAPPING and VT PAYLOAD **INSERT 2 Mb/s** or **INSERT DS1**.

Insert 2 Mb/s or DS1 (Structured SONET Payload or Structured DSn)



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

Structured SONET Payload

2 Set up the required transmit SONET interface. See "Setting SONET Transmit Interface " page 12.

3 Set up the SONET 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 DSn

6 Set up, the required transmit DSn interface, See "Setting DSn Transmit Interface " page 10.

7 Set up the DSn 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

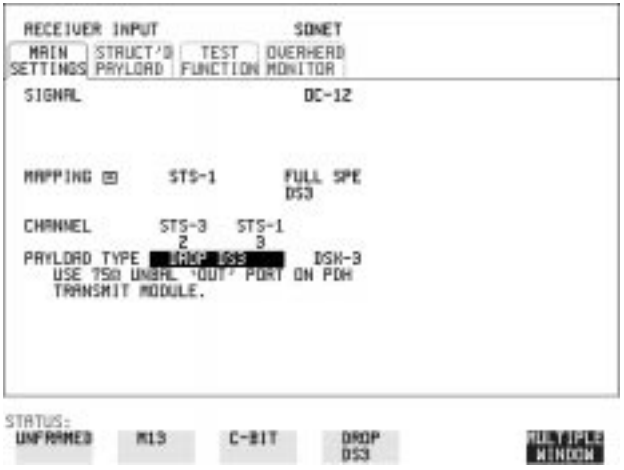
Description

You can drop a DSn signal from the received payload or drop 2 Mb/s or DS1 from the structured DSn signal to external equipment as shown in the table below. DS3 and 34 Mb/s can only be dropped if SONET is chosen as the receive interface. 2 Mb/s or DS1 can be dropped from a structured or non-structured SONET payload and from a structured DSn signal.

RATE	Availability	Option
DS3	SONET	011 Only
34Mb/s	SONET	010 and 011
2Mb/s	DSn & SONET	010 and 011
DS1	DSn & SONET	011 Only

HOW TO:

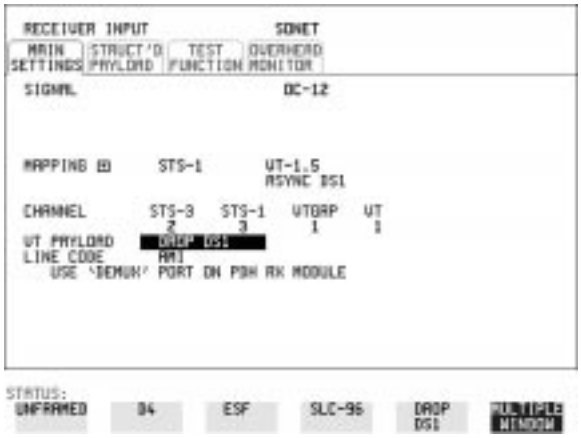
Drop 34 Mb/s & DS3



1 Connect the 75Ω OUT port of the DSn Transmit module to the external equipment.

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

Drop 2 Mb/s /DS1 (Unstructured SONET Payload)

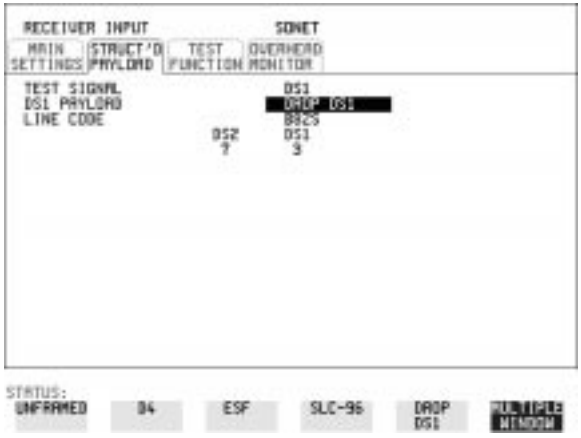


1 Connect the DEMUX port of the DSn module to the external equipment.

2 Set up the required receive SONET interface, and choose VT-2 or VT-1.5 MAPPING and VT PAYLOAD **DROP 2 Mb/s** or **DROP DS1**.

3 Choose the required LINE CODE.

Drop 2 Mb/s/DS1 (Structured SONET Payload or Structured DSn



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

Structured SONET Payload

2 Set up the required receive SONET interface. See "Setting SONET Receive Interface " page 21.

3 Set up the SONET structured payload. See "Setting Receive Structured Payload/Test Signal " page 41.

4 Choose 2M PAYLOAD **DROP 2 Mb/s** or DS1 PAYLOAD **DROP DS1** .

5 Choose the LINE CODE.

Structured DSn

6 Set up, the required receive DSn interface, See "Setting DSn Receive Interface " page 19.

7 Set up the DSn Test Signal interface. See "Setting Receive Structured Payload/Test Signal " page 41

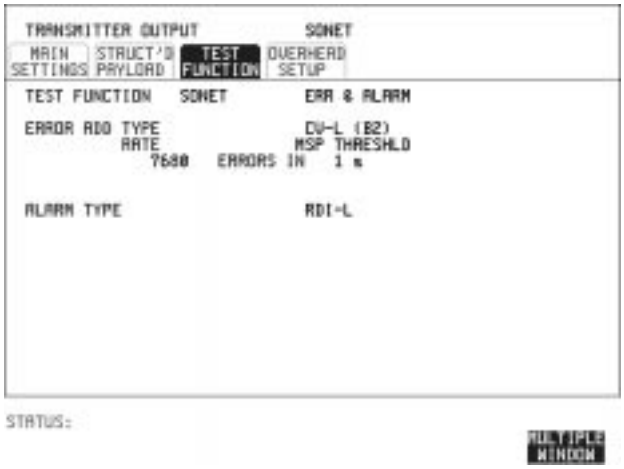
8 Choose 2M PAYLOAD **DROP 2 Mb/s** or DS1 PAYLOAD **DROP DS1** .

9 Choose the LINE CODE.

Adding Errors & Alarms at the SONET Interface

Description

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



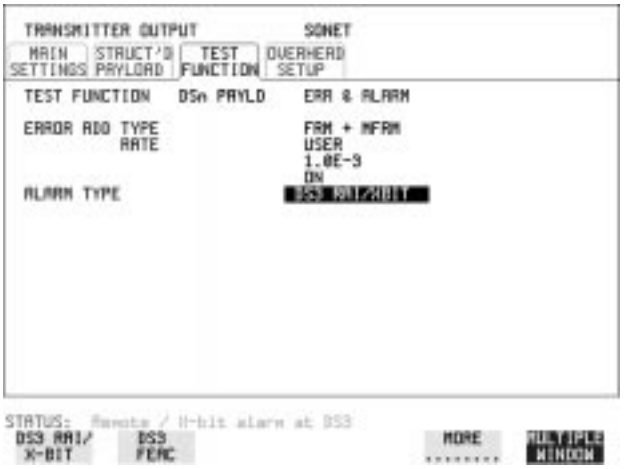
HOW TO:

1. Set up the SONET transmit interface and payload required. See "Setting SONET 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 CV-L errors are chosen errors can be added to trigger an APS 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 DSn Interface/ DSn Payload

Description

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



HOW TO:

1. If SONET interface is chosen, set up the SONET transmit interface and payload required. See “Setting SONET Transmit Interface” page 12.
   If DSn interface is chosen, set up the DSn interface and payload required. See “Setting DSn 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.

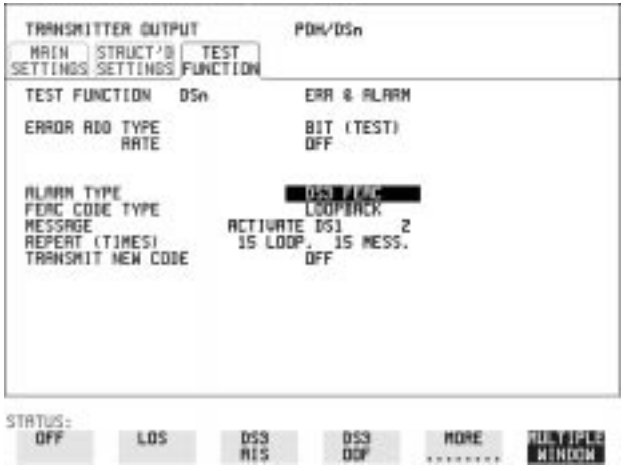
Using FEAC Codes

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 0XXXXXX011111111.
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.
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**

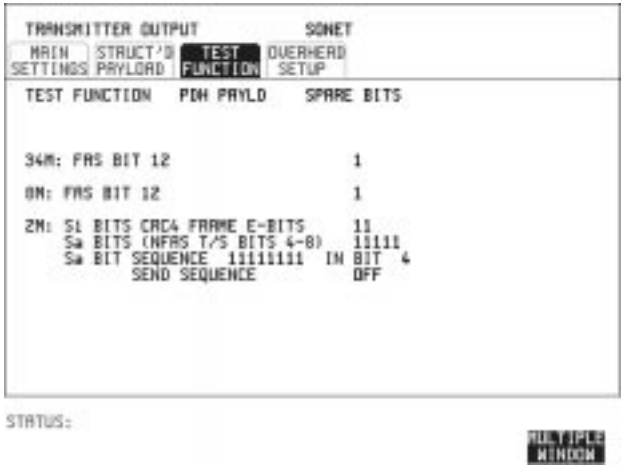
The received FEAC message can be viewed on the **RESULTS** display.

Setting DSn Spare Bits

Description

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

8 Mb/s & 34 Mb/s - FAS Bit 12
2 Mb/s - NFAS Timeslot (timeslot 0 of NFAS frame) Bit 0



HOW TO:

1. If SONET interface is chosen, set up the SONET transmit interface and payload required. See "Setting SONET Transmit Interface " page 12.
   If DSn interface is chosen, set up the DSn transmit interface and payload required. See "Setting DSn 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 SPE or VT pointer value can be adjusted for testing purposes.

HOW TO:

1. Set up the SONET transmit interface and payload required. See "Setting SONET 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 VT 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.

OFFSET - You can frequency offset the line rate or the SPE/VT rate, relative to each other, thus producing pointer movements. If you offset the SPE 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 SONET interface or payload, pointer OFFSET is not available.

Pointer Type	Line Rate	SPE Rate	VT Rate
SPE	Constant	Offset	Tracks AU Payload
SPE	Offset	Constant	Constant
VT	Constant	Constant	Offset
VT	Offset	Tracks Line Rate	Constant

T1.105/GR-253 - Provides pointer movements according to T1.105 and GR-253:

4 Choose the T1.105/GR-253 ADJUSTMENT TYPE.

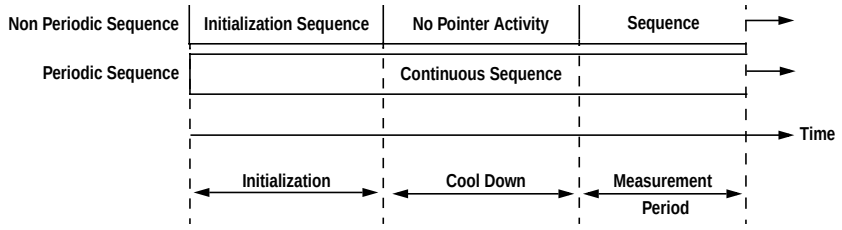
5 Choose the POLARITY, INTERVAL and PATTERN (where applicable) for the selected sequence.

6 Choose POINTER SEQUENCES **START INIT** to generate the selected G.783 sequence and **STOP INIT** to stop the pointer sequences.

T1.105/GR-253 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 T1.105.03 and GR-253.

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 softkey 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*, an example is given in the following figure:



Note: SINGLE (A1), BURST (A2) and PHASE TRANSIENT(A3) are Non Periodic Sequences.

Initialization Period

For SINGLE A1, BURST A2 and PHASE TRANSIENT A3 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

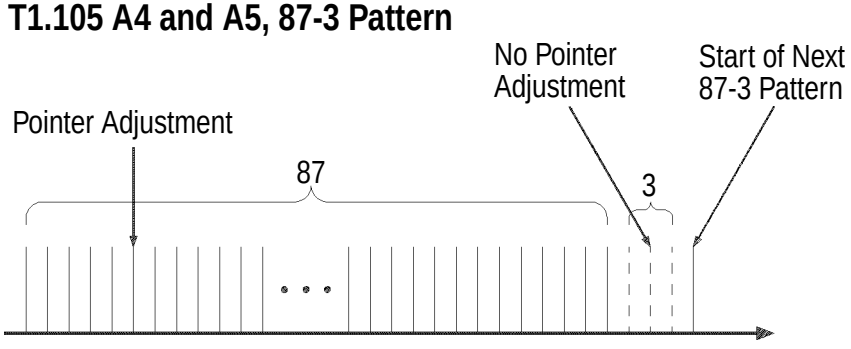
For periodic test sequences (for example PERIODIC ADD) both the 60 second initialization and 30 second cool down periods consist of the same sequence as used for the subsequent measurement sequence. If the product of the period T and the selected Optional background pattern (87+3 or 26+1) exceeds 60 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.

NOTE

The following conditions apply for pointer sequence generation:
The sequences can only be applied to the SPE pointer when the SPE does not contain a VT structure, otherwise it is applied to the VT 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 T1.105/GR-253, 87-3 Pointer Sequence.



An Example of a Pointer Sequence

Pointer Sequence	Description
T1.105 A1 SINGLE GR-253 5-29	Periodic Single adjustments, all of the same polarity which is selectable. Separation between pointer adjustments is fixed at approximately 30 seconds.
T1.105 A2 BURST OF 3 GR-253 5-30	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.

Pointer Sequence	Description
T1.105 A3 PHASE TRANSIENT GR-253 5031	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.
T1.105 A4 PERIODIC NORMAL (87-3 Pattern) GR-253 5-33(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.
T1.105 A4 PERIODIC NORMAL (Continuous Pattern) GR-253 5-34(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).
GR-253 5-32(b) PERIODIC NORMAL (26-1 Pattern)	This selection is only available if you have selected VT1.5 mapping. 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.
T1.105 A5 PERIODIC ADD (87-3 Pattern) GR-253 5-33(c)	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. 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.
T1.105 A5 PERIODIC ADD (Continuous Pattern) GR-253 5-34(c)	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.

Pointer Sequence	Description
GR-253 5-32(c) PERIODIC ADD (26-1 Pattern)	This selection is only available if you have selected VT1.5 mapping. 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.
T1.105 A5 PERIODIC CANCEL (87-3 pattern) GR-253 5-33(d)	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.
T1.105 A5 PERIODIC CANCEL (Continuous Pattern) GR-253 5-34(d)	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.
GR-253 5-32(d) PERIODIC CANCEL (26-1 pattern)	This selection is only available if you have selected VT1.5 mapping. 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.

NOTE

For SPE pointers 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 VT pointers the sequence interval is selectable from: 200 ms, 500 ms, 1, 2, 5 and 10 seconds.
For SPE pointers the minimum spacing between adjustments is 500 us.
For VT pointers the minimum spacing between adjustments is 2 ms.

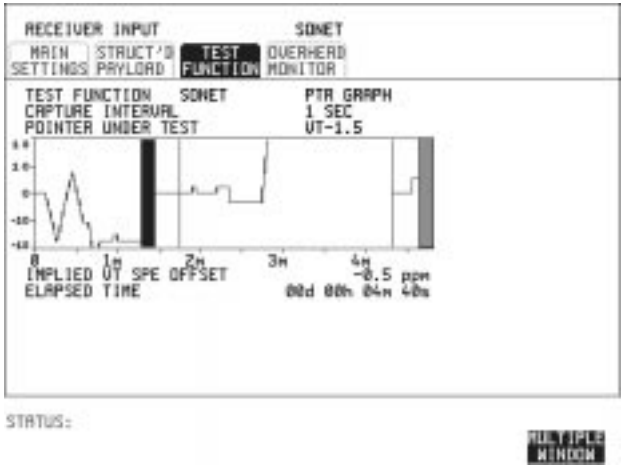
Table 1 **Pointer Sequences Available with Selected Mapping**

POINTER SEQUENCE	MAPPING		
	SPE	VT6, VT2	VT1.5
A1 SINGLE	✓	✓	✓
A2 BURST OF 3	✓	✓	✓
A3 PHASE TRANSIENT	✓	✓	✓
A4 PERIODIC NORMAL(87-3)	✓		
A4 PERIODIC NORMAL (Continuous)	✓	✓	✓
PERIODIC NORMAL (26-1)			✓
A5 PERIODIC ADD (87-3)	✓		
A5 PERIODIC ADD (Continuous)	✓	✓	✓
PERIODIC ADD (26-1)			✓
A5 PERIODIC CANCEL (g) 87-3	✓		
A5 PERIODIC CANCEL (Continuous)	✓	✓	✓
PERIODIC CANCEL 26-1			✓

Using Pointer Graph Test Function

Pointer Graph shows the relative offset during the measurement period. This allows the time relationship of SPE or VT 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.

TIP: 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 SONET RESULTS display at the end of the measurement.

HOW TO:

1. Set up the receive SONET interface and payload as required. See "Setting SONET 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.

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.

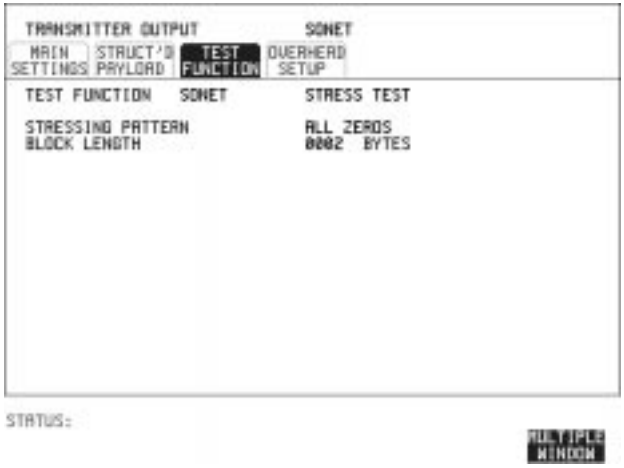
TIP: If the event occurs outside normal working hours, a Timed Start measurement can be made.
1 SEC - display window of approximately 5 minutes.
5 SECS - display window of approximately 25 minutes.
20 SECS - display window of approximately 1 hour 40 minutes.
1 MIN - display window of approximately 5 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 SONET transmit interface and payload required. See "Setting SONET 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 SONET transmit interface and payload required. See "Setting SONET 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 Multirate Analyser module.

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

DCC DROP is available on the RECEIVE SONET TEST FUNCTION display.

HOW TO:

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

3

Making Measurements

Using Overhead BER Test Function

Description

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

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

HOW TO:

1. Set up the SONET transmit interface and payload required. See "Setting SONET Transmit Interface " page 12.
2. Set up the receive SONET interface and payload as required. See "Setting SONET Receive Interface " page 21.
3. Choose the overhead byte to be tested on the RECEIVE SONET TEST FUNCTION display**.**
4. Choose the overhead byte to be tested on the TRANSMIT SONET 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 SONET Analysis Measurements

Description

G.826 analysis results are provided for all relevant SONET 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 SONET interface and payload required. See "Setting SONET Receive Interface " page 21.
2. If required set up the SONET transmit interface and payload. See "Setting SONET Transmit Interface " page 12.
3. Press **RUN/STOP** to start the measurement.
4. You can view the analysis results on the **RESULTS** **SONET** **ANALYSIS** display.

TIP:

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

Making DSn Analysis Measurements

Description

G.821, G.826, M.2100, M.2110 and M.2120 analysis results are provided for all relevant DSn and DSn 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.

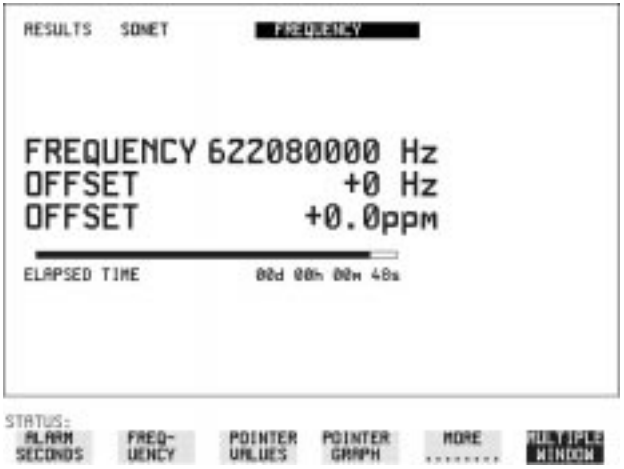
HOW TO:

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

Measuring Frequency

Description

The signal frequency and the amount of offset from the 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 DSN Receive module or the IN port of the Multirate Analyzer module (SONET electrical) or the IN port of the Optical Interface module (SONET optical).

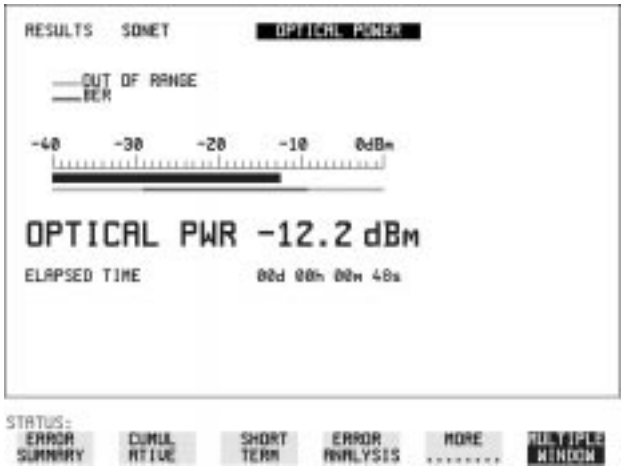
NOTE

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

Measuring Optical Power

Description

Optical power measurement can be performed on the SONET signal connected to the Optical module IN port.



HOW TO:

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

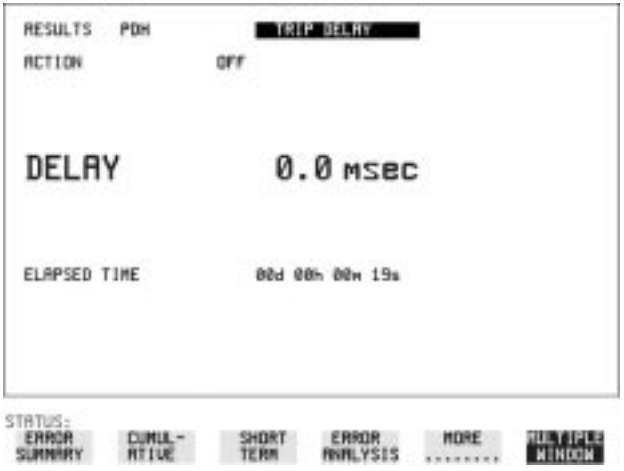
NOTE

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 34 Mb/s or 2 Mb/s DSn interface or DSn payload signal.

HOW TO:

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

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

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

2 Mb/s	1 microsecond
34 Mb/s	110 microseconds
STS-1,STS-3	0.5 milliseconds
OC-12, OC-48	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.

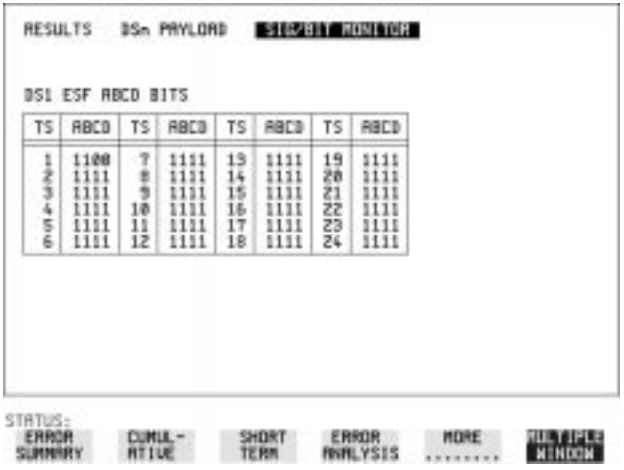
DS1 Results

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.



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 DSn or SONET interface and an ANSI (DS1, DS3) framed, unstructured payload you must select Service Disruption on the Transmitter and Receiver **TEST FUNCTION** display.

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 SONET set up the SONET transmit and receive interfaces and payloads required. See "Setting SONET Transmit Interface " page 12 and "Setting SONET Receive Interface " page 21.
2. If interfacing at DSn set up the DSn transmit and receive interfaces and payloads as required. See "Setting DSn Transmit Interface " page 10 and "Setting DSn 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.

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 a SONET 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 SONET 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.

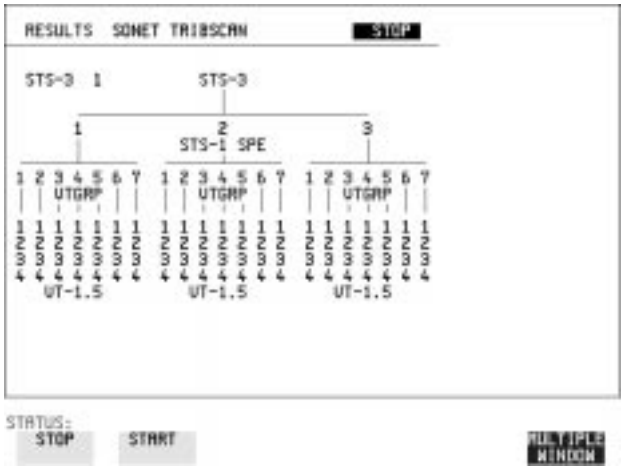
TIP: The SONET Tributary Scan display can be logged to the chosen logging device. See "Logging on Demand" page 100.

HOW TO:

1. Set up the transmit and receive SONET interfaces and payload as required. See "Setting SONET Transmit Interface" page 12 and "Setting SONET 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, 28 VT-1.5 tributaries in an STS-1 SPE - the time taken to complete the Tributary Scan will be 28 X TEST TIMING choice.

4 The Tributary Scan results can be viewed on the RESULTS SONET TRIBSCAN display.
The Scan can be started on the TRANSMIT SONET TEST FUNCTION display or the RESULTS display by choosing START.
If the Scan is started on the TRANSMIT SONET TEST FUNCTION display, the HP 37718A changes to the RESULTS display.
If a single path, for example, MAPPING STS-3c SPE is chosen, then Tributary Scan is disabled.

NOTE The keyboard is locked during tributary scan.



Performing an SONET Alarm Scan

Description

SONET 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 CV errors above a chosen threshold.
The channel in which an alarm occurred is highlighted if any of the following alarms occur:
STS SPE: LOP-P, RDI-P, AIS-P,
VT-1.5: LOP-P, AIS-P, RDI-P, H4 LOM, LOP-V, AIS-V, RDI-V

TIP:

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

HOW TO:

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

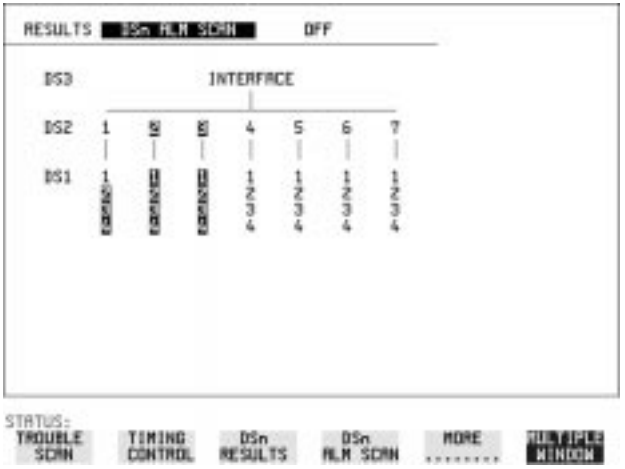
Performing a DSn Alarm Scan

Description

DSn 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 DSn interface as required. See “Setting DSn Receive Interface” page 19.
2. Choose **ON** to start the Alarm Scan.

4

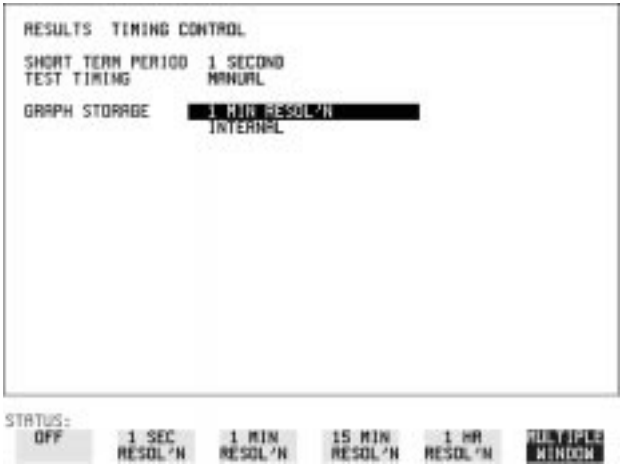
Storing, Logging and Printing

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.



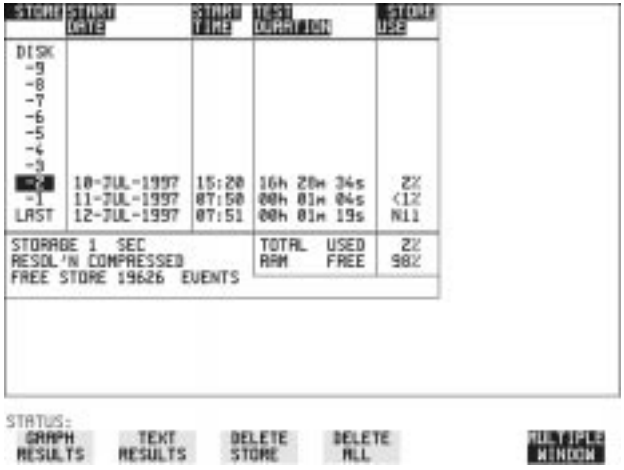
HOW TO:

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.



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.

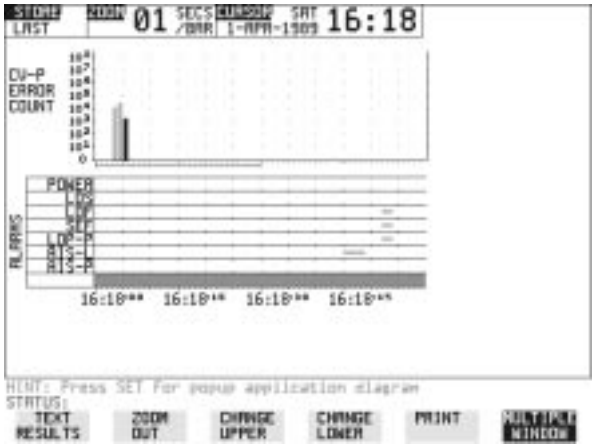
The top row of the display comprises five fields:

Store	Memory location in which the displayed bar graph data is stored. Move the highlighted cursor, to the STORE location desired, using ⬆ and ⬇.
Start Date	The start date of the test, which produced the stored results.
Start Time	The start time of the test, which produced the stored results.
Test Duration	The duration of the test, which produced the stored results.
Store Use	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.

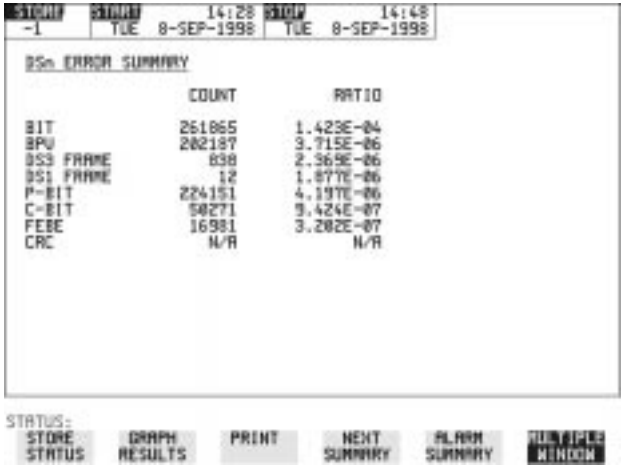
Zoom The width, in minutes, of each "bar" in the bar graph, controlled by **ZOOM IN** / **ZOOM OUT**.

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.



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 DSn/DSn; and SONET 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 DSn/DSn; and SONET Error Summaries in turn if applicable.
   The top row of the display comprises three fields:

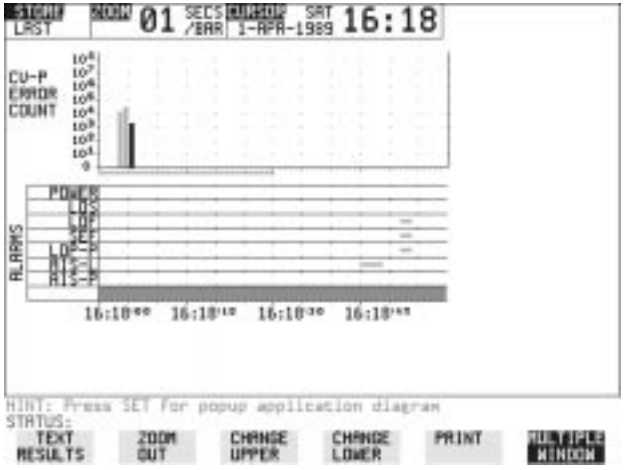
Store Memory location in which the bar graphs, error summary and alarm summary are stored.
Store can only be changed when the status of stored results is displayed. See "Recalling Stored Graph Results " page 89.

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.

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.

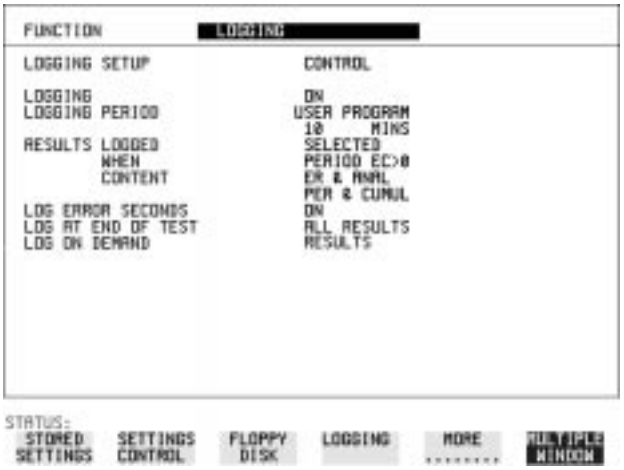
Cumulative and Period versions of the results are calculated and can be selected by the user.

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.

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



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).

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).

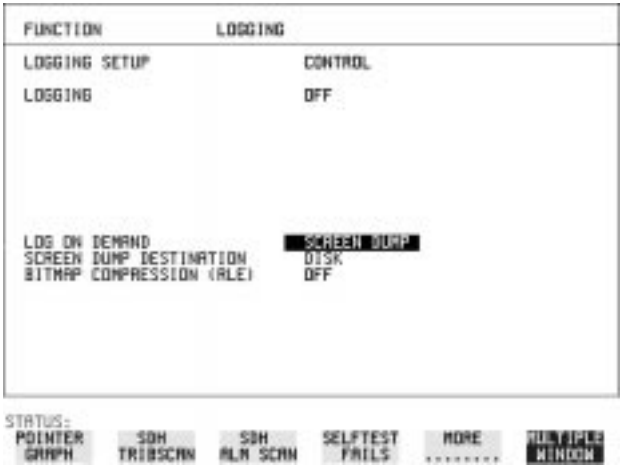
7 Choose the logging DEVICE.
If RS232 is chosen, see "Logging Results to RS-232-C Printer " page 105.
If HPIB is chosen, see "Logging Results to HP-IB Printer " page 103.
If PARALLEL is chosen, see "Logging Results to Parallel (Centronics) Printer " page 102.
If DISK is chosen, see “Saving Data Logging 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 STS-3
OVERHEAD CAPTURE - Overhead Capture display
SCREEN DUMP - allows logging of the chosen display
POINTER GRAPH - Pointer Graph display
SONET TRIBUTARY SCAN - SONET Tributary Scan display
SONET ALARM SCAN - SONET 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 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 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 HPIB port.

NOTE

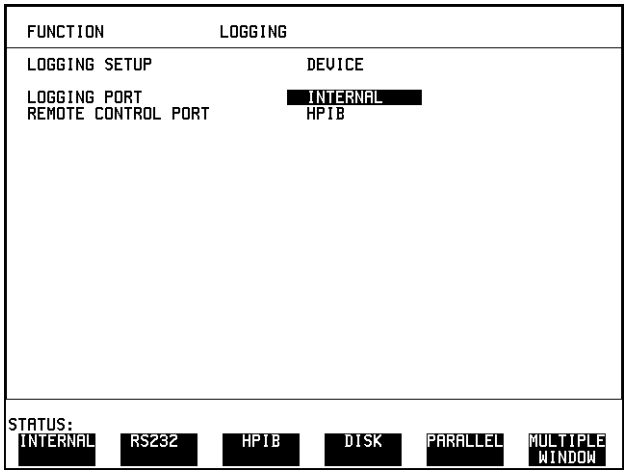
Choosing HP-IB external printer for logging prevents the use of HP-IB remote control.

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.



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.

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

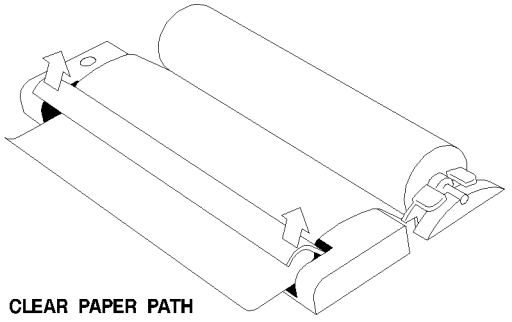
Suitable rolls of paper are available from Hewlett Packard, Part Number 9270-1360.

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).

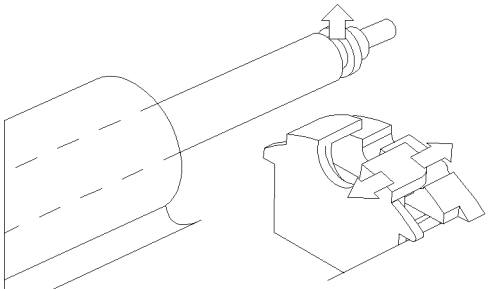


3. Lift out the spindle. Adjust the paper width adaptor to the width of the paper being used.

4 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.

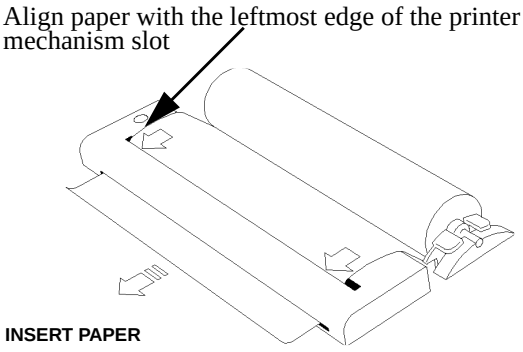
NOTE

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.



SET BLUE ADAPTOR A4 LEFT - 8½" RIGHT

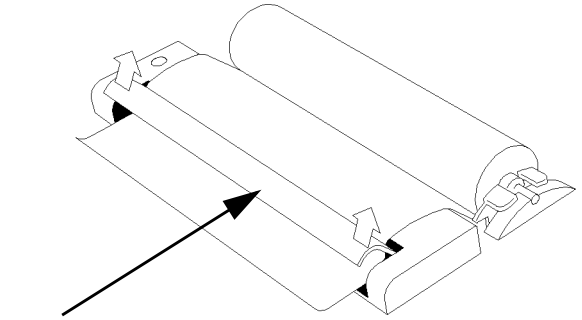
5 Feed the paper into the upper entry of the print mechanism. When the front cover of the print mechanism is closed, the printer should automatically feed the paper through until there is approximately 2.5 cm (1 in) clear at the front of the print mechanism.



CAUTION

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

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.

Cleaning Internal Printer Print Head

5

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.

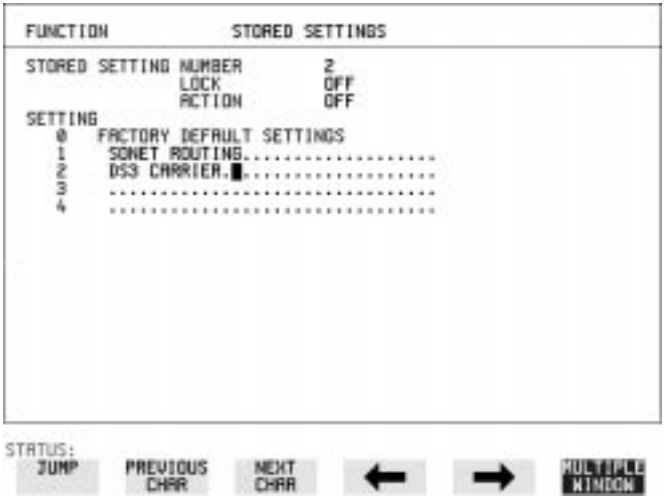
HOW TO:

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

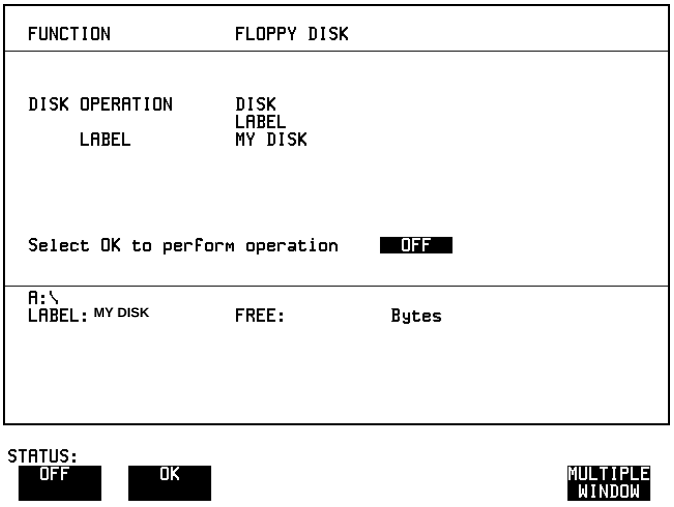
Disks can be formatted in an IBM compatible PC (1.44M, MS-DOS only) but it is recommended that the disk is formatted in the HP 37718A as this will ensure full compatibility with the Floppy Disk power fail recovery included in the HP 37718A.

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.



HOW TO:

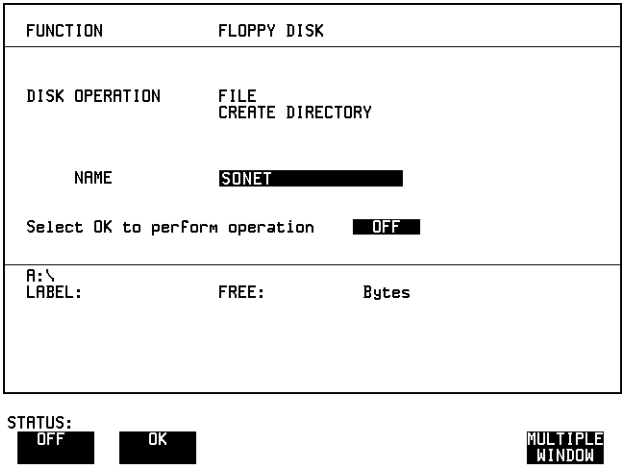
1. Choose DISK OPERATION **DISK** **LABEL**.
2. Label the Disk using **PREVIOUS CHAR** **NEXT CHAR** → ← or press **SET** and use the pop-up keypad.
3. Choose **OK** to confirm the label is correct.
   The label is displayed at the bottom of the display to confirm the operation has taken place.

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



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:\SONET will be created.

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.

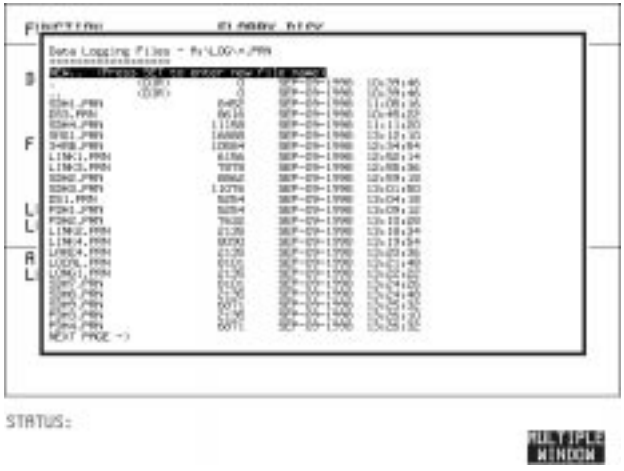
5 Move the highlighted cursor to the directory required and press SET to move to that directory. (The directory name will appear on the display).
Only the files with the file extension chosen in FILE TYPE will be displayed.

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

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.

SONET1.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.

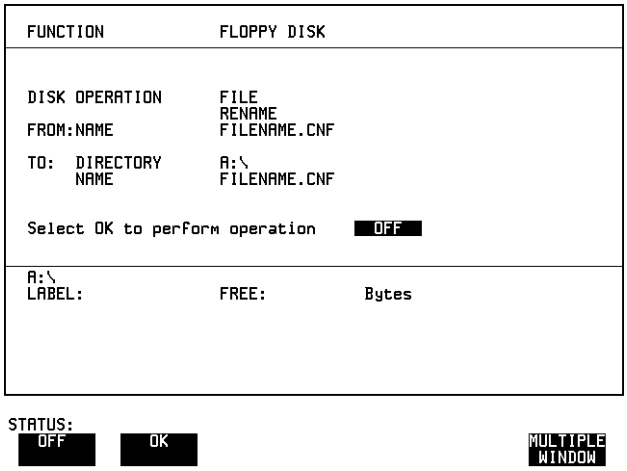


7 **NEW.** - Allows entry of new file name using pop-up keypad. Press SET to obtain the pop-up keypad display. Enter the new filename, Choose END and press SET to return to the file manager display.

8 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.



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.

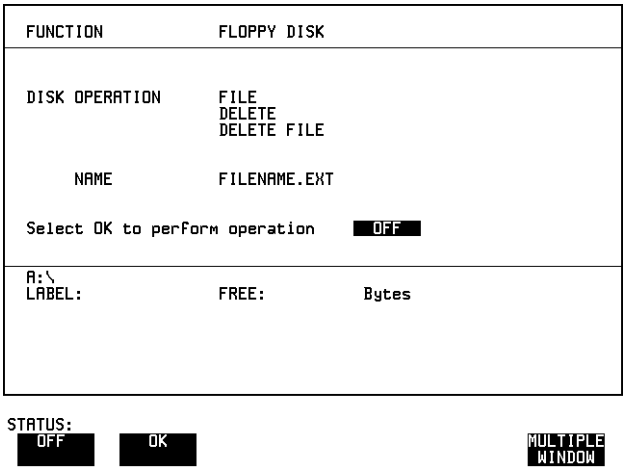
3 Choose the directory in which to locate the renamed file (it will appear on the display). See "Accessing Directories and Files " page 120.

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.



HOW TO:

1 Choose DISK OPERATION **FILE** **DELETE** **DELETE FILE**.

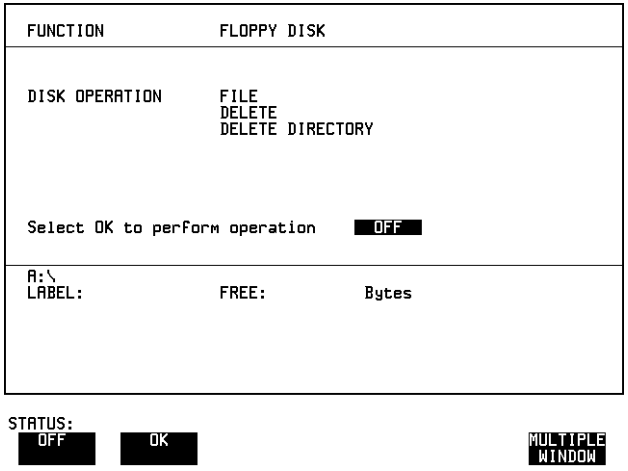
2 Choose the directory containing the file to be deleted. See "Accessing Directories and Files " page 120.

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.

Deleting a Directory on Disk

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



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:

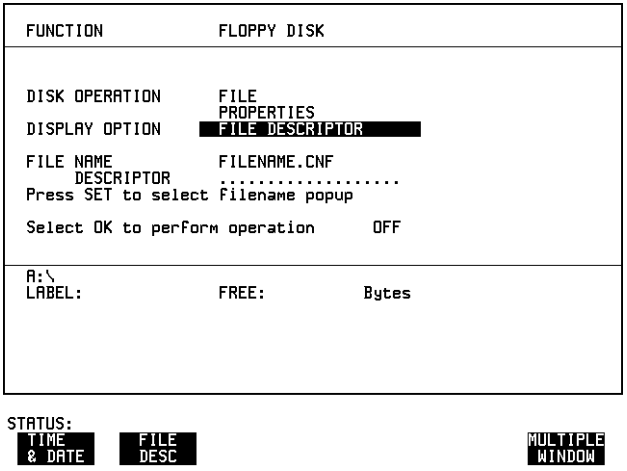
1. Choose the directory you wish to delete (it will appear on the display). See "Accessing Directories and Files " page 120.
2. Choose DISK OPERATION **FILE** **DELETE** **DELETE DIRECTORY**.
3. To delete the directory choose **OK**.
   A warning "Are you sure you wish to continue" is displayed.
   If 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.



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

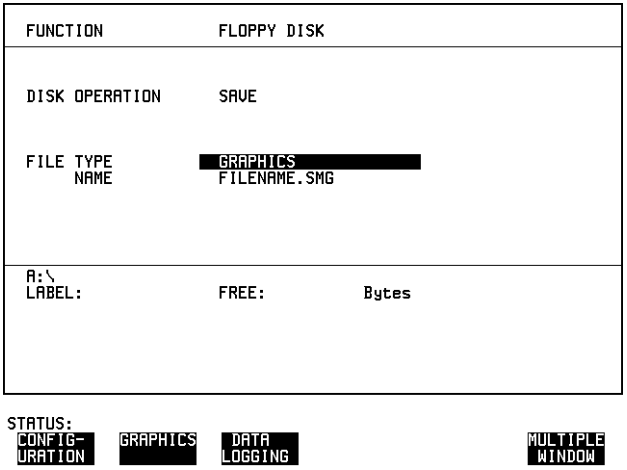
Graphics results can be saved to a file on disk. Two methods of naming the file, which is created when the measurement is started, are available:

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.



2 Choose the directory in which to save the graphics results. See "Accessing Directories and Files " page 120.

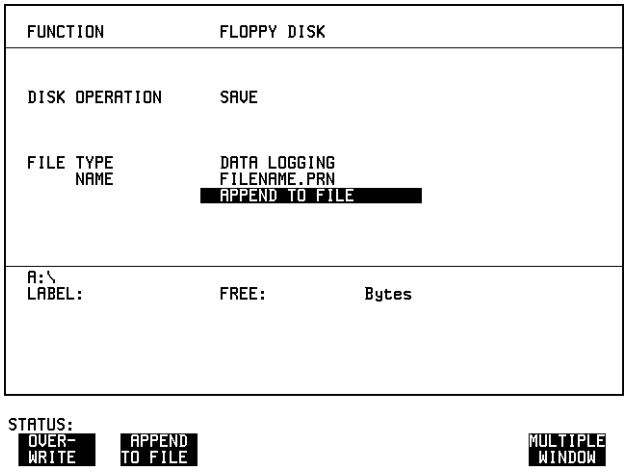
3 If you wish to enter your own choice of filename, choose DISK OPERATION **SAVE** FILE TYPE **GRAPHICS**.

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.



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:

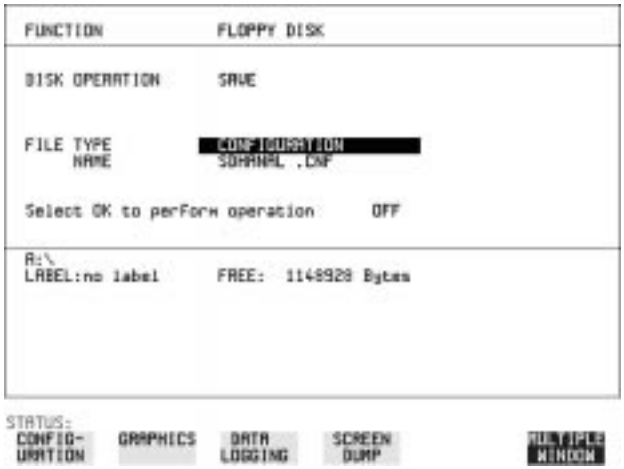
- As each logging output occurs during the measurement or
- [PRINT NOW] is pressed.

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.



HOW TO:

1 Set the HP 37718A to the configuration you wish to store.

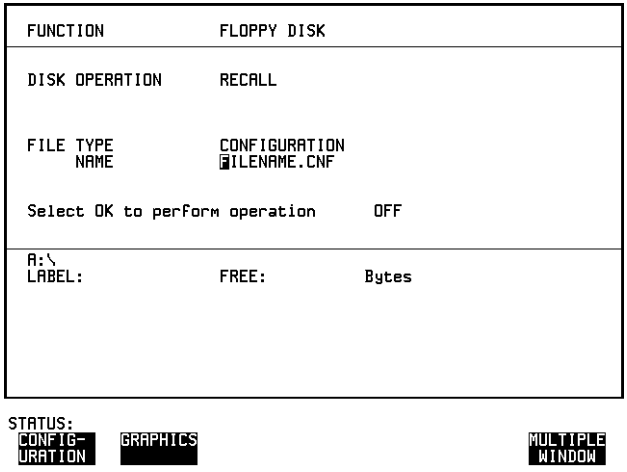
1 Choose the directory in which you wish to save the HP 37718A configuration. See "Accessing Directories and Files " page 120.

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.



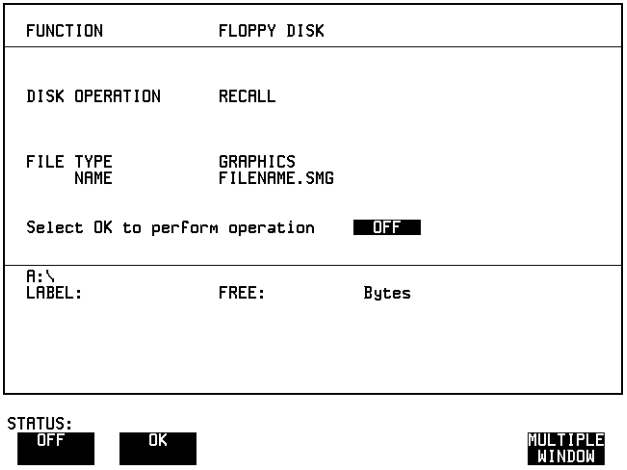
HOW TO:

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.



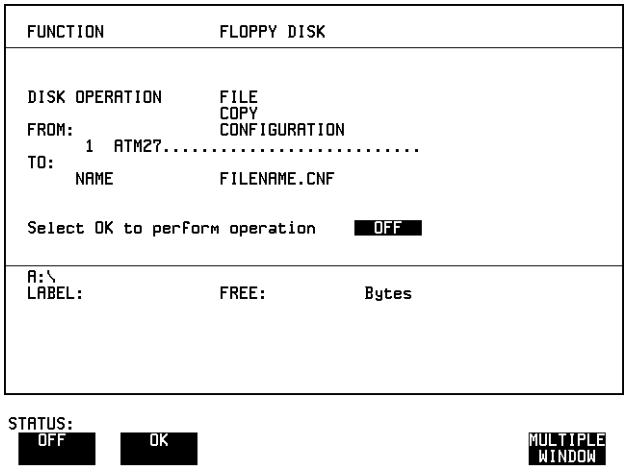
HOW TO:

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.



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.

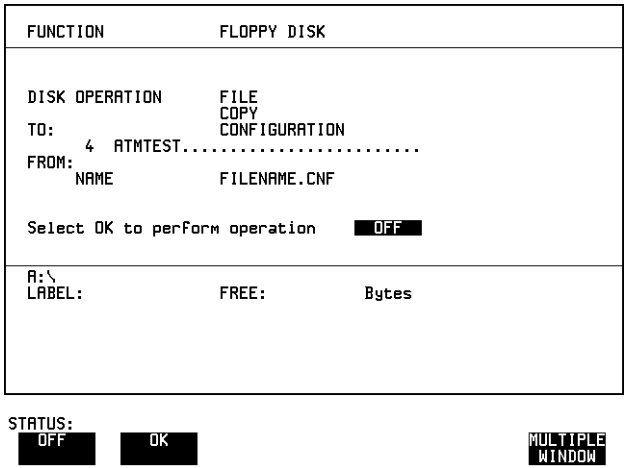
2 Enter the chosen filename using **PREVIOUS CHAR** **NEXT CHAR** ⟶ ⟵ or press **SET** twice and use the pop-up keypad.
The file name can contain up to 8 alphanumeric characters.
The filename extension is fixed as .CNF.

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.



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.

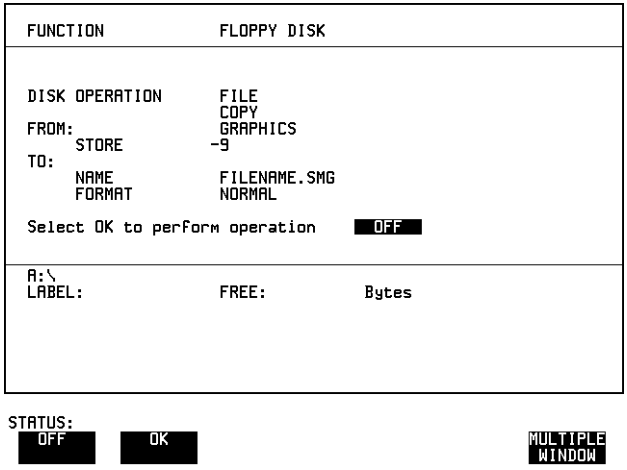
4 To copy the configuration from Disk to instrument, choose **OK**.
If you have entered a instrument store number which already contains a configuration, a warning "Are you sure you wish to continue" is displayed.
If YES is selected, the data in the instrument store will be overwritten.
If NO is selected,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



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.

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.

6

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:

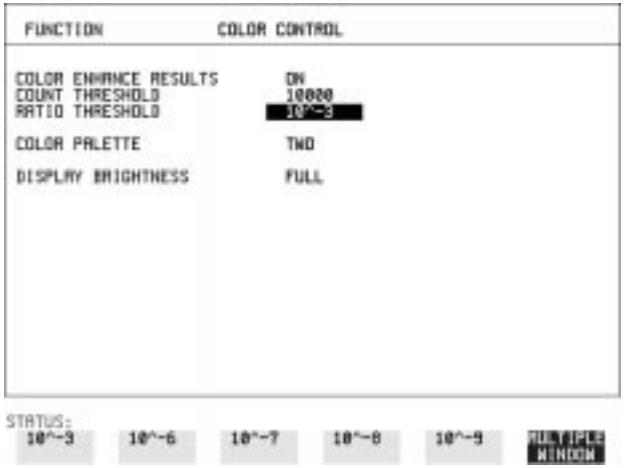
1 Choose SUSPEND TEST ON SIGNAL LOSS **ON**.

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.

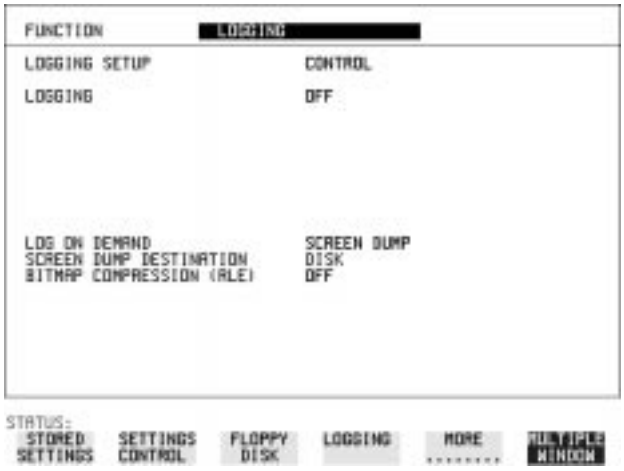
HOW TO:

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**.

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 filname.
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.

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.

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 3minutes, 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.

Appendix A

STS-1 SPE Background Patterns

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

Table 2 STS-1 SPE Background Patterns

Foreground	Background choice in Foreground TUG-3	Background choice in other AU-3
STS-1 SPE	---------	VT-1.5, VT-2 Mapping or SPE Word (8 bit user programmable word).
VT-6	Pattern in other VT-6s is numbered. They contain the word 11NNNNNx, where NNNNN is the binary number of the TU.	VT-1.5, VT-2 Mapping or SPE Word (8 bit user programmable word).
VT-2 (2 Mb/s) Unframed	VT-2 structure, unframed with 2E15-1, 2E9-1 PRBS or 1100 word pattern in all information bits.	VT-2, VT-1.5 Mapping or SPE Word (8 bit user programmable word).
VT-2 (2 Mb/s) Framed	VT-2 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.	VT-2, VT-1.5 Mapping or SPE Word (8 bit user programmable word).
VT-1.5 (DS1) Unframed	VT-1.5 structure, D4 framed with 2E15-1, 2E9-1 PRBS or 1100 Word pattern in other TU-11s.	VT-2, VT-1.5 Mapping or SPE Word (8 bit user programmable word).
VT-1.5 (DS1) Framed	VT-1.5 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	VT-2, VT-1.5 Mapping or SPE Word (8 bit user programmable word).

Appendix B

ETSI/ANSI Terminology

A table of ETSI terms with their ANSI equivalents.

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

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÷ 3 for m ≥ 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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About This Edition

This is the 1st edition of the 37718-90004 manual. It documents the product as of September 1998. Edition dates are as follows:

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In This Book

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

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