

# HP 37718A

## Communications Performance Analyzer

OmniBER 718 (37718A) communications performance analyzer offers a one box field portable multi-rate BER and jitter tester up to 2.5Gb/s (STM-16/OC-48) for installation, maintenance, commissioning, system verification and manufacture of SDH/SONET/ATM transport networks and network equipment.

### New capability now shipping in 2000

- ATM test capability up to 2.5Gb/s
- ITU-T O.172 jitter compliance
- Jitter generation and measurement at 1.5, 45 and 52 Mb/s
- User definable jitter masks
- Synchronous-only configurations (no PDH/T-carrier interfaces required)
- E1 mapped into DS3

- **Smartsetup**

Not only is the OmniBER 718 rugged and portable, its easy-to-use **Smartsetup** and **Smart Tests** simplify the installation and maintenance of SDH and SONET networks.

The OmniBER 718 lets you start testing with just two key presses! With the tester connected to any signal, simply press the **Smart Test** key on the front panel, select **Smartsetup** and the autodiscover wizard identifies the line rate and payload structure of the input signal. For SDH or SONET signals, the OmniBER 718 also automatically displays all of the J1 trace identifiers, that is 16 J1 identifiers in STM-16 or 48 J1 identifiers in OC-48. Once the signal structure has been identified it's a simple process to select a channel of interest and to explore further into the payload.

### Smart Tests

Simply pressing the front panel **Smart Test** key offers a simple shortcut to the extensive capabilities within the OmniBER 718. The **Smart Tests** are grouped together in functional blocks so you don't need an instrument expert to get tests up and running effectively. Test capability that is accessed with only a few key presses include:

- ATM Tests - Setup ATM payloads and Conduct ATM Tests
- Protection Switch Time Measurement
- Auto Jitter Transfer
- Auto Jitter Tolerance
- Jitter Measurement
- Optical Power Measurement

### Concatenated Payloads

OmniBER 718 provides concatenated payload testing at all levels of an SDH or SONET signal. Concatenated payloads are vital for the rapid testing of high bandwidth paths before they are brought into service. Concatenated payloads are also the recommended worse-case signal for performing jitter tests.

### Remote control for manufacturing applications

OmniBER 718 is shipped with a set of universal instrument drivers (UID's). UID's provide a suite of graphical function panels which make programming the OmniBER 718 easy and fast. There is no need to know about SCPI commands - the commands are generated automatically by setting switches on a graphical function panel. UID's are supported in the following environments:

- LabVIEW
- LabWindows/CVI
- HP VEE
- Visual Basic
- C/C++

and on the following operating systems:

- Windows 95

- Windows NT
- HP-UX
- Sun Solaris

Get the latest version of UIDs here

### Remote control for remote in-service monitoring

The Distributed network analyzer software (E4540A) lets you control the OmniBER 718 remotely, via modem or LAN, from a PC with a mouse. Changes you make on the virtual front panel are seen at the remote end and key presses made on the instrument are visible on the virtual front panel on your PC. For long term testing, dial in to a remote OmniBER 718 and download results to verify testing is going as planned. Disconnect and reconnect anytime without interrupting testing.

### Features:

- ATM test capability to 2.5Gb/s
- SDH only or dual SDH and SONET configurations
- Concatenated payloads at all synchronous rates up to 2.5 Gb/s
- Smartsetup autodiscover wizard for fast test setup
- Automatic detection of mixed payload signal structures
- Accurate measurement of protection switching times (ring and linear networks)
- Jitter generation and measurement at all rates (1.5, 2, 8, 34, 45, 140, 52, 155, 622 and 2,488 Mb/s)
- ITU-T O.172 jitter compliance
- Jitter testing to ITU-T and Bellcore requirements
- Accurate and reliable jitter transfer measurement using 10Hz narrowband filtering
- 64kb/s, nx64kb/s, 56kb/s and nx56kb/s testing with framed payloads
- Comprehensive, simultaneous measurement analysis: G.826, M.21XX and G.821
- Integral graphical printer

### Specifications:

Specifications depend on configuration. Refer to technical specifications document.

#### SONET

Frame formats: OC-48, OC-48c, OC-12c, OC-12, OC-3c, OC-3; OC-1, STS-3c, STS-3, STS-1, DS3, DS1 to Bellcore GR.253-CORE.

Payloads: DS3, E3, E1, DS1 and STS-3c, STS-1, VT-6, VT-2, bulk filled to Bellcore GR.253-CORE.

Drop/Insert: DS1, DS3, E1, E3 to/from SONET signal

#### Clock Sources

Internal: Accuracy  $\pm 4.5$  ppm

Offset: Range  $\pm 999$  ppm

External: 64 kb/s MIS, 1.544 Mb/s BITS, 2 Mb/s MTS signal

#### Connectors

Optical: FC/PC

Electrical: BNC on all transmit/receive and drop/insert ports except OC-1/OC-3/OC-12 NRZ monitor inputs which is SMA.

Alarm generation and detection: LOS, LOF, SEF, AIS-L, RD1-L, AIS-P, RDI-P, LOP-P, Path unequipped, AIS-V, ROI-V, LOP-V, UT unequipped, Loss of VT superframe.

Pointer Sequences: Generation and analysis to ITU-T G.783 and GR.253 plus APS time measurement.

#### SDH

Frame formats: STM-16, STM-16c, STM-4, STM-4c, STM-1 to ITU-T G.707, STM-0 to ITU-R F.750.

Payloads: ITU-T G.707 (140 Mb/s, DS3, 34 Mb/s, 2 Mb/s, DS1 and C-4, C-3, C-2, C-12 bulk-filled)

Drop/insert: 140 Mb/s, 34 Mb/s and 2 Mb/s to/from SDH signal.

#### Clock sources

Internal: Accuracy  $\pm 4.5$  ppm.

Offset: Range  $\pm 999$  ppm.

External: 2 Mb/s / 2 MHz MTS signal, received STM-4, STM-1 and STM-0 signal.

#### Connectors

Optical: FC/PC

Electrical: BNC on all transmit/receive and drop/insert ports except STM-1/STM-4 NRZ monitor inputs which is SMA.

#### Interfaces

Optical: 2.5Gb/s, 622Mb/s, 155 Mb/s (1310nm and 1550 nm), 52 Mb/s (1310 nm)

Electrical:	155 Mb/s (CMI), 52 Mb/s (B3ZS)
Error addition and detection:	A1A2 frame, B1, B2, MS-FEBE, HP B3, HP FEBE, HP IEC, LP B3/BIP-2, LP FEBE, payload bit errors.
Alarm generation and detection:	LOS, LOF, OOF, MS AIS, MS FERF, HP AIS, HP FERF, HP LOP, HP unequipped, LP AIS, LP FERF, LP LOP, LP unequipped, H4 LOM.
Pointer sequences:	Generation and analysis to ITU-T G.783.
Protection switching:	MSP linear messages to ITU-T G.783 and MSP ring architecture to ITU-T G.841 plus protection switch time measurement.

## DSn

### FrameFormats

DS3:	C-Bit parity as per ANSI T1.107 - 1990 M23 as per ANSI T1.107-1995
DS1:	SF (D4), ESF as per ANSI T1.403-1989, TR-TSY.000499 and ITU-T Rec. G.704, SLC-96
E3:	As per ITU-T G.751
E1:	As per ITU-T G.704

### Payloads

Framed, unframed or structured (full mux-demux) with 64 kb/s, 56 kb/s, n x 64 kb/s, nx 56 kb/s, timeslot testing.

### Clock sources

Internal:	Accuracy; $\pm 0.5$ ppm for DS3, E3 and E1; $\pm 0.7$ ppm for DS1
Offset:	Range $\pm 100$ ppm
External:	Clock recovered by receiver (loop timed)

### Connectors

Electrical:	Unbalanced DS3	- BNC
	Balanced DS1	- WECO bantam
	Unbalanced E3	- BNC
	Balanced E1	- BNC
	Unbalanced E1	- BNC
	DS1 add/drop	- WECO bantam
	E1 add/drop	- BNC

### Interfaces

Electrical: DS3 (B325), E3 (HDB3), DS1 (AMI or B825), E1 (AMI or HDB3).

Error addition and detection Code. Frame, CRC, Parity, FEBE, REBE, Payload.

Alarm generation and detection LOS, AIS, LOF, RAI

### PDH

Frame formats:	140 Mb/s to ITU-T G.754, 34 Mb/s to ITU-T G.751, 8 Mb/s to ITU-T G.742 and 2 Mb/s to ITU-T G.704 (Std and CRC4).
Payloads:	Framed, unframed or structured (full mux-demux) with 64 kb/s and n x 64kb/s timeslot testing.
Drop/Insert:	2 Mb/s to/from 8 Mb/s, 34 Mb/s or 140 Mb/s signal.

### Clock sources

Internal:	Accuracy $\pm 4.5$ ppm.
Offset:	Range $\pm 100$ ppm.
External:	Received 2 Mb/s signal, external 2 Mb/s / 2 MHz MTS signal on jitter generator module, external clock input on PDH binary interface module.

### Connectors

Electrical:	BNC on all transmit/receive and drop/insert ports.
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### Interfaces

Electrical:	140 Mb/s (CMI), 34 Mb/s (HDB3), 8 Mb/s (HDB3/AMI), 2 Mb/s (HDB3/AMI).
Error addition and detection:	Code, frame, CRC4, REBE and payload bit errors.
Alarm generation and detection:	LOS, AIS, LOF, RAI, RMFAI, CASMFL.

## Jitter

Jitter can be added to and measured on PDH, SDH and ATM signal structures.

Rates:	STM-16o, STM-4o, STM-1o, STM-1e, 140 Mb/s, 34 Mb/s, 8 Mb/s and 2 Mb/s.
Jitter and wander generation:	Automatic jitter tolerance to ITU-T G.958 and G.823 with jitter and wander tolerance to ITU-T G.825.
Jitter frequency range:	0.1 Hz to 20 MHz
Jitter amplitude range:	up to 800 UI
Wander frequency range:	10uHz to 0.125 Hz
Wander amplitude range:	up to 57 600 UI
Jitter tolerance pass masks:	ITU-T G.958 type A and B, ITU-T G.823 low Q and high Q. ITU-T G.825
Jitter measurement:	Peak-to-peak and rms output jitter and pointer jitter with internal 12 kHz HP plus HP1, HP2 and LP filters to ITU-T O.171/O.172.
Jitter transfer:	Automatic jitter transfer with narrow bandwidth selective filtering to ITU-T G.823 and G.958.
Jitter transfer pass masks:	ITU-T G.958 type A and B, ITU-T G.823 low Q and High Q.
Wander Measurement:	STM-16o, STM-4o, STM-1o, STM-1e, 140 Mb/s, 34 Mb/s, 8 Mb/s and 2 Mb/s.
Results include time interval error, estimated frame slips, bit slips and implied frequency offset results.	