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ProBER 2
2 Mb/s Handheld Test Set



The handheld that takes 2 Mb/s testing beyond convention

ProBER 2

Agilent Technologies
Innovating the HP Way

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2 Mb/s BER and signal quality measurements in a handheld



The ProBER 2 test set provides a powerful handheld solution for testing 2 Mb/s and 64 kb/s digital circuits. It offers extensive BER test functions plus a unique range of signal quality measurements (pulse mask, jitter, level and frequency). This unmatched test capability, combined with the intuitive operation of ProBER 2, simplifies installation and maintenance testing for faster problem resolution.

A range of signal quality measurements for faster problem resolution

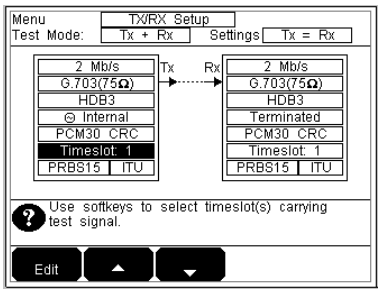
Save time by quickly identifying signal quality problems before running long-term error measurements or during trouble-shooting. With a single keystroke, the ProBER 2 rapidly identifies any frequency, level, pulse shape or jitter problem on a 2 Mb/s signal.

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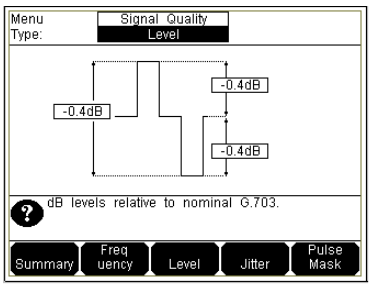
Measurement summary

The ProBER 2 supports comprehensive functional and parametric capability providing the ability to fully evaluate 2 Mb/s, n x 64 kb/s and 64 kb/s co-directional circuits.

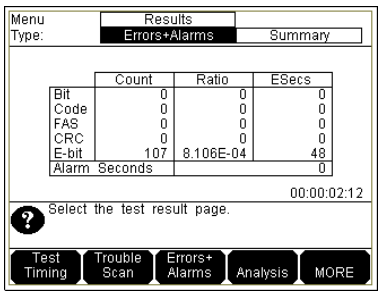
- Extensive error and alarm generation and measurement
- ITU-T recommendations G.821, G.826 and M.2100 performance analysis
- Frequency and level measurements
- Pulse mask measurements (+pulse, –pulse, pulse width ratio, pulse amplitude ratio)
- Jitter measurements to ITU-T standard O.172 (supports pointer jitter tests)
- Delay measurement
- VF tone generation and measurement
- Timeslot activity monitor
- Line rate offset
- Frame data control and monitoring
- Synchronization status messages
- Built-in talk/listen capability



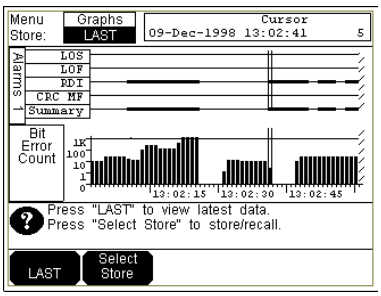
Single transmit/receive setup display minimizes the number of key presses and lets you see the instrument configuration at a glance.



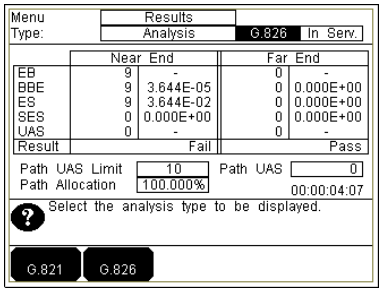
Easily identify any frequency, level, pulse shape or jitter problems.



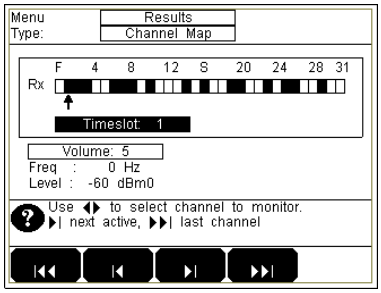
Clear results presentation in both tabular . . .



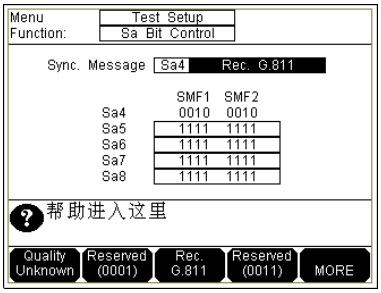
. . . and graphical formats



Clear presentation of ITU-T G.821 and G.826 in-service and out-of-service analysis



At-a-glance display of active timeslots, frequency and level measurements combined with the ability to listen to timeslots.



Textual decode of ITU-T G.704 synchronization status message along with local language on-line help.

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Technical specifications

ProBER 2 (E7580A) 2 Mb/s handheld test set

Line Rates
2 Mb/s; 64 kb/s (option 002).

Interfaces
2 Mb/s: HDB3/AMI; 75 ohm unbalanced (BNC), 120 ohm balanced (3-pin Siemens).
64 kb/s co-directional: 120 ohm balanced (3-pin Siemens).
Input mode: Terminate, bridged or monitor mode.
Monitor gain (2 Mb/s): 20 dB, 26 dB, 30 dB.
Equalization (2 Mb/s): 6 dB at f/2.
Clock input: 2 MHz; 75 ohm unbalanced (BNC).
Printer Interface : RS-232-C.

Clock
Internal: ± 4.6 ppm (includes aging, stability and setting accuracy).
Received: Clock recovered from receiver.
External: 2 MHz external clock (ITU-T G.703 section 10).

Frequency offset generation
± 100 ppm in 1 ppm steps.

Frame format
PCM30, PCM30CRC, PCM31, PCM31CRC, unframed.
Test channel: 64 kb/s timeslot, n × 64 kb/s (contiguous and non-contiguous).

Test pattern
PRBS: 2^9-1, $2^{11}-1$, $2^{15}-1$, $2^{20}-1$, $2^{23}-1$.
Word: All 1s, all 0s, 1010, 1000, 8-bit or 16-bit word (frame aligned).
Live traffic: Externally generated (thru mode).

Error and alarm measurements
Error: Frame, code, CRC-4, E-bit, bit.
Alarms: LOS, AIS, LOF, LOMF, RDI, TS-AIS, RDI(MF), pattern loss.
Basic results: Error count, error ratio (short term and cumulative), error seconds, alarm seconds.
Stored measurement graphs: Graphical display of all error counts and alarms.

Performance analysis
ITU-T G.821 (bit, FAS, CRC, E-bit), ITU-T G.826 in-service (CRC, E-bit) or out-of-service (bit).

Frequency measurement
Measurement rate: 2 Mb/s.
Measurement:
Frequency displayed in Hz, 1 Hz resolution. Offset displayed in ppm and Hz.

Delay
Supports measurement of network round-trip delay.
Range: 0 to 1,999,999 µs.
Accuracy: ± 1 µs.

VF tone and dialing
Generation and measurement of digitally encoded voice frequency tone in a 2 Mb/s timeslot.
Generation:
Frequency: 300 to 3400 Hz (1 Hz steps)
Level: +3 to –40 dBm (+3 to –20 dBm: 1 dBm steps; –20 to –40 dBm: 5 dBm steps).
Measurement:
Frequency: 300 to 3400 Hz (1 Hz resolution).
Level: +3 to –60 dBm (1 dBm resolution)
Dialing: Performs DTMF dialing

Error generation
Bit, frame, code, CRC4, E-bit.
Control: Single, 1×10^{-n} (where n = 3 to 7).
FAS: n-consecutive errored FAS words (where n = 1 to 4).

Alarm generation
LOS, AIS, LOF, RDI, TS-AIS, RDI(MF), minor alarm (via spare bits).
Control: On, off.

Frame data (control and monitoring)
FAS, NFAS, MFAS, CRC MFAS, Si-bits, Sa-bits, x-bits, E-bits, ABCD signaling (all channels), timeslot data.

Synchronization status messages
Clear test setup and monitoring of synchronization status messages defined in ITU-T G.704.

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Thru-mode

Transparent or overwrite mode.
Transparent mode: The signal is passed through the instrument without being altered. For monitoring purposes where no protected monitor point is available.
Overwrite mode: The selected test channel (64 kb/s or N × 64 kb/s) within the received frame may be overwritten with a test pattern. Errors and alarms can be also be inserted.

Telephone handset

Full talk/listen capability via internal microphone and speaker.

Battery

Type: Nickel metal hydride.
Operating Time: > 8 hours (typical; depending on operating modes).
Re-charge time: < 4 hours.

General specifications

Weight: 1 kg.
Dimensions: 270 × 133 × 54 mm.
Environmental:
Operating temperature: 0 to 50°C.
Storage temperature: –40°C to +70°C.
EMC compatibility:
Immunity: EN 50082-1:1992.
Emissions: EN 55011:1991.
Product safety:
IEC 1010-1:1990;
CSA C22.2 NO 1010-1:1993+A1+A2;
EN 61010:1992+A1+A2;
IEC 61010:1992+A1+A2;
EN 60825-1:1994/
IEC 825-1:1993 (LEDs only).

Option 001 Advanced signal quality

Jitter measurement

Measurement rate: 2 Mb/s.
Measurement ranges: 1.6 UI pk-pk, 15.5 UI pk-pk.
Measurement bandwidth
1.6 UI range: 2 Hz to 100 kHz.
16 UI range: 2 Hz to 50 kHz.
Measurement filters: HP1, HP2 and LP filters to ITU-T O.172.
HP1: 20 Hz;
HP2: 18 kHz;
LP: 100 kHz.
Measurement accuracy: Meets ITU-T recommendation O.172.
Results:
Amplitude: +peak, –peak, peak-peak, elapsed time.
Hits: Jitter hit count, jitter hit seconds, jitter hit free seconds, elapsed time.
Stored measurement graphs:
Bar Graph: Hit count.
Alarms: Unlock, out-of-range, LOS.
Pointer jitter measurement: Fully supports the measurement of jitter caused by SDH pointer adjustments (accuracy is maintained in the presence of high amplitude out-of-band jitter transients). Can be used to test jitter limits defined in ITU-T G.783.

Pulse mask

Measurement Rates: 2 Mb/s;
Measurement: +Pulse and –pulse versus ITU-T G.703 mask (also without mask), pulse width ratio, pulse amplitude ratio.

Level measurement

Measurement rate: 2 Mb/s.
Measurement: +4 to –28 dB relative to the nominal level defined in ITU-T G.703.
(1 dB resolution).
Results: pk-pk, +pk, –pk.

Option 002 64 kb/s co-directional interface

Line rate: 64 kb/s;
Interface: 120 ohm balanced (3-pin Siemens);
Error and alarm measurements:
Error: Bit error;
Alarms: LOS, octet loss.
Error and alarm generation:
Bit errors: Single, 1×10^{-n} (where n = 3 to 7);
Alarms: LOS, octet loss.

Option 003 M.2100 performance analysis

Line rate: 2 Mb/s, N × 64 kb/s and 64 kb/s;
Measurements: ITU-T M.2100 in-service (FAS, CRC, E-bit), out-of-service (bit).

ITU-T M.2110 bringing into service (15 minutes, 1 hour, 2 hours, 24 hours and 7 days).

ITU-T M.2120 in-service test for maintenance (15 minutes and 24 hours).

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Ordering information

The instrument supports a number of options allowing you to configure it to meet your test requirements.

Ordering information

E7580A 2 Mb/s test set *(includes ac adapter, operating manual)*

Option 001: Advanced signal quality measurements
(adds 2 Mb/s pulse mask, jitter and level measurements).

Option 002: 64 kb/s
co-directional interface.

Option 003: M.2100 performance analysis (including M.2110 and M.2120).

Option 020: Soft carrying case.

Option 031: Latin American localization.

Option 032: Brazilian Portuguese localization.

Option AB2: Chinese localization.

Option UK6: Calibration data and certificate

Accessories

15730B: Lightweight, battery-operated thermal printer
(40 column) with 230V power supply.

Option 100: Replaces 230V power supply with 100V supply.

Option 120: Replaces 230V power supply with 120V supply.

15736A: RS-232-C printer cable (9-pin male to 9-pin female).

24542U: RS-232-C cable for
PC data acquisition.

15993A: Soft carrying case (when not ordered as Option 020).

For further information on the ProBER 2
2 Mb/s handheld test set, please refer to brochure 5967-5869E

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Related products



The OmniBER 718 analyzer is a rugged, portable one-box solution for installation, maintenance and manufacturing of SDH/SONET networks and network elements. It provides full PDH/T-carrier and SDH/SONET capability up to 2.5 Gb/s, including STM-16c/OC-48c payloads and jitter.

For further information, refer to publication no. 5967-5870E.



The OmniBER 717 analyzer offers a modular, upgradeable one-box solution for installation, commissioning and field maintenance. This rugged, portable tester allows comprehensive functional testing of SDH/SONET, PDH and ATM – including jitter generation and test – up to 622 Mb/s.

For further information, refer to publication no. 5964-0106E.

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Printed in the USA
5968-4025E 12/99

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