When people talk about ***"The One"***
They are probably talking about this.

NETPROBE 2000

The all-in-one test set.
No plug-in module required.

Full Feature IP & PDH Analyzer & Simulator

NeT RESEARCH

NetProbe 2000

Multi-service Network and Telecom Analyzer

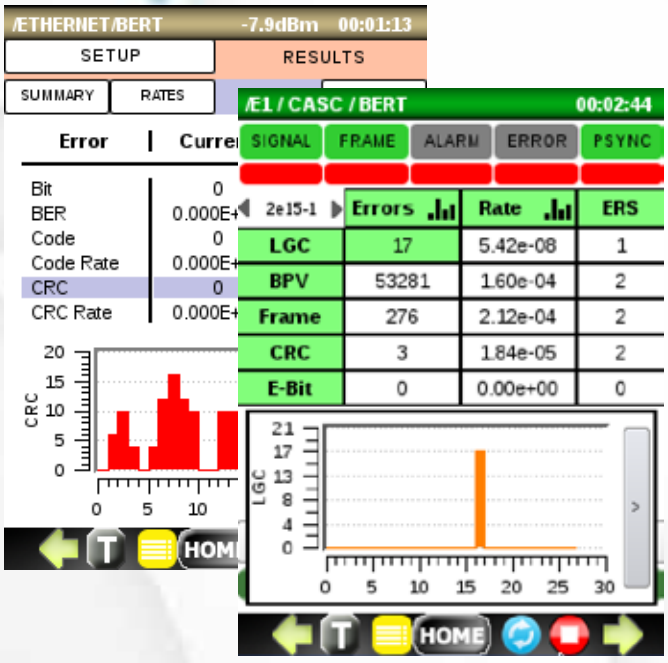
The NetProbe 2000 product family is the ideal handheld multi-service test set for operators installing and troubleshooting 1G Ethernet, IEEE C37.94, T1, E1, G.703 64kbps Co-Dir, T3, E3, Datacom, WiFi, IPTV and VoIP circuits. No plug-in modules required.

Benefits

- All-in-one tester saves time and money.
- Simple, intuitive GUI minimizes training time.
- Long battery life provides extended field testing.
- Results and Configurations can be exported for easy sharing.
- Rugged yet lightweight construction is ideal for service technicians.
- Fast processor for quick boot-up and lightning fast responses reduces repair time.

Key Features

- Gigabit analyzer supports BERT, RFC2544, IEEE-1588, 1-8 multistream Traffic Generator, Y.1564, Looping regenerator, Wiremap, and Optical.
- IEEE C37.94 analyzer supports BERT, PDL, Optical Power Meter, Alarms and more.
- T1 and E1 Datacom analyzer supports BERT, Alarms, Audio, PDL, Voice and more.
- T3 and E3 Datacom analyzer supports BERT and Alarms.
- Datacom Analyzer supports BERT, PDL and transmit/monitor Lead Lines on RS-232, RS-530, RS-449, X.21 and V.35 circuits.
- VoIP analyzer supports Call/Answer, Call Log and SIP flow diagram.
- WiFi dual-band b/g/n analyzer detects and tests WiFi devices. Displays AP's, SSID, Encryption type, Signal Strength, Channel Usage and more.
- IPTV analyzer supports STB emulation, Passive Monitoring, Channel Scan, TR101290 transport stream metrics, QoS/QoE metrics and more.
- Comprehensive results can be exported as PDF, CSV or text file onto built in 8GB flash memory.
- Graphic tables and histograms display concise results.
- Remote operation via VNC client



General Product Information

3.5” TFT color touch-screen with bright white LED backlight

Detachable Wi-Fi antenna increases signal sensitivity to improve coverage and provide accurate signal strength

5-way backlit navigation keypad for alternate way of operating the GUI even in the darkness. Center button is also power on-off-hibernate switch

Rubber overmold provides non-slip grip, protection and water resistance

12 VDC adapter jack to power the unit and charge the Li-Ion Polymer battery

10/100 Base-T LAN port for IPTV and VoIP testing and remote operation

10/100 Base-T WAN port for IPTV and VoIP primary interface or 10/100/1000 Base-T Gigabit test interface

SFP interface for removable 1000Base-SX, 1000Base-LX or 1000Base-ZX optical transceiver

Audio headset access via the Mini-USB connector

Mini-USB connector for USB OTG host or slave access

NP2000-DCOM option connector provides datacom bit error testing interface for RS-232, RS-530, V.35, RS-449, X.21 or G.703 co-dir interface

General Product Information

Holding and operating the ergonomically shaped and light weight Netprobe 2000 is easy, with no wrist fatigue.

Operating at night, dark or dim light conditions is not a problem. Both the display and 5-way navigation keypad are backlit.

Remote Access is available via PC, Tablet or Android running VNC App

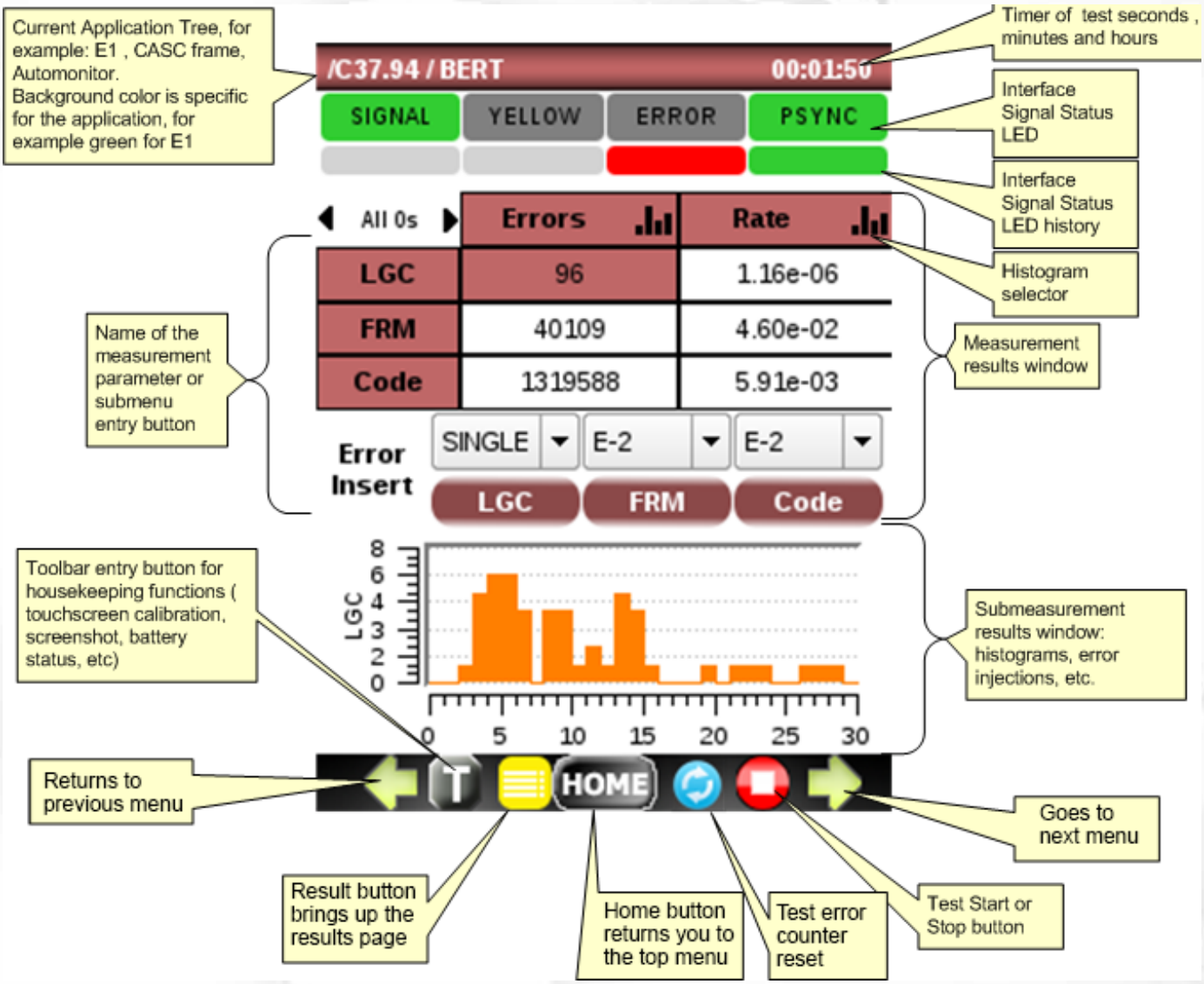
NetProbe 2000's built-in VNC server allows you to connect to Ethernet LAN or Internet via a 10/100 cable or b/g/n WiFi. The remote client on your PC, tablet or android cellphone allows you to take total control of the tester.

VNC Client app installed on PC, Tablet or Android smartphone allows remote access to the NetProbe 2000 either via mobile cellphone network or a Wireless internet connection.

General Product Information

Interface Design

- **Each application is color coded. Entry or return to a specific test or setup is quick. Test results are easily accessible from the bottom toolbar**
- **Intuitive Graphical User Interface allows for quick learning and operation of the unit.**



Gigabit Ethernet Testing Tools

The NetProbe 2000 GigE is available as

GigE-BAS: A low cost analyzer to troubleshoot the most common problems found in Gigabit networks. Upgrade to the GigE-ADV with a simple software license update.

GigE-ADV: A full feature analyzer with the complete set of our Ethernet test features.

NetProbe 2000 GigE BAS - BASIC

Features:

- WIREMAP –cable verification
- Rx and Tx Optical Power
- Full SFP info and operational status
- Looback capability for Layer 1, 2 and 3
- BERT Layer 1, 2, 3 and 4
- RFC 2544 Layer 2, 3 and 4

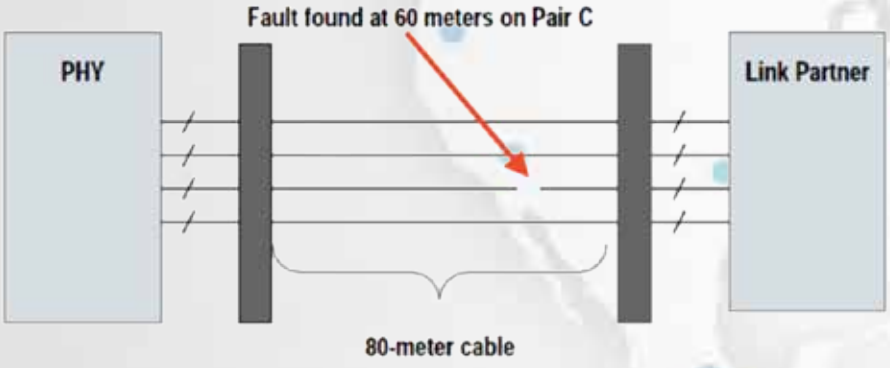
NetProbe 2000 GigE ADV - ADVANCED

Features

Includes all features of NetProbe 2000 GigE-BAS plus

- Traffic Generator (Throughput) - up to 8 streams
- Y.1564 Compliance Test (EtherSAM)

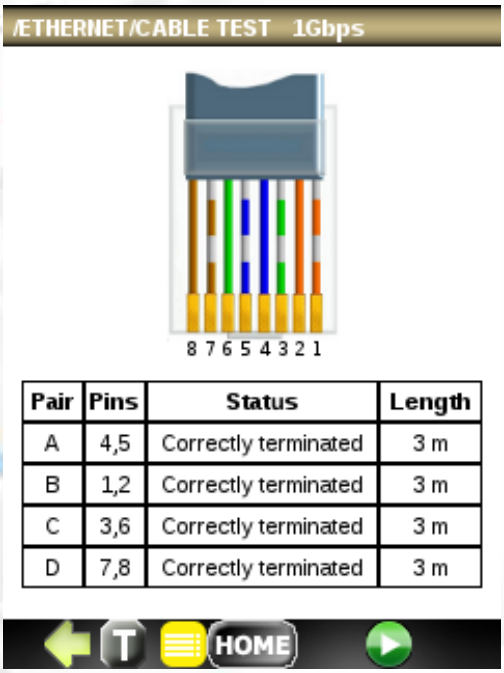
WireMap Cable Verification



Gigabit Ethernet testing should be started from the verification of the cable itself.

The WIREMAP auto-diagnostics shown to the right will check the cable in a few seconds for:

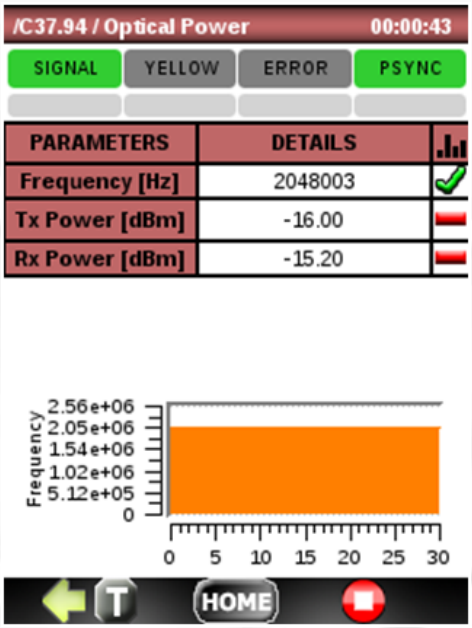
- opens
- shorts
- crosstalk
- cable length



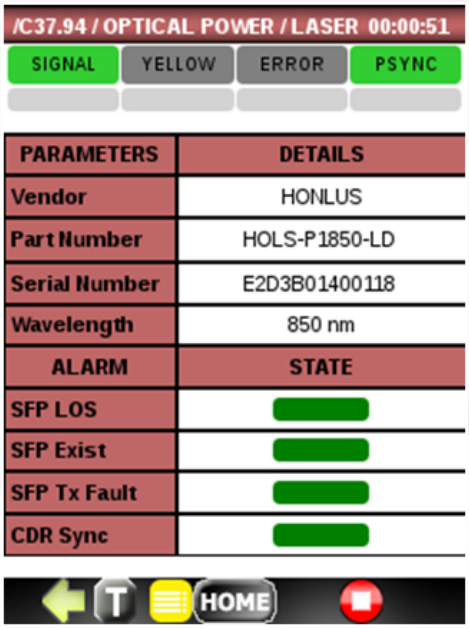
Pair	Pins	Status	Length
A	4,5	Correctly terminated	3 m
B	1,2	Correctly terminated	3 m
C	3,6	Correctly terminated	3 m
D	7,8	Correctly terminated	3 m

Gigabit Ethernet Testing Tools

Rx & Tx Optical Power

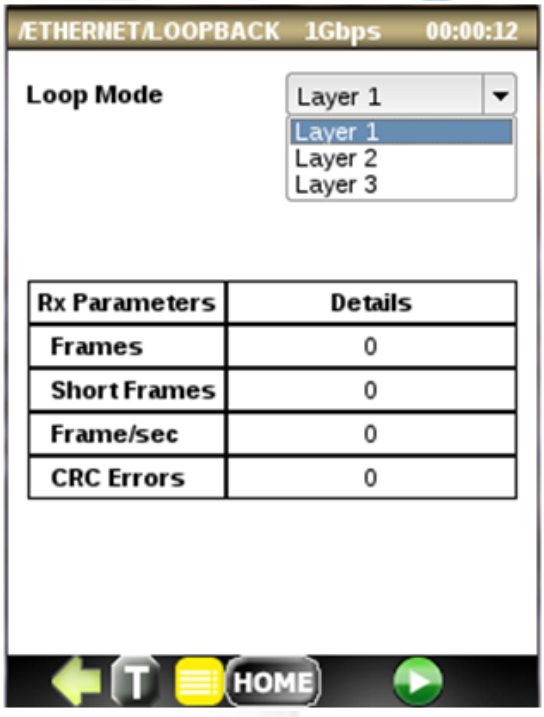


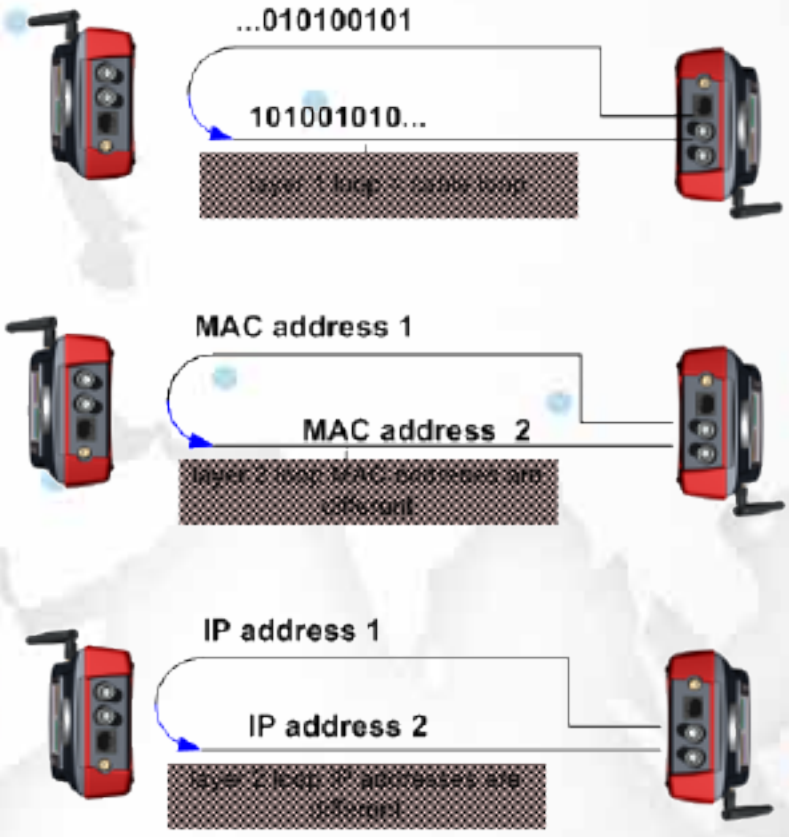
SFP Info and Status



Loopback

The NetProbe 2000 GigE BAS can be used as a loopback device with the manual selection of Layer 1, 2 or 3.



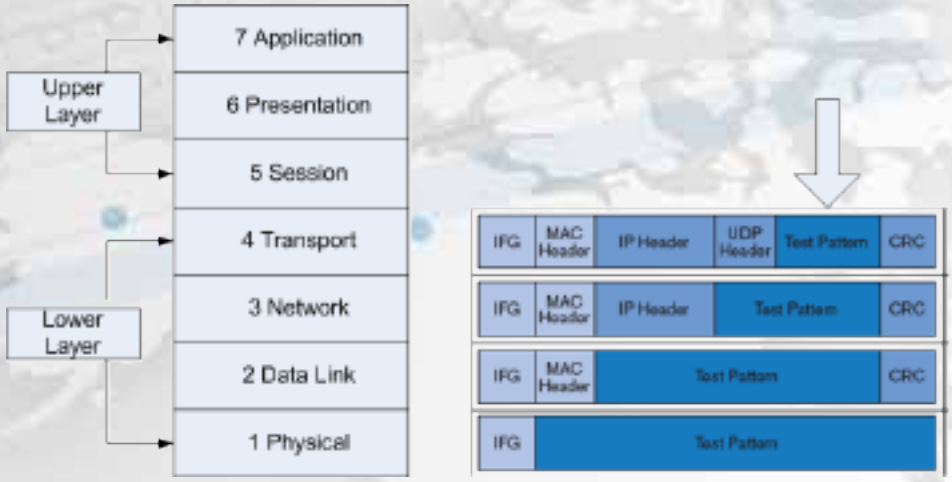


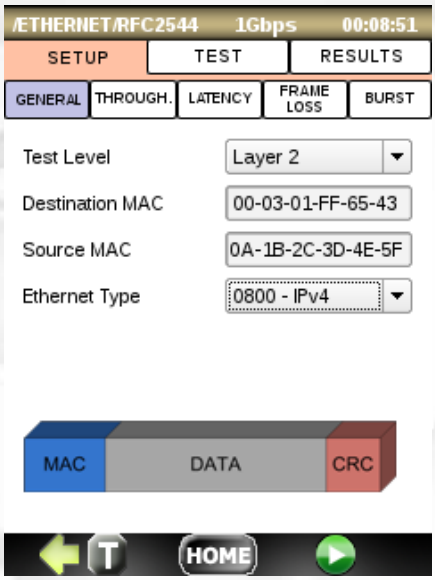
Gigabit Ethernet Testing Tools

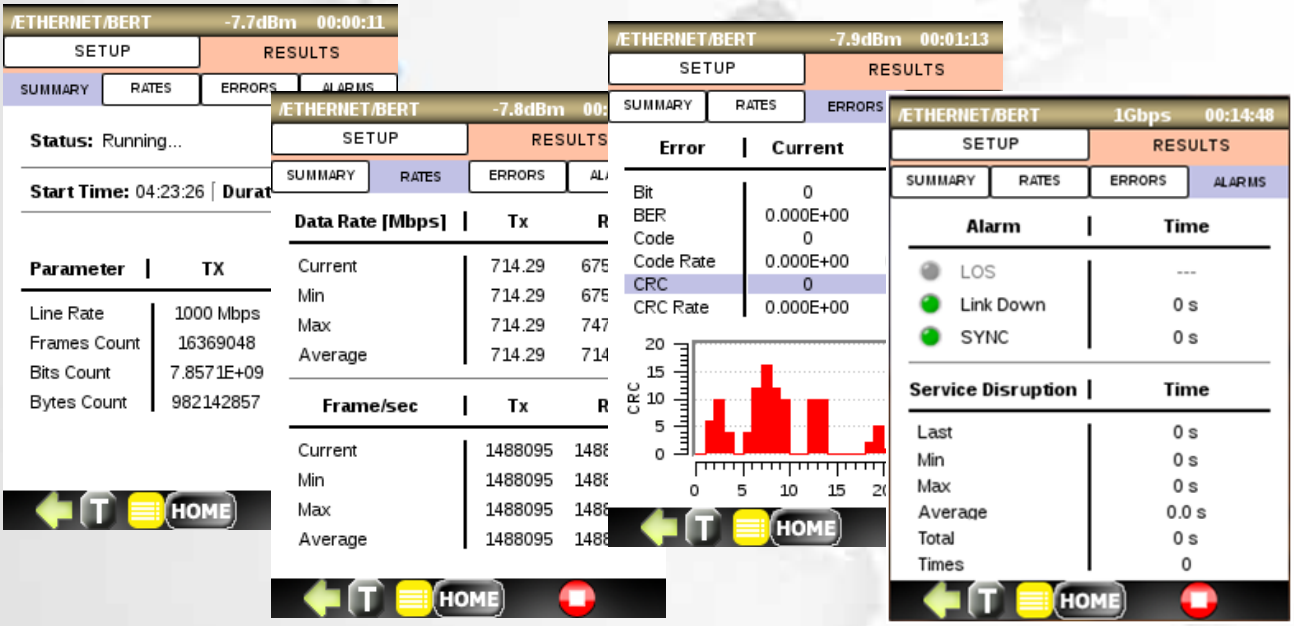
Bit Error Testing

Bit Error Testing (BERT) verifies link integrity during new service turn-up or periodic maintenances.

NetProbe 2000 GigE-BAS offers BERT on Layers 1, 2, 3 and 4 including up to 2 VLAN tags and 2 MPLS tags.







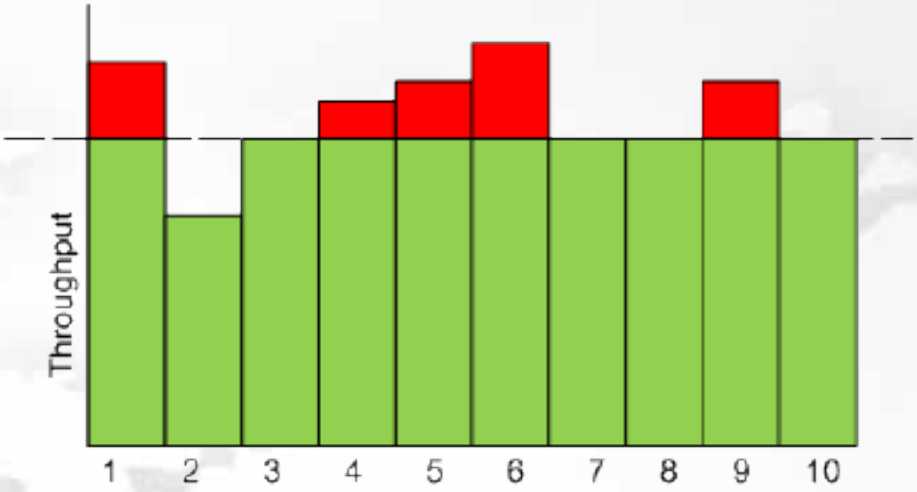
This example shows the BERT test running with current results displayed on the above four screenshots:

Summary, Rates, Errors, and Alarms. SYNC LED affirms Pattern Synchronization. Errors are also displayed graphical form

Gigabit Ethernet Testing Tools

RFC 2544 Compliance

The RFC 2544 conformance test was introduced as a method to benchmark interconnected network devices. Because of its ability to measure throughput, burstability, frame loss and latency, this methodology is also used to test Ethernet-based networks and is now the de facto standard when benchmarking an Ethernet network. The test methodology defines the different frame sizes to be tested (64,128, 256, 512, 1024, 1280 and 1518 bytes), the test time for each test iteration (should be set to at least 60 or 120 seconds (latency), the frame format (IP/UDP), etc.



The throughput test allows the technician to obtain the maximum rate at which none of the offered frames are dropped by the device/system under test (DUT/SUT). This measurement translates the obtained rate into the available bandwidth of the Ethernet virtual connection.

/ETHERNET/RFC2544 1Gbps 00:08:51

SETUP | TEST | RESULTS

THROUGH. | LATENCY | FRAME LOSS | BURST | GRAPHS

Frame Size	Through. [%]	Status
64	89.07	PASS
128	15.08	FAIL
256	61.91	PASS
512	53.77	FAIL
1024	55.99	FAIL
1280	52.38	FAIL
1518	94.63	PASS

The latency test (for store-and-forward devices) refers to the time interval that begins when the last bit of the input frame reaches the input port, and ends when the first bit of the output frame is seen on the output port. It is the time taken by a bit to go through the network and back. Latency variability can be a problem. With protocols like VoIP, a variable or long latency can cause degradation in voice quality.

/ETHERNET/RFC2544 1Gbps 00:08:51

SETUP | TEST | RESULTS

THROUGH. | LATENCY | FRAME LOSS | BURST | GRAPHS

Frame Size	Ltncy [ms]	Status
64	12.391	PASS
128	65.992	FAIL
256	41.066	FAIL
512	72.507	FAIL
1024	35.169	FAIL
1280	52.308	FAIL
1518	55.191	FAIL

The frame loss test calculates the percentage of frames that should have been forwarded by a network device under steady state (constant) loads that were not forwarded due to lack of resources. This measurement can be used for reporting the performance of a network device in an overloaded state, as it can be a useful indication of how a device would perform under pathological network conditions such as broadcast storms.

/ETHERNET/RFC2544 1Gbps 00:08:51

SETUP | TEST | RESULTS

THROUGH. | LATENCY | FRAME LOSS | BURST | GRAPHS

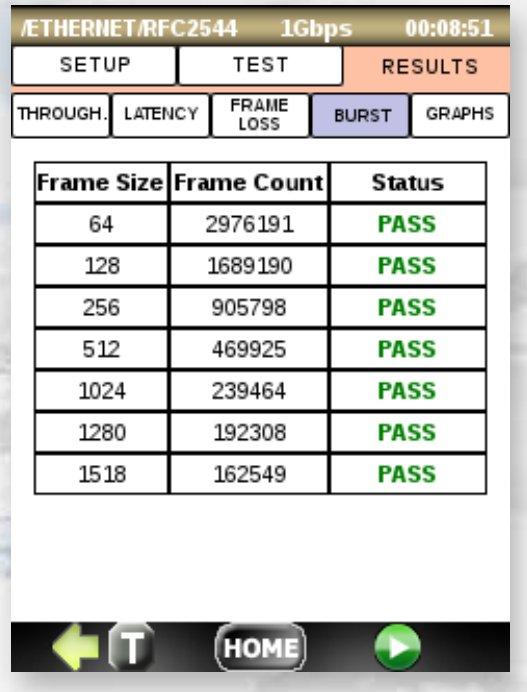
Rate step [%]: 100.00

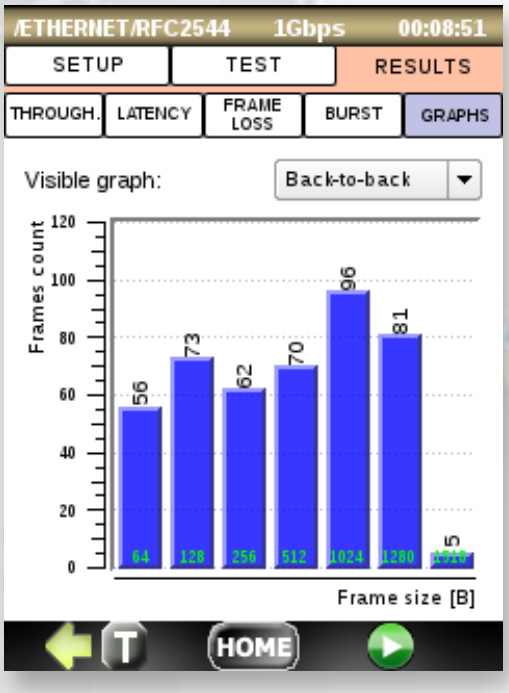
Frame Size	FrLoss [%]	Status
64	<0.01	PASS
128	<0.01	PASS
256	<0.01	PASS
512	23.31	FAIL
1024	<0.01	PASS
1280	16.18	PASS

Gigabit Ethernet Testing Tools

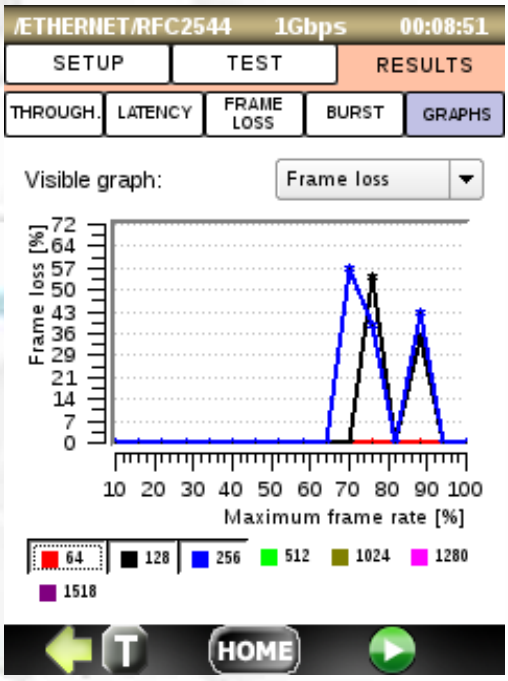
RFC 2544 Testing

The burstability or back-to-back test refers to the fixed length of frames that are presented at a rate such that there is the minimum legal separation for a given medium between frames (maximum rate) over a short to medium period of time, starting from an idle state. The test result provides the number of frames in the longest burst that the device or network under test will handle without the loss of any frames.





Example of Burst histogram



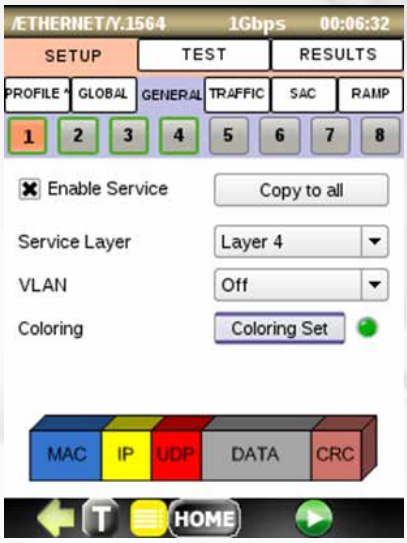
Example of Frame Loss

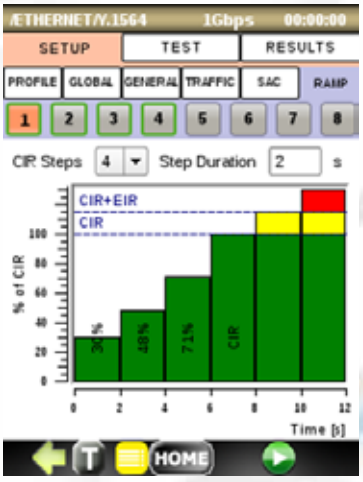
Gigabit Ethernet Testing Tools

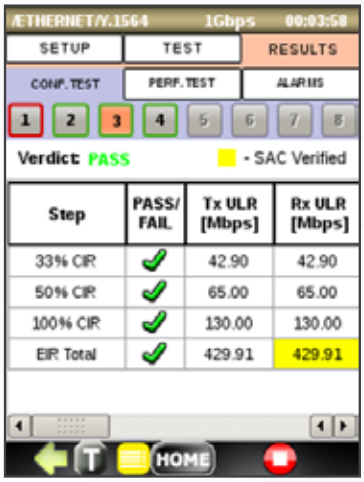
Y.1564 Testing

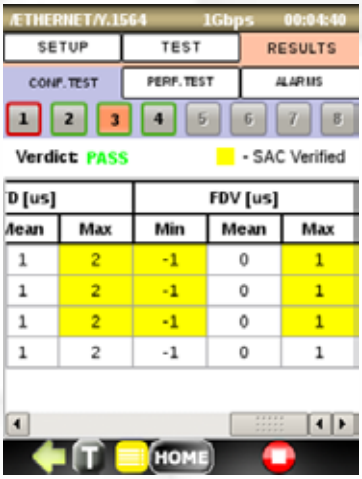
NetProbe 2000 Y.1564 test suite is fully compliant with ITU-T Y.1564 and offers an efficient method of qualifying and troubleshooting Ethernet services. The NetProbe can perform two-way tests (round-trip) with a far-end loop device. Key features of NetProbe 2000 Y.1564 are:

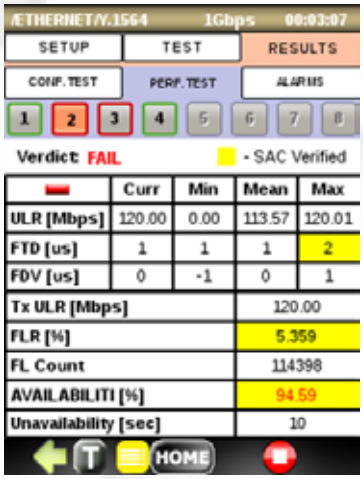
- Configurable services of up to 8 simultaneous flows including CIR, EIR, Traffic Policing, and frame size.
- Flexible Layer 2, Layer 3 and Layer 4 settings include MAC and IP addresses, VLAN settings, TTL, TOS, and UDP port number.
- Traffic coloring support (traffic classifying)
- Step load CIR test support (up to 7 steps)
- Independent setting of Service Acceptance Criteria limits for each service
- Test verdict reporting with pass/fail indication based on Service Acceptance Criteria

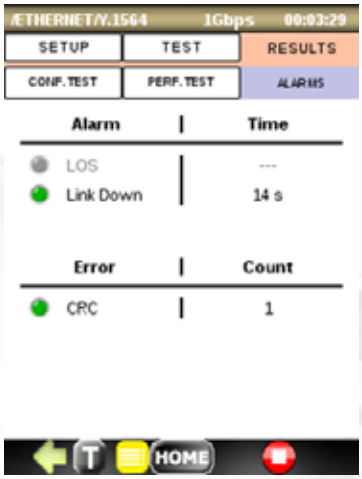










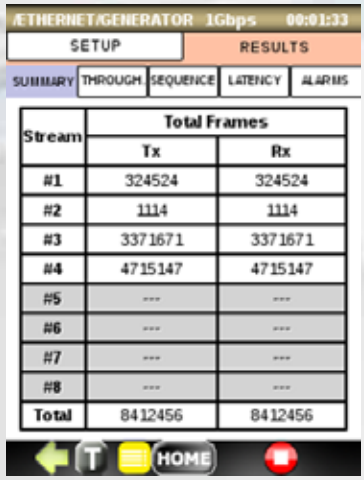


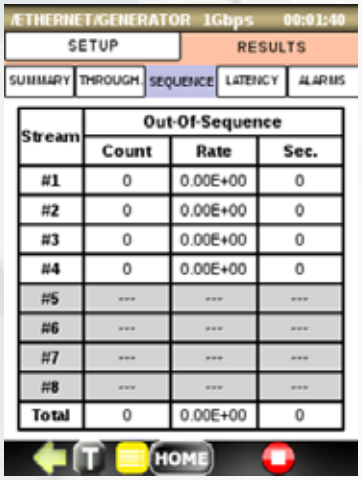
Gigabit Ethernet Testing Tools

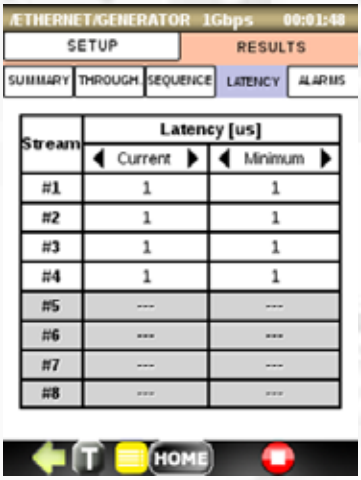
Traffic Generator Testing

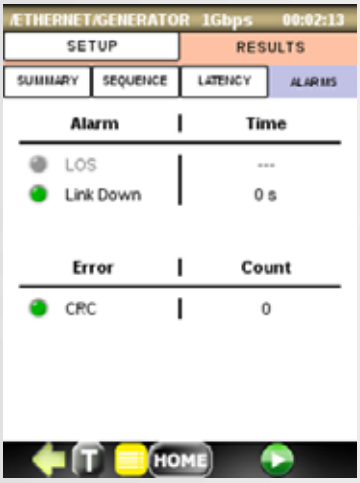
Traffic Generator test can generate up to 8 streams. The stream properties are configured independently for each stream. Tests can be performed with Layer 1, Layer 2, Layer 3, or Layer 4 configurations with up to two VLAN tags and two MPLS tags. The Traffic Generator simultaneously measures the following parameters:

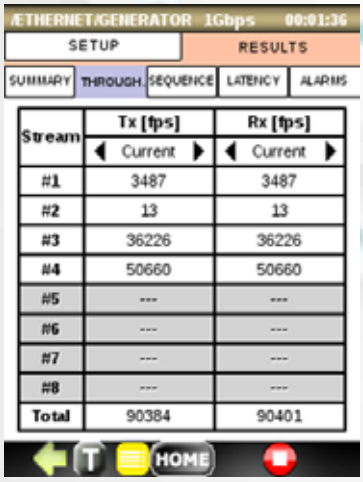
- Received Frames count
- Transmitted Frames count
- Out-Of-Sequence
- Round Trip Latency











Traffic Generator results show:

- Summary of TX and Rx frames
- Throughput in Tx and Rx rates
- Out-Of-Sequence stats
- Loss link and CR alarms
- Round Trip Latency

C37.94

Key Features

- The smallest and lightest IEEE C37.94 tester on the market
- Removable SFP optical interface for field replacement.
- Handheld design eoth a 10 year lifecycle
- USB test results storage

Power Lines have redundancy

Relays switching to the redunant lines are controlled by mulitplexers and teleprotection circuits. Fiberoptic lines are preferred over copper lines to connecting this equipment due to their immunity to electrical noise.

The NetProbe 2000 C37.94 allows provisioning and maintenance of this equipment and lines.

NetProbe 2000 C37.94 boots in seconds and measures optical power, propagation delay and runs a bit error rate test, empowering technicians/engineers to quickly turn up a new network or isolate and resolve problems between teleprotection and digital multiplexer equipment . Its alarm monitoring and optical power measurement function allows technicians to easily verify connectivity and power levels to ensure uninterrupted operation. It can measure propagation delay, the roundtrip time of a digital signal on the C37.94 teleprotection circuit, which is a critical element of the time required for a protection system to automatically respond to a circuit failure and prevent an outage in the power transmission network.

It's housed in an ultra-small, rugged enclosure and has a bright touch screen color interface. It can even be optioned with 10/100/GigE, T1, E1, T3, E3, V-series, G.703 64Kbps, WiFi, VoIP…all integrated in one unit. Operating expertise is easily achieved in just a couple of minutes with its intuitive graphical interface.

The NetProbe 2000 lists for a low price and includes a carrying case, 2 meter duplex LC to ST fiber optic cable, 850nm MM SFP optical transceiver and a mini-to-USB adaptor. Everything you need.

NetProbe 2000 C37.94 in a teleprotection optical link and equipment installation and maintenance.
Bit Error Test is peformed with looping on the Mux or Teleprotection. End-to-end test is also possible to screen each direction for problems. Optical power and clock frequency can be verified.

Technical Details

Optical Connector type:
LC into SFP plug-in (LC to ST adapter included)
Optical Transmitter
Wavelength: 850 nm
Output Power: -13 dBm
Distance: 2 to 4 km
Test Data Rate: 2 Mbps
Optical Receiver
Max input power: -3dBm
Minimum input power: - 32 dBm
Loss of Signal –Asserted: -45 dBm
Loss of Signal-Deasserted:-30 dBm
Test rate: n x 64 kbits/s, n= 1 to 12
Transmission Bit Rate: 2,048 kbits/s
Test Pattern:
2n-1, n =7,9,10,15,20,23, QRSS ,All Zero, All Ones, 1:3, 1:7, 1:15,1:31
Error Injection: Single, Continuous Rate 10-1 to 10-9
Transmitter Clock: Internal, 3 ppm or Recovered

Measurements
Bit Errors
Bit Error Rate
ITU-T G.821 Analysis
Alarms:
LOS, Yellow
Data Frequency
Propagation Delay
Optical Power in dBm
Histograms for all

General

Results storage: SD card 2GB
Utility ports: mini USB
10/100LAN: remote access via VNC
Rechargeable Battery Pack: Li Ion battery pack, 7.2V, 4800 mAh, 4-8 hours operating time.
External Power: AC/DC power converter outputs 12VDC at 2A, 110-240 VAC, 50-60 Hz.
Enclosure: Ruggedized ABS with rubber shell.
Display: 3.5” TFT LCD, with 320x240 resolution, white backlight, touchscreen.
5-way touchpad: up, down, left, right, OK/power button
Dimensions: 100mm wide, 210mm tall, 42mm deep.
Weight: 0.75 kg(1.65lbs) without battery.
Battery weight: 250g
Enviromental:
Operating Temperature: 00C to 500C
Operating Humidity: 5% to 90% non condensing
Storage: -100C to 700C

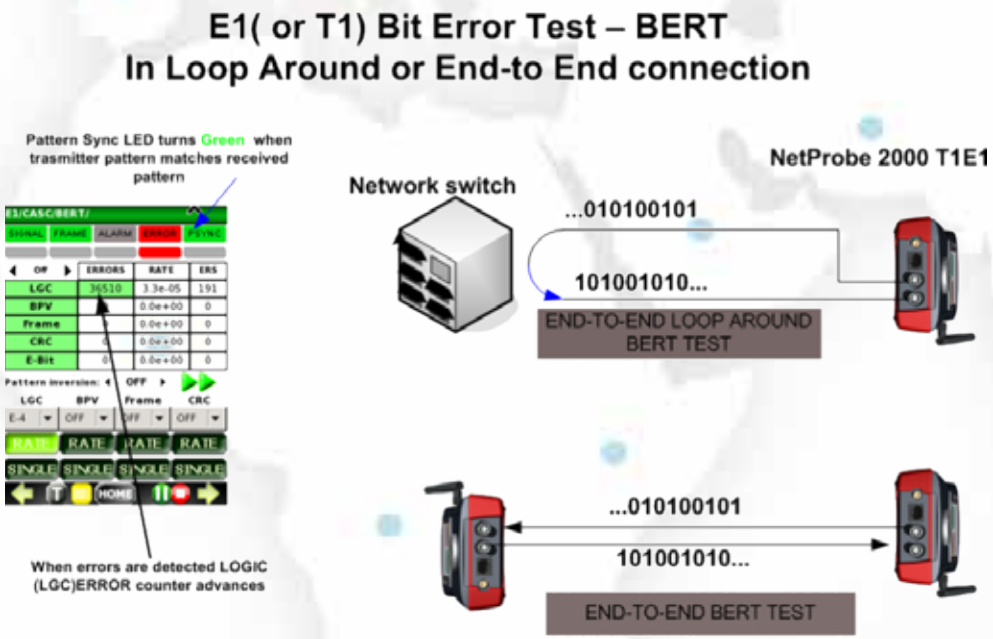
PDH Testing Tools

Key Features

- Supports T1, E1 testing
- Optional T3, E3, testing
- Combines legacy PDH/TDM interfaces with IP network testing in the smallest handheld available
- Full rate Wi-Fi access and optional test across 802.11 b/g/n/bluetooth
- Datacom DTE and DCE BERT testing on RS-232, RS-530, RS-449, V.35 and co-dir 64kb
- T1/E1 BERT, G.821, G,826, RFC 1406 and M.2100 analysis
- Histograms for errors and alarms
- Comprehensive test results, reporting and exporting via Email, FTP or USB flash drive.
- nx56/64kb round trip delay
- T1/E1 pulse mask verification
- VNC based remote control via LAN, WAN, Internet
- Remote control via Android phone ap

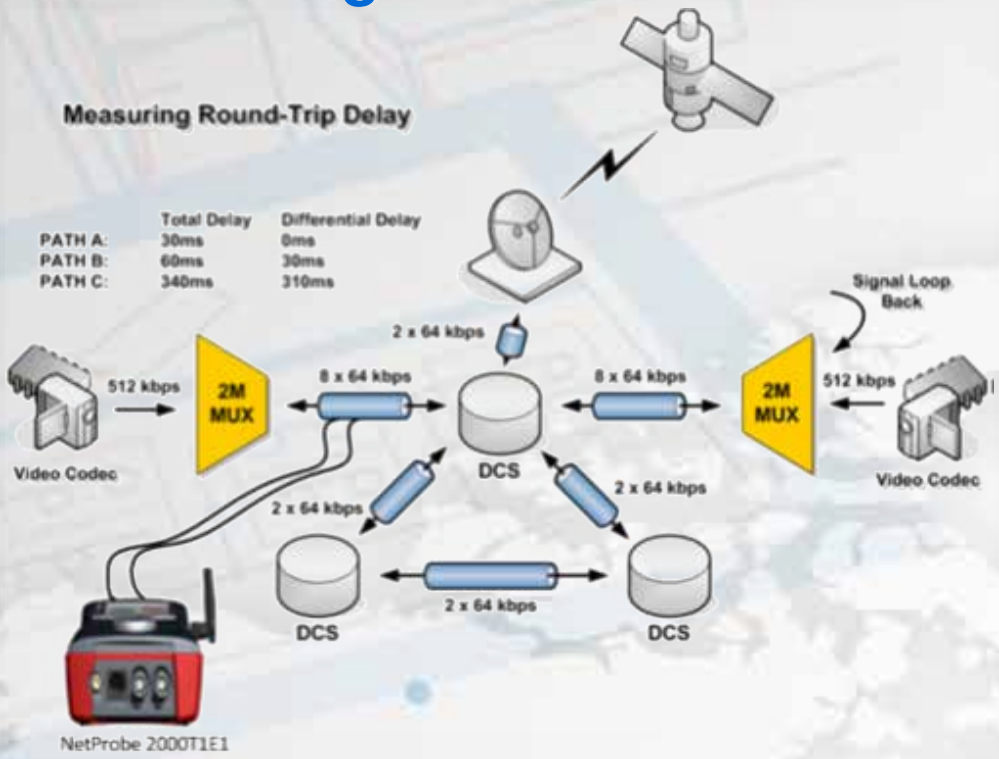
Applications Summary

- Circuit turn up and monitoring
- Physical layer testing of signal level, frequency, clock slips, and pulse mask analysis
- Frame layer errors and alarms monitoring and simulation
- BERT and fractional BERT testing end-to-end and looparound
- Offsetting trasmitter clock to stress receivers
- Data BERT testing via RS-232, RS-530, RS-449, V.35, X.21 or Co-dir interfaces
- Voice and data delay measurements

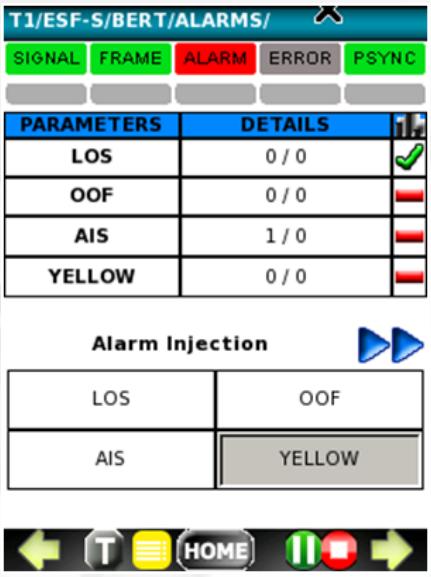


The primary function of the unit is to perform bit error tests with either end-to-end or loopback configuration.

PDH Testing Tools

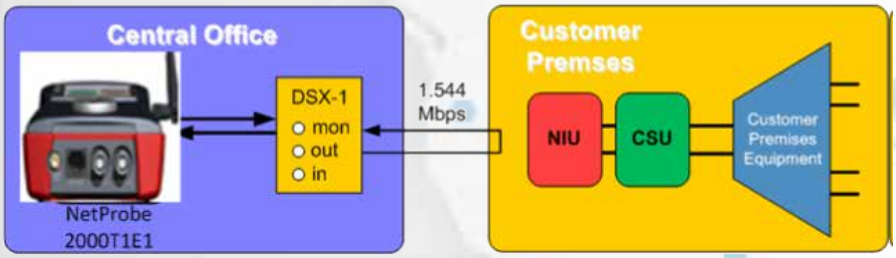


Propagation Delay test allows measuring voice and data delay in various parts of the network.



Major alarms are monitored continuously and any problems are reported. Alarm simulation allows injection of the specific alarm into the line.

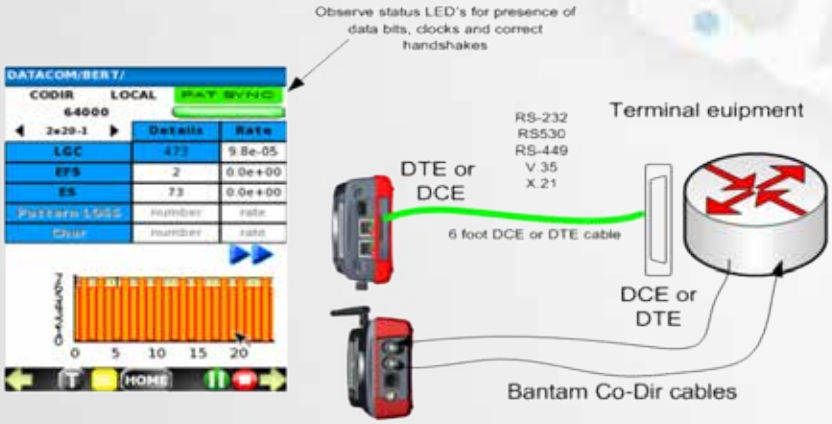
DS1 Service Acceptance



T1 CSU loop codes allow looping back the remote NIU or CSU to perform a loopback test.

Datacom Option

Data Port RS-232, RS-530, RS-449, V.35 or Bantam Co-dir 64KPS



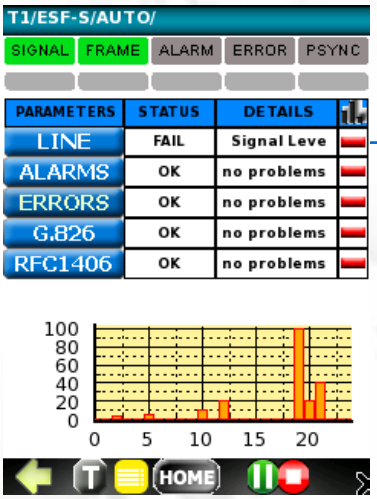
Datacom Bit Error Testing is performed via the dedicated cable type such as RS-232/530, V.35 or RS-449. The Co-dir test can also be accessed via Bantam connectors.

PDH Testing Tools

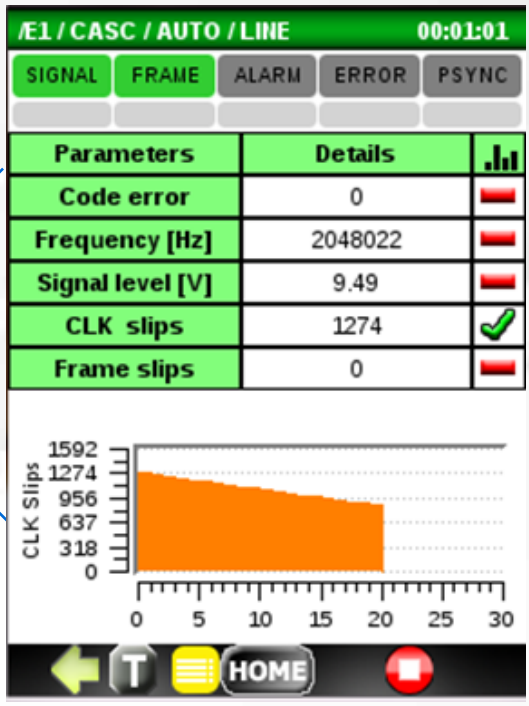
Auto Monitor test mode

Auto Monitor test mode allows automatic verification of multiple parameters for T1 and E1 line, alarms, G.826 and RFC 1406.

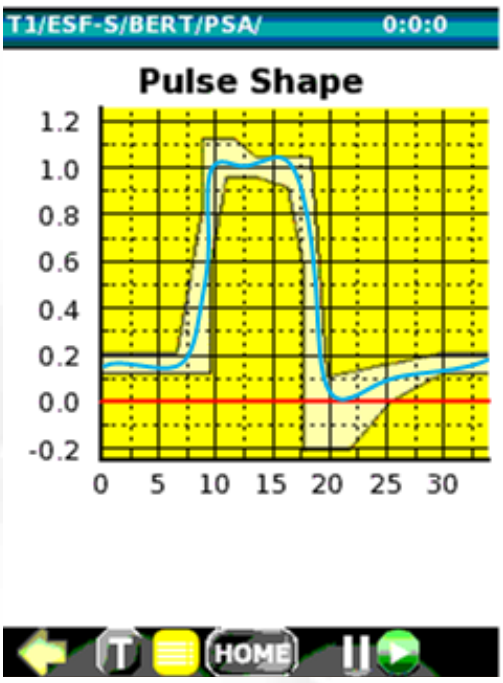
The report shows FAIL or OK. Results can be displayed as histograms.

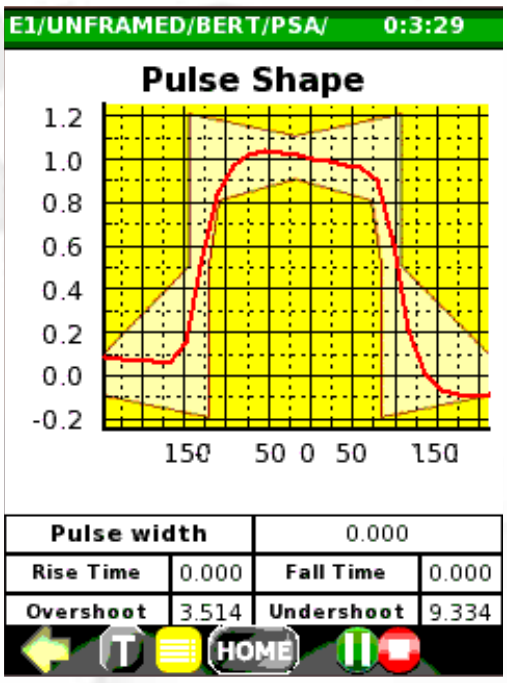


Example of Line Monitoring details



T1 and E1 Pulse Template





T1 and E1 pulse template analysis is performed automatically and reported graphically. Any issues with the pulse amplitude, width or shape are visible on the template.

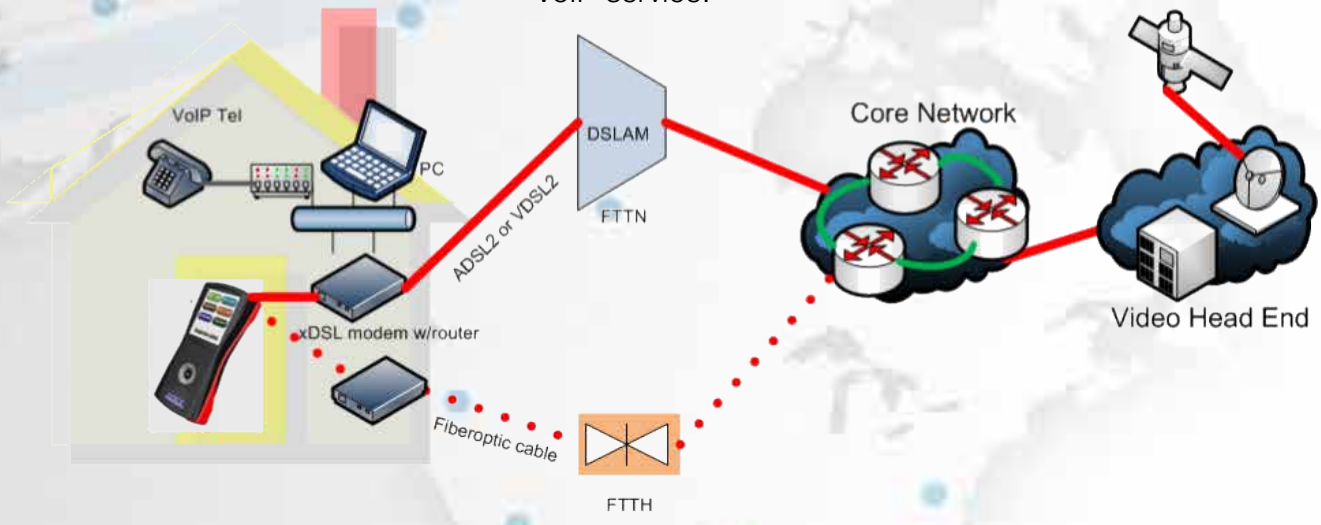
VoIP Testing

After entering the SIP-URL number and registration with the selected SIP Proxy Server, the VoIP phone is ready to dial or answer a SIP call.

Voice quality can be evaluated with MOS score.

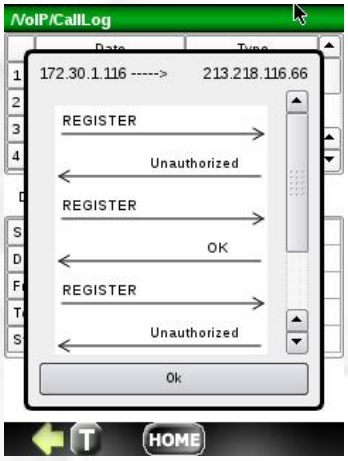
NP2000-VoIP option allows SIP controlled call origination and call answer. Microphone and speaker are provided in the included handset accessory.

The example below shows the NetProbe 2000 with VoIP option connected with the DSL modem, cable modem or GPON Gateway at the customer site to test or troubleshoot triple play VoIP service.



Adding a new VoIP account is simple and quick.

All originated and received calls are logged with Time and Type. Each call is identified by source and destination IP addresses and their url's.



SIP protocol handshake for each call can be displayed to locate problem or to confirm proper operation.

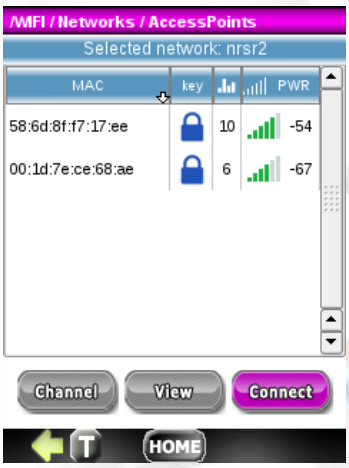
WiFi Testing

The NetProbe 2000 WiFi option supports IEEE 802.11 a/b/g/n/bluetooth for 2.4 GHz and 5 GHz bands.
It provides two applications:

- Wifi interface for the tester to access Ethernet network
- Wifi analyzer capable of detecting and testing of WiFi networks and access points.

All WiFi networks with a signal of at least –90dB are detected and categorized as encrypted and non-encrypted.
Encryption key types are identified:

No encryption |WEP key| WPA2-PSK| WPA-PSK



Each network shows its Access Point with number of frequencies used and their power level

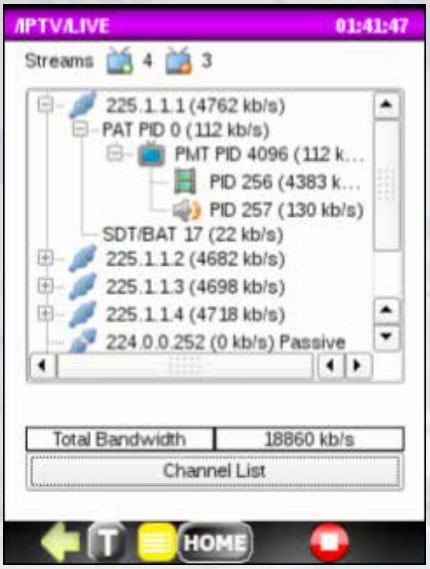
Once connection to the selected access points is established, a detailed description is available and an upper layer test is possible.

Indicates when a connection is completed

A ping test to google is ready to start.

IPTV Testing Tools

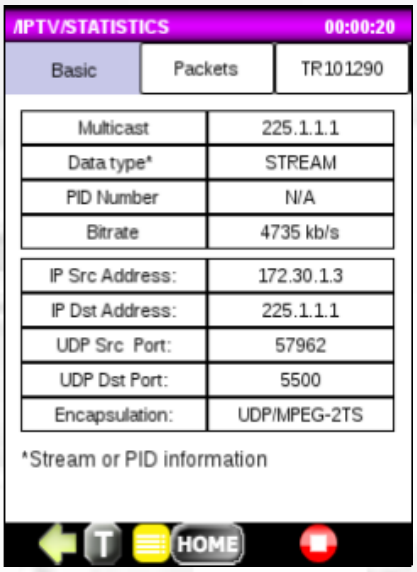
Set Top Box Emulation and Monitoring

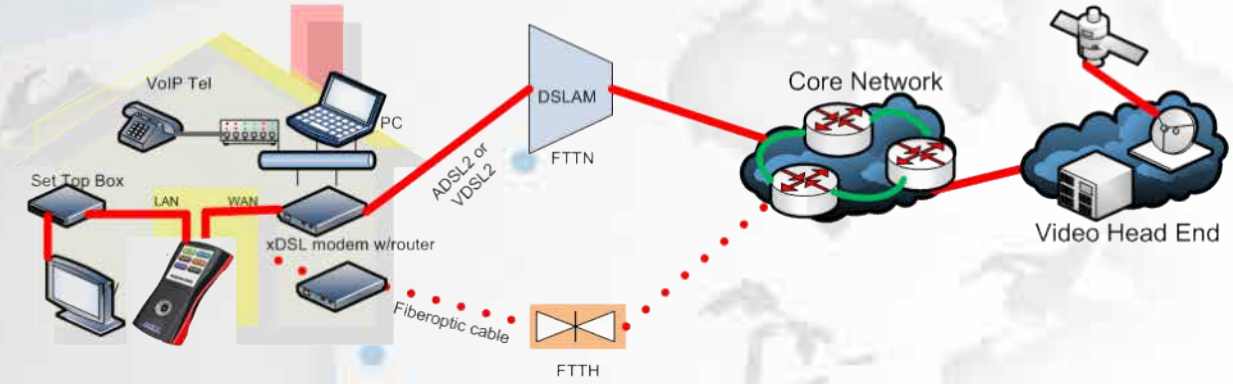


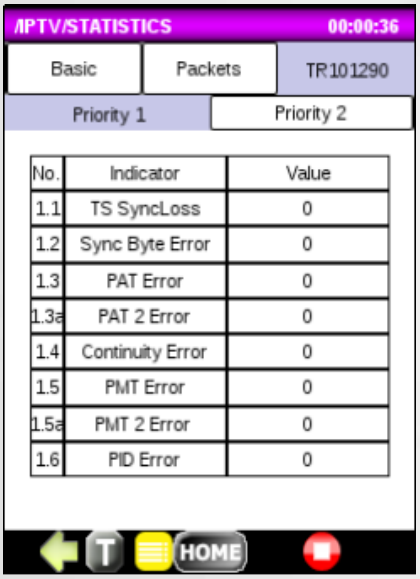
Set Top Box emulation with Channel List Manager.

Detected channels are shown on the tree with their PIDs.

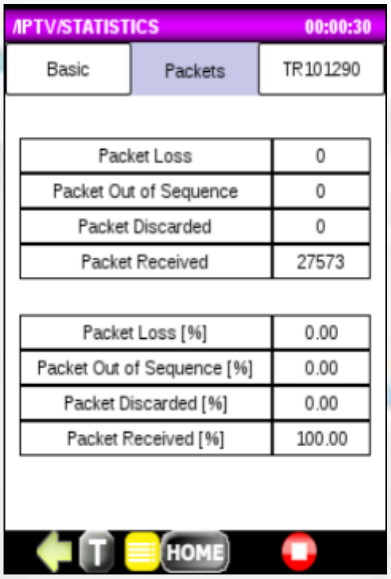
Example of Stream description



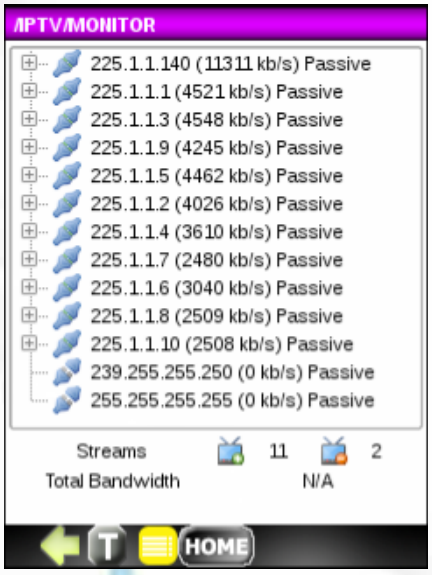




Example of Transport Metrics TR101290 Priority 1



Example of Packets Loss Metrics



Example of passively monitored channels

Technical Specifications

NP2000 GigE-BAS (Option):

Electrical Gigabit Interface
10/100/1000Base-T, RJ-45
Optical Gigabit Interface
SFP Duplex LC, field removable
Optical Power Measurement - Tx and Rx
SFP device ID and status
NP2000-ETH-BsSx
1000Base-SX
Transmitter
– Wavelength: 850 nm multi-mode
– Power: -9.5 dBm to -4 dBm
Receiver
– Wavelength: 770 nm to 860 nm
– Signal: -21 dBm to 0 dBm max
NP2000-ETH-BsLx
1000Base-LX
Transmitter
– Wavelength: 1310 nm single-mode
– Power: -9.5 dBm to -4 dBm
Receiver
– Wavelength: 1270 nm to 1600 nm
– Signal: -25.5 dBm to -3 dBm max
NP2000-ETH-BsZx
SA580-1550 (1000Base-ZX)
Transmitter
– Wavelength: 1550 nm single-mode
– Power: +3 dBm to -2 dBm
Receiver
– Wavelength: 1270 nm to 1570 nm
– Signal: -24 dBm to -3 dBm max

Wiremap

Open, short, crosstalk, length, impedance
Loopback
Manual, Layer 1,2,3

BERT

Single-ended test with loopback on the remote end
End-to-end testing with two sets
Layers: 1, 2, 3 and 4, VLAN (up to 2 tags), MPLS (up to 2 tags)

Test Patterns: all 0's,all 1's, 1:1,1:3, 2:2,5:32, 215-1,220-1,223-1, 231-1, user defined
Frame size: 64, 128, 256, 512, 1024,1536
Error Injection: Code, Bit, CRC, Single, Rate 10-1 to 10-8
Measurements:
start time, test duration,
Tx and Rx Line rate, Frame Cout, Bits Count, Bytes Count,
Tx and Rx Data Rates Current, Min, Max , Average, Tx and Rx Frame/sec Current, Min, Max Average
Rx Errors Current and Total Bit, BER, Code Rate, CRC, CRC Rate, Histograms of any
Alarms LOS, Link Down/time, Sync/time
Service Disruption (last, Min, Max, Average, Total, Times)

RFC 2544 Compliance

Layers: 2,3,4
Frames size (64,128,256,512,1024,1518 bytes)
Measure latency variation (jitter)
Throughout
Latency
Frame Loss
Burst
Single tester mode
Measurments:
Throughput: Frame size, Throughput %, Status
Latency: Frame size, Rate %, Latency (µsec), Status
Frame Loss: Frame size, Frame Loss%, Status
Burst: Frame size, Frame count, Status
Graphs for all

NP2000 GigE-ADV (Option):

Includes NP2000-GigE-BAS
Loopback
Automatic or manual, layer 1,2,3
RFC-2544 Compliance
Adds VLAN(up to 2 tags) and MPLS (up to 2 tags)
Adds user-defined frame size (48-9600 bytes)
Y.1564 Compliance
Service Configuration and Service Performance tests per ITU-T Y.1564 standard.
Up to 8 simultanous tests
Traffic Generation
Layer 1, Layer 2, or Layer 3 traffic
Configurable source and destination MAC address
Configurable 802.1q VLAN tag and 802.1p priority
Stacked VLAN: none, 1, 2 (Q-in-Q) .
Configurable source and destination IP address (IPv4)
Configurable IP header fields (ToS, TTL, Protocol, and Frame Offset) for QoS verification testing
Up to 8 traffic flows (MAC address, IP address, VLAN tag)
Test Patterns: all 0's,all 1's, 1:1,1:3, 2:2,5:32, 215-1,220-1,223-1, 231-1, user defined
Frame sizes: length 48 to 1522 bytes or Jumbo frame (up to 12 kbytes)
Frame rate 0% to 100% bandwidth utilization with steps of 1%
Traffic shaping: Constant, ramp, or burst
Error Injection: Bit, CRC, IP Checksum error and rate injection
Test duration
IP Tools
Ping over VLAN
Trace Route
FTP throughput
FTP measure the speed of download, upload
HTTP access
HTTP measure download speed

G.703 E1 INTERFACE (Option):

E1 RECEIVER:
Impedance: 120 or 75 Ohm
Connectors: BNC and RJ-45
Input Frequency: 2,048,000 Hz +/-300 ppm
Sensitivity: TERM +3 to -39 dBDSX, Bridged 0 to -30 dBDSX
DSX 0 to -26 dB resistive loss from nominal DSX level
Input Jitter Tolerance: Exceeds CCITT G.823

E1 TRANSMITTER:

Impedance: 120 or 75 Ohms software switchable with BNC and RJ-48 connectors

Technical Specifications - PDH, VoIP, Datacom, WiFi Testing

Output Level: 0+/-0.5 dBDSX
Output Clock: Internal oscillator 2,048 kHz+/- 5 ppm
External, 3000 Ohm TTL, SMA
Recovered from input signal

E1 GENERAL:

2048 kbs E1 Interface: Per CCITT G.703, G.704
Framing Modes: Auto, Unframed, CAS, CCS, CAS & CRC4, CCS& CRC4
Line Coding: HDB3, AMI
PCM Companding Law: u or A
Input/Output Connectors: BNC (or BANTAM), RJ-45
ALARM/STATUS LED's with history
Signal/Loss of Signal: green/red/off
Frame Sync/Loss of Frame: green/red/off
Alarm: red, combines the following alarms:
LOS - loss of signal
OOF - out of frame
AIS - E1 AIS alarm detected
RAI - remote Alarm detected
MFAIS - multiframe AIS alarm detected
MFRAI - red, multiframe remote alarm detected
Error: red, on whenever any error is present
Psync: green, pattern sync/pattern loss – green/off when sync is lost (No pattern sync)

E1 AUTO MONITOR:

Line: Code Error- bipolar violation of HDB3 or AMI
Frequency: Range 2200- 1800 hz, Resolution 1Hz, accuracy 5 ppm standard
Signal Level: +3 to -40 dbDSX,(0.06 to 8.5 Vp-p)
Clock Slips: +/- between E1 input and internal or external E1 clock
Frame Slips: clock slips /256
Alarms: LOS, OOF, AIS, RAI, MFAIS, MFRAI
Errors: Code, Frame, CRC, FEBE
G.826: ES, SES, ES RATIO, SES RATIO, AVS, UAVS,
RFC 1406: total sec, ES, SES, AVS, UAVS
M.2100: ES, SES, UAVS

E1 BERT (BIT ERROR TEST) FUNCTIONS:

ITU-T G.703, G.704 E1
Patterns: 2n-1, n =7,9,10,15,20,23, QRSS ,All Zero, All Ones, 1:3, 1:7, 1:15,1:31, Multipattern, Bridgetap, Inverted
Error Measurements: Logic Errors, Rate, ERS,
BPV Errors, Rate, ERS
Frame Errors, Rate, ERS
CRC Errors, Rate, ERS
E-bit Errors,Rate, ERS
G.821: EFS, ERS, SES, AVS, UAVS
Error Injection: types -Logic, BPV(Code), Frame,CRC rate - Single, Continuous Rate 10-1 to 10-9
Send Alarms: emulate LOS, OOF, AIS and Yellow(remote) alarms.
Alarm: red LED monitors the following alarms:
LOS - loss of signal
OOF - out of frame
AIS - E1 AIS alarm detected
RAI - remote Alarm detected
Loopbacks: Remote Looback, enables also through mode for line code and errors transparency
Local Loopback
FRACTIONAL E1:
Fractional N x 56/64 kb, n=1,.. ,31 access for Auto Moni tor or BERT tests.
NP2000-PSA - Pulse Shape Analysis:
samples and analyzes E1 pulse shape on the G.703 mask, displays or prints the plot.
NP-2000-PDL - Round trip propagation delay
Range: 0-2 sec
Resolution: 1 msec

DATACOM (Option):

Option NP2000-DATACOM
INTERFACES: V.24/RS-232, V.35, RS-530, G.703 CO-DIR via Hirose ST60-36 pin connector (cables are ordered seperately)
DATA RATE:
nx56/64kb/s, n=1 to 24 (32), variable frequency synthesizer 300 hz – 8 Mhz
G.703 Co-dir 64 kb/s
RS-232 - 300b/s to 115kb/s
V.35,V.36,RS-530-300b/s to 8 Mb/s
BERT test:
Patterns: 2n-1, n =7,9,10,15,20,23, QRSS ,All Zero, All Ones, 1:3, 1:7, 1:15,1:31, Multipattern, Bridgetap, Inverted
Error Measurements: Logic Errors, rate,
ERS, rate
ES, rate
Pattern Loss, Character errors

NP2000-WiFi (Option):

Radio interface: 802.11 b/g/n and Bluetooth. 2.4Ghz and 5 Ghz ranges.
List networks: signal level, security/encryption, # of APs in network, SSID name, type of network
List & locate access points: channel, signal level, AP name or MAC address, SSID name, security/encryption, type of network
AP authorization status and details
Connections test: associate with AP, request IP, Ping
Channel usage
Client details: signal level, AP MAC and name , channel, SSID, type
Locate clients
Requires external twist on antenna
External Antenna: up to 3 dB, dual band

NP2000 IPTV (Option):

Interfaces
10/100 Ethernet Port 1
10/100 Ethernet Port 2 allows pass thru mode up to 100mbps**
Encapsulation Supported
MPEG2-TS/UDP, MPEG2-TS/RTP/UDP
Encoding Type
Codec H.264, MPEG4-AVC
Modes of Connection
Termination and monitor
Maximum number of streams supported
Up to 40 mbps total bandwidth (average 3 terminate, 3 monitor)

Set Top Box Emulation
IGMP Multicast join&leave, IGMPv.2, IGMPv.3
RTSP/VoD join&leave
Quick Channel Scan (autotest)
IGMP Latency: time to join/leave

TR101290 Priority 1
- TS Sync Loss
- Sync Byte Error Count
- PAT Error Count
- PAT2 Error Count
- Continuity Error Count (same as Number of non-consecutive packets errors)
- PMT Error Count
- PMT2 Error Count
- PID Error Count

TR101290 Priority 2
- Transport Error Count
- CRC Error Count
- PCR Error Count
- PCR Repetition Error Count
- PCR Discontinuity Error Count
- PCR Accuracy Error Count
- PTS Error Count
- CAT Error Count

MPEG2-TS Packet Loss
- Number of Packets received
- Number of Packets lost
- Number of Packets Out Of Sequence
- Number of Packets Duplicated
- Packet Loss Ratio in %
- Out of sequence packet proportion (%)
- Duplicated packet proportion (%)

Jitter

Latency: packet to packet delay variation, max packet to packet delay variation
PCR Jitter
RTP packet Loss*
RTP packet loss count
RTP loss distance
RTP loss period
RTP OOS count
RTP headers errors count

QoS Quality of Service
- TQI Transport Quality Index (1-5)
- MDR Media DeliveryRate (packets/s)
- MLRM Media Loss Rate Max
- DF Delay Factor (ms)
- DFM Delay Factor Max

Audio MOS value: current, max, min
Video MOS value: current , max, min

Stream Information
- Stream Presence
- Video Resolution in pixels

Packet Size in Bytes
Video Bit Rate in kbps (speed, realtime)
Audio Bit Rate in kbps
Video Codec
Audio Codec
Encapsulation Protocol
Total Bandwidth Usage
GOP Type
GOP Length
SPTS Tree with PIDs (video, audio, data)
MPTS Tree with PIDs (video, audio, data)
TOS Type of Service
TTL Time to Live

Test Results and Configuration

Text & Histograms - save/export to USB as csv file (Excel compatible) and as pdf file.
Configurations include IPTV channel and port numbers

NP2000–VoIP (Option):

Originate and terminate SIP calls with headset
Displays the call status
Display the call history (received, dialed, missed)
Supports DNS, SIP registrations, SIP proxy, STUN
Capture, decode and analyze SIP signaling message
Measure call quality with MOS score.
Audio coding standards G.711m-law a/g, G.726, G.729

General:

Ethernet Interfaces: WAN 10/100/1000 Base-T, 1000 Base-X, LAN 10/1000 Base-T
External Interfaces: USB 2.0 OTG, microphone and ear phones (headset).
Wi-Fi Interface (optional): 802.11 b/g/n & Bluetooth for measurement and IP access.
Rechargeable Battery Pack: Li Ion battery pack, 7.2V, 4800mAh, 4-8 hours operating time.
External Power: AC/DC power converter outputs 12VDC at 2A, 110-240 VAC, 50-60 Hz.
Enclosure: Ruggedized ABS with rubber shell.
Display: 3.5” TFT LCD, with 320x240 resolution, white backlight, touchscreen.
Dimensions: 100mm wide, 210mm tall, 42mm deep.
Weight: 0.75 kg(1.65lbs) without battery.
Battery weight: 0.17 kg (6.2 oz.)
Enviromental: Operating Temperature: 00C to 500C
Operating Humidity: 5% to 90% non condensing

** This feature is not available if NP2000-GigE-xxx or NP2000-C37.94 options are not ordered

NETPROBE 2000

Multi-service Network and Telecom Analyzer

Select Starting Hardware Each starting hardware includes a main chassis with 3.5"TFT touch screen, Li-ION polymer battery, universal 110-250VAC adapter, micro USB cable adapter and carrying case. All options below are available.		Choose options
NetProbe 2000 GigE-BAS	Includes NP-2000-GigE-BAS option	
NetProbe 2000 PDH1	Includes NP-2000-T1 or NP-2000-E1 option	
NetProbe 2000 C37.94	Includes NP-2000-C37.94	
NetProbe 2000 IPTV	Includes NP-2000-IPTV	
Ethernet Test Options		
NP-2000-GigE-BAS	Basic Ethernet BERT/Loopback/RFC-2544, Wire Map and IP Tools. Includes CAT6 cable.	
NP-2000-GigE-ADV	Advanced Ethernet Multistream and Y.1564 Analysis (Requires NP2000-GigE-BAS)	
NP-2000-GigE-1588	IEEE 1588 Analysis. (Requires NP2000-GigE-ADV)	
IPTV, VoIP, WiFi Test Options		
NP-2000-WiFi	802.11b/g/n analysis including signal level, channel number, SSID, security and more.	
NP-2000-VoIP	VoIP (SIP) call origination and answer, SIP protocol flow, call log	
NP-2000-IPTV	STB emulation, monitoring, transport metrics, TR101290, packet loss statistics and more.	
PDH (T1/E1/T3/E3) Test Options		
NP-2000-T1	BERT/PDL/Pulse Mask, Autoscan, VF Analysis. RJ-45 and Bantam connection	
NP-2000-E1	BERT/PDL/Pulse Mask, Autoscan, VF Analysis. RJ-45 and Bantam connection. Coax avail.	
NP-2000-T3	BERT and Alarm Analysis, BNC connectors, Requires NP2000-T1 option.	
NP-2000-E3	BERT and Alarm Analysis, BNC connectors, Requires NP2000-E1 option.	
NP-2000-CODIR	64kbit G.703 CoDir, Bantam connectors, Datacom adaptor cable avail.	
IEEE C37.94 Test Options		
NP-2000-C37.94	C37.94 Analysis includes BERT/PDL, data monitoring, optical power. Includes 850nm MM SFP	
Datacom Test Options		
NP-2000-DATACOM	BERT analysis on RS-232, RS-530, RS-449, X.21 and V.35 circuits. (Requires NP-2000-T1/E1)	

Accessories

Optical Transceivers		
SFP-MM-850-C37	Duplex, LC, 2Mbps, 2km 850nm multi-mode	
SFP-MM-850	Duplex, LC, 1000Base-FX, 850nm multi-mode	
SFP-SM-1310	Duplex LC, 1000Base-SX, 1310 nm single-mode	
SFP-SM-1550	Duplex LC, 1000Base-SX, 1550 nm single-mode	
Cables and Test Leads		
NP2000-DCOM–232	DTE and DCE cables	
NP2000-DCOM–530	DTE and DCE cables	
NP2000-DCOM–449	DTE and DCE cables	
NP2000-DCOM–V35	DTE and DCE cables	
NP2000-DCOM–X21	DTE and DCE cables	
NP2000-CAT6	CAT6 cable, 6 foot	
Other Accessories		
NP2000-TPst	Spare touch panel pen – set of 3	
NP2000-BAT	Spare Li-Ion-Polymer battery pack	
NP2000-HDSET	Headset for VoIP or VF listen/talk or Internet Browser audio	
NP2000-ADPTR	110-250ACV Power adaptor	

	Warranty Options	
NP-MAINT1	1 Yr extended maintenance covers 2 Yrs hardware and software.	
NP-MAINT2	2 Yr extended maintenance covers 3 Yrs hardware and software.	

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