



Acterna HST-3000 Option for ADSL Services

ADSL is designed to carry a digital signal, over a copper pair, above the voice frequency band (20 KHz –1.1 MHz) to enable high speed internet service over a standard POTS line. This allows “always on” internet access while simultaneously providing voice service. Typical POTS line quality will normally support ADSL, but the DSL service must be tested when trouble strikes.

To troubleshoot DSL service, a modem emulation test set, such as the HST-3000, is needed. The DSLAM and network configuration is verified by connecting at the main distribution frame (MDF) where known interference and attenuation are minimal, as shown in Figure 1. The physical (ADSL) layer data rates and noise margins are reviewed to confirm that they match the service contract. Validate correct DSLAM and BRAS provisioning by connecting to the customer line and authenticating with the network through the DSLAM. The HST has an on-board browser to visually verify service, as well as “PING to URL” support for PING testing to simple URL addresses such as www.acterna.com.

Highlights

- All-in-One DSL tester
- Complete lightweight, web browser based toolkit replaces PC, DSL sync box, and copper tester
- Built-in 10/100BT Ethernet allows the HST-3000 to surf through the customer’s modem, isolate the PC or CPE, and isolate the customer’s modem in through-mode
- Modular hardware and software - configure for today, field upgrade tomorrow

Loop Testing

The next step involves testing from an access point such as the digital loop carrier (DLC), crossbox, pedestal, or network interface device (NID). Use the ADSL modem emulation to synchronize. If synchronization is achieved, verify data rates and noise margins as shown in figure 4. Lower than desired data rates and noise margins can have several causes: excessive attenuation, as a result of loop length or gauge changes; interference such as ISDN, HDSL, or AM radio signals; the presence of bridge taps or load coils; and physical faults such as shorts, grounds, opens, or wet sections. The copper test suite of the HST-3000 is used to sectionalize faults (see figure 1), then identify and locate the problem for repair. If you cannot synchronize, check for a load coil, an open or break on the pair or verify you are testing the correct pair. If there is no ADSL signal, a load coil or wrong pair is suspected. If the loop is verified to the NID, then any problems remaining are confined to in-house wiring or CPE (modem and PC). The advanced TDR function is used to look into the premise wiring for faults or bridge taps. If the copper tests clean, use the HST3000 to isolate the modem or PC/CPE equipment by replacing the PC with the HST in Ethernet TE mode. This isolates the CPE as the problem source. By fully utilizing the copper and ADSL capabilities of the HST-3000, a single technician can be dispatched to install, troubleshoot, and isolate ADSL service problems, eliminating repeat and duplicate truck rolls.

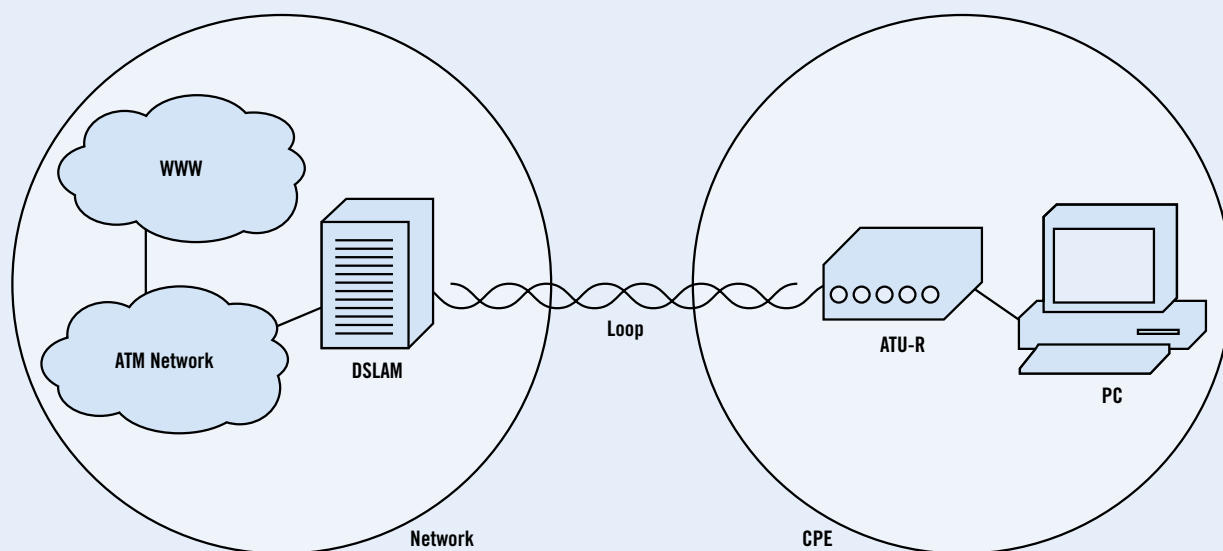


Figure 1. The HST-3000 quickly isolates your troubles: the network "IN", the loop "OUT" or the CPE.

Test the Copper, Test the Service, Improve the Process

Use the HST-3000 everywhere you need to quickly isolate your troubles: the network “IN”, the loop “OUT” or the CPE. The handheld, rugged and easy-to-use HST-3000 is ideal for field use. It is compact, rugged and can be used in almost all conditions, from inside the CO/Exchange to outside in moderate rain.

The HST is a modular platform, with software and hardware that is built-to-order, and is later upgradeable in the field with new modules and software as test needs change.

The HST-3000 boasts advanced scripting features to improve compliance with operator Methods and Procedures, through interactive, one-button auto-tests. These tests are fully customizable on a per-customer basis, to include pass-fail thresholds.

Acterna’s TechComplete™ software (optional) allows the HST-3000 to improve turn-up and maintenance processes. This is done by operating with service provider’s dispatch and closeout report systems to offload stored test results for later trend analysis and coaching reports. With these features, the HST-3000 can reduce repeat rates and failures and improve overall process efficiency.

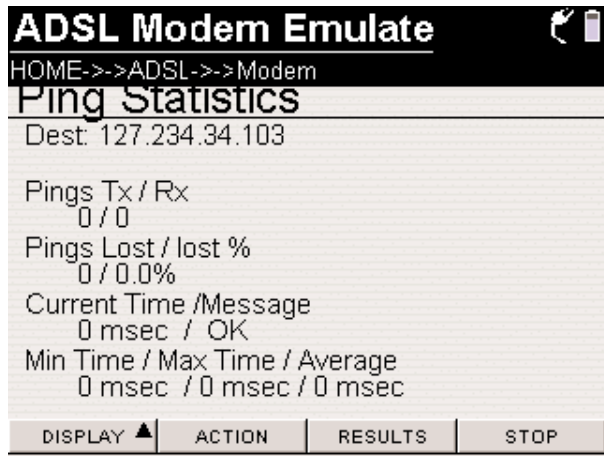


Figure 2. ADSL Ping Statistics

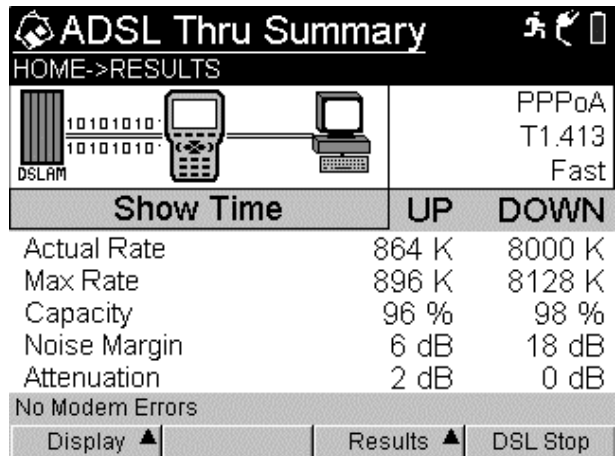


Figure 3. ADSL Show Time Results

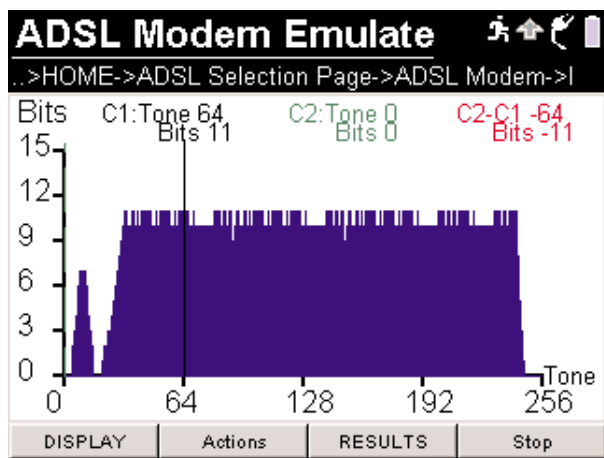


Figure 4. ADSL Modem Results

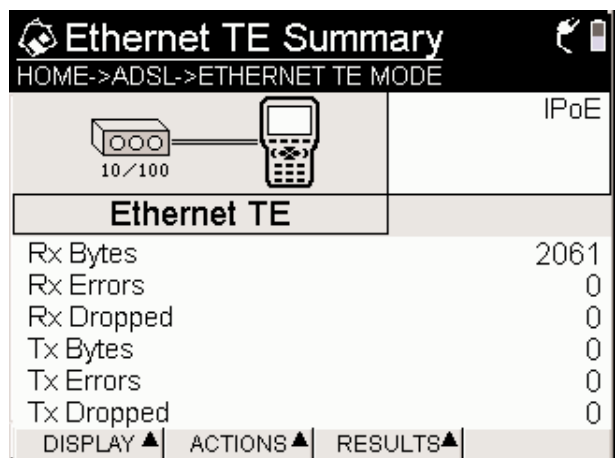


Figure 5. Ethernet Summary

Specifications:

ADSL General Specifications:

Standard compliance, ADSL over POTS modem:

- ITU-T G.992.1, Annex A (G.DMT)
- ITU-T G.992.2 (G.lite)
- ETSI ETR 328
- ANSI T1.413-1998 issue 2

Standard compliance, ADSL over ISDN modem:

- ITU-T G.992.1, Annex B

General settings:

- Switchable settings for Auto Sync, Trellis Coding and Echo Cancellation

Physical layer feature support:

- Actual and maximum bit rates
- Capacity (% of used bandwidth)
- Noise margin
- Attenuation
- Connection method
- Training time
- Number of syncs
- Interleave depths
- Coding gain
- Modem state

- Tx power
- Far Vendor ID, Revision, Name
- Event log
- Graphical display of BPT (bits per tone)
- Graphical display of SNR per tone

ADSL errors:

- LOS (loss of signal)
- SEF (severely erred frames)
- RS Corrected bytes
- CRC (cyclic redundancy check)
- OCD (out of cell delineaation)
- HEC (header error correction)
- NCD (no cell delineaation)
- Modem errors

PPP/IP Connectivity (IP Option):

- PPPoA, PPPoE, IPoA Terminate and Through
- Bridged Ethernet Terminate and Through
- Routing functions
- Ethernet TE
- Encapsulations

LLC SNAP, LLC, VC-MUX, HDLC

- Address Modes
- DHCP, IPCP, PAP, CHAP

- NAT, DNS

Data features (IP Option):

- IP Statistics Tx/Rx %, lost packets, packet delay
- Single or multiple PING
- Trace route analysis
- ATM OAM analysis

ATM statistics:

- Total RX/TX cells
- TX AAL 5 Frames
- RX AAL 5 Frames
- TX Dropped cells
- RX CRC errors
- RX AAL5 Length errors

- RX AAL5 Aborts
- Last unknown VPI/VCI

Ethernet statistics:

- RX/TX Bytes
- RX/TX Frames
- RX/TX Errors
- RX/TX dropped
- Collisions
- Optional FTP-Download feature
- Optional ON-BOARD WEB BROWSER

Type of SIMs:

- ATU-R modem for ADSL o POTS (Annex A)
- ATU-R/C modem for ADSL o POTS (Annex A)
- ATU-R modem for ADSL o ISDN (Annex B)
- ATU-R/C modem for ADSL o ISDN (Annex B)

Copper Measurement Specifications:

DVOM measurements:

AC Voltage	0 to 175 V RMS (1% +/- 0.5V)
DC Voltage	0 to 250 V RMS (1% +/- 0.5V)
DC Current	0 to 90 mΩ (1% +/- 0.5mA)
Resistance	0 – 99 MW
Resistance accuracy	0 to 9999 Ω (1% +/- 5 W) 10 kΩ to 99.9 kΩ (+/- 1%) 100 kΩ to 999 kΩ (+/- 3%) 1 MΩ to 9.9 MΩ (+/- 3%)

Leakage (test voltage 110V)	0 to 99 MΩ
Distance to short	distance calculation based on resistance, temperature and wire gauge

Opens measurement:

Displays the line capacitance or the calculated distance based on selected cable parameters	
Distance range	0 to 30 km (0 to 100 kft)
Accuracy	0 to 6 km (20 kft), +/- 2%

Noise and balance:

Longitudinal balance	28 to 99 dB
Noise (voice band, C filter/ psopho)	0 to 50 dBm (equivalent to -40 to -90 dBm)
Power (mains) influence	40 to 120 dBmC (equivalent to +30 to -50 dBm)

Generator:

Frequency range	200 Hz to 5 kHz (resolution 1 Hz)
Level range	0 to -20 dBm (resolution 1 dB)
Level accuracy	0.5 dB
Termination impedance	600 Ω or 900 Ω

Receiver:

Frequency range	200 Hz to 4 kHz (resolution 1 Hz)
Level range	+10 to -40 dBm (resolution 0.1 dB)
Level accuracy	0.5 dB
Termination impedance	600Ω or 900 Ω

Miscellaneous:

Load coil detection/ count	0 to 5 coils (< 9km/ 27 kft)
Caller ID	name, phone number, raw data
Phone feature	DTMF phone
TDR (optional):	
Short range TDR	0 to 700 m (2 kft)
Medium range TDR	150 to 3000 m (0.5 to 10 kft)
Long range TDR	3000 to 6000 m (10 to 20 kft)
Vp range (velocity of propagation)	0.300 to 1.000
Gain	X axis and Y axis
Graphical display	dual trace display an cursor operation for comparison with stored traces

Resistive Fault Location (optional):

Test methods	single pair and 2nd pair hookup
Fault identification	0 to 10 MΩ
Fault location accuracy	0 to 99 Ω, +/- 0.1% 99 to 999 Ω, +/- 0.2% 999 to 7000 Ω, +/- 0.25%
Results display	graphical strapping diagram

Wideband Transmission Impairments (optional):

Generator frequency range	10 kHz to 1.6 MHz
Generator level range	+5 to -20 dBm
Receiver frequency range	10 kHz to 1.6 MHz
Receiver level range	+10 to -70 dBm
Termination impedance	100W, 135W
Noise weighting filters	E, F, G, none (IEEE Std 743)
Wideband noise level	+10 to -70 dBm
Impulse noise counter	1 to 15 min or continuous
Impulse noise threshold	E filter: 35 to 100 dBm F filter: 40 to 100 dBm G filter: 45 to 100 dBm
Spectral measurements frequency	4Khz to 3.8MHz
Spectral measurements level	+10 to -70 dBm
On-screen display of PSD masks of common disturbers	

Physical specifications

Size	(H x W x D) 9.5 x 4.5 x 2.75 in, 24.13 cm x 11.43 cm x 6.99 cm
Weight	2.7 lb with battery, 1.23 kg
Operating temperature	22°F to 122°F, -6 C to 50 C
Storage temperature	-40°F to 150°F, -40 C to 66 C
Battery life	10 hrs. typical usage
Charging time	7 hours from full discharge to full charge
Operating humidity	10% to 80% relative humidity
Storage humidity	10% to 95% relative humidity
Display	1/4 VGA monochrome transfective, 3.8-in diagonal (readable in direct sunlight)

General

Ruggedness	Survives 3-ft drop to concrete on all sides
Water-resistance	Splashproof may be used in heavy rain
Multi-Language	English, German, French, Spanish, Italian
Keypad	Typical 12-button keyboard

Ordering information

Base units

HST-3000C	HST-3000C base with copper testing
	Requires the purchase of a SIM
	– see separate listing for HST3000-CAR (Ethernet and serial ports included)
HST-3000	HST-3000 base without copper testing
	Requires the purchase of a SIM
	– see separate listing for
HST-3000-AR	(Ethernet and serial ports included)

SIMS (Modules)

HST3000-4WLL	4 wire local loop
HST3000-T1	Dual Tx/Rx bantam T1 interface and T1 software option
HST3000-CT1	Dual T/R/G interface for copper Testing and Dual Tx/Rx bantam T1
HST3000-T3	Dual Tx/Rx bantam T1 interface, and dual Rx, single Tx BNC DS3 interface and DS3 software option
HST3000-BRI	ISDN BRI option
HST-ARCE	ADSL (ATU-R) option
HST-CAR	Copper (ATU-R) option
HST-CU	Dual T/R/G Interface to copper test option
HST-GSH	G.SHDSL option
HST3000-CuCE	Cu only SIM, CE mark
HST3000-CARCE	Cu & ATU-R (Annex A) SIM, CE mark
HST3000-ARCA	ATU-R/C dual mode SIM, AoPOTS
HST3000-CARCA	Cu & ATU-R/C dual mode SIM, AoPOTS
HST3000-ARB	Annex B ATU-R SIM
HST3000-CARB	Annex B Cu/ATU-R SIM
HST3000-ARCB	ATU-R/C dual mode SIM, AoISDN
HST3000-CARCB	Cu & ATU-R/C dual mode SIM, AoISDN
HST3000-CSHCE	G.SHDSL & Cu SIM
HST3000-BLK	Blank SIM

Software options

HST3000S-IP	Advanced IP suite – PING and through mode support
HST3000S-WEB	Web browser option
HST3000-WBTONES	WB TIMS option
HST3000-RFP	RFL option
HST3000S-VOIP	VoIP software
HST3000-FTP	FTP software option
HST3000-SCRIPT	Scripted test option
HST3000S-H.323	VoIP Signaling call contols for H.323
HST300S-SCCP	VoIP Signaling option for Cisco SCCP
HST3000S-SIP	VoIP Signaling option for SIP call control
HST3000-PCMSIG	Signaling (PCM) software option
HST3000-PCMTIMS	TIMS (PCM) software option
HST3000-T1DDS	DDS-T1 software option
HST3000-PRI	ISDN PRI software option
HST3000-SPE	Spectral Noise software option
HST3000S-MOS	MOS (Mean Opinion Score) Analysis option

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