



Acterna HST-3000 Option for ISDN BRI Services

As customers upgrade from POTS to BRI to take advantage of enhanced network services, they offer a significant revenue stream for service providers. But installing BRI is challenging. Not only is the installation more complex than POTS, but providers must struggle with reduced budgets, smaller workforces and tighter deadlines. To meet these challenges, an easy-to-use, versatile test solution is required that helps reduce failures and repeat rates while enhancing efficiency and ensuring consistent test practices.

The Acterna HST-3000 is a powerful and versatile handheld solution that tests ISDN BRI, as well as the copper plant, T1 and ISDN PRI. Hand-held, rugged and easy-to-use, the HST-3000 is ideal for field use. Its modular design provides a scalable, all-in-one solution for ISDN BRI testing, as well as thorough testing of the facilities over which it is provided.

Equipped with the ISDN BRI option, the HST-3000 is ideal for the installation and troubleshooting of ISDN BRI circuits. As a field tool, the HST-3000 can place or receive calls to verify switch translations. As a Central Office (CO) tool, technicians can verify pair assignments, service activation and service translations. The HST-3000 also offers an IDSL BERT mode to test B1, B1, 2B or 2B+D configurations to verify service before delivery to the customer.

Compact and rugged for field technicians, the HST-3000 can be used in all conditions, from inside an office environment to a noisy, wet outdoor span repeater. The HST-3000 also boasts automated setups and advanced features that ensure consistent adherence to service provider methods and procedures. Each HST-3000 is built to order and can easily be field-upgraded with new modules and software as application and technology needs change.

Highlights

- Emulation of the NT1, NT1/TE and TE for testing voice, 56/64K data and 3.1K audio call types on U interface
- U monitor capability allows bi-directional monitoring of in-service D-channel messages
- Auto SPID feature allows technicians to automatically assign SPID values
- Enables IDSL service pre-qualification with 128 K and 144 K BER testing
- Layer 1, 2 and 3 results, including plain English decodes of D-channel cause codes

Call Verification

The HST-3000 offers NT1/TE and LT modes for testing support at the customer premises or at the switch, respectively. At the customer premises, a technician can verify BRI service and SPID assignments by drawing dial tone. Service translations can then be verified by placing and receiving calls on the U interface. Up to two simultaneous calls can be made consisting of voice, 3.1k audio, 56k data or 64k data calls. At the CO, technicians can use the HST to verify cable pair assignments, identify line sealing current and polarity, as well as to verify service translations prior to service delivery. Manual or Auto SPID functionality gives technicians the flexibility to manually configure the SPID or automatically assign SPID values for single or dual calls. This allows for increased accuracy in testing and speeds service delivery to the customer.

The HST-3000 can prompt the user to manually or automatically accept or reject incoming calls. After a call has been accepted, the technician can either drop the received B-channel data to the speaker or headset or BERT the call. BER testing and a voice path, via a handset, is provided to qualify these data and voice calls.

In addition, the HST-3000 can be placed into an LT or NT mode and send or respond to EOC loopbacks, providing a method of testing the 2B1Q BRI signal quality on the BRI line. Testing in either mode, the unit can run a BERT test on either B-channel, both B-channels (2B) or the entire line (2B+D) using patterns such as 2047. This test verifies the U interface.

Easy-to-read result views allow technicians to view ISDN statistics, call status, BERT results, ISDN results and D-channel decodes. A summary screen displays “All Results OK” or a summary of errors. The unit presents Layer 1, 2 and 3 results including plain English decodes of D-channel.

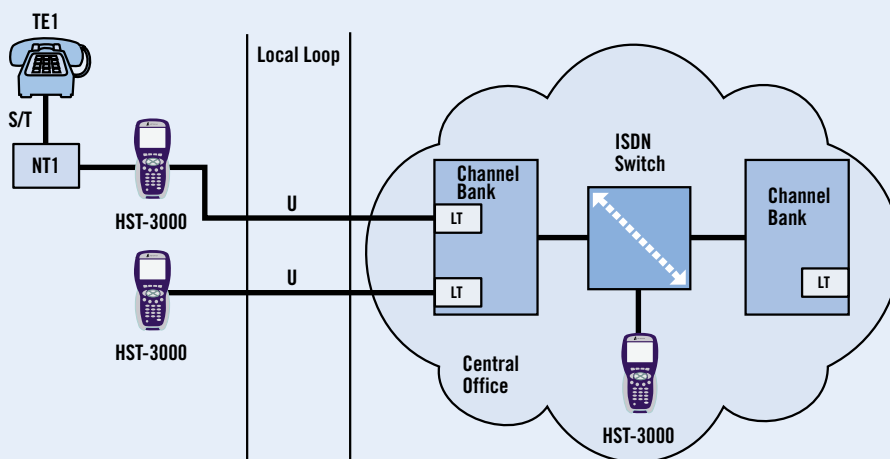


Figure 1: ISDN BRI testing

Troubleshooting

Non-intrusive bi-directional monitoring of in-service D-channel signaling messages make troubleshooting a new ISDN turn-up easier. For ISDN BRI circuits, the technician can access the D-channel on the U interface. If the problem can not be easily isolated at the customer premises or at the switch, then sectionalization can be accomplished by using the U-Monitor mode to monitor between the NT1 and LT devices. Used in tandem, the technician can sequentially replace each piece of premise equipment to identify the source of errors. Results can be displayed on-screen or stored for later retrieval and output via RS-232, USB or Ethernet connectivity – standard with each base unit.

D-Channel Decodes Analysis

D-channel decodes help to analyze such factors as call establishment status, uncompleted call and error message causes, and equipment “lock up” issues. The HST-3000 can monitor layer 2 (LAPD) and layer 3 (Q.931) cause code messages on the D-channel in both terminate and monitor modes. Layer 2 results give technicians the ability to check link and D-channel status, verify LAPD frames and check utilization rates. Following link establishment, Layer 3 decodes allow technicians to verify such factors as call state, who made or dropped the call, why the call was dropped, where the call is being carried (TEI) and call types.

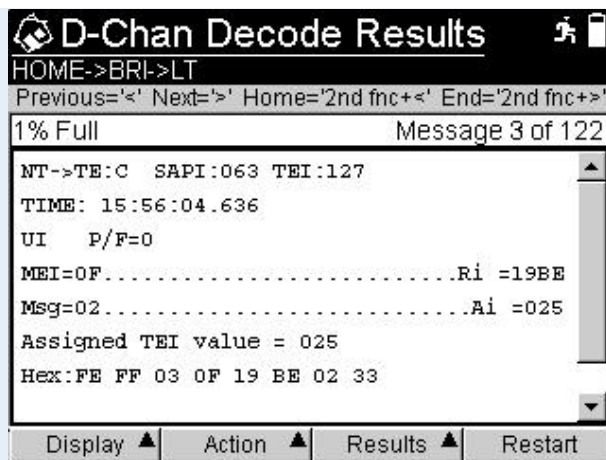


Figure 2. D-Channel Decode Results

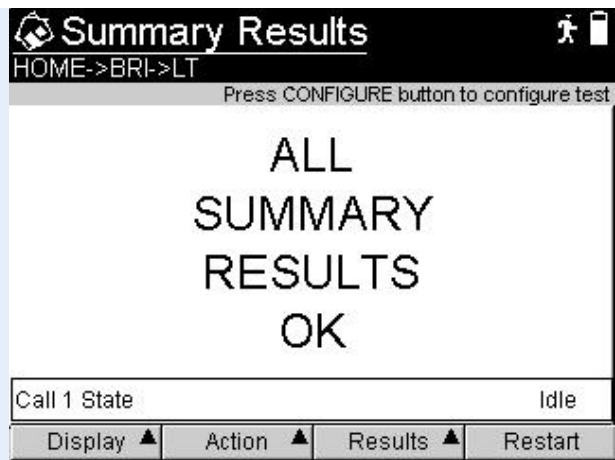


Figure 3. Summary Results

Test the Copper, Test the Service, Improve the Process

Equipped with the Copper Testing option, the HST-3000 can quickly troubleshoot the local loop for line impairments that degrade or impair ISDN BRI performance. With the HST-3000, technicians can quickly identify and locate cable impairments, including shorts, grounds, opens, crosses, bridged taps, wet sections and other high resistive faults. These impairments are easy to assess with the HST-3000's advanced time domain reflectometer (TDR), precision digital volt/ohm meter (DVOM) and an accurate resistive fault locator (RFL) to pinpoint troubles prior to circuit installation. The HST-3000 can also transmit and receive 40kHz wide-band tones and with impulse noise, background noise measurements confirm that noise and loss meet acceptable criteria. Copper test features are optimized for use anywhere on the local loop – at the NID, crossbox, pedestal, main distribution frame or anywhere a technician might gain access to the local loop to locate the source of trouble.

After the physical layer has been tested, the actual ISDN service can be tested by placing and receiving calls verifying proper switch translations. The 2-wire facility that carries the ISDN BRI service can be qualified by performing BER analysis with a number of patterns, such as 63, 511 and 2047.

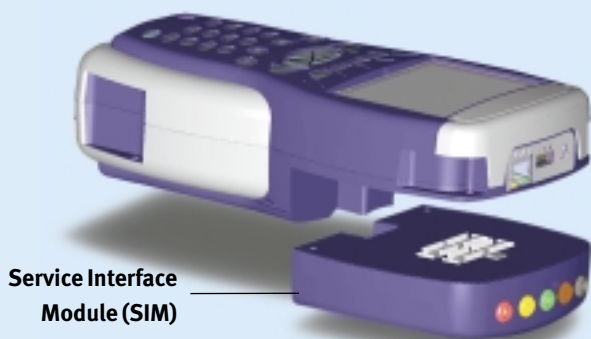
The HST-3000's pre-programmed tests and customized scripts ensure that all technicians, including novice users, follow the same procedures, eliminating mistakes caused by improper test configurations or incorrect procedures.

Acterna's TechComplete™ software (optional customized) 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.

Flexible and Rugged Design

The HST's rugged, weather resistant design and long battery life are ideally suited for use in the field. Its modularity allows for field upgrades to support new testing requirements. Standard Ethernet, USB and serial connections offer flexibility to easily download software and offload captured test data.

Easily configurable, the HST-3000 can be used by different technicians with different responsibilities to perform a wide number of tests. The HST-3000 is easily upgradeable with technologies and advanced options that support the changing needs of service installers.



Flexible, modular platform makes technology upgrades or hardware changes easy



*HST-3000 Handheld Services Tester
Actual Size: 9.5 x 4.5 x 2.75 in
Weight: 2.7 lb with battery*

Technical Specifications

Interfaces

U-interface	2-wire 8-pin modular
10/100 BT Ethernet jack	8-pin modular
Serial port	DB9 female via cable (DCE)
USB Host	
USB Device	

ISDN BRI specifications

Interface	U Interface with To LT and To NT Devices
Devices	NT1

Physical Configuration

Point to Point, Synchronous and Full-Duplex	
Bit Rate	160 kbps \pm 5ppm
User Data Rate	144 kbps \pm 5ppm
Line Coding	2B1Q
Maximum Voltage	\pm 2.5 V \pm 5%
Bits Per Frame	240
Bits User Data	216
Bits Overhead	24
Frames Per Second	666.66666...
Modes of Operation	NT1/TE LT Emulate U-Monitor (option)

Call Controls	5ESS per AT&T 5D5-900-321 NTI-F per NT NIS-S208 NATIONAL per Bellcore Documents for NI-1, NI-2, and NI-3
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Layer analysis

Layer 1 states	
Layer 2 (LAPD) states	
Layer 3 (call status) states	
Cause messages	
Loopbacks	
D-channel decode monitor (DB-9)	
D-channel message capture/LCD display/state	

Voice capability

Hands-free operation and Headset interface	
DTMF dialing	
B-channel selection	
Dual call capability	
Selectable call appearance	
Calling party ID	
Speed dialing (10, 30-digit numbers)	

Data capability

Circuit switched data calls	
Selectable for 56 kbps or 64 kbps	

ISDN testing

U Interface	
BERT	Single channel independent of call set-up
BER testing patterns	All ones, all zeros, 511, 2047, 2E15-1, 2E20-1, 2E23-1, programmable user pattern

Supporting PVC service testing	
IDSL BER testing at 128 kbps and 144 kbps	

Timed tests

Facilities testing

User-configured loopbacks	
Margin testing (dB Loss Pad selection) U interface	
Call appearance	
Auto SPID testing	

Physical specifications

Size (H x W x D)	9.5 x 4.5 x 2.75 in
Weight	2.7 lb with battery
Operating temperature	22°F to 122°F
Storage temperature	-40°F to 150°F
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 transreflective, 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
Language	English
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 or HST3000-CU (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-CAR or HST-3000-AR (Ethernet and serial ports included)

SIMS (Modules)

HST-3000-DDS	4 wire local loop
HST-3000-T1	Dual Tx/Rx bantam T1 interface and T1 software option
HST-3000-CT1	Dual T/R/G interface for copper Testing and Dual Tx/Rx bantam T1 Interface and T1 software option
HST-3000-T3	Dual Tx/Rx bantam T1 interface, and dual Rx, single Tx BNC DS3 interface and DS3 software option
HST-3000-BRI	U Interface with To LT and To NT and ISDN BRI software option

Software options

HST3000-TDR	TDR software option
HST3000-RFA	RFA/RFL software option
HST3000-WBTones	WB tones/TIMS software option
HST3000-VT100	VT100 option (Includes cable and software option)
HST3000-Script	Scripted testing software option
HST3000S-Web	Web browser software option
HST3000-PCMSIG	VF (PCM) signaling software option
HST3000-PCMTIMS	VF (PCM) TIMS software option
HST3000-T1DDS	T1 DDS software option
HST3000-PRI	ISDN PRI software option

Accessories

Test leads	Copper - 5 ft. banana plugs to alligator clips, T1 - bantam to bantam, bantam to 310 Weco, 8-pin modular to 6-pin modular, 8-pin modular, 8 pin modular to 2 clips, 8 pin modular to 4 clips
Charger Adapter	battery charger/adapter 120 VAC (50/60 Hz) input; 12 VDC (1 A) output
Soft Cover	Form fitting nylon glove for test set and leads
Carrying Case	Heavy duty, nylon case for test set, extra SIMs, accessories, and cables
Battery	Lithium ion
41084	T1 repeater power supply
43141	repeater power supply multiplexer
44116	HDSL doubler power supply
44527	HDSL remote access shelf
41157	Repeater extender

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Acterna is the world's largest provider of communications test solutions for telecommunications and cable network operators. A trusted communications test partner for more than eight decades, Acterna offers an unmatched portfolio of award-winning instruments, systems, software and services that help its customers reduce network costs while improving performance and reliability. Headquartered in Germantown, Maryland, USA – with European and Asia-Pacific operations based in Eningen, Germany and Hong Kong – Acterna serves nearly every major communications service provider and equipment manufacturer around the world through a skilled sales and support organization in 31 countries.

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