

HST-3000

ISDN BRI Service Interface Module (SIM)



Key Features

- 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

The HST-3000 is a powerful and versatile handheld solution that tests ISDN BRI, copper, 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 testing ISDN BRI, as well as thorough testing of the facilities over which it is provided.

ISDN BRI provides enhanced network services to many residential and small business customers as well as a significant revenue stream for service providers. Not only is installation and maintenance of ISDN BRI more complex than POTS, but providers are often struggling daily to meet tighter deadlines with reduced budgets and smaller workforces. To meet these challenges, an easy-to-use, versatile test solution is required that helps reduce failures and repeat troubles while improving efficiency.

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.



Call Verification

The HST-3000 offers NT1/TE and LT modes for testing support at the customer premises or switch. 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 provides prompting to the user for manual response (acceptance/rejection) to incoming calls. It can also be set to 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 LT or NT mode to send or respond to EOC loop backs, providing a method of testing the 2B1Q BRI signal quality on the BRI line. Testing in either mode, the user can then conduct BER testing 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.

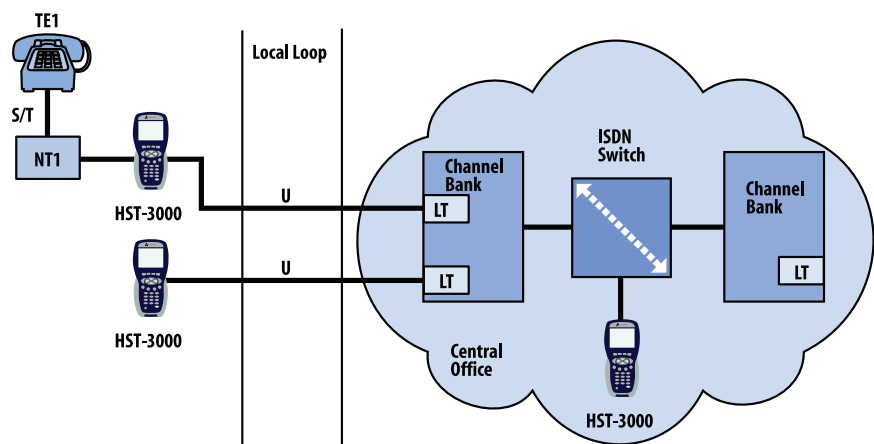


Figure 1. ISDN BRI testing

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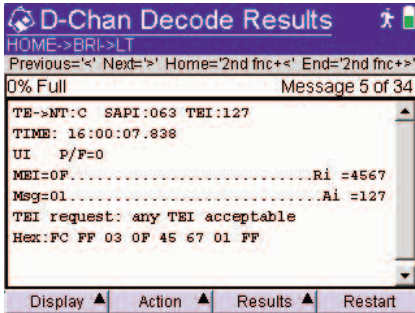


Figure 2. D-Channel Decode Results

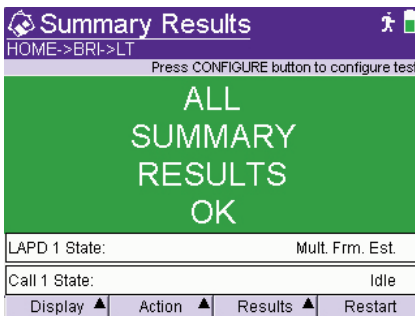


Figure 3. Summary Results

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.

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 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 wideband 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.

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.

JDSU'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-3000 incorporates a rugged, weather-resistant design and long battery life that 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



Service Interface Module (SIM)

Specifications

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 | NT1 |
| Physical Configuration | Point to Point, Synchronous and Full-Duplex |
| Bit Rate | 160 kbps ± 5 ppm |
| User Data Rate | 144 kbps ± 5 ppm |
| Line Coding | 2B1Q |
| Maximum Voltage | ± 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

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|----------------------------------------------------------|
| SESS per AT&T SD5-900-321 |
| NTI-F per NT NIS-S208 |
| NATIONAL per Bellcore Documents for NI-1, NI-2, and NI-3 |

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

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|--------------------------------------------|
| 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

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|-----------------------------------|
| Circuit switched data calls |
| Selectable for 56 kbps or 64 kbps |

ISDN Testing

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|-------------------------------------------|-----------------------------------------------------------------------------------|
| 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

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

Physical Specifications

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|-----------------------|------------------------------------------------------------------------------------------|
| Size (h x w x d) | 9.5 x 4.5 x 2.75 in. (241 x 114 x 70 mm) |
| Weight (with battery) | 2.7 lbs. (1.23 kg) |
| Operating temperature | 22° F to 122° F (5.5° C to 50° C) |
| Storage temperature | -40° F to 150° F (-40° C to 65.5° C) |
| Battery life | 10 hrs. typical usage |
| Charging time | 7 hrs. from full discharge to full charge |
| Operating humidity | 10% to 80% relative humidity |
| Storage humidity | 10% to 95% relative humidity |
| Display | 3.8" diagonal, 1/4 VGA, Color Active Matrix with backlight (readable in direct sunlight) |
| | General Specifications |
| Ruggedness | Survives 3 feet (91 cm) drop to concrete on all sides |
| Water-resistant | Splashproof (may be used in heavy rain) |
| Languages | English, German, French, Spanish, Italian, Chinese, Turkish |
| Keypad | Typical 12-button keyboard |

Specifications

Ordering Information

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|----------------|-------------------------------------------------|
| HST3000-NG | HST-3000 Mainframe without Copper (Color) |
| HST3000-NG-BW | HST-3000 Mainframe without Copper Testing (B&W) |
| HST3000C-NG | HST-3000 Copper Mainframe (Color) |
| HST3000C-NG-BW | HST-3000 Copper Mainframe (B&W) |

Available SIMS (Modules)

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|------------------|---------------------------------------------|
| HST3000-4WLL | 4-Wire Local Loop SIM |
| HST3000-AR2A-TI | ADSL2+ TI (ATU-R, Annex A) SIM |
| HST3000-AR2A | ADSL1/2/2+ (ATU-R, Annex A) SIM |
| HST3000-AR2B | ADSL1/2/2+ (ATU-R, Annex B) SIM |
| HST3000-AR2B-TI | ADSL2+ TI (ATU-R, Annex B) SIM |
| HST3000-ARB | Annex B ATU-R SIM |
| HST3000-ARCA | ATU-R/C Dual Mode SIM, AoPOTS SIM |
| HST3000-ARCB | ATU-R/C Dual Mode SIM, AoISDN SIM |
| HST3000-ARCE | ADSL (ATU-R) SIM |
| HST3000-BLK | Blank SIM |
| HST-BRA | ETSI (Euro) ISDN BRA SIM |
| HST3000-BRI | ISDN BRI SIM |
| HST3000-CAR | Copper (ATU-R) SIM |
| HST3000-CAR2A | ADSL1/2/2+ with Copper (ATU-R, Annex A) SIM |
| HST3000-CAR2A-TI | Copper, ADSL2+ TI (ATU-R, Annex A) SIM |
| HST3000-CAR2B | ADSL1/2/2+ with Copper (ATU-R, Annex B) SIM |
| HST3000-CAR2B-TI | Copper, ADSL2+ TI (ATU-R, Annex B) SIM |
| HST3000-CARB | Annex B Copper/ATU-R SIM |
| HST3000-CARCA | Copper and ATU-R/C Dual Mode SIM, AoPOTS |

| | |
|------------------------|-------------------------------------------------------------------------------------|
| HST3000-CARCB | Copper and ATU-R/C Dual Mode SIM, AoISDN |
| HST3000-CARCE | Copper and ATU-R (Annex A) SIM, CE Marked |
| HST3000-CSHHV | G.SHDSL, 380V SPAN, DVOM SIM |
| HST3000-CSH4 | Copper, 4-Wire G.SHDSL (STU-R/C, Annex A/B) SIM |
| HST3000-CSHCE | G.SHDSL and Copper SIM |
| HST3000-CT1 | T1 and Copper SIM |
| HST3000-CU | Dual T/R/G Interface to Copper Test SIM |
| HST3000-CUCE | Copper only SIM, CE Marked SIM |
| HST3000-CUVDSL-CNXT | VDSL and Copper with Connexant Chipset SIM |
| HST3000-CUVDSL-IK | VDSL and Copper with Ikanos Chipset SIM |
| HST3000-CUVDSL-INF | VDSL and Copper with Infineon Aware Chipset SIM |
| HST3000-DC | Datacom SIM |
| HST3000-E1 | E1 SIM |
| HST3000-E1-DC | E1/Datacom SIM |
| HST3000-ETH | 10/100/1000 Ethernet SIM |
| HST-GSH | G.SHDSL SIM |
| HST3000-GSHCE | 2-Wire G.SHDSL SIM |
| HST3000-T1 | Dual TX/RX Bantam T1 Interface and T1 SIM |
| HST3000-T3 | Dual TX/RX Bantam T1 Interface, and Dual RX/Single TX BNC DS3 Interface/and DS3 SIM |
| HST3000-VDSL-CNXT | VDSL with Connexant Chipset SIM |
| HST-3000-VDSL-CNXT-WB2 | VDSL and Copper (up to 30 MHz) with Connexant Chipset SIM |
| HST3000-VDSL-IK | VDSL with Ikanos Chipset SIM |
| HST-3000-VDSL-IK-WB2 | VDSL and Copper (up to 30 MHz) with Ikanos Chipset SIM |
| HST3000-VDSL-INF | VDSL with Infineon Aware Chipset SIM |
| HST-3000-VDSL-INF-WB2 | VDSL and Copper (up to 30 MHz) with Infineon Aware Chipset SIM |
| HST3000-WB2 | Wide Band 2 (up to 30 MHz) Copper Test SIM |

Specifications

Software Options

| | | | |
|-------------------|-----------------------------------------------|-------------------|-------------------------------------------------------------------|
| HST3000-BLUETOOTH | Bluetooth Wireless Software Option | HST3000-TxIMP | Transmission Impairments Software Option |
| HST3000-DSL2 | ADSL2 and ADSL2+ Software Option | HST3000-UNISTIM | VoIP Signaling Call Controls for UNISTIM Software Option |
| HST3000-FR | Frame Relay Software Option | HST3000-VT100 | VT100 Emulation Software Option |
| HST3000-FTP | FTP Software Option | HST3000-WBTONES | WB TMS Software Option |
| HST3000-IPV6 | IPv6 Software Option | HST3000S-H.323 | H.323 VoIP Signaling Software Option |
| HST3000-MPLS | MPLS Software Option | HST3000S-IP | Advanced IP Suite – PING and Through Mode Support Software Option |
| HST3000-MSTR | Multiple Streams Software Option | HST3000S-IP-Video | IP Video Analysis Software Option |
| HST3000-MSTV | Microsoft IPTV Video Analysis Software Option | HST3000S-MGCP | SCCP MGCP VoIP Signaling Software Option |
| HST3000-OPTETH | Optical Ethernet Software Option | HST3000S-MOS | VoIP Mean Opinion Score Software Option |
| HST3000-PCMSIG | Signalling (PCM) Software Option | HST3000S-SCCP | SCCP VoIP Signaling Software Option |
| HST3000-PCMTIMS | TIMS (PCM) Software Option | HST3000S-SIP | SIP VoIP Signaling Software Option |
| HST3000-PRI | ISDN PRI Software Option (NC Standard) | HST3000S-VMOS | Video MOS Analysis Software Option |
| HST3000-PS | Pulse Shape Software Option | HST3000S-VOIP | VoIP Software Analysis Software Option |
| HST3000-REMOP | Remote Operation Software Option | HST3000S-WEB | Web Browser Software Option |
| HST3000-RFL | RFL Software Option | | |
| HST3000-SCRIPT | Scripted Test Software Option | | |
| HST3000-SPE | Spectral Noise Software Option | | |
| HST3000-ST | Basic Rate ISDN S/T (ANSI) Software Option | | |
| HST3000-T1DDS | DDS-T1 Software Option | | |
| HST3000-TCPUDP | TCP/UDP Software Option | | |
| HST3000-TDR | TDR Software Option | | |

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