

HST-3000

Wireless Services Applications



Key Features

- Isolate and troubleshoot physical layer troubles from RF problems
- DS1 signal analysis and BER testing with standard and advanced stress patterns
- DS3 signal analysis and BER testing with patterns for both M13 and C-bit framing
- Dual DS1 receivers and transmitters for in-service monitoring as well as drop-and-insert and head-to-head testing
- Dual DS3 receivers for bi-directional monitoring
- Accurately measure frequency and signal level to ensure optimal T1 and T3 circuit performance
- Compact, lightweight, and scalable tool that is ideal for the needs of the wireless field technician
- Water resistant to withstand nature's elements
- Traditional T-BERD with innovative copper applications

The wireless market has become extremely competitive, making it crucial for providers to offer the best service and the broadest coverage area. The public relies heavily on their cellular devices for voice and new data applications, including text messaging, e-mail, the Internet, and digital photography. Often, customers will not tolerate noisy signals, dropped calls, or busy lines. There is a constant threat of losing customers; the pressure on the wireless provider to maintain an error-free and reliable network has become enormous.

Continued explosive growth in the demand for next generation wireless services is driving increased deployment of base stations and land lines. This growth has led to an increased requirement for accurate and reliable test solutions ensuring proper installation and maintenance of services. The ability to quickly and accurately diagnose and isolate network problems is key to a successful business.

The HST-3000 is a test solution that addresses the need to reduce failures, repeat rates, and kickbacks—especially for leased lines.

The HST-3000's ruggedness, versatility, and portability make it the ideal instrument for wireless technicians in the field to test T1/T3 with advanced stress patterns, T1 autotests, and VT100 emulation. Specifically designed for the outdoor field technician, the HST-3000 can be built to order and can quickly and easily be upgraded with new modules as application and technology needs change.

Wireless technicians use the HST-3000 to qualify and troubleshoot the circuit. They can also use the T1/T3 test features to bit error rate test (BERT) the line and to measure frequency and signal level on the circuit under test. Technicians can quickly qualify networks for accurate operation with dual transmitter and receiver T1 interfaces and with dual DS3 receivers. With advanced copper test capabilities, the HST-3000 can detect and identify copper loop problems, resolving finger-pointing issues on leased lines from the LEC.

Programmed with highly integrated applications for in-service and out-of-service testing, the HST-3000 examines both the pipeline and service levels to ensure that your network is performing properly.



DS1 Physical Layer Testing

The best way to test the network is to monitor the traffic at the T1 interface with an in-service test at the base transceiver station or cell tower, the base station controller, or the mobile switching center. The HST-3000 helps to ensure the proper performance of network connections to your base stations by performing signal, alarm, and timing tests together with BERT analysis.

The HST-3000's ability to monitor and perform BER testing in both directions of a circuit simultaneously streamlines the identification and isolation of circuit problems from faulty network equipment. Troubles within the network can be further sectionalized using standard or user-programmable loop codes to loop-back network equipment and to locate faulty repeaters. Advanced timing analysis also helps technicians pinpoint signal delays, timing slips, and mismatches between switch and remote equipment.

Locating problems in your network is especially important if the lines are leased and finger-pointing issues need to be resolved. By verifying accurate transmission to the base transceiver station or cell tower, the technician can sectionalize troubles and pinpoint RF problems from your base station to mobile devices.

DS3 Physical Layer Testing

The HST-3000 provides a comprehensive DS3 testing capability to ensure that the circuit is functioning properly and to confirm that the line is clean. Evaluation of BER test results, frequency, and signal level helps identify potential sources of problems such as faulty or loose cable crimps, improper line build out, or miss-optional or faulty network equipment.

The HST-3000 allows you to qualify DS3 circuits with an array of BER testing patterns for both M13 and C-bit framing. It also supports the verification of frame synchronization on the circuit. For more comprehensive and flexible testing, you can insert test patterns or tones on single, multiple, or all DS1 channels within the DS3 circuit. The HST-3000 DS3 BER testing measurements include:

- DS3 FEAC loopback codes
- Advanced stress patterns
- Signal level and frequency
- Insertion of logic and frame errors

Easy-to-read result menus allow technicians to view physical layer measurements, BERT results, parity errors, FEBEs, and alarm conditions. Additionally, the summary screen provides a rapid assessment of overall test performance.

Straightaway Testing

Straightaway testing is useful in isolating problems between the base stations and the mobile switching center. A known test pattern can be simultaneously transmitted in each direction between the HST-3000 and network test equipment, providing for easier sectionalization of network and equipment troubles. Looping up a CSU, which only requires one test set, can also verify your T1/T3 circuit.

End-to-End Testing

If problems still exist after running straightaway or loopback testing, it is possible that errors were introduced by another providers' network. Testing through to the far end can determine if the problem is outside the immediate network. By using a pair of HST-3000s at either end of the line, end-to-end testing of the network using both straightaway and loopback tests will isolate the trouble.

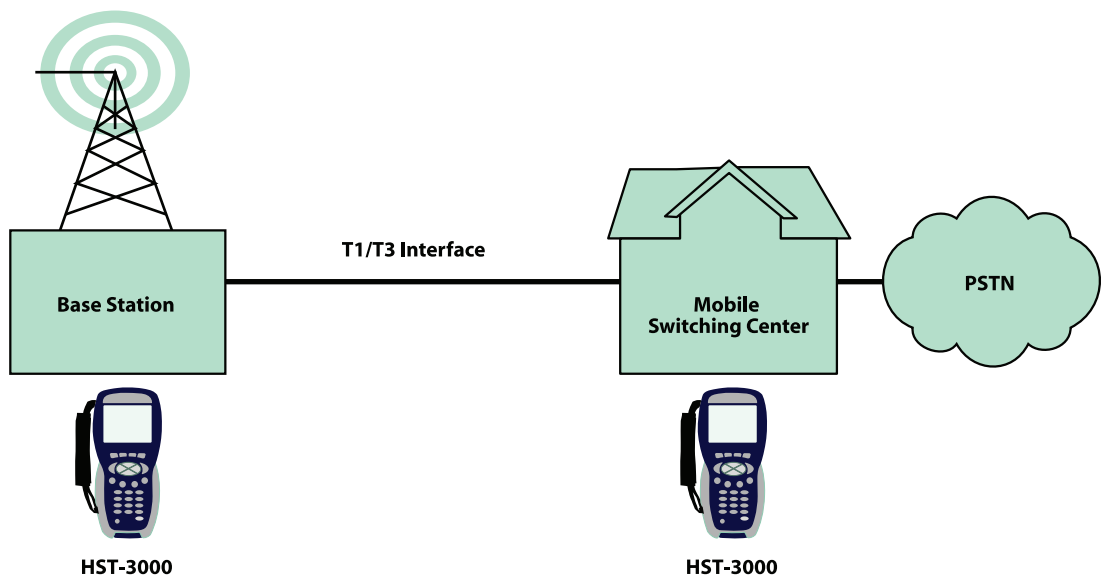


figure 1: HST-3000 testing in the wireless network

VT100 Emulation

With the HST-3000 VT100 Emulation feature, technicians can access T1 and HDSL network equipment for configuration, performance data measurements, and loopback capabilities without having to carry a PC or laptop into the field.

T1 Autotest

The HST-3000 standard T1 Autotest allows technicians to select a series of BERT patterns and the time duration for each pattern. All standard and advanced T1 patterns are available to choose from, giving the user a lot of flexibility. Results are easily saved and can be associated with a work order ticket.

Saved Results

Hundreds of results can be saved on the HST-3000 and can then be exported directly to a printer or to a PC via serial or Ethernet connections. The results files can then be e-mailed, printed, or saved on a PC. The HST-3000 file manager also allows the technician to view previously saved test information on the test instrument.

Copper Plant Testing

The HST-3000 copper features enable wireless technicians to quickly troubleshoot their T1/T3 copper lines for faults and conditions that can degrade the service. This option can locate physical plant impairments proving to leased-line providers that problems exist on the cable. The HST-3000 has an advanced time domain reflectometer (TDR), precision digital volt/ohm meter (DVOM), and an accurate resistive fault locator (RFL) to pinpoint troubles.

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. 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 variety of tests. The HST-3000 is based on a modular platform allowing for the addition of upgrades and options in the field. Other supported testing applications include: ADSL, G.SHDSL, DDS-LL, PCM Signaling and TIMS, BRI, and VoIP.

To accommodate the future and changing needs of wireless field technicians, the HST-3000 is an easily upgradeable platform that will allow for the support of new technologies and advanced options.



Specifications

Interfaces

DS3 (Single Tx/Dual Rx) BNC
DS1 (Dual Tx/Rx) bantam jacks
10/100 BT ethernet jack 8-pin modular
Serial port DB9 female via cable (DCE)
USB host
USB device

T1 Specifications

Operating modes	Self test, T1 unframed, T1 D4, T1 ESF, FT1 D4 framed, FT1 ESF framed, T1 test loopback, T1 line loopback
Input impedance Bridge	>1000 Ohms
Term	100 Ohms +/- 5%
DSX-MON	100 Ohms +/- 5%
Receive level Bridge	0 to -20.0 dBdsx
Term	+6 to -35.0 dBdsx
DSX-MON	+6 to -24.0 dBdsx
Transmitting timing sources	internal clock, recovered clock
Line codes	AMI, B8ZS
Line build out level	0, 7.5, 15.0, and 22.5 dB of cable loss at 722 kHz
Line build out tolerance	+/- 1 dB at 722 kHz with LBO of 0 dB

Error insert Logic, BPV, Frame

DS3 Specifications

Operating modes	Terminate and Monitor
Receiver (input) specifications	
Frequency	44,736 Mbps + 300 ppm
Impedance	Nominal 75 Ohms at 22 MHz (unbalanced to ground)
Term	0 to 12 dB of cable loss at 22 MHz
DSX-MON	-20 dB loss plus 0 to 9 dB of cable loss from high signal 22 MHz
Transmitting timing sources	internal clock, recovered (from network) clock
Tests	BERT, Monitor, Framing Auto, Unframed, M13, C-bit
Line coding	B3ZS
Error/Alarm Types	Logic, BPV, Parity, Frame, AIS, RAI
FEAC loop codes	NIU, DS3 line, DS1 line

Physical specifications

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

Ordering Information

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)

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	ADSL 1/2/2+ with Copper (ATU-R, Annex A) SIM
HST3000-CAR2A-TI	Copper, ADSL2+ TI (ATU-R, Annex A) SIM
HST3000-CAR2B	ADSL 1/2/2+ 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

Software options

HST3000-BLUETOOTH	Bluetooth Wireless Software Option
HST3000-DSL2	ADSL2 and ADSL2+ Software Option
HST3000-FR	Frame Relay Software Option
HST3000-FTP	FTP Software Option
HST3000-IPV6	IPv6 Software Option
HST3000-MPLS	MPLS Software Option
HST3000-MSTR	Multiple Streams Software Option
HST3000-MSTV	Microsoft IPTV Video Analysis Software Option
HST3000-OPTETH	Optical Ethernet Software Option
HST3000-PCMSIG	Signalling (PCM) Software Option
HST3000-PCMTIMS	TIMS (PCM) Software Option
HST3000-PRI	ISDN PRI Software Option (NC Standard)
HST3000-PS	Pulse Shape Software Option
HST3000-REMOP	Remote Operation 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
HST3000-TxIMP	Transmission Impairments Software Option
HST3000-UNISTIM	VoIP Signaling Call Controls for UNISTIM Software Option
HST3000-VT100	VT100 Emulation Software Option
HST3000-WBTONES	WB TIMS Software Option
HST3000S-H.323	H.323 VoIP Signaling Software Option
HST3000S-IP	Advanced IP Suite – PING and Through Mode Support Software Option
HST3000S-IP-Video	IP Video Analysis Software Option
HST3000S-MGCP	SCCP MGCP VoIP Signaling Software Option
HST3000S-MOS	VoIP Mean Opinion Score Software Option
HST3000S-SCCP	SCCP VoIP Signaling Software Option
HST3000S-SIP	SIP VoIP Signaling Software Option
HST3000S-VMOS	Video MOS Analysis Software Option
HST3000S-VOIP	VoIP Software Analysis Software Option
HST3000S-WEB	Web Browser Software Option

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