

## JDSU Acterna HST-3000 Specs

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### HST-3000

## Wireless Infrastructure Test Applications



#### Key Features

- Isolate and troubleshoot physical layer troubles from RF problems
- Conduct DS1 signal analysis and BER testing with standard and advanced stress patterns
- Conduct DS3 signal analysis and BER testing with patterns for both M13 and C-bit framing
- Offers dual DS1 receivers and transmitters for in-service monitoring as well as drop-and-insert and head-to-head testing
- Offers dual DS3 receivers for bidirectional monitoring
- Accurately measure frequency and signal level to ensure optimal T1 and T3 circuit performance
- Lightweight, rugged, water resistant, and battery-powered handheld test equipment ideal for the needs of wireless field technicians
- Functions as a traditional T-BER® with innovative copper applications

The JDSU HST-3000 is a rugged, versatile, and portable tester that is ideal instrument for wireless technicians in the field who conduct T1/T3 tests with advanced stress patterns, T1 autotests, and VT100 emulation. Specifically designed for the outdoor field technicians, the HST-3000 can be built to order and can quickly and easily be upgraded with new modules as application and technology needs change.

In this extremely competitive wireless market, it is crucial for providers to offer the best service and the broadest coverage. The public relies heavily on their cellular devices for voice and new data applications, including text messaging, e-mail, Internet access, and digital photography. Customers will seldom tolerate noisy signals, dropped calls, or busy lines. Losing customers remains a constant threat; therefore, the pressure on wireless providers to maintain error-free and reliable networks 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 increased the 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 offers a test solution that addresses the need to reduce failures, repeat rates, and kickbacks—especially for leased lines.

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, HST-3000 can detect and identify copper loop problems, resolving finger-pointing issues on leased lines from the local exchange carrier (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 networks are performing properly.

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Summary Settings	
CONFIG->SUMMARY	
1 - Test Mode	Terminate
2 - Pri. Input	Terminate
3 - Payload	Full Rate
4 - Framing	ESF
5 - Line Coding	B8ZS
6 - Pattern	3 in 24

SUMMARY | DS1 | PATTERN | LOOP

DS1 Test

**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 base stations by performing signal, alarm, and timing tests together with BERT analysis.

The ability of the HST-3000 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. Further sectionalize troubles within the network using standard or user-programmable loop codes to loopback 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 backhaul lines are leased and finger-pointing issues must be resolved. With the HST-3000, technicians can verify whether the faults are inside or outside of their network responsibilities.

BERT Results	
HOME->T3->BERT (TERM, FULL T3)	
<b>Primary</b>	
Pattern Sync	ON
Pattern Losses	0
Pattern Slips	0
Sync Loss Seconds	0
Bit Errors	0
Bit Error Rate	0.00E+00
Error Seconds	0
Error Free Seconds	119
Pattern	2*23-1
Framing	C-Bit
1 Insert 1 DS3 Frame Err...	3 Enable DS3 AIS
Display ▲	Action ▲
Results ▲	Restart

DS3 Test

**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 mis-optioned or faulty network equipment.

The HST-3000 lets users 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, technicians 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

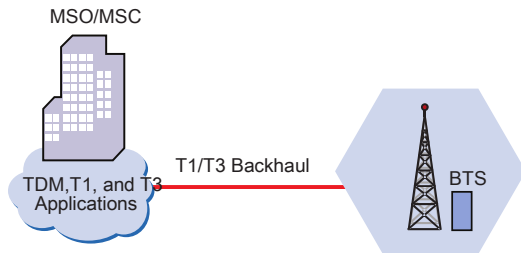
Easy-to-read result menus allow technicians to view physical layer measurements, BERT results, parity errors, far-end block errors (FEBEs), and alarm conditions. Additionally, the summary screen provides a rapid assessment of overall test performance.

### 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 customer service unit (CSU), which only requires one test set, can also verify T1/T3 circuits.

### End-to-End Testing

If problems remain after running straightaway or loopback tests, it is possible that another providers' network introduced errors. Testing through to the far end, also known as end-to-end testing, can determine whether the problem is outside the immediate network. With a pair of HST-3000s at either end of the line and conducting end-to-end testing of the network using both straightaway and loopback tests will isolate the trouble.



BTS = Base Transceiver Station

MSO/MSC = Mobile Switching Office/  
Mobile Switching Center

Figure 1. T1/T3 Backhaul Testing

**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. A standard and advanced T1 patterns are available to choose from, giving the user a lot of flexibility. Results can be easily saved and can also be associated with a work order ticket.

**Saved Results**

Save hundreds of results on the HST-3000 and then export them directly to a printer or to a PC via serial or Ethernet connections. Then e-mail, print, or save the results files on a PC. The HST-3000 file manager also allows technicians 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.



Figure 2. The architecture of the HST-3000 enables fast, easy field-swapping of a wide variety of test modules.

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## Specifications

Interfaces	DS3	Physical
DS3 (Single Tx/Dual Rx) BNC	Operating modes Terminate and Monitor	Size (h x w x d) 241 x 114 x 70 mm (9.5 x 4.5 x 2.75 in. )
DS1 (Dual Tx/Rx) bantam jacks	<b>Receiver (input)</b>	Weight (with battery) 1.23 kg (2.7 lbs. )
10/100 BT Ethernet jack 8-pin modular	Frequency 44,736 Mbps + 300 p	Operating temperature 5.5 to 50°C (22 to 122°F)
Serial port DB-9 female via cable (DCE)	Impedance Nominal 75 Ω at 22 MHz (unbalanced to ground)	Storage temperature -40 to 65.5°C (-40 to 150°F)
USB host	Term 0 to 12 dB of cable loss at 22 kHz	<b>Battery</b> life 10 hrs. typical usage
USB device	DSX-MON -20 dB loss plus 0 to 9 dB c	Charging time 7 hrs. from full discharge to full charge
<b>T1</b>	loss from high signal 22 kHz	Operating humidity 10 to 80% relative humidity
Operating modes Self test, T1 unframed, T1 D4 unframed, T1 ESF, FT1 D4 framed, FT1 ESF framed, T1 test loopback, T1 line loopback	Transmitting timing sources internal clock, recovered clock (from network) clock	Storage humidity 10 to 95% relative humidity
Input impedance bridge >100 Ω	Tests BERT, Monitor, Framing Auto, M13, C-bit	<b>Display</b> 3.8" diagonal, 1/4 VGA, Color Active Matrix with backlight (readable in direct sunlight)
Term 100 ± 5%	Line coding B3ZS	
DSX-MON 100 ± 5%	Error/Alarm types Logic, BPV, Parity, Frame	<b>General</b>
Receive level bridge 0 to -20.0 dBds	AIS, RAI	Ruggedness Survives 91 cm (3 ft) drop to concrete on all sides
Term +6 to -35.0 dBds	FEAC loop codes NIU, DS3 line, DS1	Water-resistant Splashproof (may be used in heavy rain)
DSX-MON +6 to -24.0 dBds		Languages English, German, French, Spanish, Italian, Chinese, Turkish
Transmitting timing sources internal clock, recovered clock		Keypad Typical 12-button keyboard
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 0 dB at 722 kHz with LBO of 0 dB		
Error insert Logic, BPV, Frame		

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Ordering Information

Base Unit	Software Options
HST3000-NG HST-3000 Mainframe without Copper (Color)	HST3000-BLUETOOTH Bluetooth Wireless
HST3000C-NG HST-3000 Copper Mainframe (Color)	HST3000S-WEB Web Browser
HST3000-ETH 10/100/1000 Ethernet T1 and Copper	HST3000-REMOP Remote Operation
HST3000-CT1 T1 and Copper	HST3000-SCRIPT Scripted Test
HST3000-DC Datacom	HST3000-DSL2 ADSL2 and ADSL2+
HST3000-E1 E1	HST3000S-IP Advanced IP Suite—PING and Through Mode Support
HST3000-E1-DC E1/Datacom	HST3000S-IP-Video IP Video Analysis
HST3000-4WLL 4-Wire Local Loop	HST3000S-VMOS Video MOS Analysis
HST3000-T1 Dual TX/RX Bantam T1 Interface	HST3000-MSTV Microsoft IPTV Video Analysis
HST3000-T3 Dual TX/RX Bantam T1 Interface	HST3000-VT100 VT100 Emulation
HST3000-T3 and Dual RX/Single TX BNC DS3 Interface	HST3000S-VOIP VoIP Software Analysis
HST3000-ETSI ETSI (Euro) ISDN Line	HST3000S-H.323 H.323 VoIP Signaling
HST3000-BRI ISDN BRI	HST3000S-MGCP SCCP MGCP VoIP Signaling
HST3000-CSHCE G.SHDSL and Copper	HST3000S-MOS VoIP Mean Opinion Score
HST3000-GSHDSL G.SHDSL	HST3000S-SCCP SCCP VoIP Signaling
HST3000-GSHCE 2-Wire G.SHDSL	HST3000S-SIP SIP VoIP Signaling
HST3000-CSH4 Copper, 4-Wire G.SHDSL (STU-R/C, Annex A)	HST3000-UNISTAMP VoIP Signaling Call Controls for UNISTAMP
HST3000-BLK Blank	HST3000-OPTETH Optical Ethernet
HST3000-IPV6 IPv6	HST3000-MPLS MPLS
HST3000-MSTR Multiple Streams	HST3000-TCPUDP TCP/UDP
HST3000-FTP FTP	HST3000-WBTONES WB TMS
HST3000-WBTONES WB TMS	HST3000-PCMTIMS TMS (PCM)
HST3000-PCMTIMS TMS (PCM)	HST3000-PCMSIG Signaling (PCM)
HST3000-PCMSIG Signaling (PCM)	HST3000-SPE Spectral Noise
HST3000-SPE Spectral Noise	HST3000-RFL RFL
HST3000-RFL RFL	HST3000-TDR TDR
HST3000-TDR TDR	HST3000-PRI ISDN PRI (NC Standard)
HST3000-PRI ISDN PRI (NC Standard)	HST3000-ST Basic Rate ISDN S/T (ANSI)
HST3000-ST Basic Rate ISDN S/T (ANSI)	HST3000-T1DDS DDS-T1
HST3000-T1DDS DDS-T1	HST3000-TxIMP Transmission Impairments
HST3000-TxIMP Transmission Impairments	HST3000-FR Frame Relay
HST3000-FR Frame Relay	HST3000-PS Pulse Shape
HST3000-PS Pulse Shape	

**Test & Measurement Regional Sales**

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