

HST-3000

DS3 Service Interface Module (SIM)



- Key Features**
- Reduce DS3 circuit testing time by using dual receivers for bidirectional monitoring, allowing for timely trouble isolation and correction
 - Seamlessly transition from testing the DS3 interface to testing at the T1 tributary without swapping modules or test sets via the standard dual Transmit and receive DS1 interface
 - Verify multiplexed operation by performing BER testing on one or all 28 DS1 channels within the DS3
 - Accurately measure frequency and signal level to ensure optimal DS3 circuit performance
 - Compact, lightweight and scalable tool ideal for the needs of the field technician today
 - Support long-term testing with tabular and graphical results and the ability to save configurations and results

The HST-3000 DS3 test option enables users to perform the test operations necessary to install, maintain, and troubleshoot DS3 circuits and DS1 channels within DS3 circuits. Test operations include in-service monitoring, bit error rate testing (BERT), and loopback testing. Technicians can quickly qualify networks for accurate multiplexed operation by performing BER testing on one or all DS1 channels transmitted by a DS3 multiplexer.

Continued demand for high-bandwidth applications and services is driving the deployment of DS3 in many networks. DS3 is both a transport technology and a service offering that requires test solutions for install and maintain proper installation and maintenance. Technicians who traditionally install and maintain T1 and lower speed service are now tasked with DS3 testing responsibilities. This, coupled with today's smaller workforces and reduced budgets for equipment and training, presents a real challenge to service providers who must ensure that the service provisioning and trouble correction is done right the first time.

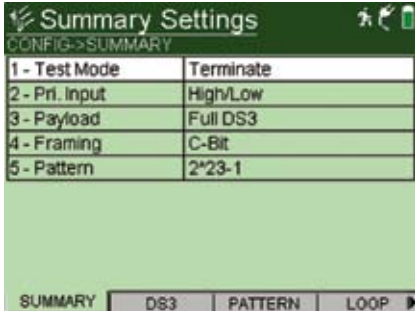


Figure 1: DS3 Summary Configuration Screen

Service Installation

Testing may be performed to a loop at the far-end cross-connect panel or straight away with another test set located at the far end to sectionalize potential problems. For circuits with C-Bit framing, the HST-3000 can send DS3 far-end alarm and control (FEAC) loop commands and report FEAC alarms. For multiplexed DS3 testing, BERT patterns can be inserted on a single channel or all 28 DS1 channels within the DS3. Other standard features include error insertion to verify continuity, and alarm generation to verify proper network provisioning. Easy-to-read result menus allow technicians to view physical layer measurements, BERT results, parity errors, far-end block errors (FEBEs) and alarm conditions. The summary screen also provides a rapid assessment of overall test performance.

The testing capability of the HST DS3 helps ensure the circuit is functioning properly before handoff to the customer by providing simplified testing that includes a full range of test patterns and capabilities for both multiplexed and unchannelized DS3 circuits with M13 or C-Bit framing. Evaluation of BER test results, frequency, and signal level helps identify potential sources of problems such as faulty or loose cable crimps, improper line buildout, excessive coaxial cable length, and misallocated or faulty network equipment.

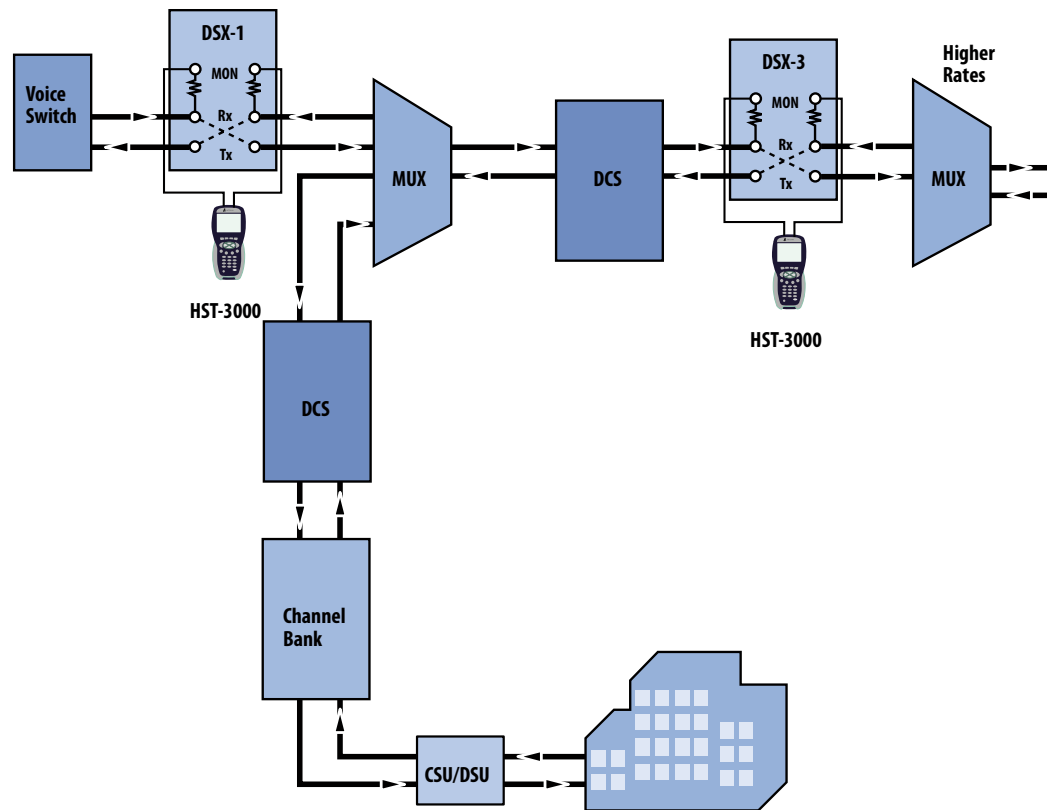


Figure 2: DS1/DS3 testing

T1 Testing

Installing or maintaining DS3 often requires testing at the T1 tributary level. The HST-3000 DS3 Option comes standard with dual transmit and receive for DS1 interfaces. This feature lets the user switch from DS3 to DS1 physical layer testing without changing instruments or swapping modules—enabling timely and thorough testing of the T1 circuit to verify proper multiplexed operation.

Service Maintenance

It is often necessary to perform in-service monitoring of a DS3 circuit during routine maintenance or troubleshooting operations. The HST-3000 DS3 Option comes standard with dual DS3 receivers for bidirectional monitoring, allowing the user quick and non-intrusive identification and sectionalization of potential problems. Results from both receivers (primary and secondary) are easily view-able on the same screen.

The HST-3000 can isolate a single DS1 from the DS3 for analysis. If it becomes necessary to conduct intrusive testing to isolate and correct a problem, the full range of out-of-service testing, described earlier, is available.

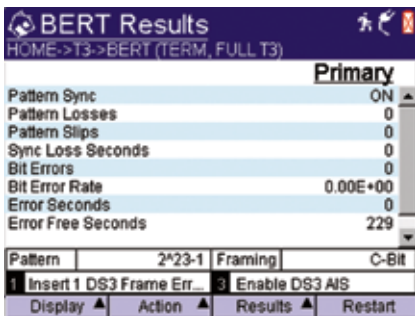


Figure 3: DS3 BERT Results

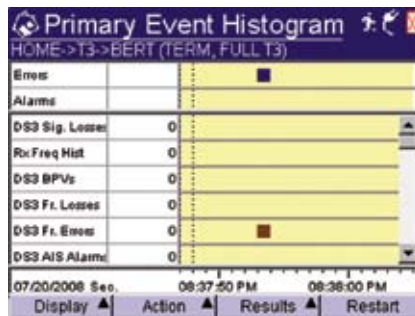


Figure 4: DS3 Primary Event Histogram (with errors)

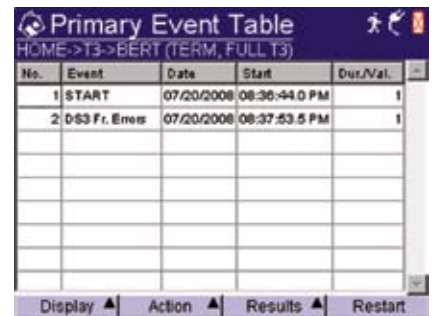


Figure 5: DS3 Primary Events Table

Test the Copper, Test the Service, Improve the Process

As an optional capability, the HST-3000 can be configured to include a robust suite of testing features for verification and troubleshooting of copper facilities. Equipped with this option, the HST-3000 can quickly troubleshoot the local loop for line impairments that degrade or impair DS1 performance. The user can quickly identify and correct cable impairments including: shorts, grounds, opens, crosses, bridged taps, wet sections, and other highly resistive faults. These impairments are easy to locate with the advanced time domain reflectometer (TDR), precision digital volt/ohm meter (DVOM), and the accurate resistive fault locator (RFL) of the HST-3000 to pinpoint troubles prior to circuit installation.

The HST-3000 also can transmit the full range wideband tones to 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.

The HST-3000 DS3 Option provides the complete range of both DS1 and DS3 physical layer circuit testing. Building on these capabilities, the HST-3000 can be equipped with options that support ISDN Primary Rate (PRI) testing as well as pulse code modulation (PCM) signaling and Transmission Impairment Measurement Set (TIMS) testing for verification of digital voice service on a T1 line. The HST-3000 can easily scale to address the full breadth and depth of testing requirements from qualification of the copper pair through voice and data service verification.

The HST-3000 offers pre-programmed tests and customized scripts that simplify testing and ensure consistent adherence to standard test procedures. These customizations help eliminate mistakes caused by improper test configurations or incorrect methodologies. 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.

Easily configurable, technicians with differing responsibilities can use the HST-3000 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.



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

Specifications

Technical**Interfaces**

DS3 (Single Tx/Dual Rx)	BNC
DS1 (Dual Tx/Rx)	Bantam Jacks
10/100 BT Ethernet jack	8-pin modular
Serial port	DB-9 female via cable (DCE)
USB host	
USB device	

DS3

Operating modes	Terminate and Monitor
Receiver (input) specifications	
Frequency	44,736 Mbps +300 ppm
Impedance	Nominal 75 Ω at 22 MHz (unbalanced to ground)
Range	TERM: 0 to 12 dB cable loss at 22 MHz DSXMON: -20dB loss plus 0 to 9 dB of cable loss from high signal of 22 MHz

Jitter Tolerance

Transmitter (Output) Specifications	
Frequency	44,736 Mbps +50 ppm
Impedance	Nominal 75 Ω unbalanced to ground
Timing	Internal clock Recovered (from network) clock
Pulse (High)	Nominal 1.2 Vp
Pulse (DSX)	Nominal 0.6 Vp
Pulse (Low)	Nominal 0.3 Vp with 75 Ω
Pulse shape	Per T1.102 (1993) & ITU-T G.703
Output jitter	Per T1.102 (1993)
Tests	BERT, Monitor
Framing	Auto, Unframed, M13, C-bit
Line coding	B3ZS
Error/alarm types	Logic, BPV, Parity, Frame, AIS, RAI
Loopback codes	NIU, CSU, HDLSL, MSS, user defined, and repeater
FEAC loop codes	NIU, DS3 line, DS1 line

Frequency & Level Measurements

Frequency	Range: 44,736 +350 ppm Accuracy: +3ppm, +1ppm/year Resolution: 4 Hz
Level Vp	Range: 0.0 V to 1.99 V Accuracy: (+0.02 V/+10%) Resolution: 0.01 V

DS1

Operating modes	Terminate, Monitor, Drop and Insert, Loopback, (Full T1 and Fractional)
Framing	Unframed, D4/SF, ESF
Line coding	AMI, B8ZS
Input impedance	BRIDGE > 1000 Ω TERM 100 Ω +5% DSX-MON 100 Ω +5%
Receive level	BRIDGE 0 to -20.0 dBdsx TERM +6 to -35.0 dBdsx DSX-MON +6 to -24.0 dBdsx
Timing sources	Internal clock Recovered (from network) clock
Line buildout level	0, 7.5, 15.0, and 22.5 dB of cable loss at 722 kHz
Error Insertion	Logic, BPV, frame

Physical

Size (h x w x d)	241 x 114 x 70 mm (9.5 x 4.5 x 2.75 in)
Weight (with battery)	2.7 lb (1.23 kg)
Operating temperature	-5.5 to 50°C (22 to 122°F)
Storage temperature	-40 to 65.5°C (-40 to 150°F)
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-in diagonal, 1/4 VGA, Color Active Matrix with backlight (readable in direct sunlight)

General

Ruggedness	Survives 91 cm (3 ft) 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

Base Unit

HST3000-NG	HST-3000 Mainframe without Copper (Color)
HST3000C-NG	HST-3000 Copper Mainframe (Color)

Available SIMS (Modules)

HST3000-CUCE	Copper only SIM, CE Marked
HST3000-AR2A-T1	ADSL2+ T1 (ATU-R, Annex A)
HST3000-AR2A	ADSL1/2/2+ (ATU-R, Annex A)
HST3000-AR2B	ADSL1/2/2+ (ATU-R, Annex B)
HST3000-AR2B-T1	ADSL2+ T1 (ATU-R, Annex B)
HST3000-CAR2A	ADSL1/2/2+ with Copper (ATU-R, Annex A)
HST3000-CAR2A-T1	Copper, ADSL2+ T1 (ATU-R, Annex A)
HST3000-CAR2B	ADSL1/2/2+ with Copper (ATU-R, Annex B)
HST3000-CAR2B-T1	Copper, ADSL2+ T1 (ATU-R, Annex B)
HST3000-CARB	Annex B Copper/ATU-R
HST3000-CARCA	Copper and ATU-R/C Dual Mode, AoPOTS
HST3000-CARCB	Copper and ATU-R/C Dual Mode, AoISDN
HST3000-CARCE	Copper and ATU-R (Annex A), CE Marked
HST3000-WB2	Wide Band 2 (up to 30 MHz) Copper Test
HST3000-VDSL-CNXT	VDSL with Connexant Chipset
HST-3000-VDSL-CNXT-WB2	VDSL and Copper (up to 30 MHz) with Connexant Chipset
HST3000-VDSL-IK	VDSL with Ikanos Chipset
HST-3000-VDSL-IK-WB2	VDSL and Copper (up to 30 MHz) with Ikanos Chipset
HST3000-INF-VDSL	VDSL with Infineon Aware Chipset
HST-3000-INF-VDSL-WB2	VDSL and Copper (up to 30 MHz) with Infineon Aware Chipset
HST3000-ETH	10/100/1000 Ethernet
HST3000-CT1	T1 and Copper
HST3000-DC	Datacom
HST3000-E1	E1
HST3000-E1-DC	E1/Datacom
HST3000-4WLL	4-Wire Local Loop
HST3000-T1	Dual TX/RX Bantam T1 Interface and T1
HST3000-T3	Dual TX/RX Bantam T1 Interface, and Dual RX/Single TX BNC DS3 Interface/and DS3
HST-BRA	ETSI (Euro) ISDN BRA
HST3000-BRI	ISDN BRI
HST3000-CSHCE	G.SHDSL and Copper
HST-GSH	G.SHDSL
HST3000-GSHCE	2-Wire G.SHDSL
HST3000-CSH4	Copper, 4-Wire G.SHDSL (STU-R/C, Annex A/B)
HST3000-BLK	Blank

Software Options

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

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