HST-3000 Handheld Services Tester

Broadcom® Bonded ADSL2+/VDSL2 SIM

Key Benefits

- Saves money and reduces repeat faults with triple-play services testing capability
- One universal module covers VDSL2/ADSL2 single and bonded pair with vectoring
- Saves time—the same tip/A, ring/B leads test copper and xDSL
- Verifies critical correct pair-bonding and provisioning, letting users segment single-line performance issues for bonded groups
- Isolates faults stemming from bridged taps, noise, or poor pair balance using Hlog and QLN graphs and G.INP analysis
- Improves OpEx and field productivity when combined with StrataSync™, a cloud-based solution that displays assets, modules, versions, and locations; maintains accurate instrument configuration and setup; and provides visibility into instrument utilization and test data management

StrataSync™
ENABLED

Applications

- ADSL2+, VDSL2, ADSL2+/VDSL2 bonding and VDSL2 vectoring
- Triple-play services over ADSL2+, VDSL2, Ethernet, and WiFi (web, data throughput, IP video, VoIP)
- Advanced copper-circuit testing with precision fault location
- Optical power level testing (with MP-60 or MP-80 USB accessory)

Service providers face significant challenges when ramping up their networks to provide advanced triple-play services with the same or better quality than cable/multiple switch operators (MSOs). Key to their success is cost-effectively increasing bandwidth to subscribers for new IP video services over bonded asymmetric digital subscriber line 2+/very high-speed digital subscriber line 2 (ADSL2+/VDSL2). Internet Protocol television (IPTV) services require pristine xDSL service Layer 1 performance. Factors such as noise, crosstalk, pair imbalance, bridged taps, and other copper plant anomalies can be easily hidden when testing one pair at a time. Designed for the outside plant, the HST-3000 meets those challenges head-on.

Featuring the latest Broadcom Corporation chipset, the new service interface module (SIM) tests bonded-pair ADSL2+/VDSL2 by terminating both pairs of a bonded group. The Broadcom SIM also supports legacy ADSL1, ADSL2, ADSL2+, VDSL2, and vectored VDSL2 in the same module, so technicians can easily switch between testing bonded and non-bonded services without the need to swap modules. Further, the module lets technicians work smarter and faster to test copper and xDSL using the same dual tip/ring/ground interface leads for both service turn-up and copper fault isolation.

The lightweight, rugged, and battery-operated HST-3000 with the Broadcom SIM cost-effectively scales to provide an all-in-one solution for field installation, maintenance, and troubleshooting across a wide range of triple-play service test applications.

Applications

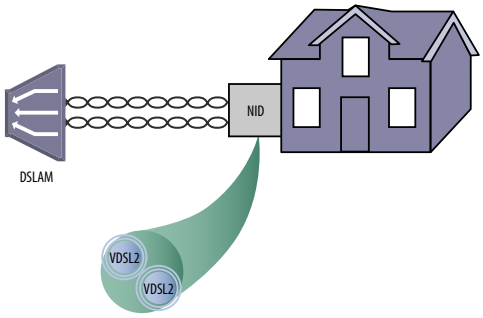


Figure 1. Bonded pair testing is mission critical

Why a Bonded Pair Test?

A relatively simple, single-pair sync test that checks one xDSL pair at a time is simply insufficient for bonded pair DSL service. Testing one pair at a time will not establish actual line rates, because it does not include the impact of crosstalk. Rates may give a false positive, because they may show higher bit rates without the effects of crosstalk noise. Testing one line at a time will not exercise the pair-bonding timer threshold settings nor will it validate that each line is wired to or configured for the same bonding group.

- Identifying when loops are not in the same bonding group *requires* dual modem testing
- Proper provisioning and bonded group metrics analysis require *both* interfaces to be active
- Crosstalk analysis is only possible when both pairs are active

Full Compatibility Range

The new universal xDSL SIM for the HST-3000 tests ADSL1, ADSL2, ADSL2+, VDSL2, bonded ADSL, bonded VDSL, and vectored VDSL2 with just one module, making it compatible with a huge range of CPE and DSL access multiplexer (DSLAM) equipment. Service providers can minimize their investment cost in test equipment as well as in DSLAM ports, so they can continue to offer high-speed data services over single-pair ADSL2+, while turning up new IP video service tiers as they qualify new bonded service areas.

Figure 2. Show Time for bonded pairs requires that both pairs of a bonded group are active

Figure 3. View statistics simultaneously for both pairs of a bonded group

BPT, Hlog, and QLN Graphs

Technicians can analyze poorly performing services with bits-per-tone (BPT), Hlog (insertion loss), and quiet line noise (QLN) graphs accessible within the xDSL application. Significant dips or notches in the BPT and Hlog graph may indicate the presence of a bridged tap or a corroded splice, showing the absorption of DSL signal energy. The QLN graph provides an indication of external noise interference. Spikes may show a high noise floor revealing noise interference issues. After identifying the trouble source, technicians can find and correct problems with the advanced copper measurement suite on the HST-3000, including the precision time domain reflectometer (TDR) or resistive fault locator (RFL) tools.

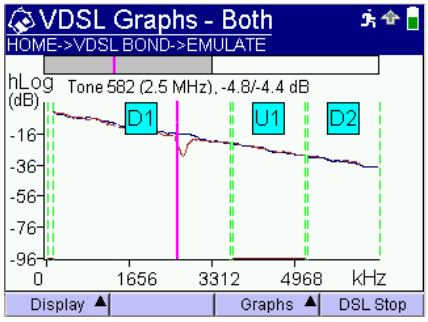


Figure 4. Dual-pair Hlog graph showing likely bridged tap on pair 1 at tone 582

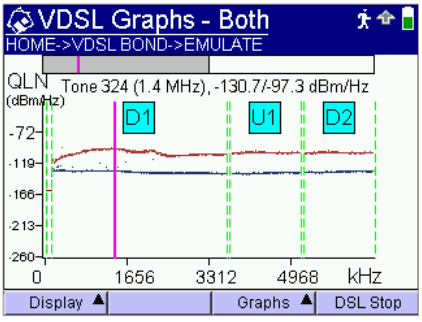
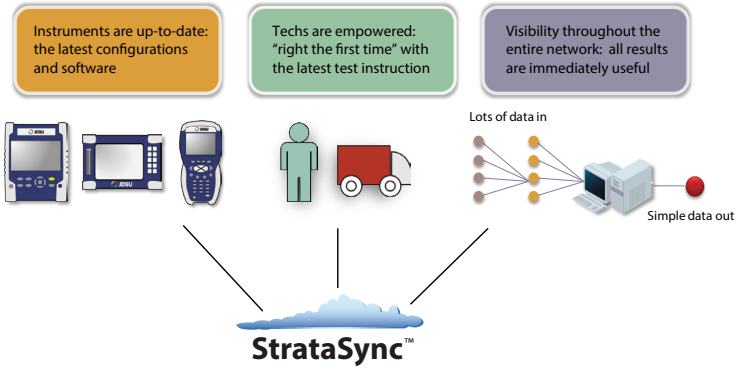


Figure 5. Dual-pair QLN graph showing noise on pair 1

StrataSync Empowers Your Assets

StrataSync is a hosted, cloud-based solution that manages assets, configurations, and test data for JDSU instruments and ensures that all instruments are equipped with the latest software and installed options. StrataSync manages inventory, test results, and performance data from anywhere with browser-based ease for improved technician and instrument efficiency. StrataSync manages and tracks test instruments, collects and analyzes results from the entire network, and informs and trains the workforce.

StrataSync™
ENABLED



Get all this without increasing headcount and while minimizing overall operating costs and truck rolls.

Specifications

DSL Modem

Test Interface
ADSL2+/VDSL2, RJ45 (single and bonded)
ADSL2+/VDSL2, 2 mm recessed banana tip/A, ring/B, (single and bonded)

Modem Chipset
Broadcom 63168

VDSL Standard Compliance ITU-T- G.993.2 VDSL2 Annex A, B
ITU-T-G.998.1 ATM bonding
ITU-T-G.998.2 PTM bonding
ITU-T-G.993.5 self-FEXT cancellation (vectoring)
Profiles: 8a/8b/8c/8d, 12a/12b, (17a for single only)
Band plan 997 and 998, U0 band

ADSL Standard Compliance ITU-T G.992.1 Annex A (G.DMT)
ITU-T G.992.3 Annex A, L (ADSL2)
ITU-T G.992.5 Annex A, M (ADSL2+)
ITU-T-G.998.1 ATM bonding
ITU-T-G.998.2 PTM bonding
ANSI T1.413-1998, Issue 2
ITU-T G.992.5 INP Amendment 3

All Modes (single, bonded pair ADSL/VDSL2)
Graphs
BPT
Combination BPT/SNR tone
VDSL band statistics
Hlog
QLN
Miscellaneous results
Synchronization (Show Time)
Failed synchronization
Number of syncs
Training time
Standard used
Estimated loop length
Modem firmware version
Errors/Performance Local/Remote/Remote (total)
Loss of signal
Forward error correction (FEC)
Cyclic redundancy check (CRC)
Loss of frame
Loss of margin
Far end loss of signal
Errored seconds
Severely errored seconds
Unavailable seconds

Measurements (bonded pair ADSL/VDSL2)
G.INP Statistics (upstream/downstream)
Status
Retransmitted DTUs
Corrected DTUs
Uncorrected DTUs
INP REIN
Measurements (upstream/downstream)
Modem state
Group rate
Max group rate
Group capacity
Lapse time
Per Band Bonded VDSL2 Statistics
Loop attenuation (LATN)
Signal attenuation (SATN)
SNR margin
Tx power
Vectoring Status
V-not configured, V-running, V-full, F-friendly

Network

Network Modes
Terminate,through

Network Types
ADSL1, ADSL2, ADSL2+, VDSL, bonded ADSL2+, bonded VDSL
IPoE, PPPoE, IPv6oE, multiple VLANS, data off
ADSL/ADSl2+
IPoE, PPPoE, IPv6oE, MVC Video, IPoA, PPPoA, multiple VLANS, Network off
VPI/VCI

Transport Types
ATM, PTM

IP Mode
DHCP, static

MAC Setting
Factory default, user-defined

Vendor Id
Yes/No

User Class
Yes/No

VLAN
Tag on/off
ID selection 0–4095
Priority selection 0–7

Additional Features
Technology auto mode for single pair DSL standard (Auto, ADSL, VDSL2)
Transport auto mode (ATM or PTM bonding)
PhyR settings upstream/downstream
NitroMode
Dual latency paths (VDSL2)
Four latency paths (ADSL2/2+)

Cables

CB-5CLIP-BON RJ to 5-clip lead cable (bonded cable for Broadcom/Conexant®/Capri SIMs)
CB-5CLIP-RTC RJ to 5 clip lead cable with regular telco clips (bonded cable for Broadcom/Conexant/Capri SIMs)
CB-BONDED RJ to dual RJ cable (bonded cable for testing at the NID/NIU)

Ordering Information

Base Unit

HST3000-NG2-1	HST-3000 mainframe without copper (color)
HST3000C-NG2-1	HST-3000 copper mainframe (color)

Available SIMS (modules)

HST3000-BDCM-2	ADSL/VDSL with Broadcom chipset
HST3000-BDCM-WB2-2	ADSL/VDSL bonded and copper (up to 30 MHz) with Broadcom chipset
HST3000-CUCE	Copper only SIM, CE marked
HST3000-WB2	Wide band 2 (up to 30 MHz) copper test
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-CSH4	Copper, 4-wire G.SHDSL (STU-R/C, Annex A/B)
HST3000-BLK	Blank

Software Options

HST3000-BLUETOOTH	Bluetooth wireless
HST3000-COS	Class of service
HST3000-802.11	802.11 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 option for Ethernet SIM
HST3000-MPLS	MPLS
HST3000-MSTR	Multiple streams
HST3000-TCPUDP	TCP/UDP
HST3000-FTP	FTP
HST3000-WBTONES	WB TIMS

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