

MAKING
COMMUNICATIONS
BETTER

960B

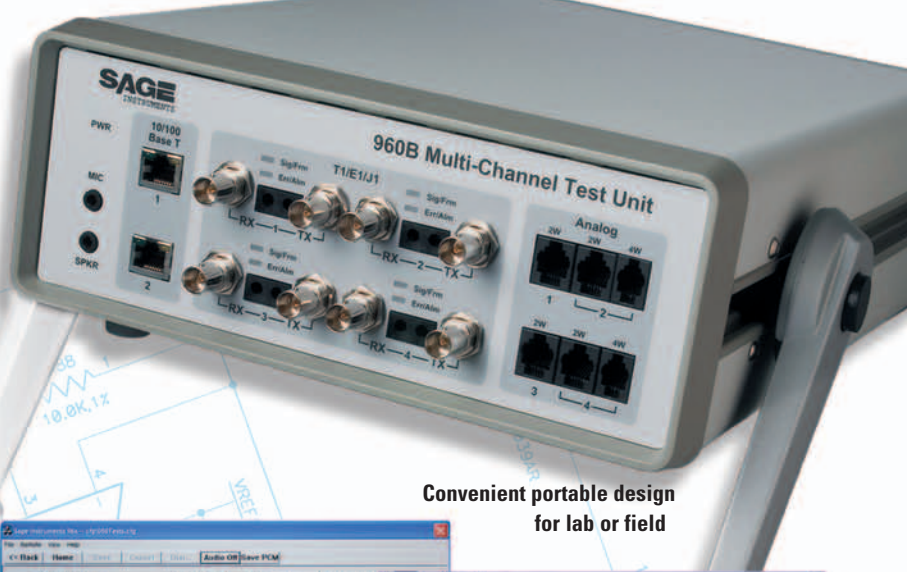
NEXT GENERATION MULTI-CHANNEL TEST INSTRUMENT

IP Telephony's most powerful multi-channel test instrument. The 960B combines TDM, Ethernet, and Analog interfaces with unparalleled "Real-Time" simultaneous test capability to comprehensively test and monitor Next Generation Elements and Networks.

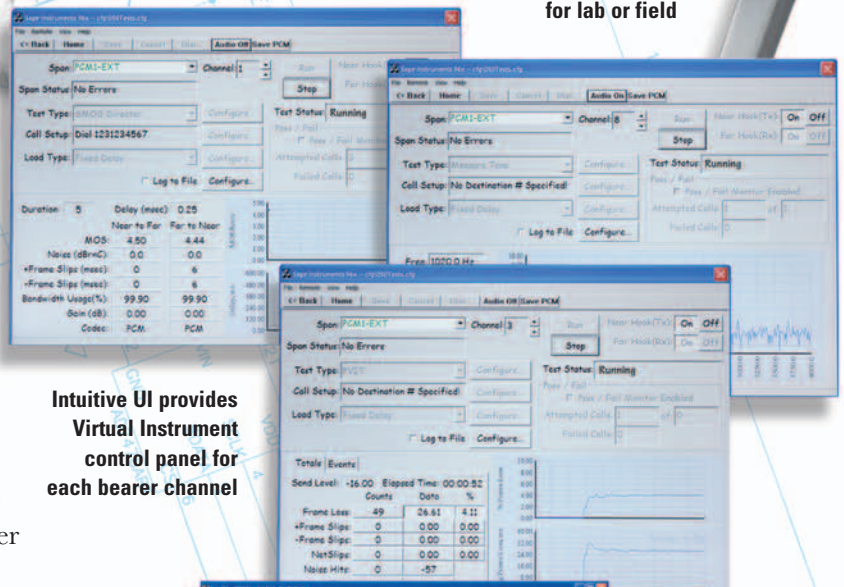
- Voice Processing & IP Telephony Transparency Testing
- VoIP Service Pre-Qualification, Turn-Up Testing, and Troubleshooting
- IMS VoIP & Video Certification

The 960B can generate one or many end-to-end test calls from the Packet, TDM, and/or Analog interfaces while Monitoring the bearer channel (TDM, RTP, & Analog) to flush out Real-Time performance issues.

- Passively and/or actively detect & measure AUDIO LEVELS and ECHO
- Assess voice quality – PESQ, MOS, DELAY, and NOISE
- Qualify Echo Cancellers – Dispersive Echo and programmable delay
- Verify FAX/data modem transparency
- Verify VAD, Jitter Buffer, Comfort Noise, Silence Suppression Performance
- Emulate Fax and True IP Phones with Jitter Buffers, Real RTP and TOS
- True CPE & GW wrap around testing

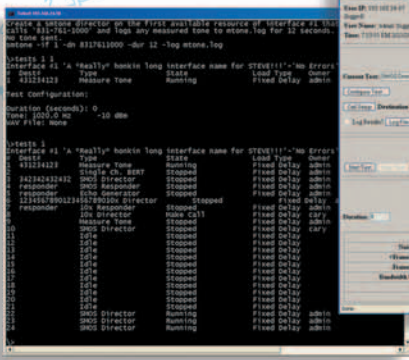


Convenient portable design for lab or field



Intuitive UI provides Virtual Instrument control panel for each bearer channel

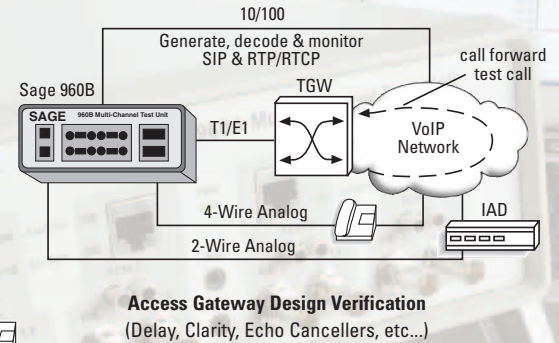
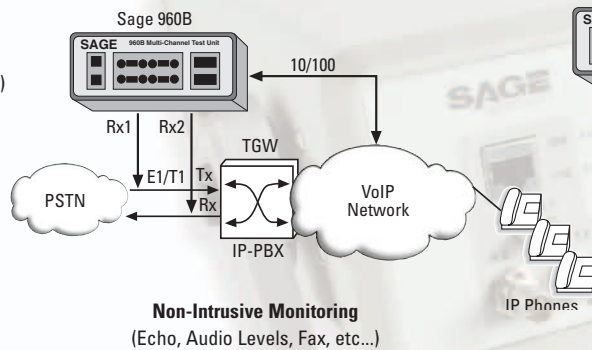
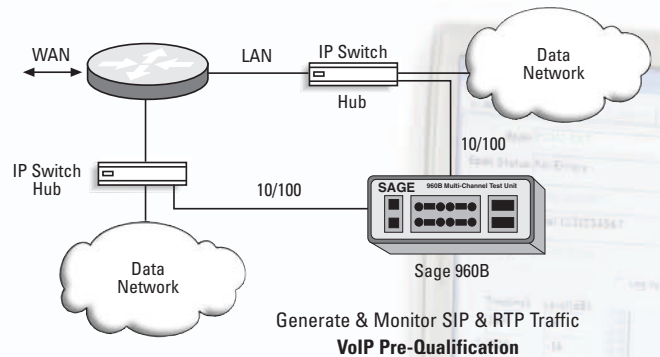
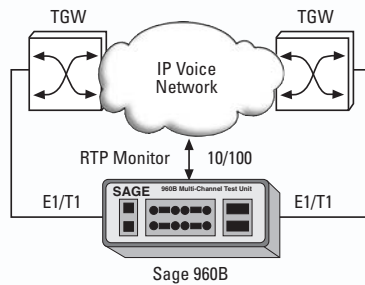
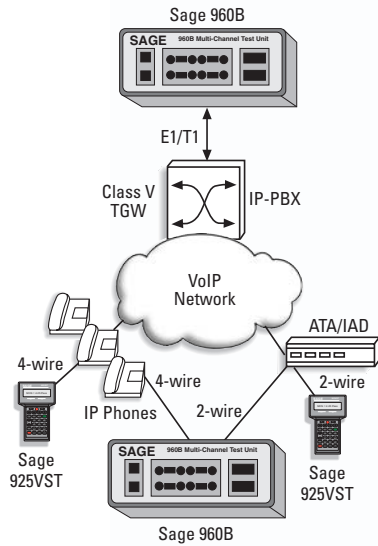
Robust CLI and Browser Interfaces



960B

POWERFUL IP TELEPHONY NEXT GENERATION MULTI-CHANNEL TEST INSTRUMENT

960B TEST CONFIGURATIONS



960B FEATURES A POWERFUL NEXT GENERATION TEST SUITE

FEATURES & CAPABILITIES

Echo Cancellation Performance

- Multi-Echo Detection
- Real-Time Echo Level, Echo Delay
- Echo Canceller Disabler Tone(s)
- Dispersive Echo Emulation
- Echo Cancellation Convergence Testing
- G.168 Test Suite and Echo Can Control
- Passive Echo Monitor (INMD P.561)
- Adjustable Back-Ground Noise (Hoth)
- Selectable Double-Talk Signal (.wav/PCM)

Voice Data, Fax, Video Quality & Telephony Transparency

- Two-Way Mean Opinion Score (MOS) Testing
- Voice Clarity PESQ & P.862.1
- One-Way continuous MOS
- Real-Time E-Model G.107 (with Measured Parameters)
- One-Way and Round Trip Delay
- Comfort Noise Level (CNG)
- Audio Level (Gain/Attenuation)
- Jitter Buffer VAD Performance & Voice Clips
- Packet/Frame Loss Burst Length
- DTMF/MF Verification, Monitor/Emulation w/programmable on/off times, frequency level wink, & flash

FEATURE MATRIX		INTERFACES			
		T1/E1	2-Wire Analog	4-Wire Analog	Ethernet
7960-0800-02	Remote Control	•	•	•	•
7960-1000-02	PRI-ISDN Call Setup & Protocol Monitor	•			
7960-1010-02	Remote Audio Monitor	•	•	•	
7960-5000-02	E-Model ITU G.107 Conversational Quality Test	•	•	•	•
7960-5010/20/30-02	Analog/TDM/Ethernet ITU P.862 PESQ, License	•	•	•	•
7960-5040-02	PESQ Tools Offline GUI (Single User License)	•	•	•	•
7960-5100-02	Digit Analyzer & Sender	•	•		
7960-5200-02	ROTL 100, 102 & 105 Test Lines & Directors	•			
7960-5300-02	MoIP – Modem over IP Transparency Test Line and Director (Fax/Data/Voice)	•	•	•	
7960-5400-02	BERT – DSO, DS1, FT1, & FE1 BERT	•			
7960-5500-02	NGEN Tests – SMOS, PVIT, Echo Sounder, & Echo Generator Test Line Directors	•	•	•	•
7960-5600-02	G.168 Suite – ITU B.168 Echo Canceller Conformance Test	•	•		•
7960-5700-02	INMD – ITU P.561 (Passive Echo)	•			•
7960-5800-02	Fax – T.30 Transmit & Receiver Emulation	•	•		
7960-6110-02	SIP Protocol Monitor/Decode				•
7960-6120-02	SIP Call Setup				•
7960-6130-02	RTP Monitor & Decode				•
7960-6140-02	RTCP Monitor & Decode (-XR)				•
7960-6150-02	RFC 2833/4733 Telephony Event Monitor				•
7960-6155-02	RFC 2833/4733 Special Event Emulator				•
7960-6160-02	T.38 Fax Relay Protocol Monitor				•
7960-6170-02	ITU T.38 Fax Relay Emulation				•
7960-6180-02	VoIP Impairment Generator				•
7960-5900-02	V.9x Modem Protocol Analyzer	•			
7960-8XXX-02	Video Quality Assessment *				•
7960-4XXX-02	FSK Monitor & Emulation *		•		
7960-4XXX-02	Advanced TIMS Suite *	•	•		•
Standard	Send & Measure Tone	•	•	•	•
Standard	Spectrum Analyzer	•	•	•	•
Standard	ITU G.826 Span Alarm & Counters	•			
Standard	One-Way-Delay Test	•	•	•	•
Standard	CAS Control Bit Monitor	•			
Standard	Audio Monitor & Capture	•	•	•	•

* Contact Sage Sales for Availability.

- RFC 2833/4733 Monitor/Emulation
- Fax Testing: T.30 & T.38 Fax Relay Monitor/Emulation [V.8, V.17, V.21, V.27 & V.34]
- Impairment Generation – Delay, Packet Loss Jitter, Out of Sequence Packet, Supports Multiple Flows
- RTP Monitor – Lost Discarded, Out of Sequence Packets, Packet Arrival Delay, Inter-Arrival Jitter, Transient Packet Loss, and Discarded Packet Loss Distribution [G.711 & G.729]
- Send/measure tone with spectrum analyzer insert and capture wave/PCM audio files
- SIP phone Emulation [RFC 3261, 2617] Adjustable Parameters: Local IP Address [Port, MAC, Phone Number] Jitter Buffer Size,

- Real RTP and SIP ToS Bits & Code Type [G.711, G.729]
- FSK Monitor/Emulation, CallerID analyzer (Decode, FC, F offset, Amplitude, Pulse duration)
- Advanced TIMS IEEE-743, 23-Tones Test, C-MSG/Psophometric, C-notch, 3kHz flat noise
- Remote Audio Support
- IPTV testing: Visual MOS Index
- V.9x Modem Protocol Monitor
- RTP Traffic Generation (G.711 & G.729)
- Long-term Packet Voice Integrity Testing (PVIT) Monitoring
- Codec type detection
- Call completion time, Post-Dial-Delay, Dial-Tone Delay, CallerID

continued

960B

NEXT GENERATION MULTI-CHANNEL TEST INSTRUMENT

FEATURES & CAPABILITIES

Digital Facility Turn-up & Validation

- Multi-Channel BERT and Fractional E1/T1
- G.826 E1/T1 Span Alarms
- DSO BERT patterns & loop codes

Test Interfaces

- Two T1/E1 – 48/64 Simultaneous Tests or
- Four T1/E1 – 96/124 Simultaneous Tests [BNC, Bantam]
- Dual 10/100 BT – 400 Simultaneous Tests [RJ-45]
- Quad 2-wire FXO – 4 Simultaneous Tests [RJ-11]
- Dual 4-wire Dry – 2 Simultaneous Tests [RJ-22]
- MIC & Speaker, Interfaces [3.5mm]

Call Setup Signaling

- CAS or Clear Channel
- PRI-ISDN
- SIP (P-P, Proxy, IMS, REG & AUTH)
- Ring frequency, Ring voltage, Ring duration, On-hook voltage & loop current

Passive Monitor

- PCM, Analog Monitor & Capture
- SIP Call Protocol Monitor & Capture
- RTP Decode and Monitor & Capture
- RTCP-XR Decode and Monitor (RFC 3611) w/H.248 query
- Echo Level & Delay
- PRI-ISDN Protocol Monitor
- E-Model G.107
- Analog and TDM Bridge mode, V.9 x/V.34 Protocol Monitor, FAX Monitor

Remote Control

- Multi-user (up to 10 users) Command Line Interface (CLI Scripting Interface)
- HTML Web Browser (up to 10 users)
- Single-user Instrument Interface GUI (PC Client)

User Interface

- User friendly GUI with multi-window view and scalable graphics
- Log results in CSV format
- Record audio in WAV or PCM format
- Channel selectable PC audio Monitor

- User storable test configurations
- Interoperates with script control and test configuration files

960B OPTIONS

- 7960-0100-02 Dual E1/T1
- 7960-0200-02 Quad E1/T1
- 7960-0300-02 Dual ENET (10/100 BaseT)
- 7960-0450-02 Quad 2-Wire and Dual 4-Wire Analog Interface
- 7960-0800-02 Remote Control Onboard Cntrl & TCP/IP Interface
- 7960-1000-02 PRI-ISDN Call Setup
- 7960-1010-02 Option 1010: Remote Audio Monitor
- 7960-5000-02 E-Model ITUG.107 Conversational Quality Test
- 7960-5010-02 Analog ITU P.862, PESQ, License
- 7960-5020-02 TDM ITU P.862, PESQ, License
- 7960-5030-02 Ethernet ITU P.862, PESQ License
- 7960-5040-02 PESQ Tools Offline GUI (Single User License)
- 7960-5050-02 PESQ License Bundle Analog/TDM(2)/ENET
- 7960-5100-02 Digit Analyzer & Sender
- 7960-5200-02 ROTL 100, 102 & 105 Test Lines & Directors
- 7960-5300-02 MoIP – Modem over IP Transparency Test Line and Director (Fax/Data/Voice)
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- 7960-6110-02 SIP Protocol Monitor/Decode
- 7960-6120-02 SIP Call Setup
- 7960-6130-02 RTP Monitor & Decode plus Dual Spectrum Analyzer
- 7960-6140-02 RTCP Monitor & Decode
- 7960-6150-02 RFC 2833/4733 Telephony Event Monitor
- 7960-6155-02 RFC 2833/4733 Special Event Emulator
- 7960-6160-02 T.38 Fax Relay Protocol Monitor
- 7960-6170-02 ITU T.38 Fax Relay Emulation
- 7960-6180-02 VoIP Impairment Generator

For the most current information please visit
www.sageinst.com/960_B.html