

Simulate in Real-time Echo, Delay, Attenuation, Dispersion, and more

Manual and Automated Testing of ECs in ATAs & Gateways

G.168 Compliance Testing of ECs in ATAs and Gateways

Automated EC Testing per G.168 (2000, 2002, 2004)

Access to the IP interface with RTP Toolbox™

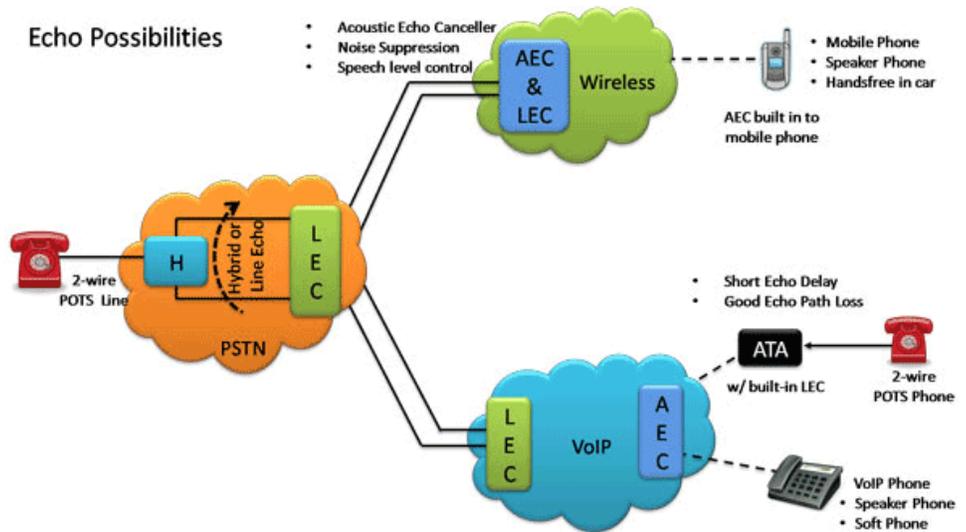
Access to T1 E1 Interfaces with T1 and E1 Cards

Complete Simulation of EPD (delay) & EPL (loss) on VoIP Networks

Manual, Semi-Automated, and Fully Automated Test Configurations

Monitor Hybrid / Acoustic Echo along with Voice Quality

Echo Canceller Testing in VoIP Networks



Echo Testing Solutions

In VoIP networks - gateways and ATAs usually contain echo cancellers (ECs) to cancel the echo generated by the landline 2/4 wire hybrids. To effectively test ECs in such elements, access to 2-wire, T1, E1, and IP sides of these elements are necessary. GL test equipments provide access to all these interfaces for performance testing and G.168 compliance testing of ECs in such VoIP network elements. Various solutions and configurations are described below.

GL's ITU-T Specification **G.168 EC compliance test suite** are developed for testing Echo Cancellers (EC) that reside within a VoIP (Voice over Internet Protocol) and TDM (Time Division Multiplex) environments

GL's **RTP Toolbox™** is used to provide a VoIP test interface creating RTP streams to send and record test files. The application includes the ability to send different types of traffic including, voice files, digits, tones, RTP events, and so on. For inter-working with TDM networks, RTP Toolbox™ can be used with **GL's T1E1 analyzer**. In addition, RTP Toolbox™ includes client-server command-line modules for automation and GLC View application for graphical analysis.

GL's **Voice Band Analyzer (VBA)** is an analysis tool developed for monitoring the quality of voice band traffic (including hybrid and acoustic echo) over VoIP, TDM and wireless networks.

Please visit <http://www.gl.com/echocan.html#voip> for more details.

Key Features:

- Performance testing of ECs in ATAs and Gateways
- G.168 compliance testing of ECs in ATAs and Gateways
- Access to the IP interface with RTP Toolbox™
- Access to the T1 E1 interface with GL's T1 and E1 Cards
- Ability to simulate in real time - echo, delay, attenuation, dispersion, and more
- Ability to measure and verify compliance to G.168
- Manual, semi-automated, and fully automated test configurations
- Monitor Hybrid / Acoustic Echo along with voice quality using VBA



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Manual G.168 EC Compliance Testing of ATAs and Gateways with a Two-Wire Interface

- Manually test most G.168 compliance cases
- Echo Path Loss (EPL) & Echo Path Delay (EPD) not controllable due to being embedded in gateway
- Use RTP ToolBox™ (PKB100) and G.168 compliance test suite (PKB105)
- Uses GLC View to manually analyze G.168 compliance
- More information is provided at <http://www.gl.com/VoIPata.html> on specific G.168 procedures covered
- Manual procedures are very similar to the procedures provided at <http://www.gl.com/manualectesting.html>

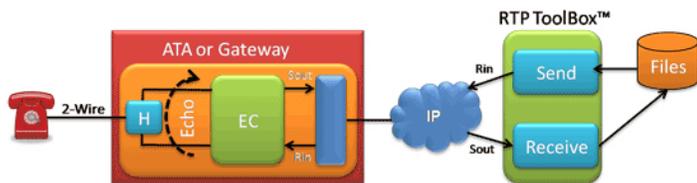


Figure: EC Testing ATAs & Gateways with Two-Wire Interface

Manual G.168 EC Compliance Testing of ATAs and Gateways with T1 E1 Interfaces

- Manual testing of all G.168 cases
- Echo Path Loss (EPL) and Echo Path Delay (EPD) fully controllable in T1/E1 card
- Use RTP ToolBox™ (PKB100) and G.168 compliance test suite (PKB105)
- Dual HD T1/E1 card (HDT001 or HDE001) with Delay /Attenuate software
- Uses GLC View to manually analyze G.168 compliance
- Full automation currently not available (coming soon)
- Manual procedures are very similar to the procedures provided at <http://www.gl.com/manualectesting.html>

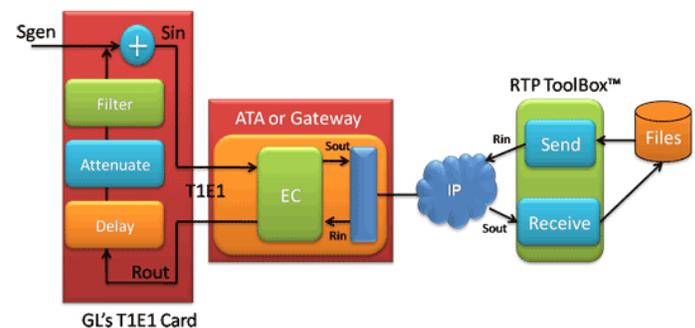


Figure: EC Testing ATAs & Gateways with T1/E1 Interface

Automated G.168 EC Compliance Testing of ATAs and Gateways - All IP Solution

- AutoECTest talks via a CLI (Command Line Interface) to an RTP Toolbox™ Server
- RTP Toolbox™ Server establishes two RTP sessions with the EC under test
- Full automation requires that Rout, Sin, Rin, and Sout streams are available through the IP interface
- Semi – automated operation is also possible with manual control of the EC
- For each compliance test in the G.168 test suite
 - S_{in} and R_{in} signals are transmitted files
 - R_{out} and S_{out} are captured files via the IP interface
 - S_{out} is analyzed by AutoECTest and the results displayed graphically

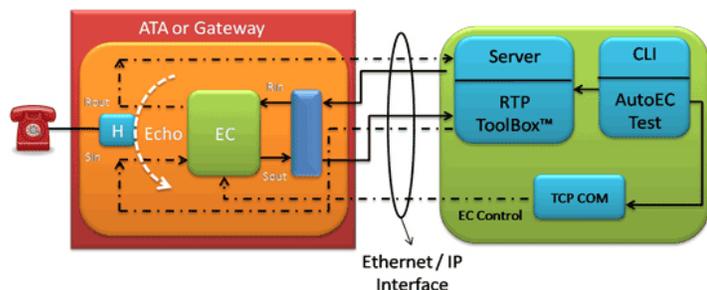


Figure: EC Testing of ATAs & Gateways - All IP Solution

Automated G.168 Compliance Testing of Gateways - Back to Back Gateway Solution

- Back-to-back gateways with testing interface at T1 E1 side
- http://www.gl.com/SA_echocancellertesting.html - Full Automation
- <http://www.gl.com/manualectesting.html> - Full manual testing
- <http://www.gl.com/echocancellertesting.html> - Semi-automated testing
- Quick performance testing is also possible -
 - Visit http://www.gl.com/GUI_echocancellertesting.html
 - Visit <http://www.gl.com/digitalechocanceller.html>
 - Visit <http://www.gl.com/loopdelayerl.html>

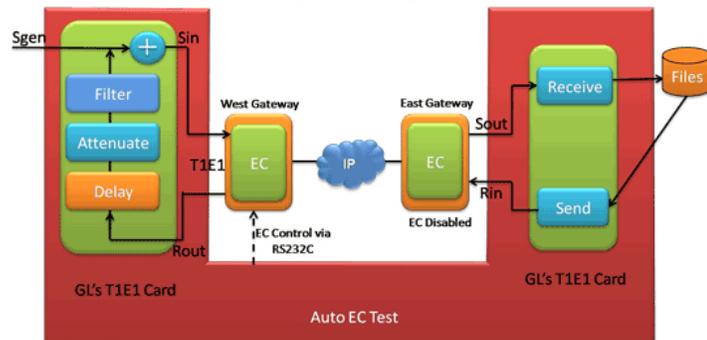


Figure: Automated EC Testing of Gateways

Automated G.168 EC Compliance Testing of Gateways – VoIP & TDM Interfaces

- Test ECs in Gateways
- Echo Path Loss (EPL), Echo Path Delay (EPD), and hybrid dispersion fully controllable in T1/E1 card
- Use of RTP ToolBox™ (PKB100) and Client-Server (PKB110) for automation on IP side
- Use of Windows Client Server (xx600, xx610, and xx630) for automation on TDM side
- Requires Dual HD T1/E1 card (HDT001 or HDE001) or USB T1 E1 Analyzer (UTE001)
- Use of Windows Client Server (xx600, xx610, and xx630) for automation on TDM side
- Automatic procedures are very similar to the procedures provided at [Fully Automated EC Compliance Testing per G.168 for VoIP and TDM systems](#)

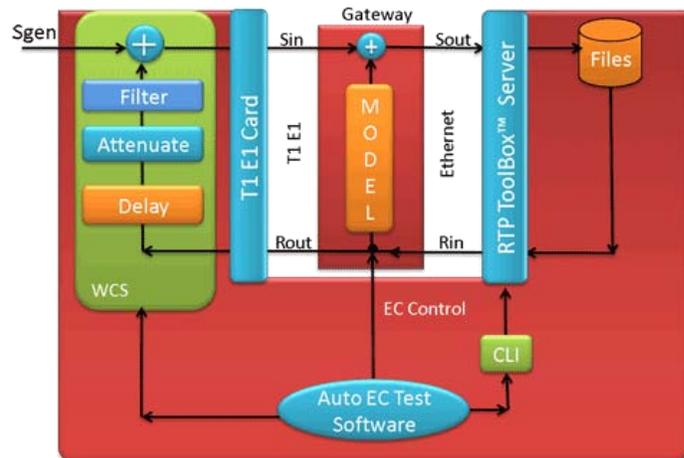


Figure: EC Testing of ATAs & Gateways - VoIP & TDM interfaces

Network Monitoring of Hybrid / Acoustic Echo and Voice Quality

- VBA works in conjunction with GL's TDM, Packet, and Wireless non-intrusive capture products, such as T1 and E1 Call Capture and Analysis, VoIP PacketScan & trade, and GSM, CDMA, and 3G Call Capture Products.
- Required software PKV100 and VBA032 at each probe location and PKV170 PacketScanWeb™ - Network Surveillance Software
- Required hardware - 1U rack PC with sufficient hard disk for capturing over 10,000 calls (80 GB HD) for each VBA collocated with a probe
- Additional hardware - PC for (PKV100) VoIP PacketScan & trade Software
- Also see <http://www.gl.com/voicebandanalyzer.html>

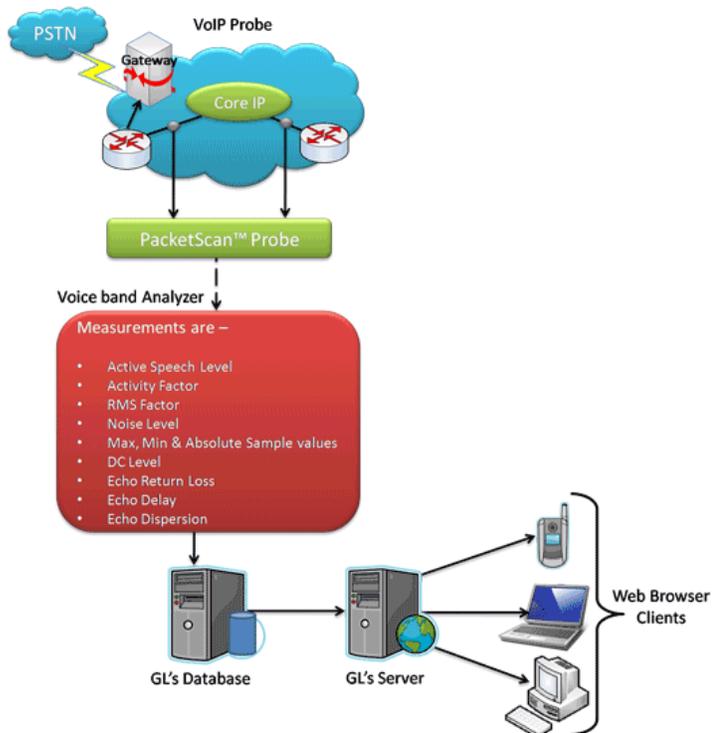


Figure: Network Monitoring of Acoustic Echo

Buyers Guide

For [Solution 1](#) - PKB100, PKB105

For [Solution 2](#) - PKB100, PKB105 + T1E1 Hardware, Software

For [Solution 3a](#) - PKB100, PKB067, PKB110

For [Solution 3b](#) - PKB100, PKB067, PKB110 +T1E1 Hardware, Software

For [Solution 4](#) - XX067, XX062, XX063, XX066, XX020, XX065+ T1E1 Hardware, Software

Item No. and Description

[PKB067](#) - AutoECTest - Automatic G.168 Compliance Test Suite

[PKB105](#) - G.168 Echo Canceller Test Compliance Suite

[PKB080](#) - AutoECTest TDM-VoIP Fully Automated EC Testing per G.168 for combined TDM-VoIP Interfaces

[PKB100](#) - RTP ToolBox™

[PKB110](#) - RTP ToolBox™ Client-Server Application (C++, TCL)

[PKV100](#) - PacketScan™ (Online and Offline)

[PKS170](#) - PacketScanWeb™

[XX020](#) - Record / Playback File Software

[XX062](#) - Echo Path Delay / Loss Simulation

[XX063](#) - Echo Path Delay / Loss Measurement Software

[XX065](#) - Manual G.168 Echo Canceller Test Suite

[XX066](#) - Digital Echo Canceller

[XX600](#) - Basic Client/Server Scripted Control Software

[XX610](#) - File based Record / Playback

[VBA032](#) - Near Real-time Voice-band Analyzer

Related Hardware

[HDT001/HDE001](#) - HD T1 / E1 (PCI) Cards with Basic Analyzer Software

[UTE001](#) - Portable USB based Dual T1 / E1 Laptop Analyzer