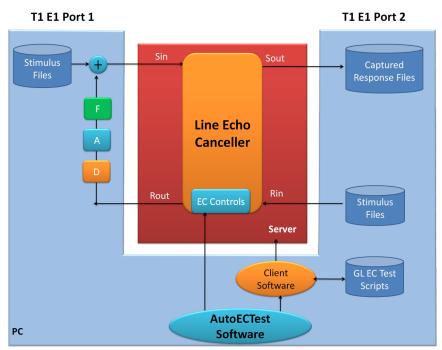
Automated Echo Canceller Testing



Overview

The **Auto EC Test Software** (XX067) is an application used to perform echo cancellation compliance testing automatically per ITU G.168 specification. ITU G.168 spec refers to characteristics of Line Echo Cancellers (LEC). AutoECTest uses GL's T1 E1 hardware platforms and can be used in TDM, Wireless, and VoIP configurations. R_{in} and S_{in} files (stimulus and echo) are prepared by Auto EC Test software in accordance with user inputs.

For more information, please visit Auto Echo Canceller Testing webpage.

Users are permitted to set:

- G.168 (2000/2002/2004/2007/2009) test requirement
- Simulation of echo path with various delay, attenuation, hybrid filters, noise level, etc.
- Levels for pseudo speech/noise
- Levels for noise
- Hybrid filter types including multiple echo paths
- Echo path delays, etc.

Main Features

- Simulates an actual echo loop with echo path delay, hybrid filter, and attenuation
- Real-time as well as off-line analysis with tabular Pass/Fail results
- Auto or Manual control of the EC during testing
- Auto analysis of the response according to G.168 (2000/2002/2004/2007/2009) requirement
- Simulation of echo path with various delay, attenuation, hybrid filters, noise level, etc
- Detailed graphical and tabular results for individual and overall test
- Option to zoom-in on any test results to investigate further
- Supported on Windows® operating system with user-friendly Graphical User Interface
- Compatible with GL's tProbe™, T1 E1 Analyzer and Dual PCIe Express cards

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Functions

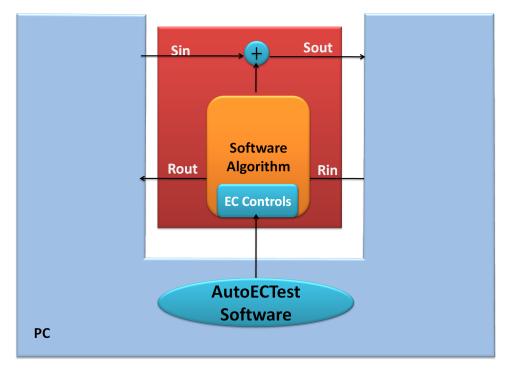
There are three core functions of AutoEC Test applications:

- Test EC for G.168 compliance
- Analyze the result files, formally named as S_{out} PCM data files, and save the results into a MAT file (contains the complex binary data format)
- Present the test results in graphical, CSV, or text formats

Approach

- Solution 1 uses WCS (Windows Client Server) software to transmit/receive files and to simulate the echoes in real time, which is used for VoIP applications. This is depicted in the main image of this brochure.
- Solution 2 is designed for ECs that are still in software forms. No GL hardware is required. See figure below.

EC Software picks up Rin & Sin (with echo) stimulus files (by frequently polling) provided by AutoECTest software and apply them to the EC in synchronous fashion. EC Software produces the output files Sout and possibly Rout and provides it to the AutoECTest software for analysis. AutoECTest performs a full analysis (with detailed displays) that results in a "Pass" or "Fail".



Testing Developmental EC Software



Test parameters per G.168

This program allows you to set the parameters for each test per ITU-T G.168. These parameters include: CSS level, NLP options (on/off), Noise level, Hybrid models (m1 \sim m7 or m1 \sim m8), ERL, and Delay, etc. The parameters can be saved into a file. A preset configuration file can be read in for establishing the test cases to be run. The settings for the test cases are as depicted in the screen below.

Echo Canceller Test Automation - E1				
Echo Canceller Test Setup	EC Test Control Mode Resu	t Analysis Result Report		
Load a Setup File	Test Repeat Number User Defined Dir C:\autoecter	Initialization		
1 1001 1	All Timeslots	Initialize GL Cards 04/2000 06/2002		
	Automated Echo Canceller G.168 Complia	Lakintan E.C. Chakan (08/2004		- 🗆 ×
50% TS0 TS1 TS2	Echo Path Simulation Settings	Test Signal Settings	Test Setting Monitorin	
TS8 TS9 TS10	Enable Energy Distribution in three Echo Paths	CSS Levels: [0 -10 -20 -30]	Overall EC Test Setup	Parameters for Each Test
▼ 0% TS16 TS17 TS18	Echo Path 1 Hybrid Settings	CSS File: css-s10.ula	Summary of Test Setup	Test 2B-a
0 TS24 TS25 TS26	Filter1 Energy(%): 100	Tone Level for Test 6 & Test 7	Framing format: 193E	NLP= OFF
	m2 m3 ERL(dB): [6 10 12]	[0 -10 -20 -30]	Total Number of Tests= 1	HybridType= 1 HybridERL= 6 10 dB
	m4 Delay(ms): [28 32 64 128]	Special Inputs for Test 8	Test 2B-a has 16 cases	HybridDelay= 28 32 ms
	Echo Path 2 Hybrid Settings	After/Before: [-90 -30 0 30 90]	Estimated time: 3284.8 second	HybridType2= 1 HybridERL2= 6 dB
Display Window		Power: Nominal C Extreme1 C Extreme2	or 0 hours 54 minutes 44 secc	HybridDelay2= 28 ms HybridType3= 1
	m2 m3 Delau(me)	Sustem: ♥ SS5+6+7 ♥ SS5 ♥ SS 6/7		HybridERL3= 6 dB HybridDelay3= 28 ms
	m4 Celay(ms) [28]			Echo Path 1= 100 Echo Path 2= 0
	Echo Path 3 Hybrid Settings	Noise Level for Test 9		Echo Path 3= 0 CSSLevel=0 -10 -20 -30 dBmC
	Filer3 Energy(%): 0	[-40 -45 -50]		
	EBL(dB)	Special Inputs for Test 15		
GL Communications Inc Auto EC Test E1	m3 m4	Point A Point B DC Power [-40]	× ×	×
Version 5.33d	NLP Options NLP On Sgen = -55 dBm0 NLP Off	3-b: Double talk signal 15 5.726-32kbps	Convergence Input for Test 2A/8- Filter	b/12 Type: G.168 Version 03/2009
	Test 1 Test2A-a Test2B-a Test2C-ab Tes	t 3A Test 3B Test 2A-b Test 38-b Test 16A	Delay in ms: [32] m2 m3	
	Test 3C Test 4 Test 5 Test 6 Test	t7 Test 8 Test 28-b Test 12 Test 168	ERL in dB: [6] m3 m4 m5	Reset Save
		15A Test 15B Test 2C-c Test 13	CSS in dBm0: [-10] m5 m6 m7	Load Apply

Main GUI & Parameters Settings

Set RS 232 control commands

Auto EC test software can be run in two modes: Auto and Manual modes. In Auto mode the commands will be saved into an internal file. The appropriate commands will be sent per G.168 (04/2000, 06/2002, or 08/2004) requirements during EC test.

🛃 Echo Canceller Control Settings 📃 🗖 🔀				
Echo Canceller Status Control Command Sets		Serial Port (RS232) Configuration		
		Connect using: COM1		
Command Response Delay Time in msec: 1000		Port Configuration		
Log on EC:	log on	Bits per second: 9600		
Log off EC:	log off	Data bits: 8		
Select channel n:	select all	Parity: None 📑		
Set EC online:	enable EC	Stop bits:		
Set EC offline:	bypass EC	Flow control: Xon/Xoff		
Enable EC Adaptation:	enable adaptation	TTL Controls		
Disable EC adaptation:	freeze H-reg			
Clear H-register:	clear H-reg			
Unclear H-register:	unclear H-reg	Send "Start/Stop" string?		
Enable NLP:	nlp on	Commands to Enable SS5/6/7 for Test 8 SS5 0n TS16 C5		
Disable NLP:	nlp off	SS5 Off TS16 CCS		
NLP On Conv. On:	nlp on con on	SS6/7 On TS16 CCS		
NLP On Conv. Off:	nlp on con off	SS6/7 Off SS67 Off SS5/6/7 On SS567 On		
NLP Off Conv. On:	nlp off con on	SS5/6/7 Off SS567 Off		
NLP Off Conv. Off:	nlp off con off	Test2C Extra Delay (ms): 0		
Enable NLP with Noise:	nlp w noise			
Disable Comfort Noise:	disable comfort noise injection	Options for EC Control Setting GUI		
Freeze H-registe	r Command Calibration	Save to File		
with delay measurements		Reset Load from File		
System Delay Calibration		Quit Apply & Close		

RS 232 control commands

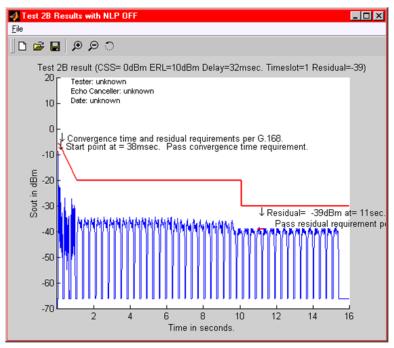
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AutoECTest Results

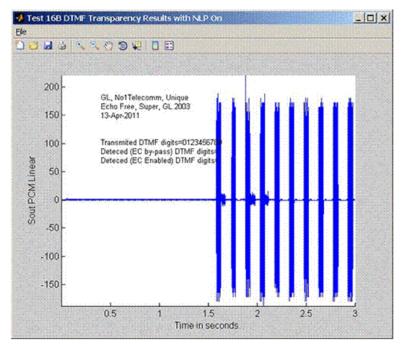
AutoECTest performs a full analysis (with detailed displays) that results in a "Pass" or "Fail".

The graphs below depict the result analysis per G.168. For the 'Pass' cases, both the convergence time and the residual should meet the requirements of G.168

For the 'Fail' cases, either one (convergence or residual) or both (convergence and residual) does not meet the requirements of G.168.



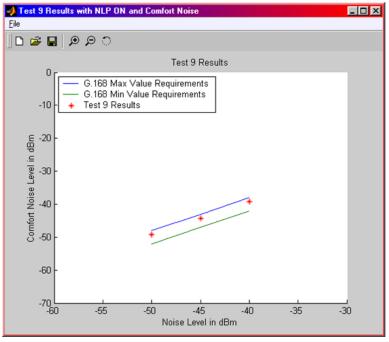
Test 2B Results in Graph



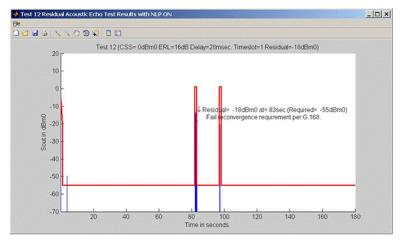
Test 2B Results in Graph

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AutoECTest Results (Contd.)



Test 9 Results shown in Graph



Test 9 Results shown in Graph



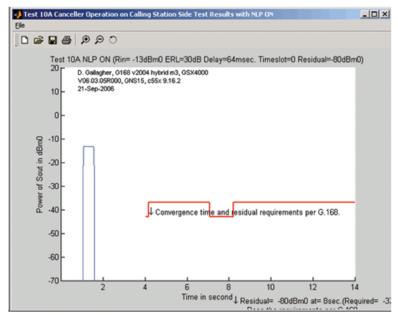
Offline analysis using AutoECTest Viewer

AutoEC Test results (saved as MAT files) can be analyzed and graphically viewed in the GL's **AutoECTest Viewer** (Automatic Echo Canceller Test Viewer) application. The screen to the left depicts the graphical presentation of the Sout file for any test case can be viewed.

The main functionalities of AutoEC Test Viewer are offline analysis of the Sout PCM result files, present the test results in graphical, CSV, or *.txt formats.

AutoECTest Result MAT File D:\Program Files\GI Raw PCM Sout File Location c:\autoectestt1\55x_9162_m3	C E1 System	G.168 Version — G.168 2004 C. G168 2002 C. G168 2000	
All Test Cases C Failed Test Cases	Offline Analysis	Analysis All	
Case (623): Pass (Test 2Cc NLP=OFF CSS= -200 Case (624): Pass (Test 2Cc NLP=OFF CSS= -200 Case (625): Pass (Test 2Cc NLP=OFF CSS= -200 Case (626): Pass (Test 2Cc NLP=OFF CSS= -200 Case (627): Pass (Test 2Cc NLP=OFF CSS= -300 Case (629): Pass (Test 2Cc NLP=OFF CSS= -300 Case (630): Pass (Test 2Cc NLP=OFF CSS= -300 Case (631): Pass (Test 2Cc NLP=OFF CSS= -300 Case (632): Pass (Test 2Cc NLP=OFF CSS= -300 Case (632): Pass (Test 2Cc NLP=OFF CSS= -300 Case (633): Pass (Test 2Cc NLP=OFF CSS= -300 Case (633): Pass (Test 2Cc NLP=OFF CSS= -300 Case (634): Pass (Test 2Cc NLP=OFF CSS= -300 Case (635): Pass (Test 2Cc NLP=OFF CSS= -300 Case (635): Pass (Test 2Cc NLP=OFF CSS= -300)	dBm ERL=15dB Delay=1 dBm ERL=30dB Delay=2 dBm ERL=30dB Delay=2 dBm ERL=6dB Delay=28 dBm ERL=6dB Delay=28 dBm ERL=6dB Delay=6 dBm ERL=15dB Delay=2 dBm ERL=15dB Delay=2 dBm ERL=15dB Delay=1 dBm ERL=15dB Delay=1 dBm ERL=30dB Delay=2	05msec.TS=0) 8msec.TS=0) 44msec.TS=0) 05msec.TS=0) msec.TS=0) 5msec.TS=0) 8msec.TS=0) 44msec.TS=0) 05msec.TS=0) 8msec.TS=0)	•
Case (636): Pass (Test 2Cc NLP=OFF CSS= -300			

AutoECTest Viewer



AutoECTest Viewer Results

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Buyer's Guide

Item No	Product Description	
<u>XX067</u>	Auto Echo Canceller Testing with / without VQT	
AEC001	AutoECTest Viewer	
<u>XX600</u>	Basic Client/Server Scripted Control Software (included)	
<u>XX630</u>	DSP Functionality (included)	
Item No	Related Software	
<u>PKB080</u>	Auto EC Test TDM-VoIP G.168 Test Software	
<u>PKB081</u>	Automated Acoustic Echo Cancellation (AEC) Compliance Test Software	
<u>XX068</u>	Semi-Automated and Scripted EC Testing Suite	
<u>XX065</u>	Manual G.168 EC Test Suite for T1 & E1 (with GLCView, XX020, XX062, XX063, XX066)	
<u>PKB105</u>	Manual G.168 EC Test Suite for ATAs & Gateways	
<u>XX066</u>	Digital Echo Canceller	
<u>XX062</u>	Echo Path Delay/Loss Simulation	
<u>XX063</u>	Echo Path Delay/Loss Measurement Software	
<u>PKB070</u>	Audio Processing Utility	
<u>VBA032</u>	Near Real-time Voice-band Analyzer	
<u>EMU037</u>	Echo Measurement Utility (EMU) Software	
Item No	Related Hardware	
<u>PTE001</u>	tProbe™ T1 E1 Base Unit	
FTE001	QuadXpress T1 E1 Main Board (Quad Port- requires additional licenses)	
ETE001	OctalXpress T1 E1 Main Board plus Daughter Board (Octal Port- requires additional licenses)	
<u>XTE001</u>	Dual Express (PCIe) T1 E1 Boards	

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, please visit Auto Echo Canceller Testing webpage.



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