

Monitor/ Create/ Terminate RTP Sessions

Scan automatically for RTP Sessions

Provides Oscilloscope and Spectrum Analyzers

Generates or Captures Single/ Dual/ Multitones/ DTMF/ MF/ MFR2 Digits

Generates or Captures RFC-2833 Digits and Events

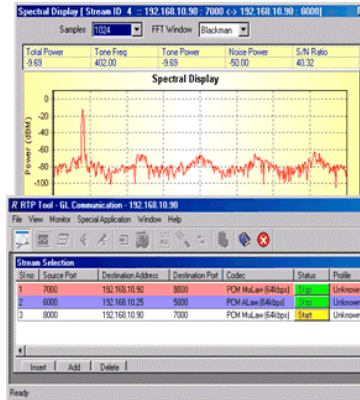
Graphically represents Jitter Buffer Statistics, and Degradation Factor statistics

Quality Metrics (R & MOS Factors), Burst Metrics, and Delay Metrics Graphs

Supports Synchronous Tx/Rx of Voice Files

Statistical Report of RTP and RTCP Packets

RTP ToolBox™ (RTP Simulation Tool)



RTP Toolbox™

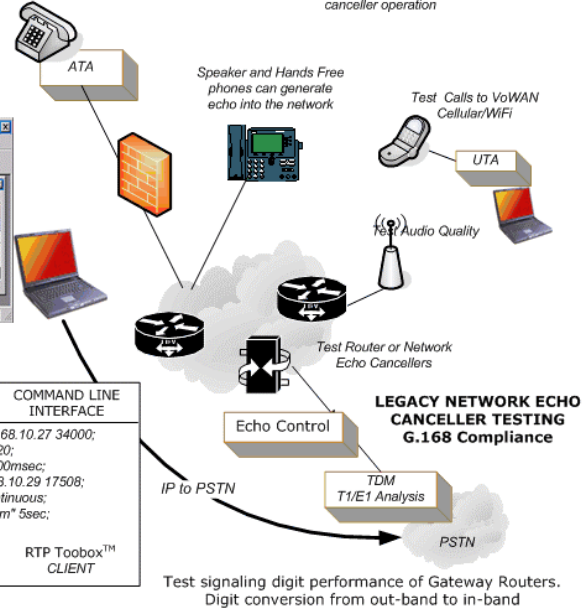
- Spectrum Analyzer and Oscilloscope
- RTP analysis - Statistics
- Client/Server CLI
- In-band/Outband DTMF, MF, R2D, RTP Actions
- Tone generation – User Defined Tones
- Synchronous Play/Record
- Caller Agent with proxy support
- E Model – R Factor
- Codecs include G.711 u-law A-law
- G.726, G.729, GSM
- Loop stream
- IP Impairments – Loss and Latency
- Auto Echo Canceller Test G.168 compliance

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Session created
RTP Toolbox™ SERVER  COMMAND LINE INTERFACE
f create_session 192.168.10.27 34000;
f set tx_profile PCMU 20;
f set rx_profile static 100msec;
f start_session 192.168.10.29 17508;
f tx file "Vijay.pcm" continuous;
f rx client file "some.pcm" 5sec;
wait 15000;
f stop tx file;
f stop_session;
RTP Toolbox™ CLIENT
    
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ECHO PROBLEMS

ATA's can produce echo with poorly implemented echo cancellers, impedance mis-matches
 Loud background noise can inhibit echo canceller operation



Overview:

GL's RTP ToolBox™ testing and simulation tool is designed not only to monitor RTP and RTCP packets, but also to allow users to manually create and terminate RTP sessions, independent of call-signaling protocols such as SIP, H323, MEGACO, or MGCP.

This tool can be used for Testing and developing enhanced voice features (VAD, Echo Cancellation, Codec, Digit Regeneration, Digit Generation, Fax over IP, Jitter Implementation etc) within end-user equipment (IP Phones, ATA, MTA etc), Testing media gateway telephony interfaces, End-to-End network testing before and during VoIP deployment, Automated testing of Digital Signal Processing embedded into network elements.

Main Features:

- Supported Codec's: G.711 (Mu-law/A-law), G.729, G.726-40/32/24/16, GSM, AMR, ILBC, and SPEEX
- Automatic scan option to capture all incoming RTP traffic
- Monitoring RTP streams using scalable Oscilloscope and Spectral Analyzer
- Generation/Detection of in-band and out-of-band Digits/Tones (DTMF, MF, user-defined, etc.)/Events per RFC-2833
- Set user-defined impairments: latency, packet loss, out of sequence and duplicate packets
- Detailed statistical information of RTP and RTCP packets
- Sending and recording of voice files with a synchronous Tx/Rx option
- G.168 testing for echo cancellation equipment
- Talk and Play to Speaker options using PC sound card
- Call Generation and Reception ability provides UA simulation
- Quality Metrics with R-Factor and MOS Factors, Jitter Buffer Statistics, Degradation Factor, Burst Metrics, and Delay Metrics are graphically represented
- Supports Client-Server functionality (requires additional license)-C++, & TCL clients
- Captured data can be graphically viewed using Oscilloscope and Spectral display applications

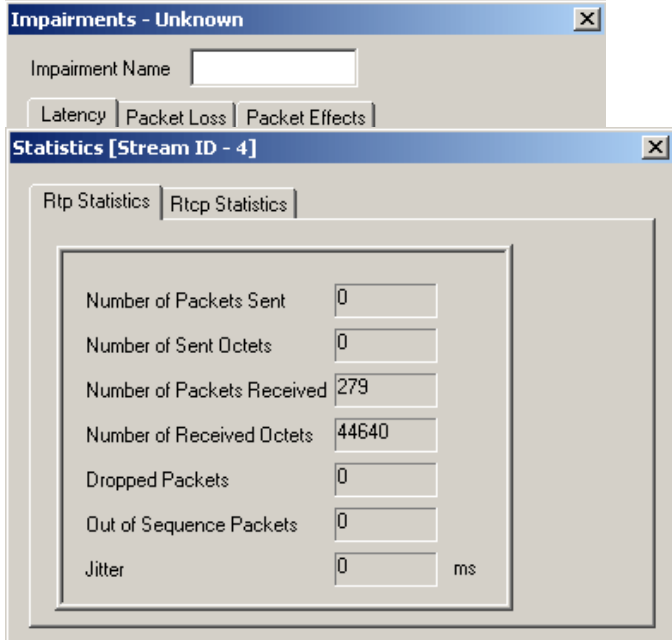


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Call Generation & Reception Capability

RTPToolBox™ allows users to configure and simulate user agent (UA) for manual call generation and reception using public URL and contact IP addresses. Multiple calls can be placed and received through a single user agent. All the calls at the application end will be answered automatically so received calls show the status as Hang-Up indicating that call has been established.



The figure shows two windows from the RTPToolBox application. The top window is titled 'Call Generation' and contains a table with the following data:

To URL	Type	Port No	Codec	Status	Description
0001@192.168.10.14	UDP	9000	A-law	HangUp	Call Established
0001@192.168.10.14	UDP	9000	A-law	HangUp	Call Established

The bottom window is titled 'Call Reception' and contains a table with the following data:

From URL	Type	Port No	Codec	Status	Description
sam@gl.com	UDP	9000	A-law	HangUp	New Incoming Call
sam@gl.com	UDP	9000	A-law	HangUp	Call Established
sam@gl.com	UDP	9000	A-law	HangUp	Call Established

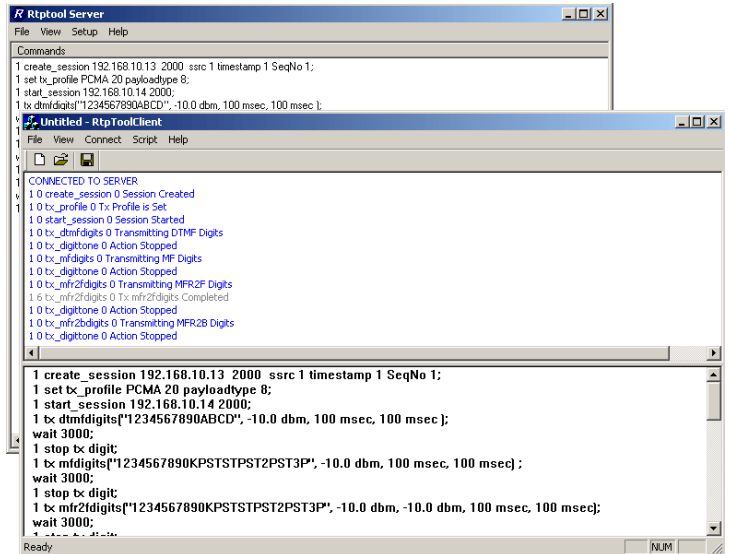
Impairments, RTP/RTCP Packet Statistics

Users can manually introduce impairments and transmit on the RTP sessions. This includes introducing fixed latency, uniform/normal distributed latency, periodic/random/burst packet loss, out-of-order packets, and duplicate packets.

Statistics reports of RTP and RTCP packets transmitted on a session such as Number of Packets Sent, Packets Received, Dropped Packets, Out of Sequence Packets, Sender Reports, and Receiver Reports are also displayed using RTP/RTCP statistics applications

Server-Client Functionality (requires additional license)

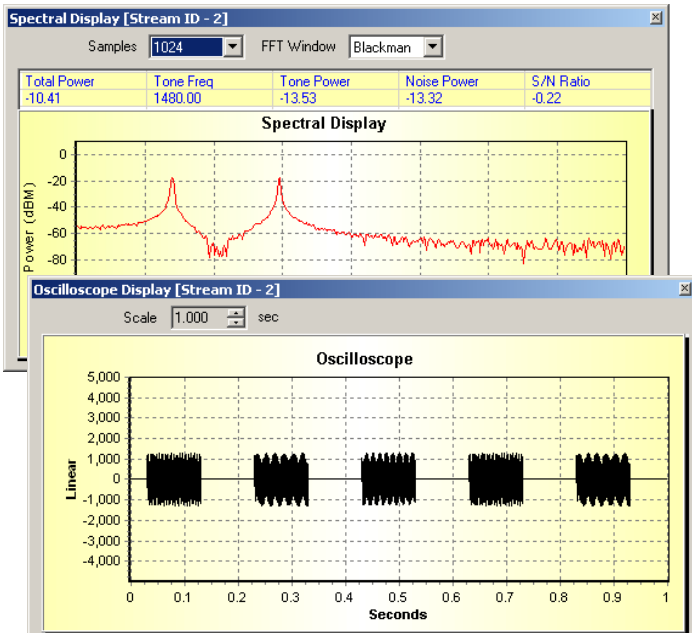
RTPToolBox™ can be configured as server-side application, to enable remote controlling of the application through multiple command-line based clients. Supported clients include C++ and TCL based clients. User can remotely perform all functions such as creating RTP sessions, Digit/Tones/Event generation and reception, Setting impairments, Creating session profiles & so on.



Oscilloscope and Spectrum Analyzer

The PCM codes (amplitude of the incoming signal) for any selected session are graphically displayed in real-time as a function of time.

The data received on a specified receive timeslot can be viewed in the spectral domain (spectral amplitude vs frequency). A Fast Fourier Transform (FFT) is applied to successive sample sets of the incoming data and displayed in graphic form. The FFT length can adjust the frequency resolution. (from 32 points to 8192 points).



Generation/Detection of Digits/Tones/RTP Events

Generation

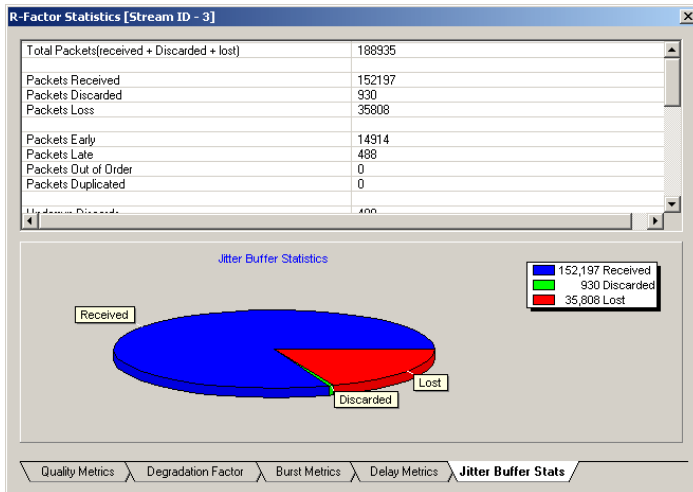
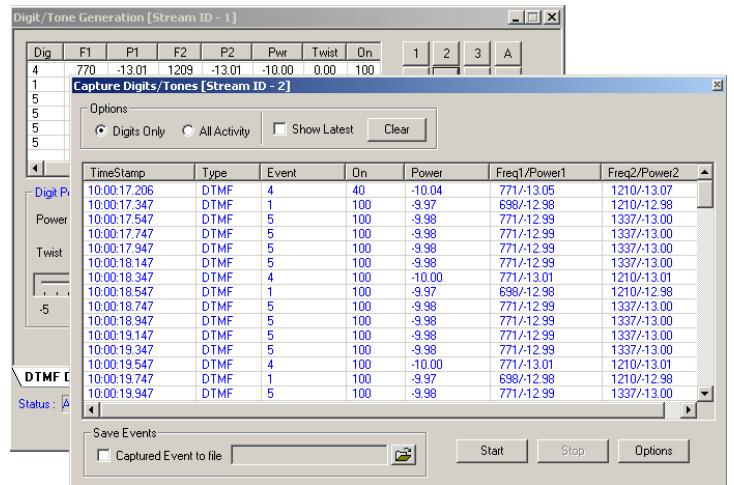
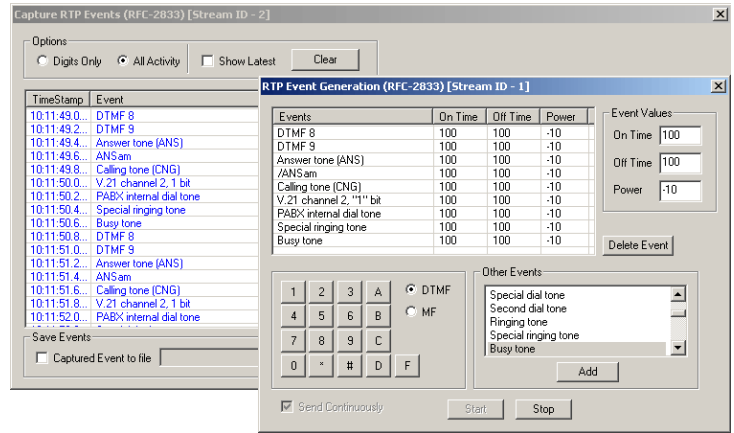
RTPToolBox™ application can be used to generate in-band digits and tones. The supported tones include single, dual, and multi-tones. Supported digits include DTMF, MF, and MFR2 forward and backward digits. The generation of RTP Events/Digits per RFC-2833 is also available. RTP ToolBox™ also allows the user to send voice files (*.wav and *.pcm).

Detection

Similar to generation, RTPToolBox™ application allows users to capture tones and digits in the traffic. It also displays additional information about the captured signal such as type of the signal, timestamp, event, power, and accept/ reject frequencies. This is completely supported for both in-band digits/tones and RTP digits/events per RFC-2833.

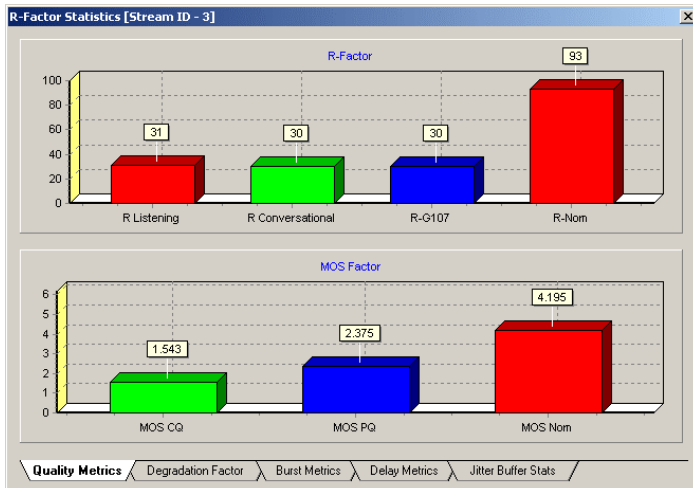
Transmit/Record Voice File

The application can also record the incoming voice data to file. These files can be compared with GL's optional Voice Quality Testing software, providing PESQ, PAMS and PSQM score. The ability to send and record files also allows G.168 testing for echo cancellers.



Jitter Buffer Statistics, Quality Metrics (R&MOS), Degradation Factor, Burst Metrics, Delay Metrics

Jitter Buffer feature allows you to set the buffer used for delayed packets that arrive at receiving end. Both static and dynamic jitter buffers are supported.

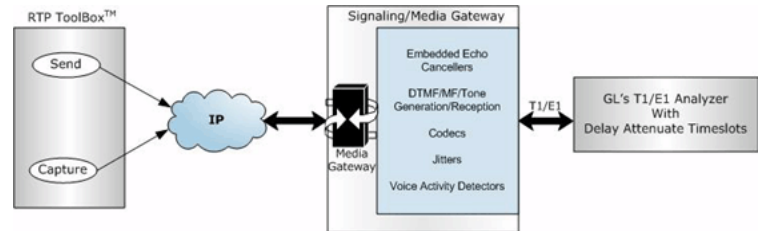
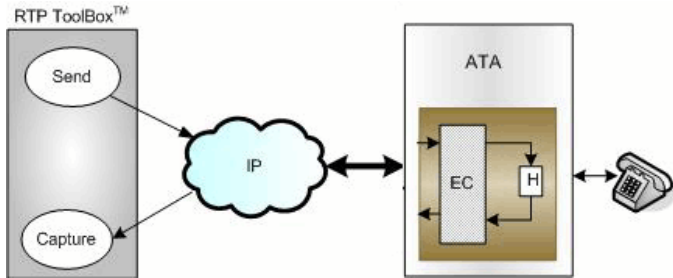


Quality metrics include various graphs for R-Factor and for MOS Factor. **R Factor** graph will display statistics such as,

R-Listening, R-Conversational, R-G107 and R-Nom. MOS Factor graph will display statistics such as MOS CQ, MOS PQ and MOS Nom. In addition to these statistics, RTPToolBox™ also supports Delay Metrics, Burst Metrics, and Degradation Factor statistics.

Media Gateway Testing using RTP ToolBox™

- Complete G.168 Compliance Testing (All 13 Tests) – Tests 1, 2A, 2B, 2C, 3, 4, 5, 6, 7, 8, 9, 10A, 10B, 11, 12, 13, 14, 15.
- Voice Quality Testing using PESQ, PAMS and PSQM
- Codec Testing and Verification



G.168 Compliance Test for EC Within ATA

G.168 Tests which can be performed on an ATA using RTP ToolBox™ include Tests 1, 2A, 2B, 2C, 3, 4, 5, 6, 7, 8, 9, 10A, 10B.

Buyers Guide:

PKB100 RTP ToolBox™ Application

PKB105 G.168 Echo Canceller Test Compliance Suite

PKB110 RTP ToolBox™ Client- Server Application

Related Software

PKS100 - PacketGen™ with PacketScan™

PKV100 -PacketScan™

VQT004 -VQT with PESQ, PAMS and PSQM

VQT002 -VQT with PESQ only

XX062 - Echo Path Delay/Loss Simulation Software