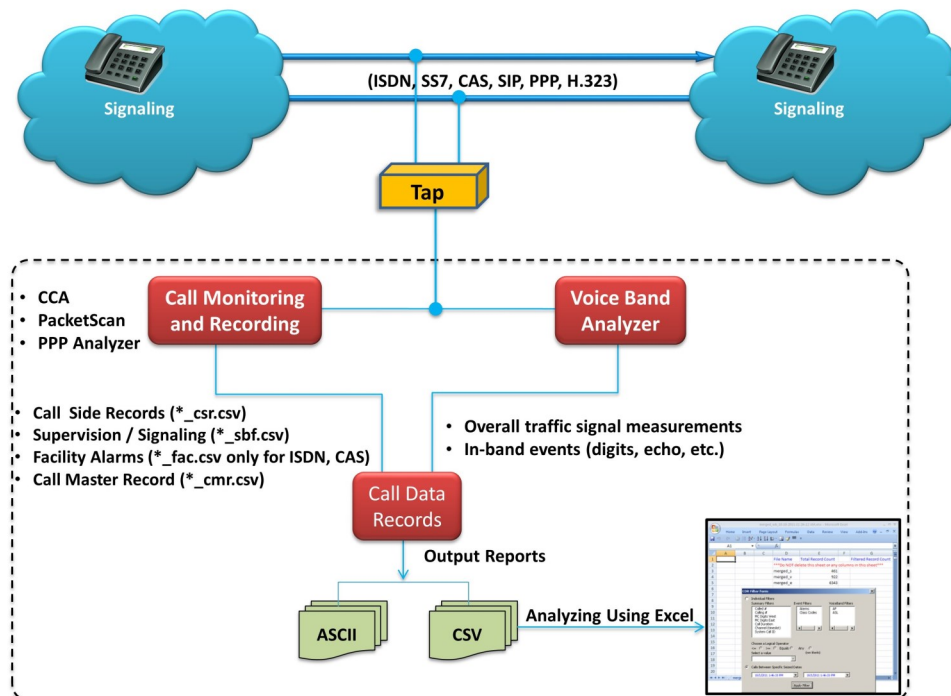


# Call Detail Records



## Overview

The telecommunication industries often face challenges in analyzing customer behavior from the large volumes of call records that are in the database over a period of time. Analyzing call records for failures, voice quality and proper signaling from a huge database is computationally intensive task and requires specialized call processing tools.

GL's **Call Data Records (CDR)** is the software based call-processing part of the GL's TDM Call Capture and Analysis ([CCA](#), [PacketScan™](#), [PPP Analyzer](#), [VBA](#)) solution. The CDR output centers around each 'call' and for each call, it reports comprehensive information occurring on T1 E1 lines and IP networks , such as:

- Voice capture for both directions
- supported codecs data rates are - a-law,  $\mu$ -law, 16-bit PCM (Intel), 16-bit PCM (Motorola), MS Wave, G.726 (40 Kbps, 32 Kbps, 24 Kbps, and 16 Kbps) and 14-bit 16 KHz G.722 (64 kbps)
- Complete signaling information for each direction for CAS, ISDN, MFC-R2, SS7, SIP, MLPPP
- All alarms and errors occurring during the call including BPV, Frame Errors, CRC errors, Loss Of Sync, and more
- Detailed voiceband event information occurring during the call including dual tones (DTMF, MF, MFC-R2), fax tones, modem signals, and more
- Detailed analysis of the voiceband call including noise level, speech level, speech activity factor, echo measurements, and more
- Categorization of the call as voice, fax, modem, or data

The generated measurements along with the recorded voice files of a particular call are combined in the Excel® using a built-in tool allowing the users to do custom filtering based on any measurements (ASL, AF, % Digits, %Voice, Mid-call-digits) or signaling messages (ISDN signaling, CAS Signaling, Release Codes, Call Duration, Call Events etc.).

For more details, visit [Call Data Records](#) webpage.



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## Call Data Records (CDR) Relationship with GL's Call Capture Applications

**Capture and Analysis (CCA), PPP Analyzer** application monitors hundreds of call in real-time and captures bidirectional voice traffic to files, including logging of detailed analysis of selected voice band streams into \*.csv files. Captures may be triggered by protocols such as signaling bits, ISDN, SS7, SIP, MLPPP and more. CCA also records signaling and alarm events.

**PacketScan™** analyzer in real-time is used to capture and monitor live IP, VoIP, and IP based video traffic. It can be used as a stand-alone tool as well as a probe in a distributed system using a central database such as Oracle as implemented in GL's PacketScanWeb™ application. Besides the SIP (H.323, MGCP, and MEGACO) messaging and RTP impairment reports, additional functions include reporting of Mean Opinion Score (MOS) / R-factor scores matched to the call as part of the Call Detail Record (CDR). It also has a powerful Trigger Action feature that can be used to select and save calls (audio or PCAP) based on parameters in the CDR. Also included is the ability to save the actual RTP of the call.

**Voice-Band Analyzer (VBA)** –operates in near-real-time, processing the signal files recorded by CCA, PacketScan™, PPP Analyzer, and produces voice-band measurements of the captured signals.

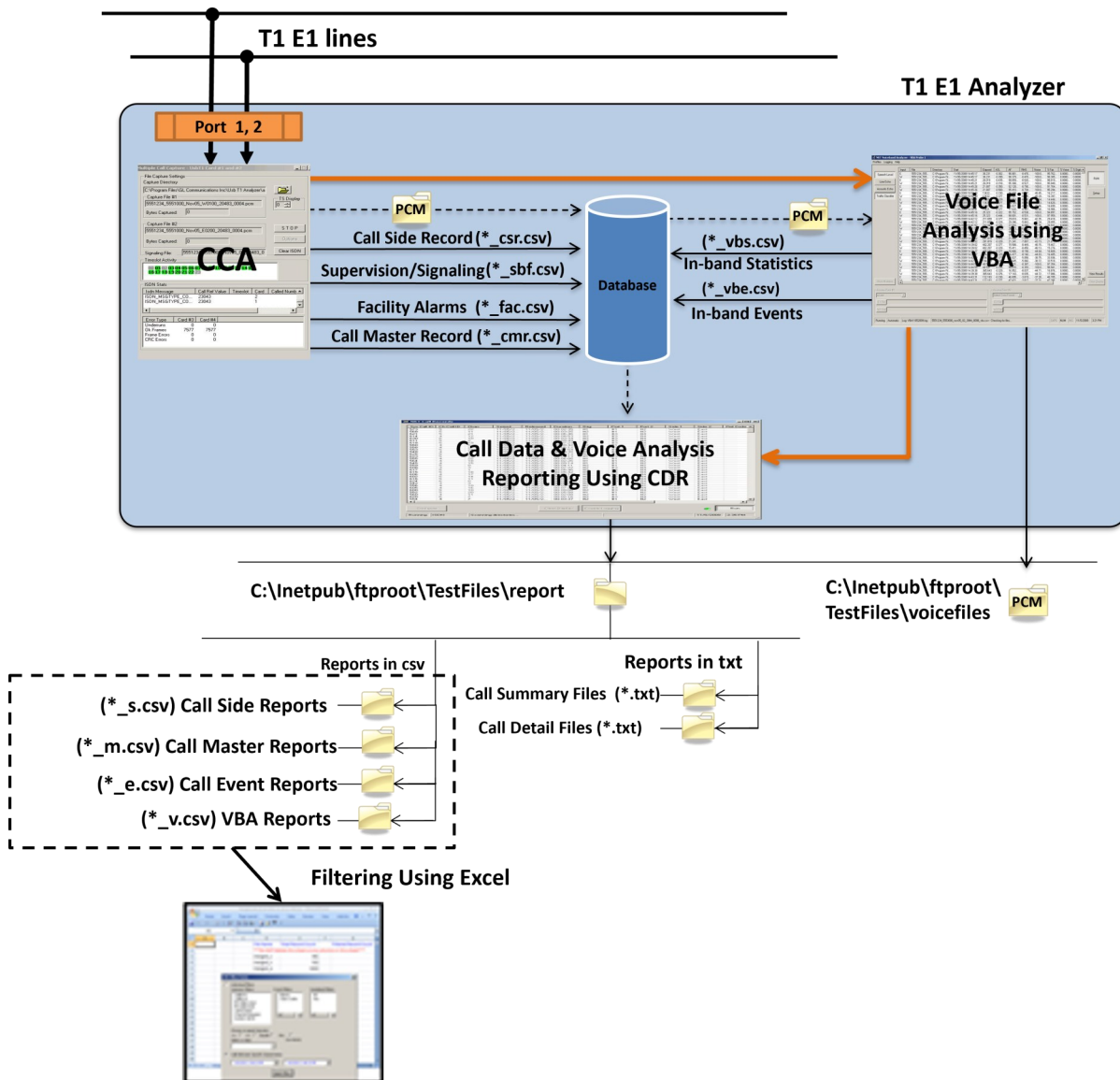


Figure: CDR with CCA, PPP Analyzer, PacketScan™ and VBA

## Working Principle

- CDR application keeps busily looking for files to process till manually stopped
- Classifies the captured events from CCA, PPP Analyzer, PacketScan™ into Call summary information (CSR, CMR), Call events (Channel supervision (CAS, ISDN, etc.), Facility alarms) results
- Classifies the captured events from VBA into In-band events (digits, echo, etc.) results and overall traffic signal measurements.
- CDR can be configured to output its results to "comma-separated values" ("CSV") files or ASCII file for loading into a database or spreadsheet
- CDR processes file sets produced by all the captured calls as described in the below table.
- The generated call records can be processed in Excel® and analyzed comprehensively to get the calls of interest using a built-in add-in included with the Excel® application

File	Designation	Description	Source
Call Summary	"*_csr.csv"	Call Side Records (CSR)	CCA
	"*_cmr.csv"	Call Master Record (CMR)	CCA
Supervision	"*_sbf.csv"	Channel supervision (CAS, ISDN, etc.)	CCA
Alarms	"*_fac.csv"	Facility alarms	CCA
In-band Statistics	"*_vbs.csv"	Overall traffic signal measurements	VBA
In-band Events	"*_vbe.csv"	In-band events (digits, echo, etc.)	VBA

Probe ID	Call ID	Orig	Calling	Called	Start	Released	Duration	Rel Code
ATTCARD1	111116111506-1	New York(#2:0)	3016041111	3019241111	11/16/2011 11:15:24	11/16/2011 11:16:58	00:01:34	Normal
ATTCARD1	111116111506-3	New York(#2:2)	3016243333	3019243333	11/16/2011 11:15:24	11/16/2011 11:16:05	00:00:41	Normal
ATTCARD1	111116111506-24	New York(#2:22)	3017242222	3019242229	11/16/2011 11:15:29	11/16/2011 11:16:11	00:00:42	Normal
ATTCARD1	111116111506-2	New York(#2:1)	3016042222	3019242222	11/16/2011 11:15:24	11/16/2011 11:16:07	00:00:43	Normal
ATTCARD1	111116111506-21	New York(#2:20)	3012242220	3019242220	11/16/2011 11:15:25	11/16/2011 11:16:06	00:00:41	Normal
ATTCARD1	111116111506-19	New York(#2:18)	3017242218	3019242218	11/16/2011 11:15:25	11/16/2011 11:16:08	00:00:43	Normal
ATTCARD1	111116111506-18	New York(#2:17)	3015242217	3019242217	11/16/2011 11:15:25	11/16/2011 11:16:08	00:00:43	Normal
ATTCARD1	111116111506-17	New York(#2:16)	3016242216	3019242216	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-16	New York(#2:15)	3016242215	3019242215	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-15	New York(#2:14)	3016242214	3019242214	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-14	New York(#2:13)	3016242213	3019242213	11/16/2011 11:15:24	11/16/2011 11:16:07	00:00:43	Normal
ATTCARD1	111116111506-13	New York(#2:12)	3016242212	3019242212	11/16/2011 11:15:24	11/16/2011 11:16:07	00:00:43	Normal
ATTCARD1	111116111506-12	New York(#2:11)	3016241011	3019242211	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-11	New York(#2:10)	3016241010	3019241010	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-10	New York(#2:9)	3019242289	3017242239	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-9	New York(#2:8)	3019242288	3017242238	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-8	New York(#2:7)	3019242237	3016242237	11/16/2011 11:15:24	11/16/2011 11:16:07	00:00:43	Normal
ATTCARD1	111116111506-7	New York(#2:6)	3019242236	3016242236	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-6	New York(#2:5)	3019242235	3016242235	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-5	New York(#2:4)	3019242234	3016242234	11/16/2011 11:15:24	11/16/2011 11:16:06	00:00:42	Normal
ATTCARD1	111116111506-4	New York(#2:3)	3019242233	3016242233	11/16/2011 11:15:24	11/16/2011 11:16:05	00:00:41	Normal
ATTCARD1	111116111506-22	New York(#2:21)	3019242221	3016242220	11/16/2011 11:15:25	11/16/2011 11:16:06	00:00:41	Normal
ATTCARD1	111116111506-20	New York(#2:19)	3014242219	3012242219	11/16/2011 11:15:25	11/16/2011 11:16:06	00:00:41	Normal

Figure: Call Data Records Main Window

## Output Formats

### Text and CSV Output

CDR output its results to text or Comma-Separated Values ("CSV") files. The CDR output in text format provides call summary report and call detail reports. Different types of Call Detail Report are -

- **Call Master Record** - gives an overall summary of the call, including the Probe ID, CALL ID, Side 1 and 2, Call Ref Value, Protocol, Data Rate, Release Code and so on
- **Call side Information** - gives Telephone number, Port and Timeslot number, Mid call digits, and Capture file name
- **Call events** - gives an event-by-event account of the call. Events include channel supervision events, sporadic echo, alarms, ISDN calls, and various traffic
- **In-band summary** – display depends on the VBA configurations

The example below depicts all the different sections of the Call Detail Report in \*.txt format.

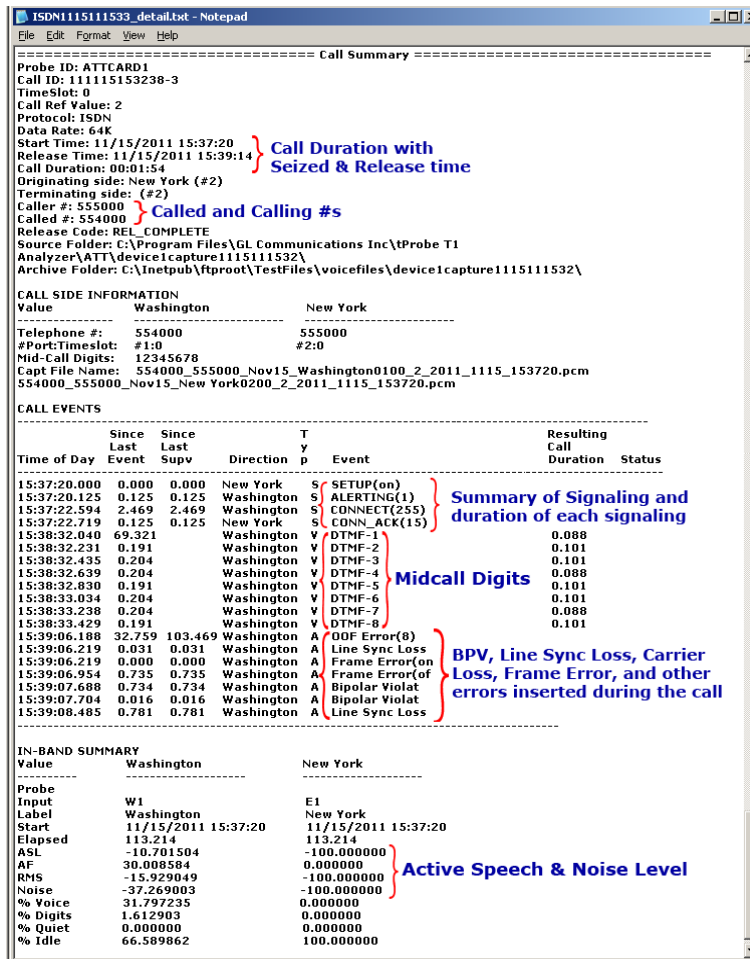


Figure: Call Detail Text Report

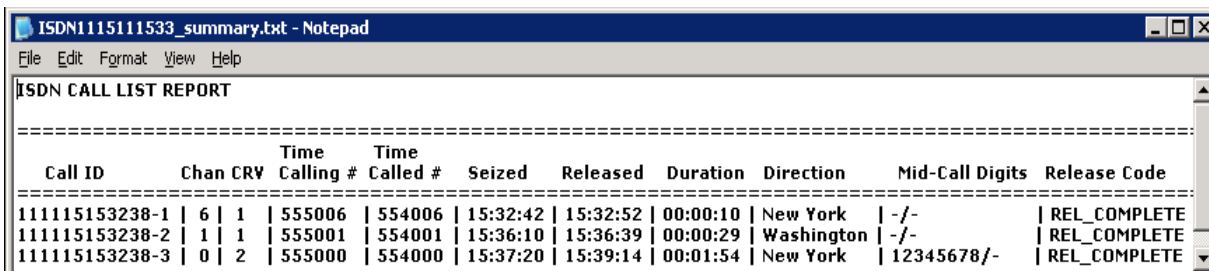


Figure: ISDN Call Summary Text Report

## Output Formats (Contd.)

### CSV Output

The examples below depicts all the different Call Detail Report in \*.CSV formats. All files are in "CSV" ("Comma-Separated Values") format, a widely used format in the Windows® world understood by popular data management applications such as Microsoft® Excel and Access.

The figure shows two overlapping Microsoft Excel windows. The top window, titled 'ISDN1202111528\_m - Microsoft Excel', displays a 'Master Report' with columns: Probe ID, Call ID, Side 1, Side 2, Protocol, Start, Released, Duration, Orig, Term, Rel Code, Src Dir, Arch Dir, CRV, and Data Rate. The bottom window, titled 'ISDN1202111528\_s - Microsoft Excel', displays a 'Side Report' with columns: Probe ID, Call ID, Side, Address, File Name, Port, TimeSlot, and MC Digits.

Figure: ISDN Call Master and Side Report

The figure shows two overlapping Microsoft Excel windows. The top window, titled 'ISDN1202111528\_e - Microsoft Excel', displays a 'Call Event Report' with columns: Probe ID, Call ID, Side, Class ID, Class, Code ID, Code, Data, Start, and Dur. The bottom window, titled 'ISDN1202111528\_v - Microsoft Excel', displays a 'Call Inband CSV Report' with columns: Probe ID, Call ID, Input Side, ASL, AF, RMS, Noise, % Voice, % Digits, % Quiet, and % Idle.

Figure: ISDN Call Event and Call Inband CSV Report

## CDR Excel® Add-In

- **Excel® Add-in for Advanced Filtering:** The generated CSV call records can be processed in Excel® application and analyzed more comprehensively to get the calls of interest using a built-in tool included with the Excel® application.
- The generated measurements along with the recorded voice files of a particular call are combined in the Excel®. Also allows the users to do custom filtering based on any measurements (ASL, AF, % Digits, %Voice, Mid-call-digits, etc.) or signaling messages (ISDN Signaling, CAS Signaling, Release Codes, Call Duration, Call Events , etc.)
- **Retrieving Calls of Interest:** The details of a selected call from the filtered records in Excel® can be printed or stored as PDF files for further scrutiny.

The screenshot shows a Microsoft Excel spreadsheet with a table of call records. The 'Calls of Interest' dialog box is open, displaying a filtered list of calls. The selected call is highlighted in red in the dialog box. Below the list, there are tabs for 'Call Summary', 'Call Side Information', 'Call Events', and 'Voiceband Measurements'. The 'Call Summary' tab is active, showing details for the selected call. To the right of the summary, there are options to 'Play the Voice Files' or 'Download and Play the Voice Files', along with a folder path input field and a 'Print Selected Record' button.

Probe ID	Call ID	Side 1	Side 2	Protocol	Start	Released	Duration
VoIPProbe	GLPG40068772850547	Left	Right	SIP	11/30/2011 10:07:24	11/30/2011 10:08:22	00:00:58
VoIPProbe	GLPG45198872850596	Left	Right	SIP	11/30/2011 10:08:15	11/30/2011 10:09:13	00:00:58
VoIPProbe	GLPG58764772850782	Left	Right	SIP	11/30/2011 10:10:31	11/30/2011 10:11:23	00:00:52
VoIPProbe	GLPG62096972850822	Left	Right	SIP	11/30/2011 10:11:04	11/30/2011 10:12:04	00:01:00
VoIPProbe	GLPG66819272850872	Left	Right	SIP	11/30/2011 10:11:51	11/30/2011 10:12:44	00:00:53
VoIPProbe	GLPG73129972850950	Left	Right	SIP	11/30/2011 10:12:54	11/30/2011 10:13:50	00:00:56

Filtered Calls: 6 of 130 Total Calls ; Filtering Criteria: Duration > 00:00:50

Call Summary | Call Side Information | Call Events | Voiceband Measurements

3  
 Probe ID: VoIPProbe  
 Call ID: GLPG58764772850782  
 Protocol: SIP  
 Start Time: 11/30/2011 10:10:31  
 Release Time: 11/30/2011 10:11:23  
 Call Duration: 00:00:52  
 Call Originating Side: Left  
 Call Terminating Side: Left  
 Release Code: Normal Call Clearing  
 Post Dial Delay(PDD): 14  
 Session Delay(SD): 0  
 Archive Folder: C:\Program Files\GL Communications Inc\PacketScan\ATT\VoIPCaptures\_2011\_11\_30\_10\

Play the Voice Files  
 (requires the voice file path to have write permissions)

Download and Play the Voice Files  
 C:\Test\  
 (Enter the folder name only)

Print Selected Record

Figure: Filtering Required Calls from Large Set of Records

## CDR Excel® Add-In (Contd.)

- **Easy Invocation of Voice Files:** The voice files of a particular call from the filtered records in Excel® can be downloaded or played back using third-party audio editing tools such as Goldwave®

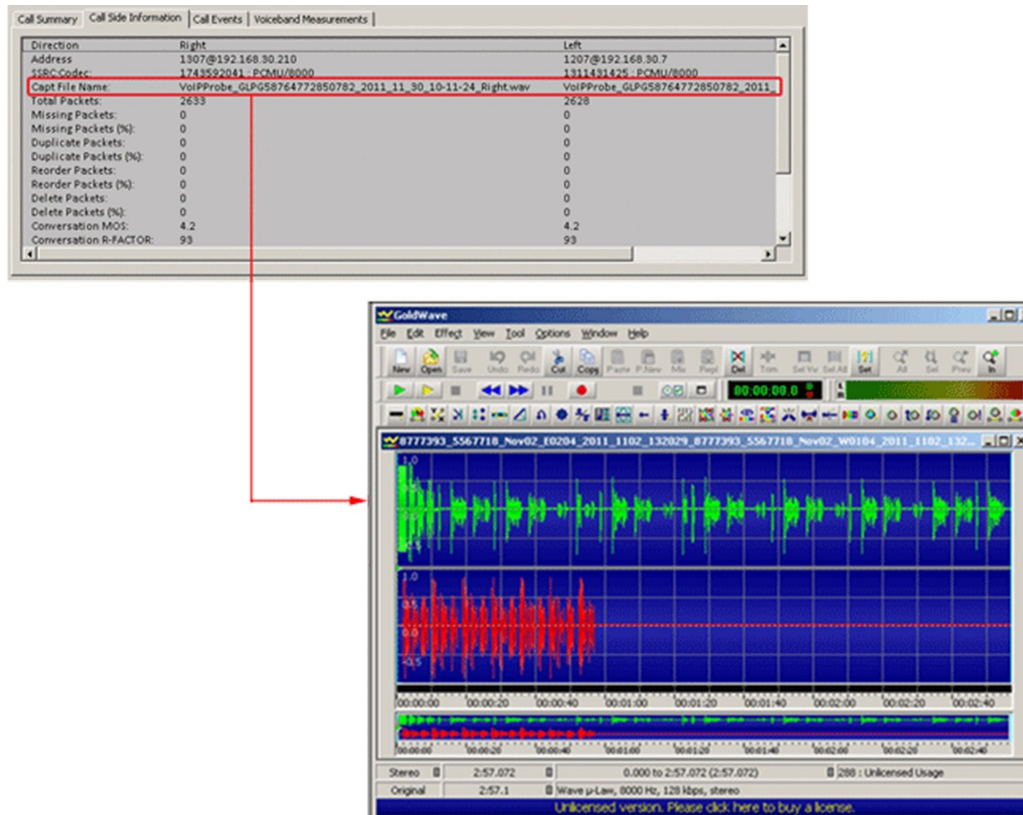


Figure: Play/Download the Stereo Voice Files from Filtered Calls

## Buyer's Guide

Item No	Product Description
<a href="#">CDR032</a>	Call Data Records (CDR) Software

Item No	Related Software
<a href="#">XX031</a>	Call Capture and Analysis
<a href="#">XX020</a>	Record and Playback of Files
<a href="#">VBA032</a>	Near Real-time Voice-band Analyzer
<a href="#">PKB070</a>	Audio Processing Utility
<a href="#">XX680</a>	T1 E1 Traffic Classifier

Item No	Related Hardware
<a href="#">PTE001</a>	tProbe™ T1 E1 Base Unit
<a href="#">FTE001</a> , <a href="#">ETE001</a>	Quad and Octal T1 E1 Analyzer Boards
<a href="#">XTE001</a>	Dual Express (PCIe) T1 E1 Boards
<a href="#">TTE001</a>	tScan16™ T1 E1 Boards

For more details, visit [Call Data Records](#) webpage.



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