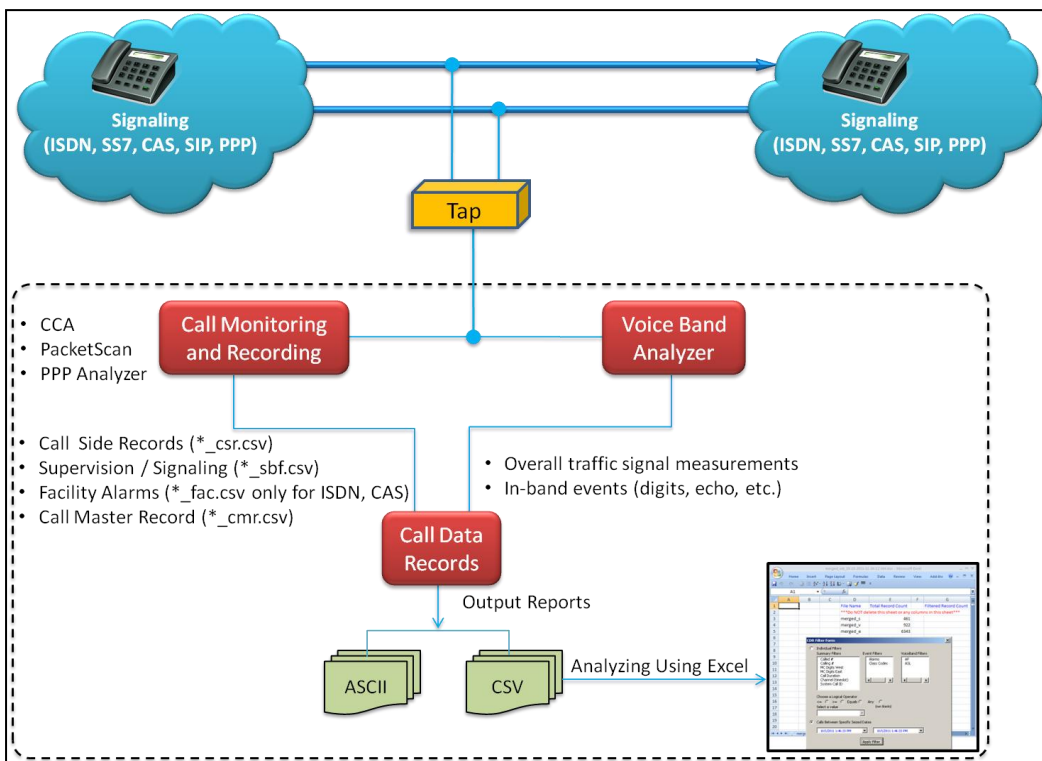


## Call Data Records (CDR)

GL Communications Inc's approach to Call Data Records (CDR) compilation is as depicted in the picture below.



### Overview

Often the telecommunications industries 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) 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
- 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,...). For more details, visit our web page <http://www.gl.com/calldatarecords.html>.

Reports in Text and CSV Files

Categorizes Call Records as Master, Side, Signaling and Alarm Events, Inband Statistics

Generates Call Summary & Call Detail Reports in \*.txt Format

Supports CAS, ISDN, MFC-R2, SS7, SIP, MLPPP and more

Operates in Near-Real-time

Categorization of the Calls as Voice, Fax, Modem, or Data

Detail Voiceband, Call Events Information, and more

All Alarms and Errors (BPV, Frame, CRC, Loss Of Sync, and more) Logged

Custom Excel® Add-in to Filter Calls and Voice Files



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

**Call Capture & 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.

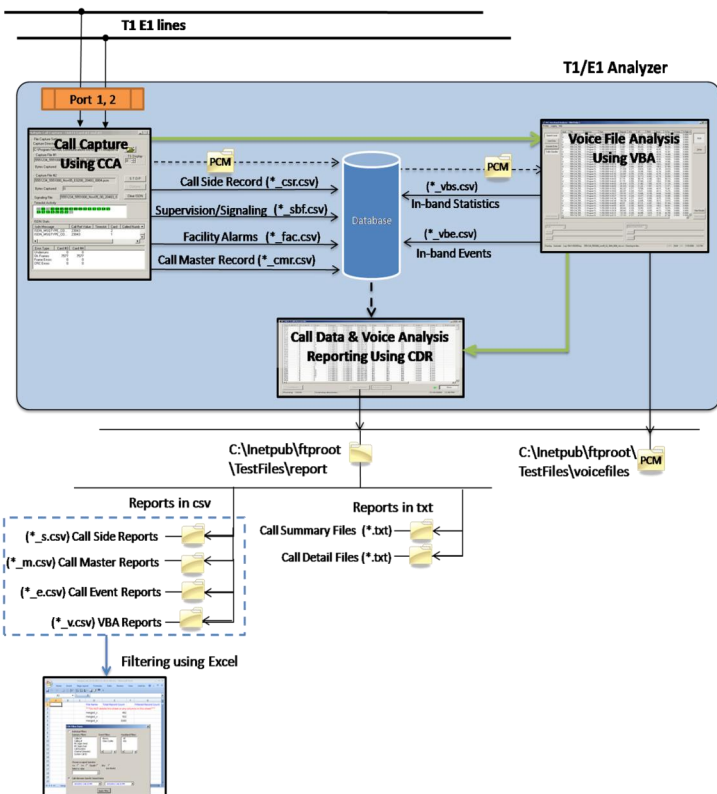


Figure: CDR with CCA, PPP Analyzer, PacketScan™ & VBA

## 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 following 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

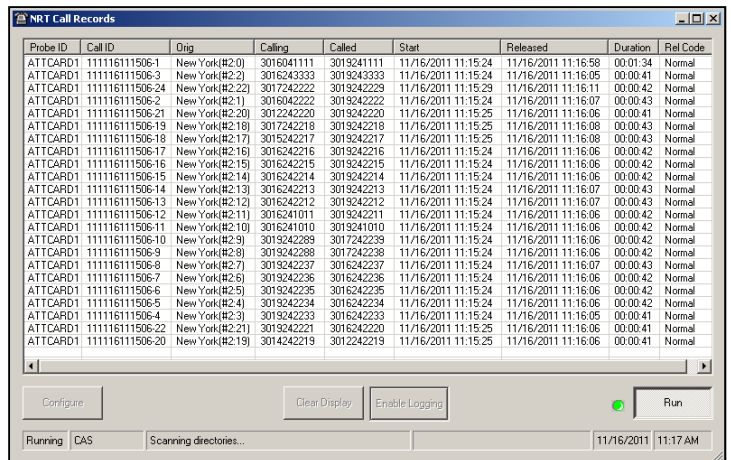


Figure: Call Data Records Main Window



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## Output Formats

### Text & 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.

**Call Summary**

Probe ID: ATTCARD1  
 Call ID: 11115153238-3  
 TimeSlot: 0  
 Call Ref Value: 2  
 Protocol: ISDN  
 Data Rate: 64K  
 Start Time: 11/15/2011 15:37:20  
 Release Time: 11/15/2011 15:39:14  
 Call Duration: 00:01:54  
 Originating side: New York (#2)  
 Terminating side: (#2)  
 Caller #: 554000  
 Called #: 554000  
 Release Code: REL\_COMPLETE  
 Source Folder: C:\Program Files\GL Communications Inc\Probe T1  
 Analyzer: ATTCARD1\Device\capture111511533\Archive Folder: C:\inetpub\ftproot\TestFiles\voicefiles\device\capture111511533\

**CALL SIDE INFORMATION**

Value	Washington	New York
Telephone #:	554000	555000
#Port: Timeslot:	#1:0	#2:0
Mid-Call Digits:	12345678	
Capt File Name:	554000_555000_Nov15_Washington0100_2_2011_1115_153720.pcm	554000_555000_Nov15_New York0200_2_2011_1115_153720.pcm

**CALL EVENTS**

Time of Day	Event	Since	Supv	Direction	T	Y	Event	Resulting Call Duration	Status
15:37:20.000	0.000	0.000	New York	S			SETUP(on)		
15:37:20.125	0.125	0.125	Washington	S			ALERTING(1)		
15:37:22.594	2.469	2.469	Washington	S			CONNECT(255)		
15:37:22.719	0.125	0.125	New York	S			CONN_ACK(15)		
15:38:32.040	69.321		Washington	V			DTMF-1	0.088	
15:38:32.231	0.191		Washington	V			DTMF-2	0.101	
15:38:32.435	0.204		Washington	V			DTMF-3	0.101	
15:38:32.639	0.204		Washington	V			DTMF-4	0.101	
15:38:32.830	0.191		Washington	V			DTMF-5	0.101	
15:38:33.034	0.204		Washington	V			DTMF-6	0.101	
15:38:33.238	0.204		Washington	V			DTMF-7	0.088	
15:38:33.429	0.191		Washington	V			DTMF-8	0.101	
15:39:06.188	32.759	103.469	Washington	A			ODF Error(8)		
15:39:06.219	0.031	0.031	Washington	A			Line Sync Loss		
15:39:06.219	0.000	0.000	Washington	A			Frame Error(on)		
15:39:06.954	0.735	0.735	Washington	A			Frame Error(of)		
15:39:07.688	0.734	0.734	Washington	A			Bipolar Violat		
15:39:07.704	0.016	0.016	Washington	A			Bipolar Violat		
15:39:08.485	0.781	0.781	Washington	A			Line Sync Loss		

**IN-BAND SUMMARY**

Value	Washington	New York
Probe	W1	E1
Label	Washington	New York
Start	11/15/2011 15:37:20	11/15/2011 15:37:20
Elapsed	113.214	113.214
ASL	-10.701504	-100.000000
AF	30.008584	0.000000
RMS	-15.929049	-100.000000
Noise	-37.269003	-100.000000
% Voice	31.797235	0.000000
% Digits	1.612903	0.000000
% Quiet	0.000000	0.000000
% Idle	66.589862	100.000000

Figure: Call Detail Text Report

**ISDN CALL LIST REPORT**

Call ID	Chan	CRV	Calling #	Called #	Seized	Released	Duration	Direction	Mid-Call Digits	Release Code
11115153238-1	6	1	555006	554006	15:32:42	15:32:52	00:00:10	New York	-/-	REL_COMPLETE
11115153238-2	1	1	555001	554001	15:36:10	15:36:39	00:00:29	Washington	-/-	REL_COMPLETE
11115153238-3	0	2	555000	554000	15:37:20	15:39:14	00:01:54	New York	12345678/-	REL_COMPLETE

Figure: ISDN Call Summary Text Report

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.

Probe ID	Call ID	Side 1	Side 2	Protocol	Start	Released	Duration	Orig	Term	Rel Code	Src Dir	Arch Dir	CRV	Data Rate
ATTCARD1	111202152329-4	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:27	0:00:47	Washington	New York	REL_COMI	C:\Progra	C:\inetpu	256	64K
ATTCARD1	111202152329-5	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:27	0:00:47	Washington	New York	REL_COMI	C:\Progra	C:\inetpu	512	64K
ATTCARD1	111202152329-6	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:27	0:00:47	Washington	New York	REL_COMI	C:\Progra	C:\inetpu	2816	64K
ATTCARD1	111202152329-7	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:28	0:00:48	Washington	New York	REL_COMI	C:\Progra	C:\inetpu	3584	64K
ATTCARD1	111202152329-8	Washington	New York	ISDN	12/2/2011 15:26	12/2/2011 15:28	0:01:56	Washington	Los Ange	REL_COMI	C:\Progra	C:\inetpu	256	64K
ATTCARD1	111202152329-9	Washington	New York	ISDN	12/2/2011 15:26	12/2/2011 15:28	0:01:56	Washington	Los Ange	REL_COMI	C:\Progra	C:\inetpu	512	64K
ATTCARD1	111202152329-10	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:28	0:01:56	Washington	Los Ange	REL_COMI	C:\Progra	C:\inetpu	768	64K
ATTCARD1	111202152329-11	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:28	0:01:56	Washington	Los Ange	REL_COMI	C:\Progra	C:\inetpu	1024	64K
ATTCARD1	111202152329-12	Washington	New York	ISDN	12/2/2011 15:27	12/2/2011 15:29	0:01:50	Washington	New York	REL_COMI	C:\Progra	C:\inetpu	1792	64K

Figure: ISDN Call Master Report

Probe ID	Call ID	Side	Address	File Name	Port	TimeSlot	MC Digits
ATTCARD1	111202152329-4	Washington	8763096	5558485_8763096_Dec02_Washin	1	0	
ATTCARD1	111202152329-4	New York	5558485	5558485_8763096_Dec02_New Yo	2	0	
ATTCARD1	111202152329-5	Washington	8758004	5515213_8758004_Dec02_Washin	1	10	
ATTCARD1	111202152329-5	New York	5515213	5515213_8758004_Dec02_New Yo	2	10	
ATTCARD1	111202152329-16	Washington	5523997	5523997_8748072_Dec02_Washin	1	19	
ATTCARD1	111202152329-16	New York	8748072	5523997_8748072_Dec02_New Yo	2	19	
ATTCARD1	111202152329-20	Washington	5520208	5520208_8746578_Dec02_Washin	1	16	
ATTCARD1	111202152329-20	New York	8746578	5520208_8746578_Dec02_New Yo	2	16	

Figure: ISDN Call Side Report

Probe ID	Call ID	Side	Class ID	Class	Code ID	Code	Data	Start	Duration
ATTCARD1	111202152329-4	Washington	4	ISDN	5	SETUP	on	0	0
ATTCARD1	111202152329-4	New York	4	ISDN	2	CALL_PROC	on	0.017125	0
ATTCARD1	111202152329-4	New York	4	ISDN	3	PROGRESS	15	0.040875	0
ATTCARD1	111202152329-4	New York	4	ISDN	7	CONNECT	15	0.0485	0
ATTCARD1	111202152329-4	Washington	4	ISDN	15	CONN_ACK	255	0.05525	0
ATTCARD1	111202152329-4	New York	4	ISDN	69	DISCONNECT	on	46.181375	0
ATTCARD1	111202152329-4	Washington	4	ISDN	77	RELEASE	255	46.205	0
ATTCARD1	111202152329-4	New York	4	ISDN	90	REL_COMPLETE	on	46.20825	0
ATTCARD1	111202152329-5	Washington	4	ISDN	5	SETUP	on	0	0

Figure: ISDN Call Event CSV Report

Probe ID	Call ID	Input	Side	ASL	AF	RMS	Noise	% Voice	% Digits	% Quiet	% Idle
ATTCARD1	111202152329-4	E1	New York	-13.34086	28.9236	-18.72833	-42.56242	34.10405	0	0	65.895954
ATTCARD1	111202152329-4	W1	Washington	-12.84547	85.4308	-13.52932	-30.15544	94.21965	0	0	5.780347
ATTCARD1	111202152329-5	E1	New York	-13.35329	29.0275	-18.72519	-42.56908	34.10405	0	0	65.895954
ATTCARD1	111202152329-5	W1	Washington	-19.15365	93.9155	-19.42627	-32.09595	100	0	0	0
ATTCARD1	111202152329-1	E1	New York	-13.44842	28.2021	-18.9456	-42.75729	32.95455	0	0	67.045455
ATTCARD1	111202152329-1	W1	Washington	-19.49922	96.1119	-19.67144	-32.20077	100	0	0	0
ATTCARD1	111202152329-2	E1	New York	-13.42818	27.2097	-19.08094	-42.93841	31.81818	0	0	68.181818
ATTCARD1	111202152329-2	W1	Washington	-19.7428	97.6705	-19.84516	-32.30474	100	0	0	0

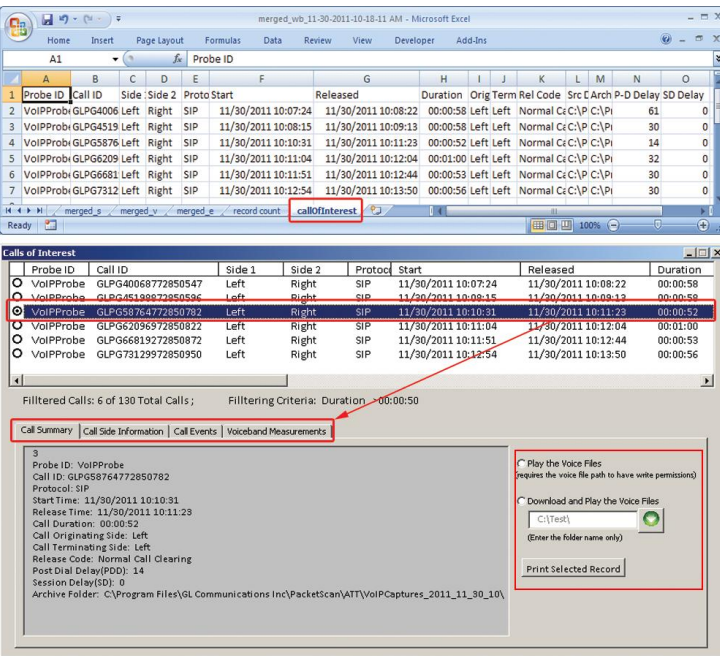
Figure: ISDN Call Inband CSV Report



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**CDR Excel® Add-In**

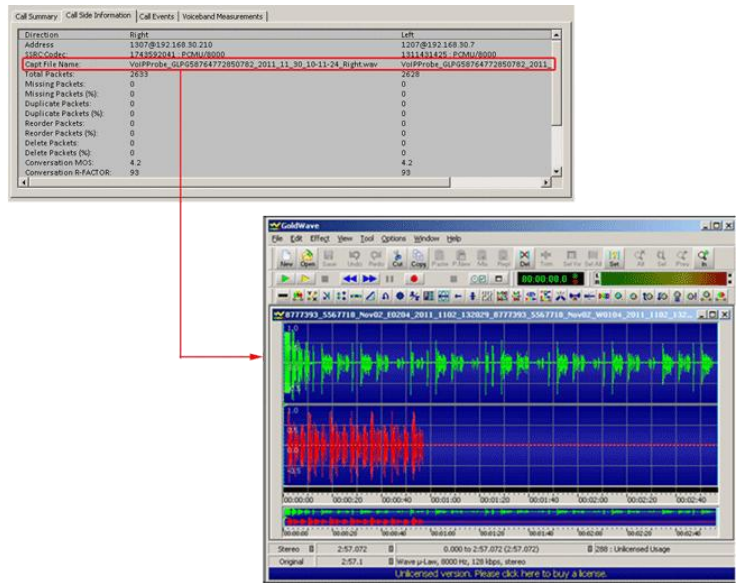
- **Excel® Add-in for Advanced Filtering:** The generated CSV call records can be processed in Excel® application and analyzed more comprehensively to get the calls of interest using a built-in tool included with the Excel® application.
- The generated measurements along with the recorded voice files of a particular call are combined in the Excel® 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,...).
- **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.



**Figure: Filtering Required Calls from Large Set of Records**

**CDR Excel® Add-In**

- **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**

**Buyers Guide**

[CDR032](#) - Call Data Records (CDR) Software

**Related Software**

- [XX030](#) - Call Capture Analysis Software and its accessories
- [XX031](#) - CCA with Traffic Activated Triggering
- [VBA032](#) - Near Real-time Voice-band Analyzer
- [XX020](#) - Record/Playback File Software
- [PKB070](#) - Audio Processing Utility
- [XX680](#) - T1/E1 Traffic Classifier

**Related Hardware**

- [PTE001](#) - tProbe™ Dual T1 E1 Laptop Analyzer (Requires Basic Software)
- [HTE001](#) - Universal T1/E1 Card
- [UTE001](#) - Portable USB based Dual T1 or E1 Laptop Analyzer



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