

---

# V5.x Protocol Analyzer

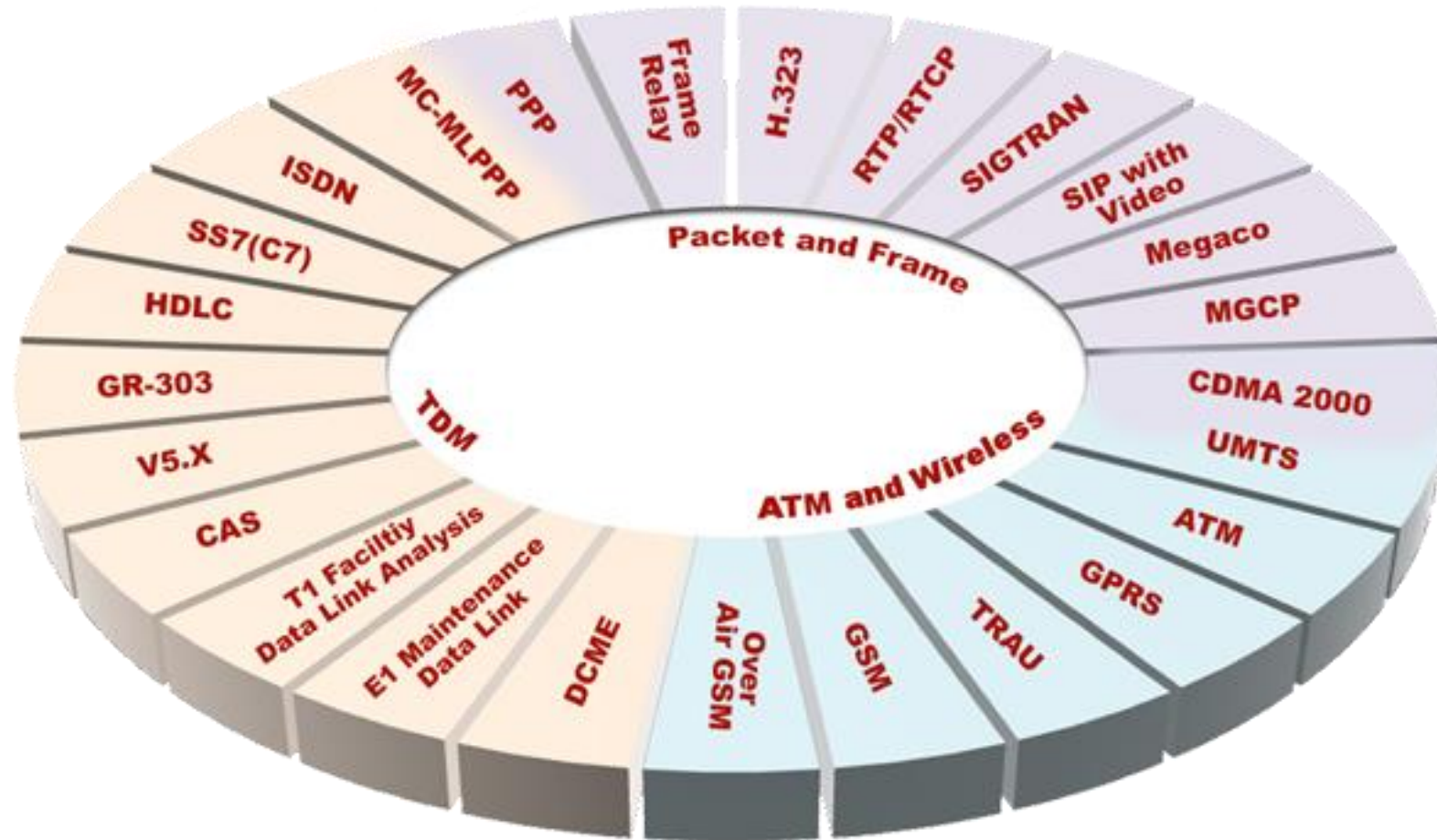
---



818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878  
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: [info@gl.com](mailto:info@gl.com)  
Website: <https://www.gl.com>

# TDM, Wireless, and VoIP Protocol Analysis

- GL Communications provides a host of protocol analyzers for testing a variety of protocols
- Analysis may be done both in real-time and off-line



# Supported Platforms



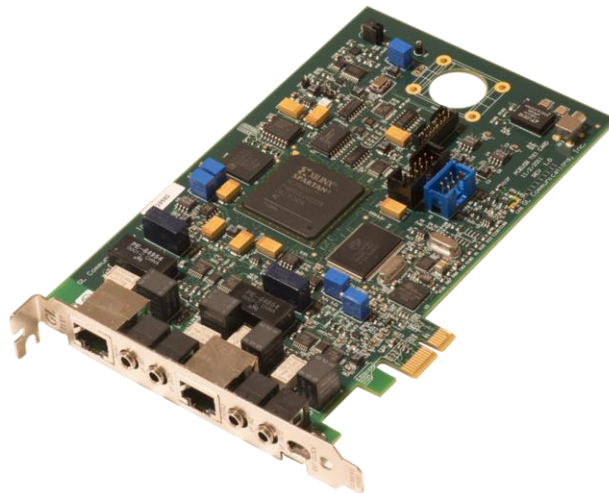
Front Panel

Back Panel

**tProbe™ - Portable USB based T1 E1 VF  
FXO FXS and Serial Datacom Analyzer**

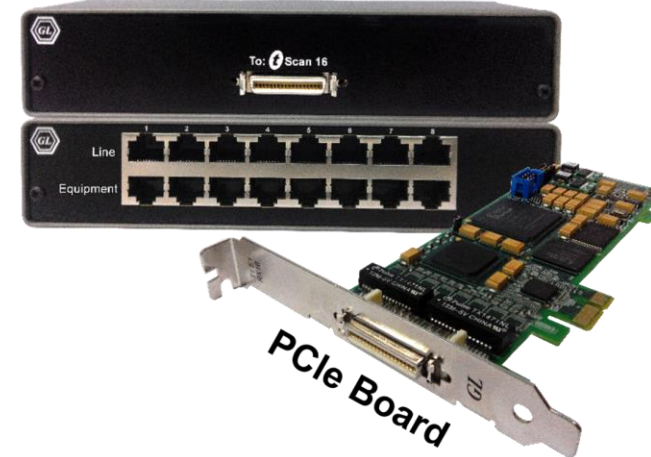


**Quad / Octal T1 E1 PCIe Card**



**Dual T1 E1 Express (PCIe) Board**

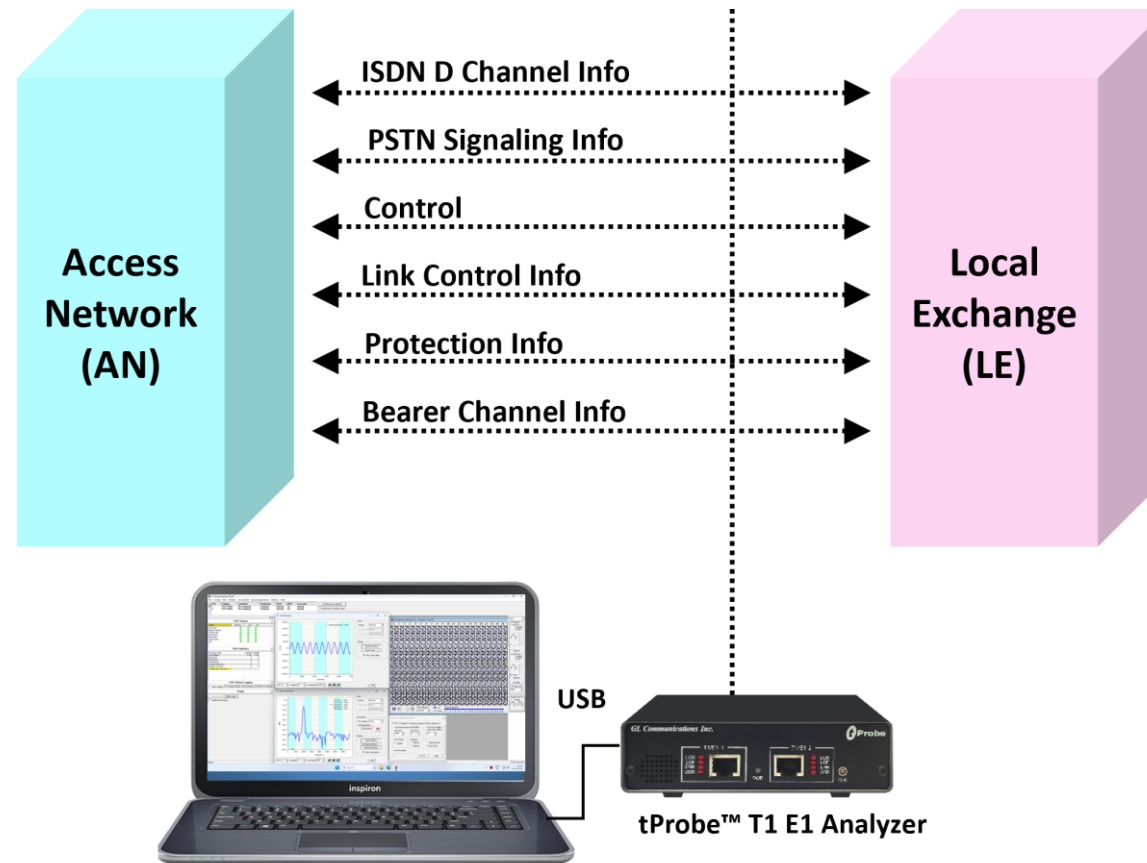
**tScan16™ with  
16-port T1 E1 Breakout Box**



**PCIe Board**

# Overview

- GL's V5.x analyzer can be used to capture and analyze a stream of frames from the link between LE and AN
- The analyzer provides V5.x based on ETSI / ITU standard in order to decode according to the corresponding standards
- Supports capturing and decoding of LAPV5, ISDN Call Signaling - Q.93 as layer 3, Link Control Protocol (LCP), Protection Protocol (PP), Bearer Channel Connection (BCC). and PSTN



# Supported Protocol Standard

- V5 ITU Standard
- V5 ETSI Standard

Supported Protocols	Specification Used
LAPV5	
PSTN	
BCC	ITU-T Q921, G.964 & G.965
PP	
Link Control	
ISDN Q.931	ITU-T Q.931

# Features

- Summary View displays Device Number, Time Slots: Sub channels, Frame number, Time, Frame length, etc. in a tabular format
- Summary view (Call Quality Matrix) displays complete summary of call information in graphical format, along with a summary of alerts
- Detail View displays packet by packet statistics for call information in tabular format
- Any protocol field can be added to the summary view, filtering, and search features providing users more flexibility to monitor required protocol fields
- Option to combine data from multiple columns under one column
- Option to create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results efficiently
- Advanced filtering and search based on any user selected protocol fields
- Allows the user to create search/filter criteria automatically from the current screen selection
- Remote monitoring capability using GL's Network Surveillance System

# Real-time Analysis

The screenshot displays the V5x Protocol Analysis V5 ITU Standard 64-bit software interface. The top menu bar includes File, View, Capture, Statistics, Database, Call Detail Records, Configure, and Help. Below the menu is a toolbar with various icons for file operations, capture control, and analysis tools.

The main window is divided into several sections:

- Packet List Table:** A table showing captured packets. The columns are Dev, TSlot, SubCh, Frame#, TIME (Relative), Len, Error, BCC Message Type Information, and CTRL Message Type Information. The first four packets are highlighted in blue.
 

Dev	TSlot	SubCh	Frame#	TIME (Relative)	Len	Error	BCC Message Type Information	CTRL Message Type Information
1	0		4	00:00:00.000000	15		AN FAULT	
1	0		5	00:00:00.000000	16		PROTOCOL ERROR	
1	0		6	00:00:00.000000	15		ALLOCATION REJECT	
1	0		7	00:00:00.000000	15			PORT CONTROL
- Packet Details:** Below the packet list, the details for the selected packet (Card1 TimeSlot=0 Frame=4 at 00:00:00.000000 OK Len=15) are shown. It identifies the frame as HDLC Frame Data + FCS and displays the LAPV5 Layer information:
 

```

===== LAPV5 Layer =====
0000 EA1                      = .....0 (0)
0000 C/R                      = .....0.. Command(User), Response(Network)
0000 EF Address                = 8178 (111111.. 1110010..)
0001 EA2                      = .....1 (1)
0002 VSDIaddr                 = 8178 (111111 1110010 )
      
```
- Hex Dump of the Frame Data:** A section showing the raw hexadecimal data of the frame. The first line of data is:
 

```

FC E5 FC E5 13 48 E0 3F 28 40 04 C0 07 47 49
      
```

 The second line shows the corresponding ASCII characters:
 

```

      uâââ Hà?(@ À GI
      
```
- Summary Table:** A table at the bottom summarizing the frame counts for each device.
 

Device #	Frame Count(Device #)
1	20
total 1	20

The status bar at the bottom indicates the file path C:\Program Files\GL Communicatic and shows 22 Frames.

## Summary View

## Detail View

## Hex Dump View

## Statistics View

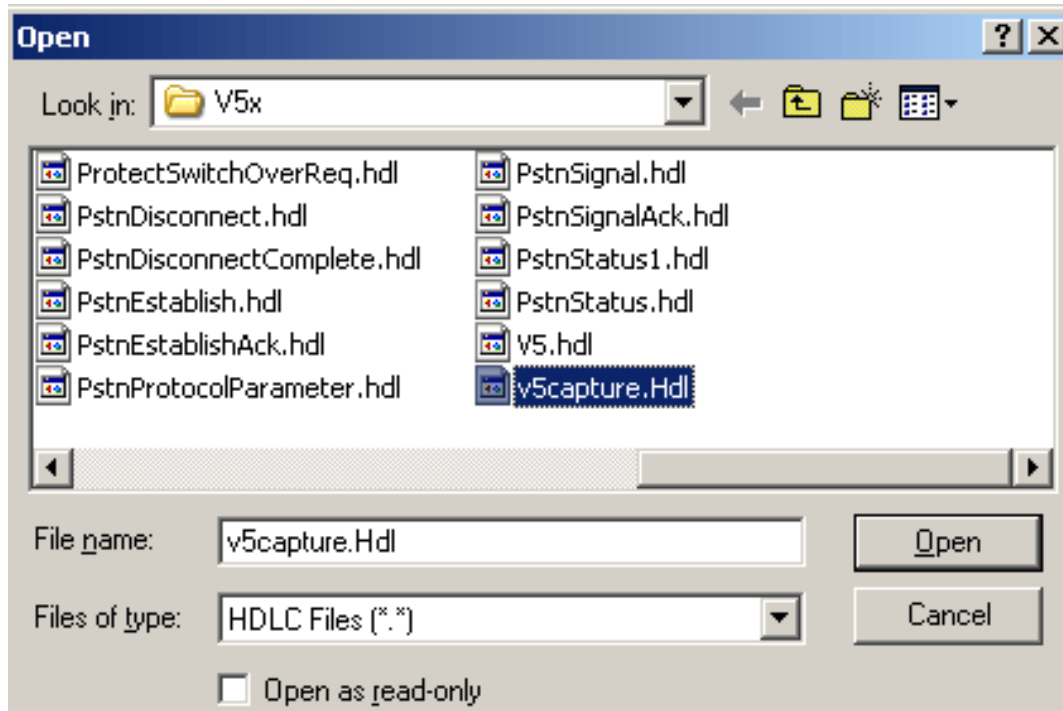
# Different Views

- **Summary View:** This pane displays the columns that contain Card Number, Timeslots, Frame Number, BCC Message Type Information, CTRL Message Type Information, and more in a tabular format
- **Detail View:** This pane displays in detail about a frame in order to analyze and decode by selecting it in the summary view
- **Hex Dump View:** This pane displays the frame information in HEX and ASCII format
- **Statistics View:** This pane displays various statistics that are calculated based on the protocol fields



# Offline Analysis

- Off-line analysis is equivalent to capturing a file in pre-defined timeslots
- Captured frames or only the filtered frames can be exported to \*.HDL file for the further off-line analysis
- Trace file for offline analysis can be loaded either through analyzer GUI or through simple command-line arguments



V5x Protocol Analysis V5 ITU Standard 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

Dev	TSlot	SubCh	Frame#	TIME (Relative)	Len	Error	BCC Message Type Information	CTRL Message Type Information	PP Message Type Information
✓ 1	0		0	00:00:00.000000	14		PROTOCOL ERROR		
✓ 1	0		1	00:00:00.000000	15		PROTOCOL ERROR		
✓ 1	0		2	00:00:00.000000	11		AN FAULT ACKNOWLED...		
✓ 1	0		3	00:00:00.000000	15		AN FAULT		
✓ 1	0		4	00:00:00.000000	15		AN FAULT		
✓ 1	0		5	00:00:00.000000	16		PROTOCOL ERROR		
✓ 1	0		6	00:00:00.000000	15		ALLOCATION REJECT		
✓ 1	0		7	00:00:00.000000	15			PORT CONTROL	
✓ 1	0		8	00:00:00.000000	14			PORT CONTROL ACK	
✓ 1	0		9	00:00:00.000000	23			COMMON CONTROL	
✓ 1	0		10	00:00:00.000000	14			COMMON CONTROL ACK	

Card1 TimeSlot=0 Frame=0 at 00:00:00.000000 OK Len=14

HDLC Frame Data + FCS

\*\*\*\*\* LAPV5 Layer \*\*\*\*\*

0000 EA1 = .....0 (0)

0000 C/R = .....0. Command(User). Response(Network)

0000 EF Address = 8178 (111111... 1110010.)

0001 EA2 = .....1 (1)

0002 VSDLaddr = 8178 (111111... 1110010.)

0003 Layer 3 Protocol = 1110010. BCC

0004 Ctl = .....11 Unnumbered

0004 Modifier Function = 000.00... UI

0004 P/F = ...1.... (1)

\*\*\*\*\* Information Layer \*\*\*\*\*

0000 Spare = 11111100 (252)

0001 Spare = 11100101 (229)

0002 BCC Protocol =

0002 Spare = 11111100 (252)

0003 Spare = 11100101 (229)

0004 Spare = 00010011 (19)

0005 Protocol Discriminator = 72 (x48)

0006 BCC Reference Number = 6207 (.1100000 ..111111)

0006 Source ID = 1..... (1)

0008 BCC Message Type = .0101010 PROTOCOL ERROR

0009 User Port Identification =

0009 IE Identifier(PEC) = 01000101 Protocol Error Cause Information

000A Length of Protocol Error Cause = 1 (x01)

000B Protocol Error Cause = .0000001 Protocol discriminator error

Off-line Viewing. C:\Program Files\GL Communications Inc\Probe E1 Anz 22 Frames

# Filtering and Search

- Isolates required frames from all frames in real-time, as well as offline
- The frames can also be filtered after completion of capture based on C/R, SAPI, TEI, CTL, different ISDN message types and more. Similarly, search capability helps user to search for a particular frame based on specific search criteria

Space Delimited Length List to Exclude

5 7

Exclude FISU Exclude LSSU Clear ALL

Filter Selection

- Q.93x
  - Data Link
    - LAPD
      - C/R
      - SAPI
      - TEI
      - CTL
      - P/F
      - N(S)
      - N(R)
      - FUNC
- Q.93x Layer 3

CTL Value

- Information
- Supervisory
- Unnumbered

Activate Deactivate

All Selected

Layer	Field	Filter Value
LAPD	C/R	Command(User), Response(Network)
LAPD	CTL	Information, Supervisory, Unnumbered

Conditions for all selections

☐ AND ☒ OR ☒ Include ☐ Exclude Deactivate Sel Deactivate All

# Filtering Criteria From Screen Selection

- Allows the user to create filter criteria automatically from the current screen selection

The image illustrates the process of creating filter criteria from a screen selection in the Analyzer GUI. It shows a table of data, a context menu, a dialog box, and the main GUI configuration window.

**Data Table:**

✓	1	0	4	00:00:00.000000	15	AN FAULT
✓	1	0	5	00:00:00.000000	16	PROTOCOL ERROR
✓	1	0	6	00:00:00.000000	15	ALLOCATION REJECT
✓	1	0	7	00:00:00.000000	15	
✓	1	0	8	00:00:00.000000	14	
✓	1	0	9	00:00:00.000000	23	

**Context Menu:**

- Search Selected Value
- Set Search Criteria as Sel Values
- Set Filter Criteria as Sel Values

**Dialog Box:**

Use Ctrl, Shift for Extended Selection

Information::BCC Message Type

OK Select All Cancel

**Analyzer GUI and Protocol Configuration:**

Save Load Default

Select summary columns to di...  
Menu checked options  
Protocol standard selection  
Network/User side selection  
Time Format  
View Filter  
View Search  
TCP Connection Options  
Periodic Trace Saving Options  
Startup Options  
Data Link Groups  
View Font Size  
INI Decode Options  
Define Summary Columns  
Aggregate Summary Columns  
Capture Options

**Filter Selection:**

- ✓ V5 ITU Standard
  - Data Link
  - LAPV5
  - Information
  - Q.93x

**Value Selection:**

Activate Deactivate

**All Selected:**

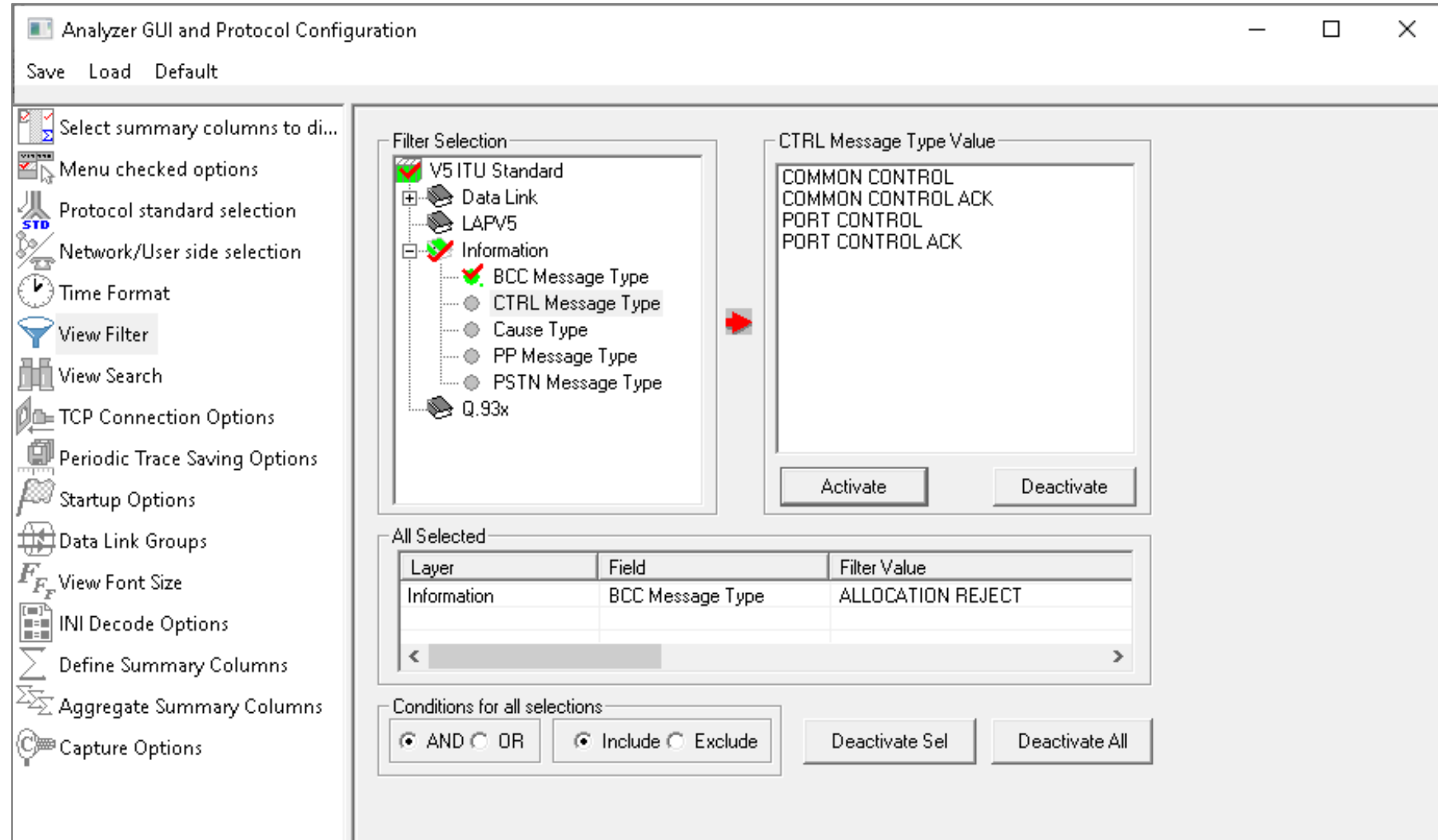
Layer	Field	Filter Value
Information	BCC Message Type	PROTOCOL ERROR

**Conditions for all selections:**

AND OR Include Exclude Deactivate Sel Deactivate All

# Search Options

- Search features helps users to search for a particular frame based on specific search criteria



# Search Criteria From Screen Selection

- Allows the user to create search criteria automatically from the current screen selection

Use Ctrl, Shift for Extended Selection

Information::CTRL Message Type

OK Select All Cancel

Analyzer GUI and Protocol Configuration

Save Load Default

Select summary columns to di...  
Menu checked options  
Protocol standard selection  
Network/User side selection  
Time Format  
View Filter  
View Search  
TCP Connection Options  
Periodic Trace Saving Options  
Startup Options  
Data Link Groups  
View Font Size  
INI Decode Options  
Define Summary Columns  
Aggregate Summary Columns  
Capture Options

Filter Selection

V5 ITU Standard  
Data Link  
LAPV5  
Information  
Q.93x

Value Selection

Activate Deactivate

All Selected

Layer	Field	Search Value
Information	CTRL Message Type	PORT CONTROL

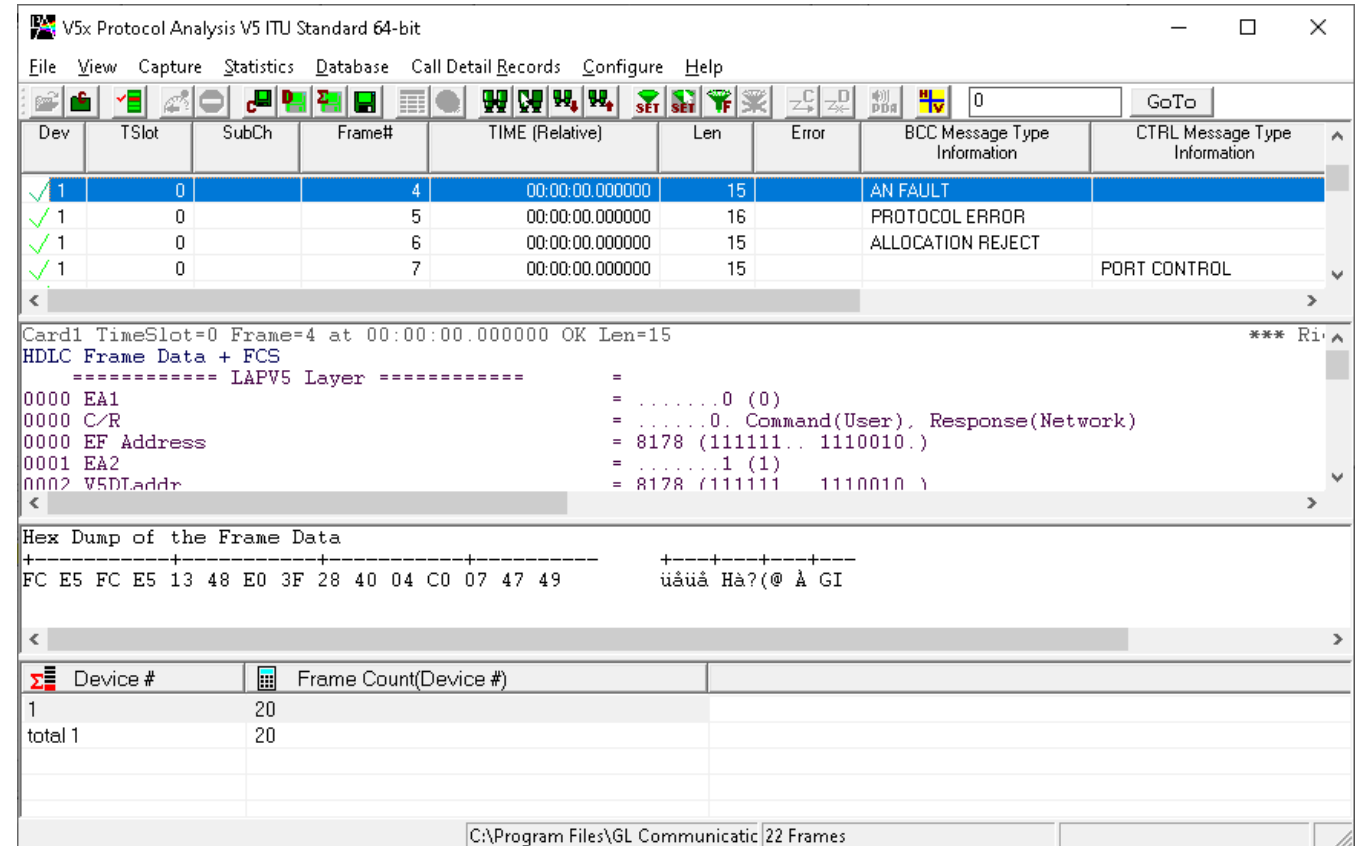
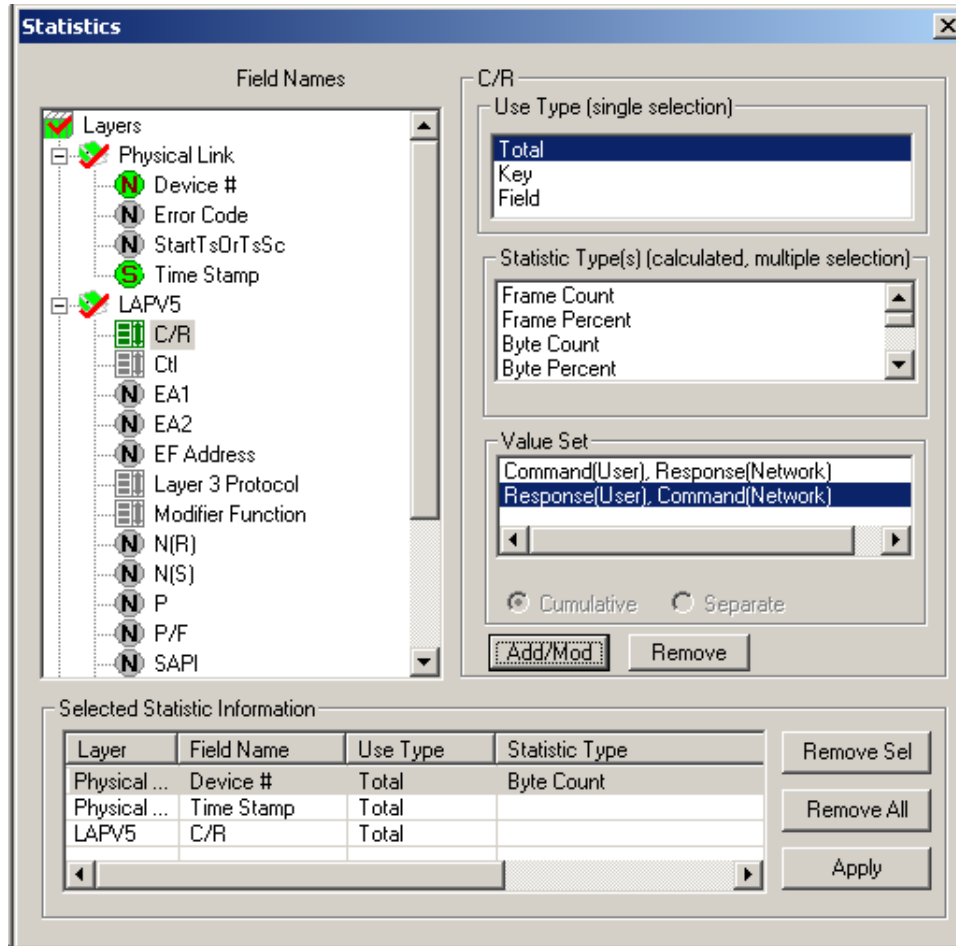
Conditions for all selections

AND OR Include Exclude

Deactivate Sel Deactivate All

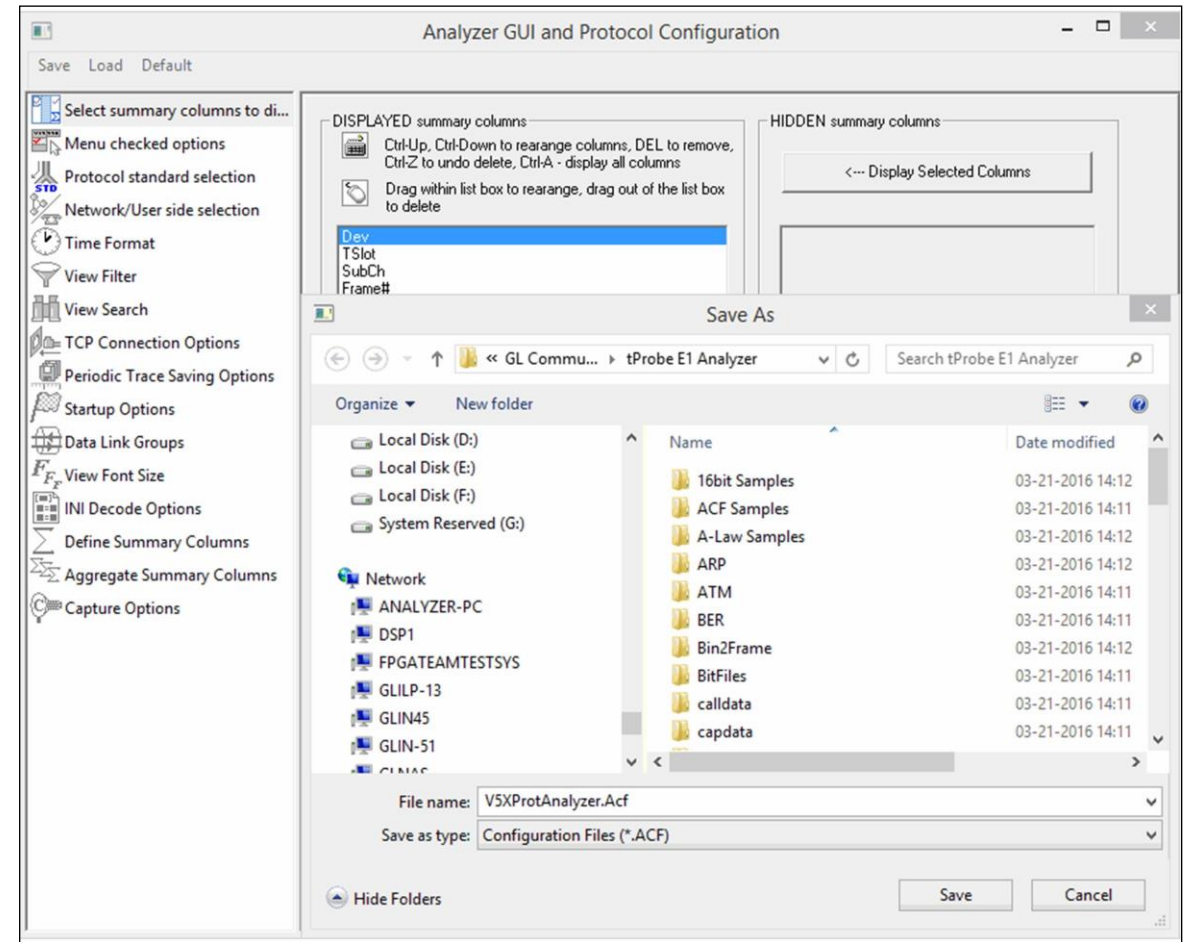
# Statistics

- Statistics is an important feature available in V5.x analyzer and can be obtained for all frames both in real-time as well as offline mode



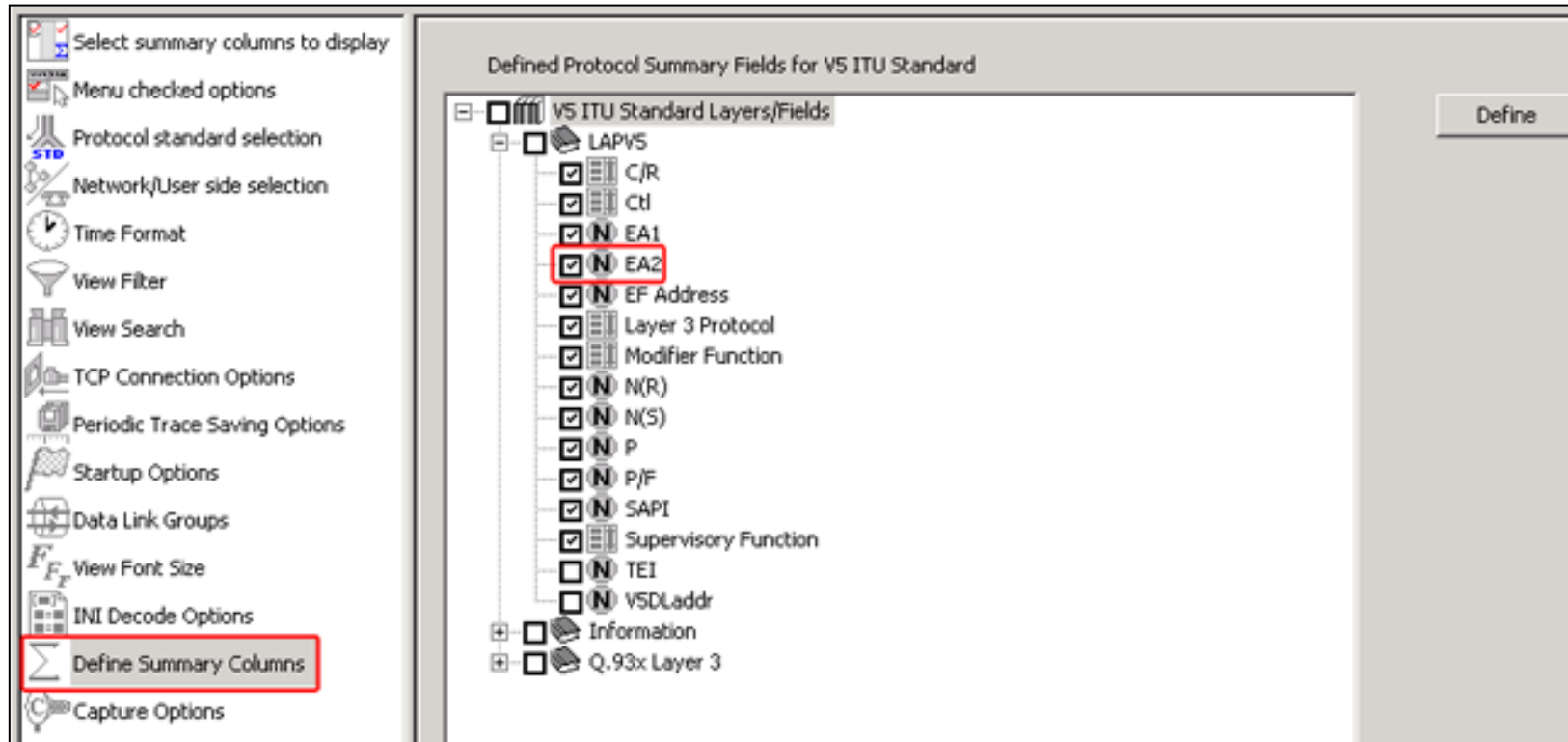
# Saving a File

- Captured trace files can be controlled by saving the trace using different conventions such as –
  - Trace files with user-defined prefixes
  - Trace file with date-time prefixes
  - Slider control to indicate the total number of files, file size, frame count, or time limit



# Define Summary Columns

- Required protocol fields can be added through Define summary column option
- User can remove the protocol field which is not required

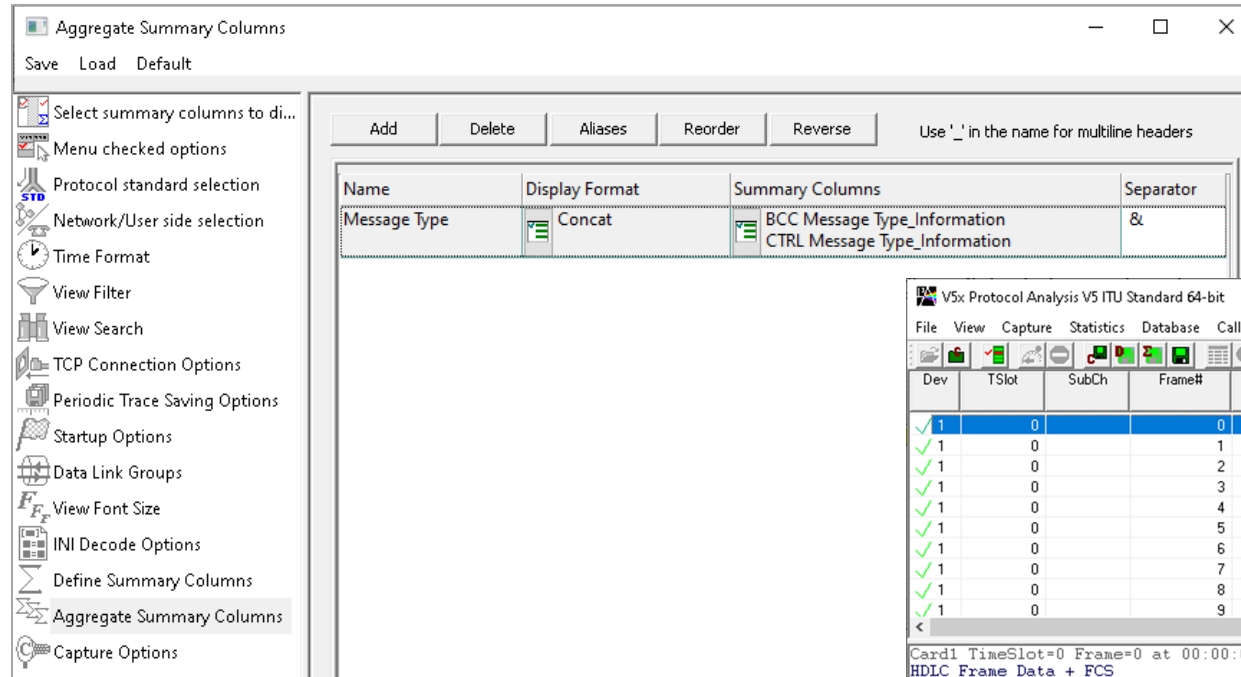




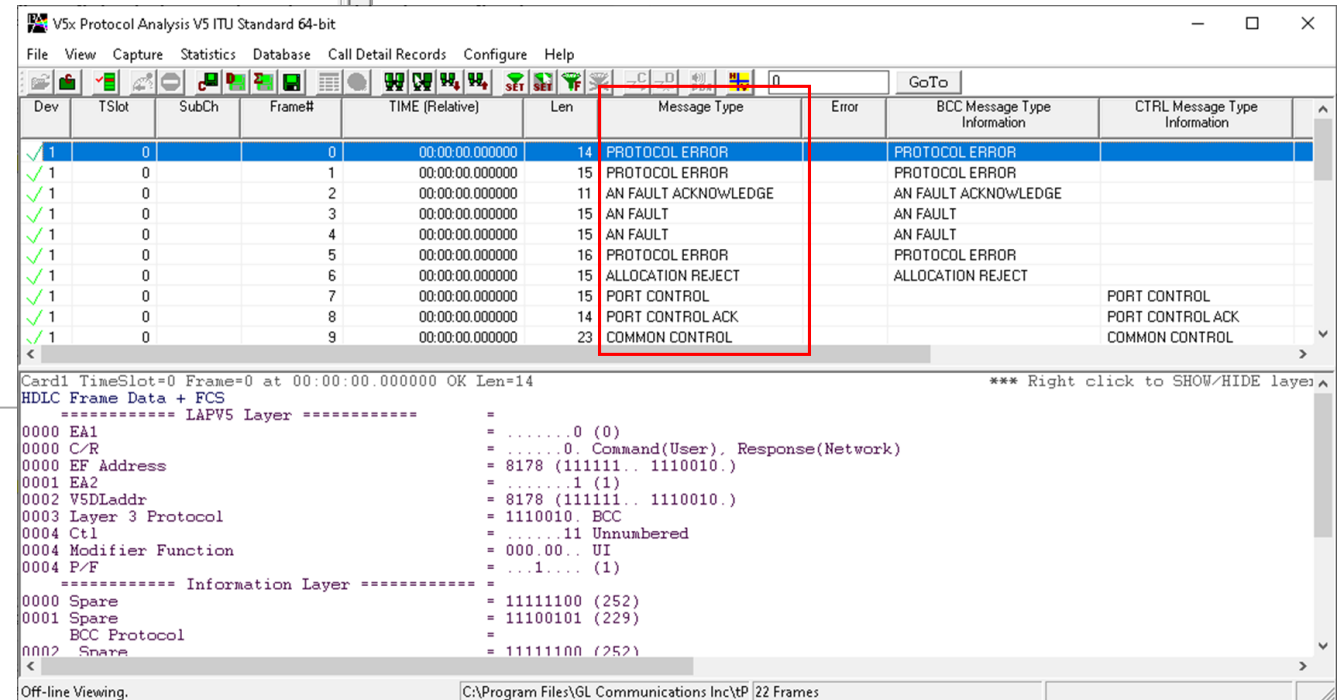
# Aggregate Summary Column

- The user can use this option to combine the two or more summary columns and remove unnecessary empty columns into a single Aggregate Summary Column

Selection of Summary Column



Output display in analyzer



# Aggregate Summary Column Group

- The user can create multiple aggregate column groups and prioritize the groups as per the requirement to display the summary results efficiently

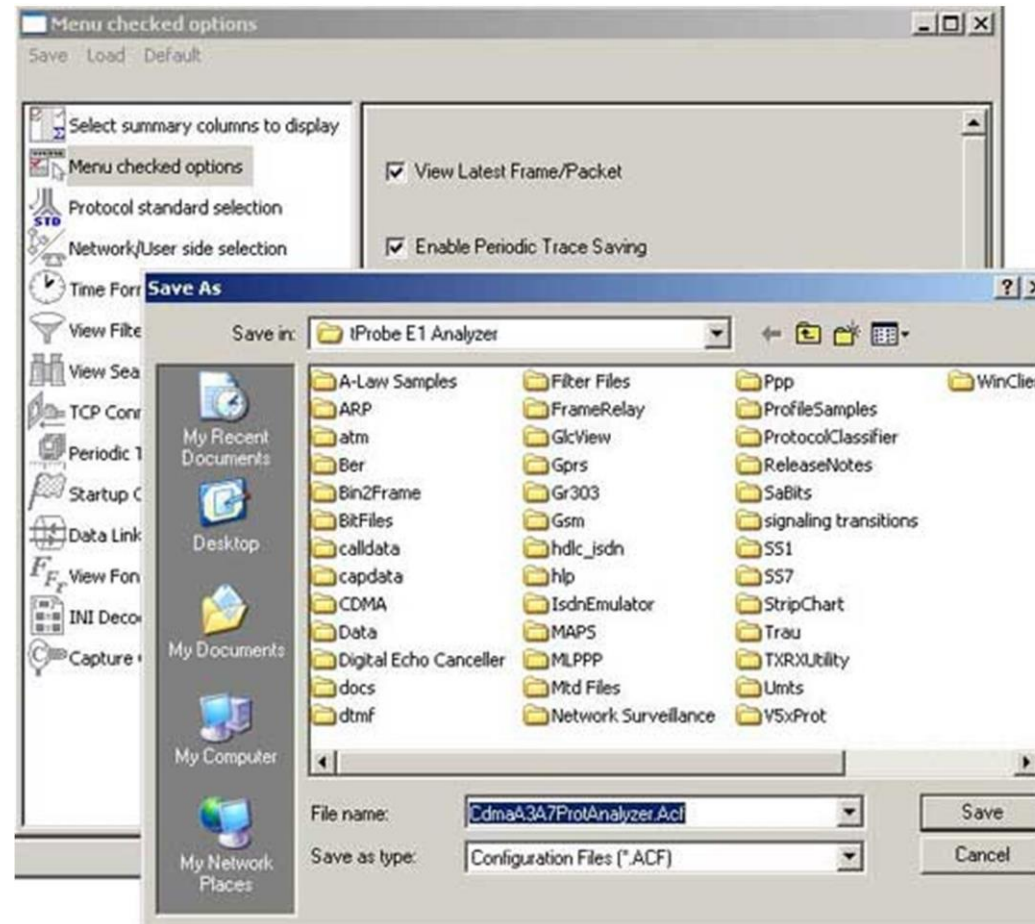
The screenshot displays the 'Aggregate Summary Columns' dialog box in the V5x Protocol Analysis V5 ITU Standard 64-bit software. The dialog has a sidebar with various configuration options, including 'Select summary columns to di...', 'Menu checked options', 'Protocol standard selection', 'Network/User side selection', 'Time Format', 'View Filter', 'View Search', 'TCP Connection Options', 'Periodic Trace Saving Options', 'Startup Options', 'Data Link Groups', 'View Font Size', 'INI Decode Options', 'Define Summary Columns', 'Aggregate Summary Columns' (which is selected), and 'Capture Options'. The main area of the dialog shows a table with columns: Name, Display Format, Summary Columns, and Separator. The table contains three rows: Group~0 with Display Format '<Col\_Alias> Value' and Summary Columns 'BCC Message Type\_Information' and 'CTRL Message Type\_Information'; Group~1 with Display Format 'Overlay' and Summary Columns 'Cause Type\_Information'; and Group~2 with Display Format 'Concat' and Summary Columns 'BCC Message Type\_Information'. The 'Aggregate Summary Columns' option is highlighted in the sidebar.

The main window shows the 'V5x Protocol Analysis V5 ITU Standard 64-bit' interface. The 'Aggregate Summary Columns' dialog is open, and the 'Group~0' column is highlighted in the main data table. The data table has columns: Dev, TSlot, SubCh, Frame#, TIME (Relative), Len, Group~0, Error, BCC Message Type Information, and CTRL Message Type Information. The data rows show various protocol messages, including 'BCC Message>PROTOCOL ERROR', 'BCC Message>AN FAULT ACKNOWLEDGE', 'BCC Message>AN FAULT', 'BCC Message>PROTOCOL ERROR', 'BCC Message>ALLOCATION REJECT', 'CTRL Message>PORT CONTROL', 'CTRL Message>PORT CONTROL ACK', 'CTRL Message>COMMON CONTROL', and 'CTRL Message>COMMON CONTROL ACK'. The 'Group~0' column is highlighted in red.

The bottom of the window shows the 'Off-line Viewing' section with a detailed view of the selected frame (Frame 0) and its contents, including the HDLC Frame Data + FCS, LAPV5 Layer, and Information Layer. The status bar at the bottom indicates 'Off-line Viewing' and 'C:\Program Files\GL Communications Inc\TP 22 Frames'.

# Save/Load All Configuration Settings

- Protocol Configuration window provides a consolidated interface for all the settings required in the analyzer such as protocol selection, filter criteria, search criteria, and so on
- Configuration settings can be saved to a file, loaded from a configuration file, or user may just revert to the default values using the default option



Thank you