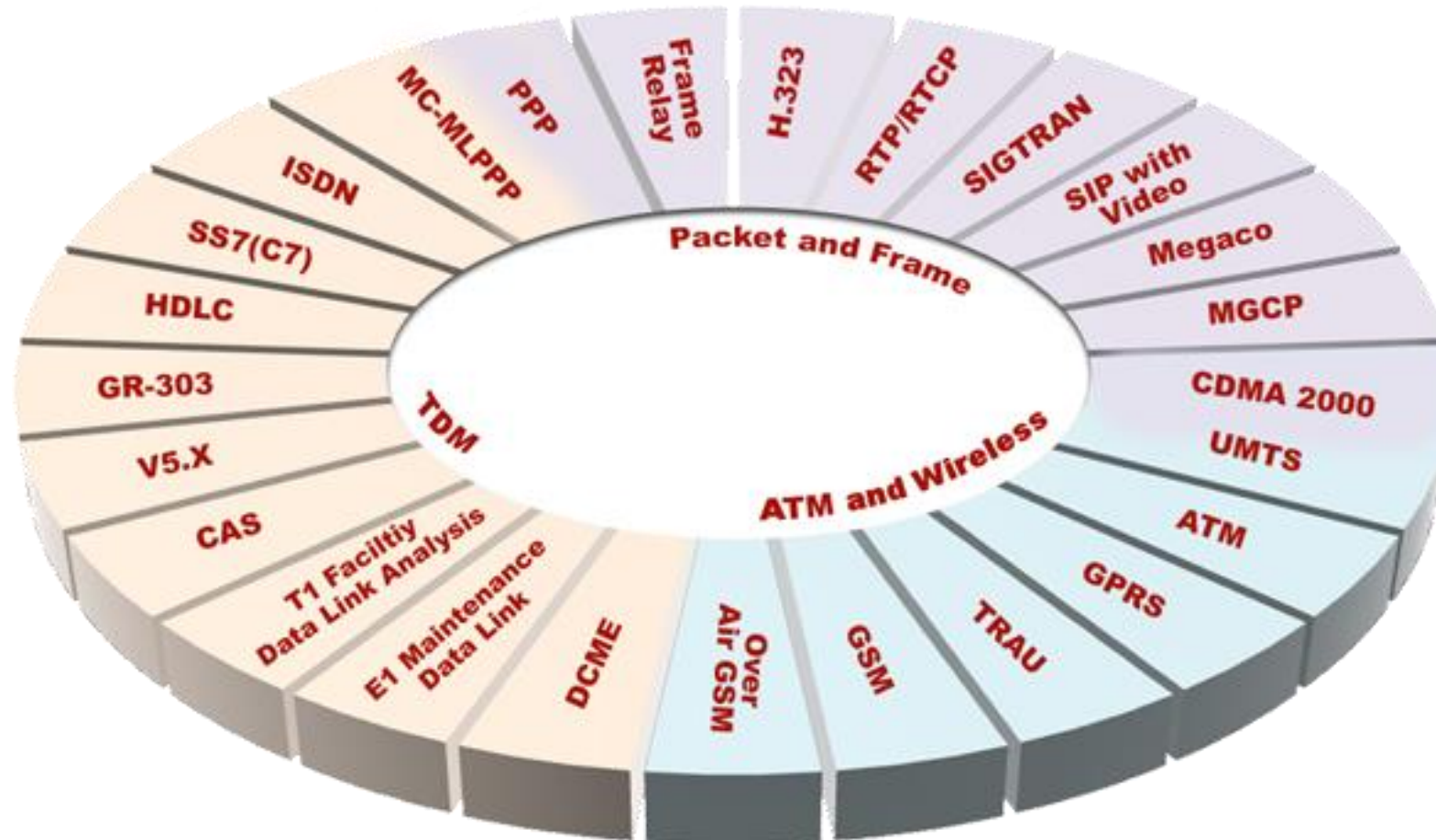

CDMA2000 Protocol Analyzer



818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: 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



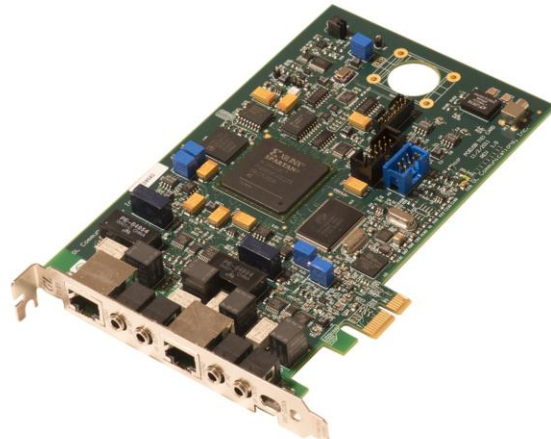
Back Panel

Front 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

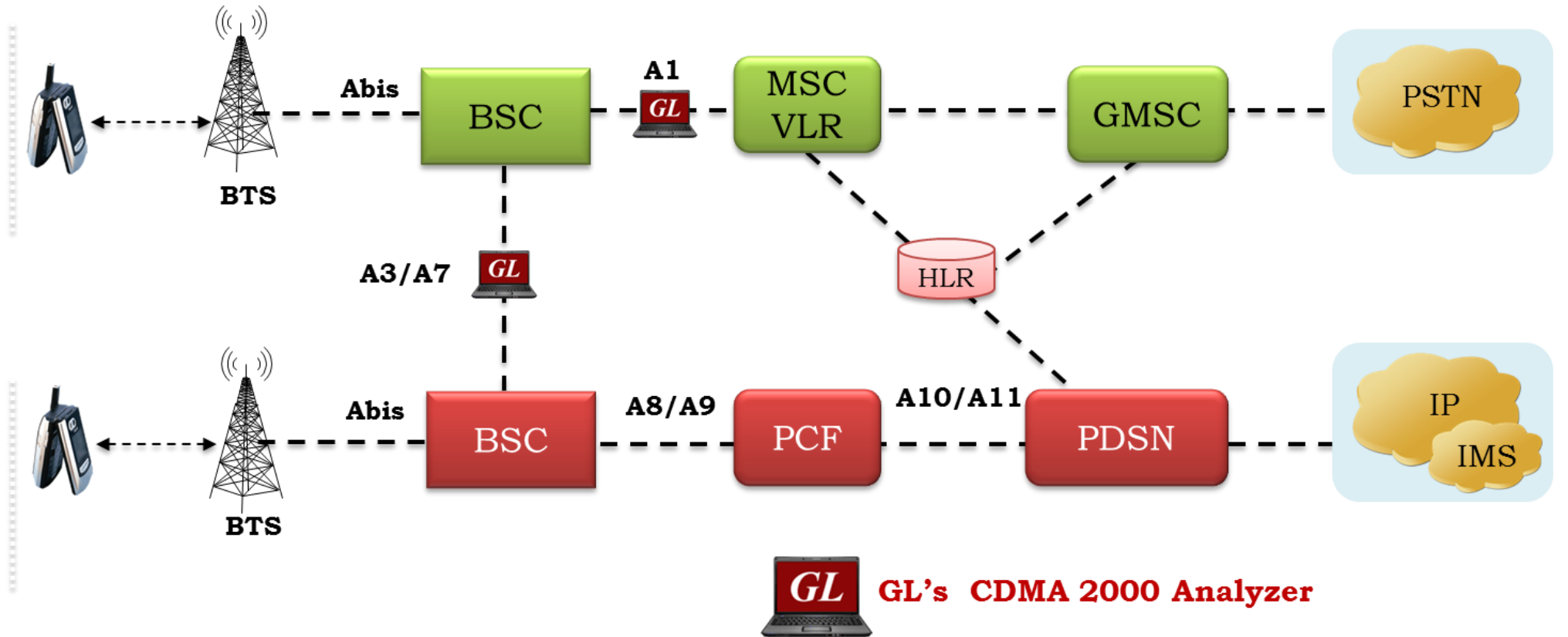
tScan16™ with 16-port T1 E1 Breakout Box



PCIe Board

Overview

GL's CDMA analyzer is used to analyze and view protocols across A, Ater, Aqinter, and Aquater signaling interfaces



Supported Protocols

- BSAP, MTP2 (ITU), MTP3 (ITU)
- MTP3 (ANSI), SCCP Management
- SCCP ITU, SCCP ANSI
- Test and Network Management Messages (ITU)
- Test and Network Management Messages (ANSI)

| Available Standards | Supported Protocols | Specification Used |
|---------------------|---|---|
| A1 Interface (ANSI) | BSAP | 3GPP2 A.S0014-A, Version 2.0.1 July 2003 |
| A1 Interface (ITU) | MTP2 (ITU) | ITU-T Q.703 |
| A3/A7 Interface | MTP3 (ITU) | ITU-T Q.704 |
| | MTP3 (ANSI) | ANSI T1.111-1996 |
| | SCCP Management | ITU-T Q.711 (07/96) |
| | SCCP ITU | ITU-T Q.711 to Q.714 |
| | SCCP ANSI | ANSI T1.112 |
| | Test & Network Management Messages (ITU) | ITU-T Q.703, Q.704 |
| | Test & Network Management Messages (ANSI) | ANSI T1.111.4, ANSI T1.111.7 |
| | A3/A7 Interface | 3GPP2 A.S0015-C, Version 1,0 February2005 |
| | ATM | ITU-T I.361 |
| | AAL | ITU-T I.363 |
| | SSSAR | ITU-T I.366.1 |
| | AAL2 | Class B (ITU-T I.363.2) |
| | AAL5 | Class C & D (ITU-T I.363.5) |
| | IP | RFC 791 |
| | TCP | RFC 793 |
| | MAC | IEEE 802.3 |
| | IP | RFC 791 |
| | TCP | RFC 793 |
| | UDP | RFC 768 |

Features

- Summary View displays Device Number, Time Slots: Sub channels, Frame number, Time, Frame length, and 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 particular 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

Features (Contd.)

- For A1 interface, streams can be captured on the selected time slots (contiguous or non-contiguous), sub-channels or full bandwidth
 - Frames captured can be filtered real-time based on length of frames (FISSU – Length as 5 and LSSU – Length as 7) can be set
 - Data transmission rate starting from 8kbps to N*64kbps is supported
 - Timeslot's selection can be contiguous or non – contiguous
 - Supports decoding of frames with FCS of 16 bits and 32 bits, or none
 - Call Detail Recording feature includes data link groups that help in defining the direction of the calls in each network and form logical groups comprised of unidirectional (either 'Forward' or 'Backward') data links
- For A3 A7 interface, Streams may be captured on the selected time slots (contiguous or non-contiguous) and on full bandwidth
 - Captures, decodes, filters, and reassembles (with or without Inverse Multiplexing option) AAL-2 and AAL-5 frames in real-time, from within the ATM cells according to user defined VPI/VCI
 - Real-time capturing requires user to specify timeslots, bit inversion, octet bit reversion, user/network side, ATM mapping, scrambling, and inverse multiplexing options
 - Streams may be captured on the selected time slots (contiguous or non-contiguous) and on full bandwidth
 - Unscrambling of ATM cells based on SDH X43 + 1 algorithm

Real-time Analysis

CDMA Protocol Analysis A1 Interface(ANSI) 64-bit

File View Capture Statistics Database Call Detail Records Configure Help

| Dev | TSlot | SubCh | Frame# | TIME (Relative) | Len | Error | BSMAP Message Type BSAP | DTAP Message Type BSAP | Type of Identity BSAP | Electronic Serial Nu. BSAP |
|-----|-------|-------|--------|-----------------|-----|-------|------------------------------|---------------------------|--------------------------|-------------------------------|
| ✓ 1 | 17-18 | | 0 | 00:00:00.000000 | 86 | | Complete Layer 3 Information | CM Service Request | ESN | 1190078268 |
| ✓ 2 | 17-18 | | 1 | 00:00:00.000000 | 22 | | | | | |
| ✓ 2 | 17-18 | | 2 | 00:00:00.000000 | 55 | | Assignment Request | | | |
| ✓ 1 | 17-18 | | 3 | 00:00:00.000000 | 36 | | Assignment Complete | | | |

Card1 TimeSlots=17-18 Frame=0 at 00:00:00.000000 OK Len=86 *** Right click to SHOW/HIDE layers

HDLC Frame Data + FCS

```

===== MTP2 Layer =====
0000 BSN          = .1101000 (104)
0000 BIB          = 1..... (1)
0001 FSN          = .0011001 (25)
0001 FTR          = 1 (1)
    
```

Hex Dump of the Frame Data

```

E8 99 3A 83 FE A3 D3 E9 A3 D3 0D 01 48 03 F0 02  è|:|p|é|ó| H 8
02 04 02 C1 FC 04 05 C3 DE E9 A3 D3 0F 36 00 34  Áü Äpé|ó 6 4
57 05 03 02 FF F6 17 2C 03 00 24 91 0F 42 00 47  W  yö , $' B G
00 02 01 FF 02 03 01 04 07 02 09 05 08 1E 23 45  y #E
67 89 AB CD EF 5E 06 A5 01 23 45 67 89 0D 05 05  g|<<i|^ * #Eg|
46 EF 27 3C 4C 23  Fi'<L#
    
```

| Device # | Frame Count(Device #) |
|----------|-----------------------|
| 1 | 5 |
| total 1 | 5 |
| 2 | 5 |
| total 2 | 5 |

| Call ID | Call Status | Call Start Date & Time | Call Duration | DevNo | TS | OPC | DPC | Call Type | Mob.Identity | Called Number | Release Cause |
|---------|-------------|-----------------------------|-----------------|-------|----|---------|---------|---------------|-----------------|---------------|--------------------|
| 0 | completed | 47776-62623-00 3704:6232... | 00:00:00.000000 | 1 | 17 | 211.... | 211.... | Mobile Ori... | 132547698bad... | 1032547698 | SCCP user origi... |

C:\Program Files\GL Communications Inc\U: 10 Frames

Summary View

Detail View

Hex Dump View

Statistics View

Call Trace View

Different Views

- **Summary View:** This pane displays the columns that contain Card Number, Timeslots, Frame Number, BSMAP Message Type, DTAP Message Type Frame Error Status, 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

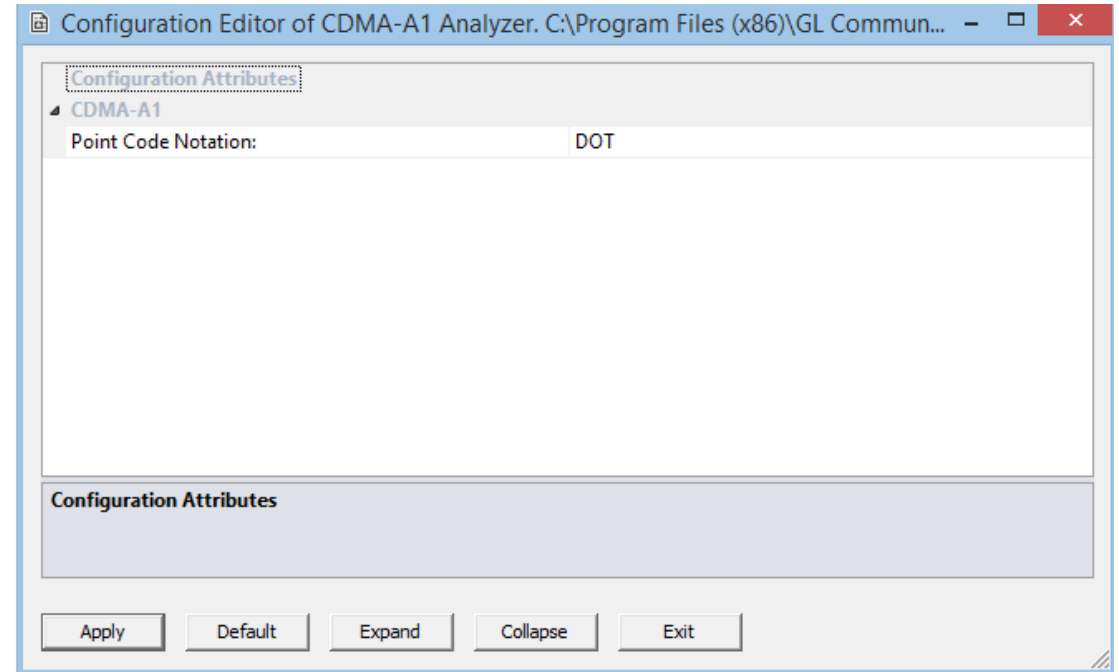
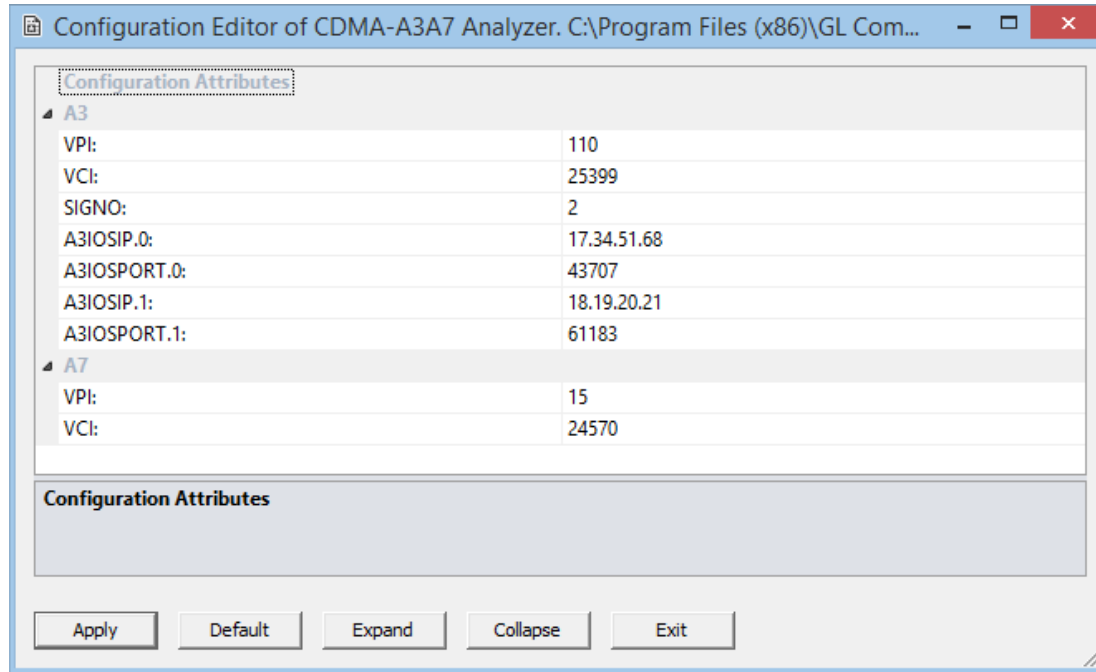
The image shows two overlapping windows from a CDMA protocol analysis tool. The 'Open' dialog box on the left is set to the 'CDMA' directory and lists three HDL files: 'A1_Cdma_Call.hdl', 'A3_Cdma_Call.hdl', and 'A7_Complete_Call.hdl'. The 'File name' field contains 'A1_Cdma_Call.hdl' and 'Files of type' is set to 'HDLC Files (*.*)'. The 'CDMA Protocol Analysis A1 Interface(ANSI) 64-bit' window on the right displays a table of captured frames and their details.

| Dev | TSlot | SubCh | Frame# | TIME (Relative) | Len | Error | BSMAP Message Type BSAP | DTAP Message Type BSAP | Type of Identity BSAP | Electronic Serial No. BSAP |
|-----|-------|-------|--------|-----------------|-----|-------|------------------------------|---------------------------|--------------------------|-------------------------------|
| ✓1 | 17-18 | | 0 | 00:00:00.000000 | 86 | | Complete Layer 3 Information | CM Service Request | ESN | 1190078268 |
| ✓2 | 17-18 | | 1 | 00:00:00.000000 | 22 | | | | | |
| ✓2 | 17-18 | | 2 | 00:00:00.000000 | 55 | | Assignment Request | | | |
| ✓1 | 17-18 | | 3 | 00:00:00.000000 | 36 | | Assignment Complete | | | |
| ✓2 | 17-18 | | 4 | 00:00:00.000000 | 29 | | | Connect | | |
| ✓1 | 17-18 | | 5 | 00:00:00.000000 | 30 | | Clear Request | | | |
| ✓2 | 17-18 | | 6 | 00:00:00.000000 | 30 | | Clear Command | | | |
| ✓1 | 17-18 | | 7 | 00:00:00.000000 | 24 | | Clear Complete | | | |
| ✓2 | 17-18 | | 8 | 00:00:00.000000 | 22 | | | | | |
| ✓1 | 17-18 | | 9 | 00:00:00.000000 | 20 | | | | | |

Below the table, the software displays the HDLC frame data for the selected frame (Frame 0):

```
Card1 TimeSlots=17-18 Frame=0 at 00:00:00.000000 OK Len=86
HDLC Frame Data + FCS
----- MTP2 Layer -----
0000 BSN = .1101000 (104)
0000 BIB = 1..... (1)
0001 FSN = .0011001 (25)
0001 FIB = 1..... (1)
0002 LI = .111010 MSU Format
----- MTP3 ANSI Layer -----
0003 Service Indicator = ....0011 SCCP
0003 Priority Code = .00.... Priority Code 0
0003 Sub-service field = 10..... National Network
0004 DPC = 211.163.254(11111110 10100011 11010011)
0007 OPC = 211.163.233(11101001 10100011 11010011)
```

Decode Settings



Filtering and Search

- Isolates required frames from all frames in real-time, as well as offline
- For A1, real-time capturing filter based on length of frames can be set. For A3 and A7 interfaces, users can also specify custom VPI, VCI, and PT type values to filter and reassemble frames during real-time capture

The screenshot displays a software interface for configuring filters. On the left, a text box labeled "Space Delimited Length List to Exclude" contains the value "57". Below it are three buttons: "Exclude FISU", "Exclude LSSU", and "Clear ALL".

The main interface is titled "Filter Selection" and features a tree view of protocol layers. The "A1 Interface(TU)" is selected, and its sub-items are: "Data Link", "MTP2", "BSN", "BIB", "FSN", "FIB", and "Status Field". The "MTP2" layer is expanded, showing "BSN" and "BIB" selected with checkmarks. A red arrow points from the "BIB" selection to the "BIB Value" field on the right, which contains the value "1". Below this field are "Activate" and "Deactivate" buttons.

Below the tree view is a table titled "All Selected":

| Layer | Field | Filter Value |
|-------|-------|--------------|
| MTP2 | BSN | 25 |
| MTP2 | BIB | 1 |

At the bottom, there are radio buttons for "Conditions for all selections": "AND" (unselected) and "OR" (selected). There are also radio buttons for "Include" (selected) and "Exclude" (unselected). Finally, there are "Deactivate Sel" and "Deactivate All" buttons.

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. It shows a table of data, a context menu, a dialog box for selecting filter criteria, and the main configuration window with a filter rule applied.

Table Data:

| ✓ | 1 | 17-18 | 0 | 00:00:00.000000 | 86 | Complete Layer 3 Information | CM Service Request | ESN |
|---|---|-------|---|-----------------|----|------------------------------|--------------------|-----|
| ✓ | 2 | 17-18 | 1 | 00:00:00.000000 | 22 | | | |
| ✓ | 2 | 17-18 | 2 | 00:00:00.000000 | 55 | Assignment Request | | |
| ✓ | 1 | 17-18 | 3 | 00:00:00.000000 | 36 | Assignment Complete | | |
| ✓ | 2 | 17-18 | 4 | 00:00:00.000000 | 29 | | | |
| ✓ | 1 | 17-18 | 5 | 00:00:00.000000 | 30 | Clear Request | | |
| ✓ | 2 | 17-18 | 6 | 00:00:00.000000 | 30 | Clear Command | | |
| ✓ | 1 | 17-18 | 7 | 00:00:00.000000 | 24 | Clear Complete | | |

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

BSAP::BSMAP 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:

- ✓ A1 Interface(ANSI)
 - Data Link
 - MTP2
 - MTP3 ANSI
 - SCCP
 - Sccp Management
 - ✓ BSAP
 - SLTM
 - SSNM

Value Selection:

Activate Deactivate

All Selected:

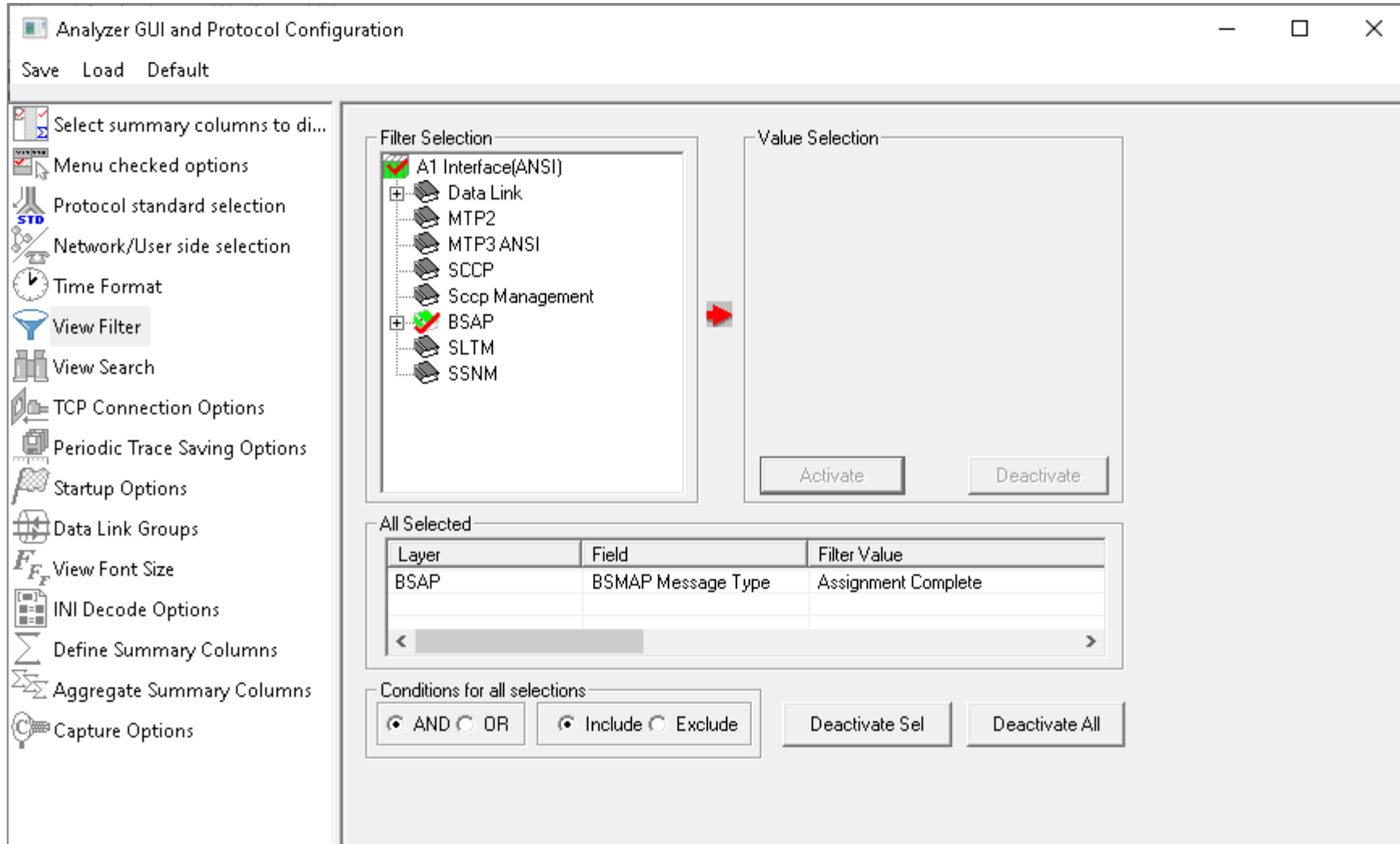
| Layer | Field | Filter Value |
|-------|--------------------|---------------------|
| BSAP | BSMAP Message Type | Assignment Complete |

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

| ✓ | 1 | 17-18 | | 0 | 00:00:00.000000 | 86 | Complete Layer 3 Information | CM Service Request |
|---|---|-------|--|---|-----------------|----|------------------------------|--------------------|
| ✓ | 2 | 17-18 | | 1 | 00:00:00.000000 | 22 | | |
| ✓ | 2 | 17-18 | | 2 | 00:00:00.000000 | 55 | Assignment Request | |
| ✓ | 1 | 17-18 | | 3 | 00:00:00.000000 | 36 | Assignment Complete | |
| ✓ | 2 | 17-18 | | 4 | 00:00:00.000000 | 29 | | |
| ✓ | 1 | 17-18 | | 5 | 00:00:00.000000 | 30 | Clear Request | |
| ✓ | 2 | 17-18 | | 6 | 00:00:00.000000 | 30 | Clear Command | |
| ✓ | 1 | 17-18 | | 7 | 00:00:00.000000 | 24 | Clear Complete | |

Use Ctrl, Shift for Extended Selection

BSAP::BSMAP Message Type

OK Select All Cancel

Analyzer GUI and Protocol Configuration

Save Load Default

Filter Selection

- A1 Interface(ANSI)
- Data Link
- MTP2
- MTP3 ANSI
- SCCP
- Sccp Management
- BSAP
- SLTM
- SSNM

Value Selection

Activate Deactivate

All Selected

| Layer | Field | Filter Value |
|-------|--------------------|---------------------|
| BSAP | BSMAP Message Type | Assignment Complete |

Conditions for all selections

AND OR Include Exclude Deactivate Sel Deactivate All

Statistics

- Statistics is an important feature available in CDMA2000 analyzer and can be obtained for all frames both in real-time as well as offline mode

The 'Statistics' window is divided into several sections:

- Field Names:** A tree view showing protocol layers. 'MTP2' is selected, with sub-items like BIB, BSN, FIB, FSN, LI, Reassembly Info, Status Field, and Status Field 2nd Octet.
- Status Field:** A section for selecting a status field. 'Total' is selected under 'Use Type (single selection)'. Under 'Statistic Type(s) (calculated, multiple selection)', 'Frame Count', 'Frame Percent', 'Byte Count', and 'Byte Percent' are listed.
- Value Set:** A list of values to include in the statistics, with 'SIN', 'SID', 'SIDS', and 'SIPO' selected.
- Buttons:** 'Add/Mod' and 'Remove' buttons are present at the bottom of the configuration sections.
- Selected Statistic Information:** A table at the bottom showing the current configuration:

| Layer | Field Name | Use Type | Statistic Type | Remove Sel |
|-------|--------------|----------|----------------|------------|
| MTP2 | LI | Total | Frame Count | |
| MTP2 | Status Field | Total | Byte Count | |

The 'CDMA Protocol Analysis A1 Interface(ANSI)' window displays a table of frame statistics and a hex dump of frame data.

Frame Statistics Table:

| Dev | TSlot | SubCh | Frame# | TIME (Relative) | Len | Error | BSN | BIB | FSN | FIB |
|-----|-------|-------|--------|-----------------|-----|-------|-----|-----|-----|-----|
| ✓ 1 | 17-18 | | 0 | 00:00:00.000000 | 86 | | 104 | 1 | 25 | 1 |
| ✓ 2 | 17-18 | | 1 | 00:00:00.000000 | 22 | | 25 | 1 | 105 | 1 |
| ✓ 2 | 17-18 | | 2 | 00:00:00.000000 | 55 | | 25 | 1 | 107 | 1 |
| ✓ 1 | 17-18 | | 3 | 00:00:00.000000 | 36 | | 25 | 1 | 107 | 1 |

Hex Dump of the Frame Data:

```

Card1 TimeSlots=17-18 Frame=0 at 00:00:00.000000 OK Len=86
HDLC Frame Data + FCS
===== MTP2 Layer =====
BSN                               = .1101000 (104)
PTR                               = 1 (1)

Hex Dump of the Frame Data
+-----+-----+-----+-----+-----+-----+-----+-----+
E8 99 3A 83 FE A3 D3 E9 A3 D3 0D 01 48 03 F0 02      èl:|pε0εε0 H δ
02 04 02 C1 FC 04 05 C3 DE E9 A3 D3 0F 36 00 34      Au Åpεε0 6 4
57 05 03 02 FF F6 17 2C 03 00 24 91 0F 42 00 47      W  yö , $' B G
  
```

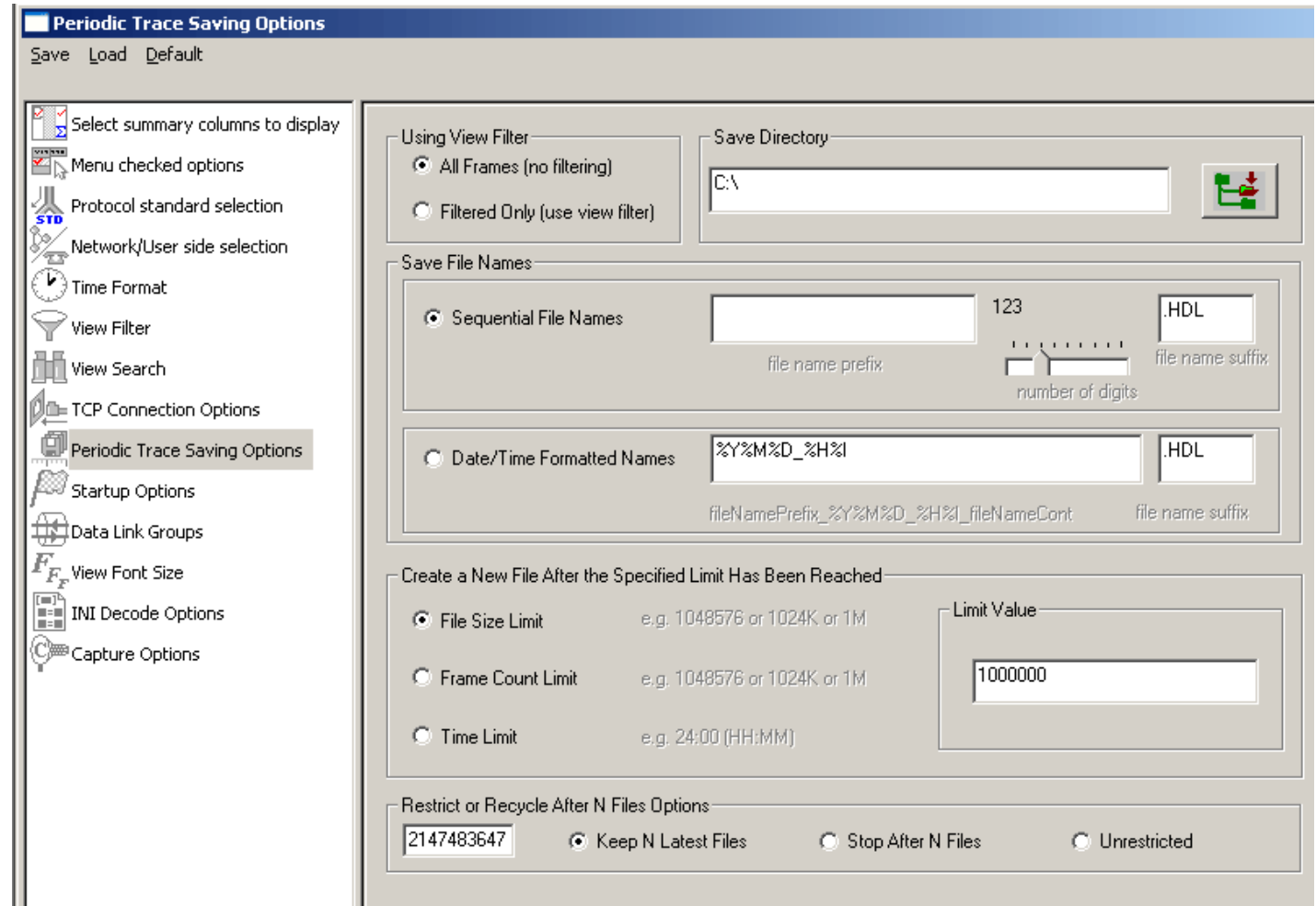
Summary Table:

| Device # | Time Stamp | Frame Count(Time Stamp) |
|----------|-------------------|-------------------------|
| 1 | x1122334455667788 | 5 |
| total 1 | Total | 5 |
| 2 | x1122334455667788 | 5 |
| total 2 | Total | 5 |

At the bottom, it shows the file path: C:\Program Files\Gl Comm 10 Frames

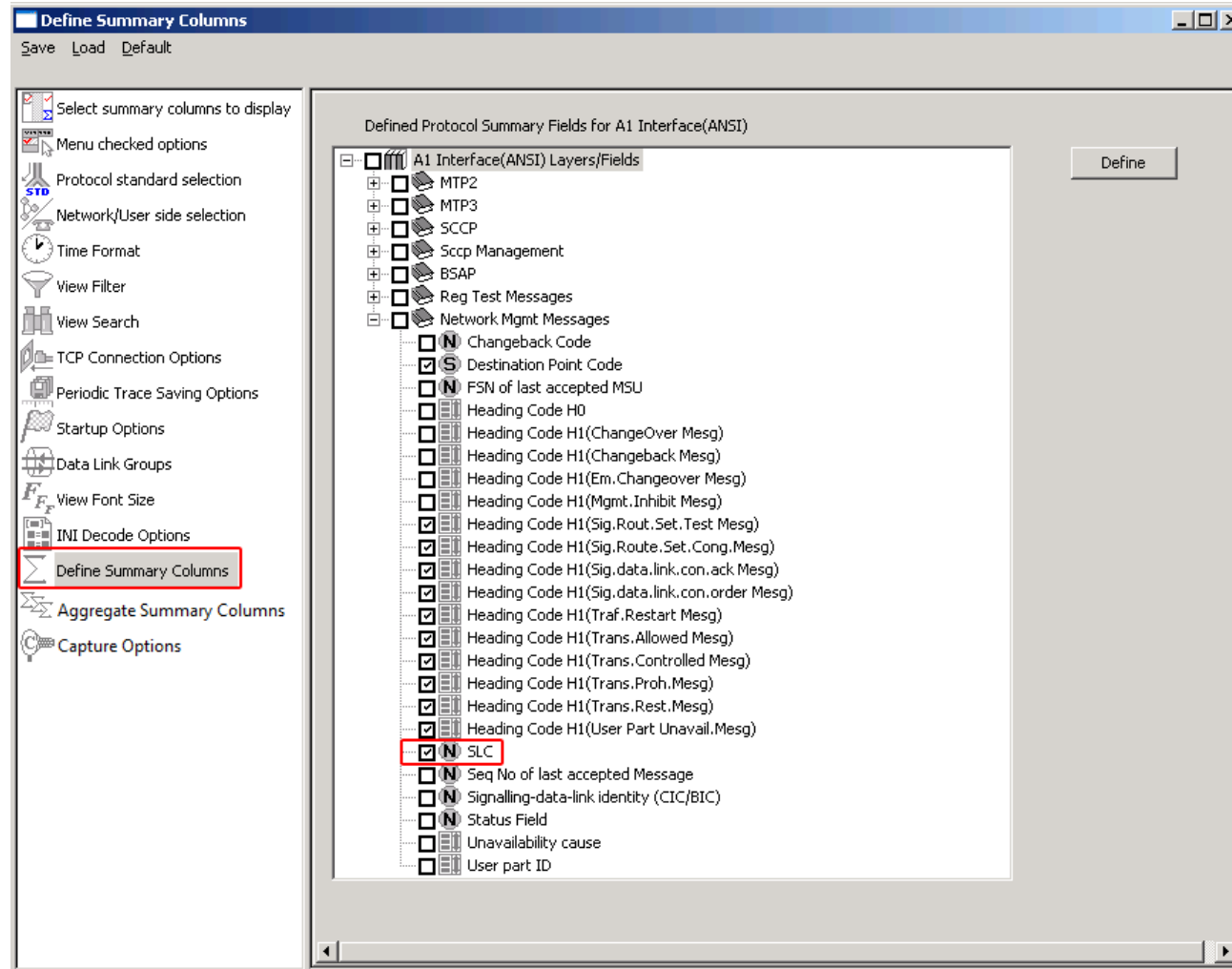
Saving a File

- 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 Group Column

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

The screenshot shows the 'Aggregate Summary Columns' dialog box and the main analysis window. The dialog box has a sidebar with various options and a main area with a table of aggregate groups. The main window displays a table of protocol analysis results with a red box highlighting a specific group.

Aggregate Summary Columns Dialog Box Table:

| Name | Display Format | Summary Columns | Separator |
|---------|------------------|--|-----------|
| Group~0 | <Col_Alias>Value | BSMAP Message Type_BSAP Identity_BSAP | & |
| Group~1 | Concat | Type of Identity_BSAP | |
| Group~2 | Overlay | DTAP Message Type_BSAP | ---> |

Main Window Table (CDMA Protocol Analysis A1 Interface(ANSI) 64-bit):

| Dev | TSlot | SubCh | Frame# | TIME (Relative) | Group~0 | Len | Error | BSMAP Message Type BSAP | DTAP Message Type BSAP |
|-----|-------|-------|--------|-----------------|---|-----|-------|------------------------------|------------------------|
| ✓ 1 | 17-18 | | 0 | 00:00:00.000000 | <BSMAP Message>Complete Layer 3 Information | 86 | | Complete Layer 3 Information | CM Service Request |
| ✓ 2 | 17-18 | | 1 | 00:00:00.000000 | <BSMAP Message>Assignment Request | 55 | | Assignment Request | |
| ✓ 2 | 17-18 | | 2 | 00:00:00.000000 | <BSMAP Message>Assignment Complete | 36 | | Assignment Complete | |
| ✓ 1 | 17-18 | | 3 | 00:00:00.000000 | Connect | 29 | | | Connect |
| ✓ 2 | 17-18 | | 4 | 00:00:00.000000 | <BSMAP Message>Clear Request | 30 | | Clear Request | |
| ✓ 2 | 17-18 | | 5 | 00:00:00.000000 | <BSMAP Message>Clear Command | 30 | | Clear Command | |
| ✓ 1 | 17-18 | | 6 | 00:00:00.000000 | <BSMAP Message>Clear Complete | 24 | | Clear Complete | |
| ✓ 2 | 17-18 | | 7 | 00:00:00.000000 | | 22 | | | |
| ✓ 2 | 17-18 | | 8 | 00:00:00.000000 | | 22 | | | |

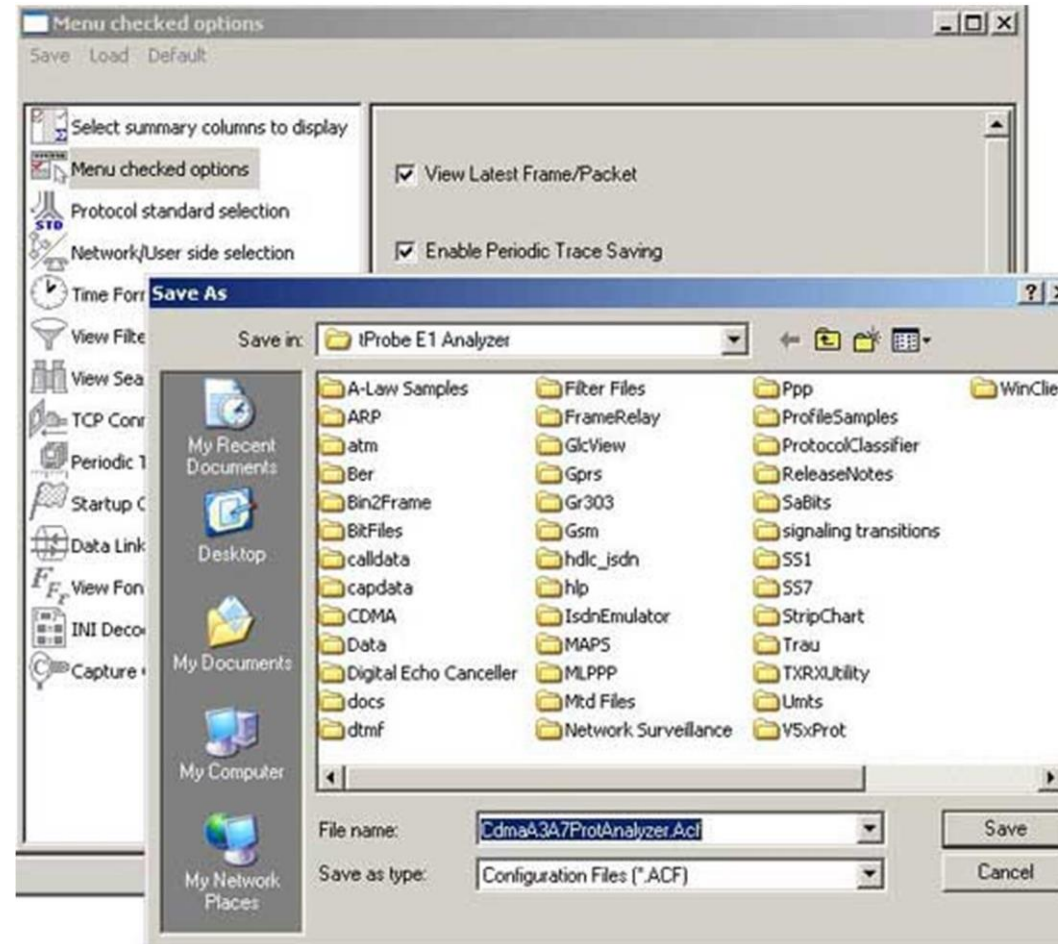
Main Window Text Output:

```

Card1 TimeSlots=17-18 Frame=0 at 00:00:00.000000 OK Len=86
HDLC Frame Data + FCS
===== MTP2 Layer =====
0000 BSN = .1101000 (104)
0000 BIB = 1..... (1)
0001 FSN = .0011001 (25)
0001 FIB = 1..... (1)
0002 II = .111010 MSU Format
===== MTP3 ANSI Layer =====
0003 Service Indicator = ...0011 SCCP
0003 Priority Code = .100.... Priority Code 0
0003 Sub-service field = 10..... National Network
0004 DPC = 211.163.254(11111110 10100011 11010011)
0007 OPC = 211.163.233(11101001 10100011 11010011)
000A Signalling Link Selection = 00001101 (13)
===== SCCP Layer =====
000B Message Type = 00000001 CR connection request
Mandatory Fixed Parameters
  
```

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



Call Detail Record (CDR)

- The Call Detail Record isolates call specific information for each individual call from the captured data and display the information in an organized fashion

CDMA Protocol Analysis A1 Interface(ANSI)

File View Capture Statistics Database Call Detail Records Configure Help

0 GoTo

| Dev | TS... | Su... | Frame# | TIME (Difference) | Len | Error | BSN | BIB | FSN | FIB | Statu... | SLS | DPC | OPC |
|-----|-------|-------|--------|-------------------|-----|-------|-----|-----|-----|-----|----------|-----|----------|----------|
| ✓ 1 | 16 | | 0 | 00:00:00.000000 | 73 | | 51 | 1 | 25 | 1 | | 8 | 253.1... | 253.1... |
| ✓ 2 | 16 | | 1 | 00:00:00.684500 | 34 | | 25 | 1 | 52 | 1 | | 8 | 253.1... | 253.1... |
| ✓ 1 | 16 | | 2 | 00:00:02.515750 | 80 | | 52 | 1 | 26 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 2 | 16 | | 3 | 00:00:00.110625 | 22 | | 26 | 1 | 53 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 2 | 16 | | 4 | 00:00:00.235500 | 34 | | 26 | 1 | 54 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 1 | 16 | | 5 | 00:00:01.467625 | 32 | | 54 | 1 | 27 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 1 | 16 | | 6 | 00:00:22.423500 | 30 | | 54 | 1 | 28 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 2 | 16 | | 7 | 00:00:00.083375 | 26 | | 28 | 1 | 55 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 1 | 16 | | 8 | 00:00:00.090875 | 23 | | 55 | 1 | 29 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 2 | 16 | | 9 | 00:00:00.028750 | 22 | | 29 | 1 | 56 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 1 | 16 | | 10 | 00:00:00.019625 | 20 | | 56 | 1 | 30 | 1 | | 9 | 253.1... | 253.1... |
| ✓ 1 | 16 | | 11 | 00:00:04.496375 | 27 | | 56 | 1 | 31 | 1 | | 0 | 253.1... | 253.1... |
| ✓ 2 | 16 | | 12 | 00:00:00.026375 | 27 | | 31 | 1 | 57 | 1 | | 0 | 253.1... | 253.1... |

| Call ID | Call Status | Call Start Date & Time | Call Duration | Dev... | TS | OPC | DPC | Call Type | Mob. Identity | Called Num... | Release Cause |
|---------|-------------|---------------------------|-----------------|--------|----|----------|----------|-------------------|----------------------|---------------|---------------------|
| 0 | completed | 2004-02-16 16:50:55.88... | 00:00:00.684500 | 1 | 16 | 253.1... | 253.1... | | 460030902000064-I... | | End user originated |
| 1 | completed | 2004-02-16 16:50:59.08... | 00:00:24.459875 | 1 | 16 | 253.1... | 253.1... | Mobile Origina... | 460030902000064-I... | 88785 | End user originated |

F:\Program Files\GL Communications I | 23 Frames

Inverse Multiplexing in CDMA A3A7

- The CDMA Analyzer can capture and reassemble frames that were transmitted with Inverse Multiplexing option
- With Inverse Multiplexing over ATM (IMA) feature, up to 8 T1 E1 links can be configured to form a high-speed connection
- ATM cells are transmitted across multiple interfaces in a cyclical fashion, and recombined to form the original stream

Captured ATM Frames with IMA in A3A7 Interface

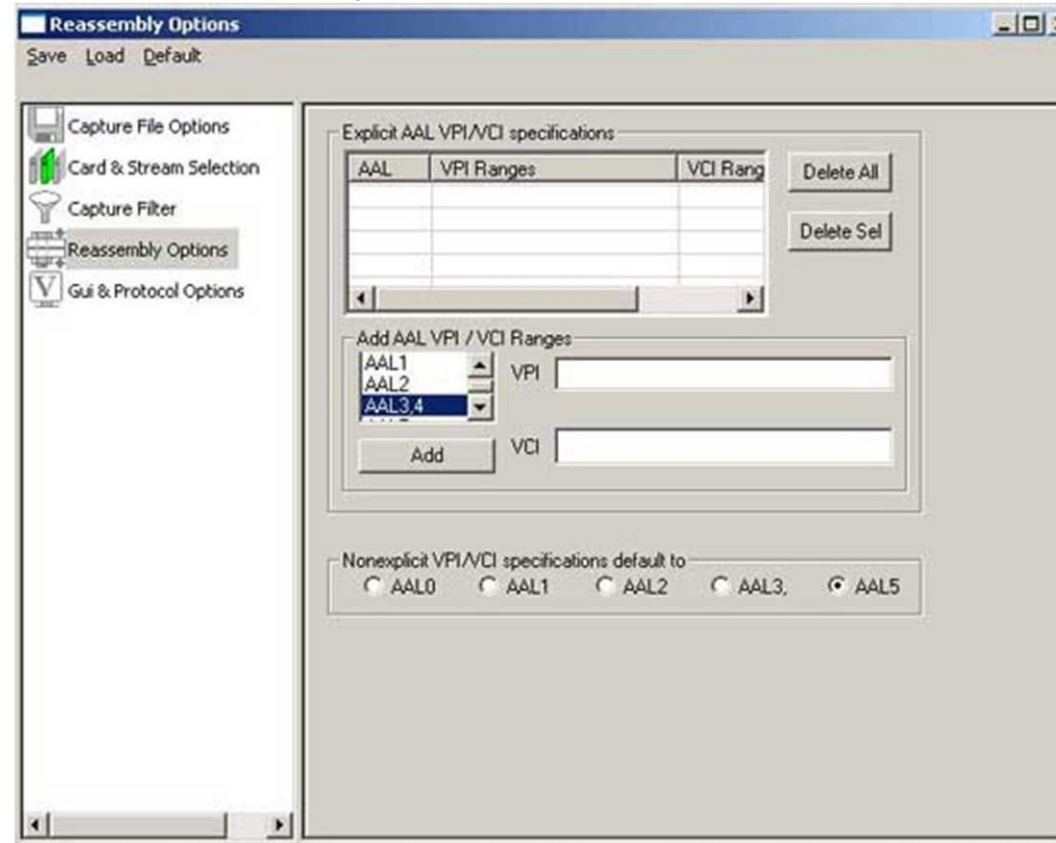
The screenshot displays the CDMA Analyzer interface with the following components:

- Table of Captured Frames:** A table with columns: Dev, TS, Frame#, TIME (Date), Len, OSF, AAL Type, Frame T, CID, U, UUI, CPI, Me, End. It shows several frames with lengths of 245 and 53. A callout box points to the 245-length frames, stating "ATM cells distributed over links in cyclical fashion". Another callout points to a single 245-length frame, stating "Cells recombined into single ATM stream".
- Frame Detail View:** Shows the structure of an ATM frame:
 - ATM Frame Data
 - ATM Layer: VPI, VCI, FT, CLP, HEC.
 - AAL5 Reassembly (CPCS-PDU) Layer: Payload (hex: xAAAA030080C20007...DE000000F000000 (Length=200)), Padding, CPCS User-to-User Indication (CPCS-UUI), Common Part Indicator (CPI), Length.
- Hex Dump of the Frame Data:** A hex dump showing the raw data of the frame, with a corresponding ASCII representation on the right.

Reassembly in CDMA A3A7

- Using reassembly option user can specify VPI /VCI value to reassemble using the segmentation and reassembly rules defined by the specified AAL type

Reassembly Options in A3A7 Interface



Thank You!