QCAT6

User Guide

80-V1233-6 G

August 29, 2013

Submit technical questions at:
https://support.cdmatech.com/

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Revision history

Revision	Date	Description
A	May 2011	Initial release
B	Aug 2011	Updated Section 3.4.20
C	Jan 2012	Updated Sections 3.4.8, 3.4.20, and 3.4.25
D	Jun 2012	Updated Sections 3.4.25.4 and 4.2.1.2
E	Aug 2012	Updated Sections 3.4.10, 4.2.1.1, 4.2.1.2, 4.2.2.1; Table 4-1; removed nonapplicable information
F	Jul 2013	Updated Section 3.4.11.1 and Table 4.1
G	Aug 2013	Updated Table 1-1

1 Introduction

1.1 Purpose

QCAT is an integrated software package that allows you to decode the contents of binary log files generated by the Qualcomm Technologies, Inc. (QTI) Mobile Diagnostic Monitor (MDM), CDMA Air Interface Tester (CAIT), and Qualcomm Extensible Diagnostic Monitor Professional™ (QXDM Pro) tools. QCAT is compatible with Microsoft Windows 2000, XP, Vista, and 7 platforms.

QCAT supports performance log packets, mobile events, and logged signaling messages generated by QTI Dual Mode Subscriber Software (DMSS) and Advanced Mode Subscriber Software (AMSS) targets. These include packets related to platforms, such as IS-95, IS-2000 Rel 0, 1xEV-DO, WCDMA, GSM, GPRS, LTE, gpsOne™, and Bluetooth®.

For up-to-date information on what packets are supported in specific versions of QCAT, see the Supported Logs listing file. In QCAT, this file can be opened by selecting Help → Supported Logs in the application window.

1.2 Scope

This document is written for users of QCAT and assumes that the user is familiar with QTI logging concepts, as well as at least one of the Diagnostic Monitor (DM) applications.

1.3 Conventions

Function declarations, function names, type declarations, and code samples appear in a different font, e.g., `#include`.

Code variables appear in angle brackets, e.g., `<number>`.

Commands to be entered appear in a different font, e.g., **`copy a:*.* b:`**.

Button and key names appear in bold font, e.g., click **Save** or press **Enter**.

Shading indicates content that has been added or changed in this revision of the document.

1.4 References

Reference documents are listed in Table 1-1. Reference documents that are no longer applicable are deleted from this table; therefore, reference numbers may not be sequential.

Table 1-1 Reference documents and standards

Ref.	Document	
Qualcomm Technologies		
Q1	*QXDM Professional™ Software Users Guide*	80-V1241-21
Q2	*PC Tool DLF Format Specification*	80-V1595-1
Q3	*CDMA Dual-Mode Subscriber Station Serial Data Interface Control Document*	80-V1294-1
Q4	*Serial Interface Control Document for WCDMA*	80-V2708-3
Q5	*Serial CD for GSM, GPRS, and EGPRS Interface Control Document*	80-V5295-1
Q6	*Serial Interface Control Document (ICD) for UMTS*	80-V4083-1
Q7	*Application Note: Software Glossary for Customers*	CL93-V3077-1

1.5 Technical assistance

For assistance or clarification on information in this document, submit a case to QTI at https://support.cdmatech.com/.

If you do not have access to the CDMATech Support Service website, register for access or send email to support.cdmatech@qti.qualcomm.com.

1.6 Acronyms

For definitions of terms and abbreviations, see [Q7]. For terms specific to this document, see the following table.

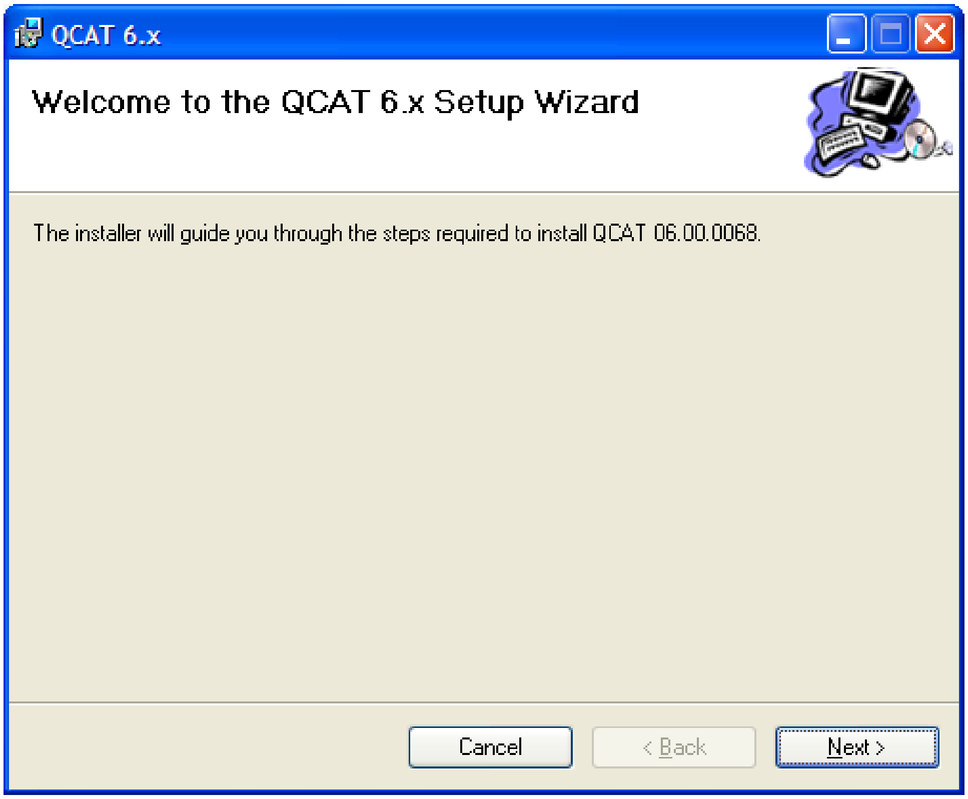
Term	Definition
CB	Cell broadcast (Layer 3 task)
DS	Data services (Task)
GL1	GSM/GPRS Layer 1
GL2 G	SM/GPRS Layer 2
GHDI	Generic hardware-driver interface
GSDI	Generic SIM-driver interface
MM	Mobility management (Layer 3 task for GSM)
MN	Mobile network layer (Layer 3 task)
RLC DL	Radio link control downlink (Layer 2 task for WCDMA or GPRS)
RLC UL	Radio link control uplink (Layer 2 task for WCDMA or GPRS)
RR	Radio resource (Layer 3 task for GSM)
SACCH	Standalone control channel
SM	Session management
SNDC	Subnet dependent converge protocol (GRPS)
SS	Supplementary service

Term	Definition
WL1	WCDMA Layer 1
WL2	WCDMA Layer 2

2 Installing Software

2.1 QCAT installation

The QCAT installation package is a single Windows MSI installer file with a naming convention of QCAT.xx.xx.xx.msi, where xx.xx.xx represents the major, minor, and build version numbers of QCAT. Double-click this file to install QCAT. The Windows installer wizard walks you through each step required to install the application. The installer allows you to choose the path to install the application. The QCAT installation setup screen is shown in the following screenshot.



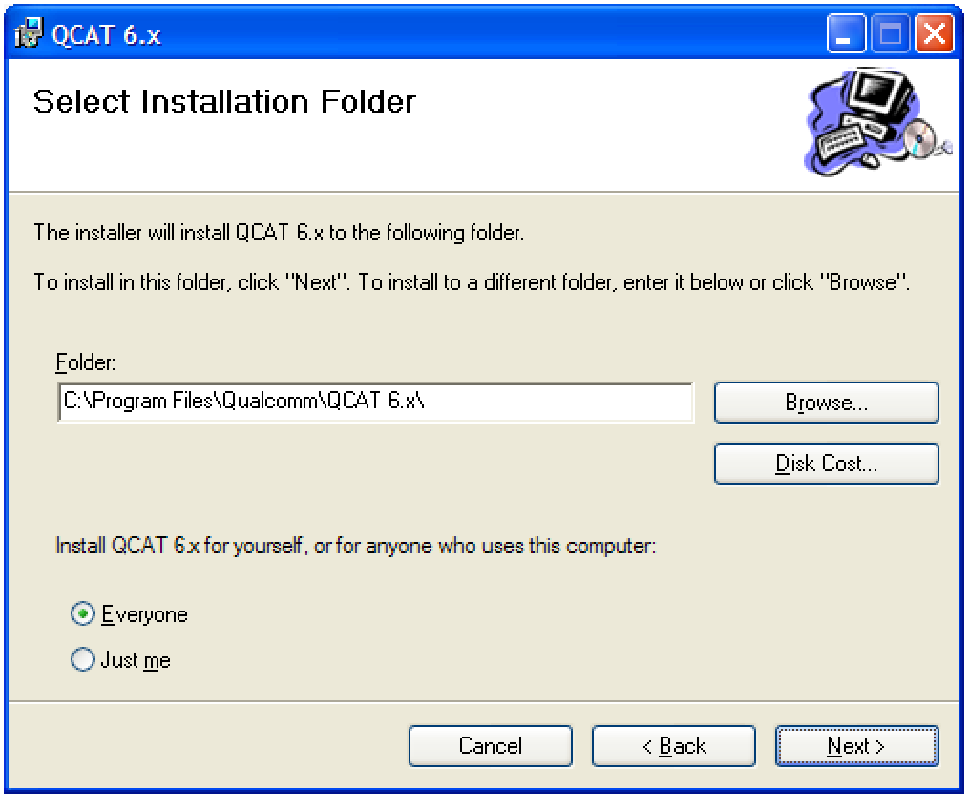
QCAT 6.x

Welcome to the QCAT 6.x Setup Wizard

The installer will guide you through the steps required to install QCAT 06.00.0068.

NOTE: To maintain backward compatibility for automation setups dependent upon tool versions, QCAT 6.x does not require that any previous installation of QCAT 5.x be uninstalled. This is only true for different major versions. Multiple minor revisions of QCAT 6.x will not coexist.

The QCAT installer allows you to specify the path into which the components must be installed.



QCAT 6.x

Select Installation Folder

The installer will install QCAT 6.x to the following folder.

To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".

Folder: C:\Program Files\Qualcomm\QCAT 6.x\

Install QCAT 6.x for yourself, or for anyone who uses this computer:

● Everyone

○ Just me

2.2 License file

QCAT is distributed with a limited period license. The validity and duration of the license is indicated in the license.txt file that can be found in the same directory as the QCAT executable. The license file can be viewed using a text editor, such as Notepad. It contains a readable Start Date and End Date followed by two or more lines of encrypted data.

To illustrate, the following license file enables QCAT to run from January 10, 2007 to July 10, 2007:

```
File: License.txt
Start Date: 2007 01 10
End Date: 2007 07 10
99 75 55 b9 21 fd 87 81 08 0e 0e db 83 e4 c9 40
d9 02 b7 72 0c fb a7 03 08 dd 0e 9b 83 dc c9 40
```

Making changes to the license file will render it invalid. If you need to renew your license after expiration, contact QTI; see Section 1.5.

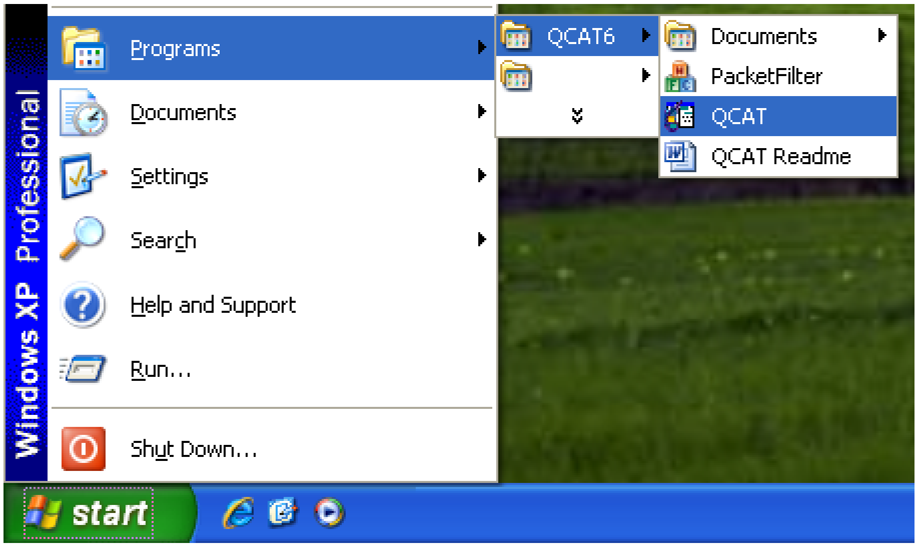
The QCAT application displays brief license information in its main window on the status bar in the lower right corner. There is usually no need to open the license file directly.

3 QCAT Application

3.1 Getting started

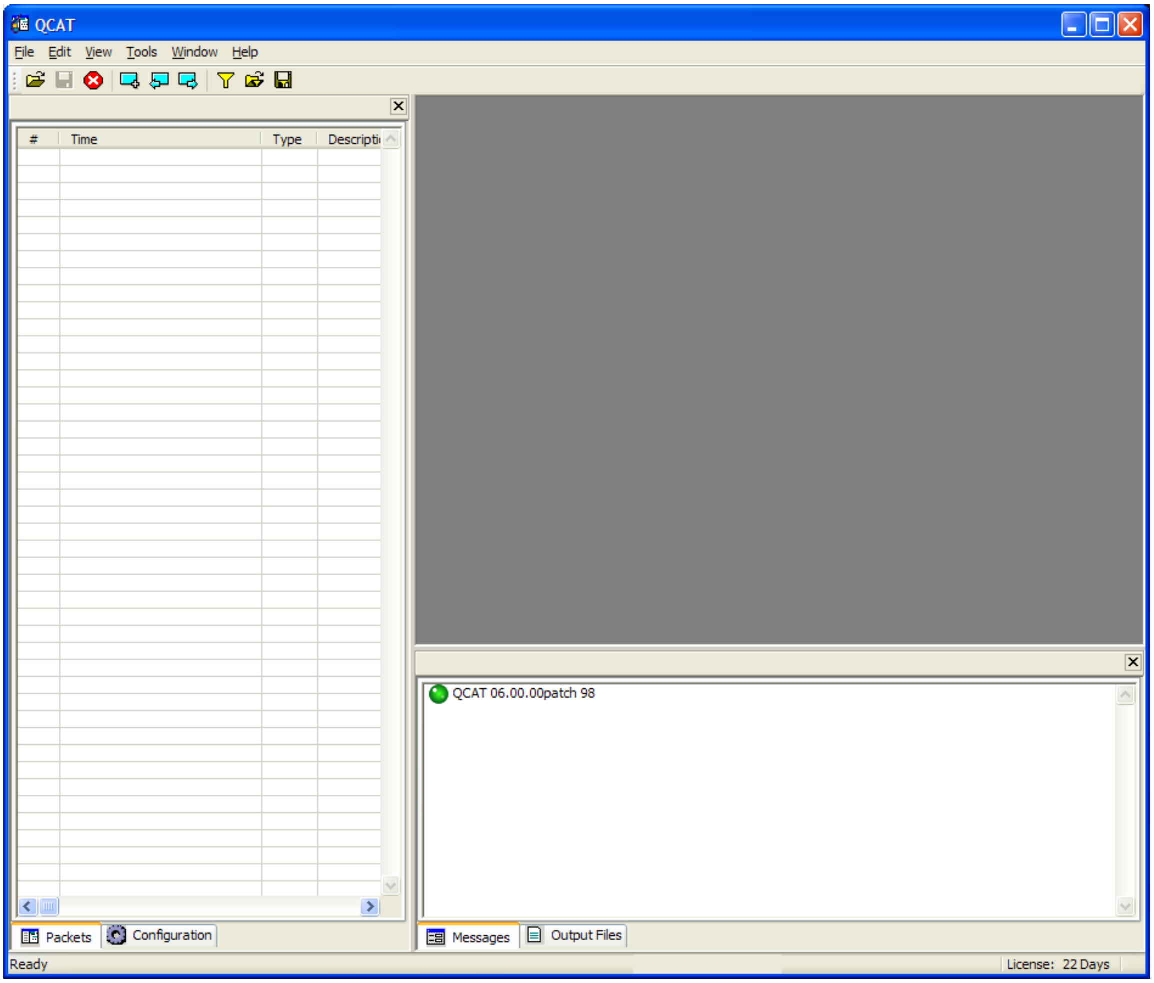
QCAT can run from the Start → Programs menu. If you have QXDM installed, you can also launch QCAT from the Tools menu of QXDM. See [Q1] for information about QXDM.

In a typical installation, QCAT can be launched by selecting Start → Programs → QCAT6 → QCAT.



3.2 QCAT window views

The main screen of the QCAT application is shown in the following screenshot.



QCAT 06.00.00patch 98

QCAT uses a splitter-view user interface with the following views:

- Log packet list (left)
- Parsed text/Tree view (right)
- Message (bottom)

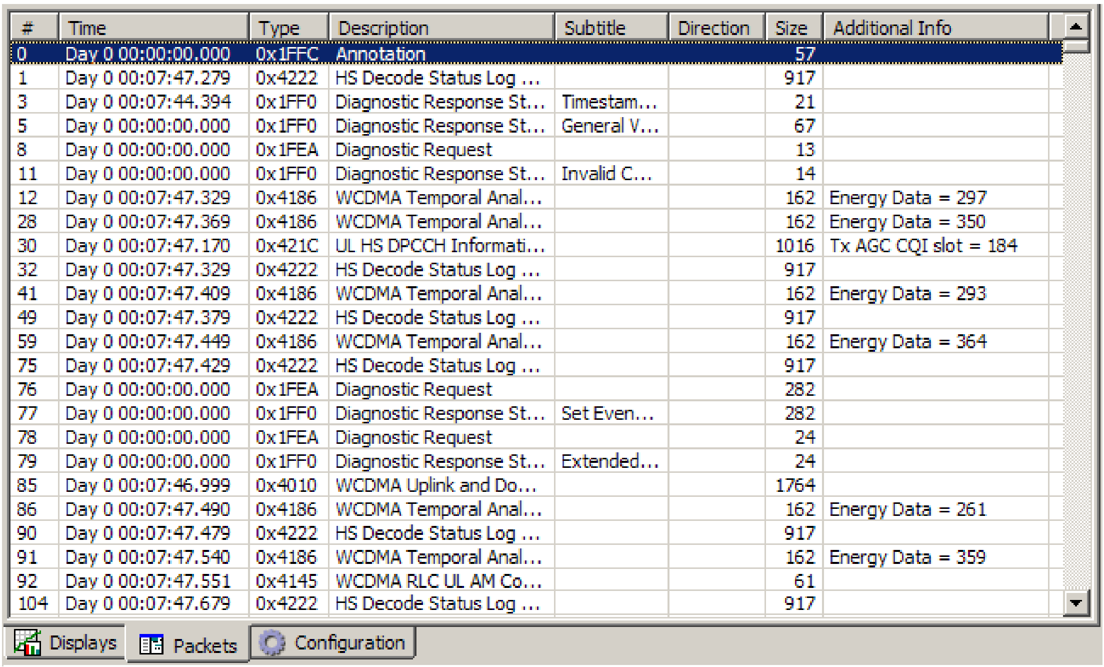
3.2.1 Log packet list (left)

The left view, called the Log Viewer, displays a list of all log packets in the currently open log file. Information about each log packet includes:

- Sequence number
- Time
- Type (log code)
- Description (log title)
- Subtitle (log subdescription)
- Direction (for signaling messages)
- Size (in bytes)
- Additional information (specified data items from the log)

Section 3.4.1 explains how to open a file. When a file is open, the bottom right of the status bar displays the number of packets in the file.

Log packets are initially listed in the same order in which they are read from the log file. Clicking in the column titles, e.g., Type or Size, reorders the packets by the values in those columns. Clicking a second time in the same column title reverses the order.



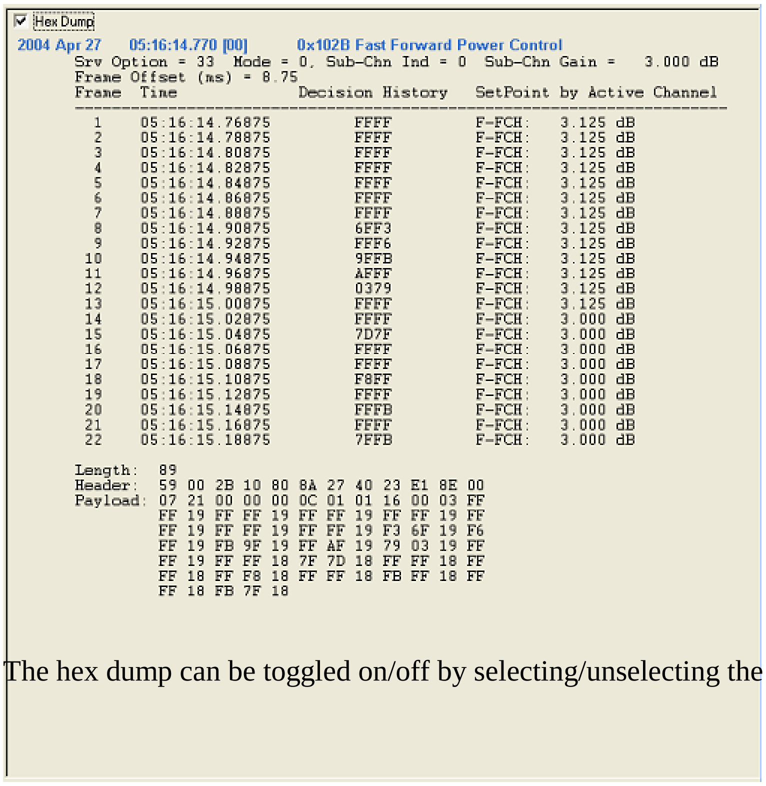
#	Time	Type	Description	Subtitle	Direction	Size	Additional Info
0	Day 0 00:00:00.000	0x1FFC	Annotation			57	
1	Day 0 00:07:47.279	0x4222	HS Decode Status Log ...			917	
3	Day 0 00:07:44.394	0x1FF0	Diagnostic Response St...	Timestam...		21	
5	Day 0 00:00:00.000	0x1FF0	Diagnostic Response St...	General V...		67	
8	Day 0 00:00:00.000	0x1FEA	Diagnostic Request			13	
11	Day 0 00:00:00.000	0x1FF0	Diagnostic Response St...	Invalid C...		14	
12	Day 0 00:07:47.329	0x4186	WCDMA Temporal Anal...			162	Energy Data = 297
28	Day 0 00:07:47.369	0x4186	WCDMA Temporal Anal...			162	Energy Data = 350
30	Day 0 00:07:47.170	0x421C	UL HS DPCCH Informati...			1016	Tx AGC CQI slot = 184
32	Day 0 00:07:47.329	0x4222	HS Decode Status Log ...			917	
41	Day 0 00:07:47.409	0x4186	WCDMA Temporal Anal...			162	Energy Data = 293
49	Day 0 00:07:47.379	0x4222	HS Decode Status Log ...			917	
59	Day 0 00:07:47.449	0x4186	WCDMA Temporal Anal...			162	Energy Data = 364
75	Day 0 00:07:47.429	0x4222	HS Decode Status Log ...			917	
76	Day 0 00:00:00.000	0x1FEA	Diagnostic Request			282	
77	Day 0 00:00:00.000	0x1FF0	Diagnostic Response St...	Set Even...		282	
78	Day 0 00:00:00.000	0x1FEA	Diagnostic Request			24	
79	Day 0 00:00:00.000	0x1FF0	Diagnostic Response St...	Extended...		24	
85	Day 0 00:07:46.999	0x4010	WCDMA Uplink and Do...			1764	
86	Day 0 00:07:47.490	0x4186	WCDMA Temporal Anal...			162	Energy Data = 261
90	Day 0 00:07:47.479	0x4222	HS Decode Status Log ...			917	
91	Day 0 00:07:47.540	0x4186	WCDMA Temporal Anal...			162	Energy Data = 359
92	Day 0 00:07:47.551	0x4145	WCDMA RLC UL AM Co...			61	
104	Day 0 00:07:47.679	0x4222	HS Decode Status Log ...			917	

The number and order of the columns in the display can be customized. For a description, see Section 3.4.8 and Section 3.4.9.

Selecting a log packet entry in this view updates the right view accordingly.

3.2.2 Parsed text (right)

The right view displays the parsed text for the contents of the log packet selected in the left view. Use **Ctrl+Shift** to select more than one packet for display in the parsed view. By default, no more than 10 packets from the multiselection are displayed; however, this can be changed via the Control tab.



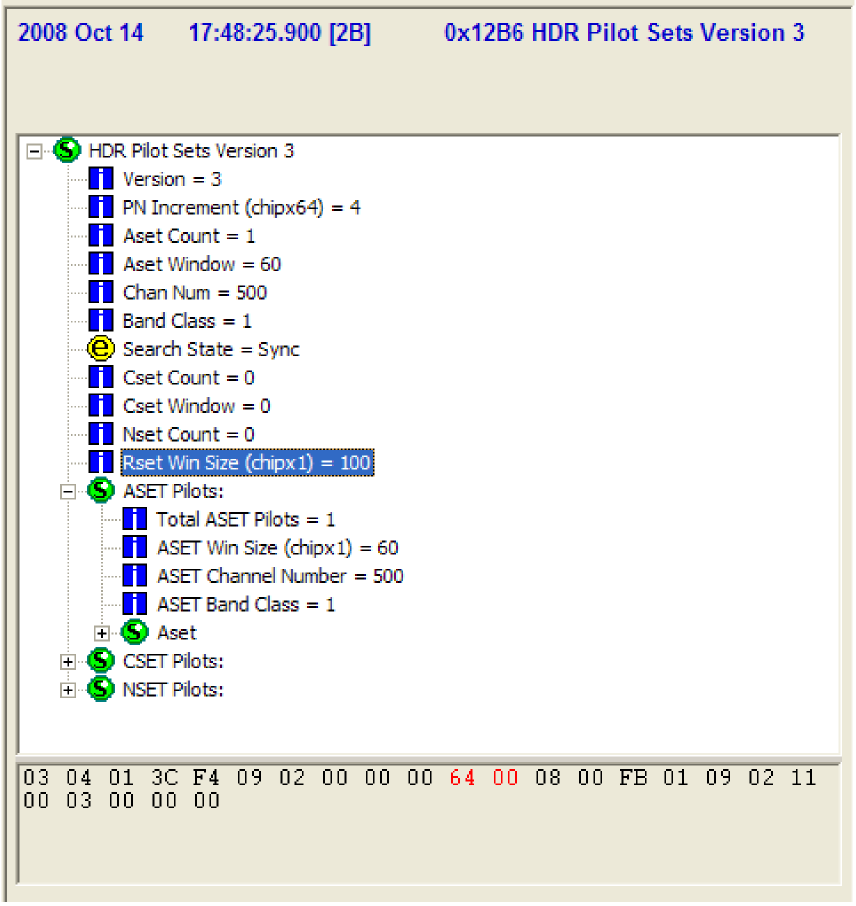
☑ Hex Dump

```
2004 Apr 27     05:16:14.770 [00]       0x102B Fast Forward Power Control
       Srv Option = 33  Mode = 0, Sub-Chn Ind = 0  Sub-Chn Gain =   3.000 dB
       Frame Offset (ms) = 8.75
       Frame  Time                  Decision History   SetPoint by Active Channel
       -----------------------------------------------------------------------
         1     05:16:14.76875         FFFF          F-FCH:    3.125 dB
         2     05:16:14.78875         FFFF          F-FCH:    3.125 dB
         3     05:16:14.80875         FFFF          F-FCH:    3.125 dB
         4     05:16:14.82875         FFFF          F-FCH:    3.125 dB
         5     05:16:14.84875         FFFF          F-FCH:    3.125 dB
         6     05:16:14.86875         FFFF          F-FCH:    3.125 dB
         7     05:16:14.88875         FFFF          F-FCH:    3.125 dB
         8     05:16:14.90875         6FF3          F-FCH:    3.125 dB
         9     05:16:14.92875         FFF6          F-FCH:    3.125 dB
        10     05:16:14.94875         9FFB          F-FCH:    3.125 dB
        11     05:16:14.96875         AFFF          F-FCH:    3.125 dB
        12     05:16:14.98875         0379          F-FCH:    3.125 dB
        13     05:16:15.00875         FFFF          F-FCH:    3.125 dB
        14     05:16:15.02875         FFFF          F-FCH:    3.000 dB
        15     05:16:15.04875         7D7F          F-FCH:    3.000 dB
        16     05:16:15.06875         FFFF          F-FCH:    3.000 dB
        17     05:16:15.08875         FFFF          F-FCH:    3.000 dB
        18     05:16:15.10875         F8FF          F-FCH:    3.000 dB
        19     05:16:15.12875         FFFF          F-FCH:    3.000 dB
        20     05:16:15.14875         FFFB          F-FCH:    3.000 dB
        21     05:16:15.16875         FFFF          F-FCH:    3.000 dB
        22     05:16:15.18875         7FFB          F-FCH:    3.000 dB

       Length:  89
       Header:  59 00 2B 10 80 8A 27 40 23 E1 8E 00
       Payload: 07 21 00 00 00 0C 01 01 16 00 03 FF
                FF 19 FF FF 19 FF FF 19 FF FF 19 FF
                FF 19 FF FF 19 FF FF 19 F3 6F 19 F6
                FF 19 FB 9F 19 FF AF 19 79 03 19 FF
                FF 19 FF FF 18 7F 7D 18 FF FF 18 FF
                FF 18 FF F8 18 FF FF 18 FB FF 18 FF
                FF 18 FB 7F 18
```

The hex dump can be toggled on/off by selecting/unselecting the **Hex Dump** checkbox.

3.2.3 Tree view (right)

The right view displays the tree view parsed contents of the log packet selected in the left view. If multiple packets are selected in the left view, only the anchor item is shown in the tree view. Selecting a field in the tree results in the bytes used to populate that field being shown in red in the hex dump.



2008 Oct 14   17:48:25.900 [2B]   0x12B6 HDR Pilot Sets Version 3

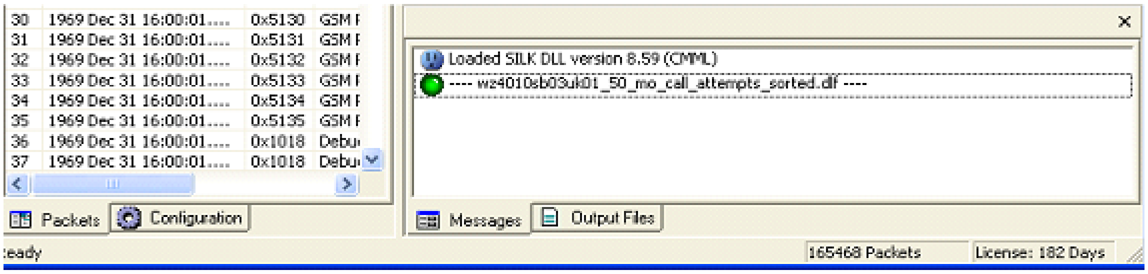
```
HDR Pilot Sets Version 3
    Version = 3
    PN Increment (chipx64) = 4
    Aset Count = 1
    Aset Window = 60
    Chan Num = 500
    Band Class = 1
    Search State = Sync
    Cset Count = 0
    Cset Window = 0
    Nset Count = 0
    Rset Win Size (chipx1) = 100
    ASET Pilots:
        Total ASET Pilots = 1
        ASET Win Size (chipx1) = 60
        ASET Channel Number = 500
        ASET Band Class = 1
        Aset
    CSET Pilots:
    NSET Pilots:
```

```
03 04 01 3C F4 09 02 00 00 00 64 00 08 00 FB 01 09 02 11
00 03 00 00 00
```

The tree view also allows the addition of fields into the Additional Info column in the packet list by right-clicking the field and selecting Add to Additional Info Column.

3.2.4 Message (bottom)

The message view displays the information, warning, and error messages generated by the QCAT application window, as well as the processing engine. An icon displayed along with the message indicates the type of message.



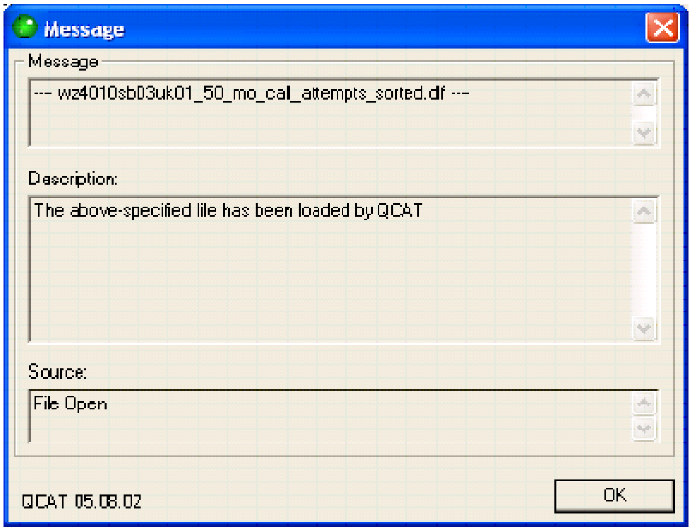
```
30  1969 Dec 31 16:00:01....  0x5130  GSM F
31  1969 Dec 31 16:00:01....  0x5131  GSM F
32  1969 Dec 31 16:00:01....  0x5132  GSM F
33  1969 Dec 31 16:00:01....  0x5133  GSM F
34  1969 Dec 31 16:00:01....  0x5134  GSM F
35  1969 Dec 31 16:00:01....  0x5135  GSM F
36  1969 Dec 31 16:00:01....  0x1018  Debu
37  1969 Dec 31 16:00:01....  0x1018  Debu
```

Loaded SILK DLL version 8.59 (CMML)

---- wz4010sb03uk01_50_mo_call_attempts_sorted.df ----

Ready | 165468 Packets | License: 182 Days

To see a detailed explanation of each message, double-click the message text. This brings up a help dialog that explains the context and the source of the message.



Message: --- wz4010sb03uk01_50_mo_call_attempts_sorted.df ---

Description: The above-specified file has been loaded by QCAT

Source: File Open

QCAT 05.08.02

3.3 QCAT status bar

The QCAT status bar displays menu status messages, the count of log packets in the currently opened log file, and the license indicator. The license indicator displays the number of remaining days of license validity.

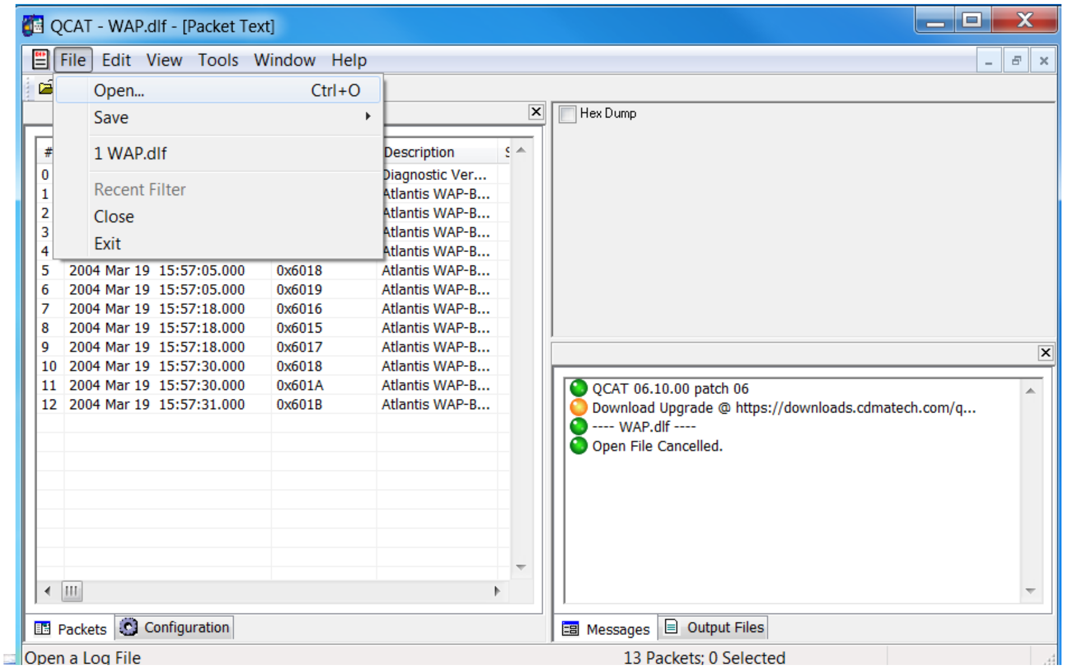
In addition, the status bar also displays the progress bar and progress information during the File → Open and File → Save as Text operations.

3.4 Using the QCAT application

The following sections explain the various features provided by the QCAT application and menus, shortcut keys, and buttons used to invoke them.

3.4.1 Opening a log file

To open a log file, select File → Open. The shortcut for this function is **Ctrl+O**.

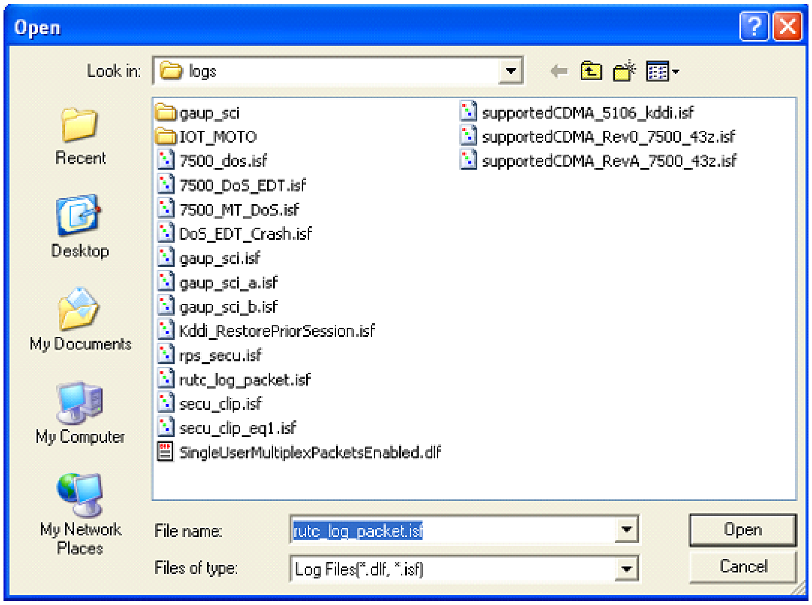


#			Description
0			Diagnostic Ver...
1			Atlantis WAP-B...
2			Atlantis WAP-B...
3			Atlantis WAP-B...
4			Atlantis WAP-B...
5	2004 Mar 19	15:57:05.000	0x6018	Atlantis WAP-B...
6	2004 Mar 19	15:57:05.000	0x6019	Atlantis WAP-B...
7	2004 Mar 19	15:57:18.000	0x6016	Atlantis WAP-B...
8	2004 Mar 19	15:57:18.000	0x6015	Atlantis WAP-B...
9	2004 Mar 19	15:57:18.000	0x6017	Atlantis WAP-B...
10	2004 Mar 19	15:57:30.000	0x6018	Atlantis WAP-B...
11	2004 Mar 19	15:57:30.000	0x601A	Atlantis WAP-B...
12	2004 Mar 19	15:57:31.000	0x601B	Atlantis WAP-B...

```
QCAT 06.10.00 patch 06
Download Upgrade @ https://downloads.cdmatech.com/q...
---- WAP.dlf ----
Open File Cancelled.
```

Open a Log File   13 Packets; 0 Selected

The Windows File → Open dialog box used to browse directories for files with extension *.dlf or .isf appears. To open log files with other extensions, select All Files (.*) in the Files of type drop-down list. Files must be in binary format to be readable by QCAT.



Look in: logs

gaup_sci
IOT_MOTO
7500_dos.isf
7500_DoS_EDT.isf
7500_MT_DoS.isf
DoS_EDT_Crash.isf
gaup_sci.isf
gaup_sci_a.isf
gaup_sci_b.isf
Kddi_RestorePriorSession.isf
rps_secu.isf
rutc_log_packet.isf
secu_clip.isf
secu_clip_eq1.isf
SingleUserMultiplexPacketsEnabled.dlf
supportedCDMA_5106_kddi.isf
supportedCDMA_Rev0_7500_43z.isf
supportedCDMA_RevA_7500_43z.isf

File name: rutc_log_packet.isf

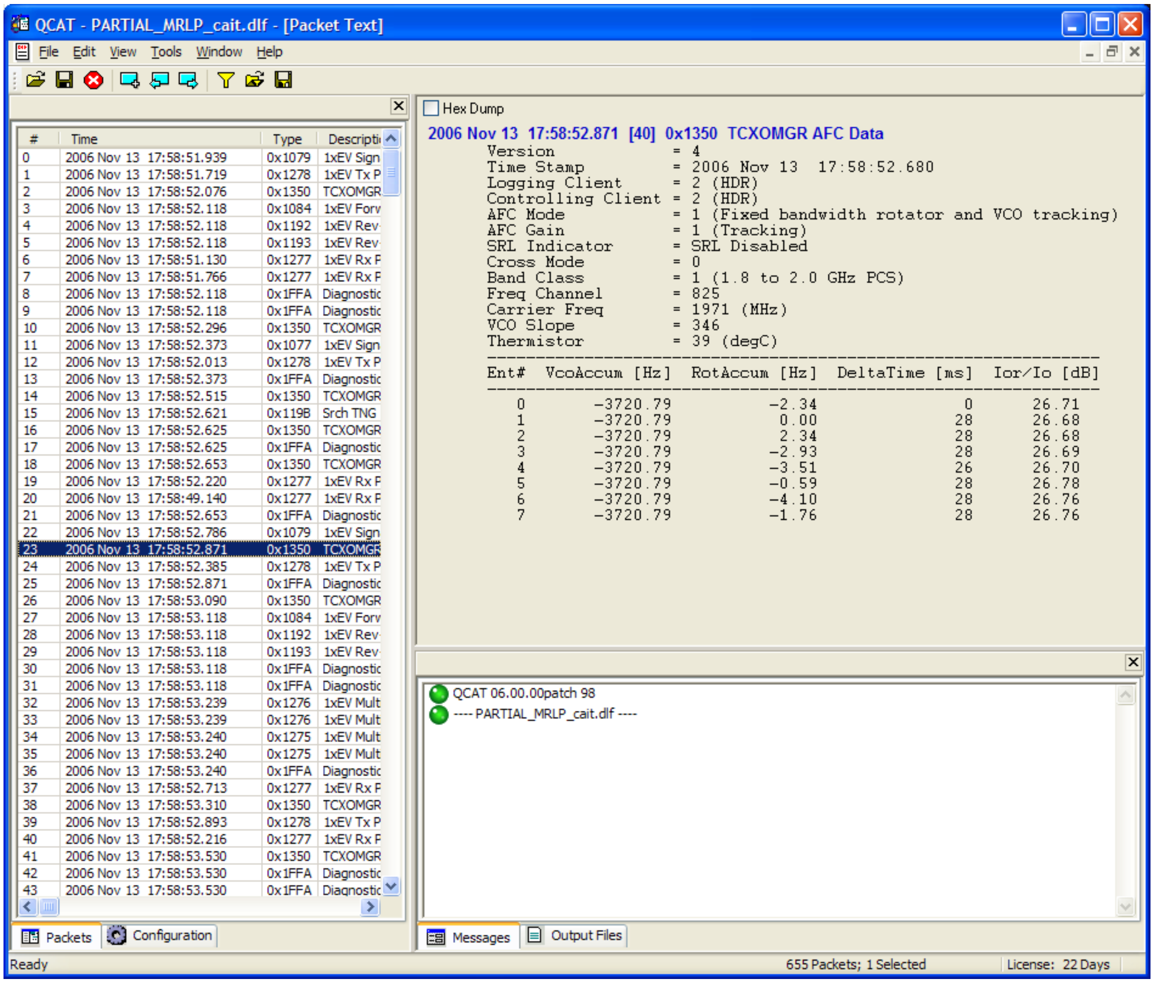
Files of type: Log Files(*.dlf, *.isf)

QCAT also provides a Most Recently Used (MRU) file list in the File menu. This allows you to select the last four log files from the File menu and open them directly.

On most Windows systems, double-clicking a .dlf file automatically launches QCAT and opens the file.

3.4.2 Viewing packet contents

To parse and view the contents of any log packet listed in the left view, click that entry. QCAT parses the selected log packet and displays the text and or tree view corresponding to the header, as well as payload of the packet, in the right view.



#	Time	Type	Descripti
0	2006 Nov 13 17:58:51.939	0x1079	1xEV Sign
1	2006 Nov 13 17:58:51.719	0x1278	1xEV Tx P
2	2006 Nov 13 17:58:52.076	0x1350	TCXOMGR
3	2006 Nov 13 17:58:52.118	0x1084	1xEV Forv
4	2006 Nov 13 17:58:52.118	0x1192	1xEV Rev-
5	2006 Nov 13 17:58:52.118	0x1193	1xEV Rev-
6	2006 Nov 13 17:58:51.130	0x1277	1xEV Rx F
7	2006 Nov 13 17:58:51.766	0x1277	1xEV Rx F
8	2006 Nov 13 17:58:52.118	0x1FFA	Diagnostic
9	2006 Nov 13 17:58:52.118	0x1FFA	Diagnostic
10	2006 Nov 13 17:58:52.296	0x1350	TCXOMGR
11	2006 Nov 13 17:58:52.373	0x1077	1xEV Sign
12	2006 Nov 13 17:58:52.013	0x1278	1xEV Tx P
13	2006 Nov 13 17:58:52.373	0x1FFA	Diagnostic
14	2006 Nov 13 17:58:52.515	0x1350	TCXOMGR
15	2006 Nov 13 17:58:52.621	0x119B	Srch TNG
16	2006 Nov 13 17:58:52.625	0x1350	TCXOMGR
17	2006 Nov 13 17:58:52.625	0x1FFA	Diagnostic
18	2006 Nov 13 17:58:52.653	0x1350	TCXOMGR
19	2006 Nov 13 17:58:52.220	0x1277	1xEV Rx F
20	2006 Nov 13 17:58:49.140	0x1277	1xEV Rx F
21	2006 Nov 13 17:58:52.653	0x1FFA	Diagnostic
22	2006 Nov 13 17:58:52.786	0x1079	1xEV Sign
23	2006 Nov 13 17:58:52.871	0x1350	TCXOMGR
24	2006 Nov 13 17:58:52.385	0x1278	1xEV Tx P
25	2006 Nov 13 17:58:52.871	0x1FFA	Diagnostic
26	2006 Nov 13 17:58:53.090	0x1350	TCXOMGR
27	2006 Nov 13 17:58:53.118	0x1084	1xEV Forv
28	2006 Nov 13 17:58:53.118	0x1192	1xEV Rev-
29	2006 Nov 13 17:58:53.118	0x1193	1xEV Rev-
30	2006 Nov 13 17:58:53.118	0x1FFA	Diagnostic
31	2006 Nov 13 17:58:53.118	0x1FFA	Diagnostic
32	2006 Nov 13 17:58:53.239	0x1276	1xEV Mult
33	2006 Nov 13 17:58:53.239	0x1276	1xEV Mult
34	2006 Nov 13 17:58:53.240	0x1275	1xEV Mult
35	2006 Nov 13 17:58:53.240	0x1275	1xEV Mult
36	2006 Nov 13 17:58:53.240	0x1FFA	Diagnostic
37	2006 Nov 13 17:58:52.713	0x1277	1xEV Rx F
38	2006 Nov 13 17:58:53.310	0x1350	TCXOMGR
39	2006 Nov 13 17:58:52.893	0x1278	1xEV Tx P
40	2006 Nov 13 17:58:52.216	0x1277	1xEV Rx F
41	2006 Nov 13 17:58:53.530	0x1350	TCXOMGR
42	2006 Nov 13 17:58:53.530	0x1FFA	Diagnostic
43	2006 Nov 13 17:58:53.530	0x1FFA	Diagnostic

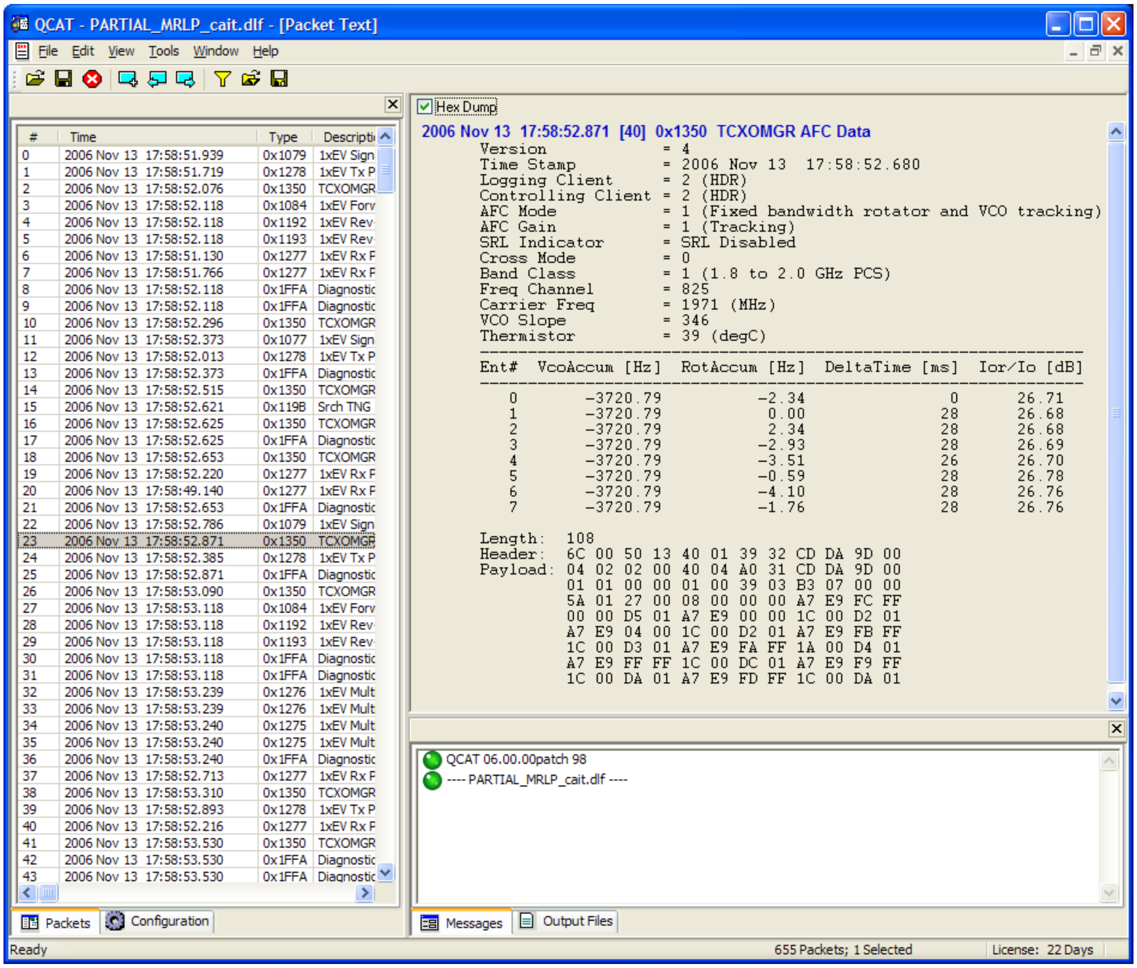
```
2006 Nov 13  17:58:52.871  [40]  0x1350  TCXOMGR AFC Data
        Version            = 4
        Time Stamp         = 2006 Nov 13  17:58:52.680
        Logging Client     = 2 (HDR)
        Controlling Client = 2 (HDR)
        AFC Mode           = 1 (Fixed bandwidth rotator and VCO tracking)
        AFC Gain           = 1 (Tracking)
        SRL Indicator      = SRL Disabled
        Cross Mode         = 0
        Band Class         = 1 (1.8 to 2.0 GHz PCS)
        Freq Channel       = 825
        Carrier Freq       = 1971 (MHz)
        VCO Slope          = 346
        Thermistor         = 39 (degC)
        ---------------------------------------------------------------
        Ent#  VcoAccum [Hz]  RotAccum [Hz]  DeltaTime [ms]  Ior/Io [dB]
        ---------------------------------------------------------------
           0       -3720.79          -2.34               0        26.71
           1       -3720.79           0.00              28        26.68
           2       -3720.79           2.34              28        26.68
           3       -3720.79          -2.93              28        26.69
           4       -3720.79          -3.51              26        26.70
           5       -3720.79          -0.59              28        26.78
           6       -3720.79          -4.10              28        26.76
           7       -3720.79          -1.76              28        26.76
```

```
QCAT 06.00.00patch 98
---- PARTIAL_MRLP_cait.dlf ----
```

Ready   655 Packets; 1 Selected   License: 22 Days

3.4.3 Viewing packet hex dump

The right view contains the hex dump of the header and contents for the packet selected in the left view. An example of a hex dump display is shown in the following screenshot.



#	Time	Type	Descripti
0	2006 Nov 13 17:58:51.939	0x1079	1xEV Sign
1	2006 Nov 13 17:58:51.719	0x1278	1xEV Tx P
2	2006 Nov 13 17:58:52.076	0x1350	TCXOMGR
3	2006 Nov 13 17:58:52.118	0x1084	1xEV Forv
4	2006 Nov 13 17:58:52.118	0x1192	1xEV Rev-
5	2006 Nov 13 17:58:52.118	0x1193	1xEV Rev-
6	2006 Nov 13 17:58:51.130	0x1277	1xEV Rx P
7	2006 Nov 13 17:58:51.766	0x1277	1xEV Rx P
8	2006 Nov 13 17:58:52.118	0x1FFA	Diagnostic
9	2006 Nov 13 17:58:52.118	0x1FFA	Diagnostic
10	2006 Nov 13 17:58:52.296	0x1350	TCXOMGR
11	2006 Nov 13 17:58:52.373	0x1077	1xEV Sign
12	2006 Nov 13 17:58:52.013	0x1278	1xEV Tx P
13	2006 Nov 13 17:58:52.373	0x1FFA	Diagnostic
14	2006 Nov 13 17:58:52.515	0x1350	TCXOMGR
15	2006 Nov 13 17:58:52.621	0x119B	Srch TNG
16	2006 Nov 13 17:58:52.625	0x1350	TCXOMGR
17	2006 Nov 13 17:58:52.625	0x1FFA	Diagnostic
18	2006 Nov 13 17:58:52.653	0x1350	TCXOMGR
19	2006 Nov 13 17:58:52.220	0x1277	1xEV Rx P
20	2006 Nov 13 17:58:49.140	0x1277	1xEV Rx P
21	2006 Nov 13 17:58:52.653	0x1FFA	Diagnostic
22	2006 Nov 13 17:58:52.786	0x1079	1xEV Sign
23	2006 Nov 13 17:58:52.871	0x1350	TCXOMGR
24	2006 Nov 13 17:58:52.385	0x1278	1xEV Tx P
25	2006 Nov 13 17:58:52.871	0x1FFA	Diagnostic
26	2006 Nov 13 17:58:53.090	0x1350	TCXOMGR
27	2006 Nov 13 17:58:53.118	0x1084	1xEV Forv
28	2006 Nov 13 17:58:53.118	0x1192	1xEV Rev-
29	2006 Nov 13 17:58:53.118	0x1193	1xEV Rev-
30	2006 Nov 13 17:58:53.118	0x1FFA	Diagnostic
31	2006 Nov 13 17:58:53.118	0x1FFA	Diagnostic
32	2006 Nov 13 17:58:53.239	0x1276	1xEV Mult
33	2006 Nov 13 17:58:53.239	0x1276	1xEV Mult
34	2006 Nov 13 17:58:53.240	0x1275	1xEV Mult
35	2006 Nov 13 17:58:53.240	0x1275	1xEV Mult
36	2006 Nov 13 17:58:53.240	0x1FFA	Diagnostic
37	2006 Nov 13 17:58:52.713	0x1277	1xEV Rx P
38	2006 Nov 13 17:58:53.310	0x1350	TCXOMGR
39	2006 Nov 13 17:58:52.893	0x1278	1xEV Tx P
40	2006 Nov 13 17:58:52.216	0x1277	1xEV Rx P
41	2006 Nov 13 17:58:53.530	0x1350	TCXOMGR
42	2006 Nov 13 17:58:53.530	0x1FFA	Diagnostic
43	2006 Nov 13 17:58:53.530	0x1FFA	Diagnostic

```
2006 Nov 13  17:58:52.871  [40]  0x1350  TCXOMGR AFC Data
        Version            = 4
        Time Stamp         = 2006 Nov 13  17:58:52.680
        Logging Client     = 2 (HDR)
        Controlling Client = 2 (HDR)
        AFC Mode           = 1 (Fixed bandwidth rotator and VCO tracking)
        AFC Gain           = 1 (Tracking)
        SRL Indicator      = SRL Disabled
        Cross Mode         = 0
        Band Class         = 1 (1.8 to 2.0 GHz PCS)
        Freq Channel       = 825
        Carrier Freq       = 1971 (MHz)
        VCO Slope          = 346
        Thermistor         = 39 (degC)
        ---------------------------------------------------------------
        Ent#  VcoAccum [Hz]  RotAccum [Hz]  DeltaTime [ms]  Ior/Io [dB]
        ---------------------------------------------------------------
          0       -3720.79          -2.34               0        26.71
          1       -3720.79           0.00              28        26.68
          2       -3720.79           2.34              28        26.68
          3       -3720.79          -2.93              28        26.69
          4       -3720.79          -3.51              26        26.70
          5       -3720.79          -0.59              28        26.78
          6       -3720.79          -4.10              28        26.76
          7       -3720.79          -1.76              28        26.76

        Length:   108
        Header:   6C 00 50 13 40 01 39 32 CD DA 9D 00
        Payload:  04 02 02 00 40 04 A0 31 CD DA 9D 00
                  01 01 00 00 01 00 39 03 B3 07 00 00
                  5A 01 27 00 08 00 00 00 A7 E9 FC FF
                  00 00 D5 01 A7 E9 00 00 1C 00 D2 01
                  A7 E9 04 00 1C 00 D2 01 A7 E9 FB FF
                  1C 00 D3 01 A7 E9 FA FF 1A 00 D4 01
                  A7 E9 FF FF 1C 00 DC 01 A7 E9 F9 FF
                  1C 00 DA 01 A7 E9 FD FF 1C 00 DA 01
```

QCAT 06.00.00patch 98
---- PARTIAL_MRLP_cait.dlf ----

Ready   655 Packets; 1 Selected   License: 22 Days

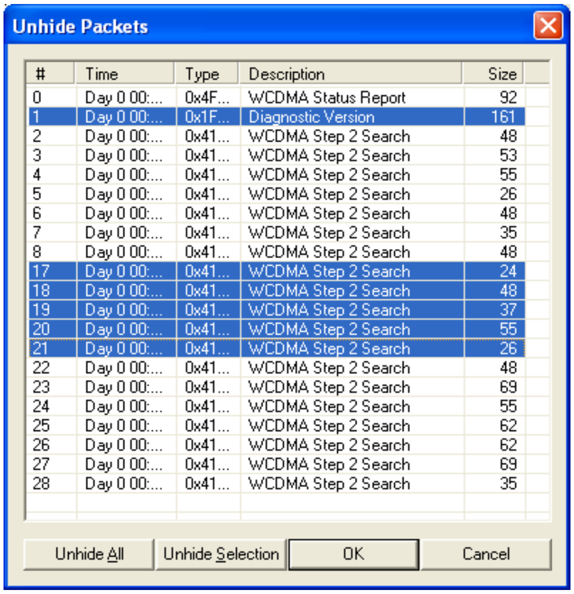
3.4.4 Sorting the display

Click any of the column headers in the left view to sort the list by column. Clicking that column header a second time reverses the sorted order.

3.4.5 Hiding/unhiding log packets

The hide/unhide feature can be used to limit the display to certain log packets. To remove log packets from view, select the packets in the left view, then select Edit → Hide Packets from the menu. The shortcut for this function is **Ctrl+H**.

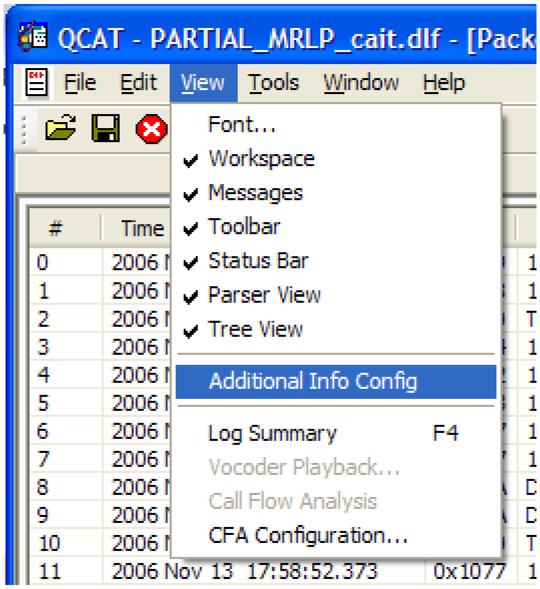
To make hidden packets visible again, select Edit → Unhide Packets. Select the packets (or click **Select All**), and then click **Unhide**.



#	Time	Type	Description	Size
0	Day 0 00:...	0x4F...	WCDMA Status Report	92
1	Day 0 00:...	0x1F...	Diagnostic Version	161
2	Day 0 00:...	0x41...	WCDMA Step 2 Search	48
3	Day 0 00:...	0x41...	WCDMA Step 2 Search	53
4	Day 0 00:...	0x41...	WCDMA Step 2 Search	55
5	Day 0 00:...	0x41...	WCDMA Step 2 Search	26
6	Day 0 00:...	0x41...	WCDMA Step 2 Search	48
7	Day 0 00:...	0x41...	WCDMA Step 2 Search	35
8	Day 0 00:...	0x41...	WCDMA Step 2 Search	48
17	Day 0 00:...	0x41...	WCDMA Step 2 Search	24
18	Day 0 00:...	0x41...	WCDMA Step 2 Search	48
19	Day 0 00:...	0x41...	WCDMA Step 2 Search	37
20	Day 0 00:...	0x41...	WCDMA Step 2 Search	55
21	Day 0 00:...	0x41...	WCDMA Step 2 Search	26
22	Day 0 00:...	0x41...	WCDMA Step 2 Search	48
23	Day 0 00:...	0x41...	WCDMA Step 2 Search	69
24	Day 0 00:...	0x41...	WCDMA Step 2 Search	55
25	Day 0 00:...	0x41...	WCDMA Step 2 Search	62
26	Day 0 00:...	0x41...	WCDMA Step 2 Search	62
27	Day 0 00:...	0x41...	WCDMA Step 2 Search	69
28	Day 0 00:...	0x41...	WCDMA Step 2 Search	35

3.4.6 Additional Info column

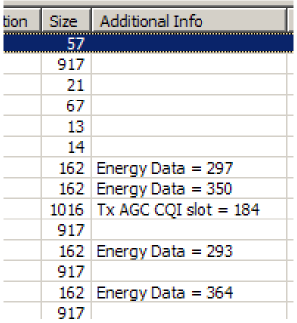
The Additional Info column can be customized to show data from specific fields in different log packets. This can be achieved by selecting the fields from the tree view and adding them to the column, or by selecting View → Additional Info Config.



If fields selected for the Additional Info column are not shown, they do not exist in that instance of the log packet. This could be due to several factors, which include, but are not limited to:

- The packet is malformed.
- The field is in an array and the index is larger than the maximum size of the instance.
- The field belongs to a different version of the packet.
- The field is optional and does not exist in the specific instance.

An example of the Additional Info column is shown in the following screenshot.



tion	Size	Additional Info
	57	
	917	
	21	
	67	
	13	
	14	
	162	Energy Data = 297
	162	Energy Data = 350
	1016	Tx AGC CQI slot = 184
	917	
	162	Energy Data = 293
	917	
	162	Energy Data = 364
	917	

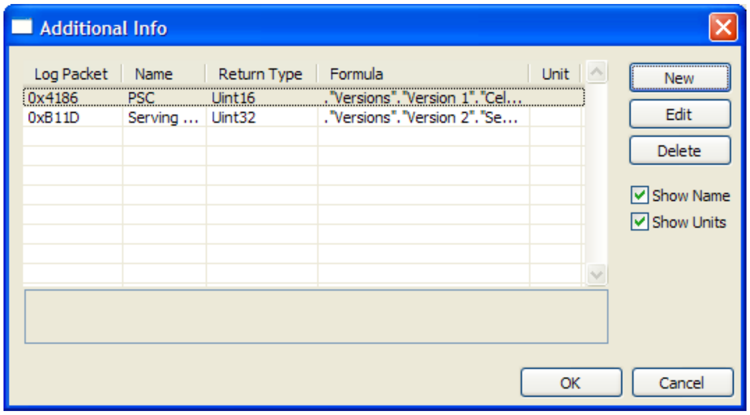
3.4.6.1 Additional Info configuration dialog

The Additional Info dialog displays all items that are currently populated in the Additional Info column. The dialog gives a quick summary of the:

- Log Packet – Log for which the item applies
- Name – Name of the field to be displayed
- Return Type – Type to be displayed in the column
- Formula – Formula used internally to retrieve the value; this follows the log structure from the base to the field
- Unit – Unit of the data, e.g., dB, sec, etc.

From the dialog, new items can be added and existing items can be edited or deleted. Selecting New or Edit invokes the Additional Info Item dialog, as described in Section 3.4.6.2.

To save space, the Show Name and Show Unit options disable printing of the name or unit in the Additional Info Column.

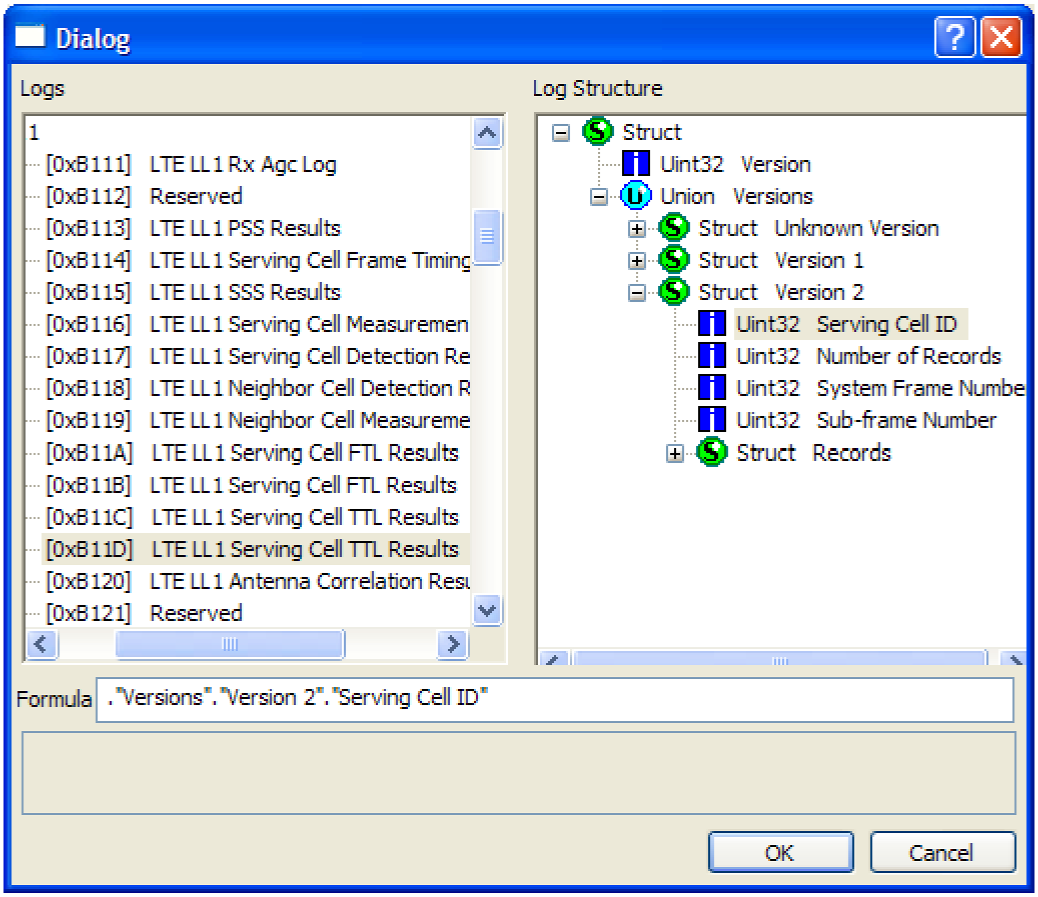


Log Packet	Name	Return Type	Formula	Unit
0x4186	PSC	Uint16	."Versions"."Version 1"."Cel...	
0xB11D	Serving ...	Uint32	."Versions"."Version 2"."Se...	

☑ Show Name
☑ Show Units

3.4.6.2 Additional Info Item dialog

The Additional Info Item dialog allows the selection of fields to show in the Additional Info column. The dialog includes a list of packets for which fields can be chosen. Selecting a packet causes that packet's structure to be displayed in the Log Structure view. Selecting a field automatically populates the Formula Edit box and the description. The formula can then be edited to set appropriate array indices.



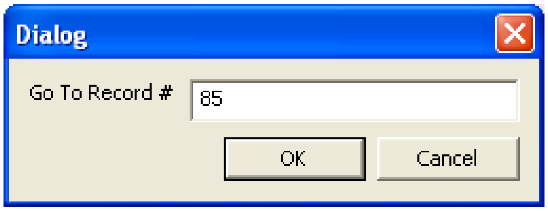
```
1
[0xB111]  LTE LL1 Rx Agc Log
[0xB112]  Reserved
[0xB113]  LTE LL1 PSS Results
[0xB114]  LTE LL1 Serving Cell Frame Timing
[0xB115]  LTE LL1 SSS Results
[0xB116]  LTE LL1 Serving Cell Measuremen
[0xB117]  LTE LL1 Serving Cell Detection Re
[0xB118]  LTE LL1 Neighbor Cell Detection R
[0xB119]  LTE LL1 Neighbor Cell Measureme
[0xB11A]  LTE LL1 Serving Cell FTL Results
[0xB11B]  LTE LL1 Serving Cell FTL Results
[0xB11C]  LTE LL1 Serving Cell TTL Results
[0xB11D]  LTE LL1 Serving Cell TTL Results
[0xB120]  LTE LL1 Antenna Correlation Resu
[0xB121]  Reserved
```

```
⊟ Struct
    Uint32  Version
  ⊟ Union  Versions
      ⊞ Struct  Unknown Version
      ⊞ Struct  Version 1
      ⊟ Struct  Version 2
          Uint32  Serving Cell ID
          Uint32  Number of Records
          Uint32  System Frame Numbe
          Uint32  Sub-frame Number
        ⊞ Struct  Records
```

Formula .'Versions'.'Version 2'.'Serving Cell ID'

3.4.7 Go to a specific packet

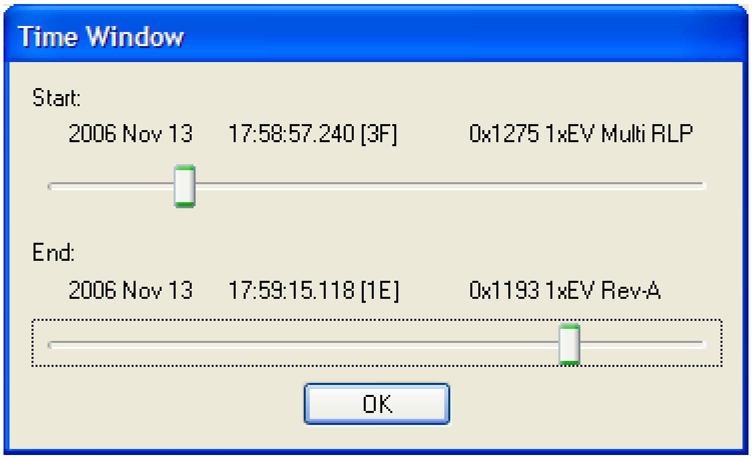
This feature allows jumping to a packet for a given record number. Select Edit → Go To Packet to bring up the dialog box.



Go To Record # 85

3.4.8 Setting a time window

This feature allows hiding/unhiding of packets based on a window defined by a start and end time. Select Edit → Time Window, then set the start and end times for the window by moving the slider controls.



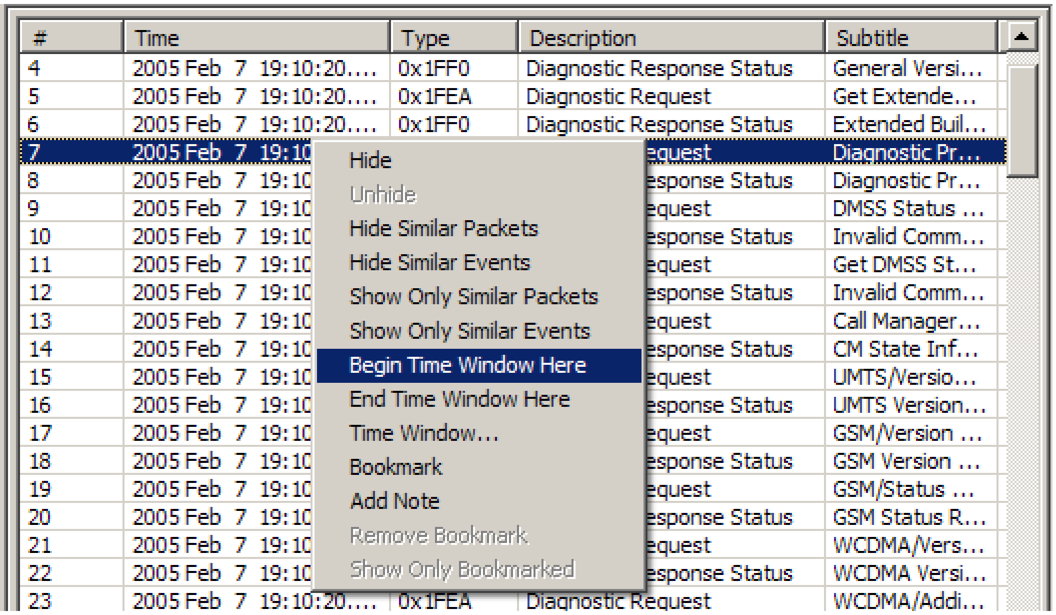
Start:

2006 Nov 13 17:58:57.240 [3F] 0x1275 1xEV Multi RLP

End:

2006 Nov 13 17:59:15.118 [1E] 0x1193 1xEV Rev-A

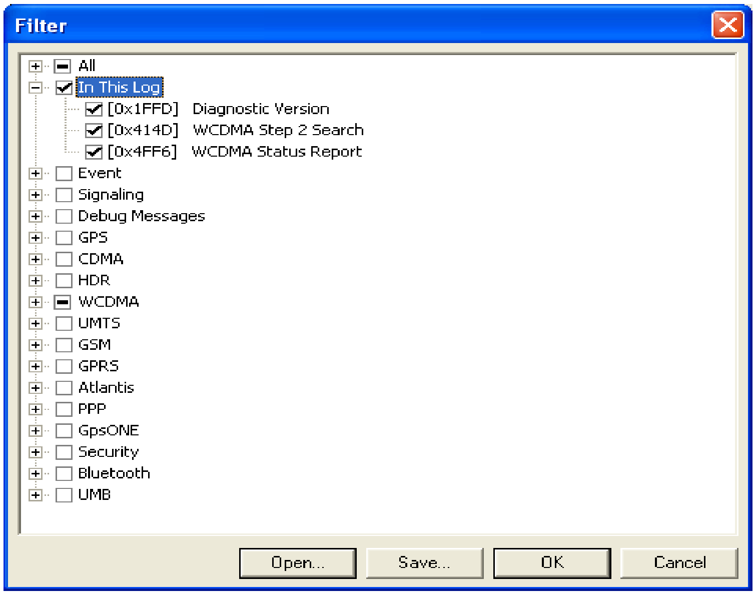
The start and end times can also be set from the packet list, by right-clicking a packet and selecting "Begin Time Window Here" or "End Time Window Here." The options are shown in the following screenshot.



#	Time	Type	Description	Subtitle
4	2005 Feb 7 19:10:20.…	0x1FF0	Diagnostic Response Status	General Versi…
5	2005 Feb 7 19:10:20.…	0x1FEA	Diagnostic Request	Get Extende…
6	2005 Feb 7 19:10:20.…	0x1FF0	Diagnostic Response Status	Extended Buil…
7	2005 Feb 7 19:10		equest	Diagnostic Pr…
8	2005 Feb 7 19:10		esponse Status	Diagnostic Pr…
9	2005 Feb 7 19:10		equest	DMSS Status …
10	2005 Feb 7 19:10		esponse Status	Invalid Comm…
11	2005 Feb 7 19:10		equest	Get DMSS St…
12	2005 Feb 7 19:10		esponse Status	Invalid Comm…
13	2005 Feb 7 19:10		equest	Call Manager…
14	2005 Feb 7 19:10		esponse Status	CM State Inf…
15	2005 Feb 7 19:10		equest	UMTS/Versio…
16	2005 Feb 7 19:10		esponse Status	UMTS Version…
17	2005 Feb 7 19:10		equest	GSM/Version …
18	2005 Feb 7 19:10		esponse Status	GSM Version …
19	2005 Feb 7 19:10		equest	GSM/Status …
20	2005 Feb 7 19:10		esponse Status	GSM Status R…
21	2005 Feb 7 19:10		equest	WCDMA/Vers…
22	2005 Feb 7 19:10		esponse Status	WCDMA Versi…
23	2005 Feb 7 19:10:20.…	0x1FEA	Diagnostic Request	WCDMA/Addi…

3.4.9 Filtering packet types

This feature allows hiding/unhiding of packets based on type code. Access this feature by selecting Edit → Filter.



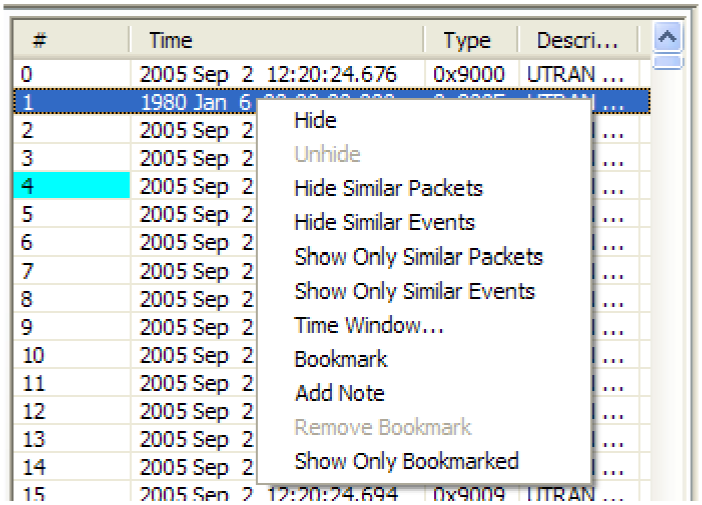
Filter

- ▬ All
- ☑ In This Log
  - ☑ [0x1FFD] Diagnostic Version
  - ☑ [0x414D] WCDMA Step 2 Search
  - ☑ [0x4FF6] WCDMA Status Report
- □ Event
- □ Signaling
- □ Debug Messages
- □ GPS
- □ CDMA
- □ HDR
- ▬ WCDMA
- □ UMTS
- □ GSM
- □ GPRS
- □ Atlantis
- □ PPP
- □ GpsONE
- □ Security
- □ Bluetooth
- □ UMB

The filter is applied to the file currently open and to any other files that are opened during the same QCAT session. If the filter is set before opening a log file, filtered packets cannot be unhidden and the file must be reopened with a different filter to get the missing packets. If no log file is open, the filter shows all supported packet types. Clicking **Select All** checks (keeps) all listed packet types; clicking **Unselect All** unchecks (discards) all listed packet types.

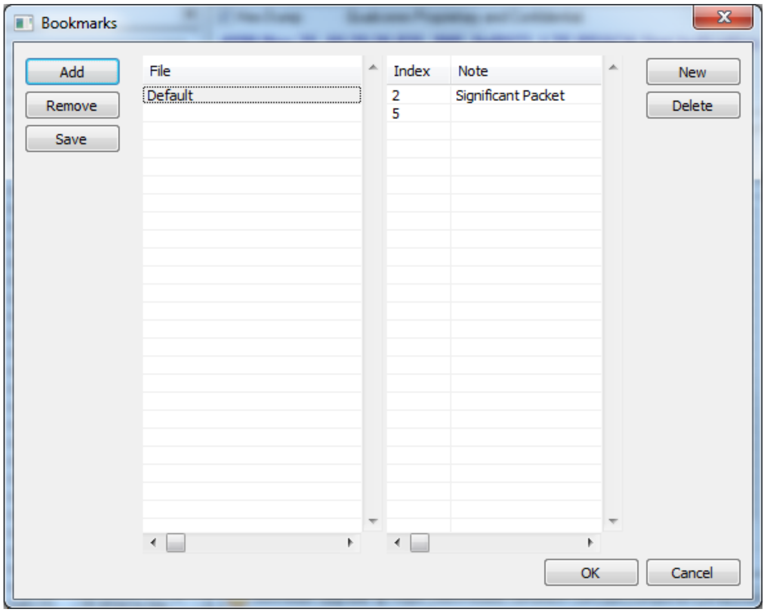
3.4.10 Bookmarks

QCAT allows bookmarking packets for easy navigation between significant packets. When a packet is bookmarked, the index is shown in a light color.



#	Time	Type	Descri...
0	2005 Sep 2 12:20:24.676	0x9000	UTRAN ...
1	1980 Jan 6		...
2	2005 Sep 2		...
3	2005 Sep 2		...
4	2005 Sep 2		...
5	2005 Sep 2		...
6	2005 Sep 2		...
7	2005 Sep 2		...
8	2005 Sep 2		...
9	2005 Sep 2		...
10	2005 Sep 2		...
11	2005 Sep 2		...
12	2005 Sep 2		...
13	2005 Sep 2		...
14	2005 Sep 2		...
15	2005 Sep 2 12:20:24.694	0x9009	UTRAN ...

To bookmark a packet, either right-click the packet and select Bookmark, or add bookmarks from the Bookmark dialog available from Edit → Bookmarks.



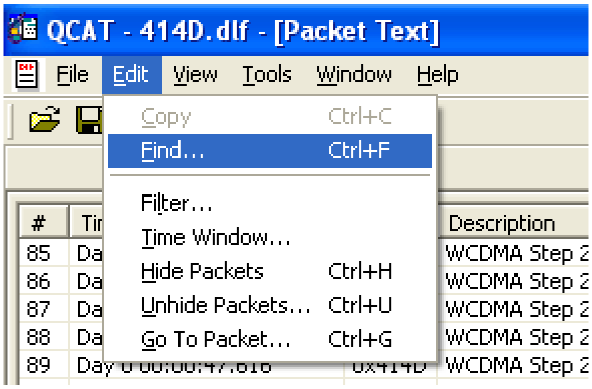
File
Default

Index	Note
2	Significant Packet
5	

The bookmark dialog allows opening and saving files containing bookmark information so that bookmark files can be passed along with log files for quick analysis. Multiple files can be opened simultaneously to show comments from multiple users. Bookmarks from each file are displayed as a different color. It also provides a way to add notes to bookmarks to explain why a packet is significant. This note displays when the cursor hovers over the index in the packet list and is printed in the header of the packet in the parsed view.

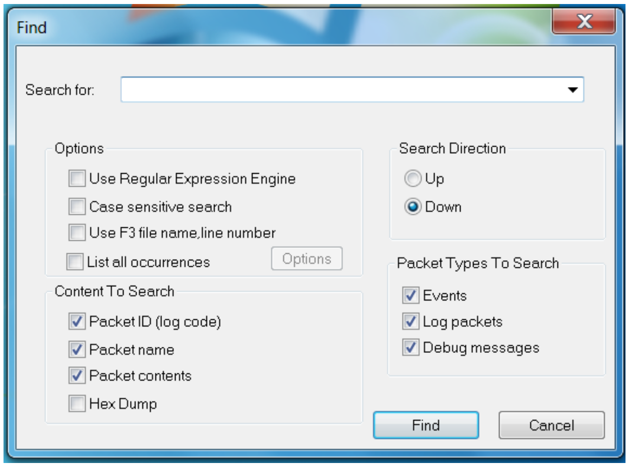
3.4.11 Find feature

This feature can be used to search for text or a regular expression within the parsing output. Select Edit → Find from the menu. The shortcut for this function is **Ctrl+F**.



3.4.11.1 Find options

The Find operation can be fine-tuned, as shown in the following screenshot. By default, the search is case-insensitive, the search direction is down, and all three packet types (events, regular log packets, and debug message packets) are searched. Also by default, all three types of packet content (ID, name, and contents) are searched. As an option, the hex dump can also be searched.



Search for:

Options
□ Use Regular Expression Engine
□ Case sensitive search
□ Use F3 file name,line number
□ List all occurrences

Search Direction
○ Up
● Down

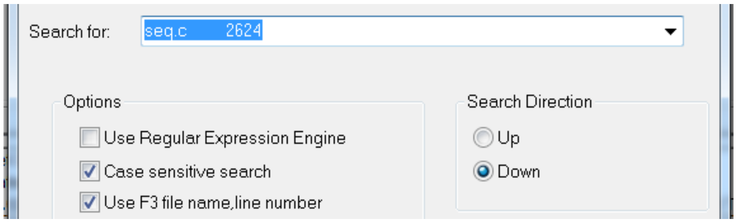
Content To Search
☑ Packet ID (log code)
☑ Packet name
☑ Packet contents
□ Hex Dump

Packet Types To Search
☑ Events
☑ Log packets
☑ Debug messages

When the text has been found, the search can be repeated by pressing **F3** to find the next occurrence. Pressing **Shift+F3** repeats the search but for the previous occurrence.

The parser accepts regular expressions when the **Use Regular Expression Engine** option is checked. Documentation on regular expression syntax is beyond the scope of this document.

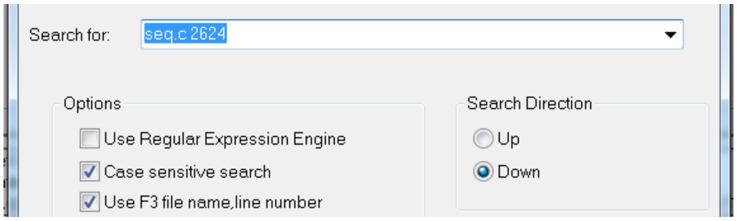
An F3 debug message (0x1FEB) index search can be enabled by checking the **Use F3 file name, line number** option. The “file name, line number” search pair input can be copied from the 0x1FEB Extended Debug Message (i.e., have a tab in between) or manually entered with a blank space in between, as shown in the following screenshots. After clicking **Find**, if no ADS information exists inside the log file, an F3 index will be built for fast search later and a dialog will pop up to check if the user would like to save the index in ADS format when trying to open a different log file. The ADS information will be lost if the user tries to zip/unzip, email, or ftp the log file, however, it is okay to copy/paste or cut/paste the file.



Search for: seq.c	2624

Options
□ Use Regular Expression Engine
☑ Case sensitive search
☑ Use F3 file name,line number

Search Direction
○ Up
● Down

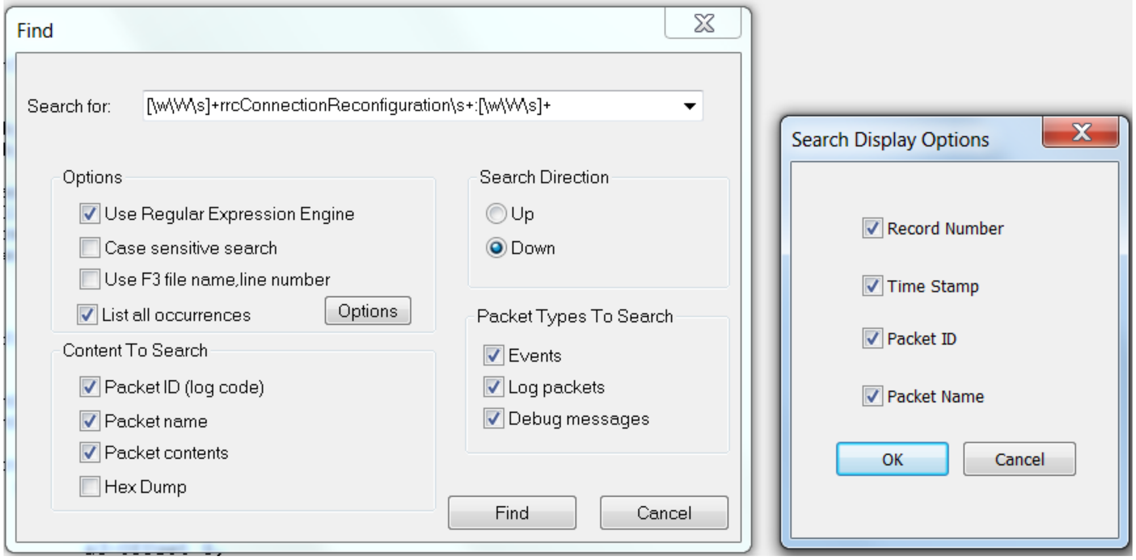


Search for: seq.c 2624

Options
□ Use Regular Expression Engine
☑ Case sensitive search
☑ Use F3 file name,line number

Search Direction
○ Up
● Down

Global search can be enabled by checking the **List all occurrences** option. Its Search Display Options will be also enabled, as shown in the following screenshot. The **Regular Expression Engine** option is supported with the global search.


Find

Search for: [\w\W\s]+rrcConnectionReconfiguration\s+:[\w\W\s]+

Options
- ☑ Use Regular Expression Engine
- □ Case sensitive search
- □ Use F3 file name,line number
- ☑ List all occurrences

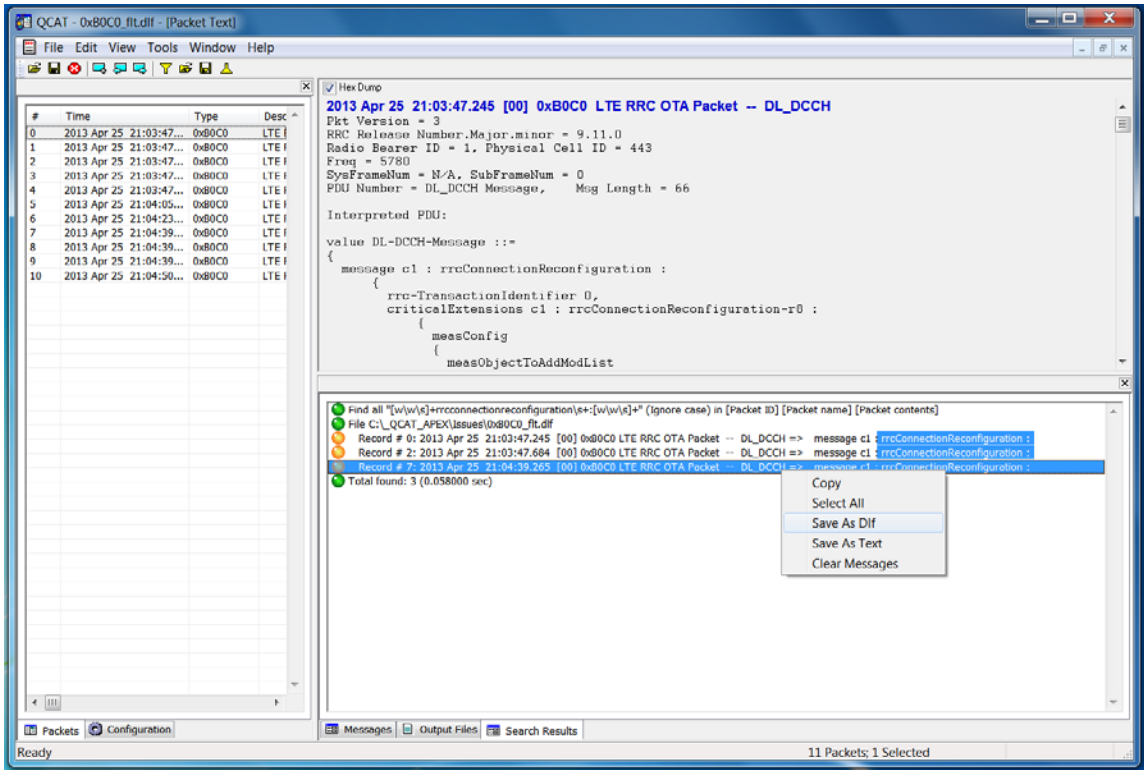
Search Direction
- ○ Up
- ● Down

Content To Search
- ☑ Packet ID (log code)
- ☑ Packet name
- ☑ Packet contents
- □ Hex Dump

Packet Types To Search
- ☑ Events
- ☑ Log packets
- ☑ Debug messages

Search Display Options
- ☑ Record Number
- ☑ Time Stamp
- ☑ Packet ID
- ☑ Packet Name

Once the search is done, all matched results will be displayed in the Search Results tab, as shown in the following screenshot. To jump to the desired packet for details, just double-click the corresponding result record. If further action is required to process search results, right-click on the Search Results pane or on the desired result record to clear, copy, or save results to a text/.dlf file. As result records can be saved to a .dlf file, the global search can be used as a filter based on packet contents.


QCAT - 0xB0C0_flt.dlf - [Packet Text]

#	Time	Type	Desc
0	2013 Apr 25 21:03:47...	0xB0C0	LTE I
1	2013 Apr 25 21:03:47...	0xB0C0	LTE I
2	2013 Apr 25 21:03:47...	0xB0C0	LTE I
3	2013 Apr 25 21:03:47...	0xB0C0	LTE I
4	2013 Apr 25 21:03:47...	0xB0C0	LTE I
5	2013 Apr 25 21:04:05...	0xB0C0	LTE I
6	2013 Apr 25 21:04:23...	0xB0C0	LTE I
7	2013 Apr 25 21:04:39...	0xB0C0	LTE I
8	2013 Apr 25 21:04:39...	0xB0C0	LTE I
9	2013 Apr 25 21:04:39...	0xB0C0	LTE I
10	2013 Apr 25 21:04:50...	0xB0C0	LTE I

☑ Hex Dump

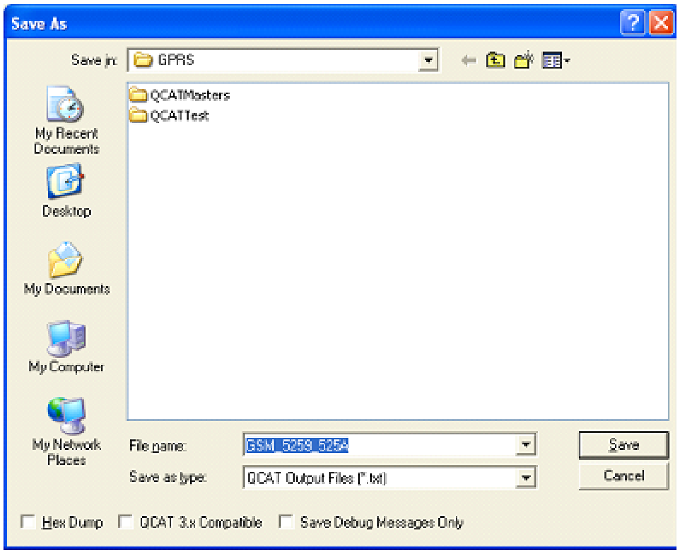
```
2013 Apr 25  21:03:47.245  [00]  0xB0C0  LTE RRC OTA Packet  --  DL_DCCH
Pkt Version = 3
RRC Release Number.Major.minor = 9.11.0
Radio Bearer ID = 1, Physical Cell ID = 443
Freq = 5780
SysFrameNum = N/A, SubFrameNum = 0
PDU Number = DL_DCCH Message,    Msg Length = 66

Interpreted PDU:

value DL-DCCH-Message ::=
{
  message c1 : rrcConnectionReconfiguration :
      {
        rrc-TransactionIdentifier 0,
        criticalExtensions c1 : rrcConnectionReconfiguration-r8 :
            {
              measConfig
              {
                measObjectToAddModList
```

```
Find all "[w\w\s]+rrcconnectionreconfiguration\s+:[w\w\s]+" (Ignore case) in [Packet ID] [Packet name] [Packet contents]
File C:\_QCAT_APEX\Issues\0xB0C0_flt.dlf
  Record # 0: 2013 Apr 25  21:03:47.245  [00] 0xB0C0 LTE RRC OTA Packet  --  DL_DCCH =>   message c1 : rrcConnectionReconfiguration :
  Record # 2: 2013 Apr 25  21:03:47.684  [00] 0xB0C0 LTE RRC OTA Packet  --  DL_DCCH =>   message c1 : rrcConnectionReconfiguration :
  Record # 7: 2013 Apr 25  21:04:39.265  [00] 0xB0C0 LTE RRC OTA Packet  --  DL_DCCH =>   message c1 : rrcConnectionReconfiguration :
Total found: 3 (0.058000 sec)
```

Ready   11 Packets; 1 Selected

3.4.12 Saving parsed text

To save parsed information for the entire log file to a text file, select File → Save → Text, or press **Ctrl+S** to bring up the Save As dialog box.



Save As

Save in: GPRS

QCATMasters
QCATTest

File name: GSM_5259_525A

Save as type: QCAT Output Files (*.txt)

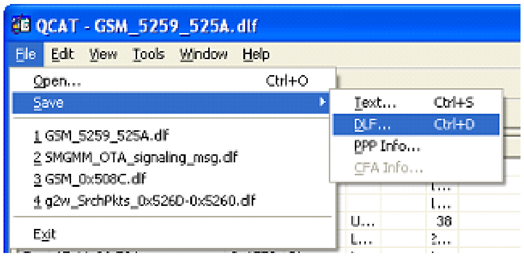
□ Hex Dump □ QCAT 3.x Compatible □ Save Debug Messages Only

The Save As dialog allows you to save the parsed text to a directory and filename of your choice. The dialog also displays some options that allow you to customize the format of the saved text file:

- Hex Dump – In addition to the packet contents, QCAT also saves the hex dump for each packet.
- QCAT 3.x Compatible – The text file is saved in the format used by QCAT Ver 3.x and earlier. This option is usually used when you have automation scripts that depend on the QCAT 3.x text output file format.
- Save Debug Messages Only – This filters out and saves only the packets that contain debug messages.

3.4.13 Saving in .dlf format

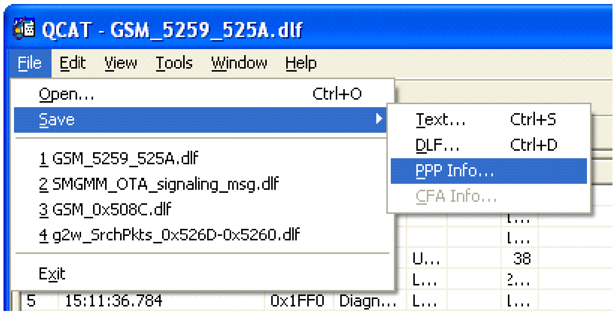
To save the current log file as a .dlf file to a directory and filename of your choice, select File → Save → DLF or press **Ctrl+D**. This feature enables you to save any editing changes you have made to the viewing format of the file, such as sorting and hiding/unhiding logs.



MAY CONTAIN U.S. AND INTERNATIONAL EXPORT CONTROLLED INFORMATION

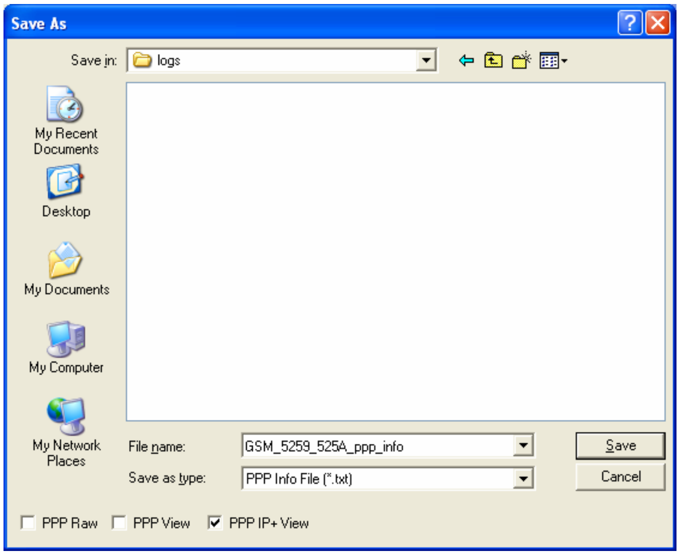
3.4.14 Saving PPP information in a text file

To save the PPP information for Tx/Rx frames in the current log file as a text file to a directory and filename of your choice, select File → Save PPP Info.



5 15:11:36.784 0x1FF0 Diagn... L...

A Save As dialog box appears. At the bottom of the box, select one or more of the four different views of the PPP data that should be saved in the text file.



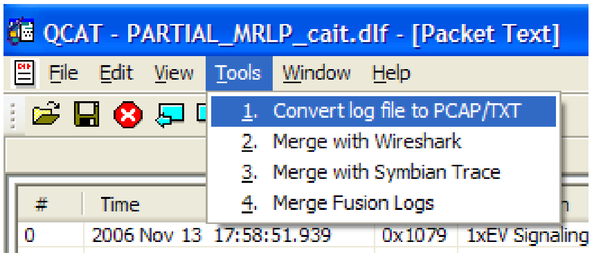
File name: GSM_5259_525A_ppp_info

Save as type: PPP Info File (*.txt)

☐ PPP Raw ☐ PPP View ☑ PPP IP+ View

3.4.15 Converting a log file to PCAP format

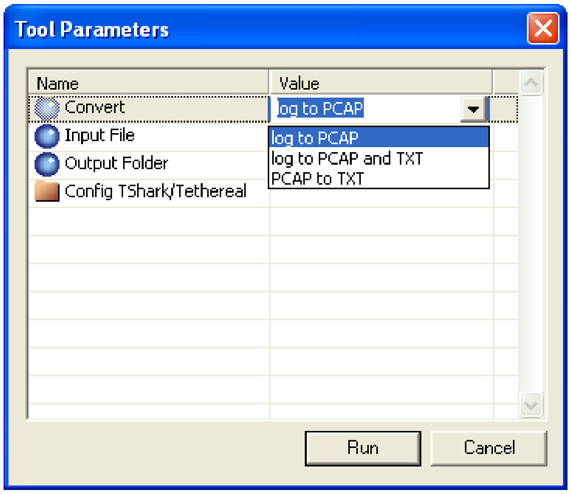
To convert a log file (.isf/.dlf) to a PCAP format file, select Tools → Convert log file to PCAP/TXT.


QCAT - PARTIAL_MRLP_cait.dlf - [Packet Text]
File
Edit
View
Tools
Window
Help
1. Convert log file to PCAP/TXT
2. Merge with Wireshark
3. Merge with Symbian Trace
4. Merge Fusion Logs
#
Time

0 2006 Nov 13 17:58:51.939 0x1079 1xEV Signaling

Select log to PCAP in Convert. Select the log file to convert by selecting the Input File option and clicking **Browse** to locate the file.

Select the output folder by selecting the Output Folder option and clicking **Browse** to locate the folder. Click **Run**. The log file is converted to PCAP files, which are written to the output folder and listed in the Exported Files pane.



Name	Value
Convert	log to PCAP
Input File	
Output Folder	
Config TShark/Tethereal	

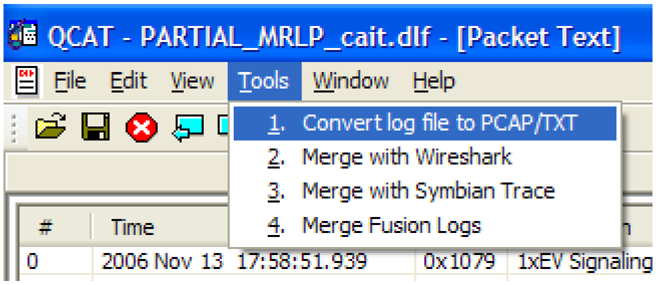
3.4.15.1 Support for Wireshark and Ethereal

Wireshark and Ethereal are both supported. Wireshark takes priority over Ethereal. TShark and Tethereal are text versions of Wireshark and Ethereal, respectively. There is no option to select Ethereal if both Wireshark and Ethereal are installed on the system. Since Wireshark is the most current, it is recommended. A migration message displays if only Ethereal is found on the system. Download and install Wireshark from http://www.wireshark.org/download.html.

3.4.16 Converting a PCAP file to .txt format

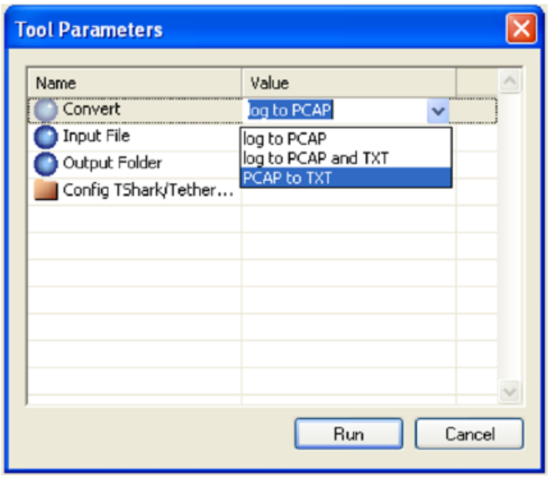
To convert a PCAP file to a .txt format file, select Tools → Convert log file to PCAP/TXT. Note that either Wireshark or Ethereal must be installed prior to executing this feature.

See Section 3.4.15.1 for information on Wireshark and Ethereal.


QCAT - PARTIAL_MRLP_cait.dlf - [Packet Text]
File
Edit
View
Tools
Window
Help
1. Convert log file to PCAP/TXT
2. Merge with Wireshark
3. Merge with Symbian Trace
4. Merge Fusion Logs
#
Time
n

```
0    2006 Nov 13  17:58:51.939    0x1079   1xEV Signaling
```

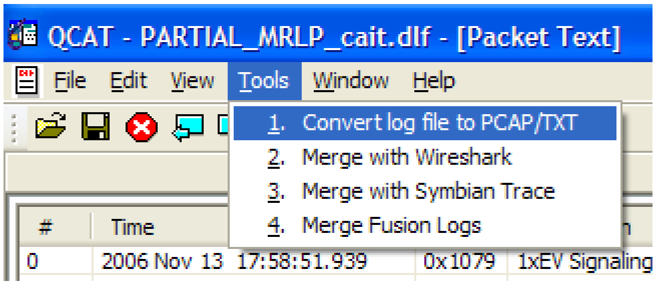
Select PCAP to TXT in Convert, then select the PCAP file to convert by selecting the Input File option and clicking **Browse**. By default, it is set to the recently opened file in QCAT. Select the output folder by selecting the Output Folder option and clicking **Browse** to locate the folder. For optional configurations that TShark/Tethereal supports, double-click the Config TShark/Tethereal folder.



For optional configurations for .txt file conversion, double-click the Config TShark/Tethereal folder. See Section 3.4.18 for more information.

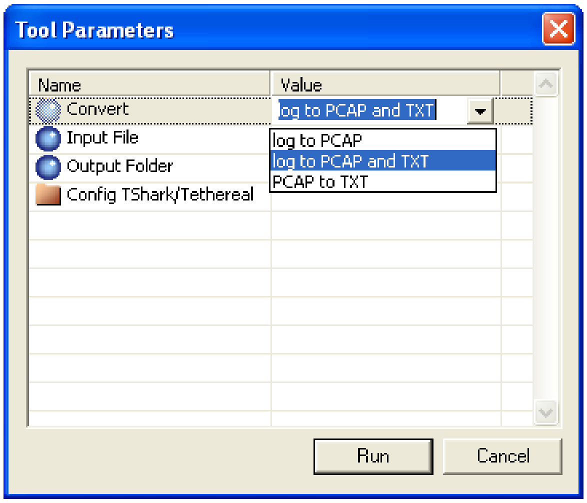
3.4.17 Converting a log file to PCAP and .txt format

To convert a log file to PCAP and .txt format files, select Tools → Convert log file to PCAP/TXT. Note that either Wireshark or Ethereal must be installed prior to execution of this feature.



See Section 3.4.19.1 for information on Wireshark and Ethereal.

Select log to PCAP and TXT in Convert, then select the log file to convert by selecting the Input File option and clicking **Browse** to locate the file. Select the output folder by selecting the Output Folder option and clicking **Browse** to locate the folder.



Name	Value
Convert	log to PCAP and TXT
Input File	
Output Folder	
Config TShark/Tethereal	

log to PCAP
log to PCAP and TXT
PCAP to TXT

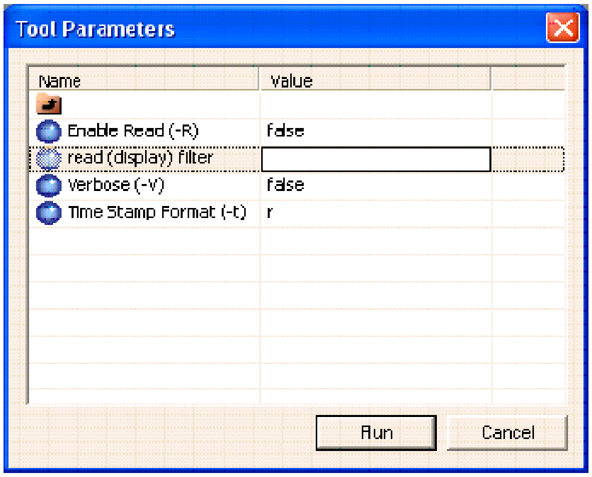
For optional configurations for .txt file conversion, double-click the Config TShark/Tethereal folder. See Section 3.4.19 for more information.

3.4.18 Config TShark/Tethereal configuration options

There are three optional configurations for Config TShark/Tethereal as described in the following sections.

Wireshark/Ethereal filtering

To use a Wireshark/Ethereal filter, set Enable Read (-R) to true and enter the filter in the text field beside the read (display) filter. The filter has exactly the same functionality as in Wireshark or Ethereal. As in Wireshark/Ethereal, double quotes are not needed around the filter value. If a filter is not needed, disable the option by setting Enable Read (-R) to false. If Enable Read (-R) is set to false, even if there are valid filter values in the line below, the result is not filtered. To learn how to use the filter, look for Wireshark or Ethereal filter syntax and reference on the website.

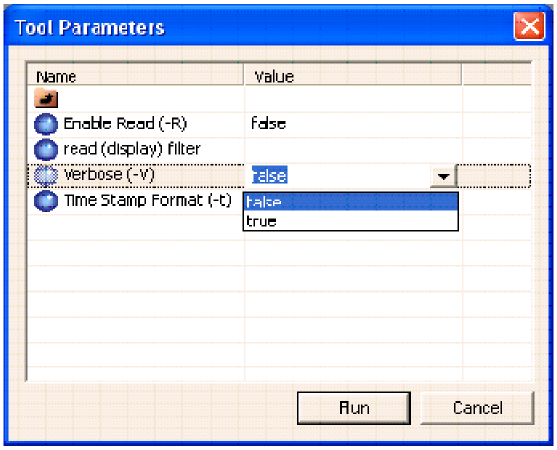


Name	Value
Enable Read (-R)	false
read (display) filter	
Verbose (-V)	false
Time Stamp Format (-t)	r

Verbose option

To use this option, set Verbose (-V) to true. Assuming TShark/Tethereal runs correctly, the PCAP file will be converted to a .txt file, which is written to the output folder and listed in the Exported Files pane.

NOTE: Setting the Verbose option to true may dramatically increase the conversion time.



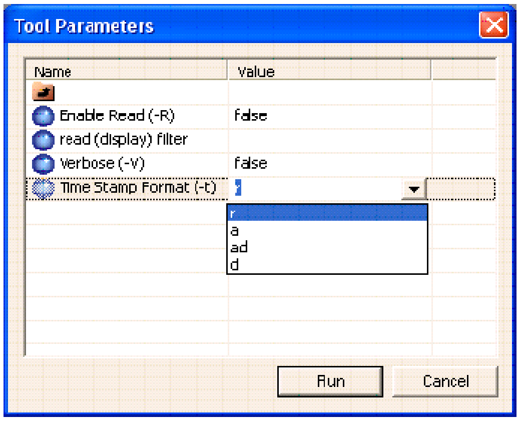
Tool Parameters

Name	Value
Enable Read (-R)	false
read (display) filter	
Verbose (-V)	false false true
Time Stamp Format (-t)	

Timestamp format option

Select the desired timestamp format option from the drop-down list.

- Select *a* for absolute format
- Select *ad* for absolute with date
- Select *d* for delta
- Select *r* for relative; this is the default option



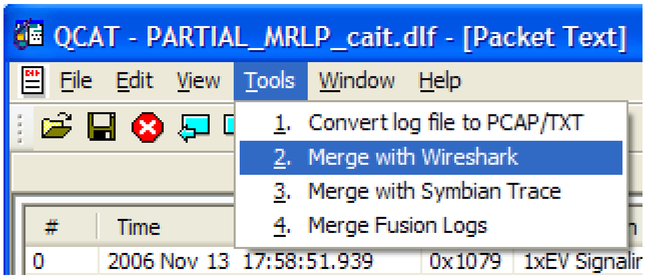
Tool Parameters

Name	Value
Enable Read (-R)	false
read (display) filter	
Verbose (-V)	false
Time Stamp Format (-t)	r r a ad d

3.4.19 Merge with Wireshark/Tethereal tool

See Section 3.4.19.1 for information on Wireshark and Ethereal.

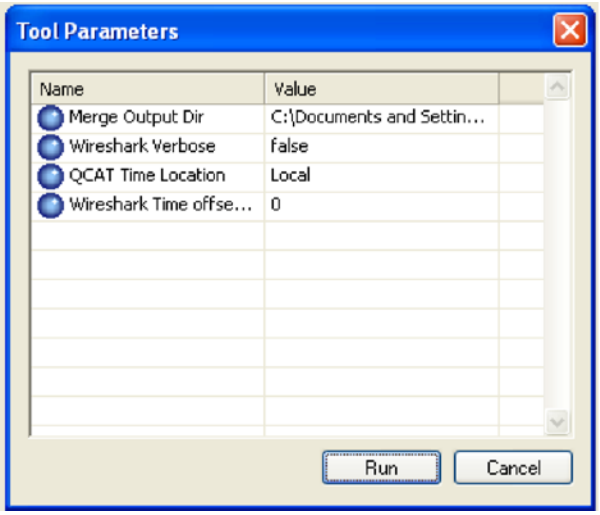
The Merge with Wireshark or Merge with Ethereal functionality is available under the Tools menu in QCAT.



Either function requires an open log file to run:

- If only Wireshark is installed, Merge with Wireshark is available.
- If only Ethereal is installed, Merge with Ethereal is available.
- If both are installed, Wireshark takes priority.
- If none is found, this option shows error text.

The dialog screen for setting merging options is shown in the following screenshot.



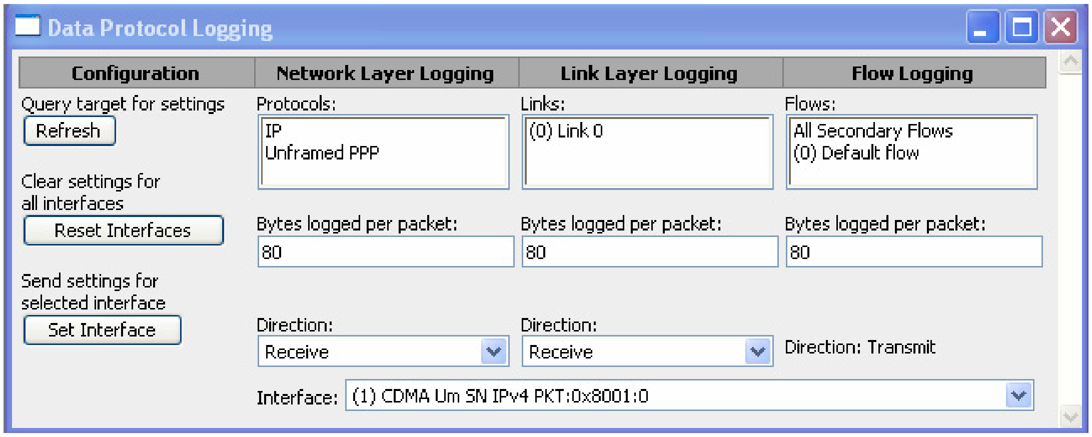
Name	Value
Merge Output Dir	C:\Documents and Settin...
Wireshark Verbose	false
QCAT Time Location	Local
Wireshark Time offse...	0

The options are:

- Merge Output Dir – This is an output directory for the merged file. By default, it is set to the QCAT output directory that is available under Configuration.
- Wireshark Verbose – This is an option for TShark/Tethereal Verbose mode to be used. By default, it is set to false.
- QCAT Time Location – This is an option for the TShark/Tethereal .txt files timestamp location. It can be set to Local or UTC.
- Wireshark Time Offset – This is the TShark/Tethereal PPP packets time offset. By default, it is set to 0.

NOTE: The Wireshark/Tethereal tool expects PPP packets with at least three-digit timestamp resolution for a good placement of Tethereal .txt packets in the QCAT-parsed output. This can be done by logging PPP packets at the IP level, instead of at the PPP level. The Data Protocol Logging view in QXDM provides an interface for configuring these logging settings.

For more information about how to use the QXDM DPL view, see [Q1].



Protocols: IP, Unframed PPP
Bytes logged per packet: 80
Direction: Receive

Links: (0) Link 0
Bytes logged per packet: 80
Direction: Receive

Flows: All Secondary Flows, (0) Default flow
Bytes logged per packet: 80
Direction: Transmit

Interface: (1) CDMA Um SN IPv4 PKT:0x8001:0

3.4.19.1 Merge with Wireshark/Tethereal tool from command prompt

The Merge tool is available from the command prompt through the Perl script MergeWithWireshark.pl.

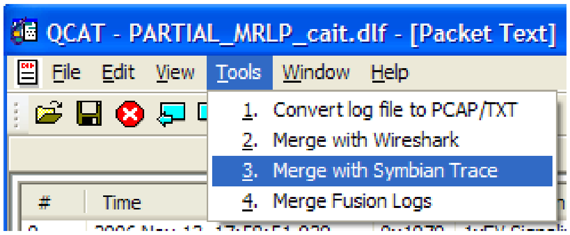
```
perl MergeWithWireshark.pl [--h] [--V] [--time <ARG>] [--offset <ARG>] [--
outputDir <ARG>] [--logFile <ARG>] [--pcapFiles <ARG>] [--pgm <ARG>]

Options:
--h : Display help

--V : Output TShark/Tethereal txt in Verbose mode, if not present default =
summary mode.

--pgm <QCAT> an application to run to generate parsed output( if not
present, default = QCAT).

--time <Time location Local/UTC>, if not present default = Local.

--offset <Time offset in ms>, if not present default = 0.

--outputDir <Merged file output dir>, if not present default = c:\Tmp.

--logFile <Full path of dlf/isf/txt files > Where dlf/isf input file from
which the parsed output and ppp/pcap binary files will be generated for
merging. If the input file is a parsed txt file then --pcapFiles option is
must.

--pcapFiles <comma separated list of PCAPGenerated files to merge>
```

Examples

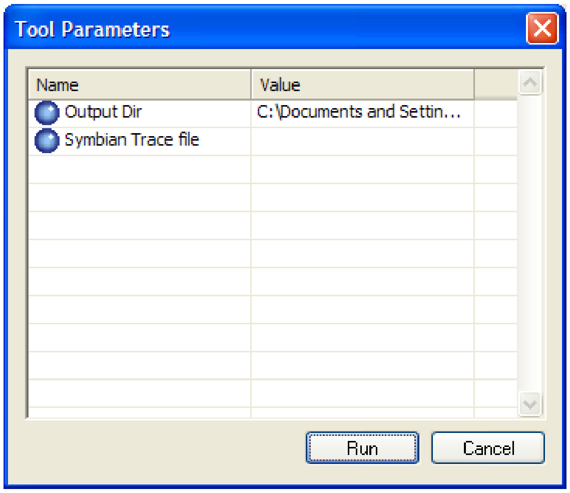
- perl merge.pl—h
- perl merge.pl—logFile c:\log.dlf—pgm QCAT—outputDir ‘c:\Merged Files’
- perl merge.pl—logFile c:\parsed.txt—pcapFiles ‘c:\file1.pcap,c:file2.pcap’

3.4.20 Merge with Symbian Trace tool through GUI

Merge with Symbian Trace tool is available under the Tools menu in QCAT. The log file to merge with must be opened in QCAT before running the tool.


QCAT - PARTIAL_MRLP_cait.dlf - [Packet Text]
File
Edit
View
Tools
Window
Help
1. Convert log file to PCAP/TXT
2. Merge with Wireshark
3. Merge with Symbian Trace
4. Merge Fusion Logs
#
Time

Options for the tool are Output Directory and Trace File. After Options are set, click **Run**. The merged .txt file is generated in the output directory.



Name	Value
Output Dir	C:\Documents and Settin...
Symbian Trace file	

3.4.20.1 MergeWithSymbianTrace.pl script through the command prompt

MergeWithSymbianTrace.pl script runs through the command prompt and requires QcatParsedFileObj.pl and SymbianTraceFileObj.pl.

The default directory with the scripts is C:\Program Files\Qualcomm\QCAT 6.x\Script. To run the script, use its full path or run it from the default directory.

Syntax

```
perl MergeWithSymbianTrace.pl [-h] [-outputDir <ARG>] -logFile <ARG> -
traceFile <ARG>
```

Options

- -h – Help
- -outputDir – <Output directory for a merged file>, optional, default c:\\Tmp.
- -logFile – <Full path of dlf/isf/txt >
- -traceFile – <Full path of trace file>

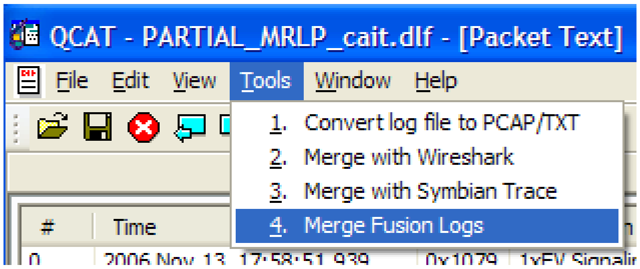
Examples

- perl mergeWithTrace.pl -h
- perl mergeWithTrace.pl -logFile c:\\log.dlf -traceFile c:\\trace.txt
- perl mergeWithTrace.pl -logFile c:\\log.isf -traceFile c:\\trace.txt
- perl mergeWithTrace.pl -logFile c:\\log.txt -traceFile c:\\trace.txt

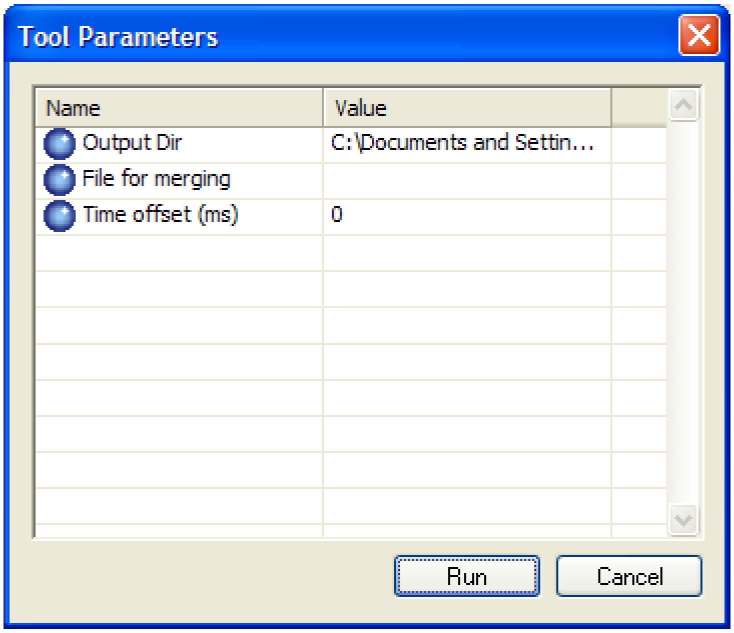
3.4.21 Merge Fusion Logs

3.4.21.1 Merge Fusion Logs tool through GUI

Open the log file to merge within QCAT. Go to Tools → Merge Fusion Logs.



Type in the Output Directory for the merged file and second file to merge with. Click **Run**.



Name	Value
Output Dir	C:\Documents and Settin...
File for merging	
Time offset (ms)	0

QCAT processes the opened file first and saves it to the .txt file. Then it opens the second file and processes it to the .txt file. In the Message pane, there is a message with the path to the merged file after merge is completed.

Click the message. The merged file displays in the default editor.

3.4.21.2 MergeFusionLogs.pl script through the command prompt

In a command prompt, use the full path or switch to the default directory with the scripts C:\Program Files\Qualcomm\QCAT 6.x\Script.

Syntax

```
perl MergeFusionLogs.pl [-h] [-app <ARG>] [-outputDir <ARG>] -logs
<ARG> ... <ARG>
```

Options

- -h – Help
- -app – QCAT
- -outputDir – Output dir optional, default c:\\Tmp
- -logs – Comma-separated list of files to merge (full path for each)

Examples

- perl MergeFusionLogs.pl -h
- perl MergeFusionLogs.pl -app QCAT -logs c:\\log1.dlf,c:\\log2.dlf
- perl MergeFusionLogs.pl -logs c:\\log1.isf,c:\\log2.isf
- perl MergeFusionLogs.pl -logs c:\\log1.txt,c:\\log2.txt

3.4.22 Vocoder extraction/playback

QCAT can extract vocoder frames and PCM samples from log packets and optionally save them as files or play them back.

3.4.22.1 PCM extraction

PCM packets contain the original PCM samples sent to the vocoder (Tx) or the PCM samples coming out of the vocoder (Rx). Based on raw data format being logged with one or more of the following log items, PCM extraction generates .raw (PCM data), .sbc (mSBC data), .cvsd (CVSD data), and/or .mp3 (bitstream data) files, but the playback function works only on .raw files. Other file formats can be played via third-party tools, e.g., Audacity application, etc.

- LOG_TX_PCM_C (0x13B0 Ver0) – Rx PCM samples
- LOG_RX_PCM_C (0x13B1 Ver0) – Tx PCM samples
- Wireless Connectivity Audio Data (0x1558) – Rx/Tx PCM, mSBC, and CVSD data
- Audio Vocoder Data Paths (0x13B0 ver1) Multiple Rx/Tx PCM samples per SessionId and ChannelInterleave
- Audio Vocoder Rx PCM (0x13B1 ver1) Multiple Rx PCM samples per SessionId and ChannelInterleave
- ADSP Audio Decoder Input Log (0x152E) – Rx PCM stream and raw bitstream
- ADSP Audio Per Object Post Processing Input Log (0x152F) – Rx PCM stream
- ADSP Audio Rx Matrix Mixer Input Log (0x1530) – Rx PCM stream

- ADSP Audio Common Object Post Processing Input Log (0x1531) – Rx PCM stream
- ADSP Audio Common Object Pre Processing Input Log (0x1532) – Tx PCM stream
- ADSP Audio Tx Matrix Mixer Input Log (0x1533) – Tx PCM stream
- ADSP Audio Per Object Pre Processing Input Log (0x1534) – Tx PCM stream
- ADSP Audio Encoder Input Log (0x1535) – Tx PCM stream
- ADSP Audio Encoder Output Log (0x1536) – Tx PCM stream and raw bitstream
- ADSP AFE Rx/Tx PCM Log (0x1586) – Rx/Tx PCM stream
- Voice FW Processing Rx/Tx Log (0x158A) – Rx/Tx PCM stream
- Voice FW Stream Rx/Tx Log (0x158B) – Rx/Tx PCM stream

3.4.22.2 Vocoder extraction

Vocoder packets contain the actual encoded frames after encoding (Tx) or before decoding (Rx). QCAT can extract these frames and convert them to PCM using one of the C-sim converters distributed with the application. Vocoder extraction/conversion/playback works only if one or more of the following packets are logged:

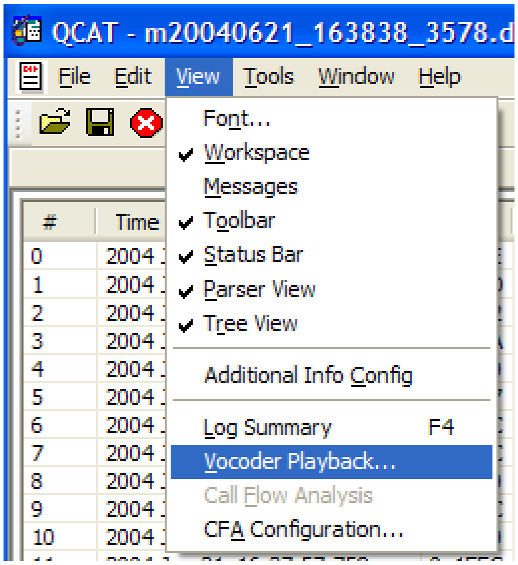
- LOG_WCDMA_UL_TX_VOCODER_INFO (0x713F)
- LOG_WCDMA_DL_RX_VOCODER_INFO (0x7140)
- LOG_UMTS_UL_TX_VOCODER_INFO_V2 (0x7143)
- LOG_UMTS_DL_RX_VOCODER_INFO_V2 (0x7144)
- LOG_VOC_FOR_TYPE (0x1009)
- LOG_VOC_REV_TYPE (0x100A)

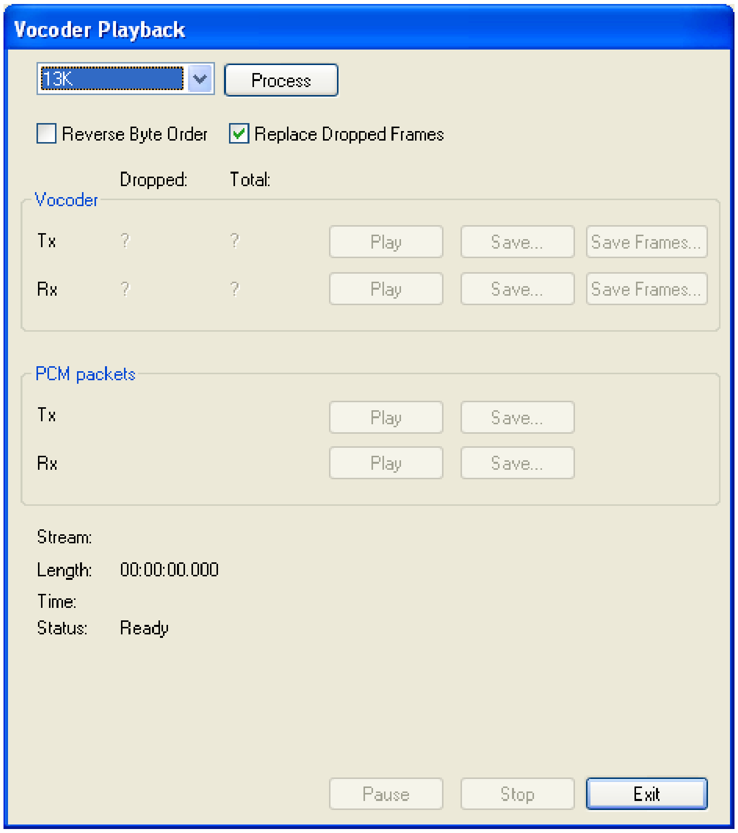
The following vocoders are currently supported:

- 13K (Qualcomm Code Excited Linear Prediction 13 kbps)
- EVRC (Enhanced Variable Rate CODEC)
- EVRC-B (Enhanced Variable Rate CODEC B)
- EVRC-WB (Enhanced Variable Rate CODEC Wide Band)
- HR (GSM Half-Rate)
- FR (GSM Full-Rate)
- EFR (GSM Half-Rate)
- AMR[-NB] (Adaptive Multi-Rate [Narrow Band])
- AMR-WB (Adaptive Multi-Rate Wide Band)

3.4.22.3 Vocoder control

The vocoder playback feature is available after a log file has been opened. To access the vocoder playback feature, select View → Vocoder Playback.





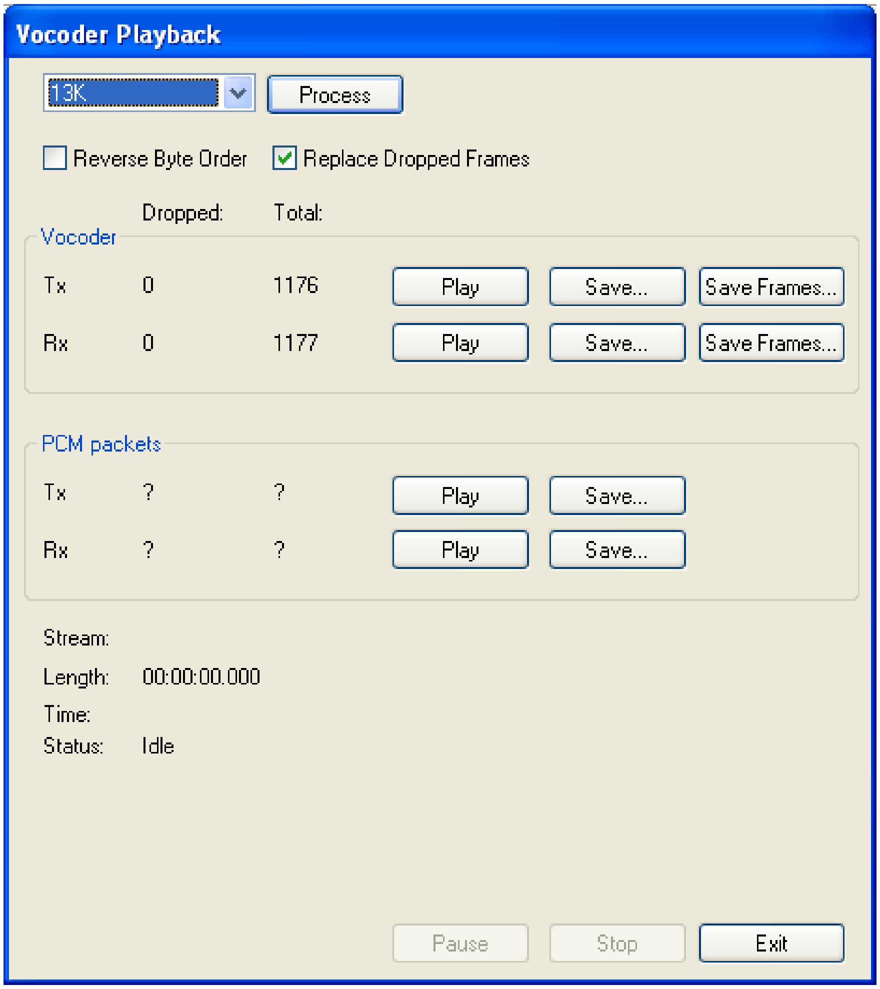
13K

☐ Reverse Byte Order ☑ Replace Dropped Frames

	Dropped:	Total:
Tx	?	?
Rx	?	?

Stream:
Length: 00:00:00.000
Time:
Status: Ready

Before processing the file, use the drop-down list to select the vocoder type. This option is not necessary if the log file contains LOG_UMTS_UL_TX_VOCODER_INFO_V2 (0x7143) and LOG_UMTS_DL_RX_VOCODER_INFO_V2 (0x7144) packets. The Reverse Byte Order option may be needed for some targets. If audio is unintelligible, try turning this option on and reprocessing the file. The Replace Dropped Frames option configures the processor to fill any gaps longer than 20 ms with blank frames (this option is recommended and enabled by default). Click **Process** to extract PCM samples and vocoder frames from the log file.



Vocoder Playback

13K

□ Reverse Byte Order ☑ Replace Dropped Frames

Vocoder

	Dropped:	Total:
Tx	0	1176
Rx	0	1177

PCM packets

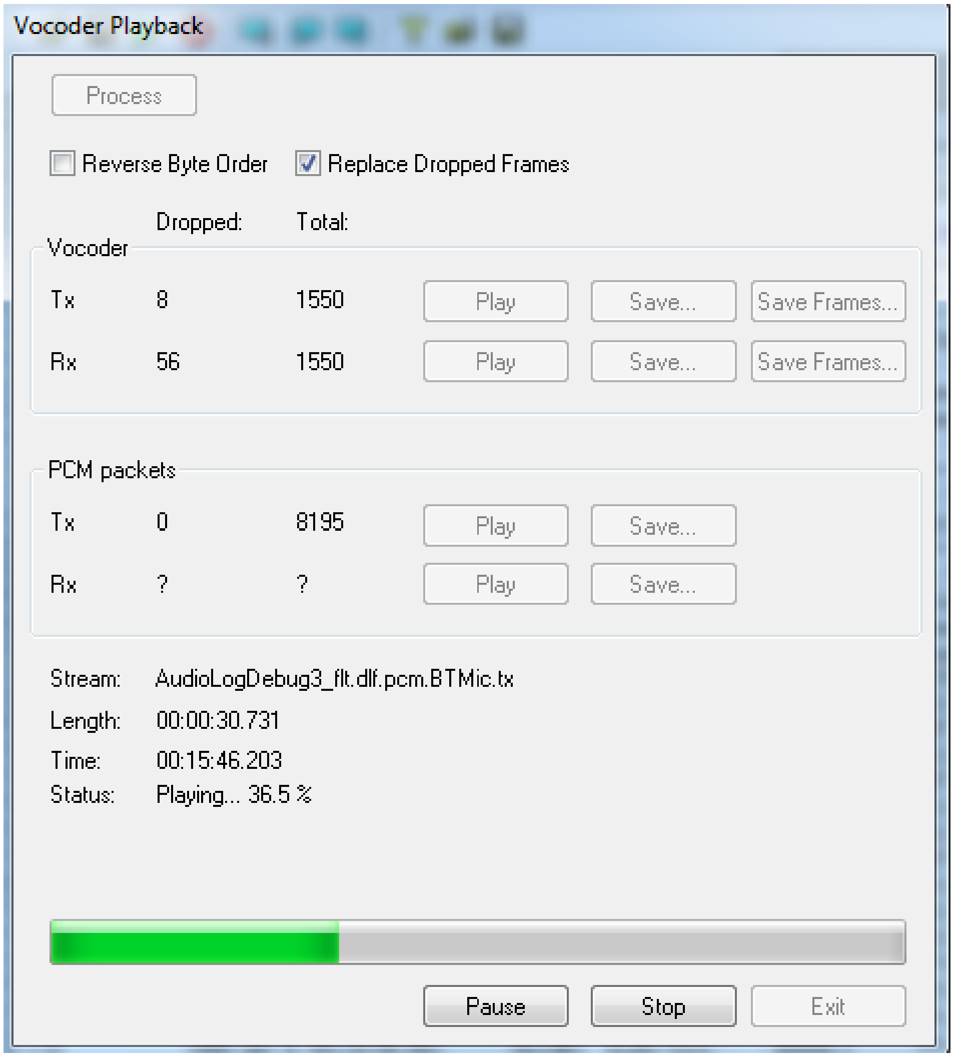
	Dropped:	Total:
Tx	?	?
Rx	?	?

Stream:
Length: 00:00:00.000
Time:
Status: Idle

After reading the log file, the **Play** and **Save** buttons are activated for each stream that has valid data. The “Vocoder” box is for vocoder packet extracted files (i.e., files in xxx.voc.tx[rx].raw format extracted from vocoder packet log codes, such as 0x7143, etc.) and the “PCM packets” box is for PCM packet extracted files (i.e., files in xxx.pcm.tx[rx].raw format extracted from PCM packet log codes, such as 0x13B0, etc.). To play a stream, click **Play** for that channel. The “Stream” field reports which stream you are listening to. The “Length” field reports the length of time for the chosen stream and the “Time” field reports the approximate log file timestamp that corresponds to the current playback position. The stream can be paused or stopped and other UI features are available while the stream is playing. To listen to the other stream, click **Play** for the desired stream. If no frames for that stream are available, the status field reads “Play Failed”.

3.4.22.4 Saving generated PCM files from vocoder packets

The **Save** button from the Vocoder box for a stream opens a dialog to save the audio stream as a raw PCM file. For vocoder streams, the file contains 16-bit, 16-kHz, signed, little-endian PCM data. For the PCM streams, the audio is 16-bit, signed, little-endian PCM, and the sample rate is 8 kHz or 16 kHz, depending on the vocoder used.



□ Reverse Byte Order ☑ Replace Dropped Frames

	Dropped:	Total:
Vocoder		
Tx	8	1550
Rx	56	1550
PCM packets		
Tx	0	8195
Rx	?	?

Stream: AudioLogDebug3_flt.dlf.pcm.BTMic.tx
Length: 00:00:30.731
Time: 00:15:46.203
Status: Playing... 36.5 %

3.4.22.5 Saving generated PCM files from PCM packets

The **Save** button in the “PCM packets” box for a stream opens a Browse for Folder dialog to save multiple audio streams as raw PCM files. For the PCM streams from 0x13B0 Ver0 and 0x13B1 Ver0, the audio is 16-bit, signed, little-endian PCM, and the sample rate is 8 or 16 kHz, depending on the vocoder used.

For PCM streams from 0x13B0 Ver1 and 0x13B1 Ver1, the information about sample rate is logged in the audio header. The rest is the same as above. There might be multiple PCM files, depending on Session ID and ChannelInterleave logged in the audio header of 0x13B0/0x13B1 Ver1 packets and depending on AudioSource for wireless connectivity audio data packets (0x1558).

3.4.22.6 Filename formats and extensions

- Generated files from PCM packets logged:
  - □ 0x1558 – Wireless connectivity audio data – Multiple Tx/Rx PCM/CVSD/mSBC files

    *.pcm.<AudioSource>.<dir>.raw (.cvsd, .sbc)
  - □ 0x13B0 Ver1 – Audio vocoder data paths – Multiple Tx/Rx PCM files *.pcm.<sessionId>.<ChannelInterleave>.<dir>.raw
  - □ 0x13B1 Ver1 – Audio vocoder Rx PCM – Multiple Rx PCM files

    *.pcm.<sessionId>.<ChannelInterleave>.rx.raw
  - □ 0x13B0 Ver0 – Audio vocoder data paths – Single Tx PCM file

    *.pcm.tx.raw
  - □ 0x13B1 Ver0 – Audio vocoder Rx PCM – Single Rx PCM file

    *.pcm.rx.raw
  - □ ADSP logs – Rx/Tx PCM and bitstream files

    <log code>.pcm.<sessionId>.<tapId>.<channel number>.<dir>.raw

    <log code>.bitstream.<sessionId>.<tapId>.<media format Id>.<dir>.mp3

NOTE: *.labels.txt is also generated for the Audacity application (Audacity label file format).

- Generated files from vocoder packets logged:
  - □ Temporary frame file: <file>.<ext>.voc.<dir>.frame.<#>.<codec>.in
  - □ PCM audio chunk file with corresponding codec: <file>.<ext>.voc.<dir>.frame.<#>.<codec>.out
  - □ Combined PCM file: <file>.<ext>.voc.<dir>.raw

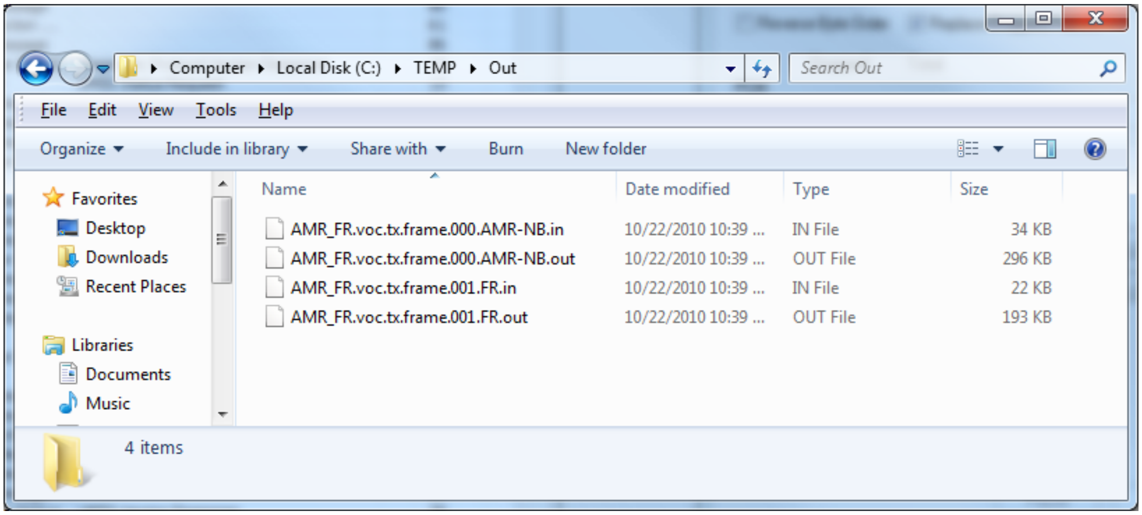
3.4.22.7 Default directory for generated files

The default directory where all generated files can be found is set to C:\TEMP\Vocoder.

This directory is not cleaned up after you close QCAT.

3.4.22.8 Saving Frame Files

The **Save Frames** button for the vocoder streams allows the user to save the vocoder frame files that were sent to the c-sim for decoding (*.in) and the raw PCM that came from that frame file (*.out). The PCM format of the .out file depends on the codec used. If multiple codecs were used in the same file, the .in files are named in sequential order and tagged with the vocoder used for that section.



Name	Date modified	Type	Size
AMR_FR.voc.tx.frame.000.AMR-NB.in	10/22/2010 10:39 ...	IN File	34 KB
AMR_FR.voc.tx.frame.000.AMR-NB.out	10/22/2010 10:39 ...	OUT File	296 KB
AMR_FR.voc.tx.frame.001.FR.in	10/22/2010 10:39 ...	IN File	22 KB
AMR_FR.voc.tx.frame.001.FR.out	10/22/2010 10:39 ...	OUT File	193 KB

3.4.23 Perl sample scripts

Scripts can be found at Qualcomm\APEX 6.x\Script. ExtractPcmFiles.pl deals with PCM packet log codes, like 0x13B0, etc., and gets only .pcm..tx(rx).raw files. ExtractVocoderData.pl handles with vocoder packet log codes, e.g., 0x7143 etc., and gets only *.voc.tx(rx).raw files.

Usage

```
perl ExtractPcmFiles.pl -in <file> -out <dir> -codec <codec>
perl ExtractVocoderData.pl -in <file> -out <dir> -codec <codec>
```

Where:

- -in – The input log file (full path), either ISF, DLF, or QMDL
- -out – The output directory (full path); directory will be created if it does not exist
- -codec – The vocoder used:
  - auto – Determine vocoder from log packets (UMTS V2 logging only)
  - celp13k – Code Excited Linear Prediction 13 kbps
  - evrc – Enhanced variable rate codec
  - evrc-b – Enhanced variable-rate codec B
  - evrc-wb – Enhanced variable-rate codec wideband
  - hr – GSM half-rate
  - fr – GSM full-rate
  - efr – GSM enhanced full rate

  - □ amr-nb – Adaptive multi-rate (narrow band)
  - □ amr-wb – Adaptive multi-rate (wideband); a Perl script that can be run from command line

If your log does not have vocoder packets logged along with PCM packets, you do not need to provide the codec variable. By default, codec will be set to celp13k.

3.4.23.1 PcmFilesGenerator.exe

The executable can be found at Qualcomm\QCAT6.x\bin.

Usage

```
PCMFilesGenerator.exe  -log <logfile> -outDir <outputdir> -codec <Codec
Enum value>
```

It generates a parsed .txt file and several *.raw files from vocoder/PCM packets.

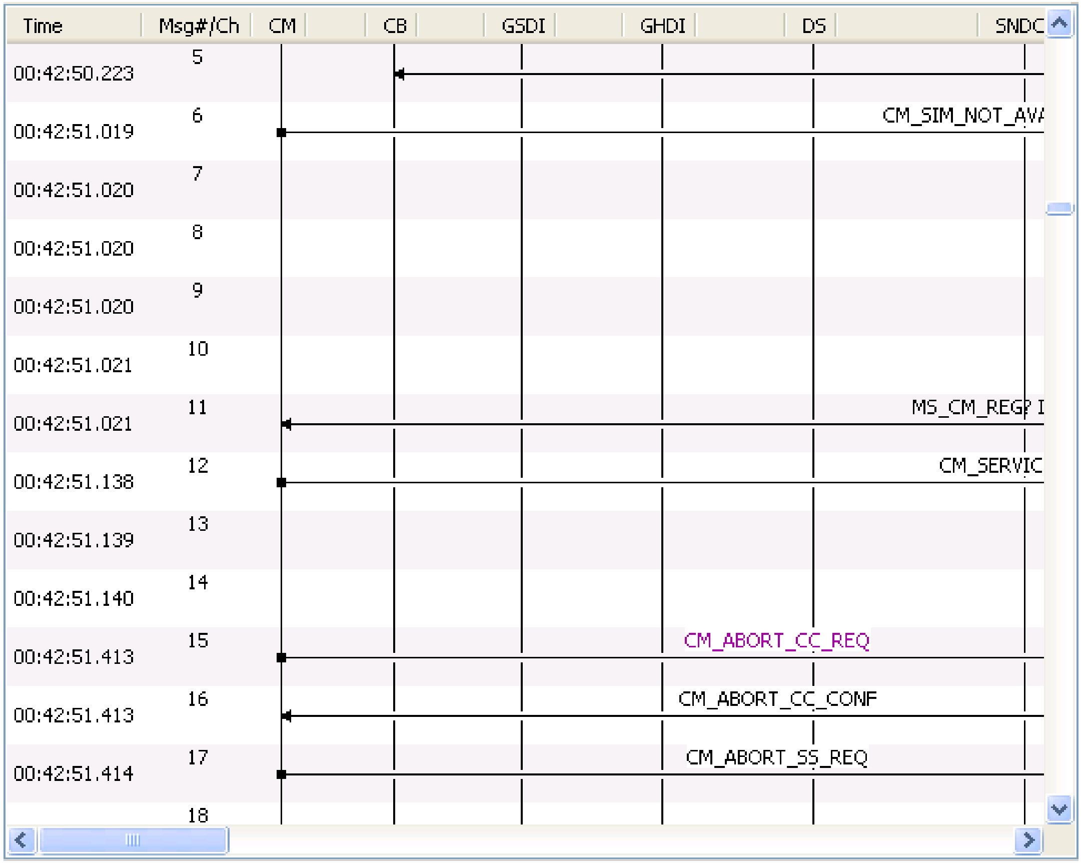
- <outputDir>/<logFileName>/<LogFileName>.voc.tx.raw
- <outputDir>/<logFileName>/<LogFileName>.voc.rx.raw
- <outputDir>/<logFileName>/<LogFileName>.pcm.tx.raw
- <outputDir>/<logFileName>/<LogFileName>.pcm.rx.raw
- <outputDir>/<logFileName>/<LogFileName>.pcm.<SessionId>.<ChannelInterleave><dir>.raw
- <outputDir>/<logFileName>/<LogFileName>.pcm.<AudioSorce>.<dir>.raw

Codec enum values

- NO_VOCODER = 0
- V13K_VOCODER = 1
- EVRC_VOCODER = 2
- AMR_NB_VOCODER = 3
- EFR_VOCODER = 4
- FR_VOCODER = 5
- HR_VOCODER = 7
- AMR_WB_VOCODER = 11
- EVRC_B = 15
- EVRC_WB = 16

3.4.24 Call flow analysis support

A call flow page is shown in the following screenshot.

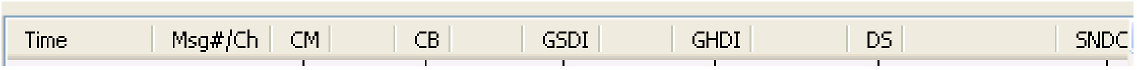


Time	Msg#/Ch	CM	CB	GSDI	GHDI	DS	SNDC
00:42:50.223	5						
00:42:51.019	6					CM_SIM_NOT_AVA	
00:42:51.020	7						
00:42:51.020	8						
00:42:51.020	9						
00:42:51.021	10						
00:42:51.021	11					MS_CM_REG? I	
00:42:51.138	12					CM_SERVIC	
00:42:51.139	13						
00:42:51.140	14						
00:42:51.413	15				CM_ABORT_CC_REQ		
00:42:51.413	16				CM_ABORT_CC_CONF		
00:42:51.414	17				CM_ABORT_SS_REQ		
	18						

Several components to this page are detailed below. There are also several ways to customize the output, explained in Section 3.4.24.5.

3.4.24.1 Column information (top)

Columns across the top of the call flow page are shown in the following screenshot. The columns indicate the names of the message sender and recipient.



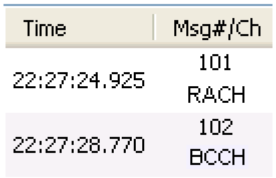
Time	Msg#/Ch	CM	CB	GSDI	GHDI	DS	SNDC

NOTE: See Section 1.6 for a current list of the column abbreviations.

3.4.24.2 Message index information (left)

The message index information across the left displays:

- Timestamp of the message delivered
- Message index number (this is the Nth CFA packet in the file)
- Channel information (optional) – When the message contains information received or Delivered over the air, the channel used is conveyed; channels would be one of:
  - BCCH – Broadcast channel
  - RACH – Random access channel
  - CCCH – Control channel (paging, access grant, etc.)
  - SACCH – Standalone control channel
  - DCCH – Dedicated control channel (either FACCH or SDCCH)



Time	Msg#/Ch
22:27:24.925	101 RACH
22:27:28.770	102 BCCH

3.4.24.3 Message summary information (center)

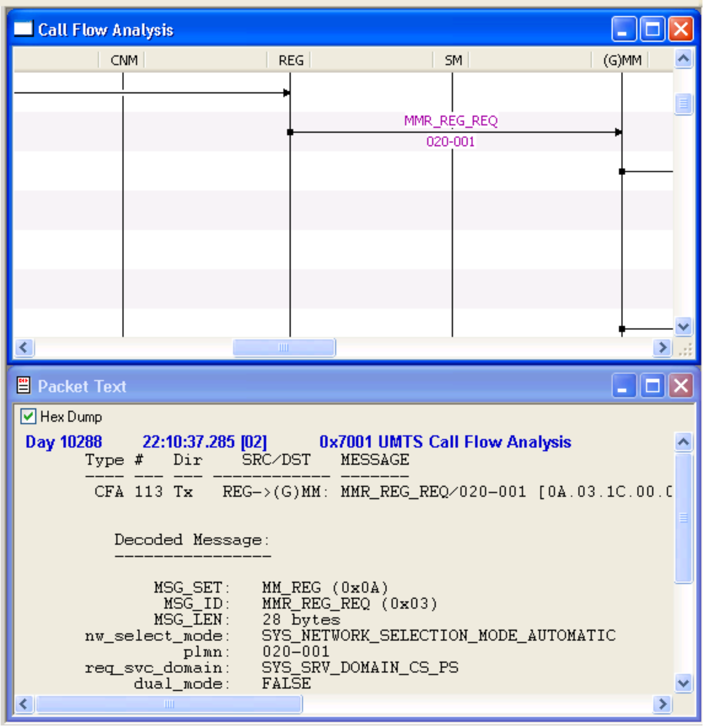
The message summary information displays the name of each message (above the arrow) and its direction (the arrow head). Messages sometimes have additional information (below the arrow). For example, if the message contains a status field, the success or failure may be displayed as the subtext. In addition, color may be used to emphasize the message.

By convention:

- **GREEN** is used when the messages have successful results
- **RED** is used when messages contain failure information
- GRAY is used to deemphasize the subtext (e.g., over-the-air message names are displayed as subtext for the DATA_IND conduit message; for messages that happen frequently, such as the system information messages, the subtext is gray).
- **BLUE** is used to emphasize the subtext (e.g., *PAGING REQUEST TYPE* is normally gray if there is no paging information contained in but blue if there is. This allows you to quickly find the page request of choice).

The message detail information displays fields for the particular message. To access this information, click the hyperlink (the message name above the arrow) of the message you are interested in. This displays:

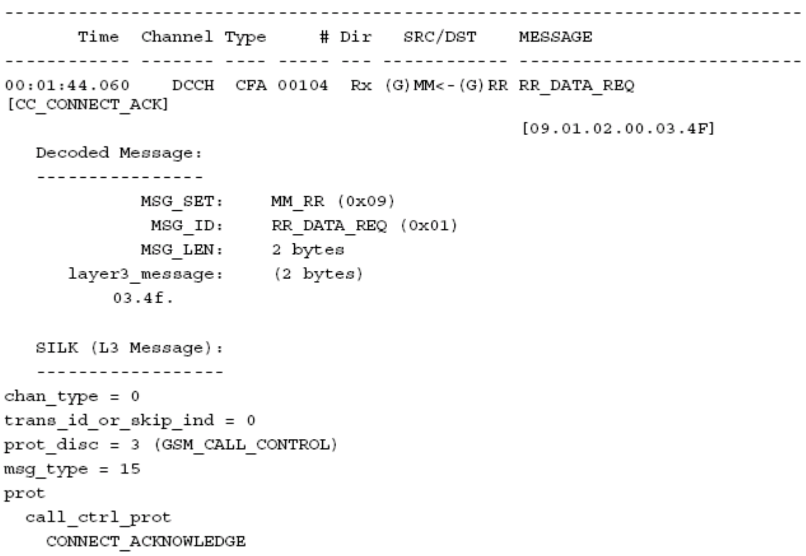
- MSGHEX – Raw payload of the message
- MSG – Fields and values of the message (if the message is known by the parser)
- Silk L3 – Over-the-air decode (if the message contains OTA message content)



```
Day 10288      22:10:37.285 [02]       0x7001 UMTS Call Flow Analysis
      Type #   Dir    SRC/DST    MESSAGE
      ---- --- ---  ------------ --------
       CFA 113 Tx   REG->(G)MM:  MMR_REG_REQ/020-001 [0A.03.1C.00.0

         Decoded Message:
         ----------------

             MSG_SET:    MM_REG (0x0A)
              MSG_ID:    MMR_REG_REQ (0x03)
             MSG_LEN:    28 bytes
      nw_select_mode:    SYS_NETWORK_SELECTION_MODE_AUTOMATIC
                plmn:    020-001
      req_svc_domain:    SYS_SRV_DOMAIN_CS_PS
           dual_mode:    FALSE
```

3.4.24.4 CFA text files

The following screenshot shows an example of a single CFA entry in the ASCII text file:



```
-------------------------------------------------------------------------------
       Time    Channel Type     # Dir    SRC/DST     MESSAGE
------------ ------- ---- ----- --- ------------ ---------------------------
00:01:44.060    DCCH   CFA 00104  Rx  (G)MM<-(G)RR RR_DATA_REQ
[CC_CONNECT_ACK]
                                                 [09.01.02.00.03.4F]

   Decoded Message:
   ----------------
             MSG_SET:     MM_RR (0x09)
              MSG_ID:     RR_DATA_REQ (0x01)
             MSG_LEN:     2 bytes
      layer3_message:     (2 bytes)
           03.4f.

   SILK (L3 Message):
   ------------------
chan_type = 0
trans_id_or_skip_ind = 0
prot_disc = 3 (GSM_CALL_CONTROL)
msg_type = 15
prot
  call_ctrl_prot
    CONNECT_ACKNOWLEDGE
```

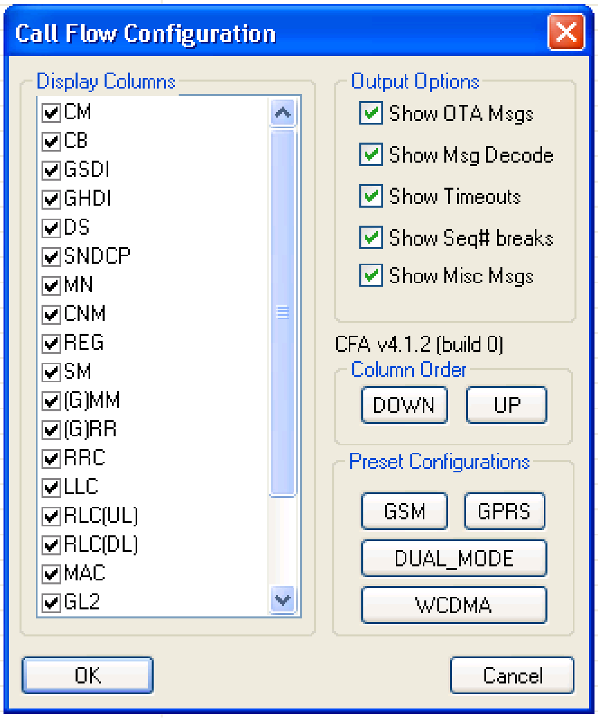
It contains the same information available in the standard call flow pages, including:

- Timestamp of the CFA message
- Channel name (optional)
- Message index number (this is the Nth CFA packet in the file)
- Message direction (Tx/Rx)
- Message sender and receiver (SRC/DST respectively)
- Message name
- Submessage name
- Hexadecimal representation
- Decoded message content
- Silk L3 – Over-the-air decode (if the message contains OTA message content)

3.4.24.5 Configuring CFA

There are several configuration options that are stored in the CFA message parser library itself.

You can reach this by selecting **View CFAConfiguration** from the View menu. If you click **OK**, these settings will be written to the registry and applied the next time you parse a file. In other words, it does not take effect on the current file(s); you will have to close and reopen them.



Call Flow Configuration

Display Columns
☑ CM
☑ CB
☑ GSDI
☑ GHDI
☑ DS
☑ SNDCP
☑ MN
☑ CNM
☑ REG
☑ SM
☑ (G)MM
☑ (G)RR
☑ RRC
☑ LLC
☑ RLC(UL)
☑ RLC(DL)
☑ MAC
☑ GL2

Output Options
☑ Show OTA Msgs
☑ Show Msg Decode
☑ Show Timeouts
☑ Show Seq# breaks
☑ Show Misc Msgs

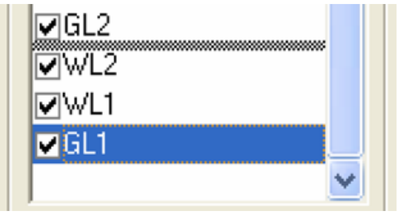
CFA v4.1.2 (build 0)

3.4.24.5.1 Column selection and order

One of the powerful features of CFA is the ability to display, hide, and reorder the columns. This allows you to produce output in a way that is familiar (such as matching a documented call flow).There are several ways to accomplish this. Here is the recommended order for quickly achieving the desired column output:

1. Select the desired column order.
   - Clicking **DOWN** enables all columns and places them in their natural descending order (highest software entity on the left; lowest on the right). This is the default setting.
   - Clicking **UP** enables all columns and places them in their natural ascending order.
2. Select the desired preset configuration.
   - Clicking **GSM** displays the columns CM, MN, CNM, REG, MM, RR, GL2, and GSM/GPRS Layer 1 (GL1).
   - Clicking **GPRS** displays the columns CM, SNDCP, MN, CNM, REG, SM, GMM, GRR, LLC, RLC(UL), RLC(DL), MAC, GL2, and GL1.
   - Clicking **WCDMA** displays the columns CM, MN, CNM, REG, MM, RRC, RLC(UL), RLC(DL), MAC, WL2, and WL1.
   - Clicking **DUAL_MODE** displays the union of GSM and WCDMA options.
3. Turn ON or OFF individual columns by checking or unchecking respectively the box next to the column name.

You can also reorder individual columns by clicking the column name and dragging it to its desired location. An example of dragging the GL1 column up under the GL2 column is shown in the following screenshot.



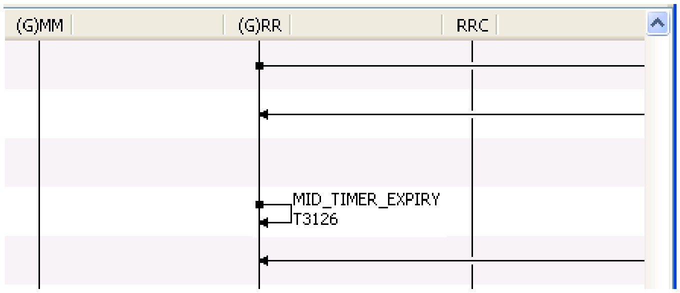
☑ GL2
☑ WL2
☑ WL1
☑ GL1

NOTE: Messages that have either their destination or source column hidden are either placed on the MISC column or hidden.

3.4.24.6 Timeouts

Timer expirations are a special class of messages that are self-posted to the column they are intended to notify. Because of this, they are difficult to selectively hide. (For example, if the RR column is checked, any RR timer expiration would be visible.) To address this, the **Show Timeouts** checkbox can be unchecked to hide these messages (if desired).

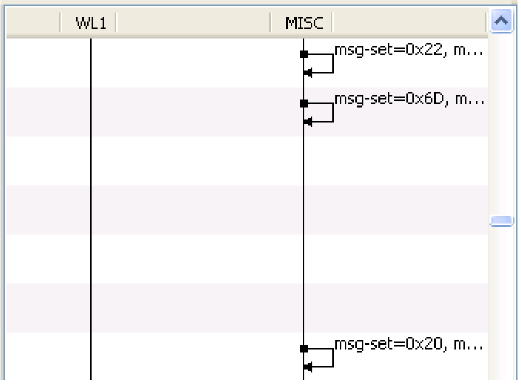
An example timeout, displayed if **Show Timeouts** is checked, is shown in the following screenshot.



MID_TIMER_EXPIRY
T3126

3.4.24.7 Miscellaneous column

Messages that have been hidden are lumped on the MISC column heading at the far right unless you uncheck this option. An example timeout, displayed if **Show Timeouts** is not selected, is shown in the following screenshot.



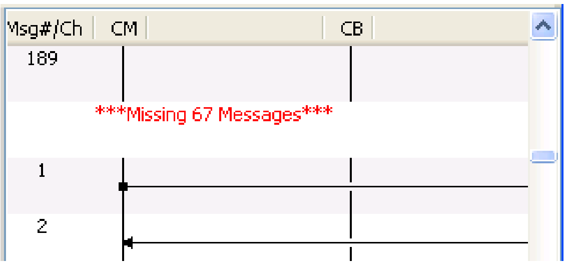
msg-set=0x22, m...

msg-set=0x6D, m...

msg-set=0x20, m...

3.4.24.8 Sequence breaks

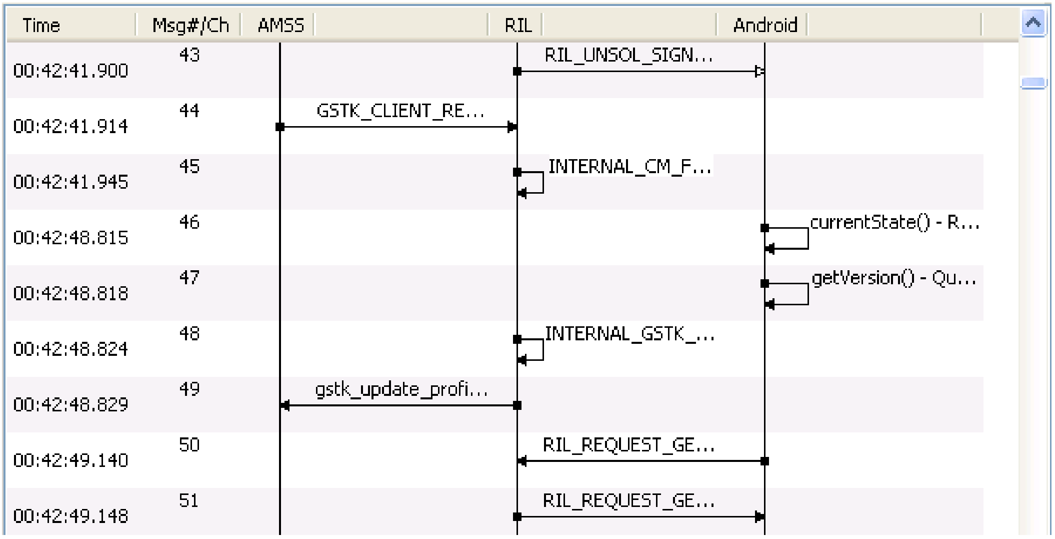
Each CFA packet contains a sequence number stamped and incremented by the phone. This mechanism is to help determine if the entire call flow was present or if there were packets dropped due to performance reasons (or other problems). The message in the following screenshot is visible in the call flow if **Show Seq# breaks** is checked.



Missing 67 Messages

3.4.25 Android™ and QMI call flow

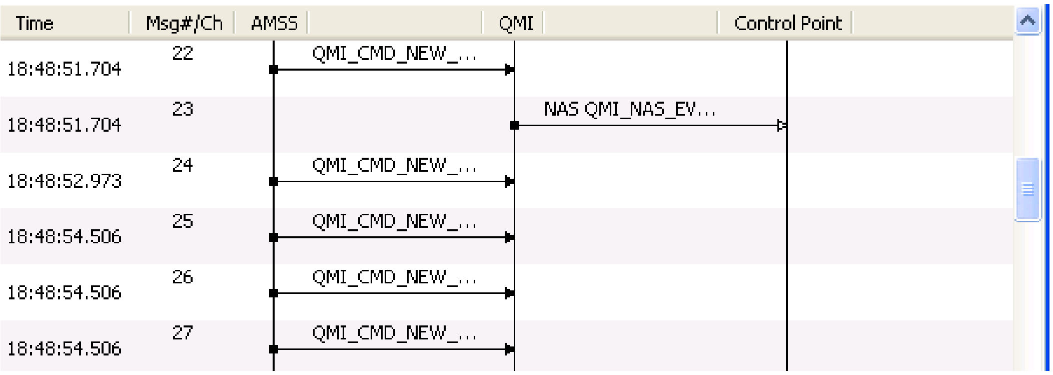
QCAT also supports Android call flow and QMI call flow. An example of an Android call flow is shown in the following screenshot.



Time	Msg#/Ch	AMSS	RIL	Android
00:42:41.900	43		RIL_UNSOL_SIGN...	
00:42:41.914	44	GSTK_CLIENT_RE...		
00:42:41.945	45		INTERNAL_CM_F...	
00:42:48.815	46			currentState() - R...
00:42:48.818	47			getVersion() - Qu...
00:42:48.824	48		INTERNAL_GSTK_...	
00:42:48.829	49	gstk_update_profi...		
00:42:49.140	50		RIL_REQUEST_GE...	
00:42:49.148	51		RIL_REQUEST_GE...	

Android call flows obtain information from log code 0x1486.

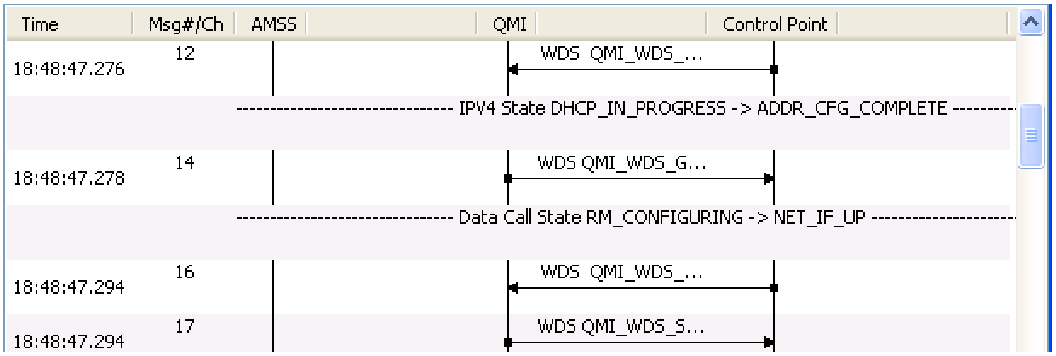
An example QMI call flow is shown in the following screenshot.



Time	Msg#/Ch	AMSS	QMI	Control Point
18:48:51.704	22	QMI_CMD_NEW_...		
18:48:51.704	23		NAS QMI_NAS_EV...	
18:48:52.973	24	QMI_CMD_NEW_...		
18:48:54.506	25	QMI_CMD_NEW_...		
18:48:54.506	26	QMI_CMD_NEW_...		
18:48:54.506	27	QMI_CMD_NEW_...		

QMI call flows obtain information from log code 0x14CF.

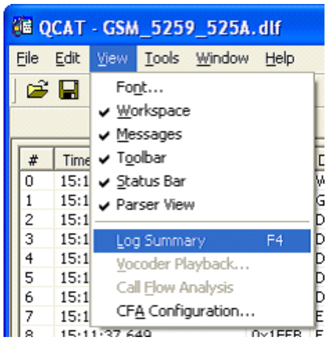
Breaks signify state changes (see the example in the following screenshot).



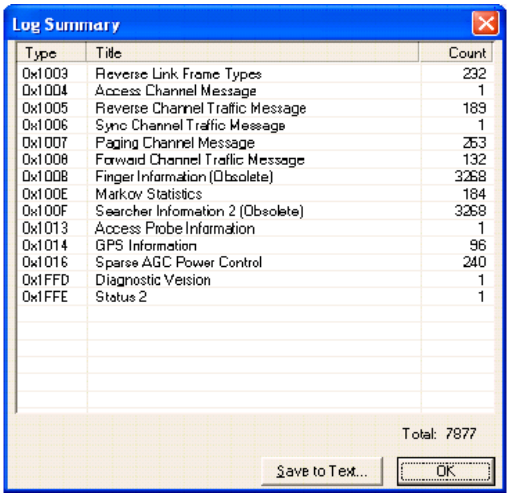
Time	Msg#/Ch	AMSS	QMI	Control Point
18:48:47.276	12		WDS QMI_WDS_...	
		------------------------------- IPV4 State DHCP_IN_PROGRESS -> ADDR_CFG_COMPLETE ---------		
18:48:47.278	14		WDS QMI_WDS_G...	
		------------------------------- Data Call State RM_CONFIGURING -> NET_IF_UP ---------------------		
18:48:47.294	16		WDS QMI_WDS_...	
18:48:47.294	17		WDS QMI_WDS_S...	

3.4.26 Viewing the log summary

The Log Summary display groups the log packets by type and shows the count of each packet type in the currently opened log file. It also displays the total count of all log packets.



To invoke the log summary, select View → Log Summary. The shortcut for this function is **F4**.

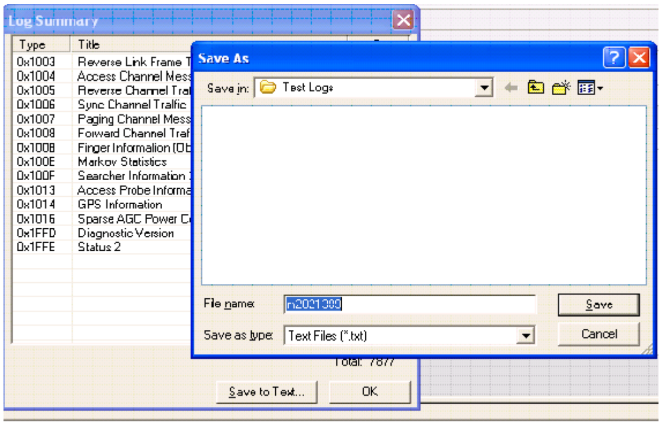

Log Summary

Type	Title	Count
0x1003	Reverse Link Frame Types	232
0x1004	Access Channel Message	1
0x1005	Reverse Channel Traffic Message	189
0x1006	Sync Channel Traffic Message	1
0x1007	Paging Channel Message	253
0x1008	Forward Channel Traffic Message	132
0x100B	Finger Information (Obsolete)	3268
0x100E	Markov Statistics	184
0x100F	Searcher Information 2 (Obsolete)	3268
0x1013	Access Probe Information	1
0x1014	GPS Information	96
0x1016	Sparse AGC Power Control	240
0x1FFD	Diagnostic Version	1
0x1FFE	Status 2	1

Total: 7877

3.4.27 Saving the log summary

To save the log summary information to a text file, click **Save to Text** in the Log Summary dialog. This brings up the Windows Save As dialog where you select the directory and filename for the summary information.


Save As

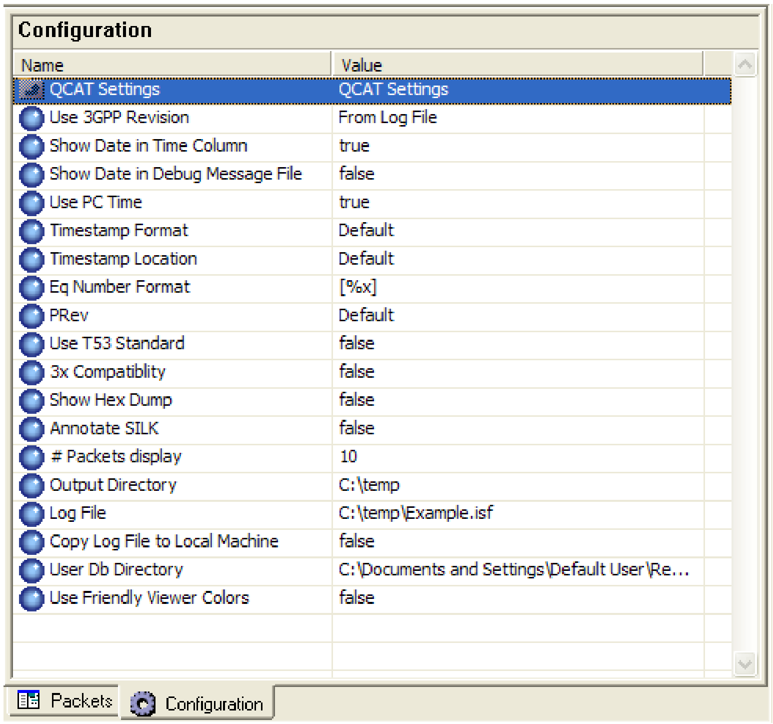
Save in: Test Logs

File name: n2021309

Save as type: Text Files (*.txt)

3.4.28 Configuration tab

The Configuration tab replaces the Option menu found in previous versions. It contains a superset of those features.

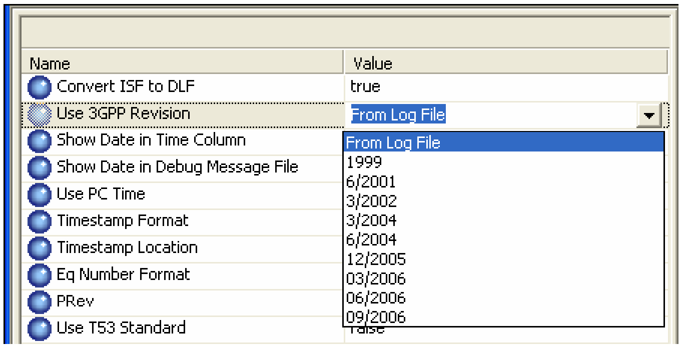


Configuration

Name	Value
QCAT Settings	QCAT Settings
Use 3GPP Revision	From Log File
Show Date in Time Column	true
Show Date in Debug Message File	false
Use PC Time	true
Timestamp Format	Default
Timestamp Location	Default
Eq Number Format	[%x]
PRev	Default
Use T53 Standard	false
3x Compatiblity	false
Show Hex Dump	false
Annotate SILK	false
# Packets display	10
Output Directory	C:\temp
Log File	C:\temp\Example.isf
Copy Log File to Local Machine	false
User Db Directory	C:\Documents and Settings\Default User\Re...
Use Friendly Viewer Colors	false

3.4.28.1 Use 3GPP revision

QCAT will normally use the 3GPP revision number found in the log file. It is possible that the number in the file is incorrect. This feature allows the user to override the From Log File value and specify the 3GPP revision number to use.



Name	Value
Convert ISF to DLF	true
Use 3GPP Revision	From Log File
Show Date in Time Column	
Show Date in Debug Message File	
Use PC Time	
Timestamp Format	
Timestamp Location	
Eq Number Format	
PRev	
Use T53 Standard	false

3.4.28.2 Show date in Time Column

This option can be set to true or false. When this option is enabled, QCAT shows the date and time in the time column (YYYY Mon DD HH:MM:SS.sss). When it is disabled, only the time (HH:MM:SS.sss) is displayed.

3.4.28.3 Show date in Debug Message file

This option can be set to true or false. When this option is set to true, QCAT includes the date with the timestamp when writing out a debug file. When it is set to false, it writes out only the timestamp. This can be seen by selecting File → Save → Text…, checking **Save Debug Messages Only**, and clicking **Save**.

3.4.28.4 Use PC time

When this option is enabled (True), QCAT offsets all timestamps by PC Time offset. The value is a diff between PC Time from Diagnostic Version Packet and first Nonzero Timestamp in the log. The first Nonzero Timestamp should not be further than 1hr from the logged PC Time in the Diagnostic Version Packet. This way QCAT will ignore stale packets that sometimes are present in the log.

To access this option, click the **Configuration** tab. To toggle this option to True or False, single-click the **Use PC Time** option to activate the drop-down list. Select the desired value. Changes take effect immediately.

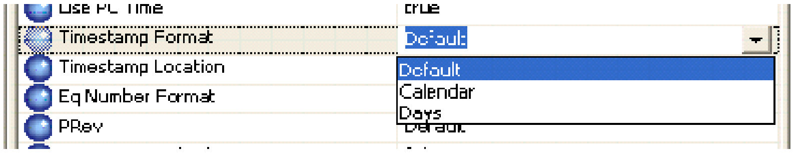
NOTE: The shortcut for this function is **Alt+C**.

This option only works for specific DM versions.

3.4.28.5 Timestamp format

The Timestamp Format option has three settings; Default, Calendar, and Days. This option affects the way the date is displayed. The Days format is (Day DD HH:MM:SS.sss) while the Calendar format is (YYYY Mon DD HH:MM:SS.sss). The default for UMTS targets is Day. The default for CDMA targets is Calendar.

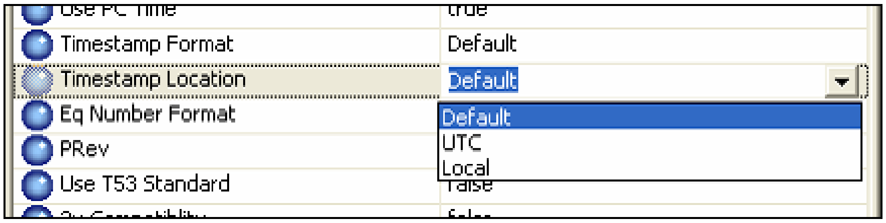
NOTE: If Use PC Time is set to true, the setting of the Timestamp Format option is ignored. It will always be the Calendar format.



Use PC Time true
Timestamp Format Default
Timestamp Location
Eq Number Format
PRev Default

3.4.28.6 Timestamp location (UTC vs local time)

The Timestamp Location option allows users to show the timestamp in the local time zone instead of UTC time. This is simply an offset of as many hours as the local time is removed from UTC time.



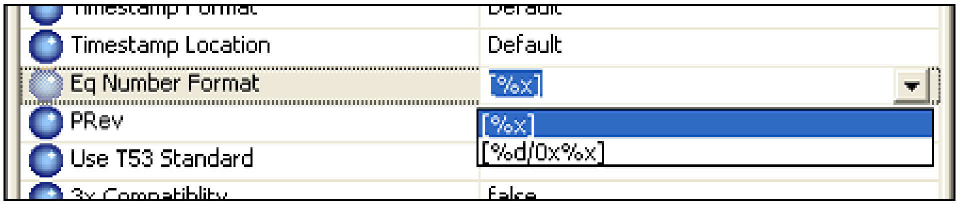
Use PC Time true
Timestamp Format Default
Timestamp Location Default
Eq Number Format
PRev
Use T53 Standard false

3.4.28.7 Eq number format

The Eq Number Format is a CFN number in the UMTS/WCDMA timestamps. For CDMA timestamps, it is an Action Time. The two options are either hex only [%x] or decimal and hex [%d/0x%x].

For example, if the packet's CFN is 0x5E, it can be displayed as one of the following:

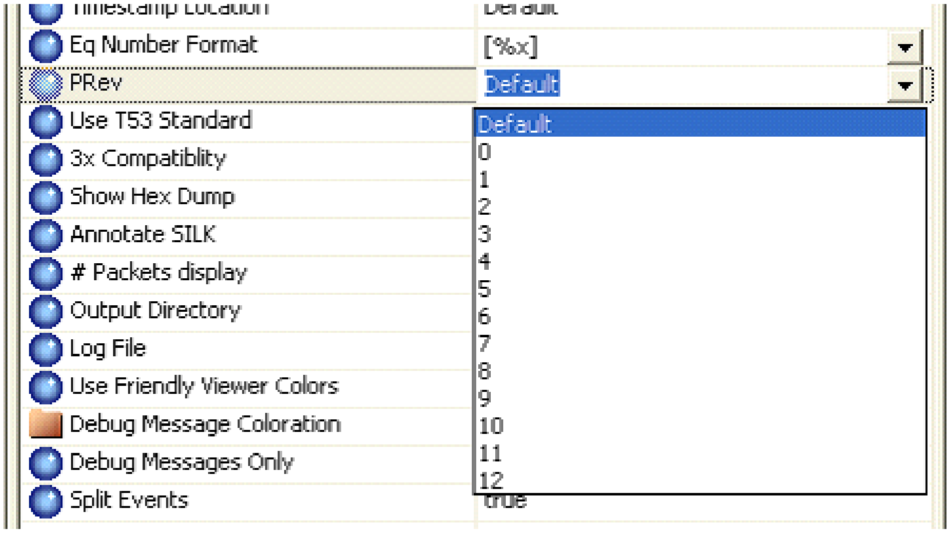
- Day 2404 01:43:37.962 **[94/0x5E]** 0x4110 WCDMA Active Set
- Day 2404 01:43:37.962 **[5E]** 0x4110 WCDMA Active Set



Timestamp Format	Default
Timestamp Location	Default
Eq Number Format	[%x]
PRev	
Use T53 Standard	
3x Compatiblity	false

3.4.28.8 PRev

A PRev revision is needed to decode CDMA messages. This allows you to override the default and set the correct revision number.



Timestamp Location	Default
Eq Number Format	[%x]
PRev	Default
Use T53 Standard	
3x Compatiblity	
Show Hex Dump	
Annotate SILK	
# Packets display	
Output Directory	
Log File	
Use Friendly Viewer Colors	
Debug Message Coloration	
Debug Messages Only	
Split Events	true

3.4.28.9 Use T53 standard

The Use T53 Standard option can be set to true or false. To toggle this option on and off, select Options → Use T53 Standard. The shortcut for this function is **Alt+5**. This option applies to CDMA targets only. When this option is enabled, QCAT notifies the signaling message parsing routines to interpret the messages as defined in the ARIB T-53 Standard, as opposed to the IS95A Standard.

3.4.28.10 3x compatibility

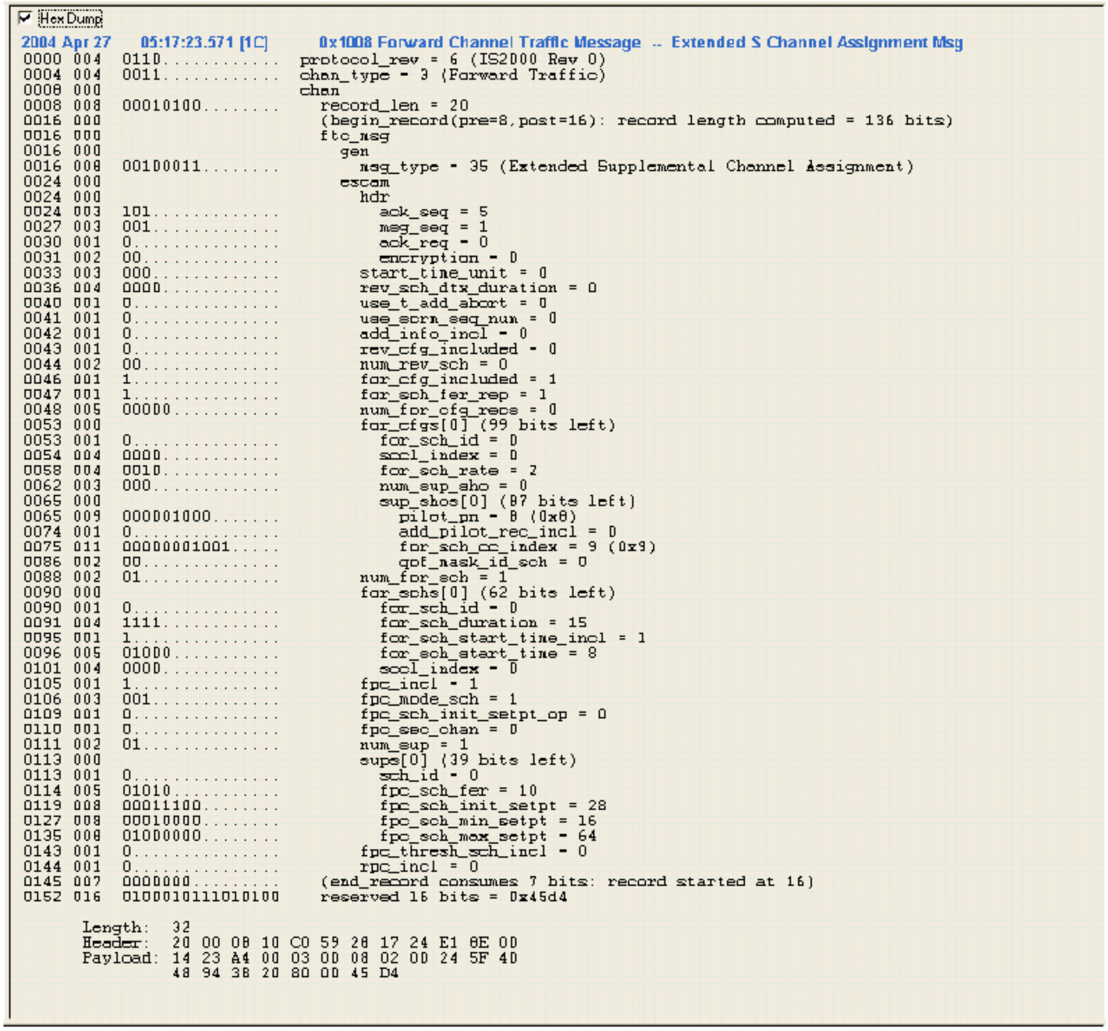
The 3x Compatibility option can be set to true or false. When true, it allows QCAT to work with packets created for QCAT version 3x.

3.4.28.11 Show hex dump

The Show Hex Dump option can be set to true or false. Toggling this option has the same effect as toggling the Hex Dump checkbox in the parser view.

3.4.28.12 Annotate SILK

Enabling the Annotate SILK option will cause the OTA message parser (SILK) to annotate the text output with information about the raw bits that were decoded into a particular output field.



☑ Hex Dump

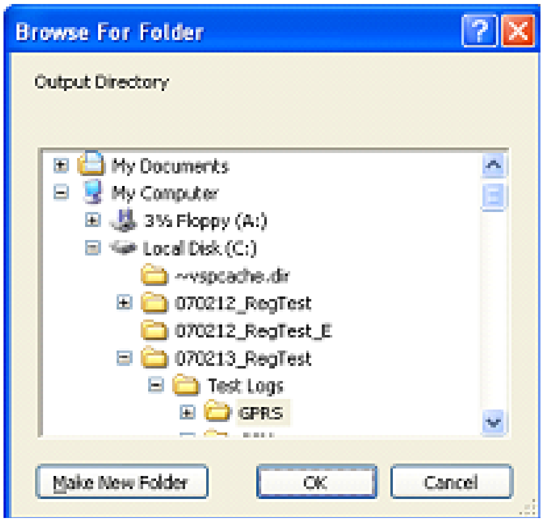
```
2004 Apr 27    05:17:23.571 [1C]    0x1008 Forward Channel Traffic Message  --  Extended S Channel Assignment Msg
0000 004  0110............    protocol_rev = 6 (IS2000 Rev 0)
0004 004  0011............    chan_type = 3 (Forward Traffic)
0008 000                      chan
0008 008  00010100........      record_len = 20
0016 000                        (begin_record(pre=8,post=16): record length computed = 136 bits)
0016 000                        ftc_msg
0016 000                          gen
0016 008  00100011........          msg_type = 35 (Extended Supplemental Channel Assignment)
0024 000                          escam
0024 000                            hdr
0024 003  101.............            ack_seq = 5
0027 003  001.............            msg_seq = 1
0030 001  0...............            ack_req = 0
0031 002  00..............            encryption = 0
0033 003  000.............          start_time_unit = 0
0036 004  0000............          rev_sch_dtx_duration = 0
0040 001  0...............          use_t_add_abort = 0
0041 001  0...............          use_scrm_seq_num = 0
0042 001  0...............          add_info_incl = 0
0043 001  0...............          rev_cfg_included = 0
0044 002  00..............          num_rev_sch = 0
0046 001  1...............          for_cfg_included = 1
0047 001  1...............          for_sch_fer_rep = 1
0048 005  00000...........          num_for_cfg_recs = 0
0053 000                            for_cfgs[0] (99 bits left)
0053 001  0...............            for_sch_id = 0
0054 004  0000............            sccl_index = 0
0058 004  0010............            for_sch_rate = 2
0062 003  000.............            num_sup_sho = 0
0065 000                              sup_shos[0] (87 bits left)
0065 009  000001000.......              pilot_pn = 8 (0x8)
0074 001  0...............              add_pilot_rec_incl = 0
0075 011  00000001001.....              for_sch_cc_index = 9 (0x9)
0086 002  00..............              qof_mask_id_sch = 0
0088 002  01..............          num_for_sch = 1
0090 000                            for_schs[0] (62 bits left)
0090 001  0...............            for_sch_id = 0
0091 004  1111............            for_sch_duration = 15
0095 001  1...............            for_sch_start_time_incl = 1
0096 005  01000...........            for_sch_start_time = 8
0101 004  0000............            sccl_index = 0
0105 001  1...............          fpc_incl = 1
0106 003  001.............          fpc_mode_sch = 1
0109 001  0...............          fpc_sch_init_setpt_op = 0
0110 001  0...............          fpc_sec_chan = 0
0111 002  01..............          num_sup = 1
0113 000                            sups[0] (39 bits left)
0113 001  0...............            sch_id = 0
0114 005  01010...........            fpc_sch_fer = 10
0119 008  00011100........            fpc_sch_init_setpt = 28
0127 008  00010000........            fpc_sch_min_setpt = 16
0135 008  01000000........            fpc_sch_max_setpt = 64
0143 001  0...............          fpc_thresh_sch_incl = 0
0144 001  0...............          rpc_incl = 0
0145 007  0000000.........      (end_record consumes 7 bits: record started at 16)
0152 016  0100010111010100      reserved 16 bits = 0x45d4

      Length:   32
      Header:   20 00 08 10 C0 59 28 17 24 E1 8E 00
      Payload:  14 23 A4 00 03 00 08 02 00 24 5F 40
                48 94 38 20 80 00 45 D4
```

3.4.28.13 # Packets display

The # Packets display option specifies the maximum number of packets that are displayed at the same time in the right panel.

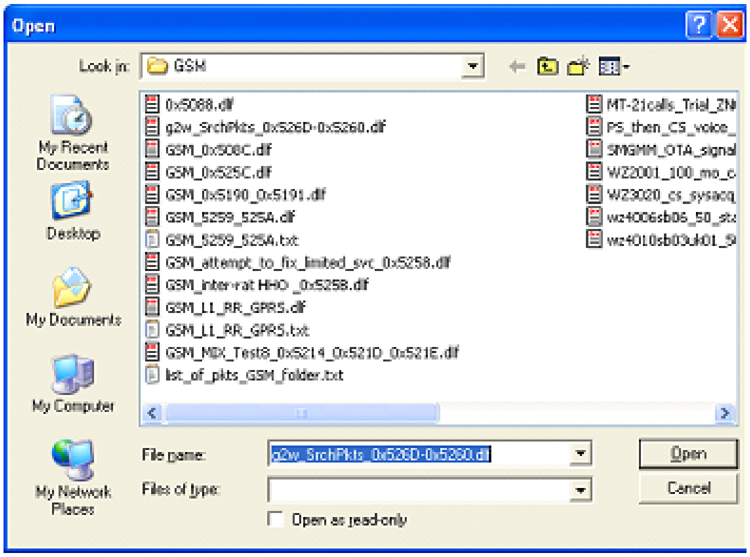
3.4.28.14 Output directory

The Output Directory option specifies the default output directory when exporting files.



3.4.28.15 Log file

The Log File option lets you select a log filename.



File name: g2w_SrchPkts_0x526D-0x5260.dlf

3.4.28.16 Copy log file to local machine

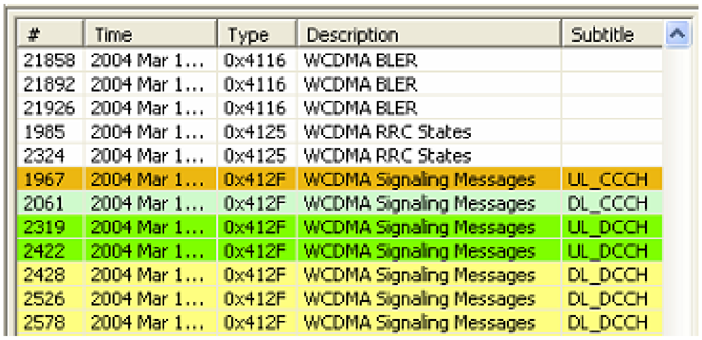
The Copy Log File to Local Machine option can be set to true or false, telling QCAT whether or not to copy log files that are accessed remotely to the local machine. The files are copied to the current user's %TEMP% directory.

3.4.28.17 User Db directory

The User Db Directory specifies a directory in which user defined diagnostic database files are located. These files will be loaded and given priority for parsing packets. Packets parsed by user-defined databases will be indicated in the supported log list by the name of the database file being used following the name of the log packet. The user database file will also be shown in the parsed output for that packet.

3.4.28.18 Use friendly viewer colors

The **Use Friendly Viewer Colors** option can be can be set to true or false, telling QCAT whether to use the Friendly Viewer application’s color scheme when displaying packets in the left panel. When enabled, it color-codes 0x412F WCDMA signaling message packets based on their subtitle; otherwise, there is no color coding.



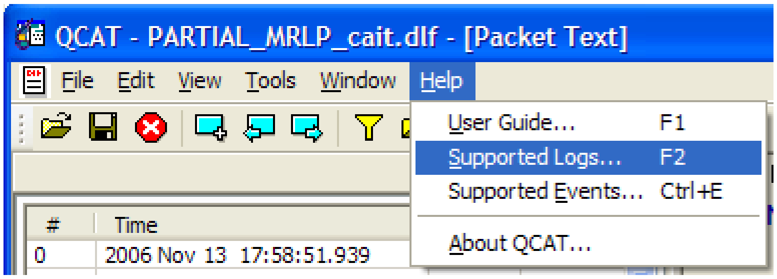
#	Time	Type	Description	Subtitle
21858	2004 Mar 1...	0x4116	WCDMA BLER	
21892	2004 Mar 1...	0x4116	WCDMA BLER	
21926	2004 Mar 1...	0x4116	WCDMA BLER	
1985	2004 Mar 1...	0x4125	WCDMA RRC States	
2324	2004 Mar 1...	0x4125	WCDMA RRC States	
1967	2004 Mar 1...	0x412F	WCDMA Signaling Messages	UL_CCCH
2061	2004 Mar 1...	0x412F	WCDMA Signaling Messages	DL_CCCH
2319	2004 Mar 1...	0x412F	WCDMA Signaling Messages	UL_DCCH
2422	2004 Mar 1...	0x412F	WCDMA Signaling Messages	UL_DCCH
2428	2004 Mar 1...	0x412F	WCDMA Signaling Messages	DL_DCCH
2526	2004 Mar 1...	0x412F	WCDMA Signaling Messages	DL_DCCH
2578	2004 Mar 1...	0x412F	WCDMA Signaling Messages	DL_DCCH

3.4.29 Invoking the QCAT user guide

To invoke the QCAT user guide, select Help → User Guide. The shortcut for this function is **F1**. This invokes the PDF version of this user guide using the appropriate document viewer.

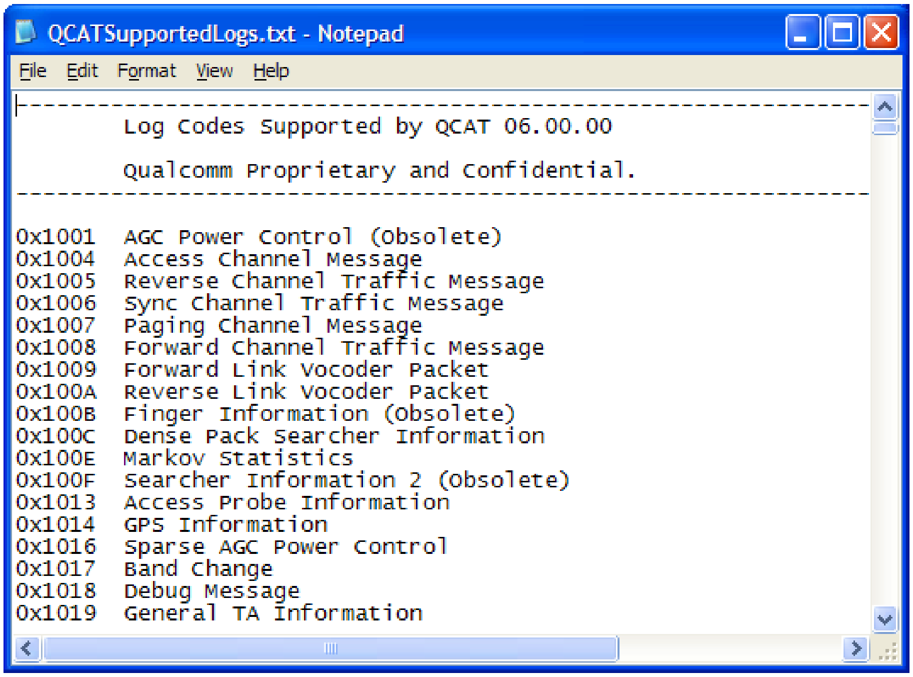
3.4.30 Viewing the Supported Logs list

QCAT creates a list of all log packets that it is capable of parsing by querying its internal parsing engine. This list is autogenerated each time you request this information. To view this list, select Help → Supported Logs. The shortcut for this function is **F2**.



#	Time
0	2006 Nov 13 17:58:51.939

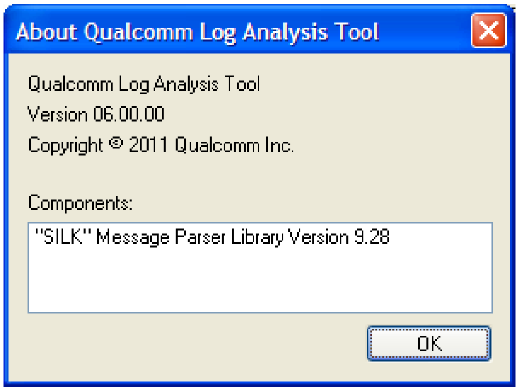
QCAT creates a text file with this information and invokes the Windows default text editor (usually Notepad) to display this text file.



```
-----------------------------------------------------------------
        Log Codes Supported by QCAT 06.00.00

        Qualcomm Proprietary and Confidential.
-----------------------------------------------------------------

0x1001  AGC Power Control (Obsolete)
0x1004  Access Channel Message
0x1005  Reverse Channel Traffic Message
0x1006  Sync Channel Traffic Message
0x1007  Paging Channel Message
0x1008  Forward Channel Traffic Message
0x1009  Forward Link Vocoder Packet
0x100A  Reverse Link Vocoder Packet
0x100B  Finger Information (Obsolete)
0x100C  Dense Pack Searcher Information
0x100E  Markov Statistics
0x100F  Searcher Information 2 (Obsolete)
0x1013  Access Probe Information
0x1014  GPS Information
0x1016  Sparse AGC Power Control
0x1017  Band Change
0x1018  Debug Message
0x1019  General TA Information
```

3.4.31 Getting QCAT version information

The QCAT version and copyright information is found in the About dialog. To invoke the About dialog, select Help →About QCAT.



Qualcomm Log Analysis Tool
Version 06.00.00
Copyright © 2011 Qualcomm Inc.

Components:
"SILK" Message Parser Library Version 9.28

In addition to the QCAT product version, this dialog also displays the versions of other nonnative components such as the SILK message parser library.

Exiting the application

To exit the application, select File → Exit.

QCAT toolbar

The QCAT toolbar contains shortcuts for some frequently used features. The buttons in the QCAT toolbar are described in Table 3-1.

Table 3-1 QCAT toolbar buttons

Button	Menu
📂	File → Open
💾	File → Save as Text
⛔	Stops the current parsing
➕	Add bookmark. Toggles whether or not the selected packet is bookmarked
⬅	Go to previous bookmark
➡	Go to next bookmark
⏷	Opens the filter packet dialog
📂	Opens the file open dialog for opening a filter file
💾	Opens the file save dialog to save the current filter

4 Scripting with QCAT

QCAT 6.x provides a COM-based automation interface that allows scripts written in languages such as Perl, VBScript, and JavaScript to access features of the application.

4.1 Sample scripts

The QCAT installation installs sample PERL scripts, listed in Table 4-1, in a folder called Script in the installation path.

Table 4-1 Listing of sample scripts

File	Description
GetVersion.pl	Invokes QCAT, get Version, and sets QCAT to be visible
ConfigTest.pl	Prints a list of all available configuration properties Tests getting and setting configuration properties by name
OptionsTest.pl	Manipulates application options
SimpleParse.pl	Single-step log file processing and automation error handling
FilterSample.pl	Sets the packet filter to load only debug messages and processes a log file, then saves as text
SortedIterationSample.pl FilteredIterationSample.pl	Gets a packet iterator and then iterates through a few packets and prints their contents
ProcessDirectory.pl	Creates the parsed text file for each file in a directory
ProcessPacket.pl	Sends a buffer of raw bytes to QCAT to be interpreted as a log packet, which can then be parsed
ProcessQmdlPacket.pl	Sends a buffer of raw bytes to QCAT to be interpreted as a qmdl payload, which can then be parsed
GetPacketList.pl	Gets the list of packets supported by QCAT
GetVocoderPCM.pl	Generates the vocoder PCM output files
SplitLog.pl	Splits a specified log file into a set of smaller log files by specifying either how many smaller files to make or a time duration for each file
closeFile.pl	Closes the log file
TimeWindowSample.pl	Sets the time window to a fraction of its original length and saves as text
UpdateQCAT4License.pl	Updates the QCAT 4.x license from the QCAT 6.x license
DebugMsgFilter.pl	Sets the debug message filter and processes a log file, then saves as text
EventsFilter.pl	Sets the event filter and processes a log file, then saves as text
MergeFusionLogs.pl	Merges two QCAT parsed outputs based on timestamp to show the synchronized information from two targets in Fusion mode
MergeWithWireshark.pl	Merges QCAT parsed text with wireshark text output

File	Description
GetLicesnseTimeRemaining.pl	Displays the amount of time before the installed version's license expires
SaveAsDlf.pl	Shows an example of how to save the current file as a new .dlf file
ExtractPcmFiles.pl	Used internally by QCAT
ExtractVocoderData.pl	Used internally by QCAT
qcatobj.pl	Used internally by QCAT
tsharkobj.pl	Used internally by QCAT
tsharkverboseobj.pl	Used internally by QCAT

NOTE: One or more of the sample scripts assumes the presence of a log file in C:\Temp\Sample.dlf. The QCAT installation and the scripts do not create or copy any such log file in the Temp folder. The scripts require you to copy any log file under the Sample.dlf name to the specified path.

4.2 QCAT automation objects

QCAT distributes responsibilities between several automation objects. The top-level object is the QCAT6.Application object.

4.2.1 QCAT6.Application object

This is the main application object. Creating this object invokes the QCAT application. The application terminates when the script releases this object.

The following code demonstrates how to create the application object:

```

use Win32::OLE;
my $qcat_app = new Win32::OLE ‘QCAT6.Application’;
if(!$qcat_app)
{
print “ERROR: Unable to invoke the QCAT application.\n”;
die;
}

The following code demonstrates how to release the application object:
$qcat_app = NULL;
```

4.2.1.1 Properties

BOOL AnnotateSILK [Put/Get]

- True – OTA messages processed by SILK will include annotations
- False – SILK output will not be annotated

String AppVersion [Get]

This is the application version string in the format: 0n.nn.nn.

LONG BandClass [Put/Get]

This explicitly sets the band class to use single packet parsing (see ProcessPacket method).

BOOL DatabaseStatus [Get]

- True – Event database is available and will provide event details (requires QXDM)
- False – Event database was not found

IAutoLogPacket* FirstPacket [Get]

This is the packet automation object that wraps the first packet in the log file.

String LastError [Get]

This is the description of the last error encountered.

LONG LastErrorCode [Get]

This is unused.

LONG LogStartTime [Get]

This is the start time of the log as the number of seconds since midnight Jan 1, 1970 (UTC).

LONG LogEndTime

This is the end time of the log as the number of seconds since midnight Jan 1, 1970 (UTC).

Double LogDuration [Get]

This is the time span of the log file in seconds.

LONG Mode [Put/Get]

This explicitly sets the Timestamp mode for single-packet parsing (see ProcessPacket method):

- UNKNOWN_MODE – 0
- CDMA_MODE – 1
- WCDMA_MODE – 4
- GSM_MODE – 5

LONG Model [Put/Get]

This explicitly sets the model for single-packet parsing (see ProcessPacket method).

LONG PacketCount [Get]

This is the number of packets in the currently open log file.

LONG VisiblePacketCount [Get]

This is the number of visible packets in the currently open log file. Visible packets are ones that are neither filtered out nor outside of the active time window.

AutoPacketFilter PacketFilter [Get]

This is the filter automation object for removing packets by type code.

LONG PRev [Put/Get]

This explicitly sets the PRev to be used by SILK in decoding OTA messages.

BOOL ShowHexDump [Put/Get]

- True – Print packet hex dump in addition to the pretty-print
- False – Do not print the hex dump

String SILKVersion [Get]

This is the SILK revision string in the format: n.nn.

BOOL SplitEvents [Put/Get]

- True – Split multi-event packets into single-event packets
- False – Leave multi-event packets bundled

VARIANT SupportedPackets [Get]

This returns an array of short (16-bit) type codes; these type codes are the packet types supported by QCAT.

LONG StateRequired([in] LONG packetType) [Get]

This returns a bitmask that identifies the log state information that must be set in order to correctly process a packet of the given type (see ProcessPacket method):

- REQUIRES_NONE – 0x00000000
- REQUIRES_MODE – 0x00000001 (see Mode property)
- REQUIRES_P_REV – 0x00000002 (see PRev property)
- REQUIRES_BANDCLASS – 0x00000004 (see BandClass property)
- REQUIRES_MODEL – 0x00000008 (see Model property)

String TimestampFormat [Put/Get]

This sets/gets the timestamp display format; valid values are:

- Default – Default QCAT 4.x/5.x/6.x time formatting
- Calendar – Displays all dates as calendar dates
- Days – Displays a number of days rather than a date

String TimestampLocale [Put/Get]

This sets/gets the timestamp locale; valid values are:

- Default – Default QCAT 4.x/5.x/6.x time locale
- UTC – All times will be printed as UTC time
- Local – All times will be adjusted to the local time zone

BOOL UseT53Standard [Put/Get]

This controls use of the T53 standard for decoding OTA messages.

BOOL UsePCTime [Put/Get]

- True – Attempts to align the timestamps of the log packets with the PC system time
- False – Uses log packet timestamps as they are

BOOL V3xCompatibility [Put/Get]

- True – Uses QCAT 3.x version packet names
- False – Uses QCAT 4.x+ naming (recommended)

BOOL Visible [Put/Get]

This controls whether the UI is visible.

4.2.1.2 Methods

void Force3GPPRev

```

(
[in] short nMonth,
[in] short nYear
);

```

This explicitly sets the 3GPP Revision for parsing WCDMA RRC Signaling messages. This is only necessary when the correct 3GPP revision cannot be determined from the log file.

BOOL GenerateVocoderPCM

```
(
[in] BSTR txOutPath,
[in] BSTR rxOutPath,
[in] LONG mode
);
```

This extracts vocoder frames from log packets, concatenates, and converts them to a PCM file that can be played back using a PCM audio utility. Descriptions are:

- txOutPath – Output file path for the Tx stream
- rxOutPath – Output file path for the Rx stream
- Mode – Vocoder mode if not contained in the log packets; must be one of the following:
  - Auto Select (0): determine from log file if possible
  - AMR-NB(1)
  - EFR(2)
  - FR(3)
  - HR(4)
  - EVRC(5)
  - 13K(6)
  - AMR-WB(7)
  - EVRC-B(8)
  - EVRC-WB(9)

BOOL ExtractVocoderFrameFiles

```
(
[in] BSTR txOutPath,
[in] BSTR rxOutPath,
[in] LONG mode

);
```

- txOutPath – Output path (a directory) for tx frames
- rxOutPath – Output path (a directory) for rx frames
- Mode – Vocoder mode if not contained in the log packets (see GenerateVocoderPCM for values)

This extracts the vocoder frames into files and converts them using the correct C-sim. Frame files and C-sim output files are saved to the given directory paths. See Section 3.4.22.8.

BOOL ExtractPcmAudio

```
(
[in] BSTR txOutPath,
[in] BSTR rxOutPath
);
```

- txOutPath – Output file path for the Tx stream
- rxOutPath – Output file path for the Rx stream

This extracts PCM samples from the vocoder frames into files and converts them using the correct C-sim. Frame files and C-sim output files are saved to the given directory paths. See Section 3.4.22.4.

VARIANT GetProperty

```
(
[in] BSTR name
);
```

This gets a configuration property by name. It returns empty if the property was not found.

String GetPacketTypeName

```
(
[in] LONG type
);
```

- Type – Packet type code to look up. This returns the English name for the type.

String GetPropertyList

```
(
[in] BOOL bIncludeValues
);
```

This returns a list of all the configuration properties in the application. These properties can be set/get using PutProperty/GetProperty.

- bIncludeValues – Includes the current value for the property in the returned string

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BOOL OpenLog

```
(
[in] BSTR pathName
);
```

This opens a log file. It returns TRUE on success. If the result is FALSE, it retrieves the last error message from the LastError property.

- pathName – Full path to the log file to be opened

BOOL closeFile( )

This closes the log file.

BOOL Process

```
(
[in] BSTR pszLogPath,
[in] BSTR pszOutPath,
[in] BOOL bHexDump,
[in] BOOL b3xCompatibility
);
```

This opens a log file and pretty-prints the packets into an ASCII text file. Descriptions are:

- BSTR pszLogPath – Full path to the target log file
- BSTR pszOutPath – Full path of the text file to produce
- BOOL bHexDump – If TRUE, the hex dump for each packet will be printed in the output file
- BOOL b3xCompatibility – If TRUE, the QCAT 3.x version of the packet name will be used (FALSE is recommended for new scripts)

BOOL ProcessDebug

```
(
[in] BSTR pszLogPath,
[in] BSTR pszOutPath
);
```

This opens a log file and pretty-prints only the debug message packets into an ASCII text file. Descriptions are:

- BSTR pszLogPath – Full path to the target log file
- BSTR pszOutPath – Full path of the text file to produce

AutoLogPacket ProcessPacket

```
(
[in] VARIANT packet,
);
```

This wraps a raw DLF packet payload with an AutoLogPacket automation object (see AutoLogPacket).

- Packet – Full DLF packet as a byte array (VT_I1 | VT_ARRAY)

This returns an AutoLogPacket automation object.

WARNING: ***Some packets require state information from other log items and will not process correctly without it.*** If the packet type requires missing state information for proper processing, the return value is NULL and the LastError property will list the missing state information. To set missing state parameters, use the BandClass, Mode, Model, and PRev properties, and the Force3GPPRev method.

AutoLogPacket ProcessQmdlPacket

```
(
[in] VARIANT packet,
);
```

This wraps a raw QMDL packet payload with an AutoLogPacket automation object (see AutoLogPacket).

- Packet – Full QMDL packet as a byte array (VT_I1 | VT_ARRAY) including the HDLC CRC and termination byte (0x7E)

This returns an AutoLogPacket automation object.

WARNING: ***Some packets require state information from other log items and will not process correctly without it.*** If the packet type requires missing state information for proper processing, the return value is NULL and the LastError property will list the missing state information. To set missing state parameters, use the BandClass, Mode, Model, and PRev properties, and the Force3GPPRev method.

BOOL PutProperty

```
(
[in] BSTR name,
[in] VARIANT value
);
```

This sets a configuration property by name. Valid configuration property names can be listed using the GetPropertyList method. Descriptions are:

- Name – Name of the property to be set
- Value – New value for the property

This returns FALSE if the property with the given name is not found.

BOOL SaveAsText

```
(
[in] BSTR outPath
);
```

This parses the current log file and saves the output text to the file specified by pszOutPath.

- outPath – Output file path

BOOL SaveAsDLF

```
(
[in] BSTR outPath
);
```

This saves the current log file as a new DLF.

- outPath – Output file path

BOOL SaveAsUpdatedDLF

```
(
[in] BSTR outPath
);
```

This saves the current log file as a new DLF, updating the time stamps to be as they are displayed. This means saving the PC Time offset into the log headers.

- outPath – Output file path

void SetTimeWindow

```
(
[in] double offset,
[in] double length
);
```

This limits packets to a specified time window. Descriptions are:

- Offset – Beginning of the window as an offset from the first packet in the log (in seconds)
- Length – Size of the window in seconds

void SetPacketWindow

```
(
[in] long offset,
[in] long length
);
```

This limits packets to a specified window. Descriptions are:

- Offset – The number of packets to be clipped off the front of the log
- Length – The number of packets to be viewed

BOOL SortByTime();

This sorts the packets of the open log file by timestamp.

BOOL SortByIndex();

This sorts the packets of the open log file by file index.

BOOL SortByLogId();

This sorts the packets of the open log file by log ID.

BOOL SortByLogName();

This sorts the packets of the open log file by log name.

BOOL SortBySize();

This sorts the packets of the open log file by log size.

4.2.2 QCAT6.AutoLogPacket

4.2.2.1 Properties

Short Type [Get]

This is the packet type code.

Short Length [Get]

This is the length of the packet in bytes (including DLF item header – 12 bytes).

String Name [Get]

This is the name for this type of packet.

String TimestampAsString [Get]

This is the timestamp as a date/time string.

String Text [Get]

This is the parsed payload of the packet as would appear in the QCAT text output.

UNSIGNED LONG SortedIndex [Get]

This is the time sorted index of the packet. This can be used in conjunction with functions taking a packet index, such as SetPacketWindow.

4.2.2.2 Methods

Bool Next();

This goes to the next packet. It returns FALSE if this is the last packet.

4.2.3 QCAT6.AutoPacketFilter

4.2.3.1 Methods

Void SetAll

```

(
BOOL bEnable
);

```

This enables/disables all packet types.

- bEnable
  - True – Enable
  - False – Disable

Void SetRange

```
(
short nFirst,
short nLast,
BOOL bEnable
);
```

This enables/disables a range of packet types (inclusive). Descriptions are:

- nFirst – First packet type to be enabled/disabled
- nLast – Last packet type to be enabled/disabled
    - True – Enable
    - False – Disable

Void Set

```
(
short type,
BOOL bEnable
);
```

This enables/disables a single packet type. Descriptions are:

- type – Type of packet to disable
- bEnable
    - True – Enable
    - False – Disable

BOOL IsEnabled

```
(
short type
);
```

This returns TRUE if the given packet type is enabled.

- Type – Packet type to query

Void Commit();

This applies the current filter to the log file.