EC200U Series QuecOpen Log Capture Guide

LTE Standard Module Series

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About the Document

Revision History

Version	Date	Author	Description
-	2021-12-23	Jensen FANG/ Kevin WANG	Creation of the document
1.0	2022-01-19	Jensen FANG/ Kevin WANG	First official release

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1 Introduction

Quectel EC200U series module supports QuecOpen® solution. QuecOpen® is an embedded development platform based on RTOS, which is intended to simplify the design and development of IoT applications. For more information on QuecOpen®, see ***document [1]***.

This document takes EC200U-CN as an example to introduce how to capture log information on the EC200U series module in QuecOpen® solution, including environment setup, log capture tool acquisition and specific operation steps, and dump analysis and saving. In the process of module debugging, if there are problems such as abnormal restart, network registration and data service or module crash, you can refer to this document to further analyze the cause of the problems.

2 Environment Setup

2.1. Software Environment

2.1.1. Driver Installation

Driver installation is the main task to set up software environment. The USB driver package *Quectel_Windows_USB_Driver(U)_For_ECM_RNDIS_V1.0.11.zip* is taken as an example in the following content. Compress the package and install the USB driver according to the installation instructions.

NOTE

Please contact Quectel Technical Support (support@quectel.com) to obtain the latest USB driver package.

After the driver is installed, you can check whether the ports work normally in the Device Manager, as shown below:

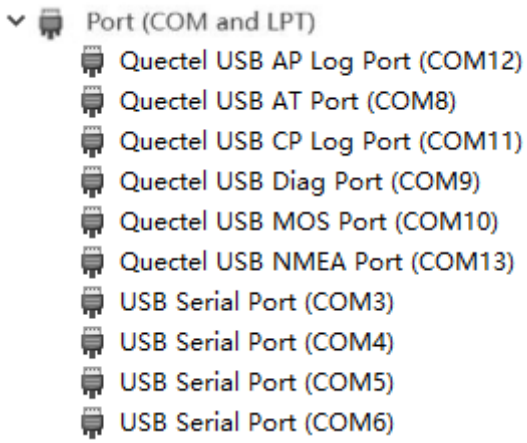

Figure 1: Ports in Device Manager

Among the ports shown in the above figure, Quectel USB AP Log Port is an AP log port and Quectel USB CP Log Port is a CP log port. The USB Serial Port (COM4) in this document is Debug UART, which can be used to output AP log.

2.1.2. Tool Acquisition

The tools mentioned in this document are shown in the following table. Please contact Quectel Technical Support (support@quectel.com) to obtain the latest version of the tools if necessary.

Table 1: Tool Overview

Tool	Description
cooltools-win32_custom_P3.R2.0.0005.7z	AP log capture tool, installation-free.
ArmTracer_V6.2.4_User.7z	CP log capture tool, installation-free.
gdb-win32_custom_P3.R2.0.0005.7z	Dump analysis tool.

2.1.3. Log Capture Tool

The AP log capture tool used is *cooltools-win32_custom_P3.R2.0.0005.7z*. It is an installation-free tool and can run directly after decompressing. If you use the Debug UART to capture AP log, run *coolwatcher_debughost.exe*. If you use Quectel USB AP Log Port to capture AP log, run *coolwatcher_usb.exe*.

If AP dump analysis is needed, you should place the decompressed subdirectories and files of *gdb-win32_custom_P3.R2.0.0005.7z* in the root directory of *cooltools*.

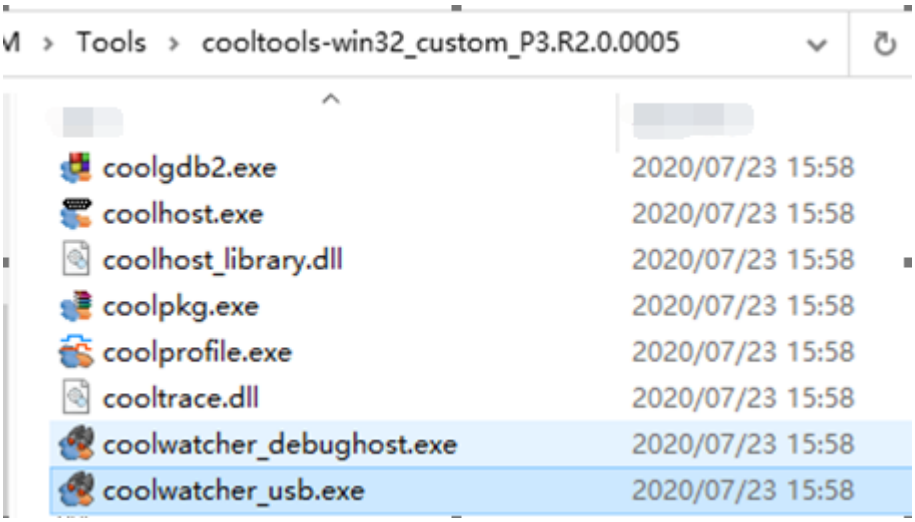

Figure 2: cooltools

The CP log capture tool used is *ArmTracer_V6.2.4_User.7z*. It is an installation-free tool and you can execute *ArmTracer.exe* after decompressing.

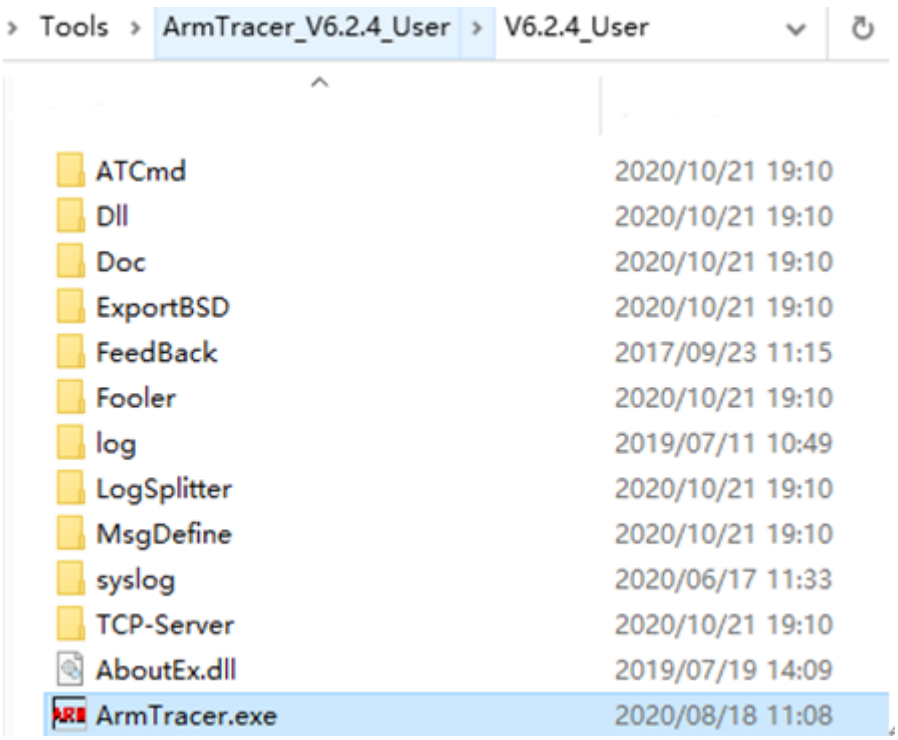

Figure 3: ArmTracer

2.2. Hardware Environment

You can use Quectel EC200U-CN TE-A or your device to capture log.

The default output port of AP log of EC200U-CN module is Quectel USB AP Log Port (currently the log is outputted from Debug UART during the startup of the module). If you use Debug UART to capture AP log, note that the baud rate of Debug UART of the module needs to be set to 921600 bps. However, because RS-232 serial port chip on LTE OPEN EVB does not support 921600 bps, AP log cannot be captured on DB9 of EVB when you use EC200U-CN TE-A. If you must use Debug UART to capture AP log, you need to separately jump a wire to the serial port conversion board supporting 921600 bps. Note that the level of the module is 1.8 V when you jump the wire.

If you use your device to capture log, you need to reserve serial port or USB port. It is recommended to reserve some test points when you design the hardware circuit, otherwise you need to jump a wire to TX and RX pins of Debug UART when capturing log.

3 Procedures

3.1. AP Log Capture with cooltools

This chapter takes Debug UART as an example to introduce the procedures of capturing AP log with cooltools. Please refer to *Coolwatcher User Guide* in the *cooltools/doc* directory for details.

3.1.1. Configuration in cooltools

After opening cooltools, you first need to manually configure the module type and log port. As shown in the figure below, the module type on the left is fixed to "**8910**", and the log port (lastcomport) is configured according to the actual port number. Click "**OK**" to go to the next step after the configuration is completed.

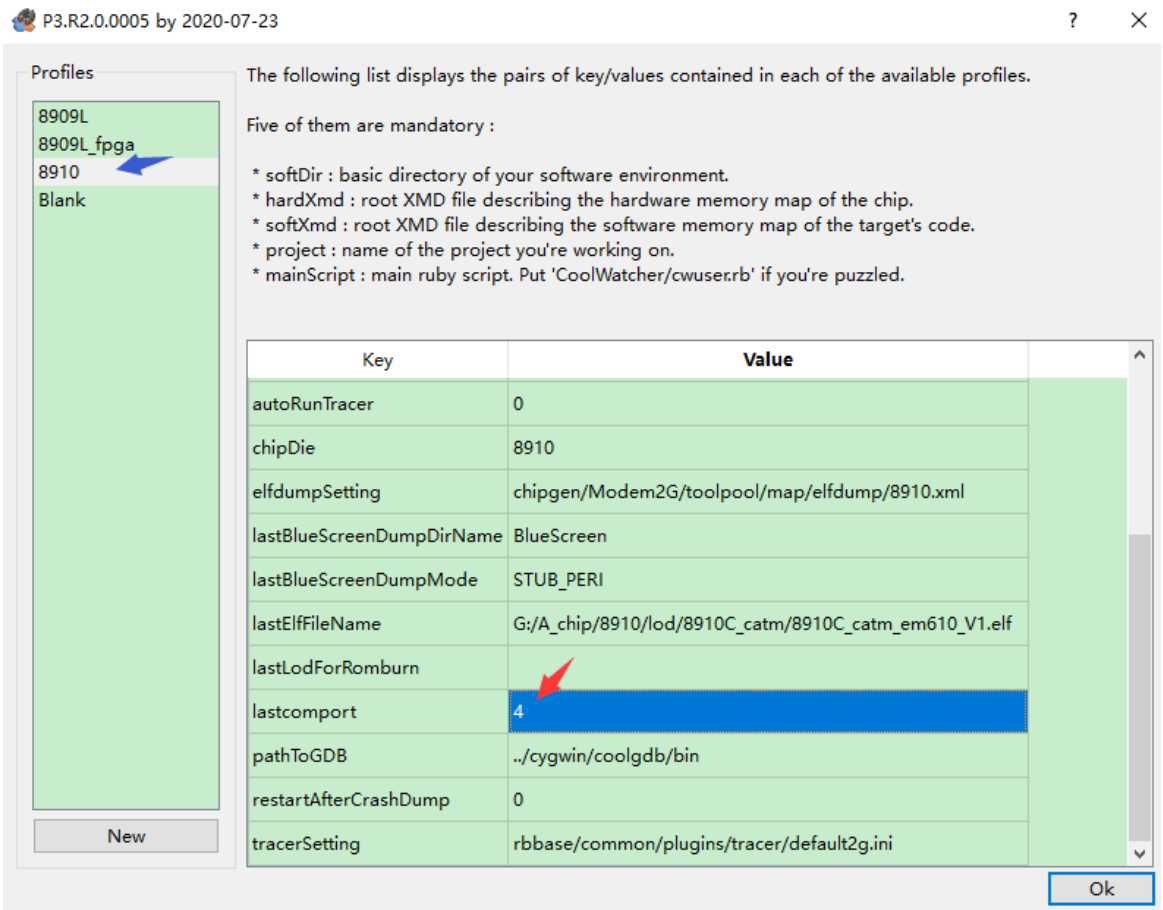

Figure 4: Module Type and Serial Port Configuration in cooltools

If the above configuration fails, the Coolhost window will appear, which may be caused by an invalid port number. You can check whether the port number is correct on Device Manager and modify it on Coolhost window. As shown in the following figure, enter the COM configuration page, select the corresponding port (configured as COM4 in this document), confirm and click the "**Reconnect**" to reconnect the port. Among the configurations presented in the following figure, Flow control cannot be modified and the flow control of Debug UART is fixed as XON/XOFF and that of USB AP Log port is fixed as None. For Debug UART, the baud rate needs to be set to 921600 bps and cannot be remodified. Note that the serial port chip also needs to support 921600 bps. See ***Chapter 2.2*** for details.

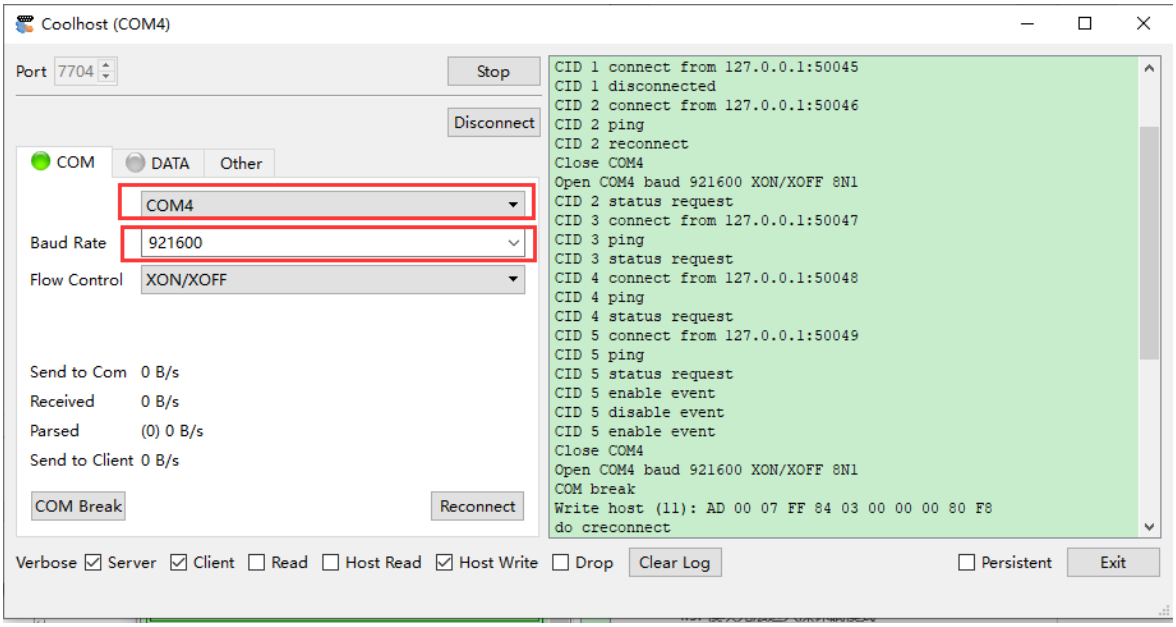

Figure 5: Coolhost Window

NOTE

See ***Chapter 4*** for details on the methods to configure AP log port.

3.1.2. AP Log Capture

Enter the cooltools home page after having opened the cooltools and finished the configuration, and select "**Activate Tracer**" in the "**Plugins**" menu drop-down box to start the Trace tool plug-in, as shown in the following figure:

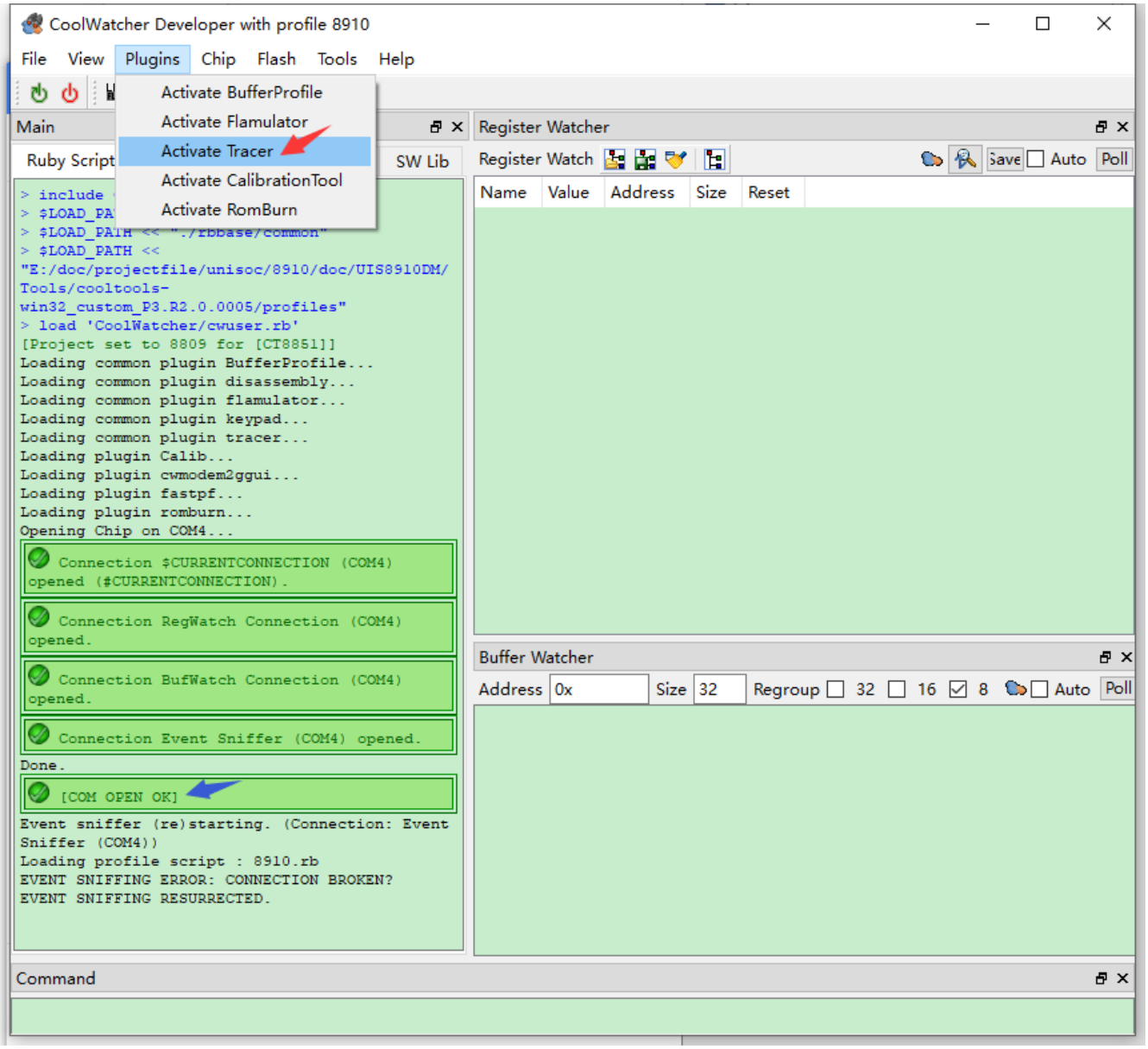

Figure 6: cooltools Home Page

Enter the Trace tool window after starting the Trace tool plug-in, as shows below:

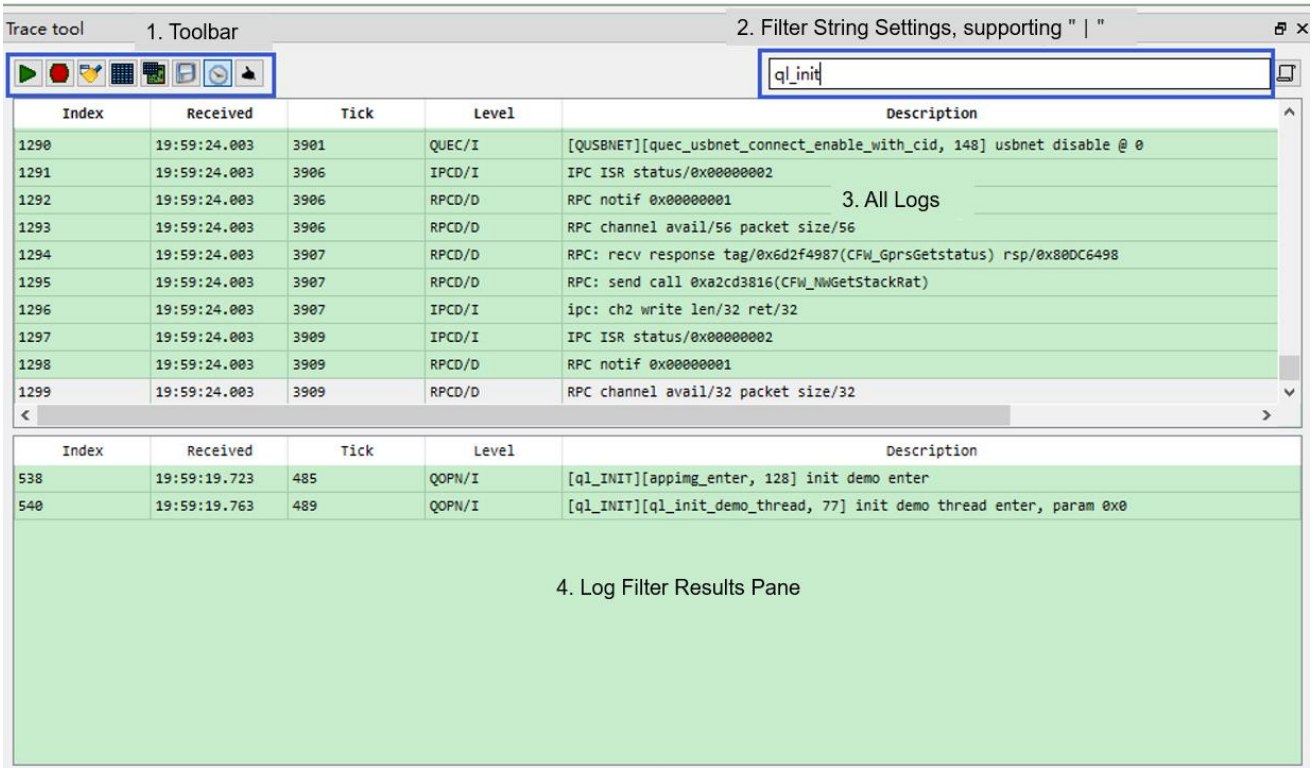

Figure 7: Trace tool Window

The functions of the toolbar icons in the upper left corner from left to right are respectively "Start", "Stop", "Clear", "Set Trace Levels", "Reapply Trace Levels", "Save", "Open/Close the Received column", and "Enable/Disable Comment". You can input keyword strings for log filtering in the bar in the upper right corner, which supports searching multiple keywords at the same time by adding "|".

Click "  " to open "**Set Trace Levels**" window. You can set automatic log saving, single log file size, the directory where the log is stored, row limit of log to be displayed, automatic capture of Wireshark log and so on, as shown below:

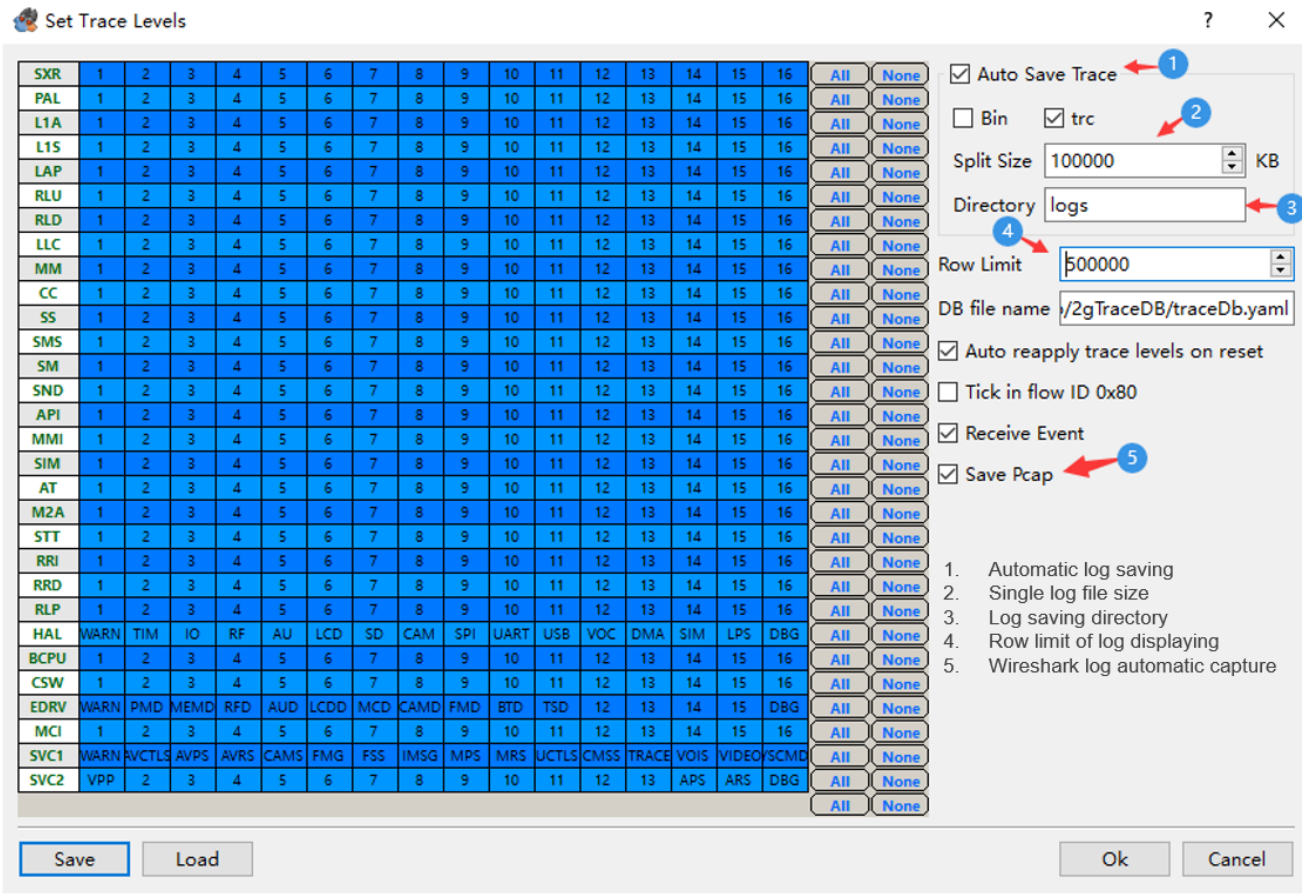

Figure 8: Set Trace Levels

If it will take a long time to capture the log, it is recommended to set a greater value for "**Split Size**" and "**Row Limit**". The default storage directory of log is the *logs* in cooltools directory. You can modify this directory name, but please pay attention to the size of the disk space where the directory is located. You can click "**Save**" to save the log to a customized directory or copy the log from the default directory to the target directory.

NOTE

The default location of Wireshark log is the same as that of the AP log, so the Wireshark log can be automatically captured when AP log is captured.

3.2. CP Log Capture with ArmTracer

CP log is protocol stack-related log outputted by Modem. Problems related to data transmission and network need to be analyzed and solved with the captured CP log. You can capture CP log via Quectel USB CP Log Port with ArmTracer. Please refer to *ArmTracer User Guide* in the *ArmTracer/doc* directory for details.

Run *ArmTracer.exe* to open the ArmTracer. You first need to configure and confirm the log port. Generally, only the port number of "**Device Port**" needs to be configured. If it takes a long time to capture the log, it is recommended to increase the single file size (for example, 100 MB), that is, modify the value in "**Trace File Size**". After configuring, click "**OK**" to go to the next step.

If there is no CP log output, check whether the module is in dump state; if not, check whether the log output port is consistent with the port opened by the ArmTracer.

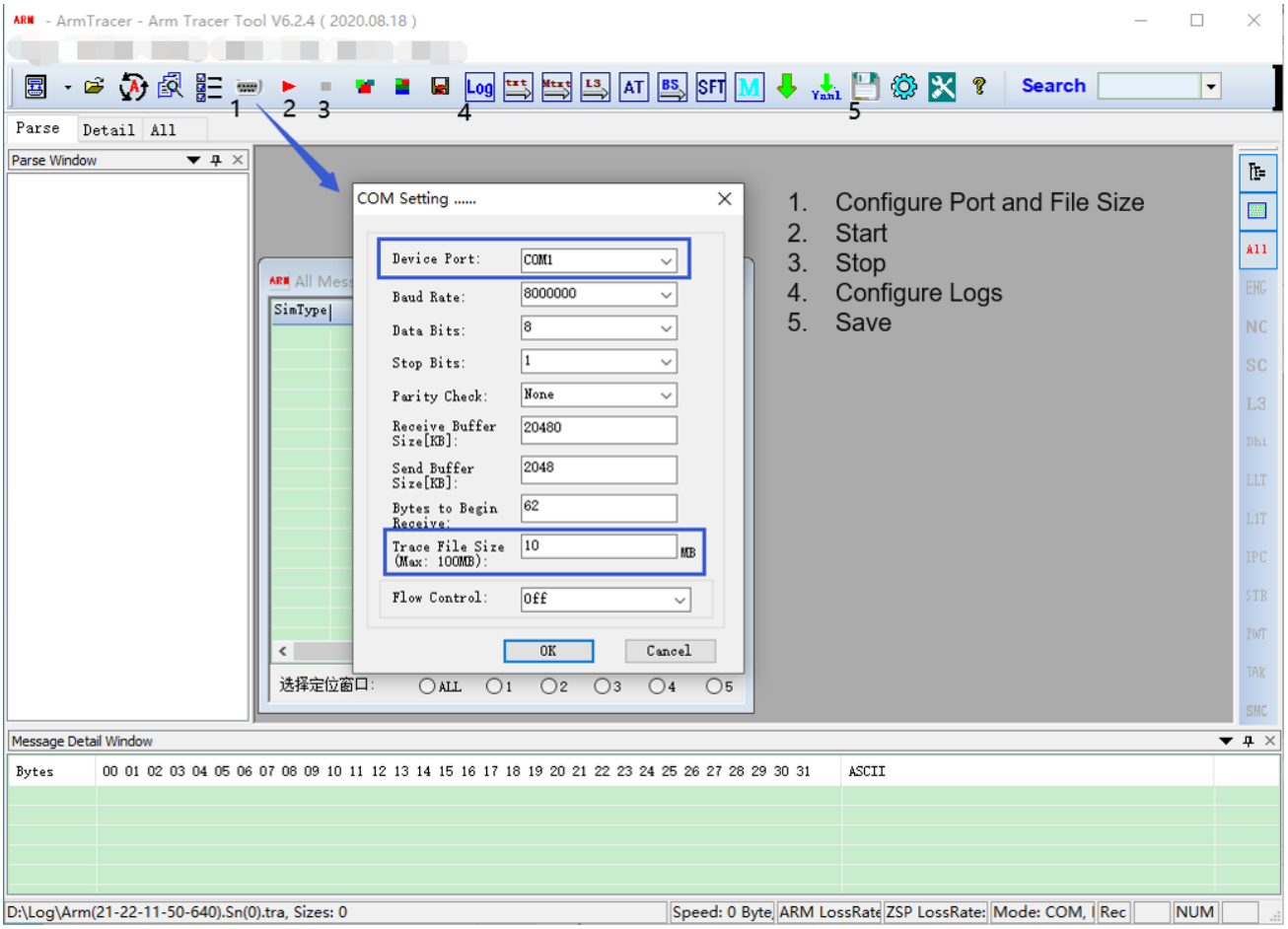

Figure 9: Open and Configure ArmTracer

Then click "" in the toolbar and the "**log setting……**" dialog box will pop up, as shown in the following figure; or directly click "Log" and the following dialog box will pop up, too. After the configuration is completed, ArmTracer starts capturing log.

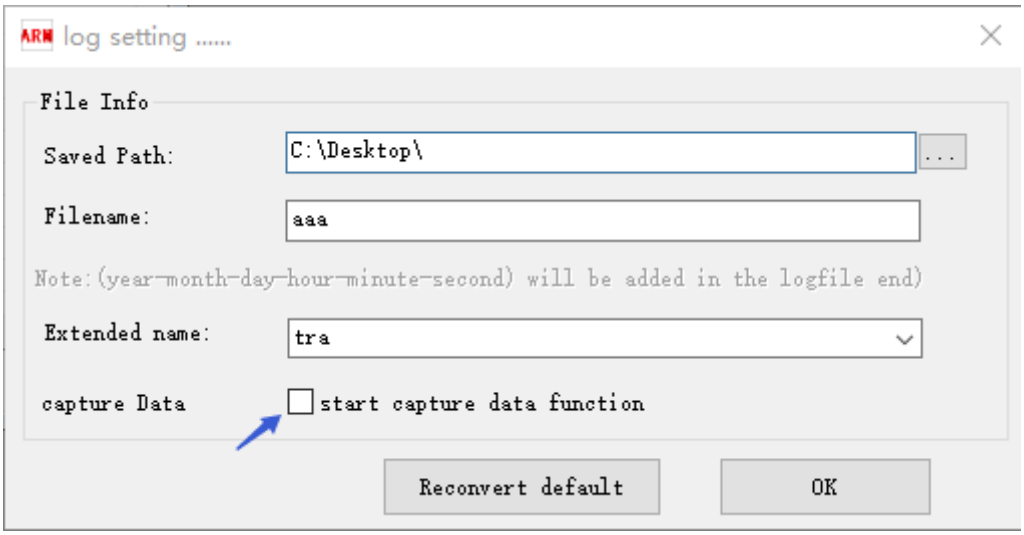

Figure 10: Log File Parameter Configuration

Once the option of "**start capture data function**" in the "**log setting……**" dialog box is enabled, log is only received and saved but it cannot be decoded in real time and displayed. When the amount of data is large or when the log is saved abnormally, you can tick "**start capture data function**".

ArmTracer automatically saves the log according to the configured "**Trace File Size**". When the log capture stops, some log information may not be saved successfully because it do not reach the configured size. At this time, click "" in the toolbar to save the log.

If you need ArmTracer to automatically detect the CP port and save the CP log after the module boots, open the *ArmTracer.ini* file in the directory after decompressing ArmTracer package, add "**Quectel USB CP Log Port**" to "**DeviceList**", and set "**DeviceSel**" to "**Quectel USB CP Log Port**", as shown below:

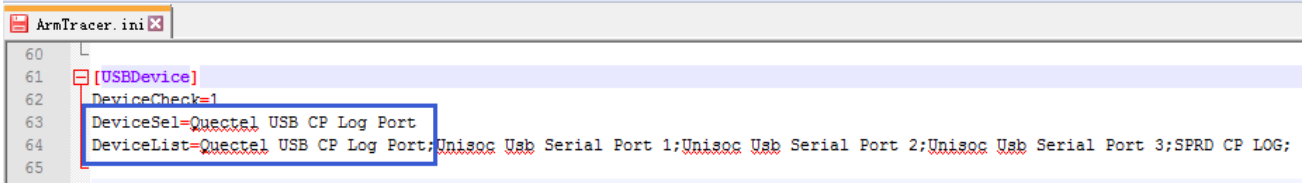

Figure 11: ArmTracer.ini File Configuration

Restart ArmTracer and click "" in the toolbar and "**Software Setting**" dialog box will pop up, as shown below. In the drop-down box of "**USB Device Description**", select "**Quectel USB CP Log Port**", tick "**Automatic Detect CP Port**" and click "**OK**".

Figure 12: Automatic Detect CP Port

Having modified ArmTracer software configuration, you can reset "**Device Port**" and "**Trace File Size**", as shown in ***Figure 9***. Click "" to start capturing CP log. In this setting, CP log is automatically saved when the module shuts down. When the module boots next time, ArmTracer will automatically detect the CP port and save the log.

3.3. AP Dump Analysis and Saving

This chapter introduces how to analyze and save the AP dump. To get the information about how to analyze CP dump, please contact Quectel Technical Support (support@quectel.com).

3.3.1. GDB Analysis of AP Dump

When there is a dump in AP, click "**Tools**" in navigation bar, select "**GDB Launcher**" in the drop-down box and perform real-time analysis with the software version ELF file. Please refer to *Coolwatcher User Guide* in the *cooltools/doc* directory for details.

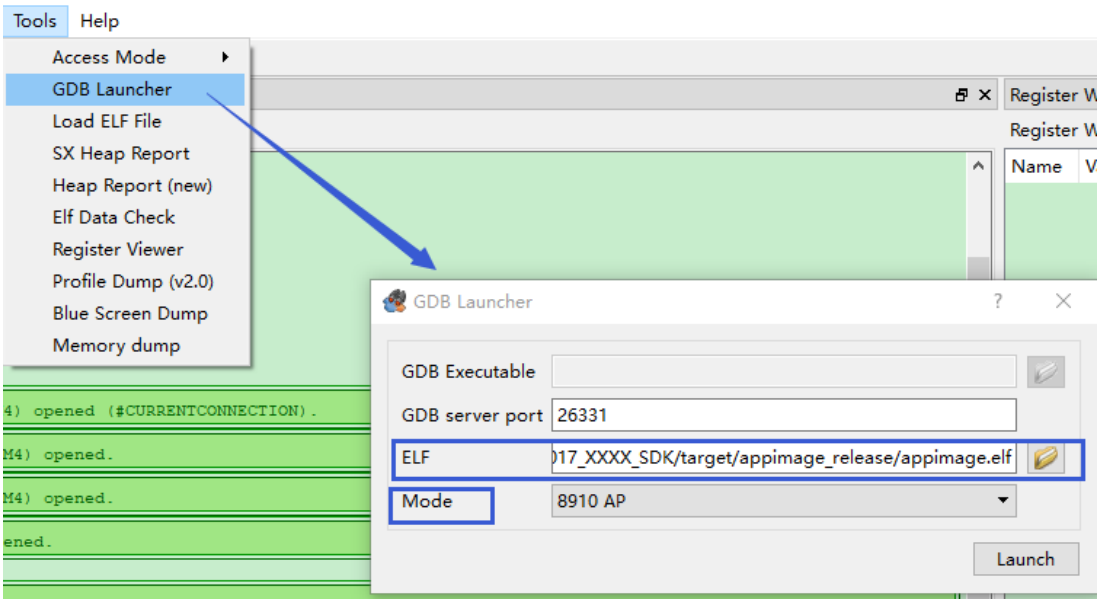

Figure 13: Launch GDB

In the "**GDB Launcher**" dialog box, select the "**ELF**" file corresponding to the software version package, select "**8910 AP**" for "**Mode**", and click "**Launch**" to start analyzing.

3.3.2. AP Dump Saving

Use cooltools to save dump file for offline analysis. Click "**Tools**" in the navigation bar, select "**Blue Screen Dump**" in the drop-down box, and configure the ELF file and output path in the pop-up dialog box. Please refer to *Coolwatcher User Guide* in the *cooltools/doc* directory for details. The Blue Screen Dump startup steps are shown in the following figure:

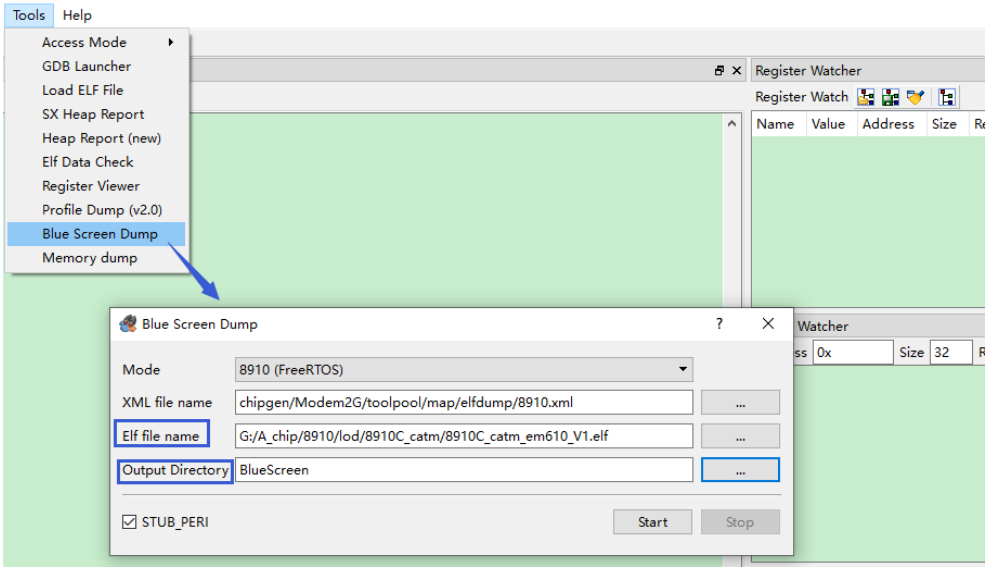

Figure 14: Start Blue Screen Dump

3.3.3. Offline Analysis of AP Dump

Please refer to ***Chapter 4.5*** and ***Chapter 4.7*** in *Coolwatcher User Guide* in the *cooltools/doc* directory for analysis.

4 AP Log Port Configuration

4.1. AP Log Port Configuration API

4.1.1. ql_log_set_port()

This function configures AP log port.

- **Prototype**

```
ql_errcode_log_e ql_log_set_port(ql_log_port_e dst_port)
```

- **Parameter**

dst_port:
[In] The AP log port to be set.

0 Disable AP log port
1 Debug Port
2 USB AP Log Port (default)

- **Return Value**

QL_LOG_SUCCESS	Successful execution
QL_LOG_PORT_SET_ERR	Failed execution
QL_LOG_INVALID_PARAM_ERR	Parameter error

4.2. AP Log Port Configuration AT Command

4.2.1. AT Command Introduction

4.2.1.1. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on the command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals to its previous value or the default settings, unless otherwise specified.
- **Underline** Default setting of a parameter.

4.2.1.2. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

Table 1: Types of AT Commands

Command Type	Syntax	Description
Test Command	**AT+<cmd>=?**	Test the existence of corresponding Write Command and return information about the type, value, or range of its parameter.
Read Command	**AT+<cmd>?**	Check the current parameter value of a corresponding Write Command.
Write Command	**AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]**	Set user-definable parameter value.
Execution Command	**AT+<cmd>**	Return a specific information parameter or perform a specific action.

4.2.2. AT Command Description

4.2.2.1. AT+QDBGCFG="tracecfg"

AT+QDBGCFG="tracecfg"	Configure AP Log Port
Write Command **AT+QDBGCFG="tracecfg",<type>,<port>**	Response **OK** Or **ERROR**
Maximum Response Time	300 ms
Characteristics	This command takes effect after the module is booted. The configuration will be saved automatically.

Parameter

<type>	Integer type. Log type.	
	0	AP log
	1	CP log
<port>	Integer type. Serial port number.	
	When **<type>** is 0:	
	0	No AP log is outputted.
	1	Debug UART
	2	USB AP log port
	When **<type>** is 1:	
	0	CP UART
	2	No CP log is outputted.
	5	USB CP log port

5 Appendix References

Table 2: Related Document

Document Name
[1] Quectel_EC200U_Series_QuecOpen_CSDK_Quick_Start_Guide

Table 3: Terms and Abbreviations

Abbreviation	Description
AP	Application Processor
API	Application Programming Interface
CP	Communication Processor
EVB	Evaluation Board
GDB	GNU Debugger
IoT	Internet of Things
RTOS	Real-Time Operating System
USB	Universal Serial Bus