

Bluetooth® Logger and Link Quality Monitor (LQM) Tools

This user's guide describes the TI *Bluetooth*[®] debug tools used to capture and analyze the Bluetooth (BT) firmware log messages and the protocol transactions from the CC256x dual-mode Bluetooth devices or the WL18xx WiLink[™]8 connectivity devices. The BT Logger and the Link Quality Monitor(LQM) tools provide visibility into the inner data and states of the BT controller as well as the information regarding the protocol transactions with the remote devices.

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Trademarks

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1 Requirements

1.1 Hardware Requirements

- Access to the BT_UART_DBG pin (for a WL18xx device) or the TX_DBG pin (for a CC256x device).
- A UART-to-USB converter to connect this pin to a PC.

The BT_UART_DBG/TX_DBG pin is a 1.8V UART TX pin that uses the baud rate of 921600. It must be connected to a 1.8V level RX pin of the UART-to-USB converter and the UART-to-USB converter should share the same ground as the BT controller.

NOTE: Multiple UART-to-USB adapters are available on the market, such as the FTDI Chip[™] TTL-232RG-VREG1V8-WE.

1.2 Software Requirements

- BT Logger and LQM applications. These applications are part of the WiLink Wireless Tools package (download link).
 - **NOTE:** Once the Wireless tools are installed, the installation files can be found at the following path:

C:\Program Files (x86)\Texas Instruments\Wireless Tools

This directory is referred to as the Installation directory throughout this document.

- ILI and XML configuration files. The latest files can be downloaded from the following links:
 - For WL18xx : WL18XX-BT-SP
 - For CC2564C : CC256XC-BT-SP
 - For CC256xB/CC2564MODN/CC2564MODA : CC256XB-BT-SP

2 Installation

The BT Logger and LQM are part of the TI wireless tools package release. When the wireless tools package is installed, the Logger and LQM icons are created in the Texas Instrument\Wireless Tools folder at Start→Programs and on the desktop (see Figure 1 and Figure 2).



Figure 1. Logger Icon



Figure 2. LQM Icon

Requirements



TI Logger

3 TI Logger

The TI BT Logger is used to capture the firmware log messages and protocol transactions from the BT controller. The Logger has the following ports.

- BT Logger 1: All the firmware traces are captured under this port.
- HCI/LMP viewer 1: All the protocol transaction messages are captured under this port.

NOTE: In order to capture the complete logs, information from both of these ports must be captured and saved.

3.1 Setting Up the TI BT Logger

Once the hardware is setup for the log capture and the required software is installed on the PC, the following steps must be used to properly configure the BT Logger:

1. Double-click the Logger icon to start the Logger application. The main working window of the logger should appear as shown in the below.

×.	🖞 Untitled - Logger 5.0 - Not Connected — 🗆 🛛 🕹															
	e <u>E</u> dit								1							_
) 🖻 🖬		8 X			Z 🖉	8	j 🗃	18 !×	1	 				1	
1	1	#	Level				Time		Port	 File Name	Line	Information		Local Clock	Network Clo	ck
2 3 4																
3																
4																
5																
5 6 7																
7																
8																
9																
10																
	<															>
Rea	dy											Auto Save	View: <none></none>	Logs: 0 / 0		11

Figure 3. Logger Main Working Window

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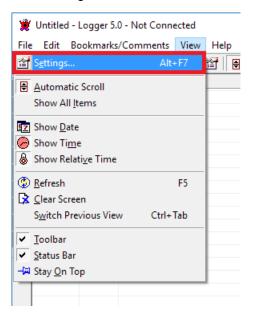


Figure 4. Opening Logger Settings

The Logger Settings dialog box should appear.

ogger Settings						Х
Synchronize with external editor:						
Installed Ports:						
BT Logger 1 - [2.0	-		Setup		OK	
HCI/LMP viewer 1	- [2.0.0.12]		Duplicate		Apply	,
					Cance	
			Delete			
Criteria:			Export	Import	Defau	ılt
Туре	Log #	Level	Text		Port	^
View Filter						
Filter New Logs						
Critical						
Tool 1 Tool 2						
Highlight Color 1						
Highlight Color 2						
Highlight Color 2						
Highlight Color 4						
Highlight Color 5						
Highlight Color 6						×
<					>	
Log #: Text: - View Schemes	Le	evel: Port:	Sep Sen Verl Prel Min	ria Rules: arate words with nicolon (;) means ical line (!) means ix ∼ indicates a 'r us (-) specifies a ces are as any o	And. Or. not' conditio range.	

Figure 5. Logger Settings

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TI Logger



TI Logger

www.ti.com

3. Select the **BT Logger 1** under the Installed Ports list and click on the **Setup...** button.

Logger Settings		×
Synchronize with external editor: Sunning on this computer C Running on a rem	note computer named:	
Installed Ports:		
BT Logger 1 - [2.0.0.8] HCI/LMP viewer 1 - [2.0.0.12]	Setup	OK
	Duplicate	Apply
	Delete	Cancel

Figure 6. Selecting BT Logger in Settings

 In the Setup dialog box, select the COM port that is connected to the BT_UART_DBG / TX_DBG pin of the TI BT controller.

Setup	\times
Connection Details Com Port: COM6 Setup	

Figure 7. Selecting COM Port

- **NOTE:** Please ensure that the COM port number is less than 50. If not, change the COM port number to a lower value from Control Panel on the PC.
- 5. Setup the COM port for the following settings and click OK.

Squirt - Serial Port Se	Squirt - Serial Port Settings X						
Select Port: 6	•	OK					
Baud Rate: 9216	00 💌 (Active)) Cancel					
Alt Baud Rate: 921600							
Baud Rate Control							
Flow Control	RTS/CTS	Control					
Parity	Data Bits	Stop Bit					
⊙ None C Odd C Even	C 7 © 8	© 1 O 1.5 O 2					

Figure 8. BT Logger Serial Port Settings

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6. Under the Mapping Files section of the Setup dialog box, click on **Add File...** button and select the appropriate *.ili file for the BT controller as listed in the Software Requirements section above.

Setup	×
Connection Details Com Port: CDM6 Setup	
Load From File	
Mapping Files Parse BT Logger protocol Parse Module protocol	Messages not found in source files
C:\wl18xx_bt_sp_v4.2\Tllnit_11.8.32.ii	Selected ILI file
Add File Remove Scan Folder	
	Cancel OK

Figure 9. Adding the ILI File

NOTE: Make sure that only one *.ili file is selected.

- 7. Click **OK** to apply the changes to the Setup dialog box for the BT Logger 1 port. Next, configure the HCI/LMP viewer port.
- 8. In the View->Settings... dialog box, select the HCI/LMP viewer 1 under the Installed Ports list and click on Setup....

Logger Settings		×				
Synchronize with external editor: Running on this computer Running on a re	mote computer named:					
Installed Ports:						
BT Logger 1 - [2.0.0.8] Setup						
□ HCI/LMP viewer 1 - [2.0.0.12]	Duplicate	Apply				
	Delete	Cancel				

Figure 10. Selecting HCI/LMP Viewer in Settings



TI Logger

9. Setup the Serial Port Settings.

Squirt - Serial Po	rt Settings	×
Select Port:	-	OK
Baud Rate: 🛛	321600 💌 (Active)	Cancel
Alt Baud Rate:	321600 💌	
Baud Rate Cor	ntrol omatic Baud Rate Switc	hing
Flow Control		Control
C Xon/Xoff	RTS/CTS	🗆 DTR
Parity • None	Data Bits	Stop Bit
C Odd	0.7	01
C Even	· 8	C 1.5 C 2

Figure 11. HCI/LMP Viewer Serial Port Settings

10. Select Add File... and select the appropriate *.xml file for the BT controller as listed in the Software Requirements section above.

Setup	×
Port: COM6 Setup Enable Topology Analyzer	
Mapping Files:	
C:\wl18xx_bt_sp_v4.2\TIInit_11.8.32.xml	_
Add File Remove Cancel OK	

Figure 12. Adding the XML File

NOTE: Make sure that only one *.xml file is selected.

- 11. Click OK to apply the changes to the Setup dialog box for the HCI/LMP viewer port.
- 12. Make sure that both the BT Logger 1 and the HCI/LMP viewer 1 ports are checked and the COM port is displayed next to both of them in the Logger Settings window.

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ogger Settings						>
- Synchronize with ex Running on this		Running on a	remote computer	named:		_
Installed Ports:						
🔽 BT Logger 1 (CON			Setup	1	OK	
HCI/LMP viewer 1	(COM6)		Duplicate	-	Apply	,
			Duplicate	1		
			Delete		Cance	9
Criteria:			Export	Import	Defau	ılt
Туре	Log #	Level	Text		Port	~
View Filter						
Filter New Logs						
Critical						
Tool 1						
Tool 2						
Highlight Color 1						
Highlight Color 2						
Highlight Color 3						
Highlight Color 4						
Highlight Color 5						
Highlight Color 6						
<					>	
Log #:	Le	vel:		eria Rules:		
Text: - View Schemes		Port:	Ve Ve Mir	parate words with , micolon (;) means / rtical line ()) means fix ~ indicates a 'n hus (-) ispecifies a i	And. Or. ot' conditio)n.
	•	Save As		aces are as any ot		ter.

Figure 13. Properly Configured Logger Settings

- **NOTE:** If the COM port nuber is not displayed next to either the BT Logger 1 port or the HCI/LMP viewer 1 port, uncheck and check each of the ports to load the COM port settings.
- 13. Click **OK** to apply changes and close the Logger settings.



TI Logger

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3.2 Capturing the Logs

1. After both the BT Logger 1 and the HCI/LMP viewer 1 ports have been setup with the correct configurations, click on the View->Show All Items option to disable any previously applied filters.

👻 Untitled - Logger 5.0 - Connected (COM6) — 🗆 X								
Automatic Scroll	Time	Po	ort	File Name	Line	Information		
Show All Items								
 Image: Show Date Show Time Show Relative Time 								
Befresh F5								
<u> </u>								
✓ Ioolbar ✓ Status Bar → Stay On Top								
	-							
<								>
		HCI/LMP viewer 1	(BT Logger 1 (CO	M6 Auto Save	View: <none></none>	Logs: 0 / 0		

Figure 14. Getting the Logger Ready to Capture the Logs

2. Power up the Bluetooth® device and enable the BT controller. An initialization sequence will be captured in the Logger windows as shown in Figure 15.



	ments View Help	10.0						
🐮 🗙 🐚 Time	🔽 🤪 🌡 🖆 🗄	Port File N	me Line Information	lead Ch. 1	Network Clock	14-14	Device	Remo
16:35:02.507		BT Logger 1	temperature sensing: temp 24, read 0x183	Local Clock	INSTWORK CIDER	Host	Device	Kemo
16:35:02.507		BT Logger 1 BT Logger 1	temperature sensing: temp 24, read 0x183 temperature sensing: temp 23, read 0x184					
16:35:02.523		BT Logger 1	Temperature val 24, region = 6					
16:35:02.523		BT Logger 1	starting INIT CALIBRATION		calibration (0)			
16:35:02.523		BT Logger 1	Calibration index = [0]		canoration (o)			
16:35:02.523		BT Logger 1	synch event REG received, module RF_CALIBRATION, msi 0					
16:35:02.523		BT Logger 1	synch cmd start instance, module RF_CALIBRATION, msi: 0					
16:35:02.523		BT Logger 1	synch cmd return event STARTED, module RF_CALIBRATION					
16:35:02.523		BT Logger 1	[0x0005] Platform					
16:35:02.523		BT Logger 1	Process type: Nominal					
16:35:02.523		BT Logger 1	PHY Process types: PD.ACW					
16:35:02.523		BT Logger 1	Chip revision: 32					
16:35:02.523		BT Logger 1	Detected Clock = 26000000 Hz					
16:35:02.523		BT Logger 1	Ref Clock = 26000000 Hz					
16:35:02.523		BT Logger 1	PLL mode disabled by pll_enable die_id bit		BT	Logger Traces		
16:35:02.523		BT Logger 1	Ref Clock is valid for PLL					
16:35:02.523		BT Logger 1	Clock Working mode: PRIMARY					
16:35:02.523		BT Logger 1	ARM Clock = 26000000 Hz, Slow Clock: External					
16:35:02.523		BT Logger 1	OCP Clock = 26000000 Hz					
16:35:02.523		BT Logger 1	Im_ic_get_local_features (5)					
16:35:02.523		BT Logger 1	Im_ic_set_brcst_retran (58)					
16:35:02.523		BT Logger 1	Im_lc_self_test_run_init_tests (95)					
16:35:02.523		BT Logger 1	Self Test passed					
16:35:02.523		BT Logger 1	I2C doesn't exist !					
16:35:02.523		BT Logger 1	Im_lc_get_local_bd_addr (23)					
16:35:02.523		BT Logger 1	Software version - 8.0.32					
16:35:02.523		BT Logger 1	UART HCI baudrate = 117000					
16:35:02.523		BT Logger 1	uart hci parameters: UartDIV=37, OS=6, SP=0, MoB=1					
16:35:02.523		BT Logger 1	TL - Detection init is over					
16:35:02.523		BT Logger 1	Deactivating time: init					
16:35:02.523		BT Logger 1	Calibration index = [32]					
16:35:02.523		BT Logger 1	synch event FINISH received, module RF_CALIBRATION, msi 0					
16:35:02.523		BT Logger 1	Calibration started. Vector=0x0, 0x1			HCI/LMP viewer 1	Traces	
16:35:02.523		BT Logger 1	PHY EW Version 1.76					
16:35:02.523		BT Logger 1	Calibration Finished, Vector=0x0, 0x1			П		
16:35:09.633		BT Logger 1	TL - transport_detection_interrupt_handler					
16:35:09.633		BT Logger 1	Transport detection: UART detected					
16:35:09.633		BT Logger 1	TL - uart_protocol_detection_interrupt_handler			45		
16:35:09.633		BT Logger 1	first byte received 1			V I		
16:35:09.633		BT Logger 1	Uart Active Protocol: H4 PROTOCOL			V		
16:35:09.633		BT Logger 1	TL - h4_init			¥		
16:35:09.695		HCI/LMP viewer 1	is organi	0x00001654	0x00001654	HCI_VS_Get_System_Status		
16:35:09.695		HCI/LMP viewer 1		0x00001654	0x00001654		HCI_Command_Complete_VS_Get_System_Status_Event	
16:35:09.695		BT Logger 1	TL - host_interface_perform_special_processing_after_first_rx_packet	0x00001034	0x00001034	-	 ric_command_complete_rs_det_system_status_event 	
16:35:09.695		BT Logger 1	UART HCI baudrate = 115200					
16:35:09.695		BT Logger 1	uart. hci parameters: UartDIV=9, OS=25, SP=0, MoB=11					
16:35:09.695		BT Logger 1	hcic_process_hci_commands: HCI_VS_Get_System_Status (Group 3f Opcode 0	(216)				
16:35:09.695		BT Logger 1	Software version - 8.0.32	se ny				
16:35:09.695		BT Logger 1	Package ID: P0.32					
16:35:09.695		BT Logger 1	hcic_get_num_of_host_commands. Total free = 3, Reported to host = 1					
16:35:09.695		BT Logger 1	HCI Send Event: HCI COMMAND COMPLETE EVT					
16:35:57.671		HCI/LMP viewer 1	HGI SERU EVERG HGI_COMMIAND_COMPLETE_EVT	0x0000AC73	0x0000AC73	HCI_VS_Update_Uart_HCI_Baudra		
16:35:57.671		HCI/LMP viewer 1 HCI/LMP viewer 1		0x0000AC73	0x0000AC73	rici_v3_opdate_oart_Hcl_Baudra	HCI_Command_Complete_VS_Update_Uart_HCI_Baudrate_Event	
16:35:57.686		BT Logger 1	hcic_process_hci_commands: HCI_VS_Update_Uart_HCI_Baudrate (Group 3f O		UXUUUUAC73	-	HCI_Command_Complete_vs_Update_Uart_HCI_Baudrate_Event	
				pcode (x550)				
16:35:57.686		BT Logger 1	hcic_get_num_of_host_commands. Total free = 3, Reported to host = 1					
16:35:57.686		BT Logger 1	HCI Send Event: HCI_COMMAND_COMPLETE_EVT					
16:35:57.686	+0:00:55.179	BT Logger 1	UART HCI baudrate = 3000000					

Figure 15. BT Controller Initialization Logs

3. When all the relevant traces (from both BT Logger 1 and HCI/LMP viewer 1 ports) are captured, use the **File->Save As...** option to save the logs as a *.lgr file.

👮 Untitled - Logger 5.0	- Connected	(COM6)	
File Edit Bookmarks/	/Comments	View Help	
🗋 <u>N</u> ew	Ctrl+N		8 !×
避 <u>O</u> pen	Ctrl+O		Port
Save	Ctrl+S	0	BT Logger 1
Save <u>A</u> s		6	BT Logger 1
		6	BT Logger 1
Load Workspace		6	BT Logger 1
Save Workspace		6	BT Logger 1
		<u> </u>	BT Logger 1
Export All (Ignore Filt	ters)	6	BT Logger 1
Export Selected	-	6	BT Logger 1
		6	BT Logger 1

Figure 16. Saving the Logs

When capturing the logs for a long period of time (i.e. for several hours), it is best practice to use the Auto Save and Clear feature of the Logger. Doing so prevents a single log file from getting too large and it helps keep the logs organized for analysis later.



TI Logger

To Setup the Audo Save and Clear, click **Edit->Auto Save and Clear...** option to open the Save and Clear window.

黉 Untitled - Logger 5.0 - Connected (COM6)						
File Edit Bookmarks/Comments View Help						
🖹 <u>С</u> ору	🖬 🧶 💩 🗃 🗄 🔢 💌					
X Delete	Time	F				
Invert Selection	16:35:02.507 +0:00:00.000	E				
	16:35:02.523 +0:00:00.016	E				
<u>F</u> ind	16:35:02.523 +0:00:00.016	E				
Find <u>N</u> ext	16:35:02.523 +0:00:00.016	E				
Find Previous	16:35:02.523 +0:00:00.016	E				
	16:35:02.523 +0:00:00.016	E				
Set Time <u>A</u> nchor	16:35:02.523 +0:00:00.016	E				
	16:35:02.523 +0:00:00.016	E				
避 Auto Save and Clear	16:35:02.523 +0:00:00.016	E				
	16:35:02.523 +0:00:00.016	E				
Open In Editor	16:35:02.523 +0:00:00.016	E				
10 12 2	16:35:02.523 +0:00:00.016	E				
		-				

Figure 17. Selecting Auto Save and Clear

Click **OK** after setting up the parameters for Auto Save.

Save And Clear		×
Activate Save And Clea	r	
When logs count reaches	100000	
Save the logs in the folder:	C:\Debug_logs\	
Filename Prefix:	DBGLogs1_	
	ОК	Cancel

Figure 18. Configuring Auto Save and Clear

NOTE: When the log capture is complete, save the last instance by clicking File->Save As... option.



3.3 Analyzing the TI Logger Capture

The saved logger traces can be opened in a new window of the TI Logger by selecting **File->Open**. There are several features in the TI Logger to help with analysis of the saved logs.

3.3.1 View Filter

The View Filter is used to see only the specified traces on the working window. This feature is useful when limiting the log analysis to only certain type of traces and/or traces with a specific keywords.

To apply the View Filter, open the **View->Settings** window and click on the **View Filter** row of the "Criteria" section.

Once the View Filter criteria is selected, enter the filter criteria in the **Text** box. For example, the macro "--" can be used to only view all the HCI/LMP viewer traces.

Logger Settings X					
Synchronize with external editor: Running on this computer C Running on a remote computer named:					
Installed Ports:					
BT Logger 1 - [2.0.0).8]		Setup	.	OK
HCI/LMP viewer 1	- [2.0.0.12]				Applu
			Duplica	ie	Apply
			Delete		Cancel
Criteria:			Export.	. Import	Default
Туре	Log #	Level	Text		Port 🔨
View Filter					
Filter New Logs	-				
Critical					
Tool 1 Tool 2					
Highlight Color 1					
Highlight Color 2					
Highlight Color 3					
Highlight Color 4					
Highlight Color 5					
Highlight Color 6					¥
<					>
Log #:	Leve	:		Criteria Rules:	
Text:	Р	ort:		Separate words with ; Semicolon (;) means / Vertical line (I) means Prefix ~ indicates a 'n	And. Or.
View Schemes	•	Save As D		Minus (-) specifies a i Spaces are as any ot	ange.

Figure 19. View Filters

Click **Apply** to apply the View Filter.



3.3.2 Highlight

The Highlight feature is used to highlight traces by color coding the traces that match the defined criteria. To add a highlight filter, click on one of the **Highlight Color** criteria in the Logger Settings dialog box.

Once the Highlight Color row is selected, enter the criteria in the Text box and click **Apply** to highlight the specified traces.

Logger Settings X							
Synchronize with external editor:							
Running on this computer							
Installed Ports:	Installed Ports:						
BT Logger 1 - [2.0.0			Setup		OK		
HCI/LMP viewer 1	- [2.0.0.12]		Duraficata		Apply		
			Duplicate				
			Delete		Cancel		
Criteria:			Export	Import	Default		
Туре	Log #	Level	Text		Port 🔨		
View Filter							
Filter New Logs							
Critical							
Tool 1 Tool 2							
Highlight Color 1							
Highlight Color 2							
Highlight Color 3							
Highlight Color 4							
Highlight Color 5							
Highlight Color 6					× 1		
<					>		
Log #: Color: Color: Color 1							
Text: Port: VS_Update_Uart_HCI_Baudrate Bg View Schemes							
	•	Save As	Delete				

Figure 20. Logger Highlight Feature



3.3.3 Toggling Log Levels

Each log trace has a specific log level. Toggling the log levels can be used to quickly apply view filters to the traces with the selected log levels.

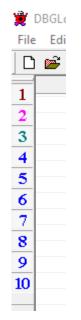


Figure 21. Log Levels

3.3.4 Bookmarks and Comments

This feature is used to add Bookmark to a trace. It can also be used to (optionally) add a comment to the bookmark.

To toggle bookmark on and off on a trace, select the trace and use **Bookmarks/Comments->Toggle Bookmark (Ctrl+F2)**. To add/edit comment on the bookmark, use the **Bookmarks/Comments->Edit Comment...(Enter)**.

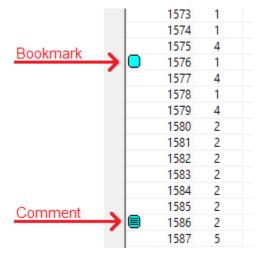


Figure 22. Bookmarks and Comments

NOTE: The **F2** or **Shift+F2** shortcuts can be used to quickly jump to next or previous bookmark respectively.

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TI Logger

3.3.5 Find Function

The Edit->Find(Ctrl+F) option can be used to find a trace in the log file.

_com Find			×
tor= Log	#:	Level:	<u>F</u> ind Next
ector <u>T</u> ext:	scan		<u>M</u> ark All
Port:		Direction	Select All
		⊂ <u>U</u> p	Cancel



3.3.6 Time Anchor

The Time Anchor is used to display the relative time of each of the traces in the log file with respect to the anchored trace.

NOTE: Make sure that the **View->Show Relative Time** option is enabled before applying the time anchor.

To anchor a trace, right click on the trace row and select Edit->Set Time Anchor.

	51	4	16:35:09.695 -0:00:48.085 BT Logger 1
	52	1	16:35:57.671 -0:00:00.109 HCI/LMP viewer 1
	53	4	16:35:57.671 -0:00:00.109 HCI/LMP viewer 1
	54	4	16:35:57.686 -0:00:00.094 BT Logger 1
	55	4	16:35:57.686 -0:00:00.094 BT Logger 1
	56	4	16:35:57.686 -0:00:00.094 BT Logger 1
	57	4	16:35:57.686 -0:00:00.094 BT Logger 1
Time Anchor Symbol	58	2	16:35:57.686 -0:00:00.094 BT Logger 1
TIME ANCHOL SYMBOL	59	1 1	16:35:57.780 +0:00:00.000 HCI/LMP viewer 1
	60	4	16:35:57.780 +0:00:00.000 HCI/LMP viewer 1
	61	4	16:35:57.780 +0:00:00.000 BT Logger 1
	62	4	16:35:57.780 +0:00:00.000 BT Logger 1
	63	4	16:35:57.780 +0:00:00.000 BT Logger 1
		1.1	

Figure 24. Time Anchor



4 Link Quality Monitor

The BT Link Quality Monitor (LQM) application monitors the Received Signal Strength Indication (RSSI) and the Link Quality (averaged throughput) information during a connection in runtime.

4.1 Running the LQM

1. To start the LQM, click the Link Quality Monitor program icon (see Figure 25).

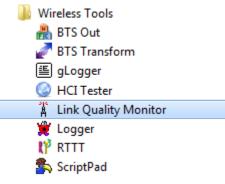


Figure 25. Starting the LQM

- 2. The LQM main window displays with the following panes (see Figure 26):
 - RSSI pane
 - Throughput pane
 - Used-channel pane (BT and BLE)

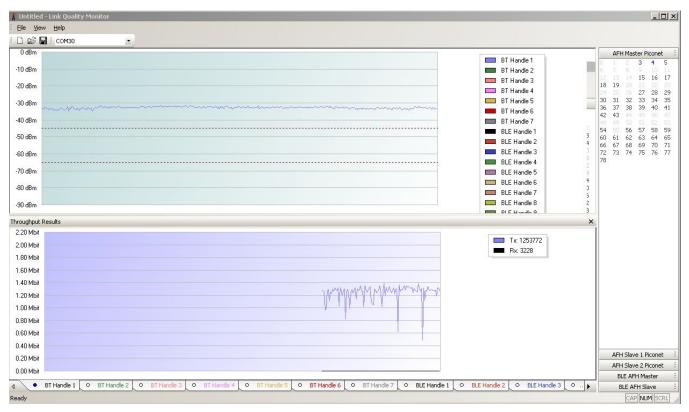


Figure 26. LQM Main Window



Link Quality Monitor

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- 3. To select the port:
- a. From the toolbar, click the **Port Connection** box. A drop-down menu displays the available ports (see Figure 27).
- b. Select the desired port.

T Untitled - Li	ink Quality Monitor	
Eile View	<u>H</u> elp	
:0 📽 🖬	COM26 •	
0 dBm	<port connected="" not=""> COM25</port>	
-10 dBm	COM26 COM27	
-20 dBm	COM28	
-30 dBm		
-40 dBm		
-50 dBm		
-60 dBm		
-70 dBm		
-80 dBm		
-90 dBm		

Figure 27. COM Port Selection

4.2 Using the LQM

4.2.1 Menu Bar

Table 1 describes the menu bar menus and submenus.

Table 1. Menu Bar

Menu	Submenu	Function
	New	Create a new LQM file
	Open	Open an existing LQM file
File	Save	Save the active LQM file
	Save as	Save the active LQM file with a new name
	Exit	Exit the LQM application
	Chart throughput results	Display or hide chart throughput results
	AFH Master	Display or hide the AFH Master Piconet pane
	BLE AFH master	Display or hide the BLE AFH Master Piconet pane
	BLE AFH Slave	Display or hide the BLE AFH Slave Piconet pane
View	AFH Slave 1 Piconet	Display or hide the AFH Slave 1 Piconet pane
	AFH Slave 2 Piconet	Display or hide the AFH Slave 2 Piconet pane
	Standard toolbar	Display or hide the standard toolbar
	Status bar	Display or hide the status bar
	Customize	Customize the keyboard and toolbar
Help		LQM information and version number



4.2.2 Toolbar

Table 2 describes the toolbar options.

Table	2.	Toolbar

Item	Function
D	Create a new LQM file
	Open an existing LQM file
	Save the active LQM file with a new name
COM1 Port connection box	Select the port to configure the connection between the application and the device

4.2.3 Customize Dialog Box

To open the customize dialog box, click the View menu and select Customize. The Customize dialog box with the following tabs (see Figure 28):

- Commands
- Toolbars
- Keyboard
- Menu
- Options

Use the Commands tab to drag and drop commands from the Customize dialog box to the menu or toolbars (see Figure 28).

Customize		×
Commands Toolbars Keyboard		1
Categories: File Help New Menu All Commands	Commands:	
Description:		
	Close	

Figure 28. Customize Dialog Box With Commands Tab Selected



Link Quality Monitor

Use the Toolbars tab to enable and disable toolbars (see Figure 29).

Cu	ustomize	×
	Commands Toolbars Keyboard Menu Options	
	Toolbars:	
	Menu Bar	Reset
	✓ Standard	Reset All
	Г	Show text labels
		Close

Figure 29. Customize Dialog Box With Toolbars Tab Selected

Use the Keyboard tab to create a keyboard shortcut for each menu item (see Figure 30).

Customize		X
Commands Toolbars Keyboa	ard Menu Options	
Category:	Set Accelerator for:	*
Commands:	Current Keys:	~
Exit New Open Save Save As	Press New Shortcut Key:	Assign Remove Reset All
Description: Quit the application; prompts to save documents		
		Close





Use the Menu tab to customize menus, which includes animations and shadows (see Figure 31).

Customize	×
Commands Toolbars Keyboard Menu	Options
Application Frame Menus:	Context Menus:
Show Menus for:	Select context menu:
Default Menu 🔽	
Reset	Reset
Default application menu. Appears when no documents Jare open.	Hint: select the context menu, change the page to "Commands" and drag the
Menu animations: None	toolbar buttons into the menu window.
Menu shadows	,
	Close

Figure 31. Customize Dialog Box With Menu Tab Selected

Use the Options tab to customize how menus are viewed (see Figure 32).

Customize	×
Commands Toolbars Keyboard Menu Options	
Toolbar	
Close	

Figure 32. Customize Dialog Box With Options Tab Selected



Link Quality Monitor

4.2.4 LQM Active Window

The LQM active window displays the following kinds of data regarding the quality of the link (also Figure 33):

- RSSI
- Used channels map

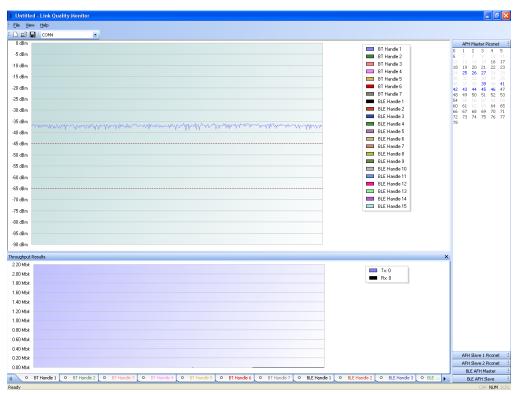


Figure 33. LQM Active Window

The LQM application supports up to seven BT handles and up to three piconets (one master and two slaves).

4.2.4.1 RSSI Window

The RSSI window displays the RSSI measurements of up to seven handles. Each handle is represented by a color. The scale of the window varies from 0[dbm] to -90[dbm]. The increase threshold is -65[dbm], and the decrease threshold is -45[dbm].

Link Quality Monitor

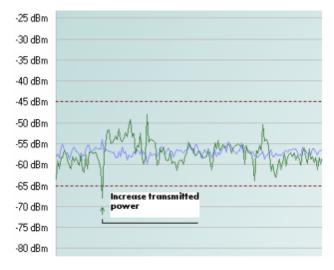


Figure 34. Increase Transmitted Power

Each time the measured RSSI falls below the lower threshold, the device sends a request to the transmitting device to increase the transmitted power to within the desired range (see Figure 34). In this case, \uparrow (up arrow symbol) indicates (in the same color of the specific handle) that transmitted power must increase. When the transmitted power rises above the upper threshold, \downarrow (down arrow symbol) indicates that transmitted power must decrease.

The last throughput results sample is displayed near the related graph. Green text indicates enough samples are present for statistics; red text indicates not enough samples are present for statistics.

4.2.4.2 Used-Channels Window

The Used-Channels window includes up to three channel maps and up to two piconets (a device can be a master in one piconet and a slave in two other piconets).

Channels appear as decimal values from 0 to 78 (for example, channel 0 = 2402 MHz; channel 1 = 2403 MHz).

The following colors can represent each channel:

- Light gray: the specific channel is not in use.
- Dark gray: the specific channel is recently removed.
- Blue: the specific channel is recently added.
- Black: the specific channel is in use.



Link Quality Monitor

Figure 35 shows the used-channels window.

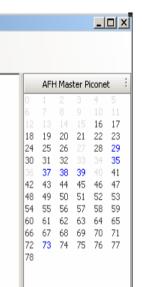


Figure 35. Used-Channels Window



Appendix A SWAU058D–December 2008–Revised May 2018

Terms and Abbreviations

Table 3 lists terms and abbreviations.

Table 3. Terms and Abbreviations

Term	Description
BD_ADDR	Bluetooth® device address
BER	Bit error rate
BT	Bluetooth®
HCI	Host controller interface
Host/host PC	A PC connected to the device through the serial port
LMP	Link manager protocol
LQM	Link quality monitor
PER	Packet error rate
RF	Radio frequency
RSSI	Received signal strength indication
SW	Software
VS	Vendor-specific



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Revision History

•	Updated Requirements section	3
•	Updated Setting Up the TI BT Logger section.	. 4
•	Updated Capturing the Logs section.	10
	Added View Filter section.	
•	Added Highlight section.	14
	Updated Log Levels image.	
	Updated Bookmarks and Comments image	
	Updated Find Dialog Box image.	
	Added Time Anchor section.	
	Removed Using the TI Logger Main Working Window section.	
	Tomorod Comy and The Edgger Main Working Window Coolern	

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