

# LC76F EVB User Guide

**GNSS Module Series**

Version: 1.0

Date: 2022-06-23

Status: Released



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**Quectel Wireless Solutions Co., Ltd.**

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: [info@quectel.com](mailto:info@quectel.com)

**Or our local offices. For more information, please visit:**

<http://www.quectel.com/support/sales.htm>.

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## Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any terminal incorporating Quectel LC76F module. Manufacturers of the terminal should send the following safety information to users and operating personnel, and incorporate these guidelines into all manuals supplied with the product. Otherwise, Quectel assumes no liability for customers' failure to comply with these precautions.



Ensure that the product may be used in the country and the required environment, as well as that it conforms to the local safety and environmental regulations.



Keep away from explosive and flammable materials. The use of electronic products in extreme power supply conditions and locations with potentially explosive atmospheres may cause fire and explosion accidents.



The product must be powered by a stable voltage source, while the wiring must conform to security precautions and fire prevention regulations.



Proper ESD handling procedures must be followed throughout the mounting, handling and operation of any devices and equipment that incorporate the module to avoid ESD damages.

# About the Document

## Document Information

<b>Title</b>	<b>LC76F EVB User Guide</b>
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<b>Subtitle</b>	GNSS Module Series
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<b>Document Type</b>	EVB User Guide
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<b>Document Status</b>	Released
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## Revision History

<b>Version</b>	<b>Date</b>	<b>Description</b>
-	2021-07-21	Creation of the document
1.0	2022-06-23	First official release

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# 1 Introduction

This document provides information on the steps needed to evaluate the Quectel LC76F module using the Evaluation Board (EVB). The EVB is a convenient tool that allows you to become familiar with the LC76F module.

Specifically, the document is divided into several sections:

- Chapter 2 provides the general overview of EVB Kit.
- Chapter 3 describes the EVB user interfaces.
- Chapter 4 describes how to communicate with a module via QCOM tool.
- Chapter 5 describes how to test the module via QGNSS tool.
- Chapter 6 describes how to upgrade the module firmware via QGPSFlashTool.
- Chapter 7 is an appendix, which summarizes the relevant documents, terms and abbreviations appearing herein.

## 1.1. Special Marks

**Table 1: Special Marks**

Mark	Definition
*	Unless otherwise specified, when an asterisk (*) is used after a function, feature, interface, pin name, or argument, it indicates that the function, feature, interface, pin, or argument is under development and currently not supported; and the asterisk (*) after a model indicates that the sample of the model is currently unavailable.

**NOTE**

For EVB schematic and PCB layout design files, contact Quectel Technical Support ([support@quectel.com](mailto:support@quectel.com)).

# 2 General Overview

## 2.1. EVB Kit

The EVB Kit includes: Evaluation Board (EVB), Active GNSS Antenna, Micro-USB Cable, USB flash drive, Bolts and Coupling Nuts. Download the software tools (QCOM, QGNSS, QGPSFlashTool) from our website [Download Zone](#) or request them from Quectel Technical Support.

The EVB Kit components are shown in the figure below, and check **Table 1** for details.

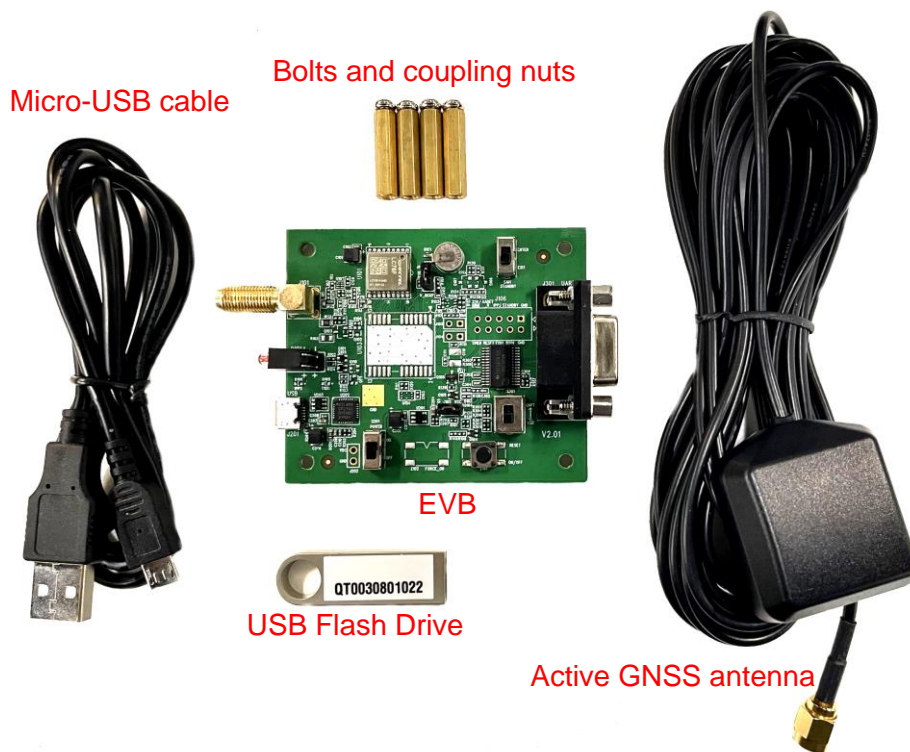


Figure 1: EVB and Components

**Table 2: List of Kit Components**

Items	Description	Quantity
EVB	Evaluation Board Size: 60 mm x 70 mm	1
USB Cable	Micro-USB Cable	1
USB Flash Drive	8 GB USB Flash Drive (including the module-related documents, tools and drivers)	1
GNSS Antenna	Active GNSS Antenna Request the Antenna Datasheet from Quectel Technical Support.	1
Instruction Sheet	Sheet providing instructions on how to connect the EVB and its components, detailed information on EVB contents, etc.	1
Other	Bolts and Coupling Nuts	4 pairs

## 2.2. Connecting Cables and Antenna to EVB

The connection between the EVB and its accessories is shown in the figure below. For detailed information on how to connect the EVB and its accessories, refer to the instruction sheet inside the EVB Kit.



**Figure 2: EVB and Components Assembly**

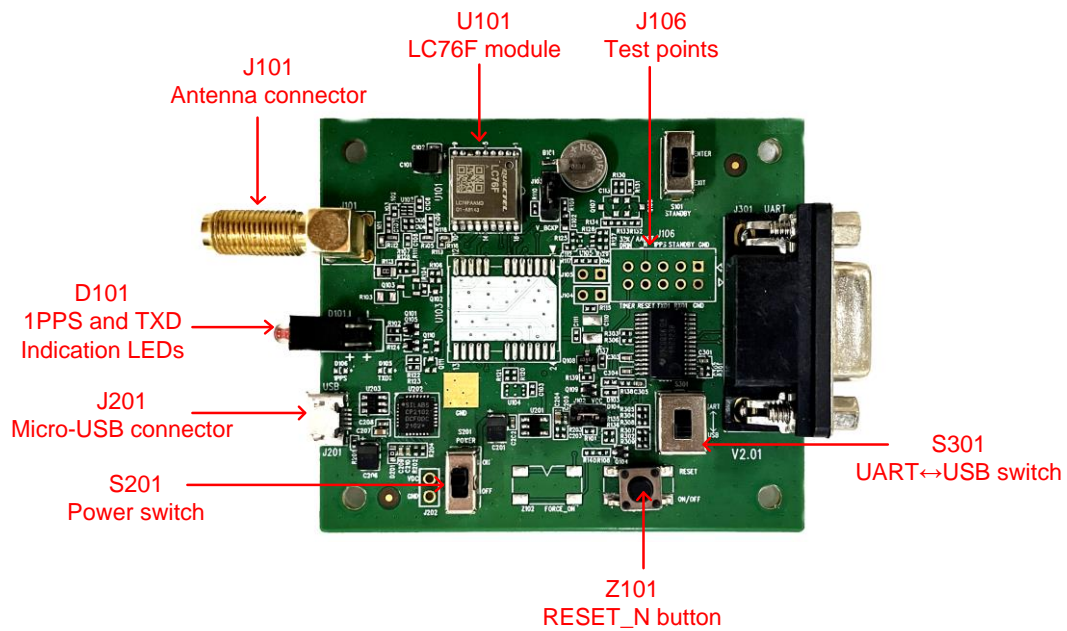
**NOTE**

Make sure that the Active GNSS Antenna is placed with a clear line of sight to the sky.

# 3 EVB Interfaces

## 3.1. EVB Top View

EVB top view is shown in the figure below.



**Figure 3: EVB Top View**

### 3.2. EVB Interfaces

The EVB interfaces are detailed in the table below.

**Table 3: Detailed EVB Interfaces**

Function	Interfaces	Description	
Power Supply	J201 Micro-USB	Power supply input: <ul style="list-style-type: none"> <li>● DC power supply: 4.5–5.5 V, typ. 5.0 V</li> <li>● Current capability should be &gt; 100 mA</li> </ul>	
Communication Interface	J201 Micro-USB	Standard NMEA messages output, PGKC commands input/output, and firmware upgrade.	
RF Input	J101 Antenna Connector	The antenna in the Kit supports: <ul style="list-style-type: none"> <li>● GPS L1 C/A</li> <li>● GLONASS L1</li> <li>● Galileo* E1</li> <li>● QZSS L1 C/A</li> <li>● SBAS L1</li> </ul>	
Signal Indication	D101 Indication LEDs	TXD (Blue LED)	Flashing: Data output from UART TXD pin. Extinct or Bright: No data output from UART TXD.
		1PPS (Red LED)	Flashing: Successful position fix. The frequency is 1 Hz. Extinct: No position fix.
Switches and Buttons	S201 Power Switch	Power the EVB on/off.	
	S301 UART↔USB Switch	Switch between USB data transfer and UART data transfer features.	
	Z101 RESET_N Button	Short press on the button to reset the module.	
Test Points	J106 Test Points	Pins are detailed in <b>Table 4</b> and <b>Table 5</b> below.	

Test point distribution is shown below:

**Table 4: J106 Pin Assignment**

32K/DRIN	AADET_N	1PPS	STANDBY	GND
TIMER	RESET_N	TXD1	RXD1	GND

**Table 5: J106 Pin Detailed Description**

<b>Pin Name</b>	<b>I/O</b>	<b>Description</b>
32K/DRIN	-	NC
AADET_N	-	NC
1PPS	DO	1 pulse per second
STANDBY	-	NC
GND	-	Ground
TIMER	-	NC
RESET_N	DI	Resets the module
TXD	DO	Transmits data
RXD	DI	Receives the data
GND	-	Ground

# 4 Communication via QCOM Tool

This chapter explains how to use the QCOM tool to communicate with the module via the Micro-USB interface. For more information, see *document [1]*.

Download the QCOM tool from our website [Download Zone](#) or request it from Quectel Technical Support.

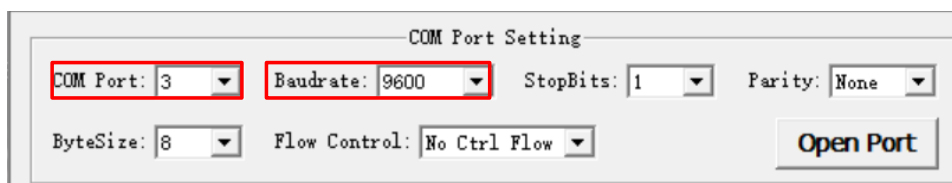
## 4.1. Communication via the Micro-USB Interface

- Step 1:** Connect the EVB and the PC with a Micro-USB cable via the Micro-USB interface.
- Step 2:** Flip the power switch (S201) to **ON** position to power on the EVB and flip the UART↔USB switch (S301) to **USB** position.
- Step 3:** Run the provided driver installer to install the USB driver.
- Step 4:** View the USB port numbers in the Device Manager, as shown in *Figure 4* below.



**Figure 4: USB Port**

- Step 5:** Install the QCOM tool provided by Quectel. The COM Port Setting interface of QCOM is shown in *Figure 5* below. (Default baud rate: 9600 bps <sup>1</sup>).



**Figure 5: COM Port Setting Interface of QCOM**

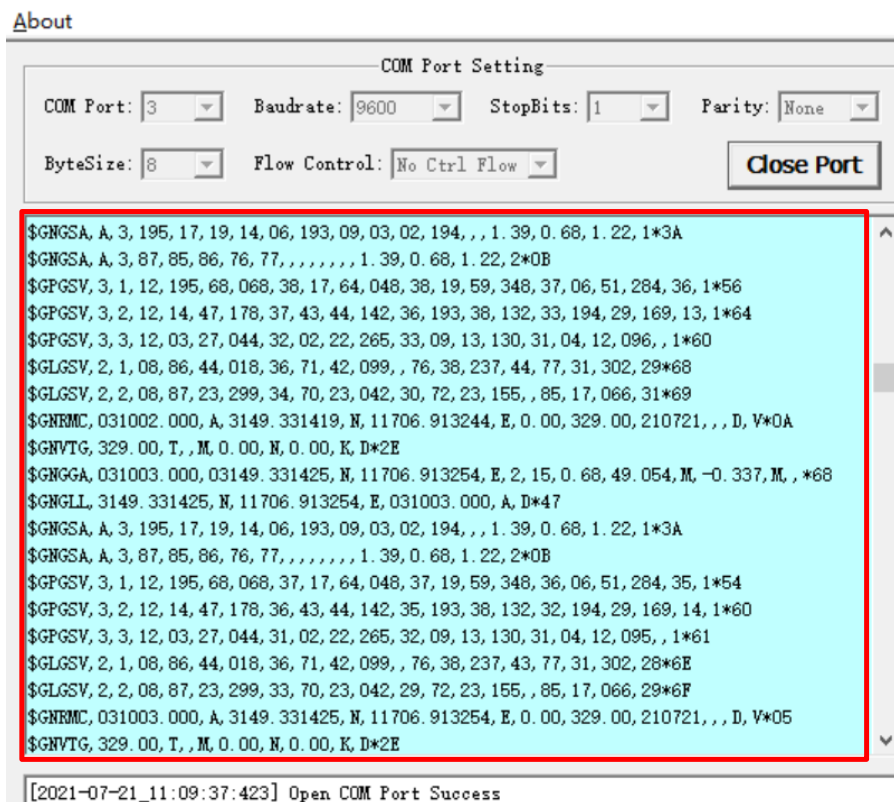
<sup>1</sup> UART interface default settings may vary depending on software versions.



**Step 6:** Select the correct “COM Port” (USB Port shown in *Figure 4* above).

**Step 7:** Set the correct “Baudrate”.

**Step 8:** Click “Open Port” to establish communication with the EVB. The NMEA messages output by the module will be displayed in the receiving bar of the QCOM tool, as shown in the figure below.



**Figure 6: NMEA Messages Output – Displayed on QCOM Tool Interface**

# 5 Test via QGNSS Tool

This chapter explains how to use the QGNSS tool for verifying the status of GNSS module. For more information about QGNSS usage, see **document [2]**.

Download the QGNSS tool from our website [Download Zone](#) or request it from Quectel Technical Support.

## 5.1. QGNSS Setting

**Step 1:** Assemble the EVB components.

**Step 2:** Flip the power switch (S201) to **ON** position to power on the EVB and flip the UART↔USB switch (S301) to **USB** position.

**Step 3:** Start the QGNSS and click “**Setting**” and “**Serial Port Configuration**” (default baud rate 9600 bps <sup>2</sup>), as shown in the figure below.

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<sup>2</sup> UART interface default settings may vary depending on software versions.

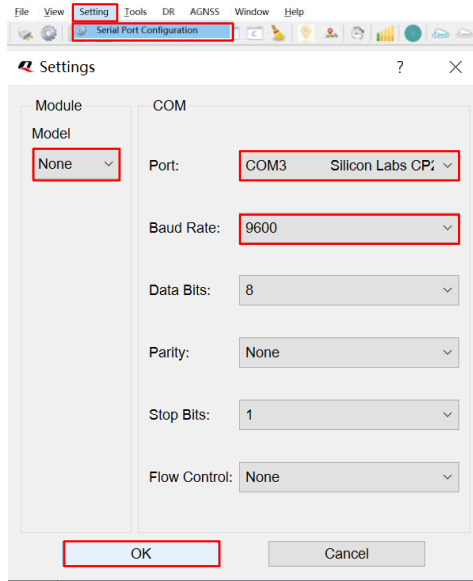



Figure 7: QCOM Port and Baud Rate Setting

**Step 4:** Click the  “Connect or disconnect” button. The interface shown in the figure below appears once the module is connected.

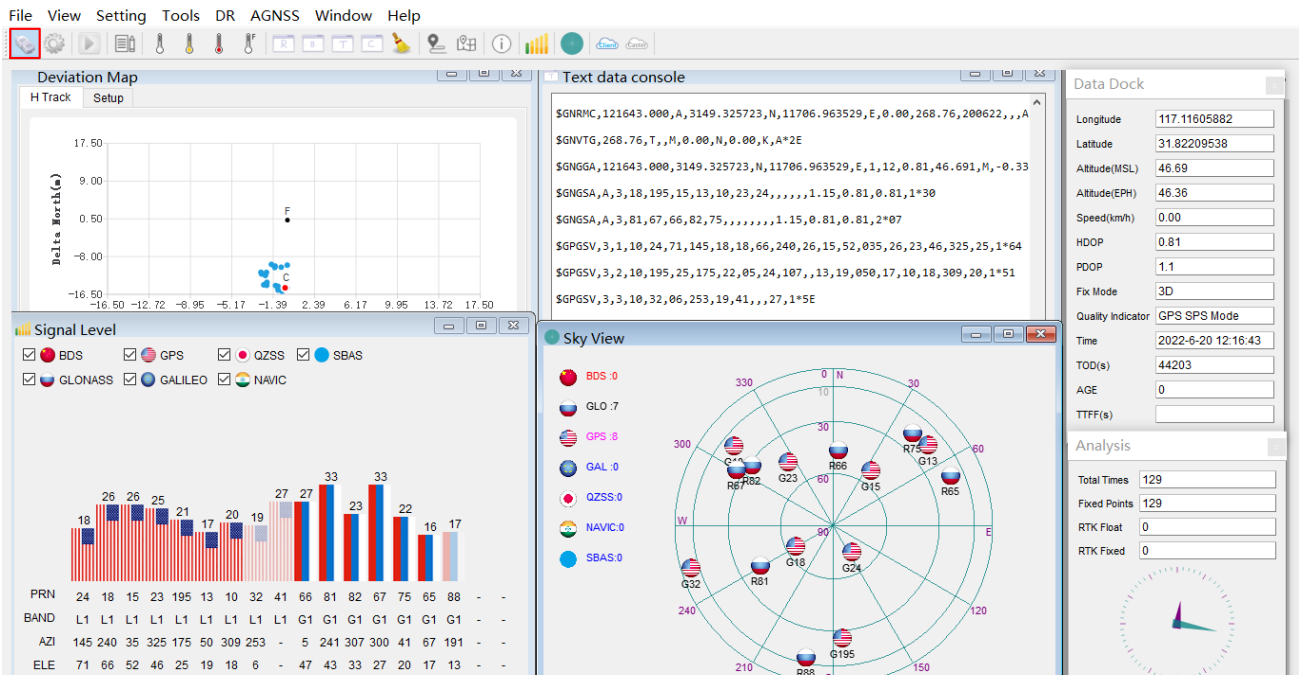
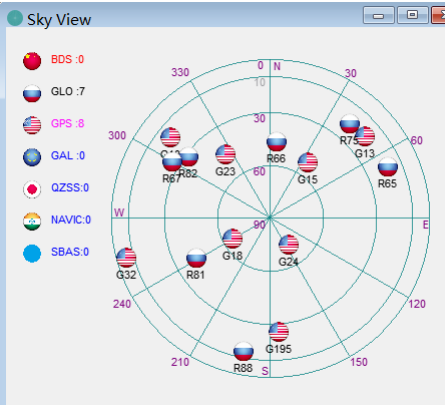
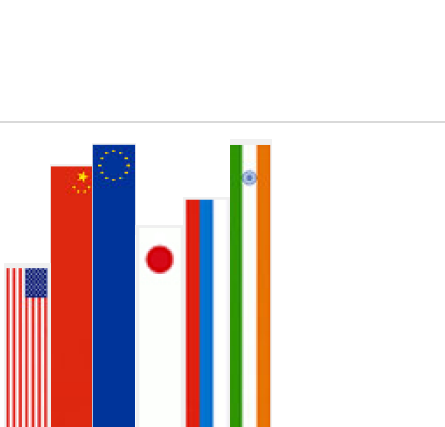
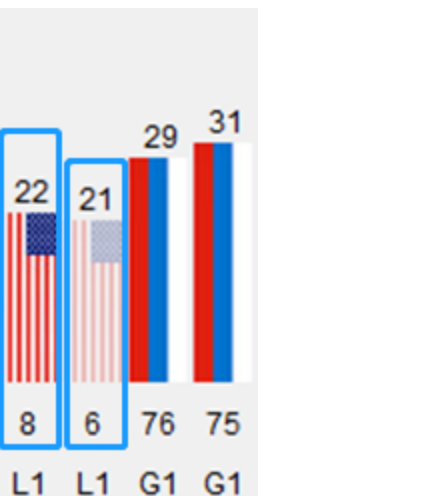


Figure 8: QGNSS Interface (Connected)

### 5.1.1. QGNSS Interface Explanation

You can view GNSS information, such as C/N<sub>0</sub> message, time, position, speed, and precision in the QGNSS interface. See the following table to find out more about these parameters.


**Table 6: QGNSS Interface Explanation**

Icon	Explanation
	<p>The sky view interface shows the position of the satellites in use.</p> <ol style="list-style-type: none"> <li>The left column icons show the satellites in use and their number. <ul style="list-style-type: none"> <li>● BDS: 0</li> <li>● GLO (GLONASS): 7</li> <li>● GPS: 8</li> <li>● GAL (Galileo): 0</li> <li>● QZSS: 0</li> <li>● NavIC (IRNSS): 0</li> <li>● SBAS: 0</li> </ul> </li> </ol>
	<ol style="list-style-type: none"> <li>The grid map on the right shows the position of the satellites in use.</li> </ol>
	<ul style="list-style-type: none"> <li>● PRN 8 C/N<sub>0</sub> is 22 dB-Hz.</li> <li>● Column in <b>bright red</b> means that the navigation data of the satellites are in use.</li> <li>● PRN 6 C/N<sub>0</sub> is 21 dB-Hz.</li> <li>● Column in <b>light red</b> means that the navigation data of the satellites are not in use.</li> </ul>

Data View	
Longitude	117.11575333
Latitude	31.82233133
Altitude(MSL)	85.30
Altitude(EPH)	
Speed(km/h)	0.00
HDOP	1.05
PDOP	2.0
Fix Mode	3D
Quality Indicator	GPS SPS Mode
Time	2022-3-9 01:06:30
TOD(s)	3990
AGE	0
TTFF(s)	4.040

- Longitude (unit: degree)
- Latitude (unit: degree)
- Altitude (MSL) (unit: m)
- Altitude (EPH) (unit: m)
- Receiver speed (unit: km/h)
- Horizontal dilution of precision
- Position dilution of precision
- Fix Mode: 2D, 3D
- Quality Indicator: DGNSS, DGPS, GPS SPS mode
- UTC date and time
- Time of day <sup>3</sup> (unit: second)
- Age of differential GPS data
- Last TTFF (unit: second)

Analysis	
Total Times	31
Fixed Points	31
RTK Float	0
RTK Fixed	0



- Total Times
- Fixed Points
- RTK Float
- RTK Fixed

<sup>3</sup> Total number of seconds elapsed since midnight of the current day.

# 6 Firmware Upgrade via QGPSFlashTool

Quectel LC76F module upgrades firmware via the UART interface using QGPSFlashTool. For more information about QGPSFlashTool usage, see **document [3]**.

Download the QGPSFlashTool from our website [Download Zone](#) or request it from Quectel Technical Support.

## 6.1. Firmware Upgrade

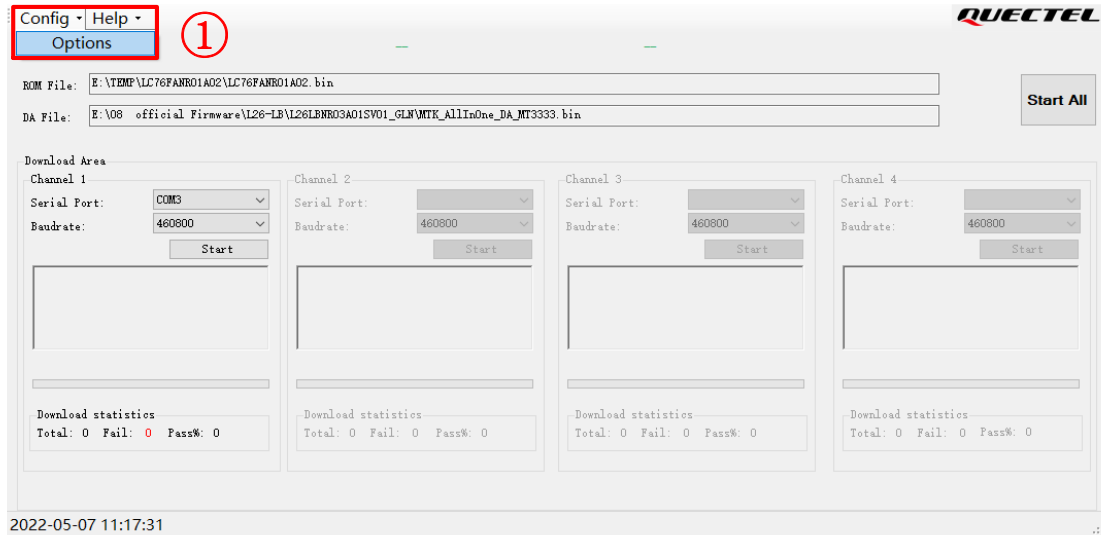
Before you start the firmware upgrade process:

**First:** Connect the EVB to a PC with Micro-USB cable.

**Second:** Flip the power switch (S201) to **ON** position to power on the EVB and flip the UART↔USB switch (S301) to **USB** position.

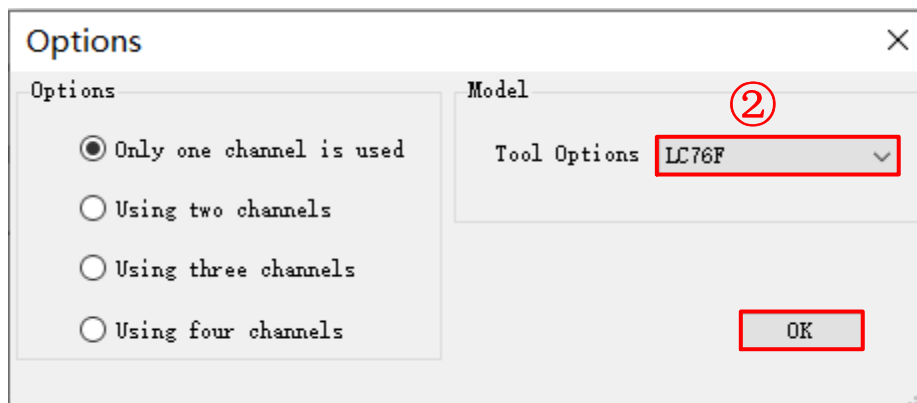
Firmware upgrade steps:

**Step 1:** Open QGPSFlashTool. Click “**Config**” and select “**Options**” as shown in the figure below.



**Figure 9: Firmware Upgrade – Step 1**

**Step 2:** In the “Options” popup window, set the number of channels to be used. In the “Tool Options” drop-down box, select “LC76F” and then click “OK” as shown in the figure below.



**Figure 10: Firmware Upgrade – Step 2**

**Step 3:** Double click “bin file” to select bin file, e.g., “LC76FANR01A03\_GLN.bin” as shown in the figure below.

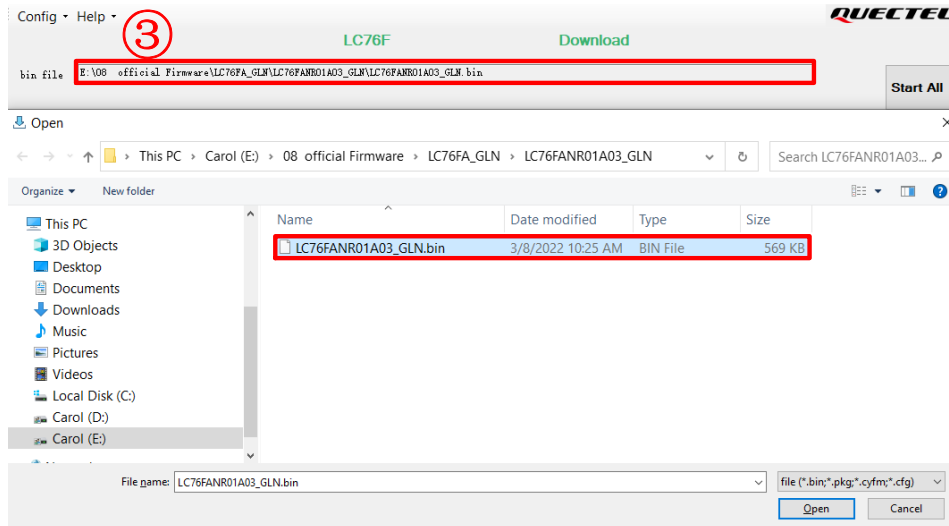


Figure 11: Firmware Upgrade – Step 3

**Step 4:** Select the “Serial Port” and “Baudrate” of the COM Port that will be used (the selected baud rate will affect the firmware download speed) and then click “Start” button to start downloading the firmware, as shown in the figure below.

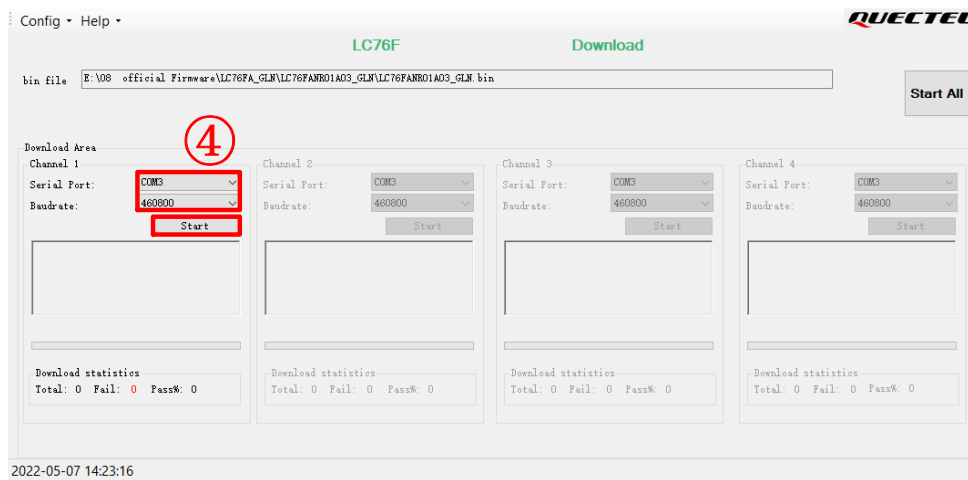


Figure 12: Firmware Upgrade – Step 4

**Step 5:** Upon successful firmware upgrade, the QGSPFlashTool green progress bar on the screen will indicate “100%”, as shown in the figure below.



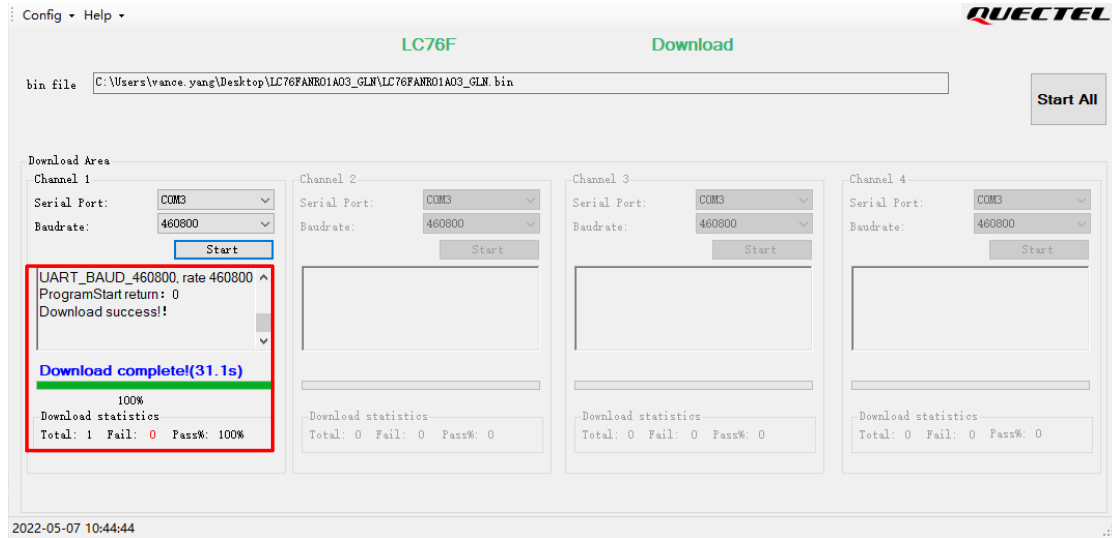


Figure 13: Successful Firmware Upgrade

**NOTE**

Make sure the module is in Continuous mode before upgrading the firmware.

# 7 Appendix References

**Table 7: Related Documents**

Document Name
[1] <a href="#">Quectel_QCOM_User_Guide</a>
[2] Quectel_QGNSS_User_Guide
[3] Quectel_QGPSFlashTool_User_Guide

**Table 8: Terms and Abbreviations**

Abbreviation	Description
2D	2 Dimension
3D	3 Dimension
BDS	BeiDou Navigation Satellite System
COM Port	Communication Port
C/N <sub>0</sub>	Carrier-to-Noise Ratio
DI	Digital Input
DO	Digital Output
ESD	Electrostatic Discharge
EVB	Evaluation Board
Galileo	Galileo Satellite Navigation System (EU)
GLONASS	Global Navigation Satellite System (Russia)
GND	Ground

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GNSS	Global Navigation Satellite System
GPS	Global Positioning System
I/O	Input/Output
LED	Light Emitting Diode
Micro-USB	Micro Universal Serial Bus
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
PC	Personal Computer
PI	Power Input
PO	Power Output
1PPS	One Pulse Per Second
QZSS	Quasi-Zenith Satellite System
RXD	Receive Data (Pin)
SBAS	Satellite-Based Augmentation System
SPS	Standard Positioning Service
TTFF	Time to First Fix
TXD	Transmit Data (Pin)
UART	Universal Asynchronous Receiver & Transmitter
USB	Universal Serial Bus
UTC	Coordinated Universal Time

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