

LG290P (03) RTK Application Note

GNSS Module Series

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About the Document

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Contents

About the Document	3
Contents	4
Table Index.....	5
Figure Index	6
1 Introduction	7
1.1 RTK Application Scenarios	7
2 RTK Related Messages	9
3 RTK Operation Guide	11
4 RTK FAQs	16
5 Appendix References	17

Table Index

Table 1: Supported RTCM Input Messages	9
Table 2: Related Document.....	17
Table 3: Terms and Abbreviations	17

Figure Index

Figure 1: UAV	7
Figure 2: Automatic Mower	8
Figure 3: Device Manager	11
Figure 4: Device Information	12
Figure 5: NTRIP Client	12
Figure 6: NTRIP Server Configuration	13
Figure 7: QuecRTK Configuration	13
Figure 8: Successful Connection to the Server	14
Figure 9: View <Quality> Parameter	15

1 Introduction

Quectel LG290P (03) is a high-precision RTK positioning module that supports multiple GNSS constellations. RTK (Real-time Dynamic) is a real-time differential GNSS technology based on carrier phase measurements, which achieves high-precision positioning centimeter-level accuracy. For more details on RTK, see [document \[1\] RTK application note](#).

This document explains module RTK function, including RTK application scenarios, RTK related messages, RTK operation guide and RTK FAQs.

1.1 RTK Application Scenarios

The main application scenarios of RTK include lawn mowers, drones, lane-level navigation.



Figure 1: UAV



Figure 2: Automatic Mower

2 RTK Related Messages

When RTK is used, RTCM messages are sent to the module through the UART interface. The Quectel LG290P (03) module supports RTCM 10403.3 input messages as shown in the following table.

Table 1: Supported RTCM Input Messages

Message Type	Message Name
1005	Stationary RTK Reference Station ARP
1006	Stationary RTK Reference Station ARP with Height
1073	GPS MSM3
1074	GPS MSM4
1075	GPS MSM5
1076	GPS MSM6
1077	GPS MSM7
1083	GLONASS MSM3
1084	GLONASS MSM4
1085	GLONASS MSM5
1086	GLONASS MSM6
1087	GLONASS MSM7
1093	Galileo MSM3
1094	Galileo MSM4
1095	Galileo MSM5
1096	Galileo MSM6
1097	Galileo MSM7
1113	QZSS MSM3

Message Type	Message Name
1114	QZSS MSM4
1115	QZSS MSM5
1116	QZSS MSM6
1117	QZSS MSM7
1123	BDS MSM3
1124	BDS MSM4
1125	BDS MSM5
1126	BDS MSM6
1127	BDS MSM7
1133	NavIC/IRNSS MSM3
1134	NavIC/IRNSS MSM4
1135	NavIC/IRNSS MSM5
1136	NavIC/IRNSS MSM6
1137	NavIC/IRNSS MSM7

3 RTK Operation Guide

This chapter introduces the steps to use QGNSS tool for RTK services via Quectel GNSS MODULE EVB. For more details about the EVB, please see [document \[2\] EVB user guide](#).

Tips:


1. After a successful connection between the EVB and the PC, four consecutive serial port numbers will appear, choose the smallest of four consecutive port numbers as shown in figure below:



Figure 3: Device Manager

2. It is imperative to utilize QGNSS V1.9 or higher versions.

The steps to use QGNSS tool for RTK service:

Step 1: Open QGNSS tool, click  to access “**Device Information**” window as shown in [Figure 4: Device Information](#).

Step 2: Choose the module.

Step 3: Choose the port with the smallest port number among the 4 COM ports.

Step 4: Choose baudrate. The default baudrate: 460800 bps.

Step 5: Click “OK”.

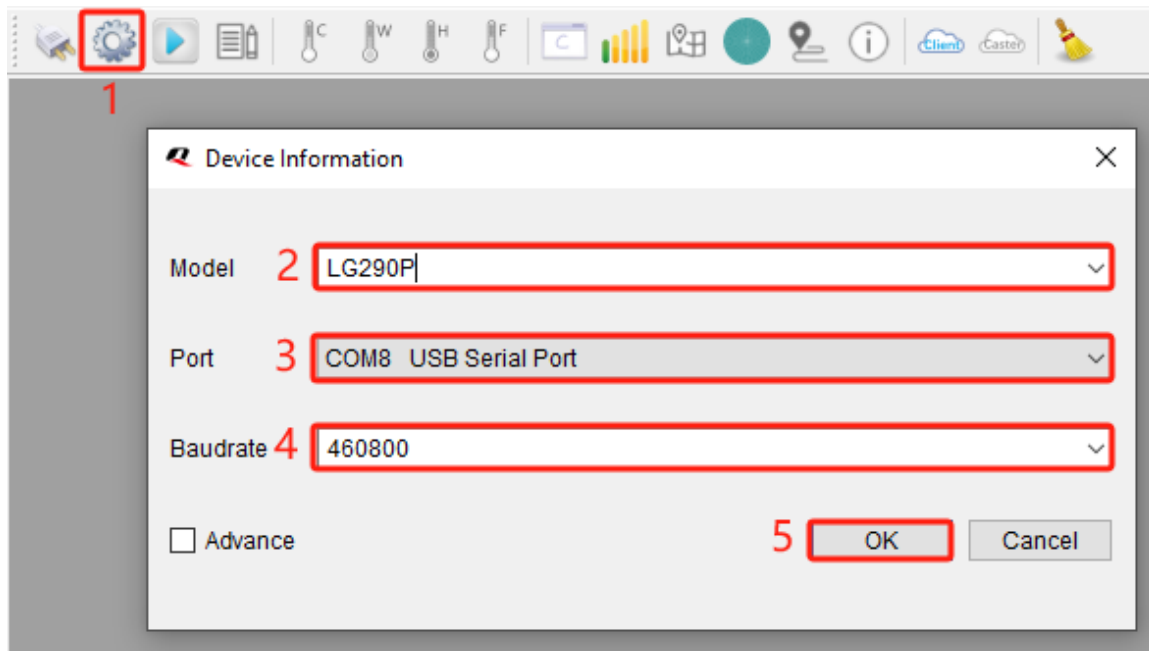



Figure 4: Device Information

Step 6: Click  to enter “NTRIP Client” window.

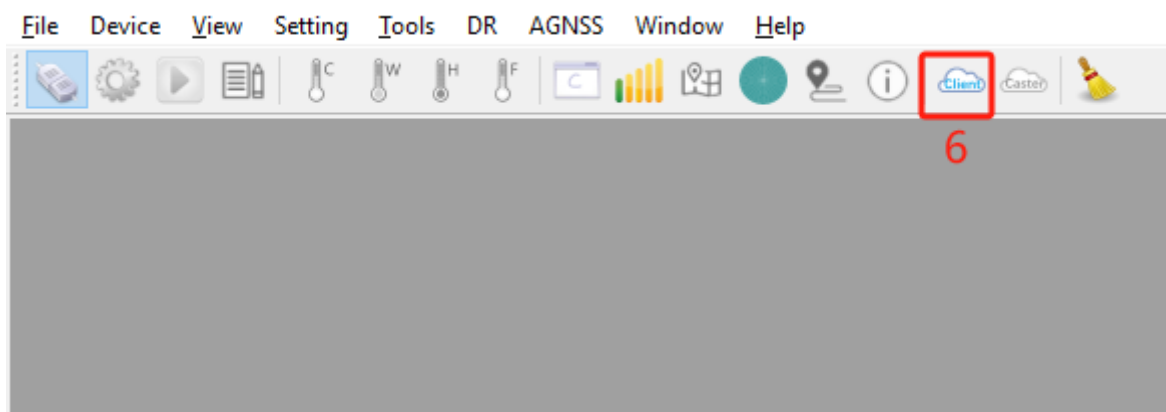


Figure 5: NTRIP Client

Step 7: Fill in the information of “Caster settings” and “NTRIP mount point” as shown in [Figure 6: NTRIP Server Configuration](#). If you have a QuecRTK account, you can also click “QuecRTK” and fill in the relevant information, as shown in [Figure 7: QuecRTK Configuration](#). Test accounts can be obtained from Quectel.

Step 8: Click “Connect To Host” to connect host as shown in [Figure 6: NTRIP Server Configuration](#).

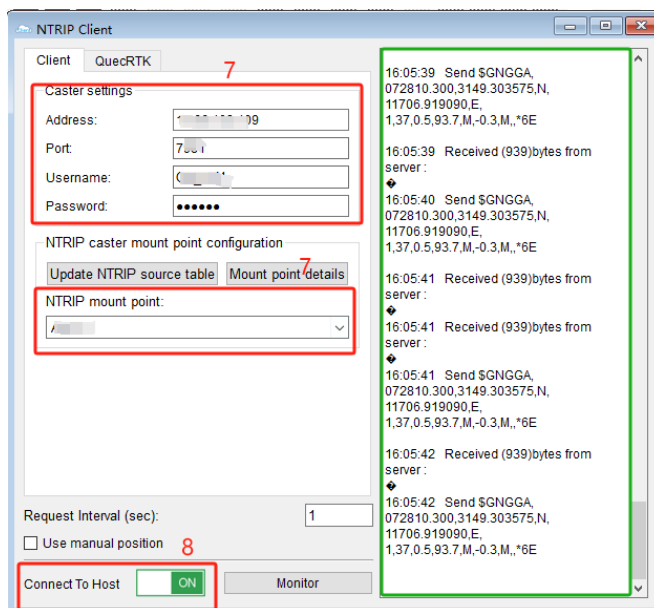


Figure 6: NTRIP Server Configuration

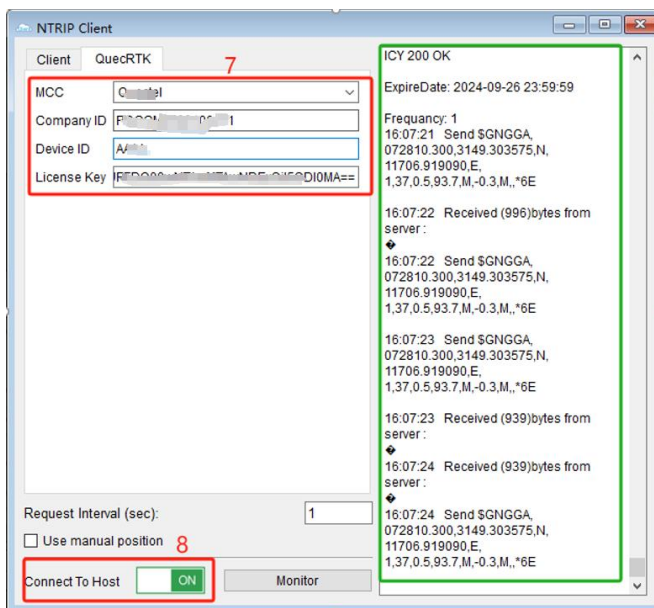


Figure 7: QuecRTK Configuration

Step 9: If configured correctly, you can see the message sent to the RTK server and the differential data received in the right box as shown in [Figure 8: Successful Connection to the Server](#).

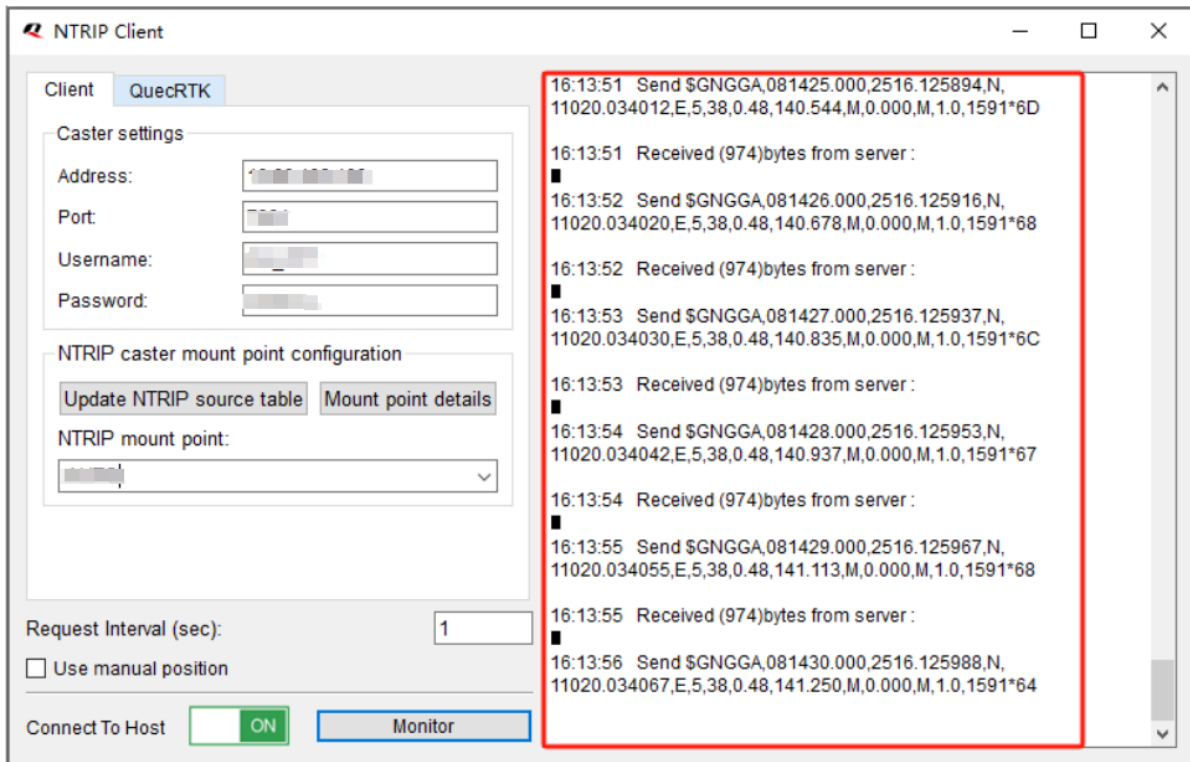


Figure 8: Successful Connection to the Server

Step 10: You can judge whether the module has entered RTK mode by outputting **GGA** messages as shown in [Figure 9: View <Quality> Parameter](#).

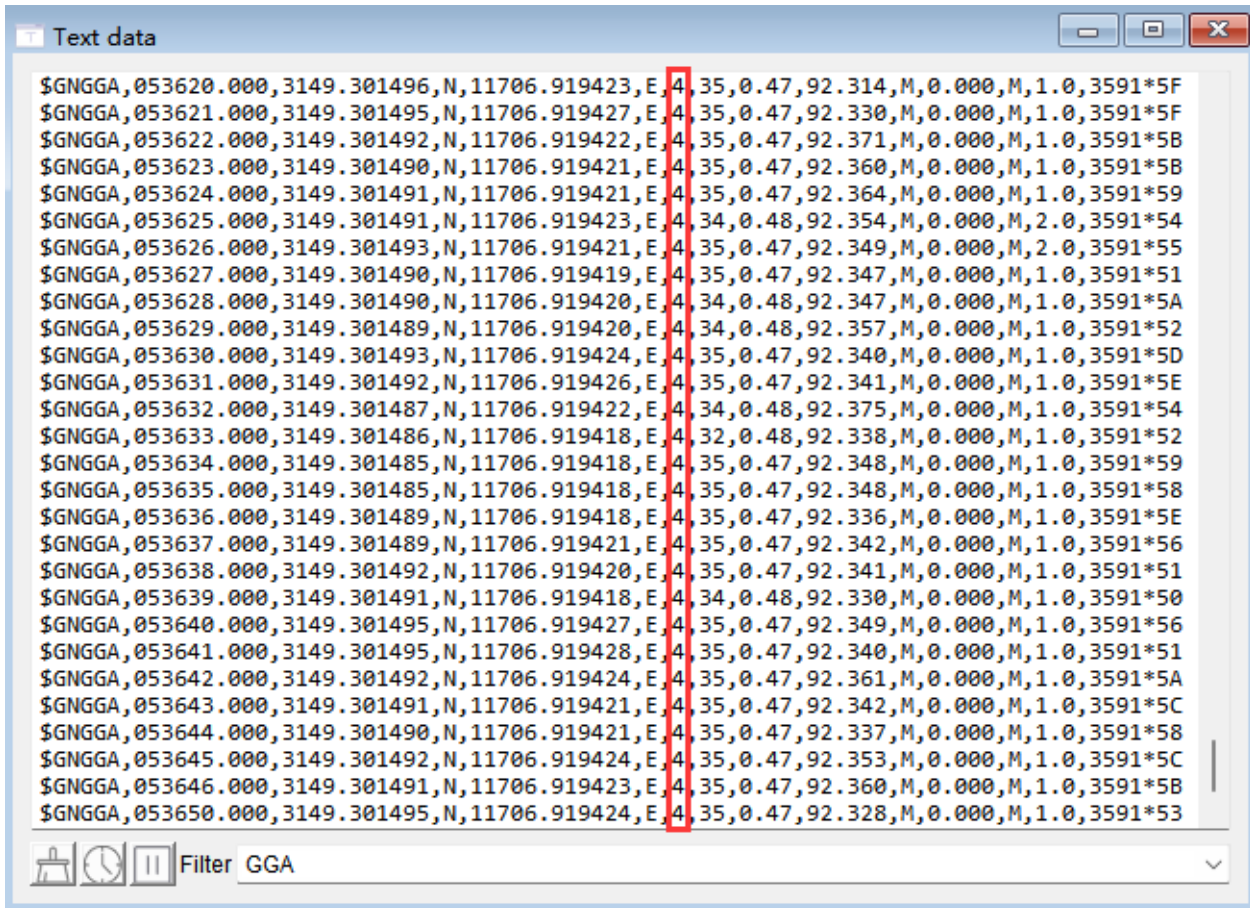


Figure 9: View <Quality> Parameter

4 RTK FAQs

1. **What is the default coordinate system for GNSS modules?**
 - WGS84 coordinate system

2. **Why does the <Quality> parameter in GGA show “5” (RTK float) instead of “4” (RTK fixed) after using RTK?**
 - If the quality indicator displays ‘5’, it indicates that the module has received RTK messages, but it is unable to achieve the high-precision positioning. It may be due to severe interference from the surrounding environment, such as magnetic field, trees, resulting in an insufficient number of received satellites signals. In such cases, it is necessary to move the module to an open area for testing.

3. **Possible reasons for not being able to access RTK?**
 - Account abnormality
 - Extremely harsh GNSS signal conditions
 - The RTK injection link is unstable or the injected data type does not match
 - The module did not receive RTK data

5 Appendix References

Table 2: Related Document

Document Name
[1] Quectel_GNSS_RTK_Application_Note
[2] Quectel_GNSS_Module_EVB_User_Guide

Table 3: Terms and Abbreviations

Abbreviation	Description
ARP	Antenna Reference Point
GGA	Global Positioning System Fix Data
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
NTRIP	Networked Transport of RTCM via Internet Protocol
RTCM	Radio Technical Commission for Maritime services
RTK	Real Time Kinematic
UART	Universal Asynchronous Receiver/Transmitter
WGS84	World Geodetic System 1984