L70-RL GPS Module Presentation

May, 2016

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Contents

Highlights

MT3337 Single Chip Solution

66 acquisition channels
22 tracking channels

Ultra Low Power Consumption

18mA@Tracking mode
21mA@Acquisition mode

PPS sync NMEA

Used for time service

Build-in LNA

Better sensitivity even in weak signal areas

EASY™

Advanced AGPS technology without the need of external memory

Extremely Compact Size

10.1 × 9.7 × 2.5mm

ROM-based Version
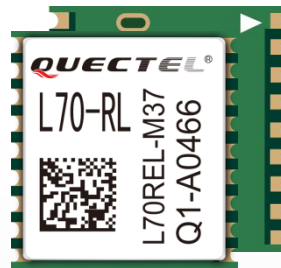
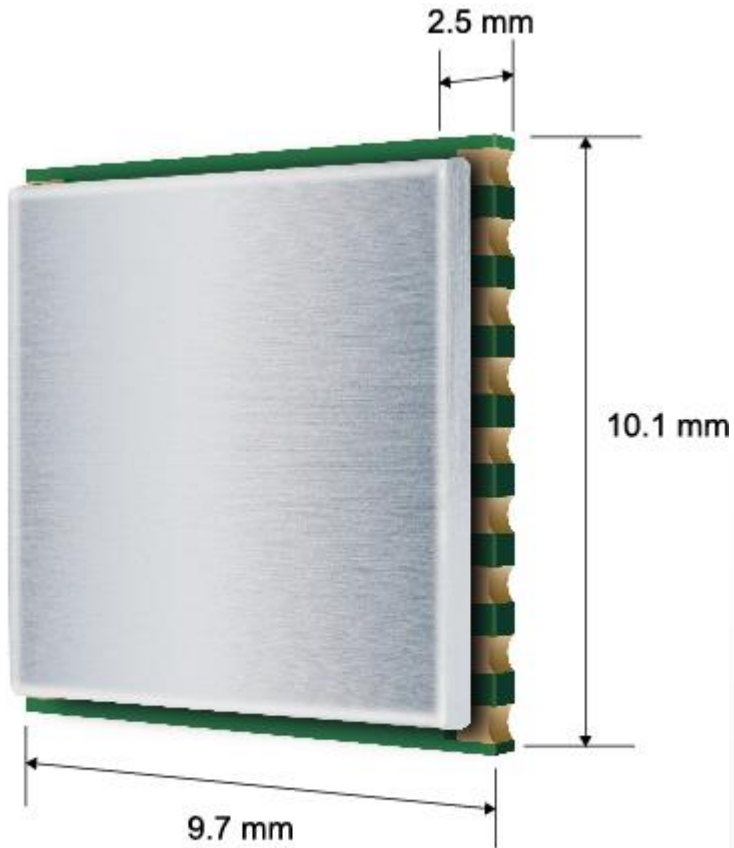Cost Efficient

AIC

Obtain better navigation quality

Anti-Jamming

Multi-tone active interference canceller

Improved Sensitivity

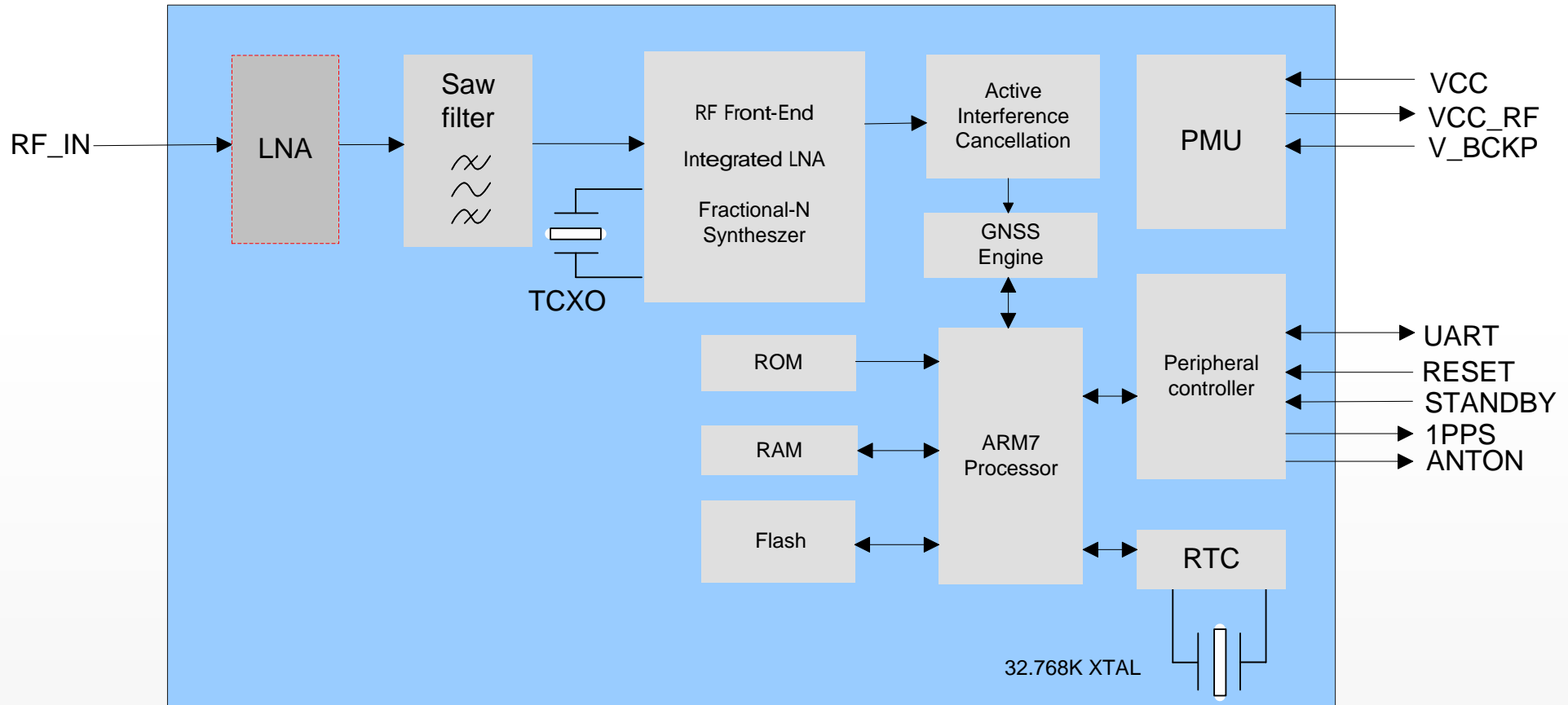-167dBm@Tracking mode
-149dBm@Acquisition mode

QUECTEL ®
L70-RL
L70REL-M37
Q1-A0466

Mechanical Dimensions

2.5 mm

10.1 mm

9.7 mm

Length: 10.1 mm
Width: 9.7 mm
Height: 2.5 mm
Weight: 0.6 g

Hardware Architecture

Target Applications

- ➢ Portable Devices

- ➢ Vehicle Management

- ➢ Asset Tracking

- ➢ Security System

- ➢ Connected PND

- ➢ GIS Application

- ➢ Industrial PDA

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Receiver Performance

➢ Extremely low power consumption in tracking mode, 18mA

➢Support EASY™, advanced AGPS technology without the need of external memory

➢ Build-in LNA greatly improves sensitivity: -167dBm@Tracking, -149dBm@ Acquisition

➢ 66 acquisition channels, 22 tracking channels

➢ Support QZSS

➢ Balloon mode, for high altitude up to 80km

➢ PPS VS. NMEA can be used for time service

➢ Great anti-jamming performance due to multi-tone active interference canceller

Specifications

L1 Band Receiver (1575.42MHz)	Channel	22 (tracking) / 66 (acquisition)	Environmental Conditions	Operation Temperature	-40℃ to 85℃	
	C/A Code			Storage Temperature	-45℃ to 125℃	
Horizontal Position Accuracy	Autonomous	<2.5m CEP	Dynamic Performance	Maximum Altitude	Max. 18000m	
Velocity Accuracy	Without Aid	<0.1m/s		Maximum Velocity	Max. 515m/s	
Acceleration Accuracy	Without Aid	0.1m/s²		Maximum Acceleration	4G	
Timing Accuracy	1PPS	10ns	Dimensions	10.1 × 9.7 × 2.5mm		
Reacquisition Time		<1s	Weight	Approx. 0.6g		
TTFF@-130dBm without EASY™	Cold Start	<35s	Serial Interface	UART: Adjustable 4800~115200 bps Default: 9600bps		
	Warm Start	<30s	Update Rate	1Hz by default, up to 5Hz		
	Hot Start	<1s	I/O Voltage	2.7V ~ 2.9V		
TTFF@-130dBm with EASY™	Cold Start	<15s	Protocols	NMEA 0183 PMTK		
	Warm Start	<5s	Power Supply	2.8V ~ 4.3V		
	Hot Start	<1s	Power Acquisition	21mA		
Sensitivity	Acquisition	-149dBm	Power Tracking	18mA		
	Tracking	-167dBm	Power Saving	8uA@Backup Mode 500uA@Standby Mode		
	Reacquisition	-161dBm	Antenna Type	Active or Passive		
			Antenna Power	External or Internal VCC_RF		

EASY™ Technology-Autonomous AGPS (1)

➢ EASY™ is the abbreviation of Embedded Assist System for quick positioning. With EASY™ technology, the GPS engine can calculate and predict orbits automatically using the ephemeris data (up to 3 days) when the power is on, and then save the predict information into the memory. So the GPS engine can use the information for positioning later if there are not enough information received from the satellites.

➢ This function is helpful for positioning and TTFF improvement under indoor or urban conditions.

EASY™ Technology-Autonomous AGPS (2)

➢ **TTFF Comparison**

Test Condition		TTFF without EASY™	TTFF with EASY™
Under GPS signal generator, and conductive power level of -130dBm	Cold Start	<35s	<15s
	Warm Start	<30s	<5 s

With EASY™ technology, L70-RL accelerates TTFF obviously.

EPO™ Technology-Offline AGPS (1)

EPO supplies the predicated Extended Prediction Orbit data to speed up TTFF. As a ROM-based version, L70-RL needs connection to external host & flash. The GPS engine will use the EPO data to assist position calculation when the navigation information of satellites are not enough or when the satellites are in weak signal zone.

EPO data service supports 1/3/5/7/14/30 days orbit predictions. There is no need to download EPO data from EPO server every day. Aiding information like ephemeris, almanac, satellites status and an optional time synchronization signal will reduce the time to first fix significantly.

EPO™ Technology-Offline AGPS (2)

> **TTFF Comparison**

Test Condition		TTFF without EPO™	TTFF with EPO™
Under GPS signal generator, and conductive power level of -130dBm	Cold Start	<35s	<15s
	Warm Start	<30s	<5 s

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L70-RL vs. Ucompany MAX-6X (1)

➤ **Specification Comparison**

		L70 -RL	MAX-6X
Packaging		18-pin LCC GPS module	18-pin LCC GPS module
Dimensions		10.1 × 9.7 × 2.5 mm	10.1 × 9.7 × 2.5 mm
Sensitivity	Autonomous Acquisition	-149dBm	-147dBm
	Reacquisition	-161dBm	-160dBm
	Hot Start	-161dBm	-156dBm
	Tracking	-167dBm	-161dBm
Timing Accuracy		<15ns	30ns RMS
Update Rate		1Hz(default), Max 5Hz	1Hz(default), Max 5Hz
Temperature Range	Operation	-40℃ to 85℃	-40℃ to 85℃
	Storage	-45℃ to 125℃	-40℃ to 85℃
Power Supply		2.8V to 4.3V	2.7V to 3.6V (MXX-6Q) 1.75V to 2.0V (MXX-6G)
Full Power Consumption	Acquisition	21mA@3.3V	47mA
	Tracking	18mA@3.3V	41mA
Power Saving Mode Consumption	Standby mode	500uA	36mW @ 3.0V 22mW @ 1.8V
	Backup mode	8uA	22uA
Embedded External LNA (Outside Chipset)		No	No
Feature	EASY ™	Supported	Not supported
	1PPS	Supported	Support (Time Pulse)

L70-RL vs. Ucompany MAX-6X (2)

➤ Tracking Comparison

When driving under the overpass and making a turn, L70-RL module shows its excellent performance. But Ucompany's module has a bigger drift.

L70-RL vs. Ucompany MAX-6X (3)

➤ **Tracking Comparison**

When driving across overpass, L70-RL module can still capture the accurate tracking data. But Ucompany's module has a small drift.

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Highlights

Advanced Features

Quectel L70-RL vs. Competitor's Product

Support Package

Support Package (1)

Evaluation Board

➢ **Interfaces**
- GPS serial port
- Antenna interface
- Micro-USB interface

➢ **Accessories**
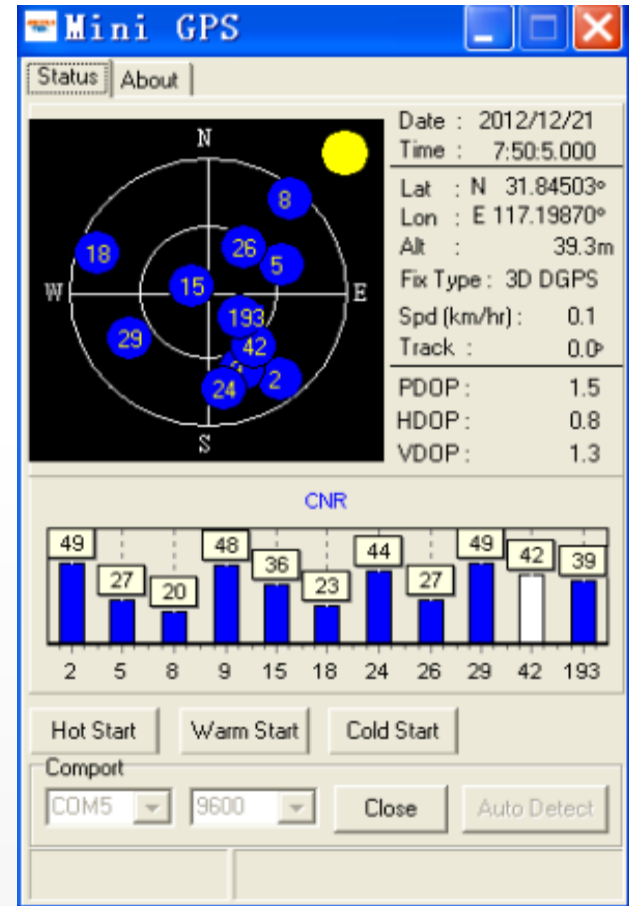- Micro-USB cable
- GPS antenna

Support Package (2)

➤ **Documents**
- Hardware Design
- Protocol Specification
- Part&Decal in PADS and Protel Format
- Evaluation Board User Guide
- Circuit Reference Design

➤ **PC tool**
- MiniGPS-GPS testing tool

Thank you