



# L70 GPS Module Presentation

May, 2014

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Highlights

Advanced Features

Quectel L70 Vs. Competitor's Product

Support Package



# Highlights

## MT3339 Single Chip Solution

66 acquisition channels  
22 tracking channels

## Extremely Compact Size

10.1 x 9.7 x 2.5 mm

## Ultra Low Power Consumption

12mA@Tracking mode  
18mA@Acquisition mode

## EASY™

Advanced AGPS technology  
Without external memory

## AlwaysLocate™

An intelligent controller of power  
Consumption

## Anti-Jamming

Multi-tone Active Interference  
Canceller

## LOCUS

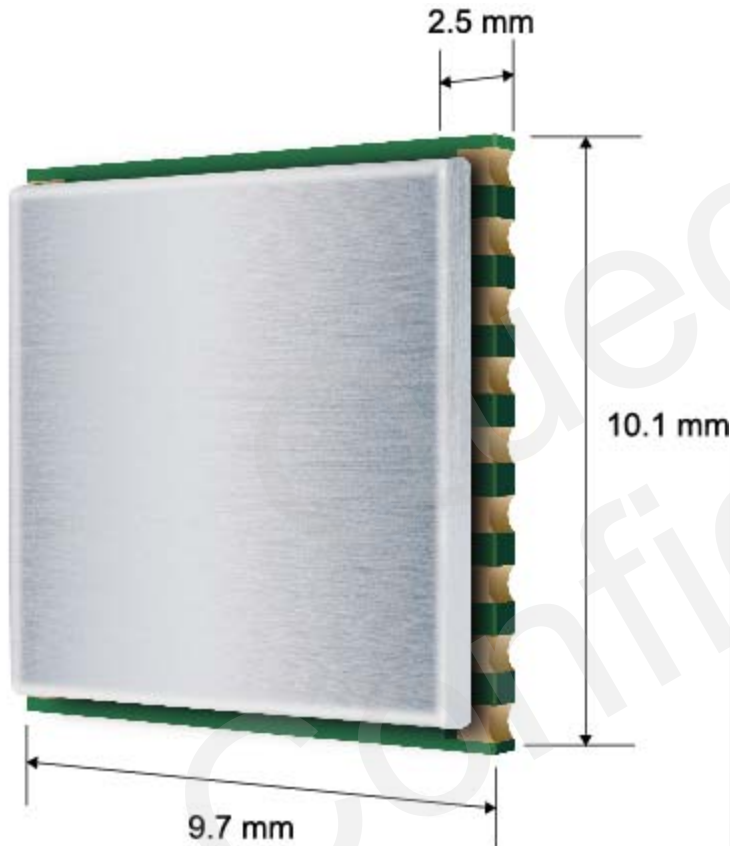
Innate logger solution with no need of host  
and external flash

## Highest Sensitivity

-165dBm@Tracking mode  
-148dBm@Acquisition mode

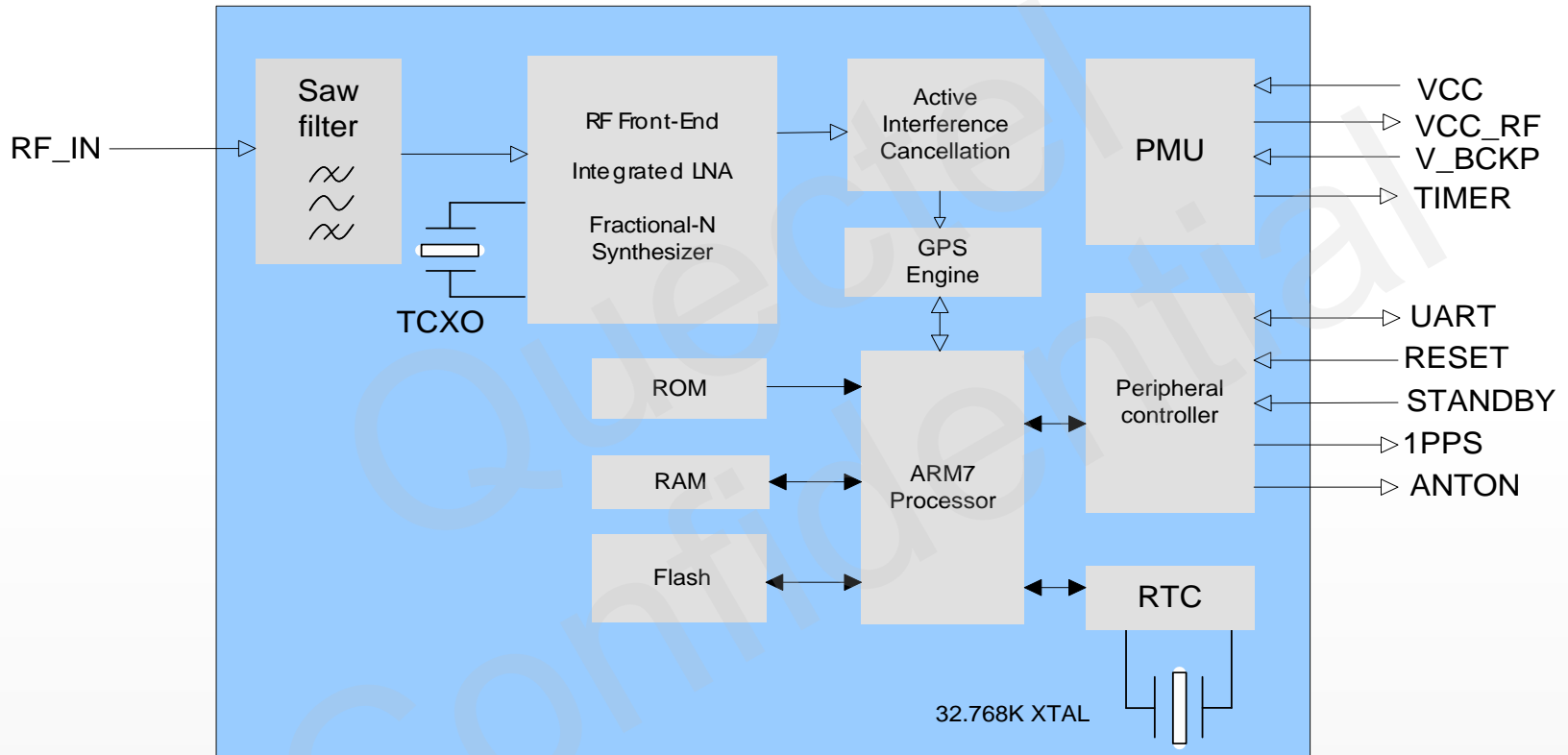


# Mechanical Dimensions



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

# Hardware Architecture



- Protocol
  - NMEA 0183 standard V3.01
  - MTK Private Protocol: PMTK
- Configurable Operating Modes
  - UART: Adjustable 4800~115200bps (default: 9600bps)
  - Update rate: 1Hz (default), up to 10Hz
  - Selectable output NMEA messages
  - Configurable Periodic Standby Mode

# Target Applications

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- Portable Devices
- Vehicle Management
- Asset Tracking
- Security System
- Connected PND
- GIS Application
- Industrial PDA



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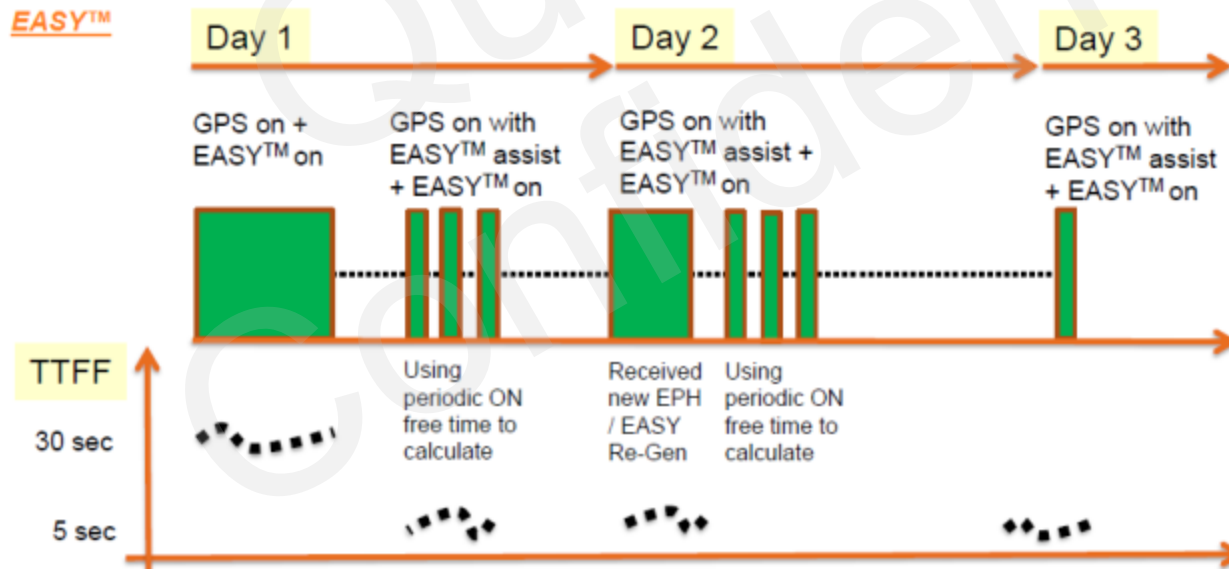
- EASY™, advanced AGPS technology without the need of external memory
- Extremely low power consumption, 12mA
- AlwaysLocate™, an intelligent controller of periodic mode
- LOCUS, innate logger solution with no need of host and external flash
- High sensitivity, -165dBm@Tracking, -148dBm@ Acquisition
- 66 acquisition channels, 22 tracking channels
- Support DGPS, QZSS, SBAS(WASS/EGNOS/MSAS/GAGAN)
- Anti-Jamming, Multi-tone Active Interference Canceller

# Specifications

L1 Band Receiver (1575.42MHz)	Channel	22 (tracking) / 66 (acquisition)	Environmental	Operating Temperature	-40°C to 85°C
	C/A code			Storage Temperature	-45°C to 125°C
	SBA	WAAS, EGNOS MSAS,GAGAN	Dynamic Performance	Maximum Altitude	Max.18000m
		Maximum Velocity		Max.515m/s	
Horizontal Position Accuracy	Autonomous	<2.5m CEP		Maximum Acceleration	4G
Velocity Accuracy	Without aid	<0.1m/s	Dimensions	10.1 x 9.7 x 2.5mm	
Acceleration Accuracy	Without aid	0.1m/s <sup>2</sup>	Weight	Approx. 0.6g	
Timing Accuracy	1PPS	10ns	Serial Interface	UART: Adjustable 4800~115200 bps Default: 9600bps	
Reacquisition Time		<1s	Update Rate	1Hz by default, up to10Hz	
TTFF@-130dBm with EASY™	Cold Start	<15s	I/O Voltage	2.7V ~ 2.9V	
	Warm Start	<5s	Protocols	NMEA 0183 PMTK	
	Hot Start	<1s	Power Supply	2.8V ~ 4.3V	
TTFF@-130dBm without EASY™	Cold Start	<35s	Power Acquisition	18mA	
	Warm Start	<30s	Power Tracking	12mA	
	Hot Start	<1s	Power Saving	1.4mA@AlwaysLocate™	
		7uA@Backup Mode			
		200uA@Standby Mode			
Sensitivity	Acquisition	-148dBm		Periodic Mode	
	Tracking	-165dBm	Antenna Type	Active or Passive	
	Re-acquisition	-160dBm	Antenna Power	External or Internal VCC_RF	

# Self-AGPS EASY Technology(1)

- EASY™ is the abbreviation for Embedded Assist System for quick positioning. With EASY™ technology, the GPS engine can calculate and predict automatically single ephemeris ( 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 will be helpful for positioning and TTFF improvement under indoor or urban conditions.



# Self-AGPS EASY Technology(2)

## ➤ TTF Comparison

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

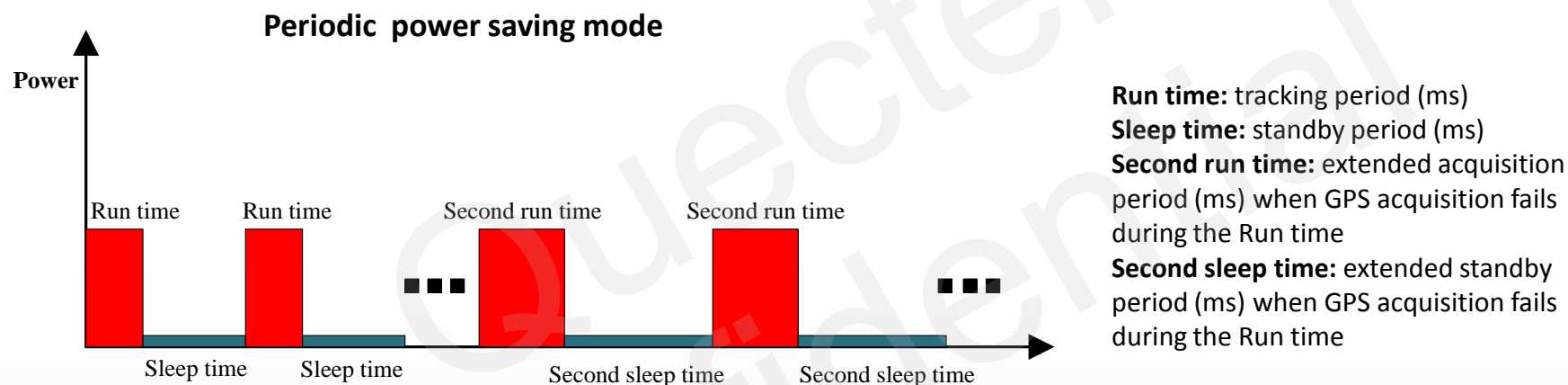
With EASY™ technology, L70 accelerates TTF obviously.

# Periodic Standby Mode

Periodic standby mode can control power on/off time of GPS periodically to reduce average power consumption, and on/off time can be configured by using PMTK command. For details, see the figure below.

Periodic standby mode can be entered by sending the following PMTK command.

**\$PMTK255, Type, Run time, Sleep time, Second run time, Second sleep time**



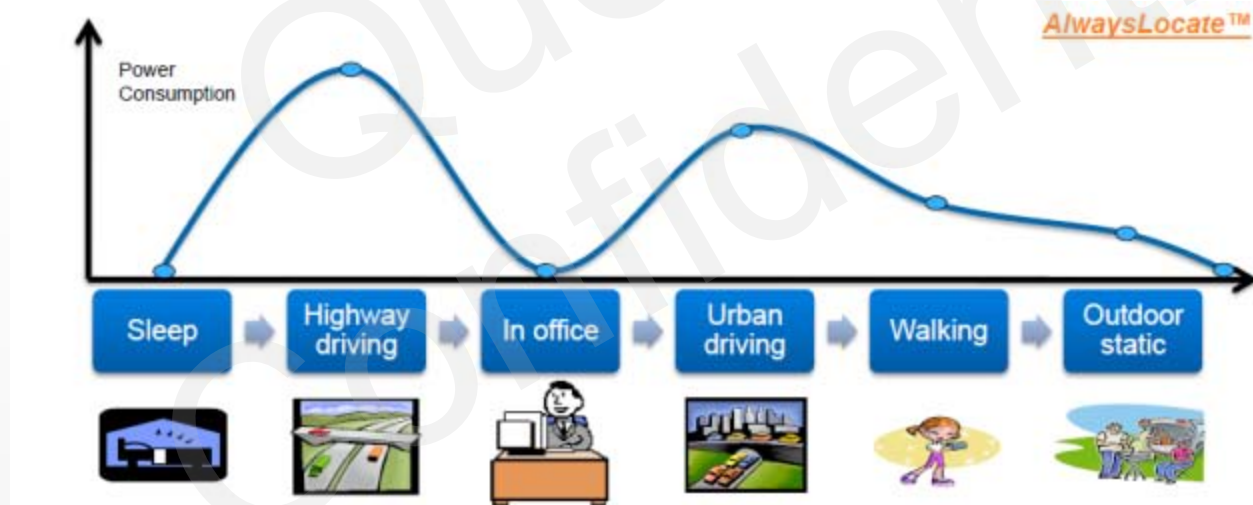
## Notes:

1. Normally, the GPS module will enter the periodic mode after successfully fixing position. But if acquisition fails, the GPS module still can enter this mode.
2. If GPS acquisition fails during the Run time, in order to ensure the success of reacquisition, it is better to set the longer Second run time.

Example: PMTK225, 2, 3000, 12000, 18000, 72000\*15 for periodic mode with 3s in tracking mode and 12s sleep in standby mode. The average current is about 2.5mA.

# AlwaysLocate™ Technology

- AlwaysLocate™ is an intelligent controller of periodic mode.
- L70 can adaptively adjust the on/off time to achieve balance between positioning accuracy and power consumption according to the environmental and motion conditions. So the average power consumption is lower in AlwaysLocate™ power saving mode than that in periodic power saving mode. Typical average power is 1.4mA.



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# L70 vs. Ucompany NEX-6Q(1)

## ➤ Specification Comparison

Product Features		L70	Ucompany NEX-6Q
Power supply		2.8V~4.3V	2.7V~3.6V
Power Consumption	Acquisition Mode	18mA@3.3V	117mW@3.0V typical
	Tracking Mode	12mA@3.3V	
Sensitivity	Acquisition	-148dBm	-148dBm
	Tracking	-165dBm	-162dBm
	Re-acquisition	-160dBm	-160dBm
TTFF @ -130dBm	Hot Start	<1s	1s
	Warm Start	<5s (EASY™)	26s
	Cold Start	<15s (EASY™)	26s
Position Accuracy		2.5m CEP	2.5m CEP
Timing Accuracy	1PPS	10ns	30ns
Data Update Rate		Up to 10Hz	Up to 5Hz



# L70 vs. Ucompany NEX-6Q(2)

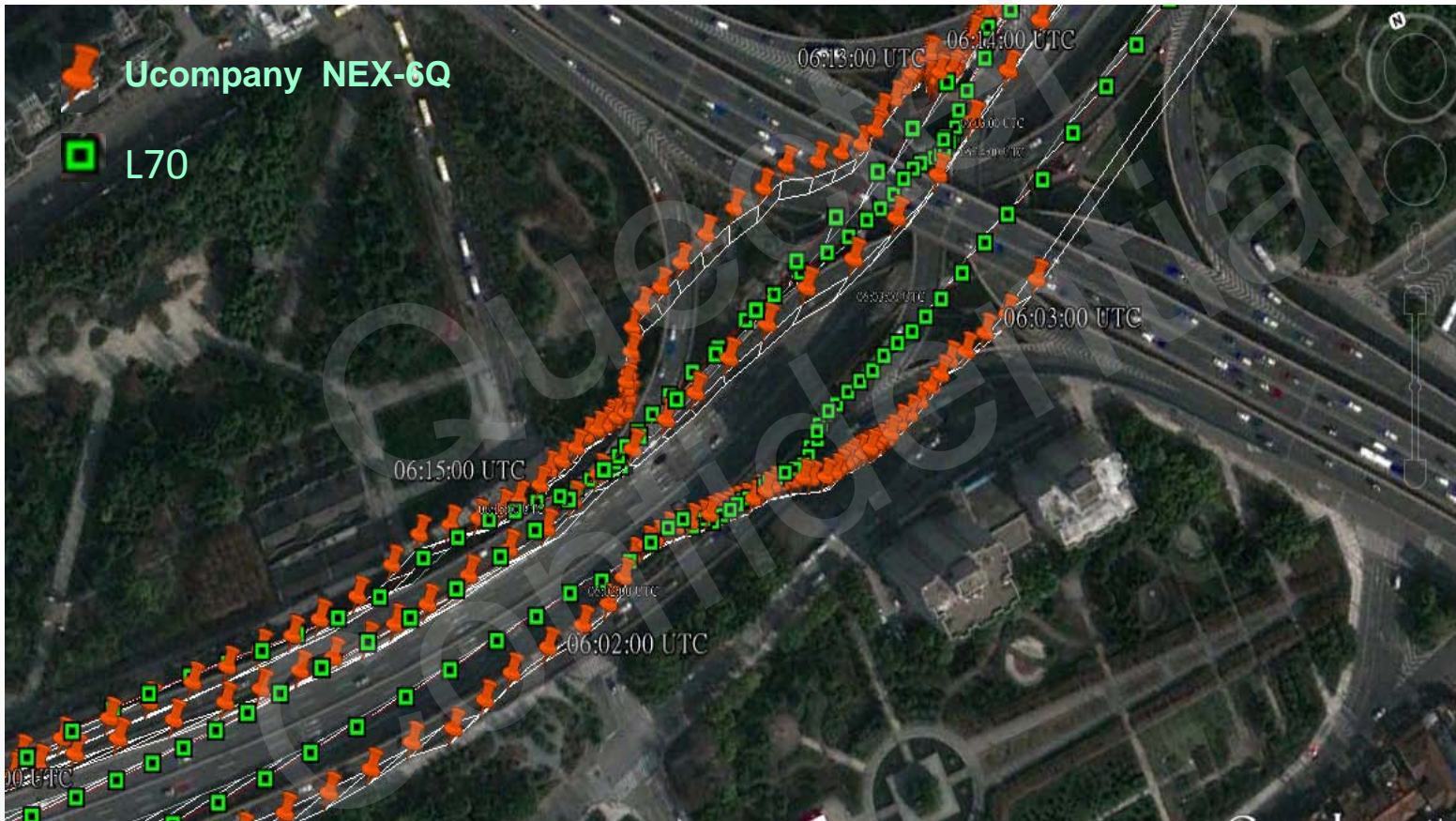
## ➤ Tracking Comparison



When driving across overpass and making a turn, L70 module can still capture the accurate tracking data. But Ucompany module has a small drift.

# L7Q(30 vs. Ucompany NEX-6)

## ➤ Tracking Comparison



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



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# Support Package(1)

## Evaluation Board

### ➤ Interfaces

- GPS serial port
- Antenna interface
- Adapter interface

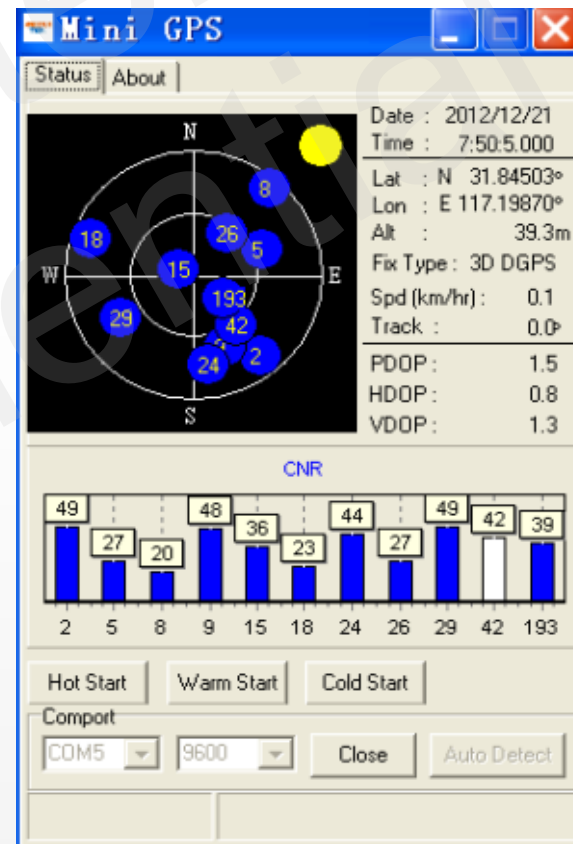
### ➤ Accessories

- Serial port cable
- DC 5V/2A power adapter
- GPS antenna



# Support Package(2)

- Documents
  - Hardware Design
  - GPS Protocol
  - Part&Decal in PADS and Protel Format
  - Evaluation Board User Guide
  - Circuit Reference Design
  
- PC tool
  - MiniGPS-GPS testing tool



Q&A...

*Thank you*

