GPS Engine Board

M-9129
SPECIFICATION

HOLUX
THE PRO NAME IN GPS

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Version Update History

Version	Date	Revised Reason
0.1	2010/07/07	Draft release
0.2	2010/11/11	Add pin definition Top View

Index

1. Introduction

1.1 General introductions

M-9129 is an ultra miniature 13 * 15 * 2.2 mm GPS engine board designed by low power consumption MTK GPS solution. It provides superior sensitivity up to -165 dBm and fast Time-To-First-Fix in navigation application. The stable performance of **M-9129** is your best choice to be embedded in your portable device design, like PDA、PND、mobile phone、Digital Camera for GPS service.

1.2 Key Features

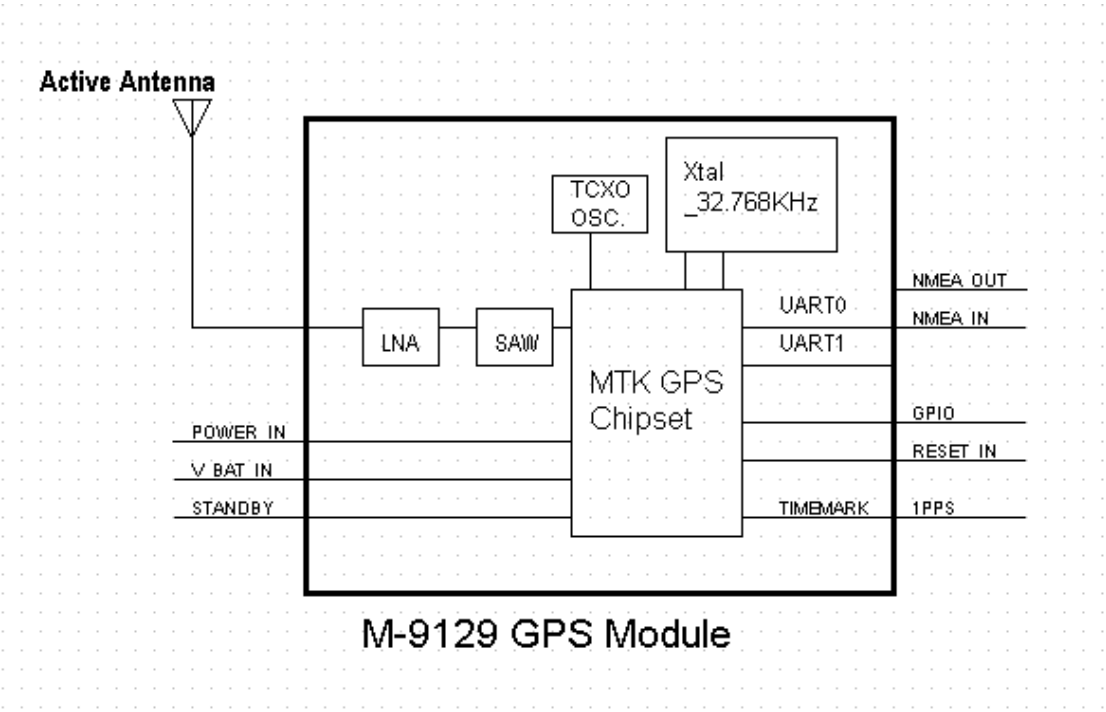
- Small form factor: 13* 15 * 2.2 mm
- RoHS/WEEE compliant
- High sensitivity -165 dBm (Tracking)
- Up to 66 parallel searching,22 tracking channels
- Fast Position Fix
- Low power consumption
- RTCM-in ready.
- Built-in WAAS/EGNOS/MSAS Demodulator.
- Support NMEA0183 V 3.01 data protocol.
- Real time navigation for location based services.
- For Car Navigation, Marine Navigation, Fleet Management, AVL and Location-Based Services, Auto Pilot, Personal Navigation or touring devices, Tracking devices/systems and Mapping devices application

1.3 Applications

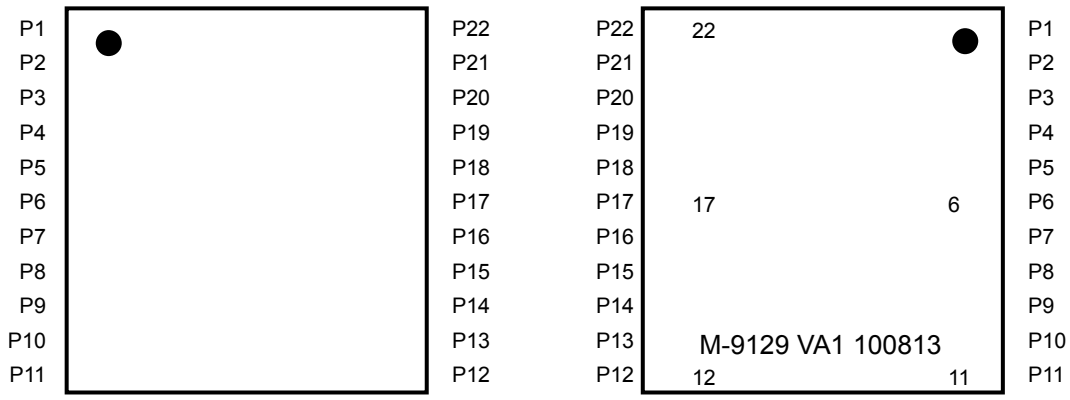
- Automotive and Marine Navigation
- Automotive Navigator Tracking
- Emergency Locator
- Geographic Surveying
- Personal Positioning
- Sporting and Recreation
- Embedded applications: Smart phone, UMPC, PND, MP4

2 Technical Description

2.1 Block Diagram



2.2 Pin Definition



Pin	Pin Name	Type	Function description
1	***RXDB***	I	Serial Data Input B
2	***TXDB***	O	Serial Data Output B
3	***1PPS***	O	1 PPS output, synchronized with GPS time. TIME_MARK 1 PPS output, 1us/s
4	***TXDA***	O	Serial Data Output A
5	***RXDA***	I	Serial Data Input A
6	***GND***	G	Ground
7	***GPIO8***	I/O	General purpose I/O
8	***GPIO0***	I/O	General purpose I/O. flash at 1Hz when position is fixed.
9	***GPIO4***	I/O	General purpose I/O
10	***VOUT***	O	Power State Indicate, 2.8 VDC Output
11	***Standby***	I	Low active for power down,(Keep NC if not used is High)
12	***V_BAT***	I	RTC and backup SRAM power Input: DC Input:2.8~4.2V. NC: provided it by module internal LDO.
13	***VCC_IN***	I	3.3 ~ 4.2 VDC Power Input
14	***GPIO6***	I/O	General purpose I/O
15	***GPIO7***	I/O	General purpose I/O
16	***GPIO5***	I/O	General purpose I/O
17	***GND***	G	Ground
18	***RESET***	I	Reset , Low active
19	***VCC_RF_O***	O	Active antenna power supply output, 2.8 VDC
20	***GND***	G	Ground
21	***RF_IN***	I	GPS signal input, 2.80 VDC output
22	***GND***	G	Ground

2.3 Specification

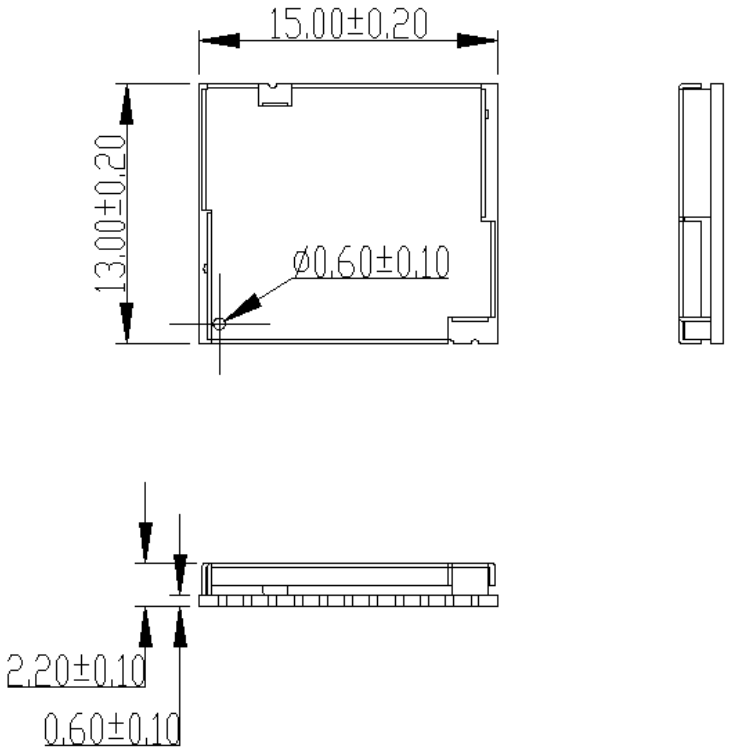
General	(Follow MTK chip specification)
GPS technology	MT3329 GPS chipset
Frequency	L1,1575.42 MHz
C/A Code	1.023 MHz chip rate
Channels	66 parallel searching,22 tracking channels
Sensitivity	- 165 dBm (Tracking)
Receiver Accuracy	(Follow MTK chip specification)
Position	Without aid:3.0 M 2D-RMS DGPS(WAAS, EGNOS, MSAS, RTCM):2.5 M
Velocity	Without aid:0.1 M/sec
Time	0.1μs. Sync GPS time
Datum	
Datum	WGS84(Default) total 219 datum's
Time to First Fix	(Follow MTK chip specification)
Hot start	< 1 sec.
Warm start	< 33 sec.
Cold start	< 35 sec.
Reacquisition	＜1sec.
Protocol	
GPS Output Data	NMEA0183(V3.01)- GGA,GLL,GSA,GSV,RMC,VTG Support Baud rate 4800/9600/…./115200 bps (default 4800), Data bit:8 , Stop bit:1, No parity.
Update Rata	1 Hz(default)
Protocol Support	NMEA-0183
1PPS	Enable(1 Hz pulse 10% duty cycle)
Limitations	(Follow MTK chip specification)
Acceleration Limit	＜4G
Altitude Limit	＜18000 meters
Velocity Limit	＜515 M/sec
Jerk Limit	20 M/sec^3
Power	
Operation Current	Acquisition≒42 mA@3.3V
Operation Current	Tracking:＜36 mA@3.3V
DC Input Range	VCC_IN: 3.3~4.2V V_BAT : 2.0~4.2V

Processing Core	
Processor Type	ARM7EJ-S
Processor Speeds	Up to 56 MHz
Interface	CMOS 2.8 V Level
Temperature	
Operating Temperature	-30℃ to +80℃
Storage Temperature	-40℃ to +85℃
Operating Humidity	5% to 95%, Non condensing
Physical	
Dimension	13 * 15 * 2.2 mm.
Weight	<2g.

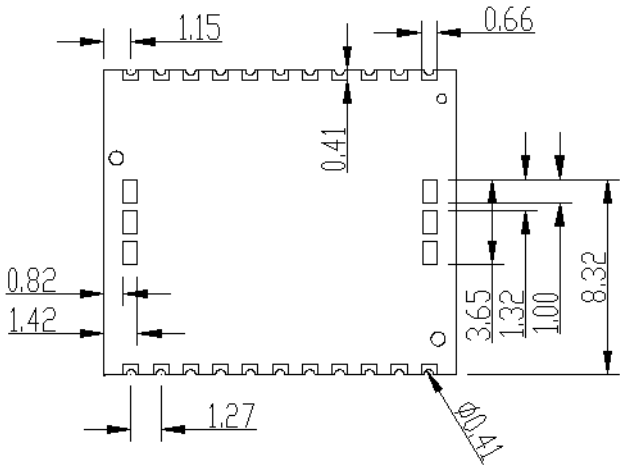
3 Mechanical Dimension

3.1 Mechanical Dimension

TOP VIEW

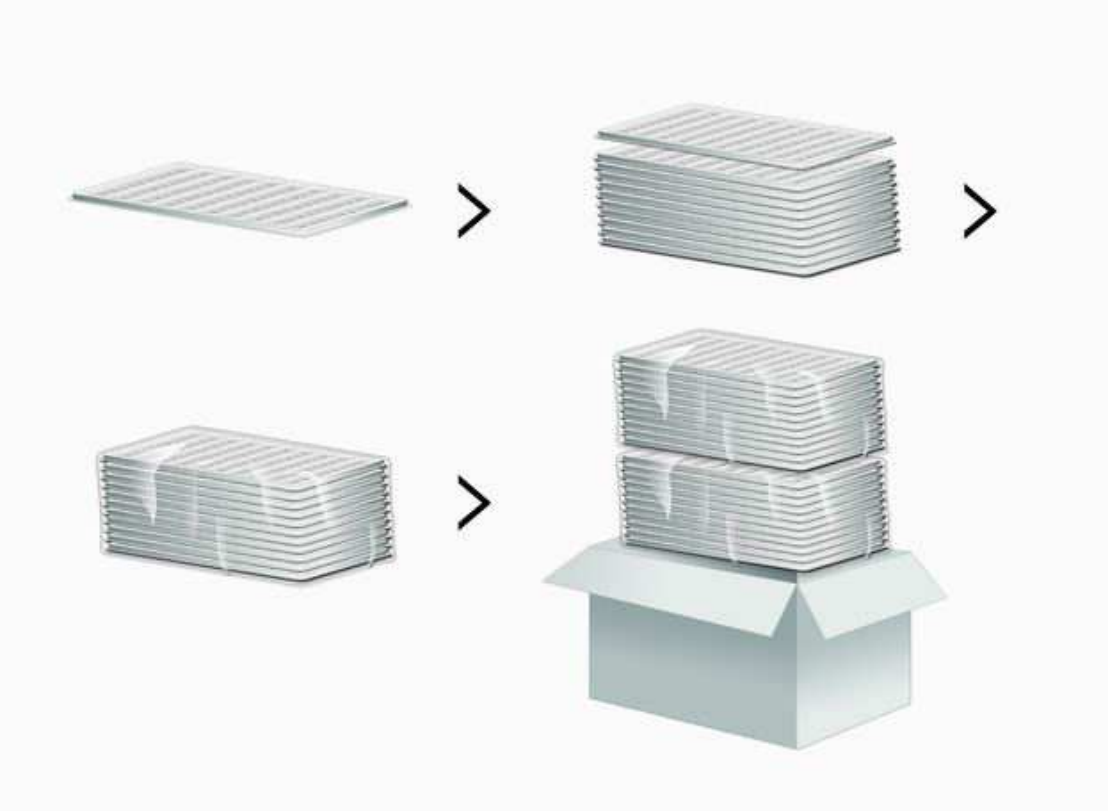


BOTTOM VIEW



4 Package

4.1 Packing



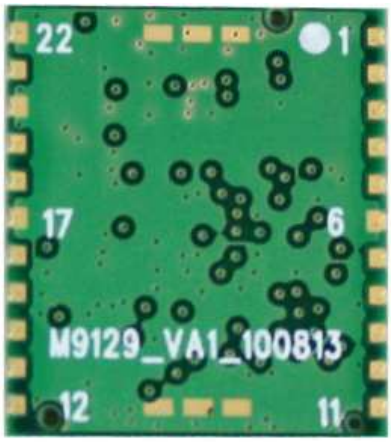
Tray dimension: 325*220*9 mm, Standard Content Qty : 100 pcs.
Carton dimension: 340*235*120 mm, Standard Content Qty : 2,000 pcs.

4.2 Reference Product Photo

The photo is for reference, the real content will depend on the real configuration.

Top side:

Bottom side: (The PCB version depend)



5. User Interface

M-9129 provides 2-wire digital UART port for communication of GPS position data using NMEA protocol or MTK extension protocol. UART port is capable of 4800 to 115200 baud rate.

5.1 NMEA Protocol

M-9129 is default to support standard NMEA-0183 protocol. In addition, a series of MTK extensions (PMTK messages) have been developed that can be used to provide extended capabilities common to many applications.

5.2 NMEA Protocol format

M-9129 is capable of supporting following NMEA formats:

NMEA RECORD	Description
GGA	GPS fix data
GLL	Geographic
GSA	GNSS DOP and active satellite
GSV	GNSS Satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course Over Ground and Ground Speed
ZDA	Time & Data

5.3 MTK NMEA Packet Format

Preamble	TalkerID	PktType	Datafield	*	CHK1	CHK2	CR	LF

Maximum packet length is restricted to 255 bytes

Field	Length	Type	D
Preamble	1 byte	Character	“$”
TalkerID	4 byte	Character string	“PMTK”
PktType	3 byte	Character string	“000”to “999”, an identifier used to tell the decoder how to decode the packet
DataField	Variable		“, ”must be inserted ahead each data filed to help the decoder process the Data Field
*	1 byte	Character	The star symbol is used to mark the end of Data Field
CHK1 CHK2	2 byte	Character string	checksum of the data between Preamble “, ”and “*”
CR, LF	2 byte	Binary data	used to identify the end of a packet

6. Reference Design

6.1 Reference circuit

Fig A-1 is M-9129 uses Active Antenna connects to RS-232 transceiver solutions intended for portable or hand-held applications such as notebook and palmtop computers.

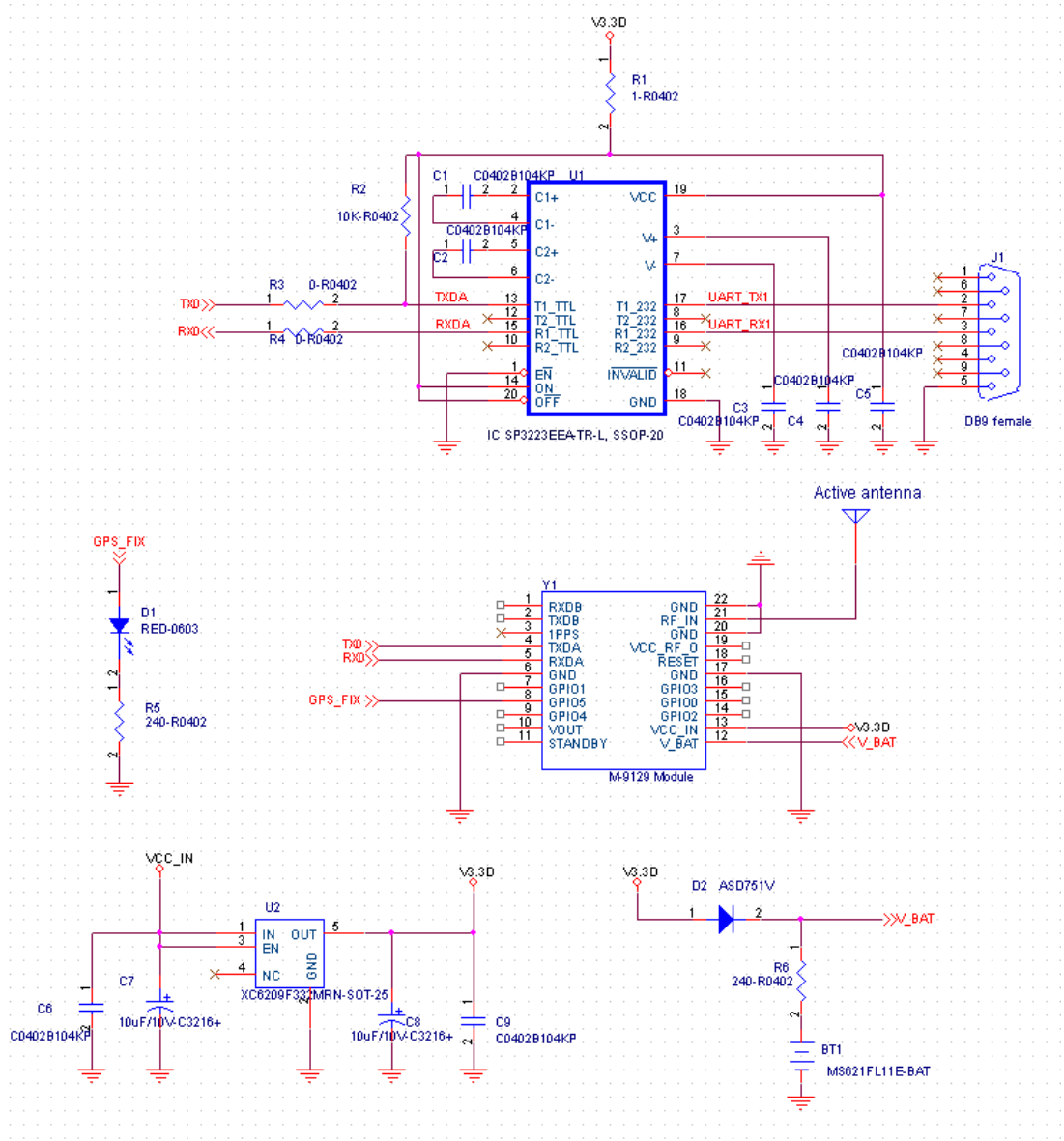
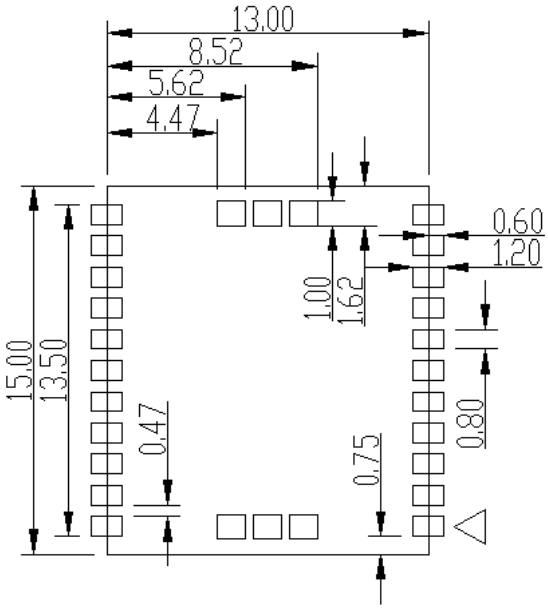


Fig.A-1

6.2 Reference PCB pattern



6.3 Recommendation reflow profile

1. We strongly recommend that this module should be designed to mount on top side of motherboard with main chip together which process the final reflow.
2. The maximum frequency of this module to pass reflow process should be no more than twice, including repair operation, otherwise it may cause side effect to the performance.
3. Below is the recommend reflow profile referred to Main MTK chip set.