

GPS Engine Board

M-89 SPECIFICATION

HOLUX CONFIDENTIAL

HOLUX
THE PRO NAME IN GPS

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0.1	2007/04/18	Draft release

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1. Introduction

1.1 General introductions

M-89 is an ultra miniature 25.4 * 25.4 * 3 mm GPS engine board designed by low power consumption MTK GPS solution. It provides superior sensitivity up to -159dBm and fast Time-To-First-Fix in navigation application. The stable performance of **M-89** 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

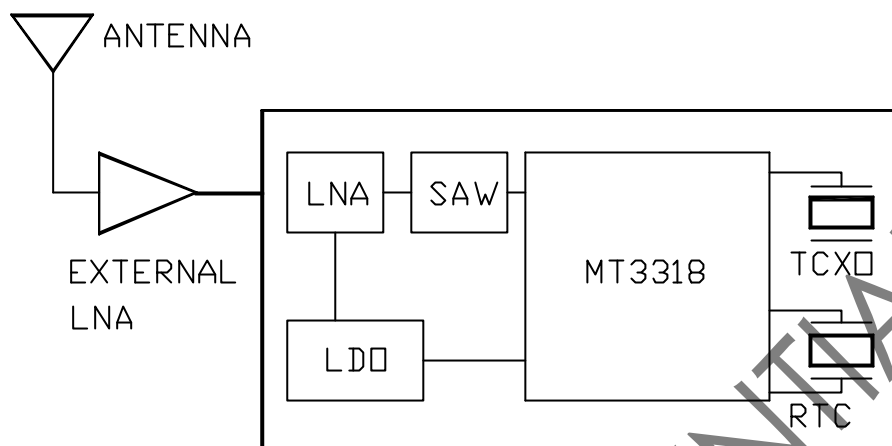
small form factor: 25.4 * 25.4 * 3 mm
RoHS/WEEE compliant
High sensitivity -159dBm
Searching up to 32 Channel of satellites
Fast Position Fix
Low power consumption
RTCM-in ready.
Built-in WAAS/EGNOS/MSAS Demodulator.
Support NMEA0183 V 3.01 data protocol.
Real time navigation for location based services.
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, MP

2 Technical Description

2.1 Block Diagram



2.2 Pin Definition



Pin	Pin Name	Type	Function description
1	VCC_IN	I	3.3 ~ 5 V supply input
2	GND	G	Ground
3	NC	I	NC
4	RXDA	I	Serial Data input A
5	TXDA	O	Serial Data Output A
6	TXDB	O	Serial Data Output B
7	RXDB	I	Serial Data input B
8	GPIO0	I/O	General purpose I/O. flash at 1Hz when position is fixed.
9	INT1	I/O	General purpose I/O
10	GND	G	Ground
11	GND	G	Ground
12	GND	G	Ground

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13	GND	G	Ground
14	GND	G	Ground
15	GND	G	Ground
16	GND	G	Ground
17	RF_IN	I	GPS signal input
18	GND	I	Ground
19	V_ANT_IN	I	Antenna power supply input, 3V
20	VCC_RF_O	O	Antenna power supply, 2.8V
21	V_BAT	I	RTC and backup SRAM power, 2.6 ~ 3.6 VDC.
22	HRST	I	Reset, active low
23	GPIO1	I/O	General purpose I/O
24	GPIO2	I/O	General purpose I/O
25	GPIO3	I/O	General purpose I/O
26	GPIO4	I/O	General purpose I/O
27	GPIO5	I/O	General purpose I/O
28	GPIO6	I/O	General purpose I/O
29	PPS	O	1 PPS output, synchronized with GPS time. TIME_MARK 1 PPS output, 1us/s
30	GND	G	Ground

2.3 Specification

General	
GPS technology	MTK GPS chipset
Frequency	L1, 1575.42MHz
C/A Code	1.023MHz chip rate
Channels	32 channels all in view searching
Sensitivity	Better than -159dBm
Receiver Accuracy	
Position	Without aid: 3.0 M 2D-RMS DGPS(WAAS, EGNOS, MSAS, RTCM): 2.5 M
Velocity	Without aid: 0.1 M/sec
Time	0.1 microsecond. Sync GPS time
Datum	
Datum	WGS84(Default) total 219 datum's
Time to First Fix	
Hot start	1 sec average

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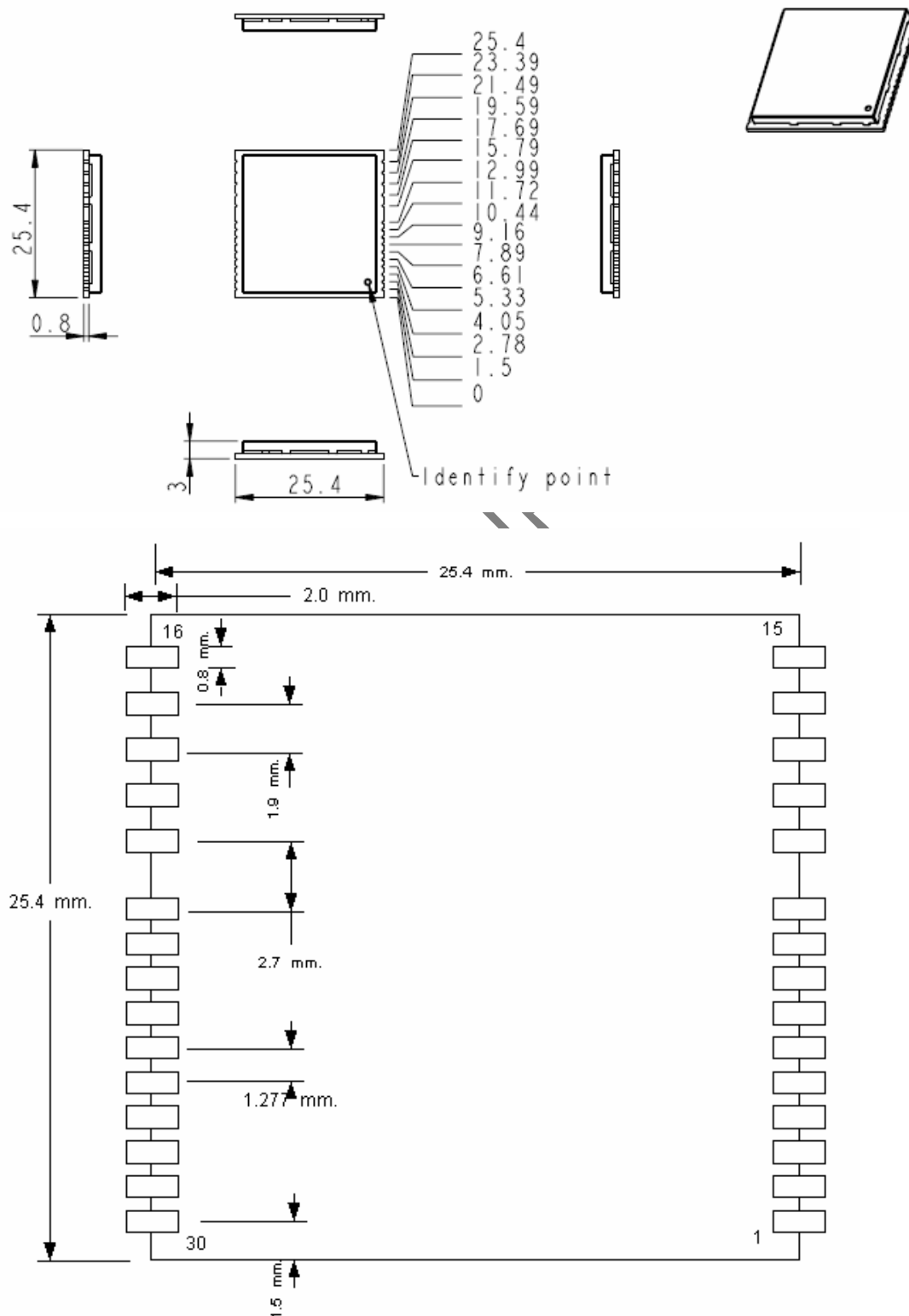
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Warm start	33 sec average
Cold start	36 sec average
Reacquisition	< 1sec
Protocol	
GPS Output Data	NMEA0183(v3.1)- GGA, GLL, GSA, GSV, RMC, VTG Support Baud rate 4800/9600/.../57600 bps (default 4800), Data bit:8, Stop bit:1
Update Rate	1Hz(default)
Protocol Support	NMEA-0183
1PPS	Enable(1Hz pulse 10% duty cycle)
Limitations	
Acceleration Limit	< 4G
Altitude Limit	< 18000 meters
Velocity Limit	< 515 M/sec
Jerk Limit	20 M/sec ³
Power	
Operation Current	Acquisition:65 mA@3.3V
Operation Current	Tracking: < 35mA@3.3V
DC Input Range	VCC 3.0~5.0V VBAT 3.0~5.0V
Processing Core	
Processor Type	ARM7EJ-S
Processor Speeds	48 MHz
Integrated program Flash	4 MHz
Interface	CMOS 2.8 V Level
Temperature	
Operating Temperature	-40℃ to +85℃.
Storage Temperature	-40℃ to +125℃.
Operating Humidity	5% to 95, No condensing
Physical	
Dimension	25.4 * 25.4 * 3 mm.
Weight	3g.

3. Mechanical Dimension

3.1 Mechanical Dimension



4 User Interface

M-89 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.

4.1 Protocol

M-89 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.

4.1.1 NMEA Protocol

M-89 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

4.1.2 MTK NMEA Packet Format

Preamble	TalkerID	PktType	Datafield	*	CHK1	CHK2	CR	LF
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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