

AscenKorea Inc.

GPS-631A Datasheet

Revision: A01



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1. Functional Description

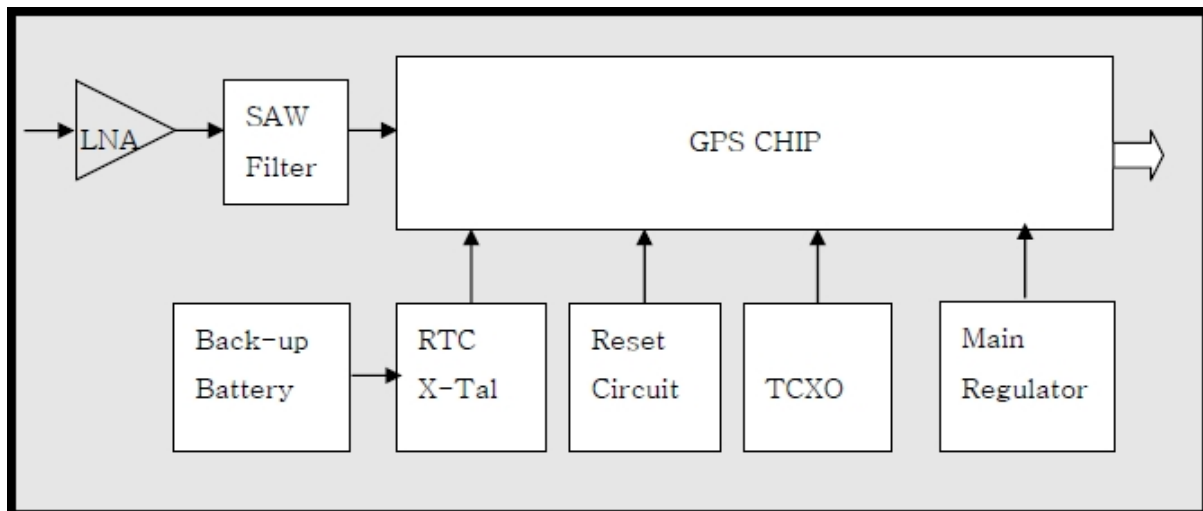
1.1 Overview

The miniGMous-PS2 is a GPS module. It is a GPS receiver providing a solution that high position and speed accuracy performances as well as high sensitivity and tracking capabilities in urban conditions .The GPS chipsets inside the module are designed by **MediaTek Inc.**, which is the world's leading digital media solution provider and largest fab-less IC company in Taiwan. The GPS solution enables small form factor devices. They deliver major advancements in GPS performances, accuracy, integration, computing power and flexibility. They are designed to simplify the embedded system integration process. The module is the best choice for you to design the GPS related products.

1.2 Highlights and Features

- ◆ High Performance GPS Single Chip (MTK Chipset)
GPS DSP with integrated real time clock(RTC) ARM7EJ-S CPU
- ◆ 4Mbit FLASH memory
- ◆ Low noise amplifier
- ◆ SAW filter
- ◆ Built-in regulators (LDO)
- ◆ GPS receiver With Patch Antenna
- ◆ Patch Antenna Size : 25(L)mm X 25(W)mm X 4(T)mm
- ◆ Case : 57mm(L) X 49mm(W) X 16mm(T)
- ◆ Weight : 36 grams Without Cable

1.3 System Block Diagram

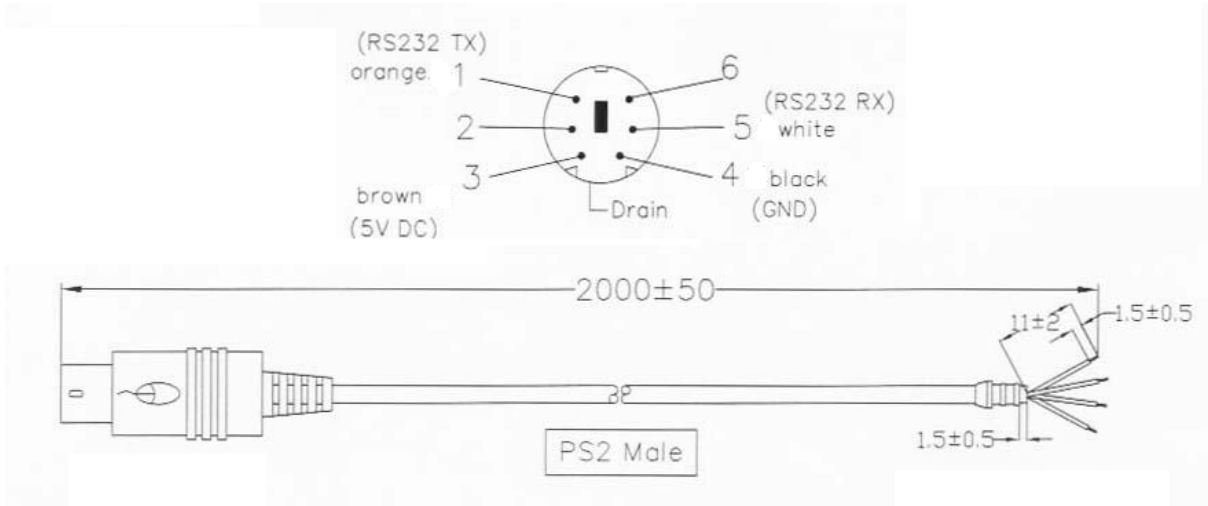


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2. Specifications

2.1 Mechanical Dimension

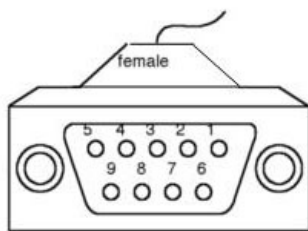
Dimension: (Unit: mm, Tolerance: +/- 0.1mm)



2.2 Pin Configuration(PS2)

Pin	Description	Internal wire color
1	Tx(RS232)	Orange
2	NC	
3	+5V DC	Brown
4	GND	Black
5	Rx(RS232)	White
6	NC	

2.3 Pin Configuration(D-Sub 9Pin)



Pin	Description
1	VCC
2	RX
3	TX
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

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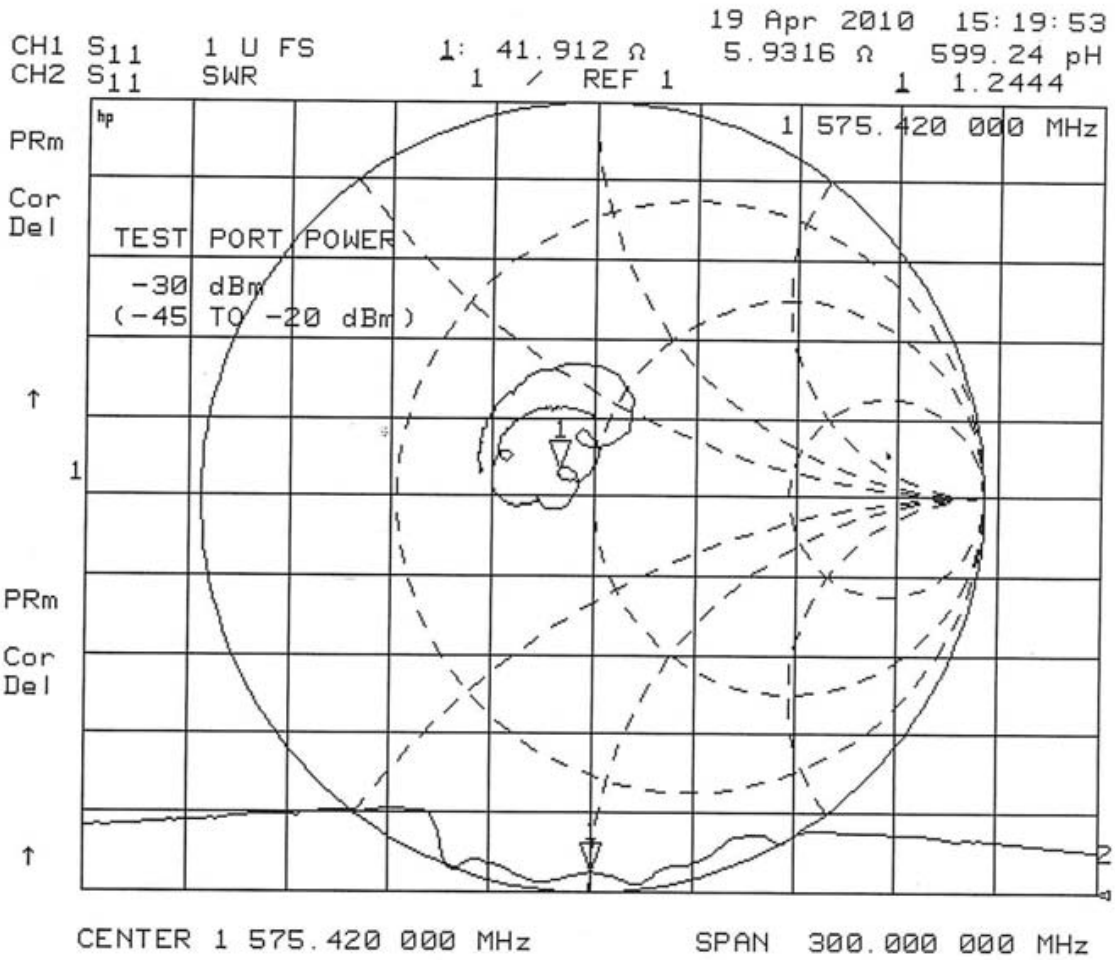
2.3 Specification List

	Description
GPS Solution	MTK MT3329
Frequency	L1, 1575.42MHz
Sensitivity ¹	Acquisition -148dBm, cold start Reacquisition -155dBm Tracking -164dBm
Channel	66 channels
TTFF ¹	Hot start: 1 second typical Warm start: 40 seconds typical Cold start: 60 seconds typical
Position Accuracy	Without aid:3.0m 2D-RMS <3m CEP(50%) without SA (horizontal)
Velocity Accuracy	Without aid : 0.1m/s Without aid:0.1 m/s²
Acceleration Accuracy	Without aid:0.1 m/s²
Altitude	Maximum 18,000m (60,000 feet)
Velocity	Maximum 515m/s (1000 knots)
Acceleration	Maximum 4G
Update Rate	1Hz
Baud Rate	9600 bps
Power Supply	DC 5.0V ±5%
Current Consumption	41mA acquisition, 38mA tracking
Storage Temperature	-40 °C to +80 °C
Operation Temperature	-10 °C to +60 °C
Dimension	33(L)x43(W)x15(H)mm, without cable
Cable Length	2m

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2.4 RF_IN Input Impedance



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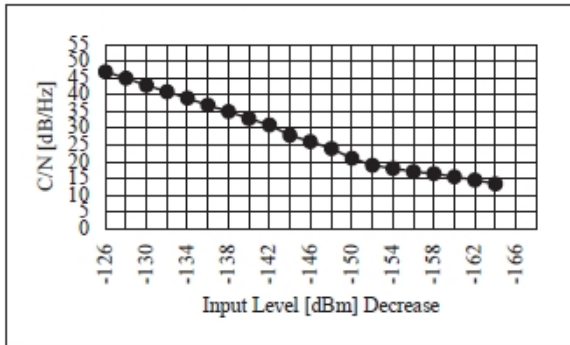
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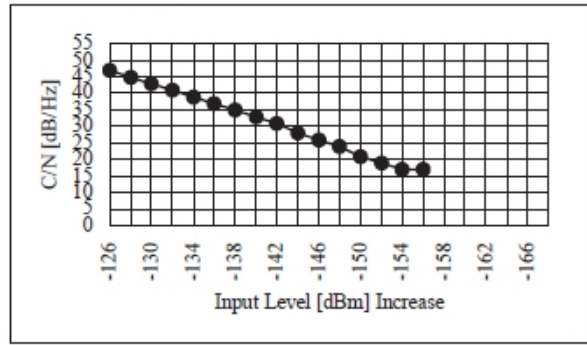


2.5 Performance Specification

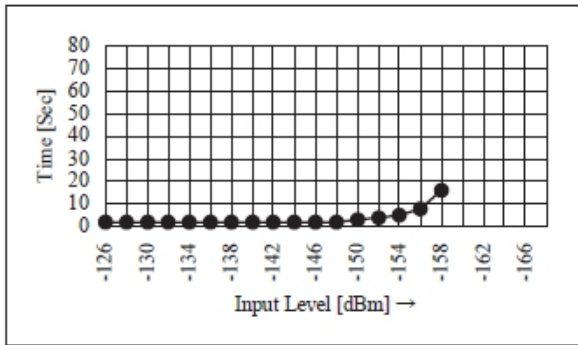
3D Tracking Sensitivity



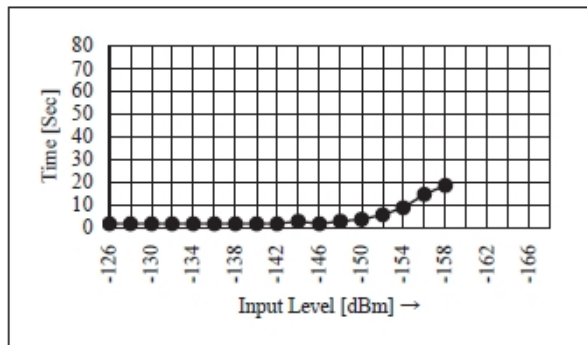
3D Re-Tracking Sensitivity



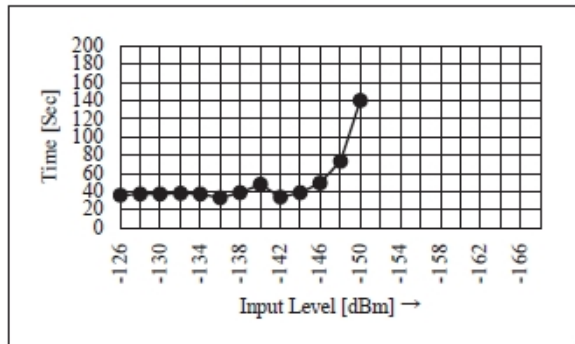
Re-Acquisition Time (After 5Sec)



Re-Acquisition Time (After 60Sec)



Cold Start Time (TTFF)



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3. Protocols

3.1 NMEA Output Sentences

Table-1 A list of each of the NMEA output sentences specifically developed and defined by MTK for use within MTK products

Table-1: NMEA Output Sentence	
Option	Description
GGA	Time, position and fix type data.
GSA	GPS receiver operating mode, active satellites used in the position solution and DOP values.
GSV	The number of GPS satellites in view satellite ID numbers, elevation, azimuth, and SNR values.
RMC	Time, date, position, course and speed data. Recommended Minimum Navigation Information.

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GGA—Global Positioning System Fixed Data. Time, Position and fix related data

Table-2 contains the values for the following example :

\$GPGGA,064951.000,2307.1256,N,12016.4438,E,1,8,0.95,39.9,M,17.8,M,,*65

Table-2: GGA Data Format			
Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Time	064951.000		hhmmss.sss
Latitude	2307.1256		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12016.4438		dddmm.mmmm
E/W Indicator	E		E=east or W=west
Position Indicator	Fix 1		See Table-3
Satellites Used	8		Range 0 to 14
HDOP	0.95		Horizontal Dilution of Precision
MSL Altitude	39.9	meters	Antenna Altitude above/below mean-sea level
Units	M	meters	Units of antenna altitude
Geoidal Separation	17.8	meters	
Units	M	meters	Units of geoid separation
Age of Diff. Corr.		second	Null fields when DGPS is not used
Checksum	*65		
<CR> <LF>			End of message termination

Table-3: Position Fix Indicator	
Value	Description
0	Fix not available
1	GPS fix
2	Differential GPS fix

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GSA—GNSS DOP and Active Satellites

Table-4 contains the values for the following example :

\$GPGSA,A,3,29,21,26,15,18,09,06,10,,,,,2.32,0.95,2.11*00

Table-4: GSA Data Format			
Name	Example	Units	Description
Message ID	\$GPGSA		GSA protocol header
Mode 1	A		See Table-5
Mode 2	3		See Table-6
Satellite Used	29		SV on Channel 1
Satellite Used	21		SV on Channel 2
....
Satellite Used			SV on Channel 12
PDOP	2.32		Position Dilution of Precision
HDOP	0.95		Horizontal Dilution of Precision
VDOP	2.11		Vertical Dilution of Precision
Checksum	*00		
<CR> <LF>			End of message termination

Table-5: Mode 1	
Value	Description
M	Manual—forced to operate in 2D or 3D mode
A	2D Automatic—allowed to automatically switch 2D/3D

Table-6: Mode 2	
Value	Description
1	Fix not available
2	2D (< 4 SVs used)
3	3D (≥ 4 SVs used)

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GSV—GNSS Satellites in View

Table-7 contains the values for the following example :

\$GPGSV,3,1,09,29,36,029,42,21,46,314,43,26,44,020,43,15,21,321,39*7D

\$GPGSV,3,2,09,18,26,314,40,09,57,170,44,06,20,229,37,10,26,084,37*77

\$GPGSV,3,3,09,07,,,26*73

Table-7: GSV Data Format			
Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Number of Messages	3		Range 1 to 3 <i>(Depending on the number of satellites tracked, multiple messages of GSV data may be required.)</i>
Message Number1	1		Range 1 to 3
Satellites in View	09		
Satellite ID	29		Channel 1 (Range 1 to 32)
Elevation	36	degrees	Channel 1 (Maximum 90)
Azimuth	029	degrees	Channel 1 (True, Range 0 to 359)
SNR (C/No)	42	dBHz	Range 0 to 99, (null when not tracking)
....
Satellite ID	15		Channel 4 (Range 1 to 32)
Elevation	21	degrees	Channel 4 (Maximum 90)
Azimuth	321	degrees	Channel 4 (True, Range 0 to 359)
SNR (C/No)	39	dBHz	Range 0 to 99, (null when not tracking)
Checksum	*7D		
<CR> <LF>			End of message termination

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RMC—Recommended Minimum Navigation Information

Table-8 contains the values for the following example :

\$GPRMC,064951.000,A,2307.1256,N,12016.4438,E,0.03,165.48,260406, 3.05,W,A*55

Table-8: RMC Data Format			
Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Time	064951.000		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	2307.1256		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12016.4438		dddmm.mmmm
E/W Indicator	E		E=east or W=west
Speed over Ground	0.03	knots	
Course over Ground	165.48	degrees	True
Date	260406		ddmmyy
Magnetic Variation	3.05,W	degrees	E=east or W=west (Need AscenKorea Customization Service)
Mode	A		A= Autonomous mode D= Differential mode E= Estimated mode
Checksum	*55		
<CR> <LF>			End of message termination

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3.2 MTK NMEA Command Protocols

The complete MTK NMEA Command list document is available by request. Contact AscenKorea for more details.

Packet Type :

103 PMTK_CMD_COLD_START

Packet Meaning:

Cold Start : Don't use Time, Position, Almanacs and Ephemeris data at re-start.

Example:

\$PMTK103*30<CR><LF>



4. Contact

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