



GPS GMOUSE G10

Product specification

Update Record

No.	Version	Updates	Revision Date
1	Ver.1.0	Initial Release	2021.07.12
2	Ver.1.1	Modify Pictures	2024.08.13

The document is subject to change without prior notice.

Product Introduction

G10 is a complete GPS&GLONASS&Galileo&QZSS engine module that features super sensitivity, ultra low power and small form factor. The GPS&GLONASS&Galileo& QZSS signal is applied to the antenna input of module, and a complete serial data message with position, velocity and time information is presented at the serial interface with NMEA protocol or custom protocol.

Its – 165dBm tracking sensitivity extends positioning coverage into place like urban canyons and dense foliage environment where the GPS&GLONASS&Galileo&QZSS was not possible before. The small form factor and low power consumption make the module easy to integrate into portable device like DVR、UVA、Car trackers and PNDs.

Applications

1. UVA (unmanned aerial vehicle)
2. DVR (Digital Video Recording)
3. Rearview mirror DVR
4. Car Tracker

Product Picture



Product Parameter

Type	Parameter
Main chip	MTK 3333
Track sensitivity	-165dBm
Time to First Fix	Extremely fast at low signal level
Built in high LNA	YES
Power consumption	Max 40mA@3.3V
Protocol	NMEA-0183 compliant protocol or custom protocol
Operating temperature	-40 to 85C
Operating voltage	3.0V to 5.0V
Module type	UART/TTL
Size	45x38x13mm
Certification	RoHS compliant(Lead-free)
Power Supply	Supply voltage: 3.0V~5.0V Typical : 3.3V
Power Consumption	Acquisition: 45mA @VCC=VBAT=3.3V Tracking: 40mA @VCC=VBAT=3.3V Standby: 2.0mA @VCC=VBAT=3.3V Backup: 20uA @VBAT=3.3V
Receiver Type	Code 66 search channels, 22 synchronous tracking channels GPS&&QZSS L1 1575.42MHz C/A, GLONASS L1OF 1602MHz, GALILEO E1B/C ¹ , GLONASS L1OF 1602MHz, SBAS: WAAS, EGNOS, MSAS,

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Sensitivity	Tracking: - 165d Bm Re-acquisition: - 156d Bm Acquisition: - 148d Bm
TTFF (EASY enabled)	Cold start : 15s typ @- 130d Bm Warm start : 5s typ @- 130d Bm Hot start : 1s typ @- 130d Bm
TTFF (EASY disabled)	Cold start(Autonomous): 35s typ @- 130d Bm Warm start (Autonomous) : 30s typ @- 130d Bm Hot start (Autonomous) : 1styp @- 130d Bm
Horizontal Position Accuracy (Autonomous)	<2.5m CEP @- 130 dBm
Max Update Rate	Up to 10Hz, 1Hz by fault
Accuracy of 1 PPS Signal	not enabled
Acceleration Accuracy	Without aid: 0.1m/s ²
Dynamic Performance	Maximum altitude: 18,000m Maximum velocity: 515m/s Acceleration: 4G
UART Port	UART Port : TXD and RXD Supports baud rate from 4800bps to 115200bps,

	9600bps by default UART port is used for NMEA output, MTK proprietary commands input and firmware upgrade
Temperature Range	Normal operation: -40°C ~ +85°C Storage temperature: -45°C ~ +125°C
Physical Characteristics	Size: 45±0.20 × 38±0.20 × 13±0.50mm Connecting line specifications: Molex 2*2Pin , L= 130CM Weight: Approx. 98g

Power Supply

Regulated power for the G10 is required. The VCC Pin Need a stable DC voltage supply. Power supply ripple must be less than 30mV. The input voltage Vcc should be 3.0V~5.0V, Recommended power supply voltage is 3.3V . maximum current is 45mA. Suitable decoupling must be provided by external decoupling circuitry.

UART Ports

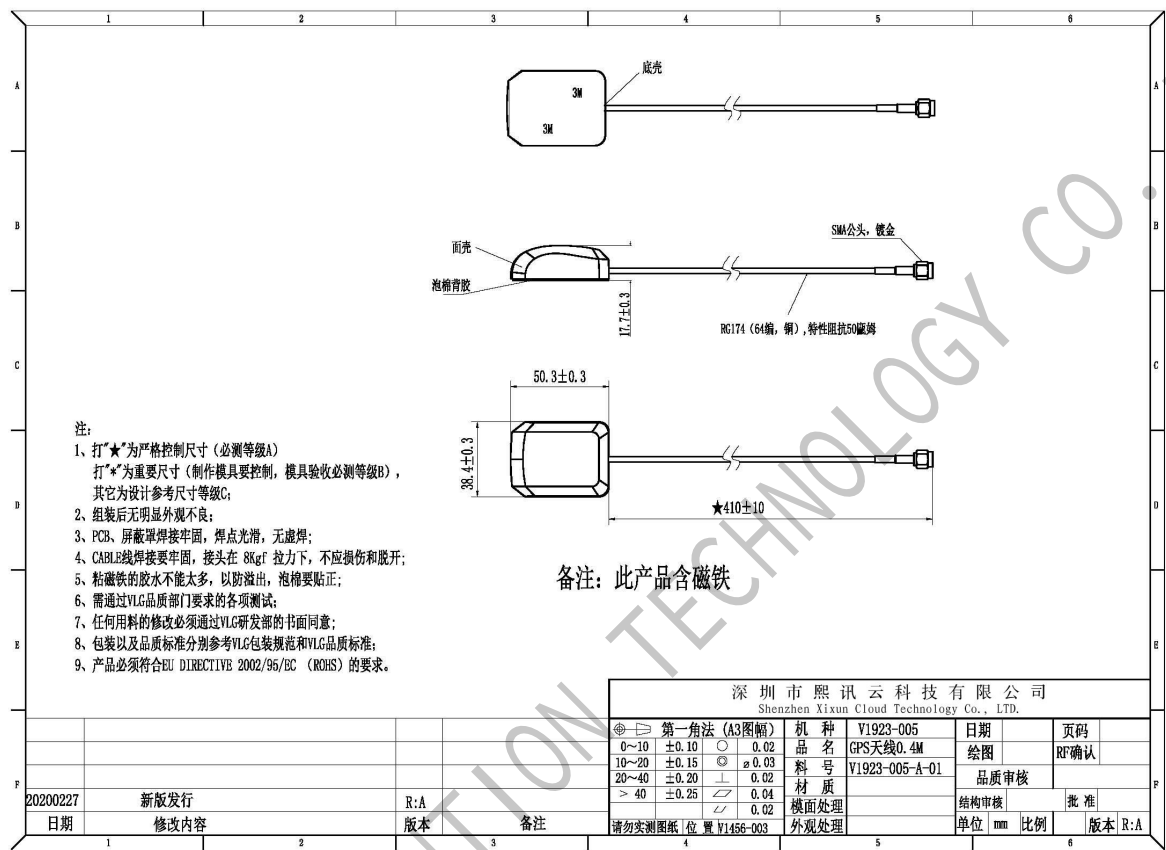
The module supports two full duplex serial channels UART. All serial connections are at 3V CMOS logic levels, if need different voltage levels, use appropriate level shifters. The baud rate of both serial ports are fully programmable, the data format is however fixed: X, N, 8, 1, i.e. X baud rate, no parity, eight data bits and one stop bit, no other data formats are supported, LSB is sent first. The modules default baud rate is set up 9600bps, however, the user can change the default baud rate to any value from 4800 bps to 115kbps. UART port can be used for firmware upgrade, NMEA output and PMTK proprietary commands input.

Application

The module is equipped with a Molex 2*2Pin connects to your application platform. The G10 module It consists of a MediaTek MT3333 single chip GNSS IC which includes the RF part and Baseband part, a patch antenna, a LNA, a SAW filter, a TCXO, a crystal oscillator, Also comes with a 0.22F crystal capacitor ,can backup satellite ephemeris about 2 hour.

SHENZHEN SYSOLUTION TECHNOLOGY CO., LTD

Mechanical Dimensions



Unit: mm

NMEA 0183 Protocol

The NMEA protocol is an ASCII-based protocol, Records start with a \$ and with carriage return/line feed. GPS& GLONASS specific messages all start with \$ GPxxx/\$ GLxxx where \$ GNxxx is a three-letter identifier of the message data that follows. NMEA messages have a check sum, which allows detection of corrupted data transfers.

1. Location mode configuration instruction

Single system or dual system positioning mode can be selected through the configuration instructions, configuration instructions such as **Table 1**.

Table 1: Instruction configuration instructions

Pattern	Instructions	NMEA Out Put
GPS	\$PMTK353, 1,0*36	GPRMC. GPGGA. GPGSV. GPGSA. GPGLL. GPVTG
GLONASS	\$PMTK353,0, 1*36	GLRMC. GLGGA. GLGSV. GLGSA. GLGLL. GLVTG
GPS& GLONASS	\$PMTK353, 1, 1*37	GNRMC. GNGGA. GPGSV. GLGSV. GPGSA. GLGSA. GNGLL. GNVTG

The ASIR AGM-41G-33MX130 initialization location mode for GPS&GLONASS dual mode.

Output data : \$GNRMC. \$GNGGA. \$GPGSV. \$GLGSV. \$GPGSA. \$GLGSA.\$GNGLL. \$GNVTG

2. NMEA-0183 data Detailed field

2.1. GGA-Global Positioning System Fixed Data

\$xxGGA, 161229.487,3723.2475,N, 12158.3416,W, 1,07, 1.0,9.0,M.0000*18

Table 2: GGA Data Format

Name	Example	Units	Description
Message ID	\$xxGGA		GGA protocol header
UTC Position	161229.487		hhmmss.sss
Latitude	3723.2457		ddmm.mmmm
N/S indicator	N		N= north or S= south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E= east or W= west
Position Fix Indicator	1		See Table 2- 1
Satellites Used	07		Range 0 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude	9.0	meters	
Units	M	meters	
Geoids Separation		meters	
Units	M	meters	
Age of Diff.Corr.		second	Null fields when DGPS is not Used
Diff.Ref.Station ID	0000		
Check sum	*18		
<CR> <LF>			End of message termination

Table 2-1: Position Fix Indicators

Value	Description
0	Fix not available or invalid

1	GPS&GLONASS SPS Mode, fix valid
2	Differential GPS&GLONASS, SPS Mode, fix valid
3	GPS&GLONASS PPS Mode, fix valid

2.2. GLL-Geographic Position – Latitude/Longitude

\$xxGLL , 3723.2475, N, 12158.3416, W, 161229.487, A*2C.

Table 3: GLL Data Format

Name	Example	Units	Description
Message ID	\$xxGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
UTC Position	161229.487		hhmmss.sss
Status	A		A= data valid or V=data not valid
Check sum	*2C		
<CR> <LF>			End of message termination

2.3. GSA-GNSS DOP and Active Satellites

\$xxGSA , A, 3, 07, 02, 26,27, 09, 04, 15, , , , , , 1.8, 1.0, 1.5*33.

Table 4: GSA Data Format

Name	Example	Units	Description
Message	\$xxGSA		GSA protocol header
Mode 1	A		See Table 4-2

Mode 2	3		See Table 4- 1
Satellite Used	07		Sv on Channel 1
Satellite Used	02		Sv on Channel 2
...	...		...
Satellite Used			Sv on Channel 66
PDOP	1.8		Position Dilution of Precision
HDOP	1.0		Horizontal Dilution of Precision
VDOP	1.5		Vertical Dilution of Precision
Check sum	*33		
<CR> <LF>			End of message termination

Table 4-1: Mode 1

Value	Description
1	Fix not available
2	2D
3	3D

Table 4-2: Mode 2

Value	Description
M	Manual-forced to operate in 2D or 3D mode
A	Automatic-allowed to automatically switch 2D/3D

2.4. GSV-GNSS Satellites in View

\$xxGSV , 2, 1, 07, 07, 79,048, 42, 02, 51,062, 43, 26, 36,256, 42, 27, 27, 138,42*71

\$xxGSV, 2, 2, 07, 09, 23,313, 42, 04, 19, 159, 41, 15, 12,041, 42*41.

Table 5: GSV Data Format

Name	Example	Units	Description
Message ID	\$xxGSV		GSV protocol header
Number of Message	2		Range 1 to 3
Message Number	1		Range 1 to 3
Satellites in View	07		
Satellite ID	07		Channel 1(Range 1 to 66)
Elevation	79	^d egrees	Channel 1(Maximum 90)
Azinmuth	048	^d egrees	Channel 1(True, Range 0 to 359)
SNR(C/NO)	42	^d BHz	Range 0 to 99,null when not tracking
...			...
Satellite ID	27		Channel 4(Range 1 to 66)
Elevation	27	^d egrees	Channel 4(Maximum 90)
Azimuth	138	^d egrees	Channel 4(True, Range 0 to 359)
SNR(C/NO)	42	^d BHz	Range 0 to 99, null when not tracking
Check sum	*71		
<CR> <LF>			End of message termination

Depending on the number of satellites tracked multiple messages of GSV data may be required.

2.5. RMC-Recommended Minimum Specific GNSS Data

\$xxRMC, 161229.487, A, 3723.2475, N, 12158.3416, W, 0. 13,309.62, 120598,, *10

Table 6: RMC Data Format

Name	Example	Units	Description
Message ID	\$xxRMC		RMC protocol header
UTS Position	161229.487		hhmmss.sss
Status	A		A= data valid or V= data not valid
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N= north or S= south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E= east or W= west
Speed Over Ground	0.13	Knots	
Course Over	309.62	Degrees	True
Ground			
Date	120598		ddmmyy
Magnetic variation		Degrees	E= east or W= west
Check sum	*10		
<CR> <LF>			End of message termination

2.6. VTG-Course Over Ground and Ground Speed

\$xxVTG, 309.62, T, M, 0.13, N, 0.2, K*6E

Table 17: VTG Data Format

Name	Example	Units	Description
Message ID	\$xxVTG		VTG protocol header
Course	309.62	Degrees	Measured heading

Reference	T		True
Course		Degrees	Measured heading
Reference	M		Magnetic
Speed	0.13	Knots	Measured horizontal speed
Units	N		Knots
Speed	0.2	Km/hr	Measured horizontal speed
Units	K		Kilometer per hour
Check sum	*6E		
<CR> <LF>			End of message termination