

## GPS/GNSS Antenna Module



### 1. Product Information

#### 1.1 Product Name: YIC91818GM

#### 1.2 Product Description:

YIC91818GM is a complete standalone GPS/GNSS antenna module. It can simultaneously acquire and track multiple satellite constellations that include GPS, GALILEO, QZSS and SBAS. It features low power and small form factor.

#### 1.3 Feature

- Build on high performance GPS single chip
- High Sensitivity -165 dBm
- Low power consumption: Max 30mA@3.3V
- Integrated LNA with low-gain mode for active antenna option
- 56 channels in Search mode and 22 channels "All-in-View" tracking
- Up to 60,000 simultaneous search windows for fast TTFF and high sensitivity acquisitions
- Average cold start time under 29seconds(open sky)
- Support standard NMEA-0183 and UBLOX protocol
- Patch Antenna Size: 18.4 mm x 18.4 mm x 4 (H)mm
- RoHS compliant (Lead-free)

#### 1.4 Product Application

- Handheld GPS receiver application
- Ideal for PDA, Pocket PC and other consumer devices requiring Positioning capability
- Geographic Surveying
- Sports and Recreation
- Marine Navigation, Fleet Management
- Automotive application
- Car navigation and tracking
- AVL and Location-Based Services
- Timing application

## 2 Technical Specifications

### 2.1 General Characteristics

#### 2.1.1 General

Frequency	L1, 1575.42 MHz
C/A code	1.023 MHz chip rate
Acquisition Channel	56
Tracking Channel	22

#### 2.1.2 Accuracy

Position	2.5m CEP
Velocity	0.1 m/s

#### 2.1.3 Datum

WGS-84	Default WGS84
--------	---------------

#### 2.1.4 Time To First Fix (TTFF)

Hot start	<1sec., average
Warm start	<28sec., average
Cold start	<29sec., average

#### 2.1.5 Sensitivity

Tracking Sensitivity	-165dBm, typical
Acquisition Sensitivity	-148dBm, typical for cold start

#### 2.1.6 Dynamic condition

Altitude	50,000m(Max)
Velocity	515m/s(Max)
Acceleration	4g
Jerk	1g/s

## 2.2 Electrical Characteristics

### 2.2.1 DC Power

Voltage	+3.3VDC
Supply current	Under 30mA @ 3.3V DC Typical

### 2.2.2 Serial Port

Electrical Interface	Two full duplex serial communication
Baud rate	9.6K (Default)
Navigation update rate	1Hz
Protocol Message	NMEA-0183

### 2.2.3 Antenna

Type	Active patch antenna
Center Frequency	1575.42 +/-1.032MHz
Polarization	RHCP
Impedance	50 Ohm

## 2.3 Environmental Characteristics

Operating range	-40°C ~ +85°C
Storage range	-40°C ~ +150°C
Relative Humidity	5% ~ 80%

## 2.4 Physical Characteristics

Length	18 mm
Width	18 mm
Height	7.1 mm

## 2.5 Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Power supply voltage	-0.1	3.3	3.6	V

## 3 Software Interface

### 3.1 NMEA V3.01 Protocol

Its output signal level is TTL: 9600bps (default), 8 bit data, 1 stop bit and no parity.

It supports the following NMEA-0183

Messages: GGA, GLL, GSA, GSV, RMC and VTG.

NMEA Output Messages: the module board outputs the following messages as shown in Table.

Table 1 NMEA-0183 Output Messages

NMEA Record	Description
GGA	Global positioning system fixed data
GLL	Geographic position – latitude / longitude
GSA	GNSS DOP and active satellites
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course over ground and ground speed

#### 3.1.1 GGA-Global Positioning System Fixed Data

Table 2 contains the values of the following example:

\$GPGGA, 161229.487, 3723.24756, N, 12158.34162, W, 1, 07, 1.0, 9.0, M, , , ,0000\*18

Table 2 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Position	161229.487		hhmmss.sss
Latitude	3723.24756		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.34162		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	
Geoid Separation		meters	
Units	M	meters	
Age of Diff. Corr.		second	Null fields when DGPS is not used
Diff. Ref. Station ID	0000		
Checksum	*18		
<CR><LF>			End of message termination

Table 2-1 Position Fix Indicator

Value	Description
0	Fix not available or invalid
1	GPS SPS Mode,fix valid
2	Differential GPS,SPS Mode,fix valid
3	GPS PPS Mode,fix valid

### 3.1.2 GLL-Geographic Position-Latitude/Longitude

Table 3 contains the values of the following Example:

\$GPGLL, 3723.24756, N, 12158.34162, W, 161229.487, A\*2C

Table 3 GLL Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		GLL protocol header
Latitude	3723.24756		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.34162		Dddmm.mmmm
E/W Indicator	W		N=north or S=south
UTC Position	161229.487		Hhmmss.ss
Status	A		A=data valid or V=data not valid
Checksum	*2C		
<CR><LF>			End of message termination

### 3.1.3 GSA-GNSS DOP and Active Satallites

Table 4 contains the values of the following example:

\$GPGSA, 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 ID	\$GPGSA		GSA protocol header
Mode 1	A		See Table 4-1
Mode 2	3		See Table 4-2
Satellite Used	07		Sv on Channel 1
Satellite Used	02		Sv on Channel 2
...			...
Satellite Used			Sv on Channel 12
PDOP	1.8		Position Dilution of Precision
HDOP	1.0		Horizontal Dilution of Precision
VDOP	1.5		Vertical Dilution of Precision
Checksum	*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

### 3.1.4 GSV-GNSS Satellites in View

Table 5 contains the values of the following example:

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

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

Table 5 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGSV		GSV protocol header
Number of Messages <sup>1</sup>	2		Range 1 to 3
Messages Number <sup>1</sup>	1		Range 1 to 3
Satellites in View	07		
Satellite ID	07		Channel 1 ( Range 1 to 32 )
Elevation	79	degrees	Channel 1 ( Maximum 90 )
Azimuth	048	degrees	Channel 1 ( True,Range 0 to 359 )
SNR(C/No)	42	dBHz	Range 0 to 99,null when not tracking
...			...
Satellite ID	27		Channel 4 ( Range 1 to 32 )
Azimuth	27	degrees	Channel 4 ( Maximum 90 )
Elevation	138	degrees	Channel 4 ( True,Range 0 to 359 )
SNR(C/No)	42	dBHz	Range 0 to 99,null when not tracking
Checksum	*71		
<CR> <LF>			End of message termination

<sup>1</sup> Depending on the number of satellites tracked multiple messages of GSV data may be required.

### 3.1.5 RMC-Recommended Minimum Specific GNSS Data

Table 6 contains the values of the following example:

\$GPRMC, 161229.487, A, 3723.24756, N, 12158.34162, W, 0.13, 309.62, 120598, \*10

Table 6 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPRMC		RMC protocol header
UTC Position	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	3723.24756		ddmm.mmmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.34162		ddmm.mmmmm
E/W Indicator	W		E=east or W=west
Speed Over Ground	0.13	knots	
Course Over Ground	309.62	degrees	Ture
Date	120598	dBHz	ddmmyy
Magnetic Variation			E=east or W=west
Checksum	*10		
<CR> <LF>			End of message termination



### 3.1.6 VTG-Course Over Ground and Ground Speed

Table 7 contains the values of the following example:

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

Table 7 VTG Data Format

Name	Example	Units	Description
Message ID	\$GPVTG		VTG protocol header
Course	309.62	degrees	Measured heading
Reference	T		Ture
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
Checksum	*6E		
<CR> <LF>			End of message termination

## 4 Hardware Interface

The YIC91818GM includes an antenna in a unique style waterproof gadget. We can manufacture variable connector cable to suit your demands. Like USB, PHR(JST), GHR(JST), Molex, PS2, RJ11, D-Sub 9..etc.

Definition of Pin assignment



( Pitch = 1.9mm)

1 2 3 4

Pin No.	Pin name	I/O	Description	Remark
1	RX	I	UART Serial Data Input	RXD
2	TX	O	UART Serial Data Output	TXD
3	GND	G	Ground	GND
4	VCC		Power Supply	3.3V