GLOBALSAT GPS Engine Board

Hardware Data Sheet

Product No : ET-314AC

Version 2.2

Globalsat Technology Corporation
16F., No. 186, Jian-Yi Road, Chung-Ho City, Taipei
Hsien 235, Taiwan
Tel: 886-2-8226-3799 Fax: 886-2-8226-3899
E-mail : service@globalsat.com.tw
Website: www.globalsat.com.tw

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Product Description

Product Description

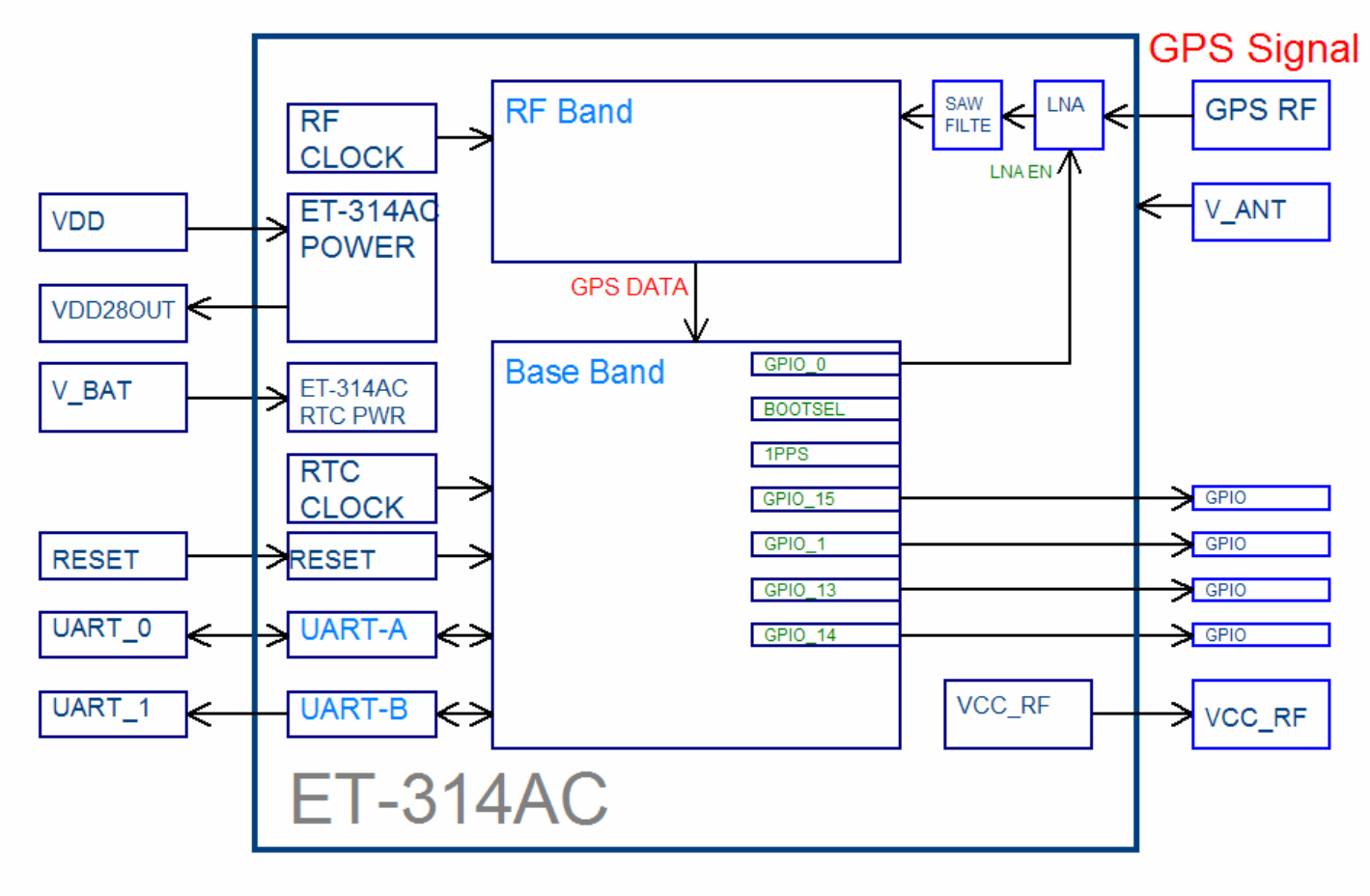
ET-314AC is a compact, high performance, and low power consumption GPS engine board. It uses SiRF Star III chipset which can track up to 20 satellites at a time and perform fast TTFF in weak signal environments. ET-314AC is suitable for the following applications:

- Automotive navigation
- Personal positioning
- Fleet management
- Mobile phone navigation
- Marine navigation

Product Features

- SiRF star III high performance GPS Chipset
- Very high sensitivity (Tracking Sensitivity: -159 dBm)
- Extremely fast TTFF (Time To First Fix) at low signal level
- Two serial ports
- 4Mb flash
- Built-in LNA
- Compact size (25.4mm * 25.4 mm * 2.50mm) suitable for space-sensitive application
- One size component, easy to mount on another PCB board
- Support NMEA 0183 V2.3 (Output: GGA, GSA, GSV, RMC**,** VTG, GLL, ZDA)
- Support SiRF binary protocol
- Active antenna detect

Product Block Diagram



Product Pin Description

PIN Number(s)	Name	Type	Description	Note
1	VCC	P	Main power supply to the engine board.	
2,10,30	GND	P	Ground.	
3	BOOTSEL	I	Set this pin to high for programming flash.	2
4	RxD0	I	This is the main receive channel for receiving software commands to the engine board from SiRFdemo software or from user written software.	1
5	TxD0	O	This is the main transmits channel for outputting navigation and measurement data to user's navigation software or user written software. Output TTL level, 0V ~ 2.85V.	
6	TxD1	O	Serial output (default null)	
7	RxD1	I	Serial input (default null)	1
8	GPIO14	I/O	General purpose I/O	1,3
9,25,26	NC		ET-314AC reserves PIN	
11,12,13,14, 15,16,18	GND_A	P	GPS RF Ground.	
17.	RF IN	RF	GPS antenna input	
19	V_ANT	I	Antenna Bias voltage	
20	VCC_RF	O	Supply Antenna Bias voltage (V=VCC)	
21	V_BAT	P	Backup battery supply voltage	
22	RESET	I	System reset (active low)	
23	VDD28OUT	O	Output voltage 2.85V	
24	GPIO1	I/O	General purpose I/O	2,3
27	GPIO13	I/O	General purpose I/O	1,3
28	GPIO15	I/O	General purpose I/O	1,3
29	1PPS	O	One pulse per second output.	2,3

<Note>

1. Internal pull-up resistor (100KΩ nominal).
2. Internal pull-down resistor (100KΩ nominal).
3. Default input at reset.

Electrical Specification

Absolute Maximums Ratings

Parameter	Min.	Typ.	Max.	Conditions	Unit
POWER Supply					
Main power supply	3.1	3.3	3.5		V
Backup battery supply	2.0		3.5		V
Main power supply Current	23.80	26.24	26.70		mA
Backup battery supply Current	4.5	5.0	12.6		uA
Interface (VCC = 3.3V, VBAT= 3.3V, Operation Temp.= 25℃)					
High Level input Voltage	0.7*VDD		3.5		V
Low Level input Voltage	-0.3		0.3*VDD		V
High Level input Current	-10		10 60	(V=2.85V) (with Pull Low)	uA
Low Level input Current	-10		10 -60	(V=0V) (with Pull High)	uA
High Level output Voltage	0.75*VDD				V
Low Level output Voltage			0.25*VDD		V
RF Input					
Input Impedance		50			Ω
Operating Frequency		1.575			Ghz

☆ VDD is 2.85V for SiRF STARIII CHIP

Receiver Performance

Sensitivity	Tracking:-159dBm
Cold Start	42 seconds, average
Warm Start	38 seconds, average
Hot Start	1 second, average
Reacquisition	0.1 second, average
Accuracy	Position: 10 meters 2D RMS 1-5 meters 2D RMS, WAAS corrected. Velocity: 0.1 m/s Time: 1us synchronized to GPS time
Maximum Altitude	＜ 18,000 meter
Maximum Velocity	＜ 515 meter/ second
Maximum Acceleration	＜ 4G

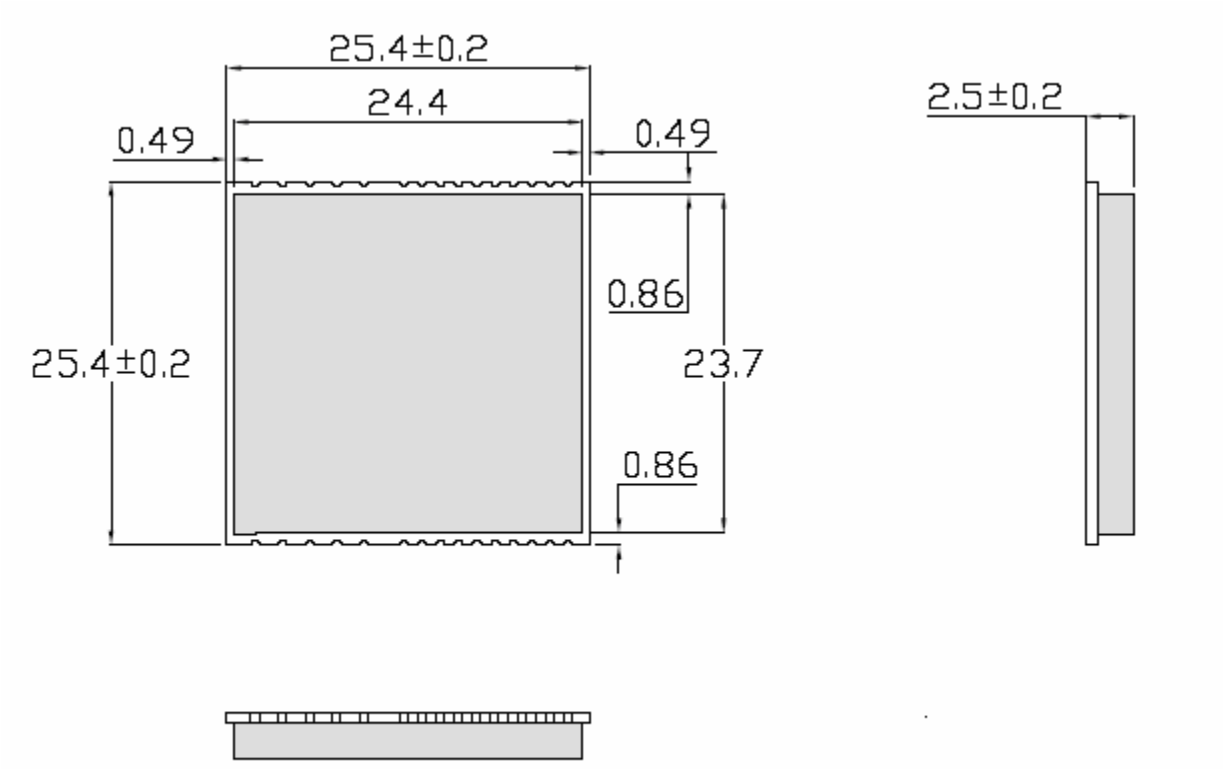
Environmental Characteristics

Parameter	Min	Typ	Max	Unit
Humidity Range	5		95	% non-condensing
Operation Temperature	-40	25	85	℃
Storage Temperature	-40		85	℃

Physical Characteristic

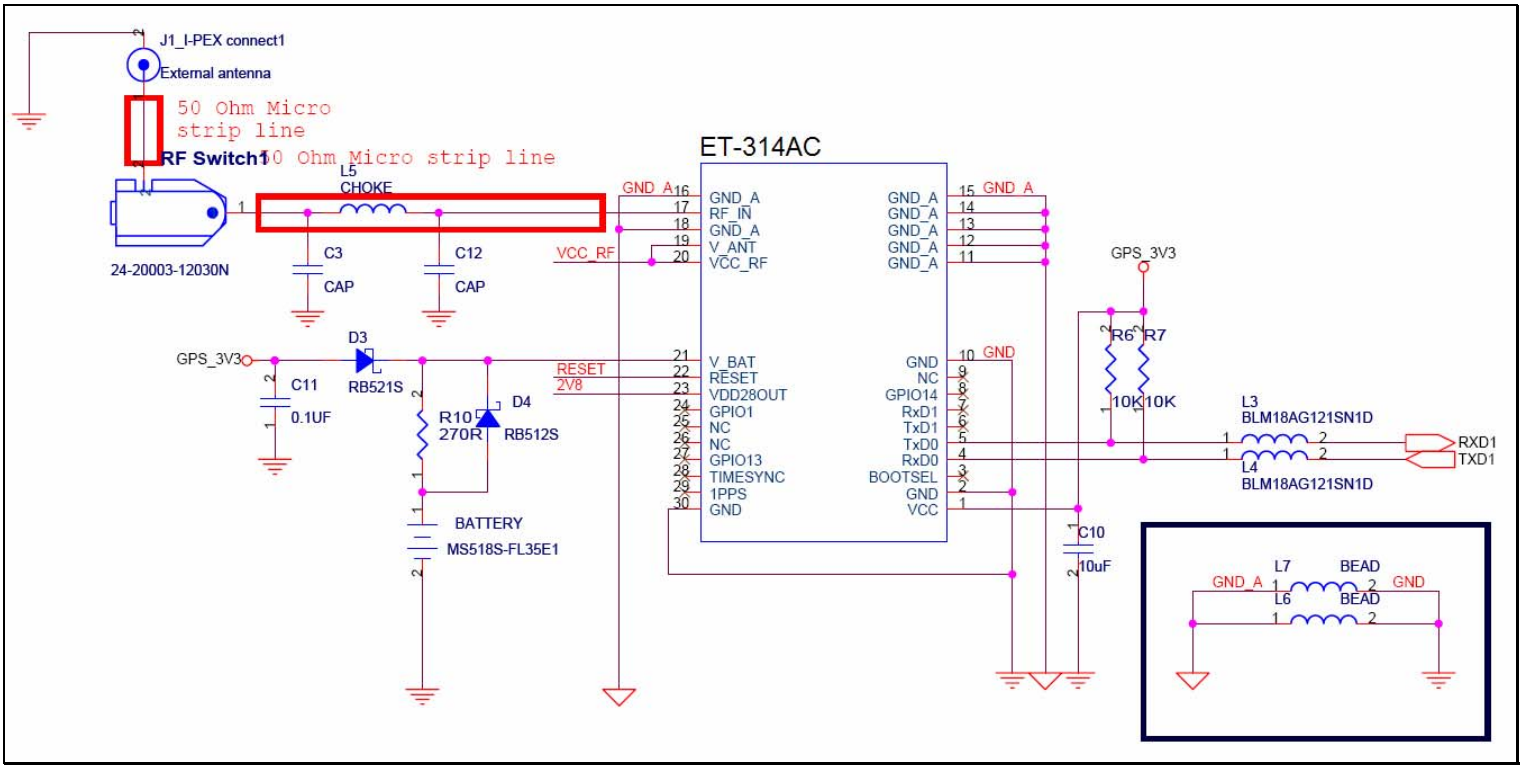
Type	30-pin stamp holes
Dimensions	25.4 mm *25.4 mm * 2.50 mm ±0.2mm

Package Dimensions

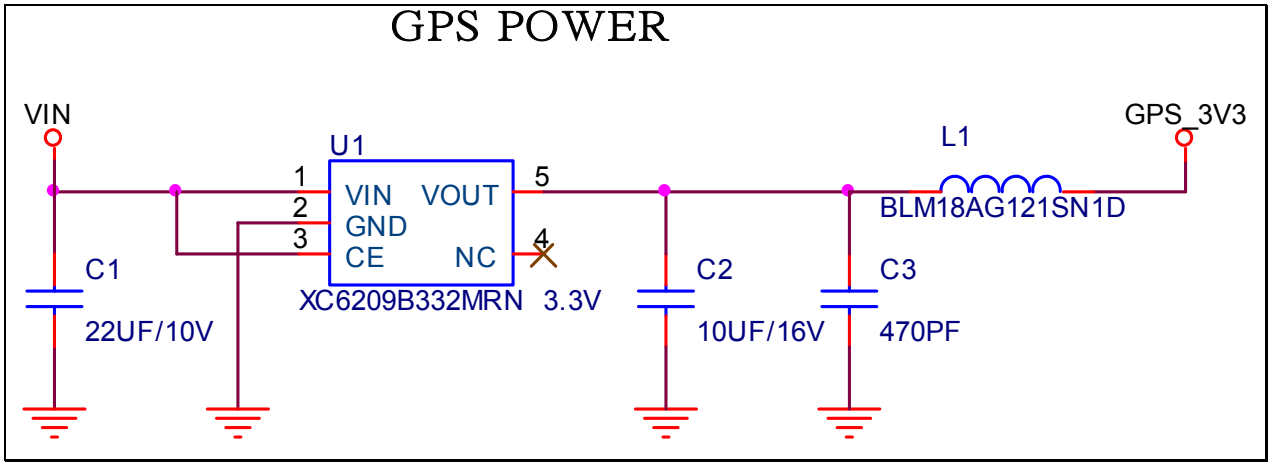


Application

Application Circuit



POWER Circuit



GPS Active Antenna Specifications (Recommendation)

Frequency:	1575.42 + 2MHz	Amplifier Gain:	18~22dB Typical
Axial Ratio:	3 dB Typical	Output VSWR:	2.0 Max.
Output Impedance:	50Ω	Noise Figure:	2.0 dB Max
Polarization:	RHCP	Antenna Input Voltage:	2.85V (Typ.)

OPERATING Description

VCC

This is the main power supply to the engine board. (3.1Vdc to 3.5Vdc)

GND

This is Ground pin for the baseband circuit.

GND_A

This is Ground pin for the ET-314AC RFand circuit. To use ET-314AC, GND_A need connect to GND with L bead or 0Ω resistor.

RxD0

This is the main channel for receiving software commands from SiRFdemo software or from your proprietary software.

TxD0

This is the main transmits channel for outputting navigation and measurement data to user's navigation software or user written software. Output is TTL level, 0V ~ 2.85V

RxD1

For user's application (default null).

TxD1

For user's application (default null).

RF_IN

This pin receives signal of GPS analog via external active antenna. It has to be a controlled impedance trace at 50ohm. Do not have RF traces closed the other signal path and routing it on the top layer. Keep the RF traces as short as possible.

V_BAT

This is the battery backup power input for the SRAM and RTC when main power is off. Without the external backup battery, ET-314AC will always execute a cold star after turning on. To achieve the faster start-up offered by a hot or warm start, a battery backup must be connected. The battery voltage should be between 2.0V and 3.5V.

NC

ET-314AC reserves PIN, Just NC.

VDD28OUT

This PIN is output voltage 2.85V. If do not use it, Just NC.

RESET

This pin is input low active. This Module has internal Power on Reset circuit.

GPIOs

User can use this I/O pin for special functions (For example, control LED) .ET-314AC had GPIO 1 & 13 &14.

VCC_RF

VCC_RF can supply Active Antenna Bias voltage. This pin will supply Active Antenna. If do not use it, Just NC.

V_ANT

V_ANT is Active Antenna Bias voltage input. If you use Active Antenna, you can connect this pin to VCC_RF or connect other POWER (Vin = 2.85~5V). If you will be use Passive Antenna, Just NC.

BOOTSEL

Set this pin to high for programming flash in debug mode. If need programming ET-314AC Flash, just pull-up 15KΩ resistor to 3.3V. When ET-314AC used in normal function, this pin just NC.

1PPS

This pin provides one pulse-per-second output from the board, which is synchronized to GPS time. This is not available in Trickle Power mode. If do not use it, Just NC.

SOFTWARE COMMAND

NMEA Output Command

GGA - Global Positioning System Fixed Data

Note – Fields marked in italic *red* apply only to NMEA version 2.3 (and later) in this NMEA message description

Table A-1 contains the values for the following example:

$GPGGA,161229.487,3723.2475,N,12158.3416,W,1,07,1.0,9.0,M,,,,0000*18

Table A-1 GGA Data Format

Name	Example	Units	Description
Message ID	$GPGGA		GGA protocol header
UTC Time	161229.487		hhmmss.sss
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
Position Fix Indicator	1		See Table A-2
Satellites Used	07		Range 0 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude[1]	9.0	meters	
Units	M	meters	
Geoid Separation[1]		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 A-2 Position Fix Indicator

Value	Description
0	Fix not available or invalid
1	GPS SPS Mode, fix valid
2	Differential GPS, SPS Mode , fix valid
3-5	Not supported
6	*Dead Reckoning Mode, fix valid*

Note – A valid status is derived from all the parameters set in the software. This includes the minimum number of satellites required, any DOP mask setting, presence of DGPS corrections, etc. If the default or current software setting requires that a factor is met, then if that factor is not met the solution will be marked as invalid.

GLL - Geographic Position-Latitude/Longitude

Note – Fields marked in italic *red* apply only to NMEA version 2.3 (and later) in this NMEA message description

Table A-3 contains the values for the following example:
$GPGLL,3723.2475,N,12158.3416,W,161229.487,A,A*41

Table A-3 GLL Data Format

Name	Example	Units	Description
Message ID	$GPGLL		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
Mode	*A*		*A=Autonomous, D=DGPS, E=DR* *N=Output Data Not Valid*
Checksum	*41		
<CR><LF>			End of message termination

GSA - GNSS DOP and Active Satellites

Table A-4 contains the values for the following example:
$GPGSA,A,3,07,02,26,27,09,04,15,,,,,,1.8,1.0,1.5*33

Table A-4 GSA Data Format

Name	Example	Units	Description	
Message ID	$GPGSA		GSA protocol header	
Mode 1	A		M	Manual-forced to operate in 2D or 3D mode
			A	2Dautomatic-allowed to automatically switch 2D/3D

Mode 2	3		1	Fix Not Available
			2	2D
			3	3D
Satellite Used[1]	07		Sv on Channel 1	
Satellite Used[1]	02		Sv on Channel 2	
…..				
Satellite Used[1]			Sv on Channel 12	
PDOP[2]	1.8		Position dilution of Precision	
HDOP[2]	1.0		Horizontal dilution of Precision	
VDOP[2]	1.5		Vertical dilution of Precision	
Checksum	*33			
<CR><LF>			End of message termination	

1. Satellite used in solution.
2. Maximum DOP value reported is 50. When 50 is reported, the actual DOP may be much larger.

GSV - GNSS Satellites in View

Table A-5 contains the values for 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 A-5 GSV Data Format

Name	Example	Units	Description
Message ID	$GPGSV		GSV protocol header
Number of Messages1	2		Range 1 to 3
Message Number1	1		Range 1 to 3
Satellites in View1	07		
Satellite ID	07		Channel 1(Range 1 to 32)
Elevation	79	degrees	Channel 1(Maximum90)
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)
Elevation	27	Degrees	Channel 4(Maximum90)
Azimuth	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

1. Depending on the number of satellites tracked, multiple messages of GSV data may be required. In some software versions, the maximum number of satellites reported as visible is limited to 12, even though more may be visible.

RMC - Recommended Minimum Specific GNSS Data

Note – Fields marked in italic *red* apply only to NMEA version 2.3 (and later) in this NMEA message description

Table A-6 contains the values for the following example:

$GPRMC,161229.487,A,3723.2475,N,12158.3416,W,0.13,309.62,120598,,*10

Table A-6 RMC Data Format

Name	Example	Units	Description
Message ID	$GPRMC		RMC protocol header
UTC Time	161229.487		hhmmss.sss
Status[1]	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 Ground	309.62	degrees	True
Date	120598		ddmmyy
Magnetic Variation[2]		degrees	E=east or W=west
East/West Indicator[2]	E		E=east
Mode	*A*		*A=Autonomous, D=DGPS, E=DR* *N=Output Data Not Valid*
Checksum	*10		
<CR><LF>			End of message termination

1. A valid status is derived from all the parameters set in the software. This includes the minimum number of satellites required, any DOP mask setting, presence of DGPS corrections, etc. If the default or current software setting requires that a factor is met, then if that factor is not met the solution will be marked as invalid.
2. SiRF Technology Inc. does not support magnetic declination. All “course over ground” data

are geodetic WGS84 directions relative to true North.

VTG - Course Over Ground and Ground Speed

Note – Fields marked in italic *red* apply only to NMEA version 2.3 (and later) in this NMEA message description

Table A-7 contains the values for the following example:
$GPVTG,309.62,T,,M,0.13,N,0.2,K,A*23

Table A-7 RMC Data Format

Name	Example	Units	Description
Message ID	$GPVTG		VTG protocol header
Course	309.62	degrees	Measured heading
Reference	T		True
Course		degrees	Measured heading
Reference	M		Magnetic[1]
Speed	0.13	knots	Measured horizontal speed
Units	N		Knots
Speed	0.2	Km/hr	Measured horizontal speed
Units	K		Kilometers per hour
Mode	*A*		*A=Autonomous, D=DGPS, E=DR* *N=Output Data Not Valid*
Checksum	*23		
<CR><LF>			End of message termination

SiRF Technology Inc. does not support magnetic declination. All “course over ground” data are geodetic WGS84 directions.

NMEA Input Command

A). Set Serial Port ID: 100 Set PORTA parameters and protocol

This command message is used to set the protocol (SiRF Binary or NMEA) and/or the communication parameters (baud rate, data bits, stop bits, and parity). Generally, this command is used to switch the module back to SiRF Binary protocol mode where a more extensive command message set is available. When a valid message is received, the parameters are stored in battery-backed SRAM and the receiver will resumes using the saved parameters.

Table B-1 contains the input values for the following example:
Switch to SiRF binary protocol at 9600,8,N,1

$PSRF100,0,9600,8,1,0*0C

Table B-1 Set serial Port Data Format

Name	Example	Units	Description
Message ID	$PSRF100		PSRF100 protocol header
Protocal	0		0=SiRF Binary, 1=NMEA
Baud	9600		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
DataBits	8		8,7. Note that SiRF protocol is only valid for 8 Data bits
StopBits	1		0,1
Parity	0		0=None, 1=Odd, 2=Even
Checksum	*0C		
<CR><LF>			End of message termination

B). Navigation Initialization ID：101 Parameters required for start

This command is used to cause a restart of the receiver, and to specify the type of restart. Optionally, it may also initialize position (in X, Y, Z ECEF coordinates), clock drift, GPS Time Of Week and GPS Week Number. This enables the receiver to search for the correct satellite signals at the correct signal parameters. Correct initialization parameters enable the receiver to quickly acquire signals.

For software that does not support initializing data (GSW3, GSWLT3, SiRFXTrac), attempting to include initializing data may cause unpredictable results. Do not set the initialize-data bit in the ResetCfg word.

Table B-2 contains the input values for the following example:

Start using known position and time.

$PSRF101,-2686700,-4304200,3851624,96000,497260,921,12,3*1C

Name	Example	Units	Description
Message ID	PSRF101		PSRF101 protocol header
ECEF X	-2686700	Meters	X coordinate position
ECEF Y	-4304200	Meters	Y coordinate position
ECEF Z	3851624	Meters	Z coordinate position
clkDrift	96000	Hz	Clock offset of the receiver in Hz☆
TimeOfWeek	497260	Sec	GPS Time Of Week
WeekNo	921		GPS Week Number （ Week No and Time Of Week calculation from UTC time）
ChannelCount	12		Number of channels to use.1-12. If your CPU throughput is not high enough, you could decrease needed throughput by reducing the number of active channels
ResetCfg	3		See Table B-3 & B-4
Checksum	*1C		
<CR><LF>			End of message termination

☆Use 0 for last saved value if available. If this is unavailable, a default value of 75000 for GSP1, 95000 for GSP 1/LX will be used.

Table B-3 Reset Configuration Bit Map

Bit	Description
0☆	Data valid flag: 1 = Use data in ECEF X, Y, Z, Clock Offset, Time of Week and Week number to initialize the receiver; 0 = Ignore data fields
1	Clear ephemeris from memory: blocks Snap or Hot Start from occurring
2	Clear all history (except clock drift) from memory: blocks Snap, Hot, and Warm Starts
3	Factory Reset: clears all GPS memory including clock drift. Also clears almanac stored in flash memory
4	Enable Nav Lib data (YES = 1, NO = 0) ★

☆ For software that does not support initialized data (GSW3, GSWLT3, SiRFXTrac) setting this bit may cause unpredictable results. Do not attempt to use initializing data.01

★ If Nav Lib data are enabled, the resulting messages are enabled: Clock Status (Message ID 7), 50BPS (Message ID 8), Raw DGPS (Message ID 17), NL Measurement Data (Message ID 28), DGPS Data (Message ID 29), SV State Data (Message ID 30), and NL Initialized Data (Message ID 31). All messages sent at 1 Hz. If SiRFDemo is used to enable Nav Lib data, the bit rate is automatically set to 57600 by SiRFDemo.2

Table B-4 Reset Configuration - SiRFLoc Specific

Decimal	Description
00	Perform a hot start using internal RAM data. No initialization data is used.
01	Use initialization data and begin in start mode. Uncertainties are 5 seconds time accuracy and 300 km position accuracy. Ephemeris data in SRAM is used.
02	No initialization data is used, ephemeris data is cleared, and warm start performed using remaining data in RAM.
03	Initialization data is used, ephemeris data is cleared, and warm start performed using remaining data in RAM.
04	No initialization data is used. Position, time, and ephemeris are cleared, and a cold start is performed.
08	No initialization data is used. Internal RAM is cleared and a factory reset is performed.

C). Set DGPS Port ID: 102 Set PORT B parameters for DGPS input

This command is used to control the serial port used to receive RTCM differential corrections. Differential receivers may output corrections using different communication parameters. If a DGPS receiver is used that has different communication parameters, use this command to allow the receiver to correctly decode the data. When a valid message is received, the parameters are stored in battery-backed SRAM and the receiver restarts using the saved parameters.

Table B-5 contains the input values for the following example:
Set DGPS Port to 9600 baud, 8 data bits, 1 stop bit, no parity bit.

$PSRF102,9600,8,1,0*12

Table B-5 Set serial Port Data Format

Name	Example	Units	Description
Message ID	$PSRF102		PSRF102 protocol header
Baud	9600		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
DataBits	8		8,7. Note that SiRF protocol is only valid for 8 Data bits
StopBits	1		0,1
Parity	0		0=None, 1=Odd, 2=Even
Checksum	*12		
<CR><LF>			End of message termination

D). Query/Rate Control ID: 103 Query standard NMEA message and/or set output rate

This command is used to control the output of standard NMEA messages GGA, GLL, GSA, GSV, RMC, and VTG. It also controls the ZDA message in software that supports it. Using this command message, standard NMEA messages may be polled once, or setup for periodic output. Checksums may also be enabled or disabled depending on the needs of the receiving program. NMEA message settings are saved in battery-backed memory for each entry when the message is accepted.

Table B-6 contains the input values for the following example:
Query the GGA message with checksum enabled

$PSRF103,00,01,00,01*25

Table B-6 Query/Rate Control Data Format

Name	Example	Unit	Description
Message ID	$PSRF103		PSRF103 protocol header
Msg	00		Message to control. See Table B-7

Mode	01		0 = Set Rate, 1 = Query one time
Rate	00	sec	Output Rate, 0 = Off, 1-255 = seconds between messages1
CksumEnable	01		0=Disable Checksum, 1=Enable Checksum
.Checksum	*25		
<CR> <LF>	n		End of message terminatio

Table B-7 Messages

Value	Description
0	GGA
1	GLL
2	GSA
3	GSV
4	RMC
5	VTG
6	MSS (If internal beacon is supported)
7	Not defined
8	ZDA (if 1PPS output is supported)
9	Not defined

Note – In TricklePower mode, the update rate specifies TricklePower cycles rather than seconds. If the TP cycle is set at 5 seconds, then an update rate of 2 means to output the message every 2 cycles, or 10 seconds.

E). LLA Navigation Initialization ID: 104 Parameters required to start using Lat/Lon/Alt

This command is used to cause a restart of the receiver, and to specify the type of restart. Optionally, it may also initialize position (in lattitude, longitude, and altitude), clock drift, GPS Time Of Week and GPS Week Number. This enables the receiver to search for the correct satellite signals at the correct signal parameters. Correct initialization parameters enable the receiver to quickly acquire signals.

For software that does not support initializing data (GSW3, GSWLT3, SiRFXTrac), attempting to include initializing data may cause unpredictable results. Do not set the initialize-data bit in the ResetCfg word..

Table B-8 contains the input values for the following example:

Start using known position and time.

$PSRF104,37.3875111,-121.97232,0,96000,237759,1946,12,1*07

Table B-8 LLA Navigation Initialization Data Format

Name	Example	Unit	Description
Message ID	$PSRF104		PSRF104 protocol header
Lat	37.3875111	degrees	Latitude + = North (Range 90 to -90)
Lon	-121.97232	degrees	Longitude + = East (Range 180 to -180)
Alt	0	meters	Altitude position
ClkDrift	96000	Hz	Clock Drift of the Receiver1
TimeOfWeek	237759	sec	GPS Time Of Week
WeekNo	1946		Extended GPS Week Number
ChannelCount	12		Range 1 to 12
ResetCfg	1		See Table B-9
Checksum	*07		
<CR> <LF>			End of message termination

Use 0 for last saved value if available. If this is unavailable, a default value of 96,250 Hz is used.

Table B-9 Reset Configuration Bit Map

Bit	Description
0☆	Data valid flag: 1 = Use data in ECEF X, Y, Z, Clock Offset, Time of Week and Week number to initialize the receiver; 0 = Ignore data fields
1	Clear ephemeris from memory: blocks Snap or Hot Start from occurring
2	Clear all history (except clock drift) from memory: blocks Snap, Hot, and Warm Starts
3	Factory Reset: clears all GPS memory including clock drift. Also clears almanac stored in flash memory
4	Enable Nav Lib data (YES = 1, NO = 0) ★

☆ For software that does not support initialized data (GSW3, GSWLT3, SiRFXTrac) setting this bit may cause unpredictable results. Do not attempt to use initializing data.

★ If Nav Lib data are enabled, the resulting messages are enabled: Clock Status (Message ID 7), 50BPS (Message ID 8), Raw DGPS (Message ID 17), NL Measurement Data (Message ID 28), DGPS Data (Message ID 29), SV State Data (Message ID 30), and NL Initialized Data (Message ID 31). All messages sent at 1 Hz. If SiRFDemo is used to enable Nav Lib data, the bit rate is automatically set to 57600 by SiRFDemo.

F). Development Data On/Off ID: 105 Switch Development Data Messages On/Off

This command turns development data (debug messages) on and off. Development data can be used to help diagnose system problems since many parts of the software contain messages that are output when problems are detected.

Table B-10 contains the input values for the following example:

$PSRF105,1*3E

Table B-10 Development Data On/Off Data Format

Name	Example	Unit	Description
Message ID	$PSRF105		PSRF105 protocol header
Debug	1		0=Off, 1=On
Checksum	*3E		
<CR> <LF>			End of message termination

G). Select Datum ID: 106 Selection of datum to be used for coordinate Transformations

This message allows the selection of an alternate map datum. The receiver software may contain one or more alternate datums in addition to WGS84, the default GPS datum. The table below lists some datums that may be in a particular software build. In addition, other datums may have been added by either SiRF or by developers with SDK software access. Avaliable datums, if different from the list below, should be documented in the system or software documentation.

Table B-11 contains the input values for the following examples:

1. Datum select TOKYO_MEAN

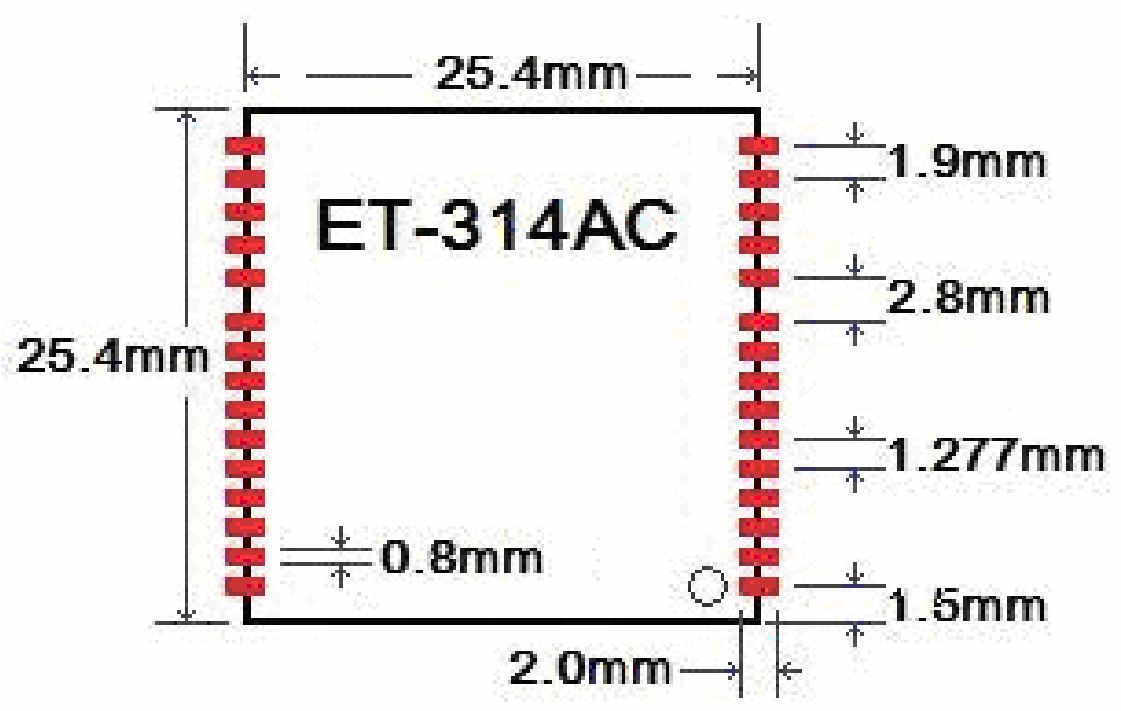
$PSRF106,178*32

Table B-11 Select Datum Data Format

Name	Example	Unit	Description
Message ID	$PSRF106		PSRF106 protocol header
Datum	178		21=WGS84 178=TOKYO_MEAN 179=TOKYO_JAPAN 180=TOKYO_KOREA 181=TOKYO_OKINAWA
Checksum	*32		
<CR> <LF>			End of message termination

PCB Layout Recommend

Recommended Layout PAD



Unit: mm
Tolerance: 0.1mm

PCB Layout Recommendations

Do not routing the other signal or power trace under the engine board.

RF:

This pin receives signal of GPS analog via external active antenna .It has to be a controlled impedance trace at 50ohm.

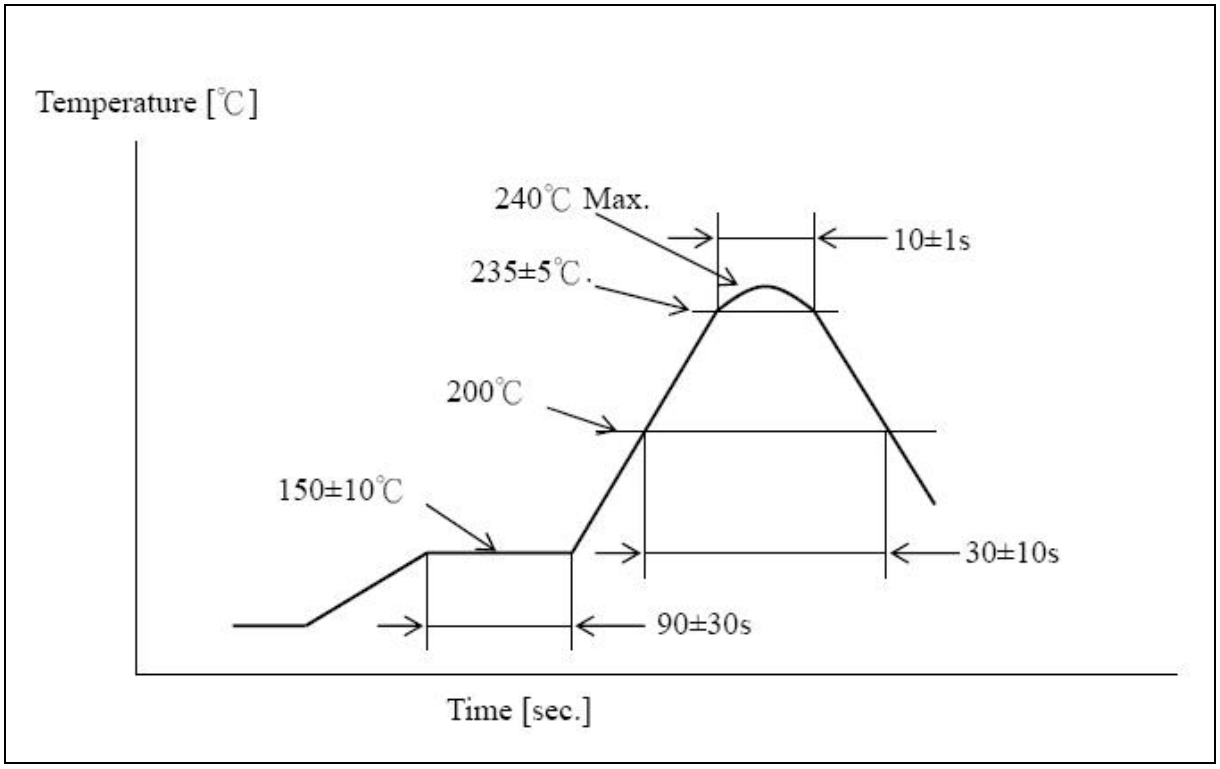
Do not place the RF traces close to the other signal path and not routing it on the top layer.

Keep the RF traces as short as possible.

Antenna:

Keep the active antenna on the top of your system and confirm the antenna radiation pattern、axial ratio、power gain、noise figure、VSWR are correct when you Setup the antenna in your case.

Recommended Reflow Profile:



Pre heating temperature:	150±10[℃]	Pre heating time:	90±30[sec.]
Heating temperature:	235±5[℃]	Heating time:	10±1[sec.]