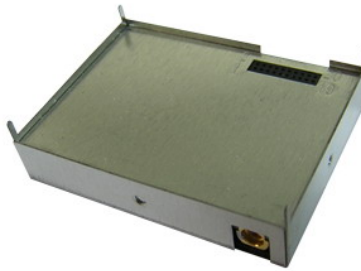




Ct-T30

SiRF Star III GPS Receiver module





Technical Specification

1. Electrical Characteristics

1.1 General	Frequency	L1,1575.42MHz
	C/A code	1.023 MHz chip rate
	Channels	20
1.2 Accuracy	Position	10 meters, 2D RMS 5 meters 2D RMS, WAAS corrected <5meters (50%)
	Velocity	0.1 meters/second
1.3 Datum	Time	1 microsecond synchronized to GPS time
	Default	WGS-84
	Other	selectable for other Datum
1.4 Time to First Fix (TTFF) (open sky & stationary requirements)	Reacquisition	0.1 sec., average
	Cold start	42 sec., average typical TTFF
	Warm start	38 sec., average typical TTFF
	Hot start	1 sec., average typical TTFF
1.5 Dynamic Condition	Altitude	18,000 meters (60,000 Feet) max.
	Velocity	515 meters/sec.(1000 Knots) max.
	Acceleration	4 g., max.
	Jerk	20 meters/sec. ³ max.
1.6 Power	Main Power	+3.3 Vdc± 10%
	power consumption	≈165 mW (continuous mode)
	Supply current	≈49 mA
	Backup Power	1.65~5.0 VDC input
1.7 Serial Port	Electrical interface	Two full duplex serial TTL or RS-232 level
	Protocol	<u>NMEA-0183@4800 bps (default)</u>
	NMEA output	GGA, GLL, GSA, GSV, RMC, VTG (on customer request) Default GGA, GSA, GSV, RMC (Baud Rate :4800)
1.8 Time-1PPS Pulse	Level	TTL
	Pulse duration	The 1PPS pulse width is 1 μs, this 1PPS is NOT suited to steer various oscillators (timing receivers, telecommunications system, etc.)
	Time reference	At the pulse positive edge
	Measurements	Aligned to GPS second, ± 1 microsecond
2. Environmental Characteristics		
2.1 Temperature	Operating range	- 40°C to +85°C
	Storage range	- 55°C to + 100°C
2.2 Physical characteristics	Length	40 mm
	Width	30 mm
	Height	Around 7 mm
	Weight	23 gm
	Antenna connector	MMCX type
	Interface connector	20-pin low profile socket, 1 mm
3. Antenna	Active Antenna	
4. CPU Throughput	Integrated ARM7 TDMI CPU with 50 % throughput available for user tasks	



3. NMEA Output Messages

NMEA-0183 format as defined by the National Marine Electronics Association (NMEA), Standard For Interfacing Marine Electronic Devices, Version 2.20, January 1, 1997.

Table 1 NMEA-0183 Output Messages

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

3.1 GGA--- Global Positioning System Fixed Data

Table 2 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 2 GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Position	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 3
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 3 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

3.2 GLL--- Geographic Position - Latitude/Longitude

Table 4 contains the values for the following example:

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

Table 4 GLL Data Forma

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
Checksum	*2C		
<CR> <LF>			End of message termination

3.3 GSA---GNSS DOP and Active Satellites

Table 5 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 5 GSA Data Format

Name	Example	Units	Description
Message ID	\$GPGSA		GSA protocol header
Mode 1	A		See Table 7
Mode 2	3		See Table 6
Satellite Used in solution	07		Sv on Channel 1
Satellite Used in solution	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 6 Mode 2

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

Table 7 Mode 1

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

3.4 GSV---GNSS Satellites in View

Table 8 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 8 GSV Data Format

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

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



3.5 RMC---Recommended Minimum Specific GNSS Data

Table 9 contains the values for the following example:

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

Table 9 RMC 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	3723.2475		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		degrees	E=east or W=west (Not shown)
Checksum	*10		
<CR> <LF>			End of message termination

3.6 VTG---Course Over Ground and Ground Speed

Table 10 contains the values for the following example:

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

Table 10 VTG 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
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