



Ct-30

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, WAAScorrected <5meters(50%), DGPS corrected |
| | Velocity | 0.1 meters/second |
| | Time | 1 microsecond synchronized to GPS time |
| 1.3 Datum | 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 TTF |
| | 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 ~ 5.0 VDC input |
| | 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 | NMEA-0183@4800 bps (default) |
| | NMEA output | GGA,GLL,GSA,GSV,RMC,VTG (on customer request) Default GGA, GSA, GSV, RMC (Baud Rate :4800) |
| 1.8 Time-1PPS Pulse | Yes | |



| 2. Environmental Characteristics | | |
|---|-----------------------------|--|
| 2.1 Temperature | Operating range | -40 deg. C to +85 deg. C |
| | Storage range | -55 deg. C to +100 deg. C |
| 2.2 Physical characteristics | Length | 30.6 mm |
| | Width | 26 mm |
| | Height | Around 7 mm |
| | Weight | 10 gm |
| | Antenna connector | MMCX type |
| | Interface connector | 20-pin low profile socket, 1 mm |
| 3. Antenna | Active Antenna | |
| 4. CPU Throughput | Integrated ARM7 TDMI | |



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 |

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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

| 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 |