

# Marine GPS Receiver & Locator

## MODEL: GM62C

Small size and ruggedness, demand of vehicle locating and marine navigation GPS Receiver that will sustain harsh environment.



GM62C is a Mini Marine GPS receiver build-in well-known SiRF StarIII GPS chipset. GM62 provides customer high position, velocity and time accuracy performances as well as high sensitivity and tracking capabilities. Customers benefit from the strength of both companies. Thanks to the low power consumption technology, the GPS-Mouse receiver is ideal for many portable applications such as PDA, Tablet PC, smart phone etc.

### Features

Built-in high performance SiRF Star III low power chipset.

Current consumption 40mA

20 channels parallel.

Average Cold Start in 42 seconds.

-159 dBm sensitivity in tracking mode

NMEA0183 compliant protocol

Extreme fast TTFF at low signal level

Water proof IP67

### Applications

Automotive

Personal/Portable Navigation (PDA)

Geographic Surveying

Sports and Recreation

Marine Navigation

Fleet Management

AVL and Location-Based Services

## Specifications

| <b>GPS Features</b>   |  | <b>Datum</b>  |                           |
|---|--|---|---------------------------|
| Chipset   | SiRF Star III LP chipset                       | WGS-84  |                           |
| Frequency   | L1, 1575.42MHz                                 |   |                           |
| C/A Code  | 1.023MHz chip rate                             | <b>Dynamic Conditions</b>   |                           |
| Channels  | 20 channels                                    | Altitude  | <18,000 m<br>(60,000feet) |
| Antenna   | Built-in 25x25x4mm patch antenna               | Velocity  | <515 m/s (1000 knots)     |
|   |  | Acceleration  | <4G                       |
| <b>Sensitivity</b>  |  | Motional Jerk   | 20m/sec <sup>3</sup> max. |
| To - 159dBm Tracking,<br>Superior Urban Canyon Performance          |  |   |                           |
|   |  | <b>Interface</b>  |                           |
|   |  | GPS Protocol: NMEA-0183 - GGA, GSA, GSV, RMC, VTG(Default)                              |                           |
| <b>Time to First Fix (TTFF)</b>                                     |  | <b>RS232 or TTL Output</b>  |                           |
| Cold Start  | 42 sec, average                                | Data bit: 8, stop bit: 1 (Default)  |                           |
| Warm Start  | 38 sec, average                                | Baud Rate : 4800 (Default)  |                           |
| Hot Start   | 6 sec, average                                 | <b>Device Size and Weight</b>   |                           |
| Reacquisition   | 0.1 sec  | 60mm(Dia.) x 18.5mm(H)<br>65grams (w/o cable & connector).                              |                           |
| Update rate : 1 Hz (std.)   |  | Bulkhead mount with 0.8 inch threaded wing nut (standard accessory).                    |                           |
| <b>Accuracy</b>   |  | <b>Environmental Characteristics</b>  |                           |
| Position  | 5m CEP without SA,<br>10m 2D, RMS              | Operating Temperature   | - 30°C to + 85°C          |
| Velocity  | 0.1m/sec, without SA                           |   |                           |
| Time  | 1µs synchronized to GPS time                   | Storage Temperature   | - 40°C to + 95°C          |
| <b>Cable(standard)</b>  | <b>0.5M-PS2(M)</b><br>With PS2(F)+1M+DB9 cable |   |                           |
| <b>Optional cable</b>   | <b>5M &amp; 10M &amp; 15M PS2(M) to PS2(F)</b> | <b>Power :</b> Operation Current 55mA<br>(Average) Power Input 5V ±5% VDC               |                           |
| <b>Optional :</b><br><b>RS232 Interface cable &amp; Power cable</b> |  | <b>1M DB9 &amp; 1M 12~40V Input to 5V</b><br><b>1M OPEN &amp; 1M 12~40V Input to 5V</b> |                           |
| <b>Optional : Bluetooth interface cable</b>                         |  | <b>12V-26V Input &amp; Bluetooth output</b>   |                           |
| <b>Optional : USB interface cable</b>                               |  | <b>PS2(F) to USB</b>  |                           |
| <b>Optional mounting</b>  | <b>FB6 SUS</b>                                 | Water Proof   | IP67                      |

*All specifications are subject to change without notice*

**Standard :**



**Optional Cable :**

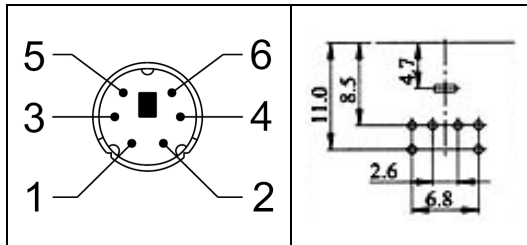
**5M**

**10M**

**15M**



**Pin Assignment of standard PS2 male Din Jack**



| Pin | Signal                     |
|-----|----------------------------|
| 1   | GND                        |
| 2   | +5V                        |
| 3   | N.C.( RS-232_Rx on demand) |
| 4   | TTL_RX                     |
| 5   | N.C.( RS-232_Tx on demand) |
| 6   | TTL_TX                     |

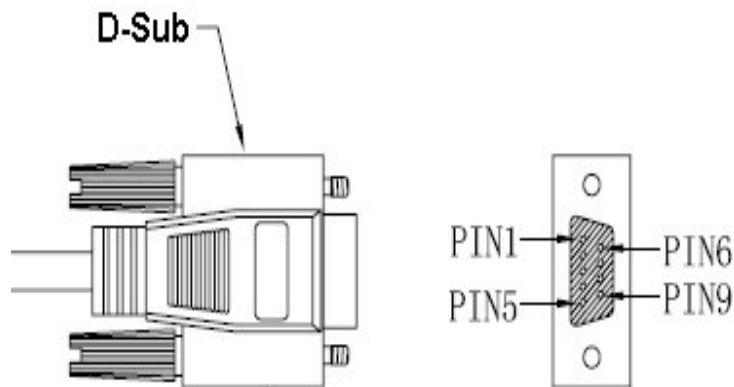
**Optional RS232 Interface cable & Power cable :**

**Model : GM62A**

**Model : GM62B**



**Pin Assignment of D-SUB 9 PIN Female connector**



| <b>GM62A</b>                 |          |                  | <b>GM62B</b>               |          | <b>GM62C</b> |
|------------------------------|----------|------------------|----------------------------|----------|--------------|
| DB9(F) – RS232 & Power cable |          |                  | OPEN – RS232 & Power cable |          | DB9          |
| PIN1                         | N.C.     | VCC 12~40V to 5V | Red                        | Vcc      | VCC 5V       |
| PIN2                         | RS232-TX |                  | Green                      | RS232-TX | RS232-TX     |
| PIN3                         | RS232-RX |                  | White or Blue              | RS232-RX | RS232-RX     |
| PIN4                         | N.C.     |                  | Yellow                     | TTL - TX | N.C.         |
| PIN5                         | GND      | GDN              | Orange                     | TTL - RX | GND          |
| PIN6                         | N.C.     |                  | Black                      | GND      | N.C.         |
| PIN7                         | N.C.     |                  | Shielded wire              | GND      | N.C.         |
| PIN8                         | N.C.     |                  |                            |          | N.C.         |
| PIN9                         | N.C.     |                  |                            |          | N.C.         |

**Optional mounting : FB6 SUS**



## Output NMEA Messages

Table 3 NMEA-0183 V2.3 Output Messages

| NMEA Sentence | Description                              |
|---------------|--|
| GGA (default) | Global Positioning System Fixed Data     |
| GLL (default) | 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 (default) | Course Over Ground and Ground Speed      |
| ZDA (default) | Time and Date                            |

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

Table 4 contains the values for the following example:

\$GPGGA,092725.00,4717.11399,N,00833.91590,E,1,8,1.01,499.6,M,48.0,M,,0\*5B

Table 4 GGA Data Format

| Name                            | Example     | Units  | Description                               |
|---------------------------------|-------------|--------|---|
| Message ID                      | \$GPGGA     |        | GGA protocol header                       |
| UTC Time                        | 092725.00   |        | hhmmss.ss, Current time                   |
| Latitude                        | 4717.11399  |        | ddmm.mmmmm, Degrees + minutes             |
| N/S Indicator                   | N           |        | N=north or S=south                        |
| Longitude                       | 00833.91590 |        | dddmm.mmmmm, Degrees + minutes            |
| E/W Indicator                   | E           |        | E=east or W=west                          |
| Position Fix Indicator          | 1           |        | See Table 5                               |
| Satellites Used                 | 8           |        | Range 0 to 12                             |
| HDOP                            | 1.01        |        | Horizontal Dilution of Precision          |
| MSL Altitude                    | 499.6       | m      |   |
| Units                           | M           | meters | Meters (fixed field)                      |
| Geoid Separation                | 48.0        | m      |   |
| Units                           | M           | meters | Meters (fixed field)                      |
| Age of Differential Corrections |             | second | Blank (Null) fields when DGPS is not used |
| Diff. Ref. Station ID           | 0           |        |   |
| Checksum                        | *5B         |        |   |
| <CR> <LF>                       |             |        | End of message termination                |

Table 5 Position Fix Indicator

| Value | Description       |
|-------|-------------------|
| 0     | No fix or invalid |

|   |                      |
|---|----------------------|
| 1 | Standard GPS (2D/3D) |
| 2 | Differential GPS     |
| 6 | Estimated (DR) Fix   |

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

Table 6 contains the values for the following example:

\$GPGLL,4717.11364,N,00833.91565,E,092321.00,A,A\*60

Table 6 GLL Data Format

| Name          | Example     | Units | Description  |
|---------------|-------------|-------|--|
| Message ID    | \$GPGLL     |       | GLL protocol header  |
| Latitude      | 4717.11364  |       | ddmm.mmmmm, Degrees + minutes  |
| N/S Indicator | N           |       | N=north or S=south   |
| Longitude     | 00833.91565 |       | dddmm.mmmmm, Degrees + minutes   |
| E/W Indicator | E           |       | E=east or W=west   |
| UTC Time      | 092321.00   |       | hhmmss.ss, Current time  |
| Status        | A           |       | V = Data Invalid / Receiver Warning,<br>A=Data Valid   |
| Status        | A           |       | N=No Fix, A=Autonomous GNSS Fix,<br>D=Differential GNSS Fix,<br>E=Estimated/Dead Reckoning Fix |
| Checksum      | *60         |       |  |
| <CR> <LF>     |             |       | End of message termination   |

## GSA---GNSS DOP and Active Satellites

Table 7 contains the values for the following example:

\$GPGSA,A,3,23,29,07,08,09,18,26,28,,,,,1.94,1.18,1.54\*0D

Table 7 GSA Data Format

| Name                | Example | Units | Description                                      |
|---------------------|---------|-------|--|
| Message ID          | \$GPGSA |       | GSA protocol header                              |
| Mode 1 (Smode)      | A       |       | See Table 8                                      |
| Mode 2 (Fix Status) | 3       |       | See Table 9                                      |
| Satellite Used      | 23      |       | SV on Channel 1                                  |
| Satellite Used      | 29      |       | SV on Channel 2                                  |
|                     |         |       | Repeated for each channel                        |
| Satellite Used      |         |       | Sv on Channel 12                                 |
| PDOP                | 1.94    |       | Position Dilution of Precision (00.0 to 99.99)   |
| HDOP                | 1.18    |       | Horizontal Dilution of Precision (00.0 to 99.99) |

|           |      |  |  |
|-----------|------|--|--|
| VDOP      | 1.54 |  | Vertical Dilution of Precision (00.0 to 99.99) |
| Checksum  | *0D  |  |  |
| <CR> <LF> |      |  | End of message termination                     |

Table 8 Mode 1 (Smode)

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

Table 9 Mode 2 (Fix Status)

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

## GSV---GNSS Satellites in View

Table 10 contains the values for the following example:

\$GPGSV,3,1,10,23,38,230,44,29,71,156,47,07,29,116,41,08,09,081,36\*7F

\$GPGSV,3,2,10,10,07,189,,05,05,220,,09,34,274,42,18,25,309,44\*72

\$GPGSV,3,3,10,26,82,187,47,28,43,056,46\*77

Table 10 GSV Data Format

| Name               | Example | Units  | Description  |
|--------------------|---------|--------|--|
| Message ID         | \$GPGSV |        | GSV protocol header  |
| Number of Messages | 3       |        | Total number of GPGSV messages being output , Range 1 to 3 |
| Message Number     | 1       |        | Number of this message, Range 1 to 3                       |
| Satellites in View | 10      |        |  |
| Satellite ID       | 23      |        | SV ID (GPS: 1-32, SBAS 33-64 (33=PRN120))                  |
| Elevation          | 38      | degree | Maximum 90   |
| Azimuth            | 230     | degree | Range 0 to 359   |
| SNR (C/No)         | 44      | dBHz   | Range 0 to 99, null when not tracking                      |
|                    |         |        | Data of 2nd, 3rd Satellite (same as above)                 |
| Satellite ID       | 29      |        | SV ID  |
| Elevation          | 71      | degree | Maximum 90   |
| Azimuth            | 156     | degree | Range 0 to 359   |
| SNR (C/No)         | 47      | dBHz   | Range 0 to 99, null when not tracking                      |
| Checksum           | *7F     |        |  |
| <CR> <LF>          |         |        | End of message termination                                 |

## RMC---Recommended Minimum Specific GNSS Data

Table 11 contains the values for the following example:

```
$GPRMC,083559.00,A,4717.11437,N,00833.91522,E,0.004,77.52,091202,,,A*57
```

Table 11 RMC Data Format

| Name                             | Example     | Units   | Description  |
|----------------------------------|-------------|---------|--|
| Message ID                       | \$GPRMC     |         | RMC protocol header  |
| UTC Time                         | 083559.00   |         | hhmmss.ss, Current time  |
| Status                           | A           |         | A=data valid or V=data not valid   |
| Latitude                         | 4717.11437  |         | ddmm.mmmmm, Degrees + minutes  |
| N/S Indicator                    | N           |         | N=north or S=south   |
| Longitude                        | 00833.91522 |         | dddmm.mmmmm, Degrees + minutes   |
| E/W Indicator                    | E           |         | E=east or W=west   |
| Speed                            | 0.004       | knots   | Speed Over Ground  |
| COG                              | 77.52       | degree  | Course Over Ground (true)  |
| Date                             | 091202      |         | Ddmyy, Current Date in Day, Month Year format  |
| Magnetic Variation               |             | degrees | E=east or W=west (Not being output by receiver)  |
| Magnetic variation E/W indicator |             |         | Not being output by receiver   |
| Mode Indicator                   | A           |         | N=No Fix, A=Autonomous GNSS Fix, D=Differential GNSS Fix, E=Estimated/Dead Reckoning Fix |
| Checksum                         | *53         |         |  |
| <CR> <LF>                        |             |         | End of message termination   |

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

Table 12 contains the values for the following example:

```
$GPVTG,77.52,T,,M,0.004,N,0.008,K,A*06
```

Table 12 VTG Data Format

| Name       | Example | Units   | Description  |
|------------|---------|---------|--|
| Message ID | \$GPVTG |         | VTG protocol header  |
| COG        | 77.52   | degrees | Course Over Ground (true)  |
|            | T       |         | True   |
| COG        |         | degrees | Course Over Ground (maganetic)<br>(Not being output by receiver) |
|            | M       |         | Magnetic   |
| Speed      | 0.004   | knots   | Speed over ground  |
| Units      | N       |         | Knots  |

|           |       |       |  |
|-----------|-------|-------|--|
| Speed     | 0.008 | km/hr | Speed over ground  |
| Units     | K     |       | Kilometer per hour   |
| Mode      | A     |       | N=No Fix, A=Autonomous GNSS Fix, D=Differential GNSS Fix, E=Estimated/Dead Reckoning Fix |
| Checksum  | *0B   |       |  |
| <CR> <LF> |       |       | End of message termination   |

## ZDA---Time and Date

Table 13 contains the values for the following example:

\$GPZDA,082710.00,16,09,2002,00,00\*64

Table 13 ZDA Data Format

| Name               | Example   | Units   | Description                                     |
|--------------------|-----------|---------|---|
| Message ID         | \$GPZDA   |         | ZDA protocol header                             |
| UTC Time           | 081727.00 | degrees | hhmmss.ss                                       |
| Day                | 16        |         | 01 to 31  |
| Month              | 09        |         | 01 to 12  |
| Year               | 2002      |         | 4 digit year                                    |
| Local zone hours   | 00        |         | (Not being output by receiver)<br>(fixed to 00) |
| Local zone minutes | 00        |         | (Not being output by receiver)<br>(fixed to 00) |
| Checksum           | *64       |         |   |
| <CR> <LF>          |           |         | End of message termination                      |