

**GM88-mini** is a GPS Mouse receiver build-in well-known SiRF StarIII GPS chipset. **GM88-mini** 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 IPX6

## Applications

- ◆ Automotive
- ◆ Personal/Portable Navigation (PDA)
- ◆ Geographic Surveying
- ◆ Sports and Recreation
- ◆ Marine Navigation
- ◆ Fleet Management
- ◆ AVL and Location-Based Services

# Specifications

| <b>General</b>   |                           | <b>Accuracy</b>  |                              |
|--|---------------------------|--|------------------------------|
| GPS Chip   | SiRF Star III LP chipset  | Position   |                              |
| Frequency  | L1, 1575.42MHz            | 10 meters, 2D RMS<br>7 meters 2D RMS, WAAS corrected<br>1-5 meters, DGPS corrected |                              |
| C/A Code   | 1.023MHz chip rate        |  | 0.1 m/sec                    |
| Channels   | 20 CH                     | Time   | 1ms synchronized to GPS time |
|  |                           | <b>Datum</b>   |                              |
| <b>Sensitivity</b>                                     |                           | WGS-84   |                              |
| To – 159Bm Tracking, Superior Urban Canyon Performance |                           | <b>Dynamic Conditions</b>  |                              |
|  |                           | Altitude   | <18,000 m (60,000 feet)      |
| <b>Acquisition Rate</b>                                |                           | Velocity   | <515 m/sec (1,000 knots)     |
| Cold Start   | 42 sec, average           | Acceleration   | <4g                          |
| Warm Start   | 38 sec, average           | Motional Jerk  | <20 m/sec                    |
| Hot Start  | 6 sec, average            | <b>GPS Protocol</b>  |                              |
| Reacquisition  | 0.1sec, average           | Default: NMEA-0183,  |                              |
| Accuracy   | Snap start 2 sec, average | GGA(1), GSA(1), GSV(1), RMC(1),  |                              |
| <b>Power</b>   |                           | Band rate 9600 bps,  |                              |
| Operation Power  | 5.0 VDC+10%               | Data bit : 8, stop bit : 1   |                              |
| Current Consumption                                    | 40mA                      | <b>Device Size</b>   |                              |
|  |                           | 41.0x36.0x15.0 mm  |                              |
| <b>Environmental</b>                                   |                           | <b>Water Proof</b>   |                              |
| Operating Temperature                                  | - 30 °C to + 80 °C        | IPX6   |                              |
| Relative Humidity                                      | 5% to 95% non-condensing  |  |                              |

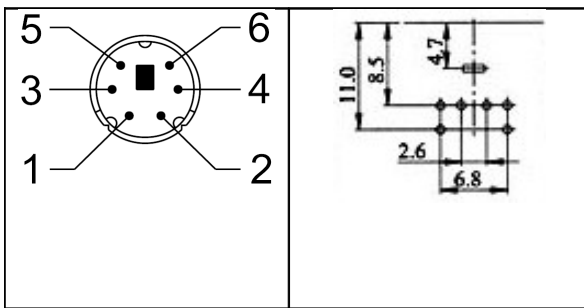
# Hardware Interface

The GM-88 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. You provide me specification, we manufacture the cable and connector.



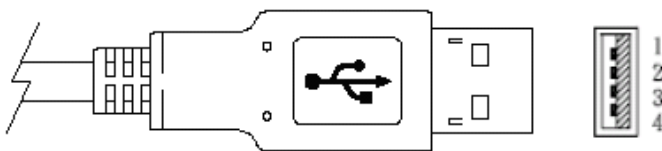
## GM-88 Standard PIN OUT

- Pin Assignment of standard PS2 male Din Jack



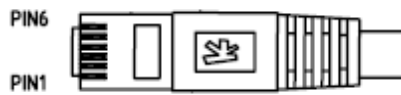
| Pin | Signal                     |
|-----|----------------------------|
| 1   | GND                        |
| 2   | VCC 5.0V                   |
| 3   | N.C.( RS-232 Rx on demand) |
| 4   | TTL RX                     |
| 5   | N.C.( RS-232 Tx on demand) |
| 6   | TTL TX                     |

- Pin Assignment of A Type USB connector



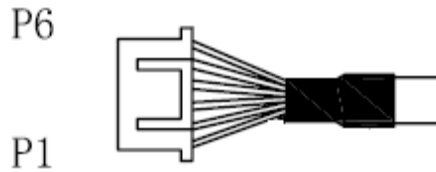
| Pin | Signal   |
|-----|----------|
| 1   | +5.0 VDC |
| 2   | D-       |
| 3   | D+       |
| 4   | GND      |

- Pin Assignment of RJ11 connector



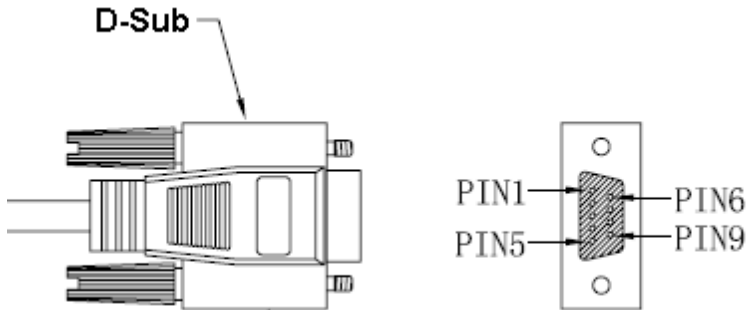
| Pin  | Signal     |
|------|------------|
| PIN1 | VCC 5.0V   |
| PIN2 | RX (RS232) |
| PIN3 | TX (RS232) |
| PIN4 | GND        |
| PIN5 | N.C.       |
| PIN6 | N.C.       |

- Pin Assignment of PHR 6 PIN connector(JST PH Connector pitch 2.0mm )



| Pin  | Signal     |
|------|------------|
| PIN1 | VCC 5.0V   |
| PIN2 | RX (RS232) |
| PIN3 | TX (RS232) |
| PIN4 | GND        |
| PIN5 | N.C.       |
| PIN6 | N.C.       |

- Pin Assignment of D-SUB 9 PIN Female connector



| Pin  | Signal   |
|------|----------|
| PIN1 | N.C.     |
| PIN2 | TTL-TX   |
| PIN3 | TTL-RX   |
| PIN4 | N.C.     |
| PIN5 | GND      |
| PIN6 | VCC 5.0V |
| PIN7 | N.C.     |
| PIN8 | N.C.     |
| PIN9 | N.C.     |

# Appendix A: NMEA output message

| 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      |

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

Table 5.1-2 contains the values for the following example:

```
$GPGGA,053740.000,2503.6319,N,12136.0099,E,1,08,1.1,63.8,M,15.2,M,,0000*64
```

Table 5.1- 2 GGA Data Format

| Name                   | Example    | Units  | Description                       |
|------------------------|------------|--------|-----------------------------------|
| Message ID             | \$GPGGA    |        | GGA protocol header               |
| UTC Time               | 053740.000 |        | hhmmss.sss                        |
| Latitude               | 2503.6319  |        | ddmm.mmmm                         |
| N/S indicator          | N          |        | N=north or S=south                |
| Longitude              | 12136.0099 |        | dddmm.mmmm                        |
| E/W Indicator          | E          |        | E=east or W=west                  |
| Position Fix Indicator | 1          |        | See Table 5.1-3                   |
| Satellites Used        | 08         |        | Range 0 to 12                     |
| HDOP                   | 1.1        |        | Horizontal Dilution of Precision  |
| MSL Altitude           | 63.8       | meters |                                   |
| Units                  | M          | meters |                                   |
| Geoid Separation       | 15.2       | meters |                                   |
| Units                  | M          | meters |                                   |
| Age of Diff. Corr.     |            | second | Null fields when DGPS is not used |
| Diff. Ref. Station ID  | 0000       |        |                                   |
| Checksum               | *64        |        |                                   |
| <CR> <LF>              |            |        | End of message termination        |

Table 5.1-3 Position Fix Indicators

| 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        |

● **GLL--- Geographic Position – Latitude/Longitude**

Table 5.1-4 contains the values for the following example:

\$GPGLL,2503.6319,N,12136.0099,E,053740.000,A,A\*52

Table 5.1-4 GLL Data Format

| Name          | Example    | Units | Description                      |
|---------------|------------|-------|----------------------------------|
| Message ID    | \$GPGLL    |       | GLL protocol header              |
| Latitude      | 2503.6319  |       | ddmm.mmmm                        |
| N/S indicator | N          |       | N=north or S=south               |
| Longitude     | 12136.0099 |       | dddmm.mmmm                       |
| E/W indicator | E          |       | E=east or W=west                 |
| UTC Time      | 053740.000 |       | hhmmss.sss                       |
| Status        | A          |       | A=data valid or V=data not valid |
| Mode          | A          |       | A=autonomous, D=DGPS, E=DR       |
| Checksum      | *52        |       |                                  |
| <CR> <LF>     |            |       | End of message termination       |

● **GSA---GNSS DOP and Active Satellites**

Table 5.1-5 contains the values for the following example:

\$GPGSA,A,3,24,07,17,11,28,08,20,04,,,,,2.0,1.1,1.7\*35

*Table 5.1-5 GSA Data Format*

| Name                 | Example | Units | Description                      |
|----------------------|---------|-------|----------------------------------|
| Message ID           | \$GPGSA |       | GSA protocol header              |
| Mode 1               | A       |       | See Table 5.1-6                  |
| Mode 2               | 3       |       | See Table 5.1-7                  |
| ID of satellite used | 24      |       | Sv on Channel 1                  |
| ID of satellite used | 07      |       | Sv on Channel 2                  |
| ....                 |         |       | ....                             |
| ID of satellite used |         |       | Sv on Channel 12                 |
| PDOP                 | 2.0     |       | Position Dilution of Precision   |
| HDOP                 | 1.1     |       | Horizontal Dilution of Precision |
| VDOP                 | 1.7     |       | Vertical Dilution of Precision   |
| Checksum             | *35     |       |                                  |
| <CR> <LF>            |         |       | End of message termination       |

*Table 5.1-6 Mode 1*

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

*Table 5.1-7 Mode 2*

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

## ● GSV---GNSS Satellites in View

Table 5.1-8 contains the values for the following example:

```
$GPGSV,3,1,12,28,81,285,42,24,67,302,46,31,54,354,,20,51,077,46*73
```

```
$GPGSV,3,2,12,17,41,328,45,07,32,315,45,04,31,250,40,11,25,046,41*75
```

```
$GPGSV,3,3,12,08,22,214,38,27,08,190,16,19,05,092,33,23,04,127,*7B
```

Table 5.1-8 GSV Data Format

| Name                                  | Example | Units   | Description  |
|---------------------------------------|---------|---------|--|
| Message ID                            | \$GPGSV |         | GSV protocol header                                |
| Total number of messages <sup>1</sup> | 3       |         | Range 1 to 3                                       |
| Message number <sup>1</sup>           | 1       |         | Range 1 to 3                                       |
| Satellites in view                    | 12      |         |  |
| Satellite ID                          | 28      |         | Channel 1 (Range 01 to 32)                         |
| Elevation                             | 81      | degrees | Channel 1 (Range 00 to 90)                         |
| Azimuth                               | 285     | degrees | Channel 1 (Range 000 to 359)                       |
| SNR (C/No)                            | 42      | dB-Hz   | Channel 1 (Range 00 to 99, null when not tracking) |
| Satellite ID                          | 20      |         | Channel 4 (Range 01 to 32)                         |
| Elevation                             | 51      | degrees | Channel 4 (Range 00 to 90)                         |
| Azimuth                               | 077     | degrees | Channel 4 (Range 000 to 359)                       |
| SNR (C/No)                            | 46      | dB-Hz   | Channel 4 (Range 00 to 99, null when not tracking) |
| Checksum                              | *73     |         |  |
| <CR> <LF>                             |         |         | End of message termination                         |

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



● **RMC---Recommended Minimum Specific GNSS Data**

Table 5.1-9 contains the values for the following example:

```
$GPRMC,053740.000,A,2503.6319,N,12136.0099,E,2.69,79.65,100106,,A*53
```

Table 5.1-9 RMC Data Format

| Name               | Example    | Units   | Description                      |
|--------------------|------------|---------|----------------------------------|
| Message ID         | \$GPRMC    |         | RMC protocol header              |
| UTC Time           | 053740.000 |         | hhmmss.sss                       |
| Status             | A          |         | A=data valid or V=data not valid |
| Latitude           | 2503.6319  |         | ddmm.mmmmm                       |
| N/S Indicator      | N          |         | N=north or S=south               |
| Longitude          | 12136.0099 |         | dddmm.mmmmm                      |
| E/W Indicator      | E          |         | E=east or W=west                 |
| Speed over ground  | 2.69       | knots   | True                             |
| Course over ground | 79.65      | degrees |                                  |
| Date               | 100106     |         | ddmmyy                           |
| Magnetic variation |            | degrees |                                  |
| Variation sense    |            |         | E=east or W=west (Not shown)     |
| Mode               | A          |         | A=autonomous, D=DGPS, E=DR       |
| Checksum           | *53        |         |                                  |
| <CR> <LF>          |            |         | End of message termination       |

● **VTG---Course Over Ground and Ground Speed**

Table 5.1-10 contains the values for the following example:

\$GPVTG,79.65,T,,M,2.69,N,5.0,K,A\*38

*Table 5.1-10* VTG Data Format

| Name               | Example | Units   | Description                |
|--------------------|---------|---------|----------------------------|
| Message ID         | \$GPVTG |         | VTG protocol header        |
| Course over ground | 79.65   | degrees | Measured heading           |
| Reference          | T       |         | True                       |
| Course over ground |         | degrees | Measured heading           |
| Reference          | M       |         | Magnetic                   |
| Speed over ground  | 2.69    | knots   | Measured speed             |
| Units              | N       |         | Knots                      |
| Speed over ground  | 5.0     | km/hr   | Measured speed             |
| Units              | K       |         | Kilometer per hour         |
| Mode               | A       |         | A=autonomous, D=DGPS, E=DR |
| Checksum           | *38     |         |                            |
| <CR> <LF>          |         |         | End of message termination |

# Appendix B: Proprietary NMEA input message

Table 5.2-1 Message Parameters

| Start Sequence           | Payload           | Checksum            | End Sequence          |
|--------------------------|-------------------|---------------------|-----------------------|
| \$PSRF<MID> <sup>1</sup> | Data <sup>2</sup> | *CKSUM <sup>3</sup> | <CR><LF> <sup>4</sup> |

1. Message Identifier consisting of three numeric characters. Input messages begin at MID 100.
2. Message specific data. Refer to a specific message section for <data>...<data> definition.
3. CKSUM is a two-hex character checksum as defined in the NMEA specification, *NMEA-0183Standard For Interfacing Marine Electronic Devices*. Use of checksums is required on all input messages.
4. Each message is terminated using Carriage Return (CR) Line Feed (LF) which is \r\n which is hex 0D0A. Because \r\n are not printable ASCII characters, they are omitted from the example strings, but must be sent to terminate the message and cause the receiver to process that input message.

Note: All fields in all proprietary NMEA messages are required, none are optional. All NMEA messages are comma delimited.

Table 5.2-2 Proprietary NMEA input messages

| Message                     | MID <sup>1</sup> | Description  |
|-----------------------------|------------------|--|
| SetSerialPort               | 100              | Set PORT A parameters and protocol                           |
| NavigationInitialization    | 101              | Parameters required for start using X/Y/Z <sup>2</sup>       |
| SetDGPSPort                 | 102              | Set PORT B parameters for DGPS input                         |
| Query/Rate Control          | 103              | Query standard NMEA message and/or set output rate           |
| LLANavigationInitialization | 104              | Parameters required for start using Lat/Lon/Alt <sup>3</sup> |
| Development Data On/Off     | 105              | Development Data messages On/Off                             |
| Select Datum                | 106              | Selection of datum to be used for coordinate transformations |

1. Message Identification (MID).
2. Input coordinates must be WGS84.
3. Input coordinates must be WGS84

## ● 100---SetSerialPort

This command message is used to set the protocol (SiRF binary or NMEA) and/or the communication parameters (Baud, 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 Evaluation Receiver restarts using the saved parameters.

Table 5.2-3 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 5.2-3 Set Serial Port Data Format

| Name       | Example   | Units | Description                 |
|------------|-----------|-------|-----------------------------|
| Message ID | \$PSRF100 |       | PSRF100 protocol header     |
| Protocol   | 0         |       | 0=SiRF binary, 1=NMEA       |
| Baud       | 9600      |       | 4800,9600,19200,38400,57600 |
| DataBits   | 8         |       | 8,7 <sup>1</sup>            |
| StopBits   | 1         |       | 0,1                         |
| Parity     | 0         |       | 0=None, 1=Odd, 2=Even       |
| Checksum   | *0C       |       |                             |
| <CR><LF>   |           |       | End of message termination  |

1. SiRF protocol is only valid for 8 data bits, 1 stop bit, and no parity.

## ● 101---NavigationInitialization

This command is used to initialize the Evaluation Receiver by providing current position (in X, Y, Z coordinates), clock offset, and time. This enables the Evaluation Receiver to search for the correct satellite signals at the correct signal

parameters. Correct initialization parameters enable the Evaluation Receiver to acquire signals quickly.

Table 5.2-4 contains the input values for the following example:

Start using known position and time

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

Table 5.2-4 Navigation Initialization Data Format

| 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                                |
| ClkOffset    | 96000     | Hz      | Clock Offset of the Evaluation Receiver <sup>1</sup> |
| TimeOfWeek   | 497260    | seconds | GPS Time Of Week                                     |
| WeekNo       | 921       |         | GPS Week Number                                      |
| ChannelCount | 12        |         | Range 1 to 12  |
| ResetCfg     | 3         |         | See Table 5.2-5                                      |
| Checksum     | *1C       |         |  |
| <CR><LF>     |           |         | End of message termination                           |

1. Use 0 for last saved value if available. If this is unavailable, a default value of 96000 is used.

Table 5.2-5 Reset Configuration

| Hex  | Description   |
|------|---|
| 0x01 | Hot Start – All data valid  |
| 0x02 | Warm Start – Ephemeris cleared  |
| 0x03 | Warm Start (with Init) – Ephemeris cleared, initialization data loaded                    |
| 0x04 | Cold Start – Clears all data in memory  |
| 0x08 | Clear Memory – Clears all data in memory and resets the receiver back to factory defaults |

### ● 102---SetDGPSPort

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 5.2-6 contains the input values for the following example:

Set DGPS Port to be 9600,8,N,1.

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

Table 5.2-6 Set GPS Port Data Format

| Name       | Example   | Units | Description                |
|------------|-----------|-------|----------------------------|
| Message ID | \$PSRF102 |       | PSRF102 protocol header    |
| Baud       | 9600      |       | 4800,9600,19200,38400      |
| DataBits   | 8         |       | 8,7                        |
| StopBits   | 1         |       | 0,1                        |
| Parity     | 0         |       | 0=None, 1=Odd, 2=Even      |
| Checksum   | *12       |       |                            |
| <CR><LF>   |           |       | End of message termination |

Note: RTCM is not supported.

### ● 103---Query/Rate Control

This command is used to control the output of standard NMEA messages GGA, GLL, GSA, GSV, RMC, and VTG.

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 5.2-7 contains the input values for the following example:

1. Query the GGA message with checksum enabled

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

2. Enable VTG message for a 1 Hz constant output with checksum enabled

\$PSRF103,05,00,01,01\*20

3. Disable VTG message

\$PSRF103,05,00,00,01\*21

Table 5.2-7 Query/Rate Control Data Format (See example 1)

| Name        | Example   | Units   | Description                           |
|-------------|-----------|---------|---------------------------------------|
| Message ID  | \$PSRF103 |         | PSRF103 protocol header               |
| Msg         | 00        |         | See Table 5.2-8                       |
| Mode        | 01        |         | 0=SetRate, 1=Query                    |
| Rate        | 00        | seconds | Output – off=0, max=255               |
| CksumEnable | 01        |         | 0=Disable Checksum, 1=Enable Checksum |
| Checksum    | *25       |         |                                       |
| <CR><LF>    |           |         | End of message termination            |

Table 5.2-8 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                           |

● **104--LLANavigationInitialization**

This command is used to initialize the Evaluation Receiver by providing current position (in latitude, longitude, and altitude coordinates), clock offset, and time. This enables the receiver to search for the correct satellite signals at the correct signal parameters. Correct initialization parameters enable the receiver to acquire signals quickly.

Table 5.2-9 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 5.2-9 LLA Navigation Initialization Data Format

| Name         | Example    | Units   | Description  |
|--------------|------------|---------|--|
| Message ID   | \$PSRF104  |         | PSRF104 protocol header                              |
| Lat          | 37.3875111 | degrees | Latitude position (Range 90 to -90)                  |
| Lon          | -121.97232 | degrees | Longitude position (Range 180 to -180)               |
| Alt          | 0          | meters  | Altitude position                                    |
| ClkOffset    | 96000      | Hz      | Clock Offset of the Evaluation Receiver <sup>1</sup> |
| TimeOfWeek   | 237759     | seconds | GPS Time Of Week                                     |
| WeekNo       | 1946       |         | Extended GPS Week Number (1024 added)                |
| ChannelCount | 12         |         | Range 1 to 12  |
| ResetCfg     | 1          |         | See Table 5.2-10                                     |
| Checksum     | *07        |         |  |
| <CR><LF>     |            |         | End of message termination                           |

1. Use 0 for last saved value if available. If this is unavailable, a default value of 96000 is used.

Table 5.2-10 Messages

| Hex  | Description   |
|------|---|
| 0x01 | Hot Start – All data valid  |
| 0x02 | Warm Start – Ephemeris cleared  |
| 0x03 | Warm Start (with Init) – Ephemeris cleared, initialization data loaded                |
| 0x04 | Cold Start – Clears all data in memory  |
| 0x08 | Clear Memory – Clears all data in memory and resets receiver back to factory defaults |

● **105---Development Data On/Off**

Use this command to enable development data information if you are having trouble getting commands accepted. Invalid commands generate debug information that enables you to determine the source of the command rejection. Common reasons for input command rejection are invalid checksum or parameter out of specified range.

Table 5.2-11 contains the input values for the following example:

1. Debug On

\$PSRF105,1\*3E

2. Debug Off

\$PSRF105,0\*3F

Table 5.2-11 Development Data On/Off Data Format

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

● **106---Select Datum**

\$PSGPS receivers perform initial position and velocity calculations using an earth-centered earth-fixed (ECEF) coordinate system. Results may be converted to an earth model (geoid) defined by the selected datum. The default datum is WGS 84 (World Geodetic System 1984) which provides a worldwide common grid system that may be translated into local coordinate systems or map datums. (Local map datums are a best fit to the local shape of the earth and not valid worldwide.)

Table 5.2-12 contains the input values for the following example:

Datum select TOKYO\_MEAN

\$PSRF106,178\*32



Table 5.2-12 Development Data On/Off Data Format

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