

Marine GPS/GLONASS Receiver

MODEL: MR-700MG

MTK MT3333 Chip GPS Marine Receiver with Full Waterproof
Garmin compatible Marine GPS Receiver



Key Feature:

- MTK high Sensitivity sokution MT3333
- Fast TTFF at low signal level
- Up to 10Hz update rate
- Standard and NMEA-0183 output
- User selectable baud rate
- Support GPS, GLONASS, GALILEO and QZSSupport AGPS
- Support 99-channel GNSS

Possible Application:

- Marine Navigation.
- Fleet Management.
- Mileage Management.
- Tracking devices/system.
- Data logging for marine Navigation.
- Mapping devices for PC & Pocket PC.
- Marine Navigation or touring devices.
- AVL and Location-Based service system

Specifications:

| Specifications | Parameter | Description |
|-------------------------|------------------------|--|
| General | | GPS, GALILEO, QZSS: L1 1575.42MHz, C/A code GLONASS: L1 1598.0625MHz ~ 1605.375MHz, C/A code Support 99 channels (33 Tracking, 99 Acquisition) |
| Update rate | | 1Hz Default , up to 10Hz |
| Accuracy Sensitivity | Position | 2.5m CEP(Autonomous) |
| | SBAS | 2.5m (depends on accuracy of correction data) |
| | Tracking Cold start | -162dBm, up to -165dBm (with external LNA) -143.5dBm, up to -148dBm (with external LNA) |
| Acquisition | Cold start | 32s (typical) without AGPS <15s (typical) with AGPS (hybrid ephemeris prediction) |
| | Hot start (Open Sky) | < 1s (typical) |
| | Hot start (Indoor) | < 30s |
| Reacquisition | | 100 ms typical (signal reacquisition) |
| Dynamics | Altitude | 18000m max. |

| | | |
|------------------------------|---------------|--|
| BJTEK Navigation Inc. | Velocity | 515 m/sec. |
| | Vibration | 4G max. |
| Operation Temperature | | -40° C to +85° C |
| Storage Temperature | | -45° C to +90° C |
| Operating Humidity | | 0% to 95% RH, non condensing |
| Water Resistance | | 100% waterproof |
| Primary Power | | 9V ~ 70V DC |
| Power Consumption | | <100mA |
| Protocol | | NMEA-0183 v3.01 baud rate default 4800 |
| Signal level | | RS-232(standard),USB & RS-422 optional |
| NMEA Message | | GGA ,GLL ,VTG ,RMC ,ZDA |
| EMI filter | | Rejects power line interference |
| Power cable | | UL 2464/24Awg , 15M-OPEN |
| Enclosure | | High impact, corrosion-proof polycarbonate resin |
| Connector | | 45CM-7PIN(M) |
| Dimensions | GPS Locator | 90.5mm(Dia.) × 108.5mm(H) |
| | Mounting Base | 70mm(W) × 41.5mm(H) |
| Weight | | 200 grams |
| Standard Mounting | | Concinnity and Solid design |

* This specification is subject to change without prior notice

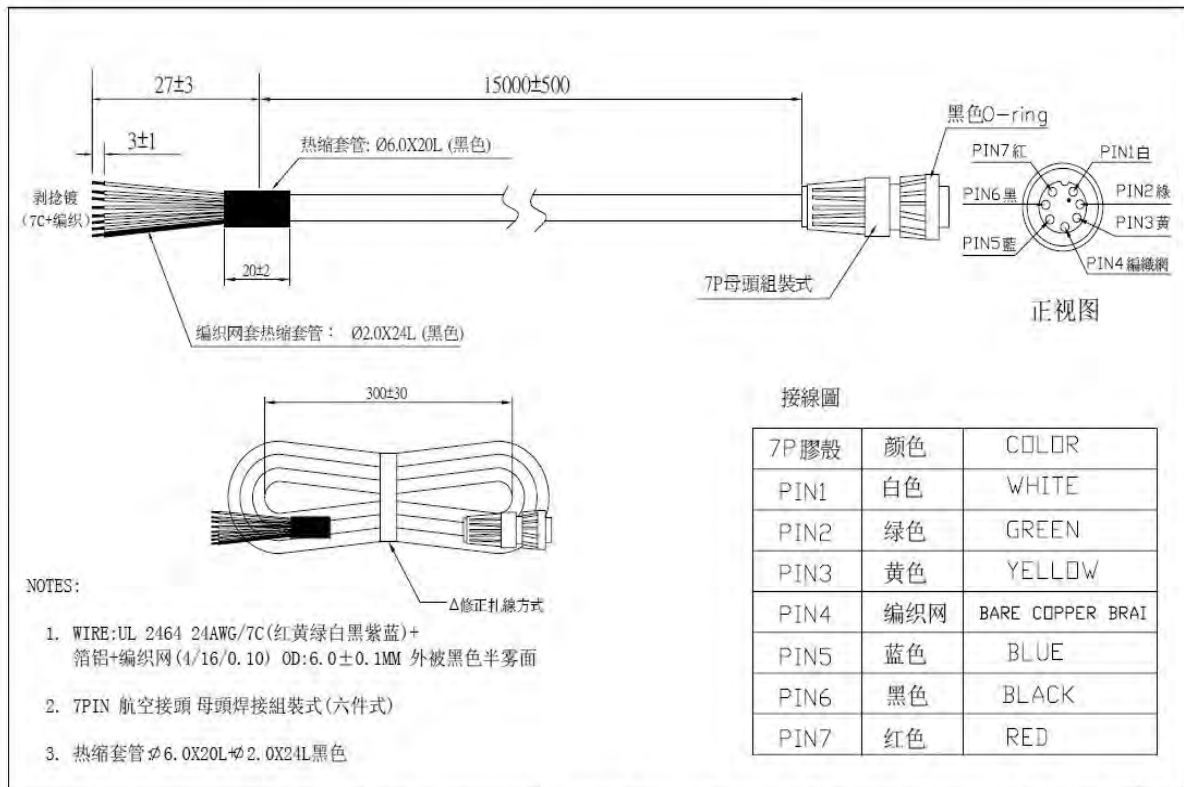
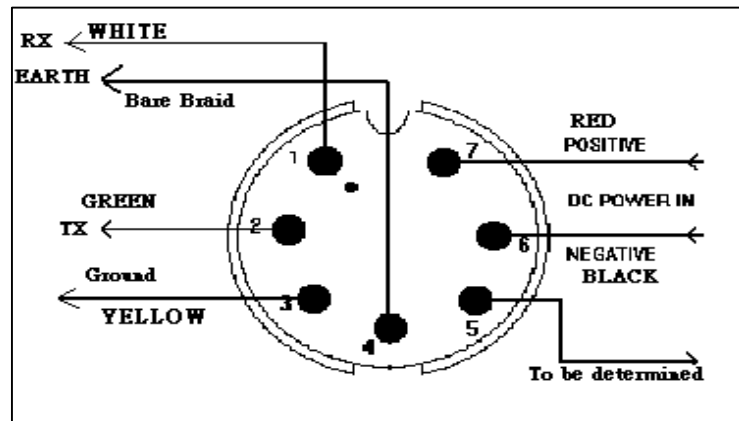
User selectable datum *Pole mount to 1"-14 UNS threaded mast



RS232 I/O Connection

| I/O PIN & CABLE | |
|----------------------|------------|
| Wire | Function |
| White (白) | Receive |
| Green(綠) | Transmit |
| Yellow(黃) | GND |
| Bare Braid(隔離地線/熱縮黑) | Earth/GND |
| Blue(藍) | NG |
| Purplr(紫) | NG |
| Black(黑) | Power- GND |
| Red(紅) | Power+ |

| Wire | Function |
|----------------------|-----------------------|
| White (R+) 白 | Differential input + |
| Green (T-) 綠 | Differential output - |
| Yellow (T+) 黃 | Differential output + |
| Purple (R-) 紫 | Differential input - |
| Blue 藍 | NG |
| Bare Braid(隔離地線/熱縮黑) | Earth/GND |
| Black (-) 黑 | Power- |
| Red (+) 紅 | Power+ |



NOTES:

- WIRE:UL 2464 24AWG/7C(紅黃綠白黑紫藍)+ 箔鋁+編織網(4/16/0.10) OD:6.0±0.1MM 外被黑色半霧面
- 7PIN 航空接頭 母頭焊接組裝式(六件式)
- 熱縮套管φ6.0X20Lφ2.0X24L黑色

| | | | | | | | | | |
|------|-------|------------|------------|---------|----------|-----------|-----------|------------------|------|
| UNIT | SCALE | PROJECTION | DRAWN BY | CHECKED | APPROVED | TOLERANCE | PARTS NO. | DWG. NO. | REV. |
| MM | NOT | | 曾雪軍 | | | | | 7P 防水母頭 CABLE | A3 |
| | | | 2013.01.04 | | | | | | |

Table 5.1-1 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 | mters | |
| Units | M | mters | |
| Geoid Separation | 15.2 | mters | |
| Units | M | mters | |
| Age of Diff. Corr. | | second | Null fields when DGPS is not used |
| Diff. Ref. Station ID | 0000 | | |
| Checksum | *64 | | |

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 ¹ | 3 | | Range 1 to 3 |
| Message number ¹ | 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 |

● **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.mmmm |
| N/S Indicator | N | | N=north or S=south |
| Longitude | 12136.0099 | | dddmm.mmmm |
| 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 |

5.2 Proprietary NMEA input message

Please refer to MTK proprietary message.