

# Marine GPS Receiver

## MODEL: MR-700UB

Concinnity and Solid design for GPS Marine Locator  
with Full Waterproof IPX7

Garmin compatible Marine GPS Receiver



**MR-700UB** is Marine GPS receiver. Its excellent performance easily conquers the most difficult tasks. In addition , it provides various functions to meet customers' needs.**MR-700UB** It provides marvelous navigation performance under dynamic conditions in areas with limited sky view like urban canyons.

### Features :

- u-blox 6 solution
- 50-channel GPS
- SBAS (WAAS, EGNOS, MSAS, GAGAN)
- GALILEO Ready
- A-GPS
- RS232, RS422 interface supported
- 25.0 x 25.0 x 4.0 mm patch antenna
- 7Pin Waterproof connector
- RoHS compliant
- Update Rate 1~5Hz

### 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
<b>General</b>		L1 1575.42MHz GALILEO Open Service L1 ublox6 50 channels, C/A code
<b>Sensitivity</b>		-160dBm (tracking) -147dBm (Acquisition/Reacquisition)
<b>Accuracy</b>	Position	5.0 meters CEP
	DGPS Accuracy	2.0 meters CEP
	Time	30 nanosecond rms (1 PPS)
<b>Acquisition</b>	Cold start	32 sec. (typical)
	Warm start	32 sec. (typical)
	Hot start	1 sec. (typical)
<b>Reacquisition</b>		< 1 sec, typical
<b>Dynamics</b>	Altitude	50,000 meters max.
	Velocity	500 meters /sec max.
		.
<b>Operation Temperature</b>		-40° C to +85° C
<b>Storage Temperature</b>		-45° C to +90° C
<b>Operating Humidity</b>		0% to 95% RH, non condensing
<b>Water Resistance</b>		100% waterproof
<b>Primary Power</b>		7V ~ 40V DC
<b>Power Consumption</b>		150mA
<b>Protocol</b>		NMEA0183 v2.3
<b>Signal level</b>		RS-232(standard), & RS-422 optional
<b>NMEA Message</b>		GGA, ZDA,GSA,GSV, RMC, VTG(Default)
<b>EMI filter</b>		Rejects power line interference
<b>Power cable</b>		UL 2464/24Awg 15M
<b>Enclosure</b>		High impact, corrosion-proof polycarbonate resin
<b>Connector</b>		Open
<b>Dimensions</b>	GPS Locator	90.5mm(Dia.) × 108.5mm(H)
	Mounting Base	70mm(W) × 41.5mm(H) optional FB1 & FB2 & FB3
<b>Weight</b>		200 grams
<b>Standard Mounting</b>		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**

<b>I/O PIN &amp; CABLE</b>	
<b>Wire</b>	<b>Function</b>
White (白)	Receive
Green(綠)	Transmit
Yellow(黃)	GND
Bare Braid(隔離地線/熱縮黑)	Earth/GND
Blue(藍)	1PPS or N.C
Purplr(紫)	N.C
Black(黑)	Power- GND
Red(紅)	Power+

**RS422 I/O Connection**

<b>Wire</b>	<b>Function</b>
White (R+) 白	Differential input +
Green (T-) 綠	Differential output -
Yellow (T+) 黃	Differential output +
Purplr (R-) 紫	Differential input -
Blue 藍	1PPS or N.C
Bare Braid(隔離地線/熱縮黑)	Earth/GND
Black ( - ) 黑	Power- GND
Red (+) 紅	Power+

## Output NMEA Messages

Table 3 NMEA-0183 V2.3 Output Messages

NMEA Sentence	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 (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, A=Data Valid
Status	A		N=No Fix, A=Autonomous GNSS Fix, D=Differential GNSS Fix, 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		Ddmmyy, 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) (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) (fixed to 00)
Local zone minutes	00		(Not being output by receiver) (fixed to 00)
Checksum	*64		
<CR> <LF>			End of message termination