

Marine GPS/GLONASS Receiver

MODEL: MR-700MG-R

MTK MT3333 Chip GPS Marine Receiver with Full Waterproof
Garmin compatible Marine GPS Receiver & support 1pps & RTCM output



Key Feature:

- MTK high Sensitivity solution 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 QZSS Support 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.

	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 ~ 40V DC
Power Consumption		<100mA
Protocol		NMEA-0183 v4.10 baud rate default 4800 & RTCM SC-104 v2.x message types 1,2,3, and 9 & 1pps (100ms pulse/sec)
Signal level		RS-232(standard), 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 :

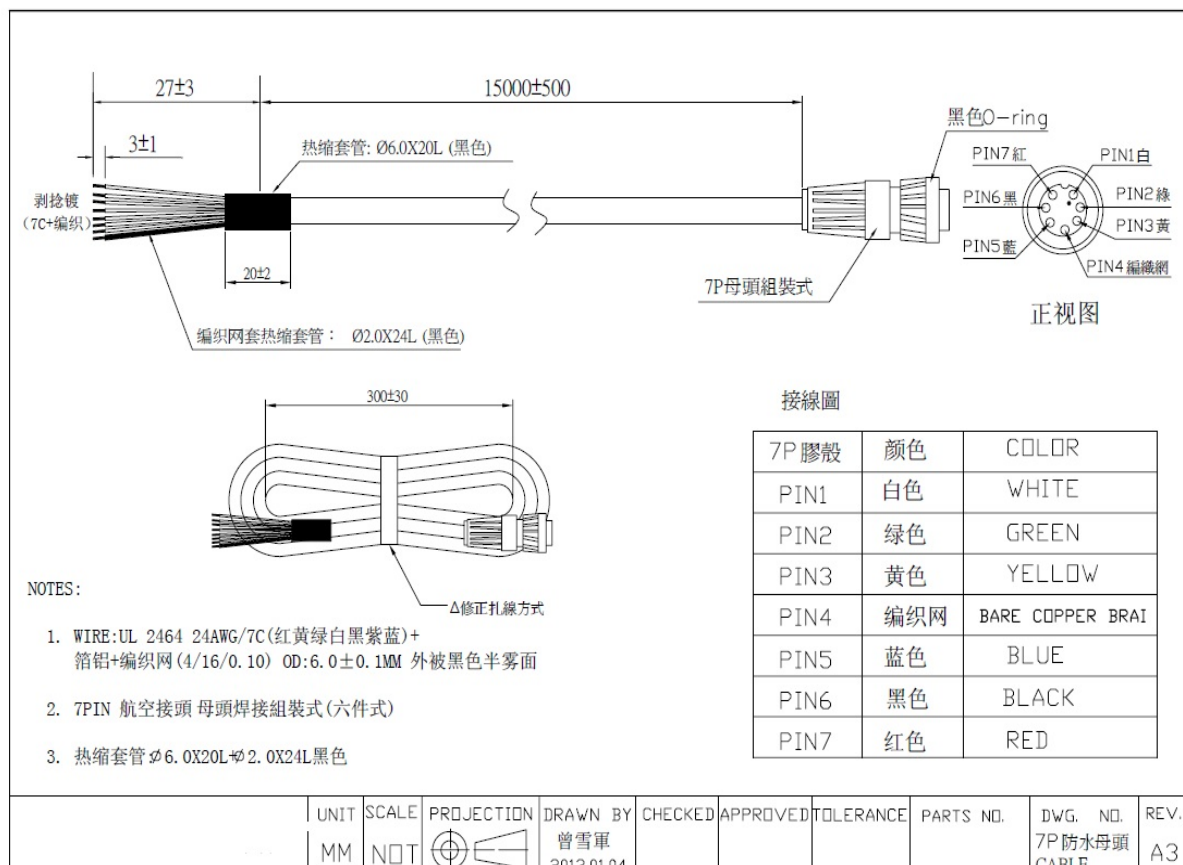
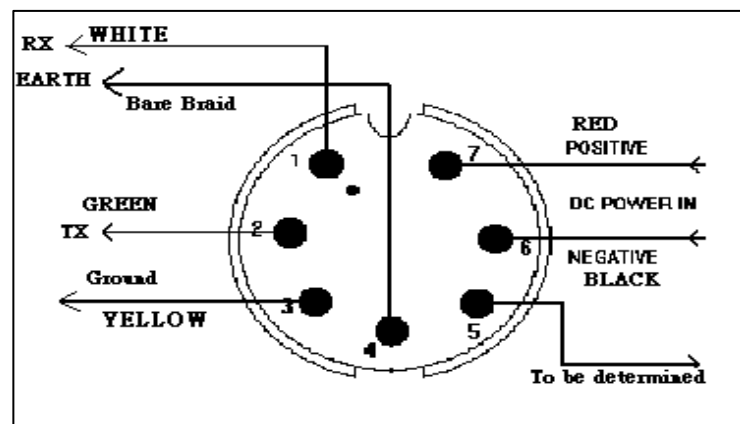
Support 1pps & RTCM

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)	1pps
	Purplr(紫)	RTCM (4800)
	Black(黑)	Power- GND
	Red(紅)	Power+

RS422 I/O Connection :

Support 1pps ,no support RTCM

Wire	Function
White (R+) 白	Differential input +
Green (T-) 綠	Differential output -
Yellow (T+) 黃	Differential output +
Purple (R-) 紫	Differential input -
Blue 藍	1pps
Bare Braid(隔離地線/熱縮黑)	Earth/GND
Black (-) 黑	Power-
Red (+) 紅	Power+



Software interface

5.1 NMEA output message

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	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
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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.mmmmm
N/S indicator	N		N=north or S=south
Longitude	12136.0099		dddmm.mmmmm
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

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.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.