Marine GPS Receiver

MODEL: MR-650M

MTK MT3339 Chip GPS Marine Receiver with Full Waterproof

Garmin compatible Marine GPS Receiver

Key Feature:

- MTK high Sensitivity sokution MT3339
- Very Fast TTFF
- Up to 10Hz update rate
- Standard and NMEA-0183 output
- User selectable baud rate
- Capable of SBAS (WAAS,EGNOS,MSAS)
- Support AGPS
- Support 66 channel gps

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		L1 frequency 1575.42Mhz, C/A code(SPS), Support 66 channels (22 Tracking, 66 Acquisition)
Update rate		1Hz Default , up to 10Hz
Accuracy	Position	3M (2D RMS)
	SBAS	2.5m (depends on accuracy of correction data)
Sensitivity	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 ~ 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, GSA, GSV, RMC, and VTG
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	60mm(Dia.) x 95mm(H)
	Mounting Base	70mm(W) × 41.5mm(H)
Weight		200 grams
Standard Mounting		Concinnity and Solid design

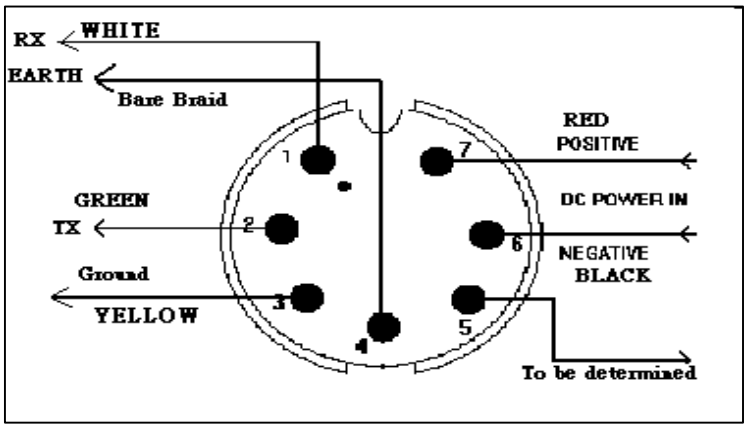
＊This specification is subject to change without prior notice

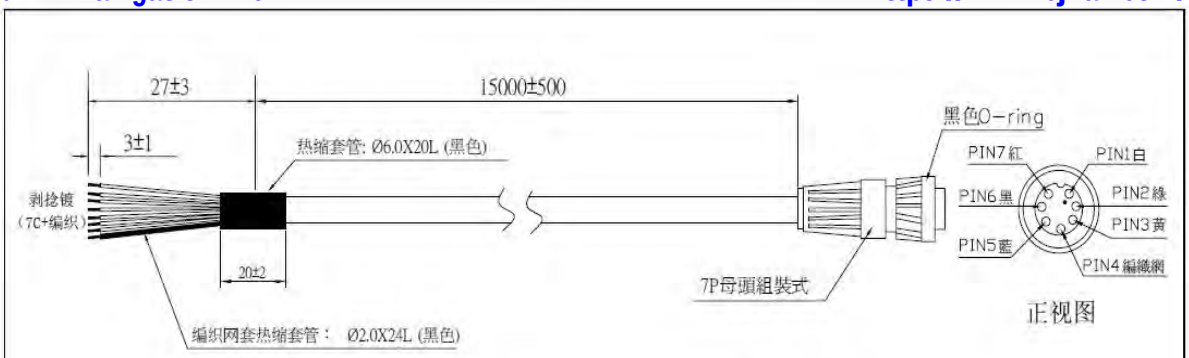
User selectable datum *Pole mount to 1"-14 UNS threaded mast

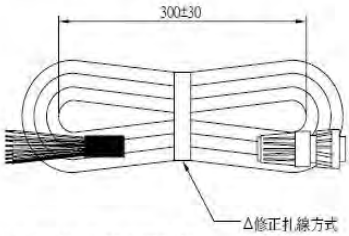
I/O PIN & CABLE	
Wire	**Function**
White (白)	Receive
Green(綠)	Transmit
Yellow(黃)	GND
Bare Braid(隔離地線/熱縮黑)	Earth/GND
Blue(藍)	NG
Purplr(紫)	NG
Black(黑)	Power- GND
Red(紅)	Power+

RS422 I/O Connection

Wire	Function
White (R+) 白	Differential input +
Green (T-) 綠	Differential output -
Yellow (T+) 黃	Differential output +
Purplr (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:

1. WIRE:UL 2464 24AWG/7C(红黄绿白黑紫蓝)+
   箔铝+编织网(4/16/0.10) OD:6.0±0.1MM 外被黑色半雾面
2. 7PIN 航空接頭 母頭焊接組裝式(六件式)
3. 热缩套管Ø6.0X20L+Ø2.0X24L黑色

接線圖

7P膠殼	颜色	COLOR
PIN1	白色	WHITE
PIN2	绿色	GREEN
PIN3	黄色	YELLOW
PIN4	编织网	BARE COPPER BRAI
PIN5	蓝色	BLUE
PIN6	黑色	BLACK
PIN7	红色	RED

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

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

Table5.1- 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		

<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[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

The leading zeros will be transferred. 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.