

**Firmware Setting**

Customer Name		Module Name	
<b>Default Value (Highlighted in Blue)</b>		<b>Filled By Customer (Highlighted in Red)</b>	

**1. Baud Rate (bps) :**

Default: 9600 bps    4800    14400    19200    38400    57600    115200

**2. Update Rate (1~10Hz) :**

Default: 1Hz Others:  2 Hz    3 Hz    4 Hz    5 Hz    6 Hz    7 Hz    8 Hz    9 Hz    10 Hz

**3. Datum:**

Default: WGS84    Tokyo-M    Tokyo-A    Other: \_\_\_\_\_

**4. Data Decimal:** ※ Sets the number of decimal places for longitude & latitude data in NMEA

Default: 4 decimal places    6 decimal places

**5. DGPS mode:** ※ RTCM and SBAS cannot be enabled at the same time.

※ RTCM supported products: Gmm-u2p/SL3C

※ SBAS can only be enabled when update rate is less than or equal to 5Hz.

Default: SBAS

RTCM: Baud rate (bps):  Default 9600    4800    14400    19200    38400    57600    115200

Disable

**6. NMEA Sentence & Interval Period: '0' = No output.**

Ex. GSV(5) -> Output 1 GSV sentence every 5-times interval.

Default: GGA(1), GSA(1), GSV(5), RMC(1), VTG(1), GLL(0), ZDA(0)

Custom: GGA(   ), GSA(   ), GSV(   ), RMC(   ), VTG(   ), GLL(   ), ZDA(   )

**7. 3D Fix Output:** ※ Supported products: Gmm-u2p / SL3C / PA6C

Period range: 0.5sec~16sec ; Duty cycle options: OFF(Low), 50ms, 100ms, 200ms, 1/8, 1/2, 7/8, ON(High)

Default setting

No Fix: Period: 2 sec; Duty cycle: 1/2

Fixed: Period: 0.5 sec; Duty cycle: OFF

Custom

No Fix: Period:        sec; Duty cycle:  OFF    50ms    100ms    200ms    1/8    1/2    7/8    ON

Fixed: Period:        sec; Duty cycle:  OFF    50ms    100ms    200ms    1/8    1/2    7/8    ON

Not Supported

**8. 1PPS Output Duration: (Duty cycle range: 1~999 ms)**

※ Supported products: Gmm-u2p / SL3C/PA6C

Default: 100 ms      Custom: Duty cycle: \_\_\_\_\_ ms      Not Supported

**9. Timing Mode: 1PPS pulse output mode selection**

※ Supported products: Gmm-u2p /PA6C/ SL3C

Default: Output 1 PPS after obtaining 3D-Fix    Output 1PPS after TTFF

Output 1PPS after obtaining 2D-Fix    Always Output 1PPS    Not Supported

**10. AIC: Active Interference Cancellation**

Default: Enabled    Disabled

**11. LOCUS: Internal logger function**

※ The baud rate 115200 bps is recommended using for LOCUS function.

※ It does not provide command to change setting of LOCUS function.

Logging Type: Default: Full&Stop     Overlap

Logging Content: Default: Basic     Racing     Search     Saving     All

Logging Mode:

Default: Interval 15 sec, Fix Only

AL     Fix Only     Normal     Interval \_\_\_\_\_ sec     Distance \_\_\_\_\_ meters

Speed \_\_\_\_\_ m/s

**12. 1-Sentence Output: (It can be outputted as ASCII or Binary format)**

※ Note: For 1-Sentence output, GTop will supply customized spec document based on customer requests, please contact o confirm the items/methods you desire.

Default: Disabled

Custom

Input command: ASCII ONLY

Output message: ASCII    Binary    Both (Switchable by command)

**13. Last Position Retention: (Continue to output last known position coordinate when GPS fix is lost)**

Default: Disabled      Enable

**14. Magnetic variation: Outputs degree of magnetic variation & measured magnetic heading**

Default: Disabled

Enable (If enable ,the other customized function cannot be enabled because of memory shortage)



**15. Geofencing:** Allows the user to set radius size around a target position. The GPS receiver will notify the user (in PGTOP serial format) if the current position is inside or outside this predefined boundary.

※ Supported products: Gmm-u2p/PA6C/SL3C

**Default: Disabled**

**Enable**

**16. Distance Calculation:** Outputs distance between two coordinates

**Default: Disabled**

**Enable**



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Please make sure you read through the notes section carefully on page 4 and 5. If you have any questions, please feel free to contact our sales or support personnel.

Confirmed by Customer:

Name (Printed)

Signature

Date

Note:

Confirmed by Sales (GlobalTop)

Name (Printed)

Signature

Date

Filled by R&D (GlobalTop)

Signature

Date

File Name

Version

Internal Code



**Notes:**

1. **Baud Rate:** High baud-rate is required for high update rate, as well as for additional NMEA output sentences. Please see "2. Update Rate" and "6. NMEA Sentence & Interval Period" for more details. Formula for calculating required baud rate, assuming each NMEA sentence takes a set amount of #: GLL=6, RMC=8, VTG=4, GSA=7, GSV=26, GGA=8, ZDA=5  
If all NMEA sentences are turned on,  
The selected baud rate must be greater than  $(6+8+4+7+26+8+5) \times \text{update rate} \times 100$   
So if the update rate is at 1 Hz with all NMEA sentences turned on, the formula will be equal to 6400, thus the selected baud rate must be 9600bps or greater!  
 **Caution:** This formula is not applicable when setting baud rate / update rate / NMEA sentence using Mini GPS Tool or PMTK Command!
2. **Update Rate:** High baud-rate is required for high update rate.
3. **Datum:** Please ask our support personnel for a complete list of datums.
4. **Data Decimal:** Set the number of decimal places for longitude & latitude data reported in NMEA.
5. **SBAS and RTCM** cannot be enabled at the same time.
6. **NMEA Sentence & Interval Period:** This option sets the output interval period for each of the NMEA sentences. Please keep in mind that the rate of the NMEA sentences output is directly affected by the update rate. For example, if the default setting is chosen: "GGA( 1 ), GSA( 1 ), GSV( 5 ), RMC( 1 ), VTG( 1 )", then GGA, GSA, RMC and VTG sentences will output once per second, while GSV will output once every 5 seconds if the update rate is at 1Hz. If the update rate is set to 10Hz, then using the above setting, GGA, GSA, RMC and VTG will now output 10 times per second, while GSV outputs 2 times per second.
7. **3D Fix Output:** "Period" specifies the entire cycle time (high + low level signal), while "Duty cycle" specifies the period of time when the signal level is high. For example, if period is set to 2 sec and Duty cycle is set to 100ms, the entire cycle time will be 2sec, where the signal will be high for 100ms and low for 1.9sec. If period is set to 2 sec and duty cycle is set to 1/2, the signal will remain high for 500ms (1/2 of period), and low for 500ms. If duty cycle is OFF or ON, then the period time will be of no use, since it will remain low or high.
8. **1PPS:** Sets the length (duration) of the pulse for 1PPS.

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9. **Timing Mode:** Timing mode functions listed below can also be changed temporarily using MTK packet command 285. Please be aware this is only supported in firmware kernel version AXN1.5

- ◆ 1PPS Output Duration
- ◆ 1PPS pulse output mode selection

10. **Active Interference Cancellation (AIC):** Provides effective narrow-band interference and jamming elimination. The GPS signal could be recovered from the jammed signal, and let user get better navigation quality.

11. **LOCUS (Data Logger solution):**

11.1 Auto logging data to MTK chip internal flash, no need to wakeup HOST side.

11.2 Smart overlapping mechanism to keep latest logger data (4KB base).

11.3 Flexible configuration to support most logging type, mode and contents.

11.4 Logger capability in MTK chip internal flash:

(1) With 1 sectorflash (64KB), user can log >16 hours

11.5 Details for logging content:

Table	Naming	Size (bytes)	UTC (4)	Fix Type (1)	Lat (4)	Lon (4)	Height (2)	Speed (2)	Heading (2)	HDOP (2)	SatNo (1)	Checksum (1)
A	Basic	16	<input type="radio"/>					<input type="radio"/>				
B	Racing	20	<input type="radio"/>			<input type="radio"/>						
C	Search	19	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>				
D	Saving	13	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>						<input type="radio"/>
E	All	23	<input type="radio"/>									

11.6 LOCUS operation during Normal and Power saving mode

Below is the Logging mode behavior during Position normal mode

Positioning LOCUS config	Normal mode	Power saving mode (Periodic/AlwaysLocate)
AL mode	No logging	Logging once before go to sleep
Normal mode	Logging per fix	Logging per fix
Customization	Logging when over the customization criterion	Logging when over the customization criterion
AL + Normal	Logging per fix	Logging once before go to sleep
AL + Customization	Logging when over the customization criterion	Logging once before go to sleep
Normal + Customization	Logging per fix	Logging per fix
AL + Normal + Customization	Logging when over the interval	Logging once before go to sleep

- 11.7 The baud rate 115200 bps is recommended, because of using it for dumping data from internal memory of chip successfully.
  - 11.8 It does not provide command to change setting of LOCUS function. It is only set by GlobalTop.
  - 11.9 The “Fix Only” is compatible with all other options.
  - 11.10 The “AL” is used to save flash data and only Log once before going to sleep when AL running
  - 11.11 The “Interval”, “Distance”, “Speed” are called “Customization mode” in this table, and all of them Are &&(AND) condition with other configuration.
12. **1-Sentence:** Customize and compact the output NMEA sentence to decrease MCU loading.  
See [One Sentence Output](#) page for more details. If you wish to use binary mode, one sentence output must be enabled, please specify the desired NMEA items.  
Optional functions are supported, but customer will need to supply detail algorithm or methods.
13. **Last Position Retention:** convenient yet elegant solution that allows the GPS module to continue output its last known position in the event of losing GPS satellite fix. Please refer to our [website](#).
14. **Magnetic variation:** Magnetic Variation data output allows electronic compass based device to adjust for declination when using bearing to determine directions (Ex. Ships) Please refer to [website](#)
15. **Geofencing:** Set a radius around a target position, and informs the user if the receiver position is inside or outside this predefined boundary, **like school attendance zone or neighborhood boundary.** Please refer to [website](#)
16. **Distance calculation:** GlobalTop GPS module is able to specify the exact **line-of-sight distances** between current location and other points of interests. This calculation is done internally within the GPS module and can help decrease the calculation loading on the main processor. Please refer to [website](#)

**Other Notes :**

1. **AGPS** function is supported in firmware version Mcore2.02 & AXN0.3 or later revisions.
2. "**Navigation Speed Threshold**" function can be enabled in all GPS modules to help reduce stationary drifting problem of GPS through a special drifting elimination algorithm. If you wish to enable or change the threshold value (1.0 m/s), please contact us. In addition, the setting can also be changed temporarily using MTK packet command 397.
3. Items 1, 2, 3 (mini GPS Tool only), 5, 6, can be changed through PMTK command or Mini GPS Tool, but will return to chosen setting when re-booted without supplying backup power. Please contact us for the complete PMTK command document or download Mini GPS Tool from [www.gtop-tech.com](http://www.gtop-tech.com).
4. "**Application notes**" document for our module is available. It contains design tips, layouts, and cautions you should watch out for when designing around GlobalTop GPS modules. Please contact us if you have not received your application notes document.
5. **Embedded Assist System (EASY)**: is the abbreviation of **Embedded Assist System**. The benefits are including:

**◆ EASY to TTFF**

EASY works as an embedded software which can accelerate TTFF by predicting satellite navigation messages from received ephemeris.

**◆ EASY to calculate**

No additional computing interval for EASY task. EASY was efficiently scheduled and computed in the free time of every second after GPS navigation solution.

**◆ EASY to design-in**

World leading technology with no additional design-in efforts.



**Caution:** The EASY only support update rate 1Hz, and it can disable/enable by PMTK command. And "VBACKUP" pin needs to be connected for this feature. Please contact us for more details.

EASY function is conceptually designed to automatically engage for predicting after first receiving the broadcast ephemeris. A while later (generally, tens of second), 3 day extensions is completely generated then all EASY function will be maintained at standby condition. EASY assist is going to be engaged when GPS request in new TTFF condition or re-generate again with another new received ephemeris. At meanwhile, the TTFF is benefited by EASY assist.