Firmware Setting			
Customer Name		**Module Name**	
Default Value (Highlighted in Blue)		**Filled By Customer (Highlighted in Red)**	

1. Baud Rate(bps):

☐**Default: 9600 bps** ☐**4800** ☐**14400** ☐**19200** ☐**38400** ☐**57600** ☐**115200**

2. Update Rate(1~10Hz): ※ The maximum rate is 5Hz for these products:SL1B / SL3 / PA2 / PA4

☐**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** ☐**u5 Default: 5 decimal places** ※ It uses for Gmm-u5LP,Gms-u5LP,Gms-u5j

☐**6 decimal places**

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

※ RTCM supported products: SL1B /SL2B/ SL3 / Gmm-u1 /Gms-u1LP

※ 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)**

☐**u5 Default: GGA(1), GSA(1), GSV(1), RMC(1), VTG(1), GLL(1), ZDA(0)**

※ It uses for Gmm-u5LP,Gms-u5LP,Gms-u5j

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

7. 3D Fix Output: ※ Supported products: SL1B / SL2B/SL3 / PA6B / PA6E / Gmm-u1/Gms-u1LP

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

Default Vales (By module type):

Status	GPS Module Default sett ng	Mini Gmouse Default setting	FGPMMOUDG Default setting
NO Fixed	Period 2sec Duty cycle 1/2	Period 0.5sec Duty cycle ON	Period 0.5sec Duty cycle ON
Fixed	Period 0.5sec	Period 1sec	Period 2sec

	Duty cycle OFF	Duty cycle 200ms	Duty cycle 1/2

☐**Default setting**

☐**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: 1~999ms)

※ Supported products: SL1B / SL2B/Gmm-u1 / Gms-u1LP/Gmm-u5LP/Gmm-u5j/Gms-u5LP

※ 1PPS can be enabled to output from 3D-fix pin with special firmware in these products: SL3

☐**Default: 100 ms** ☐**Custom: Duty cycle:_____ms** ☐**Not Supported**

9. Timing Mode: 1PPS pulse output mode selection

※ Supported products: Gmm-u1 /SL2B/ Gms-u1LP/Gmm-u5LP/Gmm-u5j/ Gms-u5LP

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

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

10. 1-Sentence Output:

※ 1-Sentence output, means to output customized ASCII or Binary sentence except standard NMEA sentence

※ It provides customized command to switch mode between customized sentence and standard NMEA sentence (default mode)

※ It only support to output one type of sentence at the same time

☐**Default: Disabled (It only support standard NMEA sentence)**

☐**Custom (To support customized ASCII or Binary or both of them)**

Additional message: ☐ASCII ☐Binary ☐Both

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

※ The default of Gmm-u5j is enabled.

☐**Default: Disabled** ☐**Enable**

12. 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)

13. 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: SL2B/PA6B/PA6E/Gmm-u1 / Gms-u1LP/Gmm-u5LP/Gmm-u5j/ Gms-u5LP

☐**Default: Disabled**

☐**Enable**

14. Distance Calculation: Outputs distance between two coordinates

☐**Default: Disabled**

☐**Enable**

⚠ **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 (Print d)

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) x update rate x 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. SL1, SL1B, SL3, PA2, PA4, PA5 can only support up to 5 Hz 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.

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. **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.

11. **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.

12. **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

13. **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

14. **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.
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. **u5 series NMEA Sentence comparison table**:

	GlobalTop Standard	u5 Series
GPRMC	UTC Time: decimal 3 places Coordinates: decimal 4 places Speed: decimal 2 places	UTC Time: decimal 2 places Coordinates: decimal 5 places Speed: decimal 3 places
GPVTG	Speed: decimal 2places	Speed: decimal 3 places
GPGGA	UTC Time: decimal 3 places Coordinates: decimal 4 places Age of Diff: Available	UTC Time: decimal 2 places Coordinates: decimal 5 places Age of Diff: None
GPGSA	Same	Same
GPGSV	Same	Same
GPGLL	UTC Time: decimal 3 places Coordinates: decimal 4 places	UTC Time: decimal 2 places Coordinates: decimal 5 places

6. **Data Logger solution:** Transform ordinary GlobalTop GPS receiver into an extraordinary GPS data logger by adding additional flash memory into your design. Please refer to website.
   (Please contact your Gtop representative to obtain detail specification document after signing NDA with us)

Revision History

Revision	Author	Description
V101228	Gavin	Add Data Logger Solution : Add Last Position Retention: Add Distance Calculation
V110121	Gavin	Add Revision History page Add Magnetic variation function Add Geofencing function Remove DM page
V110422	Gavin	Eliminate SL1 (EOL) and PA5 (EOL) Add Gmm-u5LP and Gmm-u5j,SL2B(Coming Soon),Gms-u5LP(Coming Soon) Add Notice : Data logger and Magnetic variation are Alternative

V110601	Hector	Add NMEA sentence comparison table between GlobalTop standard and u5 series Add description of NMEA sentence setting for u5 series
V110607	Hector	Remove description of Item 1,Item 2,Item 12 Add selection of item 11 Change the order of Item 13,item 14 Change the order of Note 13,item 14 Add description of Data Logger solution in Other Notes
V110915	Hector	Add selection and description of item 11:Last Position Retention Add selection and description of item 14:Distance calculation Change the order of item 8, 9,11 Change the order of Note 8,9,11 Modify NMEA sentence comparison table between GlobalTop standard and u5 series