GlobalTop Technology Inc.

List of Basic Functions

GlobalTop Tech Inc.
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Revision History

Revision	Date	Author	Description
V1.0	2015.11.03	Hector	**1st Release**

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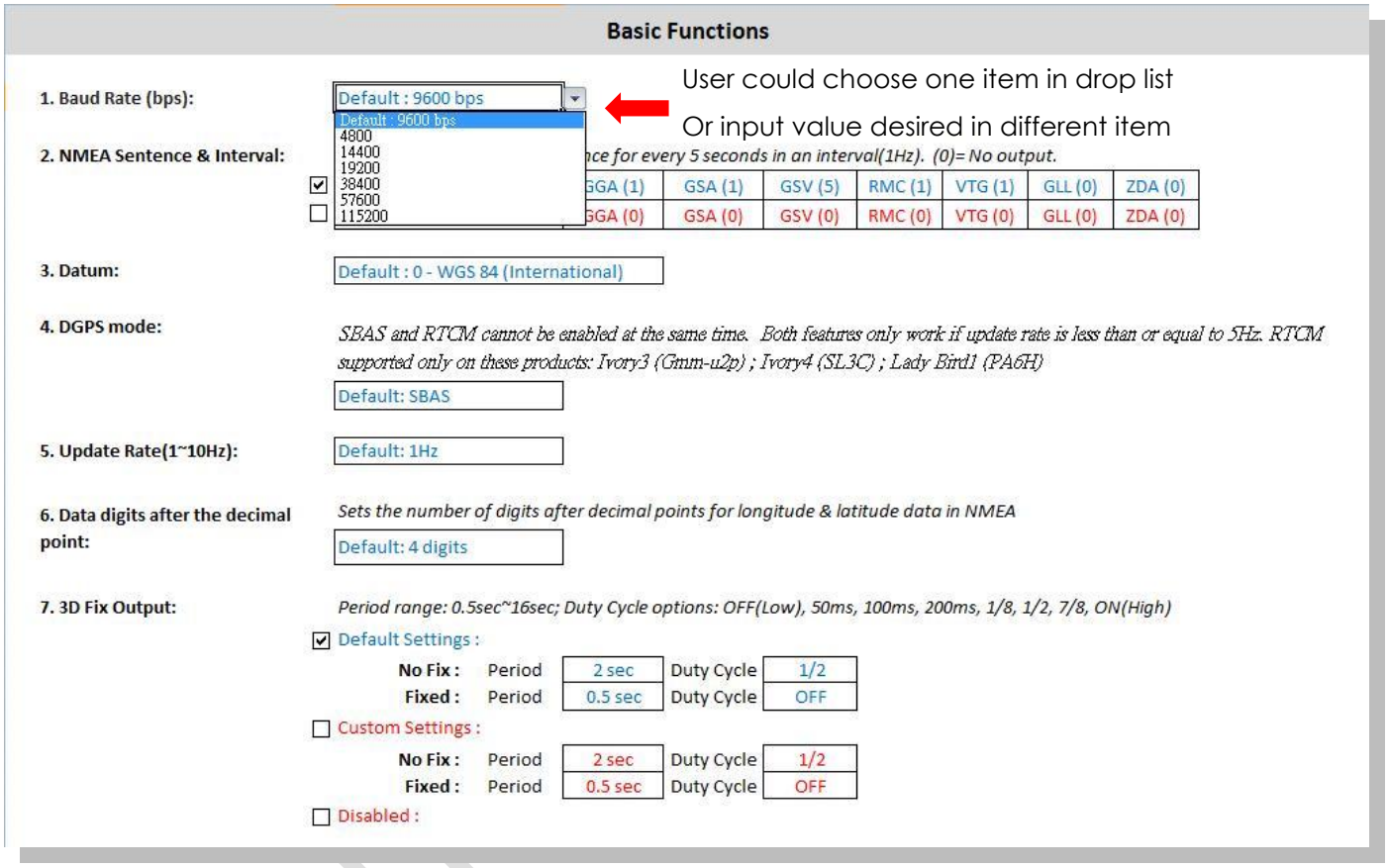
Basic Function Customization

GlobalTop Technology offers customization on basic functions. Basic functions shown below could be modified to desired values upon customer's request.



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GlobalTop Basic Function List

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MTK NMEA Packet Format

Preamble	Talker ID	Pkt Type	Date Field	*	CHK1	CHK2	CR	LF

The maximum length for each packet is 255 bytes

Field	Length	Type	Description
Preamble	1 byte	Character	"$" Code starts with a **$** sign
Talker ID	4 byte	Character string	"PMTK"
Pkt Type	3 byte	Character string	Starts from "000" to "999". An identifier tells the decoder how to decode the packet
Data Field	variable		A "," must be inserted before each data field to help decoder process the Data Field
*	1 byte	Character	The asterisk ends Data Field
CHK1, CHK2	2 byte	Character string	Checksum of the data between preamble "$" and "*"
CR, LF	2 byte	Binary data	Used to identify the end of a packet

Example of a Packet: **$PMTK000*32<CR><LF>**

Pkt Type	Abbreviation/Syntax	Data Field	Meaning/Example/Return
000	PMTK_TEST	None	Test Packet $PMTK000*32<CR><LF>
001	PMTK_ACK PMTK001,Cmd,Flag	Command/ packet type the acknowledge responds Flag: 0 = invalid command/ packet type 1 = unsupported command / packet type 2 = valid command/ packet, but action failed 3 = valid command/ packet and action succeeded	Acknowledge of PMTK command $PMTK001,604,3*32<CR><LF>
010	PMTK_SYS_MSG PMTK010,Msg	Msg: System message 0: Unknown 1:Startup	Output system message $PMTK010,001*2E<CR><LF>

When the module is powered-on or restarted via command, both "***$PMTK010,001*2E<CR><LF>***" and "***$PMTK011,MTKGPS*08<CR><LF>***" will be returned at the same time after GPS engine

completed boot-up stage successfully.

Sample Packet: $PMTK103*30<CR><LF>

Note: if the power on the device (module) is removed, all settings once modified would be lost and would be returned to factory default. The backup power supply such as VBACKUP or coin battery would keep up the device until the power is exhausted. .

1.Baud rate(bps)

High baud-rate is required for high update rate, as well as for additional NMEA output sentences. Here is the explanation for how the percentage of data occupied in each standard NMEA sentence is calculated:

- GGA sentence(1Hz update rate with baud rate 9600 bps):
  *$GPGGA,034541.000,2307.1236,N,12016.4411,E,1,10,0.87,24.6,M,17.8,M,,*5F<CR><LF>*

The example above shows the byte to be calculated starts from "$ " to "<CR><LF>", and the total bytes are 73. The actual length of the byte is:

1 start bit+8 data bits+1 stop bit ➔10bits.

So the total length of *73 bytes are 73*10➔730bits* (730/9600; approximately 7.6%)

2.NMEA sentence & output interval

For GNSS module, user can choose desired item of NMEA sentence and set the output interval.

- This option sets output interval for each of NMEA sentence. Please keep in mind that the rate of NMEA sentence output is directly affected by update rate.
- For example, if the default is: "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, when the **update rate** is at **1Hz**.

- If the update rate is set to 10Hz, then GGA, GSA, RMC and VTG will output **10** times per second and GSV will output **2** times per second.

3.Datum

The MTK GPS chip supports more than 200 Datum. Please refer to **Table 1** below.

Table 1 Datum List

No	Datum	Region
0	WGS 84	International
1	Tokyo-M	Japan
2	Tokyo-A	Mean For Japan, South Korea, Okinawa
3	User Setting	User Setting
4	Adindan	Burkina Faso
5	Adindan	Cameroon
6	Adindan	Ethiopia
7	Adindan	Mali
8	Adindan	Mean For Ethiopia, Sudan
9	Adindan	Senegal
10	Adindan	Sudan
11	Afgooye	Somalia
12	Ain El Abd1970	Bahrain
13	Ain El Abd1970	Saudi Arabia
14	American Samoa1962	American Samoa Islands
15	Anna 1 Astro 1965	Cocos Island
16	Antigua Island Astro 1943	Antigua (Leeward Islands)
17	Arc1950	Botswana
18	Arc1950	Burundi
19	Arc1950	Lesotho
20	Arc1950	Malawi
21	Arc1950	Mean For Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
22	Arc1950	Swaziland
23	Arc1950	Zaire

24	Arc1950	Zambia
25	Arc1950	Zimbabwe
26	Arc1960	Mean For Kenya Tanzania
27	Arc1960	Kenya
28	Arc1960	Tamzamia
29	Ascension Island 1958	Ascension Island
30	Astro Beacon E 1945	Iwo Jima
31	Astro Dos 71/4	St Helena Island
32	Astro Tern Island (FRIG) 1961	Tern Island
33	Astronomical Station 1952	Marcus Island
34	Australian Geodetic 1966	Australia, Tasmania
35	Australian Geodetic 1984	Australia, Tasmania
36	Ayabelle Lighthouse	Djibouti
37	Bellevue (IGN)	Efate and Erromango Islands
38	Bermuda 1957	Bermuda
39	Bissau	Guuinea-Bissau
40	Bogota Observatory	Colombia
41	Bukit Rimpah	Indonesia(Bangka and Belitung Ids)
42	Camp Area Astro	Antarctica(McMurdi Camp Area)
43	Campo Inchauspe	Argentina
44	Canton Astro 1966	Phoenix Island
45	Cape	South Africa
46	Cape Canaveral	Bahamas, Florida
47	Carthage	Tunisia
48	Chatham Island Astro 1971	New Zealand(Chatham Island)
49	Chua Astro	Paraguay
50	Corrego Alegre	Brazil
51	Dabola	Guinea
52	Deception Island	Deception Island, Antarctia
53	Djakarta(Batavia)	Indonesia(Sumatra)
54	Dos 1968	New Georgia Islands (Gizo Island)
55	Easter Island 1967	Easter Island

56	Estonia Coordinate System 1937	Estonia
57	European 1950	Cyprus
58	European 1950	Egypt
59	European 1950	England, Channel Islands, Scotland, Shetland Islands
60	European 1950	England, Ireland, Scotland, Shetland Islands
61	European 1950	Finland, Norway
62	European 1950	Greece
63	European 1950	Iran
64	European 1950	Italy (Sardinia)
65	European 1950	Italy (Sicily)
66	European 1950	Malta
67	European 1950	Mean For Austria, Belgium, Denmark, Finland, France, West Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland
68	European 1950	Mean For Austria, Denmark, France, West Germany, Netherland, Switzerland
69	European 1950	Mean For Iraq, Israel, Jordan, Lebanon, Kuwait, Saudi Arabia, Syria
70	European 1950	Portugal, Spain
71	European 1950	Tunisia
72	European 1979	Mean For Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
73	Fort Thomas 1955	Nevis St Kitts (Leeward Islands)
74	Gan 1970	Republic Of Maldives
75	Geodetic Datum 1970	New Zealand
76	Graciosa Base SW1948	Azores (Faial, Graciosa, Pico,

		Sao, Jorge, Terceria)
77	Guam 1963	Guam
78	Gunung Segara	Indonesia (Kalimantan)
79	Gux I Astro	Guadalcanal Island
80	Heart North	Afghanistan
81	Hermannskogel Datum	Croatia-Serbia, Bosnia-Herzegoivna
82	Hjorsey 1955	Iceland
83	Hongkong 1963	Hongkong
84	Hu Tzu Shan	Taiwan
85	Indian	Bangladesh
86	Indian	India, Nepal
87	Indian	Pakistan
88	Indian 1954	Thailand
89	Indian 1960	Vietnam (Con Son Island)
90	Indian 1960	Vietnam (Near 16 deg N)
91	Indian 1975	Thailand
92	Indonesian 1974	Indonesian
93	Ireland 1965	Ireland
94	ISTS 061 Astro 1968	South Georgia Islands
95	ISTS 073 Astro 1969	Diego Garcia
96	Johnston Island 1961	Johnston Island
97	Kandawala	Sir Lanka
98	Kerguelen Island 1949	Kerguelen Island
99	Kertau 1948	West Malaysia and Singapore
100	Kusaie Astro 1951	Caroline Islands
101	Korean Geodetic System	South Korea
102	LC5 Astro 1961	Cayman Brac Island
103	Leigon	Ghana
104	Liberia 1964	Liberia
105	Luzon	Philippines (Excluding Mindanao)
106	Luzon	Philippines (Mindanao)
107	M'Poraloko	Gabon
108	Mahe 1971	Mahe Island

109	Massawa	Ethiopia (Eritrea)
110	Merchich	Morocco
111	Midway Astro 1961	Midway Islands
112	Minna	Cameroon
113	Minna	Nigeria
114	Montserrat Island Astro 1958	Montserrat (Leeward Island)
115	Nahrwan	Oman (Masirah Island)
116	Nahrwan	Saudi Arabia
117	Nahrwan	United Arab Emirates
118	Naparima BWI	Trinidad and Tobago
119	North American 1927	Alaska (Excluding Aleutian Ids)
120	North American 1927	Alaska (Aleutian Ids East of 180 deg E)
121	North American 1927	Alaska (Aleutian Ids West of 180 deg W)
122	North American 1927	Bahamas (Except San Salvador Islands)
123	North American 1927	Bahamas (San Salvador Islands)
124	North American 1927	Canada (Alberta, British Columbia)
125	North American 1927	Canada (Manitoba, Ontario)
126	North American 1927	Canada (New Brunswick, Newfoundland, Nova Scotia, Qubec)
127	North American 1927	Canada (Northwest Territories, Saskatchewan)
128	North American 1927	Canada (Yukon)
129	North American 1927	Canal Zone
130	North American 1927	Cuba
131	North American 1927	Greenland (Hayes Peninsula)
132	North American 1927	Mean For Antigua, Barbados, Barbuda, Caicos Islands, Cuba, Dominican, Grand Cayman, Jamaica, Turks Islands
133	North American 1927	Mean For Belize, Costa Rica, El

		Salvador, Guatemala, Honduras, Nicaragua
134	North American 1927	Mean For Canada
135	North American 1927	Mean For Conus
136	North American 1927	Mean For Conus (East of Mississippi River including Louisiana, Missouri, Minnesota)
137	North American 1927	Mean For Conus (East of Mississippi River excluding Louisiana, Missouri, Minnesota)
138	North American 1927	Mexico
139	North American 1983	Alaska (Excluding Aleutian Ids)
140	North American 1983	Aleutian Ids
141	North American 1983	Canada
142	North American 1983	Conus
143	North American 1983	Hawaii
144	North American 1983	Mexico, Central America
145	North Sahara 1959	Algeria
146	Observatorio Meteorologico 1939	Azores (Corvo and Flores Islands)
147	Old Egyptian 1907	Egypt
148	Old Hawaiian	Hawaii
149	Old Hawaiian	Kauai
150	Old Hawaiian	Maui
151	Old Hawaiian	Mean For Hawaii, Kauai, Maui, Oahu
152	Old Hawaiian	Oahu
153	Oman	Oman
154	Ordnance Survey Great Britain 1936	England
155	Ordnance Survey Great Britain 1936	England, Isle of Man, Wales
156	Ordnance Survey Great Britain 1936	Mean For England, Isle of Man, Scotland, Shetland Island, Wales
157	Ordnance Survey Great	Scotland, Shetland Islands

	Britain 1936	
158	Ordnance Survey Great Britain 1936	Wales
159	Pico de las Nieves	Canary Islands
160	Pitcairn Astro 1967	Pitcairn Island
161	Point 58	Mean For Burkina Faso and Niger
162	Pointe Noire 1948	Congo
163	Porto Santo 1936	Porto Santo, Maderia Islands
164	Provisional South American 1956	Bolovia
165	Provisional South American 1956	Chile (Northern Near 19 deg S)
166	Provisional South American 1956	Chile (Southern Near 43 deg S)
167	Provisional South American 1956	Colombia
168	Provisional South American 1956	Ecuador
169	Provisional South American 1956	Guyana
170	Provisional South American 1956	Mean For Bolivia Chile, Colombia, Ecuador, Guyana, Peru, Venezuela
171	Provisional South American 1956	Peru
172	Provisional South American 1956	Venezuela
173	Provisional South Chilean 1963	Chile (Near 53 deg S) (Hito XVIII)
174	Puerto Rico	Puerto Rico, Virgin Islands
175	Pulkovo 1942	Russia
176	Qatar National	Qatar
177	Qornoq	Greenland (South)
178	Reunion	Mascarene Island

179	Rome 1940	Italy (Sardinia)
180	S-42 (Pulkovo 1942)	Hungary
181	S-42 (Pulkovo 1942)	Poland
182	S-42 (Pulkovo 1942)	Czechoslavakia
183	S-42 (Pulkovo 1942)	Lativa
184	S-42 (Pulkovo 1942)	Kazakhstan
185	S-42 (Pulkovo 1942)	Albania
186	S-42 (Pulkovo 1942)	Romania
187	S-JTSK	Czechoslavakia (Prior 1 Jan 1993)
188	Santo (Dos) 1965	Espirito Santo Island
189	Sao Braz	Azores (Sao Miguel, Santa Maria Ids)
190	Sapper Hill 1943	East Falkland Island
191	Schwarzeck	Namibia
192	Selvagem Grande 1938	Salvage Islands
193	Sierra Leone 1960	Sierra Leone
194	South American 1969	Argentina
195	South American 1969	Bolivia
196	South American 1969	Brazial
197	South American 1969	Chile
198	South American 1969	Colombia
199	South American 1969	Ecuador
200	South American 1969	Ecuador (Baltra, Galapagos)
201	South American 1969	Guyana
202	South American 1969	Mean For Argentina, Bolivia, Brazil, Chile Colombia, Ecuador, Guyana, Paraguay, Peru, Trinidad and Tobage, Venezuela
203	South American 1969	Paraguay
204	South American 1969	Peru
205	South American 1969	Trinidad and Tobago
206	South American 1969	Venezuela
207	South Asia	Singapore
208	Tananarive Observatory 1925	Madagascar

209	Timbalai 1948	Brunei, E Malaysia (Sabah Sarawak)
210	Tokyo	Japan
211	Tokyo	Mean For Japan, South Korea, Okinawa
212	Tokyo	Okinawa
213	Tokyo	South Korea
214	Tristan Astro 1968	Tristan Da Cunha
215	Viti Levu 1916	Fiji (Viti Levu Island)
216	Voirol 1960	Algeria
217	Wake Island Astro 1952	Wake Atoll
218	Wake-Eniwetok 1960	Marshall Islands
219	WGS 1972	Global Definition
220	WGS 1984	Global Definition
221	Yacare	Uruguay
222	Zanderij	Suriname

Note: In Datum No.3, user uses PMTK331 command to set relative parameters to module. After that, GNSS module will operate in Datum No.3 directly.

It also provides PMTK command for user to set desired datum temporarily. Please refer to the format illustrated below:

Packet Type: 330 PMTK_API_SET_DATUM

Support Chip Type:
MT3339、MT3333

Packet Meaning:
Configure Datum

Data Field:
PMTK330,Datum
Datum:
'0' = WGS84
'1' = TOKYO-M
'2' = TOKYO-A
….. …… …… …….
'222'= Zanderij

Example:
$PMTK330,0*2E<CR><LF>

Packet Type: 430 PMTK_API_Q_DATUM

Support Chip Type:
MT3339、MT3333

Packet Meaning:
Query default Datum

Data Field:
None

Return:
PMTK_API_DT_DATUM

Example:
$PMTK430*35<CR><LF>

Caution 1: GNSS module will send acknowledge PMTK530 after inputting PMTK430

Packet Type: 530 PMTK_API_DT_DATUM

Support Chip Type:
MT3339、MT3333

Packet Meaning:
Current datum used

Data Field:
PMTK530,Datum
Datum:
'0' = WGS84
'1' = TOKYO-M
'2' = TOKYO-A
….. …… …… …….
'222'= Zanderij

Example:
$PMTK530,0*28<CR><LF>

Packet Type: 331 PMTK_API_DT_DATUM

Support Chip Type:
MT3339、MT3333

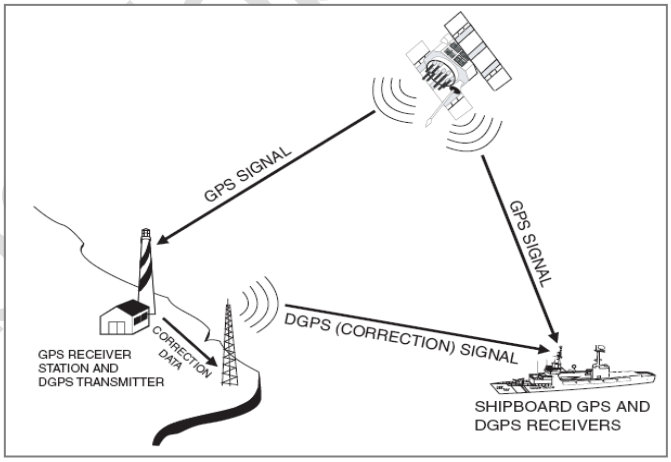
Packet Meaning:
Set user defined datum

Data Field:
PMTK331,majA,ecc,dX,dY,dZ
majA: User defined datum semi-major axis [m] [Range: 0~7000000]
ecc: User defined datumeccentric [m] [Range: 0 ~ 330]
dX: User defined datum to WGS84 X axis offset [m]
dY: User defined datum to WGS84 X axis offset [m]
dZ: User defined datum to WGS84 X axis offset [m]

Example:
$PMTK331, 6377397.155, 299.1528128, -148.0, 507.0,685.0*16<CR><LF>

4.DGPS mode

MTK GPS chip supports DGPS (Differential GPS) mode:
DGPS is a process for canceling out man-made and natural errors in the GPS signal. DGPS requires the use of another GPS receiver setting up on a position with known location. The receiver on the known location computes its location with the GPS satellite data and compares this position with the known value for its actual, known, position.
This difference (hence differential) is the error in the transmitted GPS signal. The differential value is then used for correcting, either in real-time or during post processing, the positions collected by other GPS receivers during the same time period, observing the same satellites.



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DGPS mode includes SBAS and RTCM:

SBAS (Satellite-Based Augmentation System)
The various Satellite-Based Augmentation Systems (SBASs) utilizes Geostationary Earth Orbit (GEO) Satellites which contain integrity data on GPS, GLONASS, and/or Galileo satellites, to provide ranging signals to end user

This signal is generated on the ground and provided via C-band (or K-band) uplink to the GEO, which navigation transponder frequency translates it to L1 and C-band (or K-band) downlink frequencies, then broadcasts the signals throughout the GEO's edge of coverage footprint.

SBAS: WAAS, EGNOS, and MSAS.
WAAS is a US Federal Aviation Authority (FAA) funded system of equipment and software that augments GPS accuracy, availability and integrity.

WAAS provides a satellite signal for its users to support enroute and precision approach aircraft navigation. Similar systems such as EGNOS (European Geostationary Navigation Overlay System) and MSAS (MT-SAT Based Satellite Augmentation System) also serve the same functions.

WAAS	**USA**
EGNOS	**Europe**
MSAS	**Japan**

RTCM (Radio Technical Commission for Maritime Services):
A special committee of the commission (Special Committee 104) which was set up to define a differential data link to be used to relay GPS correction messages from a monitor (Reference) station to a field user.

RTCM SC-104 recommendations define the correction message format and 16 different correction message types.

Note 1: MTK chip support RTCM v2.3. The supported types are shown in below:
Message Type 1 - Differential GPS Corrections
Message Type 2 - Delta Differential GPS Corrections
Message Type 3 - GPS Reference Station Parameters
Message Type 9 - GPS Partial Correction Set

Note 2: MTK chip has UART1 designed for the use of RTCM. Users need to check the compatibility for the modules they plan to use.

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5.Update rate(1~10Hz)

High baud-rate is required for high update rate. For example, 38400 bps is recommended for 5Hz update rate, and 115200 bps for 10Hz update rate. The maximum update rate in MTK chip is 10Hz.

6.Data digits after the decimal

MTK chip allows user to set the digit of decimal places for longitude & latitude data reported in NMEA sentence, for example GGA, RMC. It provides two options: 4-digit and 6-digit. Please refer to description below:

- 4-digit:

$GNGGA,015123.000,**2307.1198**,N,**12016.4464**,E,1,14,0.79,54.9,M,17.8,M,,*4A
$GNRMC,015123.000,A,**2307.1198**,N,**12016.4464**,E,0.61,27.30,121115,,,A*43

- 6-digit:

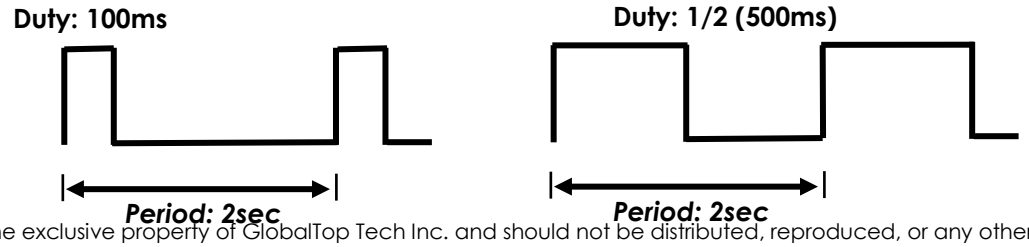
$GNGGA,015123.000,**2307.119801**,N,**12016.446402**,E,1,14,0.79,54.9,M,17.8,M,,*49
$GNRMC,015123.000,A,**2307.119801**,N,**12016.446402**,E,0.61,27.30,121115,,,A*40

7. 3D Fix Pin Output

MTK chip provides one pin for GPS fix status indicator. User needs to set desired parameter of that pin. There are two parameters need to be set:

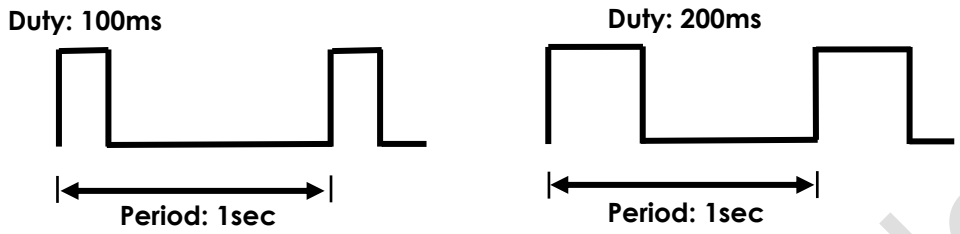
"**Period**" specifies the entire cycle time (high + low level signal), while "**Duty cycle**" specifies the period of time when the signal level is high.

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. Please refer to the figures below:



8.1PPS(1 Pulse Per Second) output duration

User can set the length (duration) of the pulse for 1PPS.
Please refer to the figures below:



9.1PPS mode

MTK chip provides 4 modes for 1PPS output:

- **Output 1 PPS after obtaining 3D-Fix:** After GNSS module getting 3D-fix (3D means >=4SV is used). It starts to output 1PPS pulse.
- **Output 1PPS after obtaining 2D-Fix:** After GNSS module getting 2D-fix (2D means >=3SV is used). It starts to output 1PPS pulse.
- **Output 1PPS after first fix:** After GNSS module getting 3D-fix or 2D-fix, the 1PPS pin will start to output pulse, even though the GPS fix is lost.
- **Always output 1PPS:** After powering on, the GNSS module will keep outputting pulse, even GPS fix is lost.

10.AIC (active interference cancellation)

It provides effective narrow-band interference and jamming elimination. The GPS signal can be recovered from the jammed signal and that allows user to get better navigation quality.

11.LOCUS (Internal logger function)

The internal flash in MTK GPS chip supports the "logger" function. This feature provides:

- Auto logging data into internal flash without waking up the HOST side.
- Smart overlapping mechanism to keep latest logger data (4KB base).
- Flexible configuration to support most logging type, mode and contents.

Capability for MTK internal flash Logger:

With 1 sector flash (64KB), user can log more than16 hours. The version supports 2 sectors (128KB). **Please note that the parameter of LOCUS function cannot be changed once the firmware is released out of factory.**

Table 2: 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	○	○	○	○	○					○
B	Racing	20	○	○	○	○	○	○	○			○
C	Search	19	○	○	○	○	○			○	○	○
D	Saving	13	○		○	○						○
E	All	23	○	○	○	○	○	○	○	○	○	○

Table3: Logging mode behavior during Position normal mode

Positioning / LOCUS config	Normal mode	Power saving mode (Periodic/AlwaysLocate)
AL mode	**No logging**	Logging once before going 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 going 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

Note 1: choosing **115200 bps** baud rate is recommended for data to be dumped successfully from the internal memory.
The command: **$PMTK251,115200*1F<CR><LF>**
Note 2: "Fix Only" is compatible with all other options.
Note 3: The "AL" is used to save data into flash. When the chip enters sleep mode, the AL will log data once and keeps running.
Note 4: The "Interval", "Distance" and "Speed" are called "Customization mode" in the table, and all of them are &&(AND) condition with each other configuration.

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Packet Type: 183 PMTK_LOCUS_QUERY_STATUS

Packet Meaning:
Query Logging status

Data Field:
None
Return:
$PMTKLOG,Serial#, Type, Mode, Content, Interval, Distance, Speed, Status, Number, Percent*Checksum
Serial#: Logging serial number : 0~65535
Type: Logging type – 0: Overlap, 1: FullStop
Mode: Logging mode – 0x08 interval logger
Content: Logging contents of configuration
Interval: Logging interval setting (valid when Interval mode selected)
Distance: Logging distance setting (valid when Distance mode selected)
Speed: Logging speed setting (valid when Speed mode selected)
Status: Logging status – 0: Logging, 1: Stop logging
Number: Logging number of data record
Percent: Logging life used percentage (0%~100%)

Example:
Input: $PMTK183*38<CR><LF>
Return: $PMTKLOG,456,0,b,31,2,0,0,0,3769,46*2A<CR><LF>

Details: It's configurable in Core Builder's LOCUS page ()
Mode: Logging mode – 0x08 interval logger
// 1<<0: AlwaysLocateTM mode (logging with AlwaysLocateTM)
// 1<<1: Fix only mode (logging when 3D-fix only)
// 1<<2: Normal mode (logging per positioning, ex: 1sec)
// 1<<3: Interval mode (logging per pre-setting interval, ex: 15sec)
// 1<<4: Distance mode (logging by distance, ex: 50 meters)
// 1<<5: Speed mode (logging by speed, ex:10 m/s)
Contents: Logging contents of configuration (by Bit-Map)
#define LOCUS_CONTENT_UTC (1<<0) // 4-byte
#define LOCUS_CONTENT_VALID (1<<1) // 1-byte
#define LOCUS_CONTENT_LAT (1<<2) // 4-byte
#define LOCUS_CONTENT_LON (1<<3) // 4-byte
#define LOCUS_CONTENT_HGT (1<<4) // 2-byte
#define LOCUS_CONTENT_SPD (1<<5) // 2-byte
#define LOCUS_CONTENT_TRK (1<<6) // 2-byte
#define LOCUS_CONTENT_HDOP (1<<10) // 2-byte
#define LOCUS_CONTENT_NSAT (1<<12) // 1-byte

Packet Type: 184 PMTK_LOCUS_ERASE_FLASH

Packet Meaning:

Erase Logging flash

Data Field:
PMTK184,Type
Type: Erase type → 1: erase all logger internal flash data

Example:
Input: $PMTK184,1*22<CR><LF>
Return: $PMTK001,184,3*3D<CR><LF>

Packet Type: 185 PMTK_LOCUS_STOP_LOGGER

Packet Meaning:
Stop/Start Logging flash

Data Field:
PMTK185,Type
Type: Logging type → 1: Stop logging
0: Start logging

Example:
Input: $PMTK185,1*23<CR><LF>
Return: $PMTK001,185,3*3C<CR><LF>

Packet Type: 186 PMTK_LOG_NOW

Packet Meaning:
Snapshot write log

Data Field:
PMTK186,Type
Type: 1 means snapshot log data

Example:
Input: $PMTK186,1*20<CR><LF>
Return: $PMTK001,186,3*3F<CR><LF>

Packet Type: 622 PMTK_Q_LOCUS_DATA

Packet Meaning:
Dump LOCUS internal flash data

Data Field:
Case 1: $PMTK622,type
Type: 0-Dump full LOCUS flash data.

1-Dump partial in used LOCUS flash data

Case 2: $PMTK622,type,offset,size*hh
Type: 2-Dump specified sectors' LOCUS flash data
offset: The start address for dump (0<=offset<32, the unit is sector[4KB])

Size: The dump length (0<=size<=32, the unit is sector[4KB])
Example:
Input: $PMTK622,0*28<CR><LF> (It's same as $PMTK622*34<CR><LF> only)
Return: $PMTK001,622,3*36<CR><LF>

Input: $PMTK622,2,3,2*2B //Skip sector 1,2,3. Dump sector4 and sector5 LOCUS flash data

Note 1: For case 2, if the input values of "**offset**" and "**size**" are out of range, it will dump all LOCUS flash.
The example: $PMTK662,0*28<CR><LF>

Note 2: For parameter of case 2, it is only supported in new version of firmware.

Packet Type: 187 PMTK_LOCUS_CONFIG

Packet Meaning:
Configure LOCUS setting by command

Data Field:
PMTK187,mode,setting
Type: 1 means interval mode
Setting: New setting instead of the original configuration (e.g. change to 5-second interval as the example below)

Example:
Input: $PMTK,187,1,5*38<CR><LF>
Return: $PMTK001,187,3*3E<CR><LF>

Note: It only allows user to set interval temporary, and the setting will get back to default when power on (without coin-battery)

LOCUS Parser -- Dump LOCUS data in a binary file, and parse the data.

Sample code for dumping data from internal flash when the Host inputs PMTK622, and the PMTKLOX is used to dump flash data content. Please contact: sales@gtop-tech.com for sample code.
PMTKLOX packet type after Host issue PMTK622.
Type 1: LOCUS start (n is the number of PMTKLOX packets will be sent)

→PMTKLOX,0,n

Type 2: LOCUS data (data will be sent by 8-byte HEX string, at most 24 events)

→PMTKLOX,1,0,xxxxxxxx, xxxxxxxx, xxxxxxxx,…

→…

→PMTKLOX,1,n-1, xxxxxxxx, xxxxxxxx, xxxxxxxx,…

Type 3: LOCSU end

→PMTKLOX,2

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❖ PMTKLOX packet format

PMTKLOX,0,n (LOCUS start)

PMTKLOX,1,0,xxxxxxxx, xxxxxxxx, xxxxxxxx,… (LOCUS data, xxxxxxxx is 8-byte HEX string, at most 24 xxxxxxxx)

PMTKLOX,1,1,xxxxxxxx, xxxxxxxx, xxxxxxxx,… (LOCUS data, xxxxxxxx is 8-byte HEX string, at most 24 xxxxxxxx)

PMTKLOX,1,2,xxxxxxxx, xxxxxxxx, xxxxxxxx,… (LOCUS data, xxxxxxxx is 8-byte HEX string, at most 24 xxxxxxxx)

PMTKLOX,1,3,xxxxxxxx, xxxxxxxx, xxxxxxxx,… (LOCUS data, xxxxxxxx is 8-byte HEX string, at most 24 xxxxxxxx)

…

PMTKLOX,1,n-1,xxxxxxxx, xxxxxxxx, xxxxxxxx,… (LOCUS data, xxxxxxxx is 8-byte HEX string, at most 24 xxxxxxxx)

PMTKLOX,2 (LOCUS end)

Notice:

How to calculate the checksum value

Example: $PGCMD,21,1*6F <CR><LF>

6F is the checksum, and it is calculated by "**Xor**" all characters between "**$**" and ***** .

CR and LF are used to identify the end of a packet

How to convert decimal value to hex value

For item of One-Sentence (Binary Type), decimal value will need to be converted to hex value. Please see the example below:

- $(79)_{10}=(4F)_{16}$
- $(120)_{10} = (78)_{16}$
- $(64951000)_{10}=(03DF12D8)_{16}$

Decimal Hex Conversion Chart:
http://www.binaryhexconverter.com/decimal-to-hex-convert

Decimal	Hexadecimal
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F

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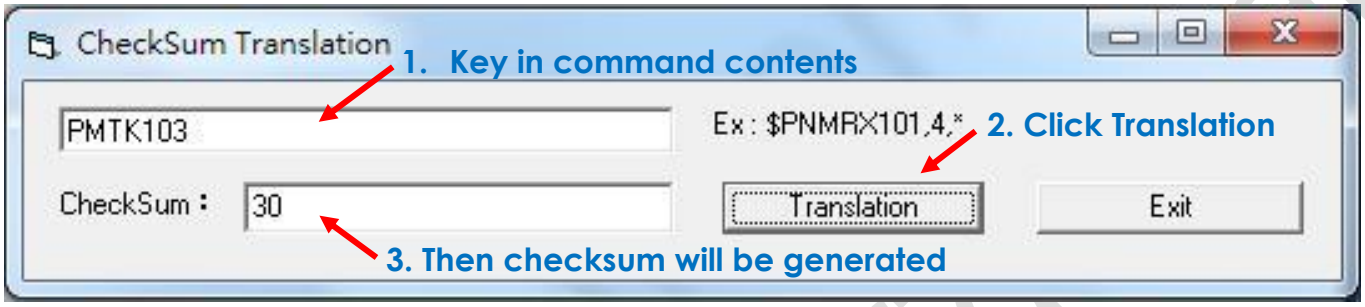
How to acquire that checksum value by checksum tool.

Example: $PGCMD,21,1*6F<CR><LF>



Command setting

Those command packets for module only changed temporary, when module power reset, those changes will be back to original setting. If user needs to set default value of module, they could contact GTop for more details. Email:sales@gtop-tech.com

Special customization support

If you want some special customization, and that is not shown above. We are very glad that you could discuss with us. Please contact: sales@gtop-tech.com . And we will assign a specially-assigned person to do the service for you.

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