PMTK Packet User Manual

Revision: 1.2
Linked FW Version: AXN3.6/3.8/2.3/2.5
Release Date: 2016.05.30

GlobalTop Tech Inc.
### Revision History

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<td>2016.04.20</td>
<td>Hector</td>
<td>1&lt;sup&gt;st&lt;/sup&gt; Release</td>
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<tr>
<td>A02</td>
<td>2016.05.12</td>
<td>Hector</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Release. It modify PMTK353 command</td>
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**MTK NMEA Packet Protocol**

In order to inform the sender whether the receiver has received the packet, an acknowledge packet **PMTK_ACK** should return after the receiver receives a packet.

### MTK NMEA Packet List

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<th>PMTK_Q_Nav_Threshold</th>
<th>PMTK_DT_Nav_Threshold</th>
<th>PMTK_Q_RELEASE</th>
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<td>010</td>
<td>011</td>
<td>101</td>
<td>102</td>
<td>103</td>
<td>104</td>
<td>220</td>
<td>400</td>
<td>500</td>
<td>251</td>
<td>301</td>
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MTK NMEA Packet Format

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<th>Field</th>
<th>Length</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preamble</td>
<td>1 byte</td>
<td>Character</td>
<td>“$”</td>
</tr>
<tr>
<td>Talker ID</td>
<td>4 byte</td>
<td>Character string</td>
<td>“PMTK”</td>
</tr>
<tr>
<td>Pkt Type</td>
<td>3 byte</td>
<td>Character string</td>
<td>From “000” to “999”, an identifier used to tell the decoder how to decode the packet</td>
</tr>
<tr>
<td>Data Field</td>
<td>variable</td>
<td>Character</td>
<td>A “,” must be inserted ahead each data field to help decoder process the Data Field</td>
</tr>
<tr>
<td>*</td>
<td>1 byte</td>
<td>Character</td>
<td>The star symbol is used make the end of Data Field</td>
</tr>
<tr>
<td>CHK1, CHK2</td>
<td>2 byte</td>
<td>Character string</td>
<td>Checksum of the data between preamble “,” and “*”</td>
</tr>
<tr>
<td>CR, LF</td>
<td>2 byte</td>
<td>Binary data</td>
<td>Used to identify the end of a packet</td>
</tr>
</tbody>
</table>

Maximum packet length is restricted to 255 bytes

Sample Packet: $PMTK000*32<CR><LF>

<table>
<thead>
<tr>
<th>Pkt Type</th>
<th>Abbreviation/Syntax</th>
<th>Data Field</th>
<th>Meaning/Example/Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>PMTK_TEST</td>
<td>None</td>
<td>Test Packet $PMTK000*32&lt;CR&gt;&lt;LF&gt;</td>
</tr>
<tr>
<td>001</td>
<td>PMTK_ACK PMTK001,Cmd,Flag</td>
<td>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</td>
<td>Acknowledge of PMTK command $PMTK001,604,3*32&lt;CR&gt;&lt;LF&gt;</td>
</tr>
<tr>
<td>010</td>
<td>PMTK_SYS_MSG PMTK010,Msg</td>
<td>Msg: System message  0: Unknown  1:Startup</td>
<td>Output system message $PMTK010,001*2E&lt;CR&gt;&lt;LF&gt;</td>
</tr>
</tbody>
</table>

In addition, when the GPS 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 has successfully completed boot-up stage.
**Note:**
1. When the power of device (module) is removed, any modified setting will be lost and reset to factory default setting. If the device (module) has backup power supply through VBACKUP or coin battery, it will be able to keep the modified setting until the backup power is exhausted.

**Packet Type: 001 PMTK_ACK**

**Packet Meaning:**
Acknowledge of PMTK command

**Data Field:**
PMTK001,Cmd,Flag
Cmd: The command / packet type the acknowledge responds.
Flag: '0' = Invalid command / packet.
'1' = Unsupported command / packet type
'2' = Valid command / packet, but action failed
'3' = Valid command / packet, and action succeeded

**Example:**
$PMTK001,604,3*32<CR><LF>

**Packet Type: 010 PMTK_SYS_MSG**

**Packet Meaning:**
Output system message

**Data Field:**
Msg: The system message
'0' = UNKNOWN
'1' = STARTUP
'2' = Notification: Notification for the host aiding EPO
'3' = Notification: Notification for the transition to Normal mode is successfully done

**Example:**
$PMTK010,001*2E<CR><LF>
Packet Type: 011 PMTK_TXT_MSG

Packet Meaning:
Output system message

Example:
$PMTK011,MTKGPS*08<CR><LF>

Packet Type: 101 PMTK_CMD_HOT_START

Packet Meaning:
Hot Restart: Use all available data in the NV Store.

Data Field:
None

Example:
$PMTK101*32<CR><LF>

Packet Type: 102 PMTK_CMD_WARM_START

Packet Meaning:
Warm Restart: Don't use Ephemeris at re-start.

Data Field:
None

Example:
$PMTK102*31<CR><LF>

Packet Type: 103 PMTK_CMD_COLD_START

Packet Meaning:
Cold Restart: Don't use Time, Position, Almanacs and Ephemeris data at re-start.

Data Field:
None
Example:
$PMTK103*30<CR><LF>

Packet Type: 104 PMTK_CMD_FULL_COLD_START

Packet Meaning:
Full Cold Restart: It's essentially a Cold Restart, but additionally clear system/user configurations at re-start. That is, reset the receiver to the factory status.

Data Field:
None

Example:
$PMTK104*37<CR><LF>

Packet Type: 220 PMTK_SET_NMEA_UPDATERATE

Packet Meaning:
Set NMEA port update rate

Data Field:
Position fix interval (millisecond). The possible interval values range between 100 and 1000 millisecond.

Example:
$PMTK220,1000*1F<CR><LF>
$PMTK220,200*2C<CR><LF>
$PMTK220,100*2F<CR><LF>

Note:
1. Before user input this command for update rate setting, it needs to see if the baud rate is enough or not. User can use PMTK251 command for baud rate setting
   1000(millisecond) = 1(sec) → 1/1 = 1Hz
   200(millisecond) = 0.2(sec) → 1/0.2 = 5 Hz
   100(millisecond) = 0.1(sec) → 1/0.1 = 10 Hz
Packet Type: 400 PMTK_API_Q_FIX_CTL

Packet Meaning:
Query update rate

Data Field:
None

Return:
PMTK_DT_FIX_CTL

Example:
$PMTK400*36<CR><LF>

Packet Type: 500 PMTK_DT_FIX_CTL

Packet Meaning:
The parameter means which update is set currently

Data Field:
Fixinterval: Position fix interval. (msec). [>=100]
1000 → 1Hz
200 → 5Hz
100 → 10Hz

Example:
$PMTK500,1000,0,0,0,0.0,0.0*1A<CR><LF>

Packet Type: 251 PMTK_SET_NMEA_BAUDRATE

Packet Meaning:
Set NMEA port baud rate

Data Field:
PMTK251, Baudrate
Baudrate setting : 4800,9600,14400,19200,38400,57600,115200

Example:
$PMTK251,38400*27<CR><LF>
Note:
1. You can also restore the system default setting via issue: $PMTK251,0*28<CR><LF>
2. The setting of baud rate will be back to default value in two conditions:
   a. Full cold start command issued
   b. Enter standby mode

Packet Type: 301 PMTK_API_SET_DGPS_MODE

Packet Meaning:
API_Set_Dgps_Mode
DGPS correction data source mode.

Data Field:
PMTK301,Mode
Mode: DGPS data source mode.
‘0’ = No DGPS source
‘1’ = RTCM
‘2’ = SBAS (Include WAAS/EGNOS/GAGAN/MSAS)

Example:
$PMTK301,1*2D<CR><LF>

Note:
1. If you wish to set DGPS mode to RTCM, please use PMTK250 first to set RTCM baud rate before using this command

Packet Type: 401 PMTK_API_Q_DGPS_MODE

Packet Meaning:
API_Query_Dgps_Mode

Data Field:
None

Return:
PMTK_API_DT_DGPS_MODE

Example:
$PMTK401*37<CR><LF>
Packet Type: 501 PMTK_API_DT_DGPS_MODE

Packet Meaning:
DGPS data source mode

Data Field:
PMTK501,Mode
Mode: DGPS data source mode.
‘0’ = No DGPS source
‘1’ = RTCM
‘2’ = SBAS (Include WAAS/EGNOS/GAGAN/MSAS)

Example:
$PMTK501,2*28<CR><LF>

Packet Type: 313 PMTK_API_SET_SBAS_ENABLED

Packet Meaning:
API_Set_Sbas_Enabled
Enable to search a SBAS satellite or not.

Data Field:
PMTK313,Enabled
‘0’ = Disable
‘1’ = Enable

Example:
$PMTK313,1*2E<CR><LF>

Packet Type: 413 PMTK_API_Q_SBAS_ENABLED

Packet Meaning:
API_Query_Sbas_Enabled

Data Field:
None

Return:
PMTK_DT_SBAS_ENABLED
Example:
$PMTK413*34<CR><LF>

Packet Type: 513 PMTK_DT_SBAS_ENABLED

Packet Meaning:
Acknowledge for SBAS function is enable or disable.

Data Field:
PMTK513,Enabled
‘0’ = Disable
‘1’ = Enable

Example:
$PMTK513,1*28<CR><LF>

Packet Type: 314 PMTK_API_SET_NMEA_OUTPUT

Packet Meaning:
API_Set_NMEA_Out
Set NMEA sentence output frequencies

Data Field:
There are totally 19 data fields that present output frequencies for the 19 supported NMEA sentences individually.

Supported NMEA Sentences
0 NMEA_SEN_GLL, // GPGLL interval - Geographic Position - Latitude longitude
1 NMEA_SEN_RMC, // GPRMC interval - Recommended Minimum Specific GNSS Sentence
2 NMEA_SEN_VTG, // GPVTG interval - Course over Ground and Ground Speed
3 NMEA_SEN_GGA, // GPGGA interval - GPS Fix Data
4 NMEA_SEN_GSA, // GPGSA interval - GNSS DOPS and Active Satellites
5 NMEA_SEN_GSV, // GPGSV interval - GNSS Satellites in View
6 //Reserved
7 //Reserved
13 //Reserved
14 //Reserved
15 //Reserved
16 //Reserved
17 NMEA_SEN_ZDA, // GPZDA interval – Time & Date
18 NMEA_SEN_MCHN, // PMTKCHN interval – GPS channel status
Supported Frequency Setting
0 - Disabled or not supported sentence
1 - Output once every one position fix
2 - Output once every two position fixes
3 - Output once every three position fixes
4 - Output once every four position fixes
5 - Output once every five position fixes

Example:
$PMTK314,1,1,1,1,5,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0*2C<CR><LF>

Note:
1. This command set GLL output frequency to be outputting once every 1 position fix, and RMC to be outputting once every 1 position fix, and so on. You can also restore the system default setting via issue:
   $PMTK314,-1*04<CR><LF>

Packet Type: 414 PMTK_API_Q_NMEA_OUTPUT

Packet Meaning:
API_Query_NMEA_Out
Query current NMEA sentence output frequencies

Data Field:
None

Return:
PMTK_API_DT_NMEA_OUTPUT

Example:
$PMTK414*33<CR><LF>

Packet Type: 514 PMTK_API_DT_NMEA_OUTPUT

Packet Meaning:
NMEA sentence output frequency setting

Data Field:
There are totally 19 data fields that present output frequencies for the 19 supported NMEA sentences individually. Please refer to PMTK_API_SET_NMEA_OUTPUT for the supported NMEA sentence and frequency setting.
Packet Type: 605 PMTK_Q_RELEASE

Packet Meaning:
Query the firmware release information.

Data Field:
None

Return:
PMTK_DT_RELEASE

Example:
$PMTK605*31<CR><LF>

Packet Type: 705 PMTK_DT_RELEASE

Packet Meaning:
Firmware release information.

Data Field:
PMTK705,ReleaseStr,Build_ID,Internal_USE_1,( Internal_USE_2)
ReleaseStr: Firmware release name and version
3318 : Mcore_x.x
3329/3339/3333 : AXN_x.x
Build_ID: for firmware version control
Internal_USE_1: Internal only
Internal_USE_2: Internal only

Example:
$PMTK705,AXN_3.60_3333_15070100,8323,Titan2,1.0*70<CR><LF>

Packet Type: 607 PMTK_Q_EPO_INFO

Packet Meaning:
Query the EPO data status stored in the GPS chip
Data Field:
None

Return:
PMTK_DT_EPO_INFO

Example:
$PMTK607*33<CR><LF>

Packet Type: 707 PMTK_DT_EPO_INFO

Packet Meaning:
EPO data status stored in the GPS chip

Data Field:
PMTK707,Set,FWN,FTOW,LWN,LTOW,FCWN,FCTOW,LCWN,LCTOW
Set: Total number sets of EPO data stored in the GPS chip
FWN & FTOW : GPS week number and TOW of the first set of EPO data stored in chip respectively
LWN & LTOW : GPS week number and TOW of the last set of EPO data stored in chip respectively
FCWN & FCTOW : GPS week number and TOW of the first set of EPO data that are currently used respectively
LCWN & LCTOW : GPS week number and TOW of the last set of EPO data that are currently used respectively

Example:
$PMTK707,28,1680,259200,259200,1681,237600,1680,345600,1680,345600*19

Packet Type: 127 PMTK_CMD_CLEAR_EPO

Packet Meaning:
Clear the EPO data stored in the GPS chip

Data Field:
None

Example:
$PMTK127*36<CR><LF>
Packet Type: 386 PMTK_SET_Nav Speed threshold

Packet Meaning:
Set the speed threshold for static navigation. If the actual speed is below the threshold, output position will keep the same and output speed will be zero. If threshold value is set to 0, this function is disabled.

Data Field:
PMTK386,Nav Speed Threshold
Nav Speed threshold: 0~2.0 (m/s)
The minimum is 0.1 m/s, the maximum value is 2.0 m/s

Example:
$PMTK386,0.2*3F<CR><LF>
$PMTK386,2.0*3F<CR><LF>

Note:
1. The setting of Nav Speed Threshold will be back to default value in two conditions:
   a. Full cold start command issued
   b. Enter standby mode

Packet Type: 447 PMTK_Q_Nav_Threshold

Packet Meaning:
Query current Nav Speed threshold setting.

Data Field:
None

Return:
PMTK_DT_Nav_Threshold

Example:
$PMTK447*35<CR><LF>

Packet Type: 527 PMTK_DT_Nav_Threshold

Packet Meaning:
Current Nav Speed Threshold setting

Data Field:
PMTK527,Current Nav_Threshold
Current Nav_Threshold:
The range is $0 \sim 2.0$ (m/s)

**Example:**

```
$PMTK527,0.20*02<CR><LF>
$PMTK527,2.00*02<CR><LF>
$PMTK527,0.00*00<CR><LF>
```

**Packet Type: 161 PMTK_COMMAND_STANDBY_MODE**

**Packet Meaning:**
Enter standby mode for power saving.

**Data Field:**
PMTK161,Type
Type: Standby type
   '0' =Sleep mode

**Example:**

```
$PMTK161,0*28<CR><LF>
```

**Note:**
1. Software on Host side sends any byte to wake up from standby mode.

**Packet Type: 223 PMTK_SET_AL_DEE_CFG**

**Packet Meaning:**
It means the module needs to extend the time for ephemeris data receiving under what situation.

**Data Field:**
PMTK223,SV,SNR,Extension threshold, Extension gap
SV: it means the module need extend the time to receive more ephemeris data while the number of satellite without ephemeris data. [default value: 1, range 1~4]
SNR: it means the module needs to enable the ephemeris data receiving while the SNR of satellite is more than the setting value. [default value: 30, range 25~30]
Extension threshold (millisecond): extension time for ephemeris data receiving [default value: 180000, range 40000~1800000]
Extension (millisecond): gap time between EPH data receiving [default value: 60000 msec, range 0~3600000]
Example:
$PMTK225,0*2B<CR><LF>
$PMTK223,1,25,180000,60000*38<CR><LF>
$PMTK225,1,3000,12000,18000,72000*16<CR><LF>

Note:
1. The command is recommended with PMTK225 command.

Packet Type: 225 PMTK_CMD_PERIODIC_MODE

Packet Meaning:
Enter Standby or Backup mode for power saving.

Data Field:
PMTK225, Type, Run time, Sleep time, Second run time, Second sleep time

Type: operation mode
- ‘0’ = go back to normal mode
- ‘1’ = Periodic backup mode
- ‘2’ = Periodic standby mode
- ‘4’ = Perpetual mode (this mode need be work with relative hardware pin)
- ‘8’ = AlwaysLocate™ standby mode
- ‘9’ = AlwaysLocate™ backup mode

Run time (millisecond): Duration to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.
- ‘0’: disable
- ‘>=1,000’: enable [Range: 1,000~518400000]

Sleep time (millisecond): Interval to come out of a minimum power sleep mode and start running in order to get a new position fix.
- ‘0’: disable
- ‘>=1,000’: enable [Range: 1,000~518400000]

Second run time (millisecond): Duration to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.
- ‘0’: disable
- ‘>=1,000’: enable [Range: Second set both 0 or 1,000~518400000]

Second sleep time (millisecond): Interval to come out of a minimum power sleep mode and start running in order to get a new position fix.
- ‘0’: disable
- ‘>=1,000’: enable [Range: Second set both 0 or 1,000~518400000]

Example: How to enter periodic modes
Periodic Backup mode
$PMTK225,0*2B<CR><LF>
$PMTK223,1,25,180000,60000*38<CR><LF>
$PMTK225,1,3000,12000,18000,70000*16<CR><LF>

Periodic Standby mode
$PMTK225,0*2B<CR><LF>
$PMTK223,1,25,180000,60000*38<CR><LF>
$PMTK225,2,3000,12000,18000,72000*15<CR><LF>

Example: How to enter AlwaysLocate modes
AlwaysLocate™ Standby
$PMTK225,0*2B<CR><LF>
$PMTK225,8*23<CR><LF>

AlwaysLocate™ Backup
$PMTK225,0*2B<CR><LF>
$PMTK225,9*22<CR><LF>

Note:
1. The second run time should larger than first run time when non-zero value.
2. The purpose of second run time and sleep time can let module to catch more satellite ephemeris data in cold boot condition. The value of them can be null. Then it will use the first run time and sleep time for ephemeris data receiving.
3. AlwaysLocate™ is an intelligent controller of MT3333/MT3339 power saving mode. Depending on the environment and motion conditions, MT3333 can adaptive adjust the on/off time to achieve balance of positioning accuracy and power consumption.

Packet Type: 255 PMTK_SET_SYNC_PPS_NMEA (only support in AXN3.6(8) and AXN2.3 after 2014.04.21)

Packet Meaning:
Enable or disable fix NMEA output time behind PPS function. (Default off)

Data Field:
PMTK255,Mode
Mode:
‘0’ = disable
‘1’ = enable

Example:
$PMTK255,1*2D<CR><LF>

Note:
1. This function is useful in 1Hz update rate and baud rate at 14400~115200 bps
2. At baud rate of 9600 and 4800, it is recommended to set RMC sentence only. Because at low baud rate, if there are many NMEA sentence output, per second transmission may exceed one second.
3. After enable this function, the relationship between PPS and Tx of UART is shown in below:

The latency range of beginning of UART Tx is between 170 ms and 180 ms at MT3339 platform (240 ms and 260 ms at MT3333 platform) and behind the rising edge of PPS.

Packet Type: 286 PMTK_CMD_AIC_MODE

Packet Meaning:
Active Interference Cancellation (AIC) feature provides effective narrow-band interference and jamming elimination.

Data Field:
PMTK286,Mode
Mode:
‘0’ = disable AIC function
‘1’ = enable AIC function

Example:
$PMTK286,1*23<CR><LF>

Note:
1. The AIC function is enabled for default factory setting.

Packet Type: 869 PMTK_CMD_EASY_ENABLE

Packet Meaning:
Enable or disable EASY function. Query if EASY is enabled or disabled.

Data Field:
PMTK869,CmdType,Enable,Extension Day
CmdType:
‘0’ = Query
‘1’ = Set

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‘2’ = Result for Query operation

Enable:
‘0’ = disable
‘1’ = enable

Extension Day: Finished extension day

Example:
To enable EASY, use
$PMTK869,1,1*35<CR><LF>

To disable EASY, use
$PMTK869,1,0*34<CR><LF>

To query if EASY is enabled or disabled, use
$PMTK869,0*29<CR><LF>

If EASY is disabled, the receiver returns
$PMTK869,2,0,0*2B<CR><LF>

If EASY is enabled and is not finished yet, the receiver may returns
$PMTK869,2,1,0*2A<CR><LF>

If EASY is enabled and is finished 1-day extension, the receiver may returns
$PMTK869,2,1,1*28<CR><LF>
If EASY is enabled and is finished 2-day extension, the receiver may returns
$PMTK869,2,1,2*28<CR><LF>

If EASY is enabled and is finished 3-day extension, the receiver may returns
$PMTK869,2,1,3*29<CR><LF>

Note:
1. The EASY function is enabled for default setting.
2. The “VBACKUP” pin needs to connect to a coin-battery for this feature. Please contact us for more details.
3. The EASY function only support update rate 1Hz.

Packet Type: 886 PMTK_FR_MODE

Packet Meaning:
Set navigation mode

Data Field:
PMTK886,CmdType
CmdType:
‘0’: Vehicle mode: For general purpose
‘1’: Pedestrian: For running and walking purpose that the low-speed (< 5m/s) movement will have more
effect on the position calculation.

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‘2’: Avionic mode: For high-dynamic purpose that the large-acceleration movement will have more effect on the position calculation.

‘3’: Balloon mode: For high-altitude balloon purpose that the vertical movement will have more effect on the position calculation.

Example:
$PMTK886,0*28<CR><LF>$: Enter vehicle mode.
$PMTK886,1*29<CR><LF>$: Enter pedestrian mode.
$PMTK886,2*2A<CR><LF>$: Enter avionic mode.
$PMTK886,3*2B<CR><LF>$: Enter balloon mode.

Return:
$PMTK001,886,3*36<CR><LF>

Note:
1. In mode 0~2, the altitude limitation is 10,000 meter. For mode 3 the altitude limitation is 80,000 meters; however when the altitude exceeds 18,000 meter, the velocity must be lower than 515 m/s.

Packet Type: 330 PMTK_API_SET_DATUM

Packet Meaning:
Configure Datum

Data Field:
PMTK330,Datum
Datum:
‘0’ = WGS84
‘1’ = TOKYO-M
‘2’ = TOKYO-A

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

Note:
1. It supports 222 different datum. Please refer to GTOP Datum List.
Packet Type: 331 PMTK_API_SET_DATUM_ADVANCE

Packet Meaning:
Set user defined datum

Data Field:
PMTK331,majA,eece,dX,dY,dZ
majA: User defined datum semi-major axis [meter]
eec: User defined datum eccentric [meter]
dX: User defined datum to WGS84 X axis offset [meter]
dY: User defined datum to WGS84 Y axis offset [meter]
dZ: User defined datum to WGS84 Z axis offset [meter]

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

Packet Type: 431 PMTK_API_Q_DATUM_ADVANCE

Packet Meaning:
Query user defined datum

Data Field:
None

Return:
PMTK_DT_DATUM

Example:
$PMTK431*34<CR><LF>
After issue PMTK431, then module send acknowledge like below:
$PMTK530,6377397.155,299.1528128,-148.0,507.0,685.0*11<CR><LF>
Packet Type: 353 PMTK_API_SET_GNSS_SEARCH_MODE

(Not supported in AXN3.0 and MT3339)

Packet Meaning:
This command is used to configure the receive to start searching of which satellite system
The setting will be kept available when NVRAM data is valid

Data Field:
, GPS_Enabled, GLONASS_Enabled, GALILEO_Enabled, GALILEO_FULL_Enabled, BEIDOU_Enabled
GPS_Enabled: '0' = disable (DO NOT search GPS satellite)
'1' or non-ZERO value = search GPS satellite
GLONASS_Enabled: '0' = disable (DO NOT search GLONASS satellite)
'1' or non-ZERO value = search GLONASS satellite
GALILEO_Enabled: '0' = disable (DO NOT search GALILEO satellite)
'1' or non-ZERO value = search GALILEO satellite
GALILEO_FULL_Enabled: '0' = disable
'1' = enable
BEIDOU_Enabled: '0' = disable (DO NOT search BEIDOU satellite)
'1' or non-ZERO value = search BEIDOU satellite

Example:
$PMTK353,0,1,0,0,0*2A : Search GLONASS satellites only
$PMTK353,1,0,0,0,0*2A : Search GPS satellites only
$PMTK353,1,1,0,0,0*2B : Search GPS and GLONASS satellites
$PMTK353,1,1,1,0,0*2A : Search GPS GLONASS, GALILEO satellites
$PMTK353,0,0,0,1,0*2A : Search BEIDOU satellites only
$PMTK353,1,0,0,0,1*2B : Search GPS and BEIDOU satellites

Note:
1. Parameter "GALILEO_FULL_Enabled" is phase out. Please keep it in ZERO value.
Packet Type: 430 PMTK_API_Q_DATUM

Packet Meaning:
Query default Datum

Data Field:
None

Return:
PMTK_API_DT_DATUM

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

Packet Type: 530 PMTK_API_DT_DATUM

Packet Meaning:
Current datum used

Data Field:
PMTK530,Datum
Datum:
‘0’ = WGS84
‘1’ = TOKYO-M
‘2’ = TOKYO-A

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

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>

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>

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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: 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 seconds interval as the example below)

Example:
Input: $PMTK,187,1,5*14<CR><LF>
Return: $PMTK001,187,3*3E<CR><LF>

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

Packet Type: 622 PMTK_Q_LOCUS_DATA

Packet Meaning:
Dump LOCUS flash data

Data Field:
Case 1: PMTK622,Type
Type: 0 means dump full flash data
1 means dump partial in used flash data

Case 2: PMTK622,type,offset,size
Type: 2 means dump specified sector’s LOCUS flash data
offset: The start address for dump (0<=offset<=32, the unit is sector [4KB])
size: The dump length (0<=offset<=32, the unit is sector [4KB])
Example:
- Input: $PMTK622,0*28  //Dump full LOCUS flash data
- Input: $PMTK622,1*29  //Dump partial LOCUS flash data
- Input: $PMTK622,2,3,2*2B  //Skip sector 1,2,3. Dump sector 4 and sector 5 LOCUS flash data

Note:
1. If the input values of offset and size are out of range, it will dump all LOCUS flash like using $PMTK622,0*28
2. For Case 2 function, it is available in latest version of C39 chip. Please contact us for more details.

Packet Type: 602 PMTK_Q_DATA_PORT

Packet Meaning:
Read data port input/output

Data Field:
None

Example:
- Input: $PMTK602*36<CR><LF>
- Return: PMTK_DT_DATA_PORT packet

Packet Type: 702 PMTK_DT_DATA_PORT

Packet Meaning:
Display data port input/output data type and baud rate

Data Field:
InType: Data port input data type
‘0’ = DPORT_IN_NONE
‘1’ = DPORT_IN_RTCM
‘2’ = DPORT_IN_NA

OutType: Data port output data type
‘0’ = DPORT_OUT_NONE
‘1’ = DPORT_OUT_RTCM
‘3’ = DPORT_OUT_NMEA

Example:
- Input: $PMTK602*36<CR><LF>
- Return: $PMTK702,1,3,9600*16<CR><LF>
Packet Type: 285 PMTK_SET_PPS_CONFIG_CMD

Packet Meaning:
Configure PPS setting

Data Field:
PMTK285,PPSType,PPSPulseWidth
PPSType: Availability
‘0’ = Disable
‘1’ = After the first fix
‘2’ = 3D fix only
‘3’ = 2D/3D fix only
‘4’ = Always
PPSPulseWidth: PPS pulse width (unit: ms)

Example:
$PMTK285,2,100*3E<CR><LF>

Packet Type: 299 PMTK_SET_OUTPUT_DEBUG

Packet Meaning:
Enable or disable Debug log output

Data Field:
PMTK299,Enabled
Enabled:
‘0’ = Disable
‘1’ = Enable

Example:
$PMTK299,1*2D<CR><LF>

Note:
1. It is recommended to set higher baud rate while using this command.
2. This command only supported in AXN3.6, AXN3.8.

Packet Type: 355 PMTK_API_QUERY_GNSS_SEARCH_MODE
(Not supported in MT3339)

Packet Meaning:
This command is to get GLONASS, BEIDOU and GALILEO search setting

Data Field:
None

Example:

$PMTK355*31<CR><LF>
Return $PMTK001,355,3,1,0,0*2E ➔ "$PMTK001,355,3,GLON_Enable,BEIDOU_Enable,GALILEO_Enable"
The GLONASS search mode is enabled.

Packet Type: 356 PMTK_API_SET_HDOP_THRESHOLD

Packet Meaning:
This command is to set the HDOP threshold. If the HDOP value is larger than this threshold value, the position will not be fixed.

Data Field:

PMTK356, HDOPThreshold

HDOPThreshold: 0 means disable this function or other value enable this function.

Example:

$PMTK356,5.0*35<CR><LF>
Return $PMTK356,5.0 Set OK!*52, it means setting is ok.

Packet Type: 357 PMTK_API_GET_HDOP_THRESHOLD

Packet Meaning:
This command is to get the HDOP threshold.

Data Field:

None

Example:

$PMTK357*33<CR><LF>
Return $PMTK357,5.0*34

Packet Type: 435 PMTK_API_Q_RTC_TIME

Packet Meaning:
This command is to get current RTC UTC Time

Data Field:

None

Example:

Input $PMTK435*30<CR><LF>
Return PMTK_API_DT_RTC_TIME packet
Packet Type: 535 PMTK_API_DT_RTC_TIME

Packet Meaning:
This packet includes current RTC UTC Time

Data Field:
PMTK535,Year,Month,Day,Hour,Min,Sec
Year: Year
Month: 1~12
Day: 1~31
Hour: 0~23
Min: 0~59
Sec: 0~59

Example:
$PMTK535,2016,4,21,6,29,37*3A

Packet Type: 250 PMTK_SET_DATA_PORT

Packet Meaning:
Set data port (UART1) input/output data type and baud rate

Data Field:
PMTK250,InType,OutType,Baudrate
InType: Data port input data type
‘0’ = DPORT_IN_NONE (No data input)
‘1’ = DPORT_IN_RTCM (RTCM input)
‘3’ = DPORT_IN_NMEA (MTK NMEA)
OutType: Data port output data type
‘0’ = DPORT_OUT_NONE (No data output)
‘1’ = DPORT_OUT_NMEA (MTK NMEA)
‘3’ = 2D/3D fix only
Baud rate: Data port input data type
4800
9600
14400
19200
38400
57600
115200

Example:
$PMTK250,1,3,9600*14<CR><LF>
Packet Type: 602 PMTK_Q_DATA_PORT

Packet Meaning:
Read data port input/output data type and baud rate

Data Field:
None

Example:
Input $PMTK602*36<CR><LF>
Return 702 PMTK_DT_DATA_PORT packet

Packet Type: 702 PMTK_Q_DATA_PORT

Packet Meaning:
Display data port input/output data type and baud rate

Data Field:
InType: Data port input data type
   ‘0’ = DPORT_IN_NONE (No data input)
   ‘1’ = DPORT_IN_RTCM (RTCM input)
   ‘3’ = DPORT_IN_NMEA (MTK NMEA)
OutType: Data port output data type
   ‘0’ = DPORT_OUT_NONE (No data output)
   ‘1’ = DPORT_OUT_NMEA (MTK NMEA)
   ‘3’ = 2D/3D fix only
Baud rate: Data port input data type
4800
9600
14400
19200
38400
57600
115200

Example:
$PMTK702,1,3,9600*16<CR><LF>
Notice:

How to calculate the checksum value

Example: $PMTK605*31<CR><LF>
31 is the checksum, and it is calculated by Xor all characters between $ and *.
CR, LF: Two bytes binary data
The two bytes are used to identify the end of a packet

How to acquire that checksum value by checksum tool.

Example: $PMTK226,3,30*4<CR><LF>

1. Key in command contents

![Image of command contents]

2. Click Translation

3. That checksum will display

Command setting reset

Those command packet for module baud rate and update rate changed only temporary, when module power reset those update rate and baud rate must be back to original setting. If user want to change baud rate and update rate of module to other value that need GTop re-edit new firmware and burning it to module.