GlobalTop

MT3339

PMTK command packet
Revision History

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<th>Author</th>
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<td>A01</td>
<td>2013-10-08</td>
<td>Hector</td>
<td>1st Release</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 MTK_ACK should return after the receiver receives a packet.

MTK NMEA Packet List

MTK NMEA Packet Format

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<th>Field</th>
<th>Length</th>
<th>Type</th>
<th>Description</th>
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</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>A “,” must be inserted before each data field to help decoder process the Data Field</td>
<td></td>
</tr>
<tr>
<td>*</td>
<td>1 byte</td>
<td>Character</td>
<td>The star symbol is used to 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>
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<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>
</tbody>
</table>
| 001      | PMTK_ACK<br>
          | PMTK001,Cmd,Flag | Command/ packet type the acknowledge responds<br>Flag:<br>0 = invalid command/ packet type<br>1 = unsupported command/ packet type<br>2 = valid command/ packet, but action failed<br>3 = valid command/ packet and action succeeded | Acknowledge of PMTK command \$PMTK001,604,3*32<CR><LF> |
| 010      | PMTK_SYS_MSG<br>
          | PMTK010,Msg     | Msg: System message<br>0: Unknown<br>1: Startup                                   | Output system message \$PMTK010,001*2E<CR><LF> |

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:
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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
Output system message

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

Packet Type: 101 PMTK_CMD_HOT_START

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
Set NMEA port update rate

Data Field:
Position fix interval (millisecond). The possible interval values range between 100 and 10000 millisecond.

Example:
Packet Type: 251 PMTK_SET_NMEA_BAUDRATE

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
API_Set_Dgps_Mode
DGPS correction data source mode.

Data Field:
PMTK301,Mode
Mode: DGPS data source mode.
‘0’ = No DGPS source

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GlobalTop PMTK command packet

‘1’ = RTCM
‘2’ = WAAS

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

Note:
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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
DGPS data source mode

Data Field:
PMTK501,Mode
Mode: DGPS data source mode.
‘0’ = No DGPS source
‘1’ = RTCM
‘2’ = WAAS

Example:
Packet Type: 313 PMTK_API_SET_SBASENABLED

Support Chip Type:
MT3339

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_SBASENABLED

Support Chip Type:
MT3339

Packet Meaning:
API_Query_Sbas_Enabled

Data Field:
None

Return:
PMTK_DT_SBASENABLED

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

Packet Type: 513 PMTK_DT_SBASENABLED

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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
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GlobalTop PMTK command packet  Rev.A01

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*2C<CR><LF>

Note:
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

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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.

Example:
$PMTK514,0,1,1,1,5,0,0,0,0,0,0,0,0,0,0,0,0,0,0*2B<CR><LF>
Packet Type: 319 PMTK_API_SET_SBAS_Mode

Support Chip Type:
MT3339

Packet Meaning:
API_Set_Sbas Mode_Selection
Choose SBAS satellite test mode

Data Field:
PMTK319,Mode
‘0’ = testing mode
‘1’ = Integrity mode

Example:
$PMTK319,0*25<CR><LF>
$PMTK319,1*24<CR><LF>

Packet Type: 419 PMTK_API_Q_SBAS_Mode

Support Chip Type:
MT3339

Packet Meaning:
API_Query_Sbas Mode_Selection
Choose SBAS satellite test mode

Data Field:
None

Return:
PMTK_API_DT_SBAS_Mode

Example:
$PMTK419*3E<CR><LF>

Packet Type: 519 PMTK_API_DT_SBAS_Mode

Support Chip Type:
MT3318、MT3329、MT3339

Packet Meaning:
Current SBAS satellite mode

**Data Field:**
PMTK519,Mode
‘0’ = testing mode
‘1’ = Integrity mode

**Example:**
$PMTK519,1*22<CR><LF>

**Packet Type: 605 PMTK_Q_RELEASE**

**Support Chip Type:**
MT3339

**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**

**Support Chip Type:**
MT3339

**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 : AXN_x.x
Build_ID: for firmware version control
Internal_USE_1: Internal only
Internal_USE_2: Internal only
Example:
$PMTK705,AXN_1.3,2102,ABCD,*14<CR><LF>

Packet Type: 607 PMTK_Q_EPO_INFO

Support Chip Type:
MT3339

Packet Meaning:
Query the EPO data status stored in the GPS chip

Data Field:
None

Return:
PMTK_DT_DT_EPO_INFO

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

Packet Type: 707 PMTK_DT_EPO_INFO

Support Chip Type:
MT3339

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:
$PMTK707,28,1680,259200,1681,237600,1680,345600,1680,345600*19
Packet Type: 127 PMTK_CMD_CLEAR_EPO

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
If the speed is slower than the specified threshold, the output position will stay freezeed.
User can test the appropriate parameters based on specified application

Data Field:
PMTK386,Nav Speed threshold
Nav Speed threshold: 0/ 0.2/ 0.4/ 0.6/ 0.8/ 1.0/1.5/2.0 (m/s)
Disable: Nav Speed threshold is set to 0 m/sec

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

Packet Type: 447 PMTK_Q_Nav_Threshold

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
Current Nav Speed Threshold setting

Data Field:
PMTK527,Current Nav_Threshold
Current Nav_Threshold:
The range is 0/ 0.2/ 0.4/ 0.6/ 0.8/ 1.0/1.5/2.0 (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_CMD_STANDBY_MODE

Support Chip Type:
MT3339

Packet Meaning:
Enter standby mode for power saving.

Data Field:
PMTK161,Type
Type: ‘0’ =Standby type
‘0’ =Sleep mode

Example:
$PMTK161,0*28<CR><LF>

Note:
Software on Host side sends any byte to wake up from standby mode.
Packet Type: 223 PMTK_SET_AL_DEE_CFG

Support Chip Type:
MT3339

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 40000~180000]
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:
The command is recommended with PMTK225 command.

Packet Type: 225 PMTK_CMD_PERIODIC_MODE

Support Chip Type:
MT3339

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 backup mode
‘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: 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: 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>
$PMTK225,1,3000,12000,18000,72000*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 be larger than the 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.

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3. AlwaysLocate™ is an intelligent controller of MT3339 power saving mode. Depending on the environment and motion conditions, MT3339 can adaptively adjust the on/off time to achieve balance of positioning accuracy and power consumption.

4. This command needs to work normal with some hardware circuits. Please contact us for more details.

**Packet Type: 286 PMTK_CMD_AIC_MODE**

**Support Chip Type:**
MT3339

**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:**
The AIC function is enabled for default setting.

**Packet Type: 869 PMTK_CMD_EASY_ENABLE**

**Support Chip Type:**
MT3339

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

**Data Field:**
PMTK869,CmdType,Enable
CmdType:
‘0’ = Query
‘1’ = Set
‘2’ = Result for Query operation
Enable:
‘0’ = disable
‘1’ = enable

**Example:**
To query if EASY is enabled or disabled, use
$PMTK869,0*29<CR><LF>
If EASY is disabled, the receiver returns
$PMTK869,2,0*37<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: 187 PMTK_LOCUS_CONFIG

Support Chip Type:
MT3339

Packet Meaning:
Configure Locus setting by command

Data Field:
PMTK187,Mode, Interval
Mode:
‘1’ = Interval mode for Locus

Interval:
The value means how many second to log a data

Example:
$PMTK187,1,5*38<CR><LF> ➔ It means every 5 second to log a data.

Note:
1. It only allow user to re-configure the interval of LOCUS function now.

Packet Type: 330 PMTK_API_SET_DATUM

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

Packet Meaning:
Set user defined datum

Data Field:
PMTK331,majA,eec,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

Support Chip Type:
MT3339

Packet Meaning:
Query user defined datum

Data Field:
None

Return:
PMTK_DT_DATUM

Example:
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: 430 PMTK_API_Q_DATUM

Support Chip Type:
MT3339

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

Support Chip Type:
MT3339

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: 351 PMTK_API_SET_SUPPORT_QZSS_NMEA

Support Chip Type:
MT3339

Packet Meaning:
The receiver support new NMEA format for QZSS. The command allow user enable or disable QZSS
NMEA format. Default is disable QZSS NMEA format. (use NMEA 0183 v3.1)

Data Field:
PMTK351,enabled
Enabled: '0': Disable
'1': Enable

Example:
$PMTK351,0*29<CR><LF>
$PMTK351,1*28<CR><LF>

Packet Type: 352 PMTK_API_SET_STOP_QZSS

Support Chip Type:
MT3339

Packet Meaning:
Since QZSS is regional positioning service. The command allow user enable or disable QZSS function. Default is enable QZSS function

Data Field:
PMTK352,enabled
Enabled: '0': Enable
'1': Disable

Example:
$PMTK352,0*2B<CR><LF>
$PMTK352,1*2A<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>

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1. Key in 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.