GlobalTop

MT3333

PMTK Command Packet

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Revision History

Revision	Date	Author	Description
A01	2012-10-25	Hector	First Release for MT3333

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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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MTK NMEA Packet Format

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

Maximum packet length is restricted to **255** bytes

Field	Length	Type	Description
Preamble	1 byte	Character	"$"
Talker ID	4 byte	Character string	"PMTK"
Pkt Type	3 byte	Character string	From "000" to "999", an identifier used to tell the decoder how to decode the packet
Data Field	variable		A "," must be inserted ahead each data field to help decoder process the Data Field
*	1 byte	Character	The star symbol is used make the end of 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

Sample 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>

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.

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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:
MT3333

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:
MT3333

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:
MT3333

Packet Meaning:
Output system message

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

Packet Type: 101 PMTK_CMD_HOT_START

Support Chip Type:
MT3333

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:
MT3333

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:
MT3333

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:
MT3333

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:
MT3333

Packet Meaning:
Set NMEA port update rate

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

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

Note：
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

Support Chip Type:
MT3333

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

Support Chip Type:
MT3333

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*1A<CR><LF>

Packet Type: 251 PMTK_SET_NMEA_BAUDRATE

Support Chip Type:
MT3333

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:
MT3333

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' = 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:
MT3333

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:
MT3333

Packet Meaning:
DGPS data source mode

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

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

Packet Type: 313 PMTK_API_SET_SBAS_ENABLED

Support Chip Type:
MT3333

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

Support Chip Type:
MT3333

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

Support Chip Type:
MT3333

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:
MT3333

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:
$PMTK314,1,1,1,1,1,5,0,0,0,0,0,0,0,0,0,0,0,0,0*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:
MT3333

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:
MT3333

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:
$PMTK514,0,1,1,1,1,5,0,0,0,0,0,0,0,0,0,0,0,0,0*2B<CR><LF>

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Packet Type: 605 PMTK_Q_RELEASE

Support Chip Type:
MT3333

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:
MT3333

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:
MT3333

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:
MT3333

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:
MT3333

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:
MT3333

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

Support Chip Type:
MT3333

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:
MT3333

Packet Meaning:
Current Nav Speed Threshold setting

Data Field:
PMTK527,Current Nav_Threshold
Current Nav_Threshold:
The range is 0~2.0 (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:
MT3333

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

Packet Type: 223 PMTK_SET_AL_DEE_CFG

Support Chip Type:
MT3333

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:
MT3333

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: 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>
$PMTK225,1,3000,12000,18000,72000*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 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 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.
4. Parameter "4" needs to work normal with some hardware circuits. Please contact us for more details.

Packet Type: 286 PMTK_CMD_AIC_MODE

Support Chip Type:
MT3333

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 factory setting.

Packet Type: 869 PMTK_CMD_EASY_ENABLE

Support Chip Type:
MT3333

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:
MT3333

Packet Meaning:
Configure Locus setting by command

Data Field:
PMTK286,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.
2. It will get back to default value when user input Full Cold Start command

Packet Type: 330 PMTK_API_SET_DATUM

Support Chip Type:
MT3333

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: 353 PMTK_API_SET_GNSS_SEARCH_MODE

Support Chip Type:
MT3333

Packet Meaning:
This command is used to configure the receive to start searching of which satellite system

Data Field:
PMTK353,GPS_Enabled,GLONASS_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

Example:
$PMTK353,0,1*36<CR><LF> ➔Search GLONASS satellite only
$PMTK353,1,0*36<CR><LF> ➔Search GPS satellite only
$PMTK353,1,1*37<CR><LF> ➔Search GPS and GLONASS satellite only

Packet Type: 430 PMTK_API_Q_DATUM

Support Chip Type:
MT3333

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:
MT3333

Packet Meaning:
Current datum used

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

Example:
$PMTK530,0*28<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>

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.