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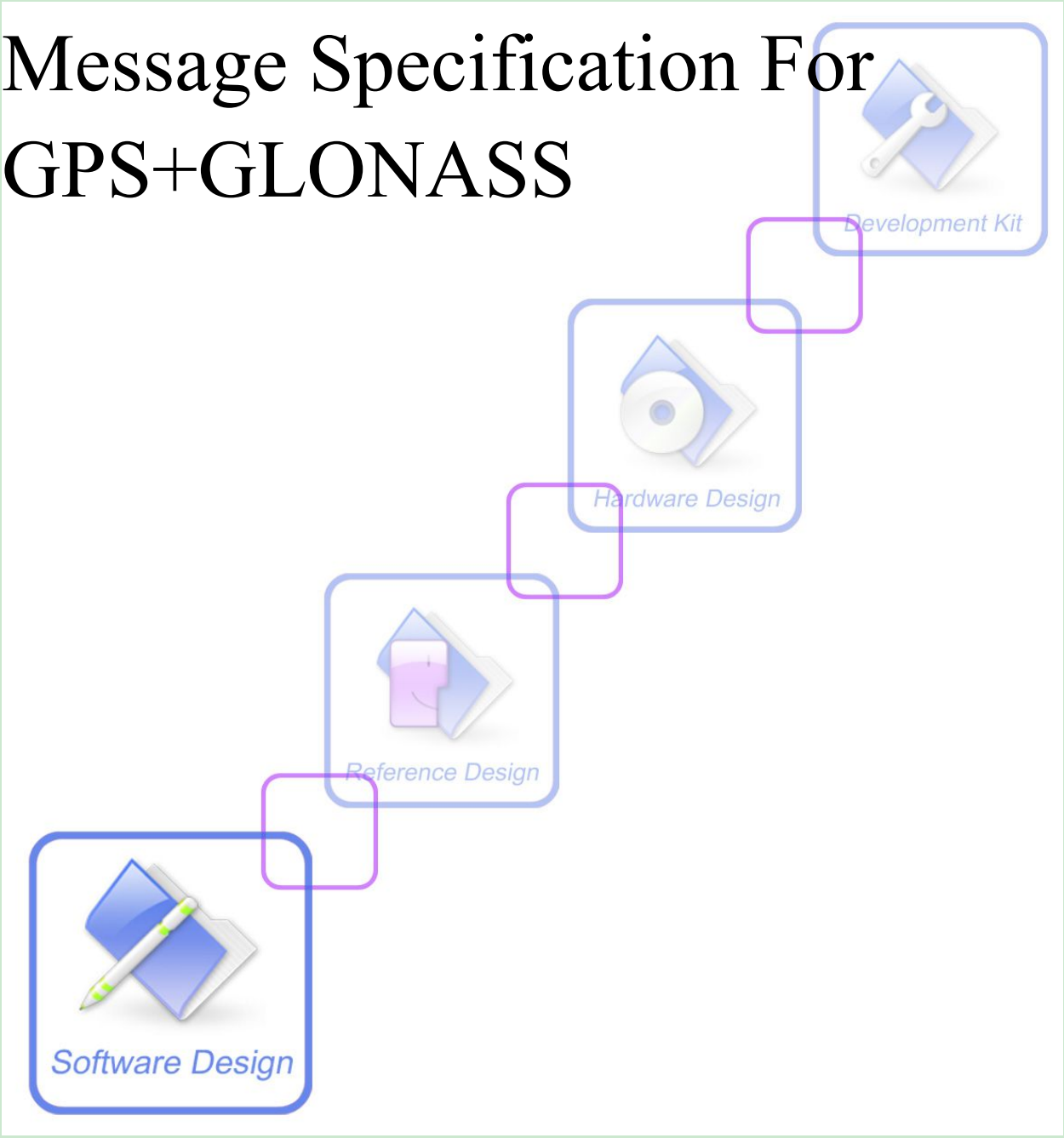
# MT3333 Platform NMEA Message Specification For GPS+GLONASS



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# Version History

| Version | Chapter | What is new |
|---|---|---|
| V1.00 | Original version | Original |
| V1.01 | 2.3.54 | Add EASY state control |

# Contents

# Tables

# 1 Introduction

## 1.1 Scope of the document

This document presents details of the frequently used NMEA messages supported by SIMCom GPS+GLONASS module which based on MTK Platform, such as SIM33ELA, SIM68R/SIM68V/SIM68M, SIM968 etc. This document does not provide information about the complete NMEA-0183, user can refer to the related documents for more information.

## 1.2 Related documents

(1). NMEA-0183 Standard For Interfacing Marine Electronic Devices

(2). MTK NMEA Packet User Manual(**Revision: 2.03**)

## 1.3 Term abbreviation

Table 1- 1: Term abbreviation

| Term | Definition |
|---|---|
| 1PPS | 1 pulse per second |
| ABP | Almanac Based Position |
| ACK | ACKnowledge |
| DGPS | Differential Global Positioning System |
| NMEA | National Marine Electronics Association |
| OSP | One Socket Protocol |
| SBAS | Satellite Based Augmentation System |
| SDK | Software Development Kit |
| SRAM | Static Random Access Memory |
| SW | Software |
| SVs | Satellites |
| PDOP | Position Dilution of Precision |
| HDOP | Horizontal Dilution of Precision |
| VDOP | Vertical Dilution of Precision |

# 2 NMEA Messages

## 2.1 General Format of NMEA Messages

NMEA messages use the ASCII character set and have a defined format. Each message begins with a $ (hex 0x24) and end with a carriage return and line feed (hex 0x0D 0x0A, represented as <CR><LF>). Each message consists of one or more fields of ASCII letters and numbers, separated by commas. After the last field, and before the <CR><LF> is a checksum consisting of an asterisk (*, hex 0x2A) followed by two ASCII characters representing the hexadecimal value of the checksum. The checksum is computed as the exclusive OR of all characters between the $ and * characters.

Table 2- 1 illustrates the NMEA output/input message parameters.

Table 2- 1: NMEA output/input message parameters

| Parameter | Example | Contents |
|---|---|---|
| **Start** | $GPGGA | Message Identifier. Input messages begin at MID 100. |
| **Payload** | <Data> | Message specific data. Refer to a specific message section for <data>...<data> definition. |
| **Checksum** | *CKSUM | CKSUM is a two-hex ASCII character. Checksums is required in all input messages. |
| **End** | <CR> <LF> | Each message is terminated using Carriage Return (CR) Line Feed (LF) which are \r\n. Because \r\n are not printable ASCII characters, they are omitted from the example strings, but must be sent to terminate the message and cause the receiver to process that input message. |

***Note:***

***1. All fields in all proprietary NMEA messages are required, none are optional and are comma delimited.***

***2. In some numeric fields representing a single data element, leading zeros before a decimal are suppressed. A single "0" character preceding the decimal point is maintained. In compound numeric structures (such as LAT or LONG), leading zeros are suppressed only on the leftmost element. Trailing zeros are not suppressed.***

## 2.2 Standard NMEA Output Messages

Table 2- 2: GPS+GLONASS module Frequently Used NMEA Output Messages

| Message | Description | Possible Talker Identifiers |
|---|---|---|
| GGA | Time, position and fix type data | GP |
| GLL | Latitude, longitude, UTC time of position fix and status | GP,GN |
| GSA | GNSS receiver operating mode, satellites used in the position solution, and DOP values | GP, GN |
| GSV | Number of GNSS satellites in view satellite ID numbers, elevation, azimuth, & SNR values | GP,GL |
| RMC | Time, date, position, course and speed data | GP,GN |
| VTG | Course and speed information relative to the ground | GP |
| ZDA | PPS timing message (synchronized to PPS) | GP |

A full description of the listed NMEA messages is provided in the following sections.

### 2.2.1 Message ID GGA: Global Positioning System Fixed Data

Table 2-3: GGA Data Format

| **Example:**<br>$GPGGA,091926.000,3113.3166,N,12121.2682,E,1,09,0.9,36.9,M,7.9,M,,0000*56<CR><LF> | | | |
|---|---|---|---|
| **Name** | **Example** | **Unit** | **Description** |
| Message ID | $GPGGA | | GGA protocol header |
| UTC Time | 091926.000 | | hhmmss.sss |
| Latitude | 3113.3166 | | ddmm.mmmm |
| N/S Indicator | N | | N=north or S=south |
| Longitude | 12121.2682 | | dddmm.mmmm |
| E/W Indicator | E | | E=east or W=west |
| Position Fix Indicator | 1 | | See Table 2-4 |
| Satellites Used | 09 | | Range 0 to 12 |
| HDOP | 0.9 | | Horizontal Dilution of Precision |
| MSL Altitude | 36.9 | meters | |
| Units | M | meters | |
| Geoid Separation | 7.9 | meters | Geoid-to-ellipsoid separation.<br>Ellipsoid altitude = MSL Altitude + Geoid Separation. |
| Units | M | meters | |
| Age of Diff. Corr. | | sec | Null fields when DGPS is not used |
| Diff. Ref. Station ID | 0000 | | |
| Checksum | *56 | | |
| <CR><LF> | | | End of message termination |

Table 2-4: Position Fix Indicator

| **Value** | **Description** |
|---|---|
| 0 | Fix not available or invalid |
| 1 | GPS SPS Mode, fix valid |
| 2 | Differential GPS, SPS Mode, fix valid |
| 3-5 | Not supported |
| *6* | Dead Reckoning Mode, fix valid |

***Note：***

***A valid status is derived from all the parameters set in the software. This includes the minimum number of satellites required, any DOP mask setting, presence of DGPS corrections, etc. If the default or current software setting requires that a factor is met, then if that factor is not met, the solution will be marked as invalid.***

### 2.2.2 Message ID GLL: Geographic Position - Latitude/Longitude

Table 2- 5: GLL Data Format

| **Example:** $GPGLL,3113.3157,N,12121.2684,E,094051.000,A,A*59<CR><LF> | | | |
|---|---|---|---|
| **Name** | **Example** | **Unit** | **Description** |
| Message ID | $GPGLL | | GLL protocol header |
| Latitude | 3113.3157 | | ddmm.mmmm |
| N/S Indicator | N | | N=north or S=south |
| Longitude | 12121.2684 | | dddmm.mmmm |
| E/W Indicator | E | | E=east or W=west |
| UTC Time | 094051.000 | | hhmmss.sss |
| Status | A | | A=data valid or V=data not valid |
| Mode | A | | A=Autonomous,<br>D=DGPS,<br>E=DR<br>N = Output Data Not Valid<br>R = Coarse Position 1 |
| Checksum | *59 | | |
| <CR><LF> | | | End of message termination |

***Note:***

***Position was calculated based on one or more of the SVs having their states derived from almanac parameters, as opposed to ephemerides.***

### 2.2.3 Message ID GSA: GNSS DOP and Active Satellites

Table 2- 6: GSA Data Format

| **Example:** $GPGSA,A,3,07,02,26,27,09,04,15, , , , , ,1.8,1.0,1.5*33<CR><LF> | | | |
|---|---|---|---|
| **Name** | **Example** | **Unit** | **Description** |
| Message ID | $GPGSA | | GSA protocol header |
| Mode 1 | A | | See Table 2- 7 |
| Mode 2 | 3 | | See Table 2- 8 |
| Satellite Used [1] | 07 | | SV on Channel 1 |
| Satellite Used [1] | 02 | | SV on Channel 2 |
| .... | | | .... |
| Satellite Used [1] | | | SV on Channel 12 |
| PDOP [2] | 1.8 | | Position Dilution of Precision |
| HDOP[2] | 1.0 | | Horizontal Dilution of Precision |
| VDOP[2] | 1.5 | | Vertical Dilution of Precision |
| Checksum | *33 | | |
| <CR><LF> | | | End of message termination |

***Note:***

***1.Satellite used in solution.***

***2.Maximum DOP value reported is 50. When value 50 is reported, the actual DOP may be much larger.***

Table 2- 7: Mode 1

| **Value** | **Description** |
|---|---|
| M | Manual – Forced to operate in 2D or 3D mode |
| A | 2D Automatic – Allowed to automatically switch 2D/3D |

Table 2- 8: Mode 2

| **Value** | **Description** |
|---|---|
| 1 | Fix not available |
| 2 | 2D (<4 SVs used) |
| 3 | 3D (>3 SVs used) |

### 2.2.4 Message ID GSV: GNSS Satellites in View

Table 2- 9: GSV Data Format

**Example:**

$GPGSV,3,1,11,26,68,023,37,15,64,251,33,05,45,058,34,29,33,253,33*75<CR><LF>

$GPGSV,3,2,11,27,32,164,30,21,25,315,29,02,24,140,31,08,19,048,29*70<CR><LF>

$GPGSV,3,3,11,09,16,180,25,18,08,284,27,10,08,085,18*4E<CR><LF>

| Name | Example | Unit | Description |
|---|---|---|---|
| Message ID | $GPGSV | | GSV protocol header |
| Number of Messages [1] | 2 | | Total number of GSV messages to be sent in this group |
| Message Number[1] | 1 | | Message number in this group of GSV messages |
| Satellites in View[1] | 11 | | |
| Satellite ID | 26 | | Channel 1 (Range 1 to 32) |
| Elevation | 68 | degrees | Channel 1 (Maximum 90) |
| Azimuth | 023 | degrees | Channel 1 (True, Range 0 to 359) |
| SNR (C/N0) | 37 | dBHz | Range 0 to 99, null when not tracking |
| .... | | | .... |
| Satellite ID | 29 | | Channel 4 (Range 1 to 32) |
| Elevation | 33 | degrees | Channel 4 (Maximum 90) |
| Azimuth | 253 | degrees | Channel 4 (True, Range 0 to 359) |
| SNR (C/N0) | 33 | dBHz | Range 0 to 99, null when not tracking |
| Checksum | *75 | | |
| <CR><LF> | | | End of message termination |

***Note:***

***1. Depending on the number of satellites tracked, multiple messages of GSV data may be required. In some software versions, the maximum number of satellites reported as visible is limited to 12, even though more may be visible.***

### 2.2.5 Message ID RMC: Recommended Minimum Specific GNSS Data

Table 2- 10: RMC Data Format

| **Example:** $GPRMC,094330.000,A,3113.3156,N,12121.2686,E,0.51,193.93,171210,,,A*68<CR><LF> | | | |
|---|---|---|---|
| **Name** | **Example** | **Unit** | **Description** |
| Message ID | $GPRMC | | RMC protocol header |
| UTC Time | 094330.000 | | hhmmss.sss |
| Status [1] | A | | A=data valid or V=data not valid |
| Latitude | 3113.3156 | | ddmm.mmmm |
| N/S Indicator | N | | N=north or S=south |
| Longitude | 12121.2686 | | dddmm.mmmm |
| E/W Indicator | E | | E=east or W=west |
| Speed Over Ground | 0.51 | knots | |
| Course Over Ground | 193.93 | degrees | True |
| Date | 171210 | | ddmmyy |
| Magnetic Variation [2] | | degrees | E=east or W=west |
| East/West Indicator[2] | | | E=east |
| Mode | A | | A=Autonomous,<br>D=DGPS |
| Checksum | *68 | | |
| <CR><LF> | | | End of message termination |

***Note:***

***1. A valid status is derived from all the parameters set in the software. This includes the minimum number of satellites required, any DOP mask setting, presence of DGPS corrections, etc. If the default or current software setting requires that a factor is met, then if that factor is not met, the solution will be marked as invalid.***

***2. Does not support magnetic declination. All "course over ground" data are geodetic WGS84 directions relative to true North.***

### 2.2.6 Message ID VTG: Course Over Ground and Ground Speed

Table 2- 11: VTG Data Format

| **Example:** $GPVTG,83.37,T,,M,0.00,N,0.0,K,A*32<CR><LF> | | | |
|---|---|---|---|
| **Name** | **Example** | **Unit** | **Description** |
| Message ID | $GPVTG | | VTG protocol header |
| Course | 83.37 | degrees | Measured heading |
| Reference | T | | True |
| Course | | degrees | Measured heading |
| Reference | M | | Magnetic1 [1] |
| Speed | 0.00 | knots | Measured horizontal speed |
| Units | N | | Knots |
| Speed | 0.0 | km/hr | Measured horizontal speed |
| Units | K | | Kilometers per hour |
| Mode | A | | A=Autonomous,<br>D=DGPS |
| Checksum | *32 | | |
| <CR><LF> | | | End of message termination |

***Note:***

***1. Does not support magnetic declination. All "course over ground" data are geodetic WGS84 directions.***

### 2.2.7 Message ID ZDA: Time & Date

This message is included only with systems which support a time-mark output pulse identified as “1PPS”. Outputs the time associated with the current 1PPS pulse. Each message is output within a few hundred ms after the 1PPS pulse is output and tells the time of the pulse that just occurred.

Table 2- 12: ZDA Data Format

**Example:** $GPZDA,091926.000,17,12,2010,,*55<CR><LF>

| Name | Example | Unit | Description |
|---|---|---|---|
| Message ID | $GPZDA | | ZDA protocol header |
| UTC time | 091926.000 | Hhmmss.sss | The UTC time units are:<br>hh = UTC hours from 00 to 23<br>mm = UTC minutes from 00 to 59<br>ss = UTC seconds from 00 to 59<br>.sss= UTC micro seconds<br>Either using valid IONO/UTC or estimated from default leap seconds |
| Day | 17 | | Day of the month, range 1 to 31 |
| Month | 12 | | Month of the year, range 1 to 12 |
| Year | 2010 | | 1980 to 2079 |
| Local zone hour [1] | | hour | Offset from UTC |
| Local zone minutes[1] | | minute | Offset from UTC |
| Checksums | *55 | | |
| <CR><LF> | | | End of message termination |

## 2.3 Proprietary NMEA Messages

### 2.3.1 Packet Type: 000 PMTK_TEST

Test Packet.

Table 2- 13: 000 PMTK_TEST Data Format

| **DataField:** PMTK000 | | | |
|---|---|---|---|
| **Example:** $PMTK000*32<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.2 Packet Type: 001 PMTK_ACK

Acknowledge of PMTK command.

Table 2- 14: 001 PMTK_ACK Data Format

| **DataField:** PMTK001,Cmd,Flag | | | |
|---|---|---|---|
| **Example:** $PMTK001,604,3*32<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Cmd | -- | -- | The command / packet type the acknowledge responds. |
| Flag | -- | -- | '0' = Invalid command / packet.<br>'1' = Unsupported command / packet type<br>'2' = Valid command / packet, but action failed<br>'3' = Valid command / packet, and action succeeded |

### 2.3.3 Packet Type: 010 PMTK_SYS_MSG

Output system message.

Table 2- 15: 010 PMTK_SYS_MSG Data Format

| **DataField:** PMTK010,Msg | | | |
|---|---|---|---|
| **Example:** $PMTK010,001*2E<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Msg | -- | -- | The system message.<br>'0': UNKNOWN<br>'1': STARTUP<br>'2': Notification: Notification for the host aiding EPO<br>'3': Notification: Notification for the transition to Normal mode is successfully done |

### 2.3.4 Packet Type: 011 PMTK_TXT_MSG

Output system message.

Table 2-16: 011 PMTK_TXT_MSG Format

| **DataField:** PMTK011, txt | | | |
|---|---|---|---|
| **Example:** $PMTK011,MTKGPS*08 <CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| txt | -- | -- | Message of this is MTK GPS |

### 2.3.5 Packet Type: 101 PMTK_CMD_HOT_START

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

Table 2-17: 101 PMTK_CMD_HOT_START Data Format

| **DataField:** PMTK101 | | | |
|---|---|---|---|
| **Example:** $PMTK101*32<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.6 Packet Type: 102 PMTK_CMD_WARM_START

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

Table 2-18: 102 PMTK_CMD_WARM_START Data Format

| **DataField:** PMTK102 | | | |
|---|---|---|---|
| **Example:** $PMTK102*31<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.7 Packet Type: 103 PMTK_CMD_COLD_START

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

Table 2-19: 103 PMTK_CMD_COLD_START Data Format

| DataField: PMTK103 | | | |
|---|---|---|---|
| **Example:** $PMTK103*30<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.8 Packet Type: 104 PMTK_CMD_FULL_COLD_START

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.

Table 2-20: 104 PMTK_CMD_FULL_COLD_START Data Format

| DataField: PMTK104 | | | |
|---|---|---|---|
| **Example:** $PMTK104*37<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.9 Packet Type: 161 PMTK_CMD_STANDBY_MODE (NOT supported in AXN3.0)

Enter standby mode for power saving.

Table 2-21: 161 PMTK_CMD_STANDBY_MODE Data Format

| **DataField:** PMTK161,Type | | | |
|---|---|---|---|
| **Example:** $PMTK161,0*28<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Type | -- | -- | Standby type：<br>'0' = Stop mode<br>'1' = Sleep mode |

### 2.3.10 Packet Type: 120 PMTK_CMD_CLEAR_FLASH_AID

Erase aiding data stored in the flash memory.

Table 2-22: 120 PMTK_CMD_CLEAR_FLASH_AID Data Format

| DataField: PMTK120 |
|---|

| Example: $PMTK120*31<CR><LF> | | | |
|---|---|---|---|
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.11 Packet Type: 220 PMTK_SET_POS_FIX

Position Fix Interval

Table 2-23: 220 PMTK_SET_POS_FIX Data Format

| DataField: PMTK220, Interval | | | |
|---|---|---|---|
| Example: $PMTK220,1000*1F<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Interval | msec | -- | Position fix interval , Must be larger than 200. |

### 2.3.12 Packet Type: 223 PMTK_SET_AL_DEE_CFG (NOT supported in AXN3.0)

Below parameters can be modified by Host command message

Table 2-24: 223 PMTK_SET_AL_DEE_CFG Data Format

| DataField: PMTK223,SV,SNR,Extension threshold, Extension gap | | | |
|---|---|---|---|
| Example: | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| SV | msec | *1* | Range: [1 ~ 4] |
| SNR | | 30 | Range: [25 ~ 30] |
| Extension threshold | msec | 180000 | Range: [40000 ~ 180000] |
| Extension gap | msec | 60000 | Extension gap is the limitation between neighbor DEE.<br>Range: [0 ~ 3600000] |

### 2.3.13 Packet Type: 225 PMTK_SET_PERIODIC_MODE (NOT supported in AXN3.0)

Periodic Power Saving Mode Settings: (See following chart) In RUN stage, the GPS receiver measures and calculates positions.

In SLEEP stage, the GPS receiver may enter two different power saving modes. One is “Periodic Standby Mode”, and another is “Periodic Backup Mode”. Due to hardware limitation, the maximum power down duration (SLEEP) is 2047 seconds. If the configured “SLEEP” interval is larger than 2047 seconds, GPS firmware will automatically extend the interval by software method. However, GPS sytem will be powered on for the interval extension and powered down again after the extension is done.

Table 2- 25: 225 PMTK_SET_PERIODIC_MODE Data Format

**DataField:** PMTK225, Type, Run time, Sleep time, Second run time, Second sleep time

**Example: How to enter Periodic modes**

Periodic Backup mode

PMTK225,0

PMTK223,1,25,180000,60000

PMTK225,1,3000,12000,18000,72000

Periodic Standby mode

PMTK225,0

PMTK223,1,25,180000,60000

PMTK225,2,3000,12000,18000,72000

**Example : How to enter AlwaysLocate modes**

AlwaysLocateTM Standby

PMTK225,0

PMTK225,8

AlwaysLocateTM Backup

PMTK225,0

PMTK225,9

| Name | Unit | Defalult | Description |
|---|---|---|---|
| Type | -- | -- | Set operation mode of power saving :<br>‘0’: Back to normal mode<br>‘1’ Periodc backup mode<br>‘2’ Periodic standby mode<br>‘4’: Perpetual backup mode<br>‘8’: AlwaysLocateTM standby mode<br>‘9’: AlwaysLocateTM backup mode |
| Run time | msec | | Duration to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.<br>‘0’: Disable<br>>= ‘1000’: Enable<br>Range: [1000~518400000] |
| Sleep time | msec | | Interval to come out of a minimum power sleep mode and start running in order to get a new position fix.<br>Range: [1000~518400000] |
| Second run time | msec | | Duration [] to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.<br>‘0’: Disable<br>>= ‘1000’: Enable<br>Range: [Second set both 0 or 1000~518400000] |
| Second sleep time | msec | | Interval to come out of a minimum power sleep mode and start running in order to get a new position fix.<br>Range: [Second set both 0 or 1000~518400000] |

***Note:***

***The Second run time should larger than First run time when non-zero value.***

### 2.3.14 Packet Type: 251 PMTK_SET_NMEA_BAUDRATE

Set NMEA port baudrate. Using PMTK251 command to setup baud rate setting, the setting will be back to defatult value in the two conditions:

1. Full cold start command is issued
2. Enter standby mode

Table 2-26: 251 PMTK_SET_NMEA_BAUDRATE Data Format

| **DataField:** PMTK251,Baudrate | | | |
|---|---|---|---|
| **Example**:$PMTK251,38400*27<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Baudrate | -- | -- | Baudrate setting<br>0 – default setting<br>4800<br>9600<br>14400<br>19200<br>38400<br>57600<br>115200<br>230400<br>460800<br>921600 |

### 2.3.15 Packet Type: 286 PMTK_SET_AIC_CMD

Enable or disable active interference cancellation function.

Table 2-27: 286 PMTK_SET_AIC_CMD Data Format

| **DataField:** PMTK286,Enabled | | | |
|---|---|---|---|
| **Example**: $PMTK286,1*23<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Enabled | -- | -- | Enable or disable<br>‘0’ = Disable<br>‘1’ = Enable |

### 2.3.16 Packet Type: 300 PMTK_API_SET_FIX_CTL

Set Fix interval.

Table 2-28: 300 PMTK_API_SET_FIX_CTL Data Format

| **DataField:** PMTK300,Fixinterval,0,0,0,0 | | | |
|---|---|---|---|
| **Example**: $PMTK300,1000,0,0,0,0<br>**Return:** $PMTK001,300,3 | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Fixinterval | milliseconds | -- | Range: [100 ~ 10000] |

### 2.3.17 Packet Type: 301 PMTK_API_SET_DGPS_MODE

Set DGPS correction data source mode.

Table 2-29: 301 PMTK_API_SET_DGPS_MODE Data Format

| **DataField:** PMTK301,Mode | | | |
|---|---|---|---|
| **Example:** $PMTK301,1*2D<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Mode | -- | -- | DGPS data source mode.<br>'0': No DGPS source<br>'1': RTCM<br>'2': WAAS |

### 2.3.18 Packet Type: 313 PMTK_API_SET_SBAS_ENABLED

Enable to search a SBAS satellite or not.

Table 2-30: 313 PMTK_API_SET_SBAS_ENABLED Data Format

| **DataField:** PMTK313,Enabled | | | |
|---|---|---|---|
| **Example:** $PMTK313,1*2E<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| *Enabled* | -- | -- | Enable or disable<br>'0' = Disable<br>'1' = Enable |

### 2.3.19 Packet Type: 314 PMTK_API_SET_NMEA_OUTPUT

Set NMEA sentence output frequencies.
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 - Recomended 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
17 NMEA_SEN_ZDA, // GPZDA interval – Time & Date

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:**

$PMTK314,1,1,1,1,1,5,0,0,0,0,0,0,0,0,0,0,0,1,0*2D<CR><LF>

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>

### 2.3.20 Packet Type: 330 PMTK_API_SET_DATUM

Set default datum.

Table 2-31: 330 PMTK_API_SET_DATUM Data Format

| **DataField:** PMTK330,Datum | | | |
|---|---|---|---|
| **Example:** $PMTK330,0*2E<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Datum | -- | -- | 0: WGS84<br>1: TOKYO-M<br>2: TOKYO-A<br>Support 219 different datums. The total datums list in the Appendix A. |

### 2.3.21 Packet Type: 331 PMTK_API_SET_DATUM_ADVANCE

Set user defined datum.

Table 2-32: 331 PMTK_API_SET_DATUM_ADVANCE Data Format

| DataField: PMTK331,majA,eec,dX,dY,dZ | | | |
|---|---|---|---|
| **Example:** $PMTK331,6377397.155,299.1528128,-148.0,507.0,685.0*16<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| majA | m | -- | User defined datum semi-major axis Range: [0 ~ 7000000] |
| ecc | m | -- | User defined datumeccentric Range: [0 ~ 330] |
| dX | m | -- | User defined datum to WGS84 X axis offset x |
| dY | m | -- | User defined datum to WGS84 Y axis offset |
| dZ | m | -- | User defined datum to WGS84 Z axis offset |

### 2.3.22 Packet Type: 335 PMTK_API_SET_RTC_TIME

This command set RTC UTC time. To be noted, the command doesn't update the GPS time which maintained by GPS receiver. After setting, the RTC UTC time finally may be updated by GPS receiver with more accurate time after 60 seconds.

Table 2-33: 335 PMTK_API_SET_RTC_TIME Data Format

| **DataField:** PMTK335,Year,Month,Day,Hour,Min,Sec | | | |
|---|---|---|---|
| **Example:** $PMTK335,2007,1,1,0,0,0*02<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Year | -- | -- | year |
| Month | -- | -- | 1 ~ 12 |
| Day | -- | -- | 1 ~ 31 |
| Hour | -- | -- | 0 ~ 23 |
| Min | -- | -- | 0 ~ 59 |
| Sec | -- | -- | 0 ~ 59 |

### 2.3.23 Packet Type: 351 PMTK_API_SET_SUPPORT_QZSS_NMEA

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 V3.01)

Table 2-34: 351 PMTK_API_SET_SUPPORT_QZSS_NMEA Data Format

| **DataField:** PMTK351,Enabled | | | |
|---|---|---|---|
| **Example:**<br>$PMTK351,0*29 : Disable QZSS NMEA format<br>$PMTK351,1*28 : Enable QZSS NMEA format | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Enabled | -- | -- | '0': Disable<br>'1': Enable |

### 2.3.24 Packet Type: 352 PMTK_API_SET_STOP_QZSS

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

Table 2-35: 352 PMTK_API_SET_STOP_QZSS Data Format

| **DataField:** PMTK352,Enabled | | | |
|---|---|---|---|
| **Example:**<br>$PMTK352,0*2B : Enable QZSS function<br>$PMTK352,1*2A : Disable QZSS function | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Enabled | -- | -- | ‘0’: Disable<br>‘1’: Enable |

### 2.3.25 Packet Type: 353 PMTK_API_SET_GNSS_SEARCH_MODE (NOT supported in AXN3.0)

This command is used to configure the receive to start searching of which satellite system.

Table 2-36: 353 PMTK_API_SET_GNSS_SEARCH_MODE Data Format

| **DataField:** PMTK353,GPS_Enabled,GLONASS_Enabled | | | |
|---|---|---|---|
| **Example:**<br>$PMTK353,0,1*36 : Search GLONASS satellites only<br>$PMTK353,1,0*36 : Search GPS satellites only<br>$PMTK353,1,1*37 : Search GPS and GLONASS satellites | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| GPS_Enabled | -- | -- | ‘0’: disable (DO NOT search GPS satellites)<br>‘1’ or non-ZERO: search GPS satellites |
| GLONASS_Enabled | -- | -- | ‘0’: disable (DO NOT search GLONASS satellites)<br>‘1’ or non-ZERO: search GLONASS satellites |

***Note:***

***Now SIM68R and SIM68V support this command, but SIM28 not support this command.***

### 2.3.26 Packet Type: 386 PMTK_API_SET_STATIC_NAV _THD

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.

Table 2-37: 386 PMTK_API_SET_STATIC_NAV _THD Data Format

| **DataField:** PMTK386, speed_threshold | | | |
|---|---|---|---|
| **Example:** $PMTK386,0.4*19<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Speed_trhreshold | m/s | -- | 0~2<br>The minimun is 0.1 m/s, the max is 2.0 m/s |

### 2.3.27 Packet Type: 389 PMTK_API_SET_TCXO_DEBUG

Set the switch of showing TCXO clock drift at every fix

Table 2-38: 389 PMTK_API_SET_TCXO_DEBUG Data Format

| **DataField:** PMTK389,on_off | | | |
|---|---|---|---|
| **Example:** $PMTK389,1*2D<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| on_off | m/s | -- | 0=off;<br>1=on (turn on $PMTK589 output at every fix) |

### 2.3.28 Packet Type: 400 PMTK_API_Q_FIX_CTL

Query Fix Control.

Table 2-39: 400 PMTK_API_Q_FIX_CTL Data Format

| **DataField:** PMTK400 | | | |
|---|---|---|---|
| **Example:** $PMTK400*36<CR><LF><br>**Return:**<br>PMTK_DT_FIX_CTL | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.29 Packet Type: 401 PMTK_API_Q_DGPS_MODE

Query DGPS mode.

Table 2-40: 401 PMTK_API_Q_DGPS_MODE Data Format

| **DataField:** PMTK401 | | | |
|---|---|---|---|
| **Example:** $PMTK401*37<CR><LF><br>**Return:** PMTK_DT_DGPS_MODE | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.30 Packet Type: 413 PMTK_API_Q_SBAS_ENABLED

Query SBAS Enabled or disabled.

Table 2-41: 413 PMTK_API_Q_SBAS_ENABLED Data Format

| **DataField:** PMTK413 | | | |
|---|---|---|---|
| **Example:** $PMTK413*34<CR><LF><br>**Return:** PMTK_DT_SBAS_ENABLED | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.31 Packet Type: 414 PMTK_API_Q_NMEA_OUTPUT

Query current NMEA sentence output frequencies.

Table 2-42: 414 PMTK_API_Q_NMEA_OUTPUT Data Format

| **DataField:** PMTK414 | | | |
|---|---|---|---|
| **Example:** $PMTK414*33<CR><LF><br>**Return:** PMTK_DT_NMEA_OUTPUT | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.32 Packet Type: 430 PMTK_API_Q_DATUM

Query default datum.

Table 2-43: 430 PMTK_API_Q_DATUM Data Format

| **DataField:** PMTK430 | | | |
|---|---|---|---|
| **Example:** $PMTK430*35<CR><LF><br>**Return:** PMTK_DT_DATUM | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.33 Packet Type: 431 PMTK_API_Q_DATUM_ADVANCE

Query user defined datum.

Table 2-44: 431 PMTK_API_Q_DATUM_ADVANCE Data Format

| **DataField:** PMTK431 | | | |
|---|---|---|---|
| **Example:** $PMTK431*34<CR><LF><br>**Return:** PMTK_DT_DATUM | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

***Note:***

***The execution result depend on firmware version.***

### 2.3.34 Packet Type: 500 PMTK_DT_FIX_CTL

These parameters control the rate of position fixing activity.

Table 2-45: 500 PMTK_DT_FIX_CTL Data Format

| **DataField:** PMTK500, FixInterval | | | |
|---|---|---|---|
| **Example:** $PMTK500,1000,0,0,0,0*1A<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| FixInterval | msec | -- | Position fix interval<br>[ >= 200] |

***Note:***

***The execution result depend on firmware version.***

### 2.3.35 Packet Type: 501 PMTK_DT_DGPS_MODE

DGPS Data Source Mode

Table 2-46: 501 PMTK_DT_DGPS_MODE Data Format

| **DataField:** PMTK501,Mode | | | |
|---|---|---|---|
| **Example:** $PMTK501,1*2B<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Mode | -- | -- | DGPS data source mode<br>‘0’: No DGPS source<br>‘1’: RTCM<br>‘2’: WAAS |

### 2.3.36 Packet Type: 513 PMTK_DT_SBAS_ENABLED

Enable to search a SBAS satellite or not.

Table 2-47: 513 PMTK_DT_SBAS_ENABLED Data Format

| **DataField:** PMTK513,Enabled | | | |
|---|---|---|---|
| **Example:** $PMTK513,1*28<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Enabled | -- | -- | Enable or disable<br>‘0’ = Disable<br>‘1’ = Enable |

***Note:***

***The execution result depend on firmware version.***

### 2.3.37 Packet Type: 514 PMTK_DT_NMEA_OUTPUT

**Packet Meaning:**

NMEA sentence output frequency setting

**DataField:**

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 Sentences and Frequency Setting.

**Example:**

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

### 2.3.38 Packet Type: 530 PMTK_DT_DATUM

Current datum used.

Table 2-48: 530 PMTK_DT_DATUM Data Format

| **DataField:** PMTK530,Datum | | | |
|---|---|---|---|
| **Example:** $PMTK530,0*28<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Datum | -- | -- | 0: WGS84<br>1: TOKYO-M<br>2: TOKYO-A |

***Note:***

***The execution result depend on firmware version.***

### 2.3.39 Packet Type: 589 PMTK_DT_SET_TCXO_DEBUG

The TCXO clock drift value.

Table 2-49: 589 PMTK_DT_SET_TCXO_DEBUG Data Format

| **DataField:** PMTK589,valid,UTC,TCXO_drift_ppm | | | |
|---|---|---|---|
| **Example:** $PMTK589,1,052130.000,-0.4712*03<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| valid | -- | -- | 0=data is not reliable;<br>1=data is ready |
| UTC | -- | -- | UTC time |
| TCXO_drift_ppm | ppm | -- | TCXO clock drift in ppm |

***Note:***

***The execution result depend on firmware version.***

### 2.3.40 Packet Type: 605 PMTK_Q_RELEASE

Query the firmware release information.

Table 2-50: 605 PMTK_Q_RELEASE Data Format

| **DataField:** PMTK605 | | | |
|---|---|---|---|
| **Example:** $PMTK605*31<CR><LF><br>**Return:** PMTK_DT_RELEASE | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.41 Packet Type: 607 PMTK_Q_EPO_INFO

EPO Data Valid day check

Table 2-51: 607 PMTK_Q_EPO_INFO Data Format

| **DataField:** PMTK607 | | | |
|---|---|---|---|
| **Example:** $PMTK607*33<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.42 Packet Type: 660 PMTK_Q_AVAILABLE_SV_EPH

Support PMTK660 which report valid Ephemeris SV:

(a) Host -> module: A PMTK660 command to request the EPH info, together with a time interval parameter (for example, 1800sec).

(b) module -> Host: Reply 32-bit flags of 32SV to indicate which EPHs will be available after the specified time interval.

Table 2-52: 660 PMTK_Q_AVAILABLE_SV_EPH Data Format

| **DataField:** PMTK660, Time interval | | | |
|---|---|---|---|
| **Example:**<br>Indicate which EPHs will be available after 1800 seconds<br>$PMTK660,1800*17<CR><LF><br>**Return:**<br>$PMTK001,660,3,40449464*17<CR><LF><br>Note the Hex 40449464 means 0100 0000 0100 0100 1001 0100 0110 0100 and the Valid SV's numbers are 3, 6, 7, 11, 13, 16, 19, 23, 31. | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Time interval | sec | -- | Set the time interval for MT3329 to reply 32-bit flags of 32SV. The Time interval > 0 and <= 7200 (2 hours). |

### 2.3.43 Packet Type: 661 PMTK_Q_AVAILABLE_SV_ALM

Support PMTK661 which report valid Almanac SV

(a) Host -> MT3329: A PMTK661 command to request the Almanac info, together with a time interval parameter (for example, 30 days).

(b) MT3329 -> Host: Reply 32-bit flags of 32SV to indicate which Almanac will be available after the specified time interval.

Table 2- 53: 661 PMTK_Q_AVAILABLE_SV_ALM Data Format

| **DataField:** PMTK661,Time interval | | | |
|---|---|---|---|
| **Example:** Indicate which Almanac will be available after 30 days<br>$PMTK661,30*1C<CR><LF><br>**Return:**<br>$PMTK001,661,3,fec0bfff*49<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| Time interval | day | -- | Set the time interval for MT3329 to reply 32-bit flags of 32SV.<br>Note that the Time interval > 0 and <= 365<br>(1 year for maximum) |

***Note:***

***The Hex fec0bfff means 11111110110000001011111111111111 and the Valid SV's numbers are 1,2,3,4,5,6,7,8,9,10,11,12,13,14,16,23,24,26,27,28,29,30,31,32.***

### 2.3.44 Packet Type: 705 PMTK_DT_RELEASE

Firmware release information.

Table 2- 54: 705 PMTK_DT_RELEASE Data Format

| **DataField:** PMTK705,ReleaseStr,Build_ID,Product_Model,(SDK_Version,) | | | |
|---|---|---|---|
| **Example:** $PMTK705,AXN_0.2,1234,ABCD,*14<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| ReleaseStr | -- | -- | Firmware release name and version:<br>3318 : Mcore_x.x<br>3329 : AXN_x.x |
| Build_ID | -- | -- | Build ID set in CoreBuilder for firmware version control |
| Product_Model | -- | -- | Product Model set in CoreBuilder for product identification |
| SDK_Version | -- | -- | Showing SDK version if the firmware is used for SDK |

### 2.3.45 Packet Type: 740 PMTK_DT_UTC

The packet contains current UTC time. Please do not use local time, which has time-zone offset. To have faster TTFF, the accuracy of reference UTC shall be better less than 3 seconds.

Table 2-55: 740 PMTK_DT_UTC Data Format

| **DataField:** PMTK740,YYYY,MM,DD,hh,mm,ss | | | |
|---|---|---|---|
| **Example:** The packet indicates that the current UTC time 2010/Feb/10 09:00:58.<br>$PMTK740,2010,2,10,9,0,58*05<CR><LF> | | | |
| **Name** | **Unit** | **Range** | **Description** |
| YYYY | year | > 1980 | UTC time: year in 4 digits |
| MM | month | 1 - 12 | UTC time: month |
| DD | day | 1 - 31 | UTC time: day |
| hh | hour | 0 - 23 | UTC time: hour |
| mm | minute | 0 - 59 | UTC time: minute |
| ss | second | 0 - 59 | UTC time: second |

### 2.3.46 Packet Type: 741 PMTK_DT_POS

The packet contains reference location for the GPS receiver. To have faster TTFF, the accuracy of the location shall be better than 30km.

Table 2-56: 741 PMTK_DT_POS Data Format

| **DataField:** PMTK741,Lat,Long,Alt,YYYY,MM,DD,hh,mm,ss | | | |
|---|---|---|---|
| **Example:** The packet indicates that the GPS receiver is at latitude 24.772816 degrees, longitude 121.022636 degrees, and altitude 160m.<br>$PMTK741,24.772816,121.022636,160,2011,8,1,08,00,00 | | | |
| **Name** | **Unit** | **Range** | **Description** |
| Lat | degree | -90.0 ~ 90.0 | WGS84 geodetic latitude.<br>Minus: south; Plus: north |
| Long | degree | -180.0 ~ 180.0 | WGS84 geodetic longitude.<br>Minus: west; Plus: east |
| Alt | m | --- | WGS84 ellipsoidal altitude. |
| YYYY | year | > 1980 | Reference UTC time: year in 4 digits |
| MM | month | 1 - 12 | Reference UTC time: month |
| DD | day | 1 - 31 | Reference UTC time: day |
| hh | hour | 0 - 23 | Reference UTC time: hour |
| mm | minute | 0 - 59 | Reference UTC time: minute |
| ss | second | 0 - 59 | Reference UTC time: second |

***Note:***

***GPS chip will check value range for the following parameters: Lat: -90.0 ~ 90.0 ,Long: -180.0 ~ 180.0***

### 2.3.47 Packet Type: 810 PMTK_TEST_ALL

Enter MP test mode and set test item and SV id.

Table 2-57: 810 PMTK_TEST_ALL Data Format

| **DataField:** PMTK810,Bitmap,SVID | | | |
|---|---|---|---|
| **Example:** $PMTK810,0003,1D*4D<CR><LF><br>This command only tests TEST_INFO and TEST_ACQ test items.The specific SV id is PRN29. | | | |
| **Name** | **Unit** | **Range** | **Description** |
| Bitmap | -- | -- | The first data field means the test items.<br>Each bit of test item field means one test item. List these test items below.<br>Supported Test Items<br>Bit0 TEST_INFO // Include f/w version, NMEA type and NMEA output rate<br>Bit1 TEST_ACQ // the time of acquiring the specific SV<br>Bit2 TEST_BITSYNC // the time of bit sync<br>Bit3 TEST_SIGNAL // Include phase error, TCXO clock/drift and CNR mean/sigma<br>Bit4 -15 (Reserved) |
| SVID | -- | 1~20 | The second means the SV id.<br>The value of SV id is between 1 and 20 in Hex format. |

### 2.3.48 Packet Type: 811 PMTK_TEST_STOP

Testing tool could send this command to GPS receiver to leave MP test mode.

Table 2-58: 811 PMTK_TEST_STOP Data Format

| **DataField:** PMTK811 | | | |
|---|---|---|---|
| **Example:** $PMTK811*3A<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

### 2.3.49 Packet Type: 812 PMTK_TEST_FINISH

GPS receiver will send out this PMTK packet to show that MP testing has finished.

Table 2-59: 812 PMTK_TEST_FINISH Format

| **DataField:** PMTK812 | | | |
|---|---|---|---|
| **Example:** $PMTK812*39<CR><LF> | | | |
| **Name** | **Unit** | **Defalult** | **Description** |
| -- | -- | -- | -- |

***Note:***

***The execution result depend on firmware version.***

### 2.3.50 Packet Type: 813 PMTK_TEST_ALL_ACQ

The result of TEST_ACQ item.

Table 2-60: 813 PMTK_TEST_ALL_ACQ Data Format

| **DataField:** PMTK813,<SVid>,<Acq Time> | | | |
|---|---|---|---|
| **Example:** The target device acquires SV29 within 2 seconds.<br>$PMTK813,29,2*01<CR><LF> | | | |
| **Name** | **Unit** | **Range** | **Description** |
| SVid | -- | -- | |
| Acq Time | sec | | |

***Note:***

***The execution result depend on firmware version.***

### 2.3.51 Packet Type: 814 PMTK_TEST_ALL_BITSYNC

The result of TEST_BITSYNC item.

Table 2-61: 814 PMTK_TEST_ALL_BITSYNC Data Format

| **DataField:** PMTK814,<SVid>,<BitSync Time> | | | |
|---|---|---|---|
| **Example:** Regard to SV29, the target device reach bit sync state within 1 second.<br>$PMTK814,29,1*05<CR><LF> | | | |
| **Name** | **Unit** | **Range** | **Description** |
| SVid | -- | -- | |
| BitSync Time | sec | | the target device reach bit sync state within |

***Note:***

***The execution result depend on firmware version.***

### 2.3.52 Packet Type: 815 PMTK_TEST_ALL_SIGNAL

The result of TEST_SIGNAL item.

Table 2-62: 815 PMTK_TEST_ALL_SIGNAL Data Format

| **DataField:** PMTK815,<SVid>,<Testing Time>,<Phase>,<TCXO Offset>,<TCXO Drift>,<CNR mean>,<CNR sigma>*<CheckSum> | | | |
|---|---|---|---|
| **Example:** $PMTK815,29,16,98,10000,30,4100,0*18<CR><LF><br>Regard to SV29, take 16 seconds to test and the result is :<br>Phase Error：0.98<br>TCXO offset/drift(Hz)：10/0.03<br>CNR mean/sigma：41/0 | | | |
| **Name** | **Unit** | **Range** | **Description** |
| SVid | -- | -- | |
| Testing Time | sec | -- | test Duration |
| Phase | 0.01 | -- | Phase Error |
| TCXO Offset | 0.01 | -- | |
| TCXO Drift | 0.01 | -- | |
| CNR mean | 0.001 | -- | |
| CNR sigma | 0.001 | -- | |

***Note:***

***The execution result depend on firmware version.***

### 2.3.53 Packet Type: 837 PMTK_TEST_JAMMING (NOT supported in AXN3.0)

Jamming scan test command.

Table 2-63: 837 PMTK_TEST_JAMMING Data Format

| **DataField:** PMTK837, JamScanType, JamScanNum | | | |
|---|---|---|---|
| **Example:** Jamming scan test 50 times:<br>$PMTK837,1,50*0A<CR><LF> | | | |
| **Name** | **Unit** | **Range** | **Description** |
| JamScanType | -- | -- | 0:disable jamming scan<br>1: enable jamming scan |
| JamScanNum | -- | -- | Jamming scan test times. |

### 2.3.54 Packet Type: 869 PMTK_ EASY_ENABLE

EASY state control, query or set, enabled by default, EASY is a AGPS function.

Table 2- 64: 869 PMTK _EASY_ENABLE Data Format

| DataField: PMTK869, <wr>, [state] | | | |
|---|---|---|---|
| Example: query the current state of EASY:<br>$PMTK869,0*29<CR><LF> | | | |
| Name | Unit | Range | Description |
| <wr> | -- | -- | 0:read, query the current state of EASY<br>IF enable, return:<br>$PMTK869,2,1*36<CR><LF><br>IF disable, return:<br>$PMTK869,2,0*37<CR><LF><br>1: write EASY state, see bellow ,[state] |
| ,[state] | -- | -- | When wr =0, [state] no use<br>When wr =1, state=:<br>0:disable EASY<br>1: enable EASY<br>Example1, disable EASY:<br>$PMTK869,1,0*34<CR><LF><br>Example2, enable EASY:<br>$PMTK869,1,1*36<CR><LF> |

***Note:***

***Only for user query, it is not recommended to modify this state.***

.

# 3 Appendix A: Datum List

| No | Datum | Region |
|---|---|---|
| 0 | WGS1984 | International |
| 1 | Tokyo | Japan |
| 2 | Tokyo | 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 Astro1965 | Cocos Island |
| 16 | Antigua Island Astro1943 | 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 Island1958 | Ascension Island |
| 30 | Astro Beacon E 1945 | Iwo Jima |

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| 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 Astro1966 | Phoenix Island |
| 45 | Cape | South Africa |
| 46 | Cape Canaveral | Bahamas, Florida |
| 47 | Carthage | Tunisia |
| 48 | Chatham Island Astro1971 | 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 System1937 | 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 (Slcily) |
| 66 | European 1950 | Malta |

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| 67 | European 1950 | Mean For Austria, Belgium,Denmark, Finland, France, W Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portuga,l Spain, Sweden, Switzerland |
| 68 | European 1950 | Mean For Austria, Debnmark,France, W Germany, Netherland , Switzerland |
| 69 | European 1950 | Mean For Irag, 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 Dataum 1970 | New Zealand |
| 76 | Graciosa Base SW1948 | Azores (Faial, Graciosa, Pico, Sao, Jorge, Terceria) |
| 77 | Guam1963 | Guam |
| 78 | Gunung Segara | Indonesia (Kalimantan) |
| 79 | Gux l Astro | Guadalcanal Island |
| 80 | Herat 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 | Sri Lanka |

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| 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 degW) |
| 121 | North American 1927 | Alaska (Aleutian Ids West of 180 degW) |
| 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 |

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| 133 | North American 1927 | Mean For Belize, Costa Rica, El Salvador, Guatemala, Honduras,<br>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,<br>Missouri, Minnesota) |
| 137 | North American 1927 | Mean For Conus (West of Mississippi, Rive Excluding Louisiana,<br>Minnesota, Missouri) |
| 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 | Hahawii |
| 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 Britian 1936 | England |
| 155 | Ordnance Survey Great Britian 1936 | England, Isle of Man, Wales |
| 156 | Ordnance Survey Great Britian 1936 | Mean For England ,Isle of Man, Scotland, Shetland Island, Wales |
| 157 | Ordnance Survey Great Britian 1936 | Scotland, Shetland Islands |
| 158 | Ordnance Survey Great Britian 1936 | Wales |
| 159 | Pico de las Nieves | Canary Islands |
| 160 | Pitcairn Astro 1967 | Pitcairn Island |
| 161 | Point 58 | Mean For Burkina Faso and Niger |

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| 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 Jan1993) |
| 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 |

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| 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 Tobago, 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 | Tristam 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 |

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