Набор команд управления приемников глобальных навигационных спутниковых систем ГЛОНАСС, GPS, GALILEO **NL3333, KL3333 и SL3333**

Руководство по применению

Редакция 1.0

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Оглавление

Аннотация

Данный документ предназначен для пользователей **Аппаратуры навигационной потребителей глобальных навигационных спутниковых систем ГЛОНАСС, GPS, GALILEO NL3333, Аппаратуры навигационной потребителей глобальных навигационных спутниковых систем ГЛОНАСС, GPS, GALILEO KL3333** и **Аппаратуры навигационной потребителей глобальных навигационных спутниковых систем ГЛОНАСС, GPS, GALILEO SL3333** – многоканального навигационного ГЛОНАСС/GPS/GALILEO приемного устройства и содержит описание системы команд управления приемниками.

История изменений

Номер редакции	Дата	Описание
0.1	Январь 2015	Предварительная версия документа
0.2	Февраль 2015	Исправлены ошибки в описании пакета 431
0.3	Март 2015	Добавлено описание сообщения $PMTKVNED
1.0	Апрель 2016	Добавлено описание команд версии ПО AXN3.8

Перечень принятых сокращений

Ниже приведен перечень принятых сокращений:

КА: космический аппарат
СНС: спутниковая навигационная система
НЗ: навигационная задача
ПК: персональный компьютер
ПО: программное обеспечение
СТ: стандартной точности = **ПТ**: пониженной точности (устаревшее обозначение)
NMEA: полное название «**NMEA 0183**», текстовый протокол связи морского (как правило, навигационного) оборудования между собой (**National Marine Electronics Association)**.

Общая информация

Аппаратура навигационная потребителей глобальных навигационных спутниковых систем (ГНСС) ГЛОНАСС, GPS, GALILEO (далее - Аппаратура) **KL3333**, **Аппаратура SL3333** и **Аппаратура NL3333** предназначена для измерений текущих навигационных параметров и определения на их основе координат и скорости движения потребителя.

Аппаратура KL3333 представляет собой навигационное приемное устройство KL3333, смонтированное на плате и снабженное согласующими цепями и разъемами для подключения к аппаратуре пользователя.

Внешний вид Аппаратуры KL3333 приведен на рисунке 1.

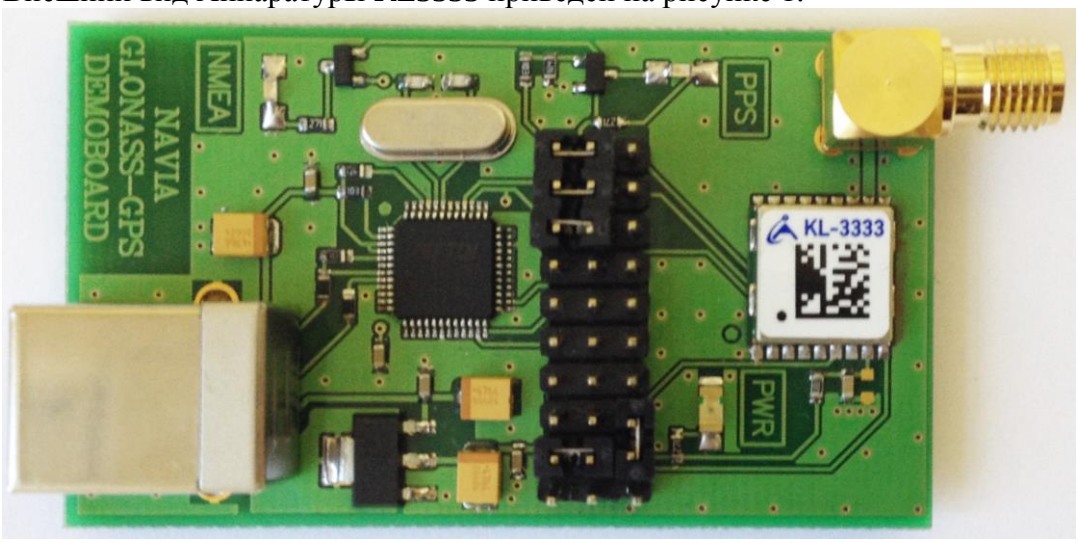


Рис. 1. Внешний вид Аппаратуры KL3333 (не в масштабе 1:1).

Аппаратура SL3333 представляет собой навигационное приемное устройство SL3333, смонтированное на плате и снабженное согласующими цепями и разъемами для подключения к аппаратуре пользователя.

Внешний вид Аппаратуры SL3333 приведен на рисунке 2.

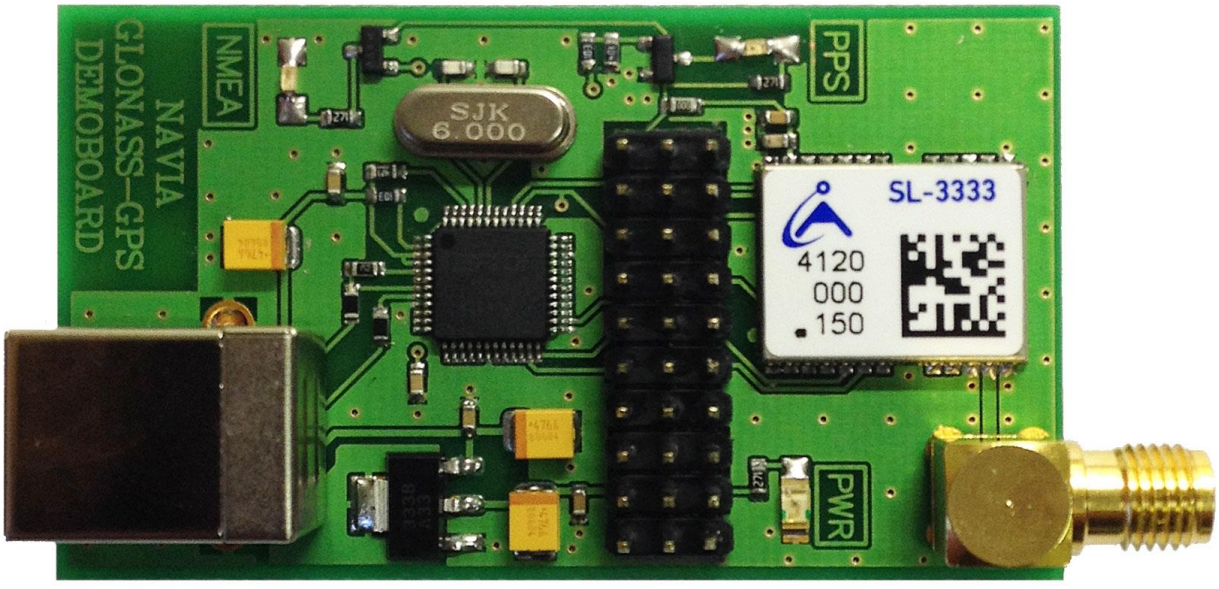


Рис. 2. Внешний вид Аппаратуры SL3333 (не в масштабе 1:1).

Аппаратура NL3333 представляет собой навигационное приемное устройство NL3333, смонтированное на плате и снабженное согласующими цепями и разъемами для подключения к аппаратуре пользователя (например, к ПК).

Внешний вид Аппаратуры NL3333 приведен на рисунке 3.

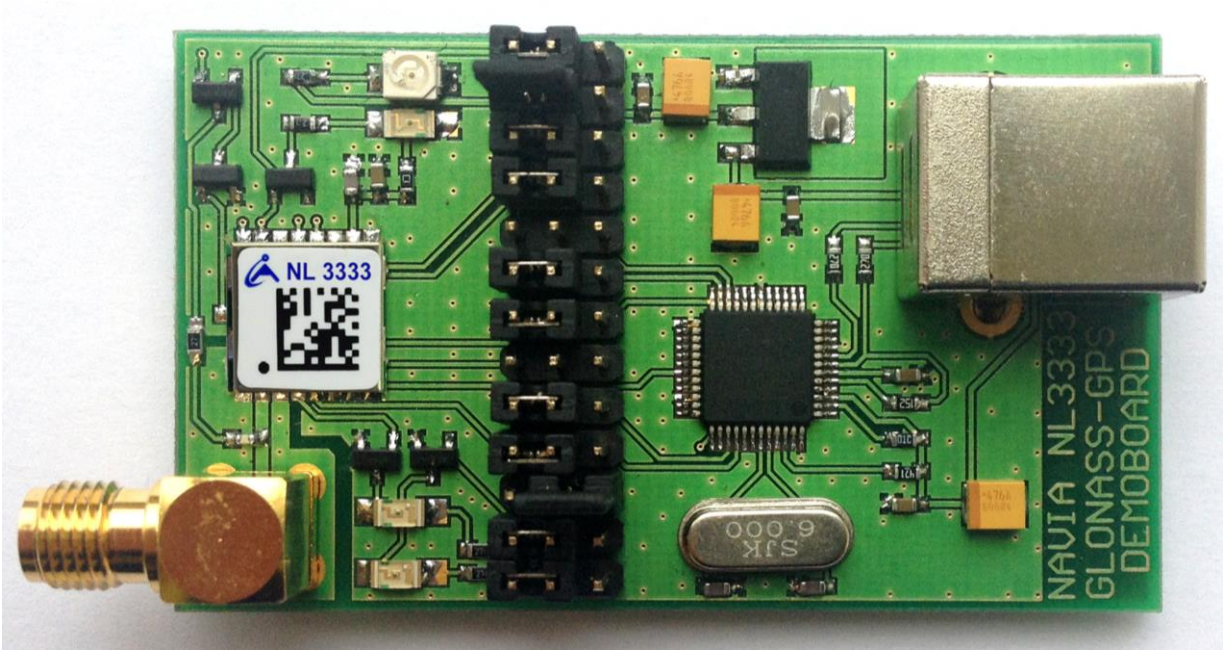


Рис. 3. Внешний вид Аппаратуры NL3333 (не в масштабе 1:1).

Основой Аппаратуры служат приемное навигационное устройство СНС ГЛОНАСС/GPS/GALILEO KL3333, приемное навигационное устройство СНС ГЛОНАСС/GPS/GALILEO SL3333 и приемное навигационное устройство СНС ГЛОНАСС/GPS/GALILEO NL3333 соответственно (далее по тексту – приемник или модуль), которые предназначены для вычисления текущих координат и скорости объекта в реальном масштабе времени в автономном и дифференциальном режимах, формирования секундной метки времени и обмена с внешним оборудованием по последовательному порту UART. Принцип действия приемника основан на параллельном приеме и обработке 33-мя измерительными каналами сигналов навигационных КА СНС ГЛОНАСС в частотном диапазоне L1 (СТ-код), GPS на частоте L1 (C/A код) и GALILEO на частоте E1. Результаты решения НЗ выдаются в формате сообщений NMEA.

Внешний вид приемников представлен на рис. 4…9.

Рис. 4. Внешний вид приемника навигационного KL3333 (не в масштабе 1:1)

Рис. 5. Внешний вид приемника навигационного SL3333 (не в масштабе 1:1)

Рис. 6. Внешний вид приемника навигационного NL3333 (не в масштабе 1:1)

Рис. 7. Внешний вид приемника KL3333 сверху и снизу (не в масштабе 1:1).

Рис. 8. Внешний вид приемника SL3333 сверху и снизу (не в масштабе 1:1).

Рис. 9. Внешний вид приемника NL3333 сверху и снизу (не в масштабе 1:1).

Приемники навигационные NL3333, KL3333 и SL3333 (далее – приемник) выполнены на основе современного чипсета (специализированного набора микросхем) MT3333, представляющего семейство так называемых «систем на кристалле» производства фирмы Mediatek, мирового лидера в области производства микросхем для навигации и мультимедийных систем.

Приемники обладают высокой чувствительностью, малым энергопотреблением и малым временем старта.

Приемник имеет 99 для каналов поиска (захвата) и 33 канала для сопровождения спутниковых сигналов, что позволяет осуществлять одновременный поиск спутниковых сигналов группировок ГЛОНАСС и GPS.

Приемник позволяет применять для первичного поиска спутниковых сигналов специально подготовленную информацию, хранящуюся в памяти приемника, что позволяет сократить время холодного старта, а также, что существенно важнее, произвести холодный старт в условиях слабых сигналов от спутников. Специальная информация может быть подготовлена как внешними источниками (и передана на приемник по каналам связи), так и самостоятельно приемником. В последнем случае не требуется получение какой-либо дополнительной информации от внешних источников.

Приемник имеет встроенные средства подавления помех, что позволяет ему работать в условиях сложной помеховой обстановки.

Управление работой приемника осуществляется при помощи специальных NMEA-подобных команд.

Для ознакомления с работой приемников NL3333, KL3333 и SL3333 выпускаются «Плата демонстрационная NL3333», «Плата демонстрационная KL3333» и «Плата демонстрационная SL3333» соответственно.

Платы демонстрационные NL3333, KL3333 и SL3333 представляют собой полный аналог **Аппаратуры навигационной потребителей глобальных навигационных спутниковых систем ГЛОНАСС, GPS NL3333, KL3333 и SL3333** соответственно, приведенных на рисунках 1 и 2. Описания плат находятся в документах «Демо плата NL3333 РЭ v1_0.pdf», «Демо плата KL3333 РЭ v1_0.pdf» и «Демо плата SL3333 РЭ v1_0.pdf». Платы могут подключаться к ПК или иному оборудованию для анализа работы приемника.

Управление приемником

Управление работой приемника осуществляется как при помощи аппаратных средств, так и при помощи специальных команд, подаваемых на приемник.

Для управления программными режимами и параметрами приемника предназначен набор специальных команд, имеющий NMEA-подобный формат - **MTK NMEA Packet Commands**.

Команды подаются на вход RxD.

Данные и ответы на команды получаются с выхода TxD.

Энергосберегающие режимы

Важнейшей особенностью навигационных модулей NL3333, KL3333 и SL3333, собранных на базе чипсета Mediatek MT3333, является их экономичность по питанию. Так, на конец 2014 года чипсет MT3333 остается самым экономичным и гибким в плане энергопотребления из всех серийно выпускающихся чипсетов. Соответственно, модули на основе этого чипсета лидируют по энерго-экономичности.

Далее в тексте **<*CS>** означает контрольную сумму сообщения, предваряемую символом ***.** После этого следуют символы **<CR><LF>,** завершающие команду.

В примерах фрагмент **<*CS>** не указывается для упрощения восприятия.

Режим Standby

Режим энергосбережения с ток потребления, не превышающем 350мкА. Вход по команде, выход по приему любого байта.

$PMTK161,0<*CS>

Команда входа в режим Standby:

$PMTK161,0

Ответ на команду:

$PMTK001,161,3

Команда выхода из режима Standby:

Любой байт

Режим Backup

Режим энергосбережения с ток потребления, не превышающим 25мкА. Вход по команде, выход по истечению заданного времени.

$PMTK291,7,0,RTCWakeup,1<*CS>

Максимальное значение **RTCWakeup** составляет 518 400 000 миллисекунд (6 дней)

Команда входа в режим Backup

$PMTK291,7,0,10000,1

Ответ на команду:

$PMTK001,291,3

Команда выхода из режима Backup

Не требуется, выход через 10000мс (10с)

Режим периодического включения (Periodic)

Режим энергосбережения с током потребления, не превышающим 350мкА или 25мкА (в зависимости от установок). Расширение режимов Standby и Backup до автоматического повторения циклов.

PMTK223, SV, SNR, Extension Threshold, Extension Gap

SV = 1 Количество спутников, требующих обновления эфемерид (1…4)

SNR = 30 Соотношение сигнал-шум для старта обновления эфемерид (25…30)

Extension threshold = 180,000 msec. Удлинение времени работы для обновления эфемерид (40000…180000)

Extension gap = 60,000 msec. Время между двумя последовательными обновлениями эфемерид (0…3600000)

PMTK225, Type, Run Time, Sleep Time, Second Run Time, Second Sleep Time

Type = 1 (1 для «periodic backup»; 2 для «periodic standby»)

‘0’: Стандартный режим

‘1’: Режим Periodc backup

‘2’ Режим Periodic standby
‘4’: Режим Perpetual backup (непрерывный)
‘8’: Режим AlwaysLocateTM standby
‘9’: Режим AlwaysLocateTM backup

Run time = 3,000мс. Время работы при наличии навигационного решения.
‘0’: Отключено
≥1000мс: Включено
Допустимые значения: 1000…2047000мс

Sleep time = 12,000мс. Время сна при наличии навигационного решения.
‘0’: Отключено
≥1000мс: Включено
Допустимые значения: 1000…2047000мс

Second run time = 18,000мс. Время работы при отсутствии навигационного решения.
‘0’: Отключено
≥1000мс: Включено
Допустимые значения: 1000…2047000мс
Должно быть больше, чем Run time

Second sleep time = 72,000мс. Время работы при отсутствии навигационного решения.
‘0’: Отключено
≥1000мс: Включено
Допустимые значения: 1000…2047000мс
Должно быть больше, чем Sleep time

Если время сна установлено больше, чем 2047с, приемник не будет переведен в состояние пониженного энергопотребления.

Перед включением или изменением параметров режима рекомендуется подать команду на сброс параметров периодического режима «Стандартный режим».

PMTK225,0

Примеры:

Периодические режимы

Режим **Periodic Backup**

PMTK225,0
PMTK223,1,25,180000,60000
PMTK225,1,3000,12000,18000,72000

Режим **Periodic Standby**

PMTK225,0
PMTK223,1,25,180000,60000
PMTK225,2,3000,12000,18000,72000

Режим **AlwaysLocate Standby**

PMTK225,0
PMTK225,8

Режим **AlwaysLocate Backup**

PMTK225,0
PMTK225,9

Работа приемника в дифференциальном режиме

Дифференциальный режим предназначен для существенного повышения точности определения местоположения приемником. Это повышение точности достигается за счет использование поправок, передаваемых спутниками SBAS (WAAS, EGNOS, MSAS, GAGAN):

- включить в приемнике режим поиска спутников дифференциальной коррекции: $PMTK313,1*2E<CR><LF>
- включить в приемнике «SBAS» как источник корректирующей информации: $PMTK301,1*2D<CR><LF>
- убедиться, что приемник учитывает корректирующий сигнал

При работе приемника в дифференциальном режиме в сообщении $GPGGA поле GPSQual будет иметь значение 2.

Отображение составляющих вектора скорости.

Программное обеспечение приемников NL3333, KL3333 и SL3333 позволяет выдавать составляющие вектора скорости объекта. Эта информация представлена в сообщении $PMTKVNED

$PMTKVNED,Timer,NorthSpd,EastSpd,DownSpd,GSpeed,Speed*Checksum
Timer: показания внутреннего таймера приемника начиная со старта [msec]
NorthSpd: проекция вектора скорости на ось Север-Юг [m/s]
EastSpd: проекция вектора скорости на ось Восток-Запад [m/s]
DownSpd: проекция вектора скорости на вертикальную ось [m/s]
GSpeed: 2-х мерная скорость, горизонтальная проекция вектора скорости [m/s]
Speed: 3-х мерная скорость, величина полного вектора скорости [m/s]

Пример:
$PMTKVNED,87607,-0.00,-0.00,-0.00,0.00,0.00*16

Для поддержки данного сообщения следует установить в приемник (прошить) специальную версию встроенного программного обеспечения (предоставляется по запросу).

Структура команд управления приемником

MTK NMEA Packet Format

Preamble	TalkerID	PktType	DataField	*	CHK 1	CHK 2	CR	LF

Packet Length:
The maximum length of each packet is restricted to **255** bytes
Packet Contents:

Field	Length (Bytes)	Type	Description
Preamble	1	Character	"$"
Talker ID	4	Character string	"PMTK"
Pkt Type	3	Character string	From "000" to "999", an identifier used to tell the decoder how to decode the packet
Data Field	variable		A comma symbol "," must be inserted ahead each data field to help decoder process the Data Field
*	1	Character	The star symbol is used make the end of Data Field
CHK1, CHK2	2	Character string	Checksum of the data between preamble "," and "*"
CR, LF	2	Binary data	Used to identify the end of a packet

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

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.

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.

Вычисление контрольной суммы пакета

Example: $PMTK605*31<CR><LF>
31 is the checksum, and it is calculated by **Xor** all characters between **$** and ***.

Окончание пакета

CR, LF：Two bytes binary data
The two bytes are used to identify the end of a packet

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 re-edit new firmware and burning it to module.

Набор команд управления приемником

В данном разделе приведен набор команд управления приемником.

Следует отметить, что часть команд не поддерживаются старыми версиями встроенного программного обеспечения приемника, потому для вновь введенных команд указывается последняя не поддерживающая их версия ПО. Например, N/S AXN3.0 (NOT supported in AXN3.0) означает, что последняя неподдерживающая данную команду версия встроенного ПО приемника AXN3.0 (текущая версия ПО AXN3.8).

Packet Type: 000 PMTK_TEST

Packet Meaning:
Test Packet.
DataField:
None
Example:
$PMTK000*32<CR><LF>

Packet Type: 001 PMTK_ACK

Packet Meaning:
Acknowledge of PMTK command
DataField:
Cmd,Flag
Cmd: The command / packet type the acknowledge responds.
Flag:
‘0’ = Invalid command / packet.
‘1’ = Unsupported command / packet type
‘2’ = Valid command / packet, but action failed
‘3’ = Valid command / packet, and action succeeded
Example:
$PMTK001,604,3*32<CR><LF>

Packet Type: 010 PMTK_SYS_MSG

Packet Meaning:
Output system message
DataField:
Msg: The system message.
‘0’: UNKNOWN
‘1’: STARTUP
‘2’: Notification: Notification for the host aiding EPO
‘3’: Notification: Notification for the transition to Normal mode is successfully done
Example:
$PMTK010,001*2E<CR><LF>

Packet Type: 011 PMTK_TXT_MSG

Packet Meaning:
Output system message
DataField:
Message of this is MTK GPS
Example:

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

Packet Type: 101 PMTK_CMD_HOT_START

Packet Meaning:
Hot Restart: Use all available data in the NV Store.
DataField:
None
Example:

$PMTK101*32<CR><LF>

Packet Type: 102 PMTK_CMD_WARM_START

Packet Meaning:
Warm Restart: Don't use Ephemeris at re-start.
DataField:
None
Example:

$PMTK102*31<CR><LF>

Packet Type: 103 PMTK_CMD_COLD_START

Packet Meaning:
Cold Restart: Don't use Position, Almanacs and Ephemeris data at re-start.
DataField:
None
Example:

$PMTK103*30<CR><LF>

Packet Type: 104 PMTK_CMD_FULL_COLD_START

Packet Meaning:
Full Cold Restart: It’s essentially a Cold Restart, but additionally clear system/user configurations at re-start. That is, reset the receiver to the factory status.
DataField:
None
Example:

$PMTK104*37<CR><LF>

Packet Type: 120 PMTK_CMD_CLEAR_FLASH_AID

Packet Meaning:
Erase aiding data stored in the flash memory.
DataField:
None
Example:

$PMTK120*31<CR><LF>

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: 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: 183 PMTK_LOCUS_QUERY_STATUS

Packet Meaning

Query Logging status

Data Field

NONE

Return

$PMTKLOG,Serial#,Type, Mode, Content, Interval, Distance, Speed, Status, Log number, Percent*CH

Serial#: Logging serial number : 0~65535

Type: Logging type - 0: Overlap, 1: FullStop

Mode: Logging mode - 0x08 : Interval logger

Content: Logging contents of configuration

Interval: Logging interval setting (valid when interval mode is selected)

Distance: Logging distance setting (valid when distance mode is selected)

Speed: Logging speed setting (valid when speed mode is selected)

Status : Logging status – 1: Stop Logging, 0: Logging

Percent : Logging life used percentage

Example

Input : PMTK183*38<CR><LF>

Output : $PMTKLOG,32,1,b,31,1,0,0,0,8032,100*2F<CR><LF>

Packet Type: 184 PMTK_LOCUS_ERASE_FLASH

Packet Meaning

Erase Logger Flash

Data Field

$PMTK184,Type

Type: Erase type '1': erase all logger internal flash data

Example

Input : PMTK184,1*22<CR><LF>

Output : $PMTK001,184,3*3D<CR><LF>

Packet Type: 185 PMTK_LOCUS_STOP_LOGGER

Packet Meaning
Stop logging data
Data Field
$PMTK185,Status
Status: Stop logging '1': Stop logging
'0': Start logging
Example
Input : PMTK185,1*23<CR><LF>
Output : $PMTK001,185,3*3C<CR><LF>

Packet Type: 186 PMTK_LOCUS_LOG_NOW

Packet Meaning
Snapshot write log
Data Field
$PMTK186, Type
Type: '1': means snapshot log data.
Example
Input : $PMTK186,1*20<CR><LF>
Output :$PMTK001,186,3*3F<CR><LF>

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: 220 PMTK_SET_POS_FIX

Packet Meaning:
Position Fix Interval
DataField:
Interval: Position fix interval [msec].
[Range: 100 ~ 10000].
Example:
$PMTK220,1000*1F<CR><LF>

Packet Type: 223 PMTK_SET_AL_DEE_CFG (N/S AXN3.0)

Packet Meaning:

DataField:

$PMTK223,SV,SNR,Extension threshold, Extension gap

Below parameters can be modified by Host command message

Default value: SV = 1 [Range: 1 ~ 4]

Default value: SNR = 30 [Range: 25 ~ 30]

Default value: Extension threshold = 180000 msec [Range: 40000 ~ 180000]

Default value: Extension gap = 60000 msec [Range: 0 ~ 3600000]

(Extension gap is the limitation between neighbor DEE)

Packet Type: 225 PMTK_SET_PERIODIC_MODE (N/S AXN3.0)

Packet Meaning:

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 system will be powered on for the interval extension and powered down again after the extension is done.

DataField:

$ PMTK225, Type, Run time, Sleep time, Second run time, Second sleep time

Type : Set operation mode of power saving

‘0’: Back to normal mode

‘1’ Periodc backup mode

‘2’ Periodic standby mode

‘4’: Perpetual backup mode

‘8’: AlwaysLocateTM standby mode

‘9’: AlwaysLocateTM backup mode

Run time: Duration [msec] to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.

‘0’: Disable

>= ‘1000’: Enable

[Range: 1000~518400000]

Sleep time: Interval [msec] to come out of a minimum power sleep mode and start running in order to get a new position fix.

[Range: 1000~518400000]

Second run time: Duration [msec] to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.

‘0’: Disable

>= ‘1000’: Enable

[Range: Second set both 0 or 1000~518400000]

Second sleep time: Interval [msec] to come out of a minimum power sleep mode and start running in order to get a new position fix.

[Range: Second set both 0 or 1000~518400000]

Note the Second run time should larger than First run time when non-zero value.

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

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. AlwaysLocateTM 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.

Packet Type: 250 PMTK_SET_DATA_PORT

[Packet Meaning]

Set data port input/output data type and baudrate

[Data Field]

PMTK250,InType,OutType,Baudrate

InType: Data port input data type
‘0’ = DPORT_IN_NONE (No data input)
‘1’ = DPORT_IN_RTCM (RTCM input)
‘3’ = DPORT_IN_NMEA (MTK NMEA)

OutType: Data port input data type
‘0’ = DPORT_OUT_NONE (No data output)
‘3’ = DPORT_OUT_NMEA (MTK NMEA)

Baudrate: Baudrate setting
4800
9600
14400
19200
38400
57600
115200
460800
921600

[Example]

$PMTK250,1,3,9600*14<CR><LF>

Packet Type: 251 PMTK_SET_NMEA_BAUDRATE

[Packet Meaning]

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

[Data Field]

PMTK251,Baudrate

Baudrate: Baudrate setting

0 – default setting
4800
9600
14400
19200
38400
57600
115200
230400
460800
921600

[Example]

$PMTK251,38400*27<CR><LF>

NOTE: The option “Allow change of baudrate” at the “NMEA” page in the CoreBuilder should be checked before using this command.

Packet Type: 253 PMTK_SET_OUTPUT_FMT

[Packet Meaning]

Set data output format for current port

Data Field:

$PMTK253,Flag

Flag (unsigned 1 byte):

0 - NMEA mode
1 - binary mode

[Example]

$PMTK253,1*2B<CR><LF> //Change output format from NMEA mode to binary mode

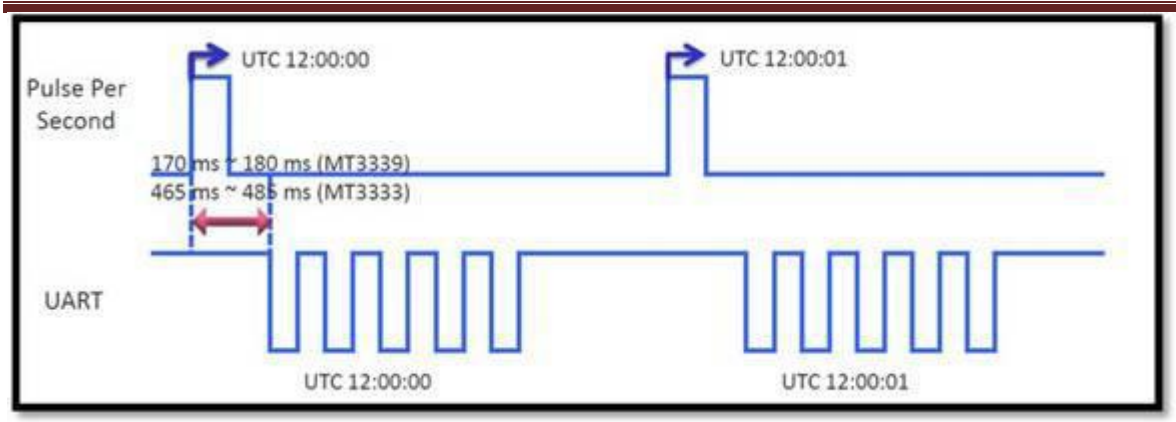
Note:

When you switch from binary mode to NMEA mode, you will receive a binary ACK after the command is
processed.
When you switch from NMEA mode to binary mode, **NO ACK** will be sent.

Packet Type: 255 PMTK_SET_SYNC_PPS_NMEA

[Packet Meaning]

Enable or disable fix NMEA output time behind PPS function. (Default off) The latency range of the beginning of UART Tx is between 170 ms and 180 ms at MT3339 platform (465 ms~485ms at MT3333 platform) and behind the rising edge of PPS.



[Data Field]

PMTK255,Enabled

Enabled: Enable or disable

'0' = Disable

'1' = Enable

Example:

$PMTK255,1*23<CR><LF>

Note:

Only support in AXN 3.6(8) and 2.3(5) after 2014/4/21.

Packet Type: 256 PMTK_SET_TIMING_PRODUCT

[Packet Meaning]

Enable or disable timing product mode (Default off). The timing product mode will enhance the PPS output timing accuracy which is listed in below table. (Support after AXN3.8)

Constellation	Previous	AXN 3.8
GPS	20 ns	<15 ns
G+G	35 ns	<15 ns
G+B	50 ns	<15 ns

[Data Field]

PMTK256,Enabled

Enabled: Enable or disable

'0' = Disable

'1' = Enable

Example:

$PMTK256,1*2E<CR><LF>

Note:

Please measure the accuracy after the device collect all satellites almanac.

Packet Type: 257 PMTK_SET_TUNNEL_SCENARIO

[Packet Meaning]

Enable fast TTFF or high accuracy function when out of the tunnel or garage. (Default enabled high accuracy function). (Support after AXN3.8)

[Data Field]

PMTK257, Functionality

Functionality:

'0' = Enable fast TTFF when out of the tunnel or garage
'1' = Enable high accuracy when out of the tunnel or garage

Example:

$PMTK257,1*2F<CR><LF>

Packet Type: 262 PMTK_SET_FLP_MODE

[Packet Meaning]

Enable or disable FLP mode. (Only support in AXN2.5 after 2014/12/10)

[Data Field]

PMTK262, Enabled

Enabled:

'0' = Disable FLP mode
'1' = Enable FLP mode

Example:

$PMTK262,1*29<CR><LF>

Packet Type: 285 PMTK_SET_PPS_CONFIG_CMD

Packet Meaning:

Config PPS setting.

DataField:

PMTK285,PPSType,PPSPulseWidth

PPSType: Availabilty

'0' = Disable
'1' = After the first fix
'2' = 3D fix only
'3' = 2D/3D fix only
'4' = Always

PPSPulseWidth: PPS Pulse Width (Unit: ms)

Example:

$PMTK285,2,100*23<CR><LF>

Packet Type: 286 PMTK_SET_AIC_CMD

Packet Meaning:

Enable or disable active interference cancellation function.

DataField:

PMTK286,Enabled

Enabled: Enable or disable

'0' = Disable
'1' = Enable

Example:

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

Packet Type: 299 PMTK_SET_OUTPUT_DEBUG

[Packet Meaning] Enable or disable Debug log output (Only support in AXN 3.6(8) and 2.3 after 2014/5/12)

[Data Field]

PMTK299,Enabled

Enabled: Enable or disable

'0' = Disable

‘1’ = Enable

[Example]

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

Packet Type: 300 PMTK_API_SET_FIX_CTL

Packet Meaning:

Set Fix interval.

DataField:

PMTK300,Fixinterval,0,0,0,0

Fixinterval: Unit is milliseconds [Range: 100 ~ 10000]

Example:

$PMTK300,1000,0,0,0,0 :Set fix interval to 1000 milliseconds

Return:

$PMTK001,300,3

Packet Type: 301 PMTK_API_SET_DGPS_MODE

Packet Meaning:

API_Set_Dgps_Mode

DGPS correction data source mode.

DataField:

PMTK301,Mode

Mode: DGPS data source mode.

‘0’: No DGPS source

‘1’: RTCM

‘2’: WAAS

Example:

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

Packet Type: 311 PMTK_API_SET_ELEV_MASK

Packet Meaning:

API_Set_Elev_Mask

Set satellite elevation mask.

DataField:

PMTK311,Degree

Degree: Satellite elevation-mask.

Example:

$PMTK311,5*28<CR><LF>

Note:

Only support in AXN3.8 after 2015/6/17, and AXN2.5 after 2015/10/19.

Packet Type: 313 PMTK_API_SET_SBAS_ENABLED

Packet Meaning:

API_Set_Sbas_Enabled

Enable to search a SBAS satellite or not.

DataField:

Enabled: Enable or disable

‘0’ = Disable

‘1’ = Enable

Example:

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

Packet Type: 314 PMTK_API_SET_NMEA_OUTPUT

Packet Meaning:

API_Set_NMEA_Out

Set NMEA sentence output frequencies.

DataField:

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
6 NMEA_SEN_GRS, // GPGRS interval - GNSS Range Residuals
7 NMEA_SEN_GST, // GPGST interval - GNSS Pseudorange Erros Statistics
17 NMEA_SEN_ZDA, // GPZDA interval – Time & Date
18 NMEA_SEN_MCHN, // PMTKCHN interval – GNSS 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:

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

Note:

Settings of GST and GRS are valid only when firmware supports GST/GRS sentences.

Packet Type: 326 PMTK_API_SET_PPS

Packet Meaning:

This packet contain the local millisecond and phase where the PPS should be placed.

DataField:

PMTK326,PPS_BY_USER,Local_ms,phase

PPS_BY_USER

1:PPS output by user.
0:PPS output automatically.

Local_ms: Local receiver time tick. Range:0-4294967295(2^32-1).

Phase: Time tick phase 0-262143.

Example:

$PMTK326,1,1345,555*3F<CR><LF>

Packet Type: 330 PMTK_API_SET_DATUM

Packet Meaning:
API_Set_Datum
Set default datum.
DataField:
PMTK330,Datum

Datum:

0: WGS84
1: TOKYO-M
2: TOKYO-A

Support 219 different datums. The total datums list in the Appendix A.

Example:

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

Packet Type: 331 PMTK_API_SET_DATUM_ADVANCE

Packet Meaning:
Set user defined datum.
DataField:
PMTK331,majA,eec,dX,dY,dZ

majA: User defined datum semi-major axis [m] [Range: 0 ~ 7000000]
ecc: User defined datum eccentric [m] [Range: 0 ~ 330]
dX: User defined datum to WGS84 X axis offset [m]
dY: User defined datum to WGS84 Y axis offset [m]
dZ: User defined datum to WGS84 Z axis offset [m]

Example:

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

Packet Type: 335 PMTK_API_SET_RTC_TIME

Packet Meaning:
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.
DataField:
PMTK335,Year,Month,Day,Hour,Min,Sec

Year: Year
Month: 1 ~ 12
Day: 1 ~ 31
Hour: 0 ~ 23
Min: 0 ~ 59
Sec: 0 ~ 59

Example:

$PMTK335,2007,1,1,0,0,0*02<CR><LF>

Packet Type: 351 PMTK_API_SET_SUPPORT_QZSS_NMEA

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 V3.01)

DataField:

PMTK351,Enabled

Enabled:

‘0’: Disable

‘1’: Enable

Example:

$PMTK351,0*29 : Disable QZSS NMEA format

$PMTK351,1*28 : Enable QZSS NMEA format

Packet Type: 352 PMTK_API_SET_STOP_QZSS

Packet Meaning:

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

Default is enable QZSS function.

DataField:

PMTK352,Enabled

Enabled:

‘0’: Enable

‘1’: Disable

Example:

$PMTK352,0*2B : Enable QZSS function

$PMTK352,1*2A : Disable QZSS function

Packet Type: 353 PMTK_API_SET_GNSS_SEARCH_MODE (N/S AXN3.0 and AXN2.3)

Packet Meaning:

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

DataField:

PMTK353,GPS_Enabled,GLONASS_Enabled

GPS_Enabled:

‘0’: disable (DO NOT search GPS satellites)

‘1’ or non-ZERO: search GPS satellites

GLONASS_Enabled:

‘0’: disable (DO NOT search GLONASS satellites)

‘1’ or non-ZERO: search GLONASS satellites

GALILEO_Enabled:

‘0’: disable (DO NOT search GALILEO satellites)

‘1’ or non-ZERO: search GALILEO satellites

GALILEO_FULL_Enabled:

‘0’: disable (DO NOT search GALILEO FULL mode satellites)

‘1’ or non-ZERO: search GALILEO satellites

BEIDOU_Enabled:

‘0’: disable (DO NOT search BEIDOU satellites)

‘1’ or non-ZERO: search BEIDOU satellites

Example:

$PMTK353,0,1,0,0,0*2A : Search GLONASS satellites only

$PMTK353,1,0,0,0,0*2A : Search GPS satellites only

$PMTK353,1,1,0,0,0*2B : Search GPS and GLONASS satellites

$PMTK353,1,1,1,0,0*2A : Search GPS GLONASS, GALILEO satellites

$PMTK353,0,0,0,0,1*2A : Search BEIDOU satellites only

$PMTK353,1,0,0,0,1*2B : Search GPS and BEIDOU satellites

Note: GLONASS only, BEIDOU only, and GALILEO only mode is only for testing purpose. Please use GPS + GLONASS or GPS + BEIDOU in the real application, GLONASS and BEIDOU can not be enabled at the same time.

Packet Type: 355 PMTK_API_QUERY_GNSS_SEARCH_MODE (N/S AXN2.3)

Packet Meaning:

This command is to get GLONASS, BEIDOU and GALILEO search setting.

DataField:

None

Example:

$PMTK355*31

Return $PMTK001,353,3,0,1,0

"$PMTK001,355,3,GLON_Enable,BEIDOU_Enable,GALILEO_Enable”

The Beidou search mode is enabled.

Packet Type: 356 PMTK_API_SET_HDOP_THRESHOLD

Packet Meaning:

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

DataField:

PMTK356,HDOPThreshold

HDOPThreshold:

‘0’: Disable this function

Other value: Enable set the HDOP threshold

Example:

$PMTK356,0.8

Return $PMTK356,0.8 Set OK!*5F

Packet Type: 357 PMTK_API_GET_ HDOP_THRESHOLD

Packet Meaning:

This command is to get the HDOP threshold.

DataField:

PMTK357,HDOPThreshold

HDOPThreshold:

‘0’: Disable

Other value: Enable

Example:

$PMTK357

Return $PMTK357,0.8*39

Packet Type: 386 PMTK_API_SET_STATIC_NAV _THD

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.

DataField:

PMTK386, speed_threshold

Speed_trhreshold: 0~2 m/s

The minimun is 0.1 m/s, the max is 2.0 m/s

Example:

$PMTK386, 0.4*19<CR><LF>

Packet Type: 389 PMTK_API_SET_TCXO_DEBUG

Packet Meaning:

Set the switch of showing TCXO clock drift at every fix

DataField:

PMTK389, on_off

on_off:

0=off;

1=on (turn on $PMTK589 output at every fix)

Example:

$PMTK389, 1*2D<CR><LF>

Packet Type: 399 PMTK_API_SET_FLASH_DATA

[Packet Meaning]

Write data to the flash.

[Data Field]

PMTK399, Address, Length, Data0, Data1, Data2, ...

Address: the starting address in hex format (the address is fixed at 0x1C0)

Length: the number of bytes of incoming data fields in hex format (Max length = 7 bytes)

DataN: data byte in hex format

[Example]

$PMTK399,1c0,7,30,5C,22,1D,02,04,01*4F<CR><LF>

Packet Type: 400 PMTK_API_Q_FIX_CTL

Packet Meaning:

API_Query_Fix_Ctl

DataField:

None

Return:

PMTK_DT_FIX_CTL

Example:

$PMTK400*36<CR><LF>

Packet Type: 401 PMTK_API_Q_DGPS_MODE

Packet Meaning:

API_Query_Dgps_Mode

DataField:

None

Return:

PMTK_DT_DGPS_MODE (See Packet Type: 501)

Example:

$PMTK401*37<CR><LF>

Packet Type: 411 PMTK_API_Q_ELEV_MASK

Packet Meaning:

API_Query_Elev_Mask

Query satellite elevation mask.

DataField:

None

Example:

$PMTK411*36<CR><LF>

Return:

$PMTK511,Degree

Note:

Only support in AXN3.8 after 2015/6/17, and AXN2.5 after 2015/10/19.

Packet Type: 413 PMTK_API_Q_SBAS_ENABLED

Packet Meaning:

API_Query_Sbas_Enabled

DataField:

None

Return:

PMTK_DT_SBAS_ENABLED

Example:

$PMTK413*34<CR><LF>

Packet Type: 414 PMTK_API_Q_NMEA_OUTPUT

Packet Meaning:

API_Query_NMEA_Out

Query current NMEA sentence output frequencies.

DataField:

None

Return:

PMTK_DT_NMEA_OUTPUT

Example:

$PMTK414*33<CR><LF>

Packet Type: 430 PMTK_API_Q_DATUM

Packet Meaning:

API_Query_Datum

Query default datum

DataField:

None

Return:

PMTK_DT_DATUM

Example:

$PMTK430*35<CR><LF>

Packet Type: 431 PMTK_API_Q_DATUM_ADVANCE

Packet Meaning:

API_Query_Datum_Advance

Query user defined datum

DataField:

None

Return:

PMTK_DT_DATUM

Example:

$PMTK431*34<CR><LF>

Packet Type: 435 PMTK_API_Q_RTC_TIME

[Packet Meaning]

API_Query_RTC_Time

Query current RTC UTC time

[Data Field]

None

Return:

PMTK_API_DT_RTC_TIME

[Example]

$PMTK435*30<CR><LF>

Packet Type: 447 PMTK_API_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: 449 PMTK_API_Q_EPH_STATUS

Packet Meaning:

This command is to query the current status of ephemeris downloading

Example:

PMTK449*3B

Return:

$PMTK001,449,3,**1***24 : The ephemeris downloading is finished.

$PMTK001,449,3,**0***25 : The ephemeris downloading is not finished yet.

Packet Type: 499 PMTK_API_GET_FLASH_DATA

[Packet Meaning]

Read the flash memory.

[Data Field]

PMTK499, Address, Length

Address: the starting address in hex format. (The address is fixed at 0x1C0)

Length: the number of bytes requested in hex format (Max length is 7 bytes)

Return:

PMTK_DT_FLASH_DATA

[Example]

$PMTK499,1C0,7*43<CR><LF>

Packet Type: 500 PMTK_DT_FIX_CTL

Packet Meaning:
These parameters control the rate of position fixing activity.
DataField:
FixInterval: Position fix interval. (msec). [Range: 100 ~ 10000].
Example:
$PMTK500,1000,0,0,0,0*1A<CR><LF>

Packet Type: 501 PMTK_DT_DGPS_MODE

Packet Meaning:
DGPS Data Source Mode
DataField:
Mode: DGPS data source mode
'0': No DGPS source
'1': RTCM
'2': WAAS
Example:
$PMTK501,1*2B<CR><LF>

Packet Type: 513 PMTK_DT_SBAS_ENABLED

Packet Meaning:
Enable to search a SBAS satellite or not.
DataField:
Enabled: Enable or disable
'0' = Disable
'1' = Enable
Example:
$PMTK513,1*28<CR><LF>

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>

Packet Type: 527 PMTK_DT_Nav_Threshold

Support Chip Type:
MT3333
Packet Meaning:
Current Nav Speed Threshold setting
Data Field:
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: 530 PMTK_DT_DATUM

Packet Meaning:
Current datum used.
DataField:
PMTK530,Datum
Datum:
0: WGS84
1: TOKYO-M
2: TOKYO-A
Example:
$PMTK530,0*28<CR><LF>

Packet Type: 535 PMTK_API_DT_RTC_TIME

[Packet Meaning]
This packet carries current RTC UTC time.
[Data Field]
Year,Month,Day,Hour,Min,Sec
Year: Year
Month: 1 ~ 12
Day: 1 ~ 31
Hour: 0 ~ 23
Min: 0 ~ 59
Sec: 0 ~ 59
[Example]
$PMTK535,2007,1,1,0,0,0*04<CR><LF>

Packet Type: 589 PMTK_DT_SET_TCXO_DEBUG

Packet Meaning:
The TCXO clock drift value
DataField:
valid,UTC,TCXO_drift_ppm
valid:
0=data is not reliable;
1=data is ready
UTC: UTC time
TCXO_drift_ppm: TCXO clock drift in ppm
Example:
$PMTK589,1,052130.000,-0.4712*03<CR><LF>

Packet Type: 599 PMTK_DT_FLASH_DATA

[Packet Meaning]
The data in the flash memory.
[Data Field]
There are totally 'length+2' data fields that present the followings:

1. Starting address in hex format
2. Length in hex format
3~n: Data bytes in hex format

[Example]

$PMTK599,1C,7,30,5C,22,1D,02,04,01*58<CR><LF>

Packet Type: 602 PMTK_Q_DATA_PORT

[Packet Meaning]

Read data port input/output data type and baudrate

[Data Field]

None

[Return]

PMTK_DT_DATA_PORT

[Example]

$PMTK602*36<CR><LF>

Packet Type: 605 PMTK_Q_RELEASE

Packet Meaning:

Query the firmware release information.

DataField:

None

Return:

PMTK_DT_RELEASE

Example:

$PMTK605*31<CR><LF>

Packet Type: 607 PMTK_Q_EPO_INFO

Packet Meaning:

EPO Data Valid day check

DataField:

None

Return:

PMTK_DT_EPO_INFO

Example:

$PMTK607*33<CR><LF>

Packet Type: 622 PMTK_Q_LOCUS_DATA

[Packet Meaning]

Dump LOCUS flash data.

[Data Field]

Case 1: $PMTK622,type

Type:

0-Dump full LOCUS flash data.
1-Dump partial in used LOCUS flash data

Case 2: $PMTK622,type,offset,size*hh

Type:

2-Dump specified sectors' LOCUS flash data

offset: The start address for dump (0<=offset<32, the unit is sector[4KB])
size: The dump length (0<=size<=32, the unit is sector[4KB])

[Example]

Input: $PMTK622,0*28 //Dump full LOCUS flash data
Input: $PMTK622,1*29 //Dump partial in used LOCUS flash data
Input: $PMTK622,2,3,2*2B //Skip sector 1,2,3. Dump sector4 and sector5 LOCUS flash data

[Note]

If the input values of offset and size are out of range, it will dump all LOCUS flash like using $PMTK622,0*28.

Packet Type: 660 PMTK_Q_AVAILABLE_SV_EPH

Packet Meaning:

Support PMTK660 which report valid Ephemeris SV

(a) Host -> MT3329: A PMTK660 command to request the EPH info, together with a time interval parameter (for example, 1800sec).
(b) MT3329 -> Host: Reply 32-bit flags of 32SV to indicate which EPHs will be available after the specified time interval.

DataField:

Time interval

Time interval: Set the time interval for MT3329 to reply 32-bit flags of 32SV. Note that the Time interval > 0 and <= 7200 (2 hours).

Example:

Indicate which EPHs will be available after 1800 seconds
$PMTK660,1800*17<CR><LF>

Return:

$PMTK001,660,3,40449464*17<CR><LF>

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.

Packet Type: 661 PMTK_Q_AVAILABLE_SV_ALM

Packet Meaning:

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.

DataField:

Time interval

Time interval: Set the time interval for MT3329 to reply 32-bit flags of 32SV. Note that the Time interval > 0 and <= 365 (1 year for maximum)

Example:

Indicate which Almanac will be available after 30 days
$PMTK661,30*1C<CR><LF>

Return:

$PMTK001,661,3,fec0bfff*49<CR><LF>

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.

Packet Type: 667 PMTK_Q_UTC_CORRECTION_DATA

Packet Meaning

Get UTC correction data.

Data Field

$PMTK001,667,3,A0,A1,dtLS,Tot,WNt,WNLSF,DN,dtLSF*CS<CR><LF>

Name	Unit	Description
PMTK667		Reference UTC correction
Action flag		'3' means UTC correnction data are available '2' means UTC correnction data are not available
A0	(seconds)/(2^-30)	UTC parameter A0
A1	(seconds/second)/(2^-50)	UTC parameter A1
dtLS	seconds	UTC time difference due to leap seconds before event
Tot	seconds	UTC reference time of week
WNt	weeks	UTC reference week number
WNLSF	weeks	UTC week number when next leap second event occurs
DN	days	UTC day of week when next leap second event occurs
dtLSF	seconds	UTC time difference due to leap seconds after event
CS		Checksum

Example

$PMTK667

[Return]

If UTC correnction data are available, the receiver returns

$PMTK001,667,3,0,0,16,507904,237,237,3,17*0A

If UTC correnction data are not available, the receiver returns

$PMTK001,667,2*36

Packet Type: 668 PMTK_Q_GPS_KEP

[Packet Meaning]

Get GPS ephemeris data in kepler format.

[Data Field]

PRN

PRN: The SVID of the satellite. Choose which satellite's ephemeris you want to get.

[Example]

$PMTK668,3*25<CR><LF>

[Return]

If ephemeris data of specified satellite is available, the receiver returns

$PMTK668,PRN,WeekNo,URAI,IDOT,IODE,Toc,af2,af1,af0,IODC,Crs,dn,M0,Cuc,e,Cus,SqrtA,Toe,Cic,Omega0,Cis,i0,Crc,w,OmegaDot,Tgd,SVHealth*CS

Field	**Description**
PMTK668	PMTK command ID
PRN	SVID of satellite
WeekNo	Reference week number[weeks]
URAI	Figure of Merit – Defines URA
IDOT	Rate of inclination angle[rad/s]
IODE	Issue of data counter
Toc	Reference time of week[s]

af2	SV clock correction polynomial coefficient[s/s/s]
af1	SV clock correction polynomial coefficient[s/s]
af0	SV clock correction polynomial coefficient[s]
IODC	Issue of data counter
Crs	Ampof sin harmonic corr term orbit radius[m]
dn	Delta n mean motion diff from computed value[rad/s]
M0	Mean anomaly at reference time[rad]
Cuc	Amplitude of cos harm corr term arg of latitude[rad]
e	Eccentricity
Cus	Amplitude of sin harm corr term arg of latitude[rad]
SqrtA	Square root of the semi-major axis
Toe	Reference time of week[Ephemeris terms][s]
Cic	Amplitude of cos harm corr term ang of inclination[rad]
Omega0	Longitude of ascending node of orbit plane[rad]
Cis	Amplitude of sin harm corr term ang of inclination[rad]
i0	Inclination angle at reference time[rad]
Crc	Amplitude of cos harm corr term orbit radius[rad]
w	Argument of perigee[rad]
OmegaDot	Rate of right ascention[rad/s]
Tgd	Group delay[s]
SVHealth	The 5 LSBs of the NAV data's health status from the ephemeris.
CS	Checksum

Note: please use the factor scale(refer to ICD-GPS-200c, page 96) to calculate the actual value.

Example:

$PMTK668,3,804,0,1378,97,18900,0,211,348491,97,1529,14047,-433441886,1302,8251567,3333,2702051329,18900,26,935176585,4,655529795,8214,-2063355058,-23169,3,0*3D

If ephemeris data of specified satellite is not available, the receiver returns

$PMTK001,668,3,0*24

Packet Type: 669 PMTK_Q_BDS_KEP

[Packet Meaning]

Get BDS ephemeris data in kepler format.

[Data Field]

PRN

PRN: The SVID of the satellite. Choose which satellite's ephemeris you want to get.

[Example]

$PMTK669,3*25<CR><LF>

[Return]

If ephemeris data of specified satellite is available, the receiver returns

$PMTK669,PRN,WeekNo,URAI,IDOT,IODE,Toc,af2,af1,af0,IODC,Crs,dn,M0,Cuc,e,Cus,SqrtA,Toe,Cic,Omega0,Cis,i0,Crc,w,OmegaDot,Tgd,SVHealth*CS

Field	**Description**
PMTK669	PMTK command ID
PRN	SVID of satellite
WeekNo	Reference week number[weeks]
URAI	Figure of Merit – Defines URA
IDOT	Rate of inclination angle[rad/s]

IODE	Issue of data counter
Toc	Reference time of week[s]
af2	SV clock correction polynomial coefficient[s/s/s]
af1	SV clock correction polynomial coefficient[s/s]
af0	SV clock correction polynomial coefficient[s]
IODC	Issue of data counter
Crs	Amplitude of sin harmonic corr term orbit radius[m]
dn	Delta n mean motion diff from computed value[rad/s]
M0	Mean anomaly at reference time[rad]
Cuc	Amplitude of cos harm corr term arg of latitude[rad]
e	Eccentricity
Cus	Amplitude of sin harm corr term arg of latitude[rad]
SqrtA	Square root of the semi-major axis
Toe	Reference time of week[Ephemeris terms][s]
Cic	Amplitude of cos harm corr term ang of inclination[rad]
Omega0	Longitude of ascending node of orbit plane[rad]
Cis	Amplitude of sin harm corr term ang of inclination[rad]
i0	Inclination angle at reference time[rad]
Crc	Amplitude of cos harm corr term orbit radius[rad]
w	Argument of perigee[rad]
OmegaDot	Rate of right ascention[rad/s]
Tgd	Group delay[s]
SVHealth	The 5 LSBs of the NAV data's health status from the ephemeris.
CS	Checksum

Note: please use the factor scale(refer to BeiDou Navigation Satellite System Signal In Space Interface Control Document) to calculate the actual value.

Example:

$PMTK669,3,804,0,1567,2,38250,0,-26092,-4263927,0,-21176,581,1267572402,-23869,2546953,66039,3404432795,38250,-126,22528884,-260,55957758,-59905,-1898601724,2465,6,0*19

If ephemeris data of specified satellite is not available, the receiver returns

$PMTK001,669,3,0*25

Packet Type: 670 PMTK_Q_GPS_IONO

[Packet Meaning]

Query ionospheric parameters.

[Data Field]

$PMTK001,670,3,α0,α1,α2 ,α3, β0, β1, β2 , β3 *CS<CR><LF>

Name	Unit	Description
α0	Seconds	IONO parameterα0
α1	sec/semi-circle	IONO parameterα1
α2	sec/(semi-circle)^2	IONO parameterα2
α3	sec/(semi-circle)^3	IONO parameterα3
β0	Seconds	IONO parameterβ0
β1	sec/semi-circle	IONO parameterβ1
β2	sec/(semi-circle)^2	IONO parameterβ2
β3	sec/(semi-circle)^3	IONO parameterβ3

[Example]

$PMTK670*33<CR><LF>

[Return]

If ionospheric paremeters are available, the receiver returns

$PMTK001,670,3,19,3,-2,-1,63,10,-3,-4*15

If ionospheric paremeters are not available, the receiver returns

$PMTK001,670,2*30

Packet Type: 702 PMTK_DT_DATA_PORT

[Packet Meaning]

Display Data port input/output data type and baud rate

[Data Field]

InType: Data port input data type

'0' = DPORT_IN_NONE

'1' = DPORT_IN_RTCM

'2' = DPORT_IN_NA

OutType: Data port input data type

'0' = DPORT_OUT_NONE

'1' = DPORT_OUT_DEBUG

Baud: Baudrate setting

4800

9600

19200

38400

57600

115200

[Example]

$PMTK702,1,1,9600*14<CR><LF>

Packet Type: 705 PMTK_DT_RELEASE

Packet Meaning:

Firmware release information.

DataField:

ReleaseStr,Build_ID,Product_Model,(SDK_Version,)

ReleaseStr: Firmware release name and version

3318 : Mcore_x.x

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

Example:

$PMTK705,AXN_0.2,1234,ABCD,*14<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:

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: 740 PMTK_DT_UTC

[Packet Meaning]

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.

[Packet Format]

$PMTK740,YYYY,MM,DD,hh,mm,ss*CS<CR><LF>

Name	Unit	Range	Description
$PMTK740		Reference UTC Time	
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
CS		8-bit accumulative checksum of all bytes in-between the $ and * characters in hexadecimal	

[Example]

The packet indicates that the current UTC time 2010/Feb/10 09:00:58.

$PMTK740,2010,2,10,9,0,58*05<CR><LF>

Packet Type: 721 PMTK_DT_SV_EPO

[Packet Meaning]

The packet contains GPS EPO data for a single satellite.

[Packet Format]

$PMTK721,SatID,W[0],…,W[17]*CS<CR><LF>

Name	Unit	Range	Description
$PMTK721	---	---	GPS EPO data (Navigation Model) for a single satellite
SatID	---	1 ~ 32	Satellite PRN number [Represented in HEX characters] for the EPO data to follow
W[0] ~ W[17]	---	---	words [LSB first] of one EPO segment data (total 72 bytes)
CS		8-bit accumulative checksum of all bytes in-between the $ and * characters in hexadecimal	

[Sample Packet]

The packet contains EPO data of satellite PRN 17.

$PMTK721,11,6a043d2f,d52e00,0d2f1a3d,…,…,……..*CS<CR><LF>

[Note]

The PRN is input with hex format.

Packet Type: 741 PMTK_DT_POS

[Packet Meaning]

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

[Packet Format]

$PMTK741,Lat,Long,Alt,YYYY,MM,DD,hh,mm,ss *CS<CR><LF>

Name	Unit	Range	Description
$PMTK741		Reference location without accuracy information	
Lat	degree	-90.0 ~ 90.0	WGS84 geodetic latitude. NOTE: suggest to express this value in floating-point with 6 decimal points Minus: south; Plus: north
Long	degree	-180.0 ~ 180.0	WGS84 geodetic longitude. NOTE: suggest to express this value in floating-point with 6 decimal points 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
CS		8-bit accumulative checksum of all bytes in-between the $ and * characters in hexadecimal	

[Range Check]

GPS chip will check value range for the following parameters:

Lat: -90.0 ~ 90.0

Long: -180.0 ~ 180.0

[Example]

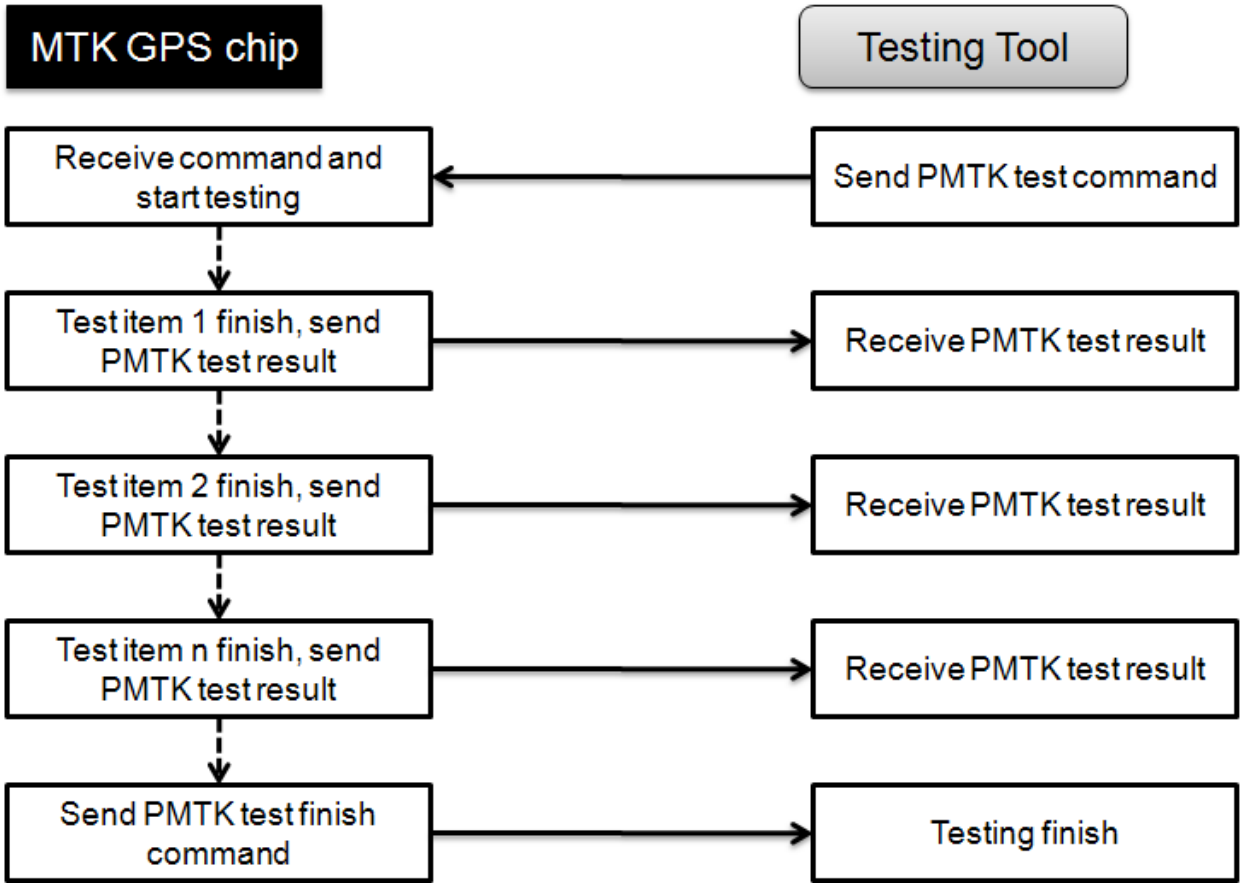
The packet indicates that the GPS receiver is at latitude 24.772816 degrees, longitude 121.022636 degrees, and altitude 160m.

$PMTK741,24.772816,121.022636,160,2011,8,1,08,00,00

Packet Type: 810 PMTK_TEST_ALL

[Packet Meaning]

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



[Packet Format]

$PMTK810,Bitmap,SVID*CS<CR><LF>

Bitmap: The first data field means the test items.

Each bit of test item field means one test item. List these test items below.

Supported Test Items

Bit0 TEST_INFO // Include f/w version, NMEA type and NMEA output rate

Bit1 TEST_ACQ // the time of acquiring the specific SV

Bit2 TEST_BITSYNC // the time of bit sync

Bit3 TEST_SIGNAL // Include phase error, TCXO clock/drift and CNR mean/sigma

Bit4 -15 (Reserved)

SVID: The second means the SV id.

The value of SV id is between 1 and 20 in Hex format.

The value of Glonass SVID is Frequency ID which is between C9 and D6 in Hex format.

Note. Glonass frequency id representation

-7 = C9
-6 = CA
-5 = CB
-4 = CC
-3 = CD
-2 = DE
-1 = CF
0 = D0
1 = D1
2 = D2
3 = D3
4 = D4
5 = D5
6 = D6

[Example]

$PMTK810,0003,1D*4D<CR><LF>

This command only tests TEST_INFO and TEST_ACQ test items. The specific SV id is PRN29.

Packet Type: 811 PMTK_TEST_STOP

[Packet Meaning]

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

[Packet Format]

No Data Field.

[Example]

$PMTK811*3A<CR><LF>

Packet Type: 812 PMTK_TEST_FINISH

[Packet Meaning]

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

[Packet Format]

No Data Field.

[Example]

$PMTK812*39<CR><LF>

Packet Type: 813 PMTK_TEST_ALL_ACQ

[Packet Meaning]

The result of TEST_ACQ item.

[Packet Format]

$PMTK813,<SVid>,<Acq Time>*<CheckSum><CR><LF>

[Example]

$PMTK813,29,2*01<CR><LF>

The target device acquires SV29 within 2 seconds.

Packet Type: 814 PMTK_TEST_ALL_BITSYNC

[Packet Meaning]

The result of TEST_BITSYNC item.

[Packet Format]

$PMTK814,<SVid>,<BitSync Time>*<CheckSum><CR><LF>

[Example]

$PMTK814,29,1*05<CR><LF>

Regard to SV29, the target device reach bit sync state within 1 second.

Packet Type: 815 PMTK_TEST_ALL_SIGNAL

[Packet Meaning]

The result of TEST_SIGNAL item.

[Packet Format]

$PMTK815,<SVid>,<Testing Time>,<Phase>,<TCXO Offset>,<TCXO Drift>,<CNR mean>,<CNR sigma>*<CheckSum><CR><LF>

The unit of <Phase>,<CNR mean>,<CNR sigma> is 0.01.

The unit of <TCXO Offset>,<TCXO Drift> is 0.001.

[Example]

$PMTK815,29,16,98,10000,30,4100,0*18<CR><LF>

Regard to SV29, take 16 seconds to test and the result is …

Phase Error：0.98
TCXO offset/drift(Hz)：10/0.03
CNR mean/sigma：41/0

Packet Type: 837 PMTK_TEST_JAMMING (N/S AXN3.0) +

Packet Meaning:
Jamming scan test command.
DataField:
$PMTK837, JamScanType, JamScanNum
JamScanType: '1' enable jamming scan
JamScanNum: Jamming scan test times.
Example:
$PMTK837,1,50*0A<CR><LF>
Jamming scan test 50 times
Return:
$PMTKJAM, sentence type, sentence content
The meaning of sentence type and its content
Sentence type = 0 : Jammer scan end
Sentence type = 1 : Jammer scan start, total number of testing
Sentence type = 2 : Jammer scan result, sentence ID, the JNR of each frequency (base frequency = 1573379250, resolution = 21000)
Sentence type = 3 : Jammer scan test round, round of test
Sentence type = 4 : No jammer scan data
Example:
$PMTKJAM,1,10*74
Jammer scan start, total number of testing = 10;
$PMTKJAM,3,5*42
Jammer scanning, the round of test = 5
$PMTKJAM,2,1,101,81,50,48,56,94,74,69,68,62,56,58,64,82,99,83,83,71,81,93,88,79,85,104,85,91,82,77,96,94,104,86,108,101,102,95,147,110,128,97,113,104,125,101,111,126,103,150,112*61
Sentence type = 2,
Sentence ID = 1,
JNR of 1573379250 Hz = 101,
JNR of 1573400250 Hz = 81,

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],[Extension Day]
CmdType:
'0' = Query
'1' = Set
'2' = Result for Query operation
Enable:
'0' = disable

'1' = enable

Extension Day: Finished extension day.

Example:

To enable EASY, use

$PMTK869,1,1*35<CR><LF>

To disable EASY, use

$PMTK869,1,0*36<CR><LF>

To query if EASY is enabled or disabled, use

$PMTK869,0*29<CR><LF>

If EASY is enabled, the receiver returns

$PMTK869,2,1*36<CR><LF>

If EASY is disabled, the receiver returns

$PMTK869,2,0*37<CR><LF>

If EASY is enabled and is finished 1-day extension, the receiver may returns

$PMTK869,2,1,1*2B<CR><LF>

If EASY is enabled and is finished 2-day extension, the receiver may returns

$PMTK869,2,1,2*28<CR><LF>

If EASY is enabled and is finished 3-day extension, the receiver may returns

$PMTK869,2,1,3*29<CR><LF>

Note：

1. The EASY function is disabled for default setting.
2. The "VBACKUP" pin needs to connect to a coin-battery for this feature.
3. The EASY function only support update rate 1Hz.

Packet Type: 875 PMTK_PMTKLSC_STN_OUTPUT

[Packet Meaning]

Enable or disable PMTKLSC Sentence output. Query if PMTKLSC Sentence output enabled or disabled.

[Data Field]

$PMTK875,CmdType,[Enable]

CmdType: Set or Query

'0': Query

'1': Set

'2': Result for Query operation

Enable: Enable or disable

'0': Disable

'1': Enable

[Example]

$PMTK875,1,1*38<CR><LF> :Enable PMTKLSC and PMTKLSCB Sentence output

$PMTK875,1,0*39<CR><LF> :Disable PMTKLSC and PMTKLSCB Sentence output

[Return]

$PMTKLSC, Parameter1, Parameter2, Parameter3*CS

$PMTKLSCB, Parameter1, Parameter2, Parameter3*CS

Where:

Parameter 1 : current leap second

Parameter 2 : leap indicator, 1 means updated from broadcast data

Parameter 3 : next leap second

Packet Type: 886 PMTK_FR_MODE

[Packet Meaning]

Set navigation mode.

[Data Field]

$PMTK886,CmdType

CmdType:

'0': Normal mode: For general purpose

'1': Fitness mode: For running and walking purpose that the low-speed (< 5m/s) movement will have more effect on the position calculation.

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

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

[Example]

$PMTK886,0*28<CR><LF> :Enter normal mode.

$PMTK886,1*29<CR><LF> :Enter fitness mode.

$PMTK886,2*2A<CR><LF> :Enter aviation mode.

$PMTK886,3*2B<CR><LF> :Enter balloon mode.

[Return]

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

Приложение 1:

Datum No	Датум (Datum)	Регион
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
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

Datum No	Датум (Datum)	Регион
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
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

Datum No	Датум (Datum)	Регион
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
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)

Datum No	Датум (Datum)	Регион
128	North American 1927	Canada (Yukon)
129	North American 1927	Canal Zone
130	North American 1927	Cuba
131	North American 1927	Greenland (Hayes Peninsula)
132	North American 1927	Mean For Antigua, Barbados, Barbuda, Caicos Islands, Cuba, Dominican, Grand Cayman, Jamaica, Turks Islands
133	North American 1927	Mean For Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua
134	North American 1927	Mean For Canada
135	North American 1927	Mean For Conus
136	North American 1927	Mean For Conus (East of Mississippi, River Including Louisiana, Missouri, Minnesota)
137	North American 1927	Mean For Conus (West of Mississippi, Rive Excluding Louisiana, 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
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)

Datum No	Датум (Datum)	Регион
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