

RADIONOVA GPS/GNSS MODULES MTK NMEA PACKET COMMANDS

Release Date 24 April 2018

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

M10578-A2, M10578-A3,

M20048-1, M20050-1

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

This page left intentionally blank.

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

MTK NMEA Packet Format

Preamble	TalkerID	PktType	DataField	*	CHK1	CHK2	CR	LF
----------	----------	---------	-----------	---	------	------	----	----

Packet Length:

The maximum length of each packet is restricted to **255** bytes

Packet Contents:

Preamble: One byte character.

'\$'

TalkerID: Four bytes character string.

"PMTK"

PktType: Three bytes character string.

From "000" to "999"

An identifier used to tell the decoder how to decode the packet

DataField: The DataField has variable length depending on the packet type.

A comma symbol ',' must be inserted ahead each data field to help the decoder process the DataField.

*: 1 byte character.

The star symbol is used to mark the end of the Datafield.

CHK1, CHK2: Two bytes character string.

CHK1 and CHK2 are the checksum of the data between Preamble and '*'.

CR, LF: Two bytes binary data.

The two bytes are 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.

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

MTK NMEA Packet List:

Packet Type: 000 PMTK_TEST	7
Packet Type: 001 PMTK_ACK	7
Packet Type: 010 PMTK_SYS_MSG.....	7
Packet Type: 011 PMTK_TXT_MSG	8
Packet Type: 101 PMTK_CMD_HOT_START.....	8
Packet Type: 102 PMTK_CMD_WARM_START	8
Packet Type: 103 PMTK_CMD_COLD_START.....	8
Packet Type: 104 PMTK_CMD_FULL_COLD_START	8
Packet Type: 161 PMTK_CMD_STANDBY_MODE (NOT supported in AXN3.0)	9
Packet Type: 120 PMTK_CMD_CLEAR_FLASH_AID.....	9
Packet Type: 127 PMTK_CMD_CLEAR_EPO	9
Packet Type: 220 PMTK_SET_POS_FIX.....	10
Packet Type: 223 PMTK_SET_AL_DEE_CFG (Not supported in AXN3.0).....	10
Packet Type: 225 PMTK_SET_PERIODIC_MODE (Not supported in AXN3.0).....	10
Packet Type: 251 PMTK_SET_NMEA_BAUDRATE.....	12
Packet Type: 255 PMTK_SET_SYNC_PPS_NMEA(Only supported in AXN3.6 after 2014/4/21).....	12
Packet Type: 285 PMTK_SET_PPS_CONFIG_CMD.....	13
Packet Type: 286 PMTK_SET_AIC_CMD	13
Packet Type: 299 PMTK_SET_OUTPUT_DEBUG.....	13
Packet Type: 300 PMTK_API_SET_FIX_CTL	14
Packet Type: 301 PMTK_API_SET_DGPS_MODE.....	14
Packet Type: 313 PMTK_API_SET_SBAS_ENABLED.....	14
Packet Type: 314 PMTK_API_SET_NMEA_OUTPUT	15
Packet Type: 326 PMTK_API_SET_PPS.....	15
Packet Type: 330 PMTK_API_SET_DATUM	16
Packet Type: 331 PMTK_API_SET_DATUM_ADVANCE	16
Packet Type: 335 PMTK_API_SET_RTC_TIME	17
Packet Type: 351 PMTK_API_SET_SUPPORT_QZSS_NMEA.....	17
Packet Type: 352 PMTK_API_SET_STOP_QZSS	17
Packet Type: 353 PMTK_API_SET_GNSS_SEARCH_MODE (NOT supported in AXN3.0).....	18
Packet Type: 355 PMTK_API_QUERY_GNSS_SEARCH_MODE	18
Packet Type: 356 PMTK_API_SET_HDOP_THRESHOLD	19
Packet Type: 357 PMTK_API_GET_HDOP_THRESHOLD.....	19
Packet Type: 386 PMTK_API_SET_STATIC_NAV_THD.....	19
Packet Type: 389 PMTK_API_SET_TCXO_DEBUG	20

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Packet Type: 399 PMTK_API_SET_FLASH_DATA.....	20
Packet Type: 400 PMTK_API_Q_FIX_CTL.....	20
Packet Type: 401 PMTK_API_Q_DGPS_MODE	21
Packet Type: 413 PMTK_API_Q_SBAS_ENABLED.....	21
Packet Type: 414 PMTK_API_Q_NMEA_OUTPUT.....	21
Packet Type: 430 PMTK_API_Q_DATUM	22
Packet Type: 431 PMTK_API_Q_DATUM_ADVANCE	22
Packet Type: 499 PMTK_API_GET_FLASH_DATA	22
Packet Type: 500 PMTK_DT_FIX_CTL.....	23
Packet Type: 501 PMTK_DT_DGPS_MODE	23
Packet Type: 513 PMTK_DT_SBAS_ENABLED	23
Packet Type: 514 PMTK_DT_NMEA_OUTPUT.....	23
Packet Type: 530 PMTK_DT_DATUM.....	24
Packet Type: 589 PMTK_DT_SET_TCXO_DEBUG	24
Packet Type: 599 PMTK_DT_FLASH_DATA	24
Packet Type: 605 PMTK_Q_RELEASE.....	25
Packet Type: 607 PMTK_Q_EPO_INFO.....	25
Packet Type: 660 PMTK_Q_AVAILABLE_SV_EPH	25
Packet Type: 661 PMTK_Q_AVAILABLE_SV_ALM.....	26
Packet Type: 667 PMTK_Q_UTC_CORRECTION_DATA	26
Packet Type: 705 PMTK_DT_RELEASE.....	27
Packet Type: 740 PMTK_DT_UTC.....	27
Packet Type: 741 PMTK_DT_POS.....	28
Packet Type: 810 PMTK_TEST_ALL.....	29
Packet Type: 811 PMTK_TEST_STOP	30
Packet Type: 812 PMTK_TEST_FINISH	30
Packet Type: 813 PMTK_TEST_ALL_ACQ	30
Packet Type: 814 PMTK_TEST_ALL_BITSYNC	31
Packet Type: 815 PMTK_TEST_ALL_SIGNAL.....	31
Packet Type: 837 PMTK_TEST_JAMMING (NOT supported in AXN3.0).....	32
Packet Type: 869 PMTK_EASY_ENABLE	32
Packet Type: 875 PMTK_PMTKLSC_STN_OUTPUT.....	33
Packet Type: 886 PMTK_FR_MODE	34
Appendix A: Datum List	35

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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:***PMTK001,Cmd,Flag***

Cmd: The command / packet type the acknowledge responds.

Flag:

- 0' = Invalid command / packet
- '1' = Unsupported command / packet type
- '2' = Valid command / packet but action failed
- '3' = Valid command / packet, and action succeeded

Example:

\$PMTK001,604,3*32<CR><LF>

Packet Type: 010 PMTK_SYS_MSG**Packet Meaning:**

Output system message

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>

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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: 161 PMTK_CMD_STANDBY_MODE (NOT supported in AXN3.0)**Packet Meaning:**

Enter standby mode for power saving.

DataField:***PMTK161, Type***

Type: Standby type

'0' = Stop mode

'1' = Sleep mode

Example:

\$PMTK161,0*28<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**Packet Meaning:**

Erase EPO data stored in the flash memory.

DataField:

None

Example:

\$PMTK127*36<CR><LF>

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Packet Type: 220 PMTK_SET_POS_FIX**Packet Meaning:**

Position Fix Interval

DataField:

Interval: Position fix interval [msec]. Must be larger than 200.

Example:

\$PMTK220,1000*1F<CR><LF>

Packet Type: 223 PMTK_SET_AL_DEE_CFG (NOT supported in AXN3.0)**Packet Meaning:****DataField:*****\$PMTK 223, 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 [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 (NOT supported in 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' Periodic backup mode

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

- '2' Periodic standby mode
- '4': Perpetual backup mode
- '8': AlwaysLocate™ standby mode
- '9': AlwaysLocate™ 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

AlwaysLocate™ Standby

PMTK225,0

PMTK225,8

AlwaysLocate™ Backup

PMTK225,0

PMTK225,9

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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 default 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>
```

Packet Type: 255 PMTK_SET_SYNC_PPS_NMEA (Only support in AXN3.6 after 2014/4/21)

[Packet Meaning]

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

[Data Field]

PMTK255,Enabled

Enabled: Enable or disable

'0' = Disable

'1' = Enable

Example:

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Packet Type: 285 PMTK_SET_PPS_CONFIG_CMD

Packet Meaning:

Config PPS setting.

DataField:

PMTK285,PPSType,PPSPulseWidth

PPSType: Availability

'0' = Disable

'1' = After the first fix

'2' = 3D fix only

'3' = 2D/3D fix only

'4' = Always

PPSPulseWidth: PPS Pulse Width (Unit: ms)

Example:

\$PMTK285,100*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

[Data Field]

PMTK299,Enabled

Enabled: Enable or disable

'0' = Disable

'1' = Enable

[Example]

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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: 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>

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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 - Recommended Minimum Specific GNSS Sentence
2 NMEA_SEN_VTG,	// GPVTG interval - Course Over Ground and Ground Speed
3 NMEA_SEN_GGA	//GPGGA interval – GPS Fix Data
4 NMEA_SEN_GSA	// GPGSA interval – GNSS DOPS and Active Satellites
5 NMEA_SEN_GSV	//GPSV interval – GNSS Satellites in View
17 NMEA_SEN_ZDA	//GPZDA interval – Time and 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:

```
$PMTK314,1,1,1,1,1,5,0,0,0,0,0,0,0,0,0,0,1,0*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>
```

Packet Type: 326 PMTK_API_SET_PPS

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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 X axis offset [m]

dZ: User defined datum to WGS84 X axis offset [m]

Example:**CONFIDENTIALITY STATEMENT**

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

\$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.

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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 (NOT supported in AXN3.0)

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_Enable, GLONASS_Enable, GALILEO_Enable, GALILEO_FULL_Enable, BEIDOU_Enable

GPS_Enabled: '0': disable (DO not search GPS satellites)

'1' or non-ZERO: search GPS satellites

GLONASS_Enabled: '0': disable (DO NOTsearch 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.

Packet Type: 355 PMTK_API_QUERY_GNSS_SEARCH_MODE

Packet Meaning:

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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 Set OK!

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:

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

PMTK386, speed_threshold

Speed_threshold: 0~2 m/s

The minimum 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:**CONFIDENTIALITY STATEMENT**

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

\$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

Example:

\$PMTK401*37<CR><LF>

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>

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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: 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>

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Packet Type: 500 PMTK_DT_FIX_CTL

Packet Meaning:

These parameters control the rate of position fixing activity.

DataField:

FixInterval: Position fix interval. (msec). [>= 200]

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.

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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*2A<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: 589 PMTK_DT_SET_TCXO_DEBUG

Packet Meaning:

The TCXO clock drift value

DataField:

PMTK589,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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

[Example]

```
$PMTK599,1C,7,30,5C,22,1D,02,04,01*58<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:

\$PMTK607

Example:

```
$PMTK607*33<CR><LF>
```

Packet Type: 660 PMTK_Q_AVAILABLE_SV_EPH**Packet Meaning:**

Support PMTK660 which report valid EphemerisSV

(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:

PMTK660, 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>
```

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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:**PMTK661, 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]**

UTC correction data.

[Data Field]

\$PMTK667,A0,A1,dtLS,Tot,WNt,WNLSF,DN,dtLSF*CS<CR><LF>

Name	Unit	Description
PMTK667		Reference UTC correction
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)/(2 [^] 12)	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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

[Example]

\$PMTK667

[Return]

\$PMTK667,0,0,16,507904,237,237,3,17*08

Packet Type: 705 PMTK_DT_RELEASE**Packet Meaning:**

Firmware release information.

DataField:***PMTK705,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

Ore SDK Version: Showing SDK version if the firmware is used for SDK

Example:

\$PMTK705,AXN_0.2,1234,ABCD,*14<CR><LF>

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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: 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]**CONFIDENTIALITY STATEMENT**

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

GPS chip will check value range for the following parameters:

Lat: -90.0 ~ 90.0

Long: -180.0 ~ 180.0

[Example]

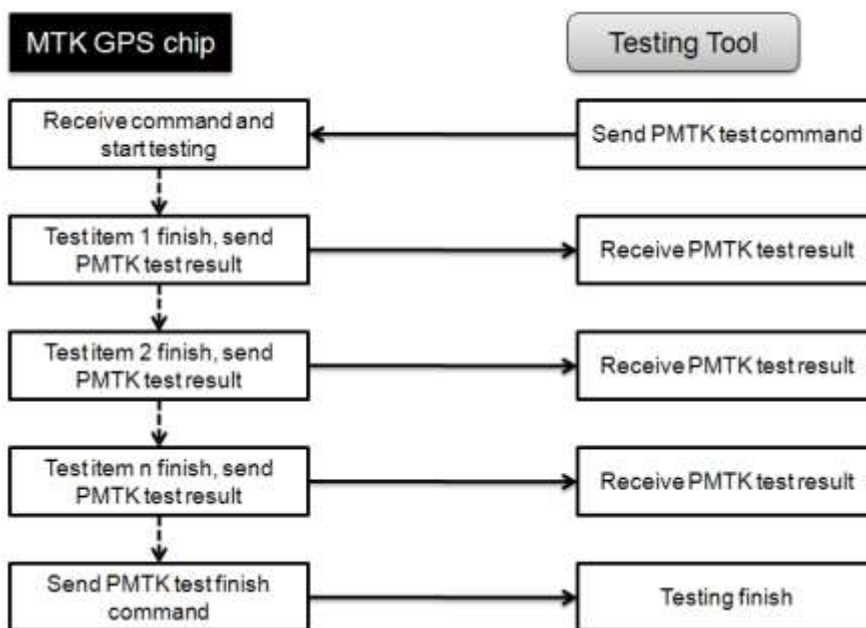
The packet indicates that the GPS receiver is at latitude 24.772816 degrees, longitude 121.022636 degrees, and altitude 160m.

\$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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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.

[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.

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

[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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Packet Type: 837 PMTK_TEST_JAMMING (NOT supported in 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

Packet Type: 869 PMTK_EASY_ENABLE

Packet Meaning:

Enable or disable EASY function. Query if EASY is enabled or disabled..

DataField:

PMTK869, CmdType, [Enable], [Extension Day]

CmdType: Set or query

0: Query

1: Set

2: Result for Query operation

Enabled: Enable or disable

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 disabled, the receiver returns

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

If EASY is enabled and is not finished yet, the receiver may returns

\$PMTK869,2,1,0*2A<CR><LF>

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

\$PMTK869,2,1,1*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>

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*35<CR><LF> :Enable PMTKLSC and PMTKLSCB Sentence output

\$PMTK875,1,0*34<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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Packet Type: 886 PMTK_FR_MODE

[Packet Meaning]

Set navigation mode.

[Data Field]

\$PMTK886,CmdType

CmdType: '0': Normal mode

'1': fitness mode

[Example]

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

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

[Return]

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

Appendix A: Datum List

	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	Tanzania
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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

37	Bellevue (IGN)	Efate and Erromango Islands
38	Bermuda 1957	Bermuda
39	Bissau	Guinea-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, Antarctica
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 (Sicily)
66	European 1950	Malta
67	European 1950	Mean For Austria, Belgium, Denmark, Finland, France, W Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland
68	European 1950	Mean For Austria, Denmark, France, W Germany, Netherlands, Switzerland
69	European 1950	Mean For Iraq, 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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

73	Fort Thomas 1955	Nevis St Kitts (Leeward Islands)
74	Gan 1970	Republic Of Maldives
75	Geodetic Datum 1970	New Zealand
76	Graciosa Base SW1948	Azores (Faial, Graciosa, Pico, Sao, Jorge, Terceira)
77	Guam1963	Guam
78	Gunung Segara	Indonesia (Kalimantan)
79	Gux I Astro	Guadalcanal Island
80	Herat North	Afghanistan
81	Hermannskogel Datum	Croatia-Serbia, Bosnia-Herzegovina
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'Poroloko	Gabon
108	Mahe 1971	Mahe Island
109	Massawa	Ethiopia (Eritrea)
110	Merchich	Morocco
111	Midway Astro 1961	Midway Islands

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

112	Minna	Cameroon
113	Minna	Nigeria
14	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, New Foundland, Nova Scotia, Quebec
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, Dominica, 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, River 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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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 Britain 1936	England
155	Ordnance Survey Great Britain 1936	England, Isle of Man, Wales
156	Ordnance Survey Great Britain 1936	Mean For England ,Isle of Man, Scotland, Shetland Island, Wales
157	Ordnance Survey Great Britain 1936	Scotland, Shetland Islands
158	Ordnance Survey Great Britain 1936	Wales
159	Pico de las Nieves	Canary Islands
160	Pitcairn Astro 1967	Pitcairn Island
161	Point 58	Mean For Burkina Faso and Niger
162	Pointe Noire 1948 _N	Congo
163	Porto Santo 1936	Porto Santo, Maderia Islands
164	Provisional South American 1956	Bolivia
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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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)	Czechoslovakia
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	Czechoslovakia (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	Brazil
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)

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.

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

CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.



www.antenova-m2m.com

Corporate Headquarters

Antenova Limited
2nd Floor Titan Court
3 Bishop Square
Hatfield
AL10 9NA

Tel: +44 1223 810600

Email: sales@antenova-m2m.com

North American Headquarters

Antenova Limited
100 Brush Creek Road
Suite 103, Santa Rosa
California 95404
USA

Tel: +1 707 890 5202

Email: sales@antenova-m2m.com

Asia Headquarters

Antenova Asia Limited
4F, No. 324, Sec. 1, Nei-Hu Road
Nei-Hu District
Taipei 11493 Taiwan, ROC

Tel: +886 (0) 2 8797 8630

Fax: +886 (0) 2 8797 6890

Email: sales@antenova-m2m.com

Copyright© Antenova Ltd. All Rights Reserved. Antenova®, Antenova M2M®, gigaNOVA®, the Antenova product family names, and the Antenova and Antenova M2M logos are trademarks and/or registered trade marks of Antenova Ltd. Any other names and/or trademarks belong to their respective companies.

The materials herein are believed to be reliable and correct at the time of printing. Antenova does not warrant the accuracy or completeness of the information, text, graphics or other items contained within this information. Antenova further assumes no responsibility for the use of this information, and all such information shall be entirely at the user's risk.



CONFIDENTIALITY STATEMENT

All the information contained in this document is commercially confidential and must not be copied or disclosed without the written consent of Antenova Ltd.