

GlobalTop

GlobalTop Technology Inc.

Firmware Customization Services



We Make GPS Smarter Than Ever

2011Q2





GlobalTop Firmware Customization Services

AGPS

fast position fix with preloaded ephemeris

BINARY MODE

outputs position in binary format for increase efficiency

PERIODIC MODE

saves battery by powering off unused components

DISTANCE CALCULATION

calculates line of sight distance between receiver and other points of interest

TIMING MODE

advanced 1 PPS control for synchronization equipments



DATA LOGGER SOLUTION

turns GPS receiver into data logger with additional flash memory

10 HZ UPDATE

fast refresh rate for high speed applications

LAST POSITION RETENTION

outputs last known position coordinates after losing GPS satellite fix

ONE SENTENCE

decreases calculation load on processor by simplifying output NMEA sentences

advanced 1 PPS control for synchronization equipments

decreases calculation load on processor by simplifying output NMEA sentences

MODE

Main Function:

- Creates a virtual circular parameter based on a single center coordinates
- GPS Module will intelligently informs via proprietary protocol whether current position is in or outside the parameter
- Can create 1 parameter per default, multi parameters customization possible by special request

How:

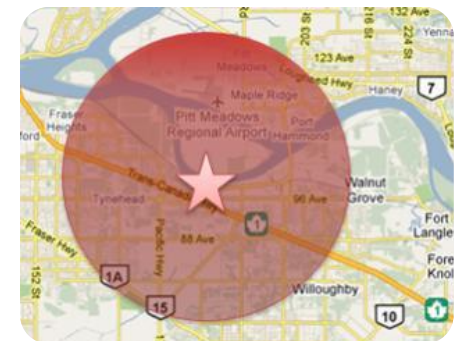
- With standard GlobalTop Geofencing customization, users can set 1 circular parameter by inputting the coordinates for center location and the radius of the parameter
- GPS will internally calculates the distance between current location and the center coordinates, then output the status based on the length of distance: If it is shorter than radius, this means the location of GPS receiver is within the geofencing zone / If it is longer than radius, than this means the location of GPS receiver is outside the geofencing zone.

Requirements:

- Custom firmware needed
- For MT3329 based GPS modules

Gtop Specialty:

- Customize geofencing specification based on application needs.
- Test software based on Windows PC to test geofencing function.



Main Function:

- Transform ordinary GPS receiver to data logger by including additional flash memory in the module design

How:

- Additional flash memory is connected to GPS module with available SPI port
- Special firmware is installed with command to control data logger function

Requirements:

- Currently only Gms-u1LP is supported
- NDA is required before coding document is released
- Only specific model of flash memory is supported

Gtop Specialty:

- Functions:
 - Record and read out position data
 - Can set record style (by time, distance or speed)
 - Can set 20 types of data recording parameters (Satellite number, height, speed, DOP, etc.)
- Ability to use command packet to adjust settings
- PC AP tool for easy implementation



Also called PGTOP™ Sentence

Main Function:

- Decrease calculation loading on host CPU
- Less processing needed = more power saving

How:

A. Output customized NMEA sentence by coming several NMEA message types into one

- NMEA has many items, including GGA, RMC, VTG etc...Host CPU need to waste computing power on picking out the items it needed
- **If you want only:** Satellite Health + Position Information, GPS module can output only the times the host CPU needed
- **EX. Your Gtop customized NMEA sentence will look like this:** GSV[Satellites in View, Satellites ID, SND] + RMC[UTC, Latitude, Longitude, Date, Magnetic Variation

B. Distance Calculations

- The **distances between each received position from seconds to seconds** can be pre-calculated within the MTK GPS chipset.

Requirements:

- Depends on customer specifications

Gtop Specialty:

- Have MTK SDK and software programmers to write and enable functions depending on customer specifications.



Main Function:

- GPS module can internally calculate distances between two location points not found in typical NMEA sentences, thus offloading the amount of work needed by host processor

How

- Our programmers can write special codes to allow the ARM processor inside the GPS module to calculate this information

Requirements:

- Please contact GlobalTop with your specifications
- Works only with GlobalTop one-sentence customization service

Gtop Specialty:

- We can program the distance calculation based on specific scenarios depending on customers need



Main Function:

- Enables the GPS module to retain and output last known position in NMEA after losing GPS satellite fix

How:

- Typically the GPS module will output null or “blank” positions in NMEA when fix to the GPS satellites is lost
- With this setting, GPS will continue to output the last confirmed coordinates when it loses GPS satellite fix.

Requirements:

- Open to all new modules, please specify you want this setting beforehand.
- Not configurable through commands or programs



Stands for Assisted GPS

Main Function:

- Shortens GPS Startup Time using EPO (extended ephemeris) data

How:

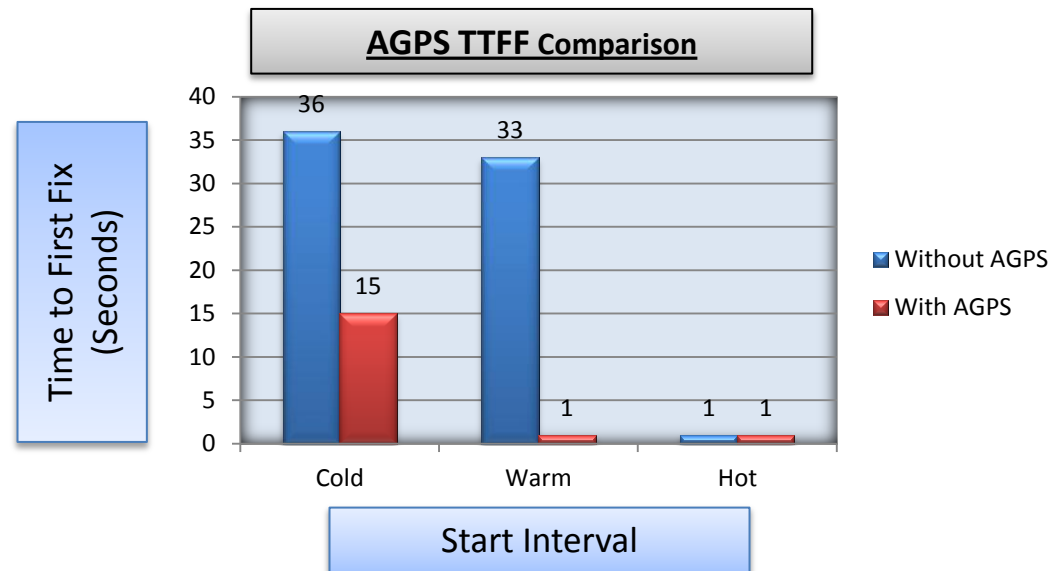
- Pre-uploads satellites ephemeris and almanac data called “EPO” to GPS module

Requirements:

- Please contact GlobalTop for more information

Gtop Specialty:

- Provide complete protocol specification for customer to implement AGPS solution
- Provide information on building AGPS EPO data server
- GlobalTop AGPS tool for Microsoft Windows Desktop platform



Main Function:

- Output in Binary Protocol
- A lot more efficient when using tiny 8-bit micro controller
- Can directly input into variables with few clock cycles without parsing, conversion, and huge C++ string library

How

• **Gtop NMEA Protocol One Sentence Format**

– \$PGTOP, 064951.000,2307.1256,N,12016.4438,E, A,0.03,165.480.03,N,0.06,K * checksum

• **Translate into Gtop Binary Protocol Format**

– 0x04,0x24,0x03,0xEA,0x94,0x28,0x01,0x60,0x74,0xF4,0x01,0x07,0x2B,0x64,0xD4,0x01,0x01,0x00,0x00,0x00,0x00,0x00,0x00,0x50,0x4E,0x00,0x00,0x00, 0x95,0x4B,0xE9,0x0D,0x0A

Requirements:

- Dependent on Applications, need to specify the data in NMEA that will be used for conversion
- Need to use in combination with one sentence customization service

Gtop Specialty:

- Special customization services for output in binary sentences
- Special command to switch between binary protocol and standard NMEA

Main Function:

- Enables GPS module to work beyond 60,000ft (approximately 18,000m)

How

- Special firmware to allow GPS module to work beyond the height limit (typically the GPS module will stop output NMEA when traveling at a speed greater than 1,000 knots (1,151 mph or 1,852km/h) or height greater than 60,000 ft (18,000m))

Requirements:

- Requires One Sentence Customization Service, cannot remove limiter on standard NMEA
- Speed limit (1,000 knots) still applies
- Only available to Gmm-u1 and Gms-u1LP GPS modules

Gtop Specialty:

- Customizable output sentence with high altitude unlimiter



Main Function:

- Special commands to adjust 1PPS pulse settings for timing and synchronization applications

How

- GlobalTop timing module can provide the following additional timing specific features:
 1. 1PPS pulse output duration setting (pulse width range: 1~999ms)
 2. 1PPS pulse output mode selection
 3. Auto-adjust leap seconds
 4. 1PPS pulse configurable by packet command

Requirements:

- Only for Gmm-u1 and Gms-u1LP GPS modules

Gtop Specialty:

- GlobalTop GPS module provides accurate one-pulse-per-second output with the rising edge of 1PPS signal synchronized to the start of each GPS seconds with special commands to configure the 1PPS pulse



Also called 10 Hz refresh rate

Main Function:

- Updates position and other information 10 times per second, useful for high speed applications

How:

- Firmware setting

Requirements:

- Only for MT3329 Chipsets (PA6 Series, Gmm-u1)
- Need UART baud rate 38400bps, 115200 bps recommended

Gtop Specialty:

- Firmware setting, provide test commands



Power Saving mode

Main Function:

- Decrease power consumption of GPS module by up to 80% (Dependent on setting)

How:

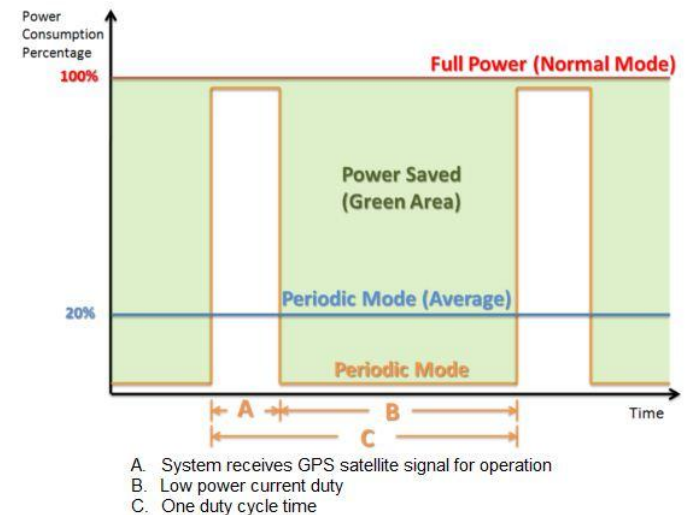
- GPS module goes to sleep and wakes up automatically to receive satellite data.

Requirements:

- Dependent on applications, some might not be suitable, such as continuous navigation

Gtop Specialty:

- Special firmware to enable users to customize settings (time of operation and sleep)



Nav Speed Threshold = Navigation Speed Threshold

Main Function:

- Provide a better GPS accuracy when used for slow traveling applications
- Reduce GPS Drift Phenomenon

How:

- A speed filter to filter out variations in position received when it is traveling slower than 1 m/s (3 Km / Hour) Reduce GPS position drift when the receiver is standing still

Requirements:

- Please contact GlobalTop for more information

Gtop Specialty:

- Special firmware to enable this function
- Can use packet command to adjust threshold value



Also called Magnetic Declination

Main Function:

- Provides angle of differences between magnetic north and true (geographical) north. Typically, the compass only points toward magnetic north, but the Earth's magnetic field is always shifting, thus compass will not point to geographical north.

How:

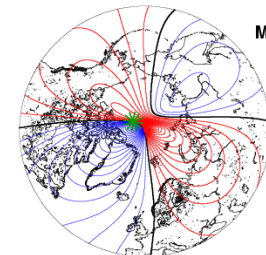
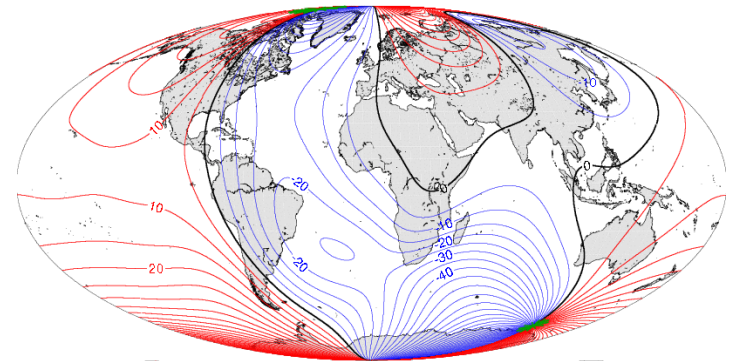
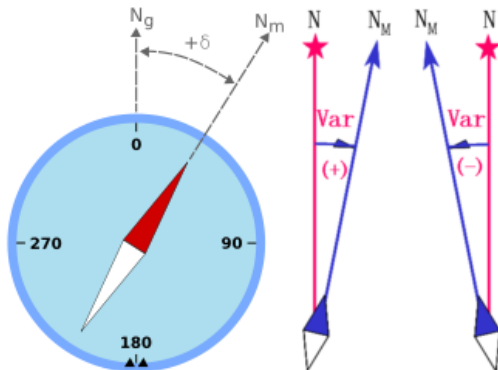
- Can output the degree of magnetic variation and measured magnetic heading.

Requirements:

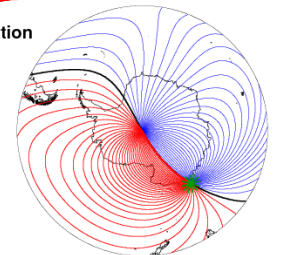
- MT3318 and MT3329 based GPS modules

Gtop Specialty:

- Gtop Can help customize and enable this option



Magnetic Field Declination
2010





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