Mini GPS/BDS Unit (AT6558)

SKU: U032

This is the M5Unit version of GPS, integrates a Zhongke Weibeidou navigation chip AT6558 and a amplification chip MAX2659 used for amplifying antenna signal.

AT6558 is highly performance, supports many types of satellite navigation system, able to receive satellite signals on 56 channels GNSS signal from 6 satellite navigation system, joint location, navigation, timing and more. The module is able to obtain accurate global location information, quick and accurate positioning for anywhere in the city, in the canyon, under the overhead, and inside the car.

The module can be widely used in vehicle monitoring, bus reporting, car navigation, onboard navigation, notebook navigation and other products.

You can plug it into port C on M5core via GROVE cable, which is a standard UART interface.

UART settings:

- Baudrate(**default: 9600bps**)
- Start bits(1 bit)
- Stop bits(1 bit)
- Parity(no)
Product Features

- Functional specification
  - Positioning accuracy: 2.5 meters (CEP50, open space)
  - Channel: 56
  - Support single system positioning of BDS/GPS/GLONASS satellite navigation systems, or multi-system joint positioning in any combination
  - Support D-GNSS differential positioning
  - Positioning update frequency: 1-10Hz
  - Maximum height: 1800 m
  - Maximum speed: 515 m/s
  - Maximum acceleration: <= 4 G

- Low power consumption
  - BDS/GPS dual mode continuous operation: <23mA (@3.3V)
  - Standby: <10μA (@3.3V)

- Sensitivity
  - Tracking: -162dBm
  - Capture: -148dBm
  - Cold start: -146dBm

- Start Time
  - Cold start: 35 seconds
  - Warm start: 32 seconds
  - Hot start: 1 second

- Operating temperature: -40~85°C
- Two Lego-compatible holes

Kit includes

- 1x GPS Unit
- 1x Grove Cable

Application

- Car, ship positioning and navigation
- Smart law enforcement positioning

Documents

- [Datasheet] - AT6558 - MAX2659
- TinyGPS++ library
- CASIC multimode satellite navigation receiver protocol specification
- Gnsstoolkit3(Windows Version)
Example

**Arduino IDE**

To get the complete code **GPSRaw.ino**, please click [here](#).

```cpp
#include <M5Stack.h>

/* By default, GPS is connected with M5Core through UART2 */
HardwareSerial GPSRaw(2);

void setup() {
  M5.begin();
  GPSRaw.begin(9600); // GPS init
  Serial.println("hello");
  termInit();
}

void loop() {
  // put your main code here, to run repeatedly:
  if(Serial.available()) {
    int ch = Serial.read();
    GPSRaw.write(ch);
  }
  if(GPSRaw.available()) {
    int ch = GPSRaw.read(); // read GPS information
    Serial.write(ch);
    termPutchar(ch);
  }
}
```

Once you download the example code **GPSRaw.ino**, when device start, following information will print by uart, you can either display with M5 core screen or PC.

$GNGGA,063012.000,2234.87140,N,11357.22414,E,1,06,4.2,7.3,M,0.0,M,,*7D
$GNGLL,2234.87140,N,11357.22414,E,063012.000,A,A*4C
$GPGSA,A,3,01,09,11,18,23,,,,,,,,6.3,4.2,4.7*32
$BDGSA,A,3,13,,,,,,,,,,,,6.3,4.2,4.7*21
$GPGRV,3,1,10,01,54,164,33,04,,,,22,08,46,019,,09,23,230,24*40
$GPGRV,3,2,10,11,81,200,12,18,65,110,26,23,14,195,25,27,18,041,*78
$GPGRV,3,3,10,28,10,300,15,30,33,319,*7C
$BDGSV,1,1,01,13,43,195,29*5A
$GNRMC,063012.000,A,2234.87140,N,11357.22414,E,0.69,171.74,240419,,,A*7A
$GNVTG,171.74,T,,M,0.69,N,1.27,K,A*2C
$GNZDA,063012.000,24,04,2019,00,00*46
$GPTXT,01,01,01,ANTENNA OPEN*25

**Analysis:**

$GNRMC,063012.000,A,2234.87140,N,11357.22414,E,0.69,171.74,240419,,,A*7A
Indicates that the positioning information is: UTC time is 06:30:12, north latitude 22.58119°, east longitude 113.95357°, April 24, 2019.
### 32.2.14.1 Recommended Minimum data

<table>
<thead>
<tr>
<th>Message</th>
<th>RMC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Recommended Minimum data</td>
</tr>
<tr>
<td>Format</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Output Message</td>
</tr>
<tr>
<td>Comment</td>
<td>The output of this message is dependent on the currently selected datum (default: WGS84). The recommended minimum sentence defined by NMEA for GNSS system data.</td>
</tr>
<tr>
<td>Message info</td>
<td>ID for CG-MSG</td>
</tr>
</tbody>
</table>

#### Message Structure:
```
$xxRMC,t,e,s,a,N,S,E,W,sp,c,d,m,y,w,e,mode,navStat,typ*hh<CR><LF>
```

#### Example:
```
$GPRMC,083555.,A,4717.11437,N,00833.91522,E,0.004,77.32,091202,,A,V*57
```

<table>
<thead>
<tr>
<th>Field No.</th>
<th>Name</th>
<th>Unit</th>
<th>Format</th>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>zRMC</td>
<td>-</td>
<td>string</td>
<td>$GPRMC</td>
<td>RMC Message ID (xx = current Talker ID)</td>
</tr>
<tr>
<td>1</td>
<td>time</td>
<td>-</td>
<td>hhmmss.ss</td>
<td>081559.00</td>
<td>UTC time, see note on UTC representation</td>
</tr>
<tr>
<td>2</td>
<td>status</td>
<td>+</td>
<td>character</td>
<td>A</td>
<td>Status, V = Navigation receiver warning, A = Data valid, see position fix flags description</td>
</tr>
<tr>
<td>3</td>
<td>lat</td>
<td>-</td>
<td>dddmm.mmmmm</td>
<td>4717.11437</td>
<td>Latitude (degrees &amp; minutes), see format description</td>
</tr>
<tr>
<td>4</td>
<td>N</td>
<td>-</td>
<td>character</td>
<td>N</td>
<td>North/South indicator</td>
</tr>
<tr>
<td>5</td>
<td>long</td>
<td>-</td>
<td>dddmm.mmmmm</td>
<td>00833.91522</td>
<td>Longitude (degrees &amp; minutes), see format description</td>
</tr>
<tr>
<td>6</td>
<td>E</td>
<td>-</td>
<td>character</td>
<td>E</td>
<td>East/West indicator</td>
</tr>
<tr>
<td>7</td>
<td>spd</td>
<td>knot</td>
<td>numeric</td>
<td>0.004</td>
<td>Speed over ground</td>
</tr>
<tr>
<td>8</td>
<td>cog</td>
<td>degree</td>
<td>numeric</td>
<td>77.52</td>
<td>Course over ground</td>
</tr>
<tr>
<td>9</td>
<td>date</td>
<td>-</td>
<td>ddmmyy</td>
<td>091202</td>
<td>Date in day, month, year format, see note on UTC representation</td>
</tr>
<tr>
<td>10</td>
<td>m1</td>
<td>degree</td>
<td>numeric</td>
<td>-</td>
<td>Magnetic variation value. Only supported in ADR 4.10 and above.</td>
</tr>
<tr>
<td>11</td>
<td>m2E</td>
<td>-</td>
<td>character</td>
<td>-</td>
<td>Magnetic variation E/W indicator. Only supported in ADR 4.10 and above.</td>
</tr>
<tr>
<td>12</td>
<td>mode</td>
<td>-</td>
<td>character</td>
<td>A</td>
<td>Mode Indicator, see position fix flags description NMEA v2.3 and above only</td>
</tr>
<tr>
<td>13</td>
<td>navStat</td>
<td>-</td>
<td>character</td>
<td>V</td>
<td>Navigational status indicator (V = Equipment is not providing navigational status information) NMEA v4.1 and above only</td>
</tr>
<tr>
<td>14</td>
<td>cs</td>
<td>-</td>
<td>Hexadecimal</td>
<td>*57</td>
<td>Checksum</td>
</tr>
</tbody>
</table>
Schematic

PinMap

<table>
<thead>
<tr>
<th>M5Core(GROVE C)</th>
<th>U2RXD(GPIO16)</th>
<th>U2TXD(GPIO17)</th>
<th>5V</th>
<th>GND</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS Unit</td>
<td>Signal Transmitter</td>
<td>Signal Receiver</td>
<td>5V</td>
<td>GND</td>
</tr>
<tr>
<td></td>
<td>(TXD)</td>
<td>(RXD)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://m5stack.com/collections/m5-unit/products/mini-gps-bds-unit/12-99-19