



GPS Module with Internal & External Antenna (NEO-M8N)

SKU: M003

GPS is build with NEO-M8N, u-blox M8 concurrent GNSS modules and come with an active Antenna. The NEO-M8 series provides high sensitivity and minimal acquisition times while maintaining low system power.

The NEO-M8N integrates a 72-channel [u-blox](#) M8 GNSS engine that supports multiple GNSS systems (Beidou, Galileo, GLONASS, GPS / QZSS) and able to receive 3 GNSS systems simultaneously.



The series communicate protocol between M5Core and GPS is UART, physically connected via **UART2 (GPIO16, GPIO17)**

If you want to Change the uart baudrate, please check here ([u-center-just-for-Windows](#))

**Notice: GPS signal can only be found outdoors*

Product Features

- Operating voltage: 2.7 ~ 3.6
- Operating temperature: -40 ~ 80 °C
- Antenna type: built-in ceramic antenna and external antenna
- external Antenna port: SMA
- Can receive data from 3 GNSS systems concurrently
- Horizontal position accuracy: minimum 2.5m
- GPS module (NEO-M8N) Built-in Flash, so that you can upgrade firmware via [u-center-just-for-Windows](#)
- Supported protocols: NMEA, UBX, RTCM
- Industry leading -167dBm sensitivity
- Backward compatibility with NEO-7 and NEO-6 series

Kit includes

- 1x GPS Module
- 1x external Antenna(cable length : 1 meter)

Application

- GPS-based logistics tracking management
- Driverless car positioning

Example

Arduino IDE

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

****Note:** The GPS module needs placed outdoors to be able to receive GPS signal ******

```
#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);
    termPuchar(ch);
  }
}
```

After burnt the example code `GPSRaw.ino`, m5core and PC serial terminal will display following information



Protocol Specification:

Please refer to the [u-blox 8 / u-blox M8 Receiver Description - Manual](#), The following table is a instruction of xxRMC message in NMEA protocol.

32.2.14.1 Recommended Minimum data

Message	RMC		
Description	Recommended Minimum data		
Firmware	Supported on: <ul style="list-style-type: none"> u-blox 8 / u-blox M8 protocol versions 15, 15.01, 16, 17, 18, 19, 19.1, 19.2, 20, 20.01, 20.1, 20.2, 20.3, 22, 23 and 23.01 		
Type	Output Message		
Comment	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.		
Message Info	ID for CFG-MSG	Number of fields	
	0xF0 0x04	16	

Message Structure:

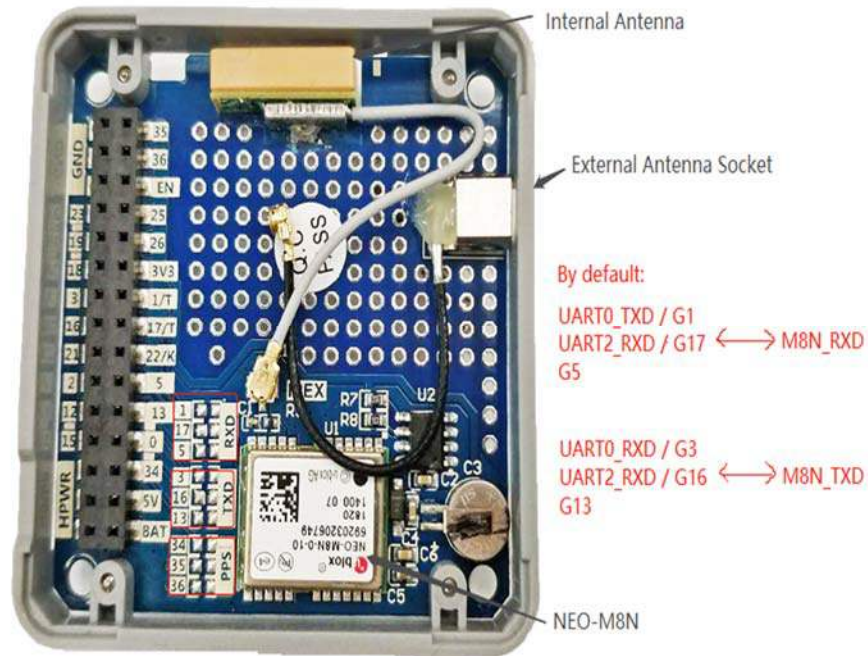
```
$xxRMC,time,status,lat,NS,long,EW,spd,cog,date,mv,mvEW,posMode,navStatus*cs<CR><LF>
```

Example:

```
$GPRMC,083559.00,A,4717.11437,N,00833.91522,E,0.004,77.52,091202,,,A,V*57
```

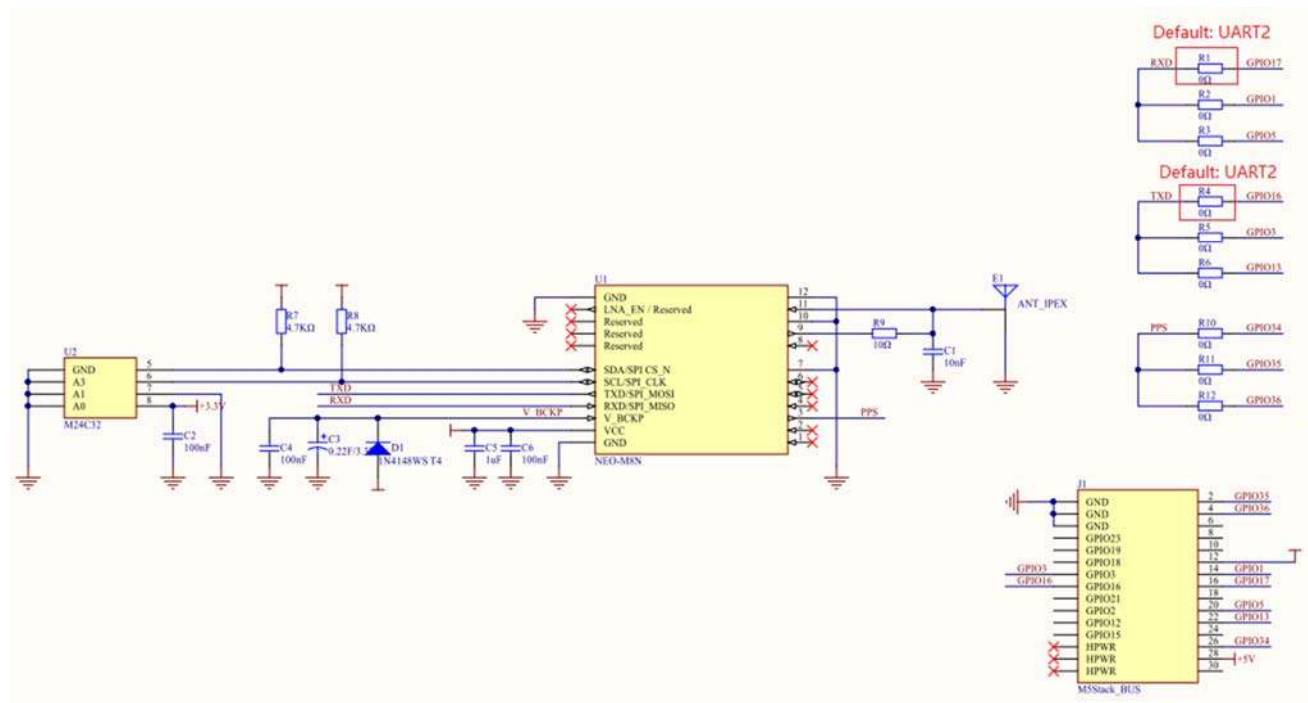
Field No.	Name	Unit	Format	Example	Description
0	xxRMC	-	string	\$GPRMC	RMC Message ID (xx = current Talker ID)
1	time	-	hhmmss.ss	083559.00	UTC time, see note on UTC representation
2	status	-	character	A	Status, V = Navigation receiver warning, A = Data valid, see position fix flags description
3	lat	-	ddmm. mmmm	4717.11437	Latitude (degrees & minutes), see format description
4	NS	-	character	N	North/South indicator
5	long	-	dddmm. mmmm	00833.91522	Longitude (degrees & minutes), see format description
6	EW	-	character	E	East/West indicator
7	spd	knot s	numeric	0.004	Speed over ground
8	cog	degr ees	numeric	77.52	Course over ground
9	date	-	ddmmyy	091202	Date in day, month, year format, see note on UTC representation
10	mv	degr ees	numeric	-	Magnetic variation value. Only supported in ADR 4.10 and above.
11	mvEW	-	character	-	Magnetic variation E/W indicator. Only supported in ADR 4.10 and above.
12	posMode	-	character	A	Mode Indicator, see position fix flags description NMEA v2.3 and above only
13	navStatus	-	character	V	Navigational status indicator (V = Equipment is not providing navigational status information) NMEA v4.1 and above only
14	cs	-	hexadecimal	*57	Checksum

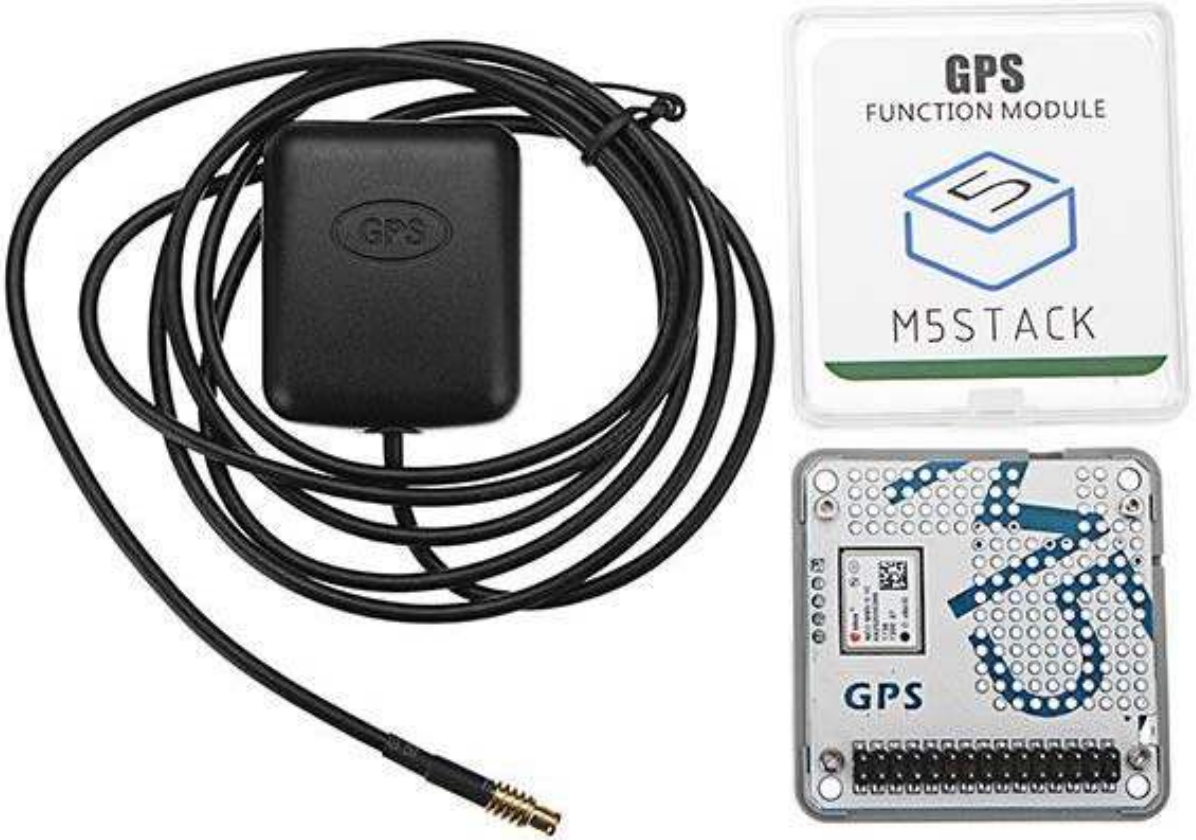
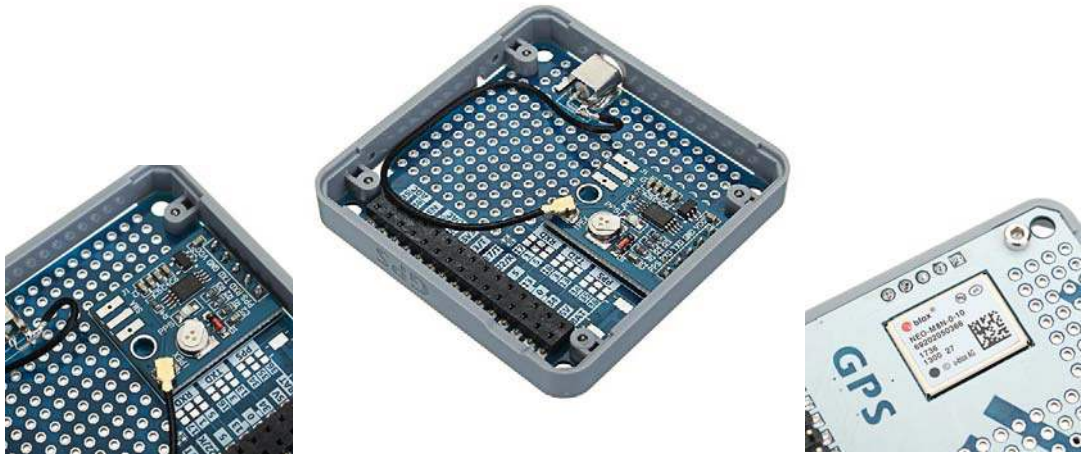
UART protocol: baud rate (default is 9600bps), data bit (8 bits), start bit (1 bit), stop bit (1 bit), Parity (none)



M5Stack Fire has occupied GPIO16 / 17 to connect with the PSRAM by default, it's conflict with TXD / RXD (GPIO16, GPIO17) of GPS module. Therefore, when using the GPS module with the M5Stack Fire, you might have to cut the TXD and RXD from GPS module and wire fly to another set of UART pin, if you gonna use the PSRAM.

Schematic





<https://m5stack.com/products/gps-module/10-2-19>