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## Arduino GPS Clock

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Here's a tutorial for making a Arduino Clock using GPS module along with all the components needed.



Hello and welcome to this tutorial, in this tutorial we are going to learn how to build an Arduino clock using UBlox NEO-M8M GPS Module. Speaking of time, you might be wondering why you need an external module to detect the running time if you've got an onboard timer in Arduino?

And the answer to this question is, yes, you can design your own clock using an internal timer, but this task will be more complicated. Therefore, using an external timer module to design an Arduino clock would be the best option.

### Arduino Clock Using UBlox NEO-M8M GPS Module

You may have used the GPS module to design the tracking system but do you know that we can also use the GPS module to design the Arduino Clock? Yes, that's right, the GPS module also sends time-related information and we're going to use that information to design an Arduino GPS Clock.

Therefore, as you know UBlox NEO-M8M GPS Module gives a bunch of data in serial format, that data includes the exact position of the location. In addition to this GPS provides location coordinates (latitude and longitude) as well as time and date information. And to separate the required information from the data being sent by GPS, we are using an Arduino board.

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```

$GPGSV,3,3,10,29,07,211,42,32,06,347,40*73
!AIVDM,1,1,,B,13:<SD5000QDF=jO=PQDRkaV08Nc,0*0B
!AIVDM,2,1,5,A,53prCOP28H71=00;W7U<m18?772222222222J6@9546fT041i0CIjp888,0*4F
!AIVDM,2,2,5,A,8888888888880,2*21
!AIVDM,1,1,,B,402OH11u1nT+k1F7V6Q?Pci004S,0*73
$GPRMC,045852,A,5431.2581,N,01833.2043,E,000.0,151.8,311012,004.6,E*76
$GPGGA,045852,5431.2581,N,01833.2043,E,2,09,0.8,6.0,M,32.5,M,,*4D
!AIVDM,1,1,,B,13pr<9P0001EL:@08KV@0DSV04S,0*7A
$GPGSA,A,3,02,04,09,12,14,17,,25,29,32,,1.5,0.8,1.2*3F
!AIVDM,1,1,,A,137naT001;QFamLQ>BS`c6sP0800,0*20
$GPGSV,3,1,10,02,21,130,48,04,29,083,49,09,47,150,48,12,79,276,51*74
!AIVDM,1,1,,A,13AiRH301IQFEH40:ibQ9i1b00SS,0*6F
$GPGSV,3,2,10,14,37,289,48,17,15,047,48,20,03,016,42,25,39,267,51*70
!AIVDM,1,1,,B,14`aNe002eQFRu808mSH26M`2LL0,0*11
$GPGSV,3,3,10,29,07,211,42,32,06,347,40*73
!AIVDM,1,1,,B,15Uw8D50001DrQDQ<hbFS`A`011H,0*18
$GPRMC,045853,A,5431.2581,N,01833.2043,E,000.0,151.8,311012,004.6,E*77
$GPGGA,045853,5431.2581,N,01833.2043,E,2,09,0.8,6.0,M,32.5,M,,*4C
$GPGSA,A,3,02,04,09,12,14,17,,25,29,32,,1.5,0.8,1.2*3F
$GPGSV,3,1,10,02,21,130,48,04,29,083,49,09,47,150,48,12,79,276,51*74
$GPGSV,3,2,10,14,37,289,47,17,15,047,48,20,03,016,42,25,39,267,51*7F
$GPGSV,3,3,10,29,07,211,42,32,06,347,40*73
!AIVDM,1,1,,B,402OVM1u1jgTrmQDuGvO<ruW00L1,0*71
$GPRMC,045854,A,5431.2581,N,01833.2043,E,000.0,151.8,311012,004.6,E*70

```

The output you are seeing in the above picture is NMEA format data received by UBlox NEO-M8M GPS module from various satellites. This output includes several lines, among these we need a line starting at \$GPRMC. \$GPRMC This term may be new to some of you, to understand this let us understand the format of the line starting with this word.

Watch the video for brief overview.

## Code To Receive GPS Time From \$GPRMC String

```
$GPRMC,182306,A,1523.82,N,00022.24,W,173.8,231.8,110120,004.2,W*70
```

In the above line, the letter next to \$ GPRMC represents Coordinated Universal Time (UTC)) ("hhmmss.ss").

Next, the letter next to the UTC number indicates the status of the data.

- An 'A' indicates that you are getting a signal and things are working properly.
- A 'V' means that your GPS is not connected to any satellite.

The two numbers after the letter "A" gives you your latitude and longitude.

The following table will help you understand the meaning of the above NMEA line.

Identifier	Description
220516	Time in hour minute seconds and milliseconds format.(h-m-s) 18-23-06
A	Status // A= Active and V= No signal
Latitude	Latitude 15 deg. 23.82 min. North
N	Direction N=North, S=South
Longitude	Longitude(Co-ordinate) 22.24 min. West
W	Direction E= East, W=West
Speed	173.8 speed in knots
Angle	231.8
Date	DATE in UTC – 11/01/20
MV	Magnetic Variation
W	Direction of variation E/W

I think this much information about the above NMEA string is sufficient to work on this project. If you want to know more about this format then [please see this link](#).

## Moving forward, you will need the following components to design the Arduino GPS Clock

### Hardware Components

[UBlox NEO-M8M GPS Module](#)

[Arduino](#)

[USB Cable](#)

[Dupont Cable](#)

[LCD Display](#)

[Bread-Board](#)

[Lipo](#) or [Li-ion](#) Battery

### Software Components

[Arduino IDE](#)

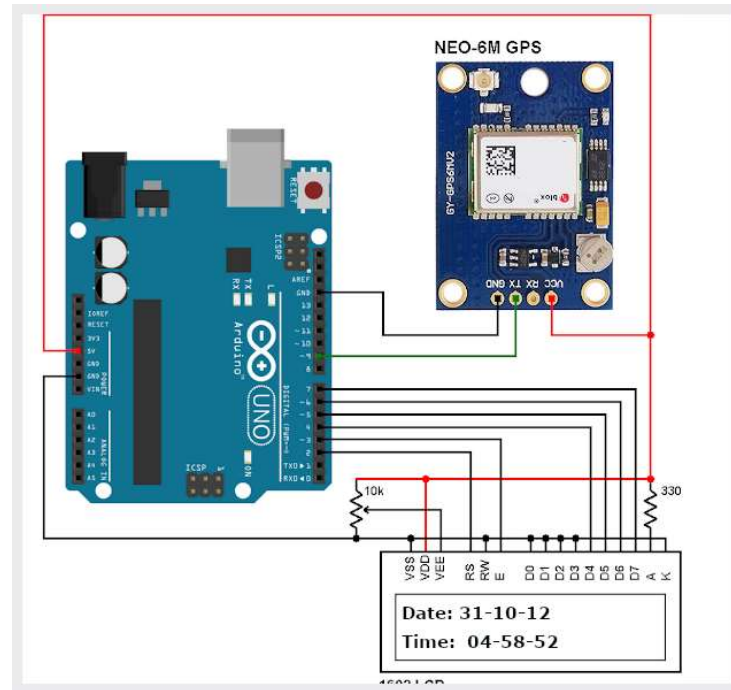
## Specification Of The UBlox NEO-M8M GPS Module

- Concurrent reception of up to 3 GNSS (GPS, Galileo, GLONASS, BeiDou).

- industry-leading-167 dBm navigation sensitivity.
  - Security and integrity protection.
  - Onboard ROM memory.
  - Supports all satellite augmentation systems.
  - Advanced jamming and spoofing detection
- Backward compatible with NEO-7, NEO-6 and NEO-5 families.

## Circuit Diagram

The Following image shows the circuit diagram of the Arduino GPS Clock.



Arduino GPS Clock Circuit Diagram

The image above shows the connection diagram, in this, we have connected the GPS module TX pin to the D9 pin of the Arduino Board and we are powering the GPS module through the Arduino itself.

## Code For Arduino GPS Clock

```
#include<LiquidCrystal.h>
LiquidCrystal lcd(7, 6, 5, 4, 3, 2);

#include <SoftwareSerial.h>
SoftwareSerial Serial1(9, 10); // RX, TX

char str[70];
char *test="$GPRMC";
int temp,i;

void setup()
{
  lcd.begin(16,2);
  Serial1.begin(9600);
  lcd.setCursor(0,0);
  lcd.print("GPS Updated Clock");
  lcd.setCursor(0,1);
  lcd.print(" Circuit Digest ");
  delay(200);
}
```

## Conclusion

In this way, we have learned to design an Arduino clock using the GPS module. If there is any doubt, please let us know in the comment section. In our next blog, we will learn how to design an Arduino using the [DS1307 RTC module](#).

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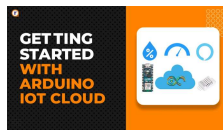
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