

# GPS MESSAGE FORMATS

GPS data is displayed in different message formats over a serial interface. There are standard and non-standard (proprietary) message formats. Nearly all GPS receivers output NMEA data. The NMEA standard is formatted in lines of data called sentences. Each sentence contains various bits of data organized in comma delimited format (i.e. data separated by commas). Here are example NMEA sentences from a GPS receiver with satellite lock (4+ satellites, accurate position):

## COPY CODE

```
$GPRMC,235316.000,A,4003.9040,N,10512.5792,W,0.09,144.75,1411
```

```
12,,*19
```

```
$GPGGA,235317.000,4003.9039,N,10512.5793,W,1,08,1.6,1577.9,M,-
```

```
20.7,M,,0000*5F
```

```
$GPGSA,A,3,22,18,21,06,03,09,24,15,,,,,2.5,1.6,1.9*3E
```

For example, the GPGGA sentence contains the follow:

- Time: 235317.000 is 23:53 and 17.000 seconds in Greenwich mean time
- Longitude: 4003.9040,N is latitude in degrees.decimal minutes, north
- Latitude: 10512.5792,W is longitude in degrees.decimal minutes, west
- Number of satellites seen: 08
- Altitude: 1577 meters

The data is separated by commas to make it easier to read and parse by computers and microcontrollers. This data is sent out on the serial port at an interval called the update rate. Most receivers update this information once per second (1Hz), but more advanced receivers are capable multiple updates per second. 5 to 20Hz is possible with modern receivers.

Source: <https://learn.sparkfun.com/tutorials/gps-basics>