

Flora Wearable GPS

Created by Becky Stern



https://learn.adafruit.com/flora-wearable-gps

Last updated on 2022-12-01 01:53:29 PM EST

Table of Contents

Overview	3
Hook up GPS	4
Program FLORA	5
Basic Echo Test	
Install Adafruit GPS Library	
Load Echo Demo	
Getting location data	8
Detailed GPS Test	
Downloads	10
• Files	

• Downloads:

Schematic & Fabrication Print

Overview



This module is the best way to add a GPS to your wearable project. It's part of the Adafruit Flora series of wearable electronics, designed specifically for use with the Flora motherboard. Installed on the PCB is the latest of our Ultimate GPS modules, a small, super-thin, low power GPS module with built in data-logging capability! This module's easy to use, but extremely powerful:

- 165 dBm sensitivity, 10 Hz updates, 66 channels
- Designed for wearable use with the Flora system
- Only 20mA current draw
- RTC battery-compatible sew a battery on to create a atomic-precision real time clock
- Built-in datalogging
- >25Km altitude
- Internal patch antenna + u.FL connector for external active antenna
- Fix status LED

This guide will get you started with the Flora GPS.

Hook up GPS



Use alligator clips to connect Flora's 3.3V pad to the 3.3V pad on the GPS. Likewise connect RX to TX and TX to RX, then finally GND to GND.

Unlike the GPS breakout and GPS shield we carry, the Flora GPS is for use with 3.3V power and logic only!



The four connectors are all in a row just to the left of Flora's JST battery connector for easy sewing. But test your project with alligator clips before sewing it in!

Program FLORA



Make sure the USB cable is connecting your computer and Flora.

Basic Echo Test

We'll start with the most basic test, where we listen to the raw GPS data, to make sure it shows up! Copy and paste this code into a new sketch window and upload it to your Flora

Install Adafruit GPS Library

Our helper library will make using the GPS easy since we have working code already. The library is available on GitHub ()

You can download the most recent version from the Arduino library manager.

First, open up the Arduino library manager

👓 demo Arduino 1.8.4						
File Edit Sketch Tools Help						
demo // Demo	Verify/Compile Upload Upload Using Programmer Export compiled Binary	Ctrl+R Ctrl+U Ctrl+Shift+U Ctrl+Alt+S	△ Manage Libraries Add .ZIP Library	rn o		
#includ #includ #includ	Show Sketch Folder Include Library Add File	Ctrl+K	Arduino libraries ArduinoHttpClient ArduinoSound			
// we li	ght one pixel at a time,	this is our	AudioZero Bridae			

Search for the Adafruit GPS library and install it



We also have a great tutorial on Arduino library installation at: http://learn.adafruit.com/adafruit-all-about-arduino-libraries-install-use

Load Echo Demo

We'll begin by loading up the HardwareSerial echo test example available in the Adafruit_GPS library

💿 gps_Hardware	Serial_parsing A	duino 1.6.9			
File Edit Sketch Tools Help					
New Open	Ctrl+N Ctrl+O				
Open Recen Sketchbook	t	PS Using Hardware Serial (e.g. GPS Flora or FeatherWing)			
Examples	CH-W	Adafruit FRAM I2C , Ing. Best used with			
Save Save As	Ctrl+W Ctrl+S Ctrl+Shift+S	Adafruit GPS Library blank Adafruit HDC1000 Library due_parsing Adafruit HMC5883 Unified due shield sdlog			
Page Setup Print	Page Setup Ctrl+Shift+P Adafruit HX8357 Lil Print Ctrl+P Adafruit ILI9340 Adafruit INA219	Adafruit HX8357 Library echo Adafruit ILI9340 flora_dumplog Adafruit INA219 flora_applog			
Quit	Ctrl+Comma Ctrl+Q	Adafruit IO Arduino Adafruit LED Backpack Library Adafruit LIS3DH GPS_HardwareSerial_Parsing			
// and help s	support open s	Adafruit MAX31855 library Adafruit MAX31855 library Ieo_locus_dumpbasic			

Wire up the GPS module according to the hookup. <u>Check your board and serial port</u> <u>settings</u> () and upload this sketch to your Flora using the Upload button in the IDE. Open up the Serial Monitor.

You should see something like the following from the serial monitor. You may not have as many numbers, but there should be sentences that start with \$GPRMC and \$GPGGA, etc. If you see text like that it means your GPS and connection are working fine.

© COM6	
	Send
+011010/EE11E01000/11/1010103/11/011001E001/11/0100/0100	
\$GPVTG,0.00,T,,M,0.03,N,0.06,K,A*38	
\$PGTOP,11,3*6F	
\$GPGGA, 224424.000, 4043.5460, N, 07400.2854, W, 1, 7, 1.11, 145.8, M, -34.2, M,	,*62
\$GPGSA,A,3,09,15,05,26,08,29,21,,,,,1.40,1.11,0.85*07	
\$GPRMC,224424.000,A,4043.5460,N,07400.2854,W,0.12,0.00,081112,,,A*7E	2
\$GPVTG,0.00,T,,M,0.12,N,0.23,K,A*3F	
\$PGTOP,11,3*6F	
\$GPGGA,224425.000,4043.5459,N,07400.2854,W,1,7,1.11,145.8,M,-34.2,M,	,*69
¢GPGSA,A,3,09,15,05,26,08,29,21,,,,,1.40,1.11,0.85*07	
¢GPGSV,2,1,08,15,83,168,33,26,53,052,48,21,50,307,22,29,33,218,33*79	9
¢GPGSV,2,2,08,05,31,075,30,09,16,159,33,08,13,040,38,41,,,*44	
¢GPRMC, 224425.000, A, 4043.5459, N, 07400.2854, W, 0.05, 0.00, 081112, , , A*73	3
\$GPVTG,0.00,T,,M,0.05,N,0.10,K,A*39	=
\$PGTOP, 11, 3*6F	
\$GPGGA, 224426.000, 4043.5460, N, 07400.2854, W, 1, 7, 1.11, 145.8, M, -34.2, M,	,*60
\$GPGSA, A, 3, 09, 15, 05, 26, 08, 29, 21,, 1.40, 1.11, 0.85*07	
\$GPRMC, 224426.000, A, 4043.5460, N, 07400.2854, W, 0.07, 0.00, 081112, , , A*78	3
\$GPVTG.0.00.TM.0.07.N.0.12.K.A*39	
	*
V Autoscroll No line e	ending 👻 57600 baud 👻

Getting location data

Detailed GPS Test

Now that we know it basically works, we'll try to get 'fix data' from the GPS. For this, you will have to have the GPS outside. It cannot be inside a building, even if its right at the window. The silver antenna must be pointing up with a clear view of the sky!

<u>.</u>	👓 GPS_HardwareSerial_EchoTest Arduino 1.6.9						
File	File Edit Sketch Tools Help						
	New	Ctrl+N					
	Open Open Recent	Ctrl+O		Nging Hardware Serial			
	Sketchbook Examples			▲ Adafruit FRAM I2C	F		
	Close	Ctrl+W		Adafruit GPS Library	•	blank	
	Save Save As	Ctrl+S Ctrl+Shift+S		Adafruit HDC1000 Library Adafruit HMC5883 Unified	1	due_parsing due_shield_sdlog	
	Page Setup Print	Je Setup Ctrl+Shift+P Adafruit HX8357 Library Adafruit HX8357 Library Adafruit ILI9340		echo flora_dumplog flora_anslog			
	Preferences	Ctrl+Comma		Adafruit IO Arduino		GPS_HardwareSerial_EchoTest	
	Quit	Ctrl+Q		Adafruit LED Backpack Library	•	GPS_HardwareSerial_Parsing	
- //	and help su	upport open s	-	Adafruit LIS3DH Adafruit MAX31855 library		leo_echo leo_locus_dumpbasic	

Wire up the GPS module according to the hookup



Check your board and serial port settings () and upload this sketch to your Flora using the Upload button in the IDE.

Place the GPS module (still connected to the Flora) outside. Once the GPS has located the satellite data, the red LED on the GPS will stop blinking.

If you see the LED blinking once a second, it does not yet have a fix!

It can take many minutes to get a fix if it doesn't see any satellites immediately.

Once it has a fix, you can check the serial monitor for the GPS data, which includes the current date and time in UTC. It will also give you your latitude, longitude and approximate altitude with the Serial monitor

GPS modules will always send data EVEN IF THEY DO NOT HAVE A FIX! In order to get 'valid' (not-blank) data you must have the GPS module directly outside, with the square ceramic antenna pointing up with a clear sky view. In ideal conditions, the module can get a fix in under 45 seconds. however depending on your location, satellite configuration, solar flares, tall buildings nearby, RF noise, etc it may take up to half an hour (or more) to get a fix! This does not mean your GPS module is broken, the GPS module will always work as fast as it can to get a fix.



Now we know where we are. According to the GPS, my location is 4043.5715 N (Latitu de 40 degrees, 43.5815 minutes North) & 07400.2783 W. (Longitude 74 degrees, 0.2783 minutes West) To look at this location in Google maps, type +40° 43.5715', -74° 00.2783' into the google maps search box () . Unfortunately gmaps requires you to use +/- instead of NSWE notation. N and E are positive, S and W are negative.

People often get confused because the GPS is working but is "5 miles off" - this is because they are not parsing the lat/long data correctly. Despite appearances, the geolocation data is NOT in decimal degrees. It is in degrees and minutes in the following format: Latitude: DDMM.MMMM (The first two characters are the degrees.) Longitude: DDDMM.MMMM (The first three characters are the degrees.)

Downloads

Files

- EagleCAD PCB files on GitHub ()
- Fritzing object in the Adafruit Fritzing Library ()

Downloads:

- MTK3329/MTK3339 command set sheet () for changing the fix data rate, baud rate, sentence outputs, etc!
- Datasheet for the PA6H (MTK3339) GPS module itself used in version 3 of this module ()
- MT3339 GPS PC Tool (windows only) () and the PC Tool manual ()

• Mini GPS tool (windows only) ()

Schematic & Fabrication Print

