Solar Powered Conch Screamer

by rabbitcreek

The tradition of blowing into an invertebrates exoskeleton when the sun descends below the horizon is practiced widely on Maui. This instructable will allow you to build a solar powered one that will fully irritate your neighbors and allow you to complete the tradition if you unable or unwilling to practice the art. So how does the amateur maker begin such a project--usually such things are connected to the internet and made whole by the IoT! A quick scan of the options revealed the complexity of these approaches--and with complexity comes watts and I wanted this thing to be solely powered by the sun.

Multiple programs using IFTTT and WEMOs with scripts for sundown were evaluated and discarded. It is nice to build something that is autonomous and self-sufficient. In the end I went with a simple program for calculating the Sundown Time each day, a RTT with interrupt circuit for power saving, a sound generator and amp that are only powered for a short burst that all fits within the weather-proof shell. (Hey, I know that is not a conch shell but this one looks better...)

https://youtu.be/Hu3M1GzI7HY

Step 1: Gather Your Materials

The shell is nicely sculptural and the support structure is curved wood. The curved wood bracket is for holding a wine bottle. Both of these parts were found at a local shops for less than $10. The design tries to hide any jangly looking electrical parts and expose the adjustable solar panel to good light positioning.

Electronic Parts

All of these are from **Adafruit**:

Stereo 3.7W Class D Audio Amplifier - MAX98306

Stereo Enclosed Speaker Set - 3W 4 Ohm

Adafruit Audio FX Sound Board - WAV/OGG Trigger with 16MB Flash

RTC DS3231--clock

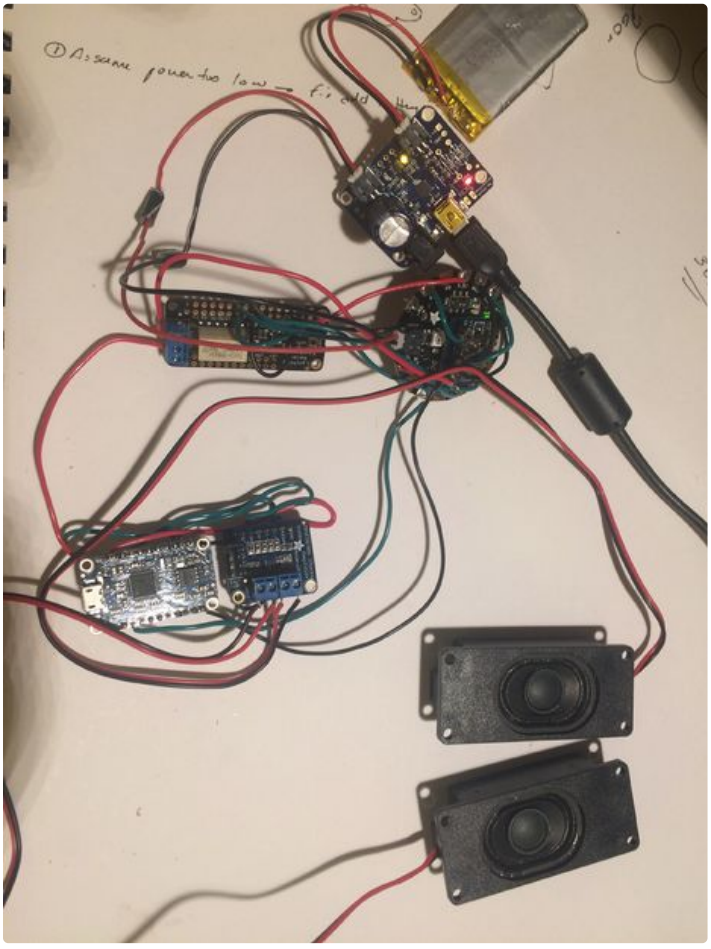
Adafruit Flora computer--

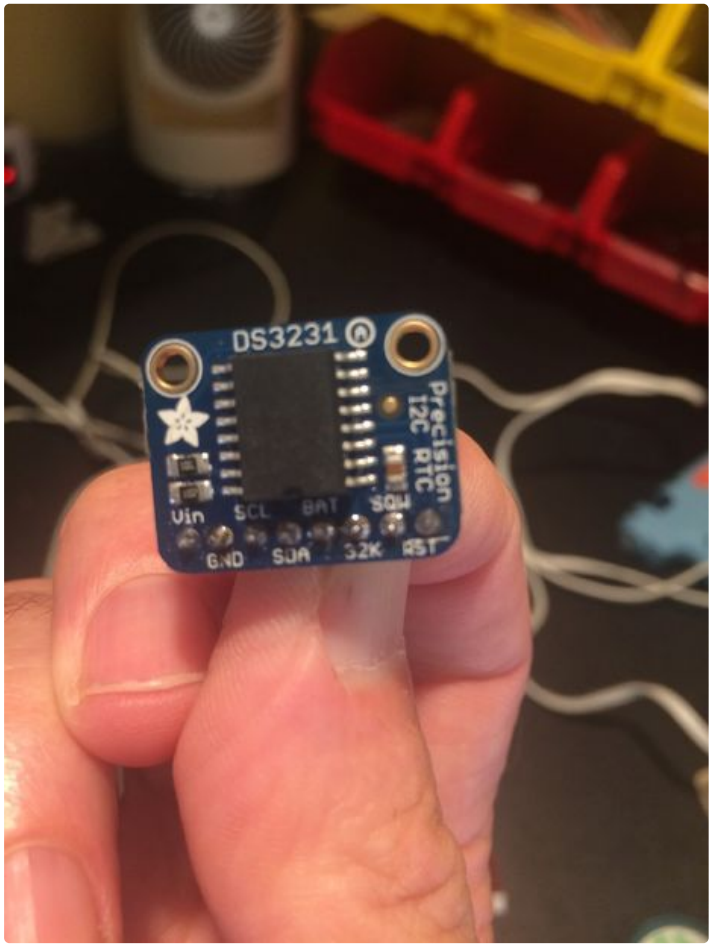
Lithium Ion Polymer Battery - 3.7v 2500mAh

USB / DC / Solar Lithium Ion/Polymer charger - v2

Medium 6V 2W Solar panel - 2.0 Watt

Adafruit Latching Mini Relay FeatherWing



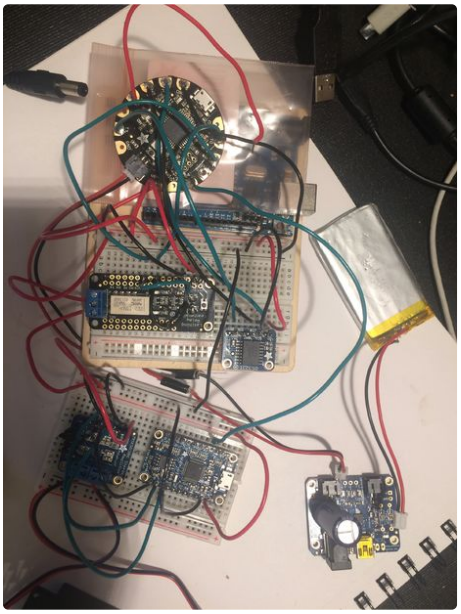


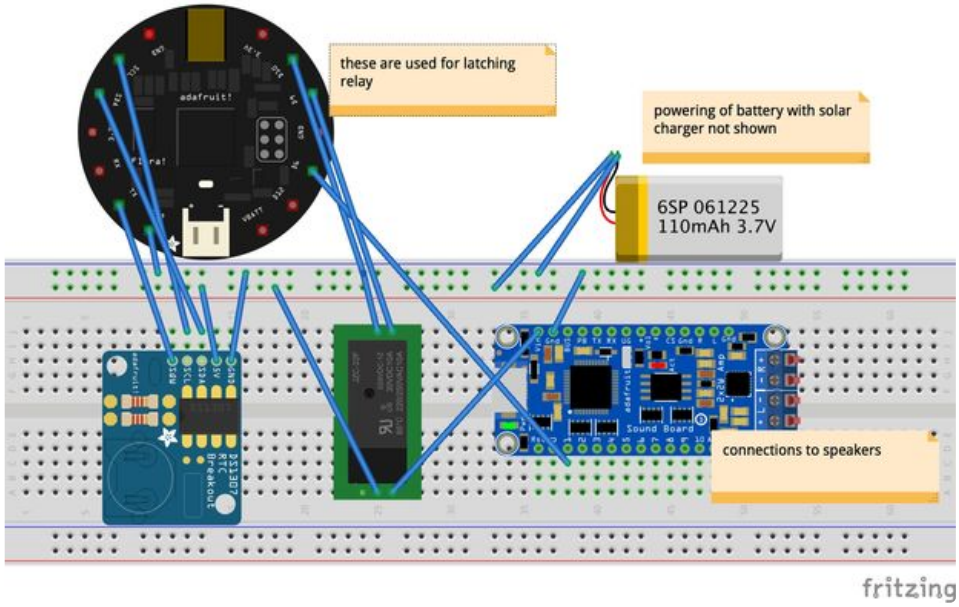
Step 2: Breadboard it Up

So on to the confusing fritzing diagram. Most of the time the Flora is asleep and no power is connected to the other pieces of the machine except for the RTT. Once a day the Flora asks the RTT for todays date then using the TimeLord sketch calculates the sundown time for that day. It sets an interrupt from the RTT SQW pin to the TX pin on the Flora to wake it up at the right time. It then switches on a relay (pins 9 and 10 for latching the relay so it doesn't use power to hold it) that powers the sound board and the amp and then fires a low signal through pin 6 to the sound board to play a recorded conch WAV file.

I left off the wiring of the solar panel and the charging circuit for the lipo battery as these are easy and available on the Adafruit web site.

The sound board was not a charmer--I had multiple problems getting the WAV file installed--follow the instructions from the excellent Adafruit site on how to use the board--the helpful people on their blog are really good too.





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Step 3: Software

The software involves a couple libraries:

TimeLord--Handles calculating the Sunset time. I included PDF for other calculations using this Library.

LowPower--handles the sleep mode

RTClib extended--does a great job of waking the Flora with the DS3231 RTC. I am very grateful for the Instructable

calculated correctly.

--**https://www.instructables.com/id/Arduino-Sleep-and-Wakeup-Test-With-DS3231-RTC/**

that was just published from which I used some code. Some differences were due to using a Flora instead of a Arduino Uno which resulted in a different pin for the interrupt and some other changes.

When putting in the code change the Longitude and Latitude for your position on earth for the sunset to be


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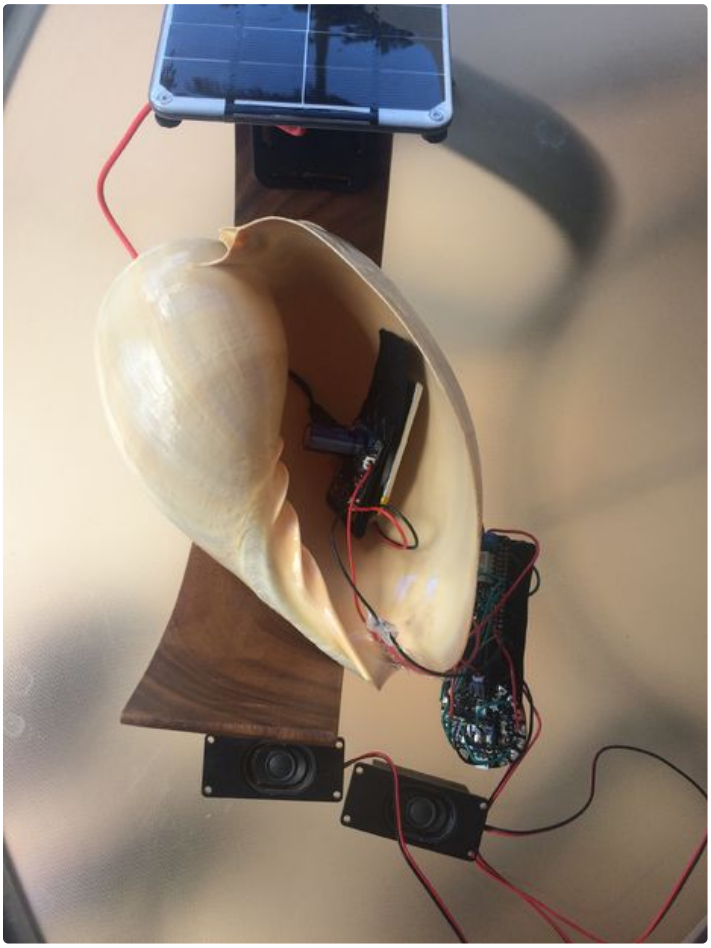
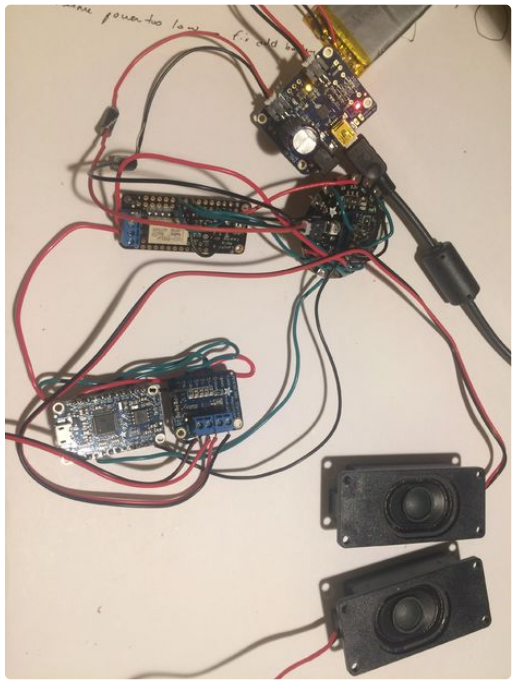
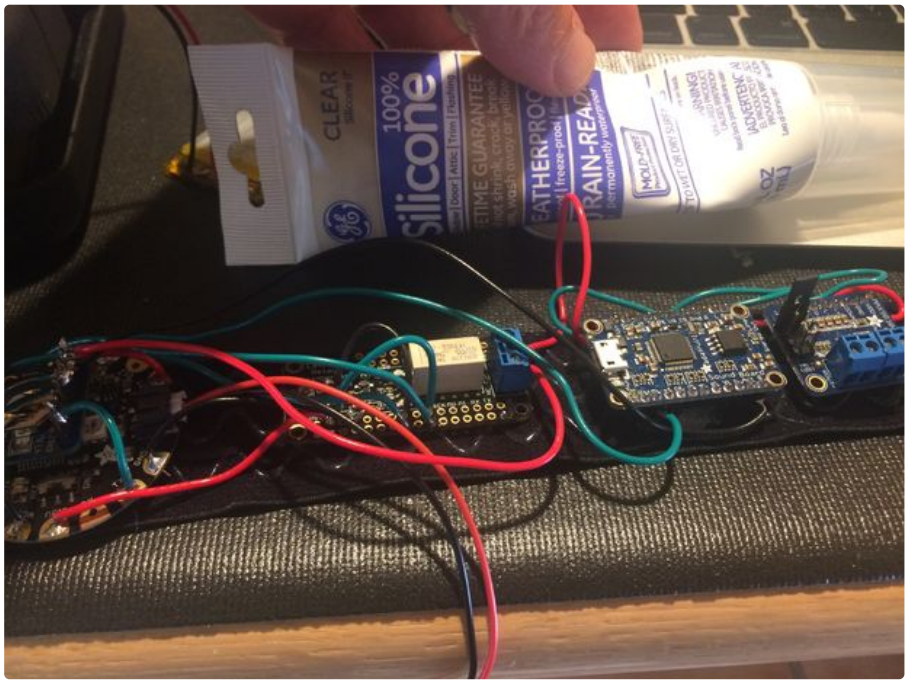
Step 4: The Build

The build is pretty easy. Everything is glued together with silicon adhesive. After you have wired all your components correctly I glued them all to a headband that came with the GoPro clip I used for the solar panel attachment. I used both sides and got all the components to play nicely without crimping too much. The solar panel was glued to one part of the GoPro clip and its corresponding mate was glued to the top of the wood backbone. This adjustable clip allows you to change the angle of the sun intercept depending on the season and how it is hanging. A hole was drilled in the back of the shell to allow the charging line to come through. Do this with lots of water to cool the abrasive bit from a Dremel. Glue the shell to the backbone at an artistic angle. The components fit nicely inside the folds of the shell with the speakers arranged near the opening. Use silicon glue again to nest and seat all the innards. If the sun doesn't shine for a while you can charge the battery inside with a booster cable attached to the connector coming from the shell hole.






CLEAR
100%
Silicone

Step 5: "What's that thing on your wall?"

The unit really doesn't use much power--I tried measuring a couple times and it seems to hover around 3 mA--maybe less. It certainly jumps quite a bit when the speakers and amp kick in but it only lasts for a really short time. The sound board can be used for a lot of different effects (see Adafruit website) and it will work for a morning Rooster call with TimeLord too. It seems fairly accurate in terms of predicting the correct time and has been working steadily for a couple of weeks off the sun with no signs of running out.

https://youtu.be/ZBT9hHReDno