Enigma: A Father's Day Tinkering Story

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The Story

- My father Leigh Sr, a World War II Veteran photographer and electronics & computer enthusiast, moved to a VA Home in 2014.

- He was no longer able to use a mobile phone SMS, or hear well enough to use a telephone.

- But my sisters and I still wanted to talk to him, and he wanted to talk to us.

The Idea

- I decided to make a big display with three buttons, to show him the most recent message from each of his children.
- Since he could talk on a regular phone, there was no need to make a device to send messages, just to receive and display them. That would make it simpler to use.

The Back Story

Every since I was 4 or 5, my father and I had built things or learned things together, from "ham" radio to electronics to computers.

He loved tinkering with these things and photography, especially wild animals, and would often tell me stories about them.

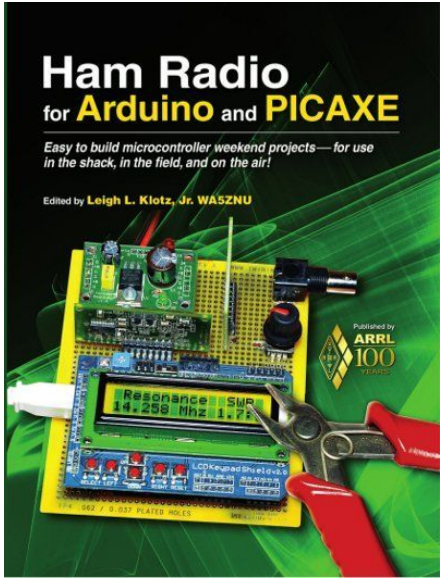
He spent a lot of time with me when I was a kid, and I wanted to build something to help him out.

This is *amateur radio*, which is electronics and radio experimentation, licensed by governments worldwide. It is still popular, with more than 700,000 people in the U.S.

Ham radio operators often design and build their own equipment.

Arduino

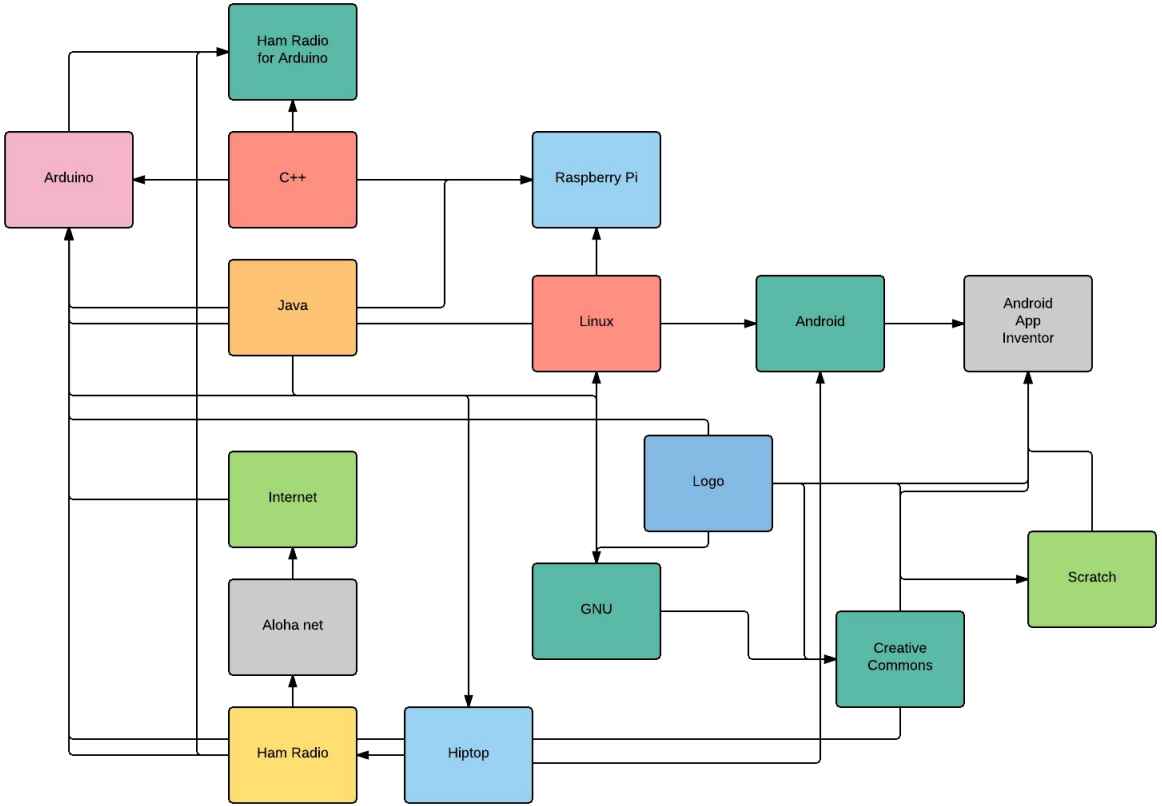
I had recently written a book on the Arduino, a small computer you can program and interface to electronics.



The Arduino was related to lots of things I had done before.

I could build on the work of others, because there is such a great community.

To find out more, visit http://arduino.cc



The Enigma

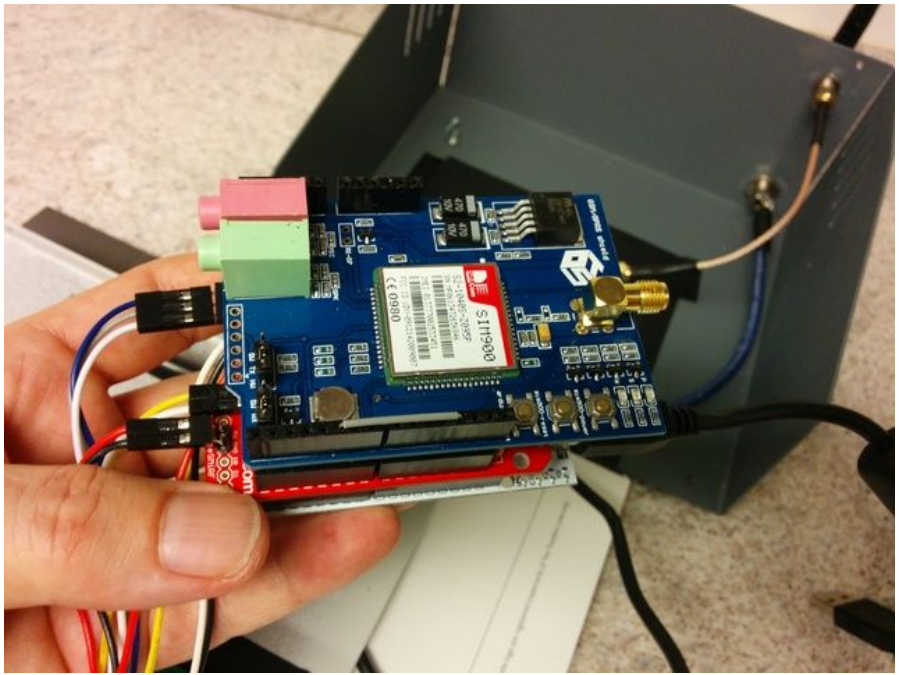
My father was fascinated with the German Enigma cryptographic device from WWII, so I named the new device "Enigma."

I found a similar case and got started.

The Main Parts

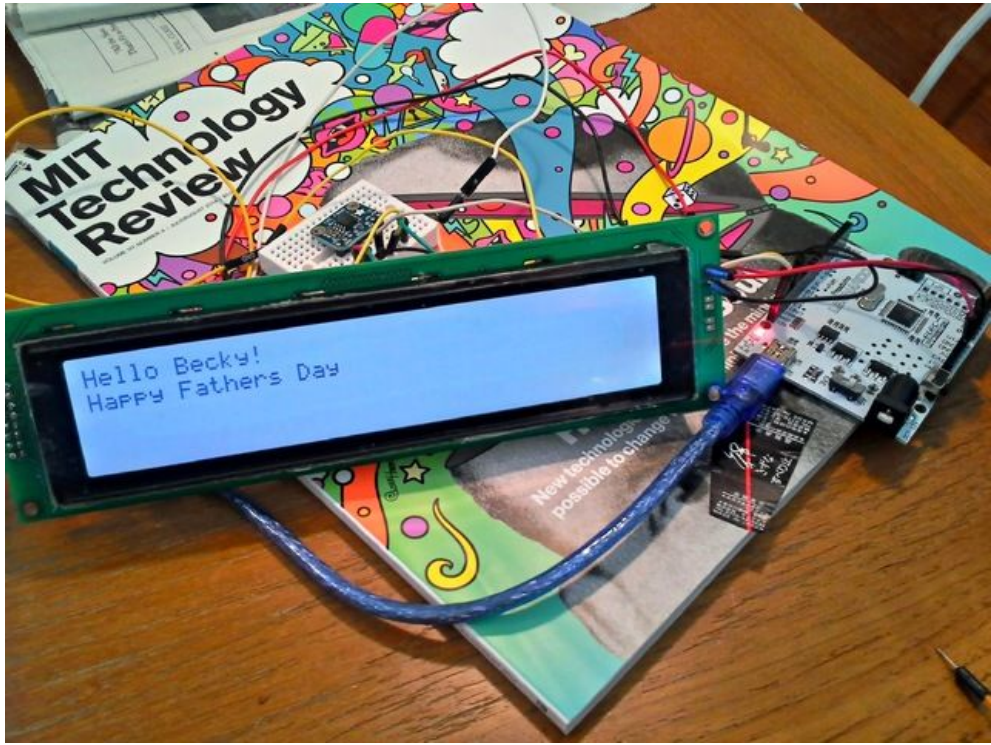
Arduinos have parts that plug together, called Shields. You can design your own or buy them.

I needed the Arduino and two shields: a GSM Modem and Message Storage / Button & Display Shield.



The Display

- I ordered the Display from China, and the Display Interface Board from Japan, and the Arduino from Italy.
- It took a long time for the parts to arrive.
- I wrote the first software that made the display work on in June, 2014.



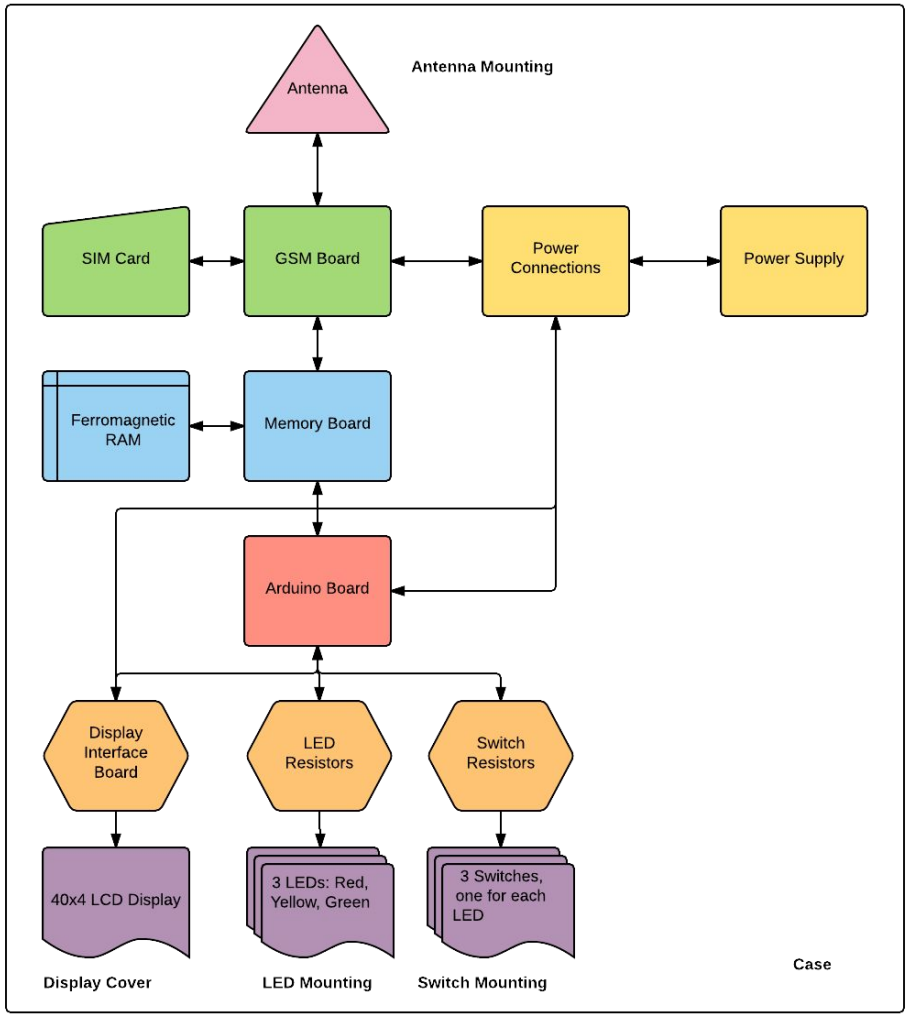
The Cellular Board

I ordered the Cellular Board from China, and used a SIM card from my father's previous Android phone

I also needed these parts:

- Software for the Arduino
- Three LEDs and buttons for showing the mailboxes
- A 40-character by 4-line display
- SIM card
- Antenna
- Power supply & Connectors
- Case
- Labels

Enigma Block Diagram



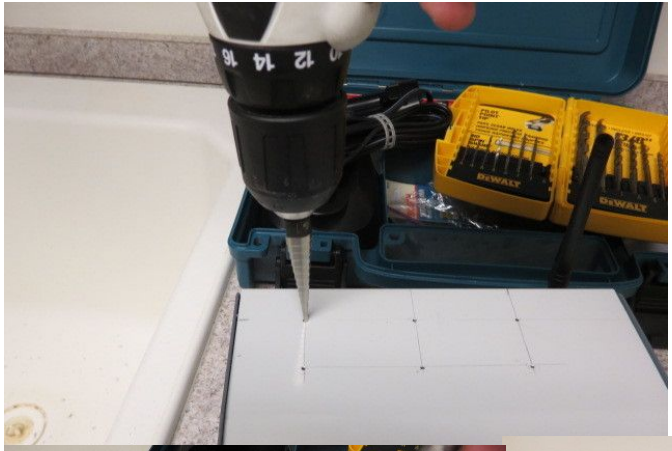
Then came the hard part...

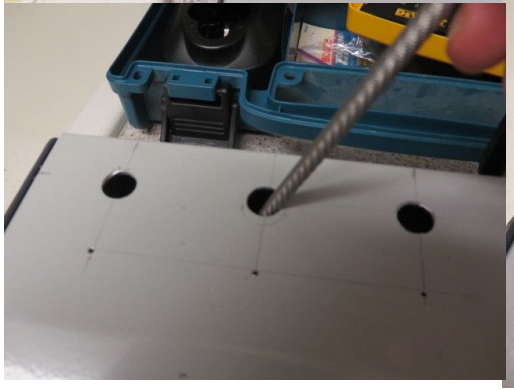
I wanted a sturdy metal case that could protect the Enigma if it got dropped or something set on top of it.

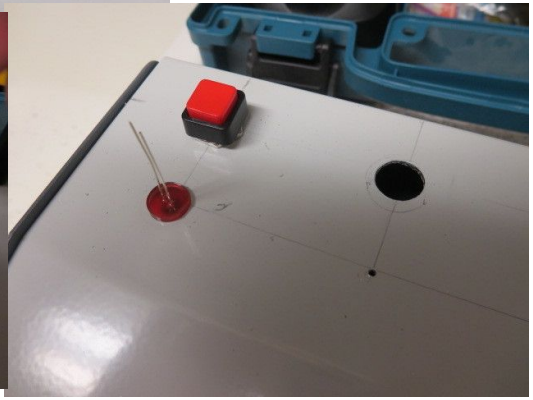
Unfortunately, that meant I had to make my own case.

Fortunately I found a metal case that looked right, but it had no holes for my parts.

Putting in the buttons and LEDs was easy...







And the Display looked easy at first

Until..

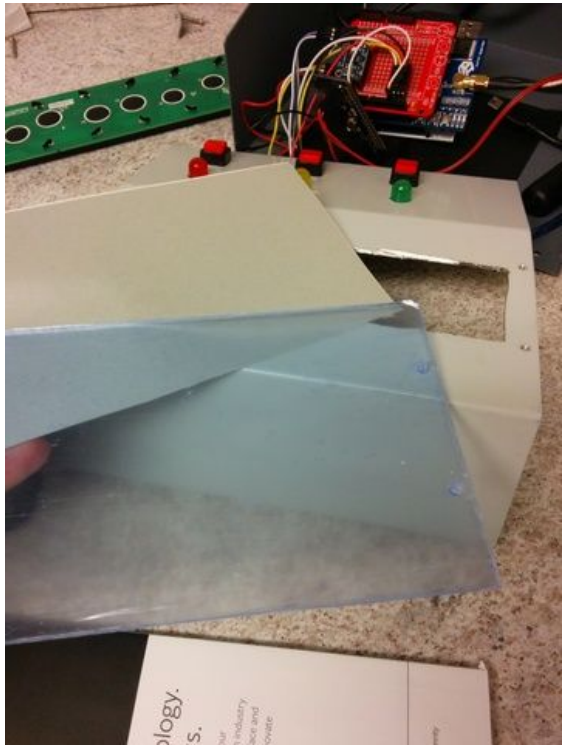
I didn't have the right tools, and the right tools were expensive.

I made the right holes, but...

Everything fit, but it didn't look pretty.

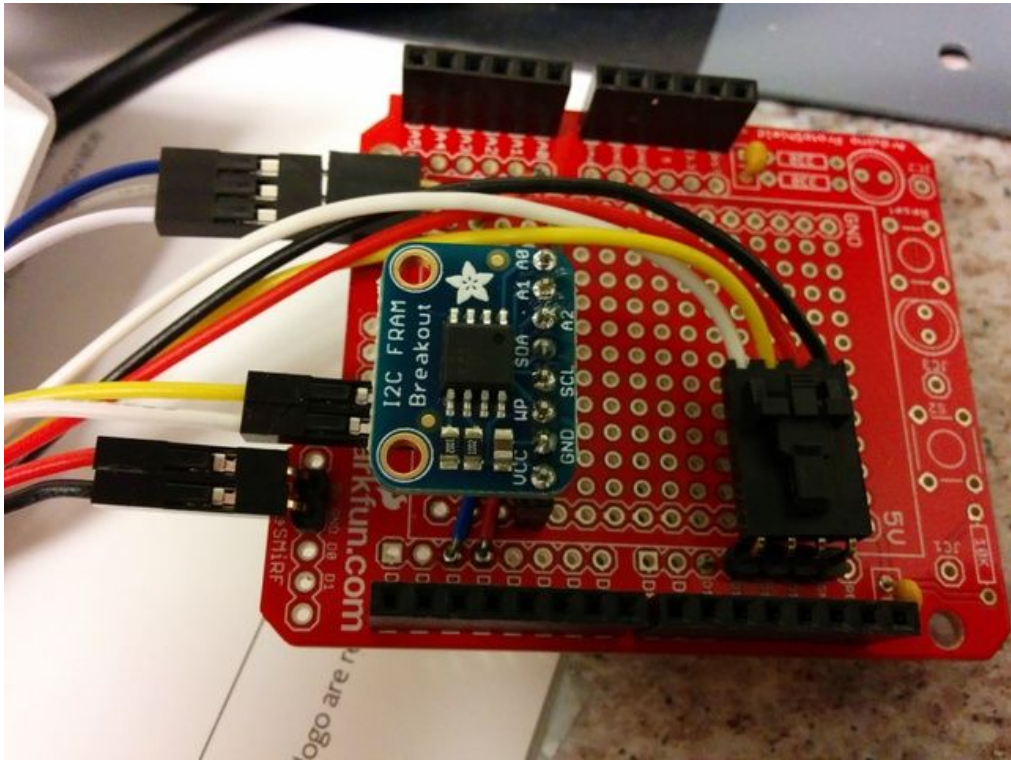
So I added a plastic cover with a translucent paper backing.

I had to do this part twice...but in the end it worked out.

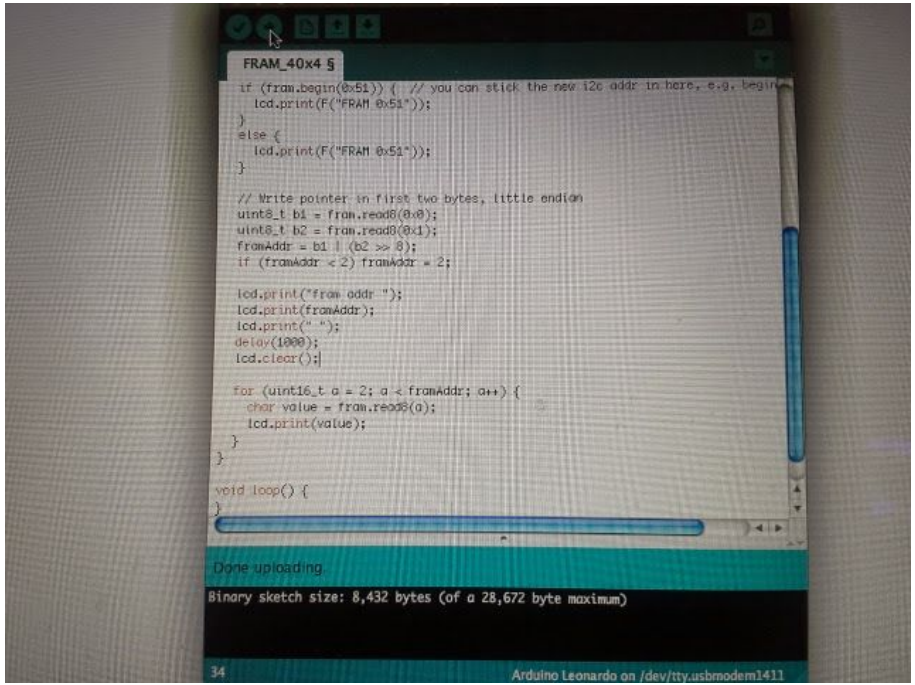


The mad scientist part: Magnetic RAM

- Even though the SIM card could store messages, it wasn't reliable, and I didn't want bugs to cause my father to doubt whether he'd received a message.
- I used a new "Ferromagnetic RAM" chip I bought from Adafruit, and a blank Arduino Shield from Sparkfun, and stored the messages in that.
- It can store over a hundred messages, but I limited it to three.
- I put the display and switch connectors on the same board.



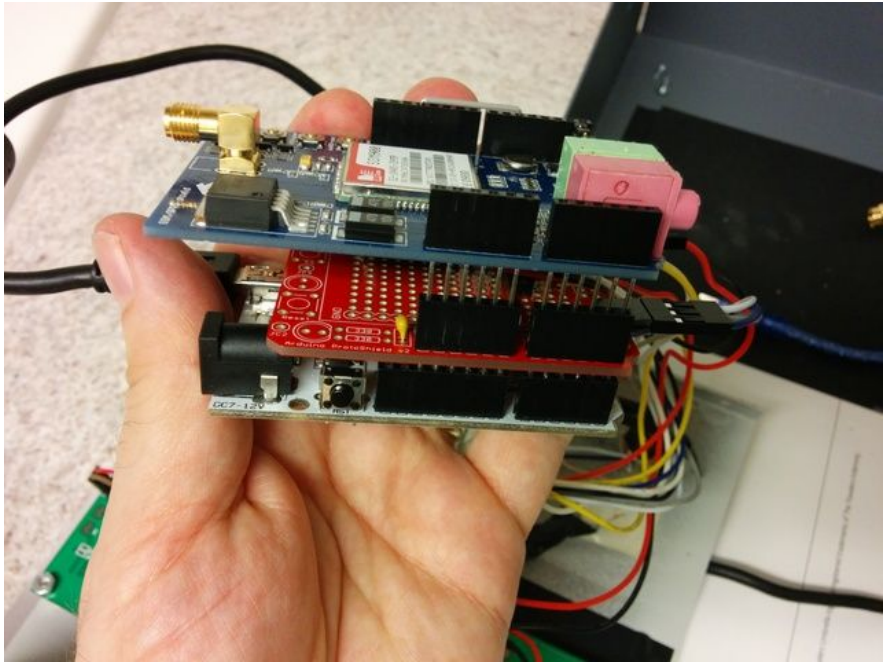
I wrote a bunch of Arduino software...for about a month

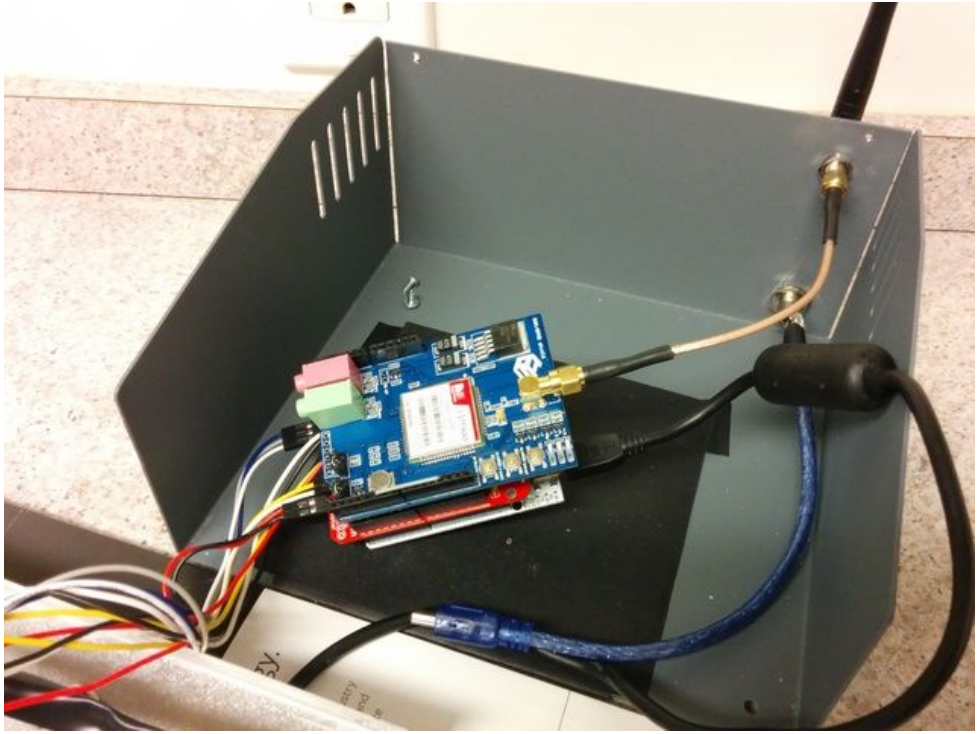


https://github.com/wa5znu/enigma

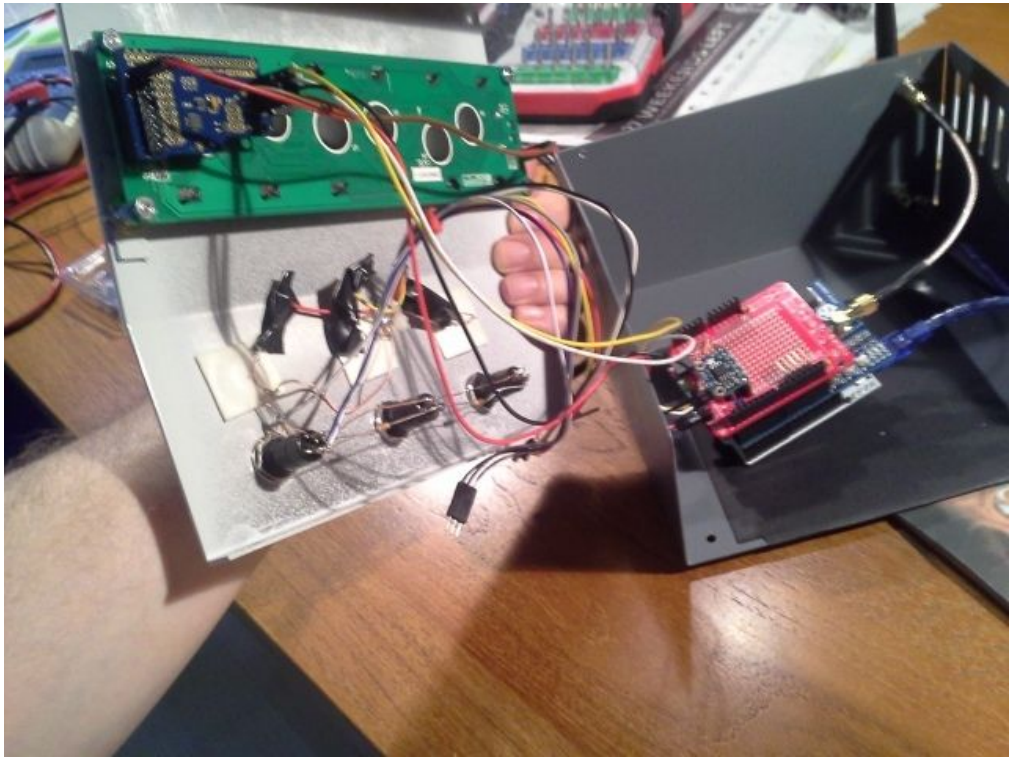
http://arduino.cc

The boards all plugged together

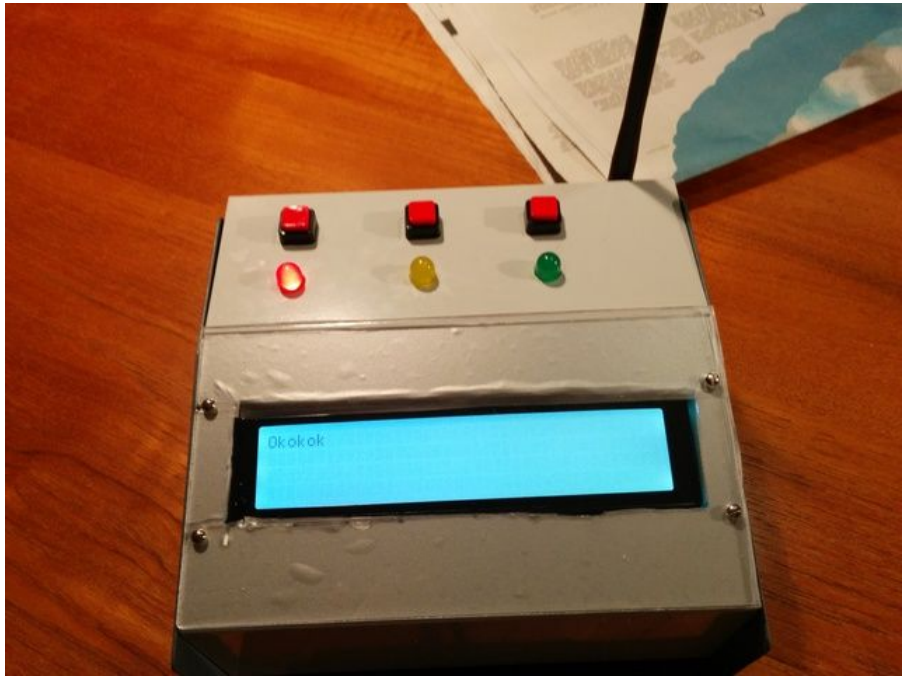




And all the cables fit...



And it works!



I spent a few weeks testing it to make sure it wouldn't break or act up once my father got it.

I finished it with labels...

I packed it well and mailed it off...

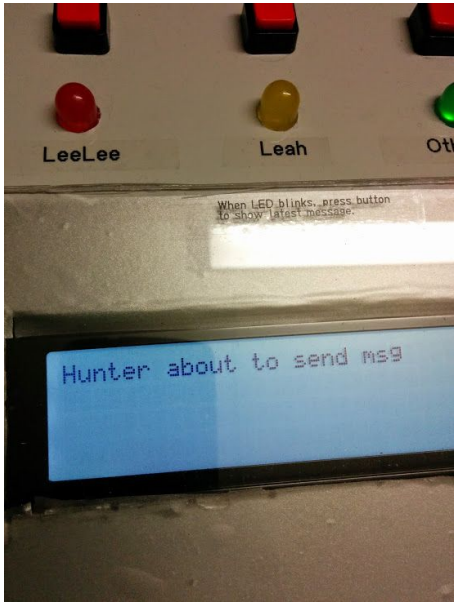
But...the post office lost my package!

http://www.cliparthut.com/mail-man-clip-art-clip art-vgxT1u.html

They found it two months later!

I was able to visit my father on his 94th birthday.

He showed me new pictures he took on his camera.



My father and I talked many times using Enigma

He loved taking pictures of people and he loved animals.

Here are his last pictures.

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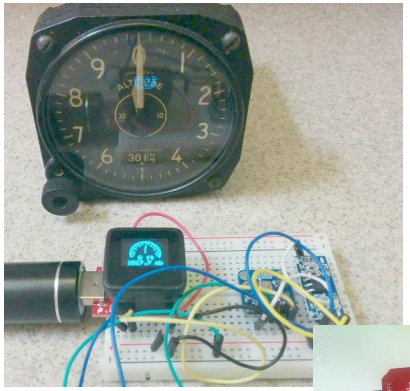
Tinkering

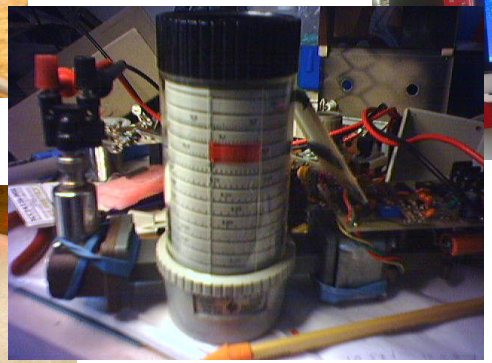
I'm glad my father was able to pass a love of tinkering with things and ideas on to me, and that I was able to use that to help stay close to him in his last year.

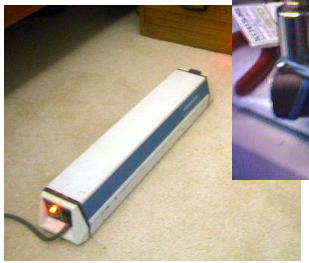
That passion led me directly to MIT, then to Xerox and now to Quixey, where I help 300 people build a product for searching apps.

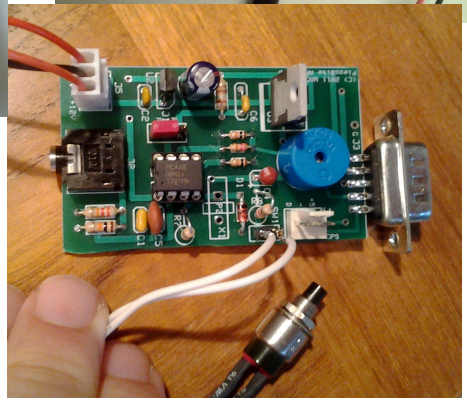
But...

But in my spare time, I still tinker at home.









Now it's your turn to tinker!