

Altium[®]

ALTIUMLIVE 2019: **When Hacking and** **Engineering Collide**

Joe Grand
Hacker + Engineer
Grand Idea Studio

San Diego
October 9-11



I Like Computers

Altium®



I Still Like Computers

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```
READY
LIST
```

```
10 GRAPHICS 1
20 POSITION 4,5
21 SETCOLOR 4,5,6
22 FOR I=1 TO 10:NEXT I
23 SETCOLOR 4,1,8
24 COLOR 2
30 ? #6;"electric dog"
40 ? #6:? #6:? #6;" by"? #6:?
   #6;"      joey grand"
50 SETCOLOR 2,76,9
51 POKE 752,1
55 ?
60 ? "      *** PLEASE WAIT ***"
80 RUN "D:K9"
```

```
READY
```



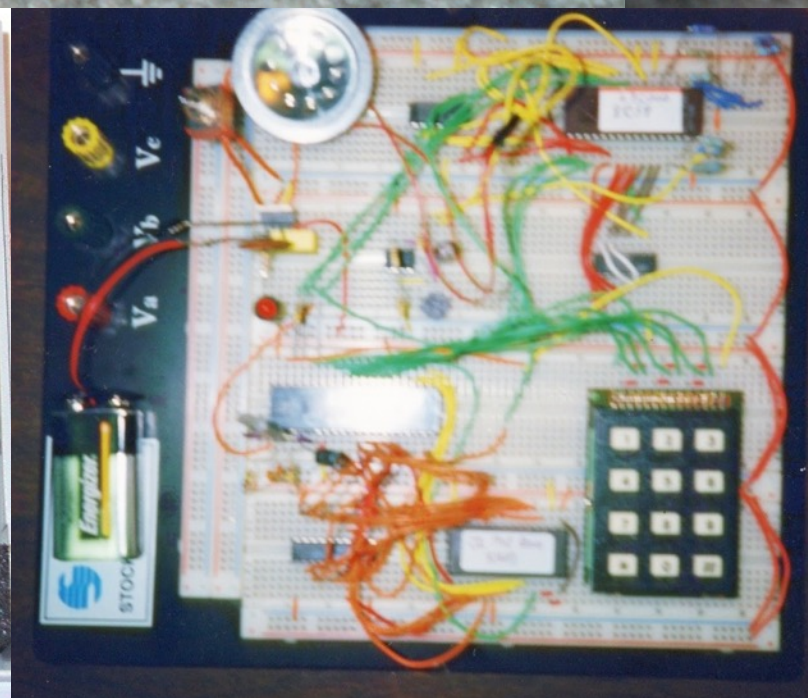
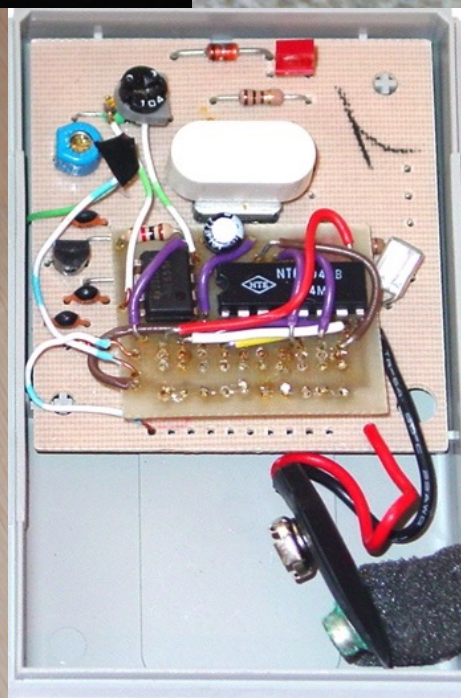
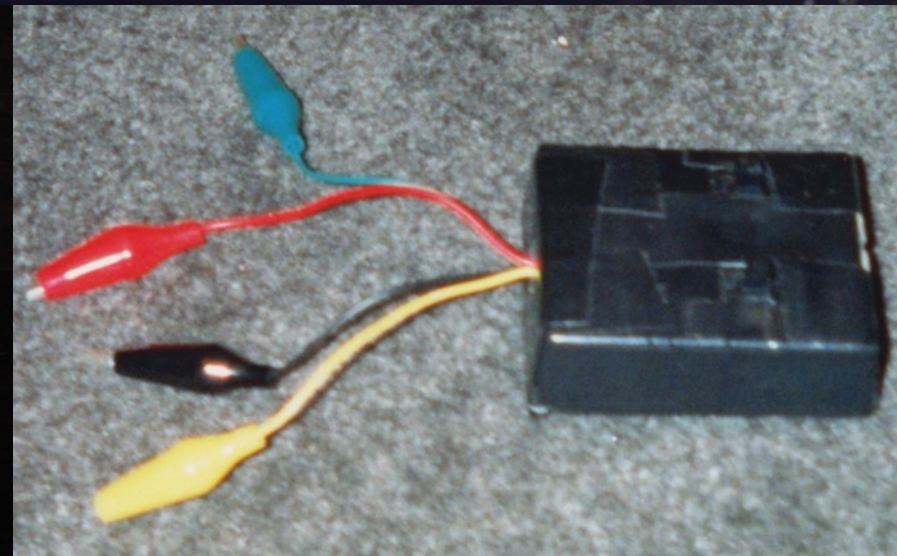
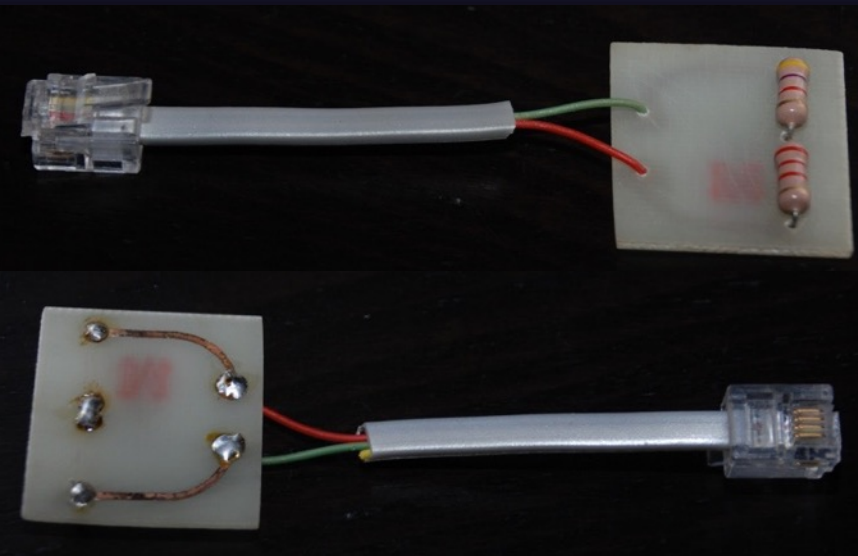
ELECTRIC DOG

BY

JOEY GRAND

*** PLEASE WAIT ***

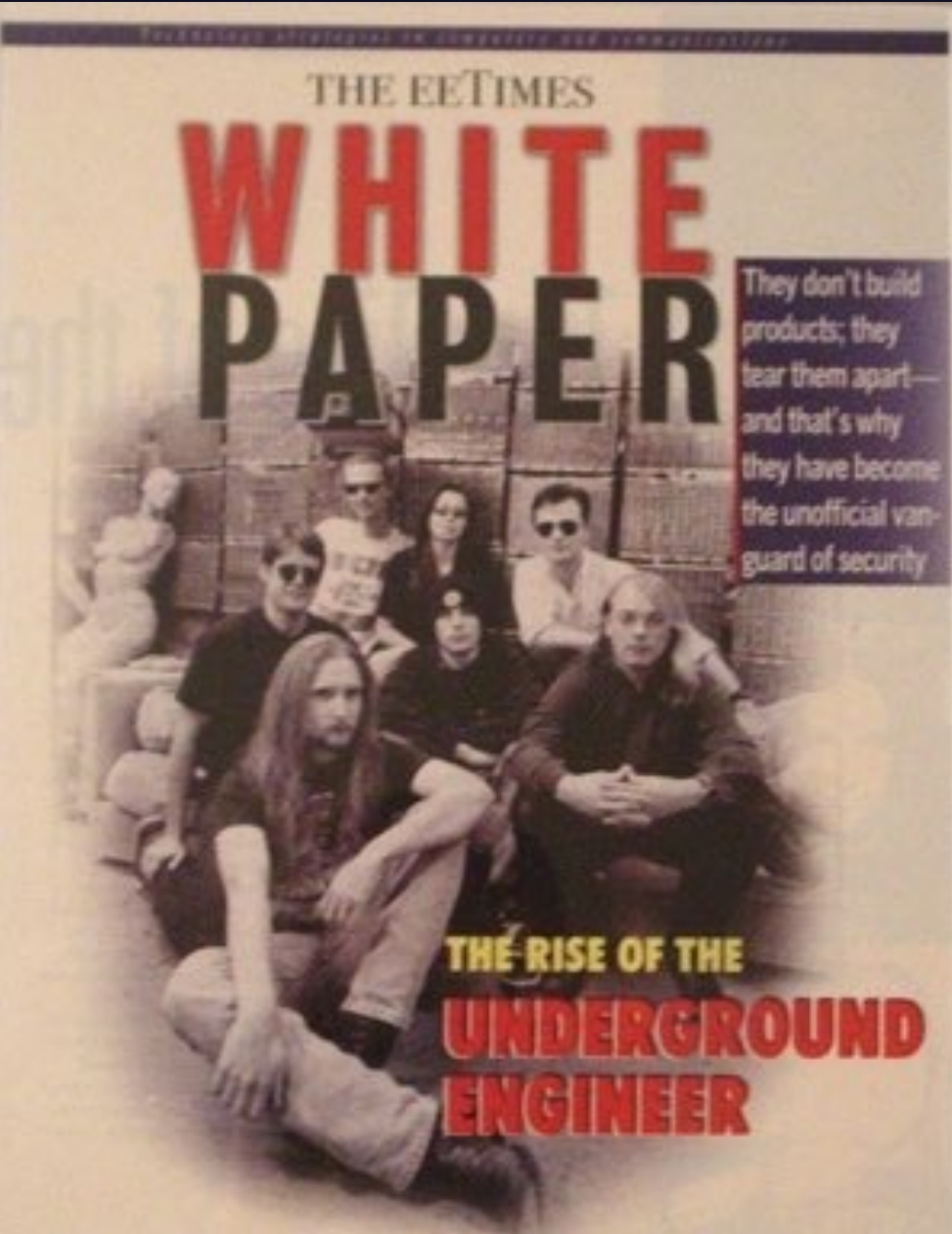
Mischievous Gadgets



"This is our world now... the world of the electron and the switch, the beauty of the baud. We make use of a service already existing without paying for what could be dirt-cheap if it wasn't run by profiteering gluttons, and you call us criminals. We explore... and you call us criminals. We seek after knowledge... and you call us criminals. We exist without skin color, without nationality, without religious bias... and you call us criminals. You build atomic bombs, you wage wars, you murder, cheat, and lie to us and try to make us believe it's for our own good, yet we're the criminals.

Yes, I am a criminal. My crime is that of curiosity. My crime is that of judging people by what they say and think, not what they look like. My crime is that of outsmarting you, something that you will never forgive me for."

L0pht Heavy Industries





POCSAG Decoder

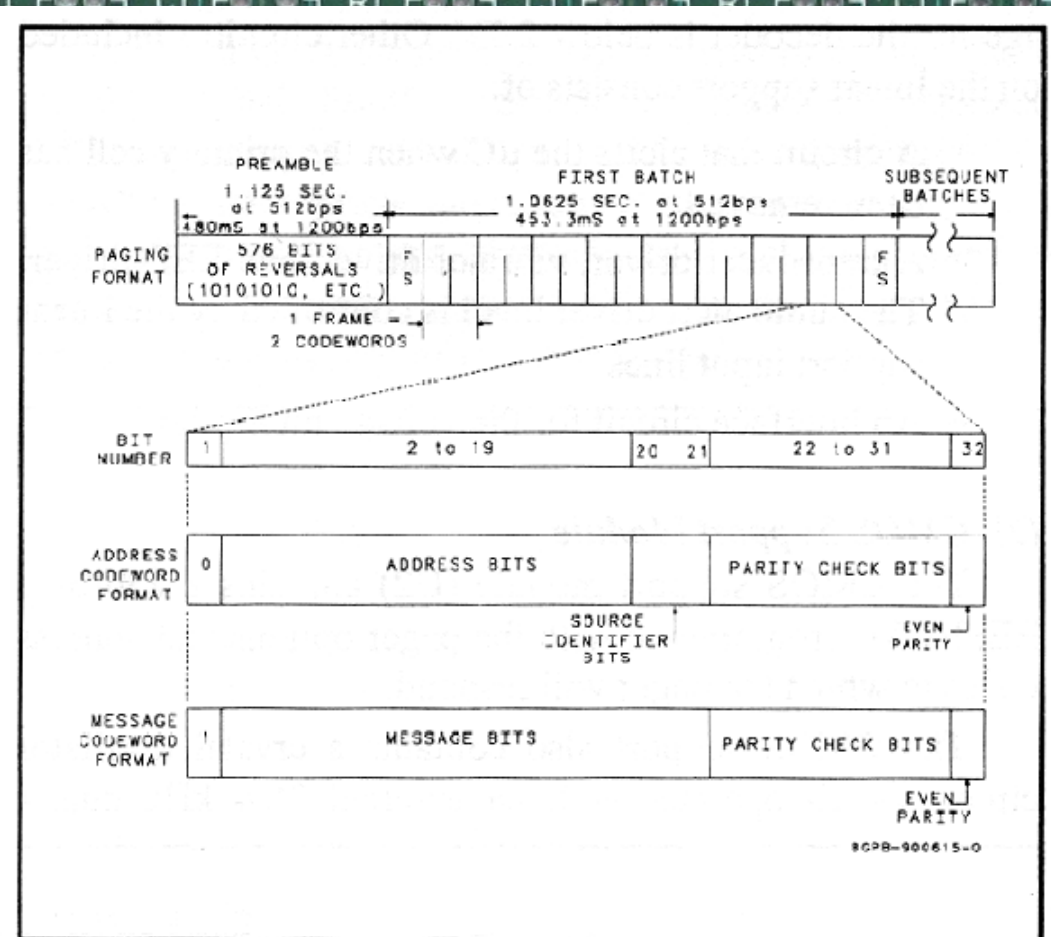
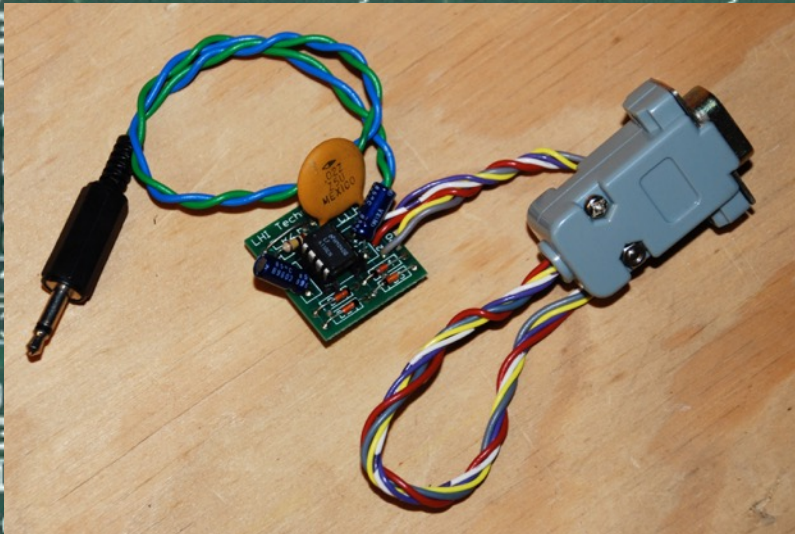


Figure 4. POCSAG Paging Format

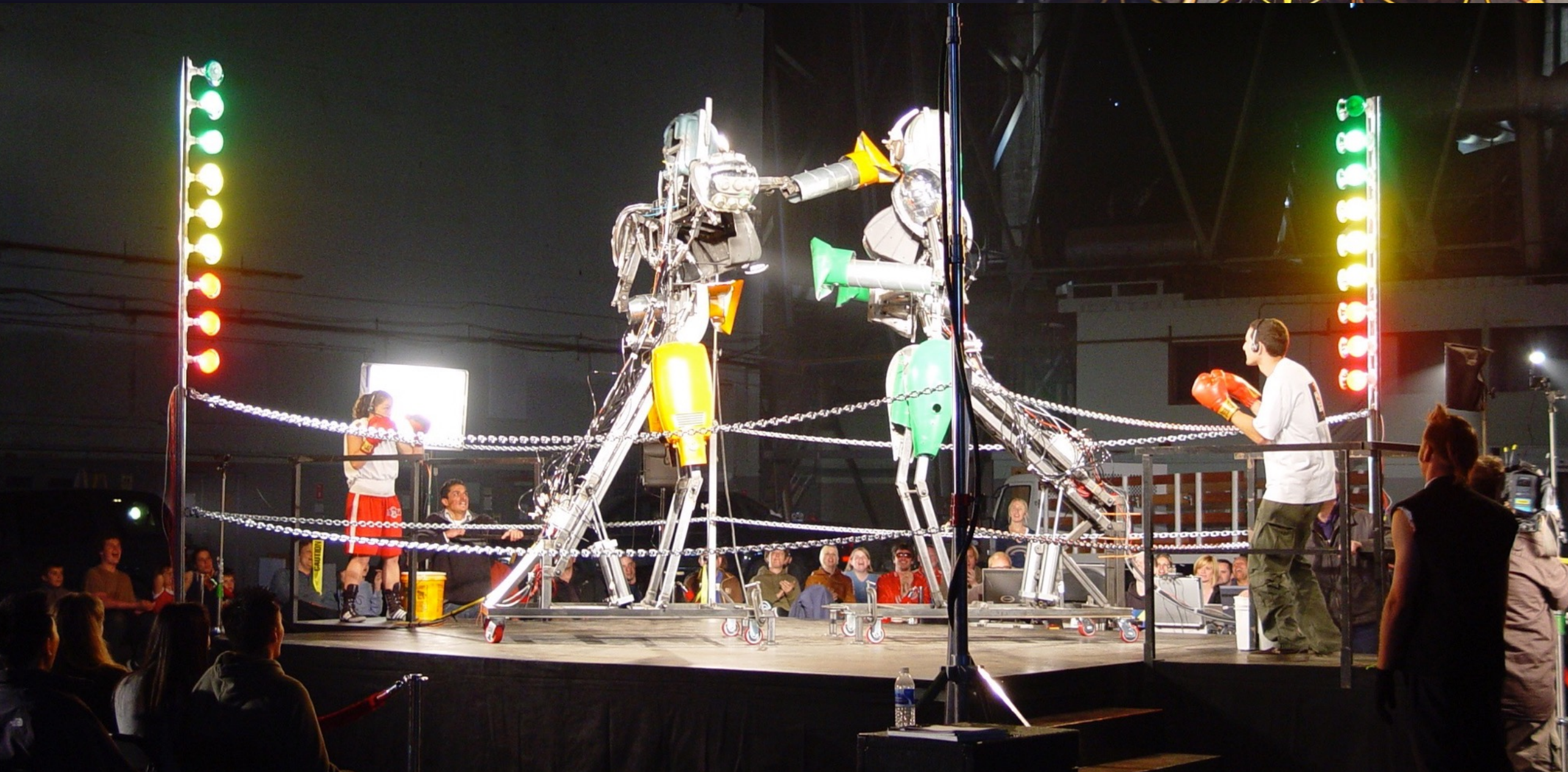
Prototype This!

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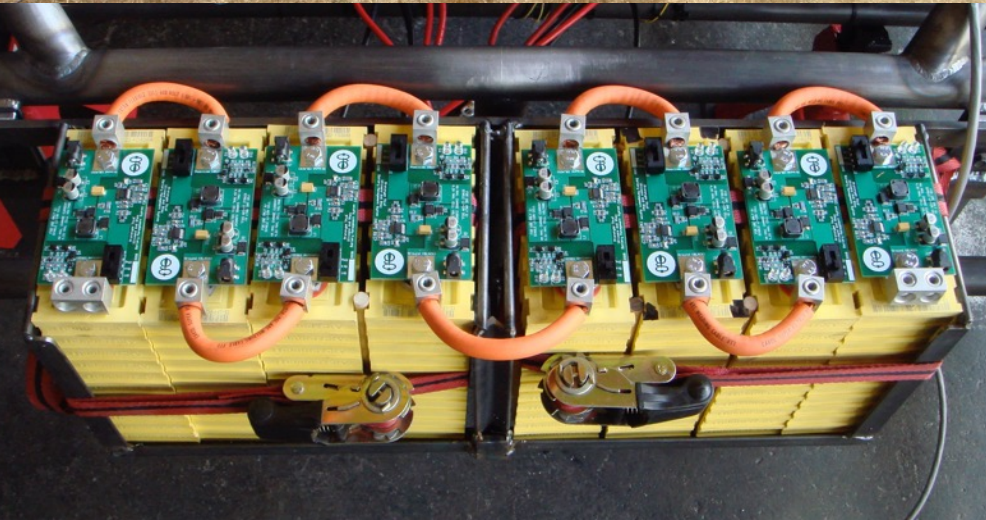


Prototype This!

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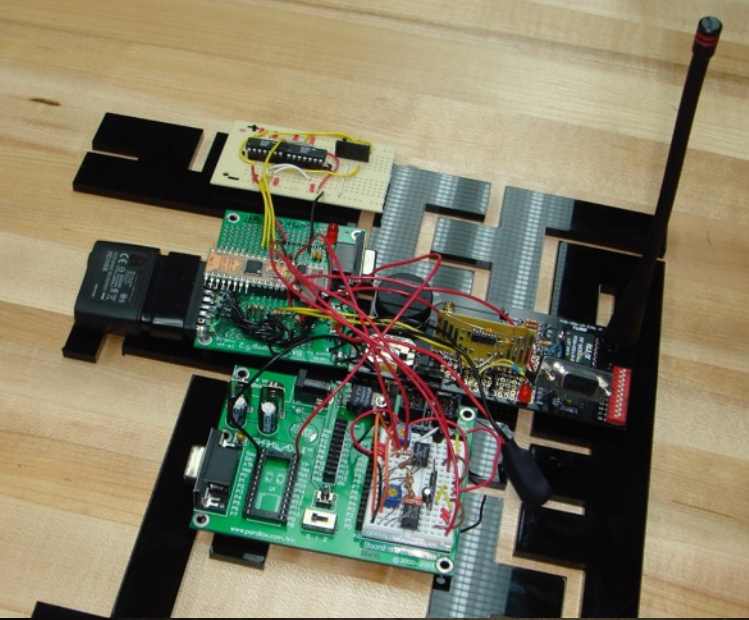


Prototype This!



Prototype This!

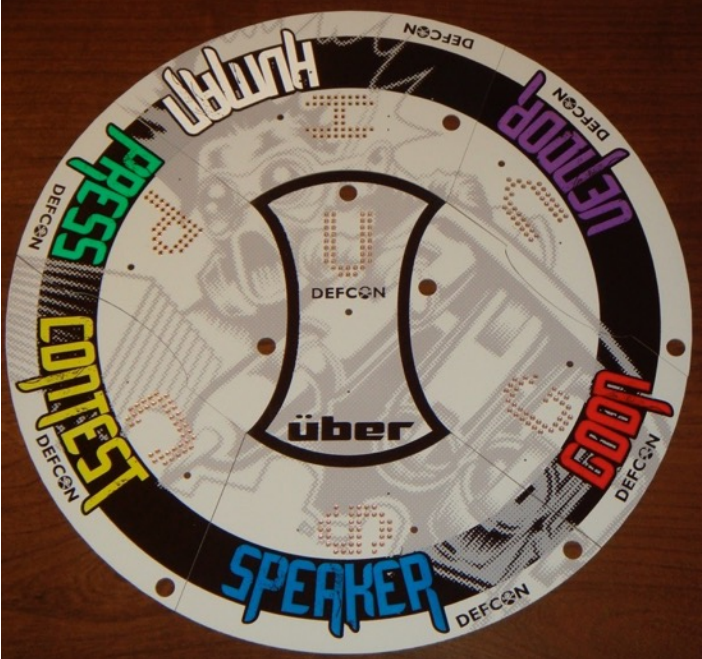
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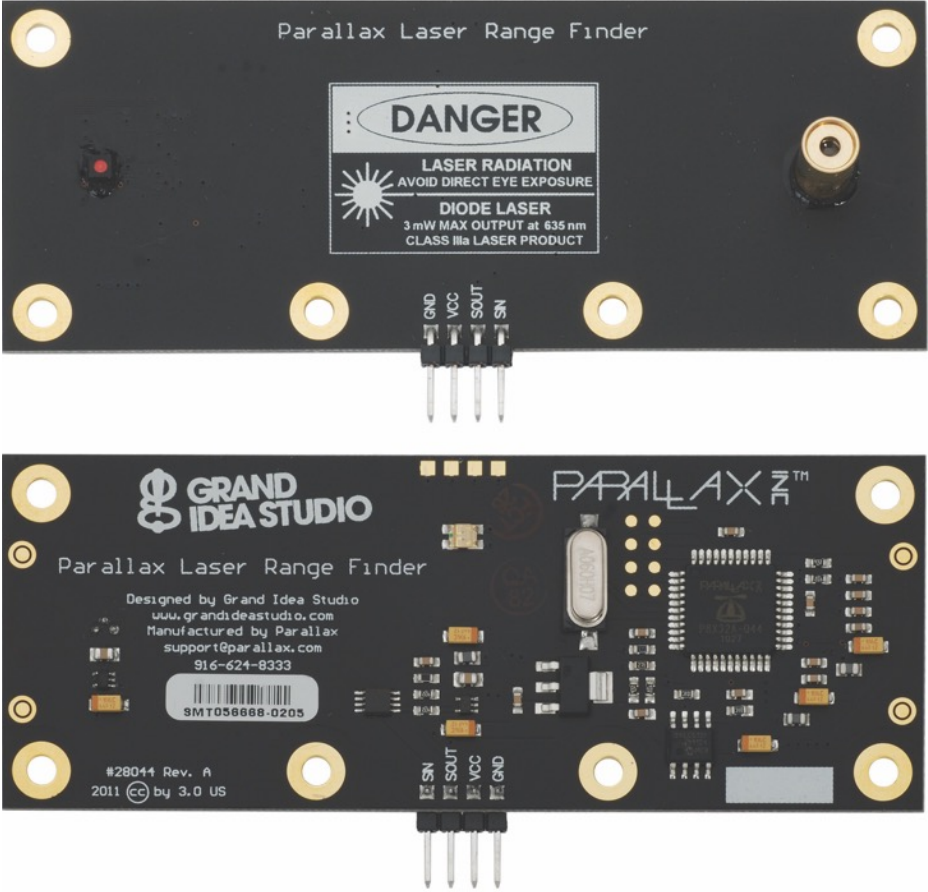
Prototype This!



DEFCON Badges



Mash Ups



Laser Range Finder + Game Boy Printer

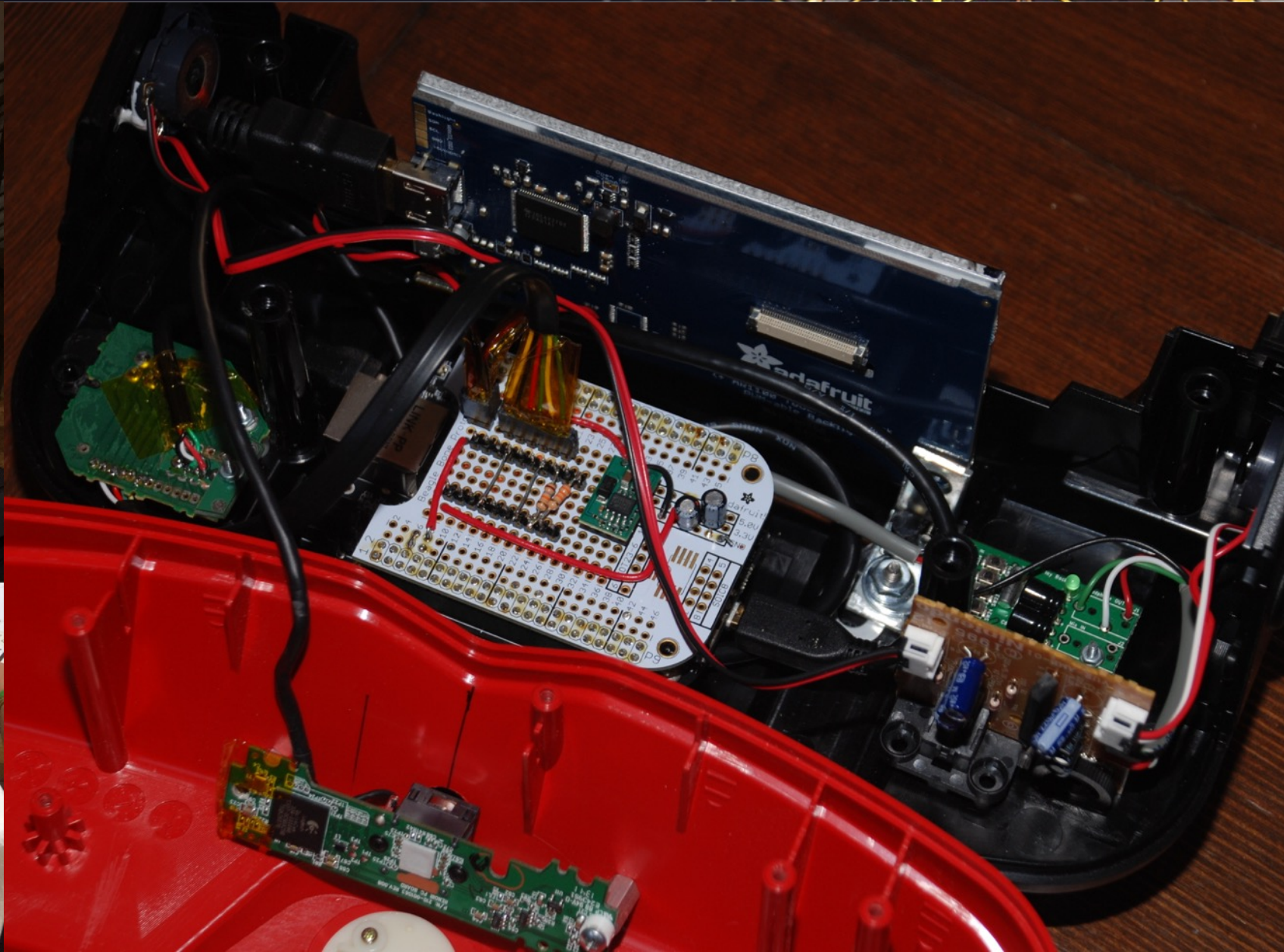
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Mash Ups



Mustache Mayhem

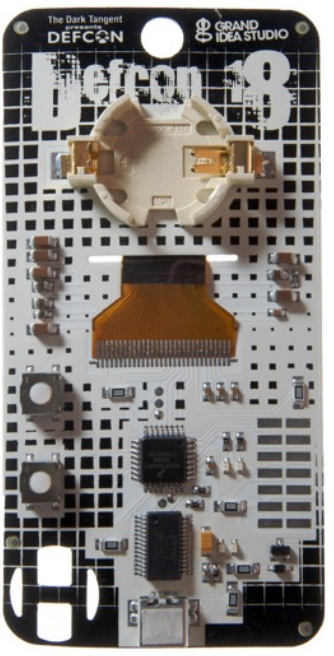
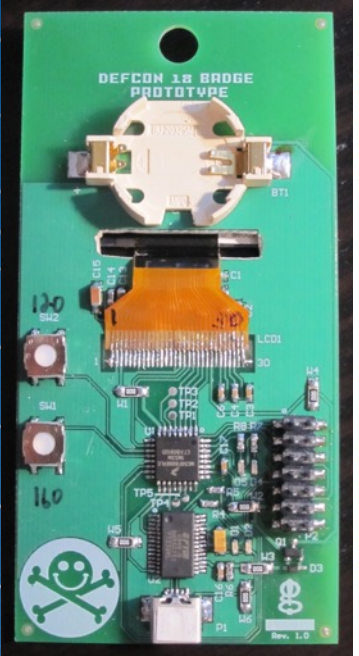
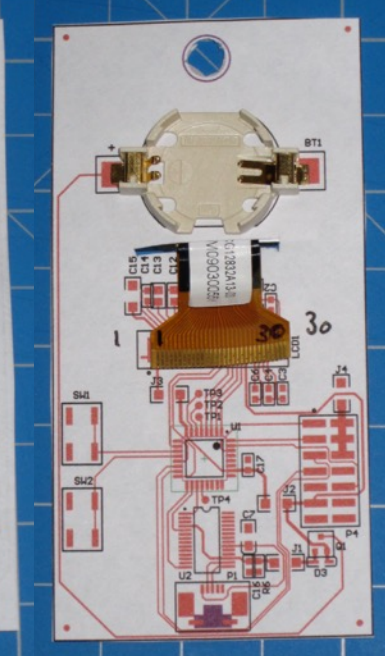
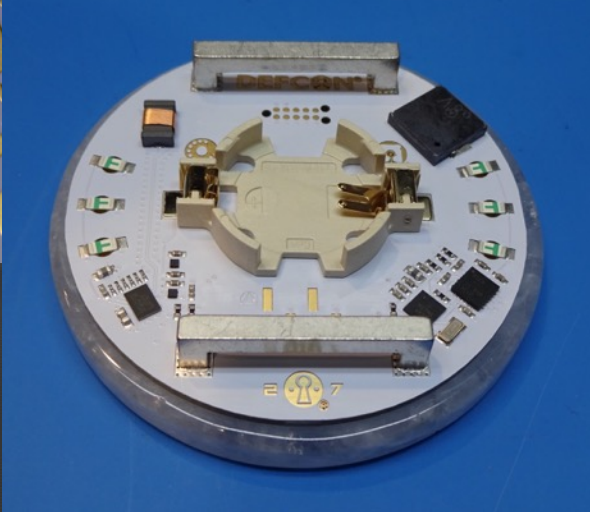
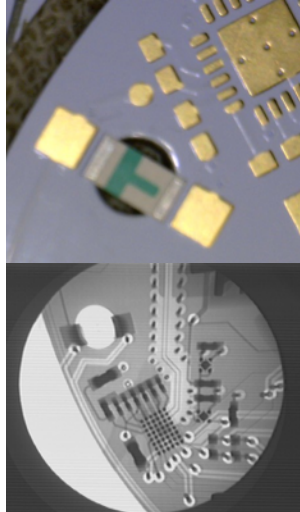
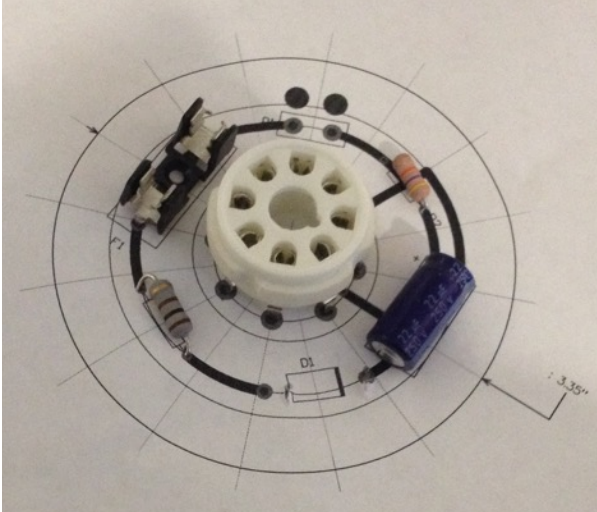


Mustache Mayhem

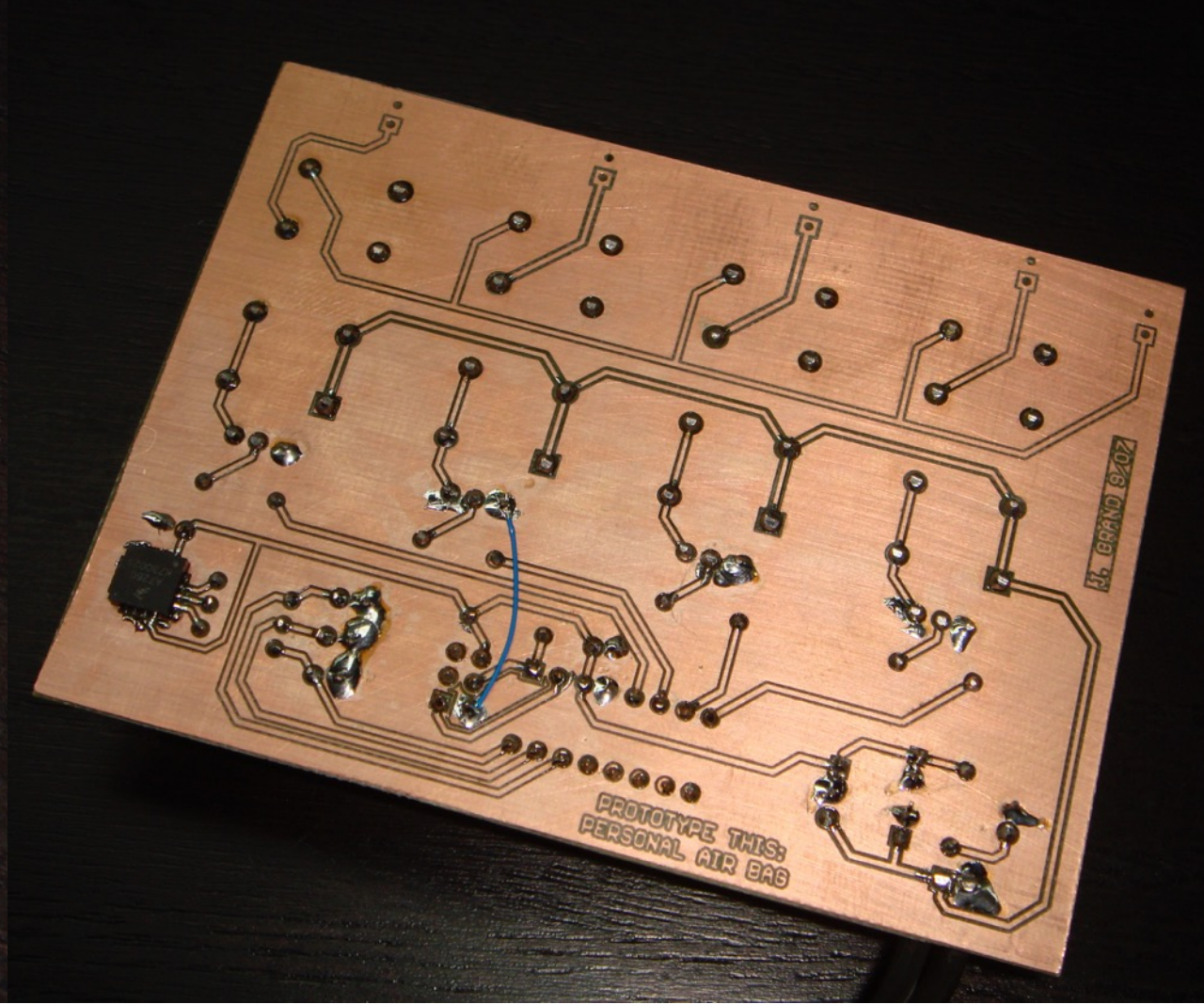
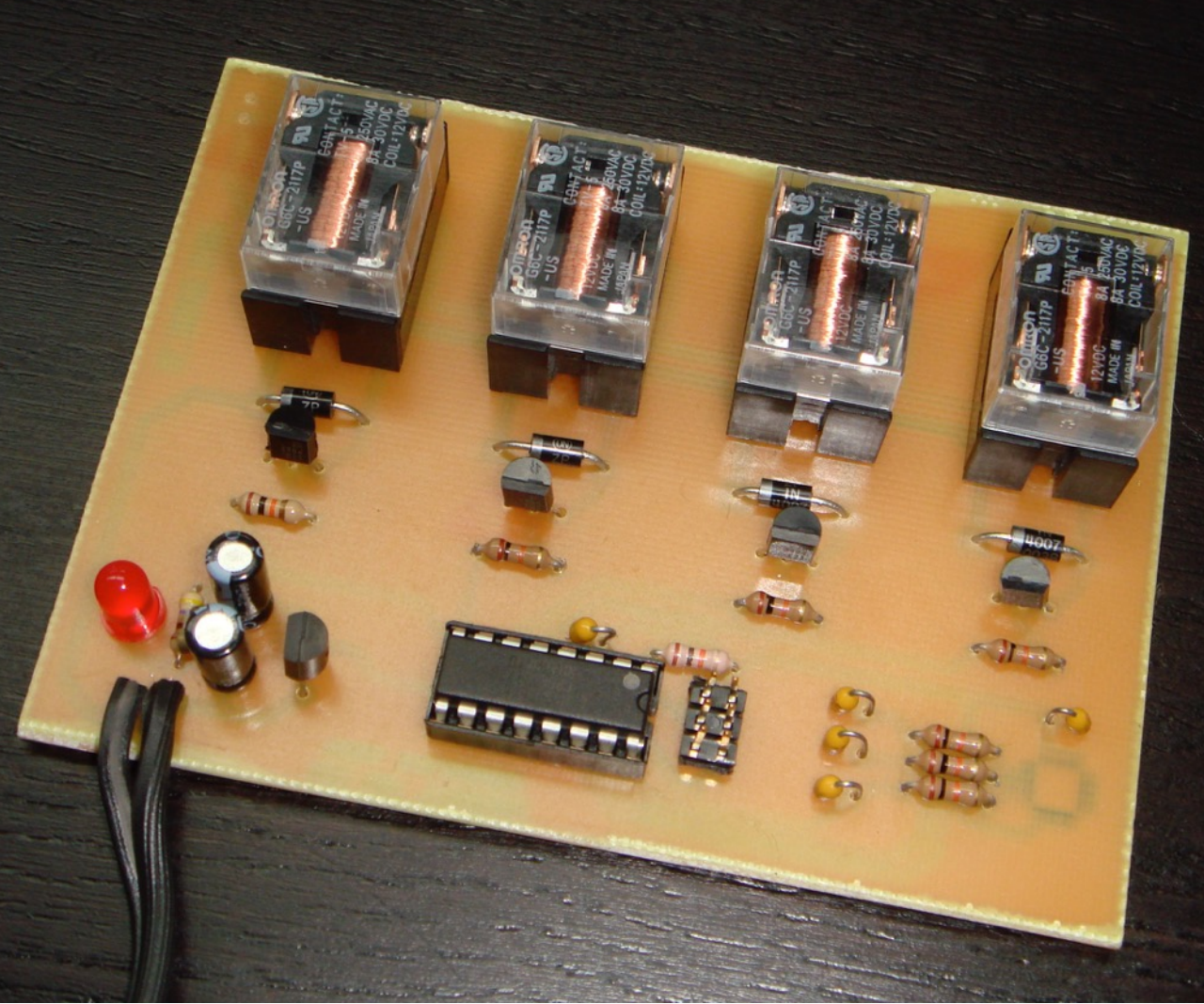


Joe Grand's Top 10 $\frac{1}{2}$ Design Tips

Check Footprints



Verify Solder Connections



Verify Solder Connections

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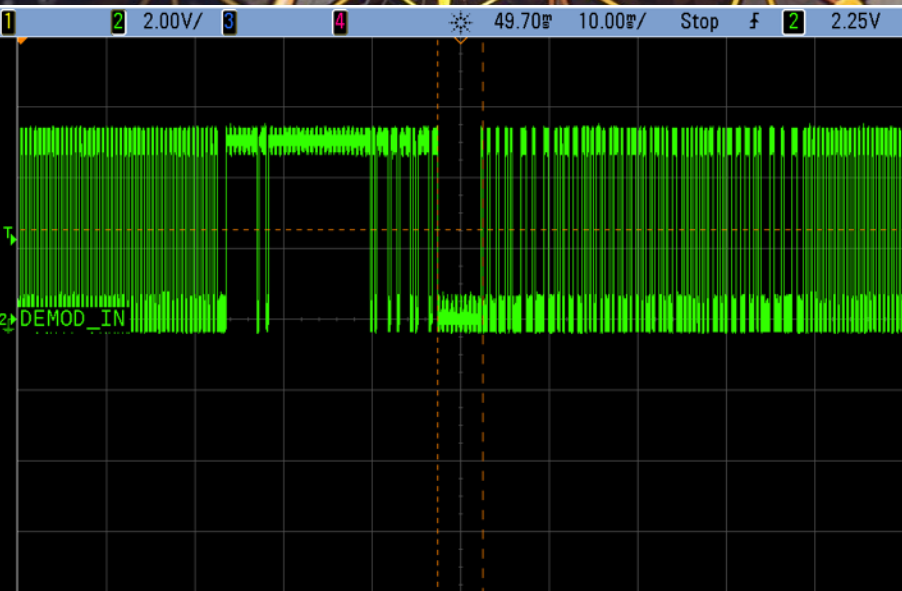
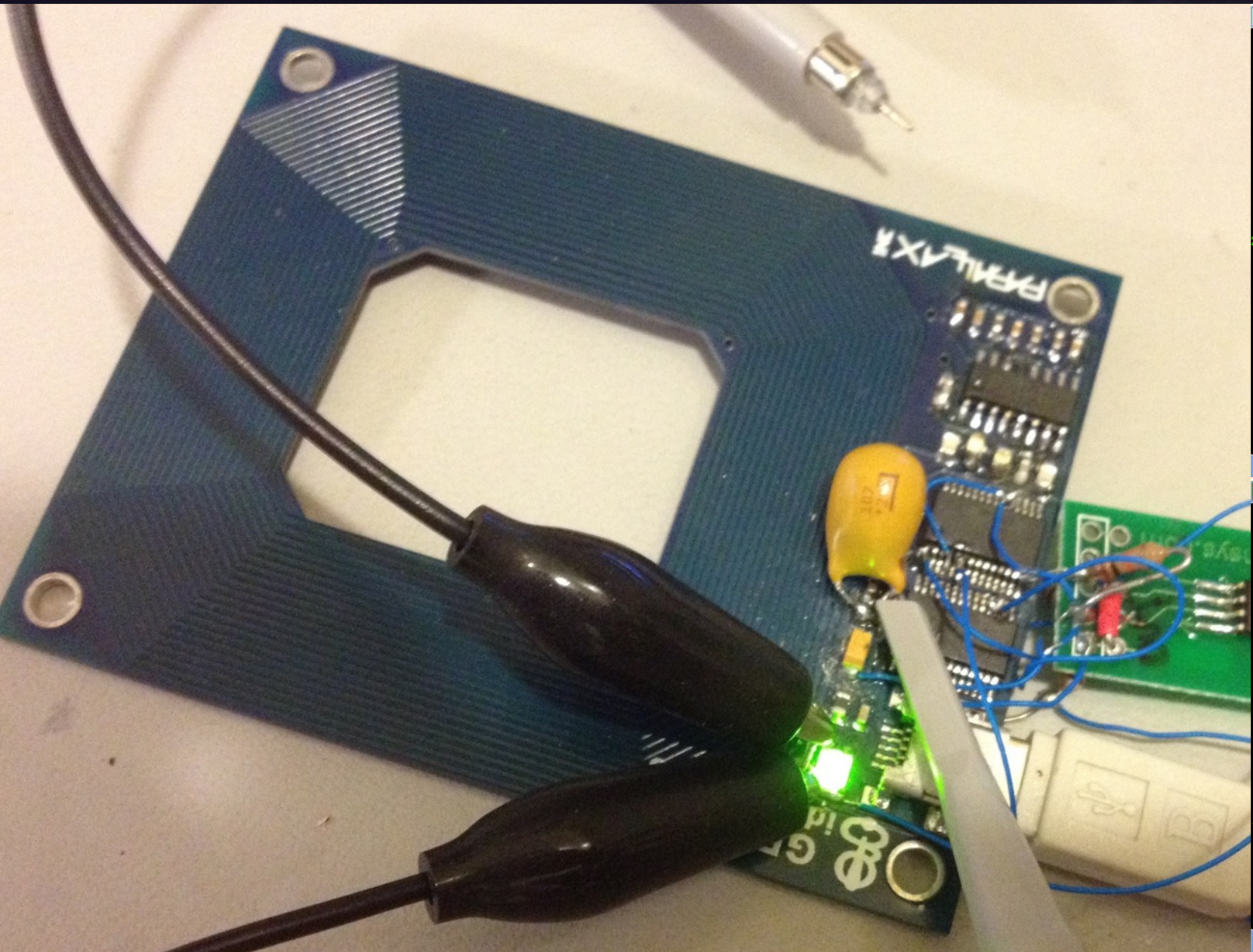


Verify Solder Connections

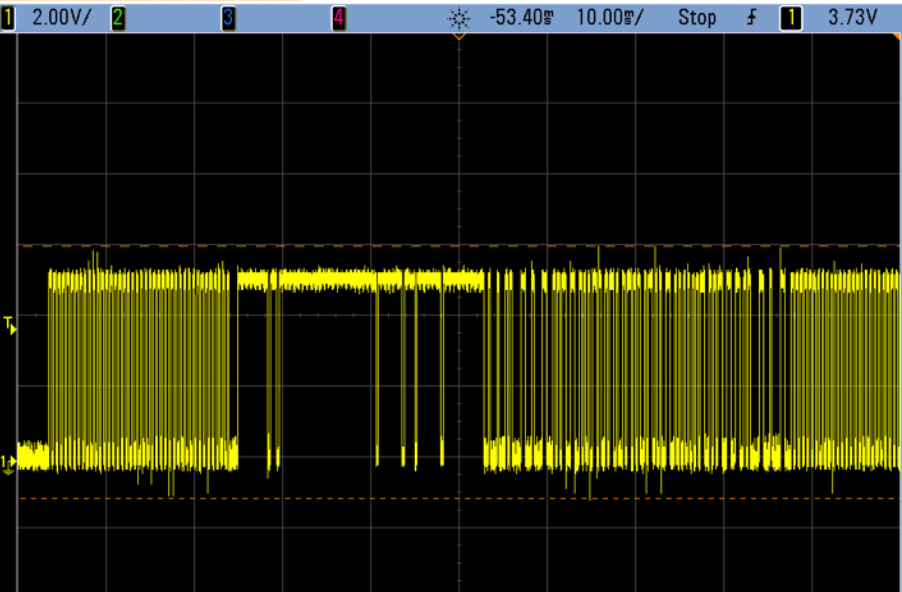
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Don't Overthink the Problem

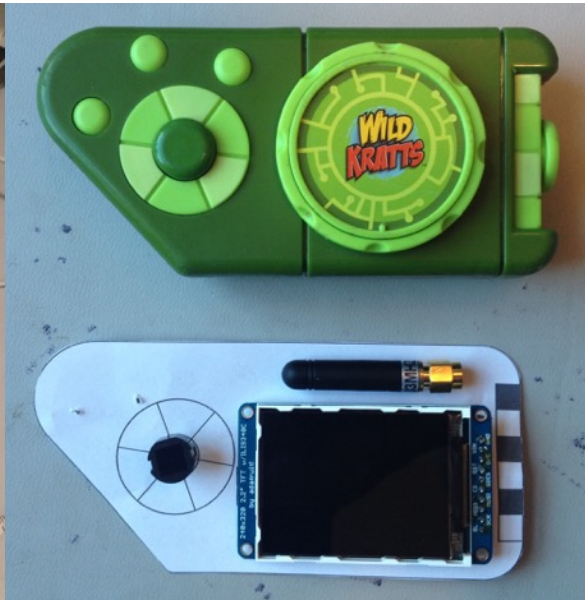
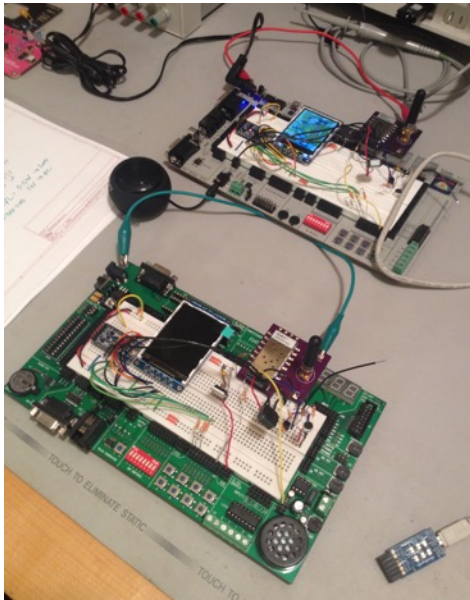
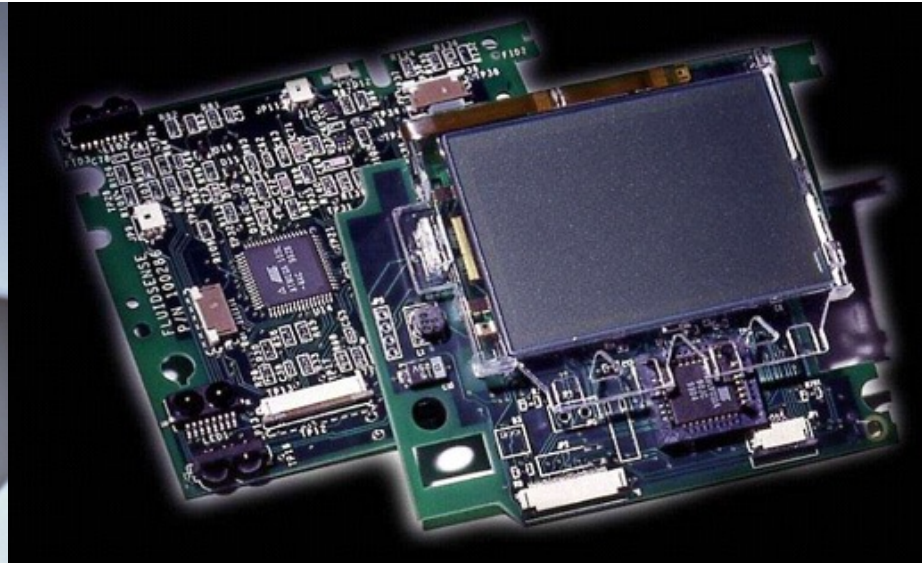
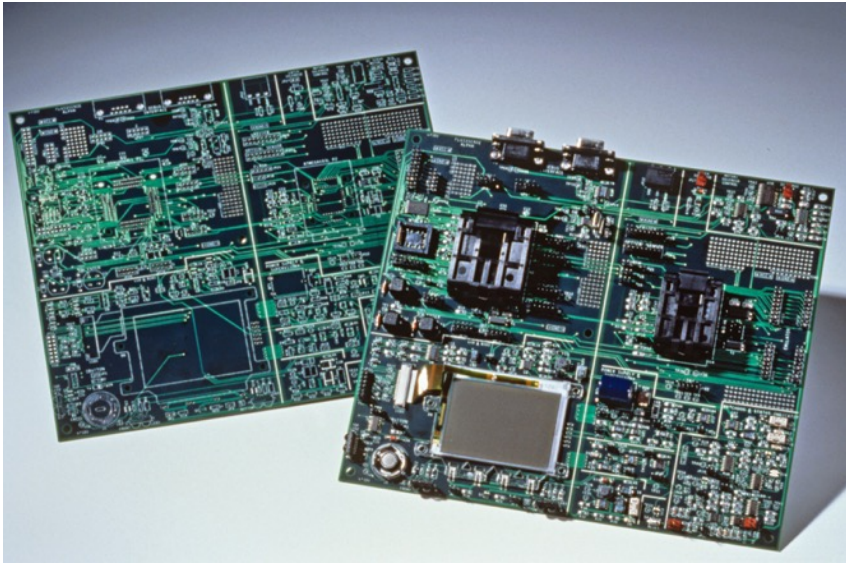


Freq(1):No signal Pk-Pk(1):No signal Pk-Pk(2): 5.88V Freq(2): 196Hz



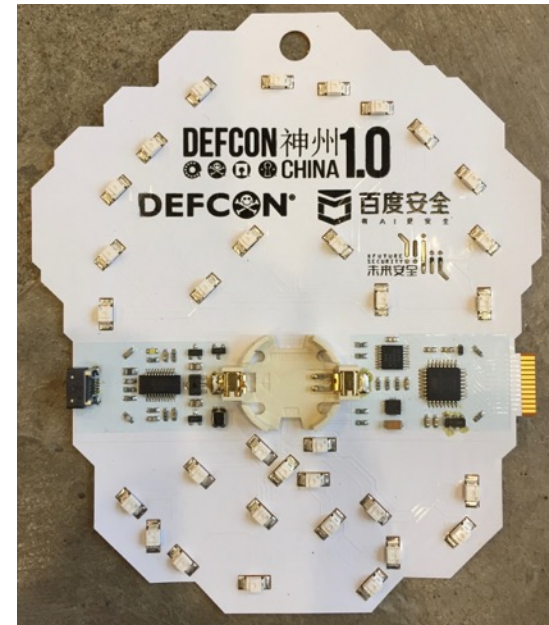
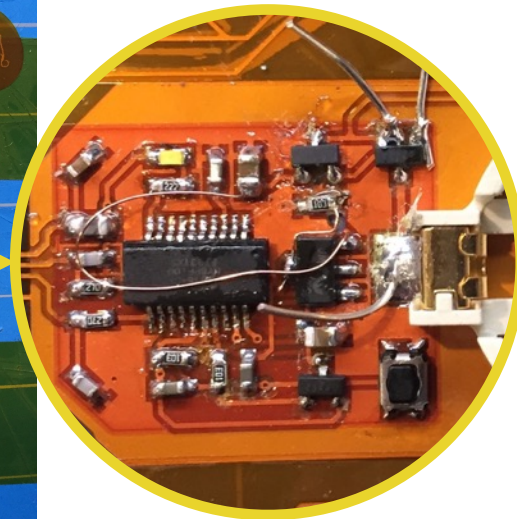
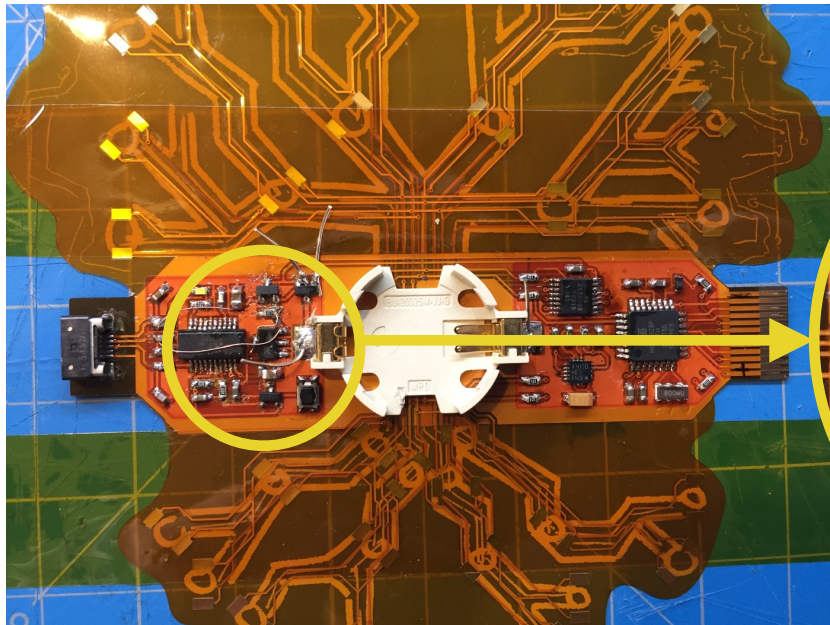
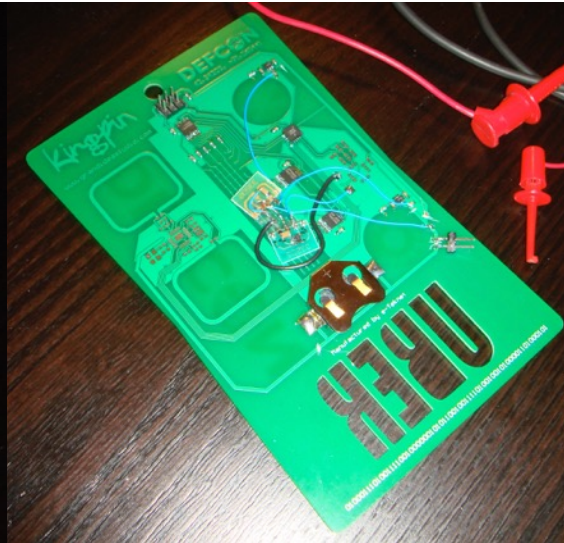
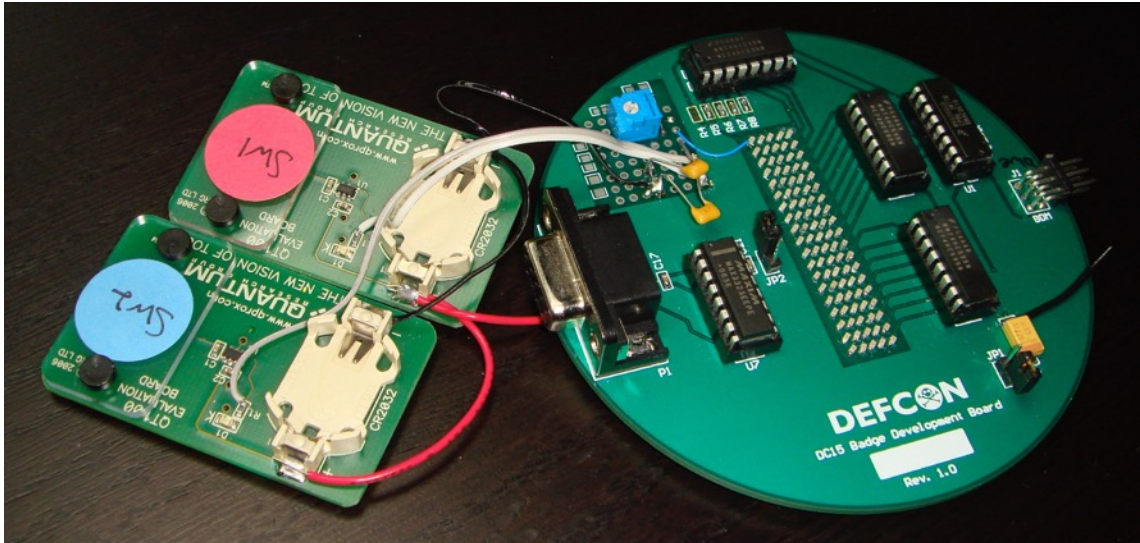
Freq(1): 204Hz Pk-Pk(1): 7.13V Pk-Pk(2):No signal Freq(2):No signal

Take Small Steps



Take Small Steps

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Design for Test





Etch away the copper clad
I am beholden

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Thank you!

