

NYIT Bears in VEX U (Team NYIT5)  
IEEE Student Branch at New York Institute of Technology  
New York, United States  
REC Foundation Online Challenges

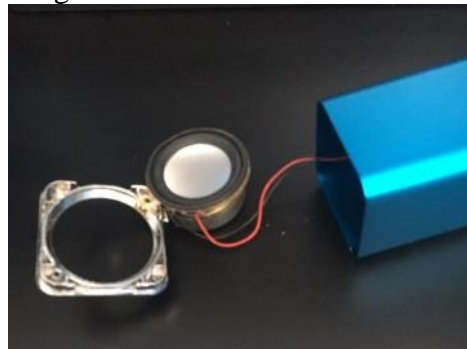
### **Texas Instruments Online Challenge: Music Angel**

For this project I choose to take apart a “Music Angel” speaker system since it had broken a while ago. One issue was that the speaker units themselves were cheaply glued to the aluminum casing. I did my best to figure out where any components would come from.



Upon observing the speaker, I see that it is an aqua blue color and that it was manufactured in China. Then I started disassembling.

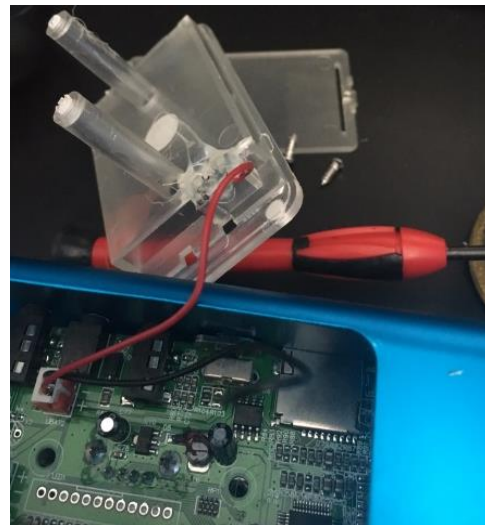
First I started by dismantling the speakers from their housing, which came off easily enough by just using brute force to break the glue bonds.



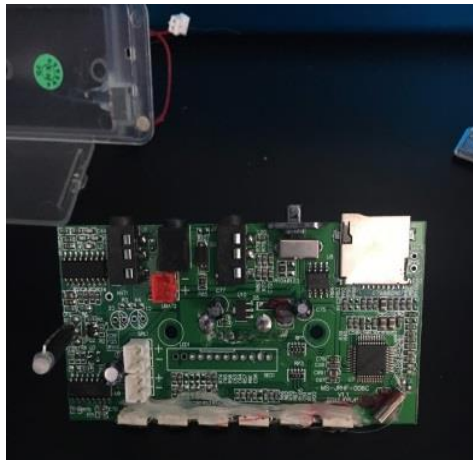
Next step was to take out the battery back located at the bottom of the speaker, easy enough to do. Turns out the battery is made by Nokia and is a discontinued product for their old phones.

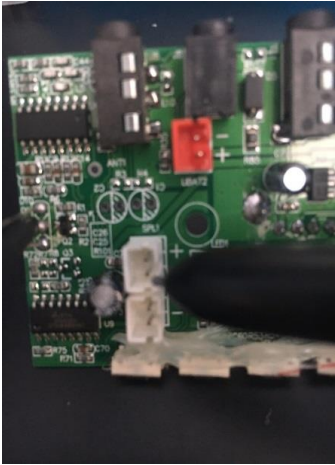


Next I went to take everything else out from the aluminum housing, I noticed two reasons why the speakers weren't working, but without a soldering station of my own, I had no way to fix them. The soldering job must not have been too great, because two important wires for transmitting power detached.

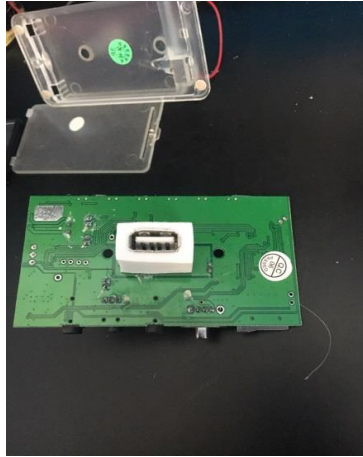


I managed to figure out how to safely detach the board and get all the components separated from each other and get my first good look at what was on the PCB. I noticed some hot glue along the bottom of the board where the button switches were and scraped it off so I could read anything written on the board.





Power Connectors For Speakers



USB port for reading mp3 players



Button switches

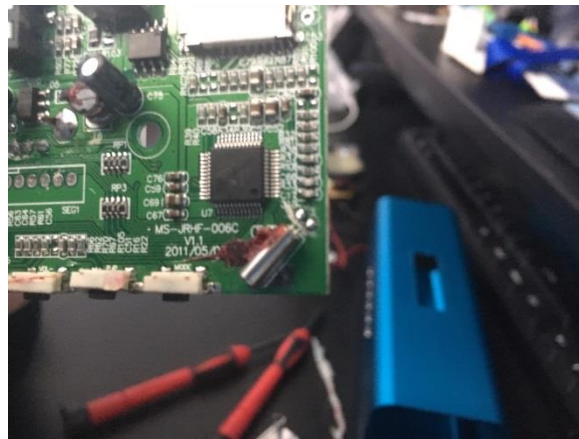


Power connector for battery



Other Side I/O ports

I noticed a few IC's on the board when I pulled it apart, unfortunately some of the IC's had either no markings, or incomplete markings (as in they were scratched off or covered up by something else, so looking up exact models was a challenge.



I couldn't find the chip above, as the model number was blocked out partially, and even through looking for a manufacturer symbol I had no luck in finding out what its purpose was, but my best guess was that this chip in particular must have been some kind of processor for the board.

I saw other IC's that looked much like 555 timers, but they were unmarked. I managed to find out what two of them were. One is produced by a company called STH based in China it seems. The site doesn't provide any more information as to what the Chip does. STH4985HS1 was the labeling of the chip, and the only thing I could gather was that this chip is largely produced and available to be sold in bulk. The chip does look like a 555 timer that I have worked with in the past.

Another chip that I saw was the SS12, which turns out is produced by Fairchild semiconductors. According to the data sheet it has the following applications, Low Voltage, High Frequency Inverters, Free Wheeling, and Polarity Protection. Based on the chip's location being close to the DC 5V port I'd assume it had to do with keeping voltage low and polarity protection.

The last chip I was able to make out was a variant of the Atmel AT24C04B EEPROM chip which according to its data sheet is responsible for holding small amounts of memory, basically like a little stick of RAM, holding only 16 bits of data at a time.

The few other IC's that were on the board seemed to be logic gates, or for helping read information off of the SD card slot and USB in port. I also noticed that each resistor was labeled throughout the board controlling the voltage for each individual logic circuit or power circuit. Unsurprisingly a few 100  $\mu$ F capacitors, which must be for storing small amounts of power for when the speaker must produce a larger boom for bass. There is one small cylindrical metal item soldered to the bottom of the chip (also with some red glue on it) which purpose is unknown, but my best guess would be that it is a capacitor or a diode of some sort. Unfortunately I didn't see any chips from Texas Instruments on the board, but it should be easy to interchange the existing IC's on the board and still function.

Links:

<http://www.jotrin.com/product/parts/STH4985HS1>

[https://en.wikipedia.org/wiki/List\\_of\\_integrated\\_circuit\\_manufacturers](https://en.wikipedia.org/wiki/List_of_integrated_circuit_manufacturers)

<https://www.fairchildsemi.com/datasheets/SS/SS12.pdf>

<http://www.atmel.com/images/doc5226.pdf>

<http://www.natthapol89.com/>