

Talking Skull Instructions

First let me thank you for attempting this project. I started this project 3 years ago and back then I knew nothing about programming Arduino or C code or anything. I still know very little and this was the vehicle I used to learn to program micro controllers.

I made several iterations of this and ultimately decided to go with a hybrid of a design by Mike North. His original design is available on his site buttonbanger.com under the tab, Jawduino. In order to complete this project, you are going to need some inexpensive modules and some basic soldering skills/equipment. We will be “hacking” one of the modules for this project.

Supplies:



Arduino Nano or Uno (I prefer Nano's because they are small and fit inside props easily)



DF mini MP3 player (sometimes called TF-16P) these are cheap, work good and the code is specific to this player.

Also a mini SD card with audio files that you want the jaw servo to “talk” to. These files need to be named properly as well. The file names should be 001, 002, 003 etc. as the player only recognizes numerical names in this format with the preceding zeros to 3 decimal places. You can have as many as 100 files if you want.



A KA2284 Module this is a small signal meter for audio devices and is the module we are going to hack to get our signal for the jaw to respond to.

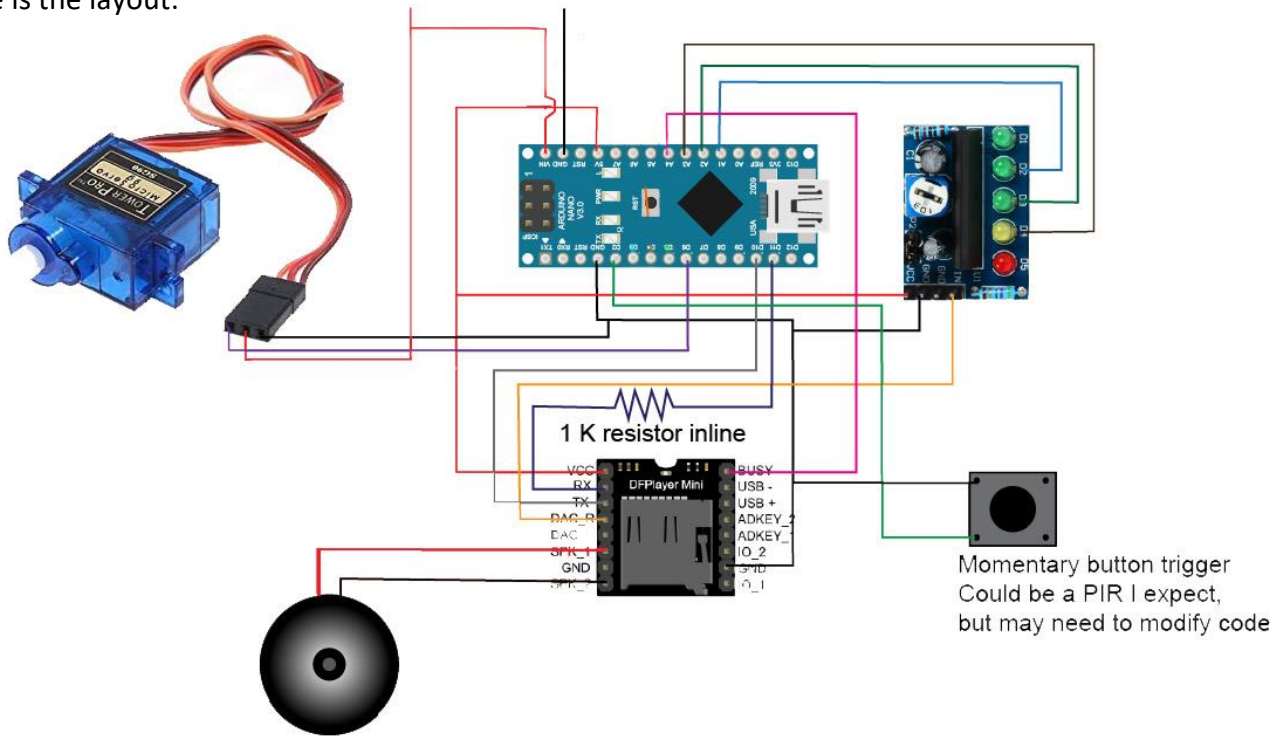
Also, we will need a speaker, hookup wires and a button or PIR motion detector.

I have not yet tried the PIR in the circuit, but it should work. You may need to invert the signal from it. Some PIR's have a jumper for this purpose. We are using a grounding of pin 2 to signal the start of a cycle.

Once the whole thing is working you have to tune the signal meter module using the onboard potentiometer to get the signal just right for the jaw movement. If you just fiddle with it while the audio is going you will get it looking good. I might add that the signal to the servo is meant to open the jaw, not close it. Meaning, the hardware of the jaw should be normally closed and opens when the audio starts getting louder on the hacked signal meter.

To 5V Power Supply

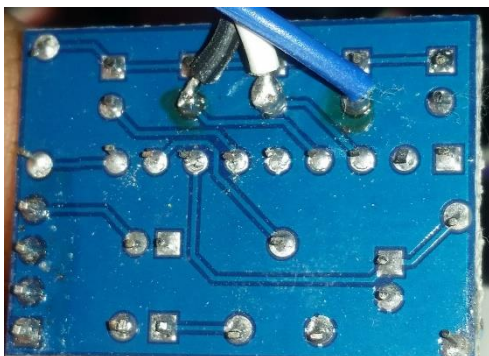
Here is the layout:



RX from the MP3 module has a 1K Resistor in-line and connects to D11 on the Arduino. The 1 K resistor in-line with RX is necessary to reduce major audio noise over the speaker. The rest of the connections are as follows: MP3 Tx = Arduino D10, MP3 Busy = Arduino A4, MP3 DAC-R = Input pin on KA2284 Module, Momentary Trigger button/PIR = Arduino D2, Servo Signal = D6. Everything needs a common Ground connection, so run a ground wire between the following: MP3 player, Switch/PIR, KA2284, Arduino, Servo. For Power the Arduino Has the ability to deliver 5V @ 1Amp. This is enough for small servos, but not big ones. Best practice is to power the servo and Arduino from a separate power supply. I recommend a DC-DC Buck converter module as they are inexpensive and will output 3 to 5 Amps depending on the model. Make sure to tune the Buck convertor to 5V output before connecting it up! To use one, you would just connect the ground to the previously described ground loop and Positive to the servo red wire (which is always the center of the 3) and to Arduino Vin. To power the other modules run a power loop from Arduino 5V to MP3 VCC and KA2284 VCC.

The speaker is small (less than 3 Watt) output.

The hack:



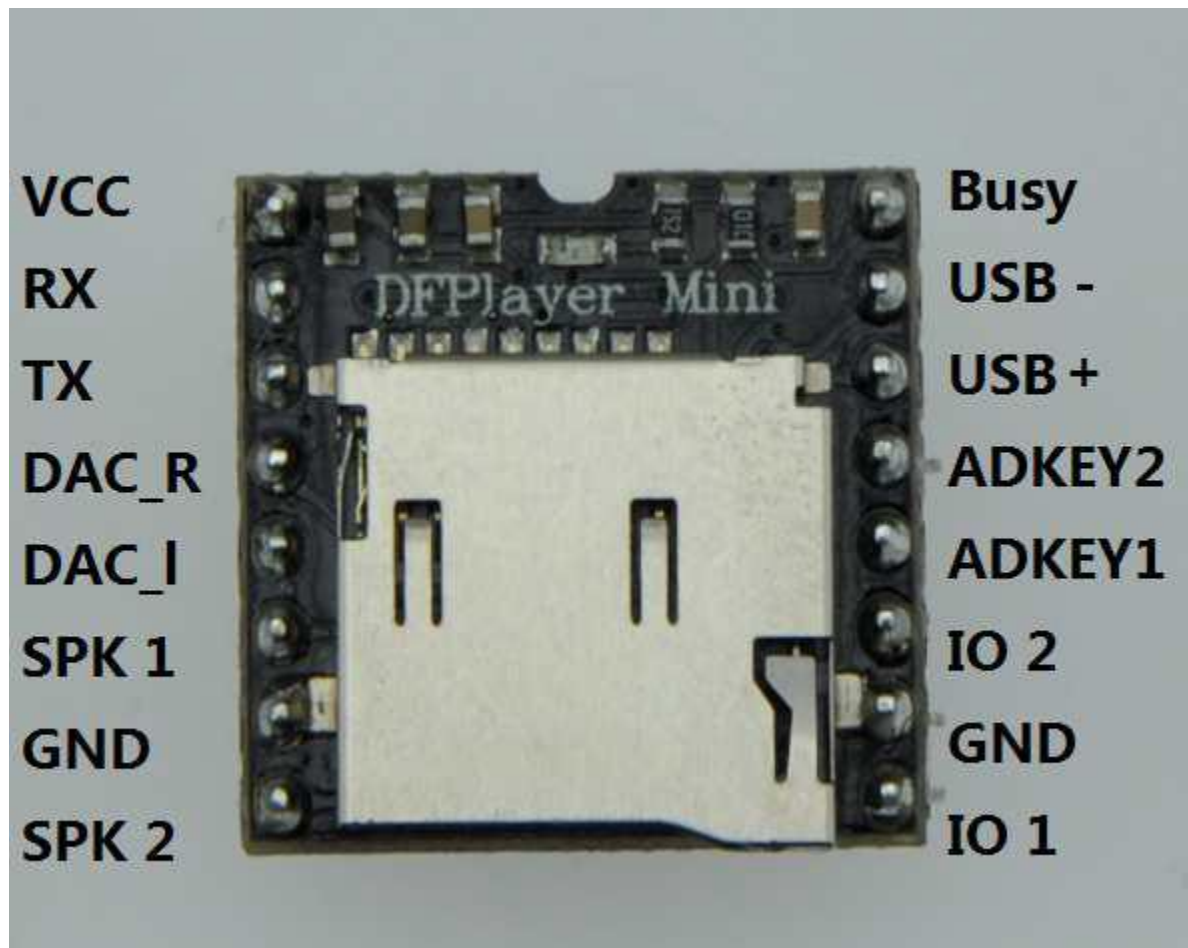
What you need to do to the KA2284 module is tie into the signal that goes to the 3 middle LED's. If you look on the back of the module (you may need a magnifying glass) you can see the circuit board traces coming from the IC chip to the LED's. These LED's connect to the IC and ground on their leads. You want to connect to the IC/LED side of the LED, NOT the LED/Ground side. You could even un solder the LED's and remove them which would leave you with a nice through hole to solder the wires to, but you do run the risk of

damaging the board more when you unsolder components. You decide. The bottom line is to get the output of the three channels from IC chip sent into the



Arduino for signal processing. The 3 wires from this hack need to get to the correct pins or this won't work. On the front the LED's are labeled D2, D3, and D4. They need to end up hooked up as follows: D2 connected to A1 on the Arduino, D3 connected to A2 on the Arduino, D4 connected to A3 on the Arduino.

Below is a pinout of the MP3 Player for reference:



That should be it, if you have problems or issues please let me know and I will do my best to help.

Kenny

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