Solar Powered Golf Cart With Speech Recognition

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Objectives:

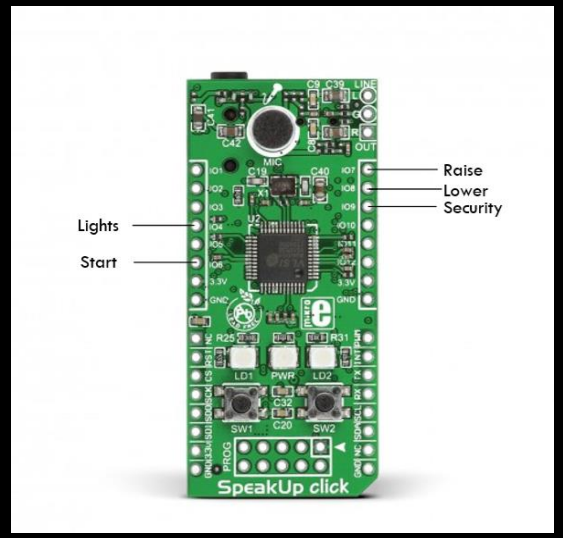
- Maintain a stable supply of power to the golf cart exclusively from the solar panels.
- Create a security protocol so that only trusted individuals can operate the golf cart.
- Configure SpeakUp Click board to different frequencies to allow for various individual speech recognitions.
- Seamlessly switch between voice command to golf cart functions, error free.

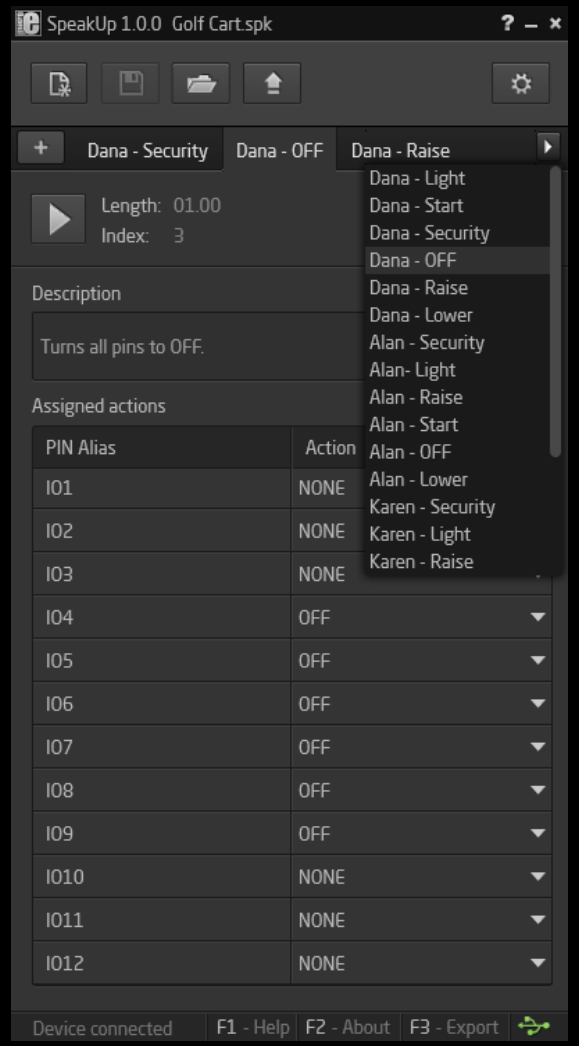
Materials:

- (1) 12V to 3.3V Regulator
- (1) SpeakUp Click Board
- (1) SN7408 logical AND gate
- (1) KIMAFUN 2.4G Wireless Microphone w/ Amplifier
- (4) 1K Ohm Resistor
- (4) 10K Ohm Resistor
- (4) 2N3904 Transistor
- (4) 1N4001 Rectifier Diode
- (4) 12V Power Relay

SpeakUp Click:

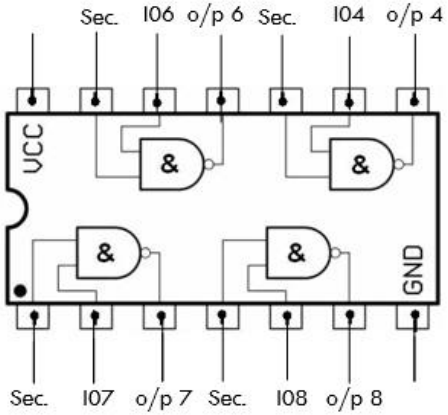
- SpeakUp Click board is configured to recognize individual speech frequencies.
- Five separate output pins on the board are configured to five different words: “raise”, “lower”, “Lights”, “Power”, and “Security”.
- A 12V to 3.3V regulator is connected to ensure that the board does not burn.





Logic AND Gate:

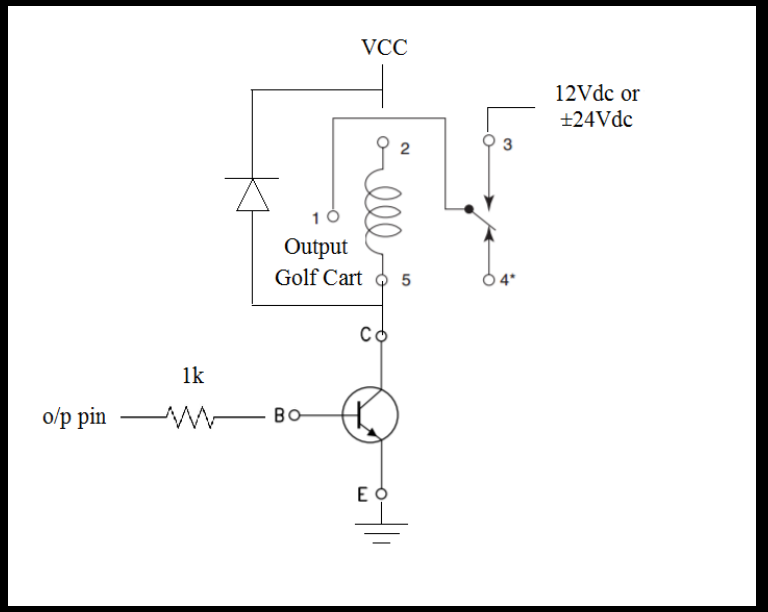
- To implement the security protocol, an AND logic gate was set up.
- “Security” goes into four of the inputs in conjunction to one of each of the other commands.
- Once “Security” is applied it will set all four inputs to high.
- From then on saying any of the other four commands will set each individual command to high.
- Once “Security” and the other command are both set to high the output will then be set to high.



Inputs		Output
Command	Security	o/p
0	0	0
0	1	0
1	0	0
1	1	1

Transistor & Relay Configuration:

- Once the output pin is activated it will go through a 1,000 Ohm resistor to regulate the current that goes into the 2N3904 transistor.
- With the output pin being set to high, it will saturate the transistor to trigger the 12Vdc power relay.
- Once the relay is triggered the switch will be initiate and “Normally Open” will be closed.
- A Rectifier diode is set up in parallel to the relay for protection, as well as to regulate the current.



Start & Lights:

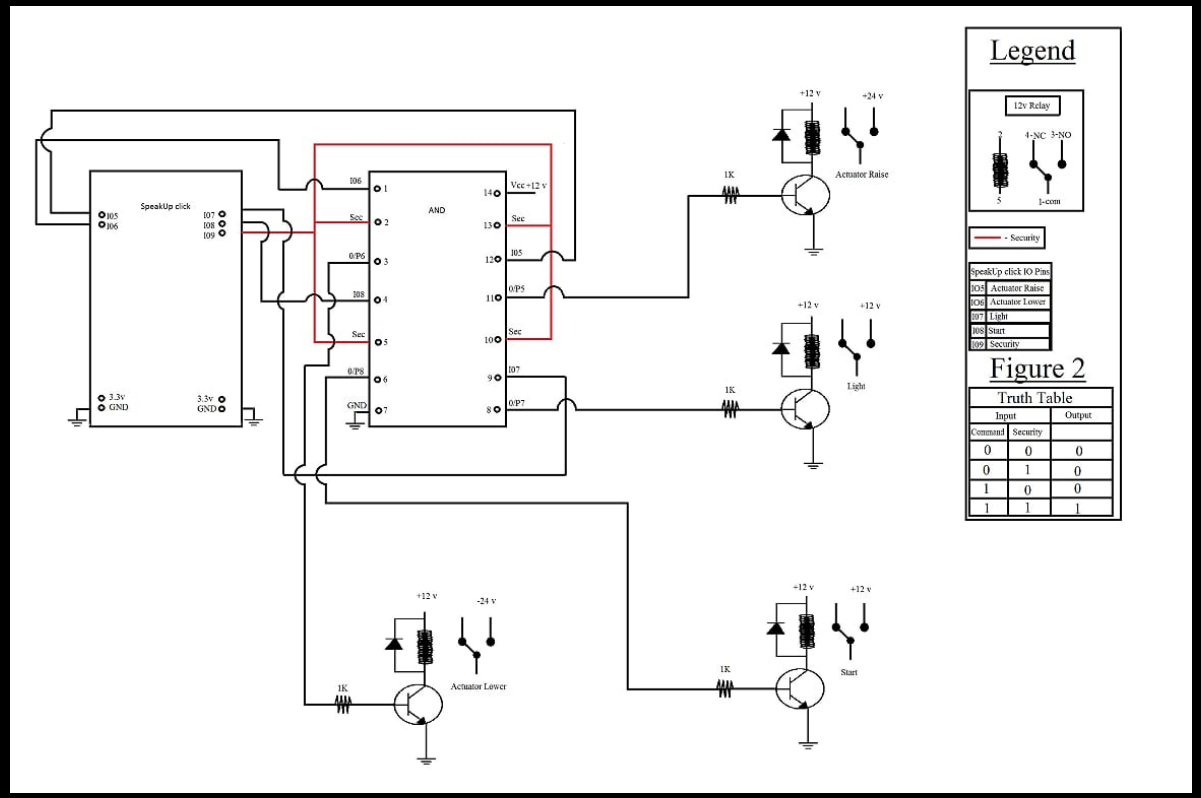
- “Power” and “Light” are powered by 12Vdc
- In this configuration “Normally Open” is connected to 12Vdc and once it’s closed the outputs will be connected to their respected commands

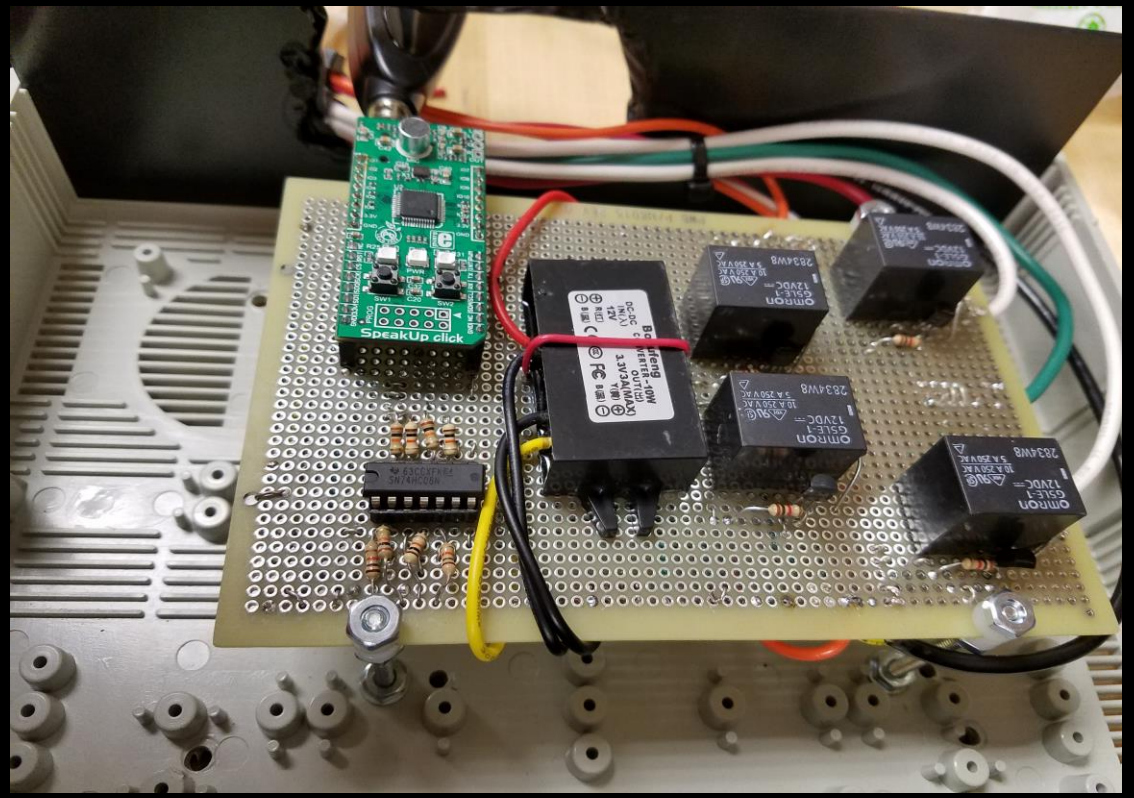
  i.e.: to the lights and the ignition.

Actuators:

- “raise” and “lower” are powered by a +24Vdc and -24Vdc.
- In this configuration “Normally Open” is connected to each voltage source respectively and once it's closed both the outputs will be connected to the actuators.
- The positive and negative 24Vdc are coming from three of the 8Vdc batteries, connected in series, located in the golf cart.
- A “Stop” command was also implemented as an extra precaution, to ensure that “Raise” and “Lower” do not work concurrently.

Final Product:





Lower Video:

Final Video: