AC FLUCTUATION TIMER AND COUNTER

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BACKGROUND

- Commercial Power Failure
  - Top 1 Fault Contributor (22%) as of 2014

OBJECTIVES

- To develop a device that counts the number of times the commercial power fluctuates
- To develop a system that can store time and date when a fluctuation eventuates
- To develop a system that measures the time duration of a fluctuation occurrence

DEVICE

AC Fluctuation Timer and Counter

- Microcontroller-based
- Counts the number of fluctuations occurred
- Saves the time and date
- Measures the time duration

BENEFITS

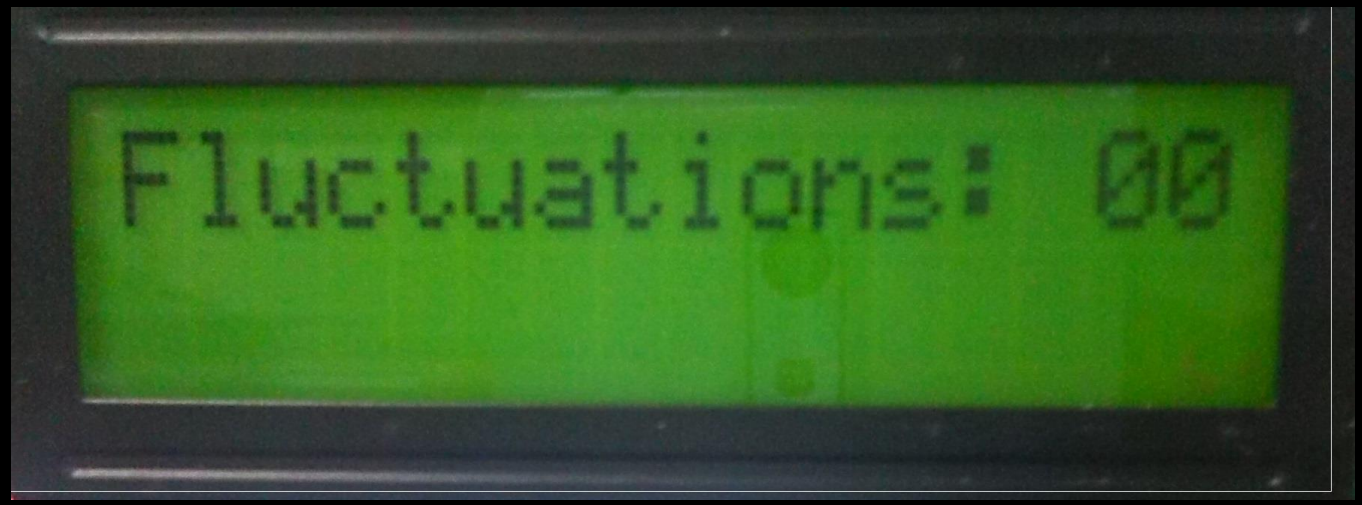
- Precisely records data of a fluctuation (e.g. time, date & duration)
- Helps in detecting cause of trouble

FEATURES

- Fluctuation Timer and Counter

FEATURES

- Total Fluctuation Display



FEATURES

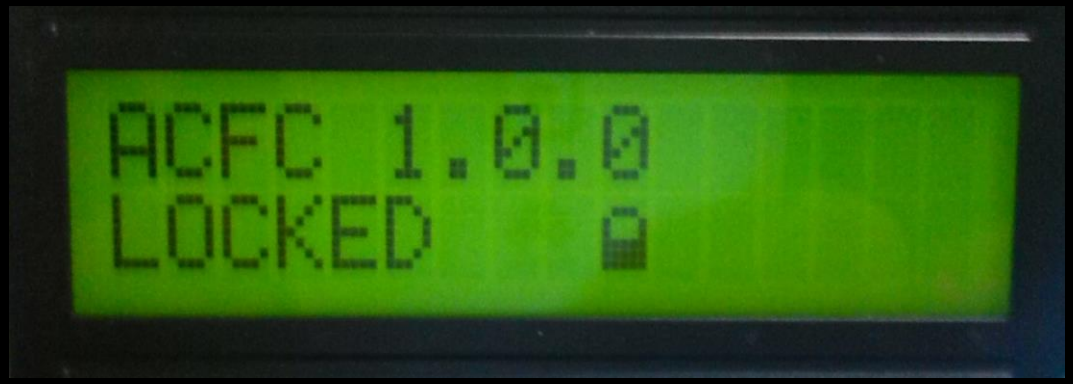
- System Time and Date

FEATURES

- Settings

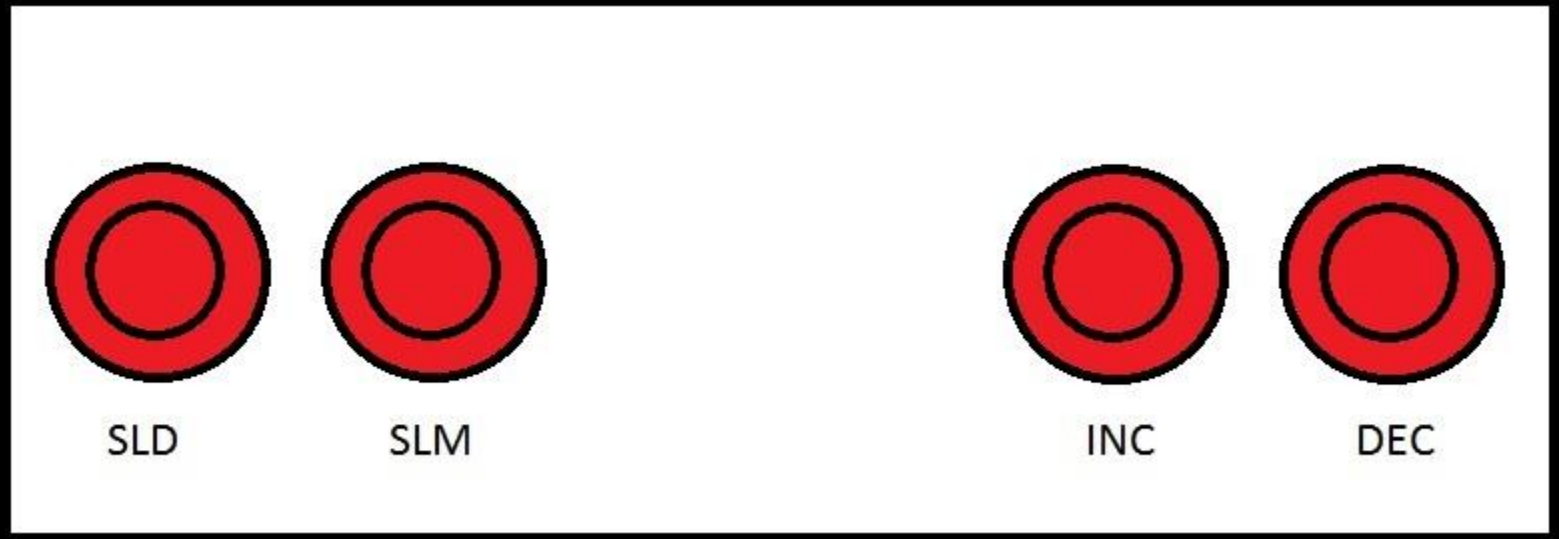
FEATURES

- Lock/Unlock



CONTROLS

- Buttons (INC = UP, DEC = DOWN)



CONTROLS

- SLD – Select Display
  - Selects what data should be displayed
  - Button Loops:
    - 1st – Fluctuation Timer and Counter (START)
    - 2nd – Total Fluctuation Counts
    - 3rd – System Time and Date
    - 4th – Settings
    - 5th – Go back to START

CONTROLS

- SLD – Select Display

CONTROLS

- SLM – Select Mode
  - Enables/disables editing of Settings and System Time & Date
  - Button Loops:
    - For System Time & Date
      * 1st – Month (START)
      * 2nd – Day
      * 3rd – Year
      * 4th – Hour
      * 5th – Minute
      * 6th – Second
      * 7th – Disable (go back to START)

CONTROLS

- INC – Increment
  - Control button for editing Settings and System Time & Date (Increases a unit of data by 1)
- DEC – Decrement
  - Same function as Increment, only that it decreases a unit of data by 1

CONTROLS

- Lock
  - Puts device into lock mode
  - SLD + SLM buttons
- Clear
  - Puts device into sleep mode
  - SLD + INC buttons

CONTROLS

- Reset
  - Resets data gathered by the device
  - SLD + DEC buttons

INSTALLATION

- Programs used:
  - Arduino IDE 1.0.6 (Plug and Play)
  - Prolific PL2303 USB-to-Serial Converter Driver
    - Needs to be installed

INSTALLATION

- Setting up (files can be found at Peripherals folder)
  - Install Prolific PL2303 USB-to-Serial Converter Driver
  - Copy Arduino IDE 1.0.6 from(Peripherals/arduino-1.0.6)
  - Copy "-gizDuino" (from Peripherals/gizDuinoPatch)folder to Arduino root folder (default: arduino-1.0.6-windows) /arduino-1.0.6/hardware folder

INSTALLATION

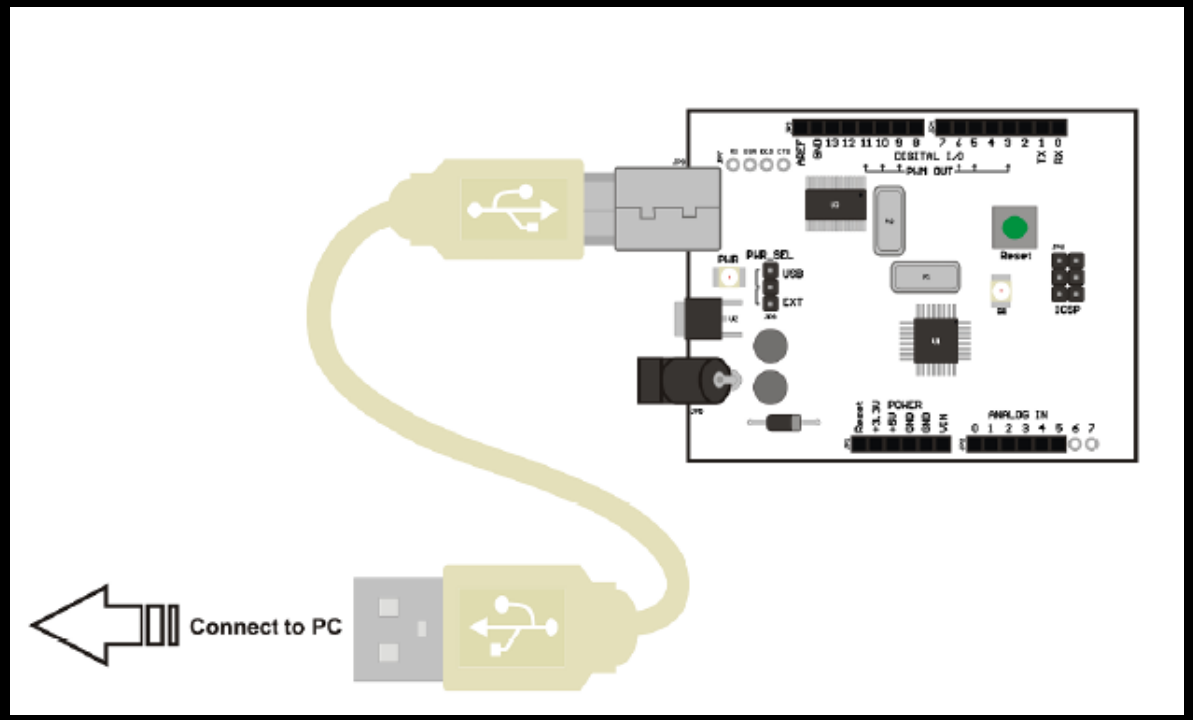
- Copy all files from Libraries folder to Arduino Root Folder/arduino-1.0.6/libraries

INSTALLATION

- Uploading Source Code (can be found at Source Code Folder)
  - Printer USB Connector

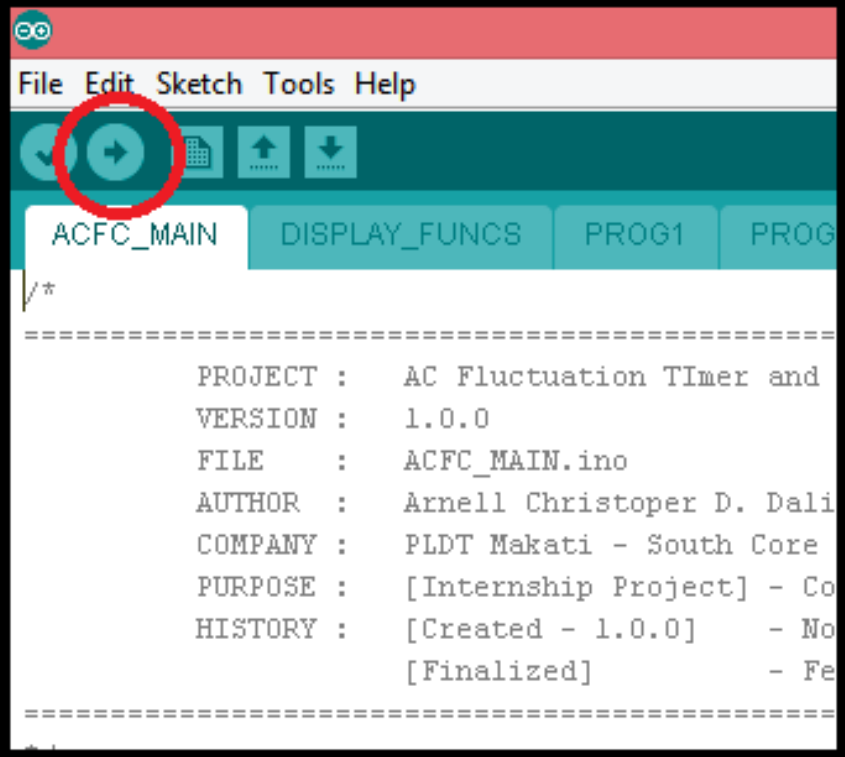
INSTALLATION

- Connect USB Connector from gizDuino to PC



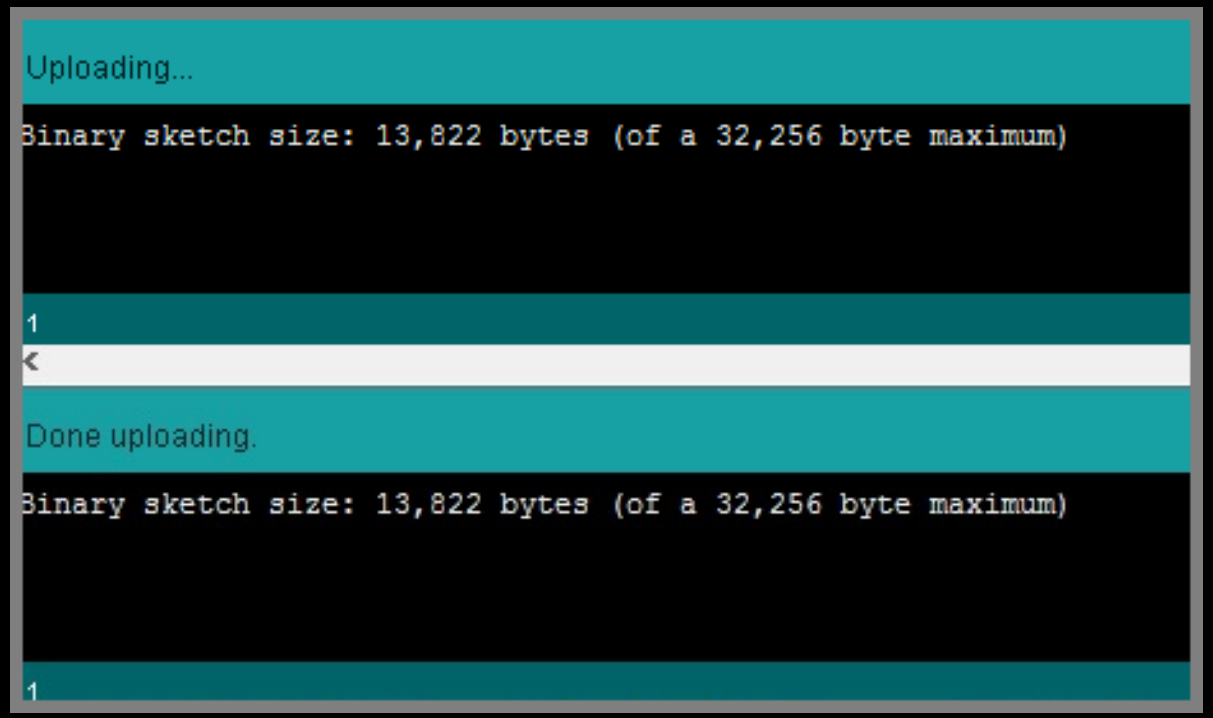
INSTALLATION

- Open ACFC_MAIN (can be found at Source Code folder)
- Upload Code



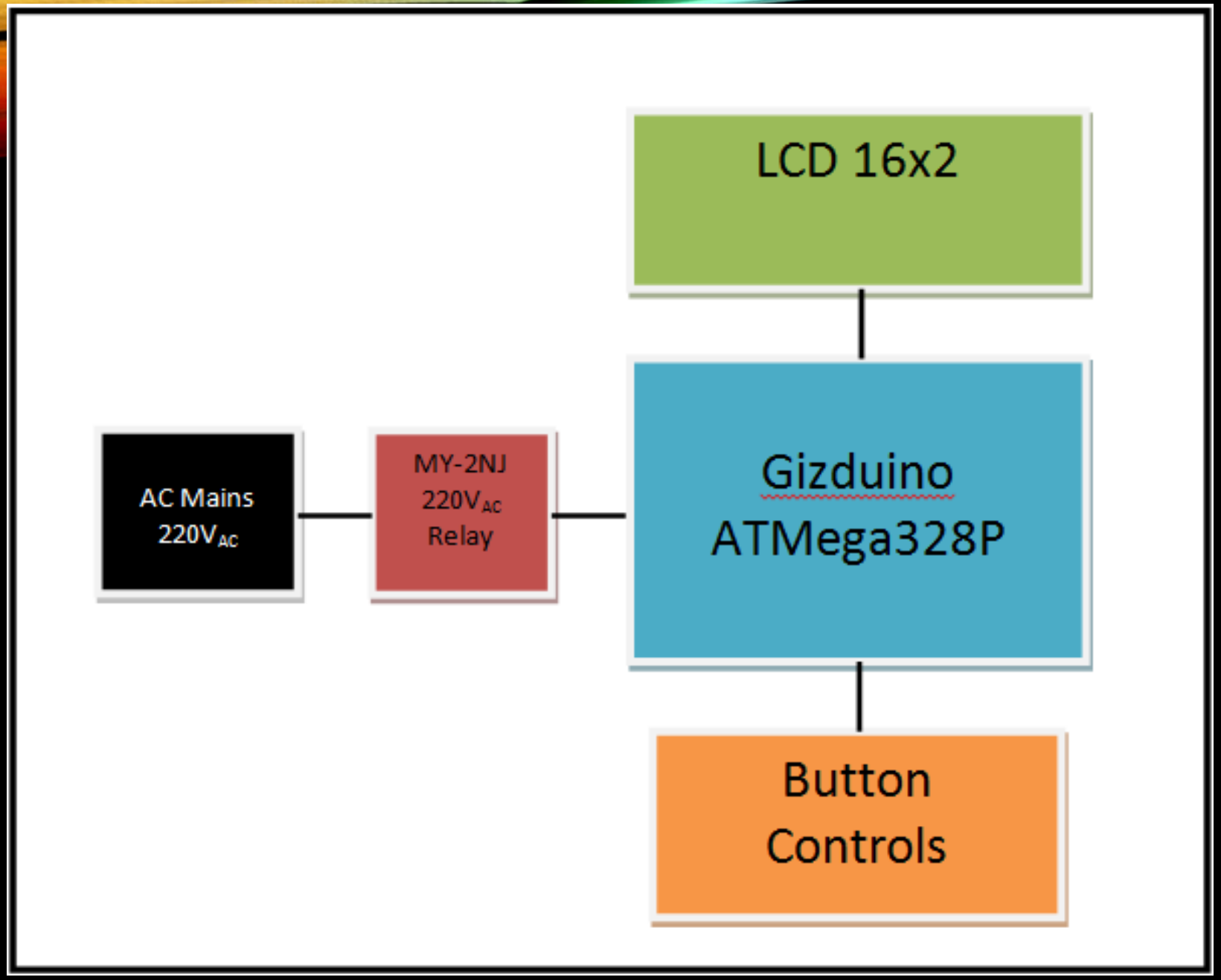
INSTALLATION

- Upload Code

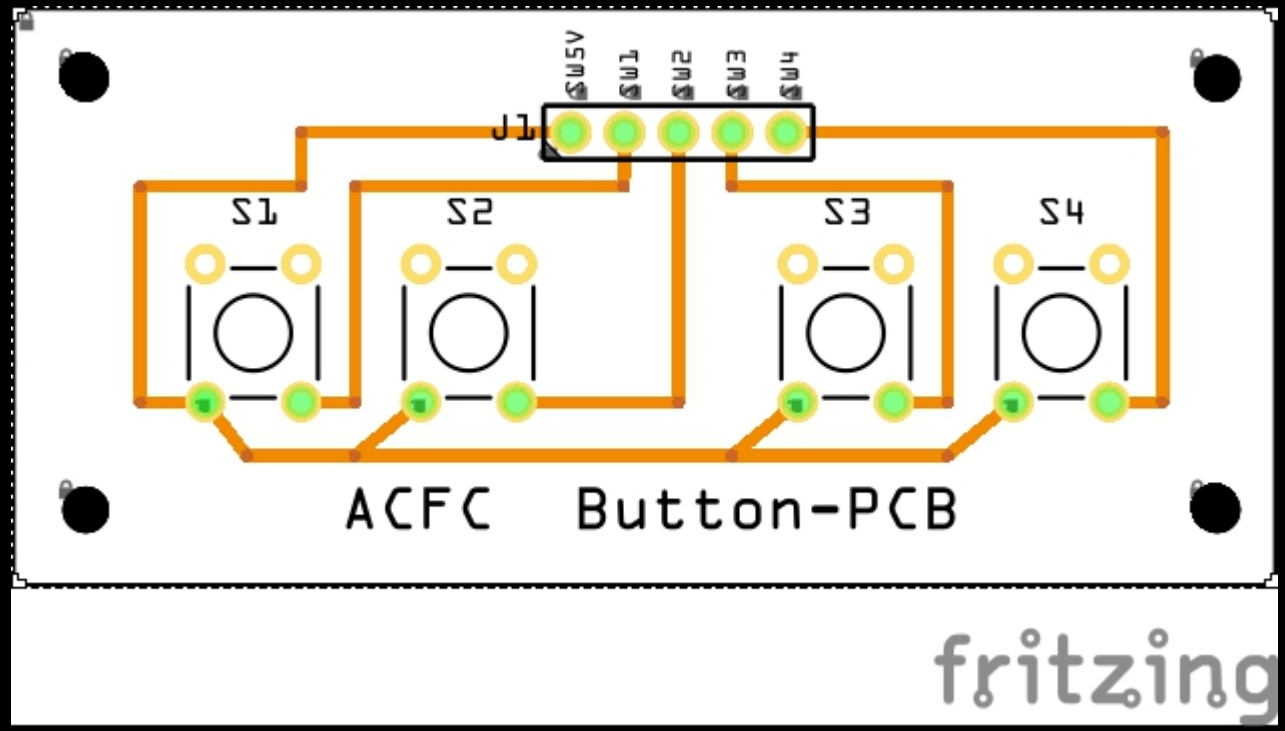


MECHANICS

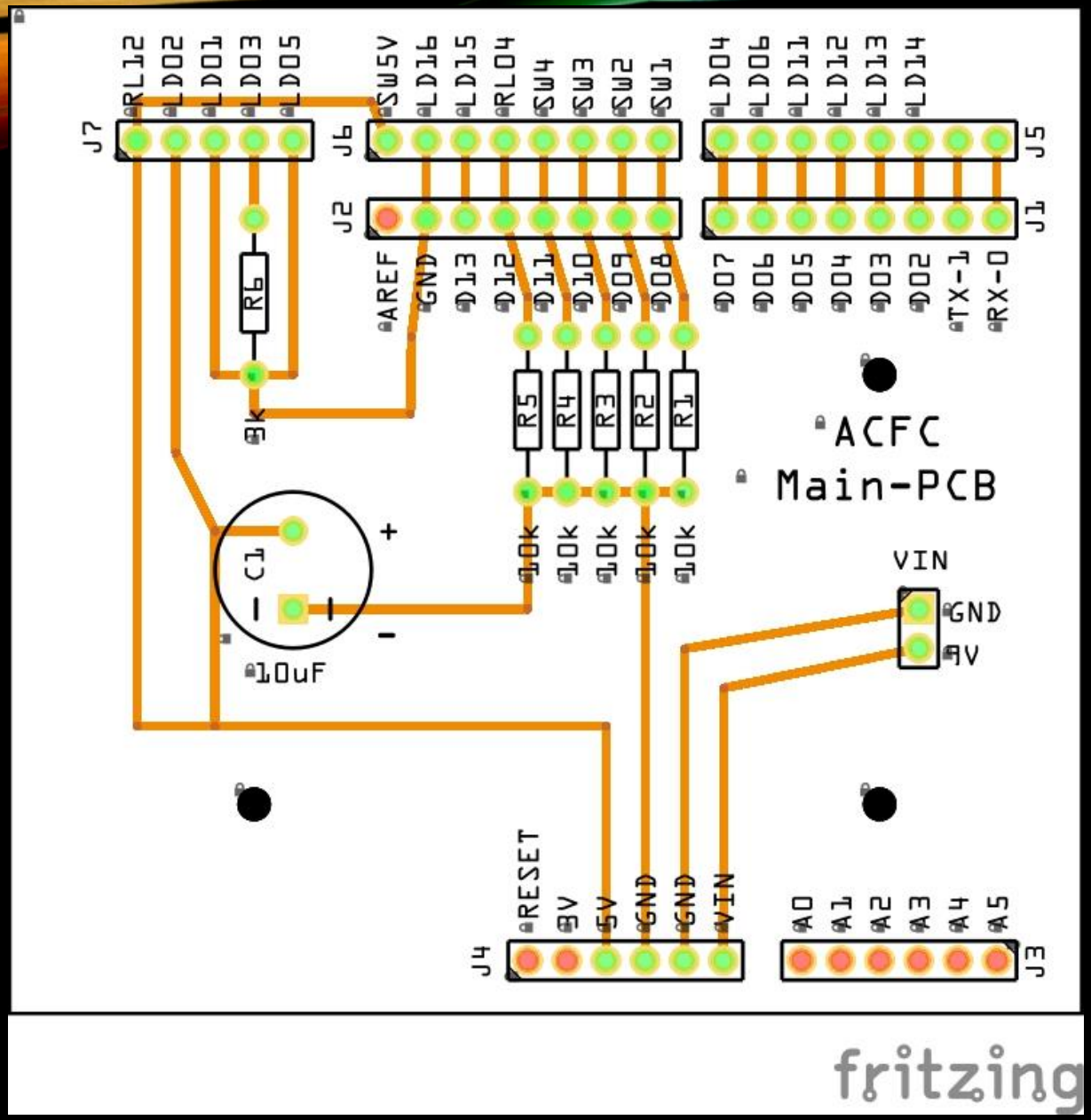
- Main Components:
  - Gizduino ATmega328P
  - MY 2NJ 2PDT Relay
  - LCD 16x2 Screen
  - Button Controls


LCD 16x2
AC Mains
220V AC
MY-2NJ
220V AC
Relay
Gizduino
ATMega328P
Button
Controls

LAYOUT



LAYOUT


J7
RL12
LD02
LD01
LD03
LD05
J6
SW5V
LD16
LD15
RL04
SW4
SW3
SW2
SW1
J5
LD04
LD06
LD11
LD12
LD13
LD14
J2
AREF
GND
D13
D12
D11
D10
D09
D08
J1
D07
D06
D05
D04
D03
D02
TX-1
RX-0
R6
8k
R5
R4
R3
R2
R1
10k
10k
10k
10k
10k
C1
10uF
ACFC
Main-PCB
VIN
GND
9V
J4
RESET
3V
5V
GND
GND
VIN
J3
A0
A1
A2
A3
A4
A5
fritzing

ETCHING

- PCB Etching Manual

ETCHING

ETCH FILES (Essentials/PCB)

- Main PCB Copper Etch
- Button PCB Copper Etch

PARTS LIST

COMPONENT	PRICE	QUANTITY	TOTAL PC/COMPONENT
Gizduino ATmega328P	662.00	1	662.00
LCD 16x2 (Hitachi HD44780 Driver Compatible)	200.00	1	200.00
OMRON MY-2NJ 220VAC Relay	150.00	1	150.00
1-PIN Female-to-Female Connector	5.00	12	60.00
4-PIN Female-to-Female Connector	20.00	2	40.00
9V Battery Snap Connector	5.00	1	5.00
9V Battery	150.00	1	150.00
8-PIN Header (Female)	2.50	4	10.00
6-PIN Header (Female)	2.00	2	4.00
40-PIN Header (Male)	12.50	1	12.50
5-PIN Header (Male-Long)	0.25	1	0.25
Tact Switch	2.50	4	10.00
Resistor 3kΩ	0.25	4	1.00
Resistor 10kΩ	0.25	5	1.25
Solid Wire (Quantity in meters)	5.50	3	16.50
PCB 60x28mm	5.00	1	5.00
PCB 66x70mm	15.00	1	15.00
AC Power Plug	40.00	1	40.00
Panel Mount Fuse	10.00	1	10.00
Fuse 10A	20.00	1	20.00
Capacitor 10uF	5.00	1	5.00
	TOTAL		1417.50

PARTS LIST

OTHERS			
Item	Price	Quantity	Subtotal
Glossy Paper (per 20 pcs)	50.00	1	50.00
Ferric Chloride (4 oz)	100.00	1	100.00
		TOTAL	150.00