

HACKSUNG

WASHING MACHINE OS



TUTORIAL GUIDE

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IMPORTANT

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INTRO

After 3 years, my Samsung WS1702 washing machine started to present an erratic behavior. Several technicians came with different diagnostics (motor carbons, motor coil, cables, electronic board) but after paying and fixing, the washing machine still doesn't work and no one understood why. Sometimes screen displayed a cryptic error E-03 and that could mean, almost everything.

Facing trash time, it didn't hurt to open the big appliance, right?

I've found out that my washing machine AC motor has 7 pins (I was expecting 3 to be honest), so I had to learn a little about these motors. It was required to make a bridge between 2 pins (carbon and phase), put AC over other 2 and the motor came to life at full speed. Then I've identified valves, measure them, I've applied AC and they



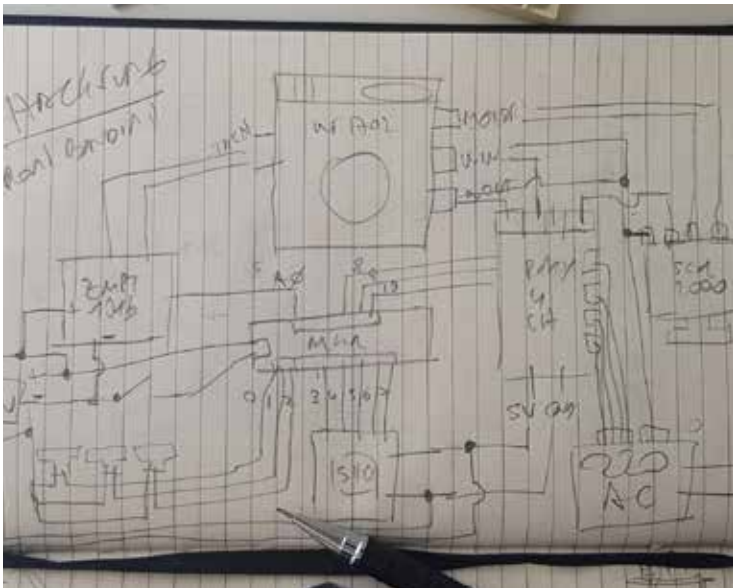
also seemed to be working.

So... motor ok, pumps ok... it seems just another case of planned obsolescence in the electronic part.

PARTS

For this project the following parts are used:

- Arduino MKR WiFi
- Voltage regulator SCR 2000W
- 4 channel Relay
- Nokia 5110 Screen
- Zmpt101b AC measure module
- 3 push buttons



- 1 switch
- 3d printed case

CIRCUIT

Nokia 5110 connected to Arduino digital pins 3,4,5,6,7

Buttons to GND and digital pins 0, 1, 2,

ZMPT101b module to GND, 5V and A0

4 Channel Relay to digital pins 8,9,10,11, GND and 5V

SCR 2000W module between motor and Relay

HACKING

I've recently won an Arduino MKR in a contest – Original Arduinos are not sold in Argentina – and I've decided this project worth it. After adding a 4 channel relay and some buttons

I was able to manually control the motor and valves. But... motor at full speed still needed a workaround. With a Voltage Control board SCR 2000W, motor was able to rotate at lower speeds as well: for example, slow movements to move clothing when water was coming in and full speed to dry clothing later.

I've added a Nokia 5110 screen and connected



the MKR to my WiFi router, so when drying is finished, a notification is sent to the entire family through a Telegram group. I've added an Extras submenu with dollar quotes, stats and... a “Will it

run Doom?” section.

I’m now solving some issues related to



automation. One of them is that motor power should be based on the weight. With certain motor voltage, some clothing and little water, motor goes full speed. With more clothing and water, it didn’t even start. So, it is required to measure motor RPM and adjust the voltage control accordingly. There is a tachometer included in the motor but readings are around 40v AC, so I’ve added a Zmpt101b board to be able to read those values through Analog port.

Another thing to solve is motor reverse. The bridge has to be changed and one AC has to be assigned to another motor pin, so a 4 channel relay is not enough. I need at least 2 more channels and I could use also 2 more water in valves (hot water and pre washing smooth)

CODE

ARDUINO

```
/******
```

```
Hacksung, control unit for Washing Machine
```

```
Roni Bandini @RoniBandini
```

```
Buenos Aires, Dec-2020
```

```
Version: 0.1
```

```
(Still testing version 1 with tachometer A0 readings and  
voltage control for motor and automatic cycles)
```

```
*****/
```

```
#include <Adafruit_GFX.h>
```

```
#include <Adafruit_PCD8544.h>
```

```
#include <SPI.h>
```

```
#include <WiFinINA.h>
```

```
Adafruit_PCD8544 display = Adafruit_PCD8544(7, 6, 5, 4, 3);  
// pin 7 - Serial clock out (SCLK) // pin 6 - Serial data out  
(DIN) // pin 5 - Data/Command select (D/C) // pin 4 - LCD  
chip select (CS) // pin 3 - LCD reset (RST)
```

```
// Debounce buttons
const int BUTTON_PIN = 0;
const int BUTTON_PIN1 = 1;
const int BUTTON_PIN2 = 2;
const int DEBOUNCE_DELAY = 75;
int lastSteadyState = HIGH;
int lastSteadyState1 = HIGH;
int lastSteadyState2 = HIGH;
int lastFlickerableState = HIGH;
int lastFlickerableState1 = HIGH;
int lastFlickerableState2 = HIGH;
int currentState;
int currentState1;
int currentState2;
unsigned long lastDebounceTime = 0;
unsigned long lastDebounceTime1 = 0;
unsigned long lastDebounceTime2 = 0;
```

```
// Relay pins
int relayMotor1 = 8;
int relayWaterIn = 9;
int relayWaterOut = 10;
int relayMotor2 = 11;
```

```
// state variables
int waterIn=0;
int waterOut=0;
int motor1=0;
int screenCursor=1;
int menuLevel=0;
```

```
// WiFi
```

```
char ssid[] = "SSID";
char pass[] = "PASSWORD";
int status = WL_IDLE_STATUS;
char server[] = "api.telegram.org";
WiFiClient client;
```

```
const unsigned char logo [] PROGMEM = {
// 'hacksung', 84x48px
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x07, 0x38, 0xf0, 0x38, 0x73, 0x8e,
0x1c, 0xee, 0x30, 0xe0, 0x00, 0x07, 0x39, 0xf0, 0xfc, 0x73,
0xbf, 0x9c, 0xef, 0x31, 0xf8, 0x00,
0x07, 0x39, 0xf8, 0xfe, 0x73, 0xbf, 0x9c, 0xef, 0x33, 0xf8,
0x00, 0x07, 0x39, 0xf9, 0xfe, 0x73,
0xbf, 0x9c, 0xef, 0x33, 0xfc, 0x00, 0x07, 0x39, 0xf9, 0xee,
```

0x77, 0x3b, 0x9c, 0xef, 0x33, 0xbc,
 0x00, 0x07, 0x39, 0xf9, 0xce, 0x77, 0x3b, 0x9c, 0xef, 0x73,
 0xbc, 0x00, 0x07, 0x39, 0xf9, 0xce,
 0x77, 0x3b, 0x9c, 0xef, 0x73, 0xbc, 0x00, 0x07, 0x39, 0xd9,
 0xce, 0x7e, 0x3c, 0x1c, 0xef, 0xf3,
 0xbc, 0x00, 0x07, 0x39, 0x99, 0xce, 0x7e, 0x3e, 0x1c, 0xef,
 0xf3, 0x80, 0x00, 0x07, 0xf9, 0x99,
 0xc0, 0x7e, 0x3e, 0x1c, 0xef, 0xf3, 0x80, 0x00, 0x07, 0xf9,
 0x99, 0xc0, 0x7e, 0x1f, 0x1c, 0xef,
 0xf3, 0xbc, 0x00, 0x07, 0xf9, 0x99, 0xc0, 0x7e, 0x0f, 0x9c,
 0xef, 0xf3, 0xbc, 0x00, 0x07, 0xfb,
 0x9d, 0xce, 0x7f, 0x0f, 0x9c, 0xef, 0xf3, 0xbc, 0x00, 0x07,
 0x3b, 0x9d, 0xce, 0x7f, 0x07, 0xdc,
 0xef, 0xf3, 0x9c, 0x00, 0x07, 0x3b, 0xfd, 0xce, 0x7f, 0x3b,
 0xdc, 0xee, 0xf3, 0x9c, 0x00, 0x07,
 0x3b, 0xfd, 0xce, 0x77, 0x3b, 0xdc, 0xee, 0xf3, 0x9c, 0x00,
 0x07, 0x3b, 0xfd, 0xce, 0x77, 0x39,
 0xdc, 0xee, 0xf3, 0x9c, 0x00, 0x07, 0x3b, 0xfd, 0xee, 0x77,
 0xbb, 0xdd, 0xee, 0x73, 0xbc, 0x00,
 0x07, 0x3b, 0x9d, 0xfe, 0x73, 0xbf, 0xdf, 0xee, 0x73, 0xfc,
 0x00, 0x07, 0x3b, 0x9c, 0xfe, 0x73,
 0xbf, 0x9f, 0xce, 0x73, 0xfc, 0x00, 0x07, 0x3b, 0x9c, 0xfc,
 0x73, 0x9f, 0x8f, 0xce, 0x71, 0xfc,
 0x00, 0x07, 0x3b, 0x9e, 0x38, 0x73, 0x8e, 0x07, 0x8e, 0x70,
 0xcc, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,

```

0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
};

```

```

const unsigned char wifilogo [] PROGMEM = {
// 'wifi', 84x48px
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xf0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x03, 0xff, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x03, 0xff, 0xe0, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x03, 0xff, 0xf8, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x03, 0xff, 0xfe, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03, 0xff, 0xff, 0x80,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x03, 0xff, 0xff, 0xe0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x07, 0xff, 0xf0,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xff,
0xf8, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x3f, 0xfc, 0x00, 0x00, 0x00, 0x00,

```

```

0x00, 0x00, 0x00, 0x00, 0x00, 0x0f,
0xfe, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x03, 0xff, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x03, 0xc0, 0x01, 0xff, 0x80, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x03, 0xfc,
0x00, 0x7f, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xff, 0x00, 0x3f, 0xe0, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x03, 0xff, 0xc0, 0x1f, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xff, 0xf0, 0x0f, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x03, 0xff, 0xf8, 0x07, 0xf8, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x03, 0xff, 0xfc, 0x07, 0xf8,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x1f, 0xfe, 0x03, 0xfc, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x07, 0xff, 0x01, 0xfc,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0xff, 0x81,
0xfe, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0xff, 0xc0, 0xfe, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x3f, 0xc0,
0xff, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0xe0, 0x7f, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x1f, 0xe0, 0x7f, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x0f,
0xf0, 0x3f, 0x80, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x70,
0x07, 0xf0, 0x3f, 0x80, 0x00, 0x00,
0x00, 0x00, 0x00, 0x01, 0xfc, 0x07, 0xf8, 0x3f, 0x80, 0x00,
0x00, 0x00, 0x00, 0x00, 0x01, 0xfc,
0x03, 0xf8, 0x3f, 0x80, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xfe, 0x03, 0xf8, 0x1f, 0x80, 0x00,
0x00, 0x00, 0x00, 0x00, 0x03, 0xfe, 0x01, 0xf8, 0x1f, 0xc0,
0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xfe, 0x01, 0xfc, 0x1f, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x01, 0xfc, 0x01, 0xfc, 0x1f, 0xc0,
0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0xfc, 0x01, 0xfc, 0x1f,

```

```

0xc0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x70, 0x01, 0xfc, 0x1f, 0xc0, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00
};

```

```

const unsigned char doom1 [] PROGMEM = {
// 'doom1', 84x48px
0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xf0, 0xff,
0xff, 0xff, 0xff, 0xff,
0xff, 0xff, 0xff, 0xff, 0xff, 0xf0, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff,
0xff, 0xff, 0xff, 0xff,
0xf0, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xff, 0xf0,
0xa5, 0x44, 0x4f, 0x89,
0x29, 0xf5, 0x12, 0xbe, 0x57, 0xa4, 0xb0, 0xc0, 0x00, 0x03,
0x00, 0x00, 0x60, 0x00, 0x08, 0x07,
0x00, 0x30, 0xf8, 0x00, 0x00, 0x40, 0x02, 0x50, 0x00, 0x04,
0x07, 0x80, 0xe0, 0xf8, 0x00, 0x01,
0x00, 0x00, 0x21, 0x00, 0x04, 0x03, 0x00, 0xf0, 0xf1, 0x00,
0x02, 0x20, 0x00, 0x60, 0x00, 0x04,
0x07, 0x20, 0xf0, 0xf8, 0x08, 0x01, 0x00, 0x00, 0x20, 0x00,
0x04, 0x02, 0x00, 0xf0, 0xf0, 0x00,
0x22, 0x00, 0x00, 0x40, 0x00, 0x08, 0x03, 0x00, 0xf0, 0xf0,
0x24, 0x01, 0x02, 0x40, 0x20, 0x28,
0x04, 0x00, 0x10, 0xf0, 0xf8, 0x1f, 0x00, 0x03, 0xe0, 0x20,
0x7c, 0x04, 0x00, 0x00, 0xf0, 0xf0,
0x1f, 0x03, 0x03, 0xe0, 0x42, 0x3c, 0x04, 0x00, 0x00, 0xf0,
0xf8, 0x1f, 0x00, 0x01, 0xe0, 0x20,
0x7c, 0x04, 0x00, 0x00, 0xf0, 0xf0, 0x1f, 0x03, 0x03, 0xe0,

```

0x20, 0x7c, 0x05, 0x00, 0x00, 0x70,
 0xf0, 0x1f, 0x00, 0x03, 0xe0, 0x20, 0x7c, 0x00, 0x00, 0x11,
 0xf0, 0xf8, 0x1f, 0x03, 0x03, 0xe0,
 0x48, 0x3d, 0x04, 0x00, 0x00, 0xe0, 0xf0, 0x1f, 0x00, 0x03,
 0xe0, 0x20, 0x7c, 0x04, 0x00, 0x00,
 0xf0, 0xf8, 0x1f, 0x03, 0x01, 0xe0, 0x00, 0x7c, 0x04, 0x02,
 0x00, 0xf0, 0xf0, 0x0f, 0x01, 0x03,
 0xe0, 0x60, 0x7c, 0x04, 0x00, 0x00, 0xf0, 0xf0, 0x1f, 0x00,
 0x03, 0xe0, 0x00, 0x7c, 0x04, 0x20,
 0x00, 0xf0, 0xf8, 0x1f, 0x03, 0x03, 0xe0, 0x20, 0x3c, 0x04,
 0x00, 0x00, 0xf0, 0xf8, 0x1f, 0x01,
 0x03, 0xe0, 0x20, 0x7c, 0x04, 0x00, 0x00, 0x70, 0xf0, 0x1f,
 0x00, 0x03, 0xe0, 0x20, 0x7c, 0x04,
 0x00, 0x01, 0xe0, 0xf8, 0x1f, 0x03, 0x03, 0xe0, 0x40, 0x7c,
 0x04, 0x00, 0x00, 0xf0, 0xf0, 0x1f,
 0x00, 0x01, 0xf0, 0x20, 0x3c, 0x00, 0x00, 0x00, 0xf0, 0xf8,
 0x0f, 0x03, 0x03, 0xe8, 0x20, 0x7c,
 0x44, 0x04, 0x40, 0xf0, 0xf0, 0x1c, 0x00, 0x00, 0xe0, 0x00,
 0x38, 0x00, 0x80, 0x00, 0xf0, 0x70,
 0x18, 0x02, 0x80, 0x60, 0x40, 0x60, 0x0c, 0x08, 0x80, 0xf0,
 0xf8, 0x10, 0x01, 0x00, 0x00, 0x20,
 0x00, 0x04, 0x0c, 0xc0, 0xf0, 0xf8, 0x00, 0x01, 0x00, 0x00,
 0x20, 0x80, 0x04, 0x04, 0x80, 0x70,
 0xf0, 0x00, 0x01, 0xc0, 0x00, 0x20, 0x08, 0x18, 0x0c, 0x81,
 0xb0, 0xf0, 0x00, 0x03, 0xc0, 0x00,
 0x40, 0x00, 0x3c, 0x87, 0xc0, 0xf0, 0xf8, 0x00, 0x0f, 0xf0,
 0x00, 0x20, 0x00, 0xff, 0x0d, 0x80,
 0xf0, 0xf8, 0x14, 0x0f, 0xf8, 0x00, 0x60, 0x00, 0xff, 0x8f,
 0xa0, 0xf0, 0xf0, 0x80, 0x7f, 0xfe,
 0x20, 0xf0, 0x07, 0xff, 0xcf, 0x80, 0xf0, 0xf8, 0x00, 0x7f, 0xff,
 0x03, 0xf9, 0x27, 0xff, 0xef,
 0x80, 0xe0, 0xd8, 0x13, 0xff, 0xff, 0x87, 0xfe, 0x9f, 0xff, 0xff,
 0xc0, 0xf0, 0xf8, 0x03, 0xff,
 0xff, 0xff, 0xfd, 0xff, 0xff, 0xff, 0x80, 0xf0, 0xf0, 0x07, 0xfb,


```

0xff, 0xff, 0xff, 0xff, 0xff,
0xff, 0xc0, 0xf0, 0xf8, 0x1f, 0xff, 0xff, 0xf7, 0xff, 0x7e, 0xf7,
0xfd, 0x90, 0xf0, 0xf0, 0x3f,
0xdf, 0xff, 0xfe, 0xff, 0xff, 0xff, 0xc2, 0xf0, 0xf8, 0xff,
0xff, 0xef, 0xff, 0xff, 0xbf,
0xfd, 0xff, 0xf0, 0xf0, 0xf9, 0xff, 0xfb, 0xff, 0xff, 0xff, 0xff,
0xff, 0xdf, 0xf0, 0xf0, 0xf3,
0xff, 0xff, 0xfd, 0xff, 0xff, 0xff, 0x7f, 0xff, 0xfd, 0xf0, 0xff, 0xff,
0xff, 0xff, 0xff, 0x7f,
0xf7, 0xff, 0xff, 0xff, 0xb0, 0xff, 0xf7, 0xff, 0xff, 0xff, 0xff, 0xff,
0xff, 0xff, 0xff, 0xd0
};

```

```

const unsigned char doom2 [] PROGMEM = {
// 'doom2', 84x48px
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x08, 0x00,
0x00, 0x02, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0xff, 0xff, 0xff, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x01, 0xff, 0xf0, 0x03, 0xff, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x03, 0xff,
0xc0, 0x3f, 0xff, 0xf8, 0x00, 0x00, 0x00, 0x00, 0x00, 0x07,
0xff, 0x03, 0xff, 0xff, 0xfc, 0x00,
0x00, 0x00, 0x00, 0x00, 0x07, 0xff, 0xff, 0xff, 0xff, 0xfc, 0x00,
0x00, 0x00, 0x00, 0x00, 0x0f,
0xff, 0xff, 0xff, 0xff, 0xfe, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0xff, 0xff, 0xff, 0xff, 0xff,
0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xff, 0xff, 0xff, 0xff, 0xff,
0x80, 0x00, 0x00, 0x00, 0x00,
0x1f, 0xff, 0xff, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00,
0x1f, 0xff, 0xff, 0xff, 0xff,
0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xff, 0xff, 0xff, 0xff,
0xff, 0x80, 0x00, 0x00, 0x00,
0x00, 0x1f, 0xff, 0xff, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00,

```

```

0x00, 0x1f, 0xff, 0xff, 0xff,
0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xf0, 0xff, 0xff,
0xe1, 0xff, 0x80, 0x00, 0x00,
0x00, 0x00, 0x1f, 0xe0, 0x3f, 0xff, 0x80, 0xff, 0x80, 0x00,
0x00, 0x00, 0x00, 0x1f, 0xe0, 0x0f,
0xfe, 0x00, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xe0,
0x01, 0xf8, 0x07, 0xff, 0x80, 0x00,
0x00, 0x00, 0x00, 0x1f, 0xc0, 0x00, 0x00, 0x3f, 0xff, 0x80,
0x00, 0x00, 0x00, 0x00, 0x3f, 0xff,
0x00, 0x00, 0x7f, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x7f,
0xff, 0xe6, 0x0c, 0xff, 0xff, 0xc0,
0x00, 0x00, 0x00, 0x00, 0x3f, 0xff, 0xff, 0xff, 0xff, 0xc0,
0x00, 0x00, 0x00, 0x00, 0x7f,
0xff, 0xff, 0xff, 0xff, 0xff, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x7f,
0xf0, 0xff, 0xff, 0xc7, 0xff,
0xc0, 0x00, 0x00, 0x00, 0x00, 0x7f, 0xf0, 0xff, 0x1f, 0xe1, 0xff,
0xc0, 0x00, 0x00, 0x00, 0x00,
0x7e, 0x39, 0xfe, 0x0f, 0xf1, 0x8f, 0xc0, 0x00, 0x00, 0x00,
0x00, 0x7e, 0x07, 0xc0, 0x00, 0x7c,
0x0f, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x7e, 0x00, 0x00, 0x00,
0x00, 0x0f, 0xc0, 0x00, 0x00, 0x00,
0x00, 0x3f, 0x00, 0x00, 0x00, 0x00, 0x0f, 0x80, 0x00, 0x00,
0x00, 0x00, 0x1f, 0xf0, 0x00, 0x00,
0x00, 0xff, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xf0, 0x0e,
0x0e, 0x01, 0xff, 0x80, 0x00, 0x00,
0x00, 0x00, 0x0f, 0xe0, 0x1f, 0xff, 0x00, 0xfe, 0x00, 0x00,
0x00, 0x00, 0x00, 0x07, 0xe0, 0x3f,
0xff, 0xc0, 0xfc, 0x00, 0x00, 0x00, 0x00, 0x00, 0x07, 0xe0,
0x0f, 0xfe, 0x00, 0xec, 0x00, 0x00,
0x00, 0x00, 0x00, 0x07, 0x60, 0x00, 0xe0, 0x00, 0x6c, 0x00,
0x00, 0x00, 0x00, 0x00, 0x07, 0xe0,
0x00, 0x00, 0x00, 0xfc, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01,
0xe0, 0xf0, 0xe0, 0xf0, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x01, 0xe1, 0xff, 0xff, 0xf0, 0xf0,

```

```

0x00, 0x00, 0x00, 0x00, 0x00, 0x01,
0xf0, 0x00, 0x00, 0x01, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0xf8, 0x00, 0x00, 0x03, 0xe0,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x78, 0x1f, 0xff, 0x03,
0xc0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x1c, 0x06, 0x04, 0x07, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x0f, 0x80, 0x00, 0x1e,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x07, 0xc0, 0x00,
0x7c, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x7e, 0x07, 0xc0, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00,
};

```

```

const unsigned char doom3 [] PROGMEM = {
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x0f, 0xff,
0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xff, 0xff,
0xff, 0xff, 0xf0, 0x00, 0x00,
0x00, 0x00, 0x00, 0x01, 0xff, 0xff, 0xff, 0xff, 0xf8, 0x00, 0x00,
0x00, 0x00, 0x00, 0x03, 0xff,
0xff, 0xbf, 0xff, 0xfe, 0x00, 0x00, 0x00, 0x00, 0x00, 0x07, 0xff,
0xff, 0x17, 0xff, 0xfe, 0x00,
0x00, 0x00, 0x00, 0x00, 0x07, 0xff, 0xfc, 0x03, 0xff, 0xfe,
0x00, 0x00, 0x00, 0x00, 0x00, 0x0f,
0xff, 0xe0, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f,
0xff, 0xf3, 0xff, 0xff, 0xff,
0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xff, 0xff, 0xff, 0xff, 0xff,
0x80, 0x00, 0x00, 0x00, 0x00,
0x1f, 0xff, 0xff, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00,
0x1f, 0xff, 0xff, 0xff, 0xff,
0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xff, 0xff, 0xff, 0xff,
0xff, 0x80, 0x00, 0x00, 0x00,

```

0x00, 0x1f, 0xff, 0xff, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00,
 0x00, 0x1f, 0xff, 0xff, 0xff,
 0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xff, 0xff, 0xff,
 0xff, 0xff, 0x80, 0x00, 0x00,
 0x00, 0x00, 0x1f, 0xff, 0xff, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00,
 0x00, 0x00, 0x1f, 0xff, 0xff,
 0xfe, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xff, 0xff,
 0xff, 0xff, 0xff, 0x80, 0x00,
 0x00, 0x00, 0x00, 0x1f, 0xf8, 0x1f, 0xff, 0xf0, 0xff, 0x80, 0x00,
 0x00, 0x00, 0x00, 0x3f, 0xf0,
 0x03, 0xfe, 0x00, 0x7f, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x3f,
 0xe0, 0x00, 0xf8, 0x00, 0x3f, 0xc0,
 0x00, 0x00, 0x00, 0x00, 0x3f, 0xf0, 0x00, 0xc0, 0x00, 0xff,
 0xe0, 0x00, 0x00, 0x00, 0x00, 0x3f,
 0xff, 0x81, 0x00, 0x1f, 0xff, 0xe0, 0x00, 0x00, 0x00, 0x00,
 0x7f, 0xff, 0xc7, 0x8f, 0x3f, 0xff,
 0xe0, 0x00, 0x00, 0x00, 0x00, 0x7f, 0xff, 0xff, 0xff, 0xff, 0xff,
 0xe0, 0x00, 0x00, 0x00, 0x00,
 0x3f, 0xff, 0xff, 0xff, 0xff, 0xff, 0xe0, 0x00, 0x00, 0x00, 0x00,
 0x7f, 0xff, 0xff, 0xff, 0xff,
 0xff, 0xe0, 0x00, 0x00, 0x00, 0x00, 0x3f, 0xf8, 0x7f, 0x9f,
 0xf0, 0xff, 0xe0, 0x00, 0x00, 0x00,
 0x00, 0x1f, 0x18, 0x03, 0x06, 0x01, 0x87, 0x80, 0x00, 0x00,
 0x00, 0x00, 0x1f, 0x18, 0x04, 0x01,
 0x01, 0x87, 0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xf0, 0x3c,
 0x03, 0xe0, 0xff, 0x80, 0x00, 0x00,
 0x00, 0x00, 0x07, 0xf0, 0x7c, 0x03, 0xf0, 0x7e, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x03, 0xe0, 0xfc,
 0x00, 0xf0, 0x7e, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03, 0xe0,
 0xc3, 0x04, 0x10, 0x7e, 0x00, 0x00,
 0x00, 0x00, 0x00, 0x03, 0xe0, 0xc0, 0x00, 0x38, 0x6e, 0x00,
 0x00, 0x00, 0x00, 0x00, 0x03, 0x70,
 0xf8, 0xf1, 0xf8, 0x6e, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
 0xf1, 0xff, 0xff, 0xf8, 0x70, 0x00,

```

0x00, 0x00, 0x00, 0x00, 0x00, 0xf1, 0xfc, 0x03, 0xf8, 0x70,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0xf1, 0xf8, 0x00, 0xf8, 0x70, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x39, 0xe0, 0x00, 0x78, 0xc0,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x38, 0xe0, 0x00, 0x39,
0xe0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x3c, 0xff, 0xff, 0xf1, 0xe0, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x0e, 0x7f, 0x07, 0xe7,
0x80, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x0f, 0x78, 0x01,
0xef, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x03, 0xe0, 0x00, 0x7e, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x38, 0x00,
0xc0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
};

```

```

const unsigned char doom4 [] PROGMEM = {
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x7f,
0xff, 0xfc, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0xff, 0xff, 0xff, 0x80, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x1f, 0x80, 0x1f, 0xff, 0xc0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x01, 0xf8,
0x00, 0x07, 0xff, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xc0, 0x00, 0x67, 0xff, 0xf8, 0x00,
0x00, 0x00, 0x00, 0x00, 0x07, 0x03, 0xc3, 0xff, 0xff, 0xfc,
0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0x0f, 0xf3, 0xff, 0xff, 0xff, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0xef, 0xff, 0xff, 0xff, 0xff,
0x80, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xef, 0xff, 0xff, 0xff, 0xff,
0xc0, 0x00, 0x00, 0x00, 0x00,
0x1f, 0xff, 0xff, 0xff, 0xff, 0xff, 0x80, 0x00, 0x00, 0x00,
0x07, 0xff, 0xff, 0xff, 0xff,
0xff, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x07, 0xff, 0xff, 0xff, 0xff,

```

```

0xff, 0xf0, 0x00, 0x00, 0x00,
0x00, 0x07, 0xff, 0xff, 0xff, 0xff, 0xff, 0xf0, 0x00, 0x00, 0x00,
0x00, 0x07, 0xff, 0xff, 0xff,
0xff, 0xff, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x03, 0xff, 0xf0, 0xcf,
0xff, 0xff, 0xf0, 0x00, 0x00,
0x00, 0x00, 0x00, 0x1f, 0xe0, 0x0f, 0xff, 0xff, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x08, 0x1f, 0xc0,
0x07, 0xff, 0xff, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f,
0x00, 0x03, 0xff, 0xff, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x18, 0x00, 0x01, 0xff, 0xff, 0xf0,
0x00, 0x00, 0x00, 0x00, 0x70, 0x10,
0x00, 0x01, 0xff, 0xff, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x7f,
0x10, 0x43, 0xfc, 0xff, 0xff, 0xf0,
0x00, 0x00, 0x00, 0x00, 0x1e, 0x78, 0xff, 0xff, 0xff, 0xff, 0xf0,
0x00, 0x00, 0x00, 0x00, 0x1e,
0xff, 0xff, 0xc7, 0xff, 0xff, 0xf0, 0x00, 0x00, 0x00, 0x00, 0x0f,
0xff, 0xff, 0x1f, 0xff, 0xff,
0xf0, 0x00, 0x00, 0x00, 0x00, 0x01, 0xff, 0xff, 0x19, 0xff, 0xff,
0xc0, 0x00, 0x00, 0x00, 0x00,
0x60, 0xf1, 0xff, 0x10, 0x7f, 0xff, 0x80, 0x00, 0x00, 0x00,
0x00, 0x60, 0xe1, 0xfe, 0x00, 0x3f,
0xff, 0x80, 0x00, 0x00, 0x00, 0x00, 0x60, 0xe1, 0xc0, 0x00,
0x3f, 0xff, 0x80, 0x00, 0x00, 0x00,
0x00, 0x60, 0xe1, 0xe0, 0x00, 0xff, 0xff, 0x80, 0x00, 0x00,
0x00, 0x00, 0x60, 0xc1, 0x90, 0x1f,
0xff, 0xff, 0x00, 0x00, 0x00, 0x00, 0x00, 0x61, 0xe3, 0x18,
0x1f, 0xff, 0xff, 0x00, 0x00, 0x00,
0x00, 0x00, 0x61, 0xff, 0xfc, 0x1f, 0xff, 0xff, 0x00, 0x00, 0x00,
0x00, 0x00, 0x73, 0xff, 0xfe,
0x0f, 0xff, 0xfc, 0x00, 0x00, 0x00, 0x00, 0x00, 0x77, 0xff, 0xfe,
0x0f, 0x3f, 0xf8, 0x00, 0x00,
0x00, 0x00, 0x00, 0x7f, 0xc0, 0x0f, 0x0e, 0x3f, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x77, 0xe0,
0x1f, 0x0e, 0x3f, 0xe0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x77,

```

```

0xff, 0xff, 0x0e, 0xfe, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x07, 0xe0, 0x3f, 0x1f, 0xf0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x03,
0xc0, 0x3f, 0x1f, 0xe0, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x01, 0xc0, 0x3e, 0x3f, 0xc0, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x1f, 0xfe, 0xff, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x3f, 0xff, 0xfe, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x18, 0x00, 0xff, 0xfc, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x7f, 0xc0,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x02, 0x00, 0xff, 0xc0, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x01, 0xdf, 0xfc, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00, 0x00
};

```

```
void setup() {
```

```

    Serial.begin(9600);
    Serial.println("Hacksung started...");
    Serial.println("Roni Bandini - @RoniBandini");

```

```
// Output pins
```

```

pinMode(relayMotor1, OUTPUT);
pinMode(relayWaterIn, OUTPUT);
pinMode(relayWaterOut, OUTPUT);
pinMode(relayMotor2, OUTPUT);

```

```
// button Pins
```

```

pinMode(BUTTON_PIN, INPUT_PULLUP);
pinMode(BUTTON_PIN1, INPUT_PULLUP);
pinMode(BUTTON_PIN2, INPUT_PULLUP);

```

```
// Start closed
digitalWrite(relayMotor1, HIGH);
digitalWrite(relayMotor2, HIGH);
digitalWrite(relayWaterIn, HIGH);
digitalWrite(relayWaterOut, HIGH);
```

```
display.begin();
display.setContrast(60);
display.clearDisplay();
display.drawBitmap(0, 0, logo, 84, 48, 1);
display.display();
delay(2000);
```

```
display.clearDisplay();
display.drawBitmap(5, 0, wifilogo, 84, 48, 1);
display.display();
```

```
// attempt to connect to Wifi network:
while (status != WL_CONNECTED) {
  Serial.print("Connecting to SSID: ");
  Serial.println(ssid);
  status = WiFi.begin(ssid, pass);
  // wait 10 seconds for connection
  delay(10000);
}
```

```
Serial.println("Connected");
```

```
}
```



```

void loop() {

    // print menu

    if (menuLevel==0){

        switch (screenCursor) {
            case 1:
                myMessage("> Manual"," Auto "," Extra", " Info");
                break;

            case 2:
                myMessage(" Manual","> Auto"," Extra"," Info");
                break;

            case 3:
                myMessage(" Manual"," Auto","> Extra"," Info");
                break;

            case 4:
                myMessage(" Manual"," Auto"," Extra", "> Info");
                break;

        }
    } // menu level 0

    if (menuLevel==1){

        // Manual
        switch (screenCursor) {

            case 1:

```

```

        myMessage("> Water In"," Motor on"," Water out", "
Back");
        break;

    case 2:
        myMessage(" Water In","> Motor on"," Water out", "
Back");
        break;

    case 3:
        myMessage(" Water In"," Motor on","> Water out", "
Back");
        break;

    case 4:
        myMessage(" Water In"," Motor on"," Water out", ">
Back");
        break;

    }
} // menu level 1

if (menuLevel==2){

    // Auto
    switch (screenCursor) {

    case 1:
        myMessage("> Mansilla"," Gombro "," Bioy", " Back");
        break;

    case 2:
        myMessage(" Mansilla","> Gombro"," Bioy"," Back");
        break;

```

```
case 3:
    myMessage(" Mansilla"," Gombro","> Bioy"," Back");
    break;

case 4:
    myMessage(" Mansilla"," Gombro"," Bioy", "> Back");
    break;
}

} // menu level 2

if (menuLevel==3){

    // Extra
    switch (screenCursor) {

        case 1:
            myMessage("> Doom"," Dollar "," Stats", " Back");
            break;

        case 2:
            myMessage(" Doom","> Dollar"," Stats"," Back");
            break;

        case 3:
            myMessage(" Doom"," Dollar","> Stats"," Back");
            break;

        case 4:
            myMessage(" Doom"," Dollar"," Stats", "> Back");
            break;
    }
}
```

```

} // menu level 3

if (menuLevel==4){

  // Info

  myMessage("Roni Bandini","Dec 2020"," @RoniBandini",
"Argentina");
  delay(4000);
  menuLevel=0;

} // menu level 3

// read buttons

currentState = digitalRead(BUTTON_PIN);
currentState1 = digitalRead(BUTTON_PIN1);
currentState2 = digitalRead(BUTTON_PIN2);

// button up

if (currentState != lastFlickerableState) {
  lastDebounceTime = millis();
  lastFlickerableState = currentState;
}

if ((millis() - lastDebounceTime) > DEBOUNCE_DELAY) {

  // if the button state has changed:
  if(lastSteadyState == HIGH && currentState == LOW)
    //Serial.println("");

```

```

    int dummy=1;
    else if(lastSteadyState == LOW && currentState == HIGH)

    {

        screenCursor--;

        if (screenCursor==0) {screenCursor=4;}

    }

    // save the the last steady state
    lastSteadyState = currentState;
}

// Button down

if (currentState1 != lastFlickerableState1) {
    lastDebounceTime1 = millis();
    lastFlickerableState1 = currentState1;
}

if ((millis() - lastDebounceTime1) > DEBOUNCE_DELAY) {

    if(lastSteadyState1 == HIGH && currentState1 == LOW)
        int dummy=1;
    else if(lastSteadyState1 == LOW && currentState1 ==
HIGH)
    {

        screenCursor++;

        if (screenCursor==5) {screenCursor=1;}
    }
}

```

```

    }

    lastSteadyState1 = currentState1;
}

// Button enter

if (currentState2 != lastFlickerableState2) {
    lastDebounceTime2 = millis();
    lastFlickerableState2 = currentState2;
}

if ((millis() - lastDebounceTime2) > DEBOUNCE_DELAY) {

    if (lastSteadyState2 == HIGH && currentState2 == LOW)
        int dummy=1;
    else if (lastSteadyState2 == LOW && currentState2 ==
HIGH)
    {

        if (menuLevel==0){

            switch (screenCursor) {

                case 1:
                    menuLevel=1;
                    screenCursor=1;
                    break;

                case 2:
                    menuLevel=2;
                    screenCursor=1;

```

```
break;

case 3:
    menuLevel=3;
    screenCursor=1;
    break;

case 4:
    menuLevel=4;
    screenCursor=1;
    break;

}
}
else if (menuLevel==1){

    switch (screenCursor) {

        case 1:

            if (waterIn==0){
                digitalWrite(relayWaterIn, LOW);
                waterIn=1;

            }
            else{
                digitalWrite(relayWaterIn, HIGH);
                waterIn=0;
            }

            break;

        case 2:
```

```
if (motor1==0){  
    digitalWrite(relayMotor1, LOW);  
    motor1=1;  
}  
else{  
    digitalWrite(relayMotor1, HIGH);  
    motor1=0;  
}
```

break;

case 3:

```
if (waterOut==0){  
    digitalWrite(relayWaterOut, LOW);  
    waterOut=1;  
}  
else{  
    digitalWrite(relayWaterOut, HIGH);  
    waterOut=0;  
}
```

break;

case 4:

menuLevel=0;

break;

}

} // menu level 1

else if (menuLevel==2){


```

switch (screenCursor) {

    case 1:

        // Program example, use the
        // zmp101b to read tachometer and set motor speed

        display.clearDisplay();
        myMessage("Lucio Mansilla", "Prewash: 5
min", "Wash: 5 min", "Cent: 400 rpm");
        display.display();
        delay(2000);

        digitalWrite(relayWaterIn,
LOW);

        delay(60*1000*2);
        digitalWrite(relayWaterIn,
HIGH);

        digitalWrite(relayMotor1,
LOW);

        delay(60*1000*5);
        digitalWrite(relayMotor1,
HIGH);

        digitalWrite(relayWaterOut,
LOW);

        delay(60*1000*1);
        digitalWrite(relayWaterOut,
HIGH);

```

```

    if (client.connectSSL(server, 443)) {
        client.println("GET /bot1491407962:TOKENHERE/
sendMessage?chat_id=-CHATIDHERE&text=Centrifugado+ter
minado HTTP/1.1");
        client.println("Host: api.telegram.org");
        client.println("Connection: close");
        client.println();
    }

```

```

while (client.available()) {

```

```

    char c = client.read();

```

```

    Serial.write(c);

```

```

}

```

```

break;

```

```

case 2:

```

```

// program 2

```

```

display.clearDisplay();

```

```

myMessage("Gombrowicz","Prewash: 15 min","Wash:
30 min", "Cent: 800 rpm");

```

```

display.display();

```

```

delay(2000);

```

```

break;

```

```

case 3:

```

```

// program 3

```

```

display.clearDisplay();

```

```

myMessage("Bioy Casares","Prewash: 30
min","Wash: 60 min", "Cent: 1000 rpm");

```

```

display.display();

```

```

        delay(2000);
        break;

    case 4:
        // return
        menuLevel=0;
        break;

} // switch

} // menu level 2

else if (menuLevel==3){

    switch (screenCursor) {

        case 1:
            // display doom animation

            display.clearDisplay();
            display.drawBitmap(0, 0, doom1, 84, 48, 1);
            display.display();
            delay(1500);

            display.clearDisplay();
            display.drawBitmap(0, 0, doom2, 84, 48, 1);
            display.display();
            delay(1500);

            display.clearDisplay();
            display.drawBitmap(0, 0, doom3, 84, 48, 1);
            display.display();
            delay(1000);

```

```
display.clearDisplay();
display.drawBitmap(0, 0, doom4, 84, 48, 1);
display.display();
delay(1000);

menuLevel=0;

break;

case 2:
// Dolar
myMessage("Dollar quote","Sell $150 ","Buy $144", "
");
delay(4000);
menuLevel=0;
break;

case 3:
// Stats
myMessage("Stats","Manual: 12","Auto: 0", "Run: 8
hrs");
delay(4000);
menuLevel=0;
break;

case 4:
// return
menuLevel=0;
break;

} // switch

} // menu level 3
```

```

    } // button pressed

    lastSteadyState2 = currentState2;
}

delay(50);

} // loop

void myMessage(String line1, String line2, String line3, String
line4){

    display.clearDisplay();
    display.setCursor(0,0);
    display.setTextSize(1);
    display.setTextColor(WHITE, BLACK);
    display.println("Hacksung");
    display.setTextColor(BLACK);
    display.setCursor(0,10);
    display.println(line1);
    display.setCursor(0,20);
    display.println(line2);
    display.setCursor(0,30);
    display.println(line3);
    display.setCursor(0,40);
    display.println(line4);

    // add icons
    if (waterIn==1){
        display.setTextSize(2);

```

```

display.setCursor(70,0);
display.write(30); // up
}

```

```

if (motor1==1){
display.setTextSize(2);
display.setCursor(70,15);
display.write(236); // infinite
}

```

```

if (waterOut==1){
display.setTextSize(2);
display.setCursor(70,32);
display.write(31); // down
}

```

```

display.display();

```

```

}

```

```

void waitServer() {
int timeout = 0;
while (!client.available() && timeout < 5000) {
    timeout++;
    delay(1);
    if (timeout >= 5000) {
        Serial.println(F("Error, max timeout reached"));
        break;
    }
}
}
}

```

VERSION 1

I'm currently testing version 1 with analog reading over A0 pin to determine motor RPM and digital resistor module for Voltage Control unit.

ELECTRONIC ART PROJECTS

This may be one of the few “useful” projects I've done. I'm usually creating electronic arts projects like:

- Jorge Luis Borges Animatronic with a hacked Furby
- The Klausner Machine
- Song recorded with Arduino instruments
- Mind Poetry
- BookSound
- Literature dispenser

- Rayuelomatic

TED TALK

- Ted Talk about Arduino and electronic art projects

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Roni Bandini

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