Security System DIY

TABLE OF CONTENT

INTENT

This manual is to develop a motion based security system with a camera. The security system will take the motion sensor and break beam sensor as input. It will output on a Nokia display. The camera will operate on an interval. This security system uses UART to communicate between ATmegas. This manual assumes the user has basic understanding of wiring a circuit and using Atmel studios.

PARTS

PIR Motion Sensor
https://www.adafruit.com/product/189
Break beam sensor
https://www.adafruit.com/product/2167
Button
https://www.amazon.com/dp/B06XRH6GNX/ref=asc_df_B06XRH6GNX5294339/?tag=hyprod-20&creative=395009&creativeASIN=B06XRH6GNX&linkCode=df0&hvadid=198090929431&hvpos=1o1&hvnetw=g&hvrand=13814345122639607061&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=9031488&hvtargid=pla-384708951823
Nokia 5110
https://www.sparkfun.com/products/10168
Raspberry Pi 3 Model B
https://www.raspberrypi.org/products/raspberry-pi-3-model-b/
Raspberry Picamera
https://www.raspberrypi.org/products/camera-module-v2/
ATmega1284 (2)
https://www.mouser.com/ProductDetail/Microchip-Technology-Atmel/ATMEGA1284-PU/?qs=lwdSMh1%2FoYI%2FXs3D3l%2Fp1w%3D%3D
Breadboard
https://www.adafruit.com/product/239

STEPS

1) Place the two ATmega1284s on the bread board. Ensure that they do not share any rails.
2) Label one for input and one for output.
3) Wire the GND and VCC for each of microcontrollers.(Pinouts are at the bottom)

INPUT

1) Wire the PIR motion sensor to the ATmega, GND, and VCC.
2) Wire the break beam sensor. One will go to GND and VCC. The other will go to ATmega, GND, and VCC.
3) Wire the button to the ATmega. The button will be connected to the GND and ATmega.
4) For UART, find two pins on the board for TX (Pinouts are at the bottom)
5) Connect the TX pin to the RX of the output ATmega.

OUTPUT

1) Connect the Nokia 5110 to the breadboard. Make sure it does not share the same rail as the bread board.
2) Nokia 5110 will be wired to VCC, GND and LED.
3) To connect it to ATmega, refer to the back of Nokia 5110.
4)

Nokia 5110	ATmega Pins
D/C input	PB2
RST	PB3
SCE	PB4
MOSI	PB5
SCLK	PB6

RASPBERRY PI

1) Connect the Raspberry Picamera to the Raspberry Pi.
2) Connect a microUSB to power the Raspberry Pi.
3) Connect an HDMI to the RPI and a Monitor

CODING

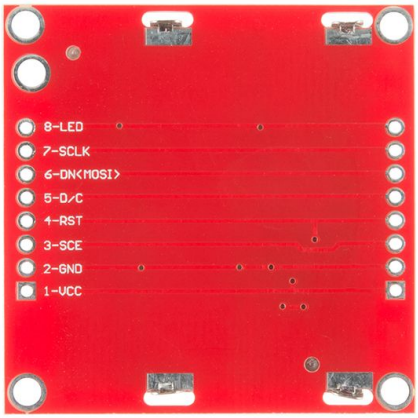
https://github.com/LittleBuster/avr-nokia5110

This library is to use the Nokia 5110. Refer to the README.md to find where to change the PINS to recognize the configuration above.
Import the library to your output ATmega code.

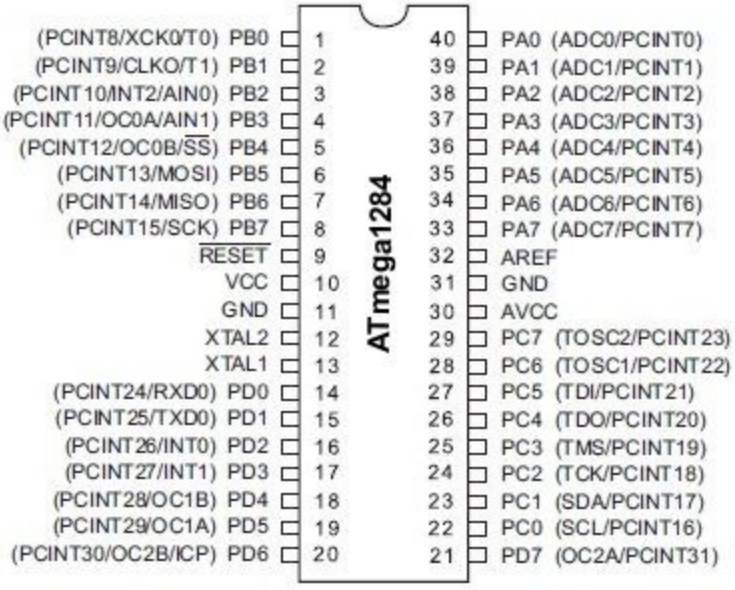
https://github.com/parkhom001/CS122ASecuritySystem

This is the connected code between your ATmega input and output. You can configure however you like depending on how you wired your board.

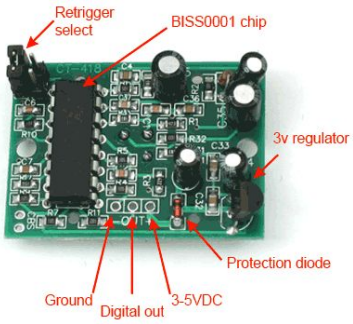
REFERENCES



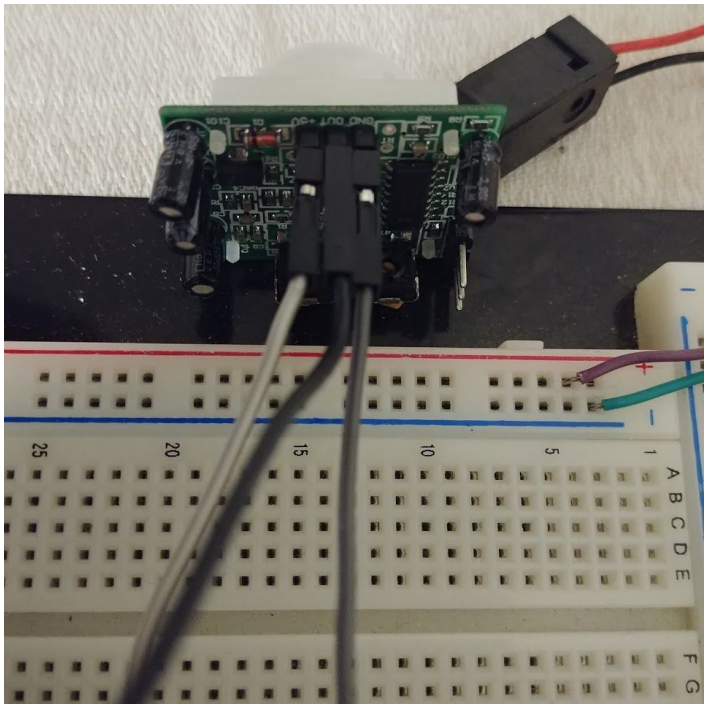
Nokia 5110 Back

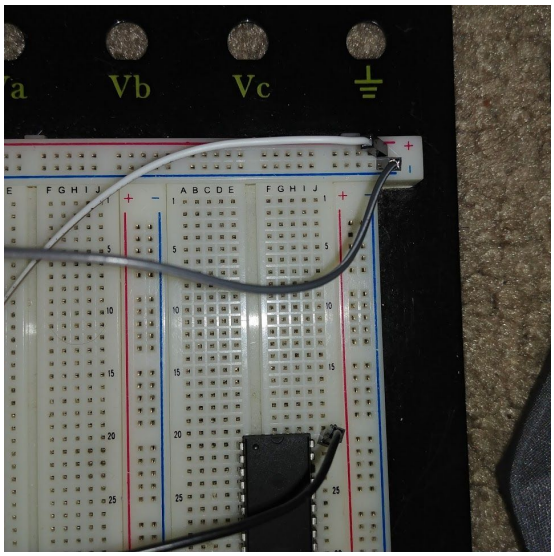


ATmega 1284 Pinout

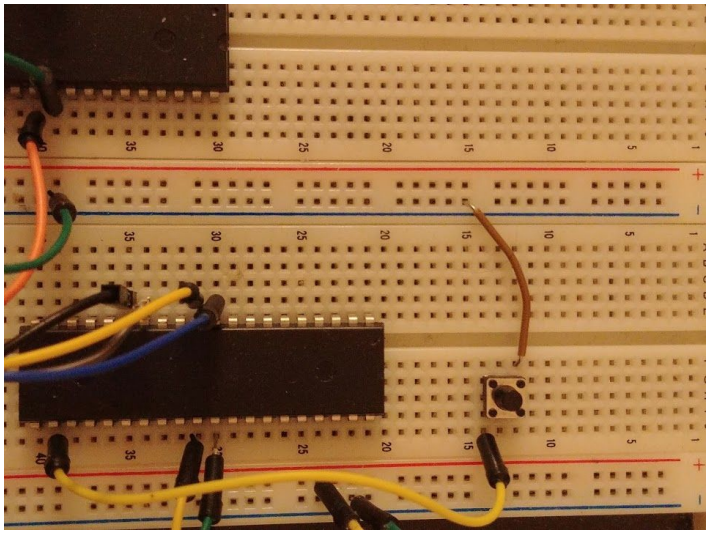


PIR motion sensor

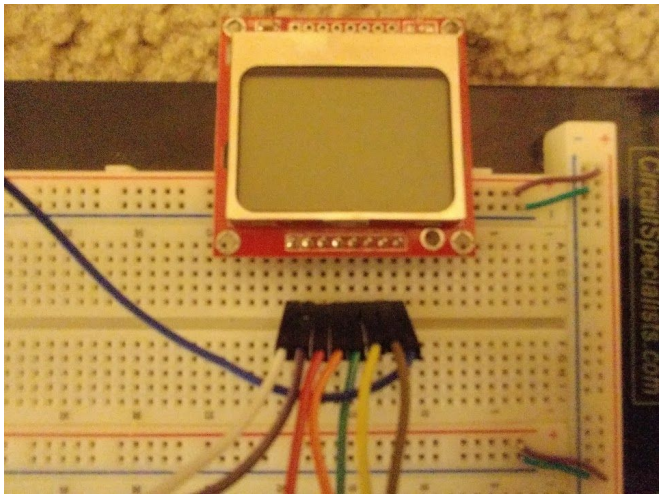


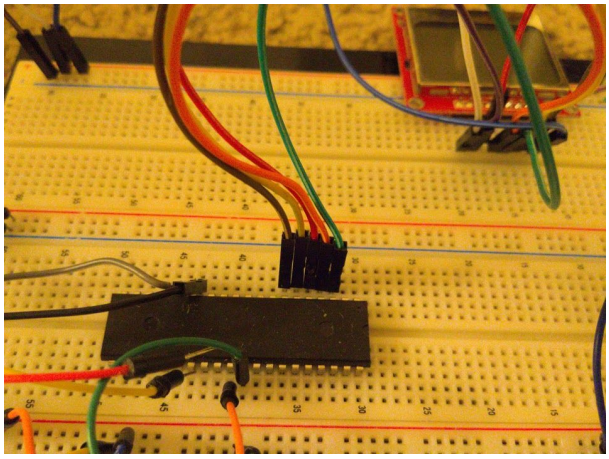


Wiring the PIR motion sensor

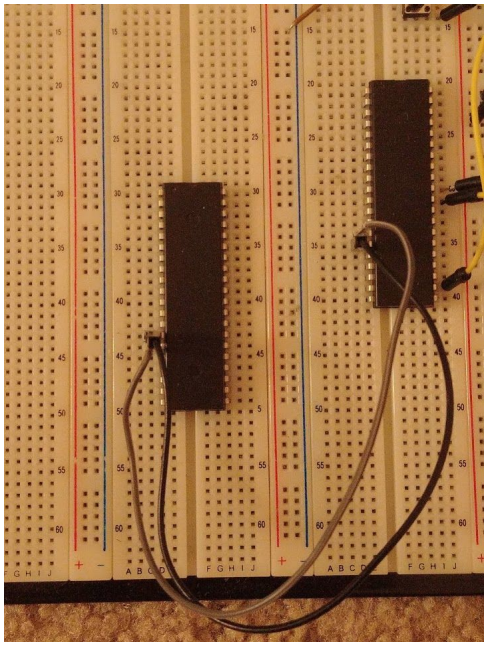


Wiring the Button

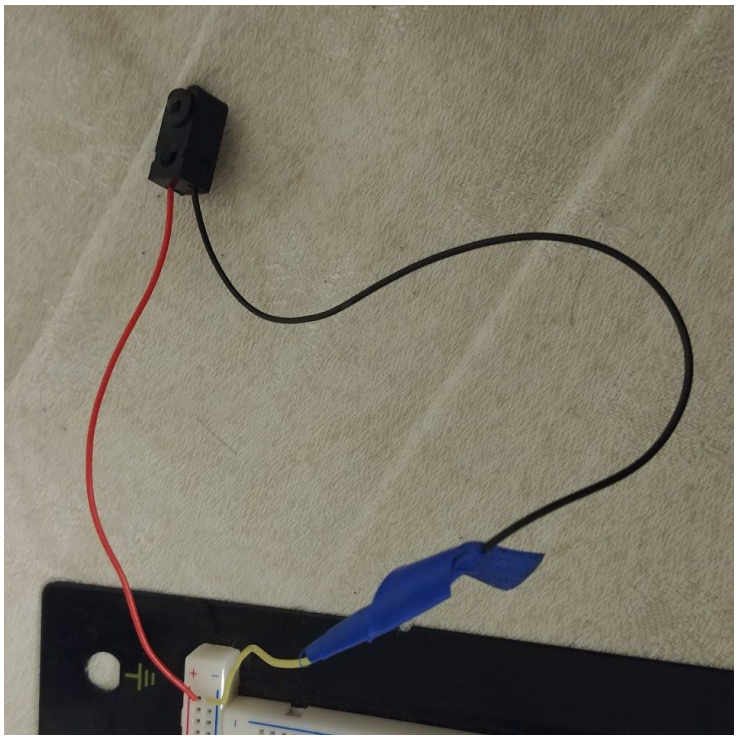


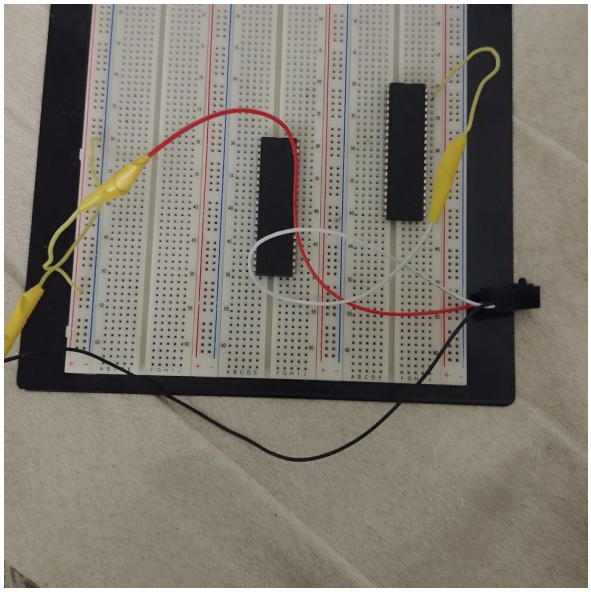


Wiring the Nokia 5110

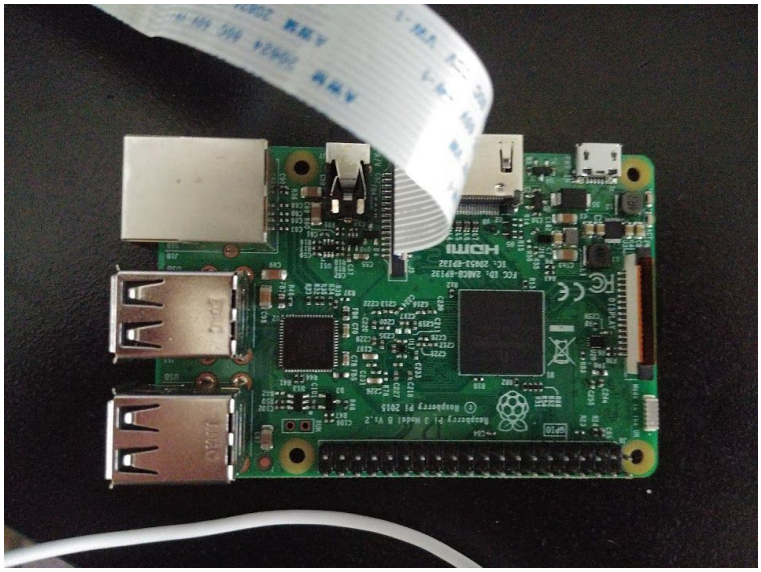


Connecting TX and RX of the input to the RX and TX of output





Wiring the break beam



Connecting Raspberry Pi to camera