

RF Domination

Shopping list (per base)

Arduino Nano	Amazon
Nano IO Shield	Ebay
NRF24L01 Module	Ebay
Buttons	Ebay
Battery holder	Ebay
Screen	Ebay

- 1 x Nano IO shield (not needed but saves on wiring and makes electronics simpler)
- 1 nrf24L01 long range module
- 1 x 20x04 i2c LCD screen
- 2 x Buttons
- 1 x battery holder
- 1x connector
- 2 x 22K resistors

Some of these are cheaper if they are bought in bulk or can be swapped out for other options such as better buttons, other forms of battery connectors etc.

The code

You can edit this but it is assumed you know how to upload to an Arduino.

The code will need to be changed in a few places before sending to each node. Look for the following lines

LiquidCrystal_I2C lcd(0x3f,20,4); // set the LCD address to 0x27 or 0x3F

Change the address of the screen from the 0x3f entry to the address of your screen (this can be found using the i2c scanner utility included in the package)

const uint8_t nodenumber = 1;

Change the "1" to the node number to which ever node you are going to send the code to.

node1 = payload.sensor;

This appears twice in the code. Change "node1" to be node1/node2/node3 etc
Make sure you change BOTH lines which say this.

payload.node == 1 ;

payload.sensor = node1 ;

Change the 1 on the first line and node1 on the second line to reflect the node number

If you change the code, please leave the top few comment lines which credit myself and the project I modified to build this. I would also be interested in seeing how you improve the game so please feel free to send it back to me.

The wiring

Assuming you are using the Nano IO shield. Wire up the the LCD screen to the pins on the I2C interface

Wire the Red button to pin 8 and the Green button to pin 7.

The RF module will go into the socket designed for it on the shield

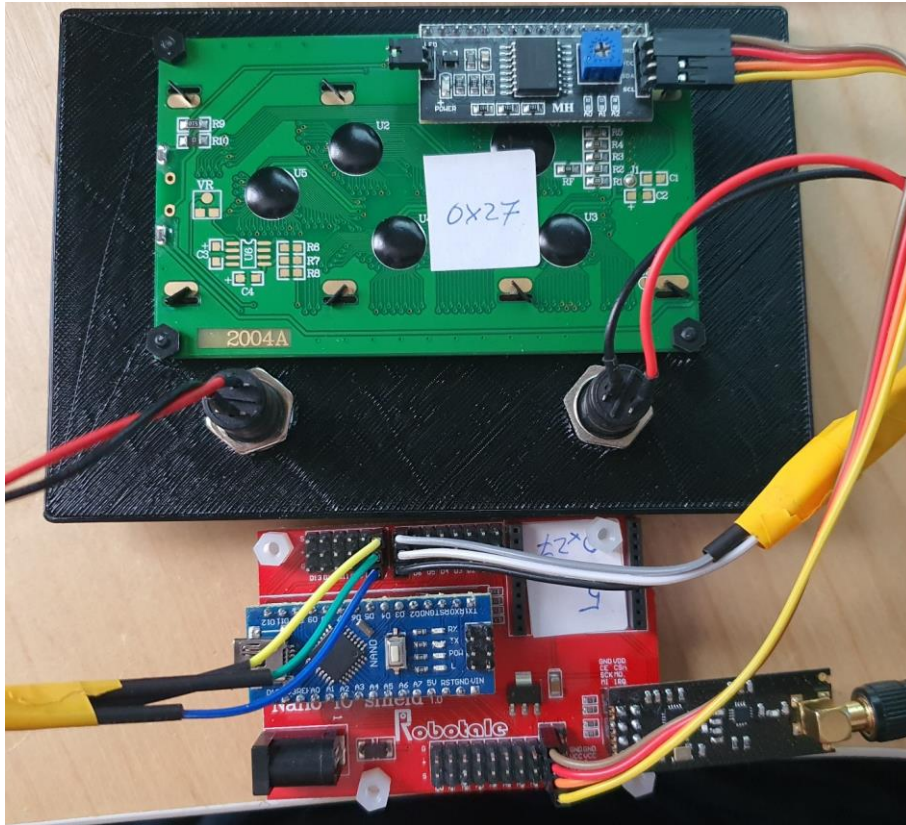
Pin on Shield	Colour in Photo	Pin on back of screen	Descrip[tion
GND	Brown	GND	Ground Pin
VCC	Red	VCC	Voltage
SDA	Orange	SDA	Serial Data
SCL	Yellow	SCL	Serial Clock

The buttons use a pull up resistor and when they are “closed” they are routed to ground

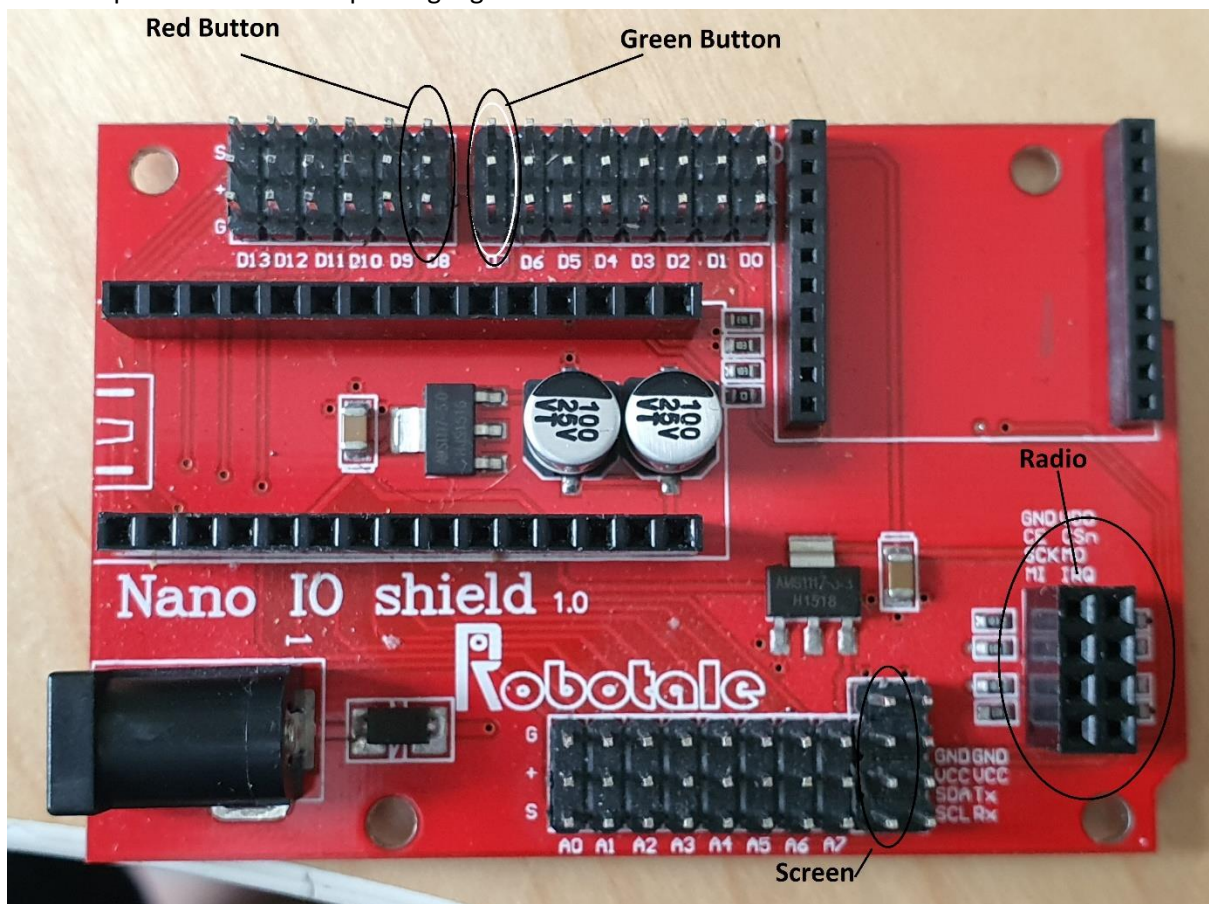
Pin on Shield	Colour in Photo	Pin on back of screen
D8 Signal	Yellow	Connected via resistor to “D8 Voltage” pin and to one button terminal for RED BUTTON
D7 Signal	Grey	Connected via resistor to “D7 Voltage” pin and to one button terminal for GREEN BUTTON
D8 Voltage	Green	Connected via resistor to D8 Signal wire
D7 Voltage	White	Connected via resistor to D7 Signal wire
D8 GND	Blue	Connected directly to other RED BUTTON terminal
D7 GND	Black	Connected directly to other GREEN BUTTON terminal

The RF module plugs in to the socket on the lower right of the shield so that it stick out to the right (not toward the pins)

Your completed device should look something like this



A close up of the shield with pins highlighted is..



The enclosure

You can mount the device in any non-metallic enclosure, but if you have access to a 3d printer, the files for the top and base are included so you can print/edit as you wish..

Range

This has been "field tested to have a range of approximately 150m. This should go upto about 500m as long as there are no objects between the bases. This includes trees and bushes.

The Game

Place the 5 bases around the playing field with nothing inbetween if possible.

Each team will be designated either "Red" or "Green"

When someone from Red team gets to a base, they should press the red button and this will set the base indicator on the screen to be "R". If all the nodes are the same colour, then that team wins

During the game there is a counter which is displayed. This counts upto 2000 before re-syncing the node. This will allow for a node to be reset and as each node syncs, the reset node will re-learn the states of the other nodes in the game.

Button presses seem to work better if the button is held down for a few seconds as opposed to a quick tap. This sometimes works but can sometimes need the box to sync before the other nodes are aware of the change of state

About the creator

I am an ESL and ASL in Swindon, UK... I have been playing with Arduino based wide games for a while and have several, from a countdown bomb, reverse geocache, laser guided bombing, and even a multi lock box.

Contact me for more details. ArduinoWideGames@pamojait.com