ST SMART

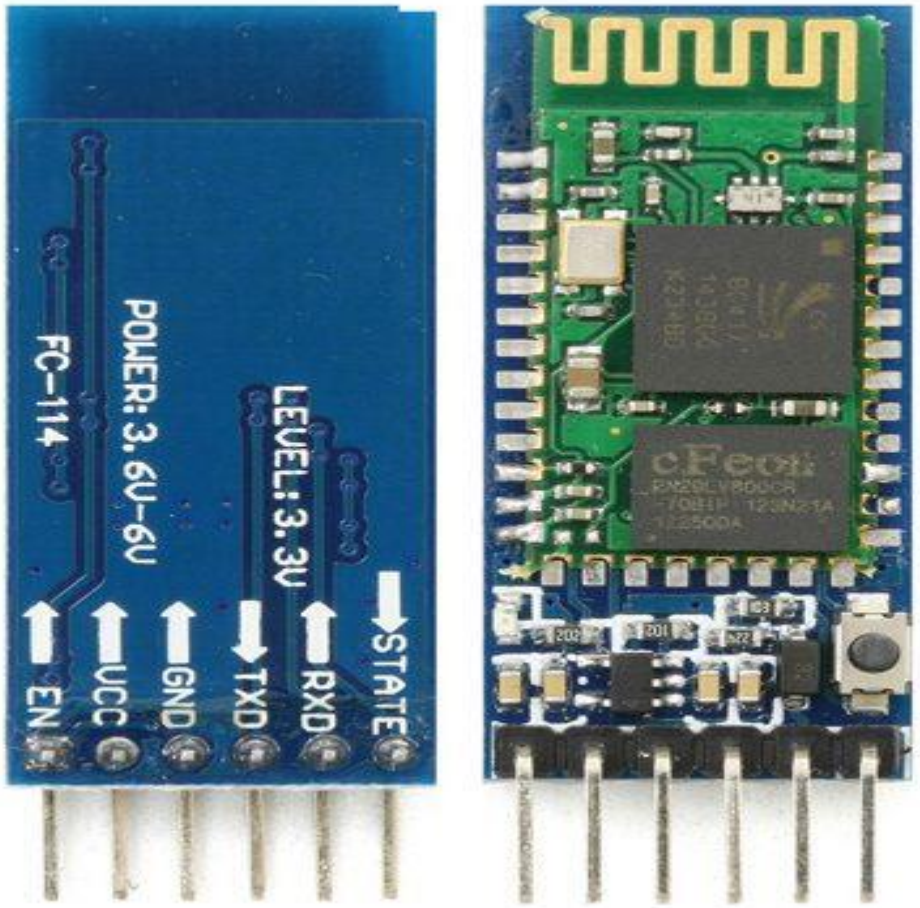
MAKE EVERYTHING SMART

SMART TECHNOLOGT

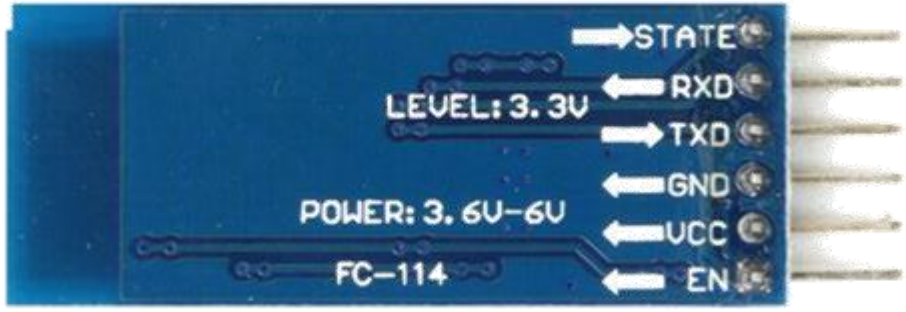
LECTURE

3

• Bluetooth (HC-05)



• Pin Configuration



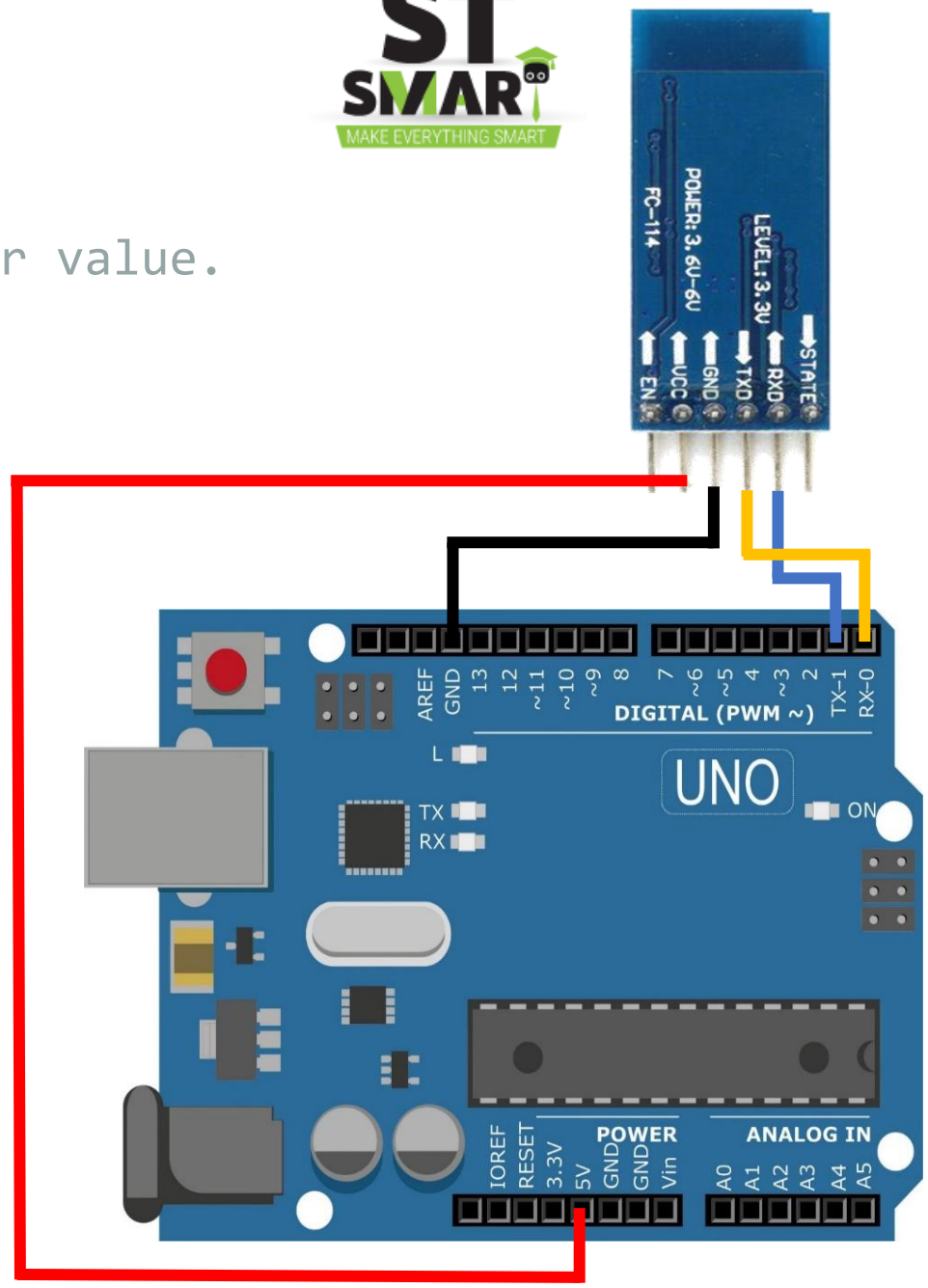
Pin number	Pin Name	Description
1	Enable / Key	This pin is used to toggle between Data Mode (set low) and AT command mode (set high). By default it is in Data mode
2	Vcc	Powers the module. Connect to +5V Supply voltage
3	Ground	Ground pin of module, connect to system ground.
4	TX – Transmitter	Transmits Serial Data. Everything received via Bluetooth will be given out by this pin as serial data.
5	RX – Receiver	Receive Serial Data. Every serial data given to this pin will be broadcasted via Bluetooth
6	State	The state pin is connected to on board LED, it can be used as a feedback to check if Bluetooth is working properly.
7	Button	Used to control the Key/Enable pin to toggle between Data and command Mode

HC-05 Default Settings

- Default Bluetooth Name: “HC-05”
- Default Password: 1234 or 0000
- Default Communication: Slave
- Default Mode: Data Mode
- Data Mode Baud Rate: 9600
- Command Mode Baud Rate: 38400
- This Bluetooth module covers 9 meters (30ft)
- Operating Voltage: 4V to 6V (Typically +5V)
- Operating Current: 30mA

• Example

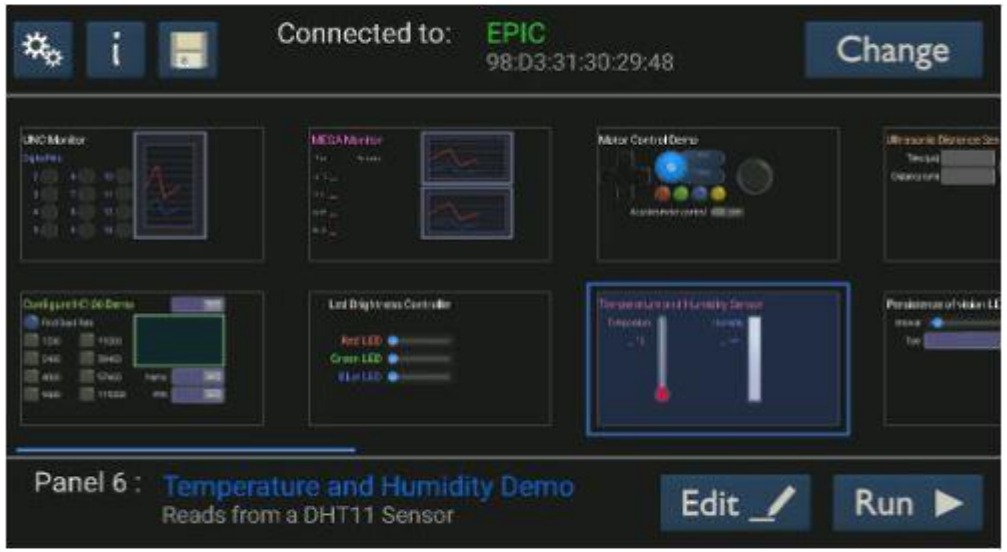
```
const int red = 13;
char reading;  // data type used to store a character value.
void setup( )
{
 pinMode(red, OUTPUT);
 Serial.begin(9600);
}
void loop( ) {
  if(Serial.available()>0) {
     reading=Serial.read();
     switch(reading){
        case 'F': digitalWrite(red,1);
                          break;
        case 'S': digitalWrite(red,0);
                          break;
       }
   }
}
```

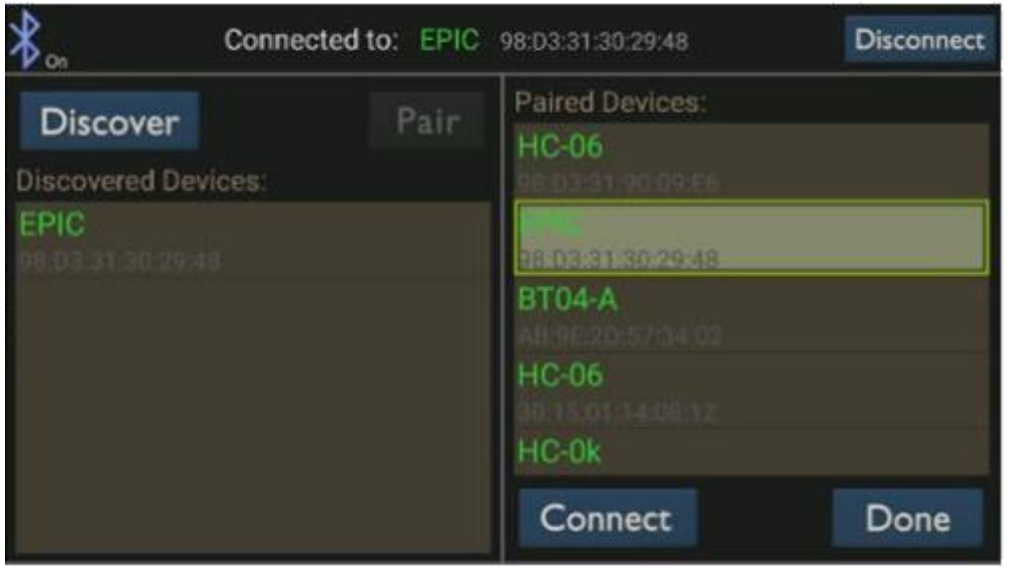


• Android App.

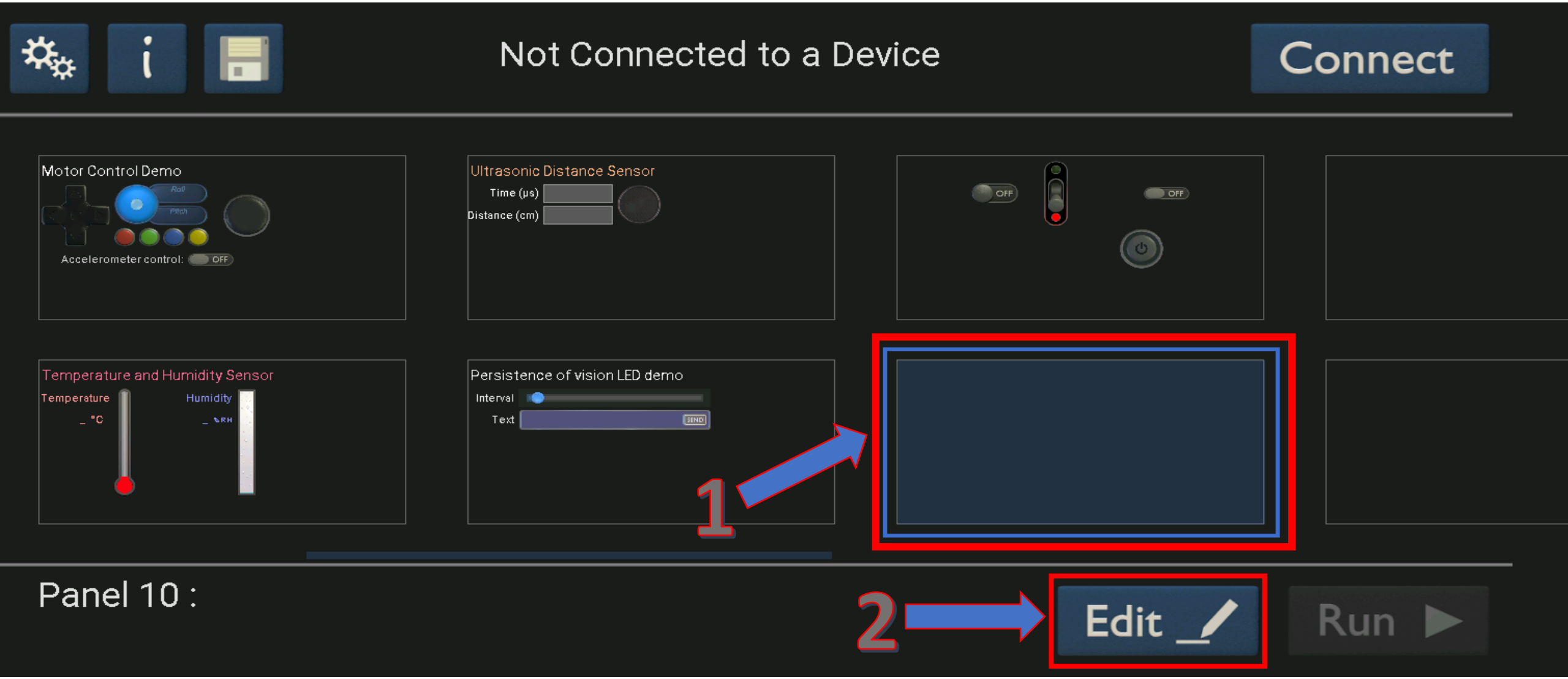

Bluetooth Electronics
Control your electronic project with your Android device!
Keuwlsoft


GET IT ON
Google Play

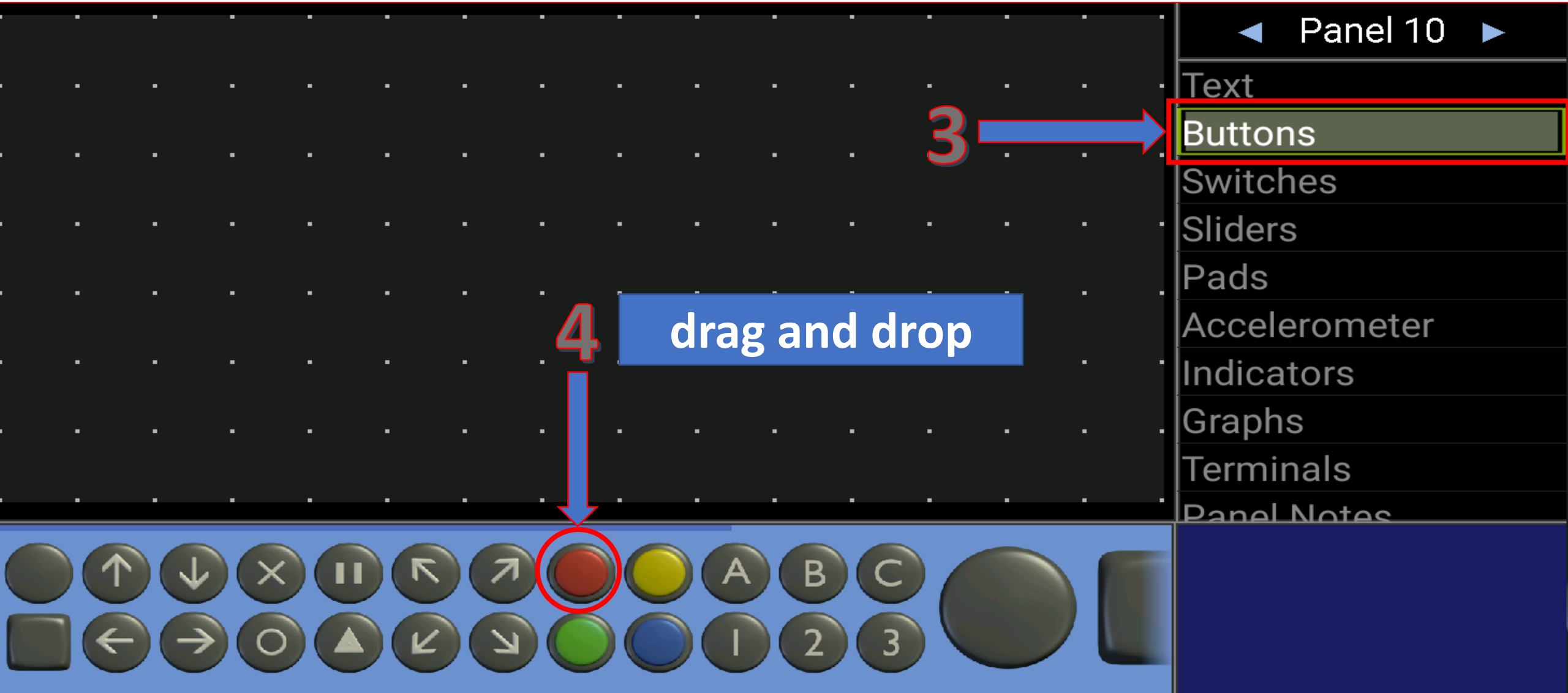

Connected to: EPIC
98:D3:31:30:29:48
Change
Panel 6 : Temperature and Humidity Demo
Reads from a DHT11 Sensor
Edit
Run


On
Connected to: EPIC 98:D3:31:30:29:48
Disconnect
Discover
Pair
Discovered Devices:
EPIC
Paired Devices:
HC-06
BT04-A
HC-06
HC-0k
Connect
Done

• Setting Up

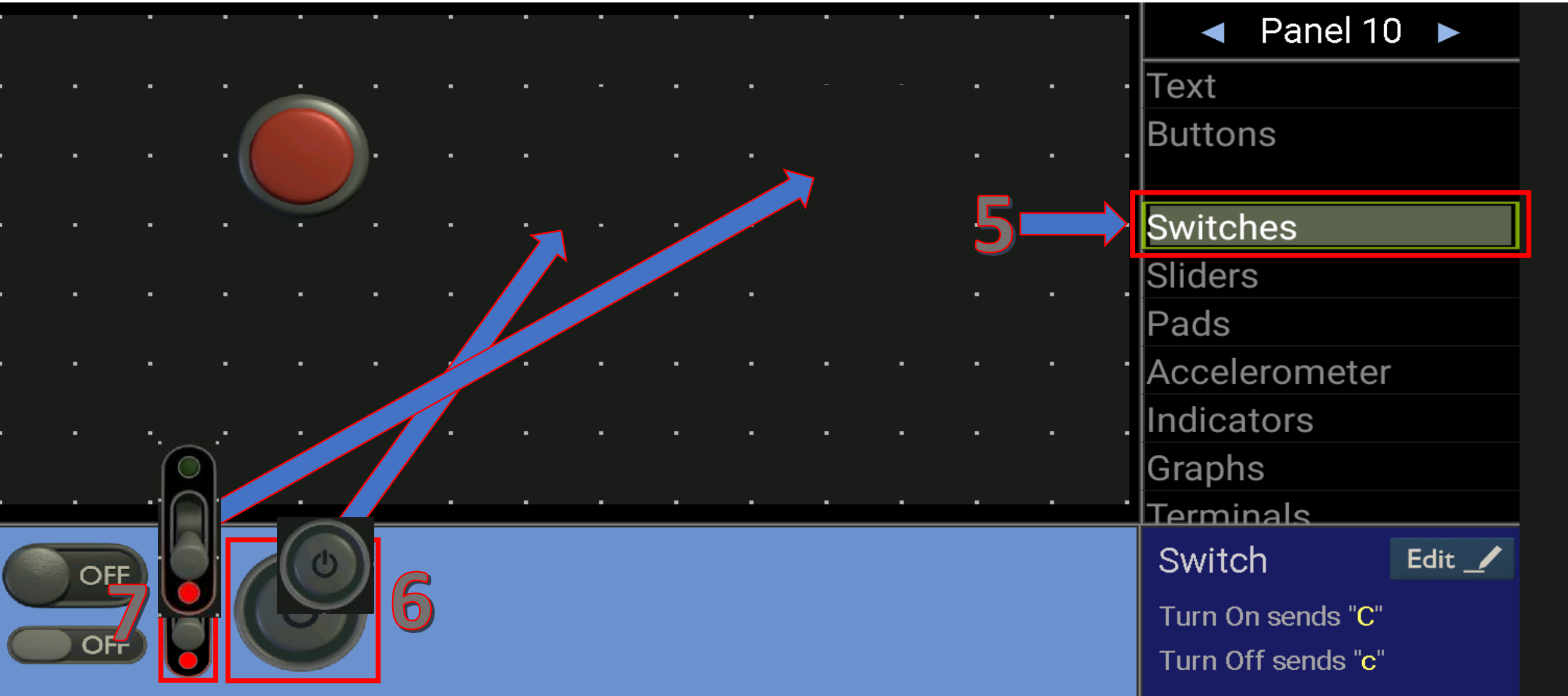

Not Connected to a Device
Connect
Motor Control Demo
Roll
Pitch
Accelerometer control:
OFF
Ultrasonic Distance Sensor
Time (µs)
Distance (cm)
OFF
OFF
Temperature and Humidity Sensor
Temperature
_ °C
Humidity
_ %RH
Persistence of vision LED demo
Interval
Text
SEND
1
Panel 10 :
2
Edit
Run

• Setting Up

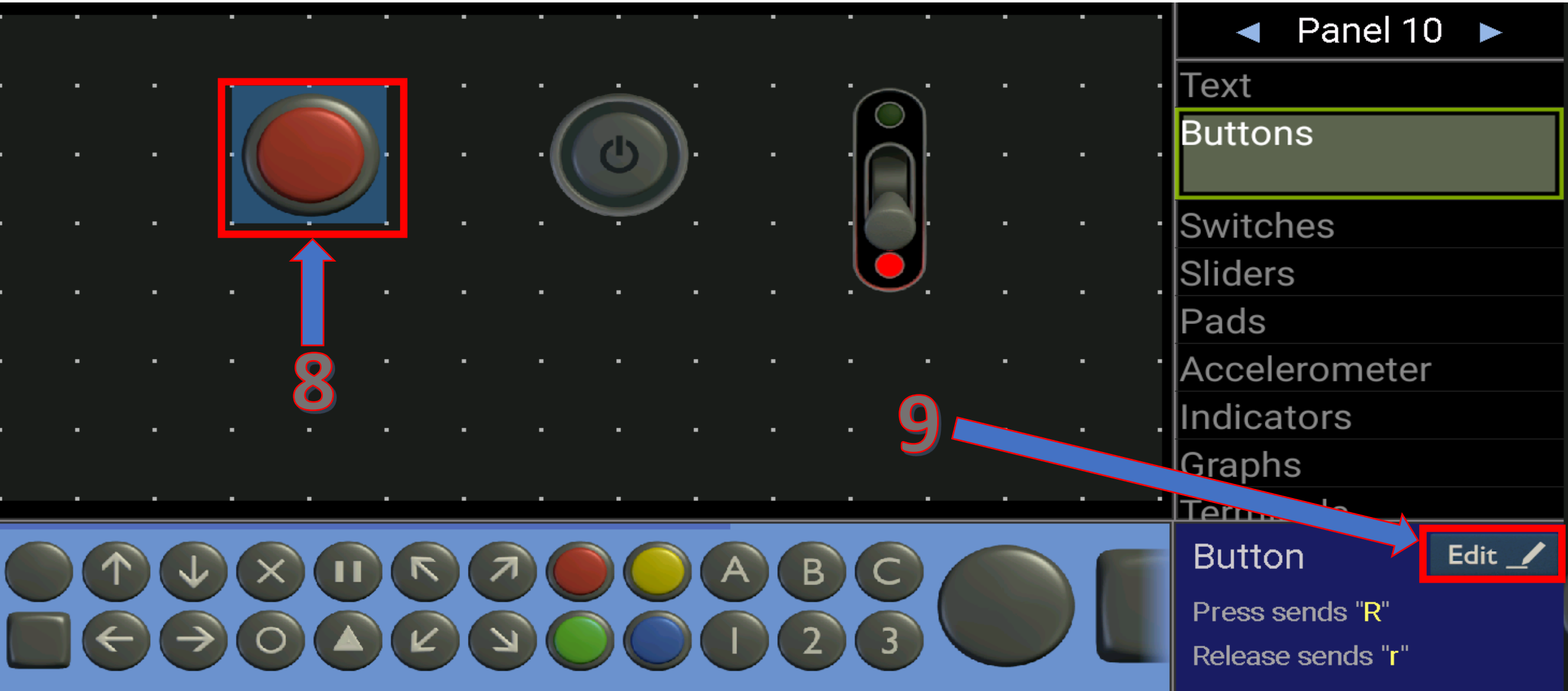

Panel 10
Text
Buttons
Switches
Sliders
Pads
Accelerometer
Indicators
Graphs
Terminals
3
4
drag and drop
A
B
C
1
2
3

- Setting Up

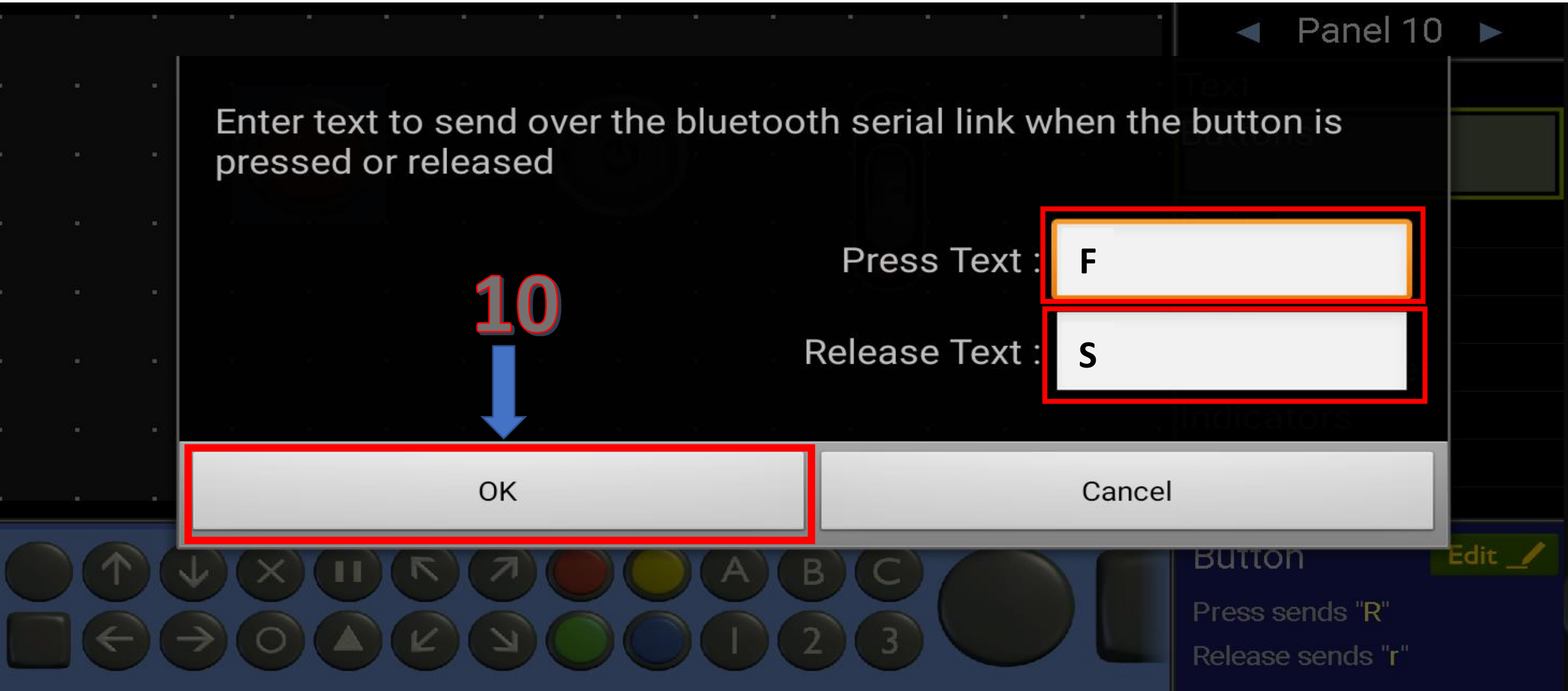
Bluetooth Electronic



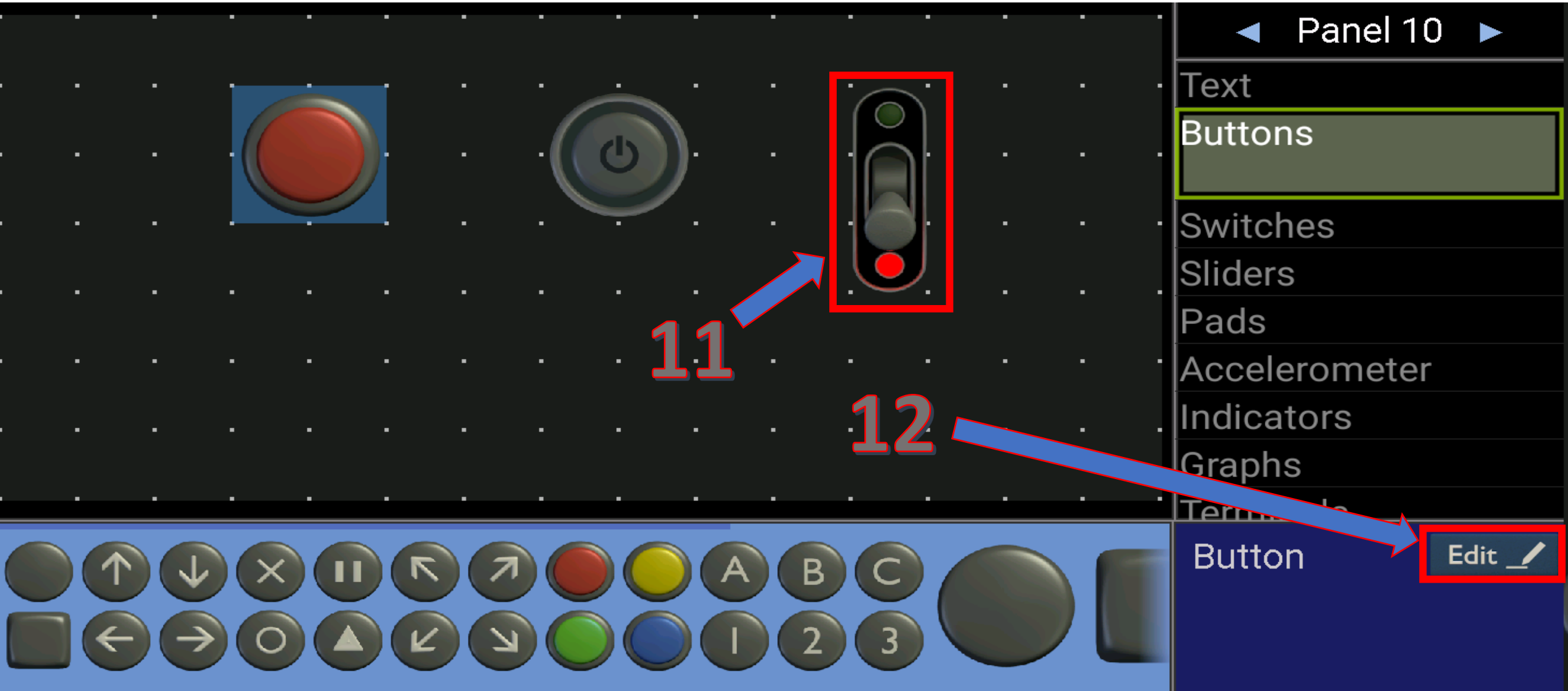
• Setting Up


Panel 10
Text
Buttons
Switches
Sliders
Pads
Accelerometer
Indicators
Graphs
8
9
A
B
C
1
2
3
Button
Edit
Press sends "R"
Release sends "r"

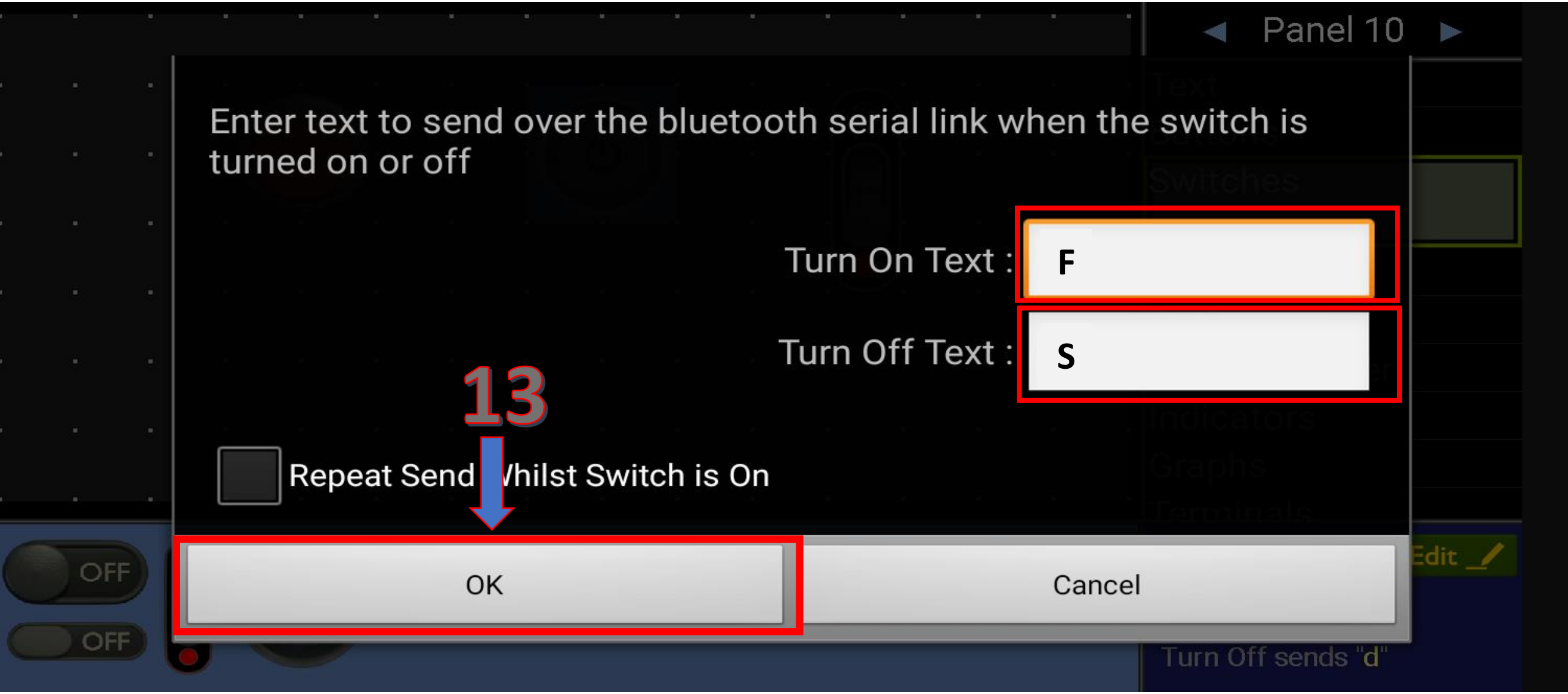
• Setting Up


Panel 10
Enter text to send over the bluetooth serial link when the button is pressed or released
Press Text :
F
Release Text :
S
10
OK
Cancel
Button
Edit
Press sends "R"
Release sends "r"

• Setting Up

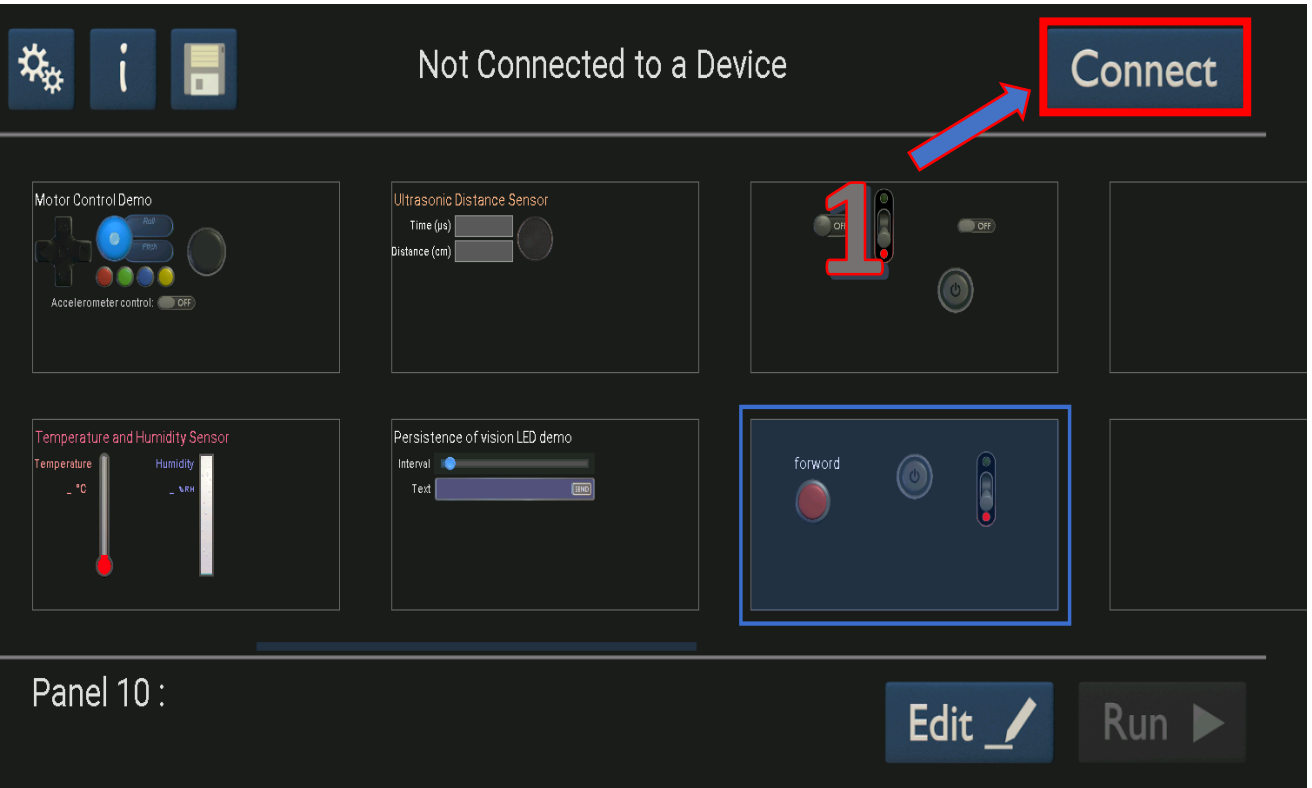

Panel 10
Text
Buttons
Switches
Sliders
Pads
Accelerometer
Indicators
Graphs
11
12
A
B
C
1
2
3
Button
Edit

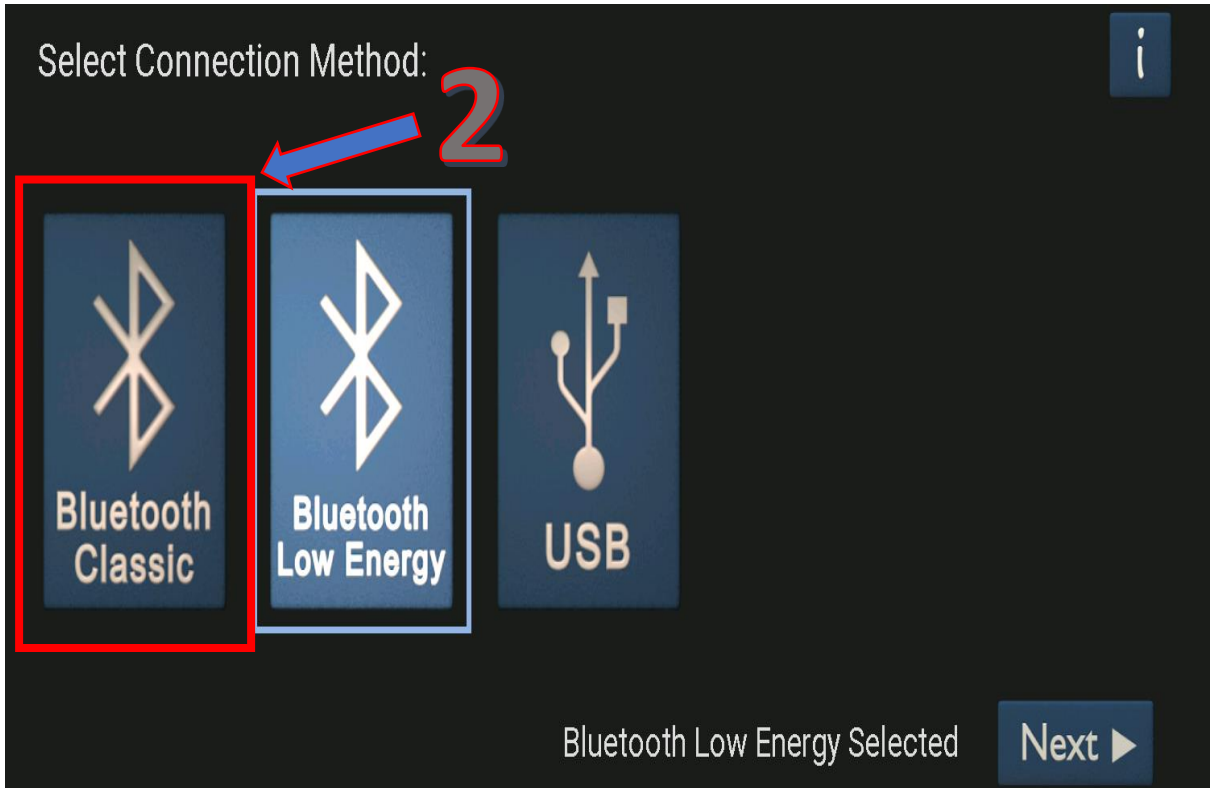
• Setting Up


Panel 10
Enter text to send over the bluetooth serial link when the switch is turned on or off
Turn On Text :
F
Turn Off Text :
S
13
Repeat Send Whilst Switch is On
OK
Cancel
OFF
OFF
Edit
Turn Off sends "d"

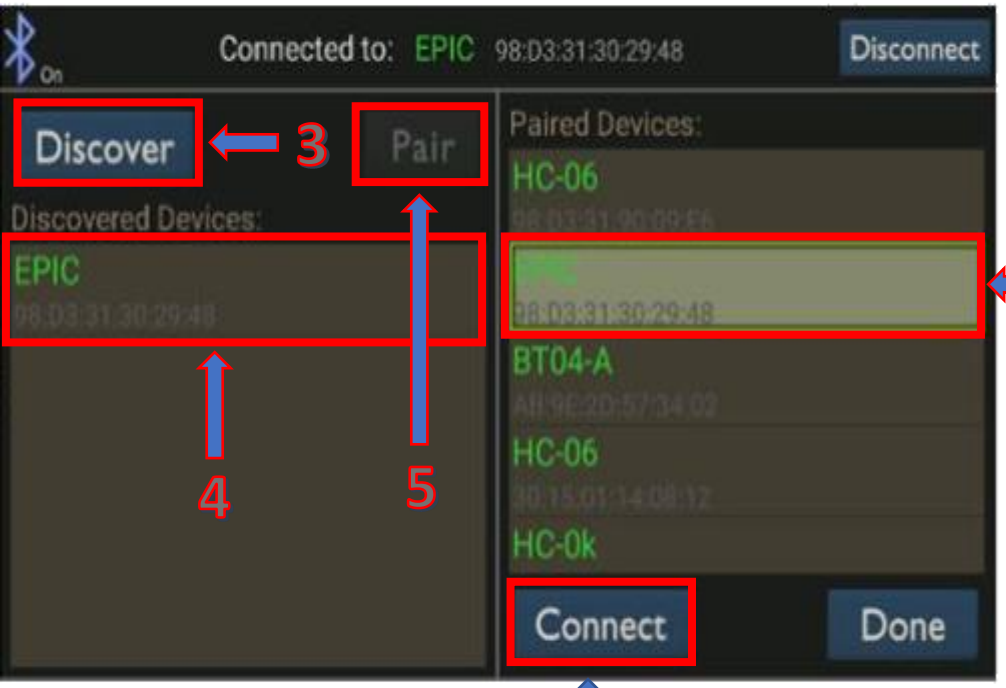
• Setting Up

return to background

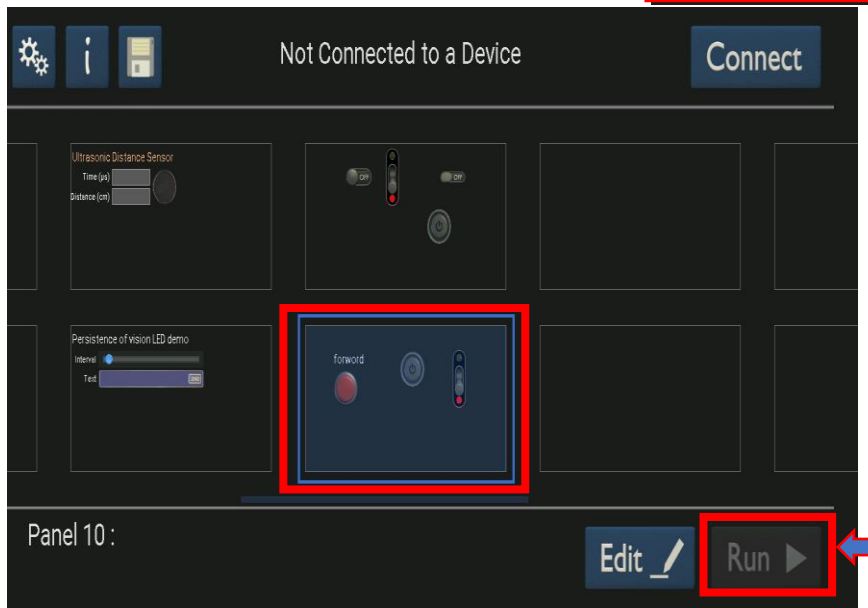


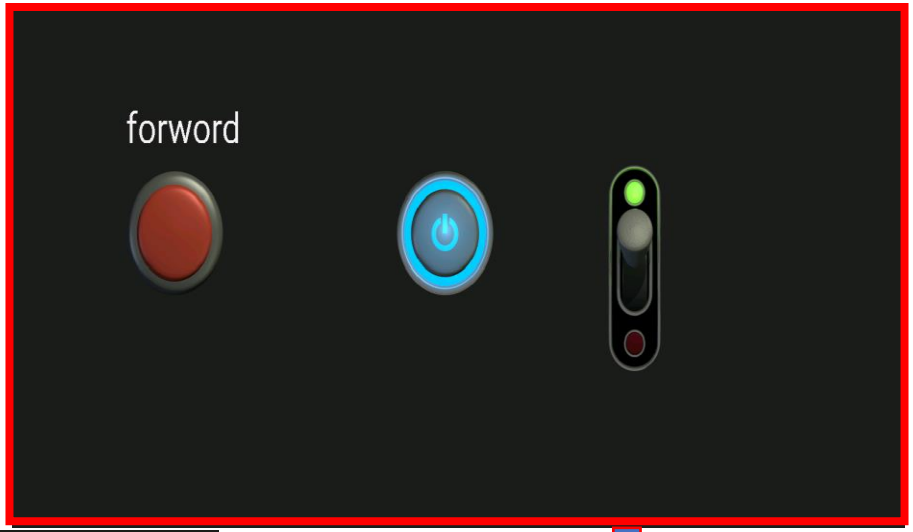


• Setting Up



password
0000 -1234



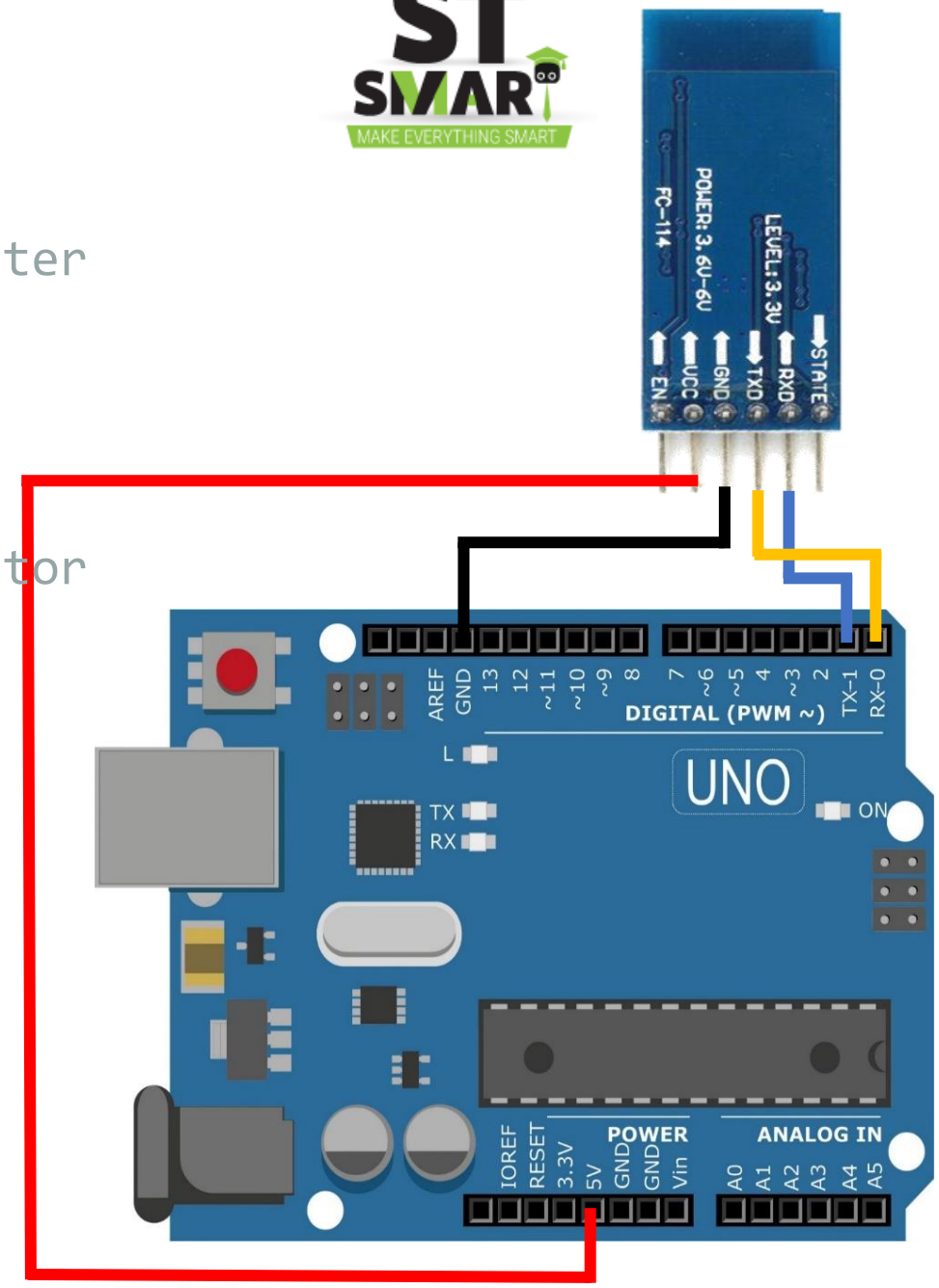


final control panel

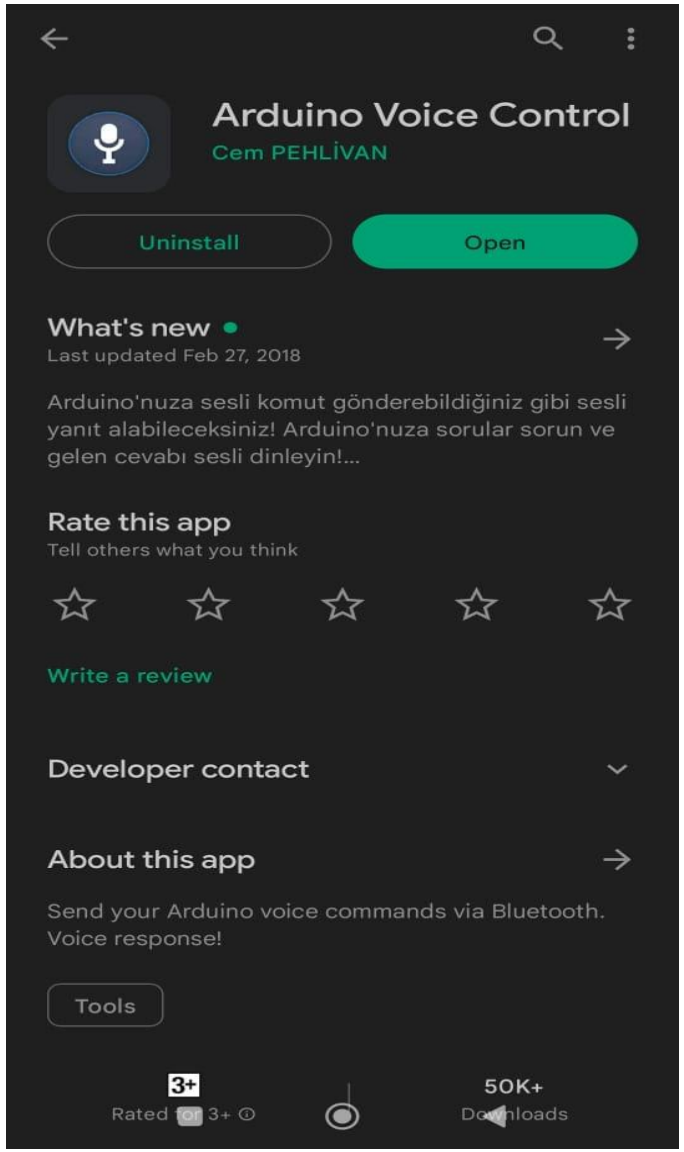
• Example

```
const int red = 13;
String reading;  // data type used to store a character
value.
void setup( )
{
 pinMode(red, OUTPUT);
 Serial.begin(9600);  // Adjust speed of serial monitor
}
void loop( ) {
  if(Serial.available()>0) {
     reading=Serial.readString();

if (reading=="turn on"){ digitalWrite(red,1);}
else if (reading=="turn off"){
               digitalWrite(red,0); }
}}
```



• Arduino Voice Control



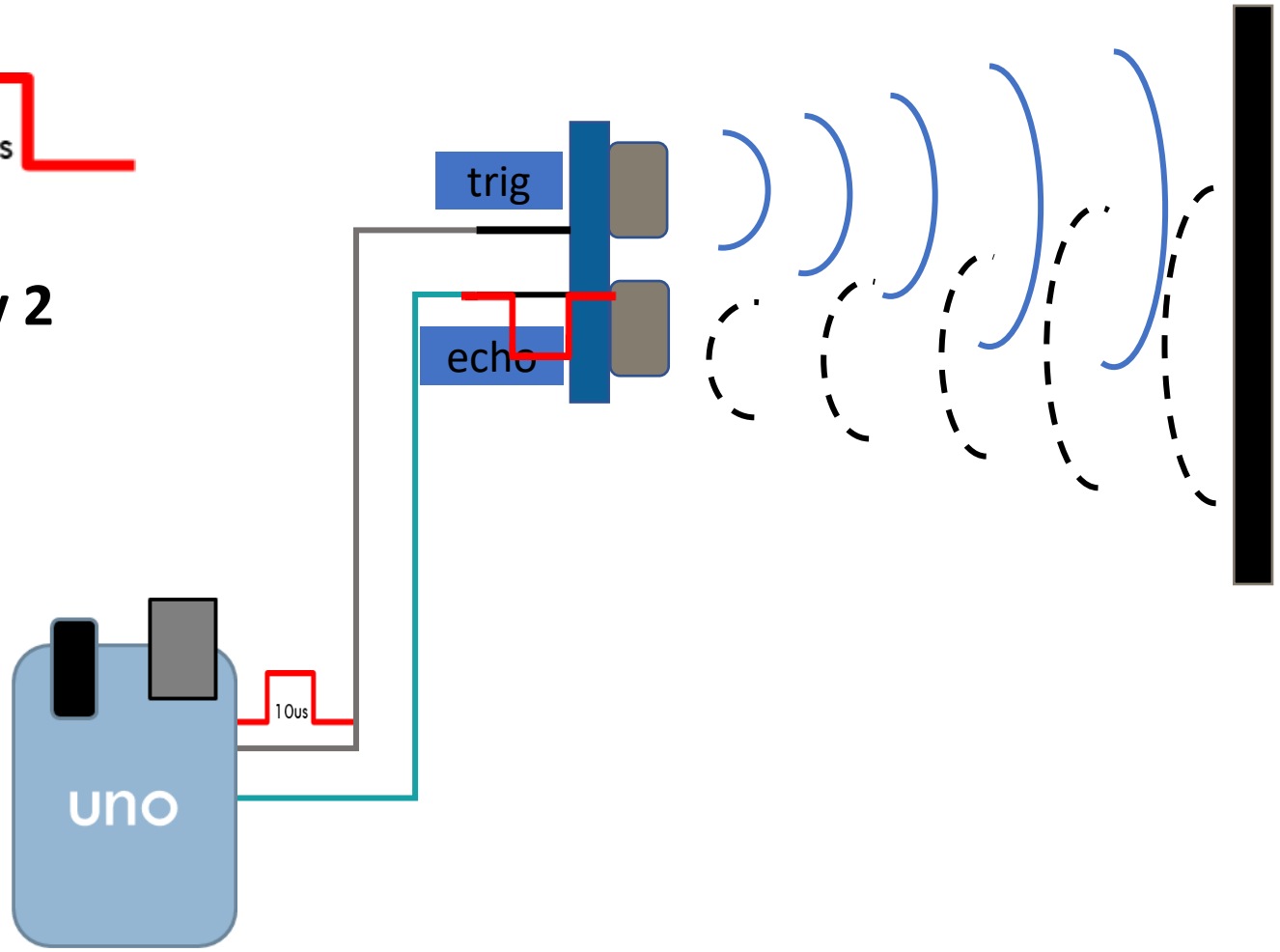
• UltraSonic Sensor

- The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do
- Power Supply :+5V DC
- Ranging Distance : 2cm – 400 cm
- Trigger Input Pulse width: 10uS
- waves are sound waves

• Basic Principle

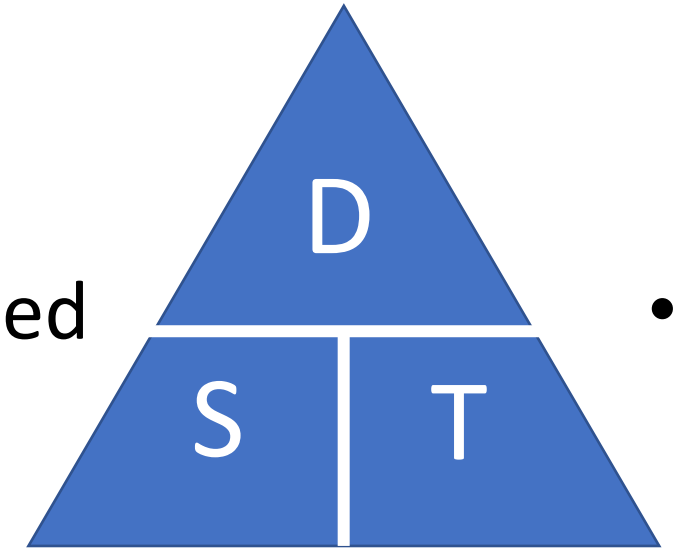
- signal HIGH → 10usec

- We need to divide the travel time by 2
- speed sound 343 m/s
- Arduino calculate the time
- after receiving wave echo send low signal



• Basic Principle

- Time = Distance / Speed

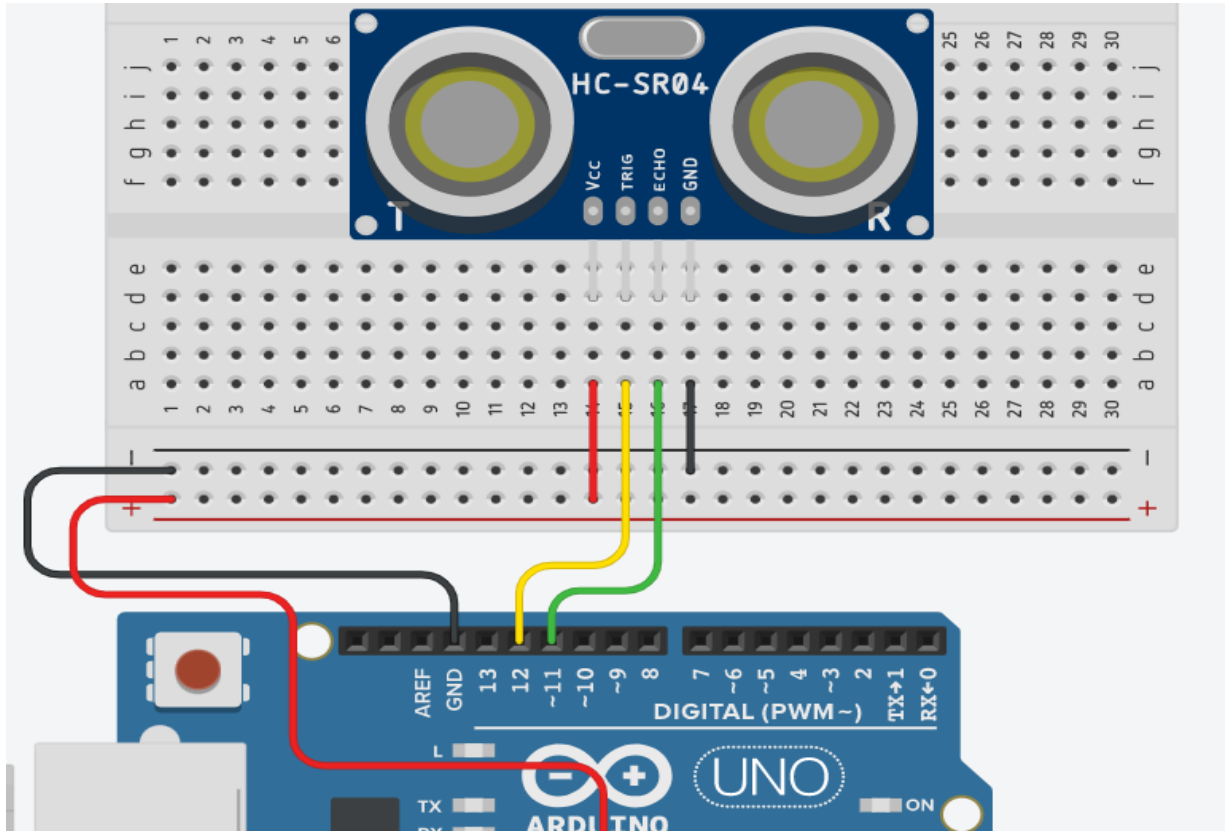


- Speed = Distance / Time

- Distance = Speed * Time

• Code

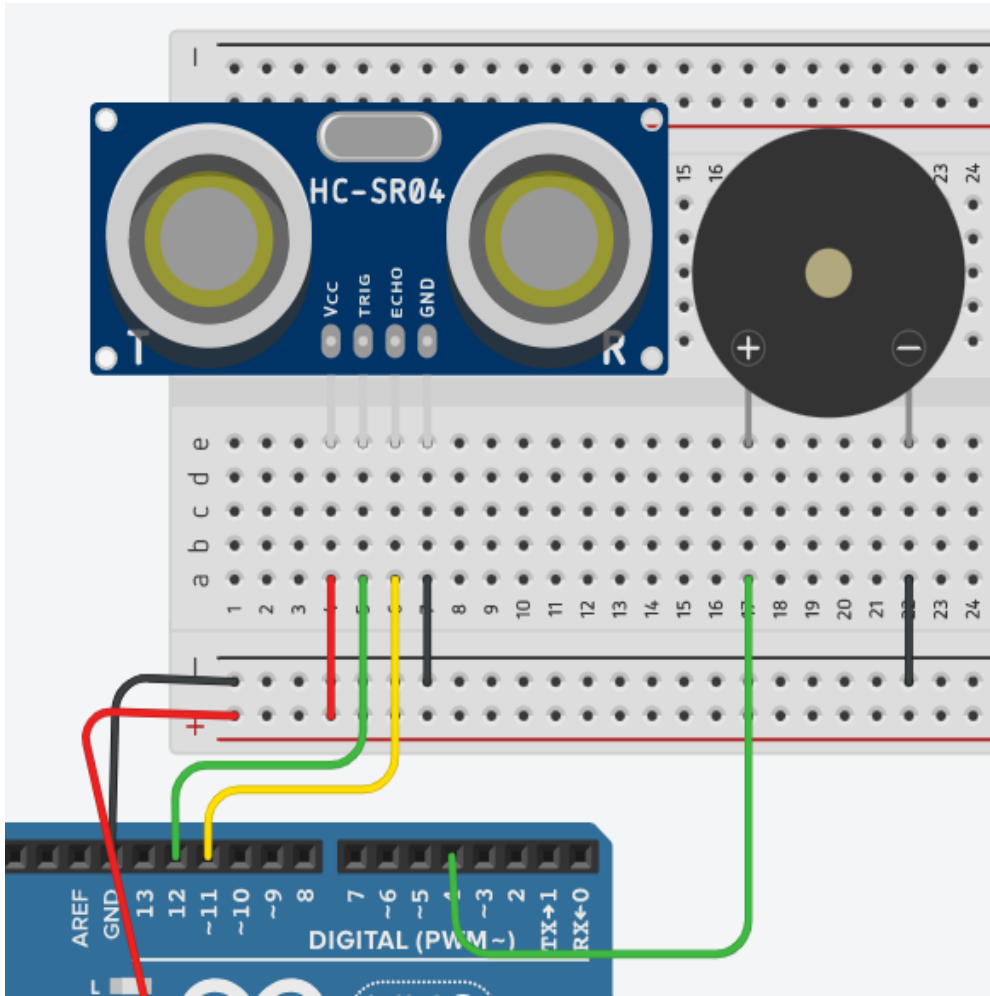
```
#define trigPin 12
#define echoPin 11
 long duration, distance;
void setup() {
Serial.begin (9600);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
}
void loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration/2) * 0.0343;      // 343 * (100/1000000) = 343/10000
Serial.println(distance);
delay(5); // wait till next scan
}
```



• Example

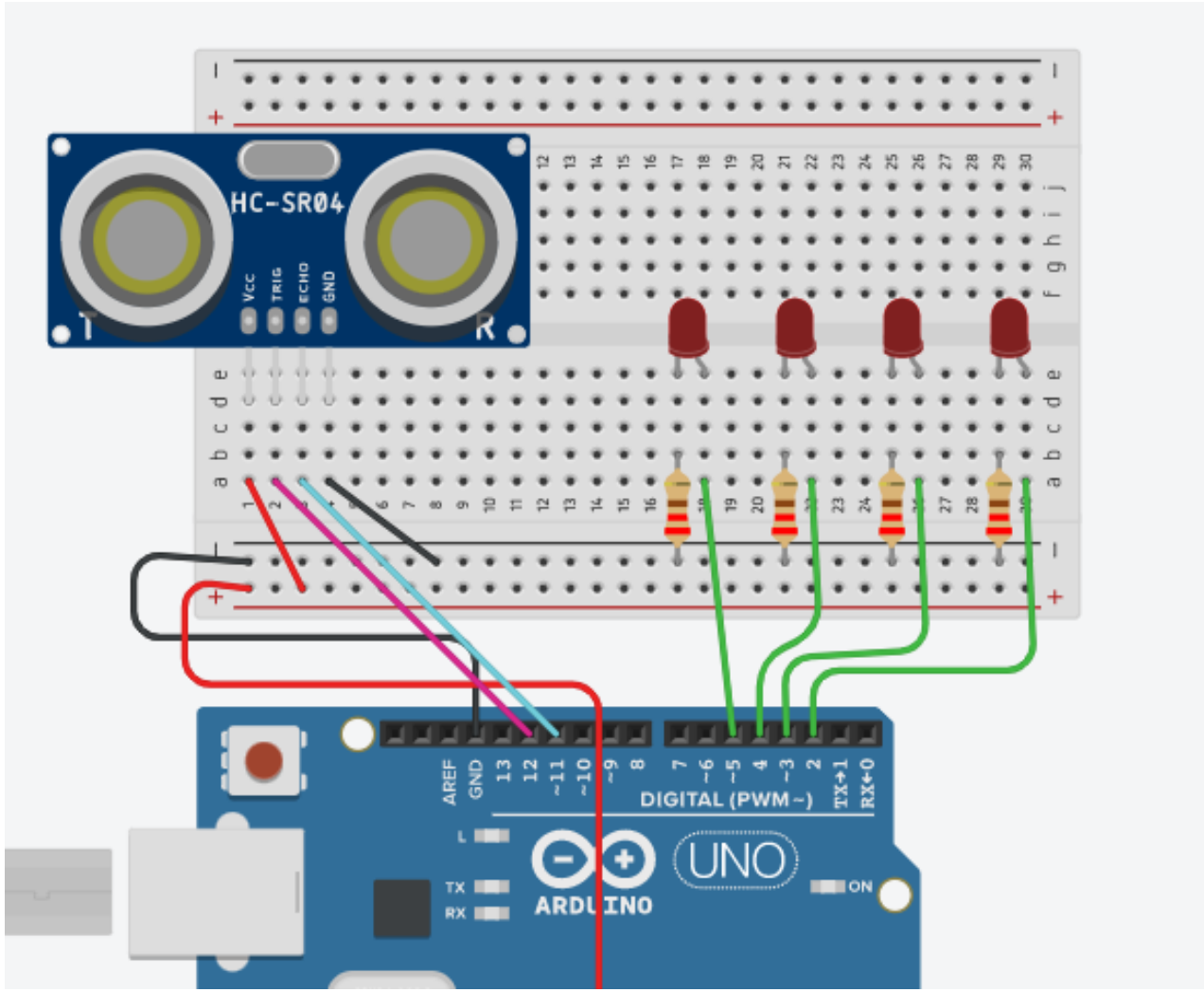
```
#define trigPin 12
#define echoPin 11
long duration, distance;
void setup() {
Serial.begin (9600);
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
pinMode(4, OUTPUT);
}
void loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration/2) * 0.0343;
Serial.println(distance);
delay(5); // wait till next scan
```

```
if(distance<=20){
  digitalWrite(4,1);
  delay(distance*30);
  digitalWrite(4,0);
  delay(distance*30);
}}
```



• Task

- Use 4 led’s to indicate distance



THANKS FOR COMING