

# SYNTHIAM

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## Use Arduino for Wheel Encoder Counter

Have your Arduino count motor encoder rotations. Connect the Arduino to your EZ-B UART #0 port to send the encoder counts.

Last Updated: 5/26/2016

## Connect The Wires

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There are two sets of wires which will need to be connected:

1. The Arduino to the encoder
2. The Arduino to the EZ-B

**Encoder** Connect the encoder wires to your Arduino pins 2 and 3. These pins are interrupt pins. The code will count the number of changes between HIGH and LOW state of these pins.

- pin 2: Encoder #1
- pin 3: Encoder #2

**EZ-B** Connect the Arduino's TX and RX ports to the UART #0 of the EZ-B. Consult the ez-b datasheet to locate the UART #0 port.

- Connect EZB UART 0 TX to ARDUINO RX
- Connect EZB UART 0 RX to ARDUINO TX
- Connect Arduino GND to EZ-B GND

## Program Arduino

Here is the program which you will upload to your Arduino. The program has 2 interrupt counters for the pins connected to the encoders. The main program will loop until the letter 'a' is received from the EZ-B over the UART. Once the 'a' is received, the Arduino will transmit 2 bytes, which are the two encoder values, respectively. Once the data is transmitted, the count of the 2 bytes is reset.

Resetting the values on each query will make it much easier in EZ-Builder to identify what wheel is spinning quicker/slower.

**Arduino Code:** ``` // just reading the encoder, nothing else.

```
int encoderValue_A = 0; int encoderValue_B = 0;

void setup() {
  Serial.begin(9600);

  pinMode(2, INPUT); pinMode(3, INPUT);

  attachInterrupt(digitalPinToInterrupt(2), countA, FALLING);
  attachInterrupt(digitalPinToInterrupt(3), countB, FALLING); }

void loop() {

  // if there is data to read, read it if (Serial.available() > 0) {

  // read the incoming data from the ezb
  int incomingByte = Serial.read();

  // command 'a' means transmit the current values and reset the counters
  if (incomingByte == 'a') {

    // send the values
    Serial.write(encoderValue_A);
    Serial.write(encoderValue_B);

    // reset the values
    encoderValue_A = 0;
    encoderValue_B = 0;
  }

}

void countA() {
  encoderValue_A++;
}

void countB() {
  encoderValue_B++;
} ```
```



In EZ-Builder, add a new EZ-Script control.

This code will be pasted into the EZ-Script control. The code will loop and continue to request the interrupt counts of the encoders from the Arduino.

The values of the encoder are in the array \$encoders[0] and \$encoders[1]. You may use these two values globally within the project to identify what the encoder values are.

**EZB Code** ``` uartinit(0, 0, 9600)

:loop

## Send a request for data to the arduino

```
uartwrite(0, 0, "a")
```

## wait a bit for the data to be transmitted

```
sleep(50)
```

```
$dataAvail = UartAvailable(0, 0)
```

```
IF ($dataAvail != 2)
```

```
print("The arduino didn't send us anything. Exiting")
```

```
halt()
```

```
ELSE
```

```
UartReadBinary(0, 0, 2, $encoders)
```

```
print("Encoder A: " + $encoders[0]) print("Encoder B: " + $encoders[1])
```

```
ENDIF
```

```
sleep(100)
```

```
goto(loop) ```
```

## Reference

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This tutorial was inspired from this thread: <http://www.ez-robot.com/Community/Forum/Thread?threadId=5603&page=3>