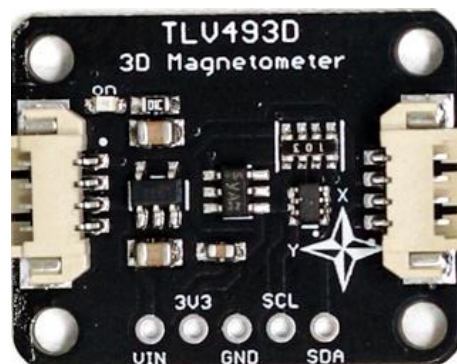




SmartElex TLV493D Triple-Axis Magnetometer



The TLV493D 3-axis magnetometer is a great little sensor for detecting magnets in 3D. In fact, the manufacturer Infineon suggests it could be used to make a joystick!

The TLV493D excels at measuring nearby magnetic fields in three dimensions. It's not going to make a good compass, it's not sensitive enough to pick up the Earth's magnetic field, but you can use it to track the movement of nearby magnets in three dimensions.

Here are a few specs:

- Digital output via 2-wire based standard I2C interface up to 1 MBit/sec
- 12-bit data resolution for each measurement direction
- Bx, By and Bz linear field measurement up to +130 mT
- Excellent matching of X/Y measurement for accurate angle sensing

As we are wont to do, we've made the TLV easy to use by putting it on a breakout PCB along with the circuitry to support it. A voltage regulator and logic level shifting combine to make it usable with a range of microcontrollers with either 3.3V or 5V logic levels. We even give you a pin for you to use the excess 3.3V juice not needed by the TLV493D.

Power Pins

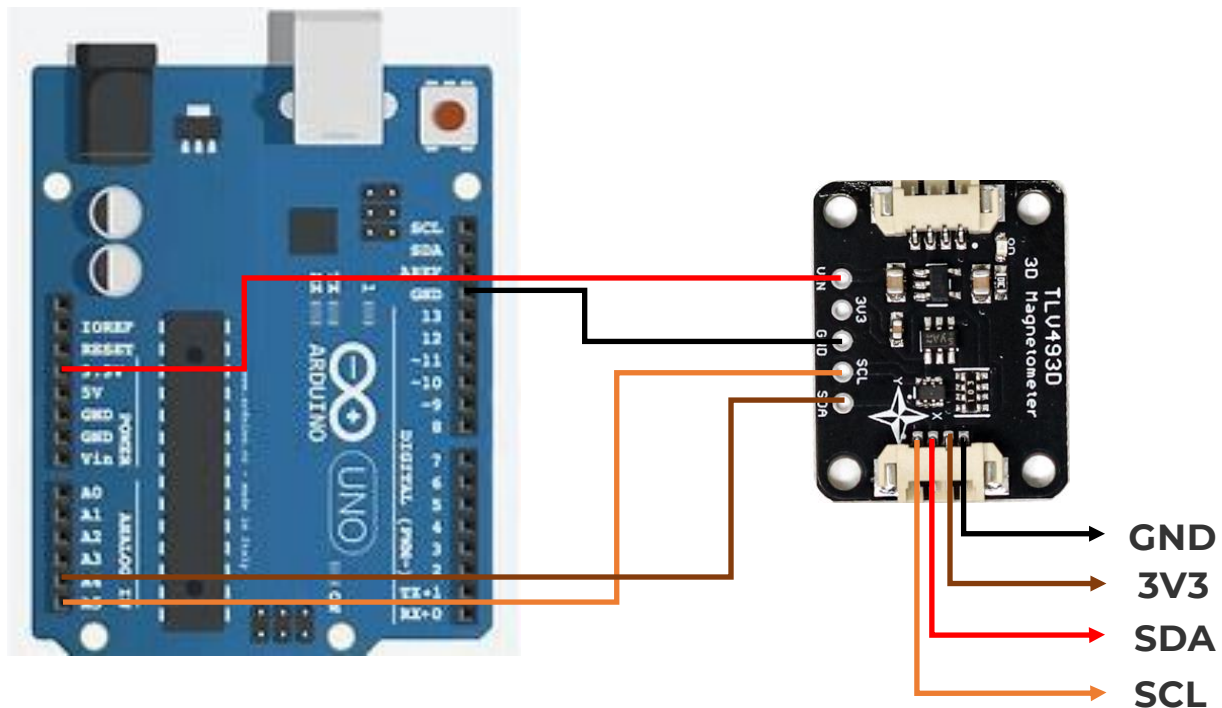
- **Vin** - this is the power pin. Since the sensor chip uses 3.3 VDC, we have included a voltage regulator on board that will take 3-5VDC and safely convert it down. To power the board, give it the same power as the logic level of your microcontroller - e.g. for a 5V microcontroller like Arduino, use 5V
- **3Vo** - this is the 3.3V output from the voltage regulator, you can grab up to 100mA from this if you like
- **GND** - common ground for power and logic

I2C Logic Pins

- **SCL** - this is the I2C clock pin, connect to your microcontroller's I2C clock line.
- **SDA** - this is the I2C data pin, connect to your microcontroller's I2C data line

Arduino I2C Wiring

Wiring the TLV493D is easy, since it only requires power and two wires for an I2C connection.



Arduino	TLV493D
SCL(A5)	SCL
SDA(A4)	SDA
5v OR 3.3v	VIN
GND	GND

- Connect **board VCC** to **Arduino 5V** if you are running a **5V** board Arduino (Uno, etc.). If your board is **3V**, connect to that instead.
- Connect **board GND** to **Arduino GND**
- Connect **board SCL** to **Arduino SCL**
- Connect **board SDA** to **Arduino SDA**

Arduino Library Installation

Fortunately Infineon have written a library for you for the TLV493D which you can install using the Arduino IDE's **Library Manager**:

Click the **Manage Libraries ...** menu item, search for **Infineon TLV493**, and select the **TLV493D-A1B6** library:

Cartesian Example

Infineon has provided a few examples, but the simplest example is the "Cartesian" example which reads the X, Y, and Z axis measurements in milli-teslas (**mT**).

```
#include <Tlv493d.h>
```

```
// Tlv493d Object
```

```
Tlv493d Tlv493dMagnetic3DSensor = Tlv493d();
```

```
void setup() {
```

```
  Serial.begin(9600);
```

```
  while(!Serial);
```

```
  Tlv493dMagnetic3DSensor.begin();
```

```
}
```

```
void loop() {
```

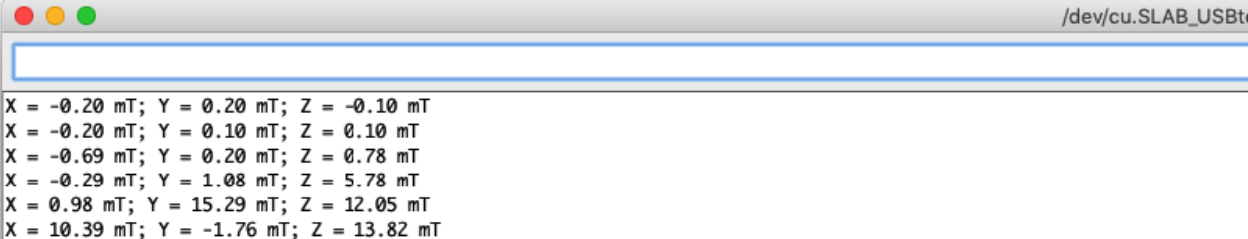
```
  Tlv493dMagnetic3DSensor.updateData();
```

```
  delay(100);
```

```
  Serial.print("X = ");
```

```
Serial.print(Tlv493dMagnetic3DSensor.getX());  
  
Serial.print(" mT; Y = ");  
  
Serial.print(Tlv493dMagnetic3DSensor.getY());  
  
Serial.print(" mT; Z = ");  
  
Serial.print(Tlv493dMagnetic3DSensor.getZ());  
  
Serial.println(" mT");  
  
delay(500);  
}
```

Once you compile and upload the example to your Arduino compatible board of choice, open the serial monitor, verify that your baud rate setting matches the example, and you should see measurements for the three axes being printed. If you wave a magnet near the sensor you can see the values changing!



The screenshot shows a serial monitor window with a title bar containing three colored buttons (red, yellow, green) and the text "/dev/cu.SLAB_USBt". The window displays the following output:

```
X = -0.20 mT; Y = 0.20 mT; Z = -0.10 mT  
X = -0.20 mT; Y = 0.10 mT; Z = 0.10 mT  
X = -0.69 mT; Y = 0.20 mT; Z = 0.78 mT  
X = -0.29 mT; Y = 1.08 mT; Z = 5.78 mT  
X = 0.98 mT; Y = 15.29 mT; Z = 12.05 mT  
X = 10.39 mT; Y = -1.76 mT; Z = 13.82 mT
```