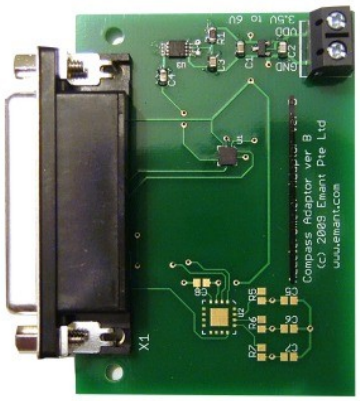
COMPASS APPLICATION ADAPTOR FOR EMANT380

The Compass Application Adaptor connects the Honeywell **HMC1052** magnetoresistive sensors designed for low field magnetic sensing to the **EMANT380** Bluetooth DAQ module.



FEATURES

- 4 Element Wheatstone Bridge
- Designed to measure direction and magnitude of Earth's magnetic fields, from 120 micro-gauss to 6 gauss

HMC1052

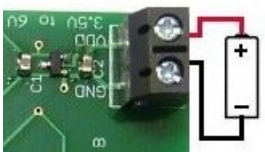
Please see **HMC1052** specifications for full information.

Typical at 25 °C unless otherwise noted. VDD=3.3V

Parameter	Condition	Specification	Unit
	Bridge Elements		
Resistance	Bridge current = 10mA	800 1000 1500	ohms
Field Range	Full scale (FS)	-6 +6	gauss
Bridge Offset	Offset = (OUT+) – (OUT-) Field = 0 gauss after Set pulse	-1.25 ±0.5 +1.25	mV/V
Sensitivity	Set/Reset Current = 0.5A	0.8 1.0 1.2	mV/V/gauss
	Set/Reset Strap		
Resistance	Measured from S/R+ to S/R-	4.5	ohms
Current	0.1% duty cycle, or less, 2µsec current pulse	0.5	A

Connect to the EMANT380 Bluetooth DAQ

1. Connect the adaptor to the EMANT380 Bluetooth DAQ module
2. Connect power supply (3.5V to 6V Max)



Programming Tips (Python)

```
    m = Emant.Emant300()
    m.Open("COM6")
    m.ConfigAnalog(0.1,Emant.Emant300.Bipolar,25)
```

1. Open the EMANT380 with the outgoing COM Port
2. Configure the Analog to Bipolar Input with Input Range to 0.1V

```
x, binval = m.ReadAnalog(Emant.Emant300.AIN2,Emant.Emant300.AIN1)
```

3. Read the X axis voltage.

```
        mx = ((x - xmin) - midx)/midx
        my = ((y - ymin) - midy)/midy
        mangle = -math.atan2(my,mx)*180/3.14
```

4. Calculate x, y values accounting for calibration offsets.
5. Calculate the angle. See **HMC1052** specifications and application notes for formulae.

```
        m.WriteDigitalBit(7, False)
        m.WriteDigitalBit(7, True)
```

6. The set/reset strap must be used to periodically condition the magnetic domains of the magneto-resistive elements for best and reliable performance.

```
config.read("compass.ini")
xmin = float(config.get("Values", "xmin"))
xmax = float(config.get("Values", "xmax"))
ymin = float(config.get("Values", "ymin"))
ymax = float(config.get("Values", "ymax"))
midx = (xmax - xmin) / 2
midy = (ymax - ymin) / 2
```

7. Due to the offsets and different sensitivity, you should run a calibration program to compensate the readings from both the X and Y outputs. Do this by making X, Y measurements with the sensor rotated at least 360 degrees.

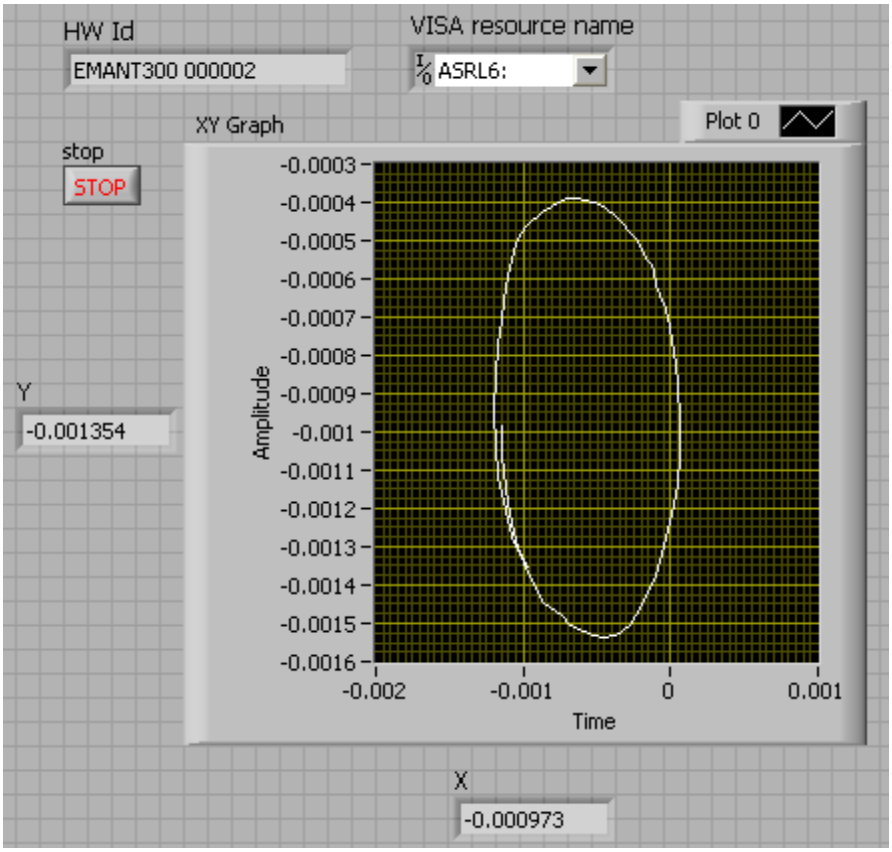
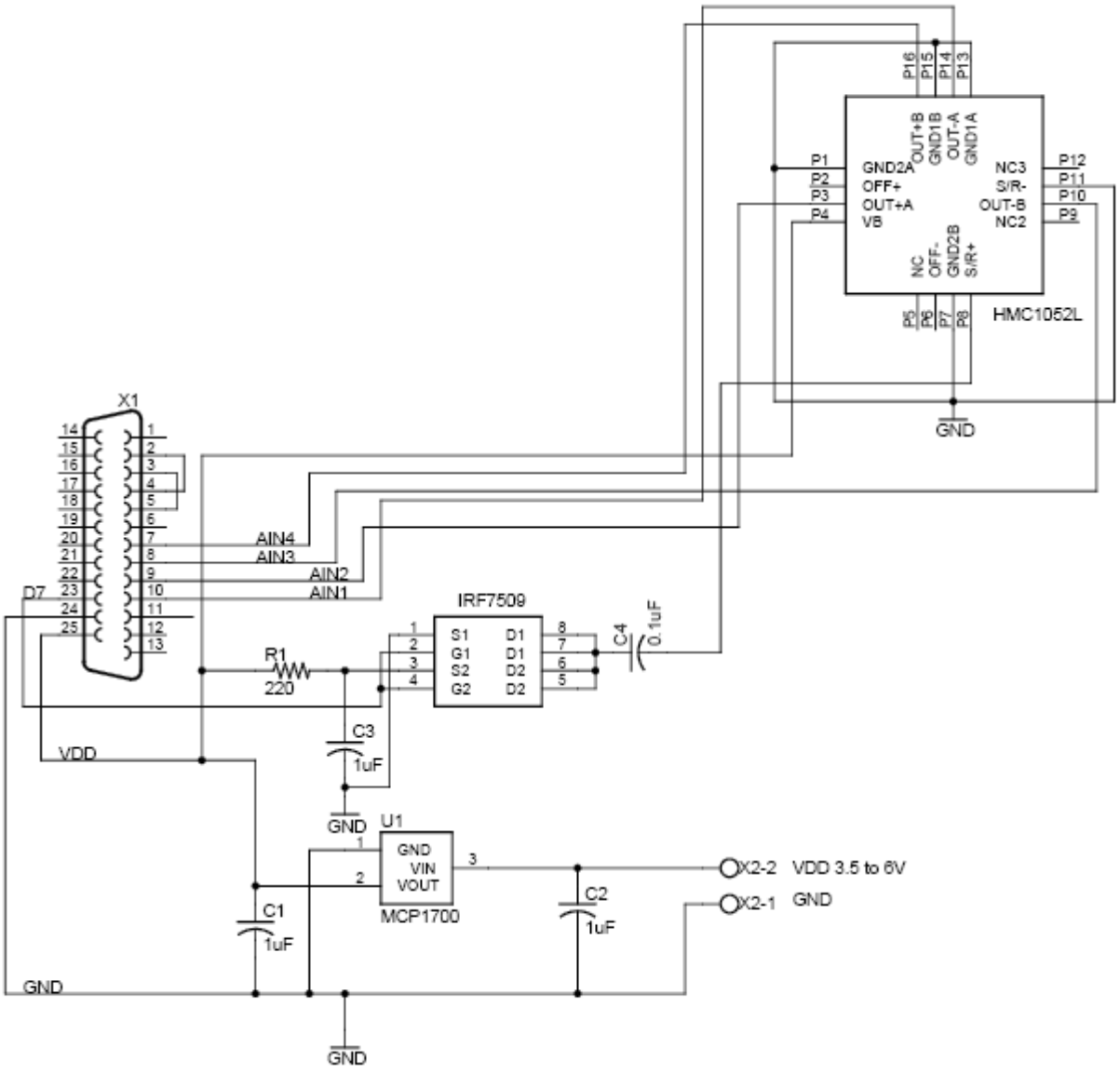


Fig 1: LabVIEW program shows the XY voltage trace after sensor is rotated 360^{o}

Schematic


HMC1052L
GND2A
OFF+
OUT+A
VB
OUT+B
GND1B
OUT-A
GND1A
NC3
S/R-
OUT-B
NC2
NC
OFF-
GND2B
S/R+
GND
X1
AIN4
AIN3
AIN2
AIN1
D7
IRF7509
S1
G1
S2
G2
D1
D1
D2
D2
C4
0.1uF
R1
220
C3
1uF
VDD
GND
U1
GND
VIN
VOUT
MCP1700
C1
1uF
C2
1uF
X2-2
VDD 3.5 to 6V
X2-1
GND
GND