

# **Analog Accelerometer**

MK-56209

January 31, 2016

**IONOTRONICS Corporation**

<http://www.ionotronics.com>

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# 1 Introduction

This User Guide describes the operation and schematic of the MK-56209 Analog Accelerometer. The MK-56209 provides an interface to the FXLN8361 Accelerometer using a Hirose 6 Pin Connector. This connector provides access to the three analog x,y and z axis measurements and also provides 3.3V power supply to the device. Figure 1 shows the MK-56209 Device.



**Figure 1 Photos MK-56209 Accelerometer**

The Analog Accelerometer allows for direct measurement of the 3-Axis values using a voltmeter or ADC. With the IONOTRONICS I2C Four Channel ADC ( MK-34765) you can use the Pyraptor USB/I2C Bridge (MK-11009) to view the 3 axis values simultaneously using the Java Meter Beans. See Section 3.

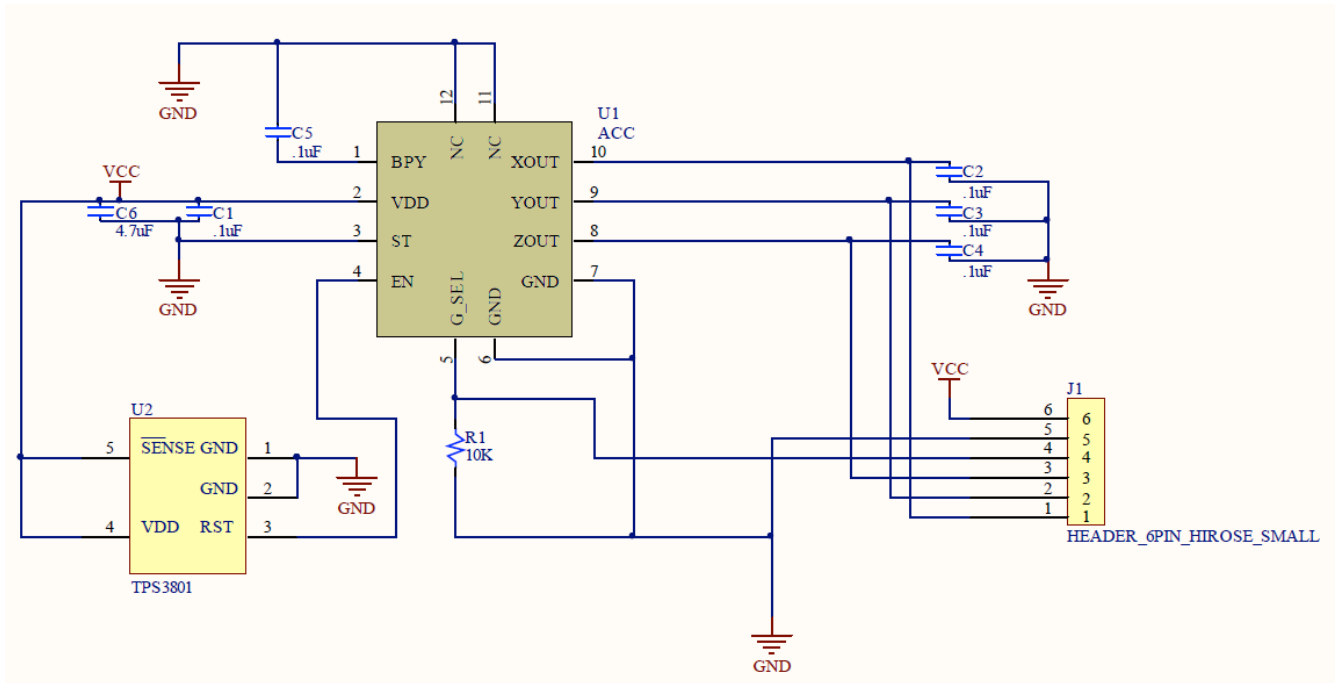
## 2 Description

The Analog Accelerometer is based on the Freescale FXLN83xxQ 3-Axis Low Power Analog-Output Accelerometer. For the datasheet see:

[http://cache.freescale.com/files/sensors/doc/data\\_sheet/FXLN83xxQ.pdf](http://cache.freescale.com/files/sensors/doc/data_sheet/FXLN83xxQ.pdf)

The Digikey part number is: FXLN8361QR1DKR-ND.

The schematic of the MK-56209 is shown in Figure 2.



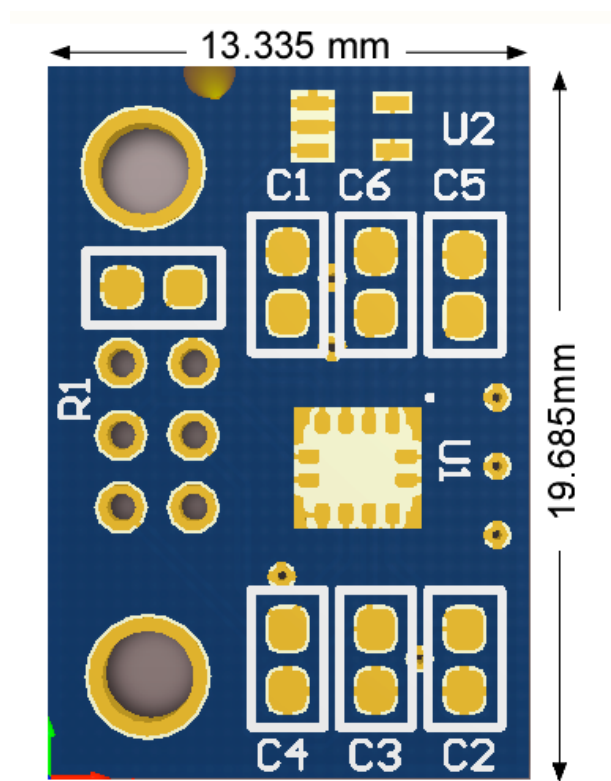
**Figure 2 Schematic of the MK-56209**

Note that in the schematic the pin G\_SEL is available in the Hirose 6 Pin Header. From the FreeScale datasheet:

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| g-Select | <p>Full Scale Range selection:</p> <p><b>For part numbers FXLN8361QR1 &amp; FXLN8371QR1:</b></p> <ul style="list-style-type: none"> <li>When the g-select pin is logic low, the accelerometer is in <math>\pm 8 g</math> mode</li> <li>When the g-select pin is logic high, the accelerometer is in <math>\pm 2 g</math> mode</li> </ul> <p><b>For part numbers FXLN8362QR1 &amp; FXLN8372QR1:</b></p> <ul style="list-style-type: none"> <li>When the g-select pin is logic low, the accelerometer is in <math>\pm 16 g</math> mode</li> <li>When the g-select pin is logic high, the accelerometer is in <math>\pm 4 g</math> mode</li> </ul> |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

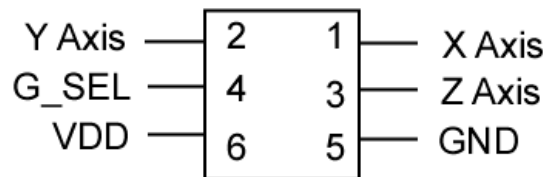
The signal is set to low but can be driven high through Pin 4 of the Hirose 6-Pin connector.

The board dimensions are shown in Figure 3.



**Figure 3 Board Dimensions**

The pin out for the Hirose DF-11 series 6 pin connector is shown in Figure 4.



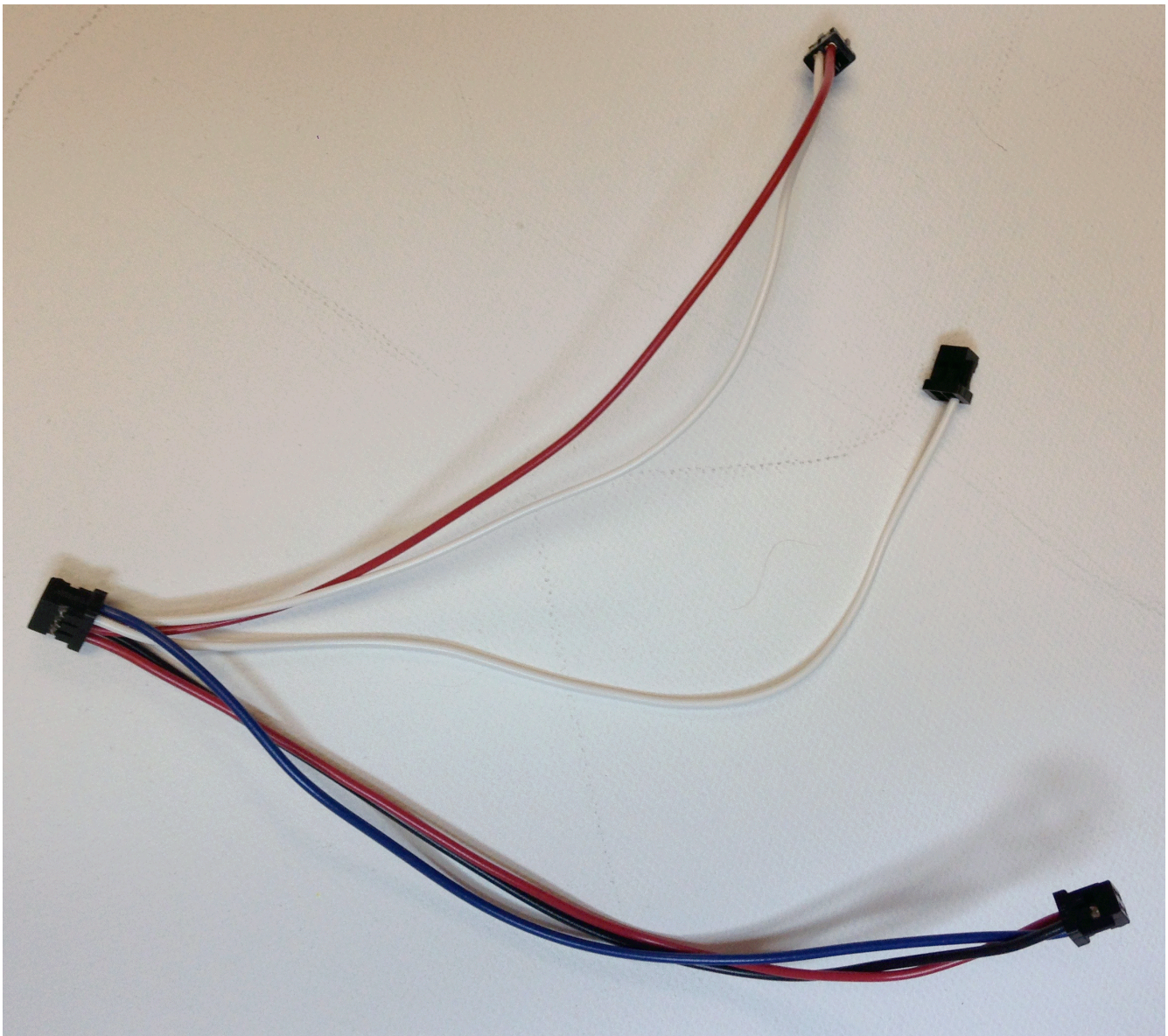
**Figure 4 Accelerometer 6 Pin Hirose DF11 Series Connector**

### **3 Connecting the MK-56209 Accelerometer to the MK-34765 Four Channel ADC/DAC**

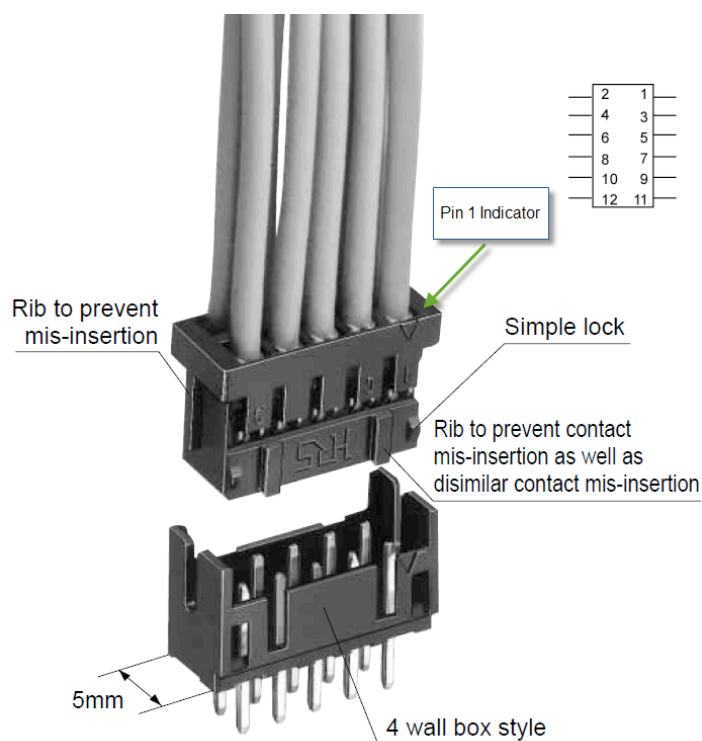
#### **3.1 Creating the Right Cable**

To connect the 6 pin Hirose connector to the 4 channel ADC DAC (MK-34765) you can build up the cabling system shown in Figure 5. This cable derives power for the MK-56209 Accelerometer from the 4 Channel ADC/DAC. The X, Y and Z Axis are connected to the ADC's. The G\_SEL is connected to the 3.3V of one of the 4 pin Hirose connectors on the MK-34765 so we can change the sensitivity to  $\pm 2g$ .

As a guide to building Cable systems based on the Hirose DF11 Series, refer to Figure 6. Although we show a 12 pin connector, the guide applies to the 6 pin and 4 pin connectors.

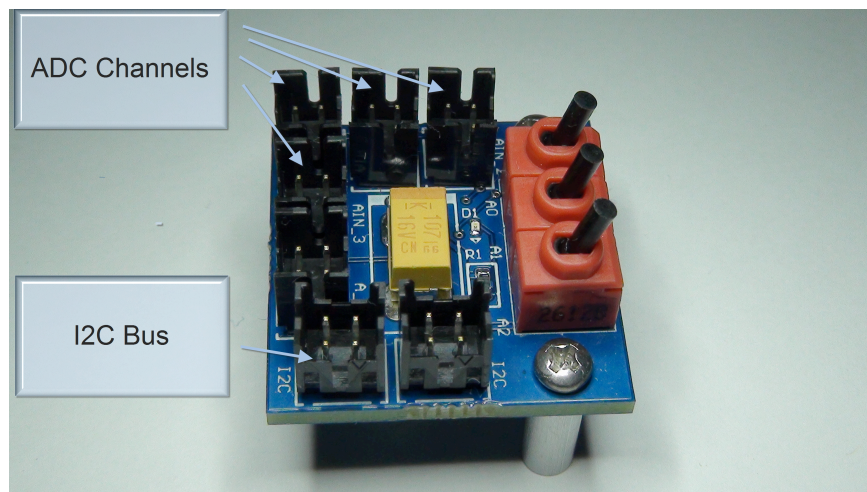


**Figure 5 Cabling system to connect the accelerometer to a 4 channel ADC (I2C)**

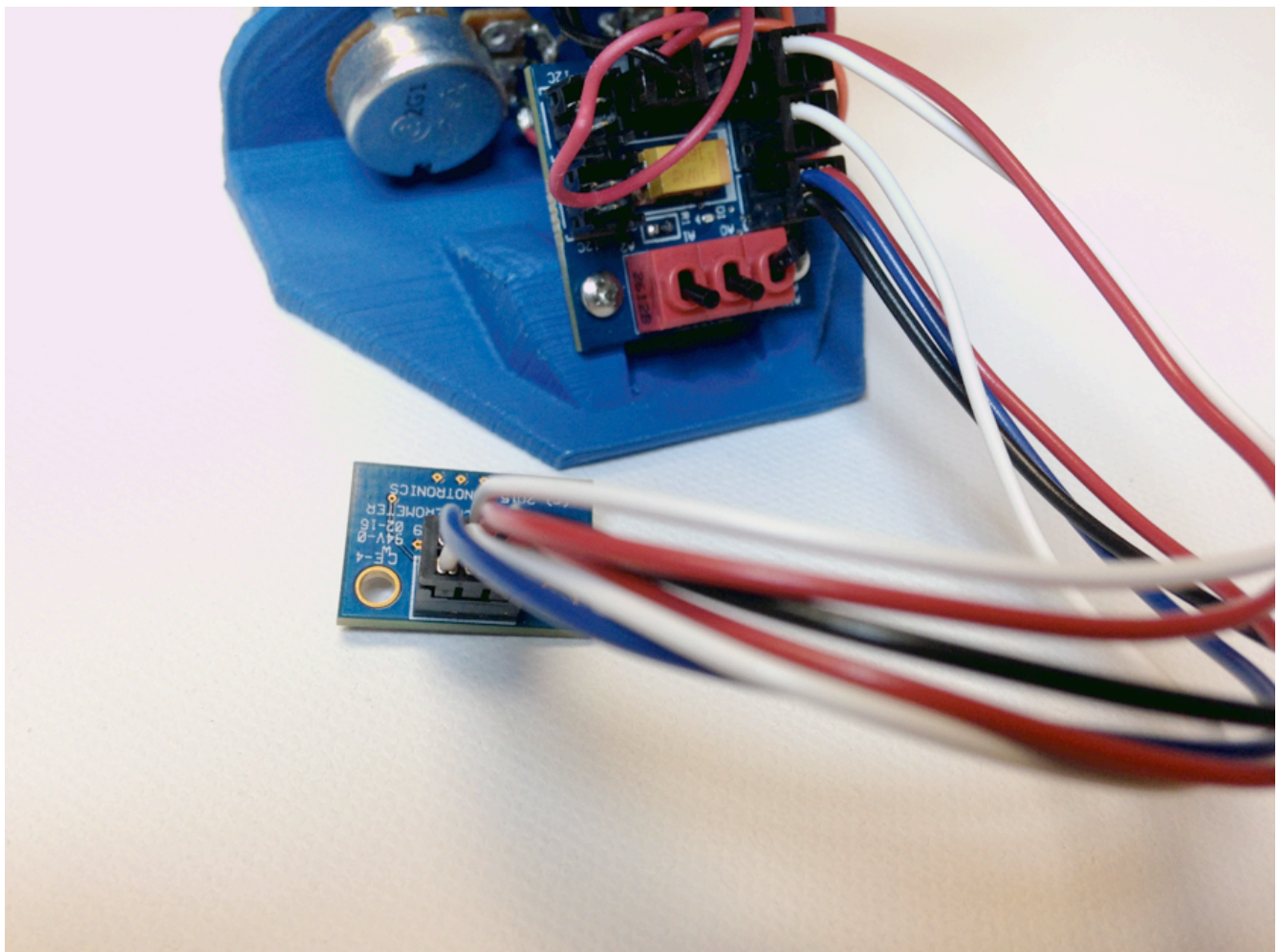


**Figure 6 Guide to the Hirose DF11 series connector**

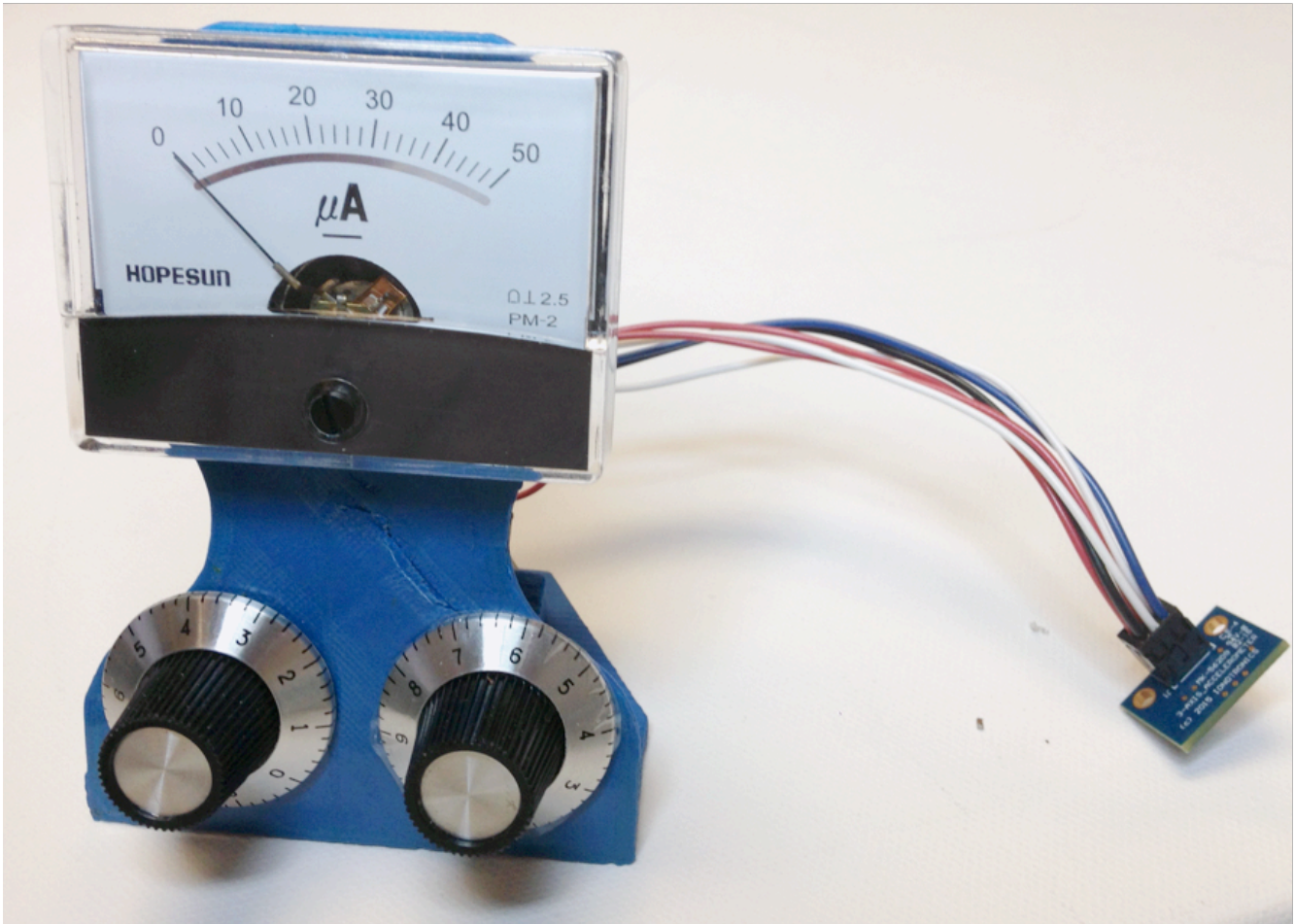
Figure 7 shows the I2C four channel ADC plus DC. See Figure 8 for a view of the 4-Channel ADC/DAC showing the 4 Four Pin Hirose Connectors for each ADC channel. Also the 4 -pin connector of the I2C interface. The MK-34765 is powered by the I2C Master (e.g. the MK-11009 Pyraptor or the MK-36019 Eororaptor). The MK-56209 Accelerometer is powered by the MK-34765 I2C ADC/DAC.



**Figure 7 Four Channel ADC/DAC I2C MK-34765**



**Figure 8 View of Accelerometer Hookup to Four Channel ADC (I2C)**



**Figure 9 View of Accelerometer Hookup to Four Channel ADC (I2C) Front View**

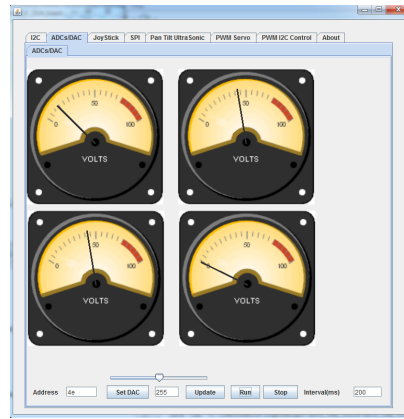
### **3.2 Viewing the 3-Axis Simultaneously with Java Bean Voltmeters**

With the cables hooked up as shown in Figure 8, and the Pyraptor connected to the Workstation (Windows PC) and the MK-34765, we can use the IONOTRONICS Java Pyraptor Software to

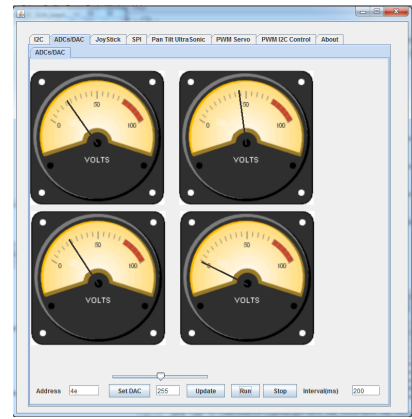
simultaneously view all three Axis in Java Bean Voltmeters. This is shown in Figure 10. For a Video of this demonstration see the IONOTRONICS Web Site.



Horizontal



Vertical



45 Degrees from Vertical

**Figure 10 Java Bean Voltmeters Showing the Measure Accelerometer Analog Outputs (X,Y and Z). Top Left X, Lower Left Y, Top Right Z.**

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