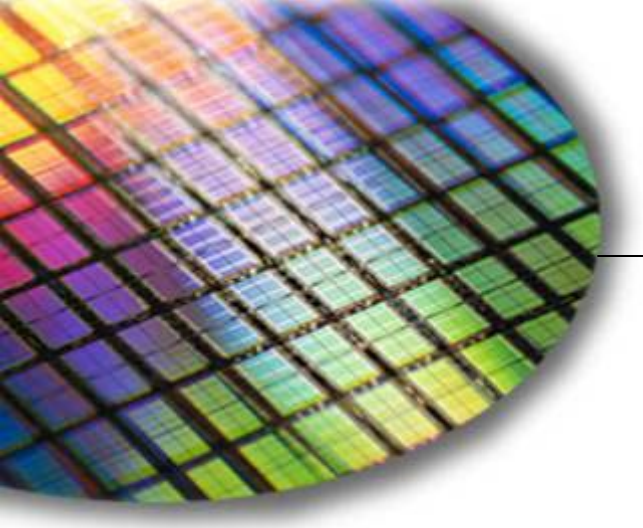

The World Leader in High Performance Signal Processing Solutions

*i*Sensor®

Getting Started with the ADIS1622x Evaluation Tools

Mark Looney
***i*Sensor Applications Engineer**
December 2010

ANALOG DEVICES

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*i*Sensor® *The Simple Solution for Sensor Integration*
Evaluation Tool Options

The *i*Sensor evaluation tools are designed for two purposes:

1. Enable fast connection to SPI-compatible processor systems.
2. Provide simple PC-based tools to demonstrate basic device functions.

ADIS16220/PCBZ, Interface board

1. Provides ADIS16220CCCZ on a small PCB with 2mm connectors.
2. Eliminates the need to solder the LGA package in a prototype process.
3. Connects directly to the PC-USB evaluation system, ADISUSBZ

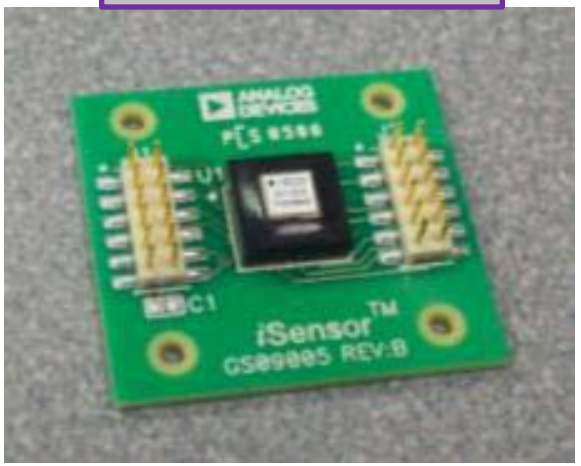
ADIS16223/PCBZ, ADIS16227/PCBZ Interface boards

1. Provides ADIS16223CMLZ on a small PCB with a 2mm connector.
2. Eliminates the need to develop a prototype board with the mating connector.
3. Connects directly to the PC-USB evaluation system, ADISUSBZ

ADISUSBZ, PC-USB Evaluation System

1. Complete system for demonstrating device function.
2. Saves capture buffer data to Excel-friendly file formats.

ADIS16220/PCBZ



ADIS16223/PCBZ
ADIS16227/PCBZ

ADISUSBZ

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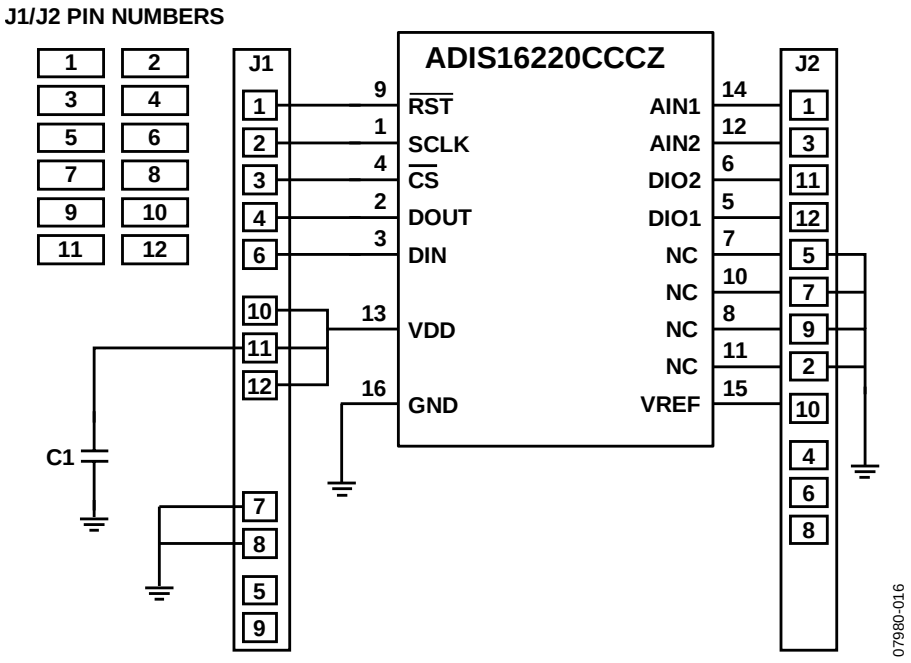
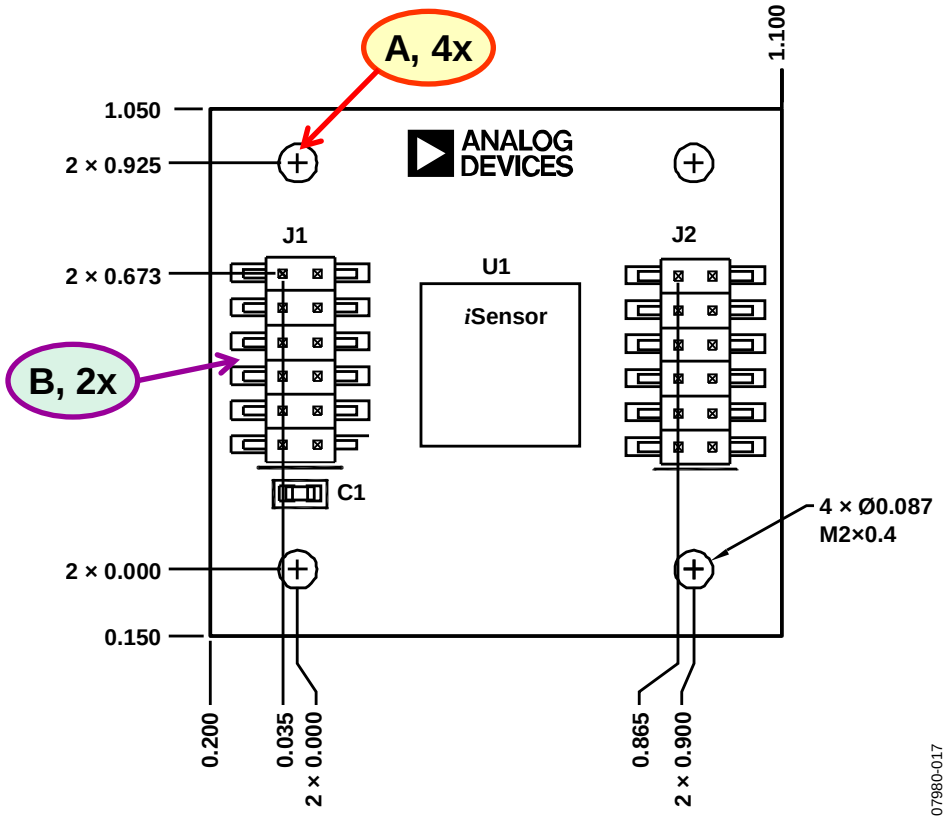
ADIS16220/PCBZ





A. **Interface board general-purpose mounting holes. Use M2 (2mm) machine screws. Use these to manage PCB-level resonance threats.**

B. **J1, J2 are dual-row, 12-pin connectors, which enable simple connection to embedded processor systems with 1mm ribbon cable systems. Hirose Hirose A3-12PA-2SV(71).**

C. **Use cables for prototype only and keep them as short as possible. SPI serial communications rely on good signal integrity.**

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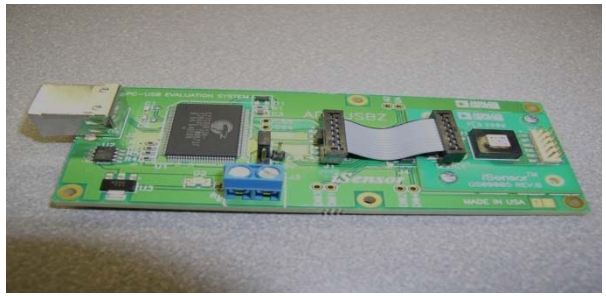
ADIS16220/PCBZ Installation on ADISUSBZ

Installation Steps

1. **Remove ribbon cable & (2) 2mm screws.**
2. **Place ADIS16220/PCBZ on the ADISUSBZ, using the silk screen and four corner mounting holes as a guide.**
3. **Install M2x6mm screws to secure ADIS16220/PCBZ on the ADISUSBZ. The ADISUSBZ provides 2mm threaded holes.**
4. **Re-install ribbon cable.**
5. **Set JP1 to "+3.3V", it isn't already in place option to "+5V" option. Do not plug USB in until completing ADIS16220 evaluation software installation.**



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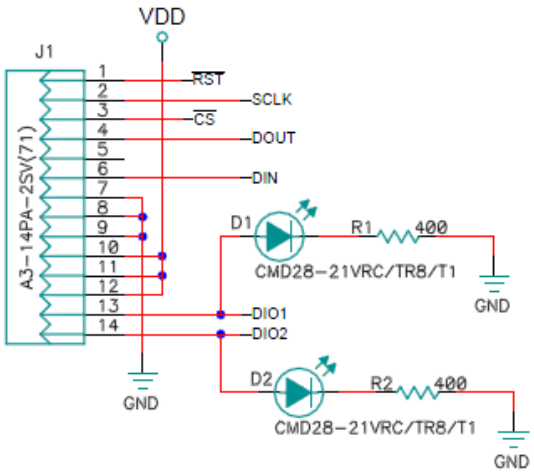
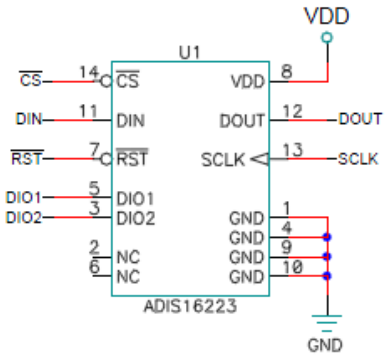
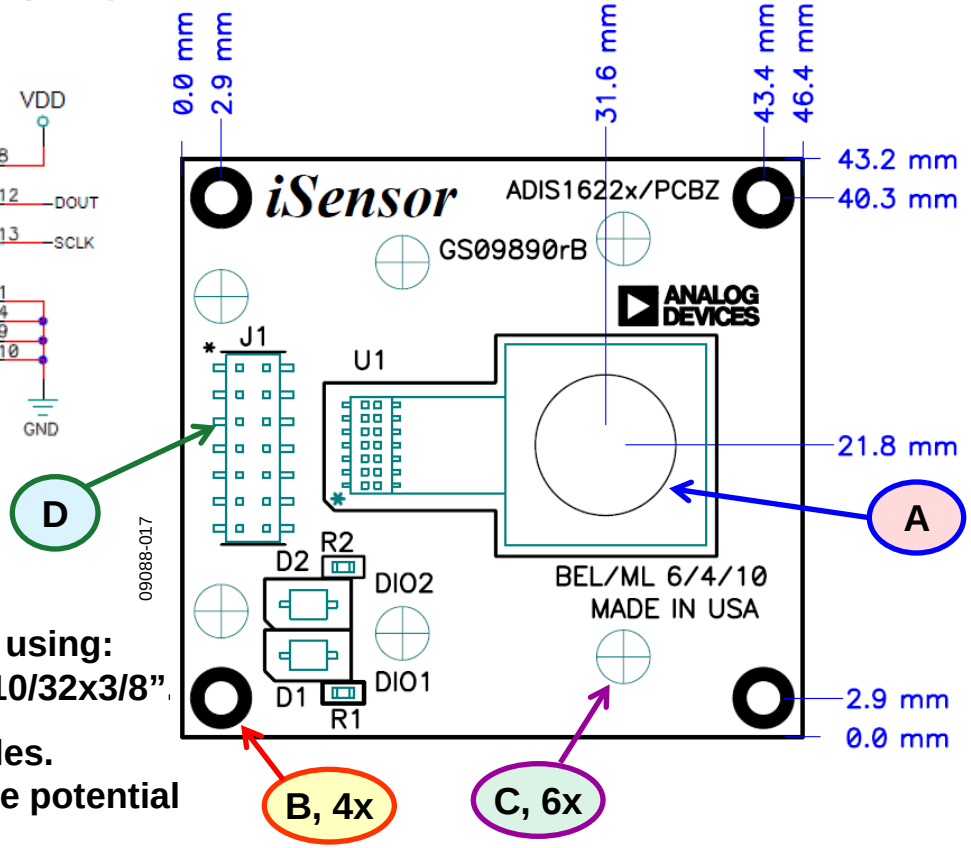
ADIS16223/PCBZ, ADIS16227/PCB7







A. **ADIS16223CMLZ bolted to the interface board using: Fastener Express p/n FHS1106-4I2 , flat head 10/32x3/8".**

B. **Interface board general-purpose mounting holes. Use M2 (2mm) machine screws to help manage potential PCB-level resonance threats.**

C. **ADISUSBZ mounting holes. Use M2 (2mm) machine screws.**

D. **Electrical interface, J1. Pads provide 14-pins but the ADISUSBZ only accommodates 12 pins. Populated with a 12-pin, 2x6, 2mm connector. Pins 13 & 14 provide access to DIO1 & DIO2. Can manually replace J1 with 14-pin version. Example: Hirose A3-14PA-2SV(71).**

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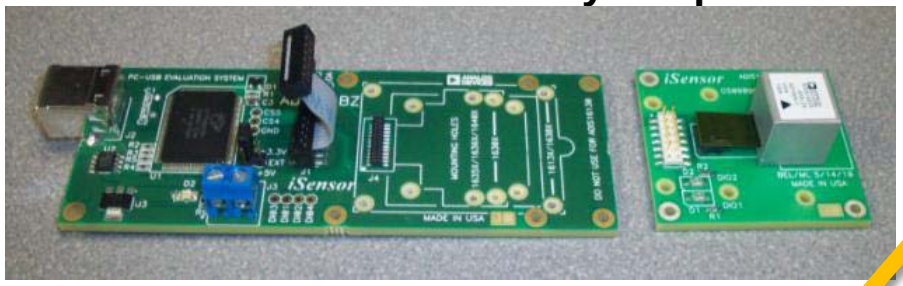
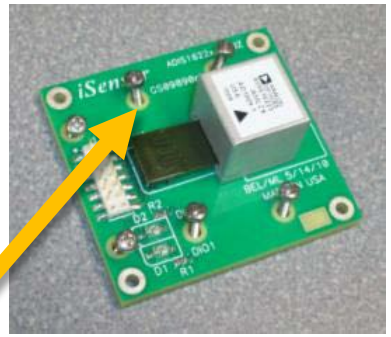
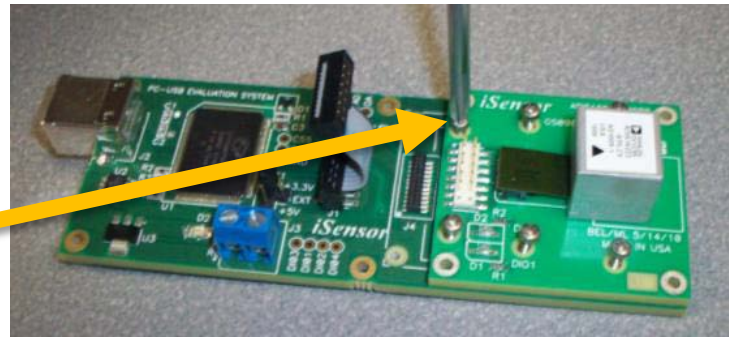
ADIS16223/PCBZ, ADIS16227/PCBZ; ADISUSBZ Installation

1. **Bend ribbon cable back.**
2. **Remove M2 screws if they are present.**

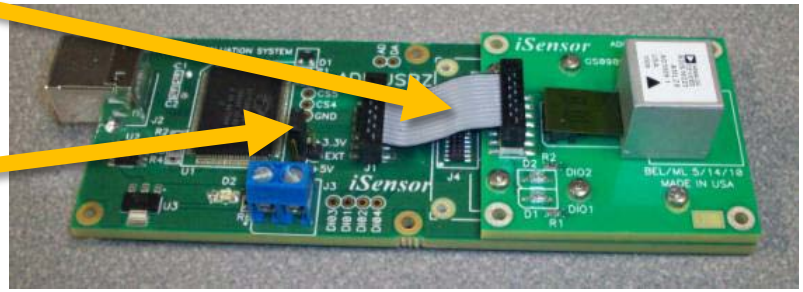




3. **Place M2x6mm screws in six ADISUSB mounting holes.**
4. **Place ADIS1622x/PCBZ onto the ADISUSBZ and tighten screws.**



5. **Connect ribbon cable, making sure that it is aligned with upper 12 pins.**
6. **Set JP1 to "+3.3V". Do not plug USB in until after completing ADIS1622x evaluation software installation.**



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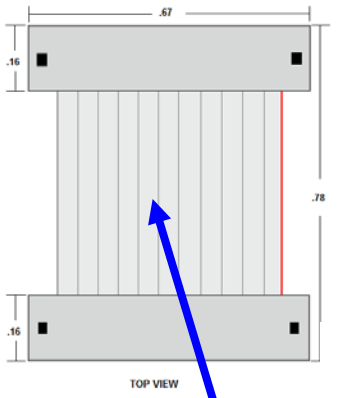
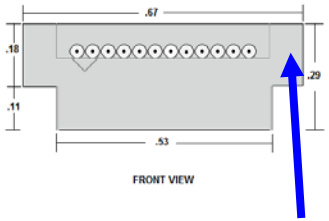
ADIS1622x/PCBZ Ribbon Cable Interface

J1/J2 Ribbon Cable Interface Parts





Ribbon Crimp Connector
3M P/N 152212-0100-GB

Ribbon Cable
3M P/N 3625/12 (100m)

ADISUSBZ uses the following cable assembly from Samtec:

ASP-140062-01

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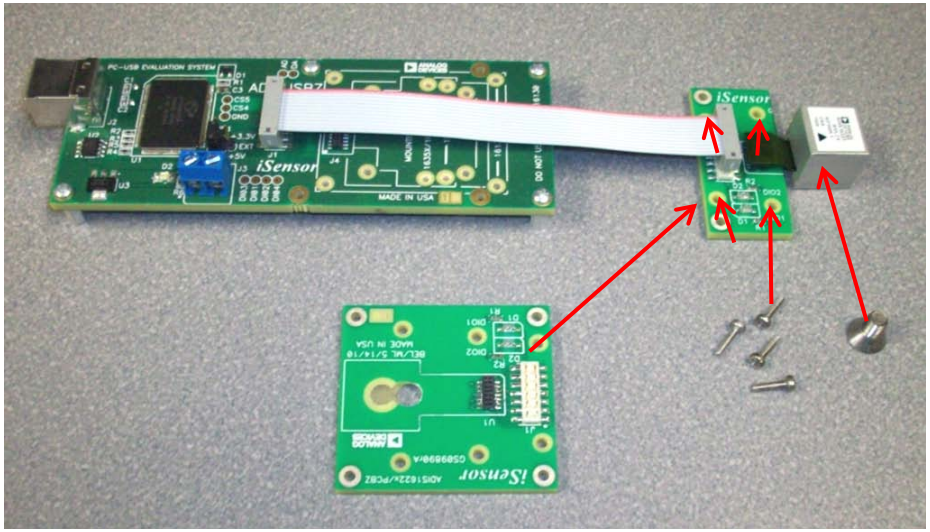
Alternate Use for Best Mechanical Coupling

1. **Remove ADIS1622xCMLZ from ADIS1622x/PCBZ by carefully unplugging the flex (it can break) and the 10-32 screw on the bottom side.**
2. **Cut the interface board down so that the ADIS1622xCMLZ can be mounted to the test frame using a 10-32 stud or machine screw.**
3. **Use the cut down version of the interface board, along with an extended ribbon cable to still use the ADISUSBZ to capture data into a test PC.**
4. **Use 2mm screws to attach the cut-down interface board and 4-40 screws to mounted the ADISUSBZ.**



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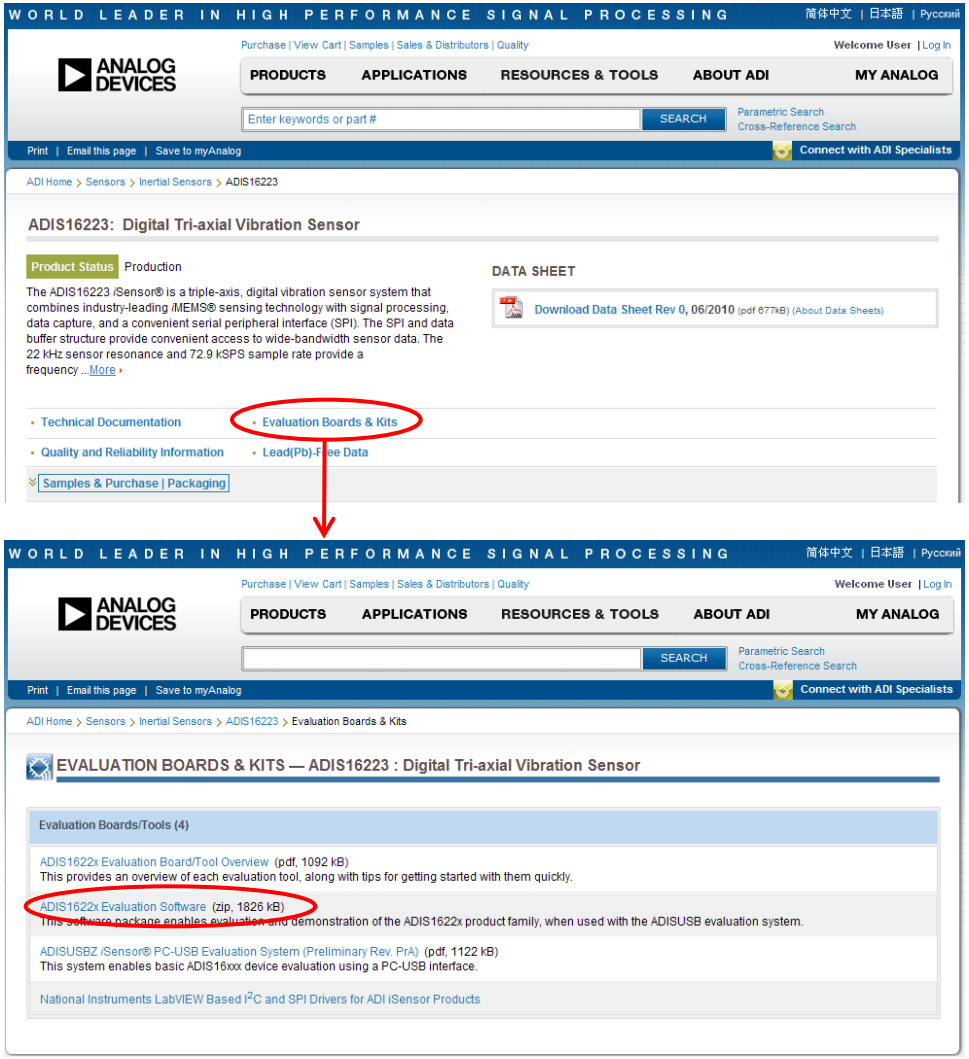
ADIS1622x Evaluation Software Installation



The ADIS16220, ADIS16223, and ADIS16227 have their own demo/evaluation software packages, which can be downloaded from each product's web page at www.analog.com.

Use the following steps to download, install, and get the evaluation software running. Each package will use a similar setup, with differences noted in the following steps.

NOTE: The demo/evaluation software packages use a driver set that is not currently compatible with Windows Vista and Windows 7. Use a machine with Windows XP operating system.

1. **Go to home page, for example: www.analog.com/ADIS16223**
2. **Click on "Evaluation Boards & Kits."**
3. **Click on the Evaluation software link to download the software and follow instructions to save it to a temporary directory.**

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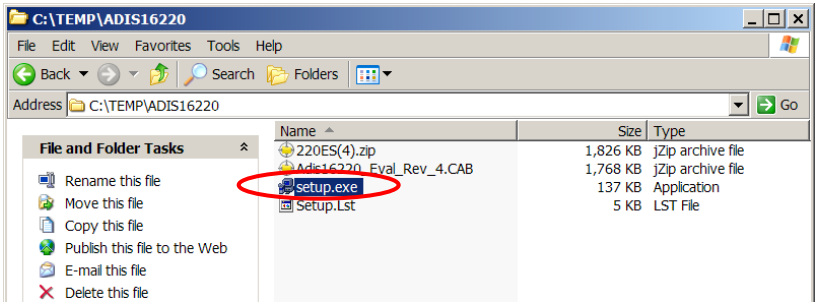
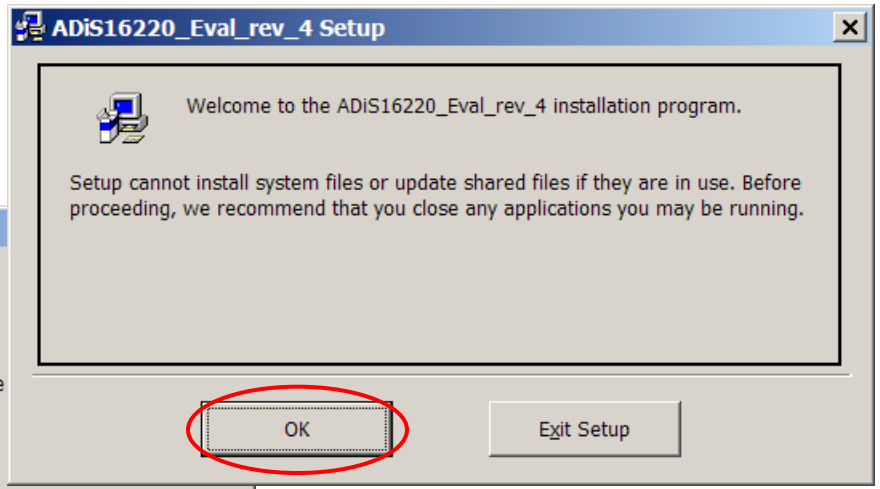
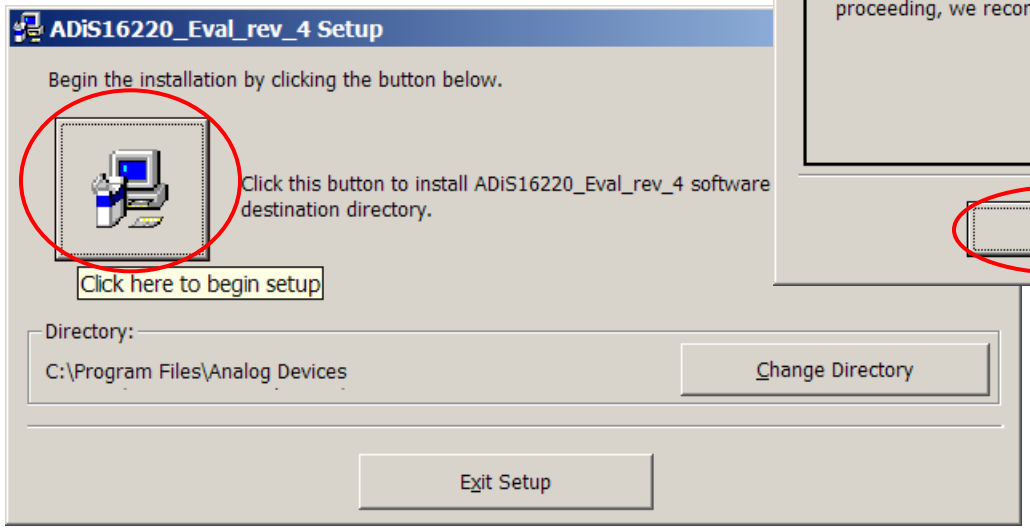
ADIS1622x Evaluation Software Installation

Installation Steps (continued)

4. **Unpack contents from zipped file and click on "setup.exe".**
5. **Click OK on the next screen.**
6. **Click on computer icon to start the installation process.**







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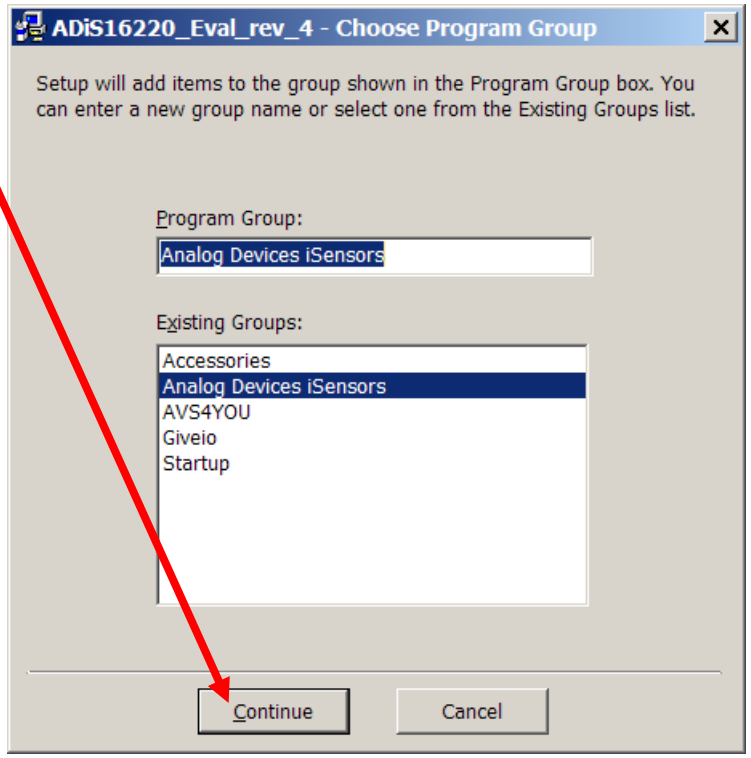
ADIS1622x Evaluation Software Installation

Installation Steps (continued)

7. **Click Continue.**
8. **If a window like this appears, we suggest keeping the existing files. In this case, click "Yes" to keep existing files.**



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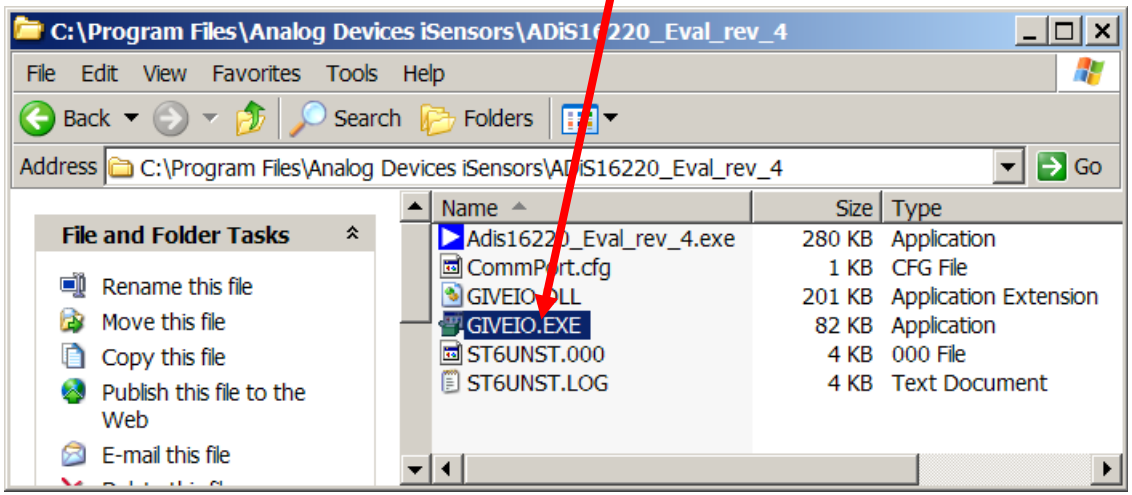
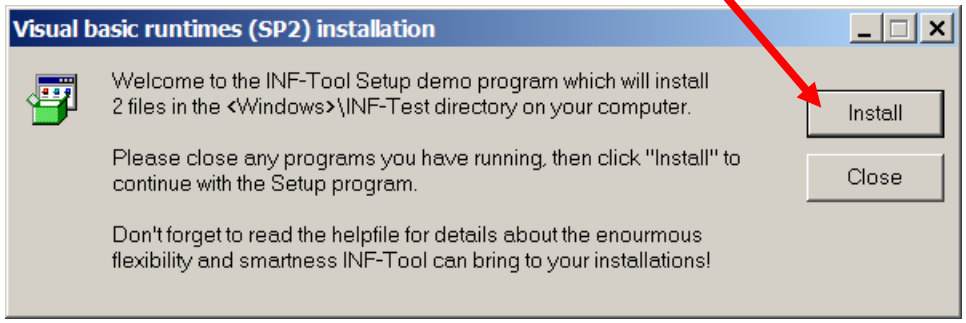
ADIS1622x Evaluation Software Installation

Installation Steps (continued)

9. **Open the newly created directory and double-click onto “giveio.exe”.**
10. **Click “Install”.**





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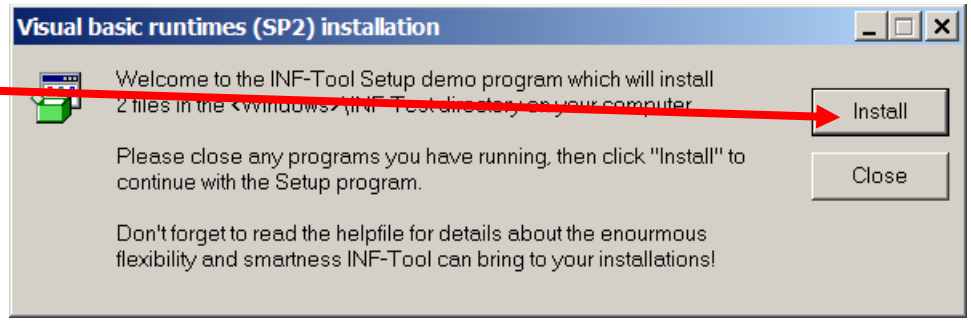
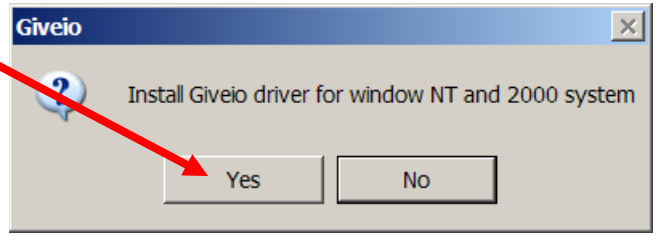
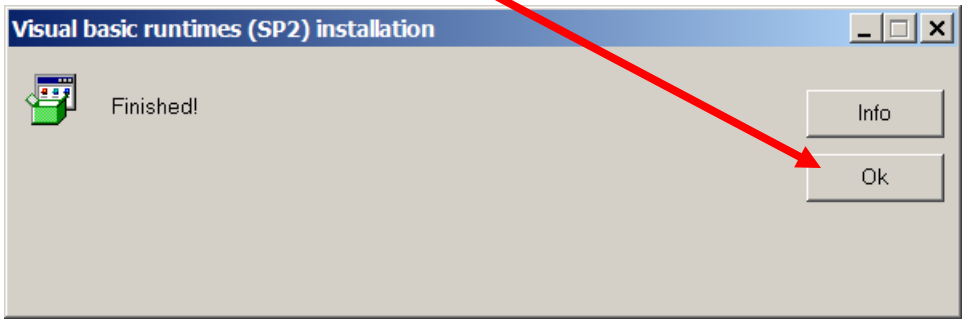
ADIS1622x Evaluation Software Installation

Installation Steps (continued)

11. **Click “Install”.**
12. **Click “Yes”.**
13. **Giveio Driver complete. Click “Ok”.**







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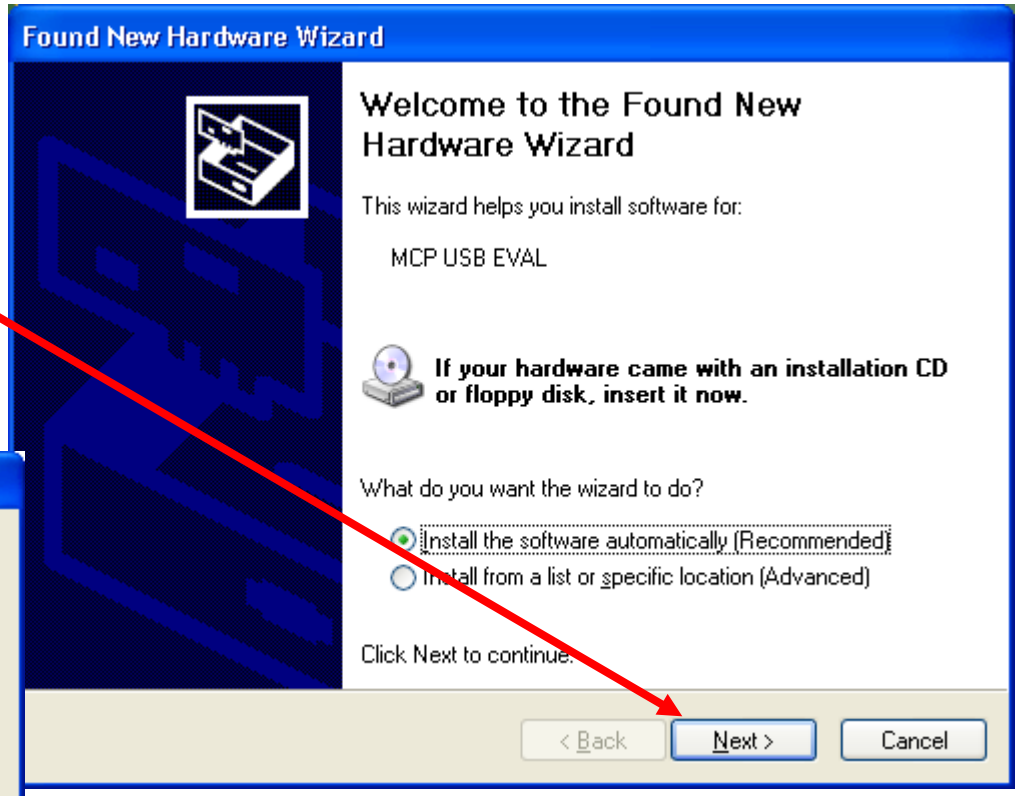
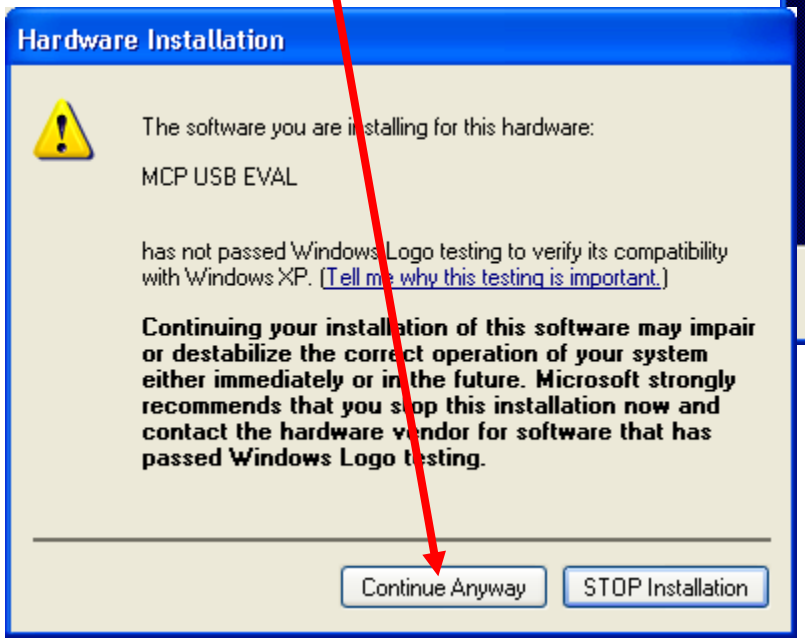
MCP USB Driver Installation

Installation Steps

1. **Plug the ADISUSBZ to the PC using an A-to-B USB cable. The USB Driver screen will pop-up. Click "Next" to start this process.**

2. **Then click on "Continue Anyway".**





This process will repeat with another file. Just follow the instructions and allow it to go through one more time. After completing this, the device is ready for test.

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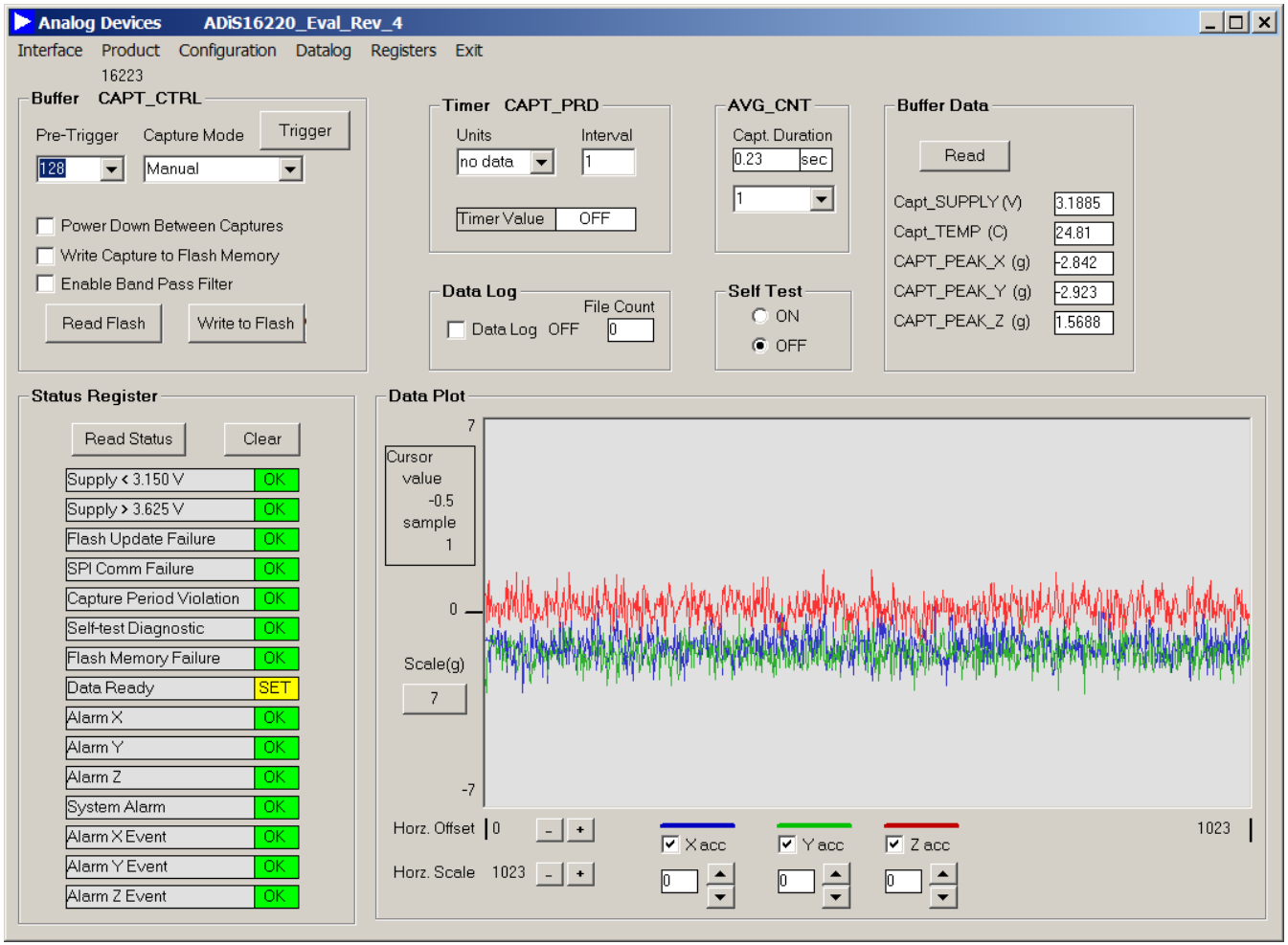
ADIS1622x Software Tips, Manual Trigger Mode



1. **Click on “Interface” and select USB, then OK when the pop-up window shows the USB device is connected.**
2. **Software should start up and place the ADIS1622x device in Manual mode.**
3. **Click to trigger button and wait for the capture to complete inside the device, then load to the screen.**

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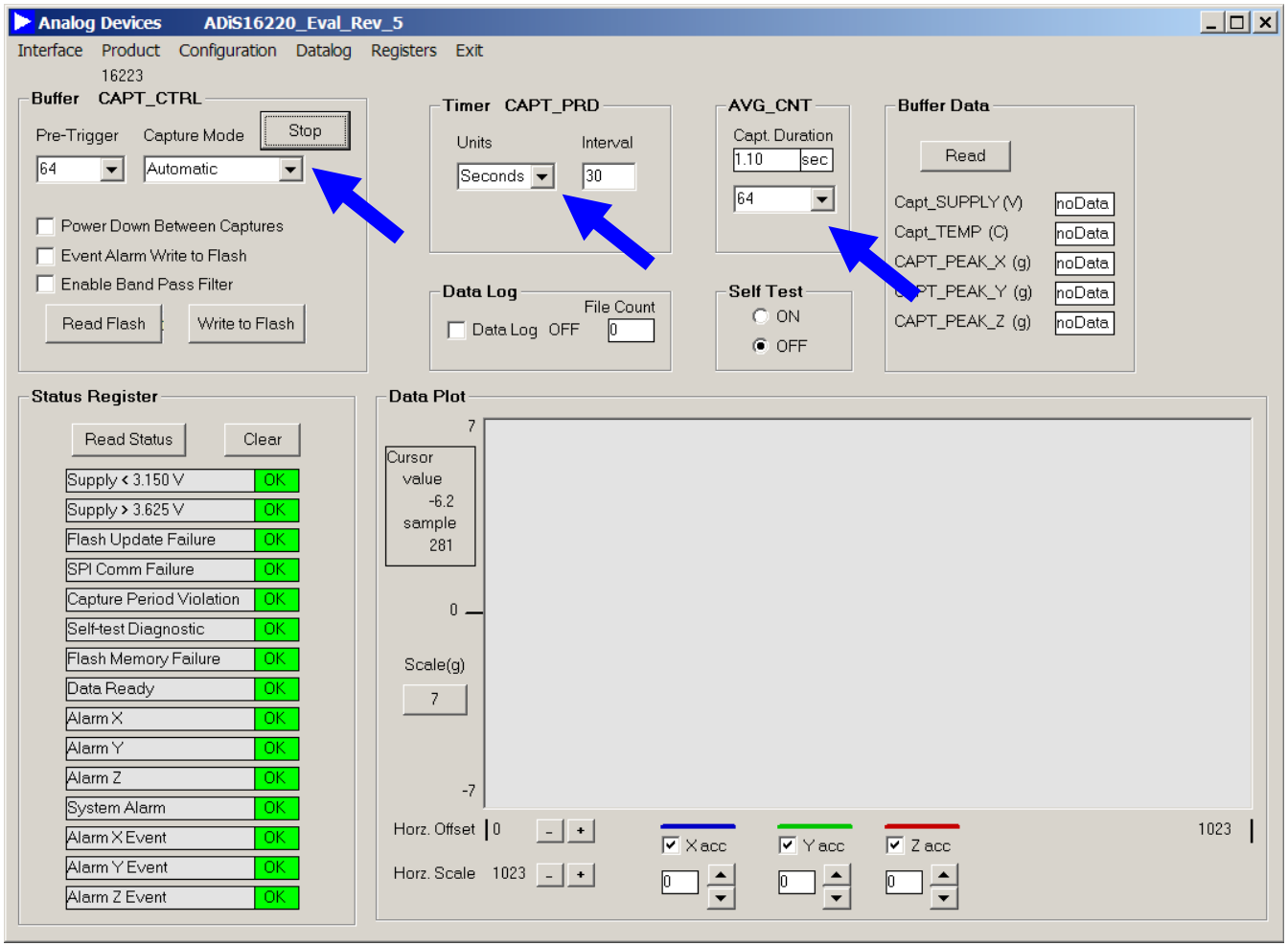
ADIS1622x Software Tips, Automatic Trigger Mode



1. **Automatic mode in the ADIS1622x products uses an internal timer to trigger new data capture events.**
2. **Since the ADISUSBZ doesn't connect to the "Busy" signal, DIO1 per factory default, use the LEDs on the ADIS16223/PCBZ to determine if the device is busy. Do not attempt to read when the LED is on. Note that the ADISUSBZ takes a few seconds to read and process the data. Keep the capture period of above 10 seconds for best results in read-back.**
3. **This screen shows a quick example. The AVG_CNT is extended to 64 so that the DIO1 LED is on longer for observation.**
4. **Click "Start" to begin, once the settings are finished.**

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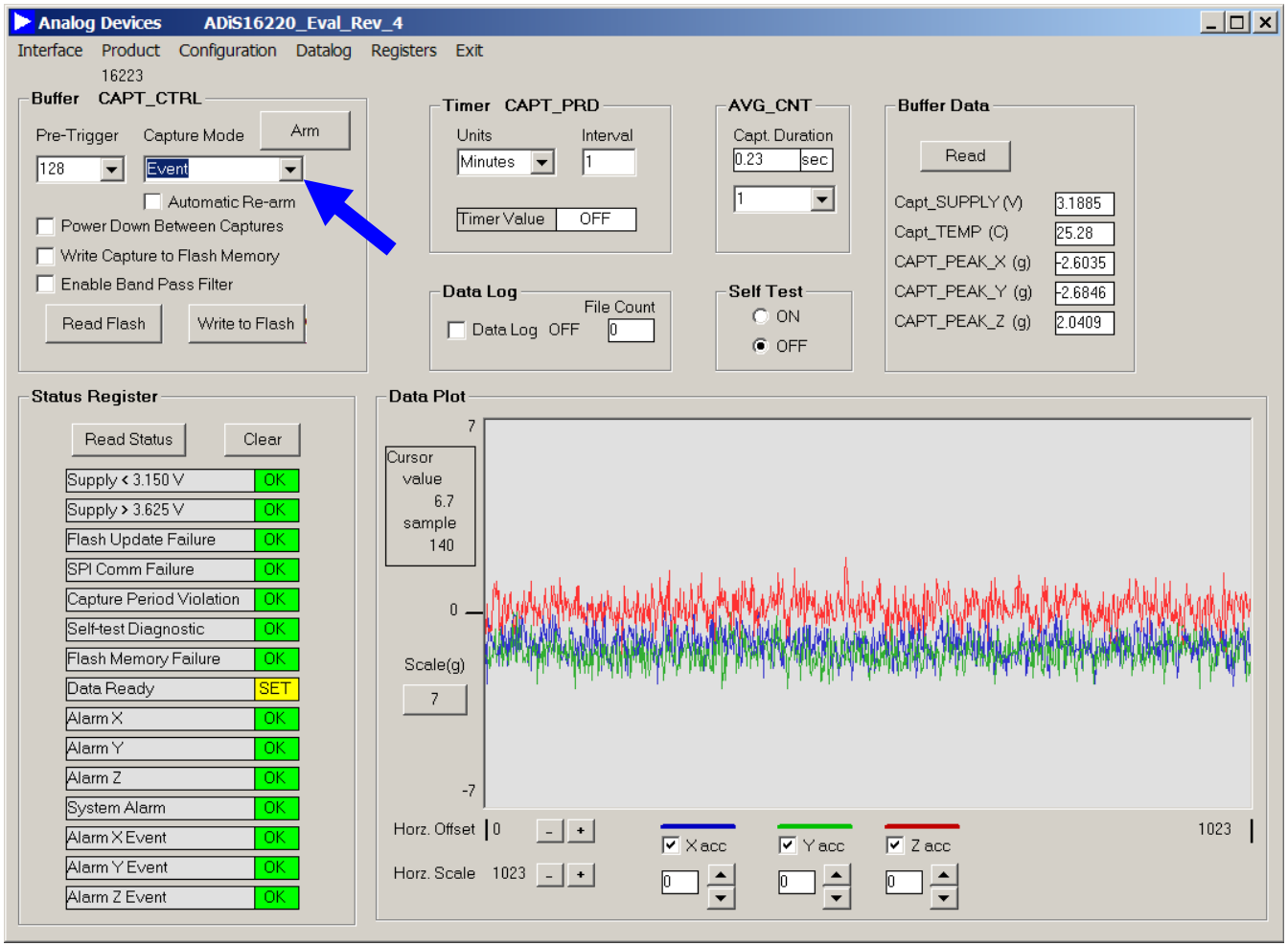
ADIS1622x Software Tips, Event Trigger Mode



1. **Use the pull-down menu to set the device up for “Event Capture Mode”.**

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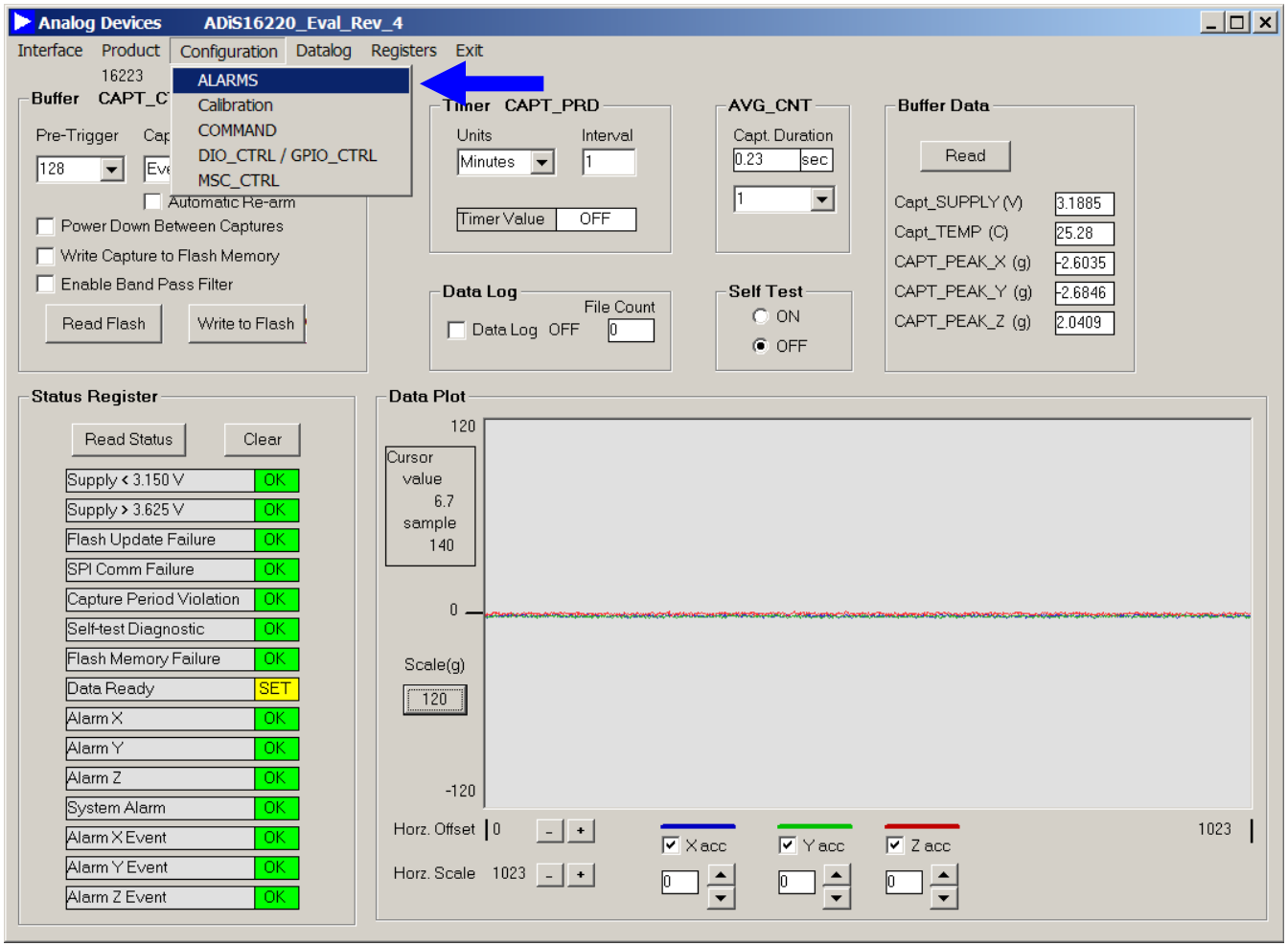
ADIS1622x Software Tips, Event Trigger Mode



2. **Use the “ALARMS” option in the configuration pull-down menu to set up the trigger levels.**

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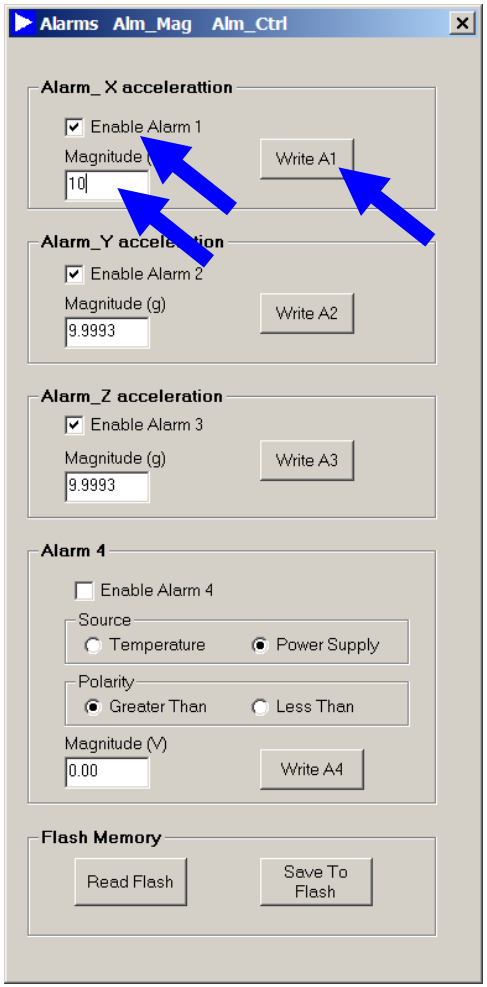
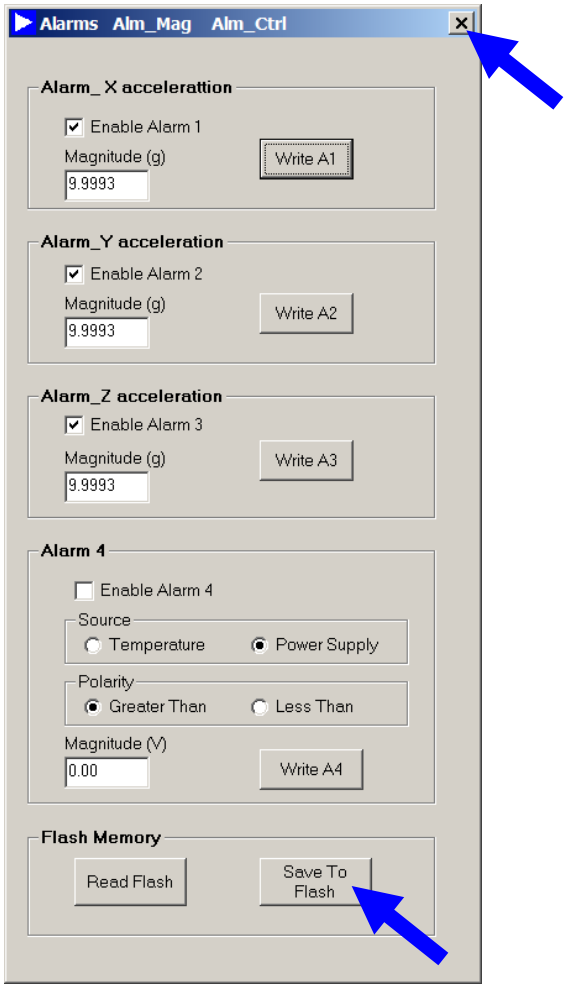
ADIS1622x Software Tips, Event Trigger Mode, Alarms





1. **In this example, enable each alarm, then enter the acceleration threshold for triggering the capture.**
2. **In this case, enter “10”, then click “Write A1”.**
3. **Notice how the device changes the value to something close. This is the closest register value for the user entry.**
4. **Then repeat for each Alarm.**
5. **Click on “Save to Flash” to back the settings up in non-volatile flash memory.**
6. **Click on “X” in upper right hand corner to exit.**

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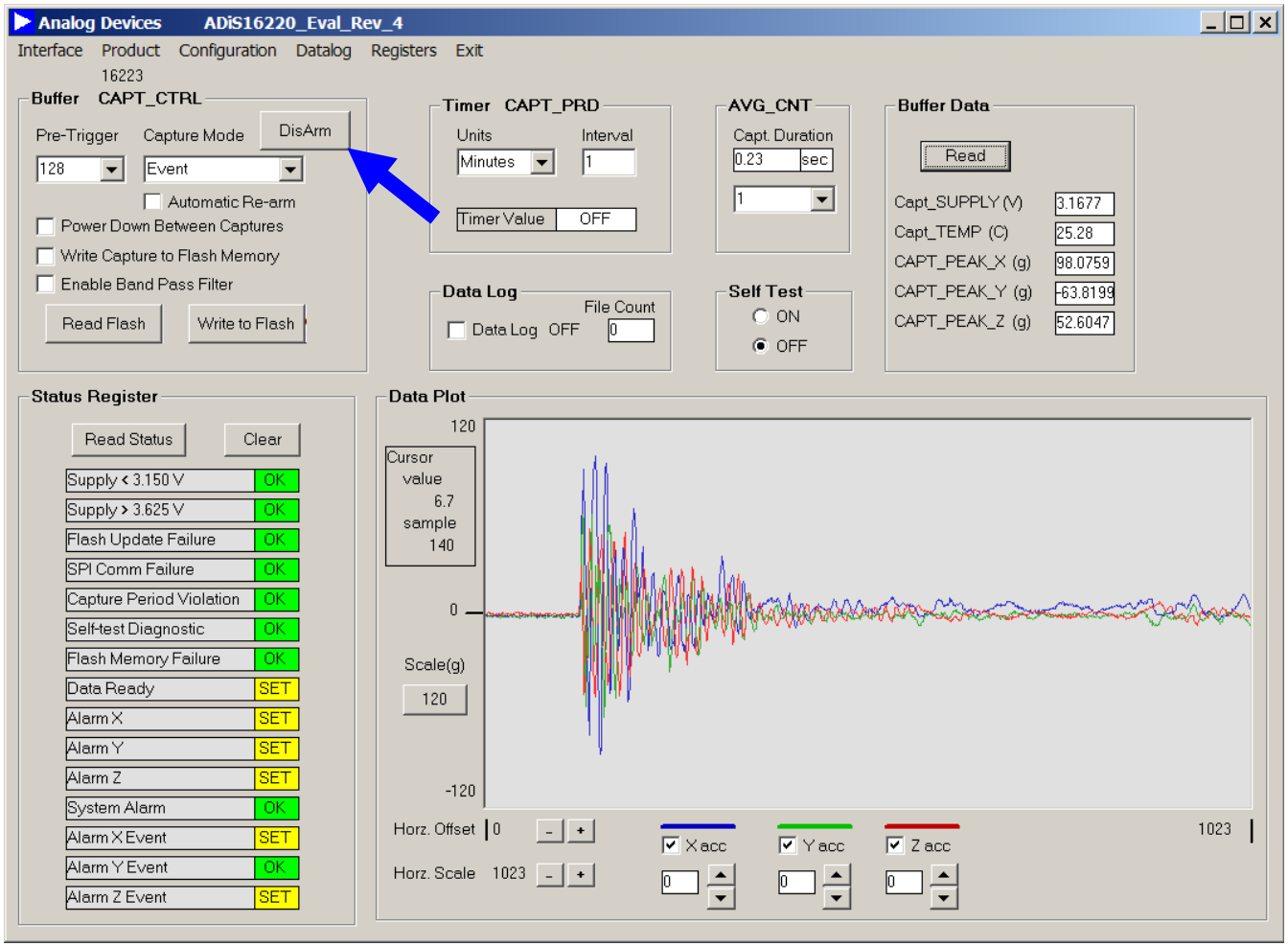
ADIS1622x Software Tips, Event Mode Capture Example



1. **Click on “Arm” and notice that the DIO1 LED light turns on.**
2. **Tap the assembly on non-valuable surface. Increase the intensity of the tap until the capture triggers.**
3. **This will be evident when the DIO1 LED is not longer lit.**
4. **Click on “DisArm,” which is the same button that was “Arm” at the start of the process.**
5. **Under “Buffer Data,” click “Read” to plot the captured data on the screen.**

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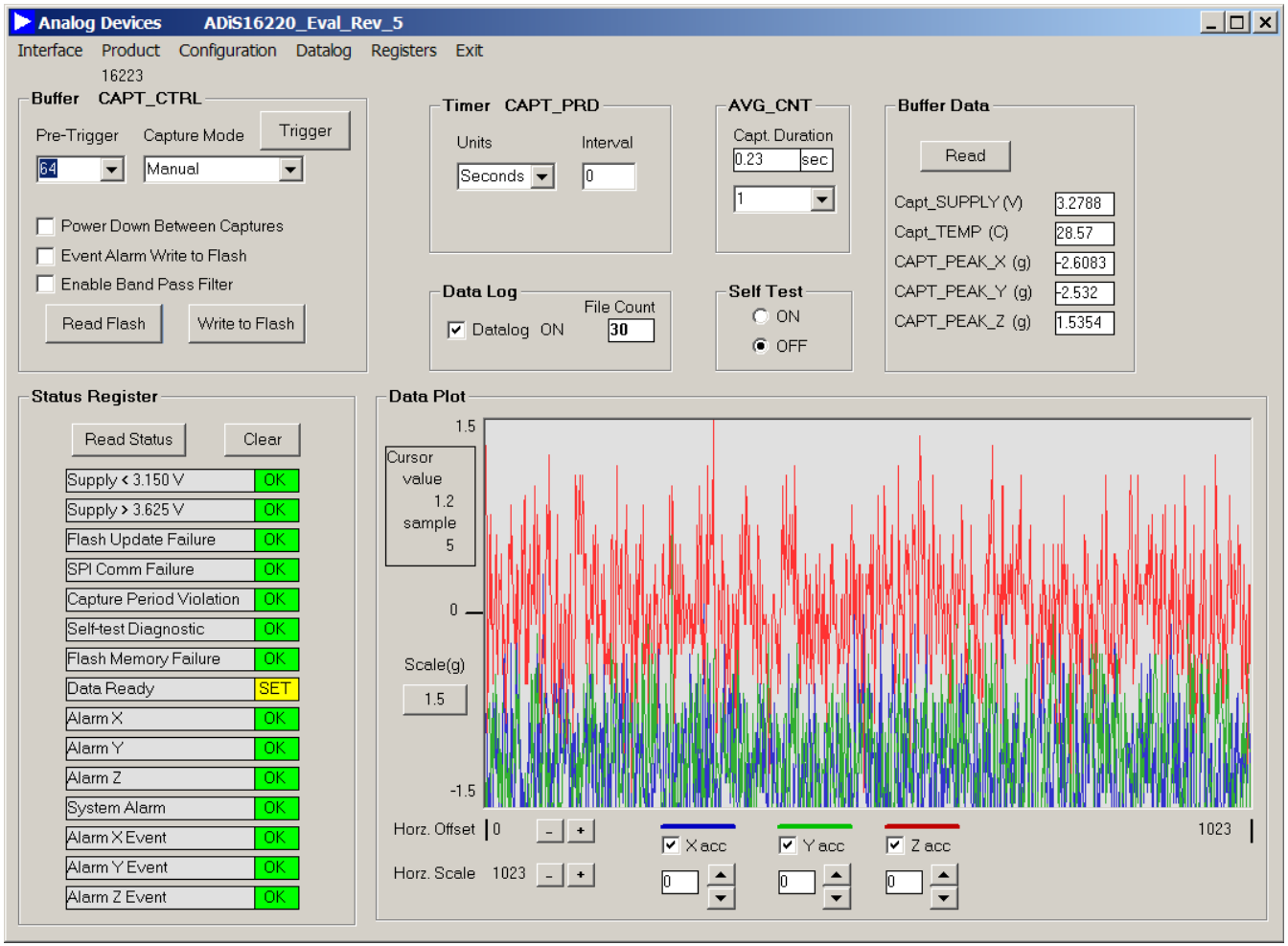
ADIS1622x Software Tips, Filtering, No Filtering Enabled



1. **The ADIS1622x are wide-band filters.**
2. **Lower frequency applications tend to value lower noise.**
3. **The filtering helps optimize the noise and frequency content of the data capture.**
4. **This plot is when no filters are enabled and the device is in its widest bandwidth.**

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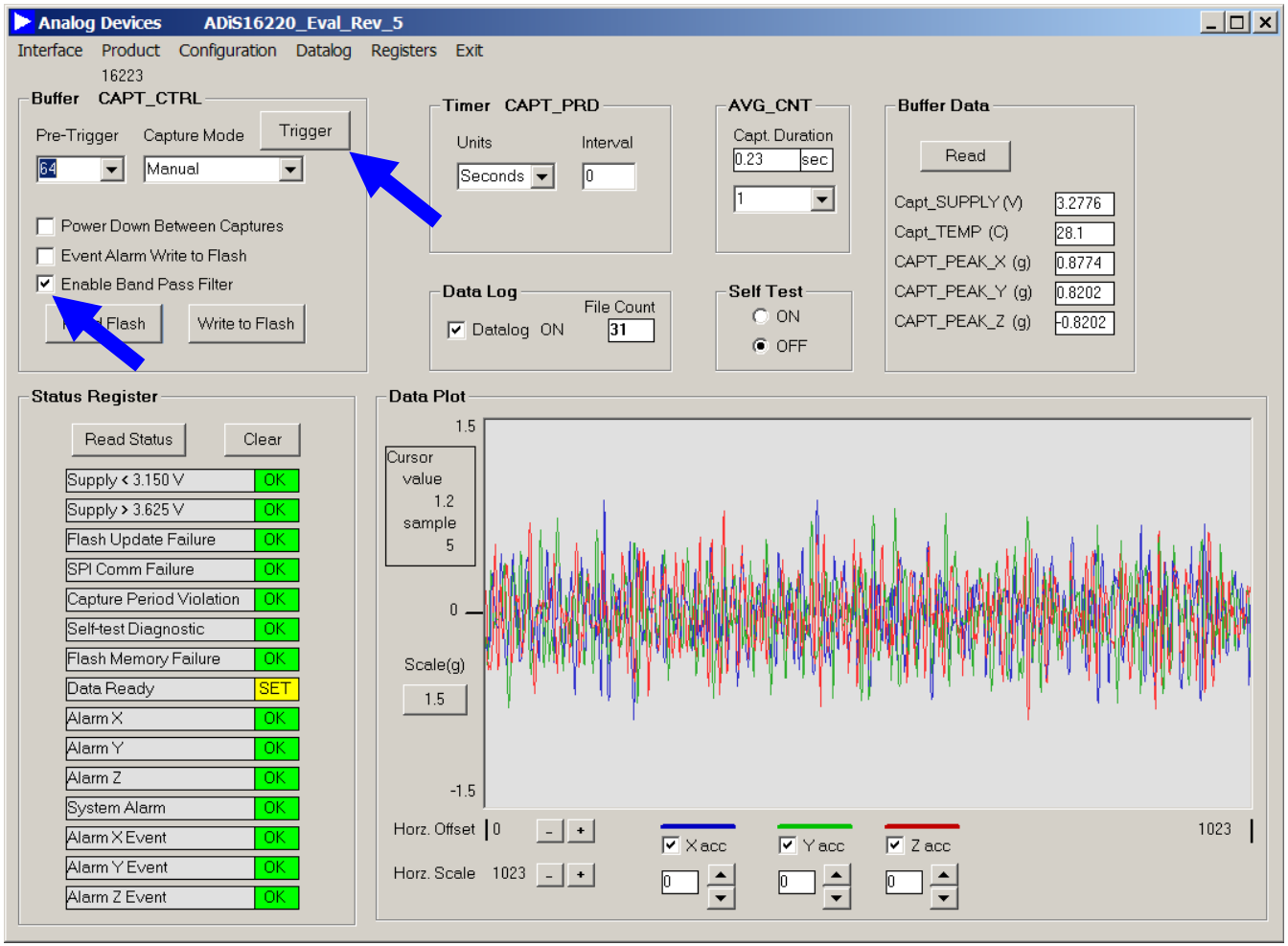
ADIS1622x Software Tips, Band-Pass Filtering



1. **Enable the band-pass filter.**
2. **Click on Trigger.**
3. **Notices the lower amount of noise and the fact that it is centered around 0g now.**

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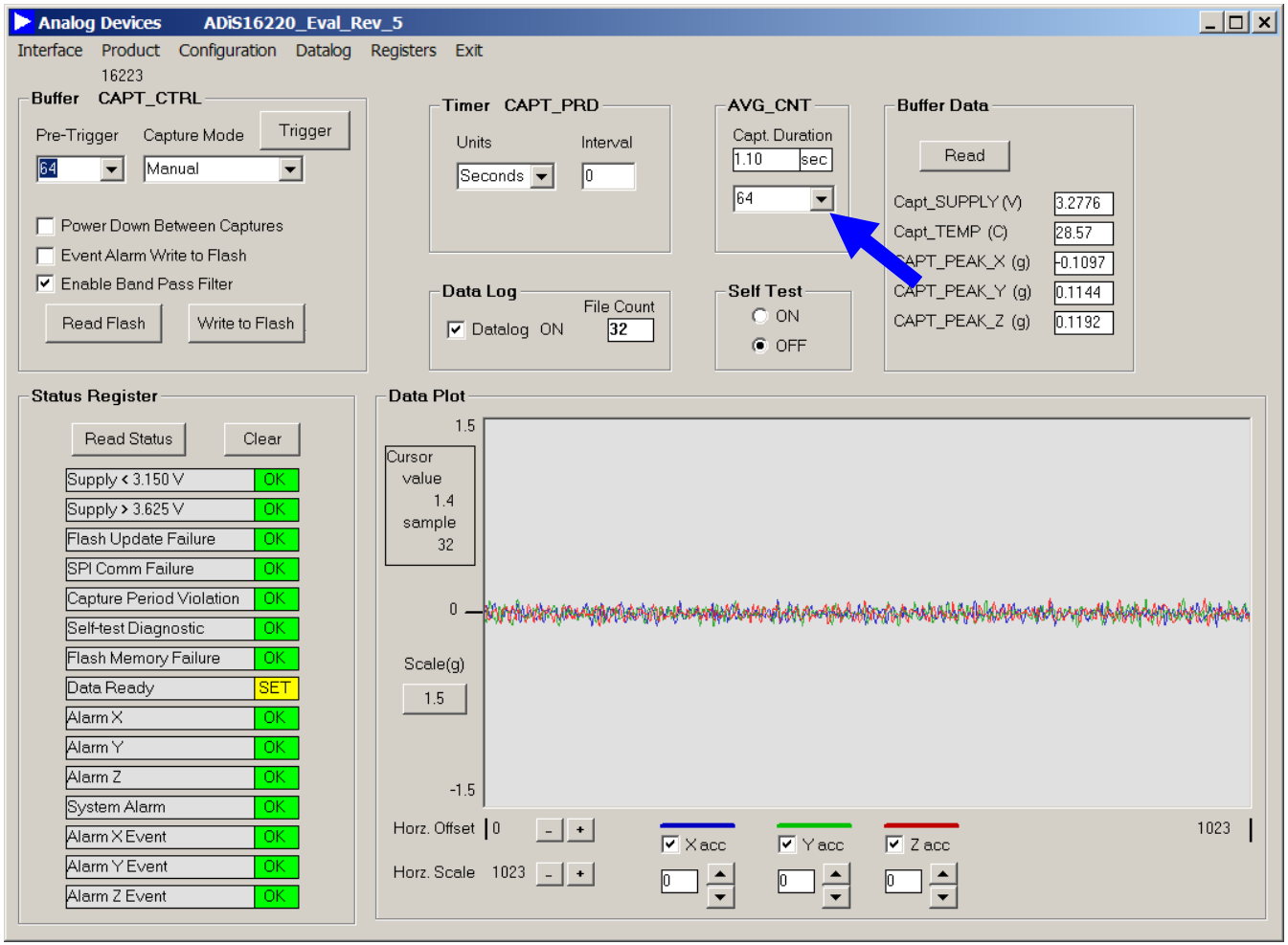
ADIS1622x Software Tips, Band-Pass & Low-Pass Filtering



1. **Click on the AVG_CNT pull-down menu and select 64.**
2. **Click on Trigger.**
3. **Observe the lower noise and longer capture time.**

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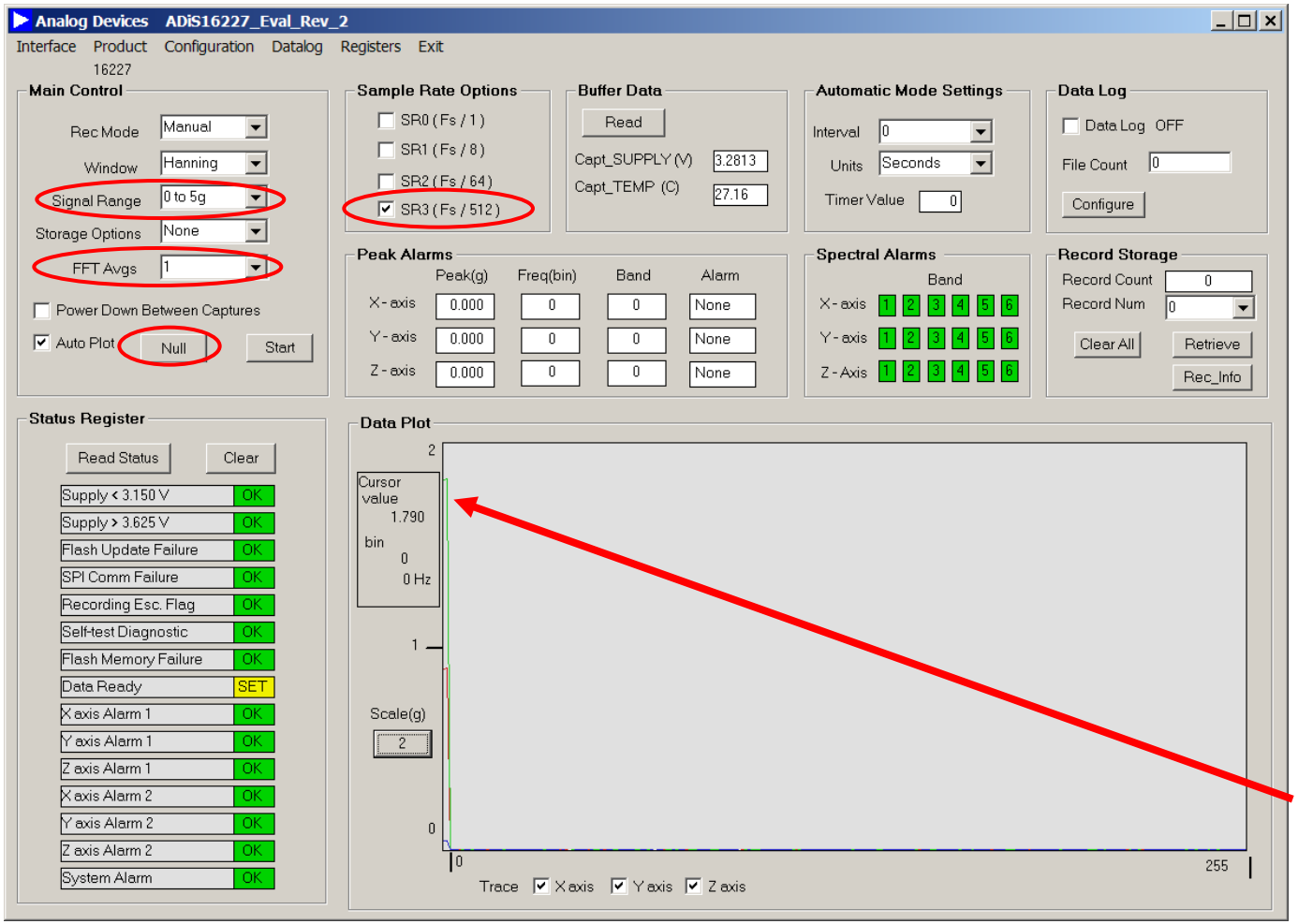
ADIS16227 Software Tips: Basic Setup



1. **Double click on the ADIS16227*.exe file to start the software.**
2. **Make sure that the settings under “Main Control” and “Sample Rate Options” match those in this graphic. The Signal Range, FFT Avgs, SR3 settings are the most common settings that need to be changed for this demo.**
3. **Take a baseline measurement by clicking on “Start”.**
4. **Click on “Null” and hold the device in a stationary position until it completes.**
5. **Take another measurement by hitting “Start” and notice that the DC response is much lower.**

ANALOG DEVICES

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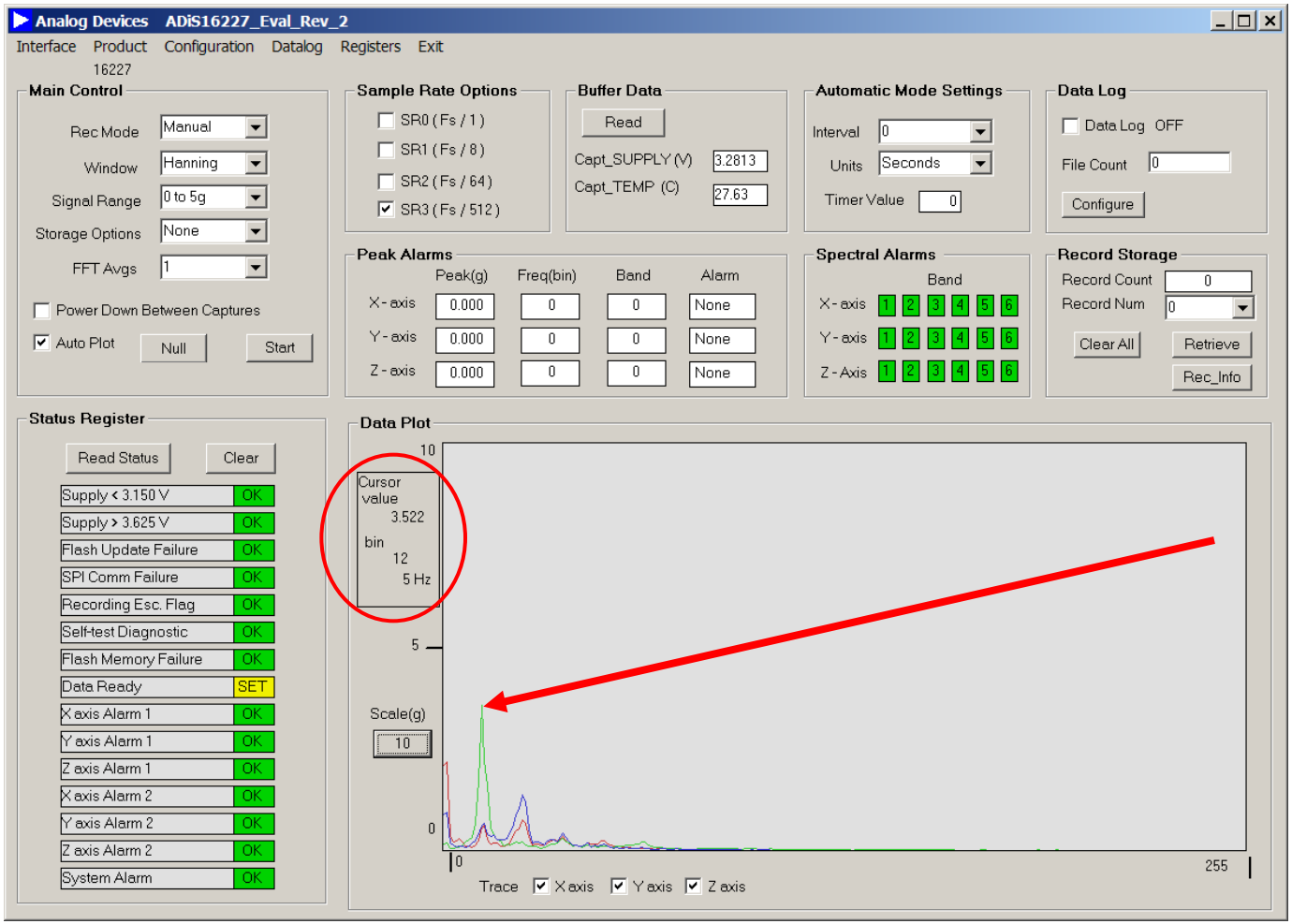
ADIS16227 Software Tips: Basic Demo



1. **Shake the ADIS16227 in a repetitive manner and click on "Start." Continue the shaking until the software completes collecting data.**
2. **After data collection is complete, use the mouse pointer to measure the response.**
3. **In this case, the mouse pointer is held over the peak of the green response.**
4. **Color coding:**
   X = red
   Y = green
   Z = blue

ANALOG DEVICES

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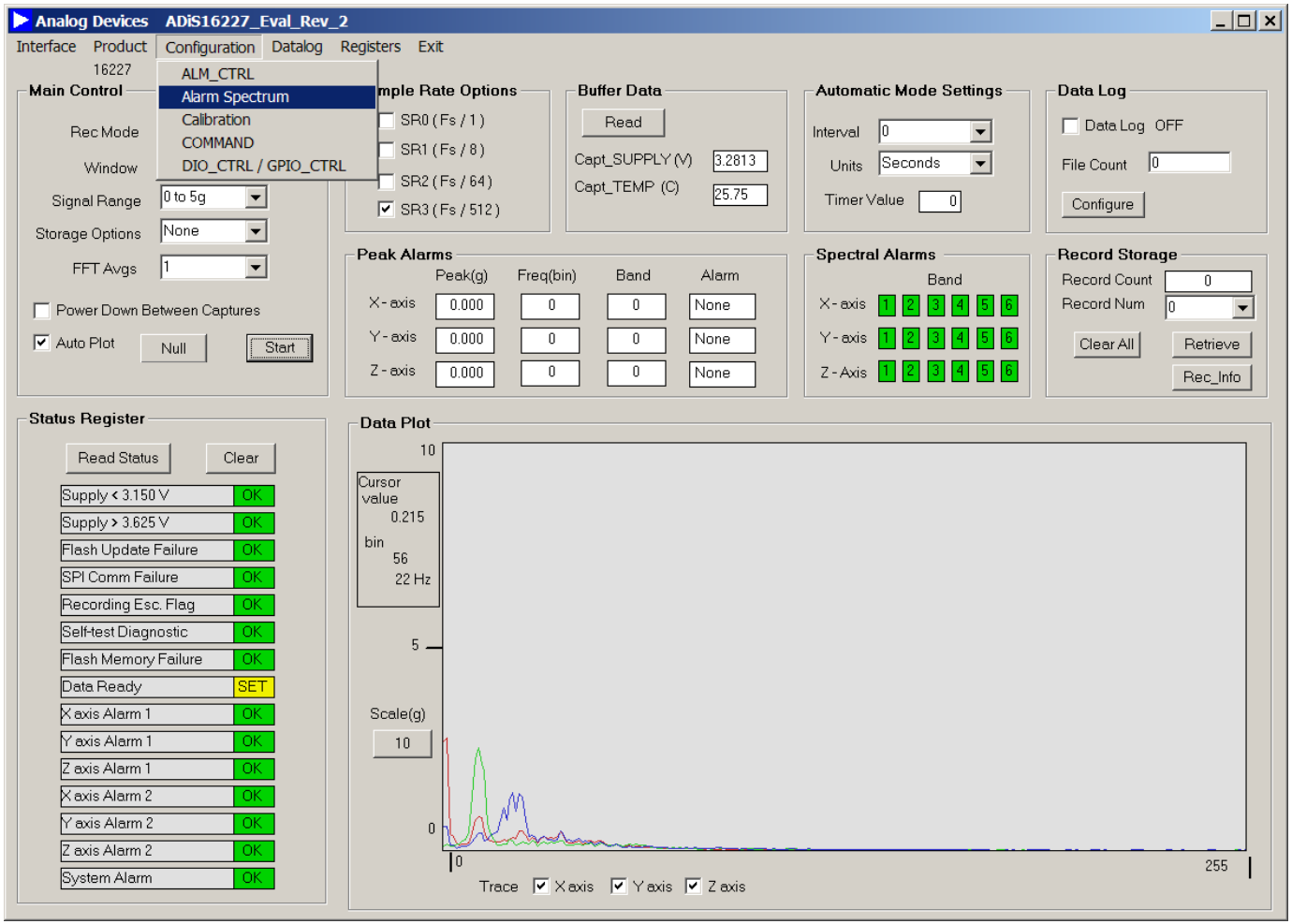
ADIS16227 Software Tips: Spectral Alarm Demo



1. **Use the “Configuration” drop-down menu to click on the “Alarm Spectrum” option.**

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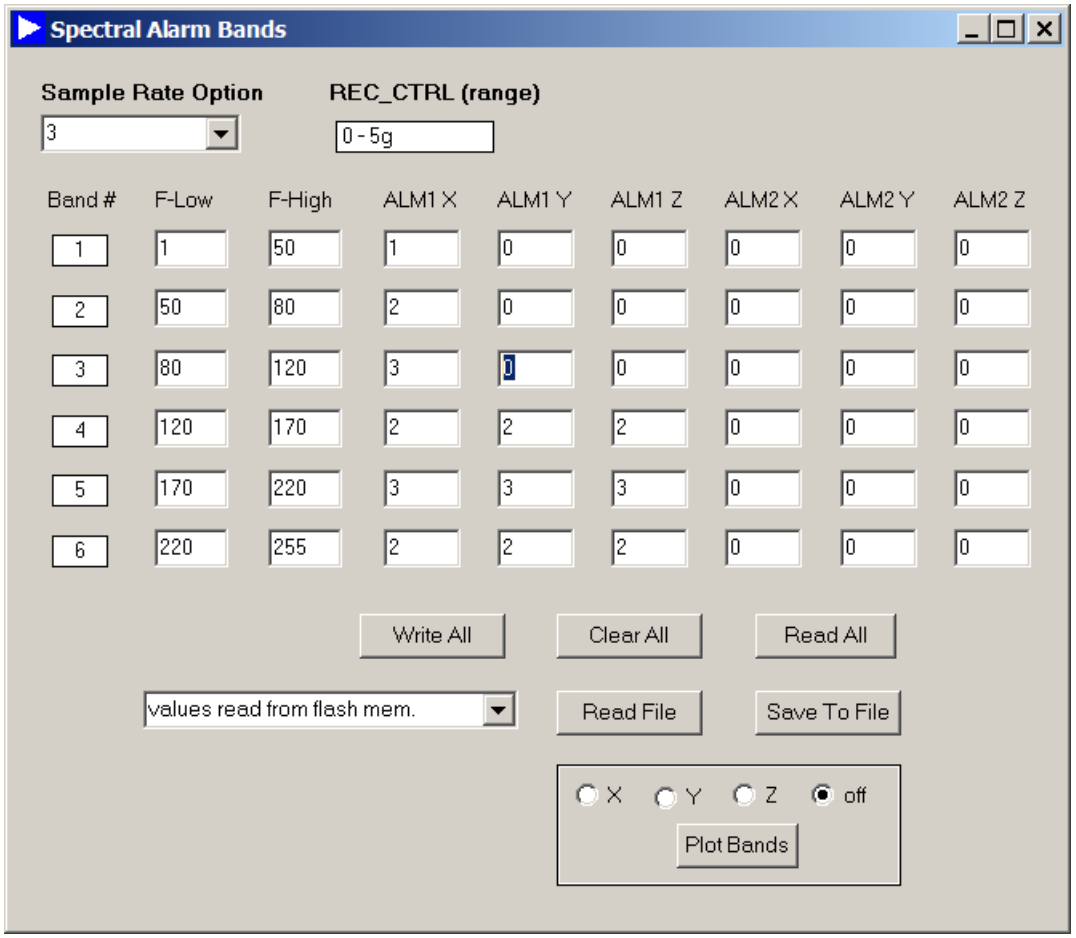
ADIS16227 Software Tips: Spectral Alarm Demo



2. **Under "Sample Rate Option," use the drop-down menu to select "3".**
3. **Change each entry by highlighting the numbers and then typing it in.**

ANALOG DEVICES

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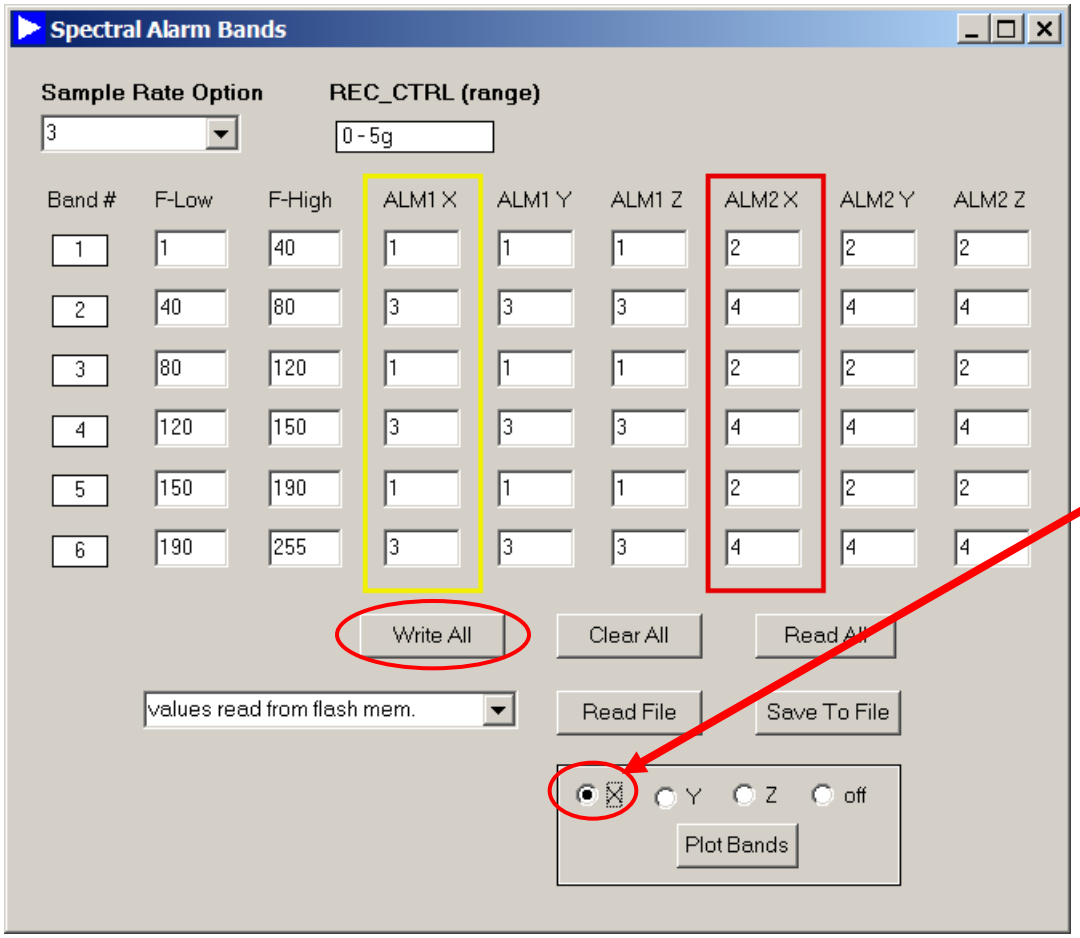
ADIS16227 Software Tips: Spectral Alarm Demo



4. **Enter all of the numbers show for this demo in the graphic.**
5. **Click on “Write All” to save them to the flash memory in the ADIS16227.**
6. **Enable the “X” axis band to plot by click on the “X” dot.**
7. **Minimize this window and return the main window.**

ANALOG DEVICES

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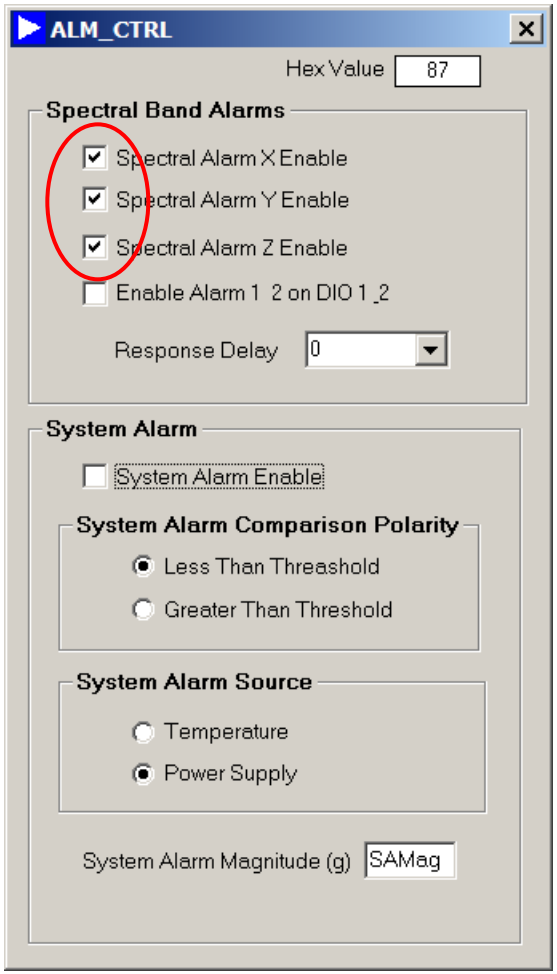
ADIS16227 Software Tips: Spectral Alarm Demo



8. **After returning to the main window, use the "Configuration" drop-down menu to select the "ALM_CTRL" option.**
9. **Use the ALM_CTRL menu to enable all three (x,y,z) spectral alarms.**
10. **Close the window to return to the main menu.**

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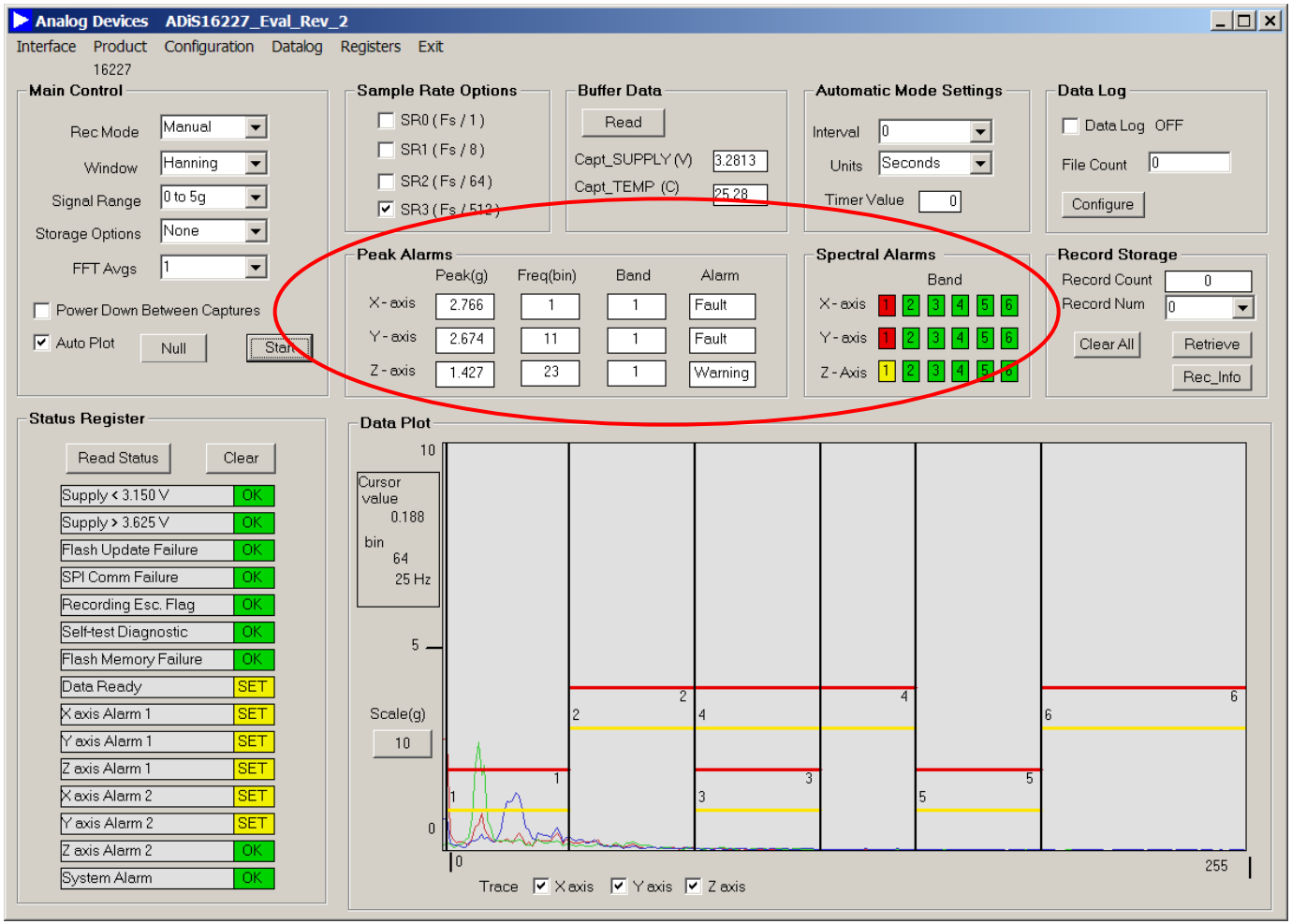
ADIS16227 Software Tips: Spectral Alarm Demo



11. **Repeat the shaking motion and click on “Start”.**
12. **Observe the Peak Alarms and Spectral Alarms outputs.**

ANALOG DEVICES

- **Contacts:**
  - **Applications Engineer:**
    Mark Looney
    mark.looney@analog.com
    1-336-605-4139
  - **Marketing:**
    Bob Scannell
    bob.scannell@analog.com
    1-336-605-4031

More Information on *i*Sensor Evaluation Tools:

- **www.analog.com/isensor-evaluation**

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