

Agile-Link™

2.4 GHz Wireless Nodes



Using the 50G, 100G or 200G Triaxial Accelerometer Cube with V-Link®

Overview

MicroStrain's 2.4 GHz V-Link® with factory-modified gain resistors will support MicroStrain's 50G, 100G or 200G Triaxial Accelerometer Cube.

- A V-Link® which has had the appropriate gain resistors modified at the factory will support the accelerometer cube. A V-Link® that has not been modified will not. Consult your invoice or a MicroStrain support engineer to determine your V-Link®'s capability.
- The cube is manufactured with 3 ICSensors Model 3031 accelerometers mounted on 3 interconnected MicroStrain circuit boards.
- These accelerometers range +/-50G, +/-100G or +/-200G.
- Specifications for the accelerometers may be found at:
http://www.meas-spec.com/myMeas/sensors/pdf/acceleration/Model3031_dft10.pdf
- The circuit board array receives a 6 foot, 8-lead, shielded wiring harness which provides pigtailed to be attached to the green Phoenix connectors on the V-Link®.
- The circuit board array is inserted into a cube made with DAP (Glass-fibre Filled Diallyl Phthalate) and potted in place with Loctite® E-60NC Hysol Epoxy Potting Compound.
- The cube and its harness are temperature rated at -30C to +70C.
- The wiring harness shield is attached to the black ground lead at the circuit board array and has a wiring clamp provided for strain relief.
- The cube carries no threaded or smooth holes for mounting. Suggested mounting methods include strapping, gluing, insertion in a holding fixture, etc.
- The wiring harness carries a shrink-wrap label that indicates the serial numbers of the 3 installed accelerometers.
- A wiring diagram for connecting the cube to the V-Link® may be found at:
<http://www.microstrain.com/pdf/3007-0011.pdf>
- Each cube comes with a Certificate of Calibration as shown in the example at:
<http://www.microstrain.com/pdf/CalibrationReport3007-0000.pdf>
- Cube dimensions and axes orientation may be found at:
<http://www.microstrain.com/pdf/3007-0011.pdf>

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Operation

- For purposes of this technical note, we will assume that the cube is wired to the V-Link[®] so that Channel 1 is the X-Axis, Channel 2 is the Y-Axis and Channel 3 is the Z-Axis.
- Establish communication between the V-Link[®] and MicroStrain's Agile-Link[™] software.
- Navigate to the Channel tab on the Node Configuration window.
- Enter and apply the appropriate Hardware Gain for each of the 3 accelerometer channels. The gain value can be found on the Certificate of Calibration in the cell entitled 'Channel Gain = '.
- Mid-scale Balance each channel.
- Navigate to the Custom Formula Plugin screen.
- Enter and apply the Converted X-Axis Calibration that you find on your cube's Certificate of Calibration into the Channel 1 Gain. Enter and apply a Channel 1 Offset of 0 (zero).
- Enter and apply the Converted Y-Axis Calibration that you find on your cube's Certificate of Calibration into the Channel 2 Gain. Enter and apply a Channel 2 Offset of 0 (zero).
- Enter and apply the Converted Z-Axis Calibration that you find on your cube's Certificate of Calibration into the Channel 3 Gain. Enter and apply a Channel 3 Offset of 0 (zero).
- Look at the cube drawing at: <http://www.microstrain.com/pdf/3007-0011.pdf>
- Place the cube flat on your desktop with the wire harness pointed up as shown in the drawing.
- Stream the V-Link[®] with the 3 channels active and the cube **stationary**.
- If the G's seem wrong to you, that's because they are. We now need to correct the Offset.
- Stream the node.
- Save the stream to file.
- Open up the file and view the data.
- This data is in G's.
- Calculate the Average Value of each channel's stream.

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- Navigate to the Channel Actions window. You should find that the Custom Formula is applied to Channels 1, 2 and 3. Click Setup for each of the channels and the Custom Bits Conversion window will appear. Enter the Average Values calculated above into the **Offset** of each channel as follows:
 - Channel 1 Average Value should be entered as a negative value. For example if the value is 100, enter -100.
 - Add 1 (for gravity) to Channel 2's Average Value and enter that value as a negative value. For example if the value is 100, add 1 to 100 and enter -101.
 - Channel 3 Average Value should be entered as a negative value. For example if the value is 100, enter -100.
- Apply and Close the Custom Bits Conversion window.
- Close the Channel Actions window.
- Stream the V-Link[®] with the cube in the same static position with the wire harness pointed up and you will be streaming correct G's.
- In this position you should be reading 0G's on the X-Axis, -1G's on the Y-Axis and 0G's on the Z-Axis.

Notes

- MicroStrain does not calibrate the accelerometers. The Certificate of Calibration records the X, Y and Z-Axis Calibration as the sensors come to us from the manufacturer.
- These manufacturer's calibrations are reported in mV/G; for our purposes, we convert to G/Bit. Using a 100G accelerometer with an X-Axis Calibration of 0.452 mV/G as an example, conversion is accomplished with the following formula:
 - $0.04656 \text{ G/Bit} = 1 / (0.452 \text{ mV/G} * (3 \text{ Volts} / 5 \text{ Volts}) * 58 \text{ Gain} * (4096 \text{ Bits} / 3000 \text{ mV}))$