Classification	☐ tDS ☐ tGW ☐ PETL/tET/tPET ☐ DS/PDS/PPDS ☐ tM-752N ☑ I/O Card ☐ VXC Card ☐ VxComm ☐ Other				
Author	Mike Chou	**Date**	2020-09-10	**NO.**	FAQ001

Q: How to measure the Load Cell signal using PCIe-LM4?

A:

The PCIe-LM4 board equips the high-accuracy ADC, so it provides 4 strain gauge input channels for measuring the minor changes of the Load Cell signal. The Load Cell equipment measures the strain using the variation of wire resistance. Each equipment may exist different initial offset voltage because of the temperature, wire length…etc. For this reason, we should calibrate the initial value before measuring the Load Cell equipment. And the PCIe-LM4 provides the software compensation to calibrate the offset voltage.

You can use the PCIe-LM4 to measure the 4-wire Load Cell or 6-wire Load Cell equipment. This article will introduce how to measure the Load Cell signal using the strain gauge channel of the PCIe-LM4.

■ Preparations

☑ CA-MINI68-15 (optional) Cable
☑ DN-68A (optional) daughter board
☑ Load Cell equipment

■ Wire

Connect the **CON1** to DN-68A board using the **CA-MINI68A** cable.



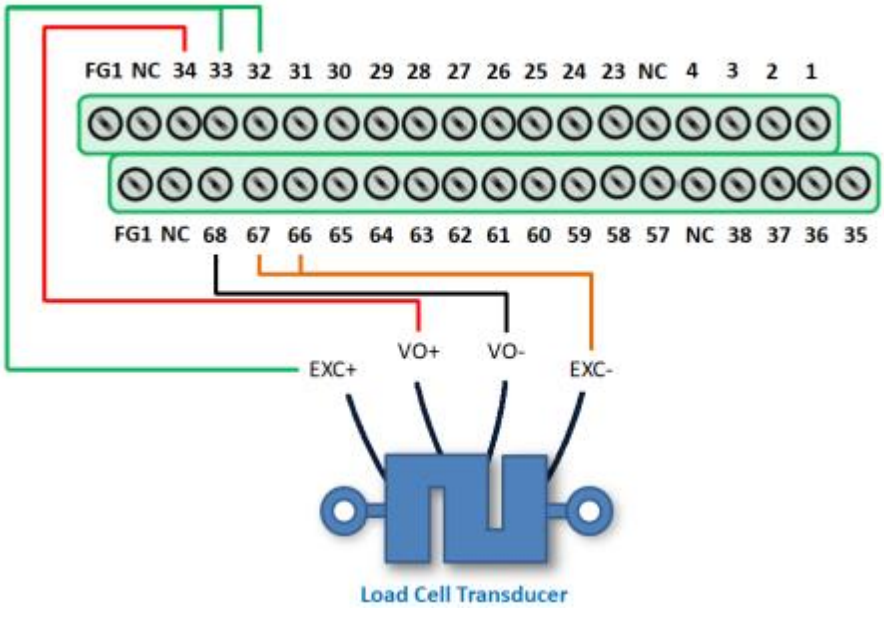
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4-Wire Load Cell

Connect the Load Cell transducer to the AI channel 0, please refer the wiring method below:

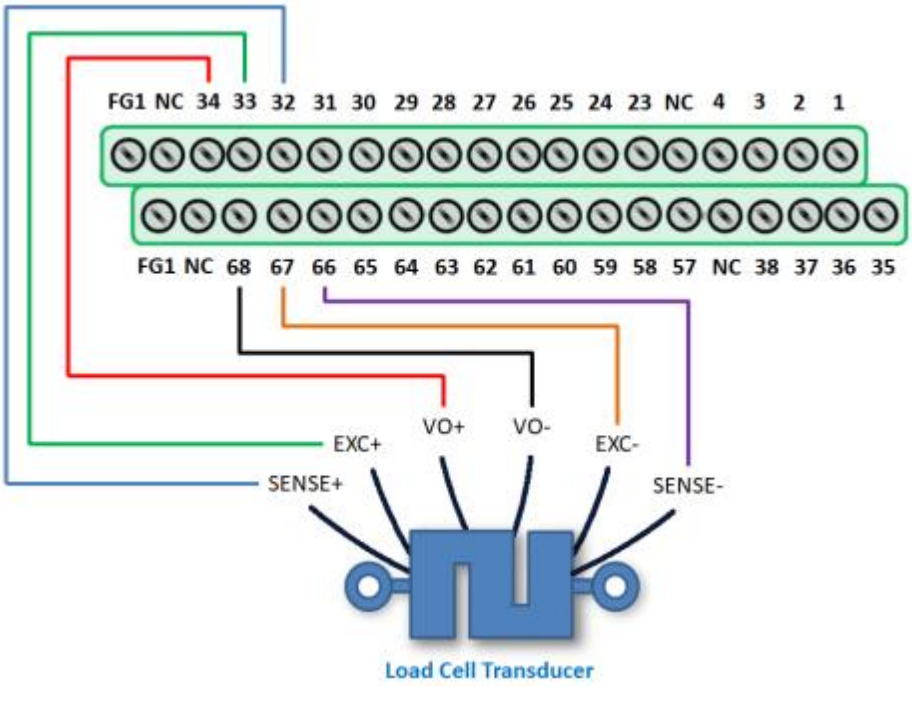
- Connect the Load Cell VO+ to AI0+ (Pin 34), and connect the Load Cell VO- to AI0- (Pin 68).
- Connect the Load Cell EXC+ to EXC1+ (Pin 33), and connect the Load Cell EXC- to EXC1- (Pin 67).
- Connect the Load Cell EXC+ to SENSE1+ (Pin 32), and connect the Load Cell EXC- to SENSE1- (Pin 66).



6-Wire Load Cell

Connect the Load Cell transducer to the AI channel 0, please refer the wiring method below:

- Connect the Load Cell VO+ to AI0+ (Pin 34), and connect the Load Cell VO- to AI0- (Pin 68).
- Connect the Load Cell EXC+ to EXC1+ (Pin 33), and connect the Load Cell EXC- to EXC1- (Pin 67).
- Connect the Load Cell SENSE+ to SENSE1+ (Pin 32), and connect the Load Cell SENSE- to SENSE1- (Pin 66).

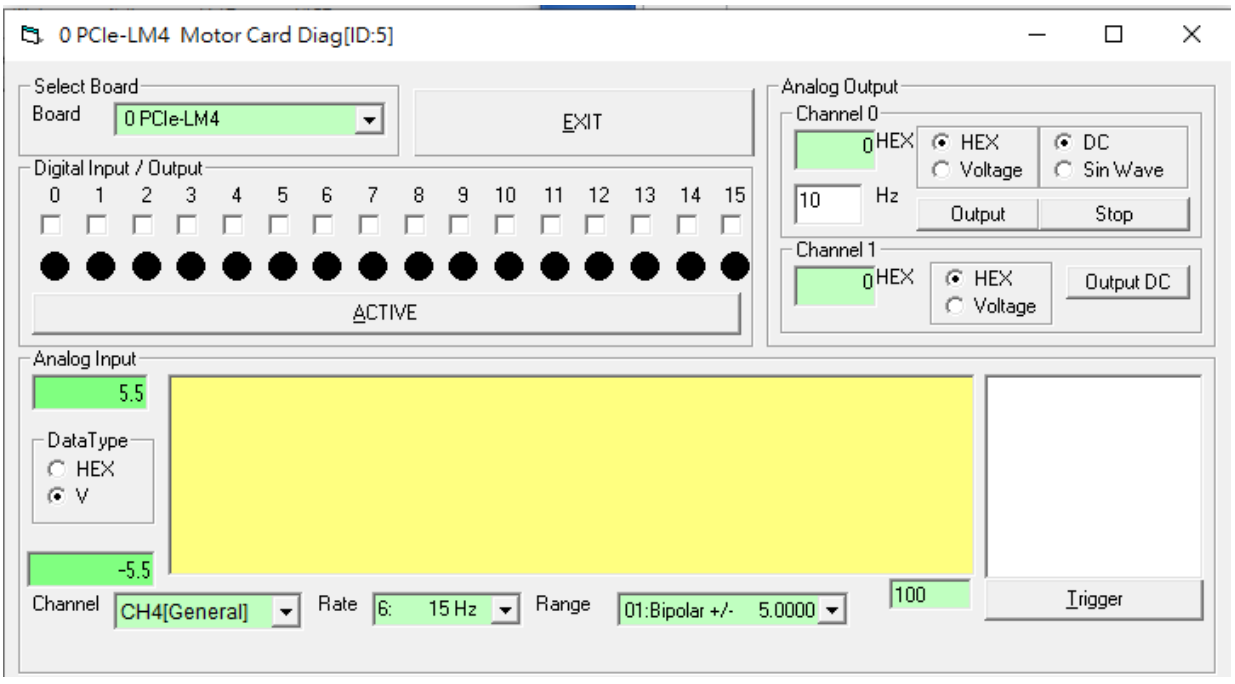


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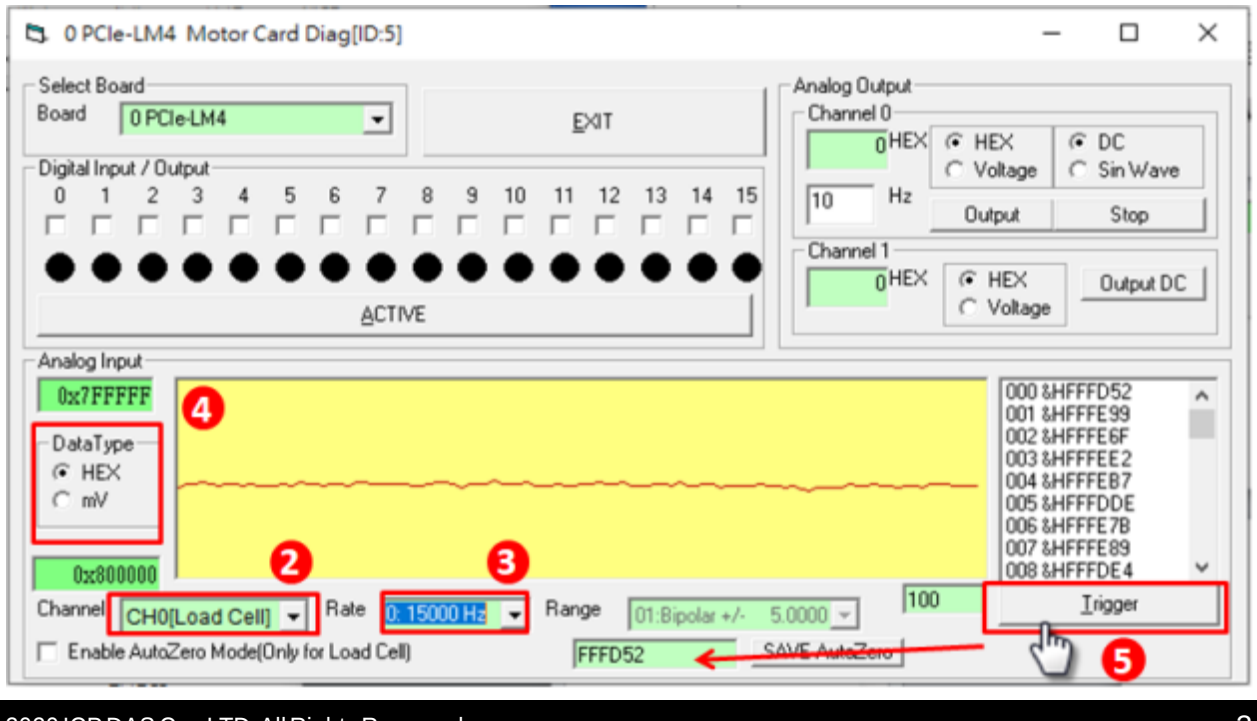
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■ Calibrate the strain gauge input channel A0

1) Launch the PCIe-LM4_IO_DIAG program. It was installed in the default folder, it will be located at **"C:\ICPDAS\PCIe-LM4\Driver"**.



2) Drop down the **"Channel"** menu and select the **"CH0(Load Cell)"** item.
3) Drop down the **"Rate"** menu and select the **"15000 Hz"** item.
4) Adjust the **"DataType"** to **"HEX"**.
5) With the initial state of the Load Cell equipment, i.e., no strain applied, click the **"Trigger"** button to acquire the calibration value.

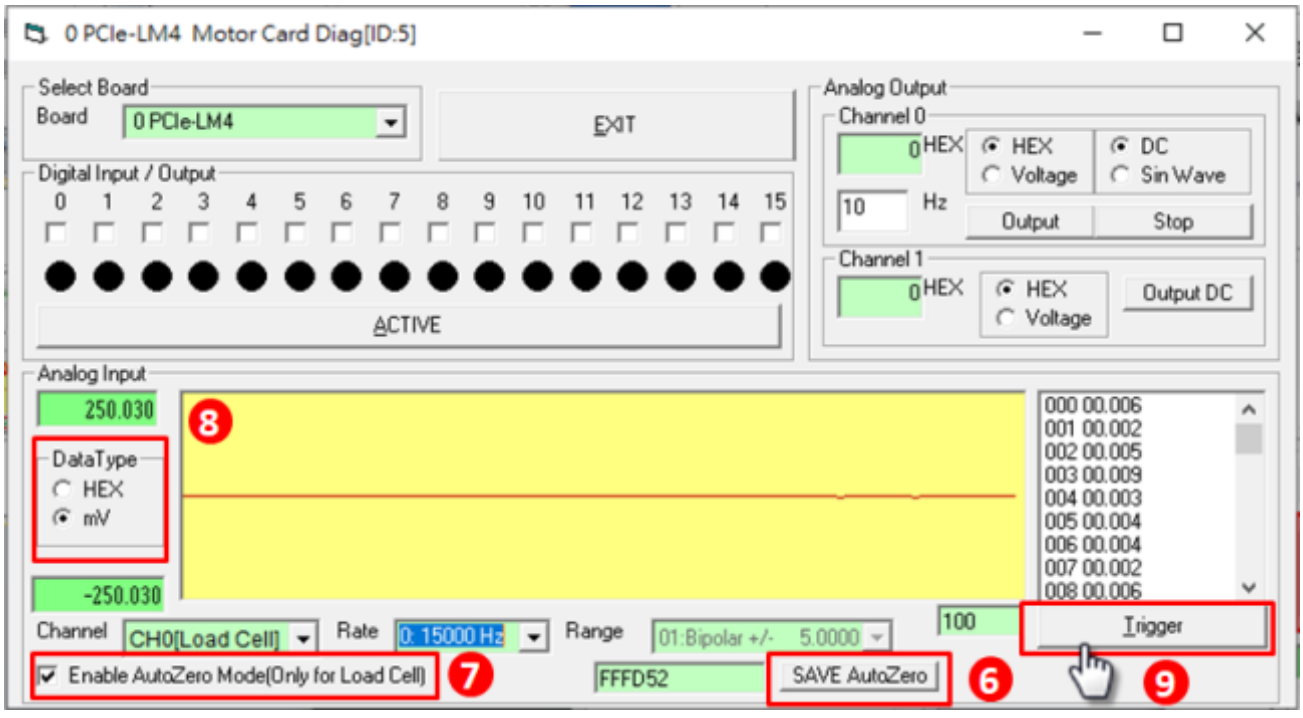


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6) Click the **“SAVE AutoZero”** button to apply the calibration value.
7) Check the **“Enable AutoZero Mode(Only for Load Cell)”** item to enable the software compensation.
8) Adjust the **“DataType”** to **“mV”**.
9) Click the **“Trigger”** button and confirm the voltage is correctly calibrated, i.e., close to 0.

The calibration value will be stored in the EEPROM, only one operation of the calibration is required. It should be recalibrated when replacing the Load Cell equipment.

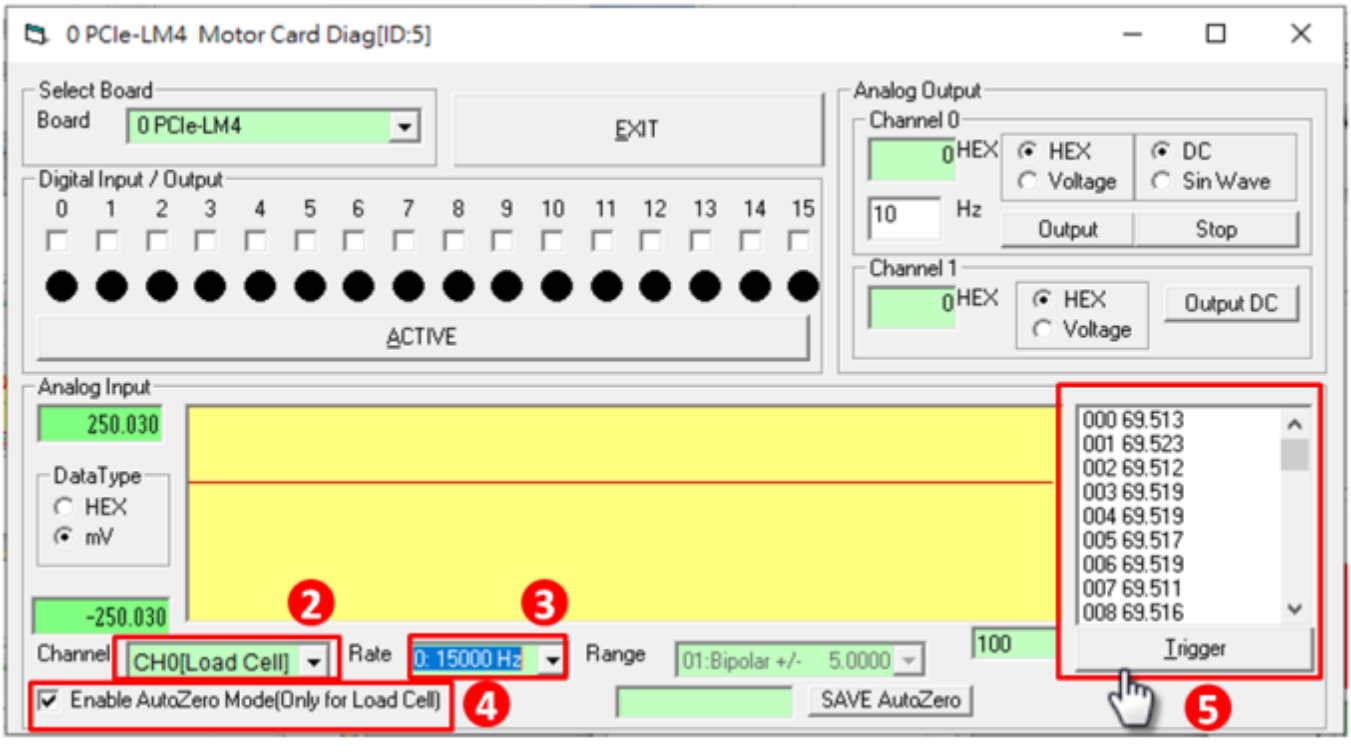


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■ Measure the strain gauge input channel A0

1) Launch the PCIe-LM4_IO_DIAG program. It was installed in the default folder, it will be located at **"C:\ICPDAS\PCIe-LM4\Driver"**.
2) Drop down the **"Channel"** menu and select the **"CH0(Load Cell)"** item.
3) Drop down the **"Rate"** menu and select the **"15000 Hz"** item.
4) Check the **"Enable AutoZero Mode(Only for Load Cell)"** item to enable the software compensation.
5) Change the signal of the Load Cell, i.e., strain applied, and clicks the **"Trigger"** button. Confirm whether the voltage level meets the expected value.



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