

## Connecting a Strain Gauge in a Quarter Bridge Configuration to the DD-128

### Introduction

If it is desired, an active strain gauge may be connected to a high-resolution input channel on a model DD-128 in a quarter bridge configuration. While Optimum Instruments generally recommends using the model DD-124 when collecting strain data, the DD-128 may be used in applications where the resolution of a strain measurement is of less concern than the ability to measure data on a large number of channels with a variety of instruments. The precision inputs on a DD-128 have a 2.5V scale, whereas the precision inputs of the DD-124 have a 100mV scale, giving the DD-124 approximately 25 times the resolution of the DD-128. In calibration tests performed at Optimum it was found that a Data Dolphin user choosing a DD-128 would have a resolution of  $\pm 12.5 \mu\epsilon$ . Compare this with the DD-124's resolution  $\pm 1 \mu\epsilon$ , and consider using a combination of a DD-128 and DD-124 if your application demands it.

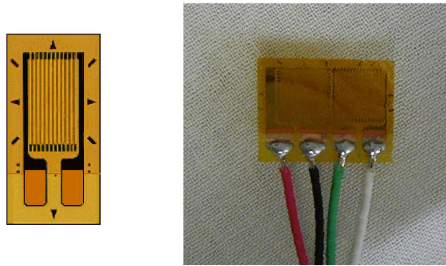


Figure 1. Typical Strain Gauges

### Power Considerations

Another difference between the two models of loggers is the amount of current available from the reference voltage outputs to power the attached strain gauges. The DD124 outputs 5V at 700mA of current from its "V<sub>EX</sub> Switched" output, whereas the DD128 produces 2.5V at 28mA from its "2.5V Ref". The lower current output of the DD128 limits the amount of 120Ω strain gauges that it can successfully power (see Table 1 below).

Data Dolphin Model	Number of Channels	Type of Channel	Excitation	Excitation Output	Number Of 120W Strain Gauges Able To Be Powered	Number Of 350W Strain Gauges Able To Be Powered
DD124	4	Differential	5V @ 700mA	"V <sub>EX</sub> Switched"*	4	4
DD128	8	Single-Ended	2.5V @ 28mA	"2.5V Ref."	2	8

\*"V<sub>EX</sub> Switched" on the DD128 is disabled

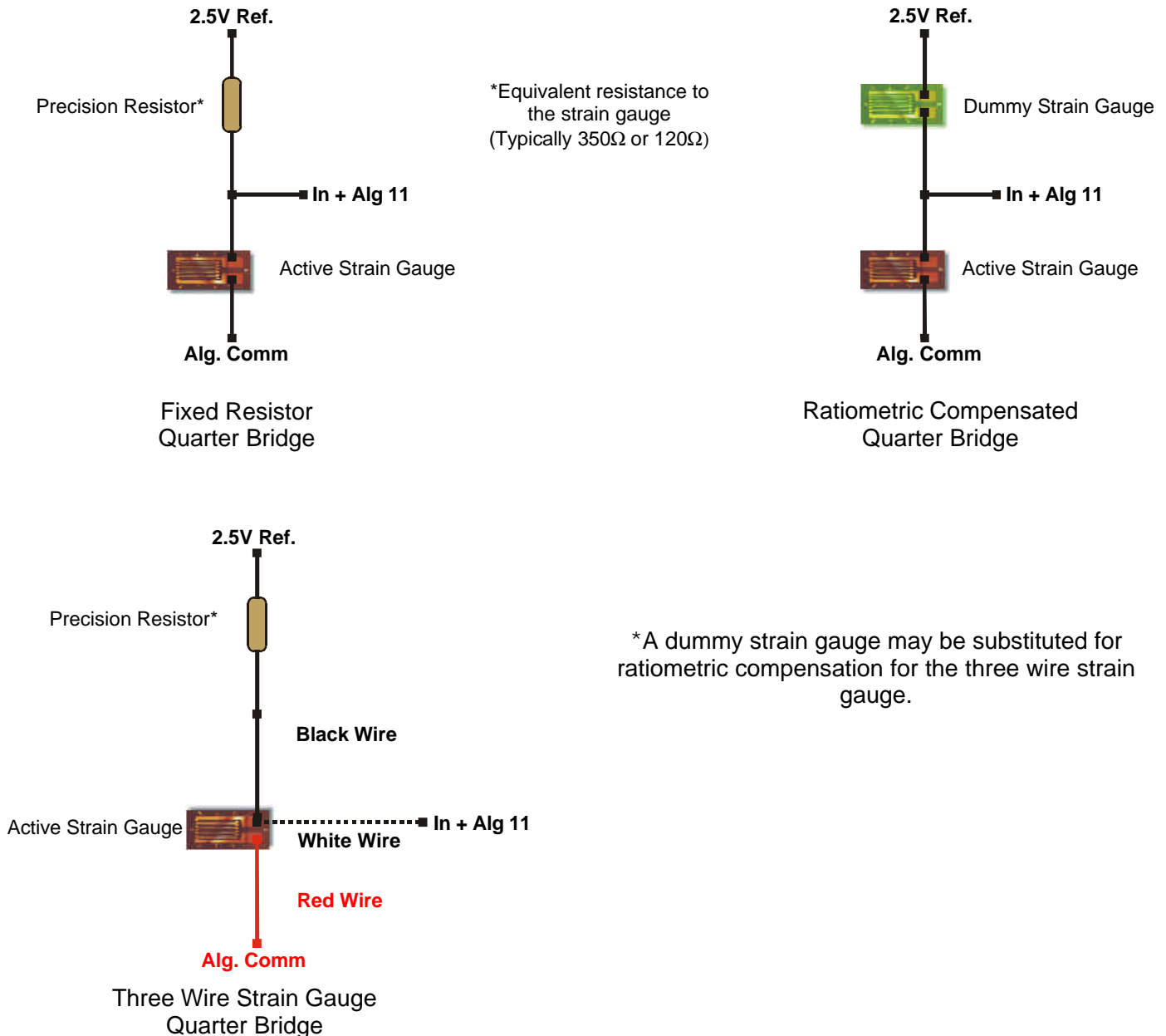
Table 1: Power comparison of the DD124 to the DD128

The large current a strain gauge draws while taking a measurement is due to its relatively low resistance.

The resulting large power draw will quickly drain the Data Dolphin's limited internal battery pack. For this reason it is suggested that an external DC battery with a larger current capacity or AC Adapter be used for strain measurement.

## Connections and Wiring

A strain gauge in a quarter bridge configuration can be wired for strain measurement with and without ratiometric temperature compensation. These wiring configurations, shown in Figure 2 below, show the connection to the DD-128's terminals for both the two and three wire strain gauges.



**Figure 2: Quarter bridge wiring configurations**

## Setting up the Data Dolphin inputs with the Data Dolphin software

Configure a DD-128's input for a quarter bridge strain connection with the Data Dolphin software as shown in Figure 3 below. Remember to click on the Apply button after changing the input's configuration to set the changes into the Data Dolphin's memory.

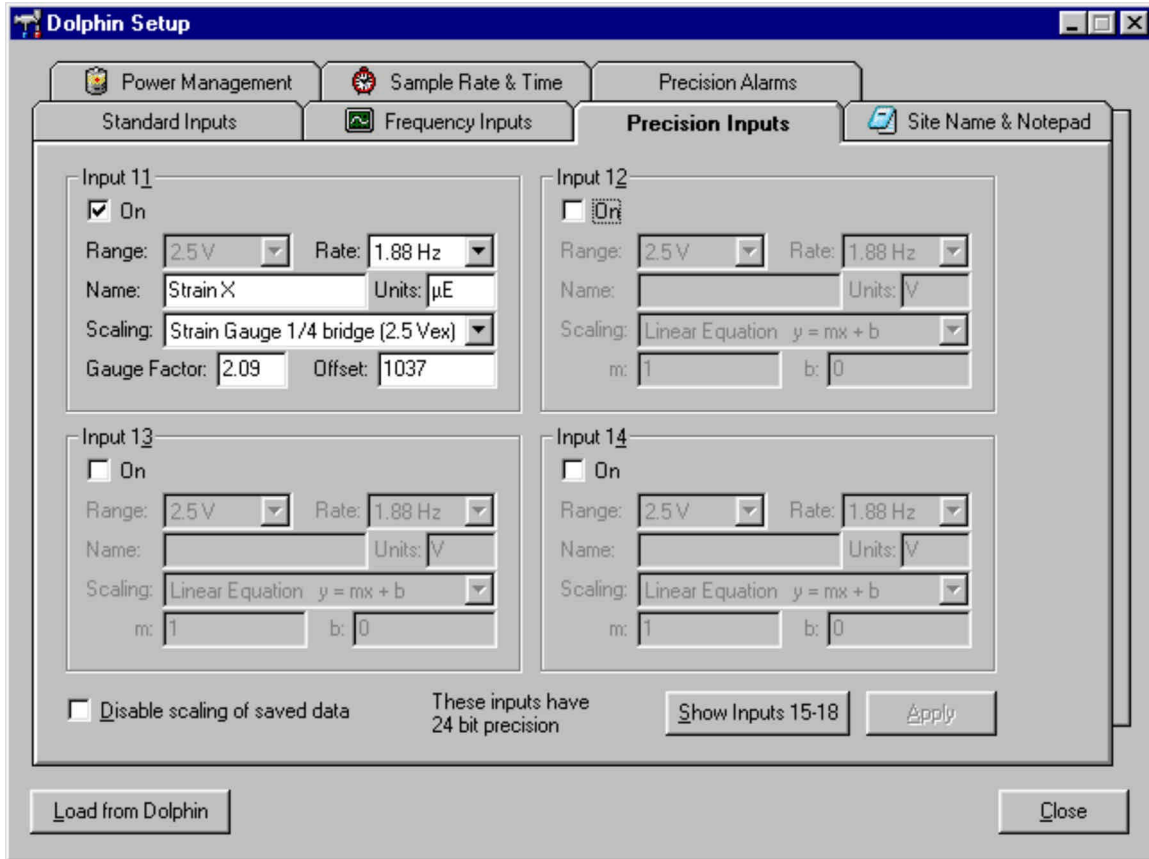


Figure 3: Input settings in Data Dolphin software for a Quarter Bridge Strain Connection