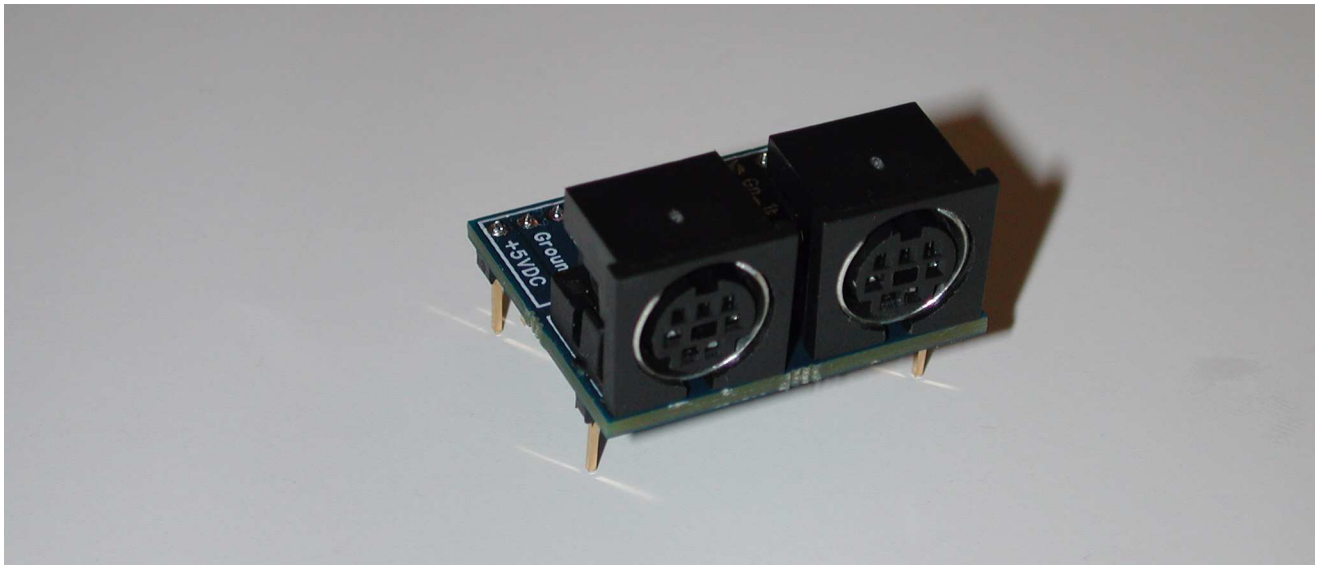
IX-ELADP iWorx-ELVIS adaptor

Overview

The IX-ELADP is a small open PCB that provides a means to interface two mini-DIN7 connector coupled analog output transducers, manufactured by iWorx Systems, to the breadboards on the stock NI ELVIS II SERIES PROTOTYPING BOARD component of the NI ELVIS system manufactured by National Instruments.

Photo



Specifications:

The IX-ELADP connects to the breadboards with a 0.1 inch pitch 12-pin SIP connector, and two single-pin mechanical support pins that are located under the mini-DIN7 connectors at the PCB corners located 0.7 inches from the 12-pin SIP connector. The mechanical support pins are not connected to any electrical node—this limits the opportunity to inadvertently cause an electrical short on the bread-board.

The top-side of the adapter is populated with the two mini-DIN7 connectors, and the silkscreen describing the pin-functionality of the electrical nodes on the 12-pin SIP connector. There are three sections—power, channel 1, and channel 2. The power section has two Ground pins, a +5 VDC pin, and a -15 VDC pin. These connections allow the adapter to be powered from the NI ELVIS +5V and -15V supplies. A negative linear regulator on the bottom of the adapter PCB is powered by the ELVIS -15V supply, and outputs -5V to the coupled transducers. The ELVIS +5V supply is simply channeled directly to the channel 1 and channel 2 trans-ducers.

The PCB bottom-side linear regulator is populated with an SOT223-4 packaged component capable of dissipating the heat generated by the 10V input-output differential multiplied by the current drawn by the channel 1 and channel 2 transducers. Typical transducers are limited to less than 40mA, providing a likely maximum heat dissipation of 800mW (2 x 40mA x 10V). The PCB sinks heat from the linear regulator into the ELVIS -15V copper plane. The plane has the solder mask removed to maximize heat transfer, and it is important that this plane is not shorted to GROUND or other nodes while prototyping. When properly used, the exposed heat sink is inaccessible.

Care must be exercised to ensure that the ELVIS power supplies are not overloaded by the prototyping loads. The ELVIS ii Hardware User Manual "Appendix A" specifies that the +5V supply provides +5 V at ±5% no load, limited to 2A. The -15V supply provides -15 V at ±5% no load, and combined with the -15V variable supply is limited to 500mA. It is advised that the user read the ELVIS ii Hardware User Manual to understand the capabilities and limitations of the provided power supplies, including the load regulation specifications.

Each Channel provides four electrical node connections—differential analog outputs, and connections to both nodes of a gain-set resistor embedded in transducers that typically require gain from an instrumentation amplifier. Many transducer outputs are single-ended, and for these, one of the differential analog outputs will be internally grounded in the transducer. For transducers that do provide a differential output, it may be driven into the NI ELVIS differential ADC analog inputs without gain, or it may first be routed to a gain block on the breadboard. If the gain-set resistor provided in some transducers is to be used, the gain-block should conform to a nominal gain equation of G=(1+50K/Rgain-set) as is typical of AD620 or LT1167 instrumentation amplifiers in order for the transducer gain-set resistor to appropriately configure the gain applied to the transducer output. Note that the gain-set resistor ends are labeled "End-A" and "End-B" as there is no polarity to this connection.

The PCB is 1.225 inches along the 12-pin SIP connector, and 1.000 inches along the edges between the 12-pin SIP connector and the mechanical support pins. The mini-DIN7 connectors are 0.550 inches tall, the PCB is 0.062" tall, SIP connectors insulation height is 0.125 inches tall. The height above the breadboard when inserted is thus 0.737 inches.

Pin-Name	Pin-Function	
A_+	Channel 1 Positive Analog Input	Output to ELVIS Breadboard
A_-	Channel 1 Negative Analog Input	Output to ELVIS Breadboard
Gn_1A	Channel 1 Gain-Set Resistor End-"A"	Output to ELVIS Breadboard
Gn_1B	Channel 1 Gain-Set Resistor End-"B"	Output to ELVIS Breadboard
A_2+	Channel 2 Positive Analog Input	Output to ELVIS Breadboard
A_2-	Channel 2 Negative Analog Input	Output to ELVIS Breadboard
Gn_2A	Channel 2 Gain-Set Resistor End-"A"	Output to ELVIS Breadboard
Gn_2B	Channel 2 Gain-Set Resistor End-"B"	Output to ELVIS Breadboard
Ground	Ground connection	Connection to ELVIS System ground
-15VDC	Negative 15 Volt DC supply	Input from ELVIS System power supply
Ground	Ground connection	Connection to ELVIS System ground
+5VDC	Positive 5 Volt DC supply	Input from ELVIS System power supply

The two Ground connections are equivalent.