

# Misure Meccaniche e Termiche

<https://elearning.unipv.it/course/view.php?id=9179>

## Sistemi Digitali di Acquisizione Dati (di Misura)

Interfaccia National Instruments MyDAQ (english version of slides)

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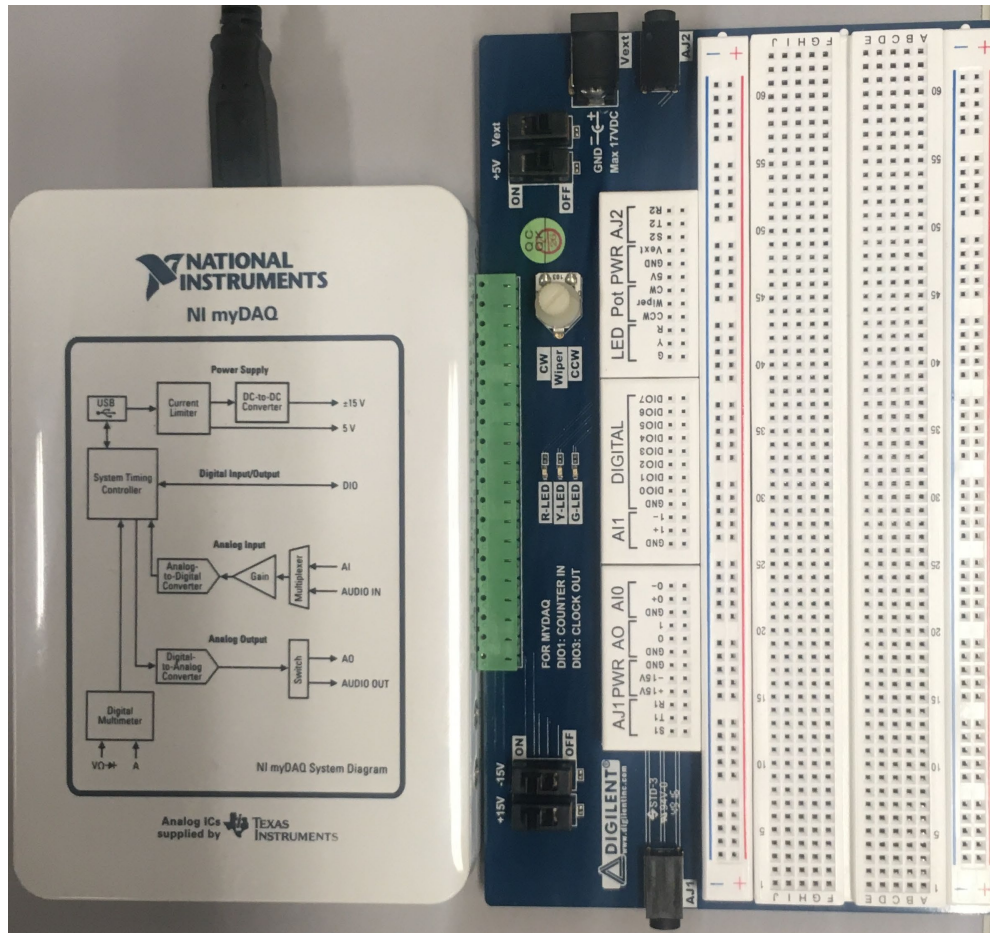
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Thanks to: Lodovico Ratti

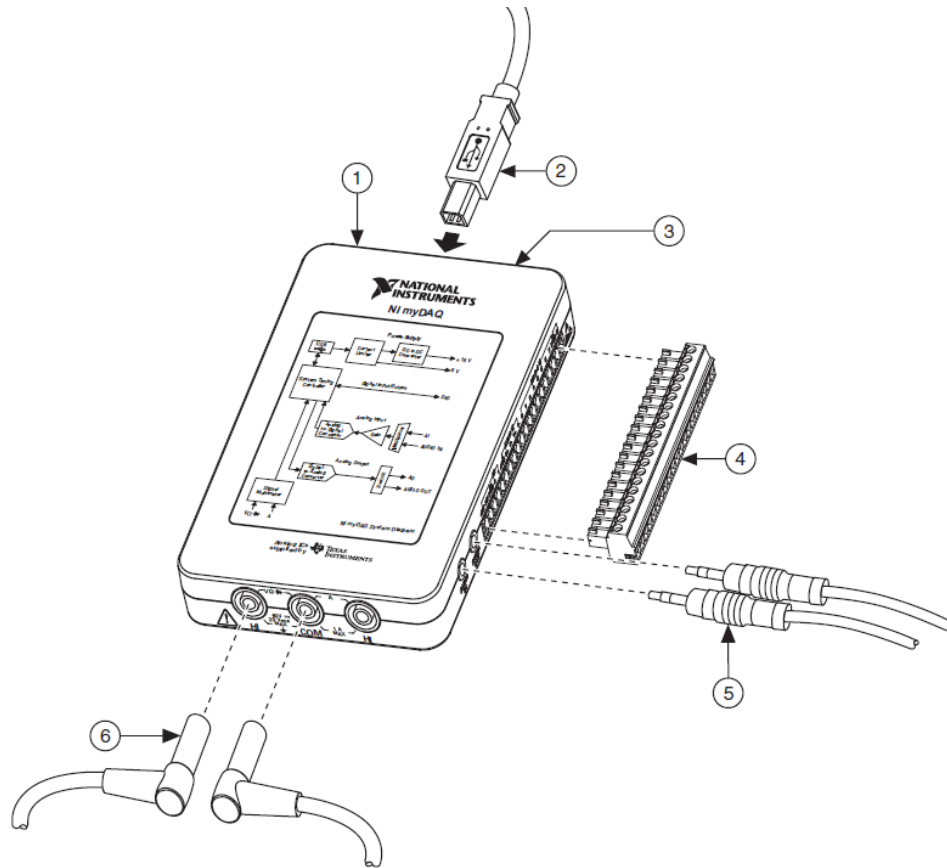


# The New NI MyDAQ System and Breadboard



- Digilent-TI Breadboard suitable for a direct connection to data acquisition (DAQ). In particular to new NI MyDAQ System.
- Makes it possible to send and acquire analog and digital signals to and from circuits built on the breadboard
- Can be powered directly by the DAQ board to which the breadboard is connected ( $\pm 15\text{ V}$  and an additional supply of  $5\text{ V}$ ) or by an external supply

# The New NI MyDAQ System



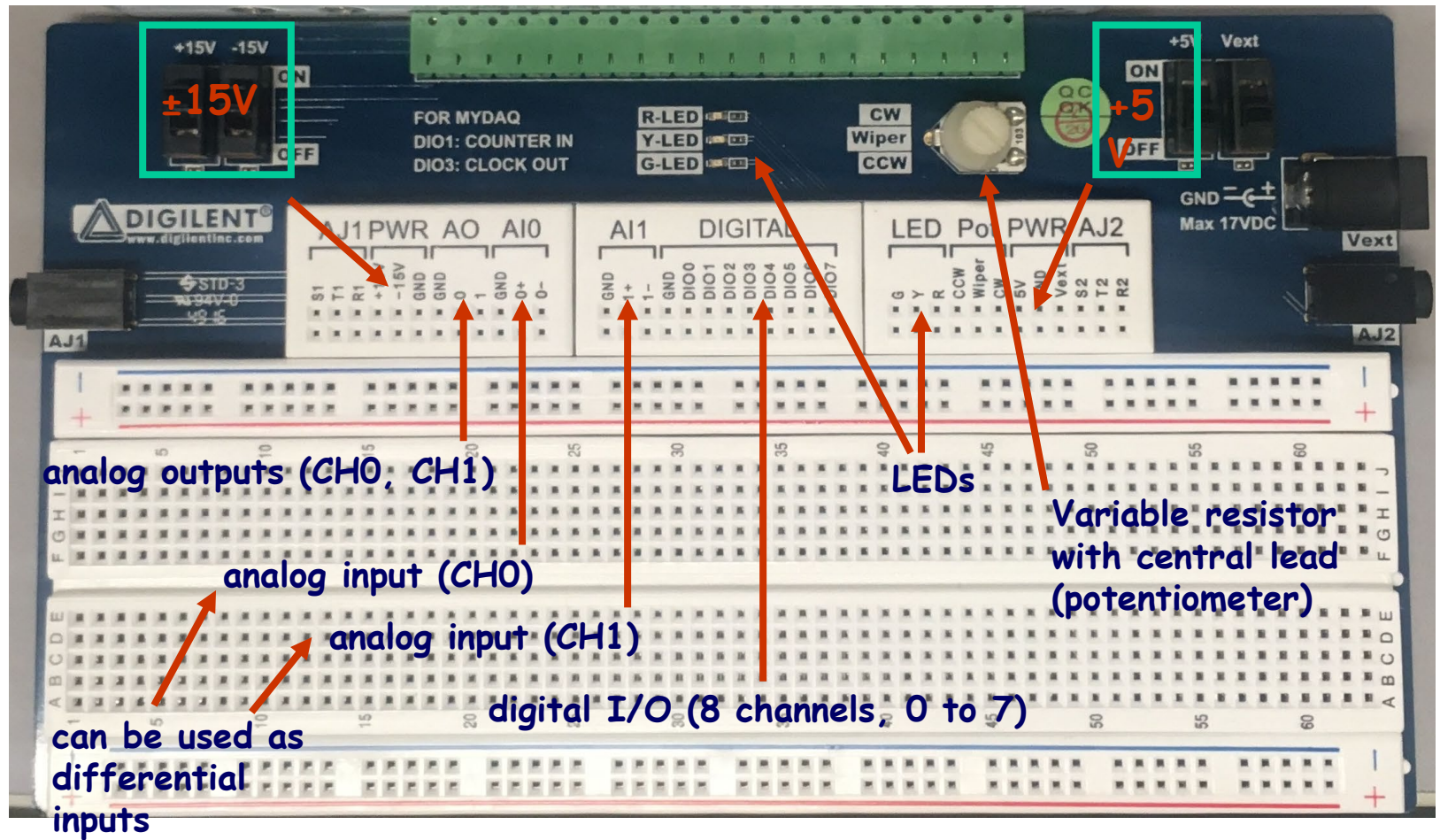
- |             |  |
|-------------|--|
| 1 NI myDAQ  | 4 20-Position Screw Terminal Connector |
| 2 USB Cable | 5 Audio Cable                          |
| 3 LED       | 6 DMM Banana Cable                     |

- The breadboard is connected to the NI MyDAQ System through a 2x20 pin connector
- The NI MyDAQ System is connected to the PC via standard USB cable

# The New NI MyDAQ System: Voltage Supply

- The New NI MyDAQ System+TI-Digilent Breadboard may easily replace DAQ boards<sup>3</sup> and systems of the previous series (Like E series and 12000 series).
- DC voltage supply: the power supply for the circuits built on the breadboard are made directly available by the breadboard itself
  - +5V: achieved on the breadboard by means of DC-DC converters
  - $\pm 15V$ : achieved on the breadboard by means of DC-DC converters
  - 0V: it is the common ground of the system, either for +5V and  $\pm 15V$
  - the power supply can be provided to also through an external source

# The New NI MyDAQ System: Breadboard Connectors



# The New NI MyDAQ System: Prototyping Area

## Prototyping area: it includes

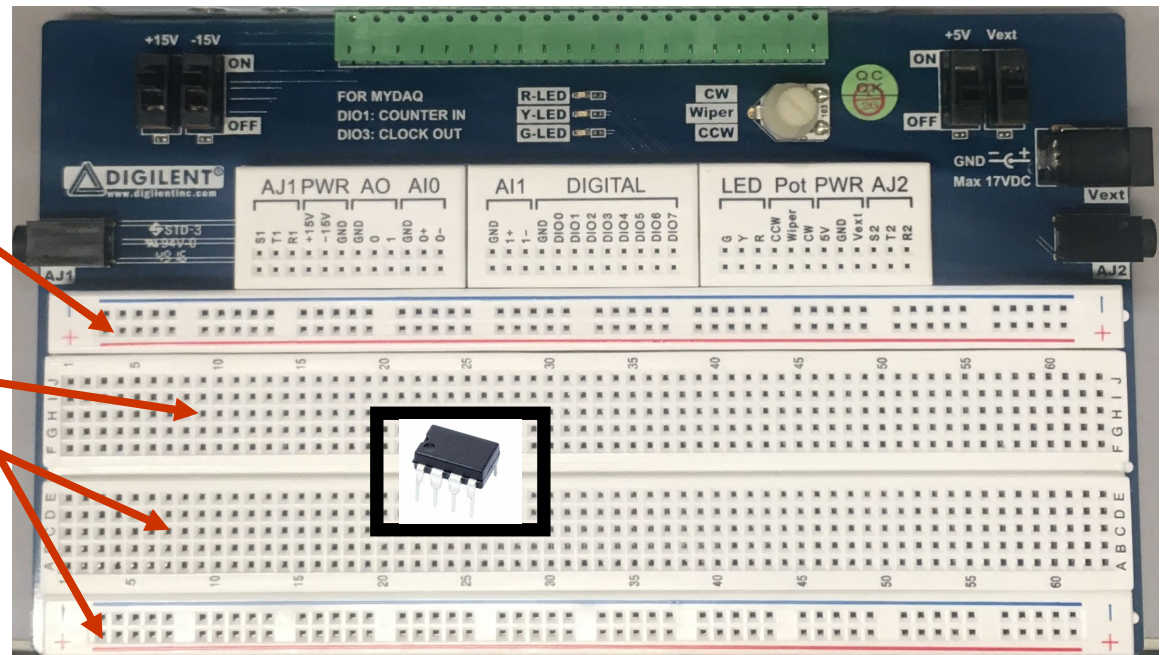
- 2 arrays of 2x50 holes for component lead insertion: in each 50 hole column, the holes are short circuited. They are usually dedicated to supplies
- 2 arrays of 5x63 holes for component lead insertion: in each 5 hole row, all the holes are short circuited. They are usually dedicated to basic connections

2 arrays of 2x50 holes - all the holes in each 50 hole column are short circuited

2 arrays of 5x63 holes - all the holes in each 5 hole row are short circuited

5 hole row  
(126 of them)

50 hole column  
(4 of them)

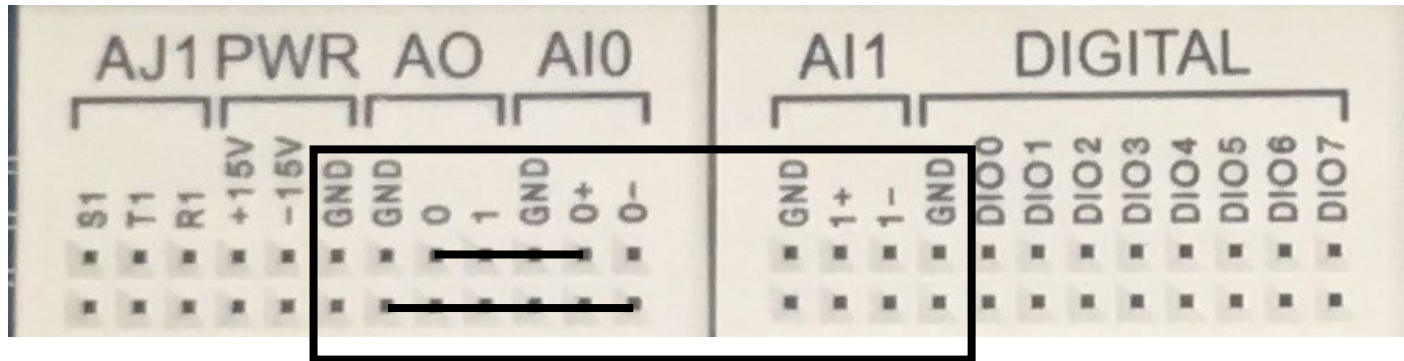


# The New NI MyDAQ System: Specifications

## Some technical specifications

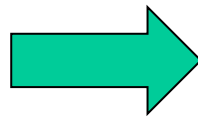
- 2 differential analog inputs: sampled at a 200 kSample/s rate with a 16 bit resolution
- 2 single-ended analog outputs: sampled at a 200 kSample/s rate with a 16 bit resolution
- input dynamic range:  $\pm 10$  V,  $\pm 2$  V DC coupled
- output dynamic range:  $\pm 10$  V,  $\pm 2$  V DC coupled
- input impedance: 10 G $\Omega$ , 100 pF
- output impedance: 1  $\Omega$
- maximum load current:  $\pm 2$  mA
- 8 input/output digital channels: TTL/CMOS compliant 0 V – 5 V (3.3 V)
- Digital input pull resistor: DOWN, 75 k $\Omega$
- $\pm 15$  V supply maximum load current: 32 mA
- +5 V supply maximum load current: 100 mA

# MyDAQ: Voltage Generation and Acquisition



- Single-Ended Analog Outputs (AO 0,1)
- GND terminals are common to all inputs and outputs
- Differential Analog Inputs (AI0 $\pm$ , AI1 $\pm$ )
  - For Single Ended use connect negative inputs (AI0-, AI1-) to GND

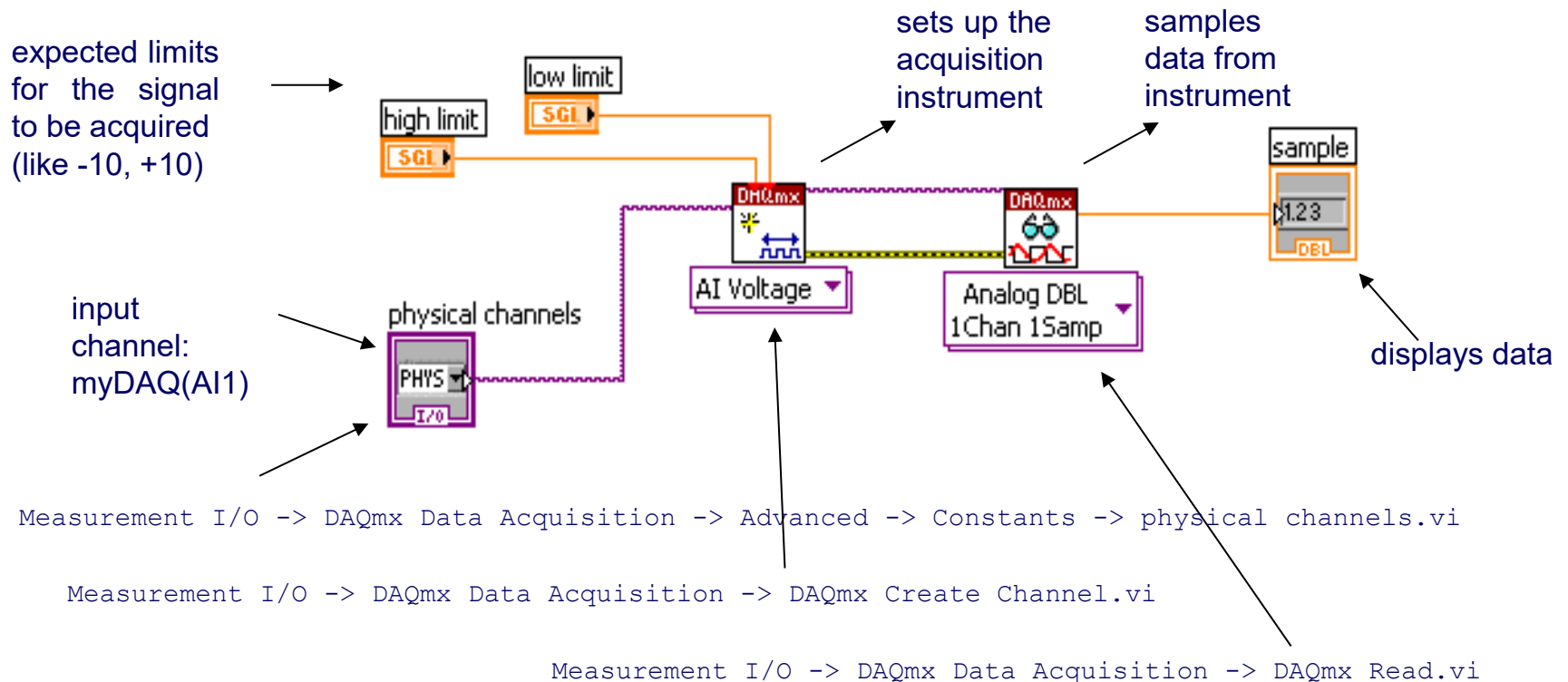
Single Ended Voltage  
Generation and read-Out



- Connect AO 0 to AI 0+
- Connect AI 0- to GND

# Voltage Acquisition VI: Physical Channel Approach

Physical channel approach to implement a Virtual Instrument for acquisition



■ You may want to use a loop

■ You may want to play with generator