



Caliper2PC - Analog Adapter

The Caliper2PC Analog adapter consists of a 10 Bit AD converter. The analog signal is sampled approximately 40 times / second and is then sent to the Caliper2PC interface as a data packet. The AD adapter offers four different operating modes. In each mode, different reference voltages are used: Two internal reference voltages (2,048V und 4,096V), as well as the operating voltage Vdd (5V) as reference voltage. In "Vref" mode an external voltage ($1,8V < Vref < Vdd$) is used as a reference voltage.

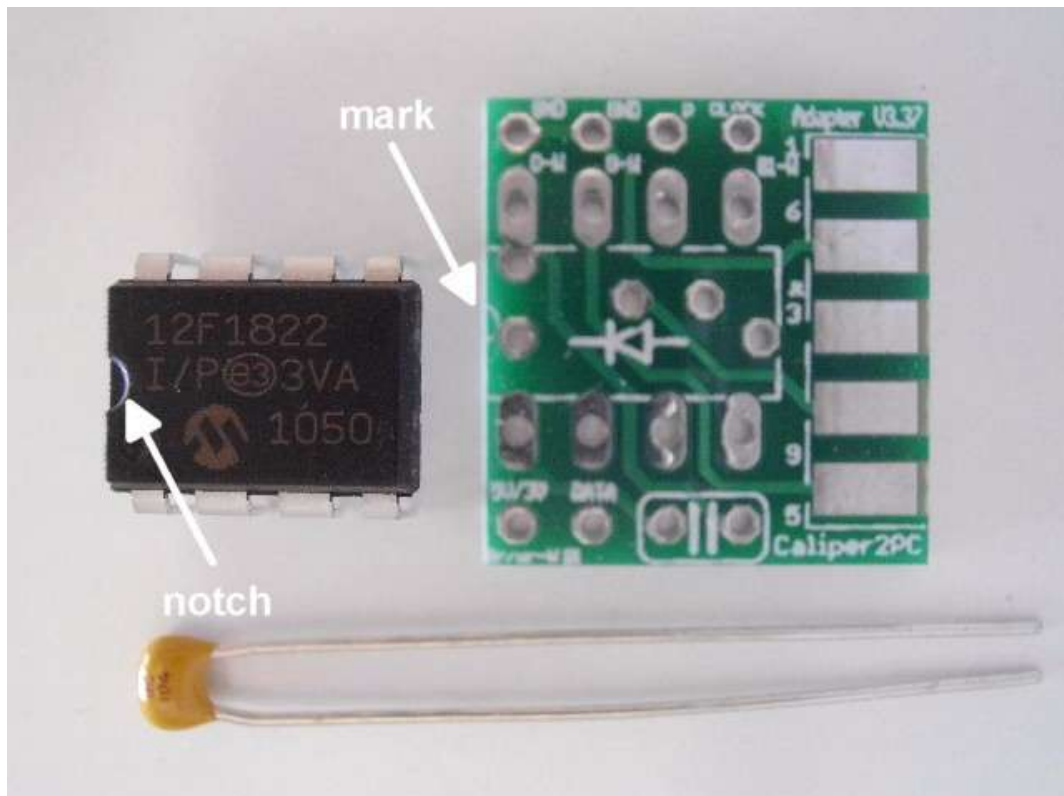
With the analog adapter the Caliper2PC system is capable of capturing analog signals, beside the supported digital encoders. With the matching circuits and amplifier strain gauges, pressure sensors, temperature sensors, humidity sensors etc. can be connected to the Caliper2PC interface. Tensile tests, thermal expansion measurements and many other measurements can be carried out in conjunction with linear encoders.

BOM & Tools Needed

- Analog Adapter Kit (available at www.caliper2pc.de)
- RJ45 Patch cable (available at any local computer store)
- 1 inch of shrink tube (1.6mm – 3.2mm diameter) or insulation tape
- soldering iron and solder
- wire cutter

Building the Analog adapter and Pin Assignment

The analog adapter kit contains the adapter PCB, the adapter IC as well as an capacitor.



Solder the components as shown in the picture. Please double check that the IC is mounted in the right direction before the device is soldered (notice the notch and the mark on the PCB).



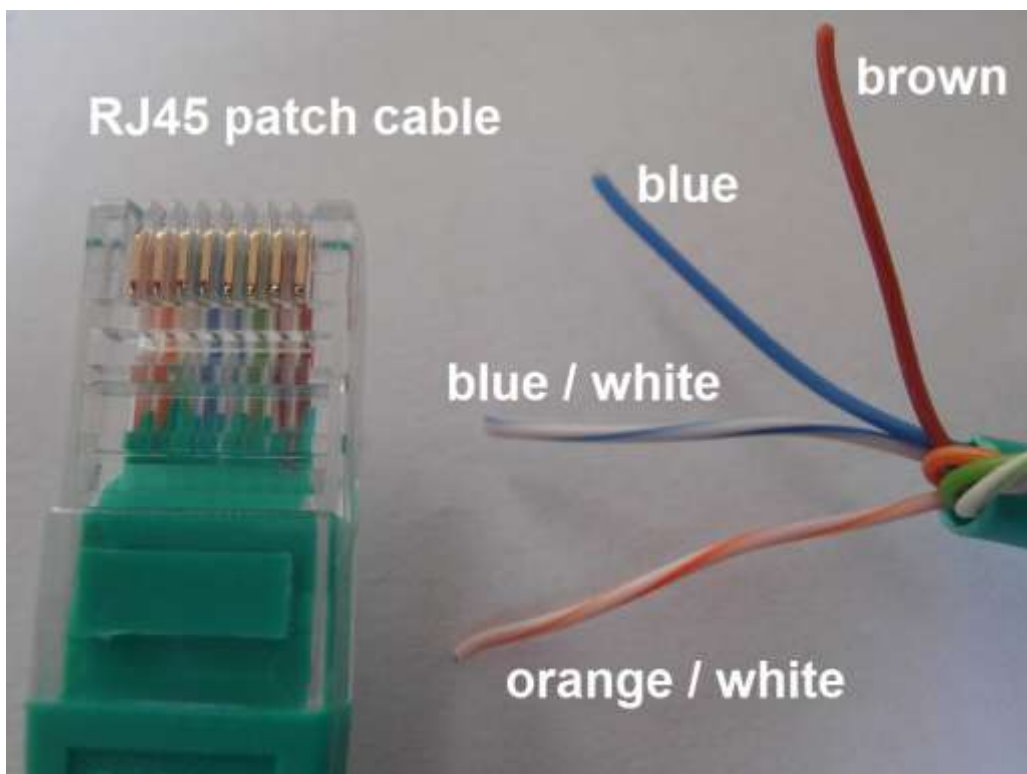
Solder the Patch Cable to the Analog Adapter

In the next step, the RJ45 patch cable (not included within the kit) for connecting the analog adapter to the Caliper2PC interface will be prepared. Dismantle the jacket (about 1 inch).

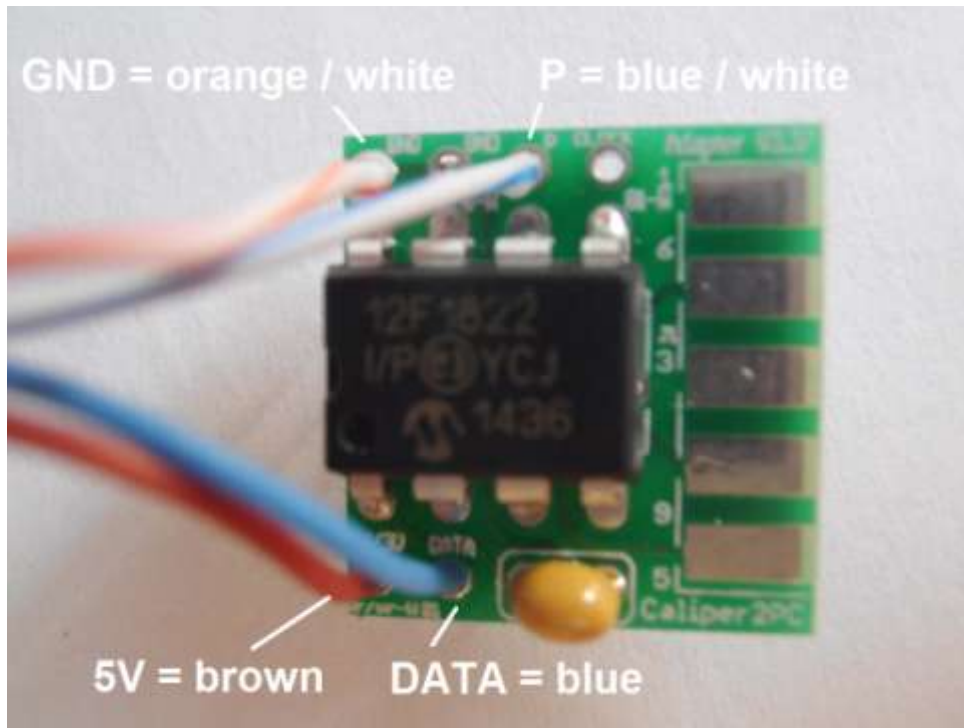
The following 4 wires of the patch cable are needed:

- Brown = +5V
- Orange / White = GND
- Blue / White = CLOCK
- Blue = DATA

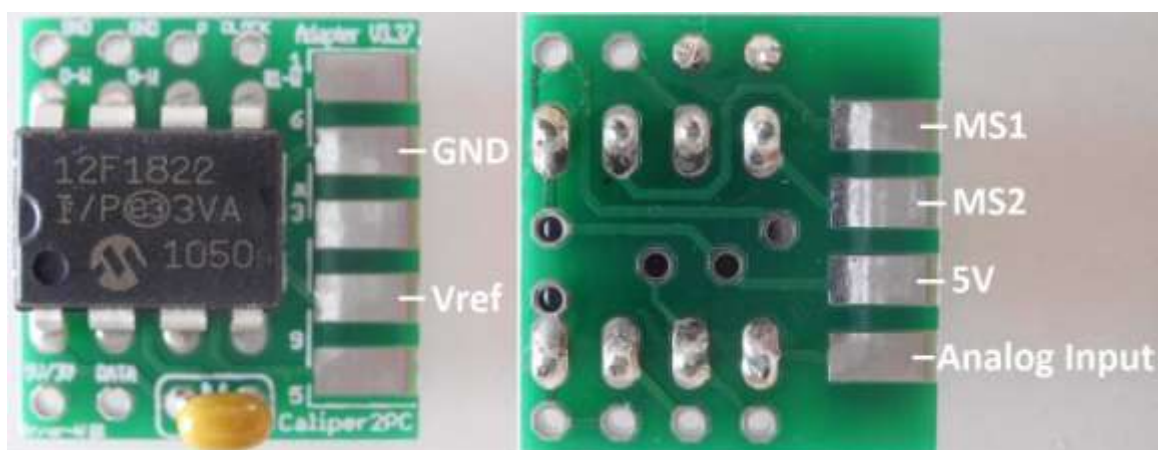
The other wires (green / white, green, orange, brown / white) are not needed and must be insulated with a shrink tube or insulating tape, to avoid short circuits.



Please note that the blue / white "Clock" wire must be connected to the "P" terminal of the PCB and not to the "Clock" terminal.



The connection of the analog adapter on the Caliper2PC interface side is now ready. Before carrying out the following steps, it is necessary to choose in which mode the analog adapter should run. Depending on the configuration of the MS1 and MS2 terminals (see below), the desired mode can be selected.





The different modes are selected through terminals MS1 and MS2. They can be connected to ground (through a wire jumper to "GND") or remaining disconnected. The terminals MS1 and MS2 have to be connected dependent on the desired mode according to this table:

MS1	MS2	Mode	Description
Not connected	Not connected	Vdd	Operating voltage (5V) as Reference voltage
Not connected	GND	Vref	External Reference voltage (1,8V < Vref < Vdd)
GND	Not connected	4,096V	Internal Reference voltage = 4,096V
GND	GND	2,048V	Internal Reference voltage = 2,048V

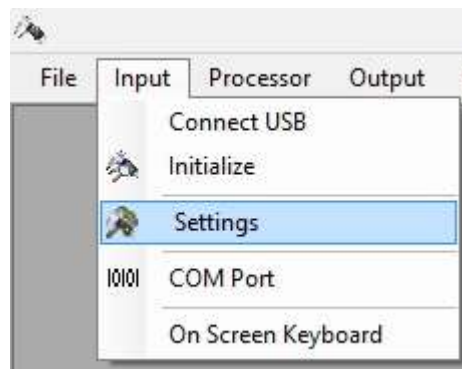
In Vref mode, an external voltage must be applied to the "Vref" terminal. The analog voltage to be measured is connected to the "Analog Input" terminal. The size of the allowed analog voltage must have a value between GND and the reference voltage.

Caution: Negative voltages as well as positive voltages > Vref at the "Analog Input" terminal can destroy the adapter IC.

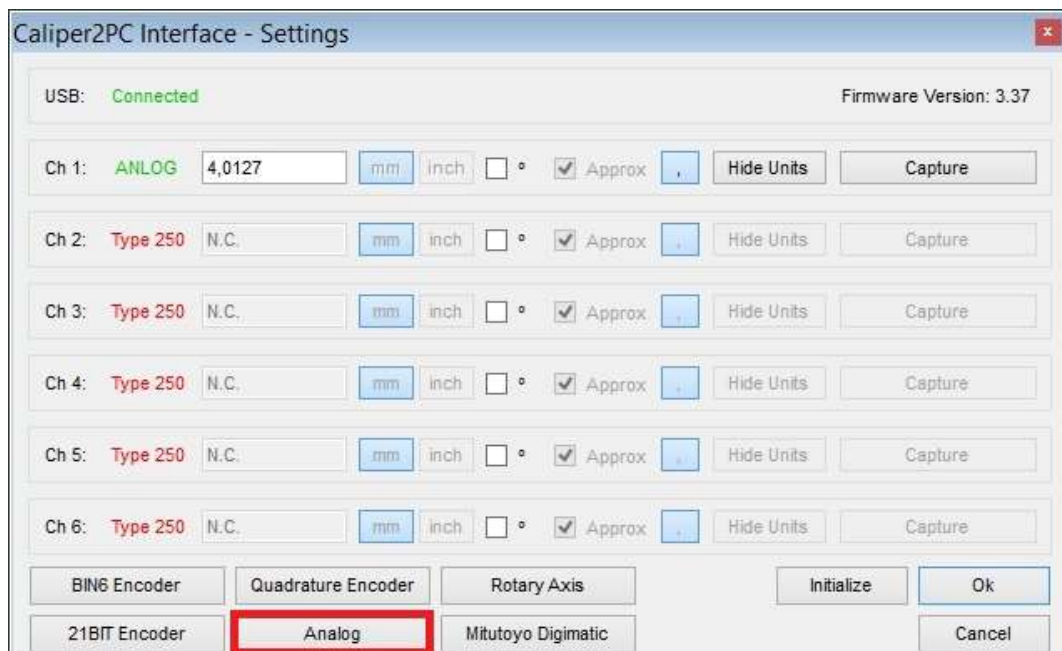
The voltage at the "Analog Input" terminal is converted in 1024 steps (0-1023) in the AD converter and is then sent as a data package to the Caliper2PC interface.

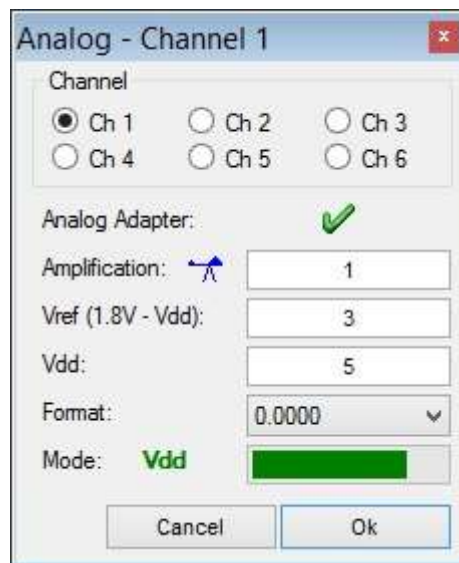
Analog adapter settings in the Caliper2PC Software

To open the settings window for analog adapters, please click on "Input" in the main menu and select the menu item "Settings" from the dropdown menu.



In the window "Caliper2PC Interface - Settings" please click on the button "Analog". This will open the settings window for analog adapters.





In the "Analog" window select the channel with the connected analog adapter (eg. channel 1). If an analog adapter was found at port "P1" during initialization, a green "V" appears on the "Analog" window.

If a preamplifier is used between the sensor and the analog adapter, the gain can be set in the textbox for the amplification. If no preamplifier is used, please set amplification = 1.

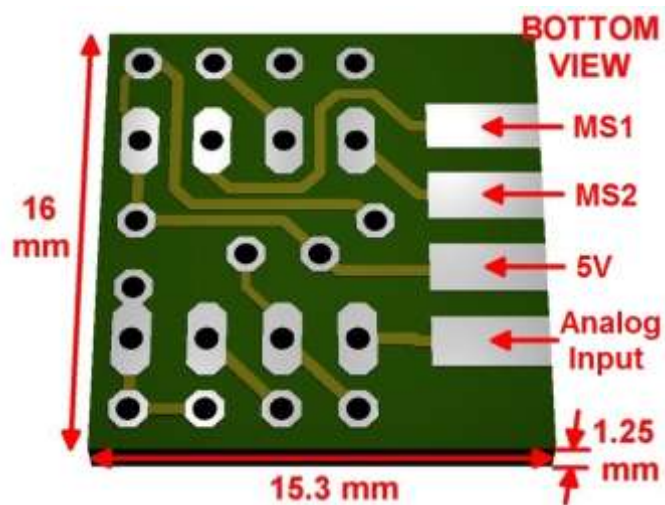
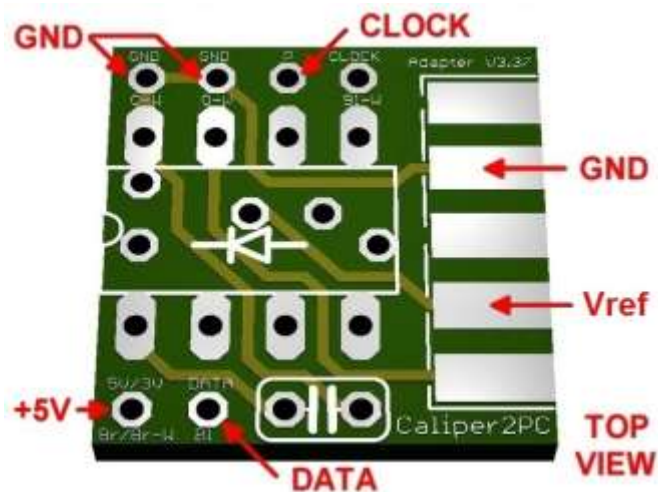
If the analog adapter runs in "Vref" mode, the applied reference voltage must be set in the textbox for Vref. In "Vdd" mode, the exact operating voltage (for example, 4.89) must be set in the textbox for Vdd.

The desired decimal places can be selected from the "Format" dropdown list.

The mode selected by the terminals MS1 and MS2 (see table above) is shown in green font. The current analog measured value is visually shown by a bar.

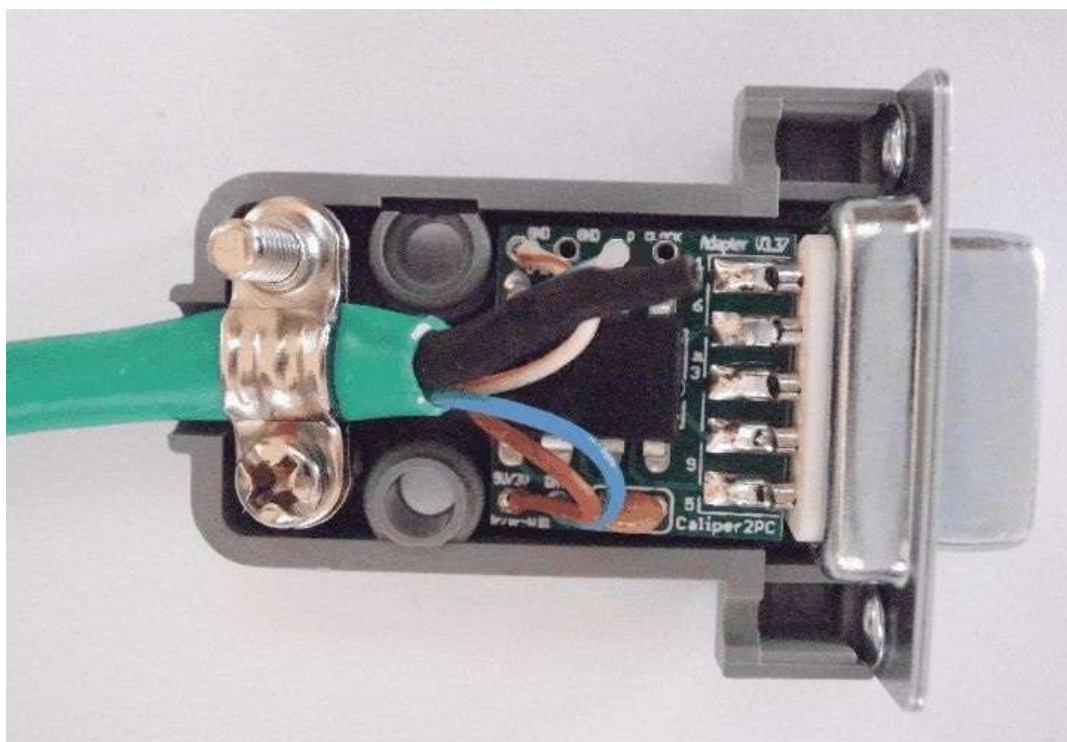
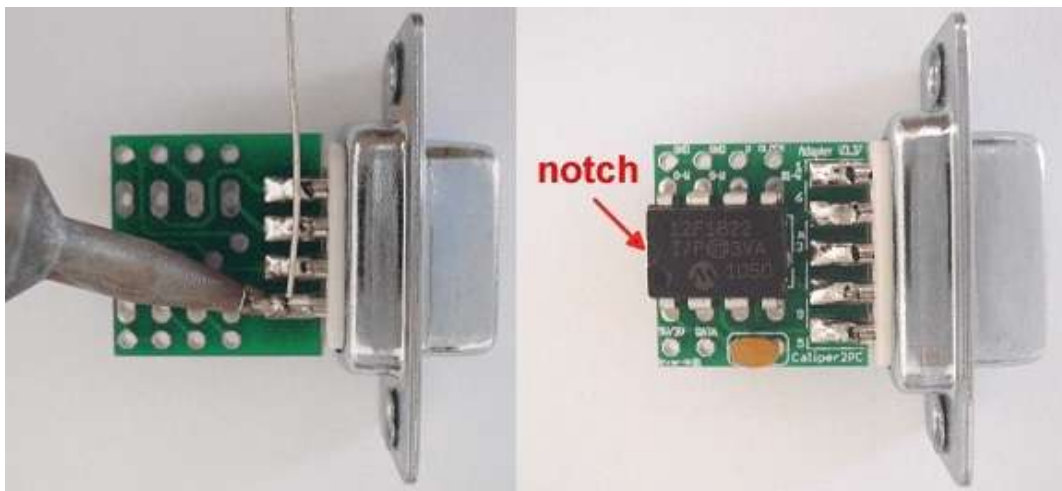
Technical Specifications

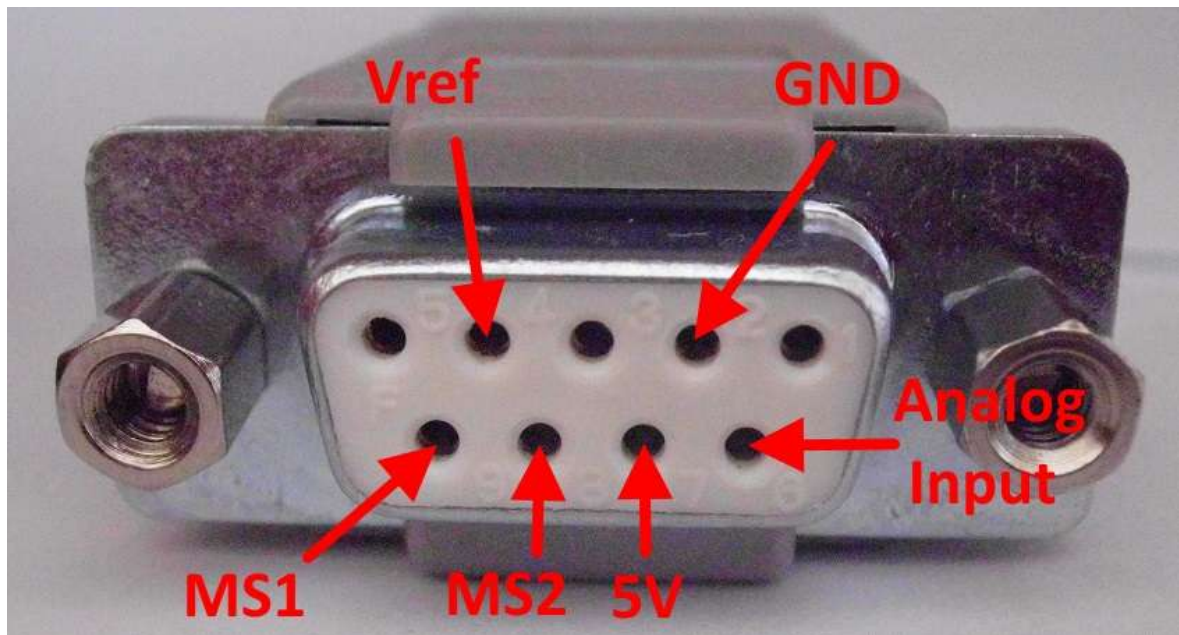
Operating voltage:	Vdd = 5V
AD-Converter:	10 Bit (0-1023)
Operation modes:	Vdd, Vref, 4,096V, 2,048V
Reference voltage:	1,8V < Vref < Vdd
Measuring voltage:	< = Vref
Sampling rate:	about 40 values / second



Appendix

In order to protect the adapter mechanically and to avoid short circuits, the adapter PCB should be covered with a shrinking tube or electrical tape. The board dimensions are designed to fit into the housing of a 9-pin D-Sub connector.





If the adapter PCB is installed in a 9-pin D-Sub connector, the pin assignment for the socket is:

Analog adapter – Pin assignment D-Sub socket								
1	2	3	4	5	6	7	8	9
/	GND	/	Vref	/	Analog Input	5V	MS2	MS1