

An Open-Source, Low-Cost Apparatus for Conductivity Measurements Based on Arduino and Coupled to a Handmade Cell

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List of files

Fig-S1_Massimo-Banzi_David-Cuartielles_Tom-Igoe_Gianluca-Martino_David-Mellis.jpg (photo of the Arduino's team in 2005)

Fig-S2_NTC-beta-equation.png (the equation of a typical NTC temperature sensor)

Fig-S3_ohm-temperature_100K-NTC.png (curve describing the equation of NTC temperature sensor)

Fig-S4_noise-shoot-in-air.png (noise coming from shield/electrodes without R2-C2 low pass filter and without measures average, useful to apply oversampling, here 2 bits, and decimation technique)

Fig-S5_the-shield-with-letter.jpg (photo of the PCB shield with all electronics components fitted and with letter code)

Fig-S6_the-electrodes-with-letter.jpg (photo of the 2 sides of PCB electrode with component fitted)

How-to-build-it-R2.doc (very detailed description, step by step, of the complete prototype construction starting from the list of components and how to buy it)

Arduino-cond-temp-the-circuits.doc (detailed description of the electronic components used for the construction of the 2 circuits (shield and electrode))

the-electrode-PCB.ZIP (.zip file with all Gerber (Extended Gerber RS274X Version) files to build the PCB for electrode)

the-shield-PCB.ZIP (.zip file with all Gerber (Extended Gerber RS274X Version) files to build the Shield supporting external components)

Conduct-temp1.2.ino (software to be upload in Arduino UNO R3 board. The sketch was produced with IDE 1.8.9 and is compatible with newer release)

in-Air-and-Tap-Water.txt (data file in output from the Arduino board when electrode is immersed in air, up to n.21 and in tap water from n.25 respectively)

Temperature-Calib-1.2.XLS (values obtained for the temperature calibration and formulae to calculate the curve parameters)

Electrode-Calibration.XLS (values obtained from 38 sample of waters at different conductivity. Can be used as a starting point to set the resolution with the Excel software "Solver" module, as shown many time in the literature)

Supporting-Materials-file-list.doc (this file)