

Conception and development of the system for the magnetic field strength measurement in the NICA-MPD PLATFORM surroundings created using Ni myRio technology

Presentation plan

1. Project description
2. Used devices
3. User interface
4. Principles of operation
5. Possible usage

Project description

- Measuring the magnetic field using a magnetometer
- Development of program for measuring device control, data gathering and saving
- Continuation of Konrad Krawczyk work
 - Choice of devices
 - First program

Magnetometer MAG 3110

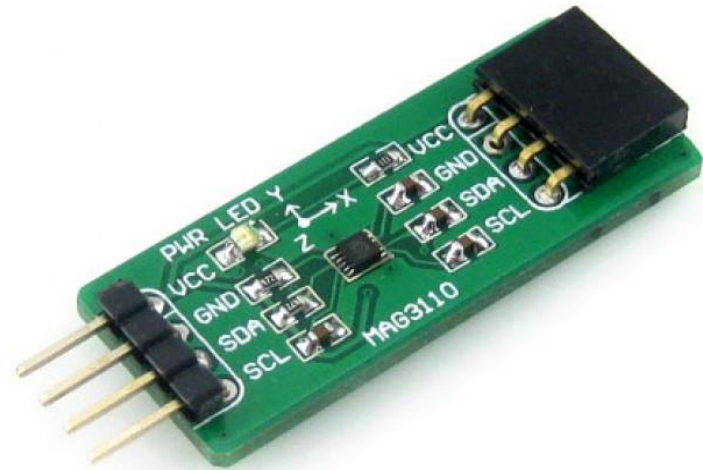
Made by Waveshare

Range: $0.1\mu\text{T}$ - $1000\mu\text{T}$

Measurement in 3 axes

Measurement speed
up to 12.5ms

Communicating via I2C



Ni myRIO 1900

Made by National Instruments

Using FPGA technology

Using NI Labview



FPGA Technology



Field Programmable Gate Array

Designed to be configured by a user

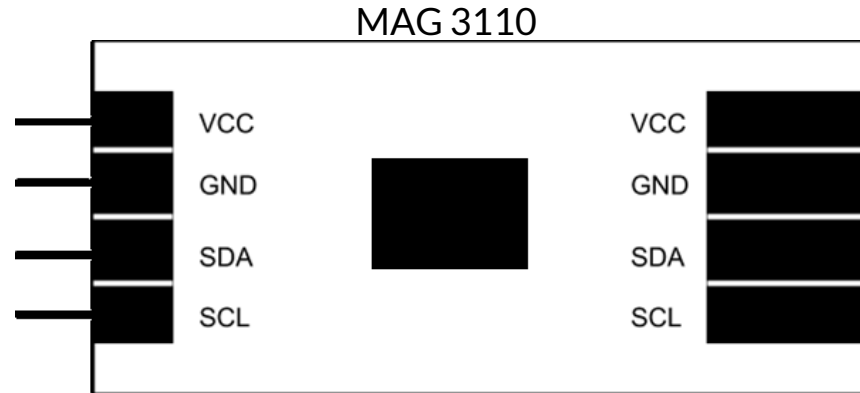
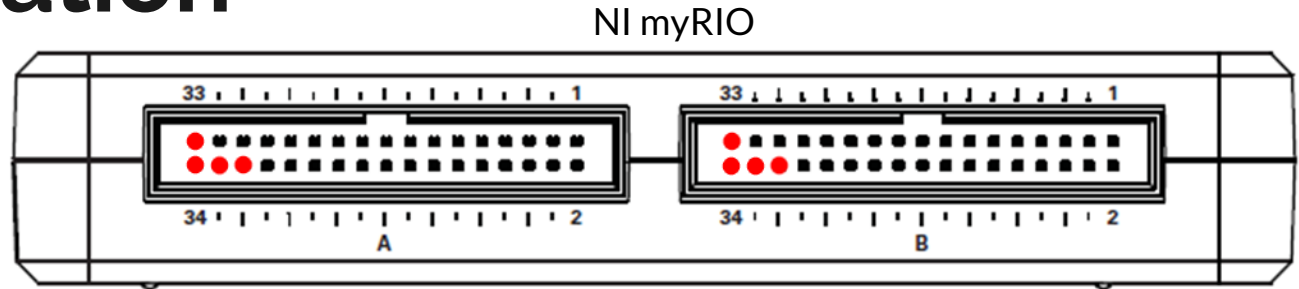
Wide range of possible applications: control system engineering, real time video engine, image processing, data monitoring etc.

Communication

Use only 4 wire

Use of ports:

- 30- DGND
- 32 - I2C.SCL
(Serial Clock Line)
- 33- +3,3V
- 34 - I2C.SDA
(Serial Data Line)

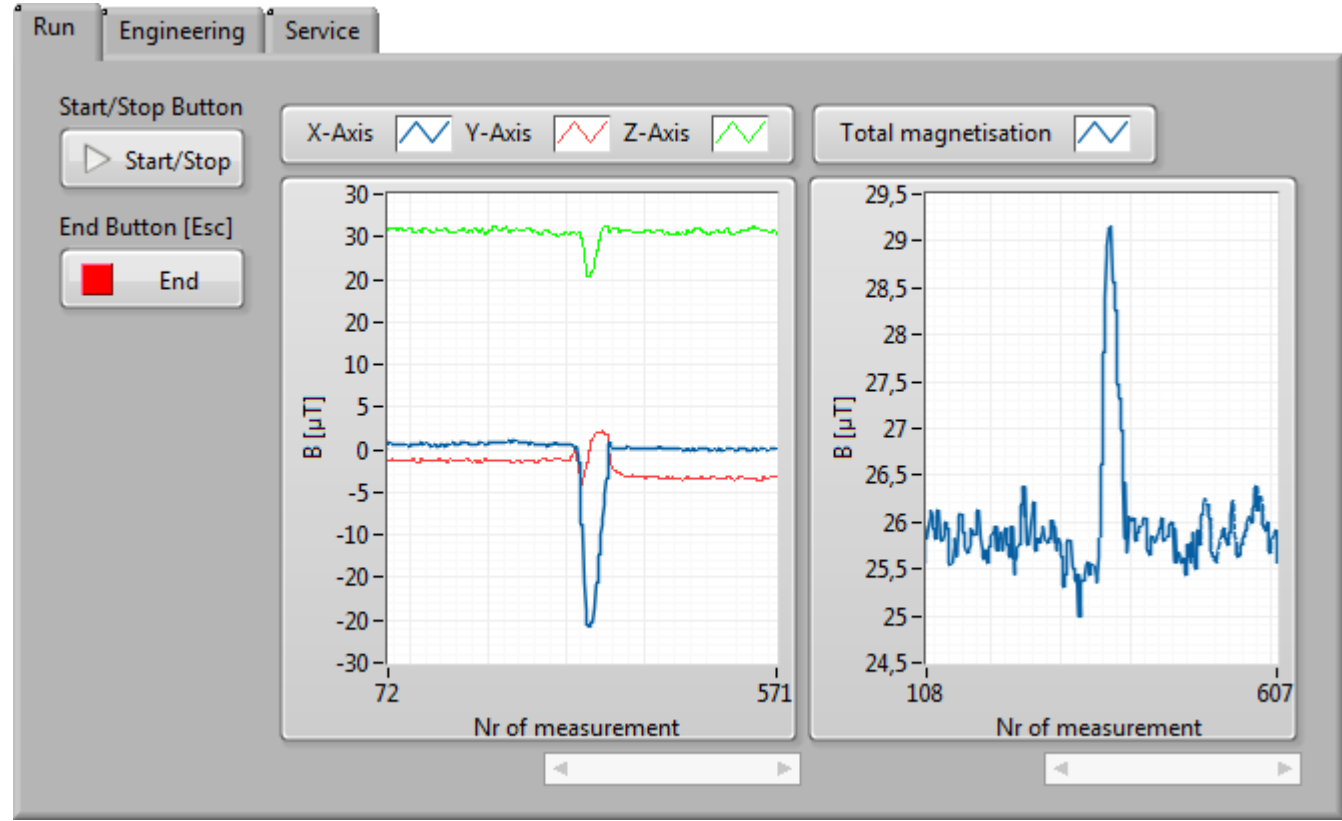


User interface



Run

Panel



User interface

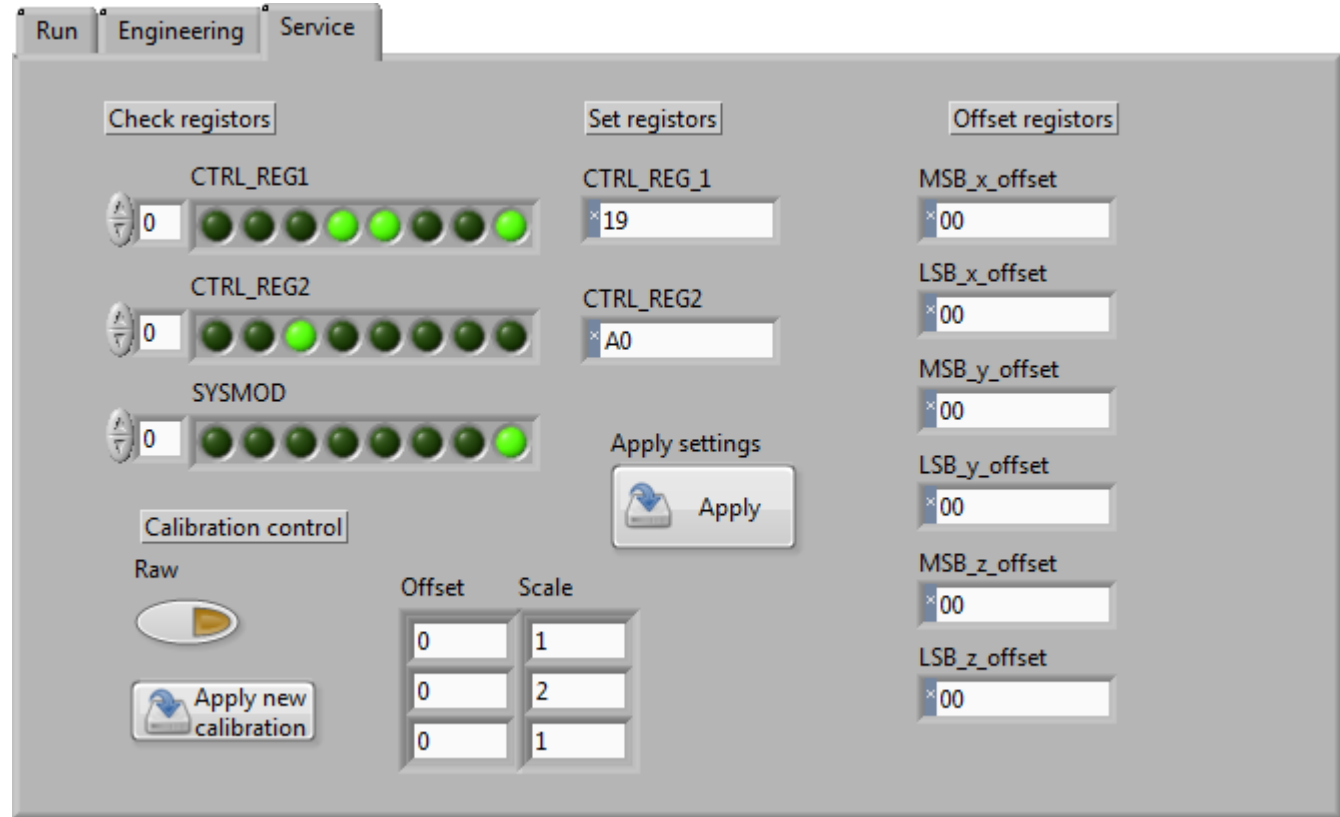
Engineering Panel

The screenshot displays the 'Engineering' panel of a software interface. It features a vertical slider for 'Measurement time [s]' on the left, with a red bar indicating the current value at 0.01. Below the slider is a numeric input field containing '0,01'. To the right, there are several input fields and buttons: 'Name' (Jakub), 'Place' (42), 'Number of measurements' (15000), 'Path' (/U), and 'Apply settings' (Apply button). On the far right, a 'Magnetic field [μT]' section contains three input fields for Bx (0,3), By (-3,2), and Bz (25,3), a 'B [μT]' field (25,5), and a 'Temperature [°C]' field (18). The interface has a grey background and a menu bar at the top with 'Run', 'Engineering', and 'Service' options.

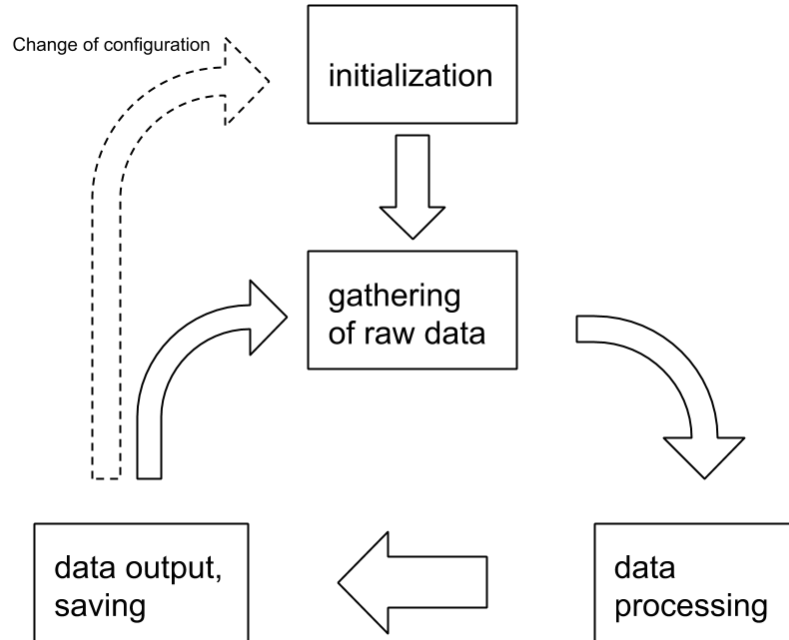
Measurement time [s]	Name	Place	Number of measurements	Path	Magnetic field [μT]	Temperature [°C]
0,01	Jakub	42	15000	/U	Bx: 0,3 By: -3,2 Bz: 25,3 B: 25,5	18

User interface

Service
Panel



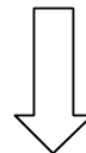
Principle of operation



Principle of operation

data processing

averaging
over set time



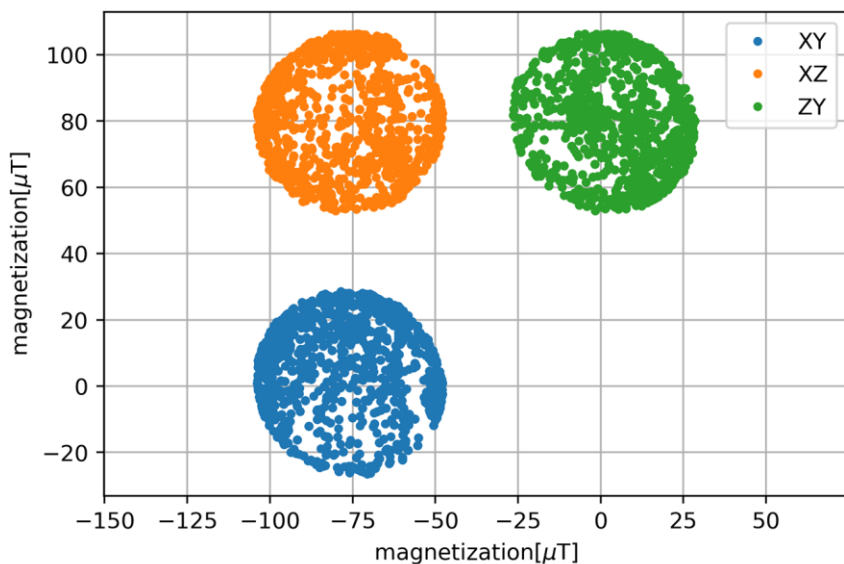
converting to μT



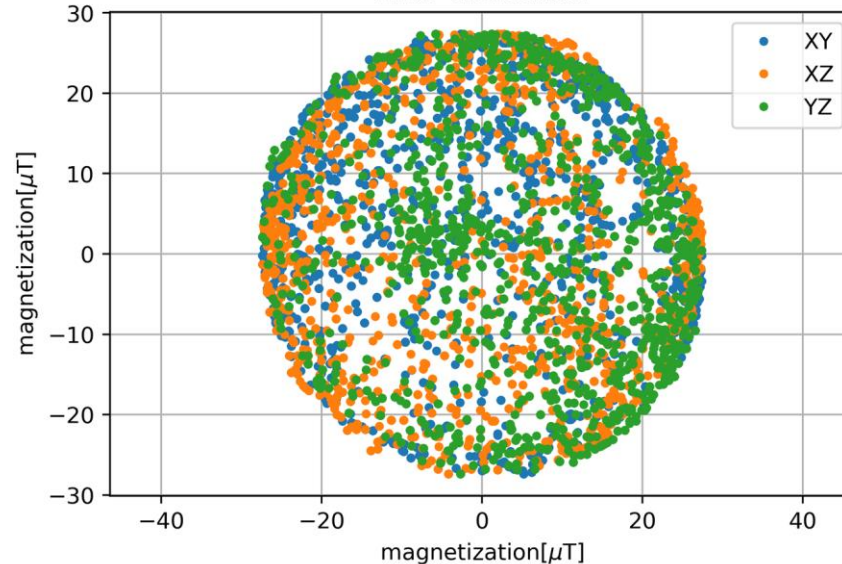
applying calibration
modifiers

Calibration

Before calibration



After calibration



Possible usage

- Recording of the background magnetic field
- Recording disturbances of electrical devices in rack cabinet
- Uniformity of the magnetic field in the magnet

Thank you for your attention
