ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Version 0.0.0
Manual Number: 88

Physikpraktikum für Vorgerückte (VP)
vp.phys.ethz.ch

Instruction Manual

Advanced Physics Lab
Electronics D

Modern Aspect of Data Taking and Processing with a Microcontroller

Pirmin Berger & Michael Reichmann

Abstract

The experiment "Digital Electronic" provides an introduction into modern data taking by operating simple digital circuits utilising an Arduino board. This manual will inform you about the Arduino board, the installation of the required software and the electrical components you will have to use. Basic knowledge on electronics, how to use oscilloscopes, bread boards and power supplies is recommended.

During the experiment you will learn how to build a circuit that measures the temperature, how to operate it using the Arduino board and to modify and improve it using more components.

In case you should already have previous knowledge we will provide many more material and own ideas on implementation are very welcome and can be built consulting the assistants.

ETH Zürich, Switzerland, May 14, 2018

Contents

1 Introduction

Arduino is a computer company, project and user community based on easy-to-use hardware and software, that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. All products are distributed as open-source hardware and software, and it's licences permit the manufacture of Arduino boards and software distribution by anyone. The boards are commercially available in preassembled form, or as do-it-yourself (DIY) kits.

The Arduino project started in 2003 as a program for students at the Interaction Design Institute in Ivrea (Italy), aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. The actual name Arduino comes from a bar in Ivrea, where some of the founders of the project used to meet. The bar was named after Arduin of Ivrea, who was the margrave of the March of Ivrea and King of Italy from 1002 to 1014.

In order to work with the Arduino Boards the Arduino programming language, which is based on Wiring, and the Arduino Software (integrated development environment (IDE)), based on Processing are used.

1.1 Arduino Board

Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

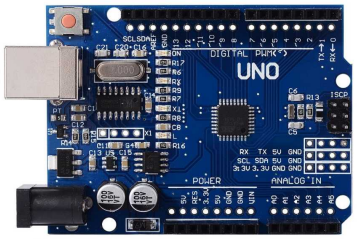

Figure 1: Arduino Uno board.

List of Acronyms

IDE integrated development environment

DIY do-it-yourself