Linux Kernel Hacking Free Course, 3rd edition

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University of Rome “Tor Vergata”

HWMPS: Hardware Monitor & Protection System

April 5, 2006

Outline of the talk

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- Project overview

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- Project overview
- Developement phases and practical issues

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- Hardware platform

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- Future plans

Project Overview

Project goals

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- Realize a stand-alone hardware platform for protecting connected electrical devices and monitoring unpredictable and harmful operational states

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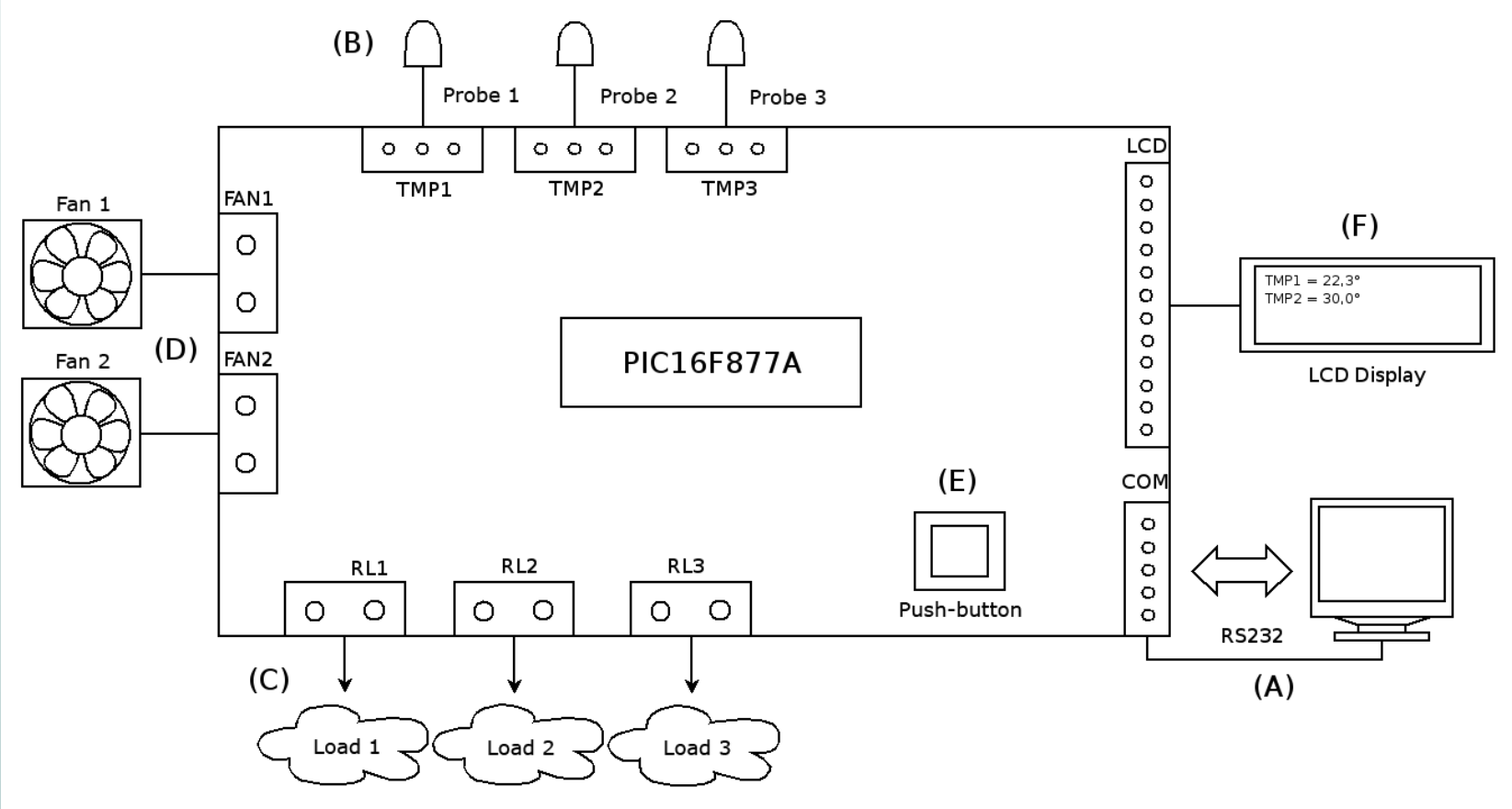
- Realize a software platform able to:
  - Communicate with the hardware platform
  - Set operational parameters of the hardware platform
  - Receive status information about connected electrical devices

Hardware platform and interfaces

Hardware platform and interfaces



Hardware functions

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  - Temperature readings from 3 thermal probes

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  - Fan speed selection (2 channels)

Application background

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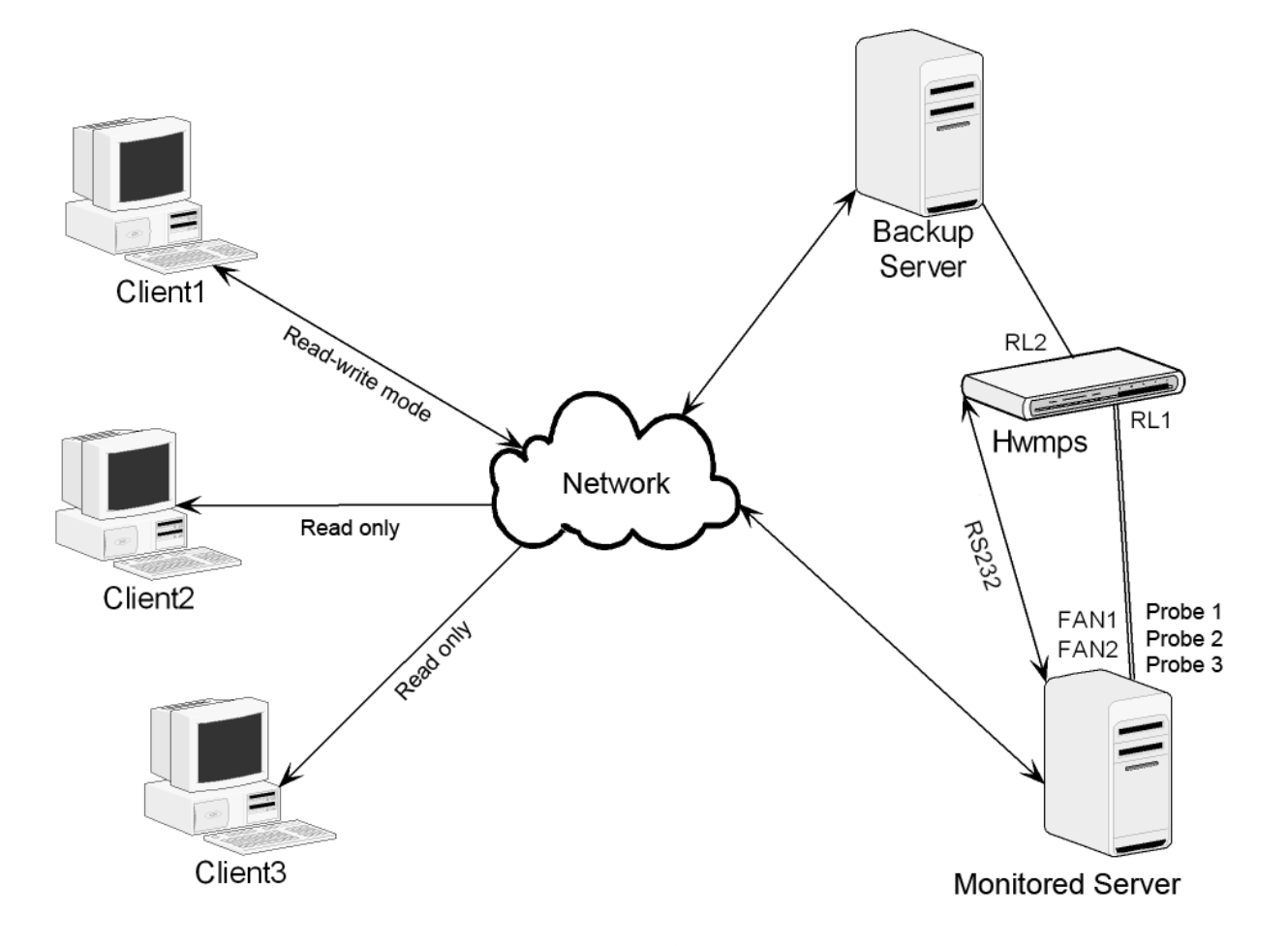

Developement phases and practical issues

Developement phases

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  - Cross-platform RS232 Serial Library
  - Cross-platform client-server hardware management software

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  - PICMicro hardware programmer, i.e. MPLAB-ICD2 (this is also an In Circuit Debugger)

Hardware platform

Electrical schematic

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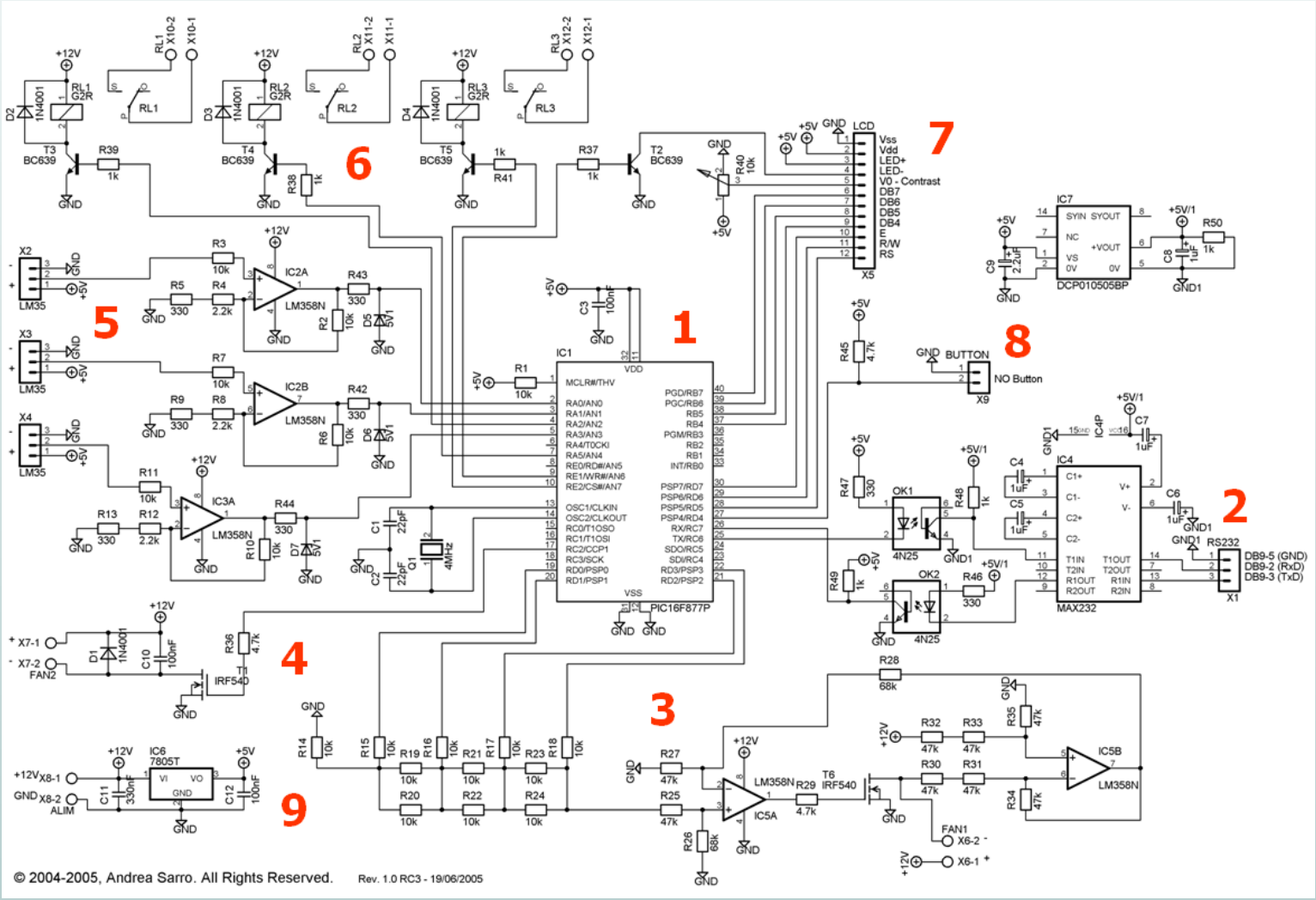

Electrical schematic - Modules

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1. Microcontroller (PICmicro MCU)
2. RS232 opto-isolated interface
3. Digital-Analog Converter (DAC)
4. Pulse Width Modulation (PWM)
5. Thermal sensors
6. Relays
7. LCD display
8. Push button
9. Power supply

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  - +5V/GND single power supply via LM7805 voltage regulator
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Bill of materials (cont'd)

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  - Pull-ups and current limiting resistors for optocouplers, two low ESR capacitors for the DC/DC converter

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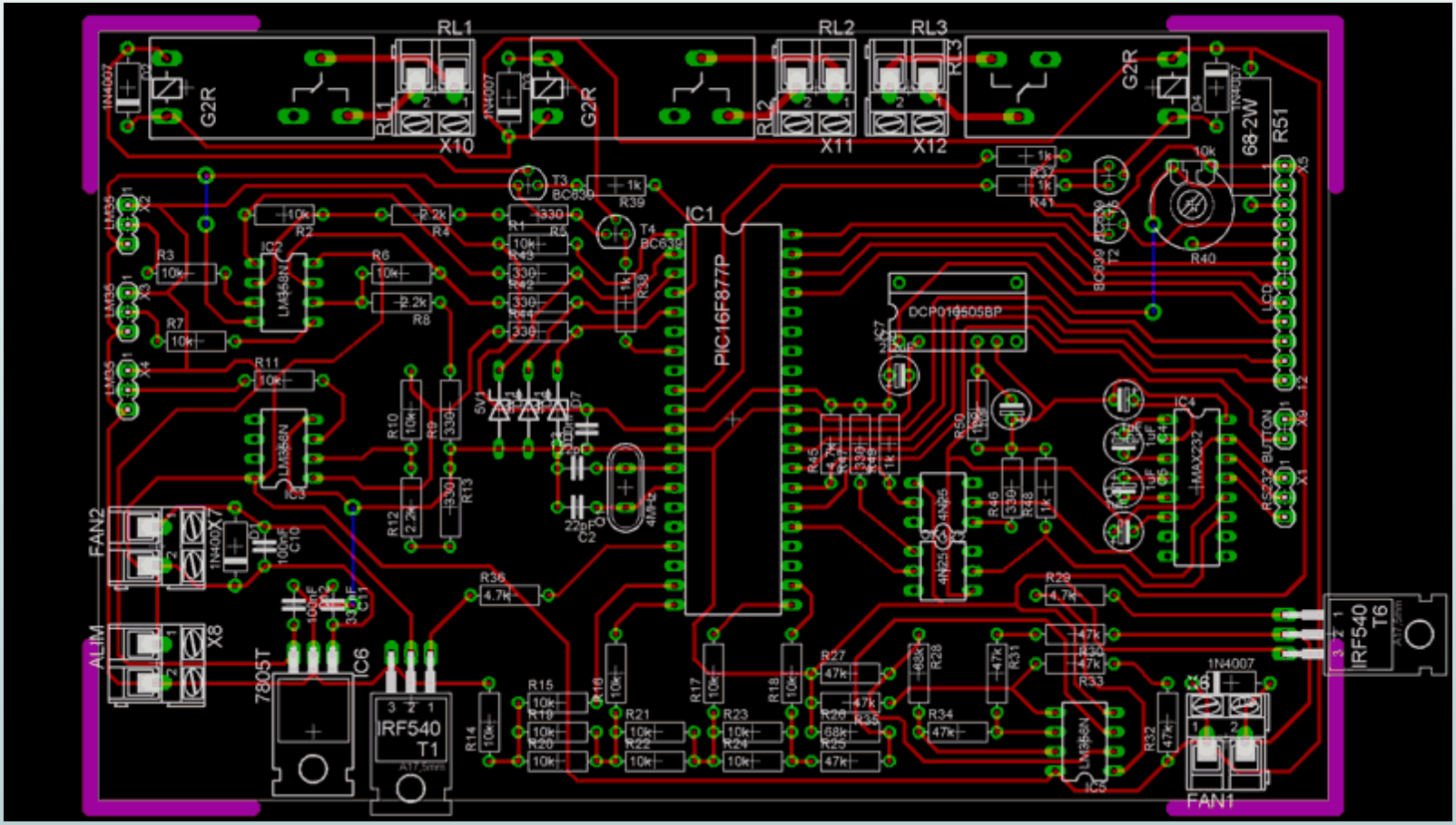

HWMPS

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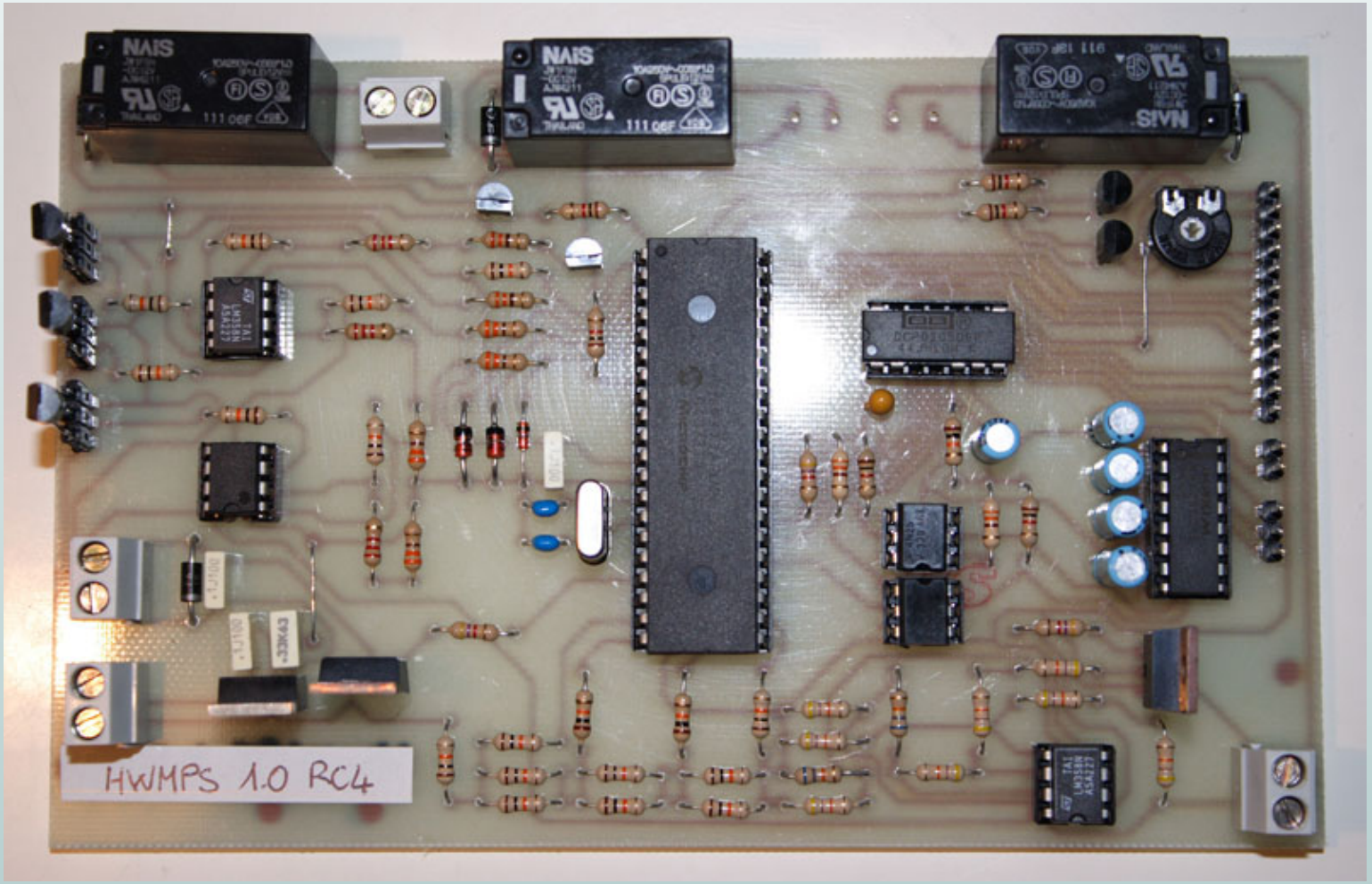

Microcontroller firmware

Microcontroller

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  - CCP Module (Capture/Compare/PWM)

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  - Serial Library
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Hardware management software

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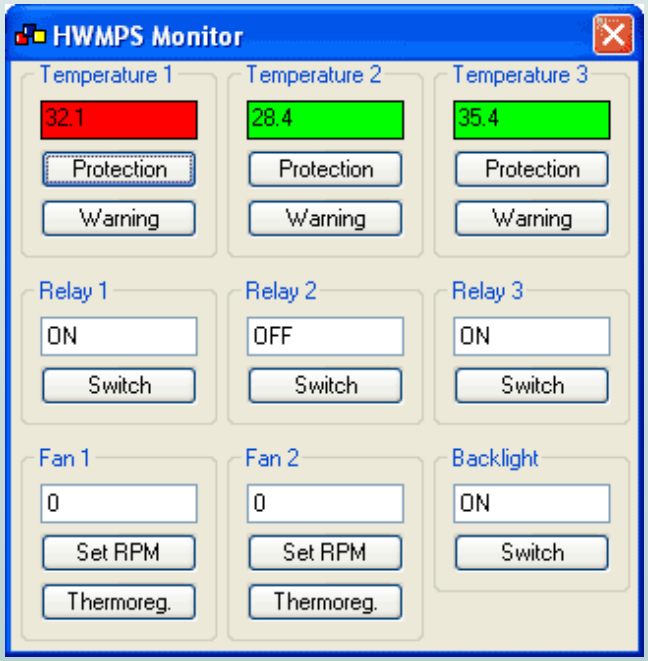

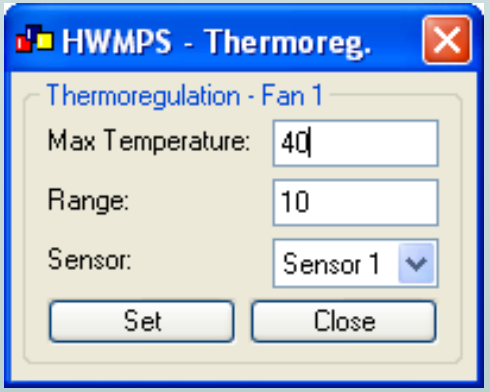

Future plans

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