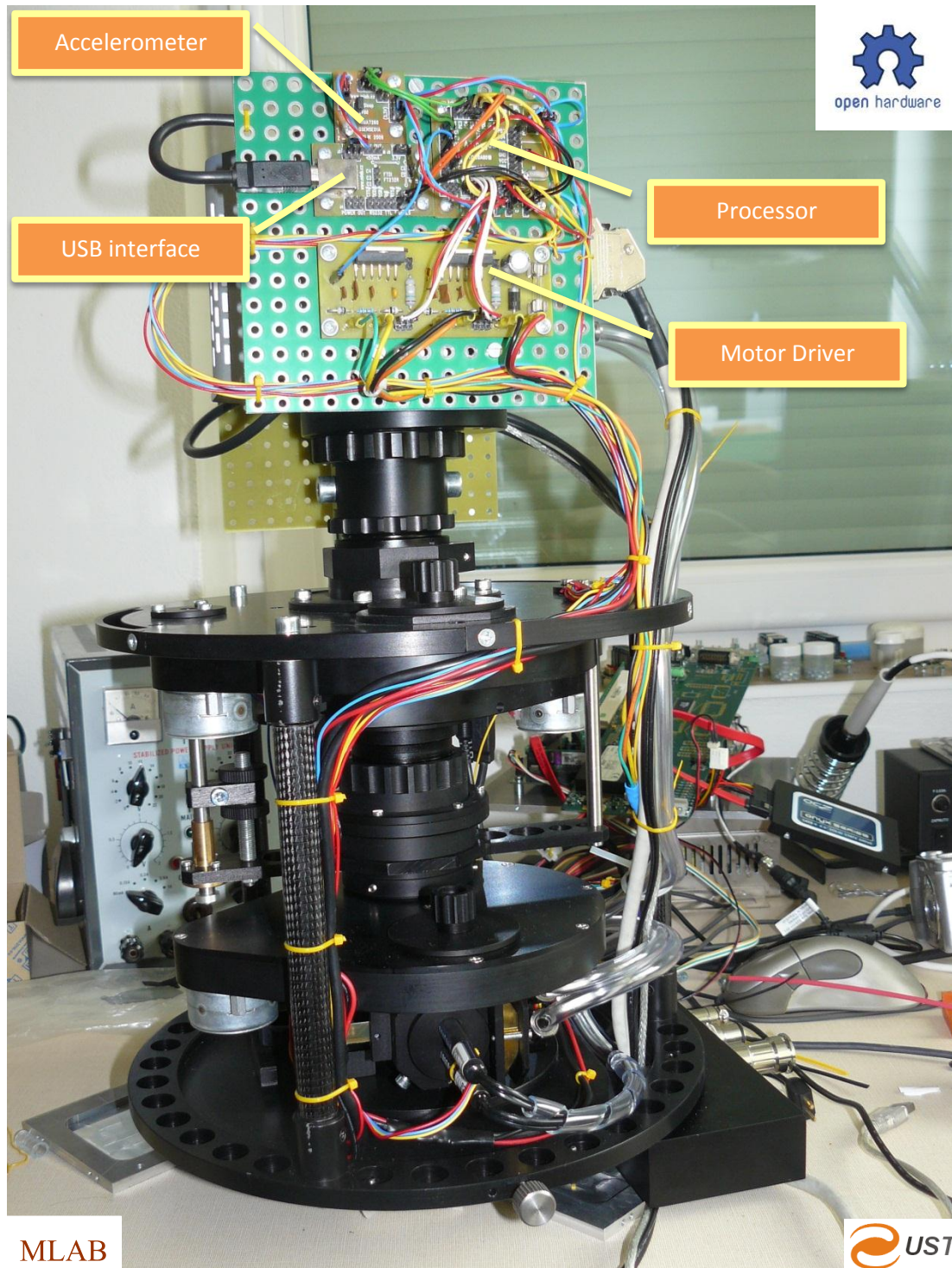# An Electronics for COLORES

*Martin Kákona (MLAB) in August 2011*

There are some simple electronics for COLORES (an astronomy spectrograph). It controls COLORES machinery and sends telemetry from the device. Because COLORES is a prototyping device the electronics is highly modular based on MLAB kit (www.mlab.cz). This concept enables adding some new sensors or servos operatively due to project needs.

MLAB

All electronics developed for COLORES is an Open Source Hardware with public documentation and it is possible freely remanufacture it or copy documentation only with mention about authors.

The electronics is driven by a board with a single chip microprocessor ATmega 328 [1] which is programmed by Processing language [2] for simplicity. Processing language allows modification of program by an inexperienced programmer without deep knowledge about electronics. The program can be modified remotely through Internet thanks bootloader which is preloaded inside processor.

The single chip processor communicates with a telescope control computer by an USB interface [3]. The telescope computer can sends commands for changing a mechanical setup of device or it can reads telemetry. The telemetry consists from information from light sensors [4], temperature sensors [5] and 3-axis accelerometer [6].
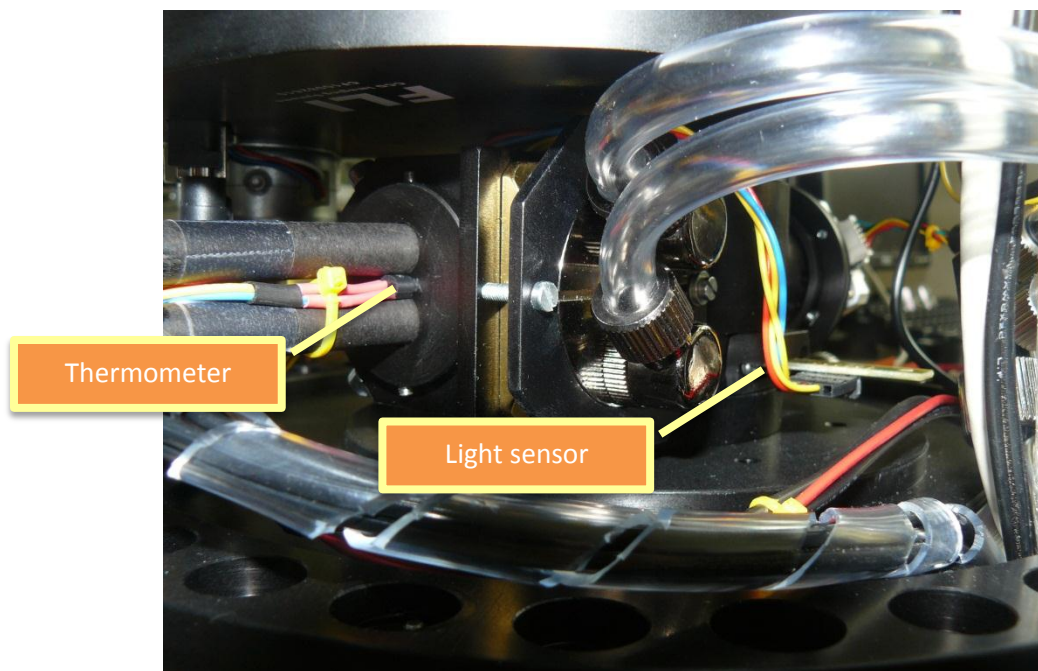
[1] Milan Horkel. http://www.mlab.cz/WebSVN/filedetails.php?repname=MLAB&path=%2FModules%2FAVR%2FATmega801B%2FSCH%2FATMEGA801B_SCH.PDF. MLAB 2005.

[2] Benjamin Fry, Casey Reas. http://en.wikipedia.org/wiki/Processing_(programming_language). MIT 2001.

[3] Milan Horkel. http://www.mlab.cz/WebSVN/filedetails.php?repname=MLAB&path=%2FModules%2FCommSerial%2FUSB232R01B%2FSCH%2FUSB232R01B_sch.pdf. MLAB 2008.

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[5] Dallas semiconductor. http://www.mlab.cz/WebSVN/filedetails.php?repname=MLAB&path=%2FDesigns%2FSpectrograph%2Fpdf%2FDS18B20.pdf

[6] Jakub Kákona. http://www.mlab.cz/WebSVN/filedetails.php?repname=MLAB&path=%2FModules%2FSensors%2FGSENSE01A%2FSCH%2FSCH.pdf . UST, MLAB 2009.