MICROPROCESSOR BASED SYSTEMS

MSc IN ELECTRONICS SYSTEMS AND ENGINEERING MANGEMENT

MODULE EEM4016

ASSIGNMENT NUMBER 2

Thursday, June, 27., 2019

Objective

The AVR system is to be used as a simple data logger. The voltage at the analogue input A0 is recorded and displayed as a bar graph in the upper LCD line. After the recording of the waveform is started dashes are displayed in the upper LCD line indicating that no samples have been read in. During sampling the current sample is displayed at the most right position and the previous samples are shifted to the left (Fig. 2). Additionally the voltage and the index of the current sample are displayed (Fig. 1).

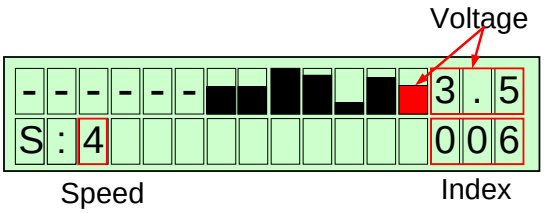

Fig. 1: Display after 7 samples have been taken

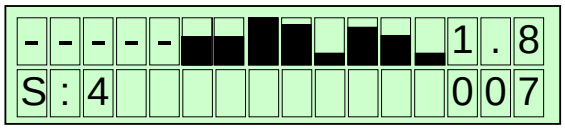

Fig. 2: Display after 8 samples

All samples are stored in an internal buffer of at least 100 samples. If the buffer has been completely filled the index of the current sample points to the end of the buffer and the oldest sample is discarded.
Recording of the samples is started by pressing key ‘B’ and stopped by pressing key ‘C’. The sampling rate can be selected by pressing key ‘9’(lowest speed) to ‘1’ (highest speed) when recording is stopped. The selected speed is displayed at the LCD.
After recording has been stopped the recorded waveform can be examined by shifting the display window. For adjusting the display window the potentiometer 2 or the keypad may be used. As in the recording mode the voltage and the index of the right most sample are shown on the LCD.
Further improvements or extensions (Help screen, zoom feature, beep on key stroke…) may be added to the systems.

Requirements

Produce a structured software design and C-code to meet the description of the task using the hardware specified. The report should include the following sections:

- Introduction,
- Analysis (e.g. sample rate, size of buffer, usage of CGRAM, accuracy..)
- Tests performed and test results, observations and conclusions.
- Program description (pseudo code)
- Well documented C-code

Please send your report (as a single pdf file) **and** c-code (*.c) by email to krybus@fh-swf.de, subject: “Ass.1, Matr.Nr.: xxxxxxxxx”

Assessment

This assignment represents 25% of the total assessment of the module Microprocessor Based Systems. 40% of the marks will be awarded for the analysis, design, testing, observations and conclusions. 60% of the marks will be awarded for the functionality and the quality and effectiveness of the C-code.

Deadline

Deadline for submission of the final report and program: **Monday, 29. July.** 15% of the marks will be deducted for submission within one week after the deadline; later submissions will not be accepted.