**Documentation**

This project was developed by Nikita Dvoriadkin and Sofia Schepetova as a semestral work on Computer Architecture and Organization (B35APO) in CTU Prague in 2019. The goal of this project was to get deeply acquainted with low-level programming by programming Microzed Zynq 7000 so that it was possible to control LED reflectors and LCD display.

Technical part:

* LCD display is controlled by three knobs.
* LCD display shows menu with set of settings so that user can easily control LEDs. Also it is possible to choose font size of menu.
* The color of the reflector light color is selected in the HSV / HSB color model.
* Each LED can reflect the light user has set. LEDs can be set individually, together and one can copy the color values from another.
* It is possible to set additional effects: continuous light change and flashing.

User manual:

User can control the whole program by spinning the knobs and pushing the buttons. As soon as the Microzed Zynq 7000 unit is launched, user will see first menu, where he can choose size of the font. There are two options: normal font and double magnified font. To choose anything from the font and main menu user has to move “X” cursor on the left of the menu item and push red button. When he has chosen preferred font, he will see main menu, which contains 4 items: left led settings, right led settings, both led settings and exit. Each led settings menu provides possibility to choose HSV values of the color to reflect. Blue button may be pushed to make one LED copy HSV color settings from the other LED. Then, user can push red button to see the menu of flashing settings. He can set flashing values as follows:

* IL - the duration of continuous illumination in seconds (from 0 to 60);
* EX - the extinction time in seconds (from 0 to 60);
* PH - the phase shift of one reflector to the other in microseconds;

Phase shift can be chosen only if LEDs have the same duration of continuous illumination and extinction time.

To exit flashing settings menu or color settings menu user has to push green button.

To add continuous light change effect to one or more LEDs user has to push the following buttons in main menu:

* Red button + Green button – effect on the LEFT LED
* Green button + Blue button – effect on the RIGHT LED
* Red button + Blue button – effect on BOTH LEDs