CSE 522, Real-time Embedded Systems, Spring 2018

Few tips of Assignment 3:

1. GPIO pins

Device on Quark and Galileo board	Linux GIO numbering	Zephyr device configuration name	Pin numbering	Zephyr driver
gip gpio controller gpio[0:7]	gpio[8:15]	GPIO_0	[0:7]	gpio_dw
legacy gpio[9:8]	gpio[0:1]	GPIO_CW	[0:1]	gpio_sch
legacy gpio_sus[0:5]	gpio[2:7]	GPIO_RW	[0:5]	gpio_sch
pcal9535a chip 0	gpio[16-31]	EXP0	[0:15]	gpio_pcal9535a
pcal9535a chip 1	gpio[32-47]	EXP1	[0:15]	gpio_pcal9535a
pcal9535a chip 2	gpio[48-63]	EXP2	[0:15]	gpio_pcal9535a
pca9685	gpio[64-79]	PWM0	[0:15]	pwm_pca9685

2. GPIO operations

You may follow the interface listed in http://docs.zephyrproject.org/1.10.0/api/io_interfaces.html#gpio-interface. Note that there are operations on each individual pin and one all pins of a port. You may also need to see the definition of flags in /include/gpio.h where you can find the flags for setting up pin direction, enabling interrupt, and triggering edges.

Here is an example to set Linux gpio60 to L (to control the multiplexing for I2C SCL and SDA):

flag = gpio_pin_configure(exp2, 12, GPIO_DIR_OUT);
gpio_pin_write(exp2, 12, 0);

Given the lack of detailed description of API functions, you will need to read the source code to know what the functions are doing precisely.

3. Pin multiplexing

Zephyr has a nice pin multiplexing driver for Galileo Gen 2 board. After binding with the driver, i.e., CONFIG_PINMUX_NAME, you can use the pinmux interface to set up the required function for each pin. For instance, to set up IO1 to GPIO4 of GPIO_DW output, you can call

pinmux_pin_set(pinmux, 1, PINMUX_FUNCT_A);

The details can be found in *zephyr/boards/x86/galileo/pinmux.c.*