

Freescalé MQX RTOS Example Guide

Security Webserver

This document explains the Security Webserver demo, what to expect from the example and a brief introduction to the API used for this example.

The Example

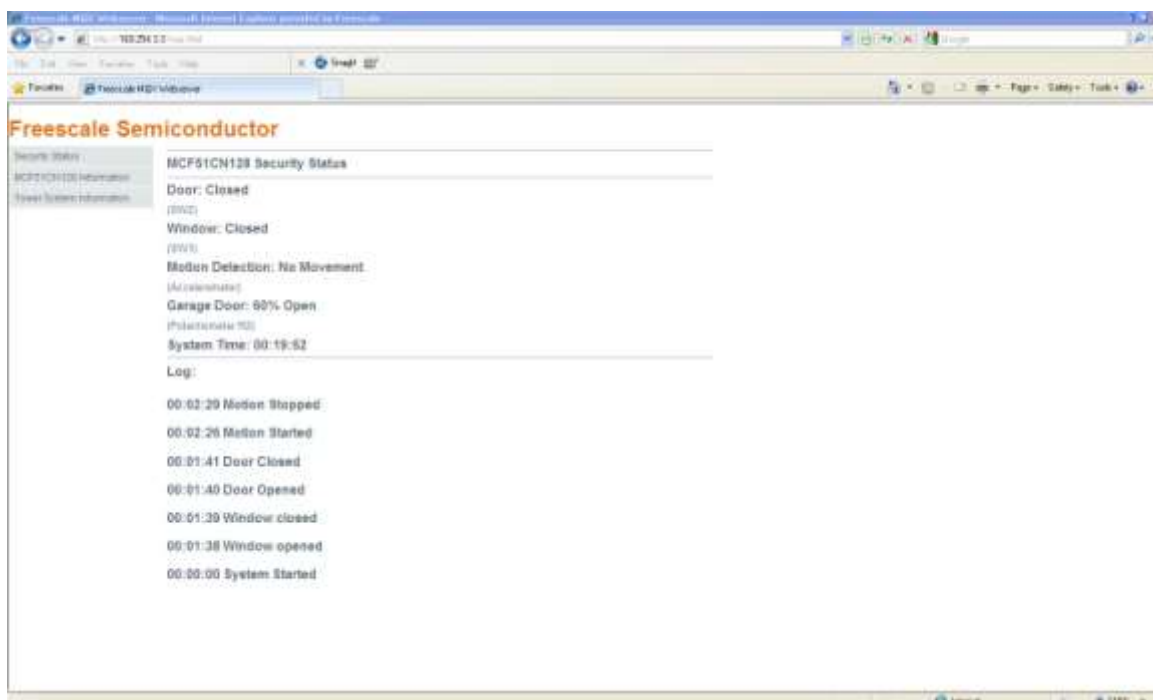
A simple Security system has been implemented as an example application to demonstrate the features of the MQX RTOS. It detects button presses and movement of the tower system, keeps a log of the events and displays the status and log on a web page.

Running the example

Connect an Ethernet cable from the board to your PC. Your PC IP address should be on the same subnet. Typically, when you connect your computer directly to the board, the computer will default to an auto IP address on the same subnet as the board (169.254.x.x), therefore requiring no setup.

Note: It may take several minutes before PC gives up attempts to obtain an IP address and sets the default one. If you have trouble connecting, you may configure the IP address of the computer manually. Select Start > Settings > Network Connections > Local Area Connection. Note your original TCP/IP settings, and then set your IP address to 169.254.3.4 and your subnet mask to 255.255.0.0.

After verifying that your board and PC are on the same subnet, open an internet browser and type the board's IP address "169.254.3.3" into the address bar and a web page like the one below should appear:



The web page shows the current status of all the I/Os, accelerometer, POT, the time since boot up and the log of all the events.

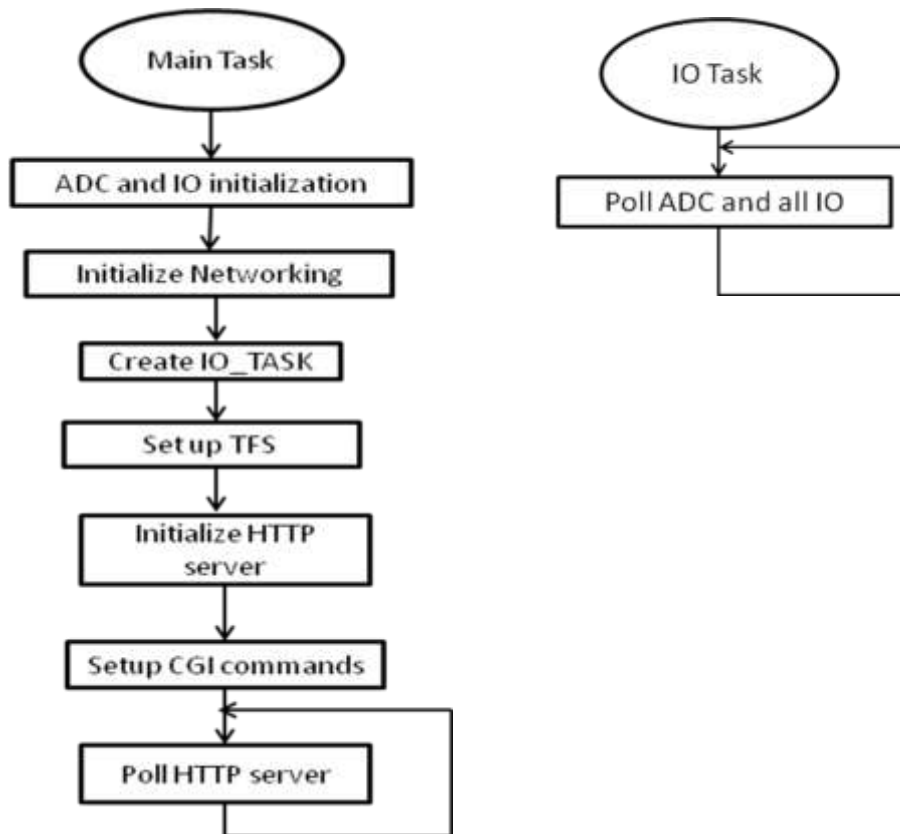
Press the SW2 on your board and the "Door" will be shown as "open", similarly in case of SW3 that represents a window. Change the POT value to change the status of the garage door, shake the board to detect any movement.

Each time one of the above events is detected, a log entry will be added.

Click on the links at the left for more information regarding the ColdFire family you are using or for Tower system information.

Explaining the example

The demo consists of 2 tasks: "main task" and "IO task":



The "Main task" first initializes the ADC and IO that will be used for the door, window and indication LED.

For setting the ADC function first the ADC device is open:

```
fd_adc = fopen(MY_ADC, (const char*)&adc_init);
```

Then the ADC channels to be used are open with proper parameters stored in the `adc_ch_param[]` array:

```
fd_ch[i] = fopen(dev_name, (const char*)&adc_ch_param[i]);
```

Inputs to simulate Door and Window are initialized through lwgpio driver this way (example for the door switch):

```
input_port = lwgpio_init(&button1, DOOR_STATE, LWGPIO_DIR_INPUT,
LWGPIO_VALUE_NOCHANGE);
if(!input_port)
{
    printf("Initializing LW GPIO for button1 as input failed.\n");
    _task_block();
}
lwgpio_set_functionality(&button1 ,BSP_BUTTON1_MUX_GPIO);
lwgpio_set_attribute(&button1, LWGPIO_ATTR_PULL_UP,
LWGPIO_AVAL_ENABLE);
```

The LED outputs are initialized in a similar fashion (example for LED1):

```
output_port = lwgpio_init(&led1, LED_1, LWGPIO_DIR_OUTPUT,
LWGPIO_VALUE_NOCHANGE);
if(!output_port){
    printf("Initializing LWGPIO for LED1 failed.\n");
}
lwgpio_set_functionality(&led1, BSP_LED1_MUX_GPIO);
/*Turn off Led */
lwgpio_set_value(&led1, LWGPIO_VALUE_LOW);
```

After the I/Os are initialized the network initialization takes place and "IO_TASK" for all the I/O management is created.

The next step is to initialize the Trivial file system. The external symbol `tfs_data` holds the web page information as an array. This array is installed as a Trivial File System with the `_io_tfs_install()` function. This allows the RTCS to access the web page data stored in the arrays in the "tfs:" partition.

If no error occurs the server initializes with the specified `root_dir` and with the "`\\mqx.html`" file as the index page. Before the server runs the server is configured with the CGI information. The `cgi_lnk_tbl` contains a list of the different available CGI services.

The `httpd_server_poll()` function is used to wait for connections to the HTTP server and serve them.

The "IO_Task" will poll all the ADC channels to detect any movement (X,Y,Z) and the water level(just Y), the I/Os for any change on the door and window status and it will keep the log of the changes for being displayed.