
Freescale Semiconductor

How to Make a Driver

By: Technical Information Center



1 Objective

2 Requirements

3 Implementation

- How to make a Driver.

- How to prove our Drive.

1. Objective:

Create a new MQX Driver and test it.

2. Requirements:

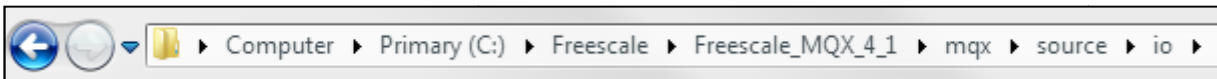
- For this Lab CW10.6 and MQX4.1 must be installed in your PC.

MQX version support

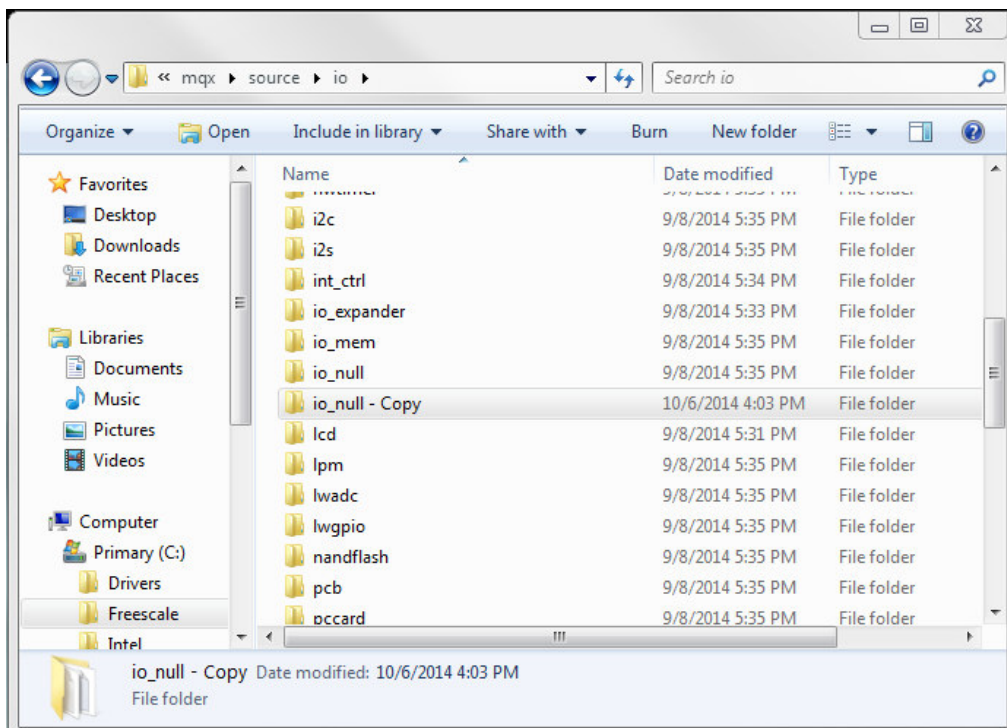
- CW10.6 – MQX4.1

3. Implementation:

1) Go to **io** folder at:



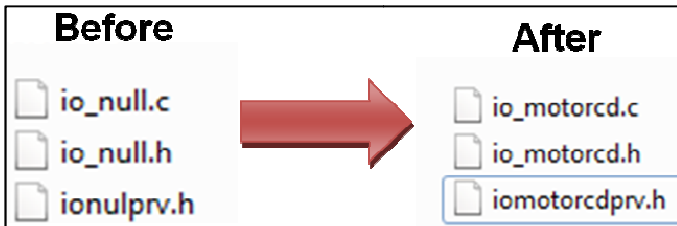
2) Copy and paste the **io_null** folder, a folder called **io_null** will appear - copy, which is the folder where the new driver will be created:



3) Rename the new folder **io_null**, in this case we used **io_motorcd**

io_expander	9/8/2014 5:35 PM	File folder
io_mem	9/8/2014 5:35 PM	File folder
io_motorcd	10/2/2014 2:12 PM	File folder
io_null	9/8/2014 5:35 PM	File folder

4) Inside the folder 3 files are located, to which they should change the name, removing “**null**” and renaming with the desired name:



5) The file **io_motorcd.c** must be modified from a text editor, where the word “**null**” is replaced by **motorcd**, lines to change are:

Original Code	New Code for Driver
<pre>#include "io_null.h" #include "ionulprv.h" _mqx_uint io_null_install io_null_open, io_null_close, io_null_read, io_null_write, io_null_ioctl, _mqx_int io_null_open _mqx_int io_null_close _mqx_int io_null_read _mqx_int io_null_write _mqx_int io_null_ioctl</pre>	<pre>#include "io_motorcd.h" #include "iomotorcdprv.h" _mqx_uint io_motorcd_install io_motorcd_open, io_motorcd_close, io_motorcd_read, io_motorcd_write, io_motorcd_ioctl, _mqx_int io_motorcd_open _mqx_int io_motorcd_close _mqx_int io_motorcd_read _mqx_int io_motorcd_write _mqx_int io_motorcd_ioctl</pre>

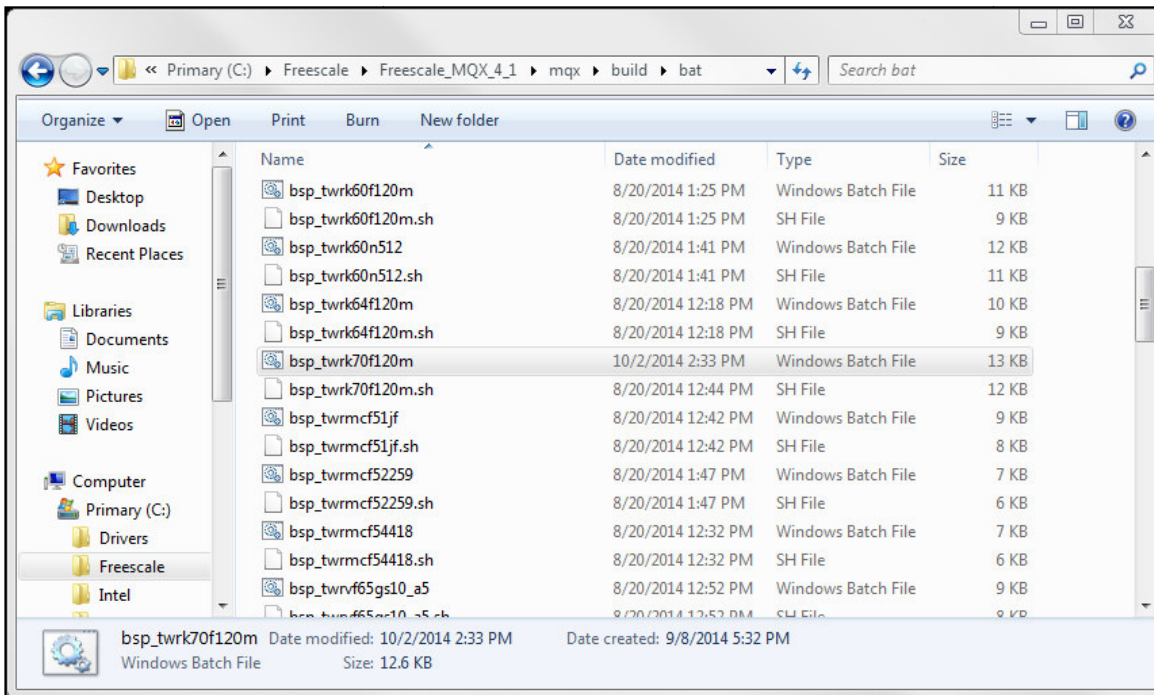
6) The file **io_motorcd.h** must be modified from a text editor, where the words " **null**" is replaced by **motorcd**, lines to change are:

Original Code	New Code for the Driver
<pre>#ifndef io_null_h #define io_null_h extern_mqx_uint io_null_install(char*);</pre>	<pre>#ifndef io_motorcd_h #define io_motorcd_h extern_mqx_uint io_motorcd_install(char*);</pre>

7) The file `io_motorcdprv.h` must be modified from a text editor, where the words "null" is replaced by `motorcd`, lines to change are:

Original Code	New Code for Driver
<pre>#ifndef __ionulprv_h__ #define __ionulprv_h__ extern_mqx_int _io_null_open(MQX_FILE_PTR, char*, char*); extern_mqx_int _io_null_close(MQX_FILE_PTR); extern_mqx_int_io_null_read (MQX_FILE_PTR, char*, _mqx_int); extern_mqx_int _io_null_write(MQX_FILE_PTR, char*, _mqx_int); extern_mqx_int _io_null_ioctl(MQX_FILE_PTR, _mqx_uint, void *);</pre>	<pre>#ifndef __iomotorcdprv_h__ #define __iomotorcdprv_h__ extern_mqx_int _io_motorcd_open(MQX_FILE_PTR, char *, char*); extern_mqx_int _io_motorcd_close(MQX_FILE_PTR); extern_mqx_int_io_null_read (MQX_FILE_PTR, char*, _mqx_int); extern_mqx_int _io_motorcd_write(MQX_FILE_PTR, char *, _mqx_int); extern_mqx_int _io_motorcd_ioctl(MQX_FILE_PTR, _mqx_uint, void *);</pre>

8) Modify the file `.bat` using a text editor. This file is located at the following path:

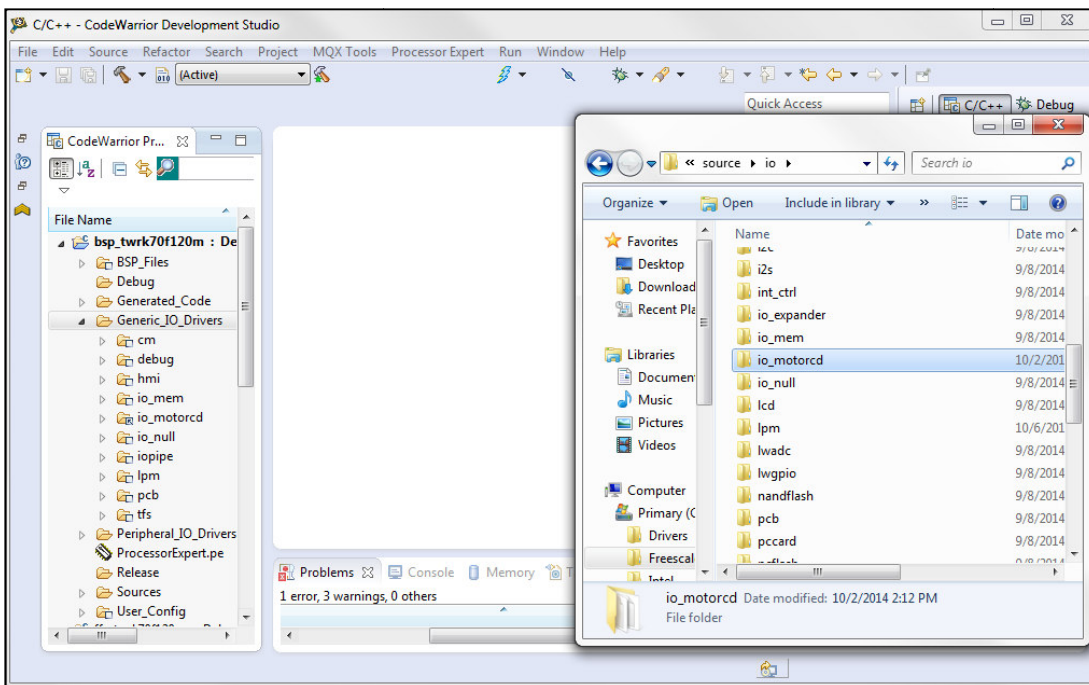


9) Inside archive .bat, add the following line:

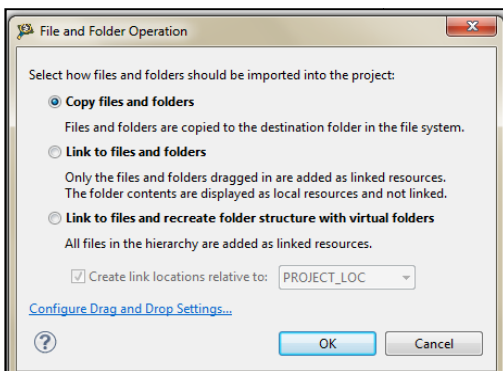
```
copy "%ROOTDIR%\mqx\source\io\io_motorcd\io_motorcd.h" "%OUTPUTDIR%\io_motorcd.h":
```

```
copy "%ROOTDIR%\mqx\source\io\enet\enet_wifi.h" "%OUTPUTDIR%\enet_wifi.h" /Y
copy "%ROOTDIR%\mqx\source\io\lwgpio\lwgpio_kgpio.h" "%OUTPUTDIR%\lwgpio_kgpio.h" /Y
copy "%ROOTDIR%\mqx\source\io\io_null\io_null.h" "%OUTPUTDIR%\io_null.h" /Y
copy "%ROOTDIR%\mqx\source\io\io_motorcd\io_motorcd.h" "%OUTPUTDIR%\io_motorcd.h" /Y
copy "%ROOTDIR%\mqx\source\io\io_chonchito\io_null.h" "%OUTPUTDIR%\io_null.h" /Y
copy "%ROOTDIR%\mqx\source\bsp\trk21d50m\init_lpm.h" "%OUTPUTDIR%\init_lpm.h" /Y
copy "%ROOTDIR%\mqx\source\io\gpio\kgpio\io_gpio_kgpio.h" "%OUTPUTDIR%\io_gpio_kgpio.h" /Y
copy "%ROOTDIR%\mqx\source\io\i2c\i2c.h" "%OUTPUTDIR%\i2c.h" /Y
copy "%ROOTDIR%\mqx\source\io\adc\adc_conf.h" "%OUTPUTDIR%\adc_conf.h" /Y
copy "%ROOTDIR%\mqx\source\io\sdc\sdcard.h" "%OUTPUTDIR%\sdcard.h" /Y
copy "%ROOTDIR%\config\common\smallest_config.h" "%OUTPUTDIR%\..\smallest_config.h" /Y
```

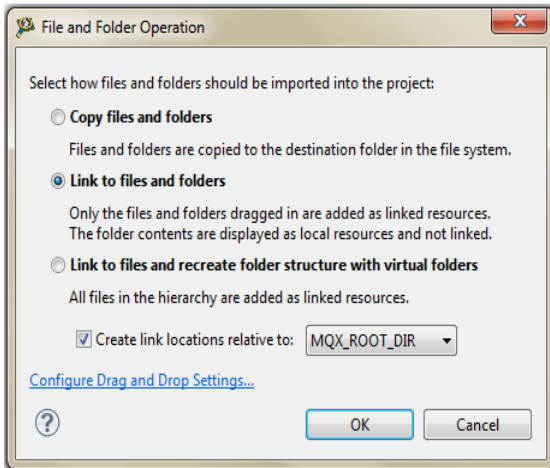
10) Open CodeWarrior **Generic_IO_Drivers** and drag the folder **io_motorcd** inside the **bsp** card folder to use:



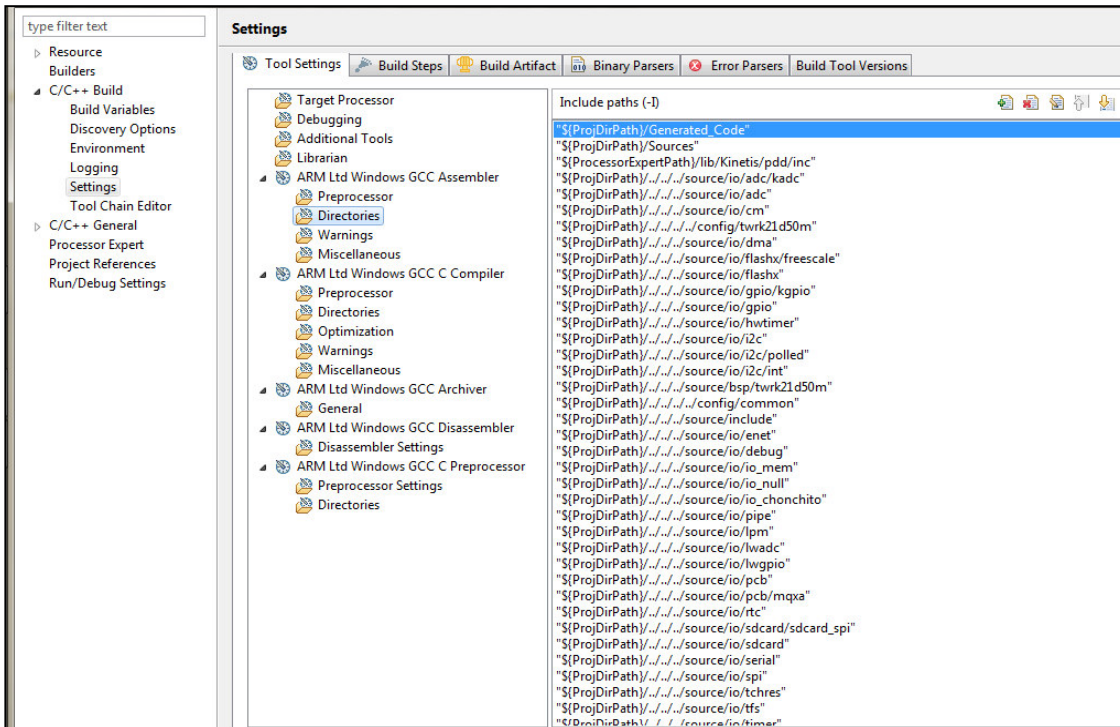
11) Dragging the folder, a window will appear where you will select “copy files and folders”:



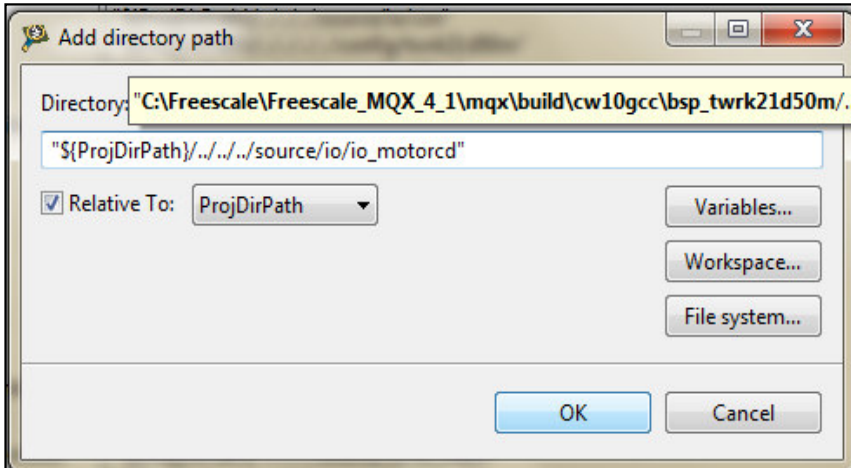
11) Remove the above folder and paste it again, this time select " **Link to files and folders**" and "MQX_ROOT_DIR"



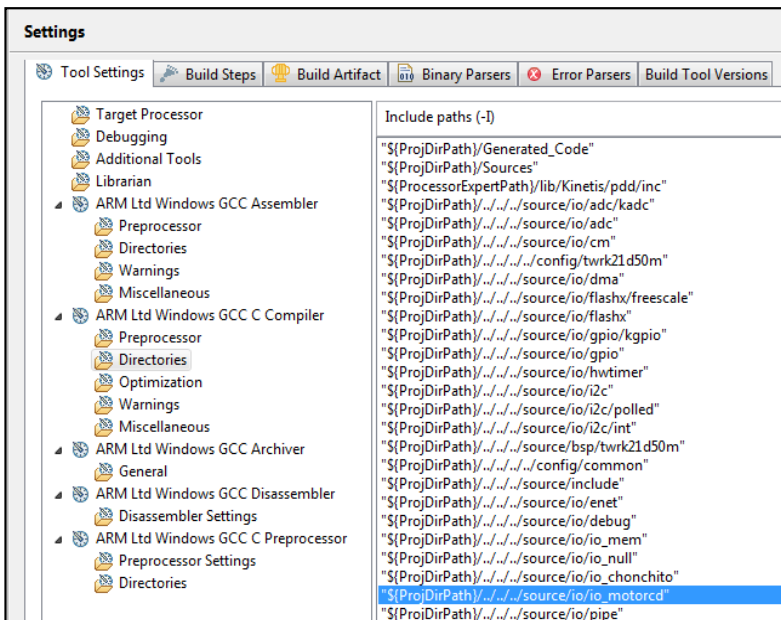
12) Right click on bsp folder and select properties → C/C++ build → Settings → Arm Ltd Windows GCC Assembler → Directories:



13) Add the driver clicking new and typing "motorcd":

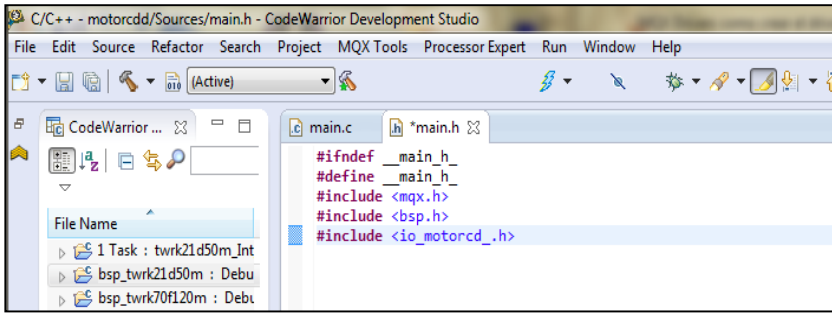


14) Do the same in Windows GCC Compiler Arm Ltd:



How to prove that our driver work?

- 1) Create a new MQX project.
- 2) Open **main.c** and **main.h** files.
- 3) Add the library "**io_motorcd_.h**" in the **main.h** file:

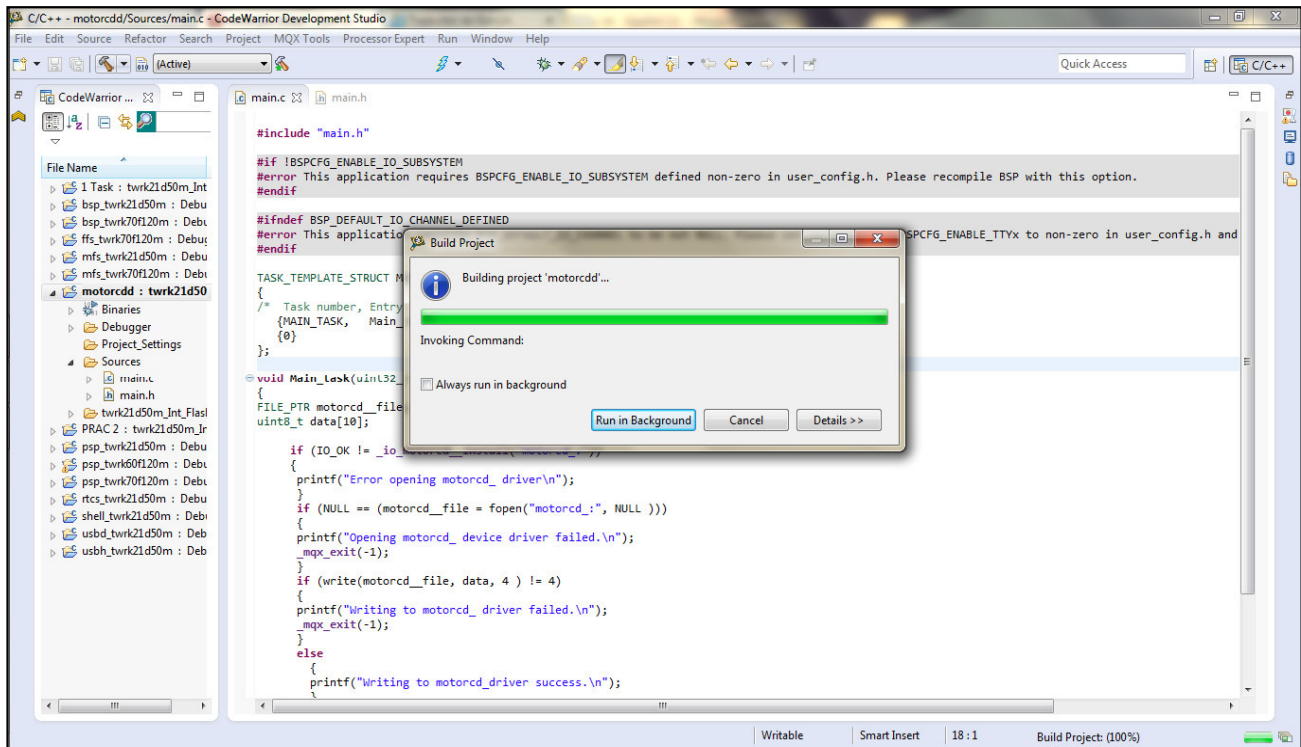


- 4) Add the following code in **main.c**

```
#include "main.h"

void Main_task(uint32_t initial_data){
    FILE_PTR motorcd__file;    /* pointer to a file device structure*/
    uint8_t data[10];
    if (IO_OK != _io_motorcd__install("motorcd:")){
        printf("Error opening motorcd_ driver\n");
    }
    if (NULL == (motorcd__file = fopen("motorcd:", NULL )))
    {
        printf("Opening motorcd_ device driver failed.\n");
        _mqx_exit(-1);
    }
    if (write(motorcd__file, data, 4 ) != 4)
    {
        printf("Writing to motorcd_ driver failed.\n");
        _mqx_exit(-1);
    }
    else
    {
        printf("Writing to motorcd_ driver success.\n");
    }
    fclose(motorcd__file);
    printf ("motorcd_ driver working\n");
    mqx_exit(0);
}
```

5) Compile the code, if no exist error, our driver works perfectly.



That now completes Lab 2.