HECTOR

EVALUATION BOARD

FRONT PANEL PROJECT EXAMPLE
1.0

HECTOR

HARDWARE ENABLED CRYPTO AND RANDOMNESS

Content

Preliminaries

HECTOR Front Panel example project files

Download the project archive zip file from https://hector.technikon.com/07-Evaluation-Boards/front_panel_example/front_panel_simple.zip and programming files front_panel_simple.zip from the same directory.

HECTOR Evaluation Board kit

The up-to-date user guide (now version 1.4) is on the HECTOR svn at https://hector.technikon.com/07-Evaluation-Boards/HECTOR_eval_board_ug_14.pdf.

Microsemi Libero SoC 11.7 SP2

The install files can be found at http://www.microsemi.com/document-portal/doc_download/135769-download-libero-soc-v11-7-for-windows, http://soc.microsemi.com/download/reg/download.aspx?p=f=LiberoSoCv11_7_SP1_WIN and http://www.microsemi.com/document-portal/doc_download/136380-download-libero-soc-v11-7-sp2-for-windows.
Note: To download the install files you need to register and create an account at the Microsemi portal. To run Libero you have to obtain a license. The free Gold License can be used for development with M2S025. (http://www.microsemi.com/products/fpga-soc/design-resources/design-software/libero-soc#licensing)

Microsemi SoftConsole v4.0

The install file can be found at http://www.microsemi.com/document-portal/doc_download/135567-microsemi-softconsole-v4-0-software-windows.

Great introduction to the SoftConsole you may find in the SoftConsole v4.0 Release Notes http://www.microsemi.com/document-portal/doc_download/135569-softconsole-v4-0-release-notes.

Note:
Firmware exported by Libero into the "firmware" folder of a Libero project is compatible with SoftConsole v4.0 and should be copied/imported into a SoftConsole v4.0 project. Refer to the SoftConsole v4.0 release notes for more information about using Libero SoC generated firmware in SoftConsole v4.0 projects. SoftConsole v4.0 should be configured as a Software IDE Tool Profile in Libero. Unfortunately neither the newest version of Libero 11.7 SP2 is still not able to generate SoftConsole v4.0 workspaces.
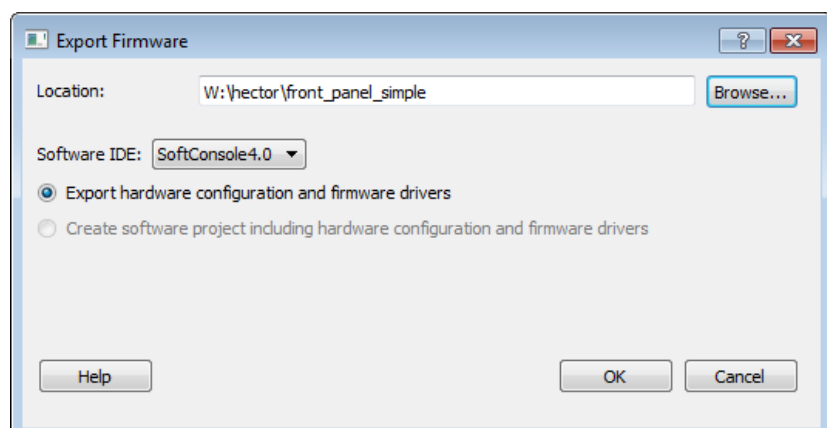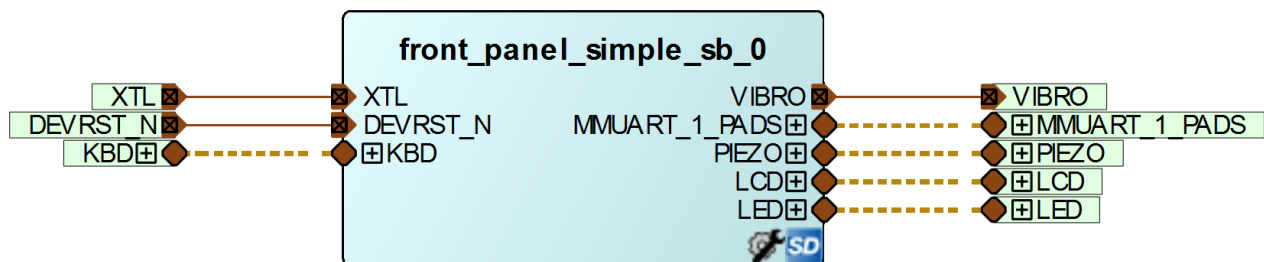
Example architecture

Hardware

Launch the **Libero11.7 SP2** and open project clicking at **Project → Open Project**.

Browse to the project directory and select the file **front_panel_simple.prjx**.

The design hierarchy shows up in the left pane. Double click the **front_panel_simple** root component.

The design is connected

- **XTL** to 12MHz external crystal;

- **DEVRST_N** to reset signal;

- **MMUART_1_PADS** to UART for debugging;

- to HECTOR Front Panel module components

   ○ I2C **KBD** to capacitive keyboard;

   ○ SPI **LCD** to display;

   ○ GPIO **VIBRO** to vibrating motor;

   ○ GPIOs **PIEZO** to beeper;

   ○ GPIOs **LED** to multi-colour LED.
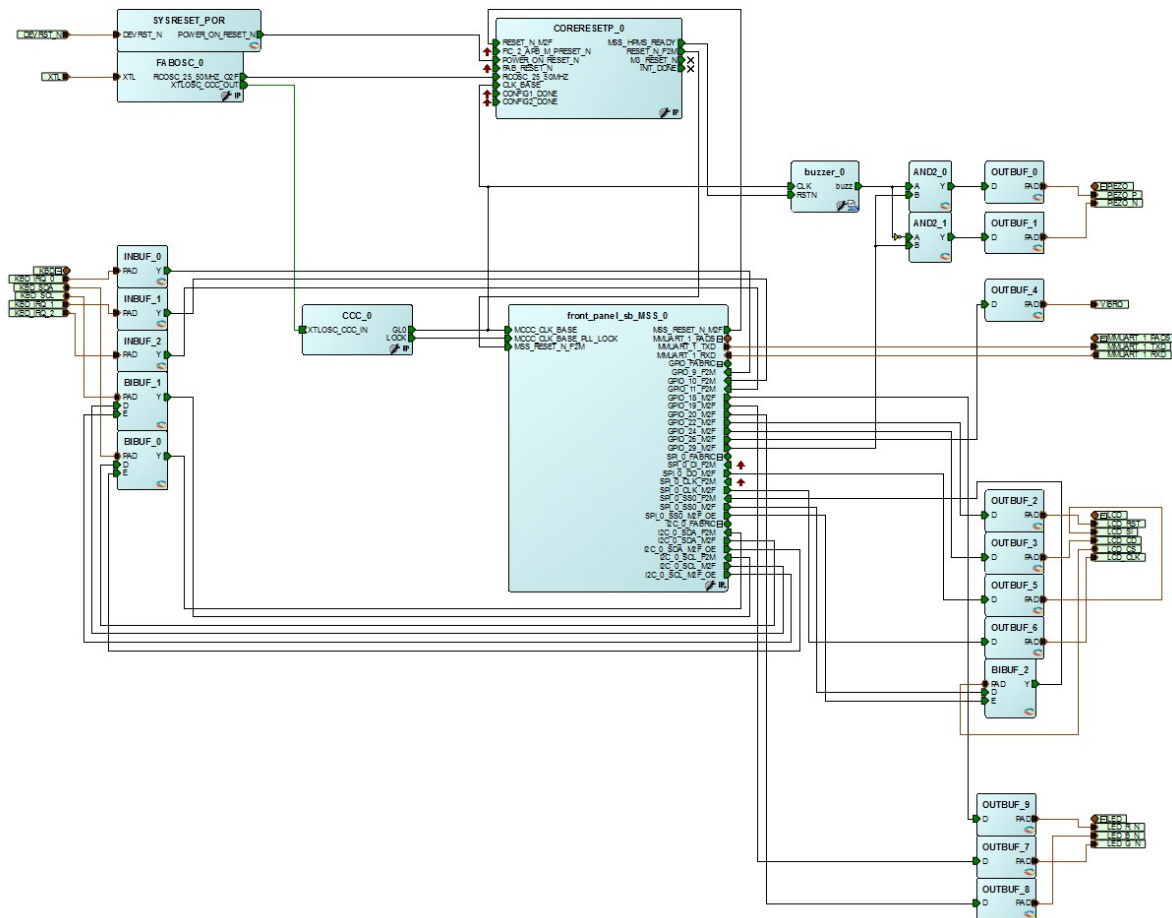
The top **front_panel_simple_sb_0** block contains

- microprocessor module **front_panel_sb_MSS_0** with

  - MMUART interface **MMUART_1_PADS** for debugging;

  - I2C interface **I2C_0_FABRIC** which together with **GPIO_9_F2M**, **GPIO_10_F2M** and **GPIO_11_F2M** communicates with the keyboard in the HECTOR Front Panel;

  - SPI interface **SPI_0_FABRIC** which together with **GPIO_22_M2F** and **GPIO_24_M2F** communicates with the keyboard in the HECTOR Front Panel;

  - **GPIO_18_M2F, GPIO_19_M2F** and **GPIO_20_M2F** driving the multi-colour LED on the HECTOR Front Panel;

  - **GPIO_26_M2F** triggering the vibrating motor in the HECTOR Front Panel;

  - and **GPIO_29_M2F** enabling the piezoelectric speaker in the HECTOR Front Panel;

- oscillator module **FABOSC_0** and PLL module **CCC_0** generating 30 and 50 MHz clocks for the microprocessor and logic;

- modules **SYSRESET_POR** and **CORERESETP_0** generating reset signals for the microprocessor and logic;

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- module **buzzer_0** generating 2kHz signal for piezoelectric speaker beeps.

Clocks

Microprocessor core and peripherals are clocked at 30MHz. The 30MHz signal is synthesized in **CCC_0** from 12MHz external crystal oscillator.

Software

Launch **Microsemi SoftConsole v4.0**.

Select a workspace browsing to the example sub-folder **front_panel_simple/SoftConsole40**.

Switch to C/C++ perspective.

In the left pane you will find the project **front_panel** which consists of

- firmware **/CMSIS**, **/drivers**, **/drivers_config**, **/hal**;

- application library **/lib** with modules **system**, **led**, **display**, **keyboard** and **sound**, each function is short described in the respective header file;

- and the application **main.c**.

The main application

1. initializes UART, millisecond timer, HECTOR Front Panel (LED, beeper, vibrating motor, display and keyboard);

2. writes a welcome screen;

3. cycles through four different LED colours (red, green, blue and almost-white);

4. launches a simple one-line text editor.

Programming

Power up the HECTOR Evaluation Board with the HECTOR Front Panel and attach the FlashPro programmer to it.

Unzip the archive **front_panel_simple_fp.zip**.

Launch **FlashPro Express** application. Click at **Project -> Open Job Project** and browse to **front_panel_simple_fp** folder and open **front_panel_simple.pro** file.
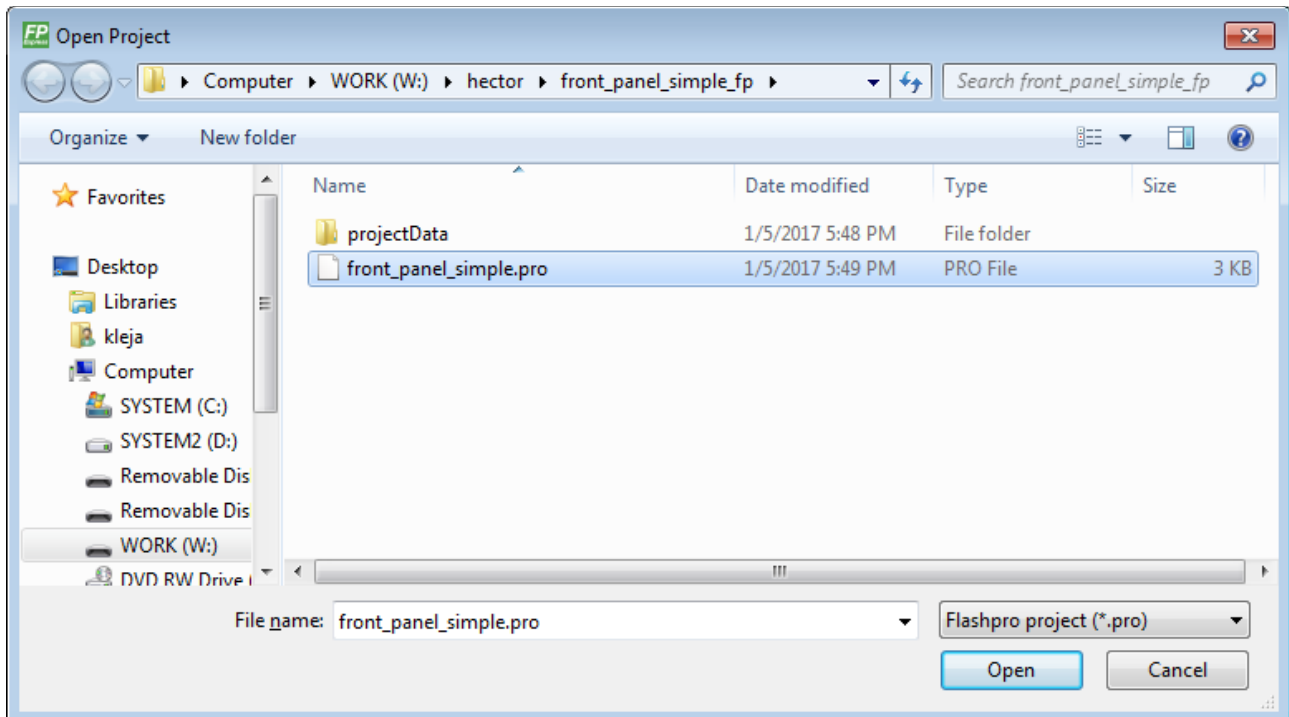
Click **RUN**.

Debugging

Launch **Microsemi SoftConsole v4.0**.

Right click on the project in the **Project Explorer** tab and select **Build Configurations** -> **Set Active** -> **Debug**.

Press **CTRL+B**.

Follow the instructions in the SoftConsole v4.0 Release Notes from page 18.

Contact

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