

3L Diamond application note

Rebuilding the firmware with Diamond

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Overview

The firmware of DSP boards provides communication resources used by the DSP to exchange data with other processors in the system.

Usually a default firmware exists which provides a set of communication resources described in the user manual for the board.

DSP applications which do not target the FPGA connected to the DSP use this default firmware.

However, the default firmware doesn't work for all systems. Some combinations of boards require the firmware to be adapted so that the boards can communicate. This implies re-building the firmware even though your application might not use the FPGA for data processing.

This application note shows how you can let Diamond generate the firmware that will match your system.

Description

We consider a system made of a SMT363XC2 and a SMT368 boards.

The application uses an SDB wire between the DSP of the SMT363XC2 and the SMT368.

The default firmware for the SMT363XC2 provides 2x16-bit SDB, whereas the SMT368 is defined with 32-bit SDB.

The application will not work since these SDBs are not of the same type.

To solve this problem we need to make sure that both boards use SDB of the same type. In our example we will update the SMT363XC2 to use 32-bit SDB since this is the fastest interface.

We will instruct Diamond to re-build the firmware of the SMT363XC2 when the application is compiled.

To do so, we need to **declare a new processor** of type FPGA and **attach** it to the SMT363XC2. This processor represent the FPGA available on the SMT363XC2.



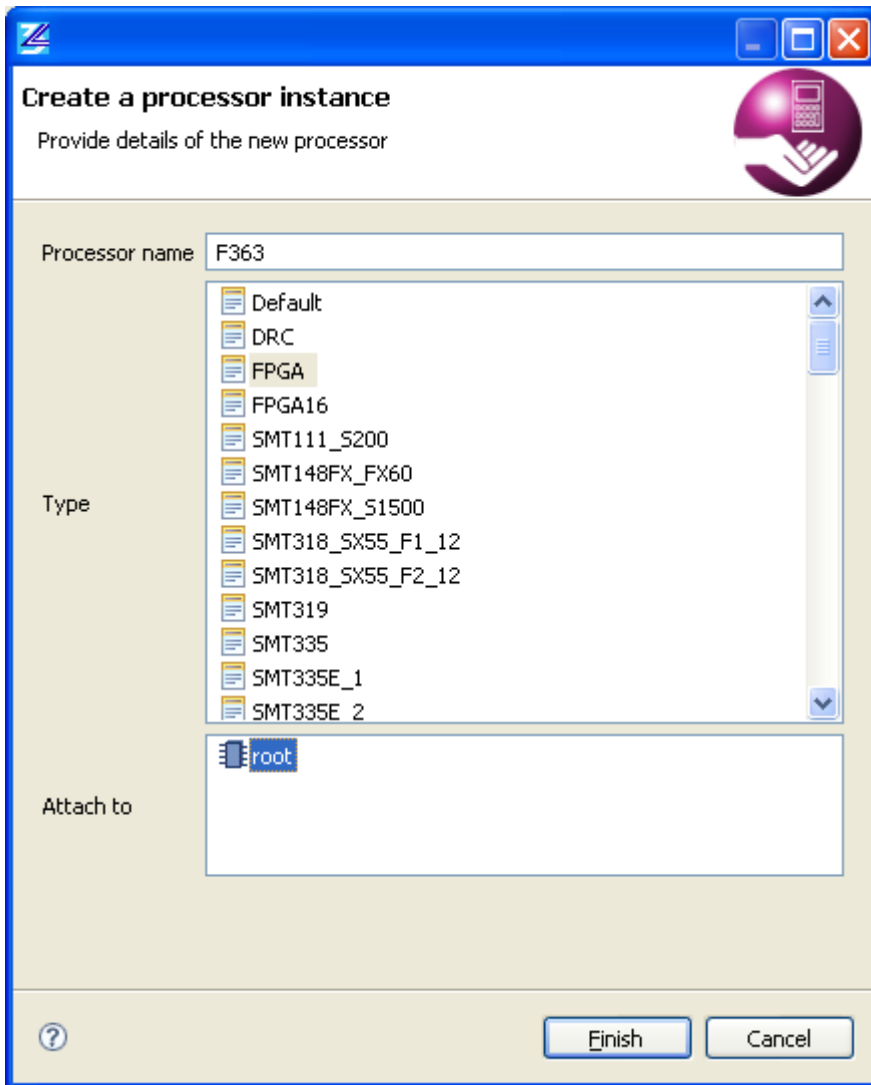


Figure 1 - create a new processor for the FPGA of the SMT363XC2

Then we need to **place** a task on this FPGA to force Diamond to build it. A simple LED flashing task will do. In this case the task is called **led363xc2**.



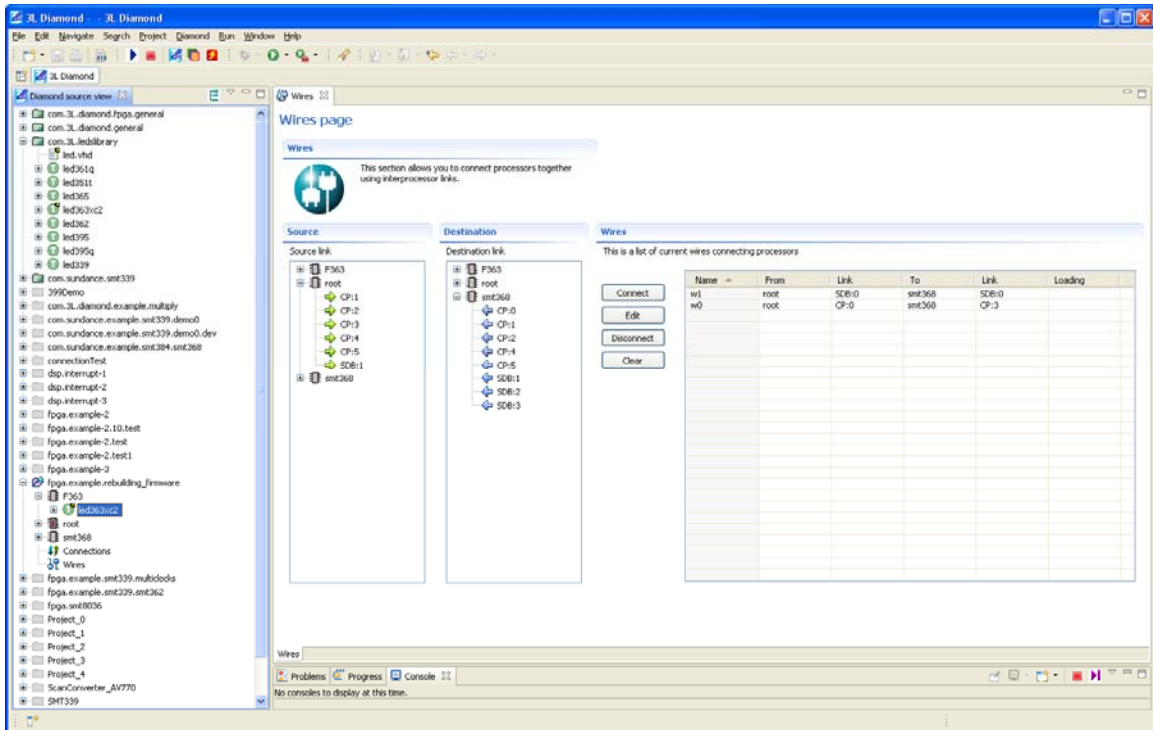


Figure 2 - place a task on the FPGA to force Diamond to build it

Now we can re-build the application. The new application will contain the bitstream for the SMT363XC2 with the communication resources needed for this application.

Note that by default Diamond does not implement the Global Bus or the LED register of DSP modules. Contact 3L if you need these interfaces.

When the application will execute Diamond will reconfigure the FPGA of the SMT363XC2 with the new firmware before configuring the SMT368 and starting the application.

Example

An example application is provided. Unzip the package file in a temporary folder. Then go in the Diamond IDE and import the projects in your workspace. The example project is “fpga.example.rebuilding_firmware”.

The archive project “com.3L.ledslibrary” provides a number of tasks that flash the LED for numerous boards. You can use these tasks in your own application.



Diamond license

Because you are now building an extra FPGA in your application it is possible that you need to extend your Diamond license.

Please contact 3L or you 3L distributor if this happens.

