

Test bench for CCounterOprEvent with a simulated or the real DE1SoC board

Core description

The core **CCounterOprEvent** is almost identical to the core **CCounterEvent**. The counter is clocked at each step, i.e. at FPGA clock. Instead of individual signals, the counter control is done via the input port **iOpr**, which type is:

```
enum Opr_t { cOprNone, cOprReset, cOprUp, cOprDown, cOprLoad };
```

Therefore, if **iOpr** equals **cOprUp** then the counter counts up.

Test bench

This test bench uses either a simulated board or the real board as target. The psC code runs without changes on both. Here is a picture of the simulated DE1SoC board during simulation, the real board will work exactly as the simulated one.



Description

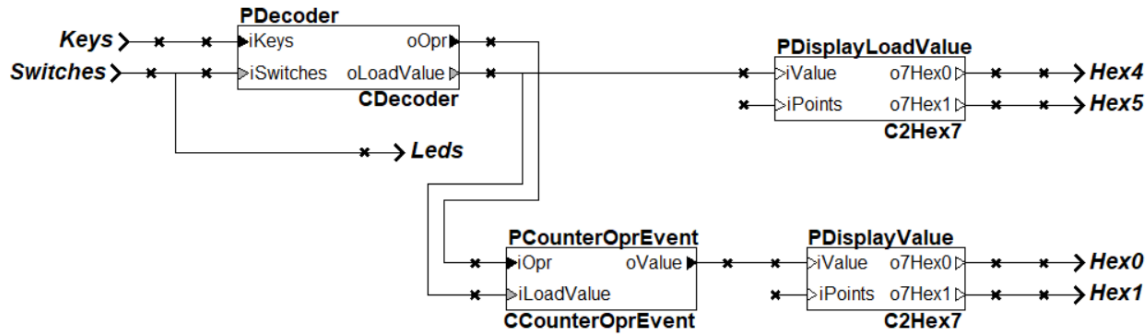
The test bench uses the **Leds**, the **Switches**, the **Keys** and the **7-segments** on the board.

- **Keys** are used to control the counter:
 - Key0 for reset
 - Key1 for up
 - Key2 for down
 - Key3 to load the value on the Switches.
- The **Switches** are used to set the load value.
- The load value is displayed on **Hex5-4**.
- The counter value is displayed on **Hex1-0**.

The psC test program

As shown on the next page, the test program consists of the core to be tested, **CCounterOprEvent**, and components to interface it with the DE1SoC peripherals:

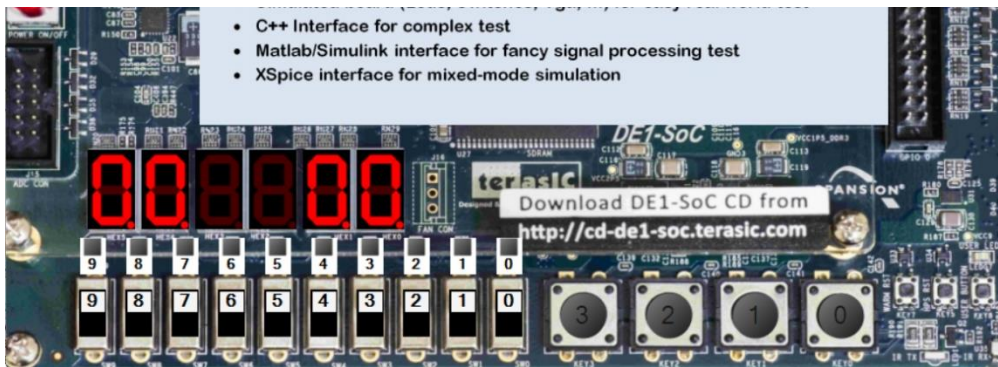
- The component **CDecoder** generates the signals **iOpr** and **iLoadValue** from the inputs **Keys** and **Switches**.
- The Processes **PDisplayValue** and **PDisplayLoadValue** are used to drive the **7-segments**. They decode a ubyte value and control individual LEDs.



- 1) Double-click on **Counter.rpj** to start Novakod Studio.
- 2) Double-click on the **main** component to view the schematic.
- 3) Double-click on the **CCounterOprEvent** component to view the counter code.
- 4) Double-click on the other components to view their code.

Execution on the simulated board

- 5) Under **Targets**, select the target **LedSwDriver**.
- 6) Run the program, menu: **Run-> Start**
- 7) A working simulated board will appear.



- 8) Use the **Keys** and the **Switches** to test the counter.

Execution on the FPGA board

If you have the DE1SoC board, connect the power, turn it on and connect the USB programming cable. You need to install the Intel Quartus tools. Refer to the DE1SoC BSP manuals for installation instructions and more details.

- 9) Select the target **DE1SoC**.
- 10) Select the **main** component and **right click->Build project**. The psC code is compiled, the Intel Quartus tools are used to generate the programming file, then the FPGA is automatically programmed.
- 11) As in simulation, use the **Keys** and the **Switches** to test the counter.