UM1760
User manual

STLUX™ SMED configurator 1.0

Introduction

The STLUX SMED configurator is a powerful graphical tool which allows to easily configure the SMED engine embedded in the STLUX family of devices. The tool allows the user to focus on creating new SMED algorithms while completely reduces the implementation time end efforts. Once the visual SMED configuration is in place, the SMED configurator can generate a C file and store the whole configuration, ready to be imported in STLUX projects.

The SMED configurator features:

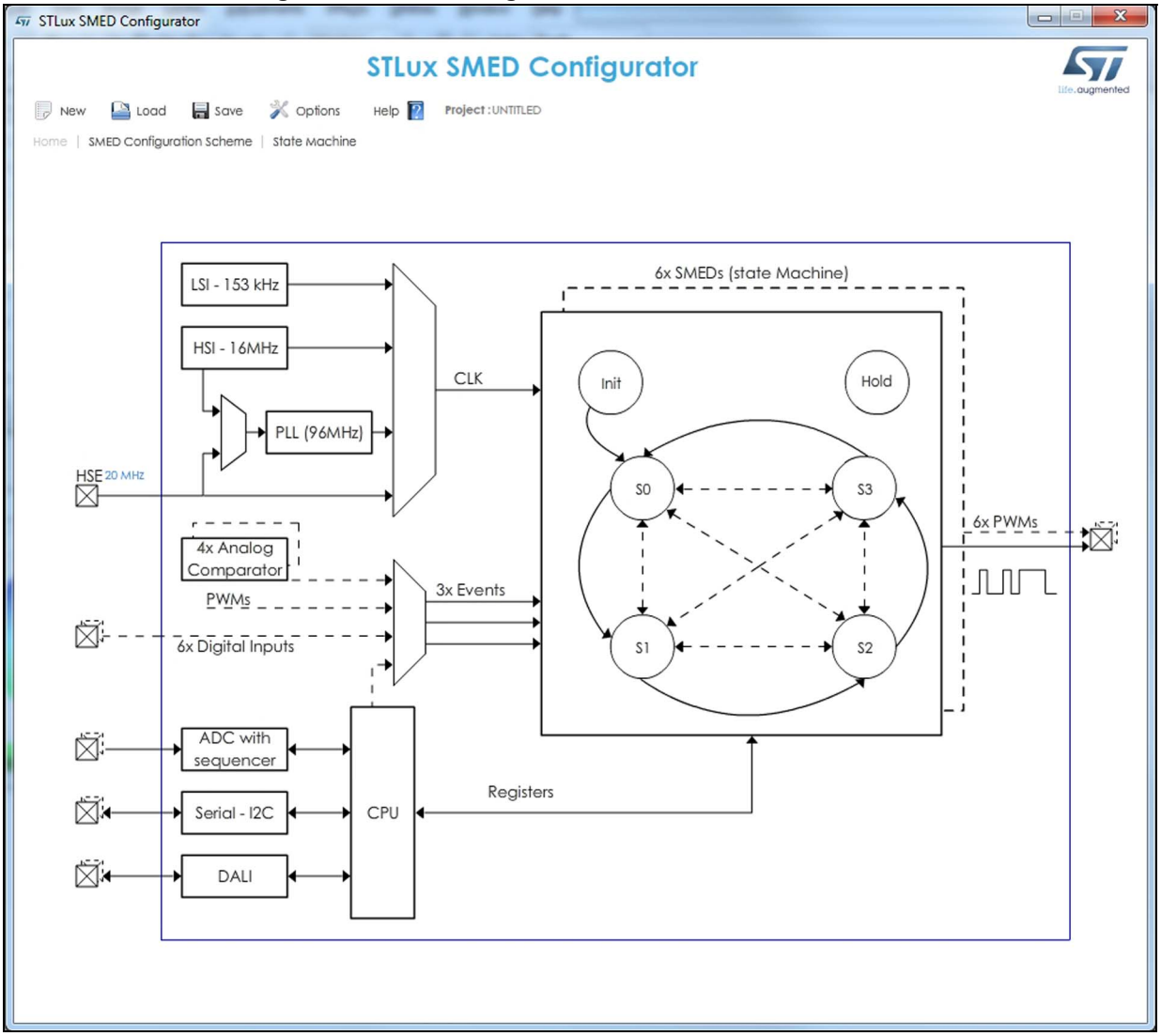
- SMED configuration schemes
- Input configuration
- Clock settings
- FSM (“Finite State Machine”) configuration
- C code generation

Contents

1 Home page

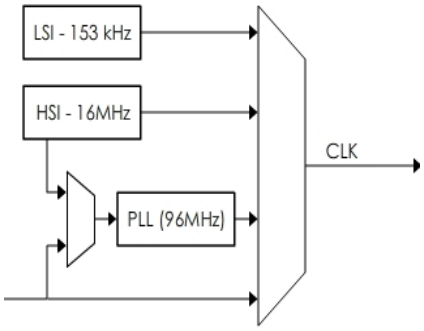
The initial view gives a visual overview of the STLUX architecture. The user can interact with all the elements of the home page and access more detailed views for each component.

Figure 1. SMED configurator - STLUX architecture view

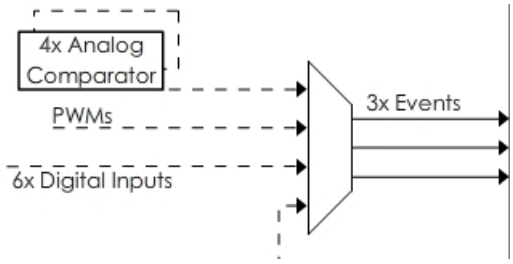


The user can choose to configure:

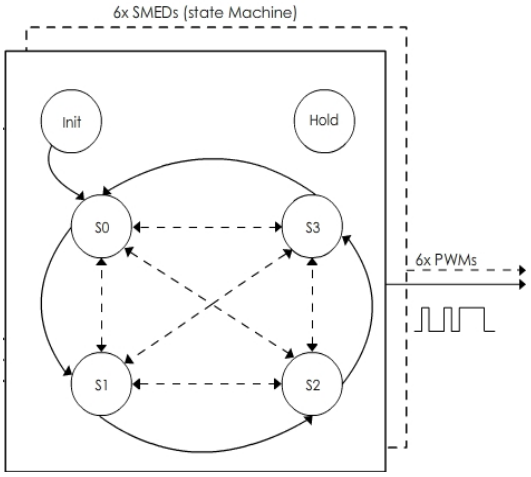
- The clocks: click on the image representing the SMED clocks.



- The inputs: click on the image representing the SMED inputs.

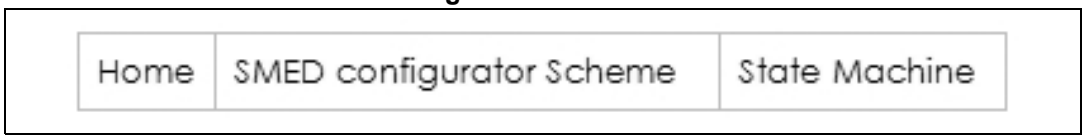


- The finite state machine (FSM): click on the image representing the FSM.



Alternatively, it is possible to use the top menu to jump into the desired view of the SMED configurator.

Figure 2. Menu bar



2 SMED configuration scheme view

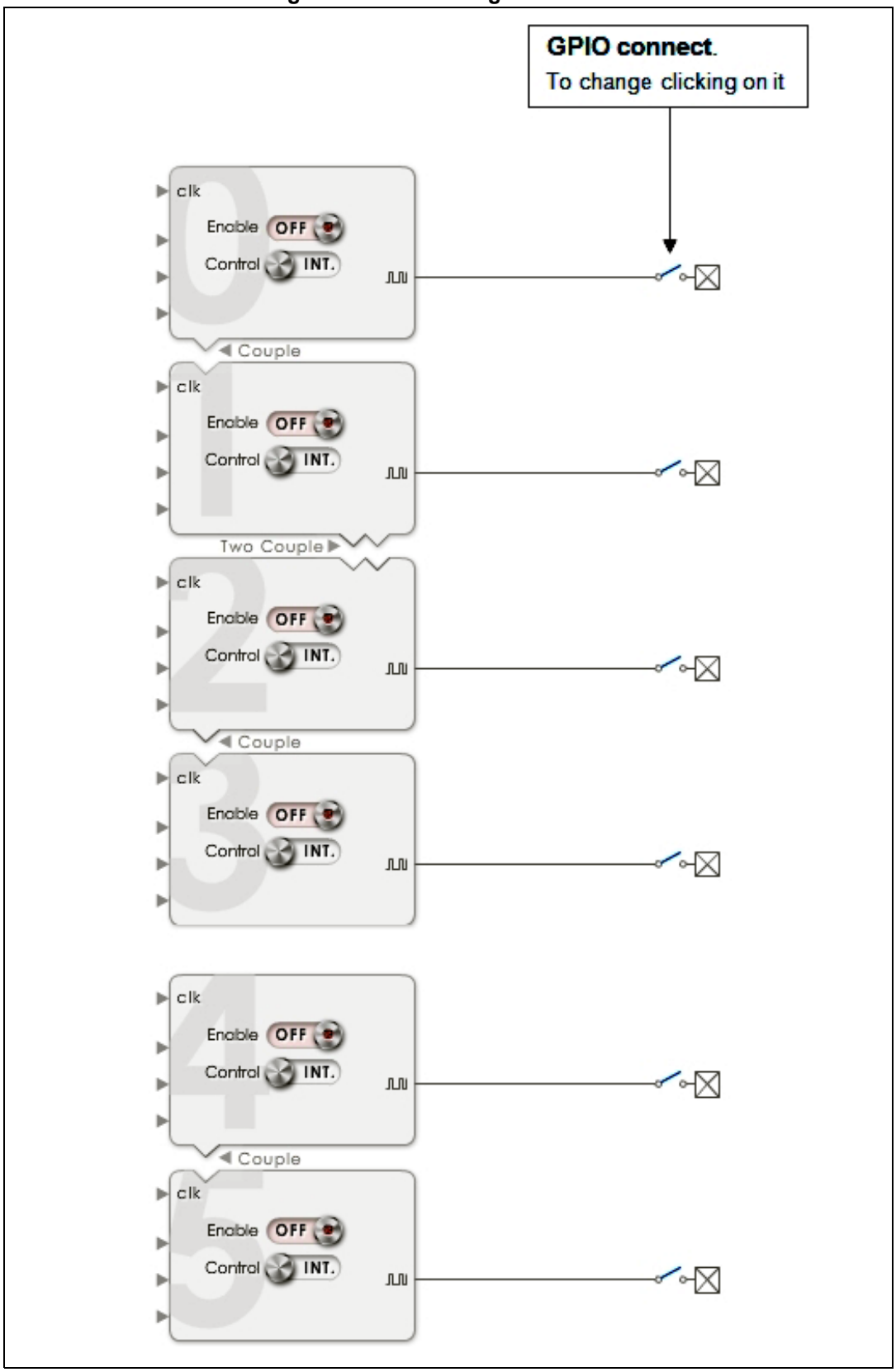
This view allows the user to establish how to use each SMED defining its working mode.

All the possible SMED configuration schemes are:

- Single SMED
- Synchronous coupled SMEDs
- Two synchronous coupled SMEDs
- Two asynchronous coupled SMEDs
- Asynchronous coupled SMEDs
- Externally controlled SMED

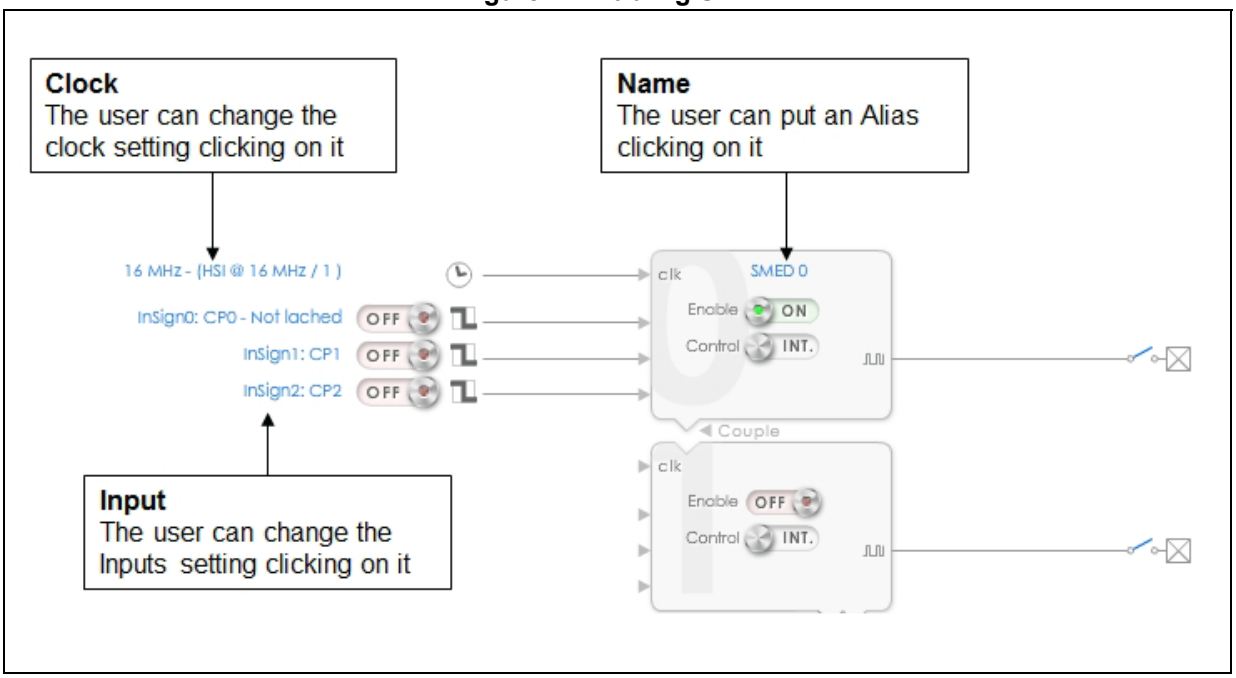
The page shows the six SMEDs and for each of them there is a button to enable it and a button to choose the control mode (internally/externally). Each SMED, if not coupled to another, will be configured respectively in the SINGLE mode or EXTERNAL depending on whether the control button is either “Int” (internal) or “Ext” (external).

Figure 3. SMED configuration view



Enabling a SMED will be shown:

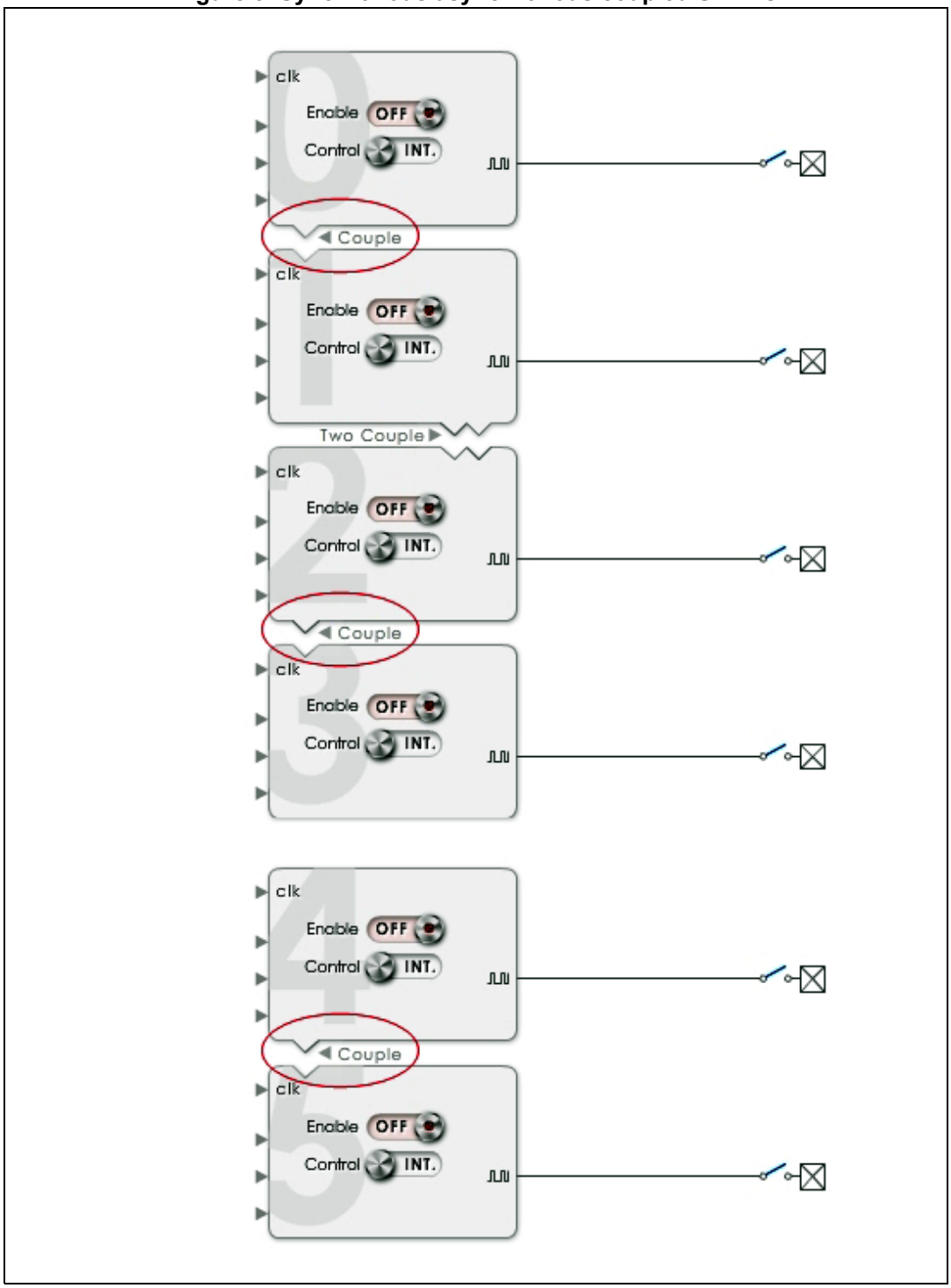
Figure 4. Enabling SMED



2.1 Synchronous/asynchronous coupled SMEDs

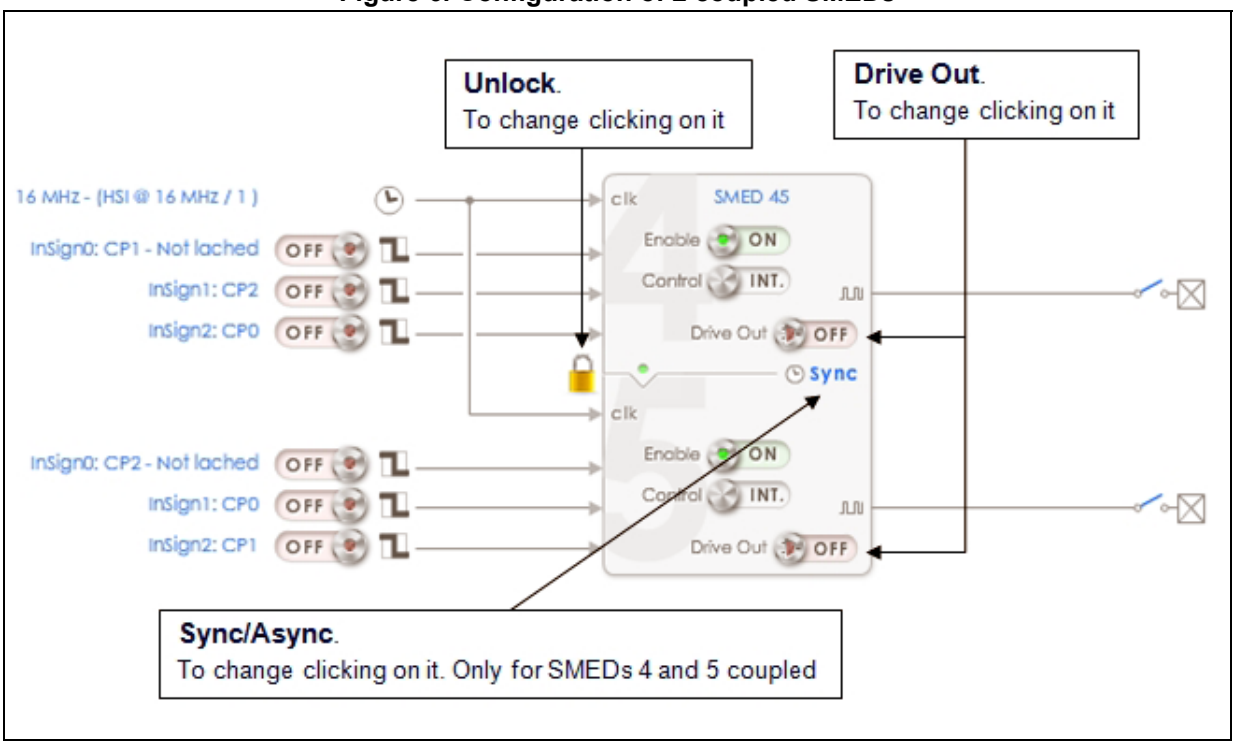
To configure 2 SMEDs in coupled mode, click the “couple” text between the 2 SMEDs required to be coupled.

Figure 5. Synchronous/asynchronous coupled SMEDs



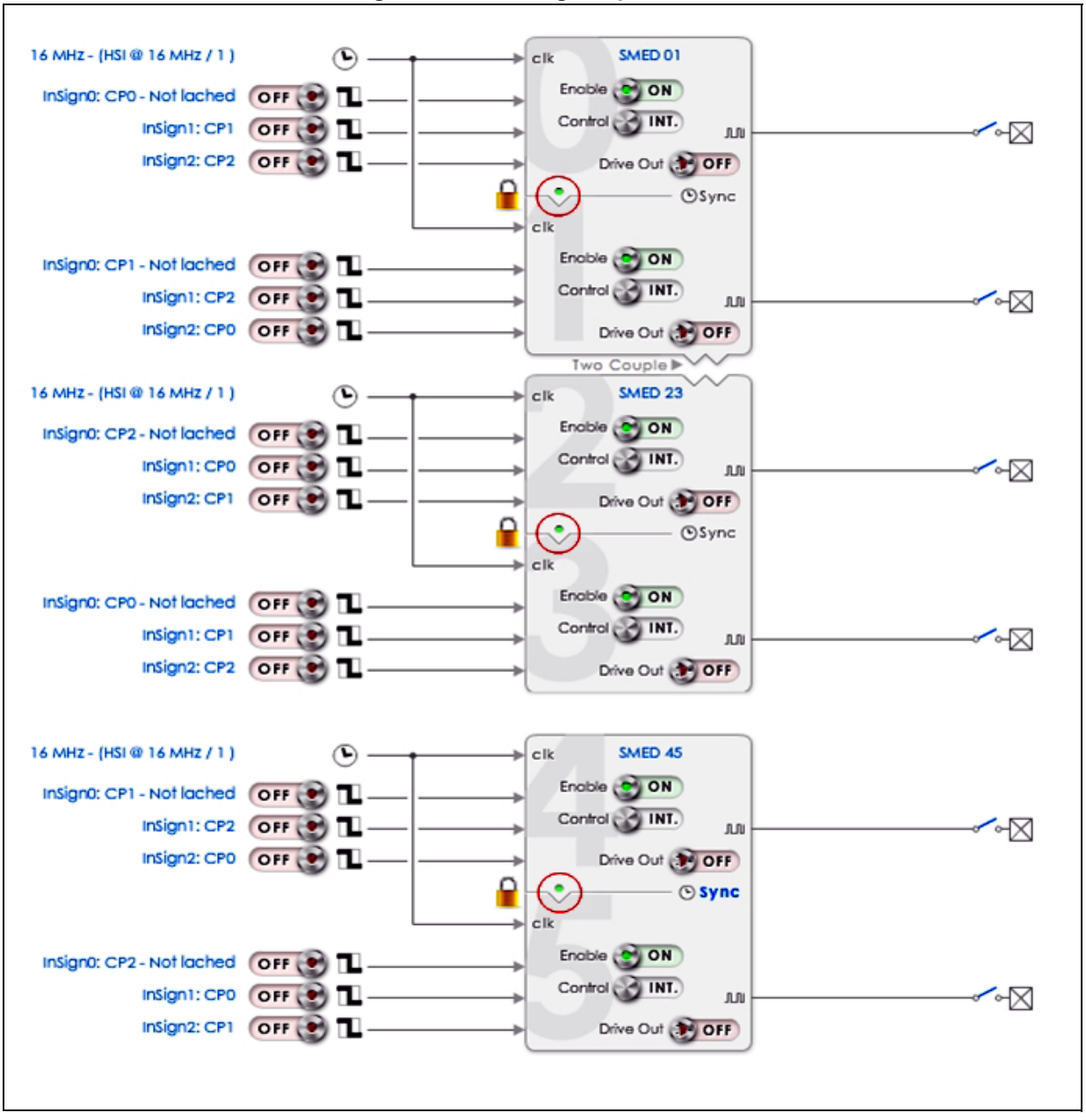
The result is that the tool shows graphically the 2 SMEDs coupled and allows the user to configure their features:

Figure 6. Configuration of 2 coupled SMEDs



To remove the coupled mode click click on the symbol that shows the coupling of the SMEDs.

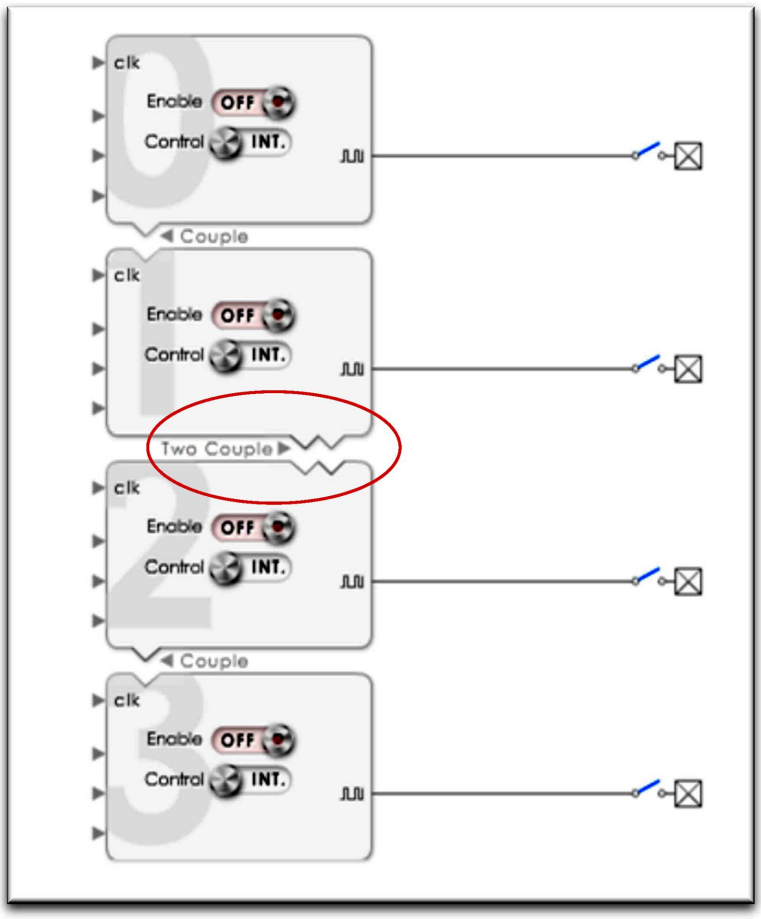
Figure 7. Removing coupled mode



2.2 Two synchronous/asynchronous coupled SMEDs

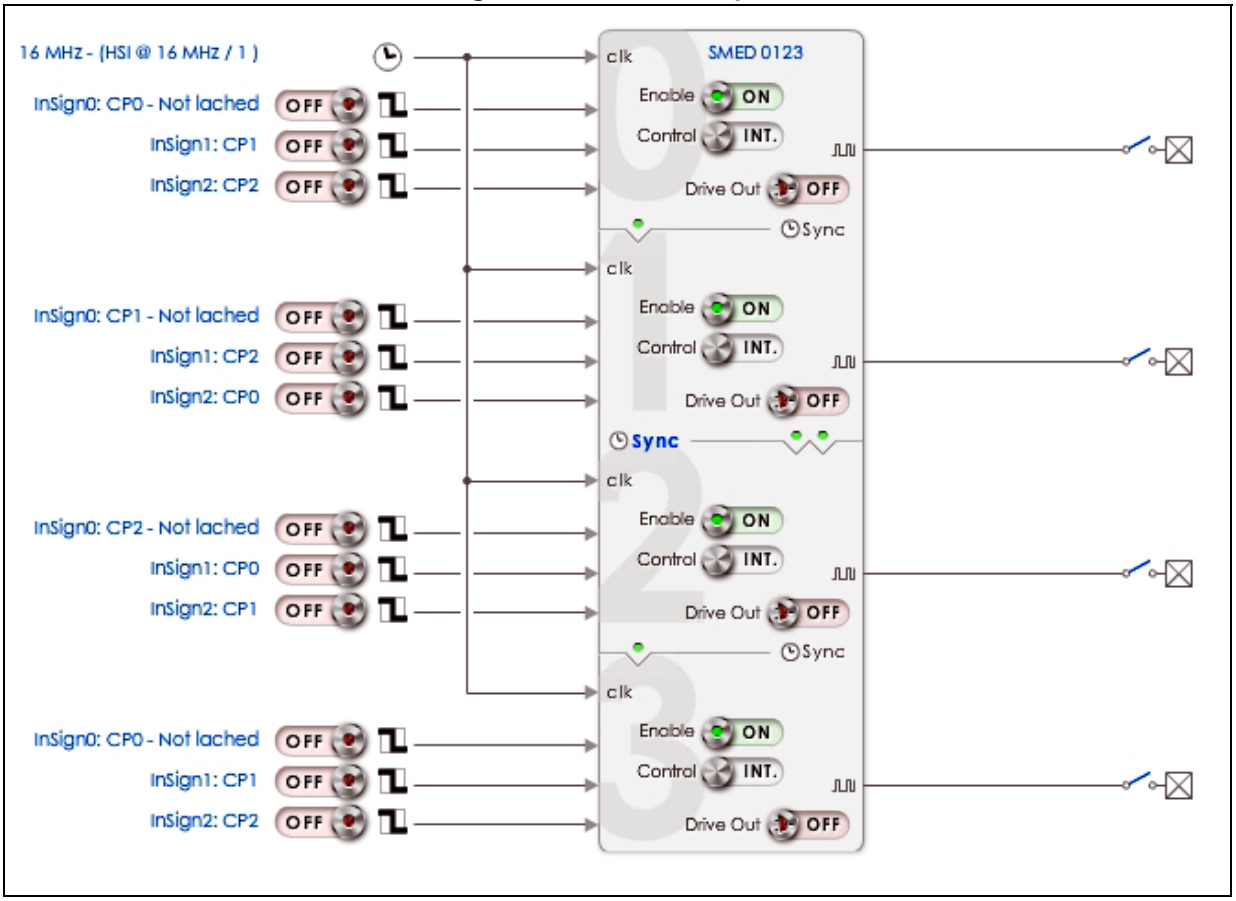
To configure 4 SMEDs (SMED0 - SMED 1 - SMED 2 - SMED 3) into the two coupled mode it's needed to click on the area representing this mode:

Figure 8. Configuring 4 SMEDs into two coupled mode



As a result, the SMED configurator shows graphically the 2 SMEDs coupled and allows the user to configure their features.

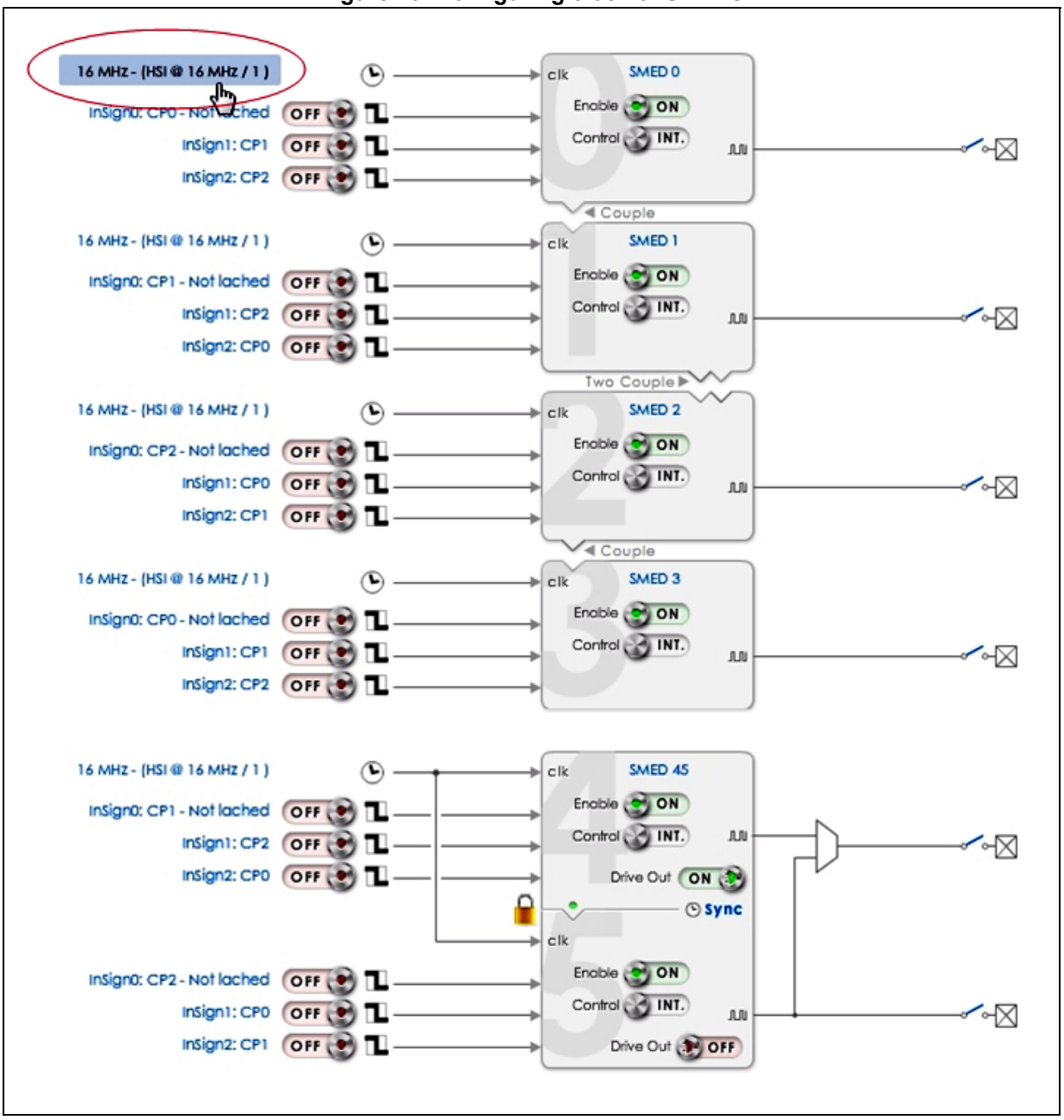
Figure 9. 2 SMEDs coupled



2.3 Clock setting

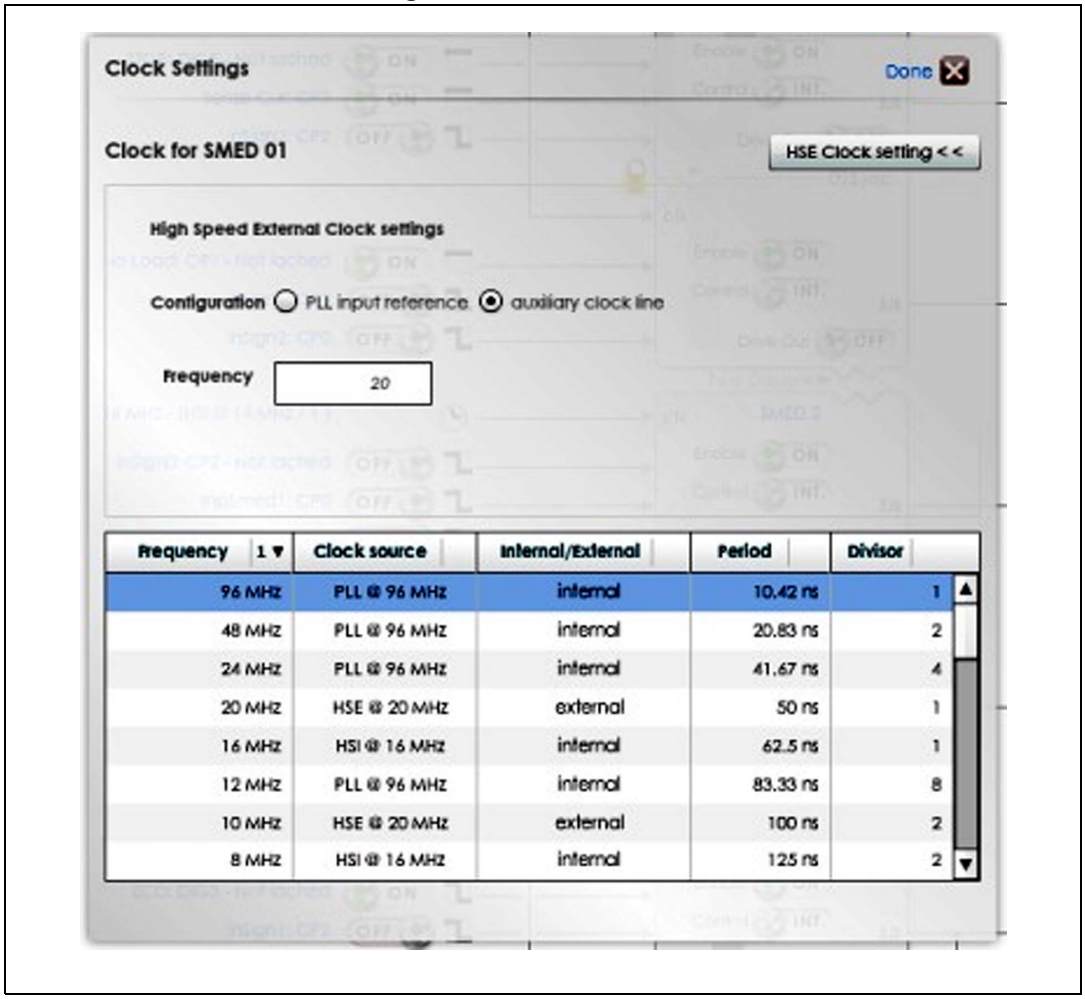
Once a SMED configuration scheme has been selected, it is possible to configure the clock of the used SMEDs clicking on the clock label.

Figure 10. Configuring clock of SMEDs



A dialog will be open in order to select one of the all possible values for the clock:

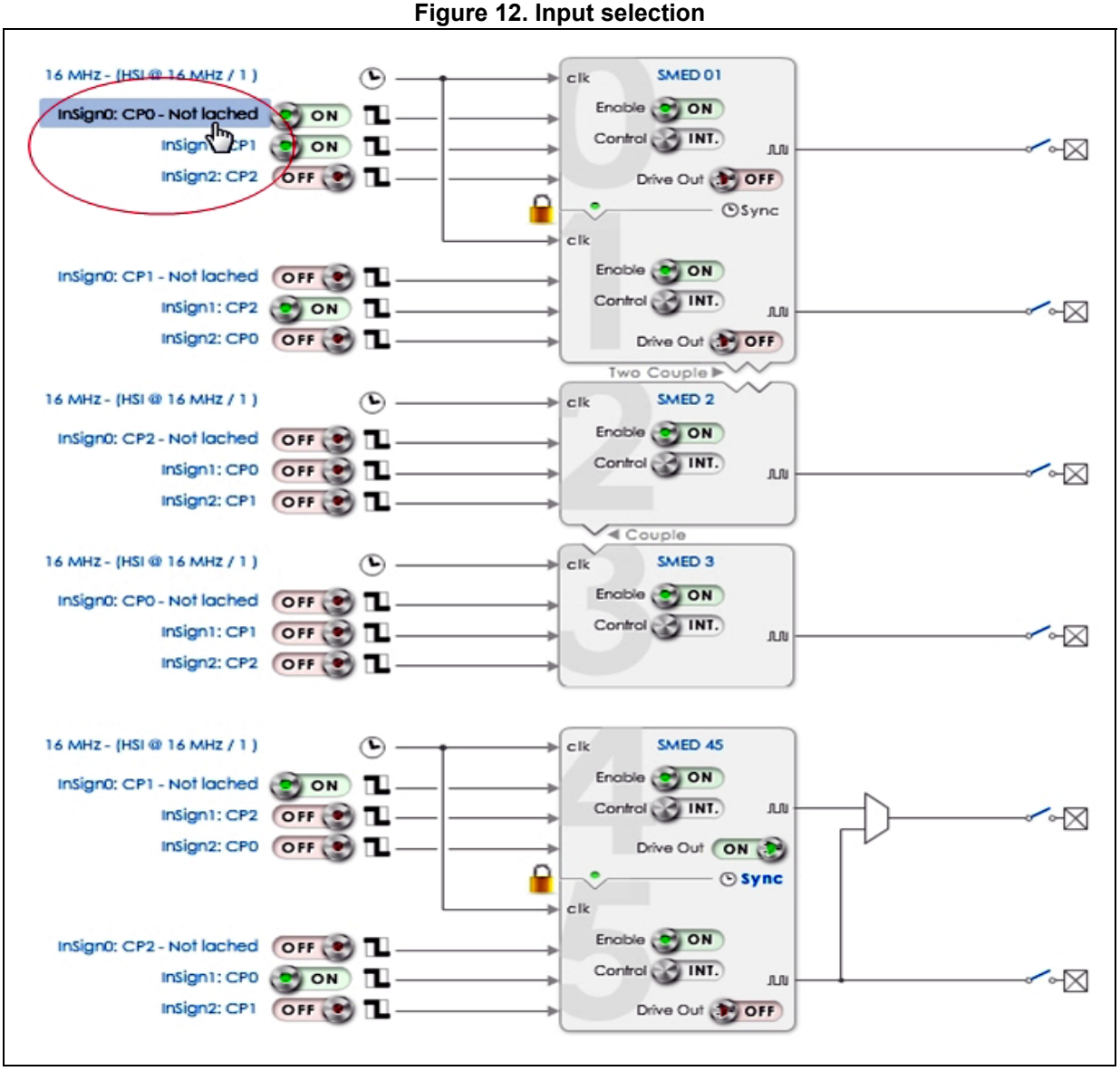
Figure 11. Clock selection



2.4 Input setting

Once a SMED configuration scheme has been selected, it is possible to configure the inputs of the used SMEDs by clicking the “input” label.

Figure 12. Input selection



A dialog will be open in order to configure the three inputs of the selected SMED.

Figure 13. Input selection dialog

It is possible to enable an input by clicking the ON/OFF button: 

.

Also it is possible to change the input trigger level by clicking on the trigger icon: .

A menu with the 4 possible values will be opened:

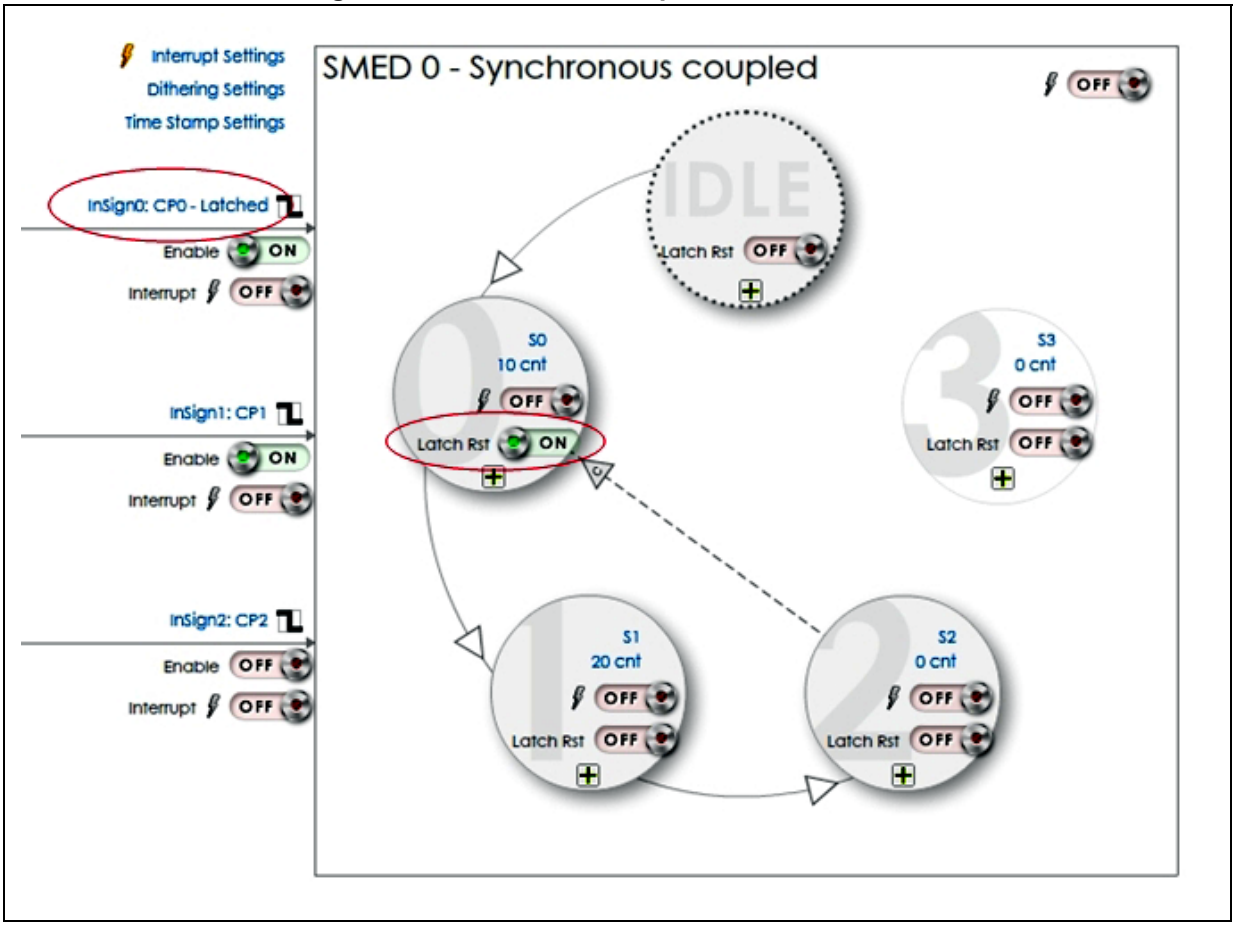
It is also possible to enable the InSig[0] input line supplementary latch functionality used to memorize occurrence of an InSig[0] capture condition.

Figure 14. Enabling Sig[0] latched mode

This allows a deferred event transition occurrence from any of the configured states to react to the InSig[0] input capture.

The latched information is selectively cleared by entering any of the S0 - S3 states if the latch reset for the state is set in the correspondent SMED state machine page.

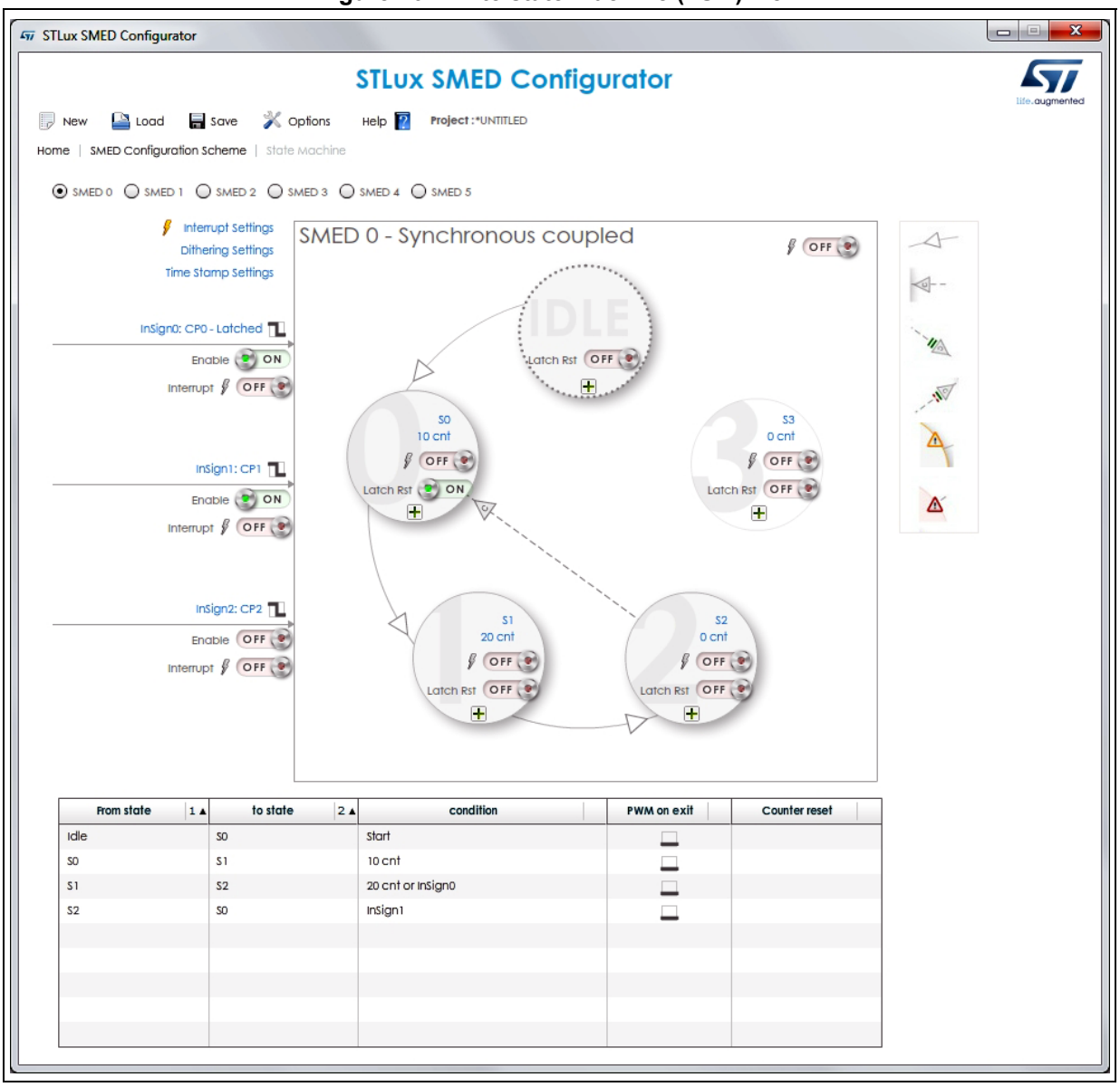
Figure 15. Latch mode as represented in the FSM



3 State machine page

The machine states page is used to set the configuration of the SMED registers that control the finite state machine.

Figure 16. Finite state machine (FSM) view



This page is divided into 2 parts:

1. General settings
   a) Interrupt
   a) Dithering
   a) Time stamp
2. Transitions

3.1 General setting

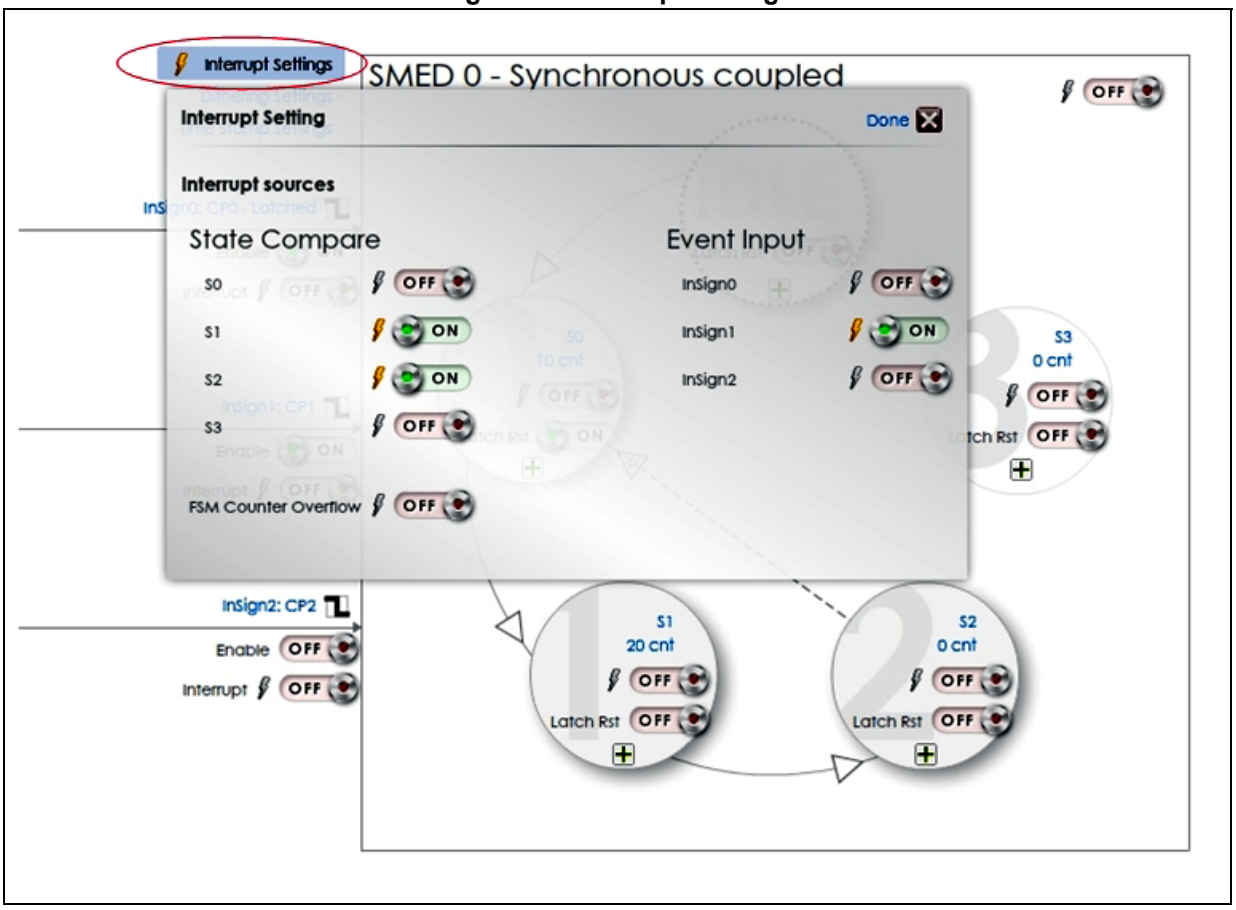
3.1.1 Interrupt settings

The “interrupt settings” label is used to configure the interrupt handling.

Clicking on the label “Interrupt Settings” a dedicated window will be opened.

The interrupts are grouped in three blocks for the state timers compare events, external input events and counter overflow event.

Figure 17. Interrupt settings

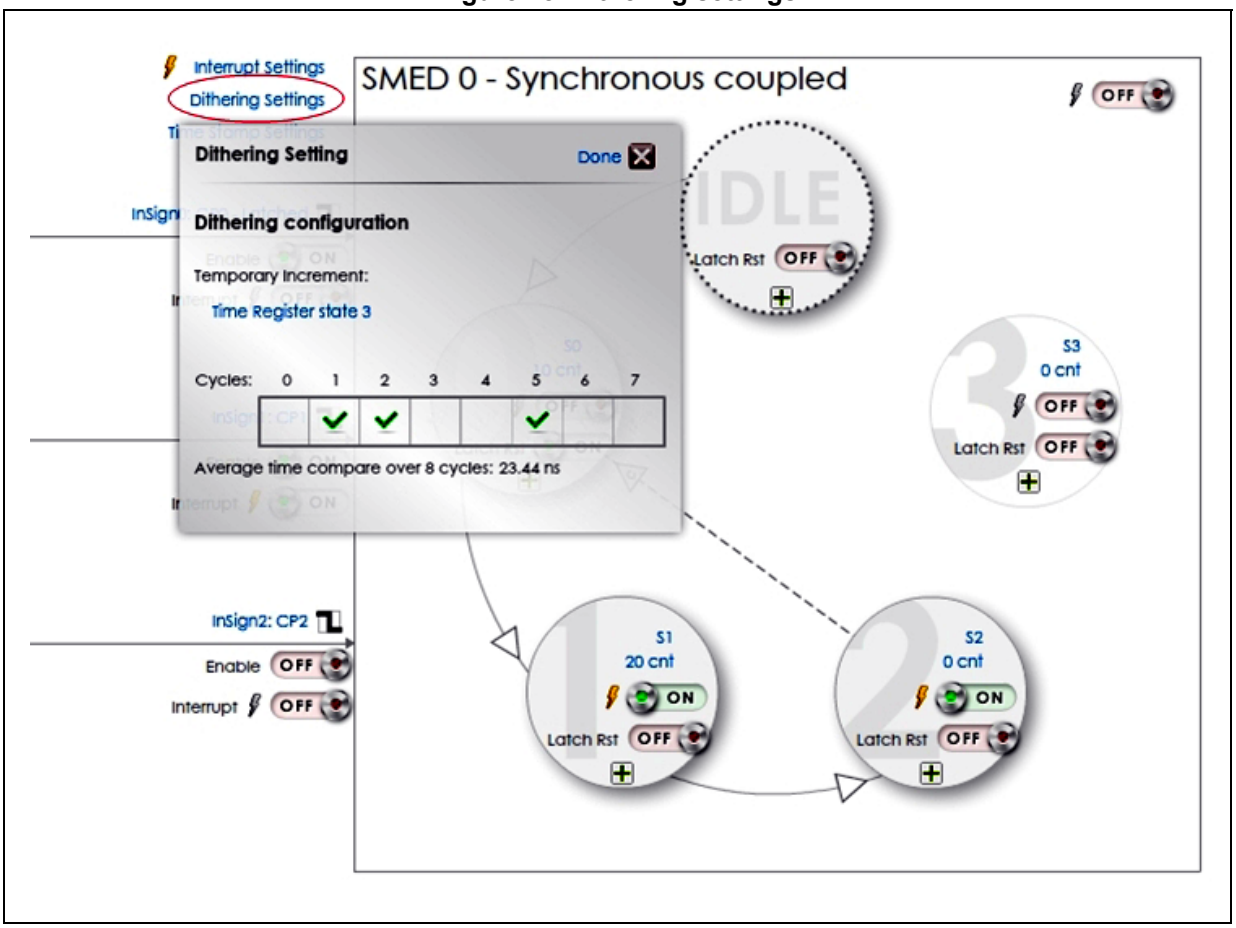


3.1.2 Dithering settings

The “dithering settings” label is used to determine the SMED cycle(s) in which the temporary dithering increment is applied on the selected timer. Any number of cycles may be enabled/disabled.

Clicking on the label “Dithering Settings” a dedicated window will be opened.

Figure 18. Dithering settings

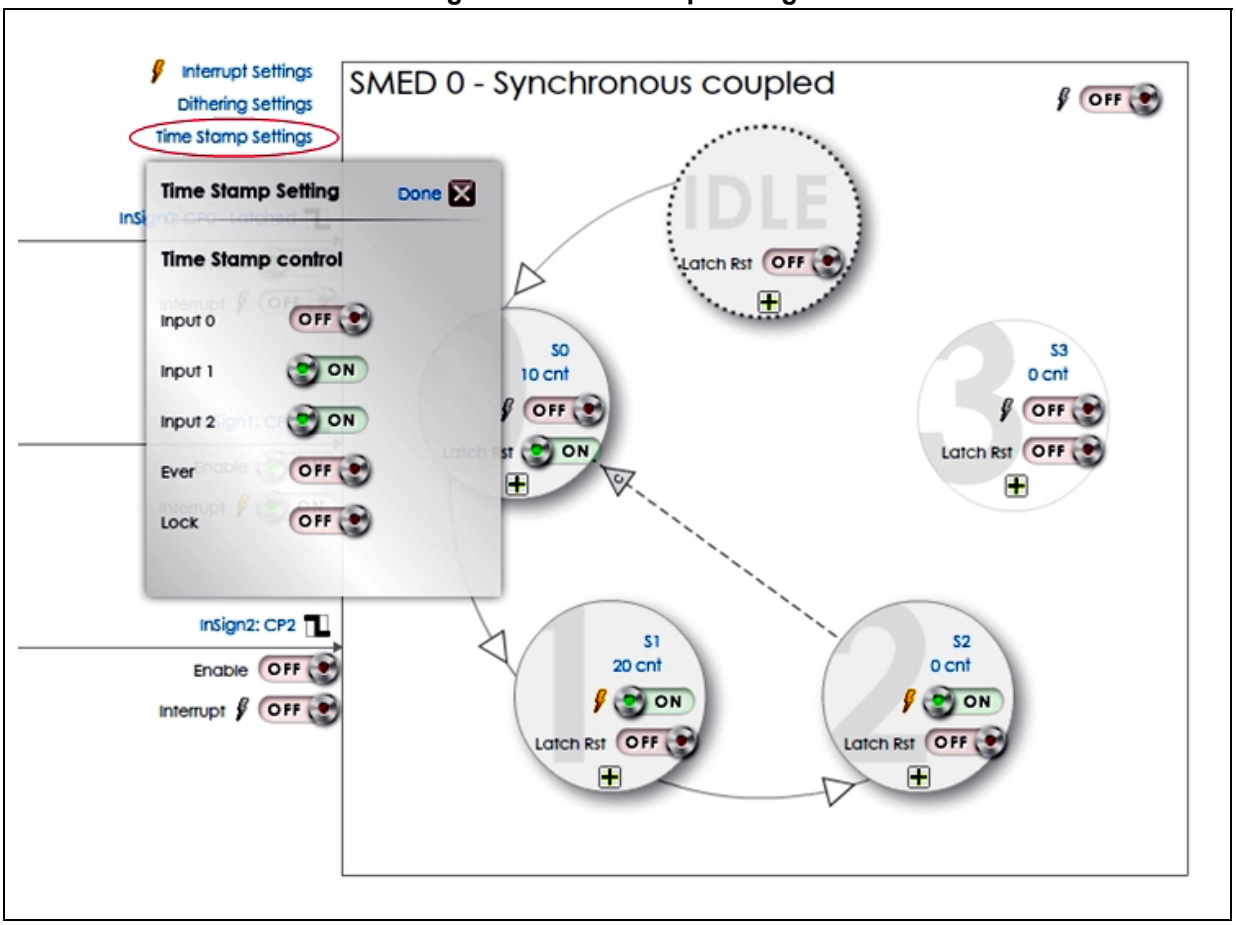


3.1.3 Time stamp settings

The “time stamp settings” label is used to control the dumping feature of the SMEDs.

Clicking on the label “time stamp settings” a dedicated window will be opened.

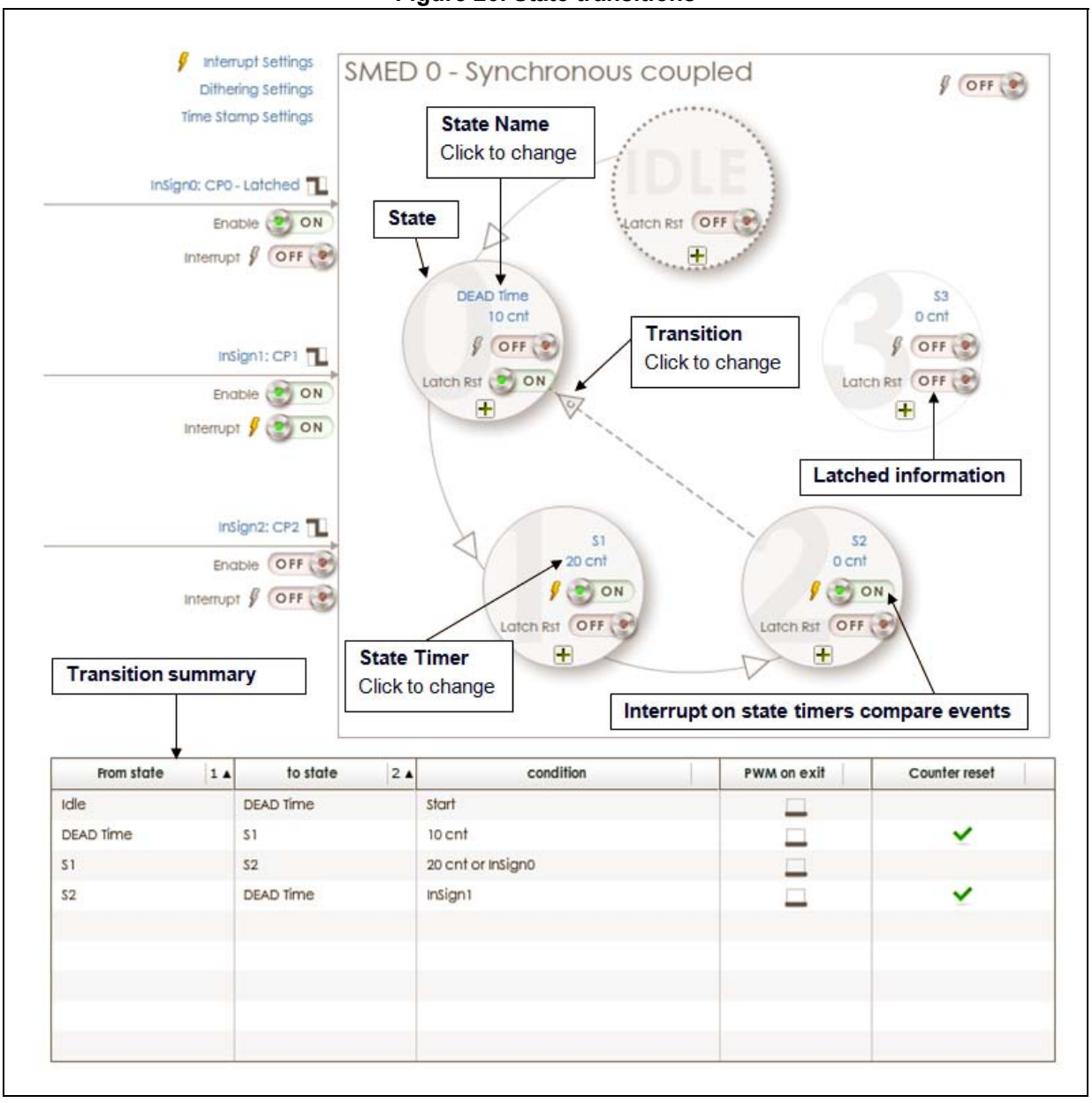
Figure 19. Time stamp settings



3.2 Transitions

State transitions are represented as arrows connecting two states involved in a transition.

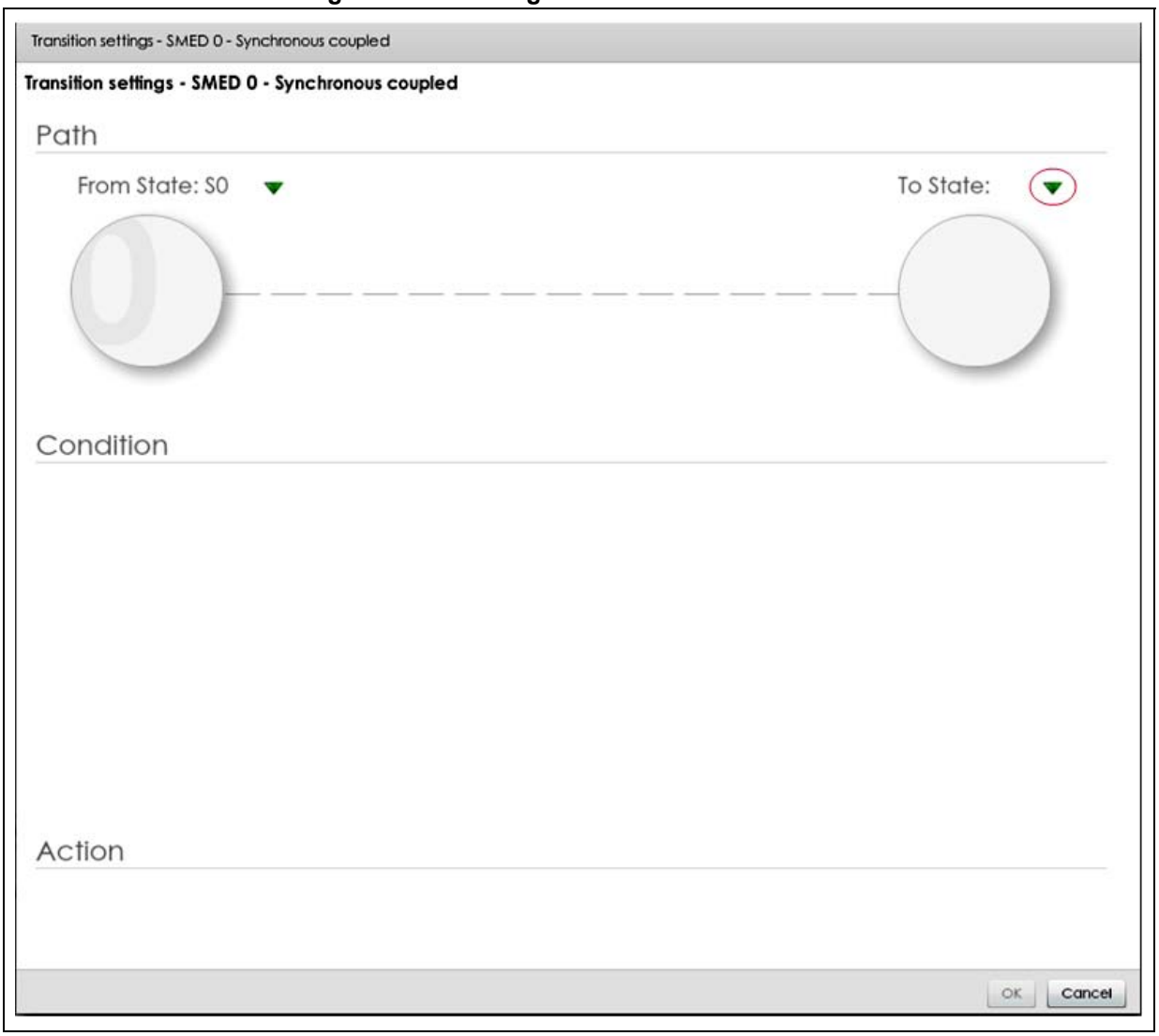
Figure 20. State transitions



To add a new transaction, click on the button relative to the initial state of the transition.

A dedicated window will be opened to select the end state of the transition.

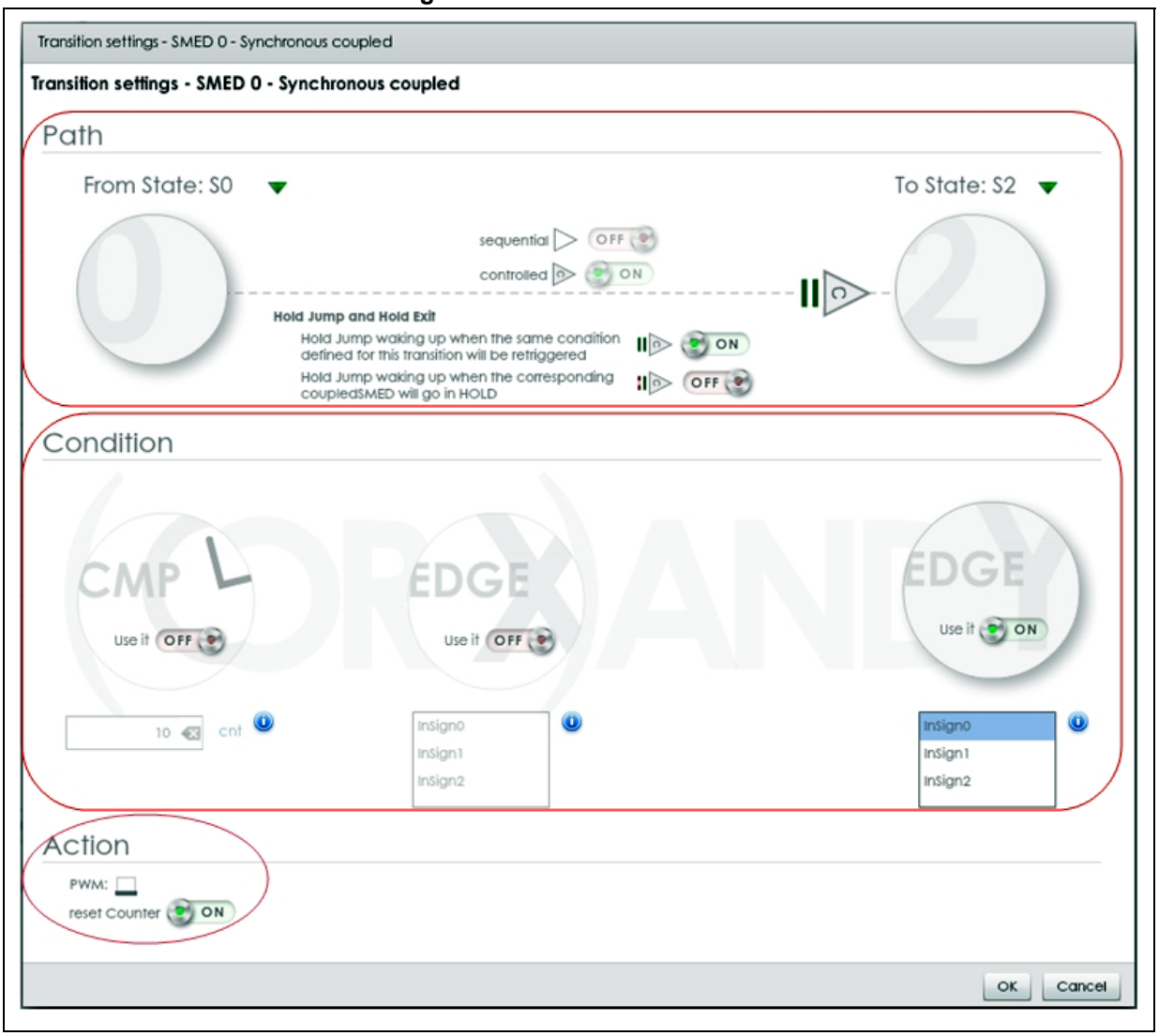
Figure 21. Selecting end state of the transition



To define a transition **three steps** are needed:

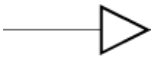
1. Path:
   Determine the path of the transition from the initial state to the end state. The tool automatically determines the type of transition (sequential or controlled) or, in case of ambiguity, leaves the choice to the user.
2. Condition
   Determine which is the condition that generates the transition: the state compare timer, edgeX triggering event, edgeY triggering event and their combination.
3. Action
   Determine which is the action of the transition in term of the PWM value and reset counter.

Figure 22. Transition definition



For the controlled transition the user can enable the possibility to enter the hold state and decides which is the condition that determines the exit from the hold state to go on the end state of the transition.

The tool uses four different symbols to identify the transition:



Sequential transition

Controlled transition

Controlled transition with the hold jump and exit from the hold when the same condition is retriggered.

Controlled transition with the hold jump and exit from the hold when a coupled SMED enters in hold.

4 Menu bar

The menu bar contains the commands that can be used to manage the application.

The available menus are:

- New
  Create a new project
- Load
  Load existing project
- Save
  - Save
    Save the active project
  - Save As…
    Save the active project with a new name
  - Save C File
    Save the text file, that contains the “C” source code of a simple function that initializes all the MIF and SMED registers conforming to the current configuration.
- Option
  Open the Option window
- Help
  - Help
    Open this file
  - Release Note
    Open the Release Note document
  - About
    Open the About window.

5 Revision history

Table 1. Document revision history

Date	Revision	Changes
14-May-2014	1	Initial release.

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