SFC tricks and tips

straton user guide – Rev. 2

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Content

1. Tricks and tips

1.1. Recommended usage

It is possible when creating a new program to use the SFC language (Sequential Function Chart) in two different ways:

- Grid editor: elements (steps, transitions, …) are all aligned in columns and rows.
- Free form editor: each element can be put freely in the program's page

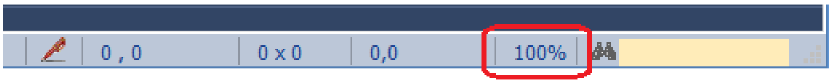
For more comfort and an easier programming, it is advised to use the "SFC – grid editor", because of a clearer overview of the program as well as the possibility to program quickly, helped by shortcuts.

It is also advised to keep simple SFC diagrams with less than 10 steps: using SFC child(s) if needed.

1.2. Zoom

Use the menu command "View / Zoom…" to set the zoom ratio.

You can open the same "zoom" box doing a double click on the zoom ratio displayed in the status bar:

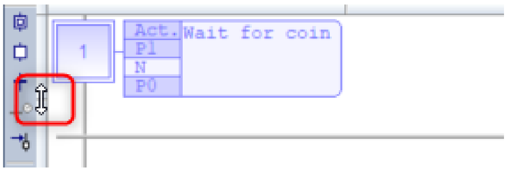


If you have a numerical keypad, you can also use "+" and "-" keys to zoom forward or backward.

The mouse wheel with CTRL key pressed also provides zoom feature.

The zoom in the SFC enlarges columns and rows sizes at the same time.

Rows and columns sizes can be changed, clicking on their border:



1.3. Using the mouse wheel

The mouse wheel offers various features:

- Without any key pressed: scroll vertically
- With SHIFT key pressed: scroll horizontally
- With CTRL key pressed: zoom
- Keep the mouse wheel pressed and move the mouse to scroll in any direction

1.4. Using the toolbar

Refer to the Online Help ("Using the SFC toolbar" page) for additional help. Putting the mouse over the different elements shows, when available, which shortcut can be used instead of pressing the button.

1.5. Using shortcuts

An SFC (grid editor mode) program can be quickly developed with the help of the different shortcuts.

(I) to insert an Initial step

(T) to insert a Transition

(S) to insert a Step

(X) to insert a divergence to the right (like a crossroads X)

(D) to insert a Divergence to the bottom

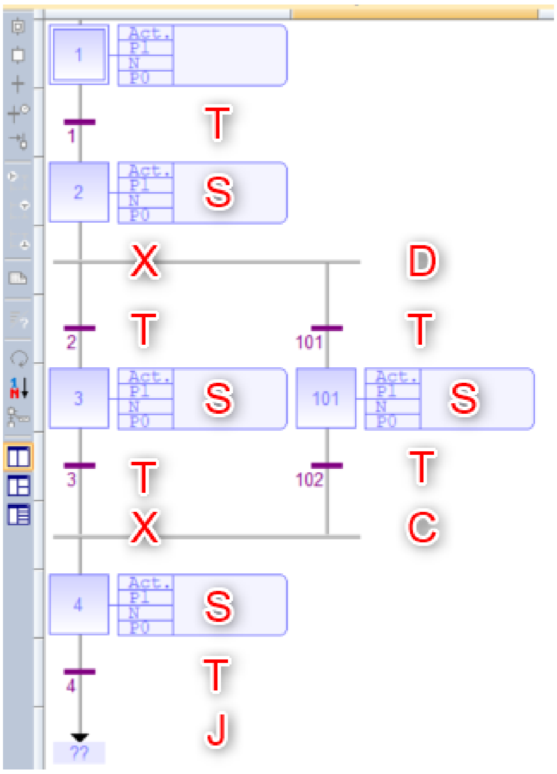
(C) to insert a Convergence

(J) to insert a Jump to a step

For example, after creating a new SFC program, pressing

T S X T S T X S T J and, on the divergence **D T S T C**

Then clicking on the "Renumber" button, it leads to:



1.6. Language in the Step box

In a Step, the program language can be set to ST/IL **or** FBD **or** LD.

To do so, right click in the action box (P1, N or P0) then “Set language ---”.

Note that the change will remove all existing code!

1.7. Language in the Transition box

In a Transition, the program language can be set to ST/IL **or** LD.

To do so, right click in the step box then “Set language ---”.

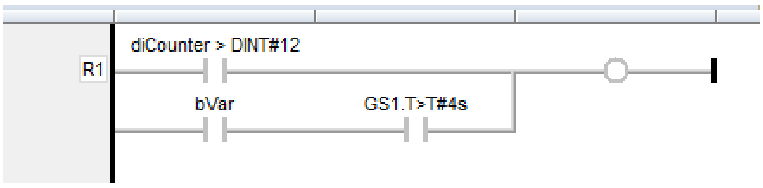
Note that the change will remove all existing code!

A transition is not a piece of code to be executed, this is a Boolean condition.

For example, an ST transition’s condition can be:

```
diCounter > DINT#12 OR (bVar AND GS1.T > T#4s)
```

An LD transition can be:

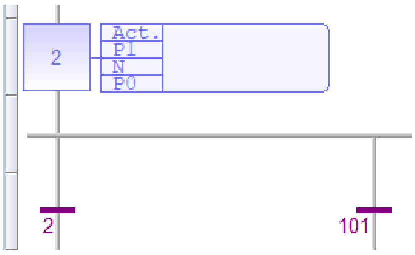


1.8. Initial step

An SFC program uses the “token” principle: the token is passed to a step or transition so it is “active” (code is executed or condition is checked). In order to avoid bad behaviors, this is advised to be very careful using AND and OR divergences, as well as this is advised to set only one initial step per SFC.

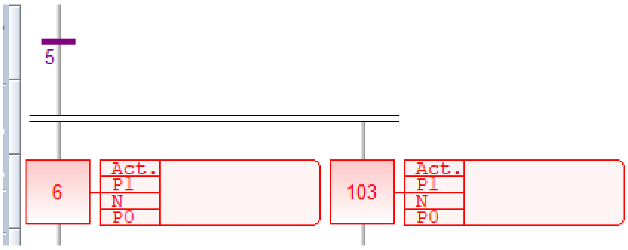
1.9. AND / OR

AND or OR divergences/convergences can be changed after clicking on it and using the spacebar, or the "Swipe Item Style” button (⟳)



An **OR** divergence is a Step followed by one or several Transitions. If both transitions are valid, then the one which is the most on the left is crossed.

An **OR** convergence must finish with Transitions and be followed by a Step.



An AND divergence is a Transition followed by one or several Steps. After the Transition is crossed, both steps below are active.

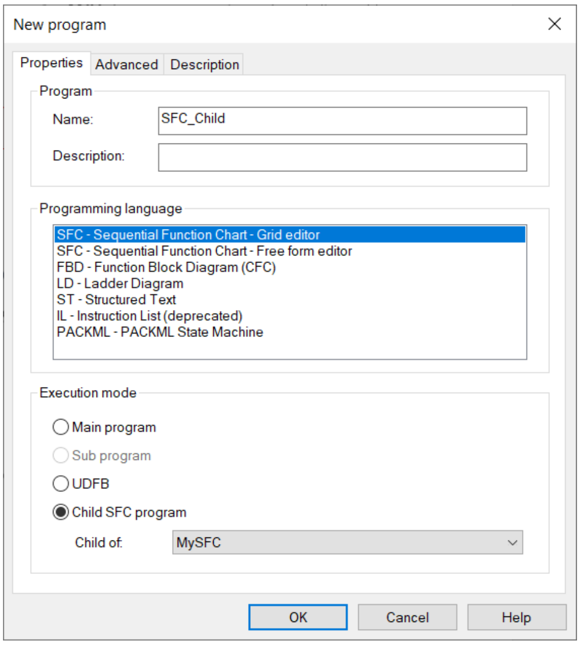
An AND convergence must finish with Steps and be followed by a Transition.

/!\ The transition after the AND convergence can only be crossed if both previous steps are active.

1.10. Inserting some space in the diagram

If needed, this is possible to insert a row in the diagram. Click on the raw and press the "Inser" key. A new raw is then inserted above the selected one.

1.11. SFC Child and debug


New program

Properties | Advanced | Description

Program

Name: SFC_Child

Description:

Programming language

- SFC - Sequential Function Chart - Grid editor
- SFC - Sequential Function Chart - Free form editor
- FBD - Function Block Diagram (CFC)
- LD - Ladder Diagram
- ST - Structured Text
- IL - Instruction List (deprecated)
- PACKML - PACKML State Machine

Execution mode

○ Main program
○ Sub program
○ UDFB
● Child SFC program

Child of: MySFC

An SFC Child is an SFC program which can only be called by an SFC father.

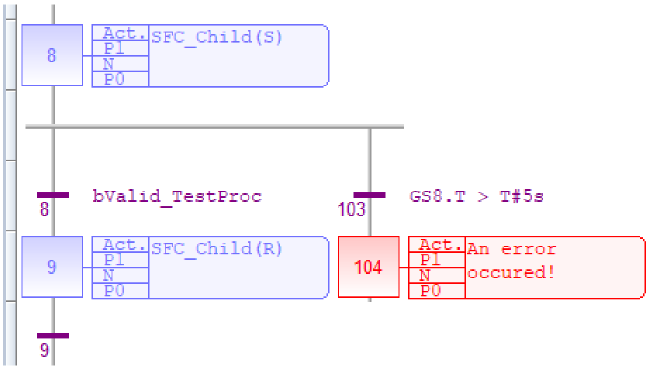
In order to create a child, insert a new program in the Project List, choose the SFC language, the execution mode to “Child of SFC program” and choose an available SFC father.

The SFC child can be called in the Action (S qualifier) of a Step.

SFC_Child(N) activates the child as long as the Step calling it is active

SFC_Child(S) activates the child as soon as the Step is active

SFC_Child(R) deactivates/kills the child as soon as the Step is active

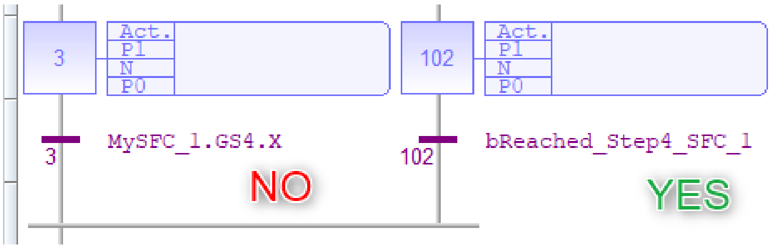


If the SFC is used as a test procedure, for example, prefer using the (S) and (R) calling SFC child instead of (N). This way, once the step indicating an error occurred is reached, the SFC child is not killed (the step calling it initially being now inactive), so it is possible to check, in the child, where did it stop.

1.12. Synchronizing SFCs

It may be needed to call an SFC child several times, by several different steps. The best then is to use an SFC Program declared as an UDFB (can be instantiated).

In an SFC program, this is not possible to know if a step of another SFC is reached or not. If this is needed to synchronize different SFCs, use intermediate, global variables.


3
Act.
P1
N
P0
3
MySFC_1.GS4.X
NO
102
Act.
P1
N
P0
102
bReached_Step4_SFC_1
YES