Auto-Connect Port Prototypes

Technical Reference

Version 1.0.4

Authors	Pavol Gramblicka
Status	Released

Document Information

History

Author	Date	Version	Remarks
Pavol Gramblicka	2015-04-28	0.1.0	Initial version
Pavol Gramblicka	2015-04-28	1.0.0	Final version
Monika Sturm	2017-02-23	1.0.1	Update to latest template
Pavol Gramblicka	2018-03-14	1.0.2	Screenshots updated
Michael Schüle	2021-06-28	1.0.3	Added second set of configuration parameters
Michael Schüle	2022-04-04	1.0.4	Product renamed to DaVinci Developer Classic

Contents

Illustrations

Tables

© 2022 Vector Informatik GmbH

1 Overview

DaVinci Developer Classic is part of Vector’s solution for AUTOSAR compatible software design. It is used to design and configure software components and provides various concepts to support this process.

This document describes a part of the design process related to DaVinci Developer Classic from a technical point of view, trying to give the user a better understanding of the internal processes and how the tool reacts in different situations.

1.1 Intended Audience

This document aims at developers who are involved in the AUTOSAR design process and use DaVinci Developer Classic to integrate various software components.

1.2 Terms and Acronyms

Term	Definition
DEVC	DaVinci Developer Classic

Table 1-1 Terms and Acronyms

2 Input Port Prototypes

The auto-connect functionality may be started contextless from the **Graphic** ribbon page (Figure 2-1) or from the context menu of the graphic view (Figure 2-2).

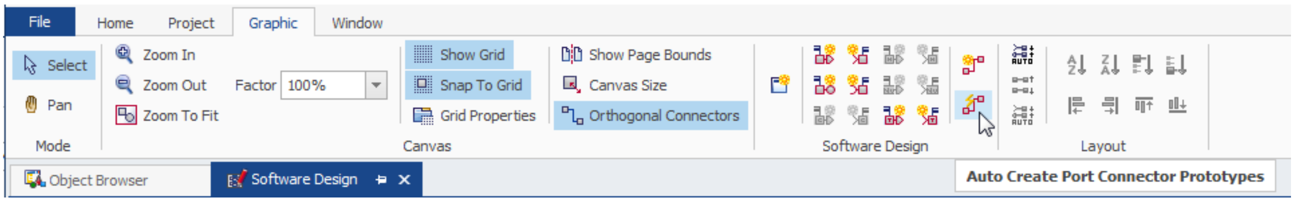


Figure 2-1 Start the contextless auto-connecting

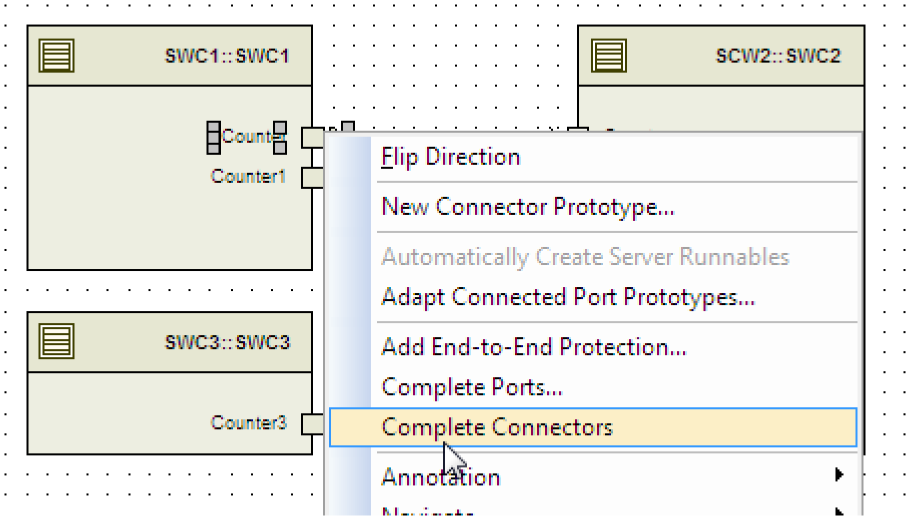

SWC1::SWC1
Count
Counter1
SCW2::SWC2
SWC3::SWC3
Counter3
Flip Direction
New Connector Prototype...
Automatically Create Server Runnables
Adapt Connected Port Prototypes...
Add End-to-End Protection...
Complete Ports...
Complete Connectors
Annotation
Navigate

Figure 2-2 Start the context dependent auto-connecting

1. In case of the contextless connecting, all port prototypes of the parent composition are considered.
2. In case of the context dependent connecting, the connections are created according to the provided selection.
   - **no selection** – all port prototypes within the composition are considered
   - **a component is selected** – all port prototypes of the component are considered
   - **single port prototype selection** – only these port prototypes are considered to be the source resp. destination of a proposed connector prototype

© 2022 Vector Informatik GmbH

3 Auto-Connect

3.1 Auto-Connect – simple pattern

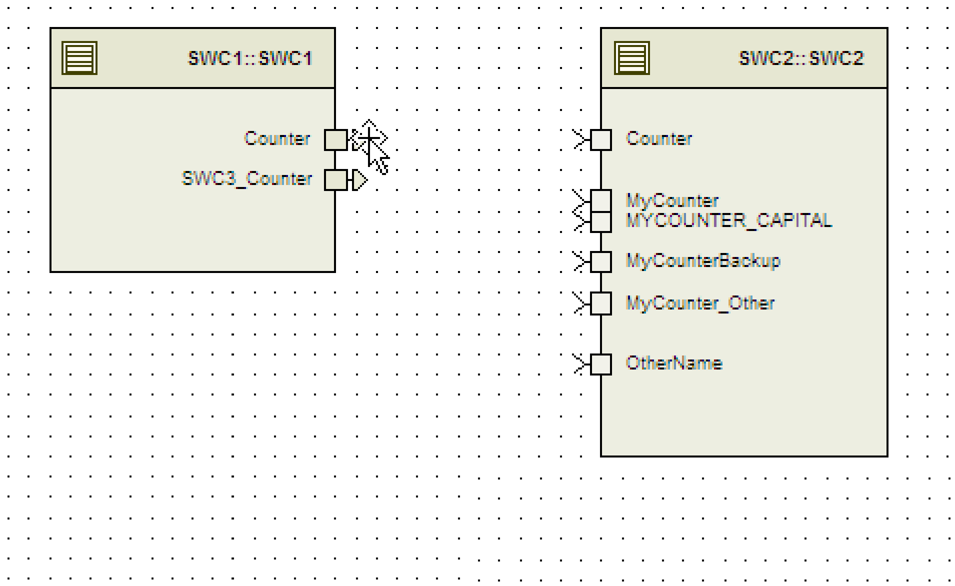
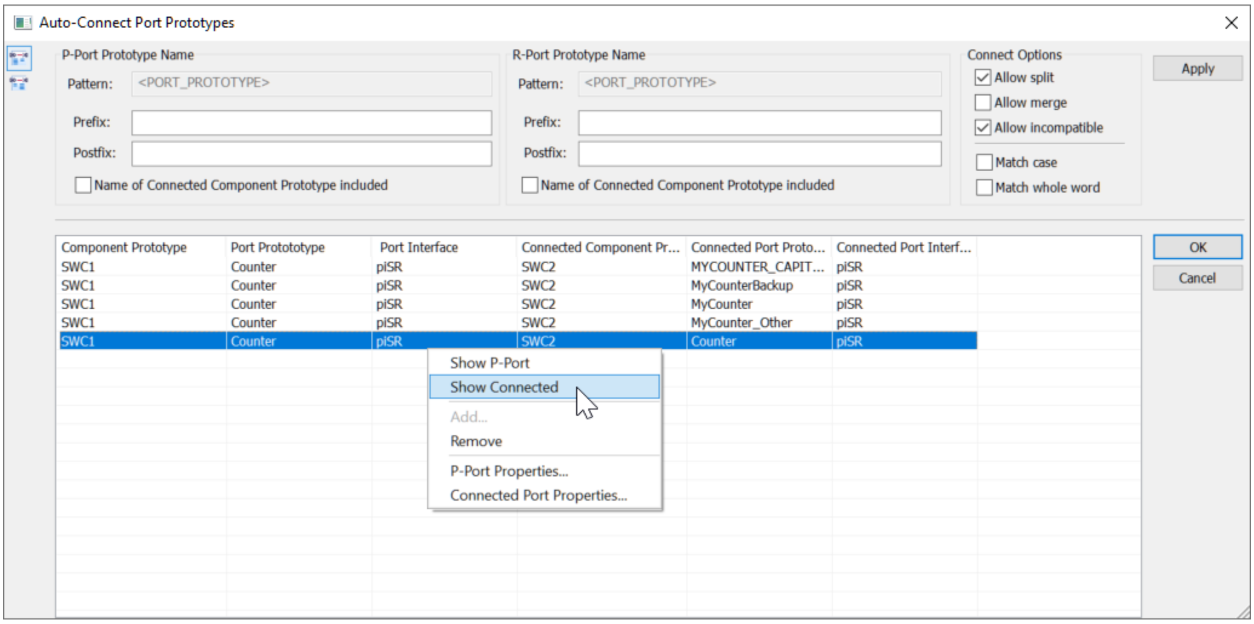


Figure 3-1 Simple auto-connect scenario

Imagine we want to use the context dependent auto-connect for the port prototype **Counter** of the component **SWC1**.

1. Select the port prototype
2. Right mouse-click on port prototype to open the context menu
3. Choose **Complete Connectors**



Auto-Connect Port Prototypes

P-Port Prototype Name
Pattern: <PORT_PROTOTYPE>
Prefix:
Postfix:
□ Name of Connected Component Prototype included

R-Port Prototype Name
Pattern: <PORT_PROTOTYPE>
Prefix:
Postfix:
□ Name of Connected Component Prototype included

Connect Options
☑ Allow split
□ Allow merge
☑ Allow incompatible
□ Match case
□ Match whole word

Component Prototype	Port Prototype	Port Interface	Connected Component Pr...	Connected Port Proto...	Connected Port Interf...
SWC1	Counter	piSR	SWC2	MYCOUNTER_CAPIT...	piSR
SWC1	Counter	piSR	SWC2	MyCounterBackup	piSR
SWC1	Counter	piSR	SWC2	MyCounter	piSR
SWC1	Counter	piSR	SWC2	MyCounter_Other	piSR
SWC1	Counter	piSR	SWC2	Counter	piSR

Figure 3-2 List of proposed connections

The algorithm is looking for counterparts for the selected port prototype **SWC1.Counter**

- in the first step, the naming pattern is analyzed to provide a key string
- a simple pattern search without prefix resp. postfix is used, i.e. only the name of the port prototype is essential for the search algorithm, key string = **Counter**
- for all connectable port prototypes[1], if the key string is a substring of the name of a connectable port prototype, a connection will be proposed
- a line in the dialog then corresponds to the proposed connection
- additionally, the algorithm can be refined with **Connect Options**
  - **Match case** – consider case sensitive matching
  - **Match whole word** – consider exact matching
  - **Allow split** – in case of a P-Port more than one connection is allowed
  - **Allow merge** – in case of an R-Port more than one connection is allowed
  - **Allow incompatible** – consider AUTOSAR compatibility rules
- If you refined the options, press **Apply** to take the changes into account
- to get more information about proposed connection press right mouse button to open the context menu
  - with **Show P-Port** resp. **Show Connected** menu buttons the port prototypes might be located in the software design graphic editor

[1] A connectable port prototype is such a port prototype which allow for creation of a meaningful connector prototypes. In case of an assembly connector, if P-Port is selected only an R-Port or PR-Ports are meaningful and vice versa. In case of a delegation connector prototypes, if P-Port is selected only a P-Port or PR-Port are meaningful and similar if an R-Port is selected only an R-Port or PR-Port are meaningful

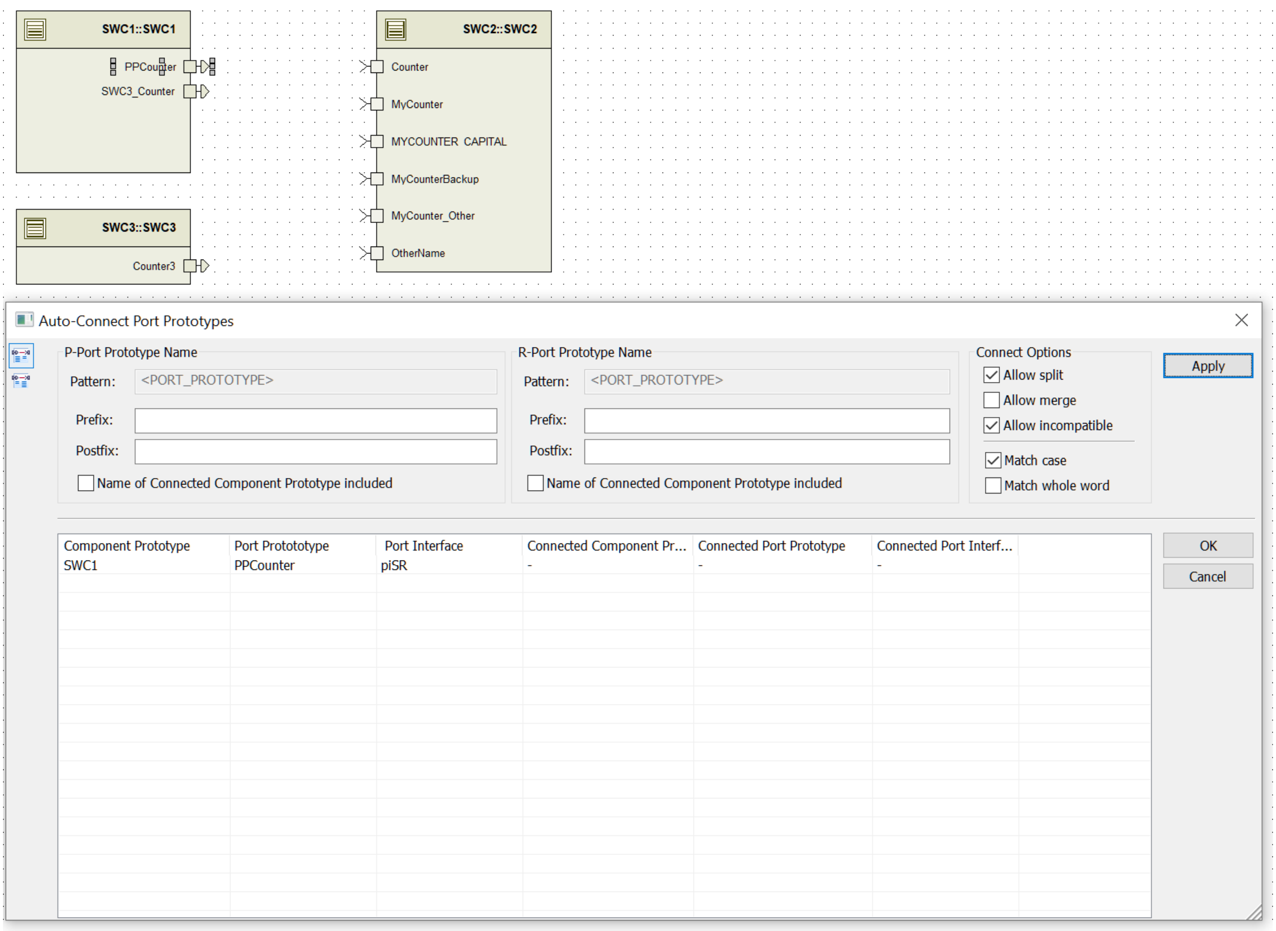
- with **Add** and **Remove** menu buttons the proposed list might be edited
- with the remaining menu buttons the corresponding property dialogs can be opened

3.2 Auto-Connect – enhanced patterns

In a more complicated case, the naming pattern of the selected port prototype has to be identified.

3.2.1 Prefix, Postfix

Consider the designer uses always a prefix or a postfix for his port prototypes, e.g. **SWC1::PPCounter**. In this case, the algorithm cannot find any connectable port prototype which includes the substring **PPCounter** in his name.



P-Port Prototype Name

Pattern: <PORT_PROTOTYPE>

Prefix:

Postfix:

□ Name of Connected Component Prototype included

R-Port Prototype Name

Pattern: <PORT_PROTOTYPE>

Prefix:

Postfix:

□ Name of Connected Component Prototype included

Connect Options

☑ Allow split

□ Allow merge

☑ Allow incompatible

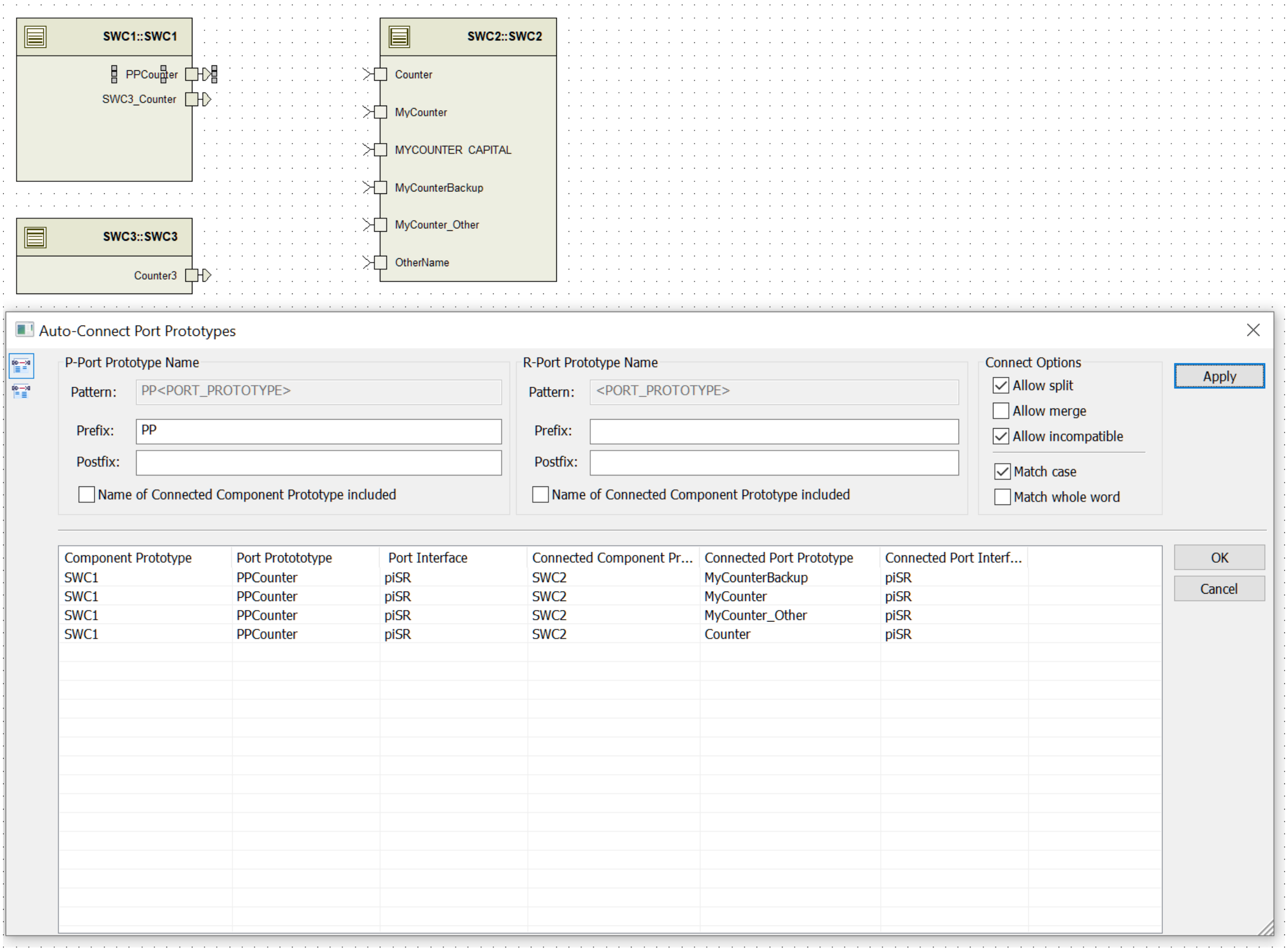
☑ Match case

□ Match whole word

Component Prototype	Port Prototype	Port Interface	Connected Component Pr...	Connected Port Prototype	Connected Port Interf...
SWC1	PPCounter	piSR	-	-	-

Figure 3-3 Context dependent auto-connecting of a prefixed port prototype

The user must explicitly determinate the prefix part. When computing the key string, the prefix part will be removed and the algorithm is running like in the simple case.



Auto-Connect Port Prototypes

P-Port Prototype Name
Pattern: PP<PORT_PROTOTYPE>
Prefix: PP
Postfix:
□ Name of Connected Component Prototype included

R-Port Prototype Name
Pattern: <PORT_PROTOTYPE>
Prefix:
Postfix:
□ Name of Connected Component Prototype included

Connect Options
☑ Allow split
□ Allow merge
☑ Allow incompatible
☑ Match case
□ Match whole word

Apply

Component Prototype	Port Prototype	Port Interface	Connected Component Pr...	Connected Port Prototype	Connected Port Interf...
SWC1	PPCounter	piSR	SWC2	MyCounterBackup	piSR
SWC1	PPCounter	piSR	SWC2	MyCounter	piSR
SWC1	PPCounter	piSR	SWC2	MyCounter_Other	piSR
SWC1	PPCounter	piSR	SWC2	Counter	piSR

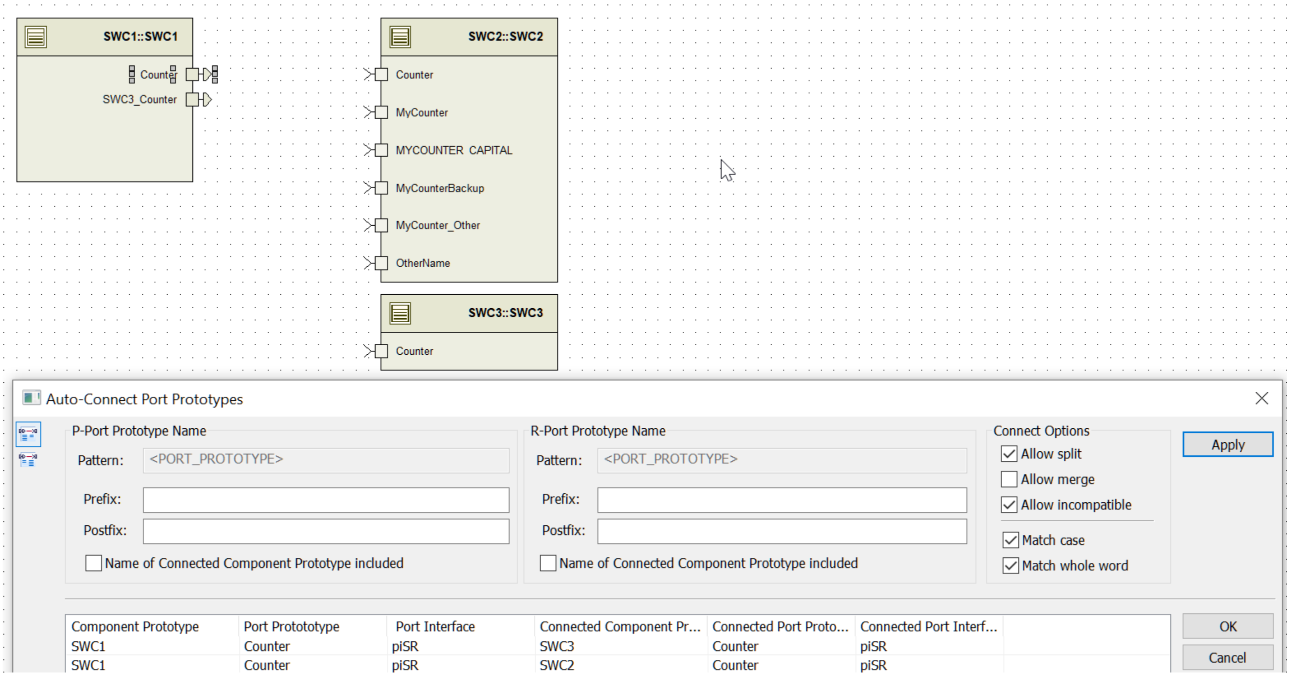
OK
Cancel

Figure 3-4 Context dependent auto-connecting with a prefixed naming pattern

The prefix and postfix mechanism can be applied to both port names. This is useful if sender and receiver ports contain a prefix and/or postfix and several port names contain the same substring. To ensure a correct match prefixes and/or postfixes must be specified for both ports and option “Match whole word” has to be enabled.

3.2.2 Complex patterns using the component prototype name

In a very special case, the destination component may be identified by the naming pattern. This scenario is applicable if there are components which have port prototypes of the same or similar naming but the proposed set should be restricted to a dedicated component. Suppose we want to restrict the proposal to component **SWC2**. The Figure 3-5 displays such a scenario where connections to **SWC2** and **SWC3** will be proposed. In our example, we can simply remove the connection to **SWC3** but in general it might be difficult to identify such relations.



P-Port Prototype Name
Pattern: <PORT_PROTOTYPE>
Prefix:
Postfix:
□ Name of Connected Component Prototype included

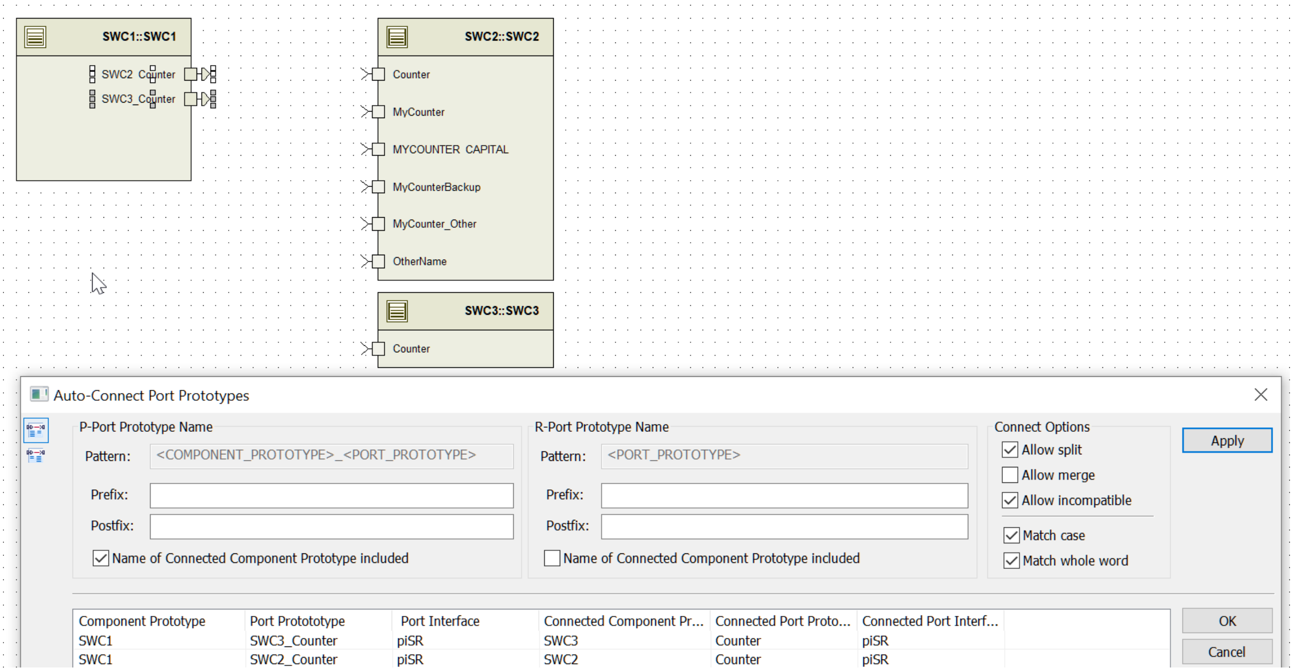
R-Port Prototype Name
Pattern: <PORT_PROTOTYPE>
Prefix:
Postfix:
□ Name of Connected Component Prototype included

Connect Options
☑ Allow split
□ Allow merge
☑ Allow incompatible
☑ Match case
☑ Match whole word

Component Prototype	Port Prototype	Port Interface	Connected Component Pr...	Connected Port Proto...	Connected Port Interf...
SWC1	Counter	piSR	SWC3	Counter	piSR
SWC1	Counter	piSR	SWC2	Counter	piSR

Figure 3-5 Context dependent auto-connecting of a port prototype without the component restriction

To be sure the port prototype of the desired component will be proposed, the restriction must be coded in the name of the selected port prototyped. The naming pattern looks like this <COMPONENT_PROTOTYPE>_<PORT_PROTOTYPE>. The algorithm will parse the port prototype name and try to identify corresponding parts. In addition to the current concept, the name of the component will be matched.



P-Port Prototype Name
Pattern: <COMPONENT_PROTOTYPE>_<PORT_PROTOTYPE>
Prefix:
Postfix:
☑ Name of Connected Component Prototype included

R-Port Prototype Name
Pattern: <PORT_PROTOTYPE>
Prefix:
Postfix:
□ Name of Connected Component Prototype included

Connect Options
☑ Allow split
□ Allow merge
☑ Allow incompatible
☑ Match case
☑ Match whole word

Component Prototype	Port Prototype	Port Interface	Connected Component Pr...	Connected Port Proto...	Connected Port Interf...
SWC1	SWC3_Counter	piSR	SWC3	Counter	piSR
SWC1	SWC2_Counter	piSR	SWC2	Counter	piSR

Figure 3-6 Context dependent auto-connecting of port prototypes with the component restriction

This option is available for both port names in case both contain the SWC name of their counterpart.

4 Contact

Visit our website for more information on

- News
- Products
- Demo software
- Support
- Training data
- Addresses

www.vector.com