

PACiS SCE

System Configuration Editor

SCE/EN O/D10

Operation Guide

PACiS SCE
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SAFETY & HANDLING

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1. INTRODUCTION

This document is a chapter of PACiS System Configuration Editor PACiS SCE documentation. It describes the safety, handling, packing and unpacking procedures applicable to PACiS SCE software tools.

2. SAFETY

WARNING: THIS SAFETY SECTION SHOULD BE READ BEFORE COMMENCING ANY WORK ON THE EQUIPMENT.

2.1 Health and Safety

The information in the Safety Section of the product documentation is intended to ensure that products are properly installed and handled in order to maintain them in a safe condition. It is assumed that everyone who will be associated with the equipment will be familiar with the contents of the Safety Section and all Safety documents related to the PC and Communication networks.

2.2 Explanation of symbols and labels

The meaning of symbols and labels may be used on the equipment or in the product documentation, is given below.

2.3 Installing, Commissioning and Servicing



Equipment operating conditions

The equipments (PC supporting PACiS SCE) should be operated within the specified electrical and environmental limits.



Fibre optic communication

Optical LED transceivers used in Switch boards are classified as IEC 825-1 Accessible Emission Limit (AEL) Class 1 and consequently considered eye safe.

Optical power meters should be used to determine the operation or signal level of the device.

2.4 Decommissioning and Disposal

Disposal:

It is recommended to avoid incineration and disposal of the PACiS SCE CD-ROM. The product should be disposed of in a safe manner.

3. GUARANTEES

The media on which you received Schneider Electric software are warranted not to fail executing programming instructions, due to defects in materials and workmanship, for a period of 90 days from date of shipment, as evidenced by receipts or other documentation. Schneider Electric will, at its option, repair or replace software media that do not execute programming instructions if Schneider Electric receive notice of such defects during the warranty period. Schneider Electric does not warranty that the operation of the software shall be uninterrupted or error free.

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In any application, including the above reliability of operation of the software products can be impaired by adverse factors, including -but not limited- to fluctuations in electrical power supply, computer hardware malfunctions, computer operating system, software fitness, fitness of compilers and development software used to develop an application, installation errors, software and hardware compatibility problems, malfunctions or failures of electronic monitoring or control devices, transient failures of electronic systems (hardware and/or software), unanticipated uses or misuses, or errors from the user or applications designer (adverse factors such as these are collectively termed "System failures").

Any application where a system failure would create a risk of harm to property or persons (including the risk of bodily injuries and death) should not be reliant solely upon one form of electronic system due to the risk of system failure to avoid damage, injury or death, the user or application designer must take reasonably steps to protect against system failure, including -but not limited- to back-up or shut-down mechanisms, not because end-user system is customised and differs from Schneider Electric testing platforms but also a user or application designer may use Schneider Electric products in combination with other products.

These actions cannot be evaluated or contemplated by Schneider Electric; Thus, the user or application designer is ultimately responsible for verifying and validating the suitability of Schneider Electric products whenever they are incorporated in a system or application, even without limitation of the appropriate design, process and safety levels of such system or application.

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1. INTRODUCTION TO PACiS

The PACiS range will continue to be expanded. The general features of PACiS will also be enhanced, as we are able to adopt new technology solutions.

For up-to-date information on any PACiS product, visit our website:
www.schneider-electric.com

2. INTRODUCTION TO PACiS GUIDES

This version of the PACiS SCE documentation refers to version PACiS. The guides provide a functional and technical description of the PACiS System Configuration Editor - PACiS SCE adapted to PACiS V4 (IEC61850 Station Bus) and a comprehensive set of instructions for the PACiS SCE's use and application.

PACiS SCE guides is divided into two volumes, as follows:

- Operation Guide: includes information on the application of the PACiS SCE and a technical description of its features. It is mainly intended for protection & control engineers concerned with the selection and application of the PACiS SCE for the Configuration of PACiS solution or of any of the PACiS equipment.
- Technical Guide: contains information on the installation and commissioning of the PACiS SCE, and also a section on fault finding. This volume is intended for site engineers who are responsible for the installation, commissioning and maintenance of the PACiS SCE application.

2.1 Chapters description

2.1.1 Chapter Safety (SA)

This chapter contains the safety instructions, handling and reception of electronic equipment, packing and unpacking parts, Copyrights and Trademarks.

2.1.2 Chapter Introduction (IT)

This is this document containing the description of each chapter of the PACiS SCE guides. It is a brief introduction to PACiS SCE capabilities.

2.1.3 Chapter Functional Description (FT)

This chapter contains a description of the product. It describes the functions included in PACiS SCE.

2.1.4 Chapter Technical Data (TD)

This chapter contains the technical data including, accuracy limits, recommended operating conditions, ratings and performance data.

It also describes environment specification, compliance with technical standards.

2.1.5 Chapter HMI, Local control and user interface (HI)

This chapter contains the operator interface description, Menu tree organisation and navigation, Setting/configuration software.

2.1.6 Chapter Installation (IN)

This chapter contains the installation procedures.

2.1.7 Chapter Commissioning record sheet (RS)

This chapter provides detailed record sheets to commission PACiS SCE.

2.1.8 Chapter Settings (ST)

This chapter contains the list of the setting with defaults values and range of the PACiS SCE.

2.1.9 Chapter Maintenance, Fault finding, Repairs (MF)

This chapter provides advice on how to identify failure modes, fault codes and describes the recommended repair actions.

2.1.10 Chapter Problem analysis (PR)

This chapter provides practical examples of problem solving and company contact information. It includes all information on the self-checking features and diagnostics of PACiS SCE.

2.1.11 Chapter Lexicon (LX)

This chapter contains lexical description of acronyms and definitions of the PACiS SCE.

2.2 **Operation guide**

This guide contains the following chapters:

SA, IT, TD, FT, HI, AP, LX

2.3 **Technical guide**

This guide contains the following chapters:

SA, IT, TD, FT, IN, ST, RS, MF, PR, LX

3. INTRODUCTION TO PACiS SCE APPLICATIONS

The PACiS SCE Applications are mainly defined in the Application chapter (AP) of each PACiS equipment (MiCOM C264/C264P, PACiS GTW, PACiS OI).

TECHNICAL DATA

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1. SCOPE OF THE DOCUMENT

This document is a chapter of PACiS System Configuration Editor PACiS SCE documentation. It describes the Technical Data (SCE/EN TD) of this set of software applications.

2. REQUIREMENTS

For the minimum hardware requirements to operate the PACiS SCE application, please refer to the table that follows:

Type of PC	Standard desktop with CPU Xeon 2.8 GHz
RAM	2048 Mbytes or more
Hard Disk	80 GB - FT32 format or more.
CD-ROM Reader	
Operating System	Windows Seven Pro 32 Bits (SP1) / 2003 / XP Pro (SP3)
Applications	XML parser
Graphics	VGA screen 256 colours minimum, resolution 1024*768 or higher
Optional	Ethernet port, USB port, CD-Writer for database exchange

You can install the SCE on the same PC than has the Operator Interface (OI) and the System Management Tool (SMT).

3. CAPABILITIES

The capabilities of the PACiS SCE application allow you to define the maximum configuration of a PACiS project. You can find a description of the capacity limits of the different devices of a PACiS project in the chapter PACiS SCE/EN MF. Please refer to the topic, Capacity limits.

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FUNCTIONAL DESCRIPTION

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1. SCOPE OF THE DOCUMENT

This document is a chapter of the PACiS SCE documentation. It is the functional description of PACiS System Configuration Editor software application dedicated to the PACiS system and sub-systems.

2. PACiS SCE ARCHITECTURE

2.1 General Description

The System Configuration Editor (PACIS SCE) is the central tool in charge to manage the PACiS system database for the PACiS equipment. The system configuration database contains the configuration data for the PACiS system equipment:

- PACiS OI the Operator Interface
- PACiS SMT the System Management Tool that download Databases
- PACiS GTW the Tele control gateway
- MiCOM Computers C264 & C264P

The PACIS SCE allows some authorised personnel to interact with the PACiS system configuration:

- modelling of coherent system configuration data: devices, electrical topologies, graphical mimics, automations
- generation of configuration data-file for IEC61850 devices of the PACiS project

To generate any equipment database, the PACIS SCE manages:

- Inner data of the device itself (structure and parameters values)
- Exchange data of the device with other system devices
- Exchange data of the device with non-system devices

With the 3rd case, the PACIS SCE manages the communication with all non-PACiS devices with typically IED or protection devices on Legacy BUS or system network. It is only by the configuration of communication mapping that PACIS SCE can handle non-PACiS devices.

2.2 Functional Specification

PACiS System Configuration Editor is a tool that:

- helps in definition/edition of equipment data with specific editors (attribute, mimic, ISaGRAF) or with queries on configuration
- generates equipment databases

The definition of data is done firstly by the definition by developer experts of templates or models of data. These templates are then stored and delivered in PACIS SCE libraries. In a second time, the models can be loaded and instanced as a clever kind of duplication to create object data customised to the application case.

When all data of the concrete case are defined, the PACIS SCE generates a coherent set of databases that can be loaded into each system device.

2.2.1 PACIS SCE Users

Control access of an operator is realised through a login and password capture.

Different levels of operators are distinguished depending on its role:

- **Level 1** allows the modification of an existing configuration by adjustment of parameters, settings or graphical representations. The users of level 1 can also add or remove elements derived from the user template libraries. They can generate PACiS application databags. Level 1 users are typically final users.
- **Level 2** allows the modification of an existing configuration by adding or removing elements derived from the user templates libraries. They can break the links between the templates and the instantiated objects. Like level 1 users they can generate PACiS application databags. Level 2 users are Integrators and VARs.
- **Level 3** users have the capability to modify and create new templates derived from the existing template libraries. They can generate PACiS application databags but also template libraries. User of level 3 will be all T&D-EAI PACiS specialists.
- **Level 4** users are PACiS SCE experts. They can modify and create the templates directly from the structural database elements. Their PACiS SCE user level allows also the management of all template databases and the administration of the structural database. The level 4 users are the PACiS SCE administrators.

Such categories is only an outline of PACiS SCE users since several of its tools thanks to specific editors, or report managers, can provided the records needed by other tasks: commissioning cubicle, mapping extraction, etc.

2.2.2 PACIS SCE Template & Object

A **database** is basically a collection of persistent data. In the PACiS SCE framework, a database is a collection of **objects**. Any object has its specific **attributes**, organised in categories and subcategories. The objects are organised in the database by following pre-defined association rules.

The **structural database** defines **object types** and **association types**. Association types are **hierarchical link types** and **relation link types** between object types. Hierarchical links are defined for father/child associations. Relation links are defined for other associations, and may hold attributes. **Cardinalities** are defined for all associations.

A **library database** contains **templates**. A template is a collection of objects/associations instantiated from the structural database or from others templates.

A **configuration database** contains objects/associations instantiated from types of the structural database or from templates. It also contains its own templates, created specifically for the configuration, or imported from a library database. A configuration database defines all data needed by system devices to feel up customer application.

All the database elements support internationalisation (multiple languages).

2.2.3 Database creation process

To create the database downloaded to system devices, the common way is to:

- Import a template from an external library into current database (in its template area)
- Customise the template if needed in DB template area
- Instantiated the template from template to Object part of the database
- Fill up predefined attribute known as degree of freedom (for example the name)
- Generate devices databases

The link between template and instantiated object can be kept. Nevertheless this relation can be broken for deep object modifications.

During all this creation process, the PACiS SCE does a check of data coherency with its Data Model. The checks are made with templates and objects. The checks are made during configuration edition and/or by a check action. They are done on:

- Attribute input
- Relation creation
- Generation

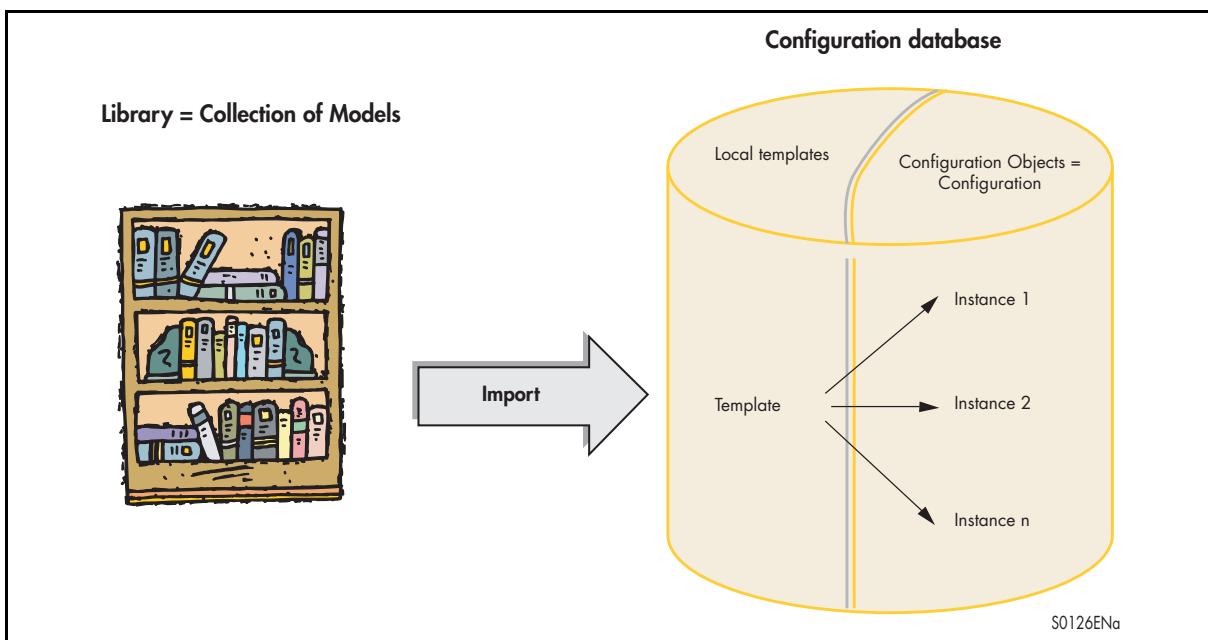


FIGURE 1: CONFIGURATION PROCESS

2.2.4 Version & release

Along time, system's device features have evolution and their inner data base structure is subject to modification. PACiS SCE need to feel the new requirement and has also evolutions and corrections referenced by version.

A unique reference determines the coherent set of system equipment database and soft/hard equipment that PACiS SCE can be used.

PACiS SCE can be compared two referenced versions of a configuration.

2.3 External Interfaces

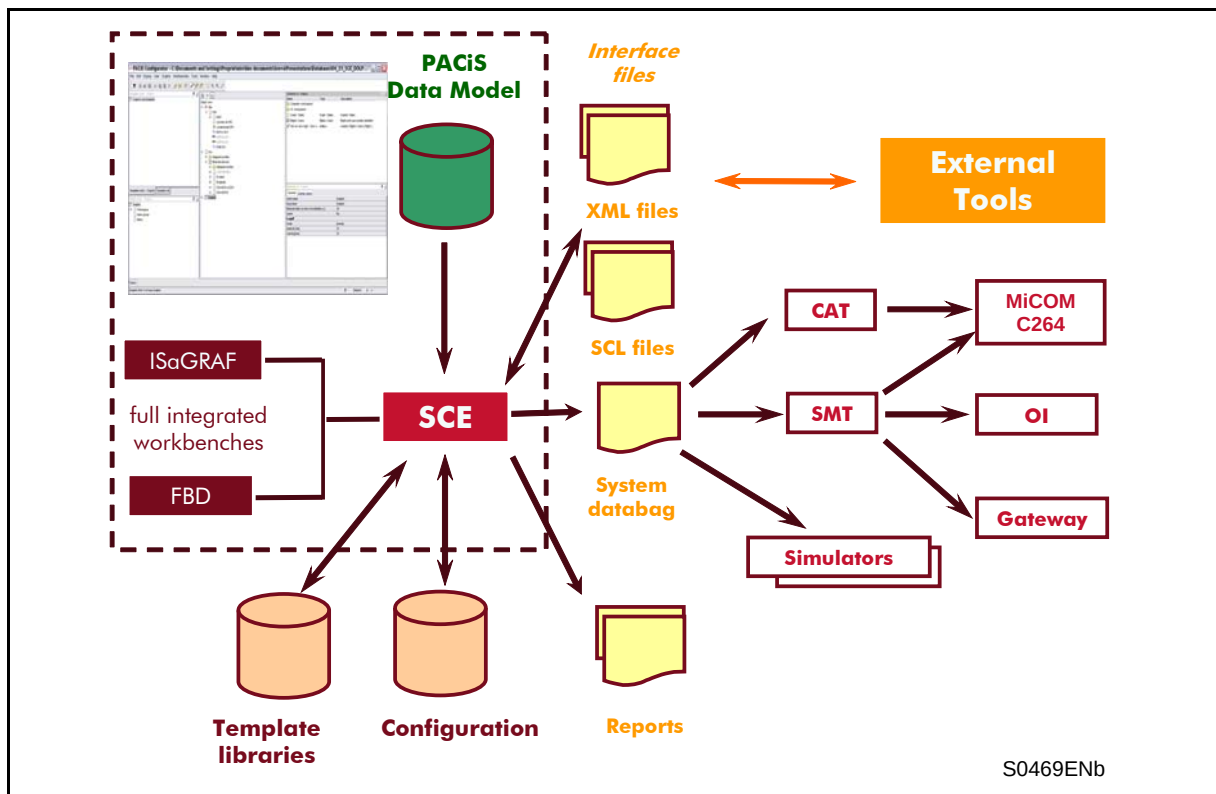


FIGURE 2: EXTERNAL INTERFACES

There is no software interfaces between PACiS SCE and other external tools or PACiS devices.

External interfaces are implemented through files:

- XML files: the user can export / import objects to / from other database.
- SCL files: the user can export or import a whole configuration or only a subset. A PACiS SCE exchange SCL format is defined for describing files which are:
 - Exported from PACiS SCE to an external tool.
 - Imported from an external tool to PACiS SCE.
- System databag: from a referenced version of a configuration, PACiS SCE generates an application databag for each PACiS devices. The application databags are bagged in a System databag. The system databag are used by PACiS CAT to download application databag in each MiCOM C264. The system databag are used by PACiS SMT to download application databag in each PACiS devices. This system databag could be used by PACiS simulator tools.
- Reports: the user selects a whole configuration or only a subset and asks a report. A predefined report pdf format is delivered with PACiS SCE.

LIMITATION: The PACiS SCE importing of graphical object whose level is lower or equal to mimic is not supported.

2.4 Human Interface

2.4.1 PACiS SCE General Display

At initial start-up or after installation of new version, the PACiS SCE application display can be seen as represented below (as far as user has all PACiS SCE rights and licences). It should be noticed that all parts are not necessary needed for all kind of user.

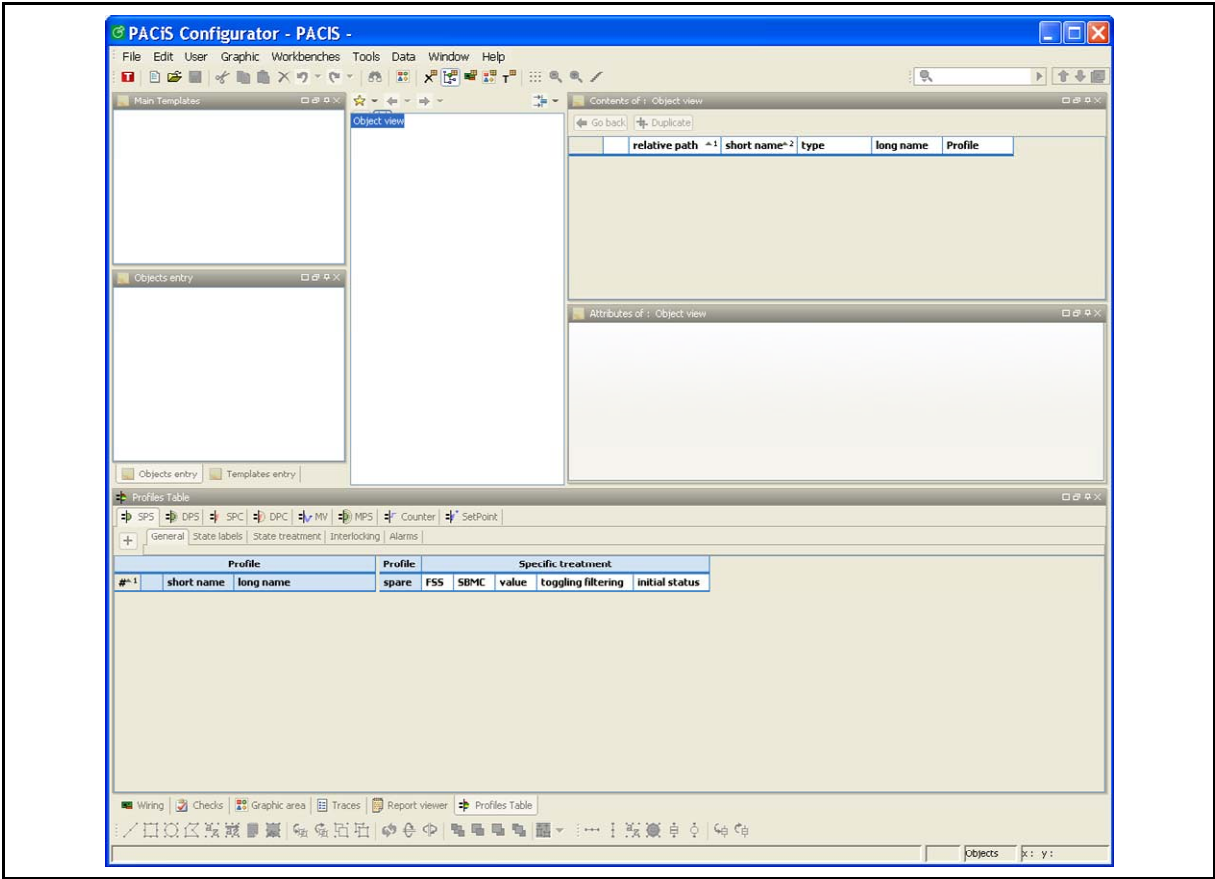


FIGURE 3: PACiS SCE DISPLAY AT START-UP

The starting view is empty. Explanation of each area is given below with some information on it.

For displaying information it is needed to load a database. After such database load, the PACIS SCE application looks as below.

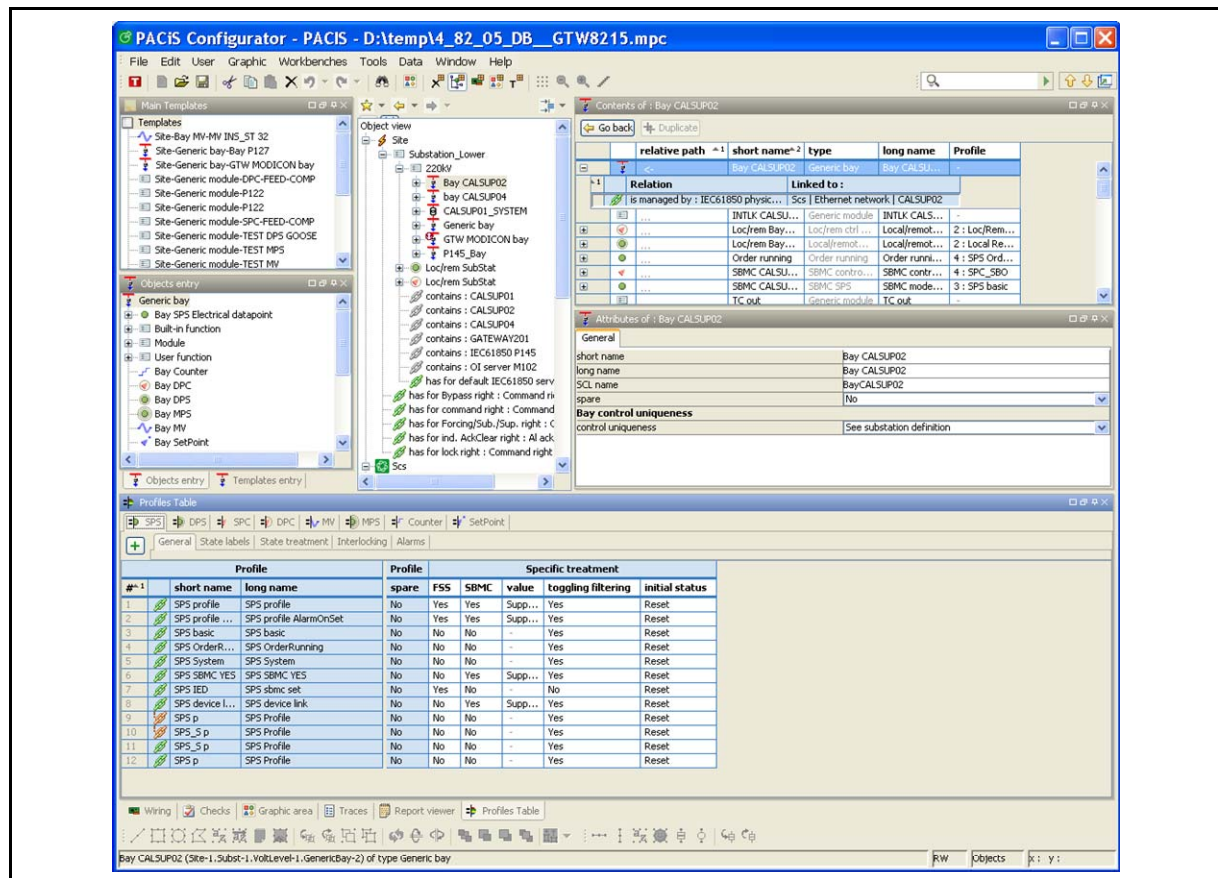


FIGURE 4: PACIS SCE DISPLAY WITH LOADED DATABASE

The display is composed of 5 areas:

- Title Bar
- Menu Bar
- Tool Bar
- Docking Window or common work area composed of several on line optional and customisable areas.
- State Bar

2.4.2 Working or Docking Window

By default or selecting all items in Menu Bar/Windows option items, the working area is displayed with all areas as below:

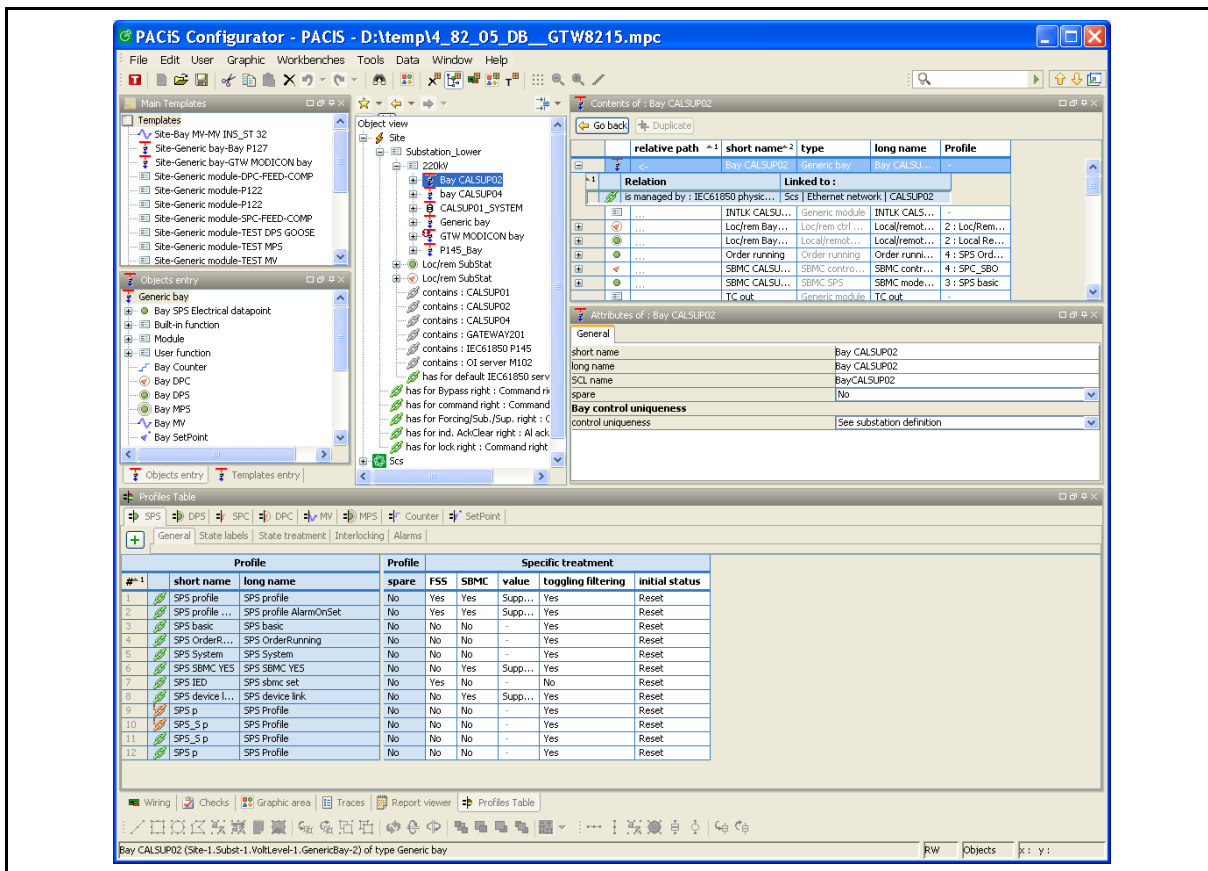


FIGURE 5: DOCKING WINDOW

Areas are viewers driven by:

- Navigator perspective Tree Viewer
- Mimic Editor

When selecting object (click, enter) all views are “refreshed” with corresponding data:

- Components List (Object/relations under selected object)
- Attributes List (of object selected)
- Template Entry List (of existing template of that can be added under selected object from DB template list)
- Object Entry List (of objects that can be added under selected object from conceptual modeling)

2.4.3 Management under Windows XP

2.4.3.1 Windowing

The PACiS SCE Application follows Windows behaviour. As presented before it has all option for iconify, maximise/minimise, or close/exit.

When window is minimised it can be resized by its border or corner, and displaced by dragging of title bar. This behaviour is also down with sub windows.

2.4.3.2 ToolTip

When mouse pointer remains on tool bar icon or menu, a tool tip appears with a short message explaining the function.

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1. SCOPE OF THE DOCUMENT

This document is a chapter of the PACiS SCE (System Configuration Editor) documentation. It describes all User Interface or **Human Machine Interface** of this engineering tool.

1.1 Using PACiS SCE

PACiS System Configuration Editor is a tool that:

- Helps in definition/**edition of all system data** with its equipment.
- **Generates** each PACiS equipment databases.

At first, the data definition is done by experts through **templates** or models of data. These templates are then stored and delivered in PACiS SCE libraries.

In a second time, the models can be loaded and **instantiated** as a clever kind of duplication to create object data customised to the application case.

In a third time users can makes **modification** on its object database.

When all data of the concrete case are defined, the PACiS SCE generates a coherent set of databases, named **system databag**, which can be loaded into each system equipment by PACiS SMT, the PACiS maintenance tools.

PACiS SCE can export/import **XML files** to/from external tools and generate **reports**.

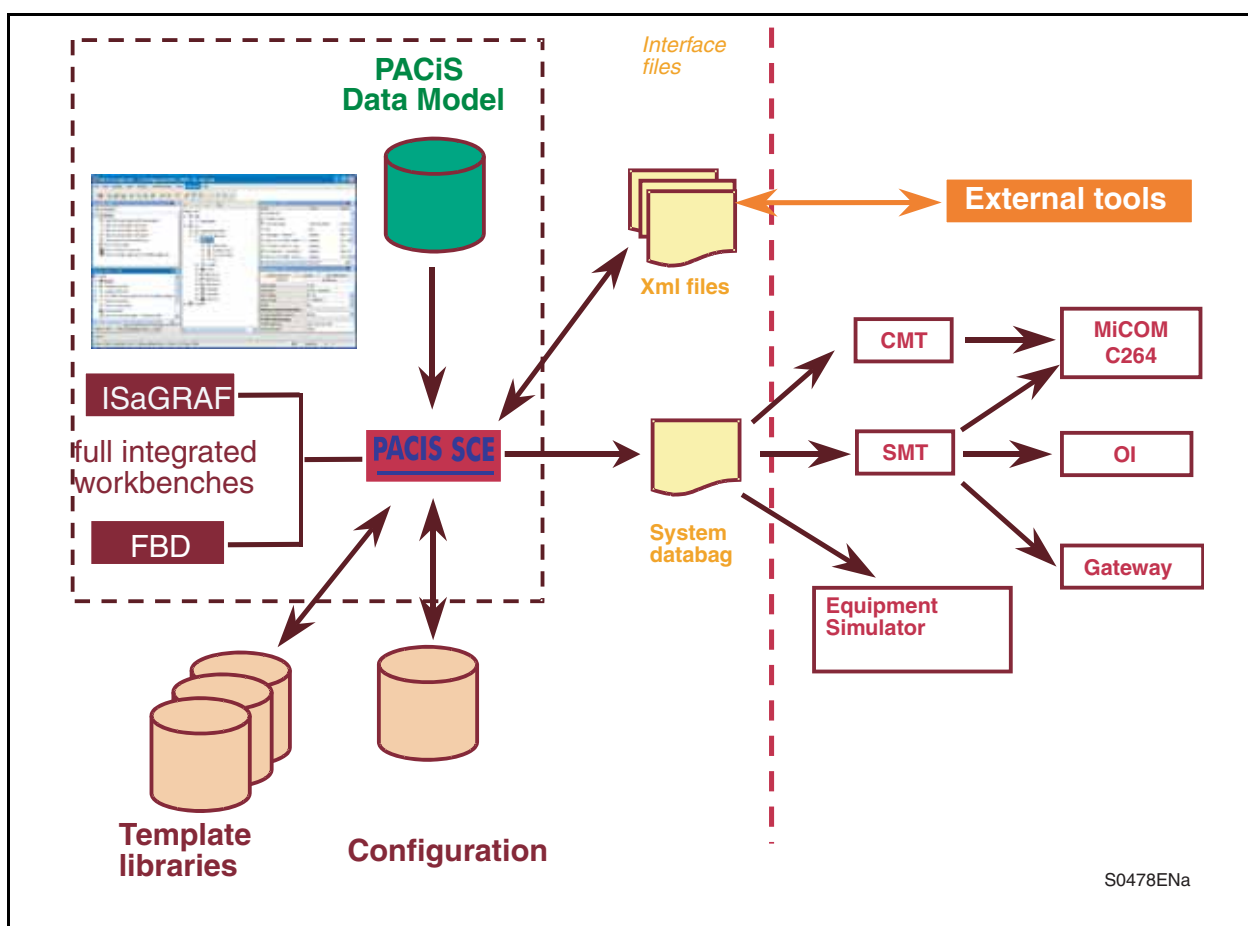


FIGURE 1 - PACiS SCE DATA FLOW

1.1.1 PACiS SCE Users

This brief definition of PACiS SCE using shows several kind of user:

- **Expert** template developers who maintain a set of libraries adapted to specified equipment, a protocol mapping, a graphical representation, or an electric automation...
- **Prototypes engineers** who should build quickly the draft of a specific substation with its devices, its main functionality and graphic views, in order to evaluate implementation solutions.
- **Configuration engineers**, who customise, detail and update all structured data of a specified application case, and generate the databases downloaded to the system devices.
- **Maintenance** technicians who need to modify or adjust parameters prior of new database download.

Such categories is only an outline of PACiS SCE users since several of its tools thanks to specific editors, or report managers, can provide the records needed by other tasks: commissioning cubicle, mapping extraction, ...

Because of these different users, PACiS SCE has several “levels” in its HMI interface. **This manual describes all of them** whatever could be option or license limitations.

The **projection** of these user categories on PACiS SCE **is not implemented in PACiS V4**.

1.1.2 Devices handle by PACiS SCE

PACiS is designed to generate database for PACiS devices:

- **PACiS OI** the Operator Interface
- **PACiS SMT** the System Management Tool that downloads Databases
- **PACiS ES** the Equipment Simulator
- **PACiS GTW** the separate Gateway or Tele control Interface to SCADA
- **MiCOM C264 and C264P**

To generate any equipment database, the PACiS SCE manages:

- Inner data of the device itself (structure and parameters values)
- Exchange data of the device with other system devices
- Exchange data of the device with non system devices

With the 3rd case, the PACiS SCE manages the communication with all **non-PACiS devices** with typically IED or protection devices on Legacy BUS or system network bus. It is only by the configuration of communication mapping that PACiS SCE can handle non-PACiS devices. Anyway, the PACiS SCE does not generate database or setting for these non-PACiS devices.

1.1.3 PACiS SCE Components

As most configuration tools, the PACiS SCE is composed of two main software parts with:

- **HMI** (Human Machine Interface) of PACiS SCE and associate tools
- **Data Model** that includes association rules attributes range, and generators.

The aim of this part is the description of Human Machine interfaces. For a full description of the **data model and its use**, refer to **chapters Application** of each PACiS device. Nevertheless, a good understanding of the user interface needs at least the few notions expressed below.

1.1.4 PACiS SCE Data hierarchy

First of all, **Data Model** defines structure and structured data. Any piece of information belongs to a **hierarchy** of information often referenced from browsing point of **view as a tree**. This abstraction of data is named **object**.

In PACiS SCE all data belong to only one of the three following tree structures:

- **Electric** process.
- **System** (device characteristics and communication).
- **Graphic** definition of Operator Interface with Archives, Graphic, Printing...

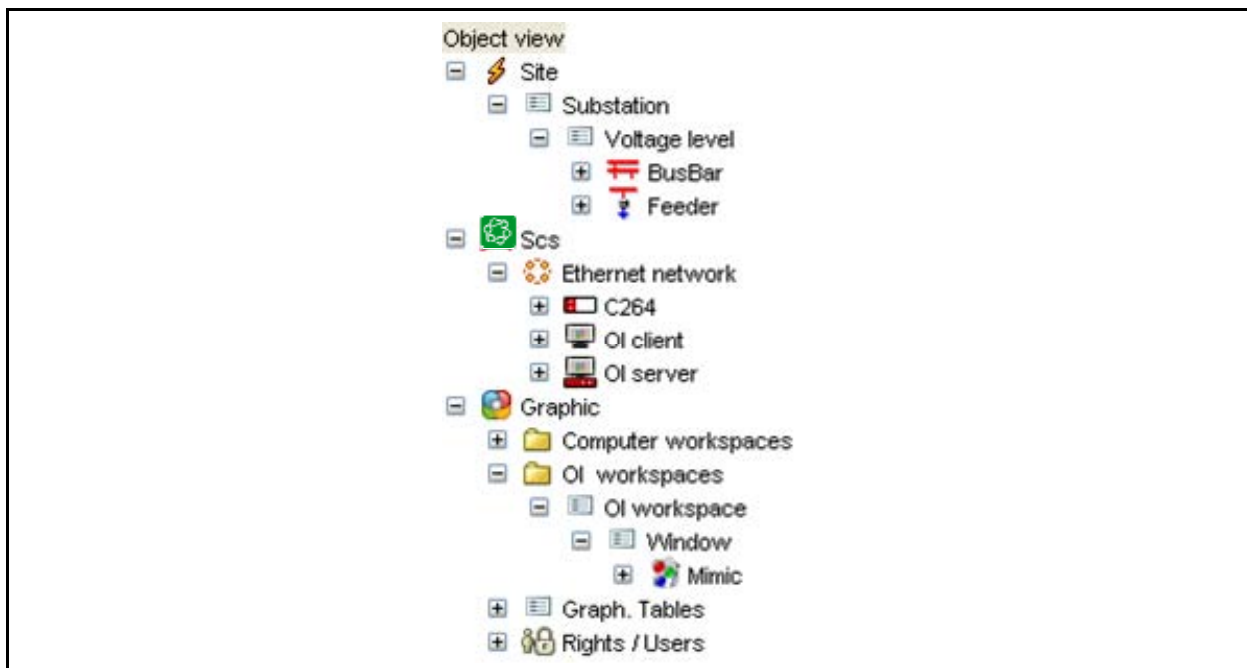


FIGURE 2: PACiS SCE DATA HIERARCHY

In the other hand, the piece of information is structured data, with **list of attributes**. For example, C264 object has a set of configurable attributes like TCP/IP address or network name.

Attributes of : C264				
General	BI filtering	Measurements	Counter	Miscellaneous
short name	C264			
long name	C264 Computer			
rack model	80 TE			
date format	YY/MM/DD			
timer for SCADA GI (ms)	10			
timestamped 'unknown' for SCADA	Yes			
spare	No			
External synchronisation				
synchronisation source	None			
TCP/IP addressing				
TCP/IP address	127.0.0.1			
network name	NW_NAME			
Boards definition				
with Switch board	No			
DIU board type	DIU 200-210			
DOU board type	DOU 200			
CCU board type	CCU 200			

FIGURE 3: ATTRIBUTES OF A C264

1.1.5 PACiS SCE Template & Object

All data are defined in data model structure. In PACiS SCE, this notion is fully exploited with the possibility for a **user to create** models called **templates**. Models are duplicated and modified for concrete cases called Object database. This last one is used to generate all PACiS devices databags.

PACiS SCE is then composed of two parts:

- template part,
- object part.

The template part is a list of separate **models** used or not. A model has its own hierarchy data, **with process, system and/or graphic data**.

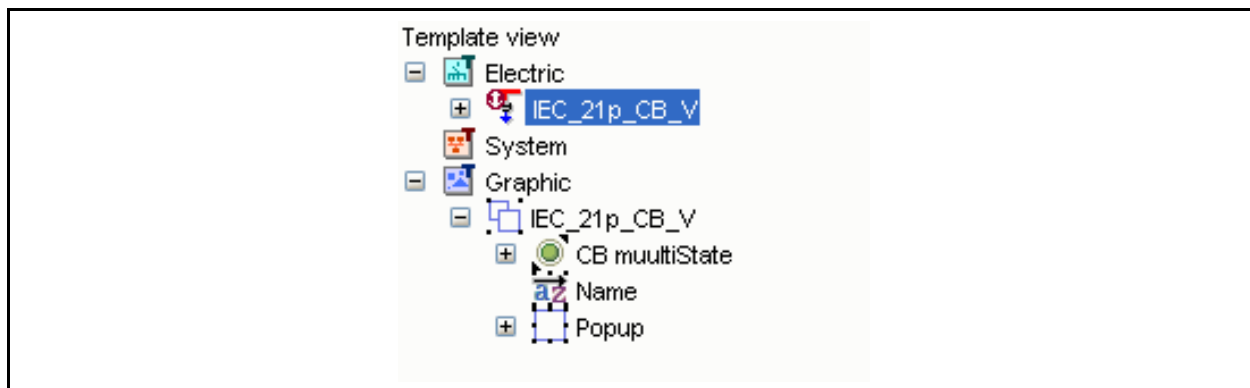


FIGURE 4 - OBJECT MODEL / TEMPLATE

The **template** is used as a model to create new data in object part. The data which come from a template are linked to this template. When template is modified, these **modifications are propagated** to all its **linked objects**.

At any moment, user can switch between Template and Object parts using



Current mode Template or Object is always displayed (right of state Bar).

Access to Template functions is only possible for Level 3 and 4 users.

1.1.6 Database creation process

To create the database downloaded to system devices, the common way is to:

1. **Import a template** from an external library into current database (in its template area)
2. **Customise** the template if needed in database template area
3. **Instantiated** the template from template to Object part of the database
4. **Modify** predefined attribute(s) known as degree of freedom (D.O.F), for example the name.
5. **Generate** devices databases

It is recommended to **work as possible with template** and to keep the link between template and instantiated object. Nevertheless, this relation can be broken for deep object modifications. This broken link operation should remain an exception.

During all this creation process, the PACiS SCE makes control in data consistency with its “Data Model”. The checks are made with templates and objects. They are done on:

- Attribute input
- Relation creation
- Generation

NOTE: Use of templates is not mandatory. A database could be configured with no template, directly with objects.

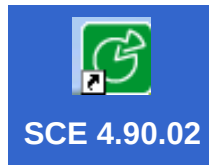
2. GENERAL DESCRIPTION

For Installation, please refer to associate document where is define also start settings.

2.1 Launching PACiS SCE

As Windows Application, PACiS SCE can be started for example by:

1. Desktop shortcut



2. Windows Explorer selection

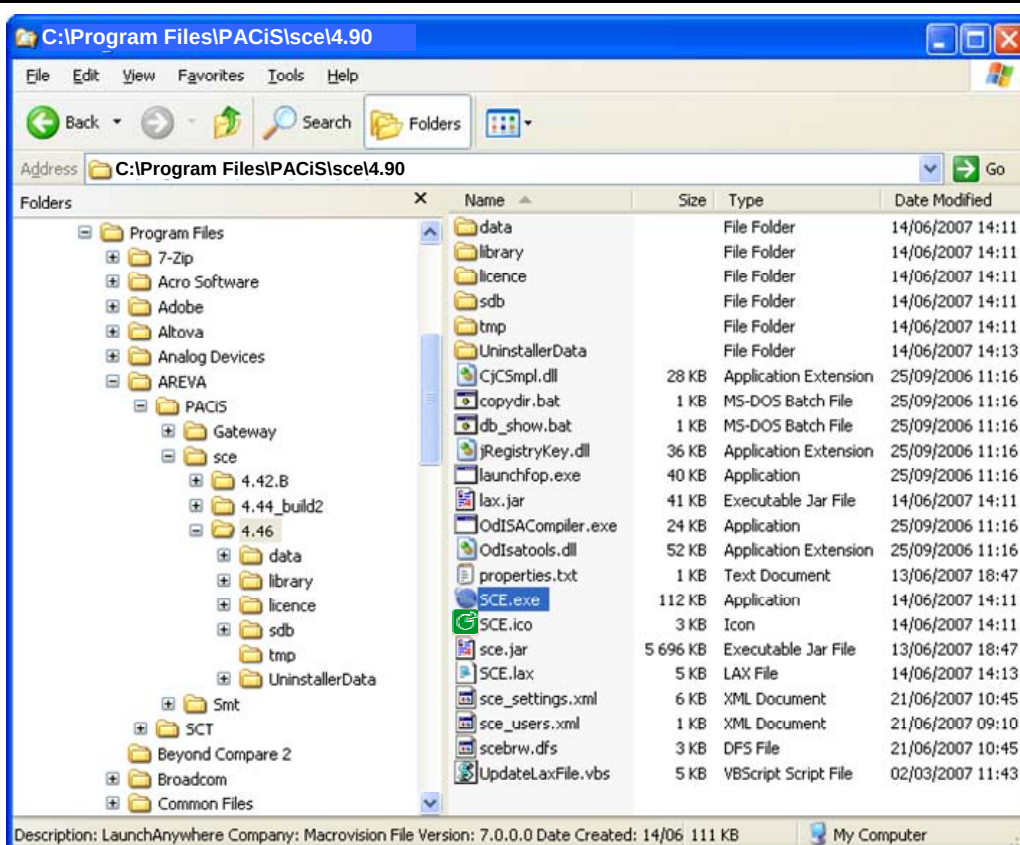


FIGURE 5: EXECUTABLE PATH

3. Start-up/Execute option and typing PACiS SCE
4. Start-up/Program/PACiS/Configuration Editor X.Y/ SCE selection

2.2 Leaving PACiS SCE

To stop PACiS SCE use the File/Exit option.

2.3 PACiS SCE General Display

At initial start-up or after installation of new version, the PACiS SCE application display can be seen as represented below (as far as user has all PACiS SCE rights and licences). It should be noticed that all parts are not necessary needed for all kind of user.

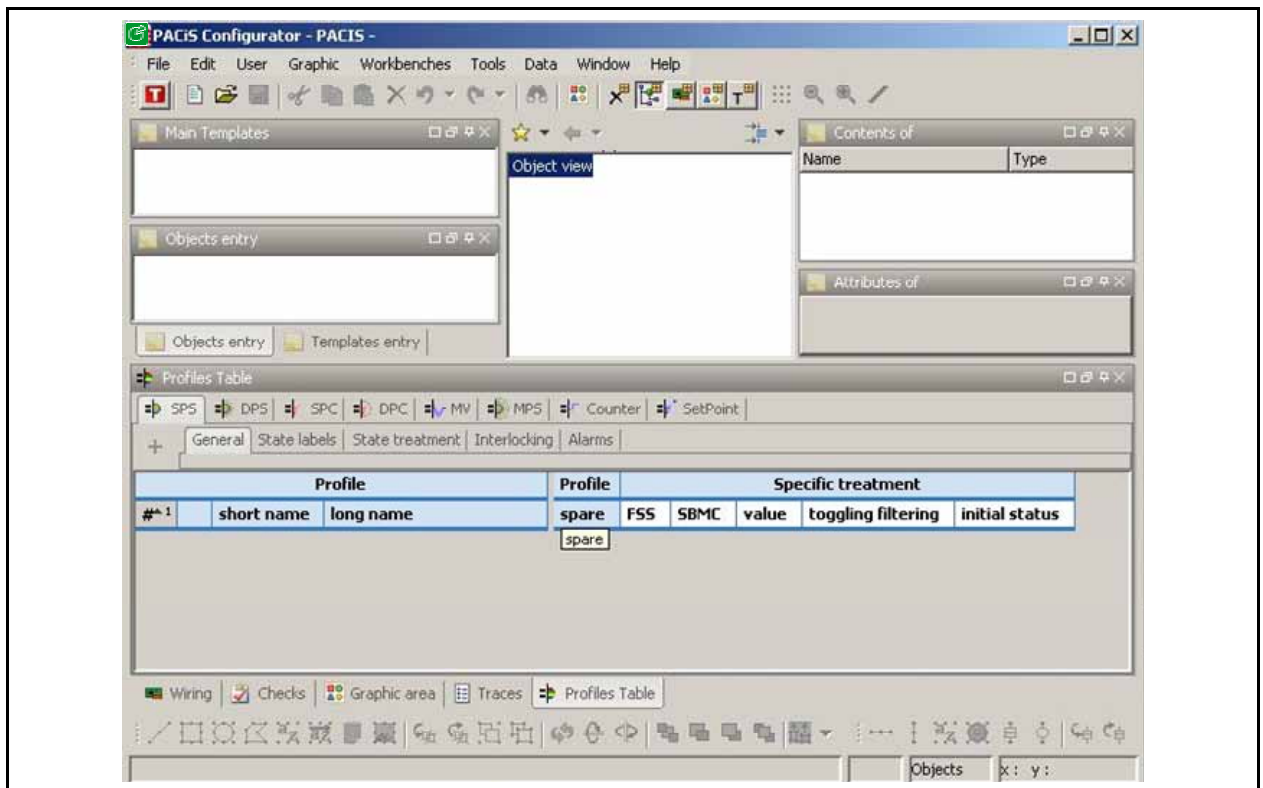


FIGURE 6 - PACiS SCE DISPLAY AT START-UP

The **starting view is empty**. Explanation of each area is given below with some information on it. For displaying information it is needed to load an example or delivered database. This loading explained in detail later is done.

Menu bar: File/Open and classic window search of a database.

After such database load, the PACiS SCE application looks as below.

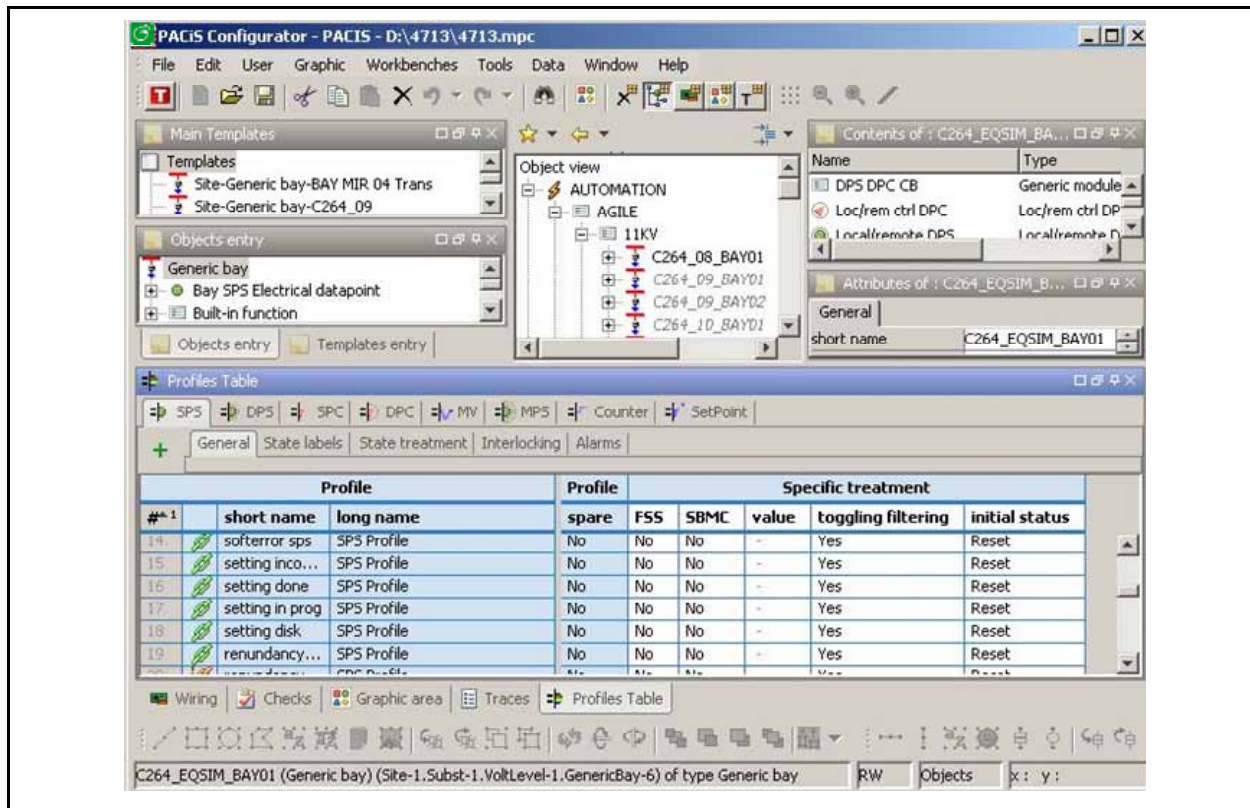


FIGURE 7: PACiS SCE DISPLAY WITH LOADED DATABASE

The display is composed of 5 areas:

- Title Bar
- Menu Bar
- Tool Bar
- Docking Window or common work area composed of several on line optional and customisable areas:
 - Template List Tree Viewer
 - Template Entry Tree Viewer (of selected item in Navigator)
 - Object Entry Tree view (of selected item in Navigator)
 - Template/Object Navigator
 - Object/Template Contents List (of selected item in Navigator)
 - Attributes List (of selected Item in Navigator)
 - Graphic area
 - Traces List Viewer
- Status Bar

2.3.1 Title Bar

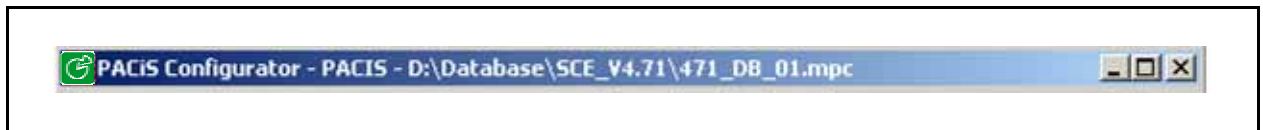


FIGURE 8: TITLE BAR

This Title bar provides:

- the name of the product **PACiS Configurator** synonym of System Configuration Editor,
- the full file name of the active database (including its path),
- optionally if database is read only.

On the right of title bar are displayed three window standard buttons



Set application as icon in Window Task Bar,



Maximise/minimize application windows



Close/Exit the application.

When the PACiS SCE window is minimised its size remain unchanged, covering fully the screen. Resizing corners and hedges are usually hidden by Windows Application Bars. To resize the minimised PACiS SCE window, it is needed to select the title bar and move it. It is then possible to select window border for a resize operation.

2.3.2 Menu Bar

The menu bar is composed of 8 Sub-Menus described in detail in next chapter



FIGURE 9 - MENU BAR

File	All Files operations including generation
Edit	All Edition operations
User	PACiS SCE access control right management
Graphic	All graphical actions (done in Graphic Area)
Workbenches	All relations with ISaGRAF and FBD editors
Tools	PACiS SCE parameters
Data	PACiS SCE internal tools
Window	All PACiS SCE work areas management
Help	Help index

2.3.3 Tool bars

Three tool bars are available. They could be independently displayed and positioned.

The tool bars display is managed by Menu/Window/Common, OI Mimic and Computer mimic Toolbar.



FIGURE 10 - COMMON, OI MIMIC AND COMPUTER MIMICS TOOL BARS

2.3.4 Working or Docking Window

By default, the working area is displayed with all areas as below.

Areas are viewers driven by:

- **Navigator** perspective Tree Viewer: presents a hierarchical view of the configuration. Three roots are defined: electric (Site), system (Scs) and graphic. Its behaviour is the same than the left part of a window explorer.

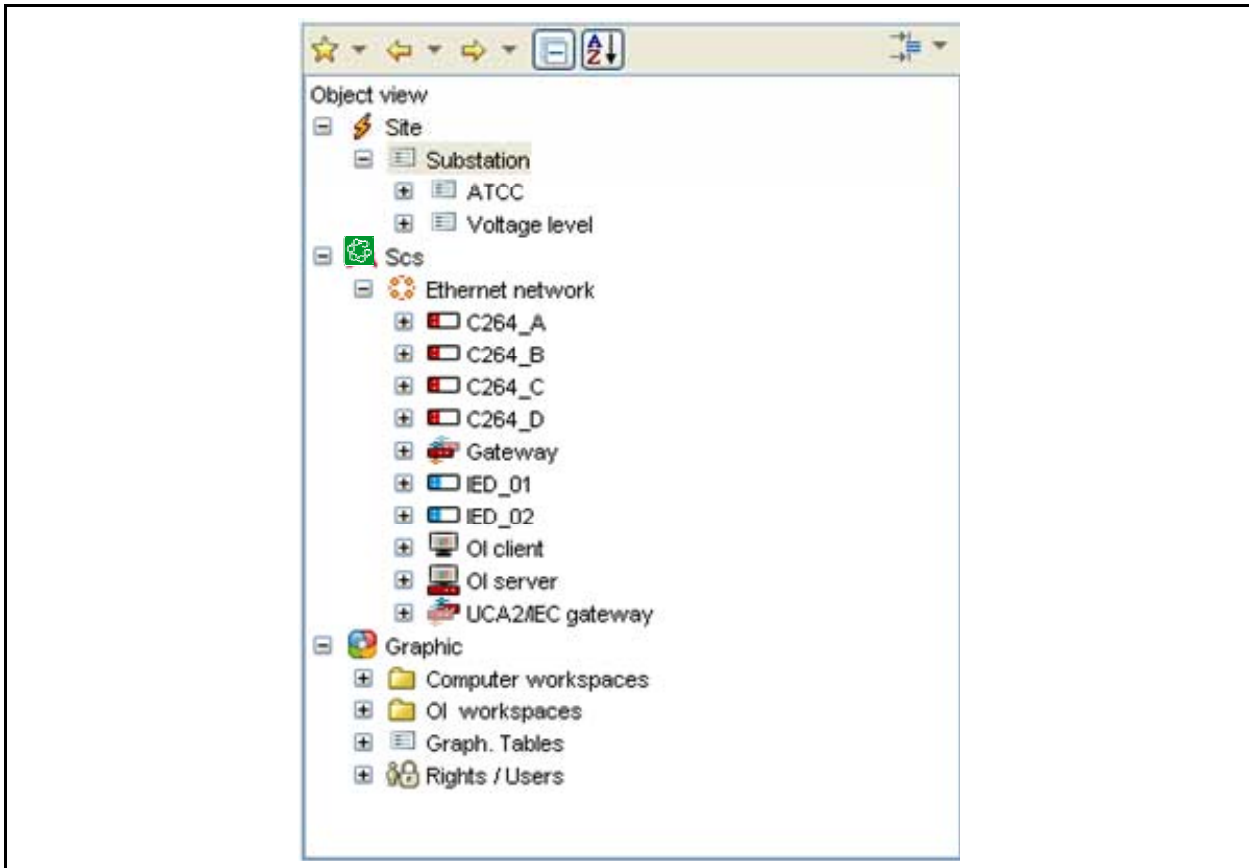


FIGURE 11: - NAVIGATOR

- **OI Mimic Editor:** this editor is displayed in the graphic area and is used to edit the OI mimics.

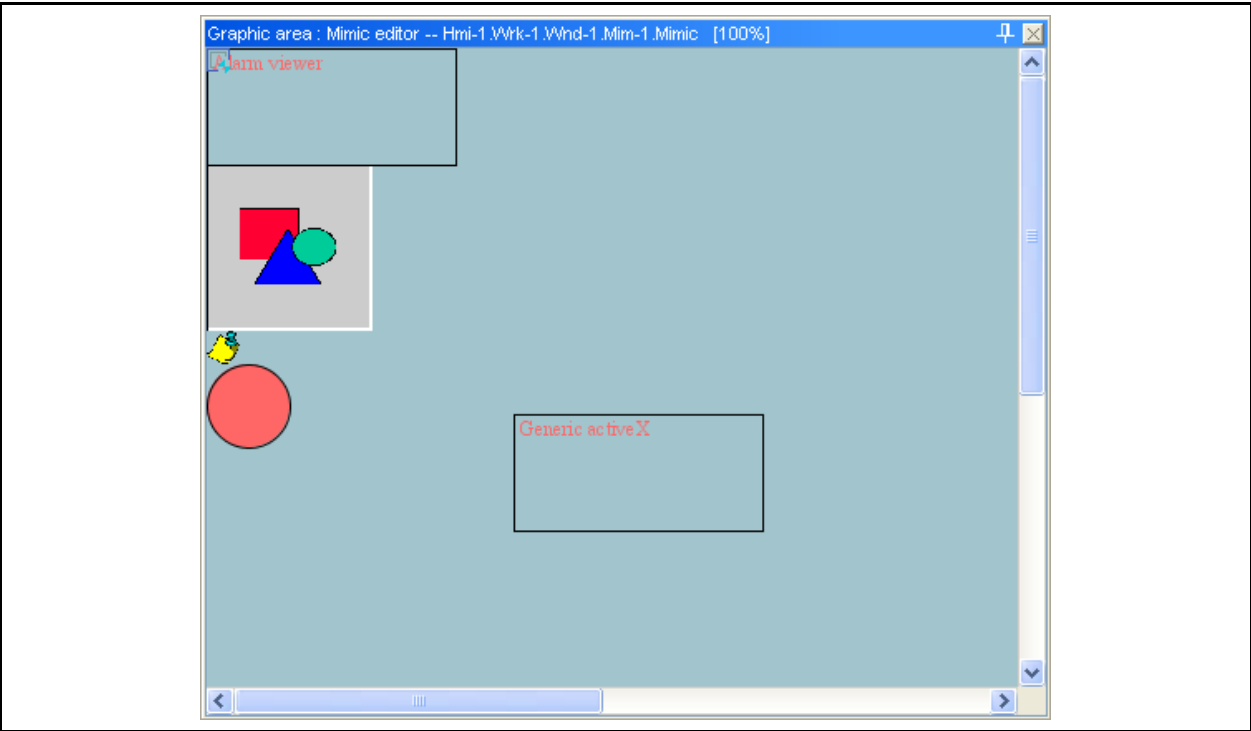


FIGURE 12: OI MIMIC EDITOR

- **Computer Mimic Editor:** this editor is displayed in the graphic area and is used to edit the bay mimic of C264 HMI.

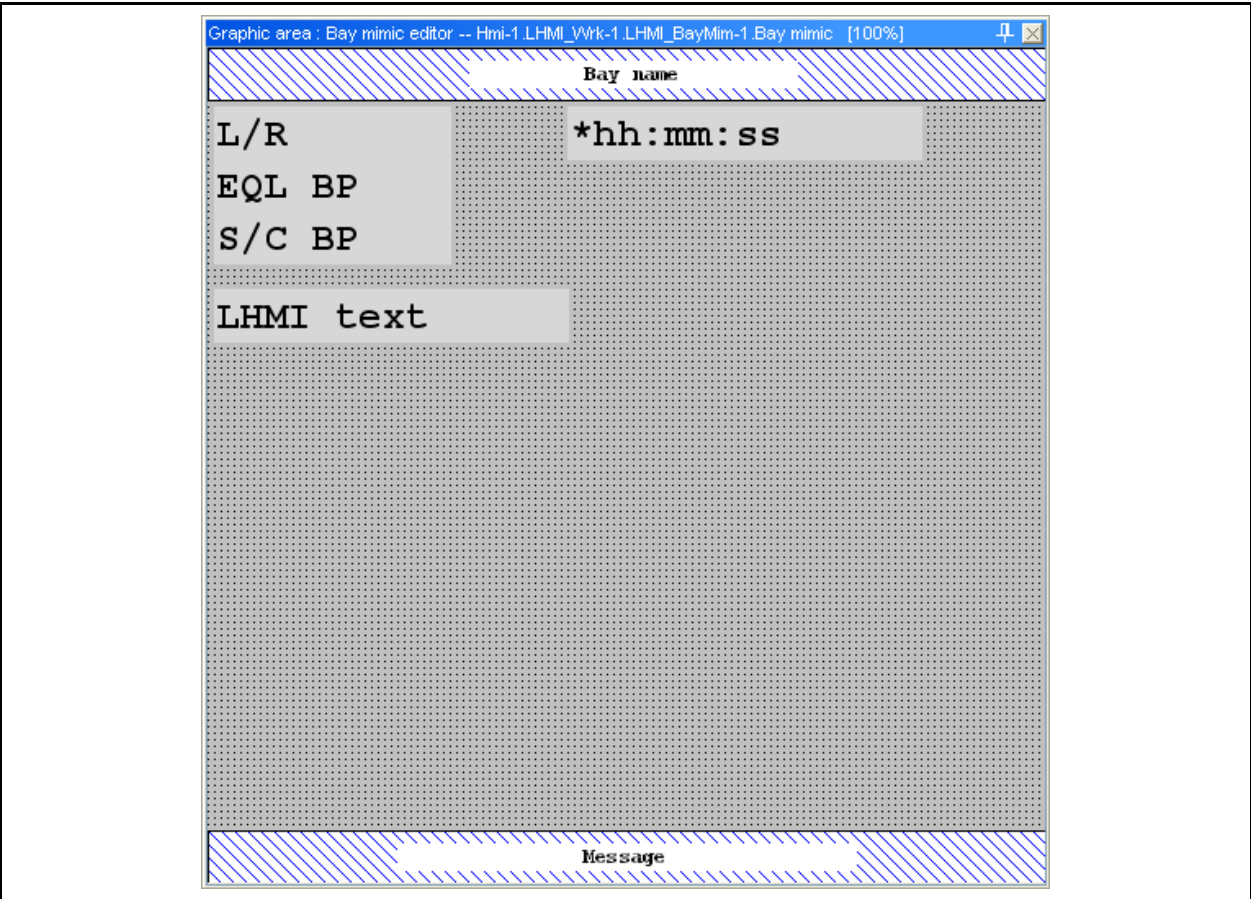


FIGURE 13: COMPUTER MIMIC EDITOR

- **Bitmap Editor:** this editor is displayed in the graphic area and allows editing the bitmap file which is used during Computer mimic edition. The bitmaps are stored in a bitmap table.

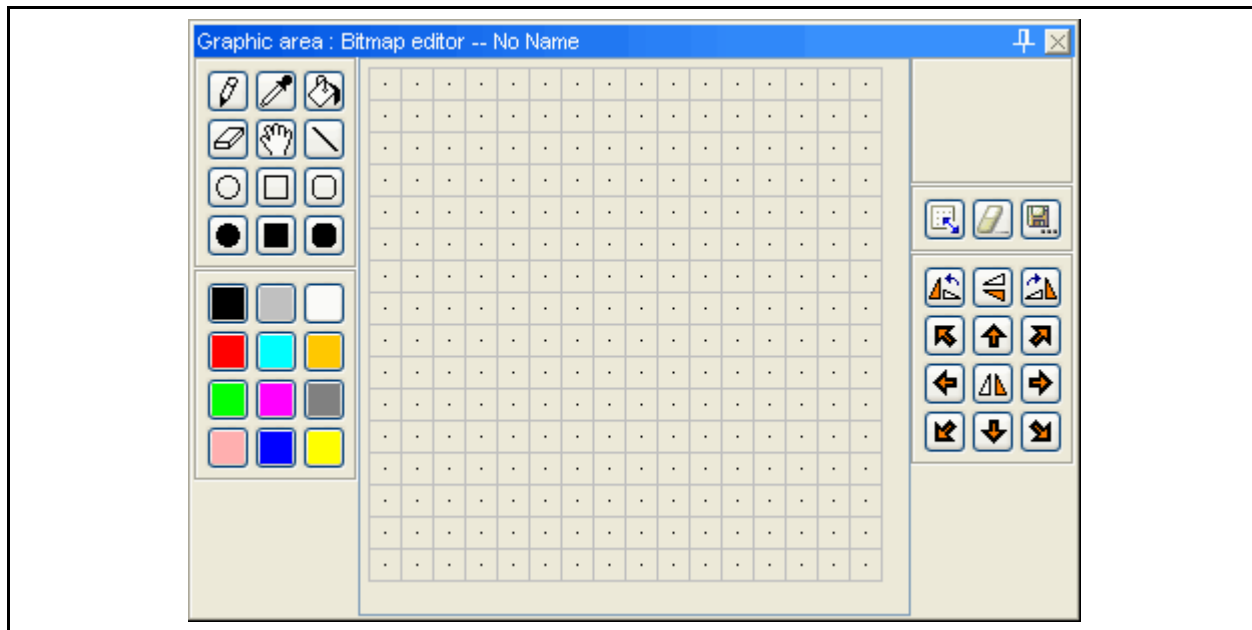


FIGURE 14 - BITMAP EDITOR

- **Template navigator:** presents the list of all templates defined in the current configuration database.

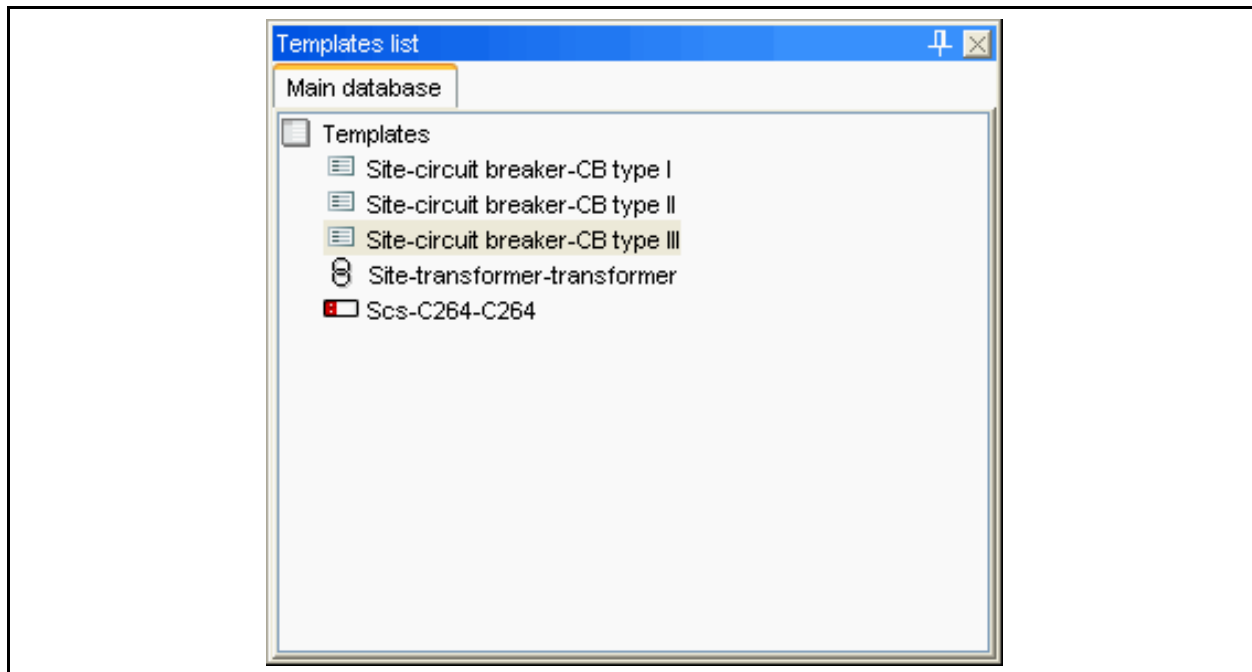


FIGURE 15 - TEMPLATE LIST

When selecting object (click, enter) all viewers are “refreshed” with corresponding data:

- **Template Entry List:** views the existing templates which can be added under the selected object.

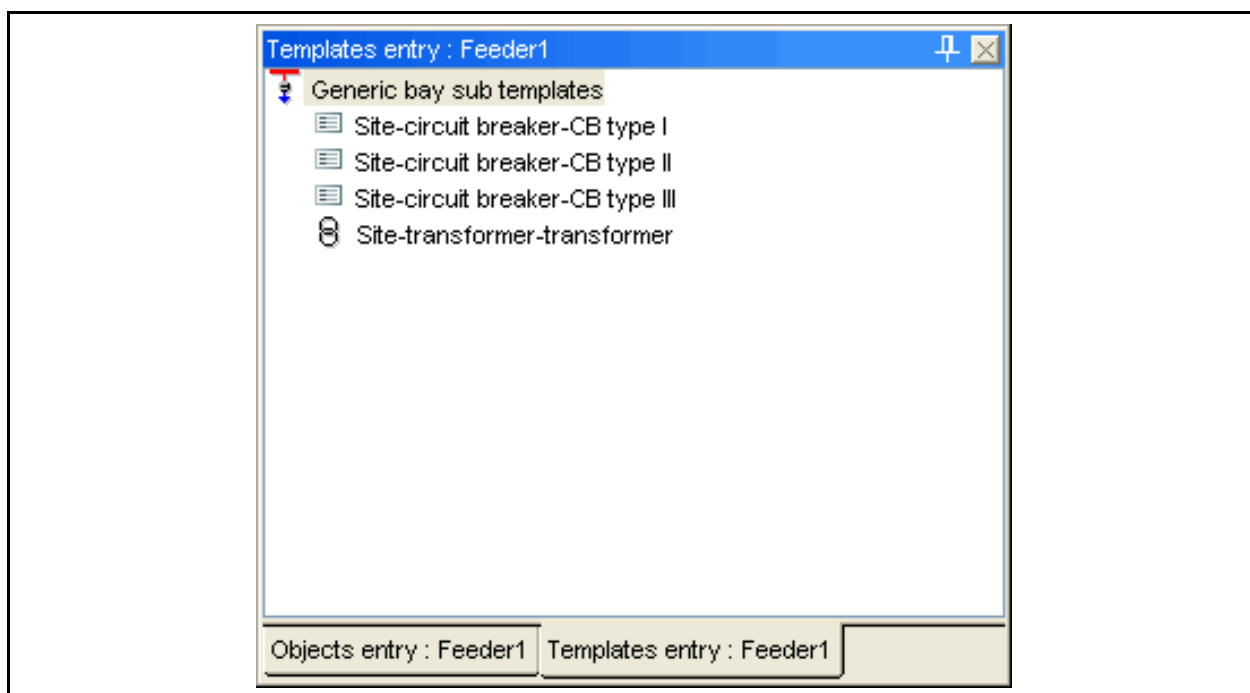


FIGURE 16 - TEMPLATE ENTRY LIST

- **Object Entry List:** displays the list of objects which can be added under the selected object. This list is presented in a tree view: for example: all boards which can be added under a C264 are presented under a folder named Board. The content of this view depends on existing objects under the selected object: if the maximum number of cards with a specific type is reached, this kind of card is deleted from this helper view.

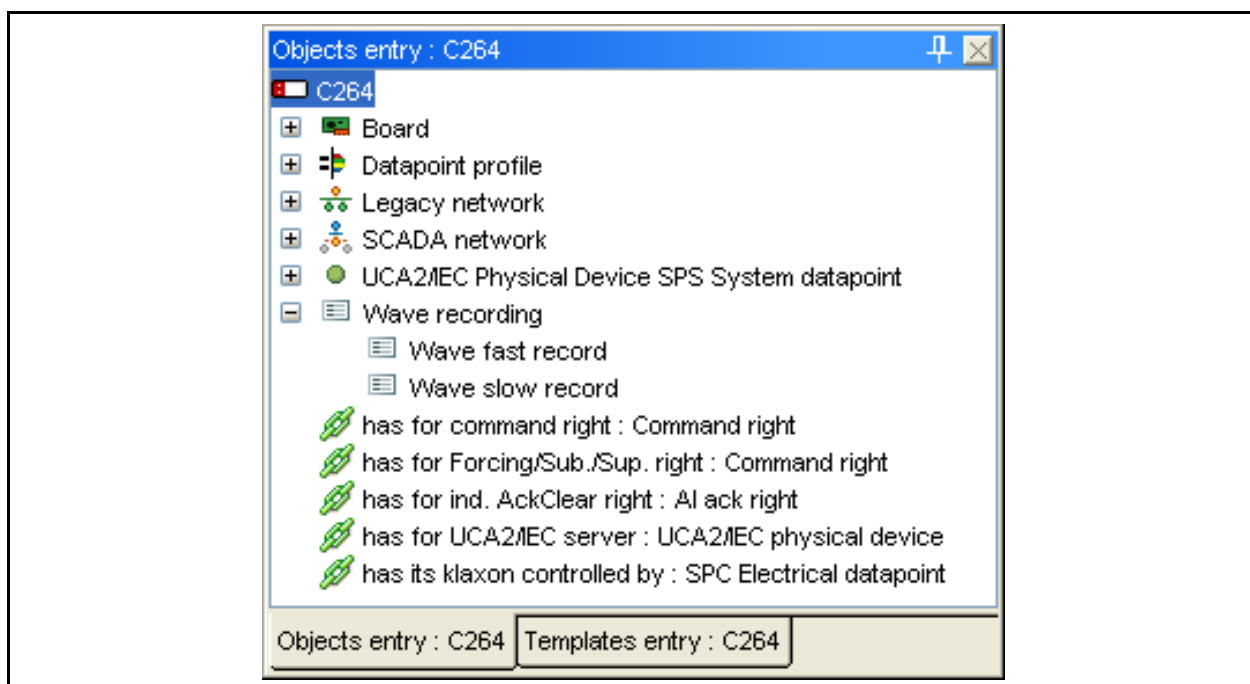


FIGURE 17: OBJECT ENTRY WINDOW ASSOCIATED TO A COMPUTER

- **Components List:** objects/relations under selected object. Its behaviour is the same than the right part of a window explorer.

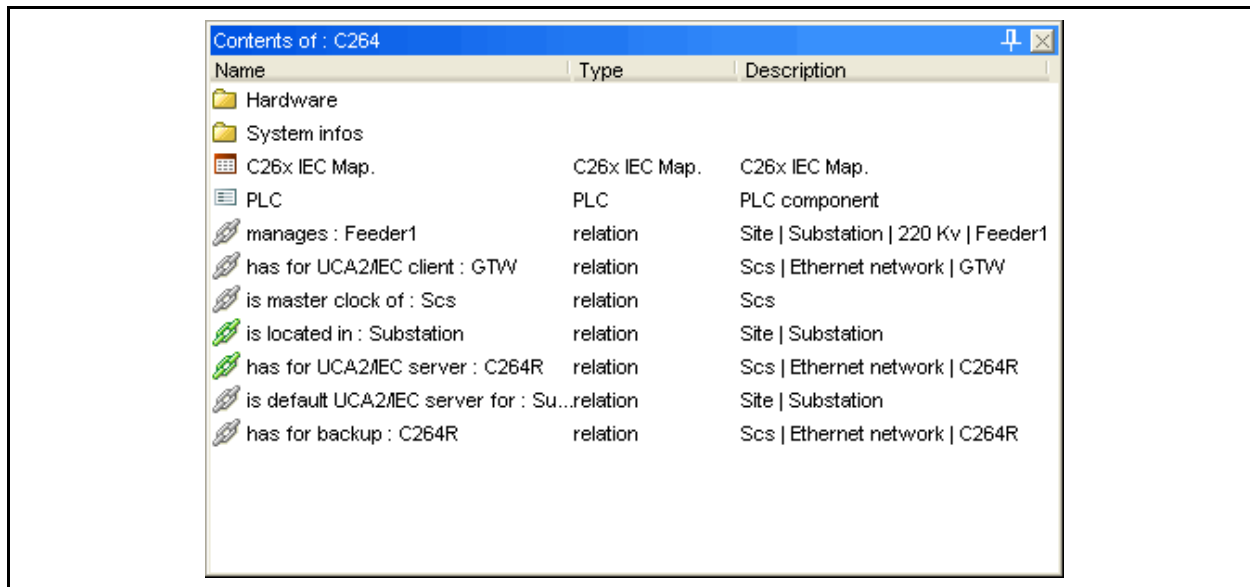


FIGURE 18 - COMPONENTS LIST

- **Attributes List:** the configurable attributes of the selected object.

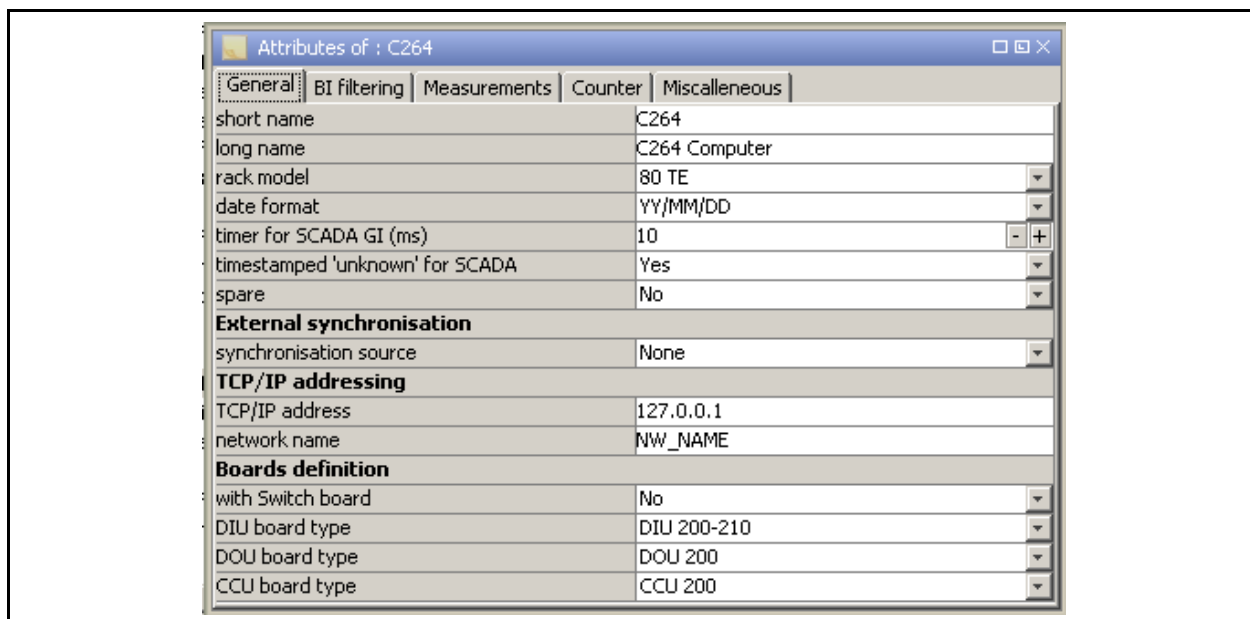


FIGURE 19: ATTRIBUTES OF AN OBJECT

2.3.5 Status Bar

At the bottom of the screen, is displayed a set of information relative to PACiS SCE Application run time messages.

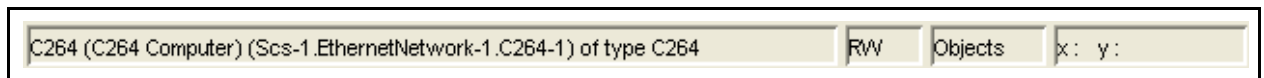


FIGURE 20 - STATE BAR

With 4 contextual labels from left to right:

1. PACiS SCE Application run time message or selected Object/Template name and type.
2. Read/Write property of the object.
3. Object / Template mode.
4. Coordinates of cursor in the OI or Computer Mimic editor.

2.4 Management under Windows XP

2.4.1 Windowing

The PACiS SCE Application follows windowing behaviour. As presented before it has all option to set as an icon, maximise/minimise, or close/exit.

Each internal window (included tool bar) is managed with the following dock/float window features:

- dock window anywhere,
- window can be fixed in the screen,
- change dock/float states by double clicking,
- window can be either attached to or detached from the tabbed components,
- save and load dock/float states when user exits and enters in the PACiS SCE Application.

When window is minimised it can be resized by its border or corner, and displaced by dragging of title bar. This behaviour is also down with sub windows.

2.4.2 ToolTip

When mouse pointer remains on tool bar icon or menu, a tool tip appears with a short message explaining the function.

3. PACiS SCE DETAILED WINDOWS DESCRIPTION

3.1 Tools Bar

The tool bar can have separate groups of tools displayed by Menu/Windows/Tools option. The associated functions are detailed in following chapter.

3.1.1 Common Tools

Set of statistically most commonly used control (also defined in menu bar)



FIGURE 21 - COMMON TOOL BAR

	Switch between Template and Object Mode
	New File Database or Library
	Open Database or Library
	Save current File (Database or Library)
	Cut Selected Object/Template
	Copy Selected Object/Template
	Paste/Duplicate Selected Object/Template
	Delete Selected Object/Template
	Add Mimic Editor Area into Dock window
	Reset the default perspective of Dock / Float windows
	Switch Dock window focus on Navigator Perspective
	Switch Dock window focus on Graphical Perspective
	Show/Hide the grid
	Zoom +
	Zoom -
	Anti-aliasing effect
	Undo
	Redo

3.1.2 OI Mimic Tools

Set of statistically most commonly used graphic control (also defined in menu bar) for OI Mimic graphical editor.



FIGURE 22 - OI MIMIC GRAPHICAL EDITOR TOOL BAR

	Create a line
	Create a rectangle
	Create a circle
	Create a polyline
	Create a text
	Create a variable text
	Create a memo icon
	Create an image
	Group edition
	Exit group edition
	Group Selected Graphic Objects
	Ungroup Graphic group object
	Rotation 90°
	Flip
	Mirror
	Graphic Object at Bottom plane
	Graphic Object at Backward plane
	Graphic Object at Forward plane
	Graphic Object at Top plane
	Scrolling list of alignment functions
	Scrolling control
	Align Horizontal Top
	Align Horizontal Centre
	Align Horizontal Bottom
	Align Horizontal Side by Side
	Align Vertical Left
	Align Vertical Centre
	Align Vertical Right
	Align Vertical Side by Side

3.1.3 Computer Mimic Tools

Set of statistically most commonly used graphic control (also defined in menu bar) for Computer Mimic graphical editor.



FIGURE 23 - MiCOM C264 MIMIC EDITOR TOOL BAR

	Create an horizontal line
	Create a vertical line
	Create a text
	Insert a bitmap
	Create a module
	Create a transformer module
	Module edition
	Exit module edition

3.2 Docking Window

3.2.1 Docking Window Management

The main working area uses a display principle called **docking**. It is made for **flexible** management of several sub-areas.

- inserted with dependency in the docking window or
- separate window.

A docked area supports any kind of editor: tree browser, list, graphic, As window sub-object, area can be **resized** by its edge, **moved** by its title bar, or **closed** by the cross on upper right corner.

When the docked area is a **separate window**, it is handled like any window and can be dragged to separate screen display (when PC has multiple screens), or on extended virtual desktop part. The separated window remains over its father PACiS SCE application window, like a more known pop-up. This window can not be set in icon.

When the docked area **remains in dock window**, its size is adjusted to other docked area and especially a main docked area. The main docked area is selected in the Window Menu. It is proposed the object/template **navigator perspective** or the **graphical area perspective** which supports all graphical editors. All other docked areas are automatically adjusted from this first area.

An area could be **pinned or not**: if it is pinned, its view is permanent, if it is not pinned; the area is displayed only when the mouse points on it.

An area could be attached to or detached from the **tabbed components**: several areas are displayed on the same window, the user works on each area through its tab button.

3.2.2 Selecting displayed area in working window

The menu bar in sub menu Windows helps to select or deselect the areas seen in working window area. When an item is clicked, a tilde appears before all activated area. Another click deselects the given area from the working window area.

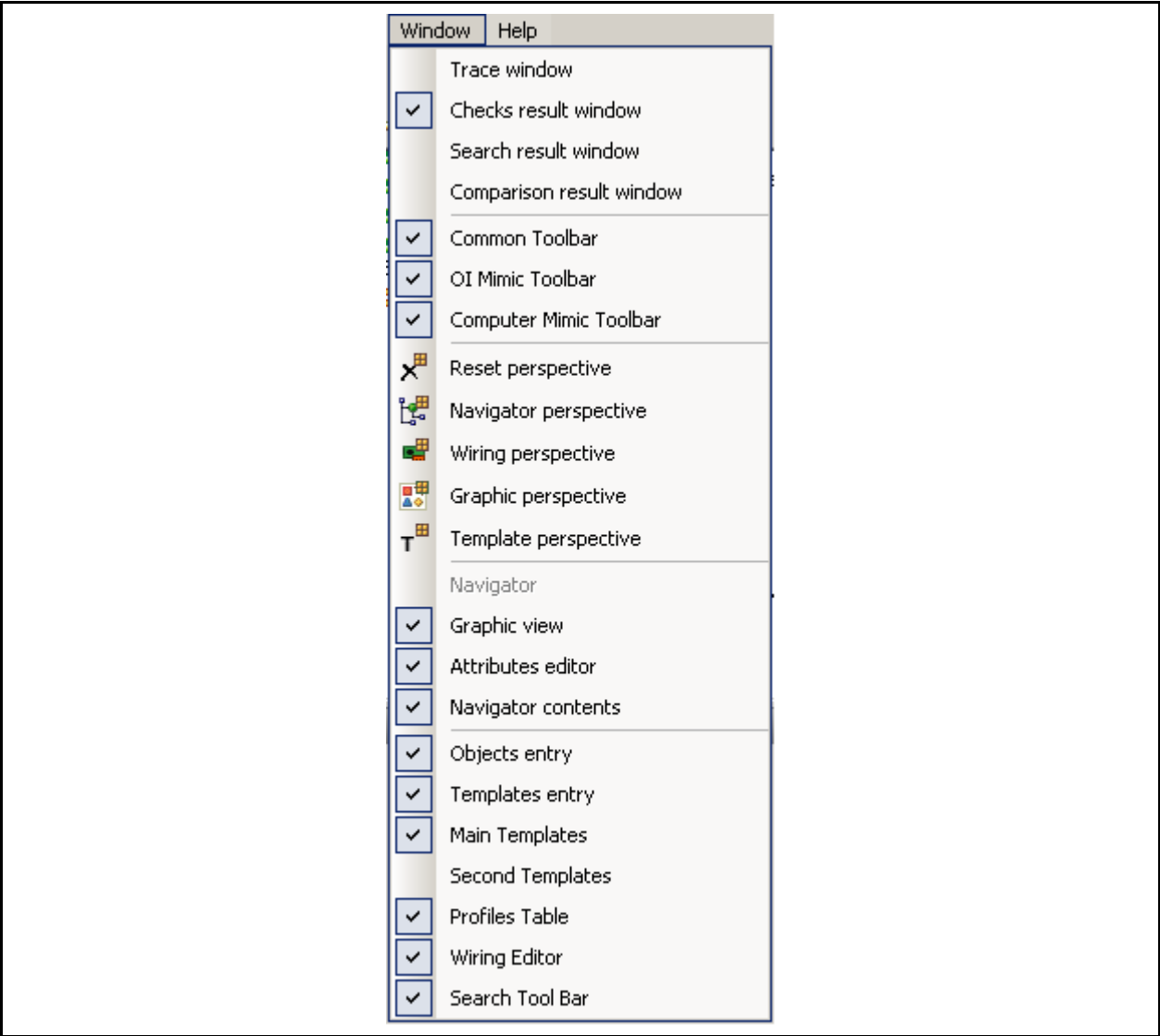


FIGURE 24 - AVAILABLE AREAS

Area unselecting can be done also by a click on its cross on upper right corner, except for the main area (navigator or graphic editor).

3.2.3 Moving/placing areas into working window area

The size of the PACiS SCE application determines the size of its inner docking windows.

Most of the time, PACiS SCE window is maximised. When new docking areas are added by menu bar, they are displayed as “docked”, in the docking window, at default location. Then all docked areas are resized.

Working with PACiS SCE, a user may need to:

- resize docked area or
- modify docked position relatively one to others.

To resize docked area without changing disposition of areas, a mouse click on border or edge allows a resizing of this area in horizontal or vertical direction. As docking window size is then fixed, other docked areas are then resized in same directions.

To modify the area disposition or how they are placed relatively one to the other, the user has to click on one area header. Since a rectangle appears. While still right mouse pressed, the rectangle representing area can be dragged. This control rectangle can change in shape or colour.

If mouse pointer is released when control rectangle is still blue, the moved area will be dropped in docking window. If the key is released when rectangle is grey, the moved area becomes a moveable window out of dock window and PACiS SCE main window.

If control rectangle is blue and dragged to the boundary of docked area it changes its shape. New shape is still rectangle but different sizing, square, flat vertical or flat horizontal. The new shape in blue is a “proposal” new positioning of the moved area into the docking window, relatively to other docked areas. A key release drops then the moved area in new relative position in docking window.

It is possible at any moment to get back the default configuration of windows by select **Reset Perspective** item  in Window menu.

3.3 Navigator

It is the main window to select template/object. It is the central area in docking window management (like also graphic area) when Navigator Perspective  (Windows menu) has been chosen. This area should not then become a stand-alone window.

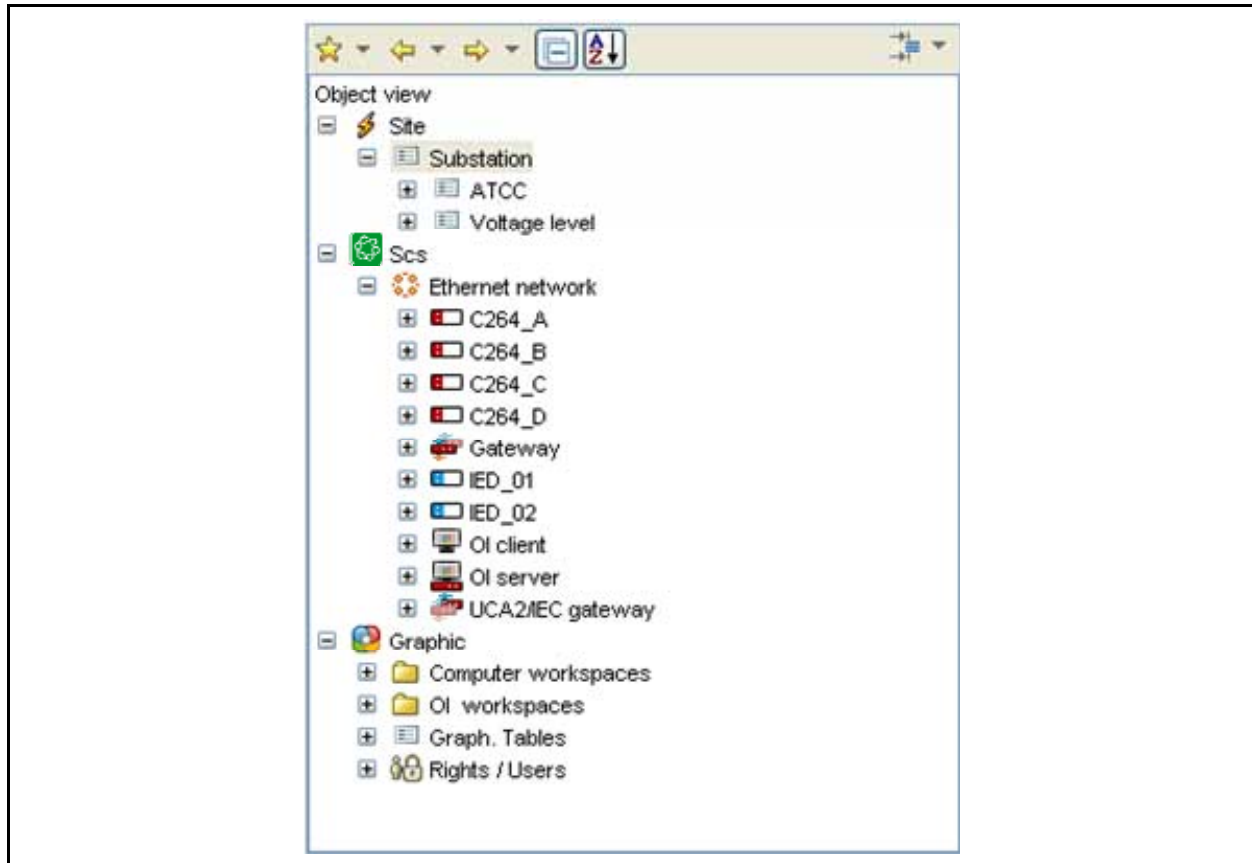


FIGURE 25: NAVIGATOR PERSPECTIVE

In any case the main interest is on the selected object (here the object **Substation** is in grey background). All other docked area refers to this object.

The navigator has a panel on its top which allows to browse into the list of the last visited objects.

There are seven buttons which have the following functions:

	Favourite: reaches to the favourite object, if it is defined. The combo list allows to visualise the path of the favourite object and to set a new one.
	Back: reaches to the previous selected object, if it is defined. The combo list allows to visualise the complete list of the previous visited objects and to select one of them.
	Forward: reaches to the next selected object, if it is defined. The combo list allows to visualise the complete list of the next visited objects and to select one of them.
	Collapse sub tree: collapses the current selected object and all components of this object. Allow to free memory used by its components.
	Sort: sorts all short names of the children components of the selected object with alphabetic order .
	This button is used to toggle the last check box (among the three described here after) which has been accessed by the user.

When this button is clicked the following submenu is displayed

☒

Complete relations

☐

Uncompleted relations

☒

Spares

The first check box is used to show (when selected) or hide (when unselected) the complete relations

The second check box is used to show (when selected) or hide (when unselected) the uncompleted relations

The third check box is used to show (when selected) or hide (when unselected) the spare objects or spare templates.

Theses buttons are used in all tree representations of PACiS SCE; with the same behaviour. This behaviour is not re-defined elsewhere in this document.

The navigator is a standard tree viewer allowing with + and – to expand, reduce browsing of object components.

Icon indicates properties of objects.

They are different in template or object mode.

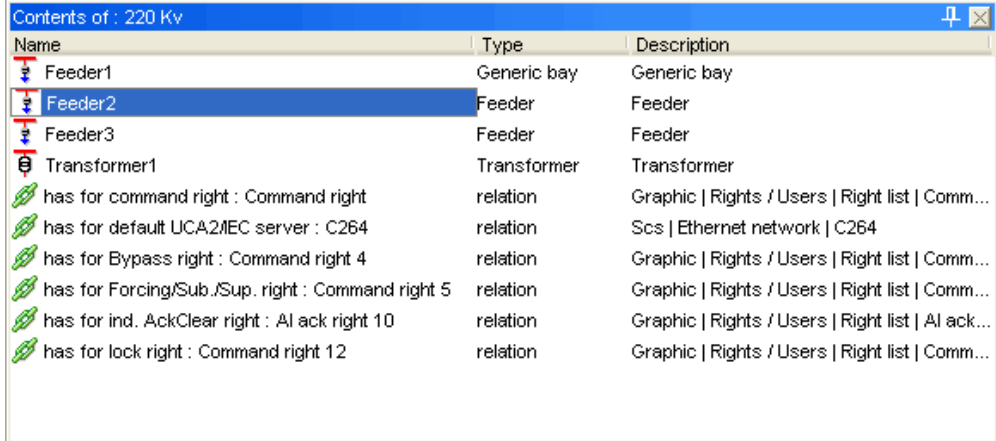
Icons	Database	Properties
	Template	Main Electric Parent
	Template	Main System Parent
	Template	Main Graphic Parent
	Both	Configurable component
	Both	Folder or Binder
	Both	Template Anchor (Parameter)
	Both	Template Instance Anchor (Parameter)
	Both	Template root
	Both	Complete or Full Filled Relation
	Both	Incomplete Relation
	Both	Complete and Fixed Relation

Relation representation is defined via toggle buttons, and . Theses buttons allows to filter or to display relations on navigator.

A double click on an object expands it.

In navigator and content window, the labels of **Spare** objects are *greyed and italic*. For sparing an object, set the Object **attribute** spare to Yes.

3.4 Components List



Name	Type	Description
Feeder1	Generic bay	Generic bay
Feeder2	Feeder	Feeder
Feeder3	Feeder	Feeder
Transformer1	Transformer	Transformer
has for command right : Command right	relation	Graphic Rights / Users Right list Comm...
has for default UCA2/IEC server : C264	relation	Scs Ethernet network C264
has for Bypass right : Command right 4	relation	Graphic Rights / Users Right list Comm...
has for Forcing/Sub./Sup. right : Command right 5	relation	Graphic Rights / Users Right list Comm...
has for ind. AckClear right : AI ack right 10	relation	Graphic Rights / Users Right list AI ack...
has for lock right : Command right 12	relation	Graphic Rights / Users Right list Comm...

FIGURE 26 - COMPONENTS LIST VIEWER

The components list gives the same sub-object that navigator expands. But it provides two other columns with the object type, and object description.

Sorting can be made by Name, Type or Description by clicking on header.

Relations, content drawings are the same that navigator, with same visibility rules. The behaviour of mouse operation is the same. A click on an object changes focus. A double click on a relation opens the **Relation link editor** dialog box..

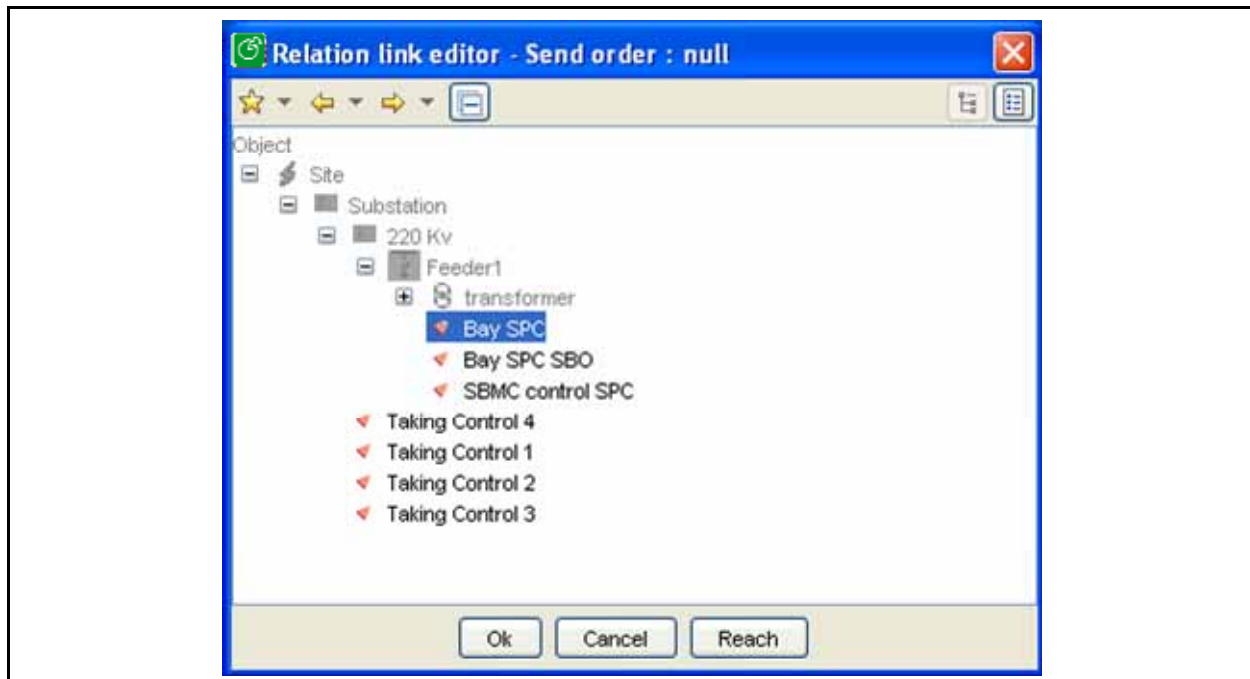


FIGURE 27 - RELATION LINK EDITOR

3.5 Attributes List Editor of Object/Template

Attributes are displayed in the editor as a table. Attributes are organised in **categories** (different tables with tabs) and **sub-categories** (different separators within a table).

Attributes of : Scs	
short name	Scs
long name	MICOM System
time zone	France: +1 hours (Local summer +2 hours)
Behaviour on DOU, CCU or AOU failure	Control refused on faulty board
computer password	AAAA
SBMC management for group	No
spare	No
TCP/IP addressing for SMT	
TCP/IP address	127.0.0.1
network name	SMT
TCP/IP addressing for SNMP Server	
TCP/IP address	255.255.255.255
auxiliary TCP/IP address (255.255.255.255: not used)	255.255.255.255

FIGURE 28: ATTRIBUTES LIST EDITOR

Relation attributes are displayed as normal attributes in a tab Relation. The path of linked object is also displayed as an attribute in a category Relation. If the relation is filled (i.e. the link is defined), the attributes of linked object are also displayed and editable while the relation edition. This allows to minimize **the navigation between objects**.

Attributes of : wired on : DI # 10	
Relation	
Link	Scs Ethernet network C264 DIU200-210 DI # 10
Attributes	
inverted value	No

FIGURE 29 - RELATION ATTRIBUTES LIST EDITOR

If the relation is filled (i.e. the link is defined), the attributes of linked object are also displayed and editable while the relation edition. This allows to **minimize the navigation between objects**.

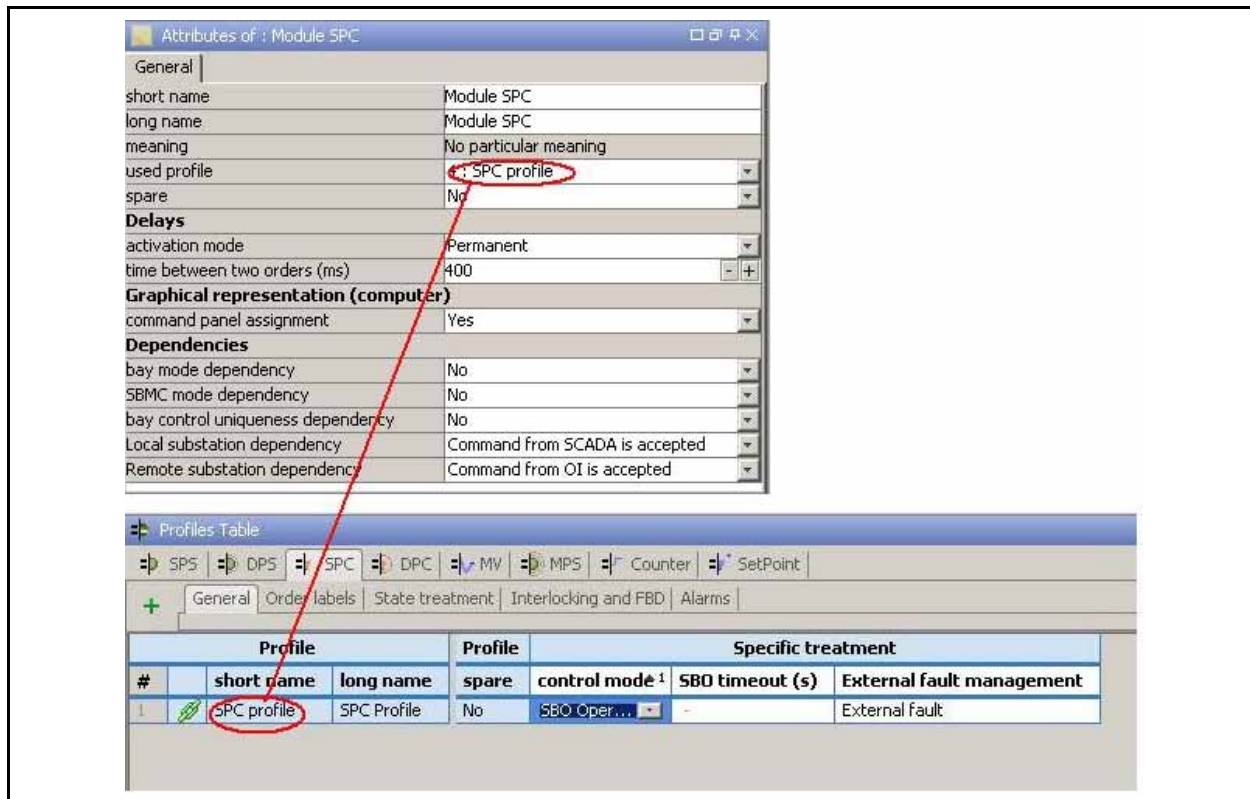


FIGURE 30 - RELATION ATTRIBUTES OF LINKED OBJECT

Attribute value modification is done by selecting a value in a list, or by double-clicking in the field to edit.

The **value representation** is different for:

- Attribute **not linked to a template**:
 - Read/write: white,
 - Read-only: greyed.
- Attribute **linked to a template**:
 - Read/write: white, its short name font colour is blue in the template mode,
 - Read-only: greyed.

Parameters are displayed as attributes in the Parameter category.

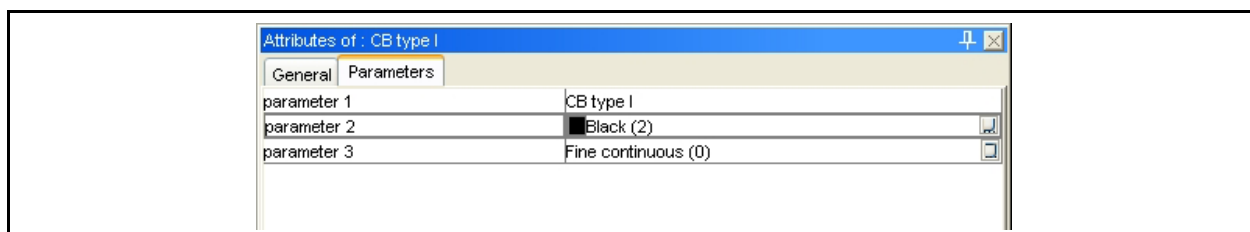


FIGURE 31 - PARAMETERS LIST EDITOR

The **contextual menus**, available with a right click, are:

- Cut: initiate the Cut action
- Copy: initiate the Copy action
- Paste: initiate the Paste action
- View linked attributes

3.6 Database Entries

The Database entry is composed of three areas whose purposes are different in the cases listed below.

3.6.1 Templates list

The **Templates list** contains all templates that are in the opened database(s).

The **main database** is the first opened database. It can be opened in update mode (work version) or read-only mode (referenced version).

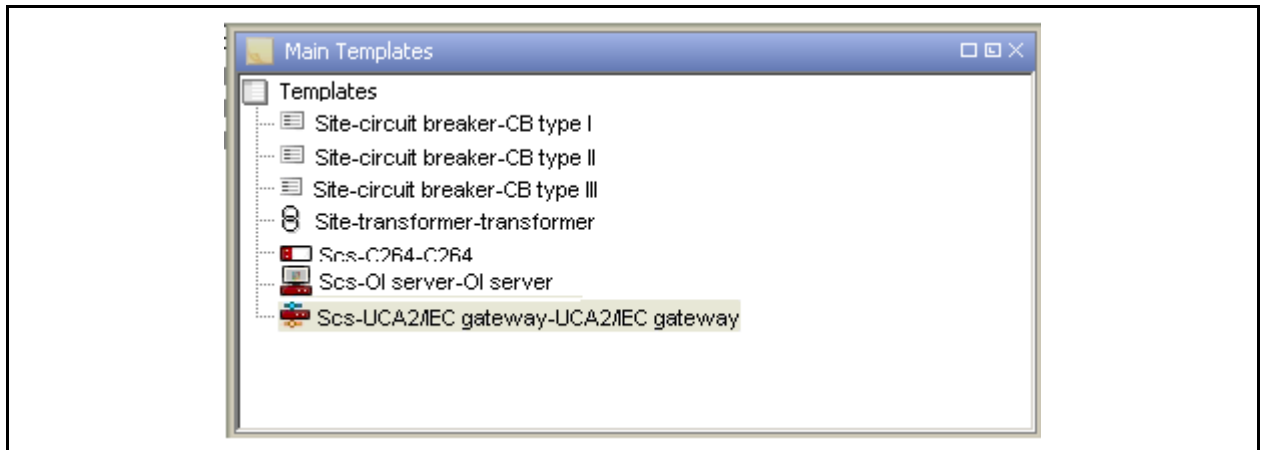


FIGURE 32 - TEMPLATE LIST AREA

The **second database** is the second opened database. It is mandatory opened in read-only mode. The System allows to open the second database only if the main database is opened in update mode.

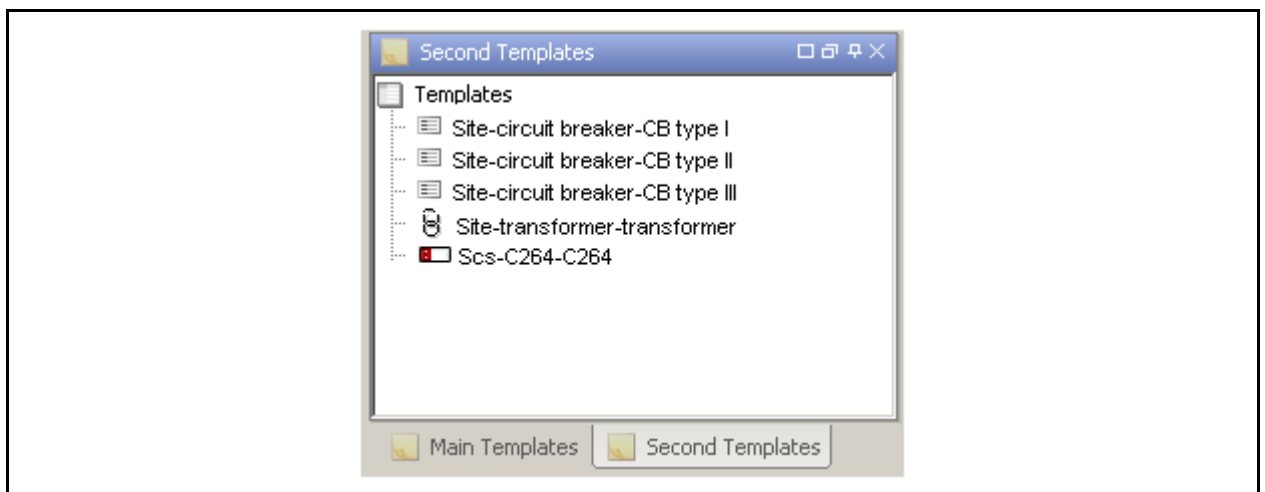


FIGURE 33 - TEMPLATE LIST AREA WITH A SECOND OPENED DATABASE

These templates are split in two tabbed panes, one for main database, and other for second database. If only main database is opened, the second tabbed pane is not visible. The tabbed panes have a ToolTip which give the name of opened database.

The Templates list and Templates entry are defined as a flat list of templates. The list root is specialised for the Templates Lists and the Templates entry (contains the type of the object/template selected in the Navigator).

The list is organised as follows:

- Electrical, then System, then Graphical templates.
- Alphabetical order on Anchor template type.
- Alphabetical order on Anchor template short name.

The list root ToolTip contains the name of the corresponding database (main database in Main Template List, second database in Second Template List).

This area is used to:

- Select a template to edit, in template mode,
- Transfer a template from second database to the main database: the template must be selected from second database templates list. On this template a contextual menu Add allows to copy this template to the main database. The template is then added into main database templates list.

3.6.2 Templates entry

The **Templates entry** contains the templates that can be added as a child of the selected element in the Navigator. It is therefore a contextual area.

A contextual menu item allows to add the current template under the current selected object from the navigator.

Hereafter, an example of a templates entry area.

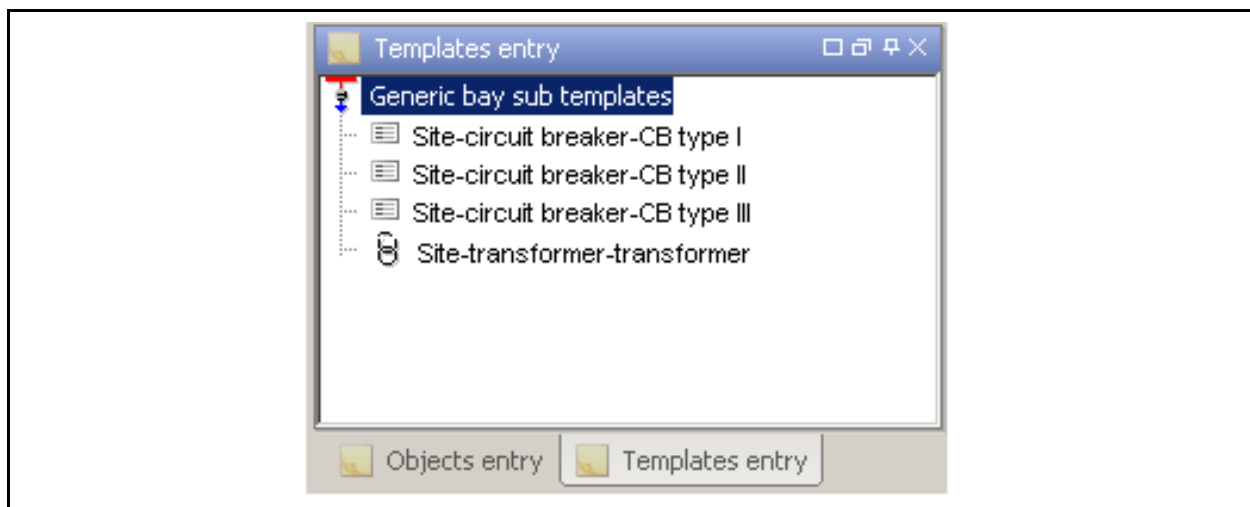


FIGURE 34 - TEMPLATE ENTRY AREA

It represents all templates which can be added under a voltage level. This voltage level is the selected object in the Navigator view.

3.6.3 Objects entry

The Objects entry contains the types (objects/templates and relations) that can be added as a child of the selected element in the Navigator. It is therefore a contextual area. These types are displayed as a tree, and organised with abstract types.

A contextual menu item allows to create an object with the selected type under the current selected object from the navigator.

Hereafter, an example of an objects entry area for a voltage level objects. It represents all objects which can be added under a voltage level. This voltage level is the selected object in the Navigator view.

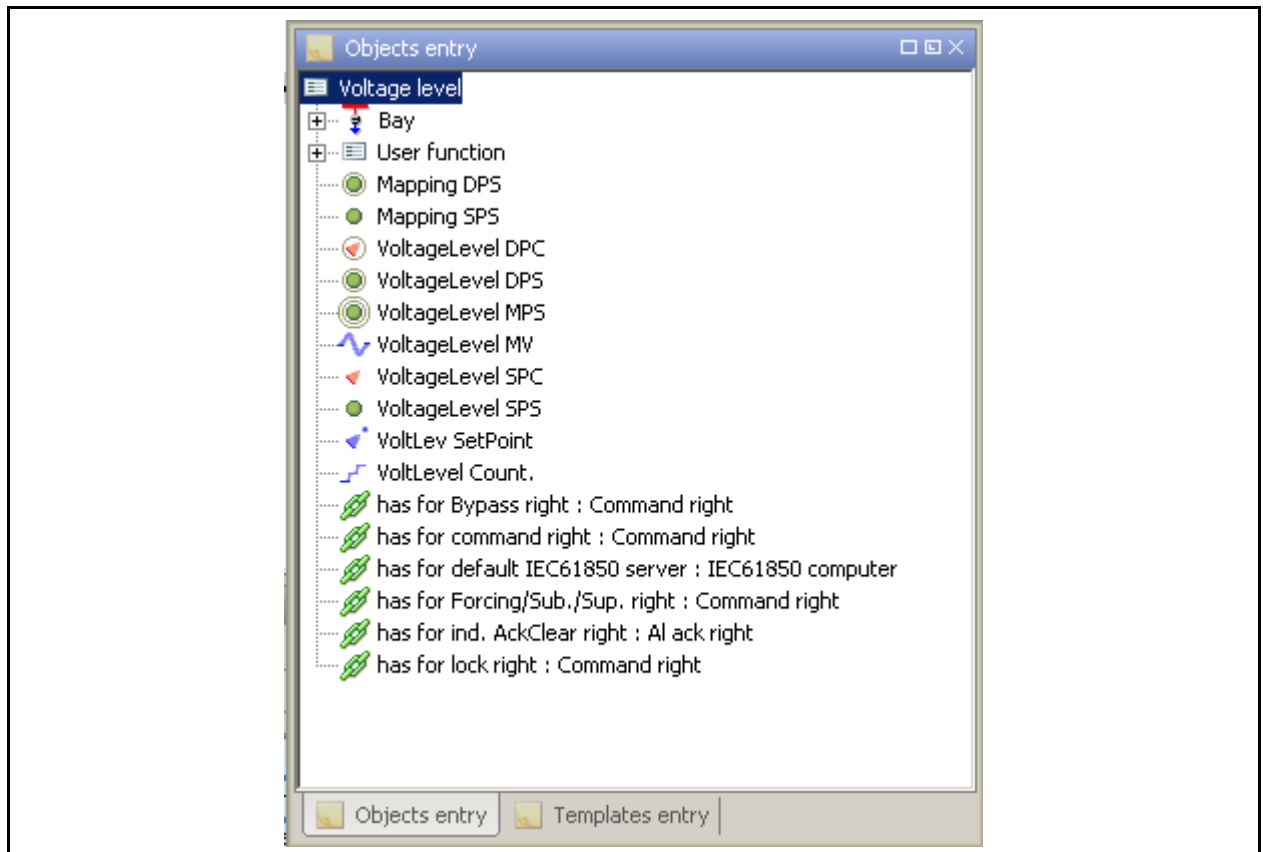


FIGURE 35: OBJECT ENTRY AREA

3.7 Graphic Area

This graphic area is represented by a moveable window.

It is the central area in docking window management (like also Navigator) when Graphic Perspective  (Windows menu) has been chosen.

It can receive various editors in according to the selected object in the **Navigator** and the selected attribute in the attributes editor.

As all objects, the graphic objects can be manipulated from the Navigator. Nevertheless, the graphic editor is helpful to create graphic objects, by showing a graphical representation of the objects.

Currently, the available editors are:

- **OI Mimic Editor:** to build the OI Mimics used by the operator interface,
- **Computer Mimic Editor:** to build the Computer Mimics used by the MiCOM C264 front panel HMI.
- **Bitmap Editor:** to build the bitmaps also used by the MiCOM C264 front panel HMI..

A complete description of these editor is done in section Graphic menu, see § 4.4.

4. PACiS SCE MENU COMMAND

All PACiS SCE actions are available through the menu bar items and/or contextual menu items.

Availability of these items is contextual. For example, Edit/Paste is enabled if an object has been cut/copy before and a potential parent object has been selected in navigator. These conditions are described for each action.

4.1 File Menu

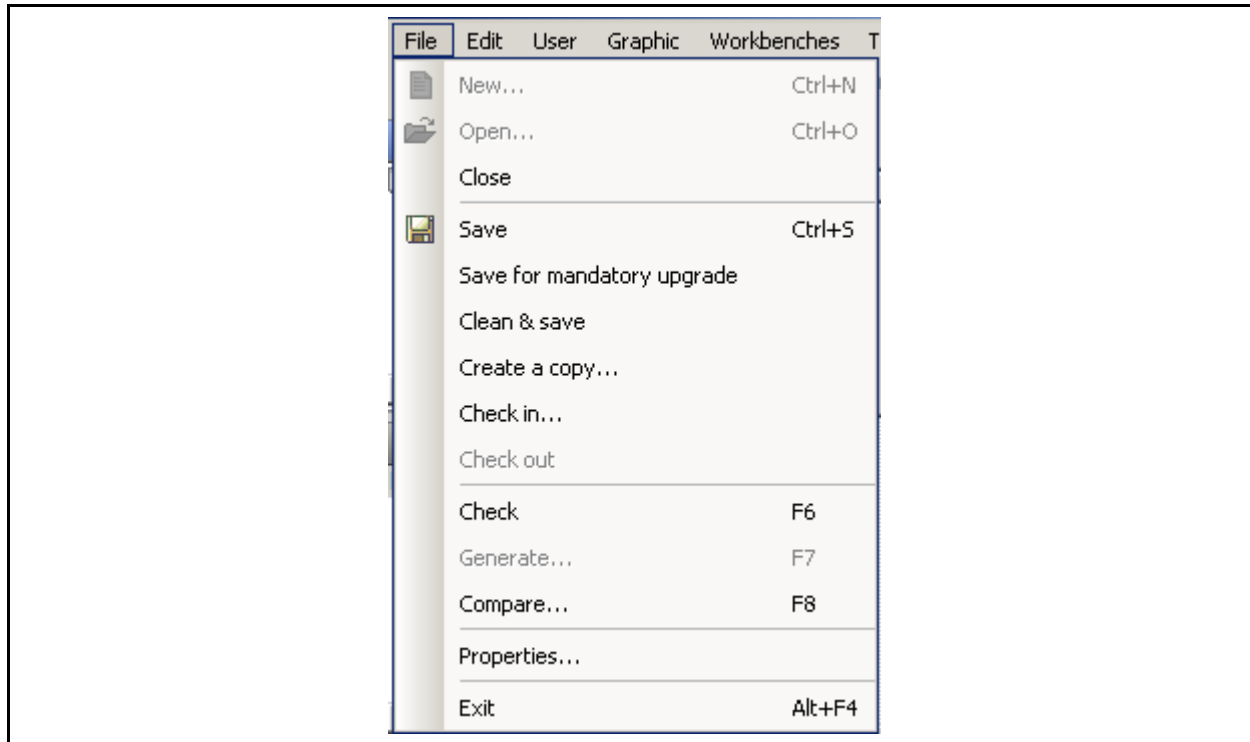


FIGURE 36: FILE MENU

A database is either a **configuration database** or a **library database**. A configuration database contains templates and a configuration which uses these templates. A library contains only templates.

Database could have some different storing format:

- a compressed file: the database is a compressed file that contains all files of the database.
- a sub tree directory: the database is a directory and its files sub tree.

The storing format of a database is indicated by its file/directory extension. e.g.:

- .mpc: database configuration file
- .mpl: database library file
- .dpc: database configuration directory
- .dpl: database library directory

Each database is composed of several versions: a **working version** and some **referenced versions**. The working version can be updated (read and write), whereas referenced versions are frozen (read only). A Check In mechanism is used to reference the working version: it becomes a referenced version. A Check Out mechanism is used to transfer a referenced version to the working version.

No more than two databases can be opened simultaneously in the PACiS SCE:

- The first opened database is the **main database**. It can be the working version (opened in update mode) or a referenced version (opened in read-only mode).
- The second opened database is the **second database**. It can be opened only if the main database is the working version. It can be the working version or a referenced version (both opened in read-only mode). This second database is only used to transfer template from a database to the main database. This second database could be a configuration database or a library database. In both case, only the template part of this database is used to transfer some template from second database to the main database.

The item of menu file applies only to the main database, except the **Open** and **Close** actions that may also apply to the second database:

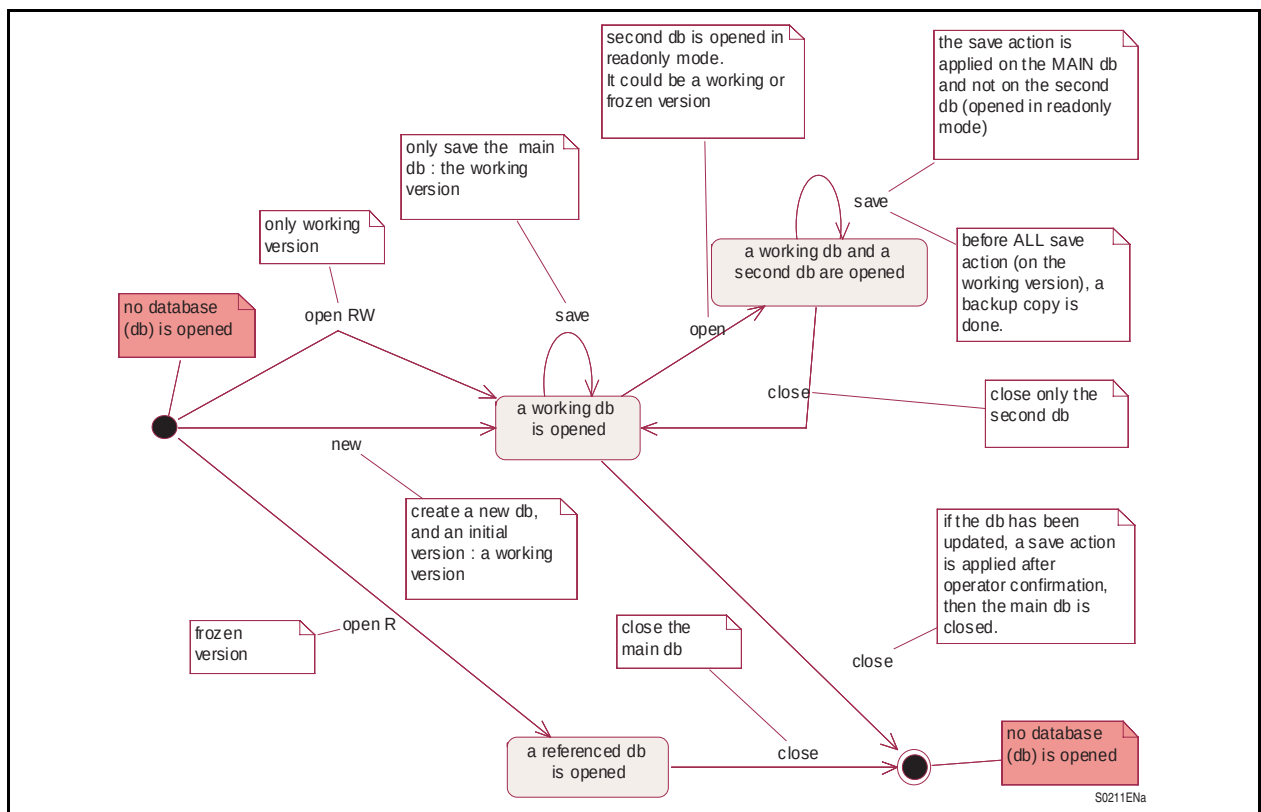


FIGURE 37 - MAIN / SECOND DATABASES

The **naming rule** of database is the following:

Referenced version is a file/directory with indices: v.r[m]. e.g.:

databaseName.1.1.3.mpc

indices range is 0..99,

third index (m) is optional and is used for partial generation use case.

database name contains any alphabetic or numeric character or “_” or “-”. Blank character is forbidden. This rule must be applied for database path also.

Work version of the configuration has no indices.

databaseName.mpc

4.1.1 File/New...

Purpose:

- Create a new working library(.mpl, .dpl) or configuration database (.mpc, .dpc)

Availability:

- No database loaded, or no working database.

Other call:

- Shortcut: Ctrl+N
- Toolbar 

Operating:

- The action is available from start-up or if all loaded database have been closed. After this new action it is possible to open second database to pick-up data/templates.

4.1.1.1 Create a new PACiS configuration.

- Before creation, the default application type PACiS must be set. Then the **present HMI is kept**: a **file chooser** appears.

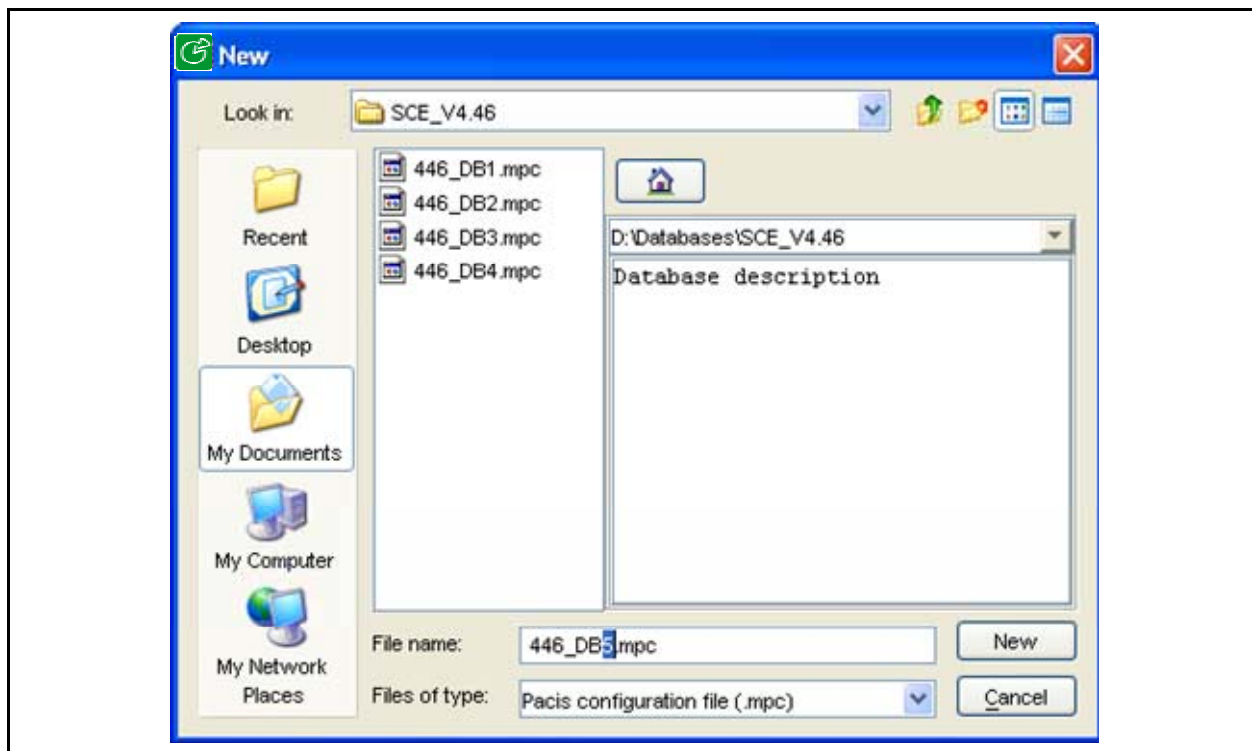


FIGURE 38: - FILE/NEW DATABASE

1. Browse the drive and directories selections to define where to store new file or directory
2. Enter a name for the New database in "File Name" area
3. Select the kind of database in "File Type" area with: mpc for configuration, or mpl for library
4. Validate by clicking the **New** button or enter in "file name" area

A first working file or directory is created. An empty working database is available under PACiS SCE interface.

With previous naming rules, the name is free, but a **good practice** is to **put PACiS SCE software version at its beginning**.

Example:

04_71_myDb.mpc

Path of database must contain only alphabetic or numeric character or “_” character or “-” character.

If the given name is wrong a warning message is displayed:

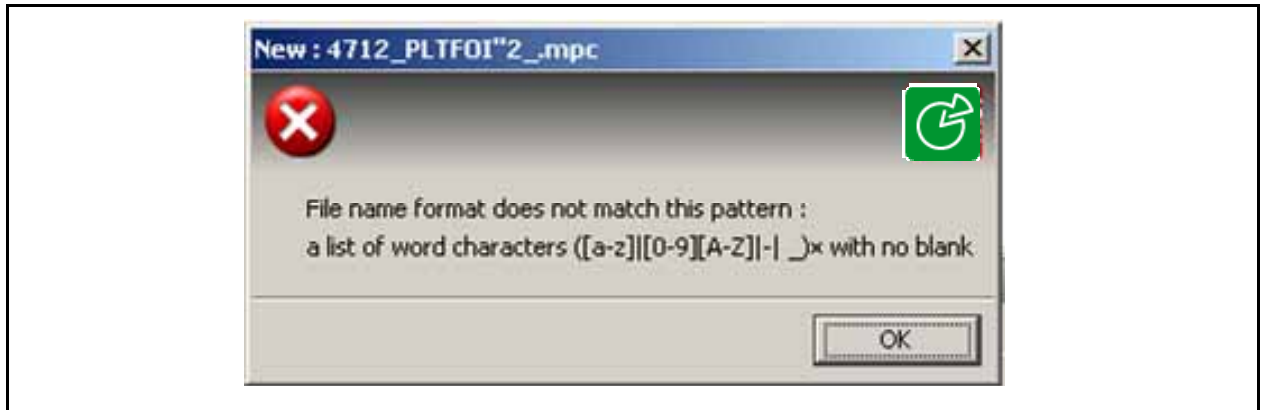


FIGURE 39: WRONG FILE NAME FORMAT

4.1.1.2 Create a new C264-Standalone configuration.

A C264-Standalone can be now configured with SCE.

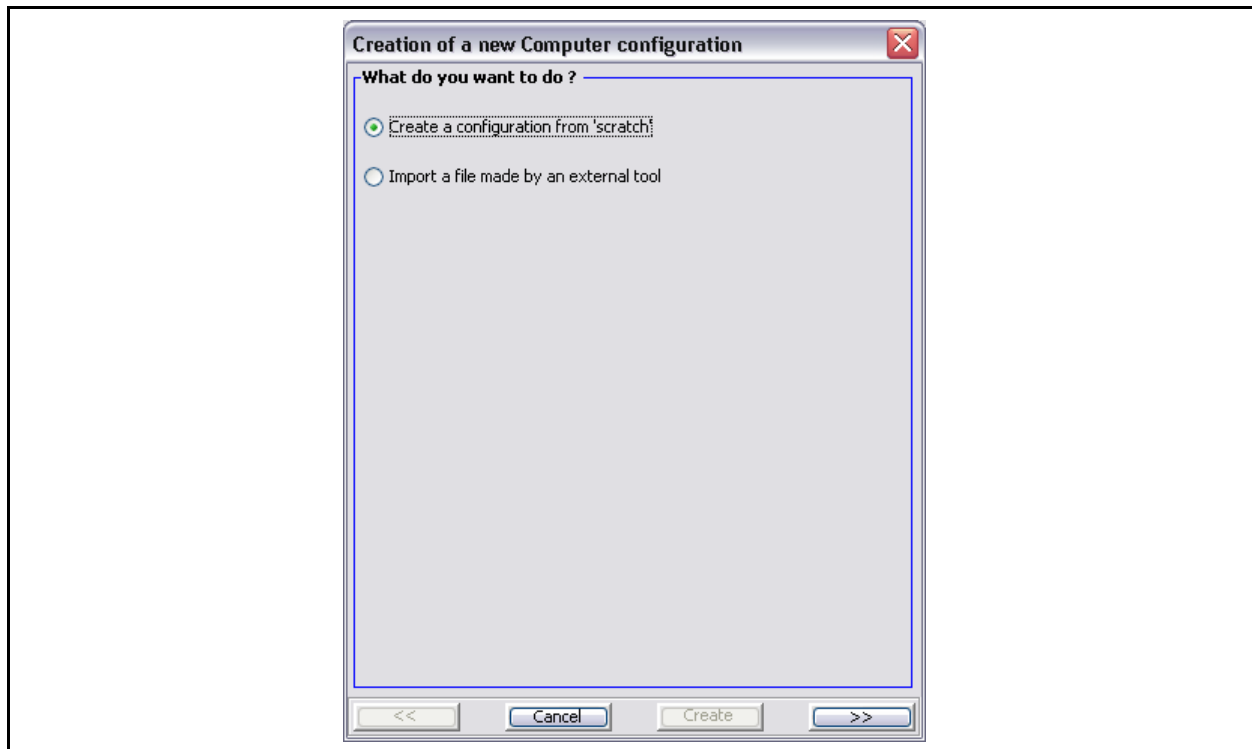
C264-Standalone application type must be used.

When you use the SCE to create a configuration Standalone, the SCE hide automatically some actions, functions and data of PACiS.

The **application type C264-Standalone** allows you to:

- In the electric part:
 - create only generic and transformer bays or modules,
 - create FBD and slow automations
- In the system part:
 - create only one computer C264,
 - create all boards except for TMU2xx,
 - create SCADA protocols (Modbus, T101, T104, HNZ),
 - create legacy networks with protocols (Modbus, T101, T103, T104)
- In the graphic part:
 - create computer workspaces with bay mimics,
 - use the bitmap table.

Use **of File/New**. When default **application type is Standalone**, a creation **wizard** appears and helps user to create this new database: from scratch or from S9R file.



4.1.2 File/Open...

Purpose:

- Open an existing library/configuration database as main or second database. If no database already opens, it opens a main working database. If a work database is already opened, a second database is opened in read only, for copy of object to the working database.

Availability:

- Only two databases can be opened simultaneously

Other call:

- Shortcut: Ctrl+O
- Toolbar 

Operating:

- The action is available from start-up, or when a main database is already defined. A pops up appears for selecting the database.

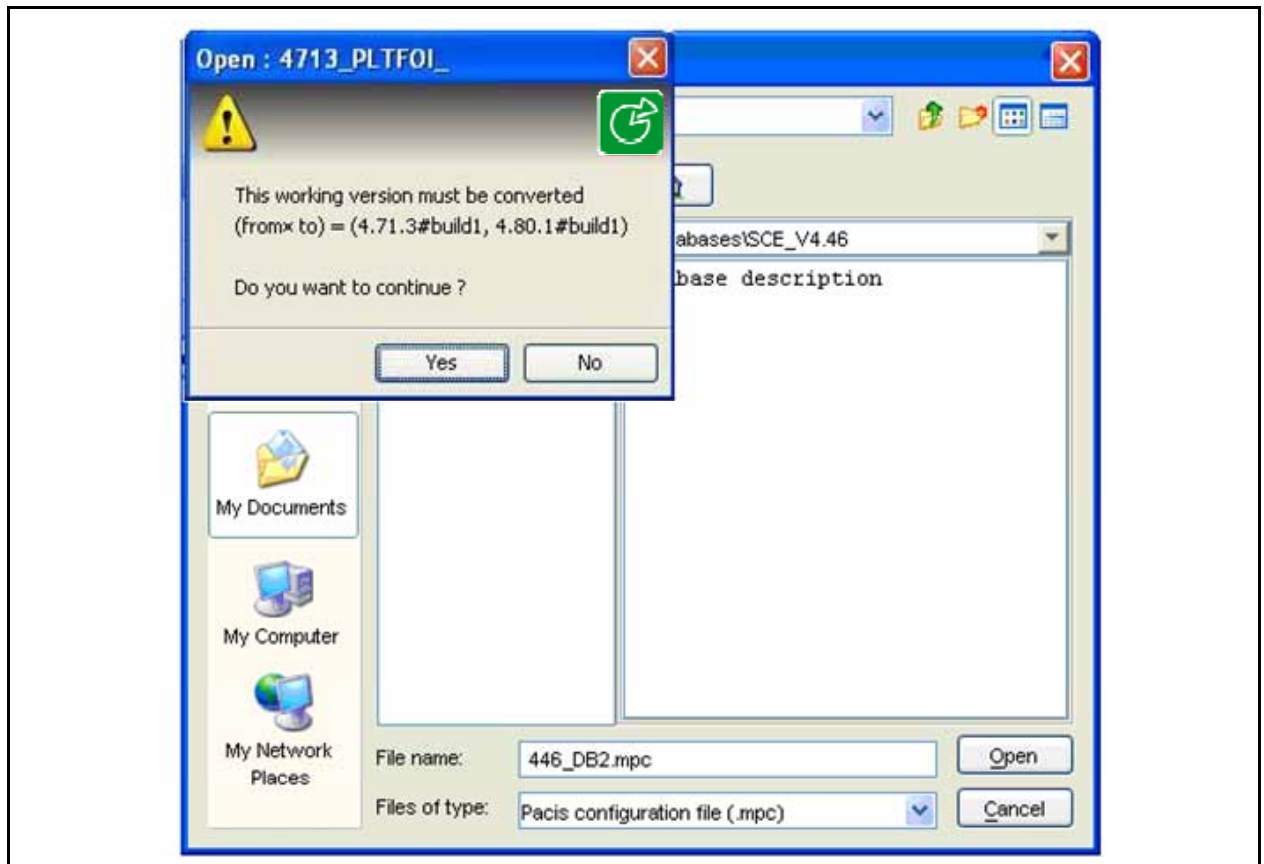


FIGURE 40: FILE/OPEN DATABASE

1. Browse directories to select the file to load with drive selection and directories
2. Select a filter with the kind of database in "File Type" area with: mpc for configuration, or mpl for library
3. Click on file name or enter the name of the database to load in "File Name" area
4. Check comments in write panel
5. Validate the selected file by clicking the **Open** button

The database is opened in a **temporary directory** (.mpx). By default, this temporary directory is an uncompressed copy of database that is created under the directory where the database is stored.

This directory where this temporary directory is created could be set explicitly via two PACiS SCE settings (tools/option).

The temporary directory could be directly the directory of database. This option is set by a PACiS SCE setting (tools/option) and is available for directory database format (.dpc, .dpl) only.

The **read/write mode** is displayed in title bar.

When PACiS SCE reads the open database, it checks with which PACiS SCE version it has been saved. If the PACiS SCE version was older, then some **upgrades can be necessary**: for example, adding a new attribute to an object, modifying the cardinality of an object, etc. In this case, the following dialog box is displayed:



FIGURE 41: FILE/OPEN WITH DATABASE CONVERSION

If answer is "Yes", then database is automatically upgraded to the new PACiS SCE data model. This upgrading is available only for a working version.

The upgrading process could be more complex, especially when new structure of databases is incompatible with the structure of database to open. In this case, the database must be saved with a special command: "prepare upgrade & save". Then opening this kind of database is available.

4.1.2.1 Open a database without application type

When user opens a database from an old version which hasn't application type, the SCE determine automatically which application type has to be used.i.e (PACiS or C264-Standalone)

The two application types are computed by searching specific objects in database, with following rules:

- If database contain **only one computer without IEC mapping** in object part, and **no IEC mapping** in template part the application type is set to **C264-Standalone**.
- If **database** is not C264-Standalone, it is PACiS.

4.1.3 File/Close

Purpose:

- Close opened library/configuration database as main or second database.

Availability:

- when a database has been opened.

Other call:

- Main window close button

Operating:

- The name of the database is already defined from Open/New. If main database is a working database and some modifications have been done, it asks to Save the database:

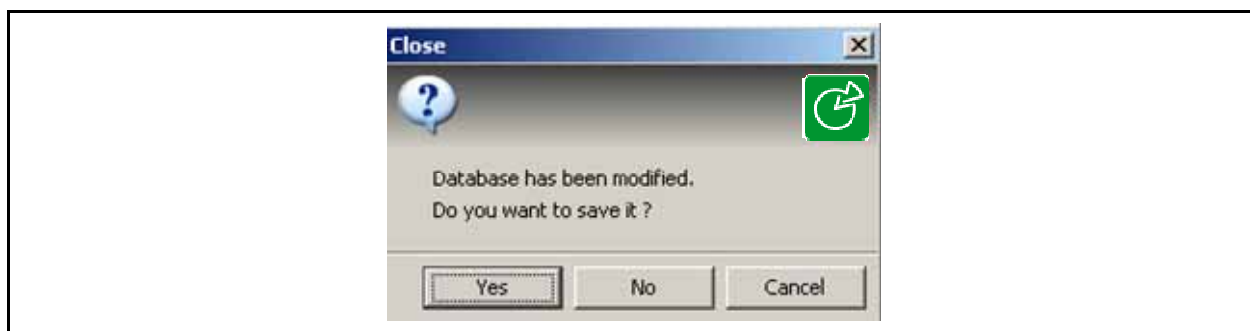


FIGURE 42: - FILE/CLOSE ASKING FOR SAVE WORK DATABASE

- If a second database is opened, it's closed and the working database is still opened.

4.1.4 File/Save

Purpose:

- Save the working opened library/configuration database. Second database can not be modified and does not need a save action.

Availability:

- Only the working version of a database (read/write) can be saved

Other call:

- Shortcut: Ctrl+S
- Toolbar 
- Main window close button if database has been modified

Operating:

- Only the working version of a database (read/write) can be saved

4.1.5 File/Prepare upgrade & Save

Purpose:

- Save the main opened library/configuration database and put into the database file an xml form of the database. This xml form could be used during opening operation if the structure of the data model has been changed (see File/ Open)

Availability:

- Only the working version of a database (read/write) can be saved with this option

Other call:

- None

Operating:

- An xml backup of the database is done. This xml backup is stored in .mpc file.

4.1.6 File/Clean & Save

Purpose:

- Compact the main opened library/configuration database and save it. The compaction consists to delete the space not used in database file: when an object is deleted, its space is not freed.

Availability:

- Only the working version of a database (read/write) can be cleaned and saved.

Other call:

- None

Operating:

- An xml backup of the database is done. This xml backup is stored in .mpc file.

4.1.7 File/Create a copy

Purpose:

- Copy the main library/configuration database into a new database.

Availability:

- Always

Other call:

- None

Operating:

- The action starts a pop-up to enter new file name where is stored the copy and eventually modify the store format of the database (.mpc <> .dpc or .mpl <> .dpl):

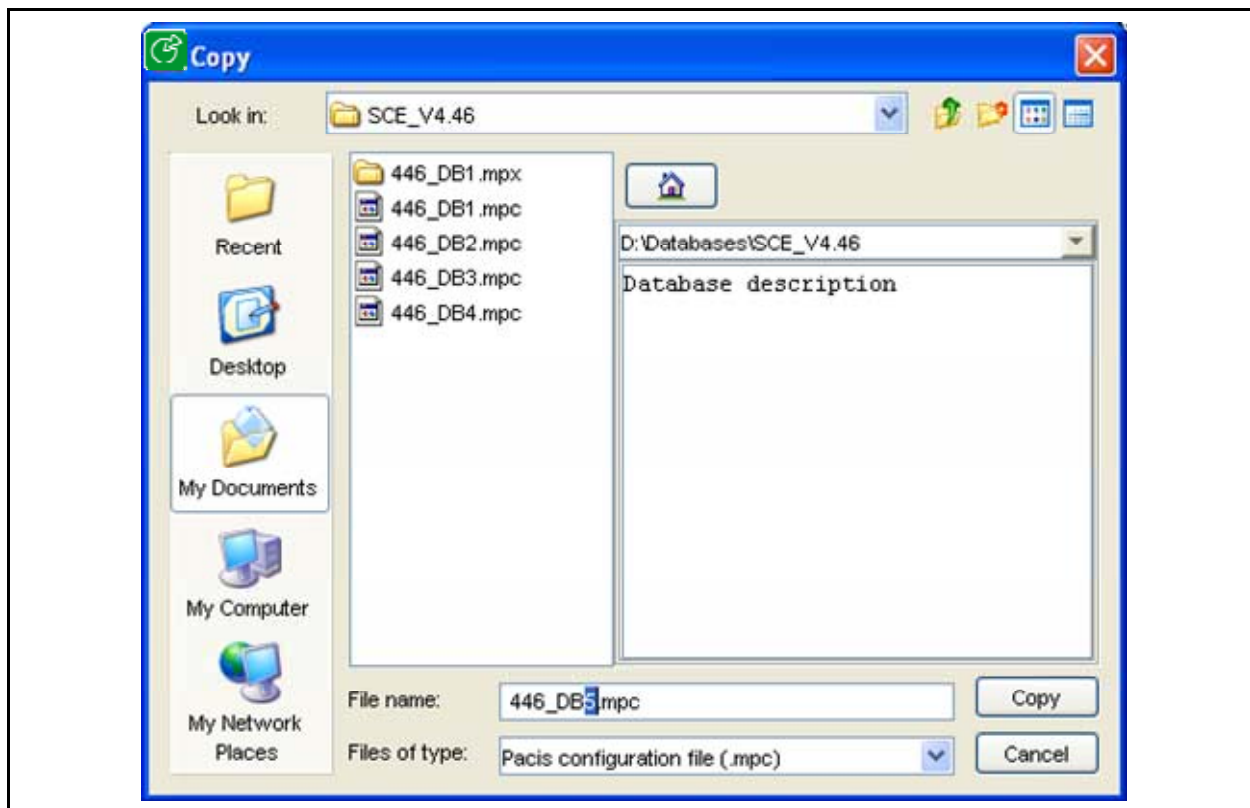


FIGURE 43: COPY FILE CHOOSER

The current database remains the same and needs to be saved later if modifications have been done. To switch to the database copy, it is needed to save and close the main database, then open the copied database.

4.1.8 File/Check in...

Purpose:

- Save the current working database (template or configuration) in a referenced file version. The working database is not saved but only copied. The “check in” file is named like work database with increment of database version. Check in file is then read only from PACiS SCE until a check out.

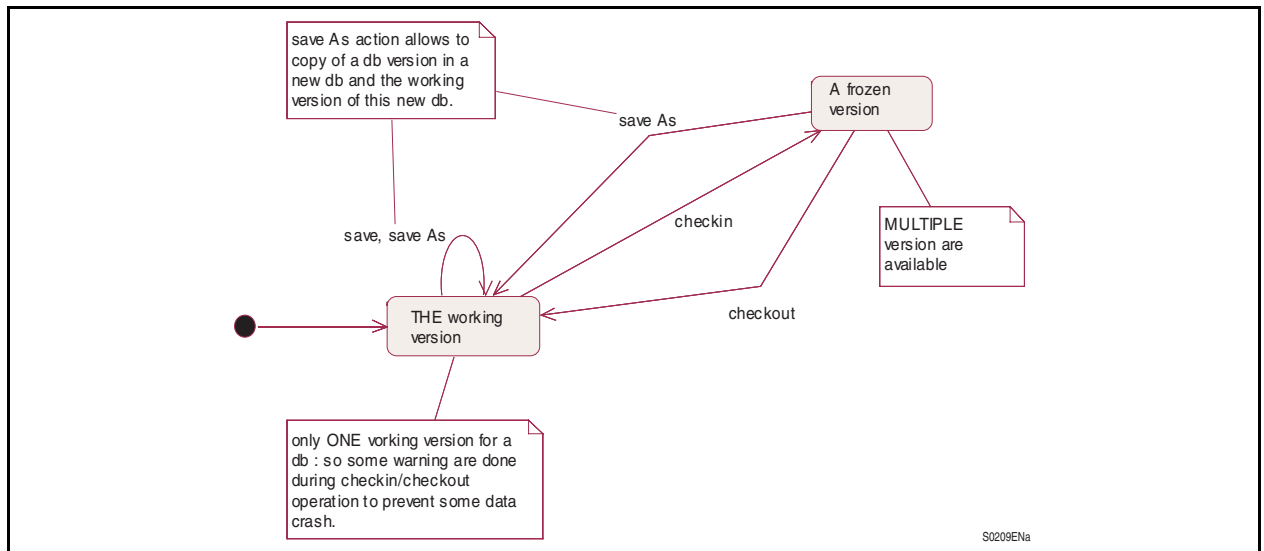


FIGURE 44 - CHECK IN / CHECK OUT MECHANISM

Availability:

- Only with working version of a database

Other call:

- None

Operating:

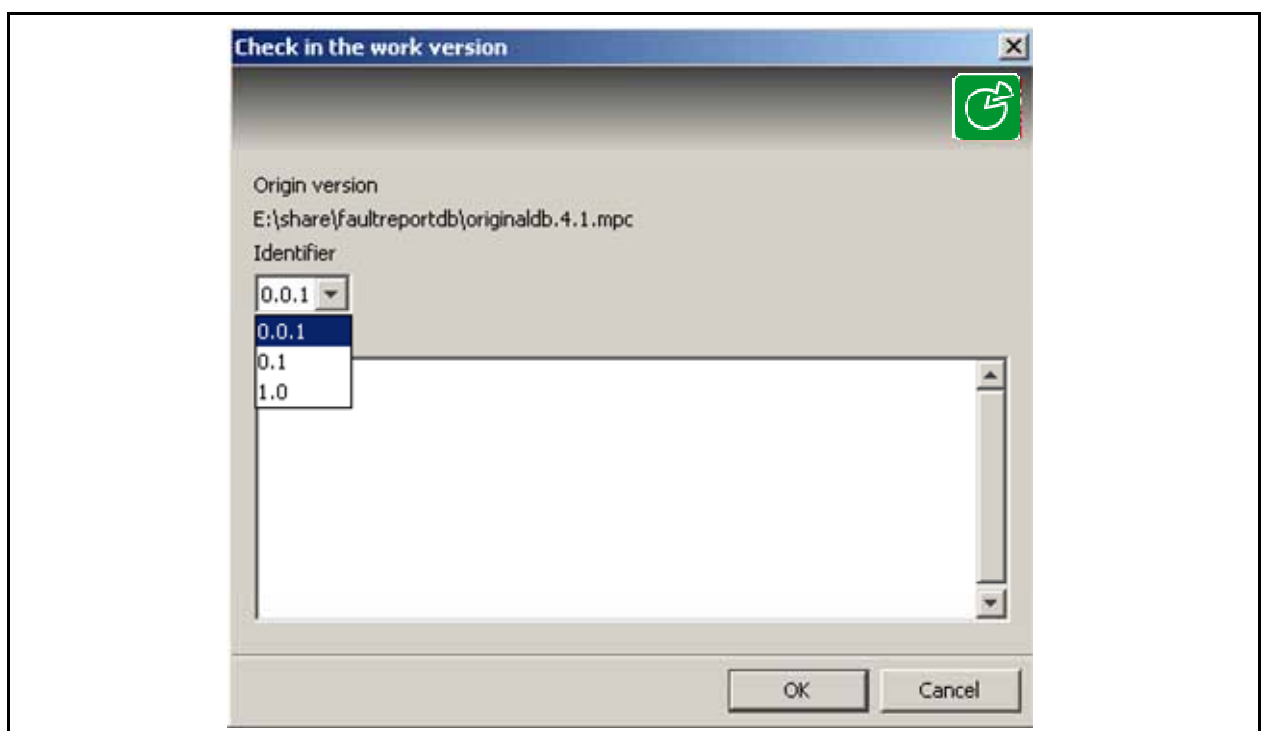


FIGURE 45: FILE/CHECK IN WORKING DATABASE

1. Select new reference identifier
2. Write comments
3. Confirm check-in by clicking the **OK** button

A pop-up window asks for **identifier increment** with major or minor evolution. PACiS SCE computes directly the proposed identifier from current one. In example it starts from 0.0. If current identifier is 3.5 it proposes 3.5.0, 3.6, and 4.0. This reference is added to the file name.

A field text area allows to precise the content or the modification of the version. This **comment** is stored in the database file. It is possible at any moment to read it with File/Properties.

A **good practice** is to keep reference 0.x for development, and 1.x, 2.x for major steps of project life: prototype, Factory version, site version... Major index modification can be also a consequence of PACiS SCE software evolution.

Three indices versions (for example 3.5.1) are used for partial generation of database: only a subset of devices are taken into account during device configuration files process (file/generate).

The loaded database is still the working database.

'Check in' does not mean Check: a referenced version (with a check in) is not mandatory a full consistent database (test done with Check operation). An inconsistent database can be referenced but a warning message is then displayed. During opening operation, if the working version does not come from the latest referenced version of database, the following warning dialog box is displayed:

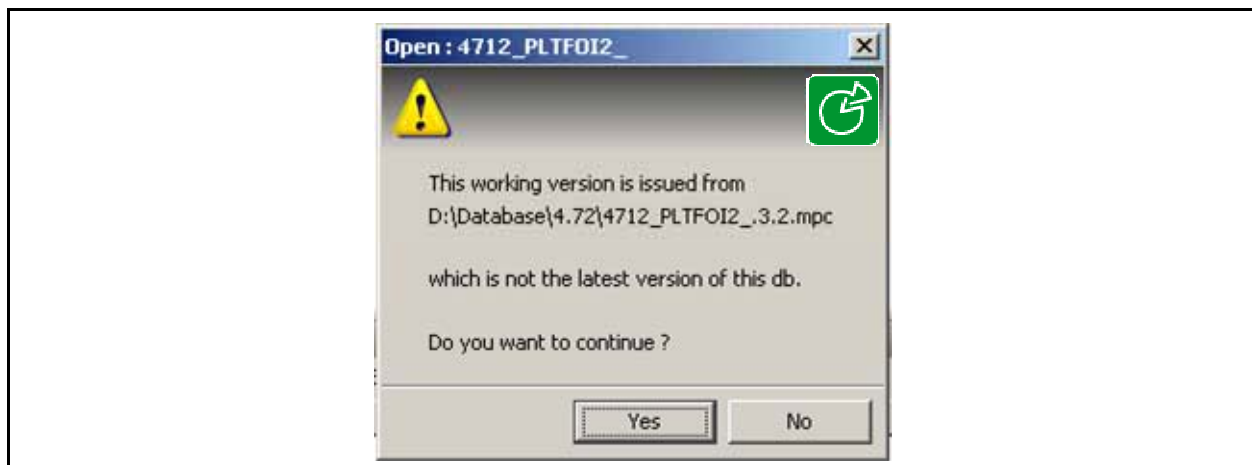


FIGURE 46: FILE/OPEN AND CHECK IN WORKING DATABASE

4.1.9 File/Check out

Purpose:

- A referenced database could not be modified (read only). The check out action allows to transform the referenced database into a working database.

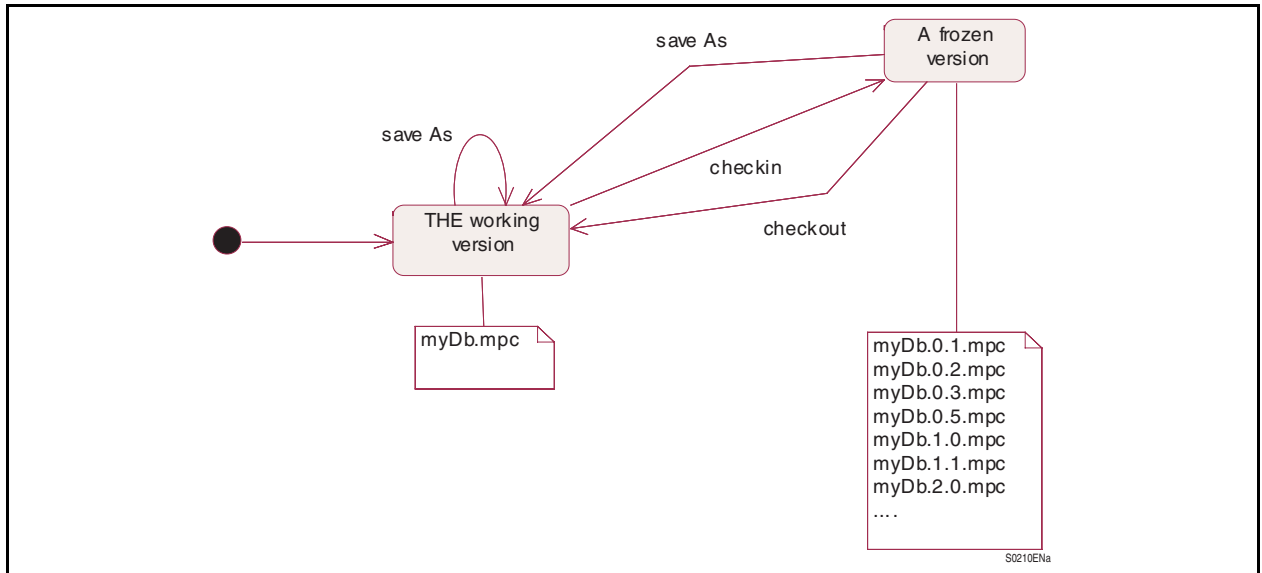


FIGURE 47 - FILE/CHECK OUT DATABASE, EXAMPLE

Availability:

- Only with loaded referenced version of a database

Other call:

- None

Operating:

- The referenced version is copied into the working version. The previous working version is overwritten. If the referenced version to check out is not the latest version, a warning dialog box is displayed:

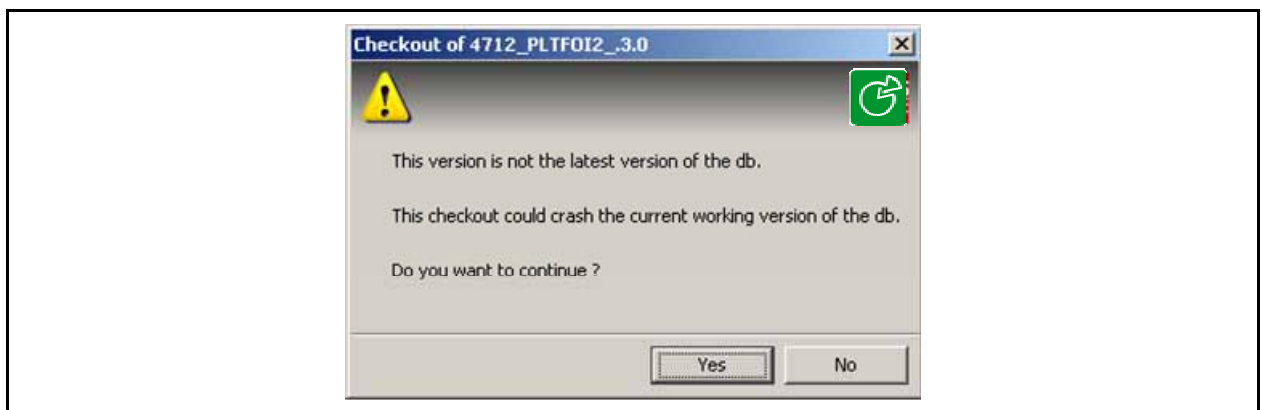


FIGURE 48: FILE/CHECK OUT WARNING

4.1.10 File/Check

Purpose:

- **Check** the main library/configuration database **consistency**. The action starts testing on whole database. The templates and the spared objects are not taken into account by the check function. The **complete definition** of errors/warnings is available in **chapter PACiS SCE/EN MF**.

All errors/warnings are displayed in the following table of the Trace panel ("Checks" tab):

Le...	Code	Type	Reference	Message
	03307	RelationLink	Scs Ethernet network C254 All AIU...	The mandatory relation has no link-> [Scs Ethernet network C264 All AIU status has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 All AO...	The mandatory relation has no link-> [Scs Ethernet network C264 All AO status has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 All TM...	The mandatory relation has no link-> [Scs Ethernet network C264 All TM status has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 All ED...	The mandatory relation has no link-> [Scs Ethernet network C264 All ED status has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 All Frin...	The mandatory relation has no link-> [Scs Ethernet network C264 All Frin status has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 All rac...	The mandatory relation has no link-> [Scs Ethernet network C264 All rac status has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 Setlin...	The mandatory relation has no link-> [Scs Ethernet network C264 Setlin done has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 Setlin...	The mandatory relation has no link-> [Scs Ethernet network C264 Setlin in coner. has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 Setlin...	The mandatory relation has no link-> [Scs Ethernet network C264 Setlin in prog. has for profile : <null>]
	03307	RelationLink	Scs Ethernet network C254 Setlin...	The mandatory relation has no link-> [Scs Ethernet network C264 Setlin disc has for profile : <null>]
	22149	DatapointClient	ALTomATION AGLE 11kV INCOM...	The goose usage for client-server relation is missing for Automation/Mapping at client level (server, client)-> [Scs Ether...
	22149	DatapointClient	ALTomATION AGLE 11kV INCOM...	The goose usage for client-server relation is missing for Automation/Mapping at client level (server, client)-> [Scs Ether...
	22148	DatapointClient	ALTomATION AGLE 11kV INCOM...	The client-server relation is missing (server, client)-> [Scs Ethernet network C264-1, Scs Ethernet network C254]

FIGURE 49 - ERROR / WARNING CHECK TABLE

Table rows: each row corresponds to one check operation whose result is an error or a warning.

Table columns:

- **Level:** it displays an icon for error or warning.
- **Type:** it contains the identifier of the check operation displayed in the row.

Example: "DataObjectPhases" is a check consisting in verifying that all the phases under a GenWYE or GenDELTA DataObject, is linked, through the "has for IEC61850 address" relation, to distinct Datapoints.

- **Reference:** for each check operation, an object implicated in the check operation, is considered as the main object. The column displays the path of this object. If the user activates the "**Reach**" action on the row, this object is retrieved in the PACiS SCE navigator and selected. This action is also available with double-click.
- **Message:** it displays a message explaining the error/warning for the check operation.
- **First column:** the user can check On/Off this column to remember which error/warning he tried to correct.

The panel of the Table contains also the following buttons:

- **Errors filter toggle** button: if this button is selected, the Error traces are not displayed (they are filtered). Else they are.
- **Warnings filter toggle** button: if this button is selected, the Warning traces are not displayed (they are filtered). Else they are.
- **Info filter toggle** button: if this button is selected, the Info traces are not displayed (they are filtered). Else they are.
- **Checked traces filter toggle** button: if this button is selected, the Checked traces are not displayed (they are filtered). Else they are.

Availability:

- For referenced or working version of a database

Other call:

- Shortcut: F6

Operating:

1. Before the beginning of the check, PACiS SCE clears the **Check Traces tab**, displays it and displays a waiting popup
2. During the check computing, PACiS SCE displays the found errors or warnings in the Check Traces tab. The number of **errors and warning are updated** at the top of Check Traces tab
3. After the check, the content of the Check Traces tab is **saved** in the **check.txt** file in the folder of the configuration. This file is a text file. It can be displayed in Microsoft Excel with the file type: Text (separator: tabulation), or in any text editor.
4. PACiS SCE notifies that the Configuration Database is modified and has to be saved (check.txt file and Configuration settings are to be saved).

4.1.11 File/Generate...

Purpose:

Generate from PACiS SCE current database the equipment database to load into system devices. This equipment database is a Zip file which is used by the SMT (System Management Tool). It's called **System Data Bag (*.sdb)**. There is **no software interface** between SMT and PACiS SCE. The exchanges are done manually with files.

This System Data Bag contains all device configuration files which are named **Application Data Bags (*.adb)**. There's an Application Data Bag for each equipment configuration to be generated. For each equipment, there's also a Maintenance Data Model (*.dm) for SMT to access the equipment through the Station Bus.

For the simulation application (equipment simulator and process simulator), the application databags are directly the configuration files of the simulators: .xml for the equipment simulator, .zip for the process simulator.

SCE generates the setting file (setting.xml) taking into account the protection functions defined in the configuration. Only the settings corresponding to functions defined in the configuration are generated in the file.

The XmlSetBuilder in SCE converts this file to a MiCOM S1 readable file.

XmlSetBuilder uses the model.xml file that describes all the parameters of the MiCOM C264. The format of this file is described in the PIDD setting. The PIDD setting defines the rules of visibility for parameter. This document permits SCE to apply those rules.

SCE will generate a databag that contains:

- MiCOM C264's configuration file,
- MiCOM C264.set file
- MiCOM C264's client.dm files

In the case of protective function, in the SCE, all thresholds are disabled by default and can be modified only by the MiCOM S1 (They are not present in the DB).

In the case of built-in and automatism, the default value of each parameter is defined by the user in the SCE. It can also be modified by the MiCOM S1.

Availability:

- Only for **referenced configuration** database version. The library database and the working database version are not available.
- If the referenced configuration has not been consistent (file/check has been done with no error), File/generate action is not available.



FIGURE 50 - CHECK WARNING FOR NO-CONSISTENT
OR OBSOLETE CONSISTENT CHECK

Other call:

- Shortcut: F7

Operating:

1. File/Open a referenced (and check in) version. This means that in common cases, the user may have to:
 - check in its working database,
 - notice the check in the new version reference,
 - save the working database for future modification,
 - close the working database,
 - open the database with new referenced version.
2. Select **File/Generate...**
3. A **Generation** dialog box lists all SBus devices available on database and allows to select a part or all of them. The spare devices are not displayed.
4. Only if referenced version has a third index, select the devices. Otherwise all devices are pre-selected.
5. Select the output directory, where the System Data Bag will be generated, with the ... button.
6. Click the **Run** button.

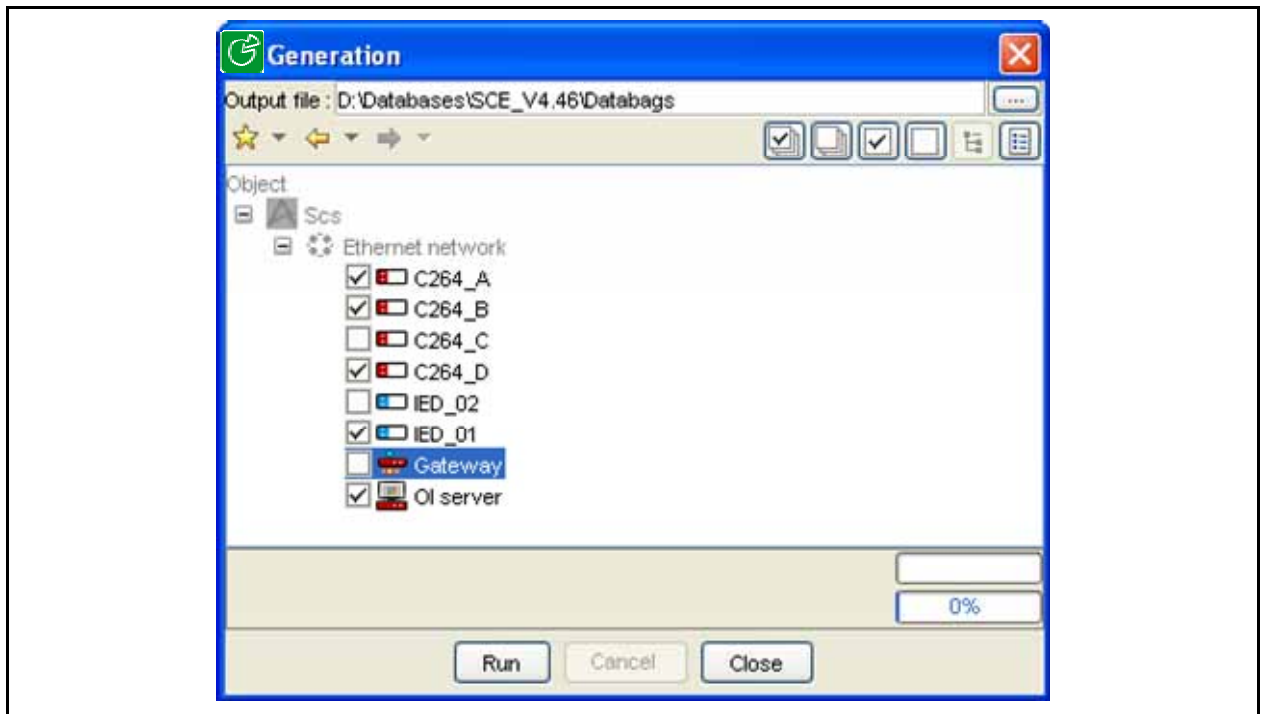


FIGURE 51: FILE/GENERATE DIALOG BOX

7. The action progression is displayed graphically. This progression can be followed in three ways:
 - the progress bar is animated to display the percentage of achievement of the process (the value is a ratio of number of treated items),
 - the messages displayed on status bar which are specific of each using,
 - the nodes of the browser change in function of their processing state to follow processing.

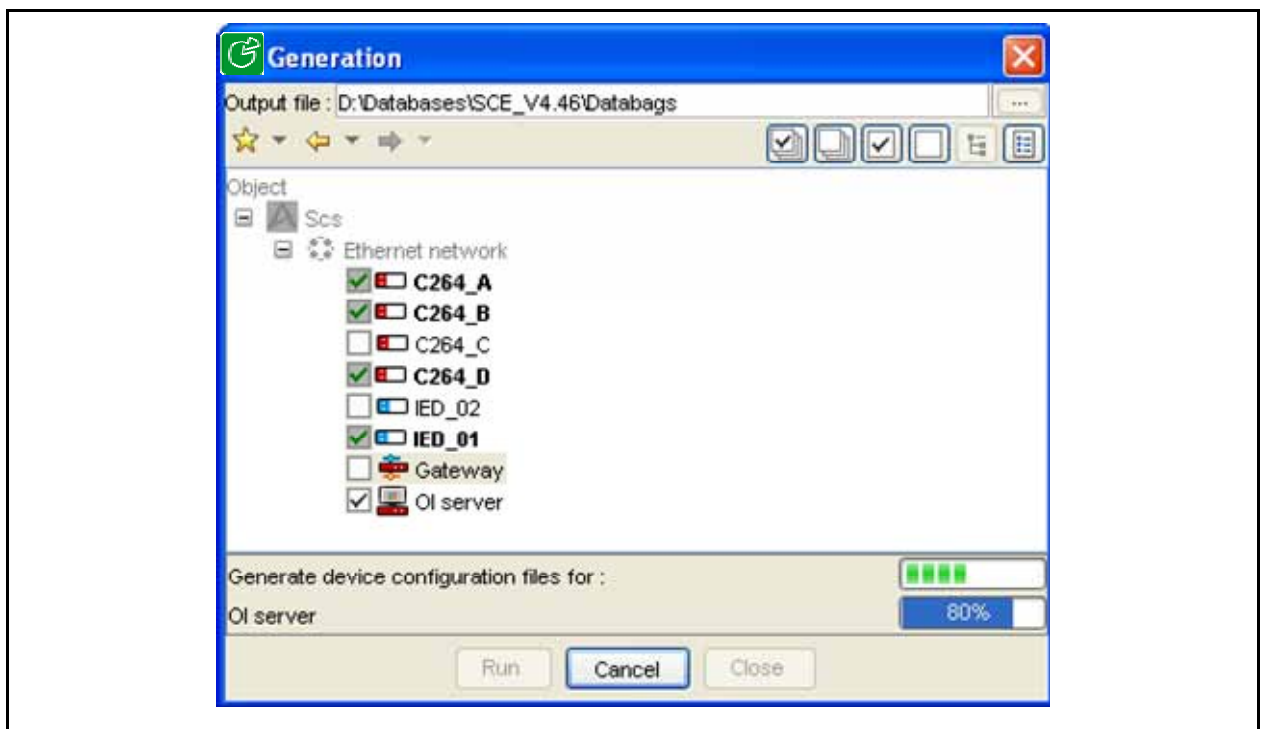


FIGURE 52: FILE/GENERATE PROGRESSION

At the end of generation the final result of generation is presented.

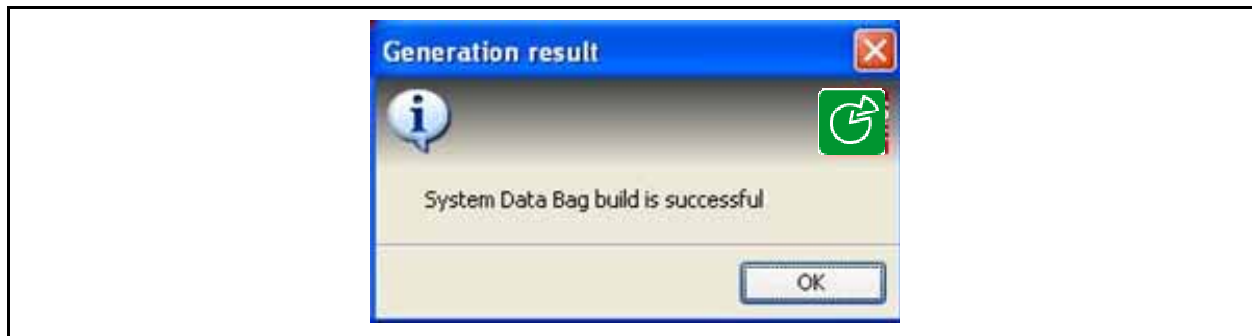


FIGURE 53 - FILE/GENERATE ... SUCCESSFUL

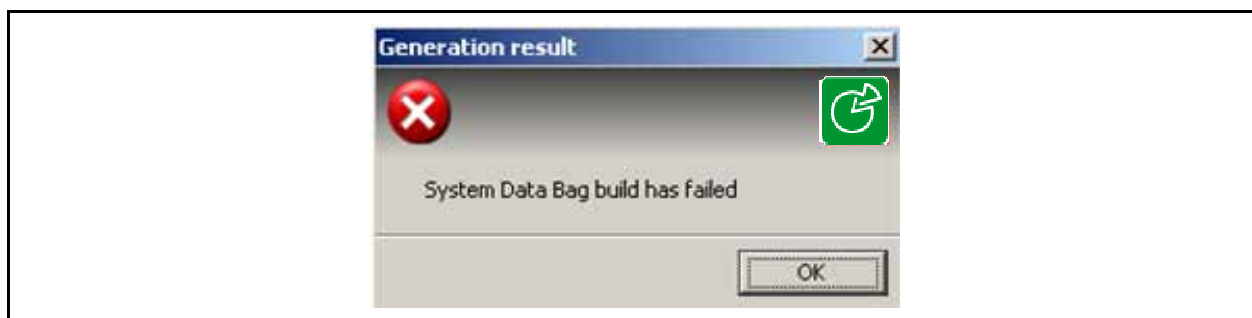


FIGURE 54 - FILE/GENERATE ... ERROR

A third result is a **warning** that indicates that some MiCOM C264 configuration files could be too big for MiCOM C264 downloading by SMT. It's only a warning and the System Data Bag is created.

So, If generation succeeds, the *.zip generated file is to be provided to SMT equipment that download equipment databases from the .zip

A **good practise** is to launch a **generation** only for a checked referenced **version** which has **no consistency error**.

4.1.12 File/Properties

Purpose:

- Display all properties of the database:

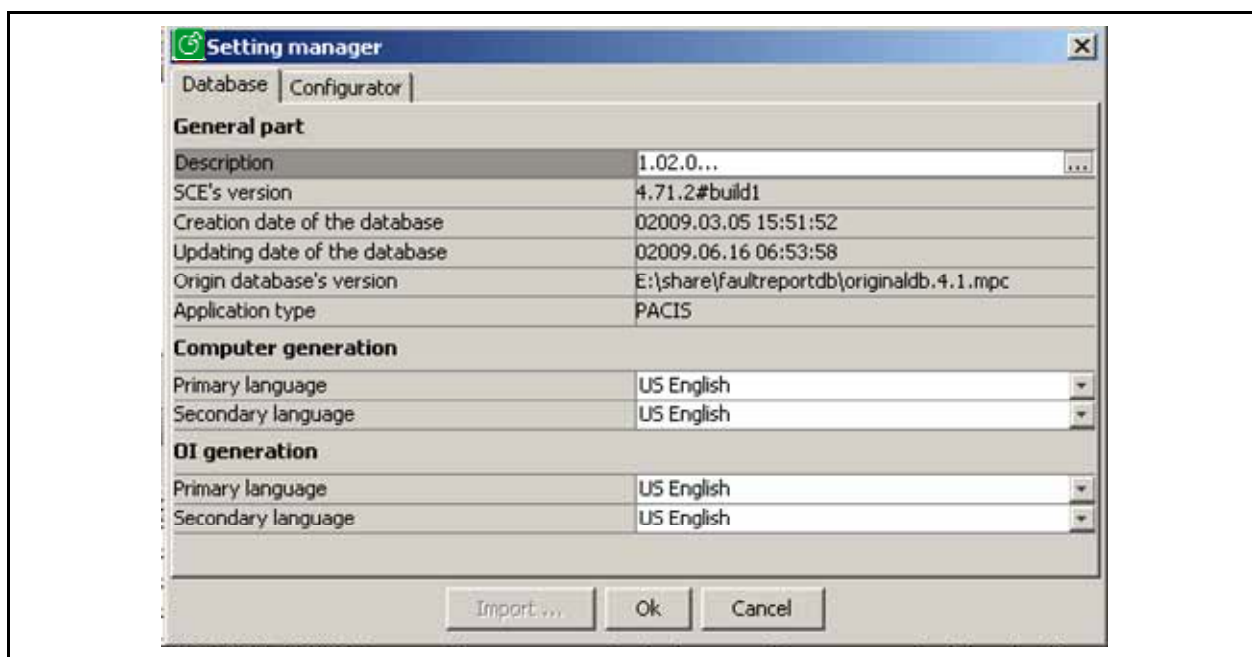


FIGURE 55: - FILE/PROPERTIES SETTING MANAGER ON WORK DATABASE

Only Languages used during File/Generate for OI and C264 localization could be updated. These fields could be also updated through Tools/Languages.

Availability:

- When database has been opened

Other call:

- None

Operating:

- Leave this display by Ok or Cancel. Cancel button restore the previous value of editable field, i.e. Description.

4.1.13 File/Exit

Purpose:

- Leave PACiS SCE application

Availability:

- Always

Other call:

- Shortcut: Alt+F4
- Window quit button or double click on title left icon

Operating:

- If main database is a working database and some modifications have been done, it asks to Save the database:

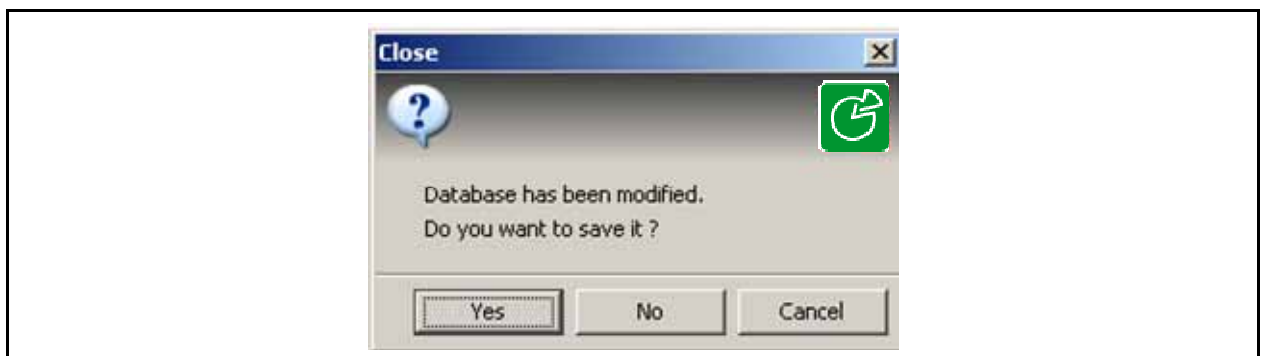


FIGURE 56: - FILE/EXIT AND PENDING MODIFIED DATABASE

- If answer is **Yes**, current working database is saved before exit,
- if answer is **No**, exit PACiS SCE application with no save,
- if answer is **Cancel**, cancel exit operation, come back to edition mode.

4.2 Edit Menu

This menu defines all available items while data edition: a data can be an object, an attribute, a graphic representation of an object, etc. The edition can occur in the different areas of PACiS SCE: navigator, components list, attribute editor, graphical editors, etc.

Most of these items are contextual and **don't appear directly in menu Edit**: they are defined by a contextual menu which depends on the type of selected object. This contextual menu is available with a right click on the focus element (node of navigator, item of list entry, graphical representation in mimic editor ...).

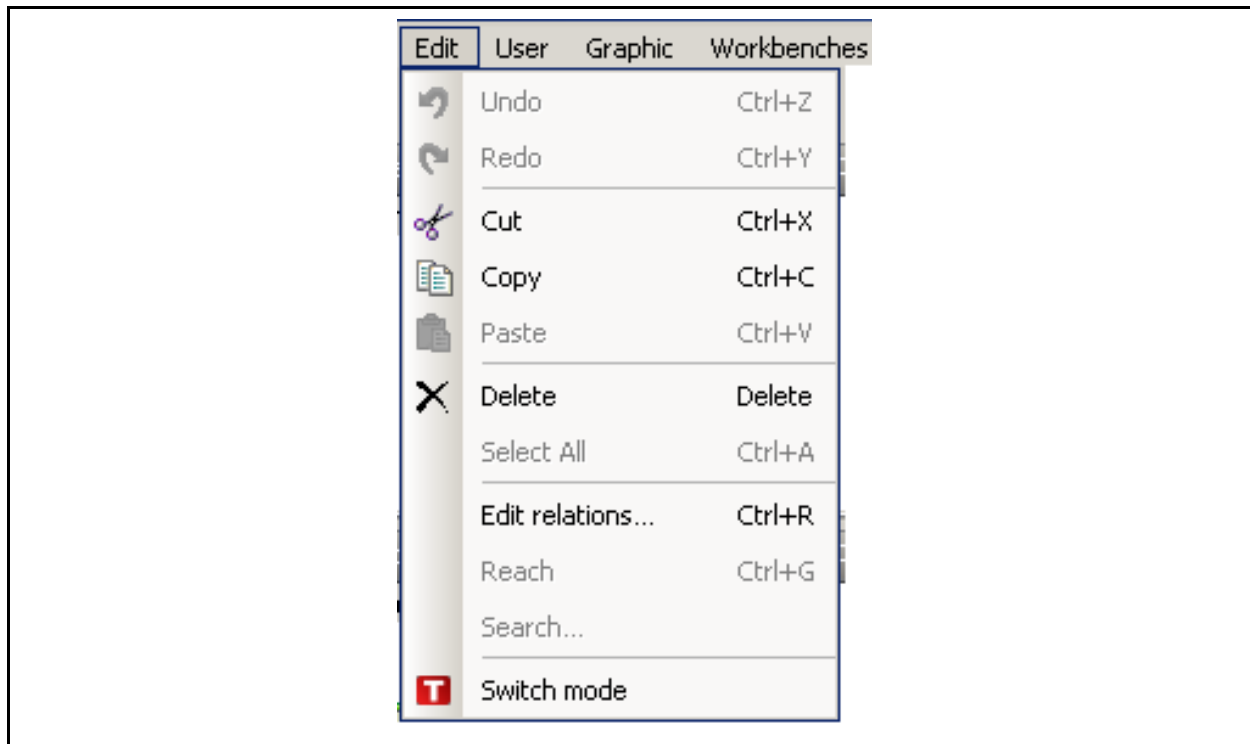


FIGURE 57 - EDIT MENU

4.2.1 Edit/Cut

Purpose:

- Cut the selected object/attribute to clipboard. The cut selection is moved to a new parent object.

Availability:

- Context dependent

Other call:

- Shortcut: Ctrl+X
- Toolbar 
- Contextual menu (Mouse right click)

Operating:

1. Select the object/attribute to cut and choose cut item. In **Navigator**, **only one** object can be selected; in **Components list**, **multi-selection** is available (left click and shift, left click and ctrl).

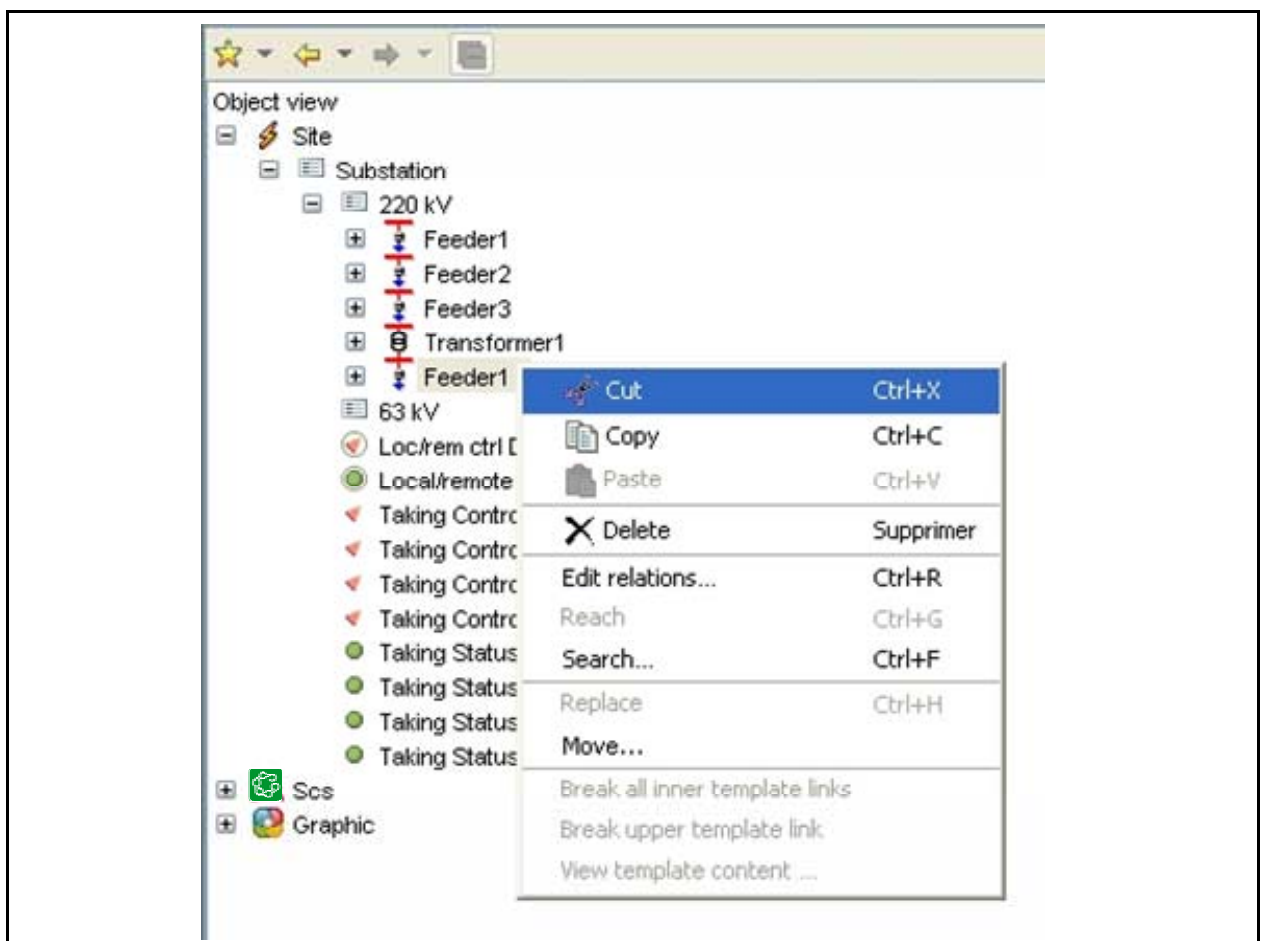


FIGURE 58 - EDIT/CUT

2. The object icon is **greyed** to indicate that a **cut/paste operation is in progress**. Any copy or another cut operation cancels the current cut/paste operation and the object icon is normal again.

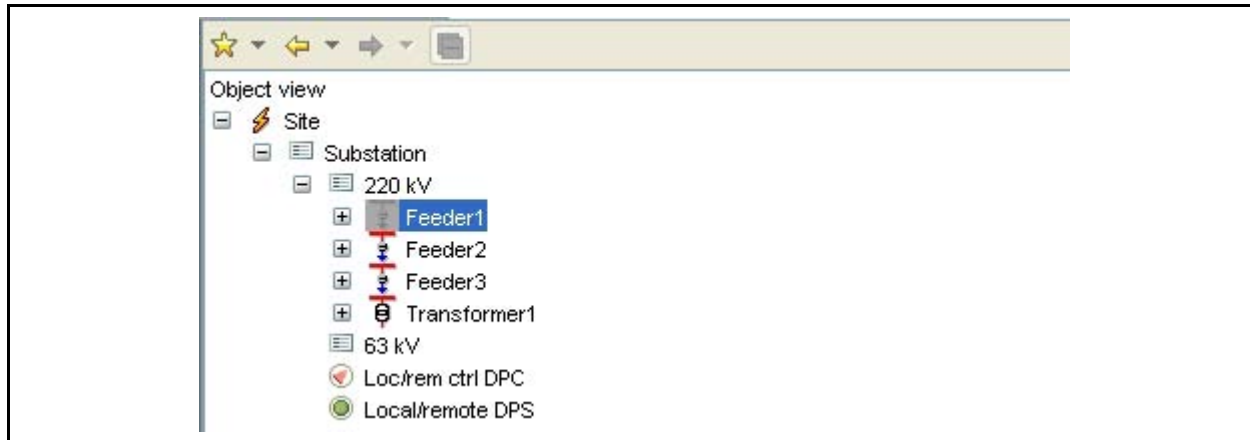


FIGURE 59 - EDIT/CUT RESULT

3. Select the **new parent** object/attribute where the cut object will be moved and choose paste item. The cut object is then moved to its new parent. If an object already exists with the same name under the same parent, the pasted object is renamed with an increment.

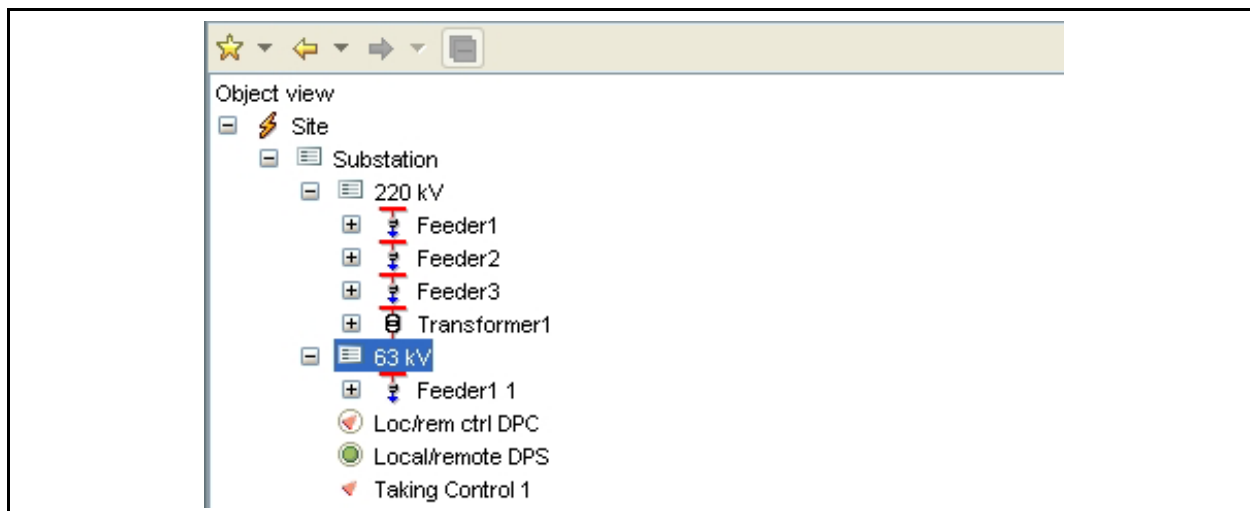


FIGURE 60 - EDIT/CUT-PASTE RESULT

4.2.2 Edit/Copy

Purpose:

- Copy the selected element to clipboard for further Paste action

Availability:

- Context dependent

Other call:

- Shortcut: Ctrl+C
- toolbar 
- Contextual menu (Mouse right click)

Operating:

1. Select in any area the object (1 left click) or attribute (2 left click) to copy/Paste

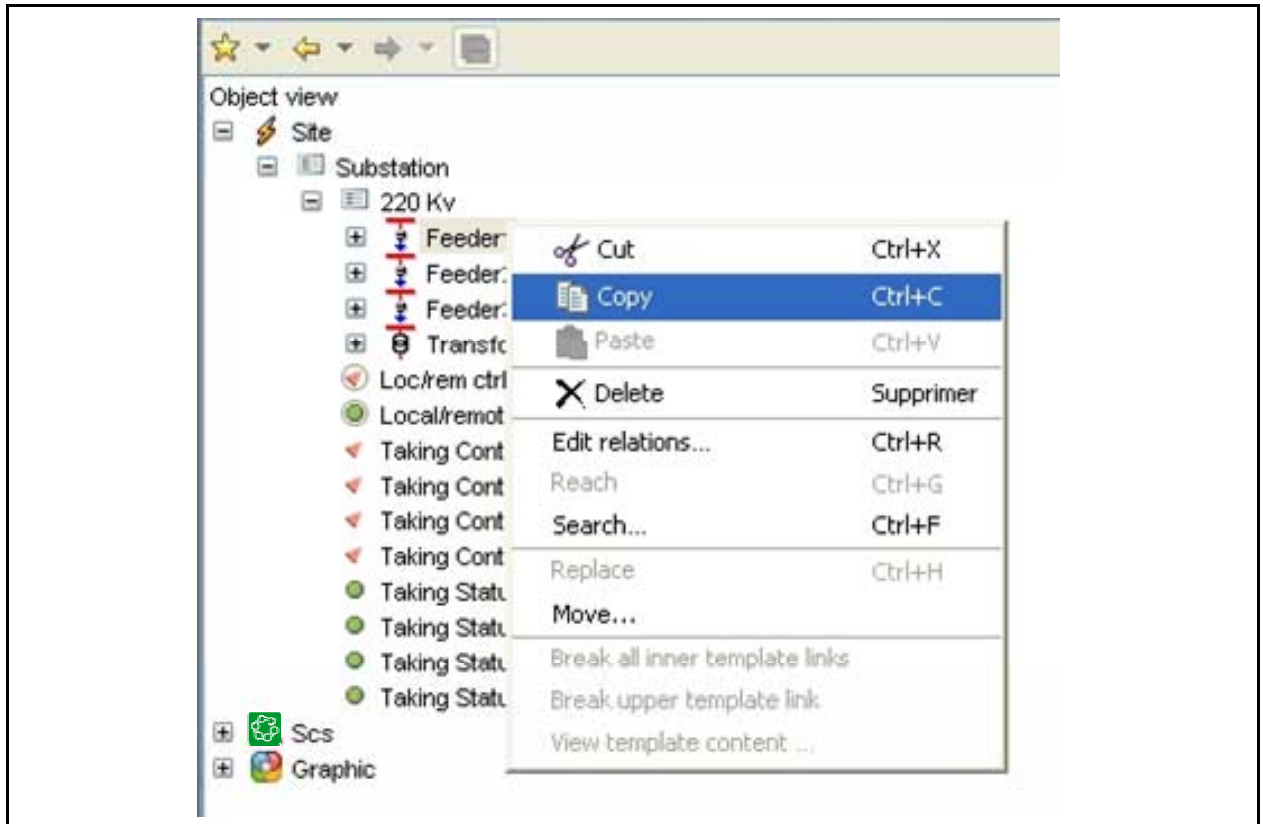


FIGURE 61 - EDIT/COPY

2. Copy the object/attribute
3. Select the object under which, or the attribute to paste
4. Edit/Paste (may be used several times) to paste copied object.

Copy action stores all objects and all hierarchy below it. Copy action tries to keep referenced relations.

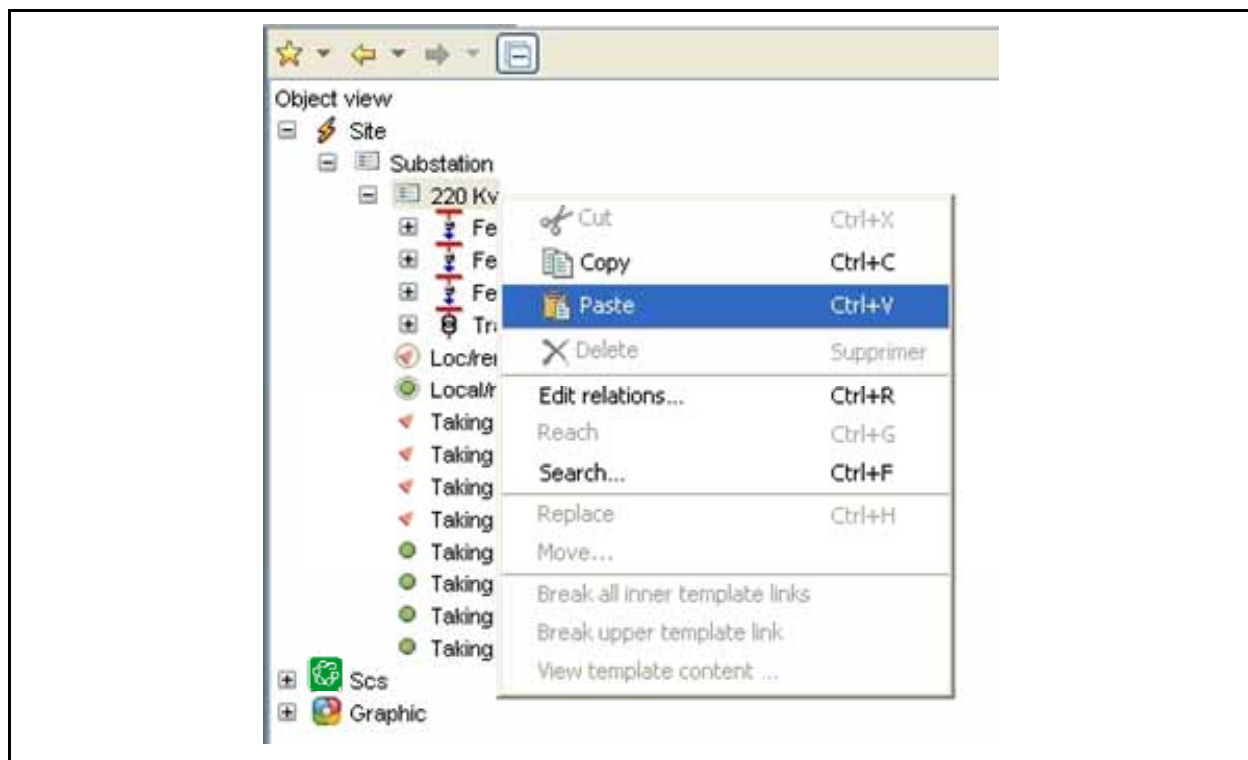


FIGURE 62 - EDIT/PASTE

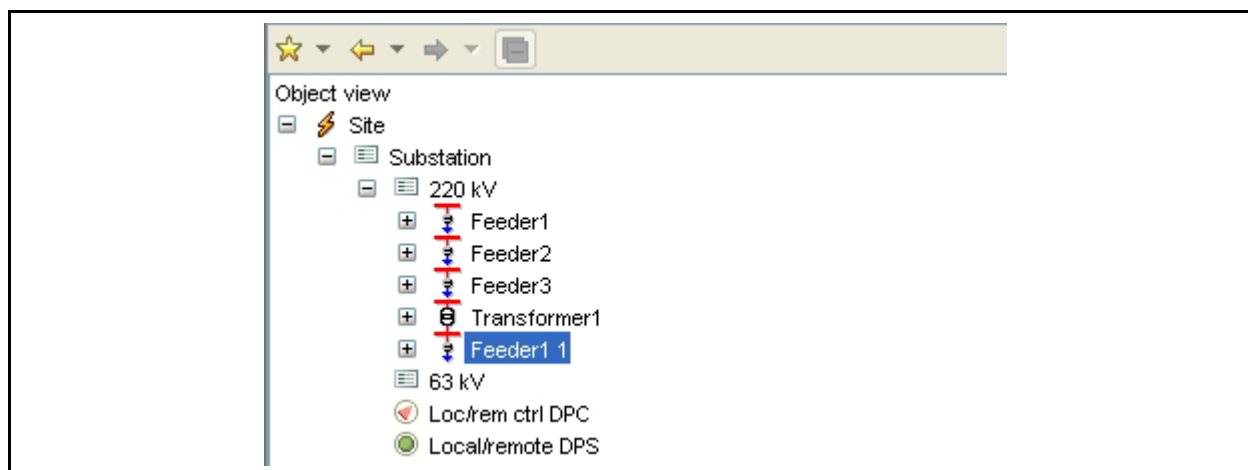


FIGURE 63 - EDIT/COPY-PASTE RESULT

4.2.3 Edit/Paste

Purpose:

- Paste the selected element from clipboard. This clipboard content comes from a cut action or a copy action. See Edit/Copy and Edit/Cut.

Availability:

- Context dependent

Other call:

- Shortcut: Ctrl+V
- Toolbar 
- Contextual menu (Mouse right click)

Operating:

- Select object under which the paste operation should be done, then paste. Paste can be used several times after a copy action. It inserts all hierarchy below copied object, all attributes and all relations.

4.2.4 Edit/Delete

Purpose:

- Delete the selected element: object, template, Unified Template, Parameter...
- A general setting allows to confirm or not any delete operation.

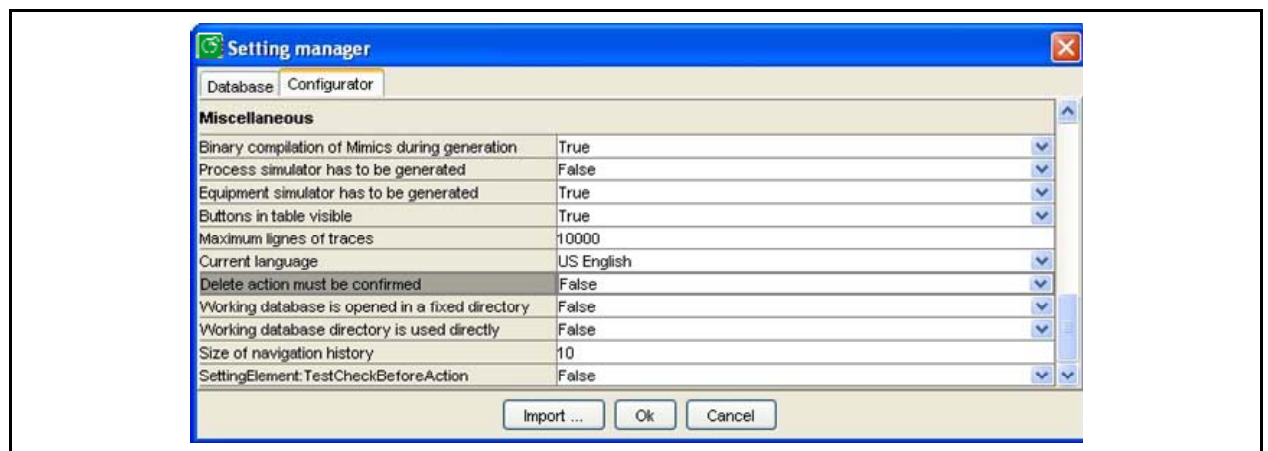


FIGURE 64 - EDIT/DELETE CONFIRMATION SETTING

If this option is set to True, before each delete operation, the following dialog box is displayed:



FIGURE 65: - EDIT/DELETE CONFIRMATION DIALOG BOX

Availability:

- Depending on the selected element and associated conditions

Other call:

- Shortcut: Del
- Toolbar 

Contextual menu (Mouse right click) in Navigator, Components list, Templates list

4.2.5 Edit/Select all

Purpose:

- Select all graphic objects in graphic viewers (OI Mimic viewer or Computer Mimic viewer).

Availability:

- The graphic viewer must have the focus.

Other call:

- Contextual menu of graphic viewer (Mouse right click)
- Shortcut: Ctrl+A.
- Be care: when Navigator has the focus, Ctrl+A moves the current selection to the root.

Operations:

1. Click to the graphic viewer or select a graphic object in the viewer.
2. Choose Select All item: all graphic objects of mimic are selected.

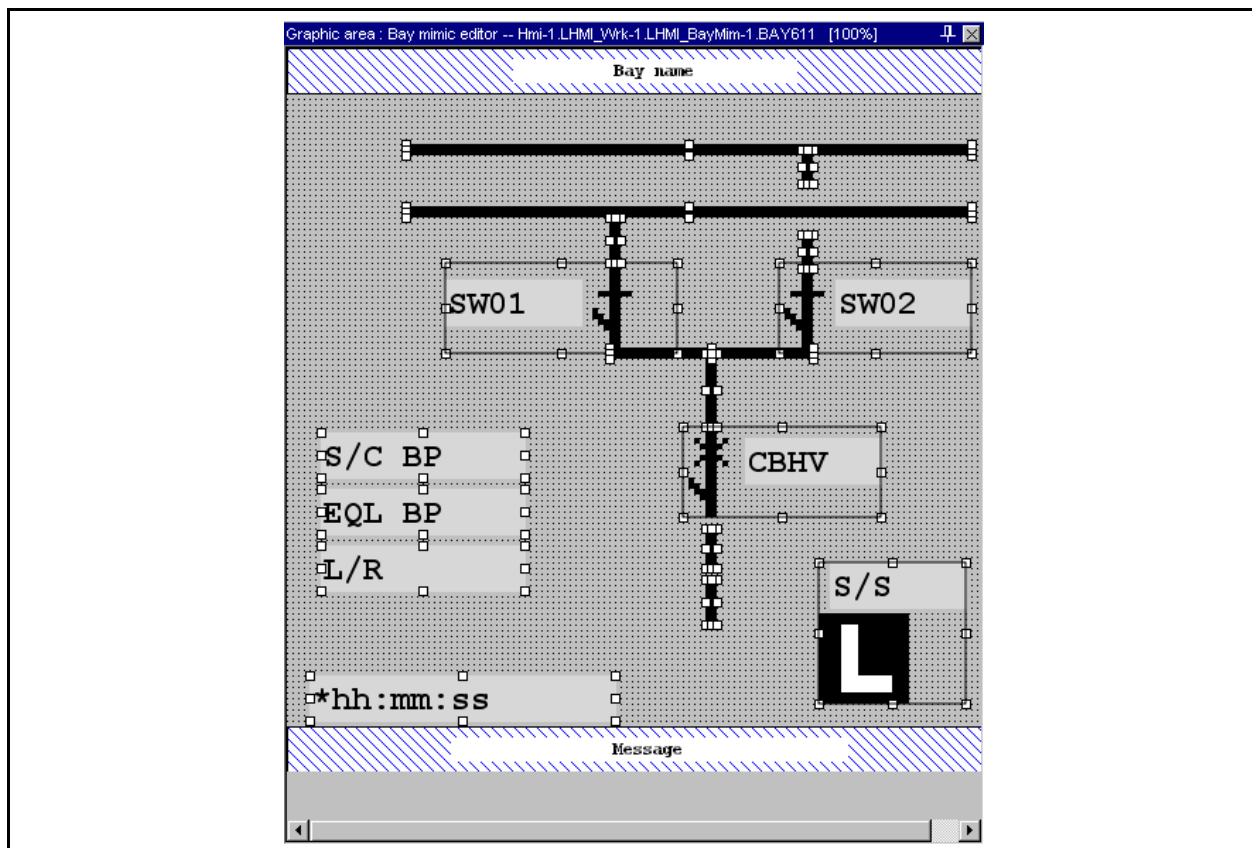


FIGURE 66 - EDIT/SELECT ALL

4.2.6 Edit/Edit relations

Purpose:

- The relation editor is a dialog providing **multiple relations creating** with automatic linking with objects.

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operations:

1. Select an object from Navigator or Components list. Choose Edit relations item.
2. This **modal** dialog box appears:

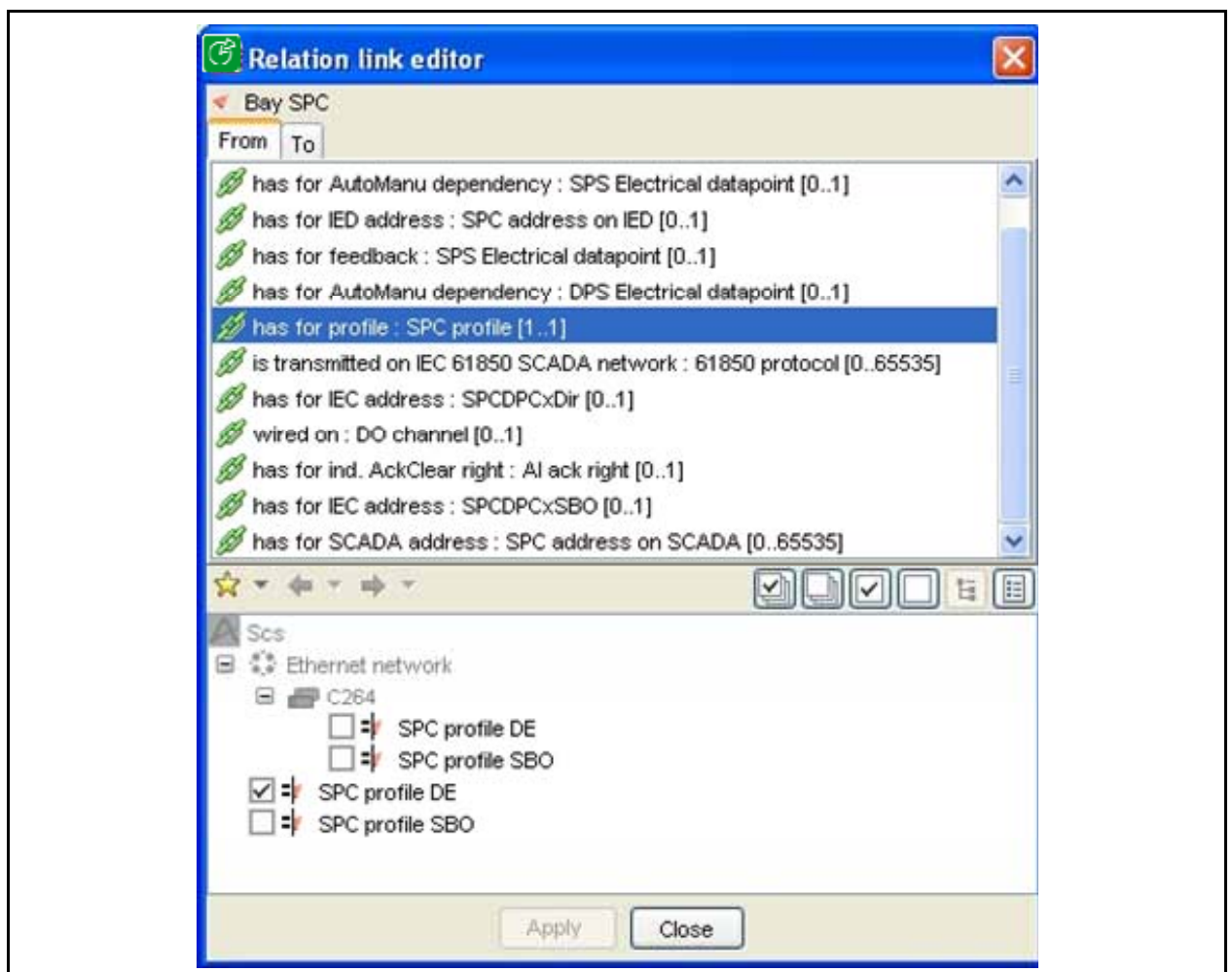


FIGURE 67 - RELATION LINK EDITOR

On top, the working object is remembered to know where user is working.

On bottom, two buttons: the first allows to apply modification and the other closes dialog box.

Two main parts:

- the **relation list** which displays all relations available for the selected object,
- the **object tree** which displays all objects available for the current selected relation.

A relation between two objects has a **direction**. So, the relation list is composed of two tabbed pane:

- “**From**” which gives relations for which the working object is the main object,
- “**To**” which gives relations for which the working object is the second object.

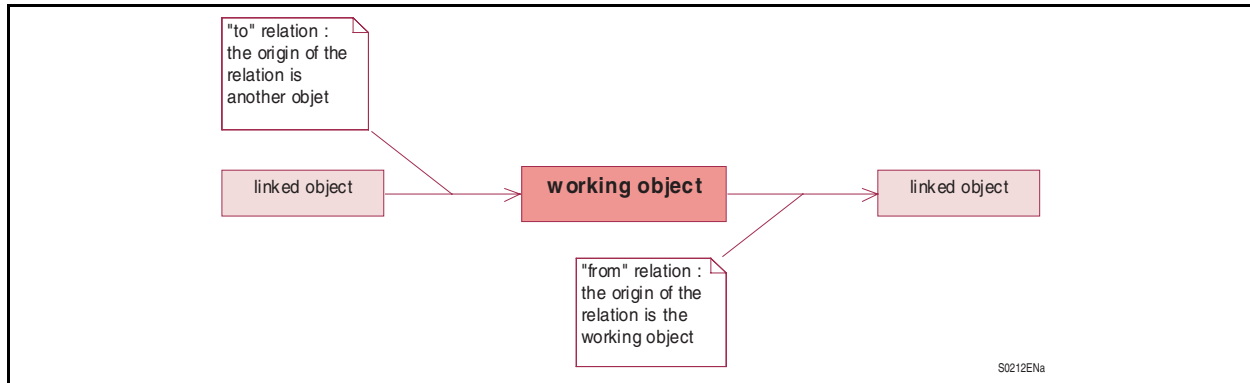


FIGURE 68 - RELATION DIRECTION

The relation label is the name of the relation, followed by the type of object which could be linked and then, the **cardinality** of the relation ([min .. max]).

User can select more than one object by checking check boxes, and when apply modification, it creates one relation for each new selected object and removes relation with new unselected objects, after controlling the cardinality.

So, if cardinality is respected by selection, after apply, there's one relation for each selected object, and no relation with others.

The object tree could be view as an **object list**:

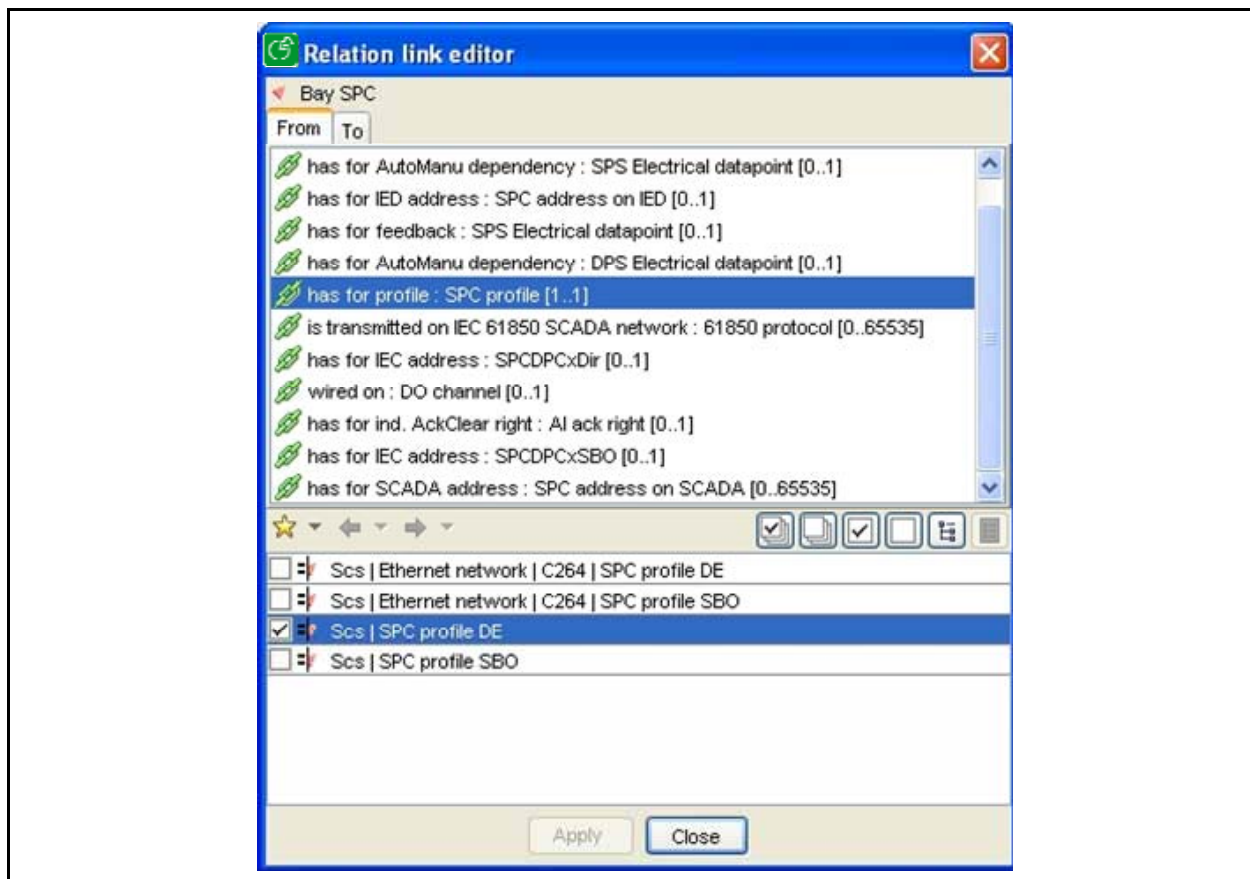


FIGURE 69 - RELATION LINK EDITOR WITH OBJECTS LIST

As user could **select more than one object**, the list provides same check boxes seen in tree view, and four new icons:

- ☐ Uncheck: which uncheck selected objects,
- ☒ Check: which check selected objects,
-  Uncheck All: which uncheck all objects of the list,
-  Check All: which check all objects of the list.

4.2.7 Edit/Reach

Purpose:

- Go to the linked object

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Navigator, Components List
- Shortcut: Ctrl+G

Operations:

1. Select relation  of an object in Navigator
2. Select **Reach** item in the contextual menu:

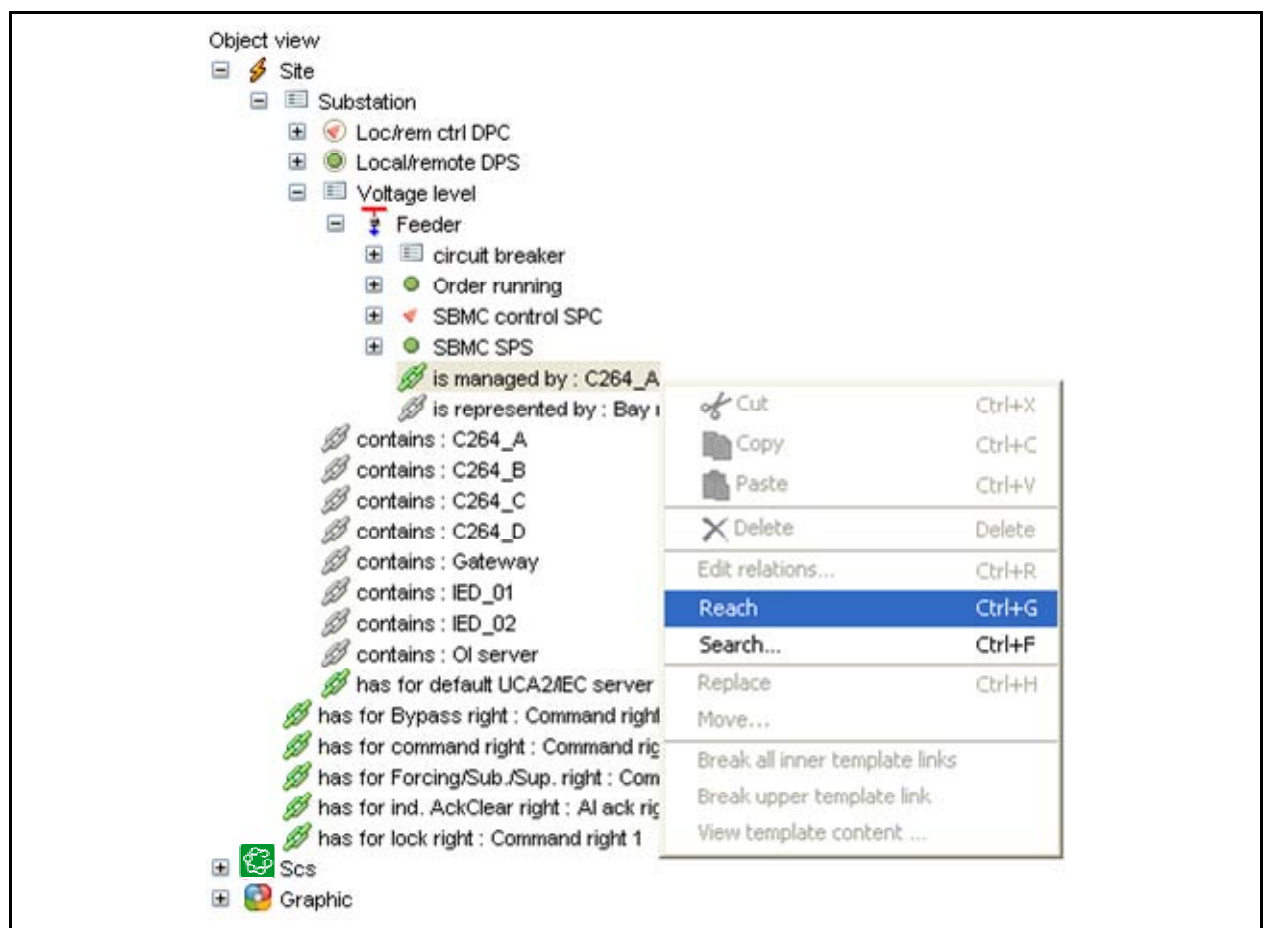


FIGURE 70 - EDIT/REACH ITEM

- The tree view is elapsed to the linked object. The linked object becomes the current object:

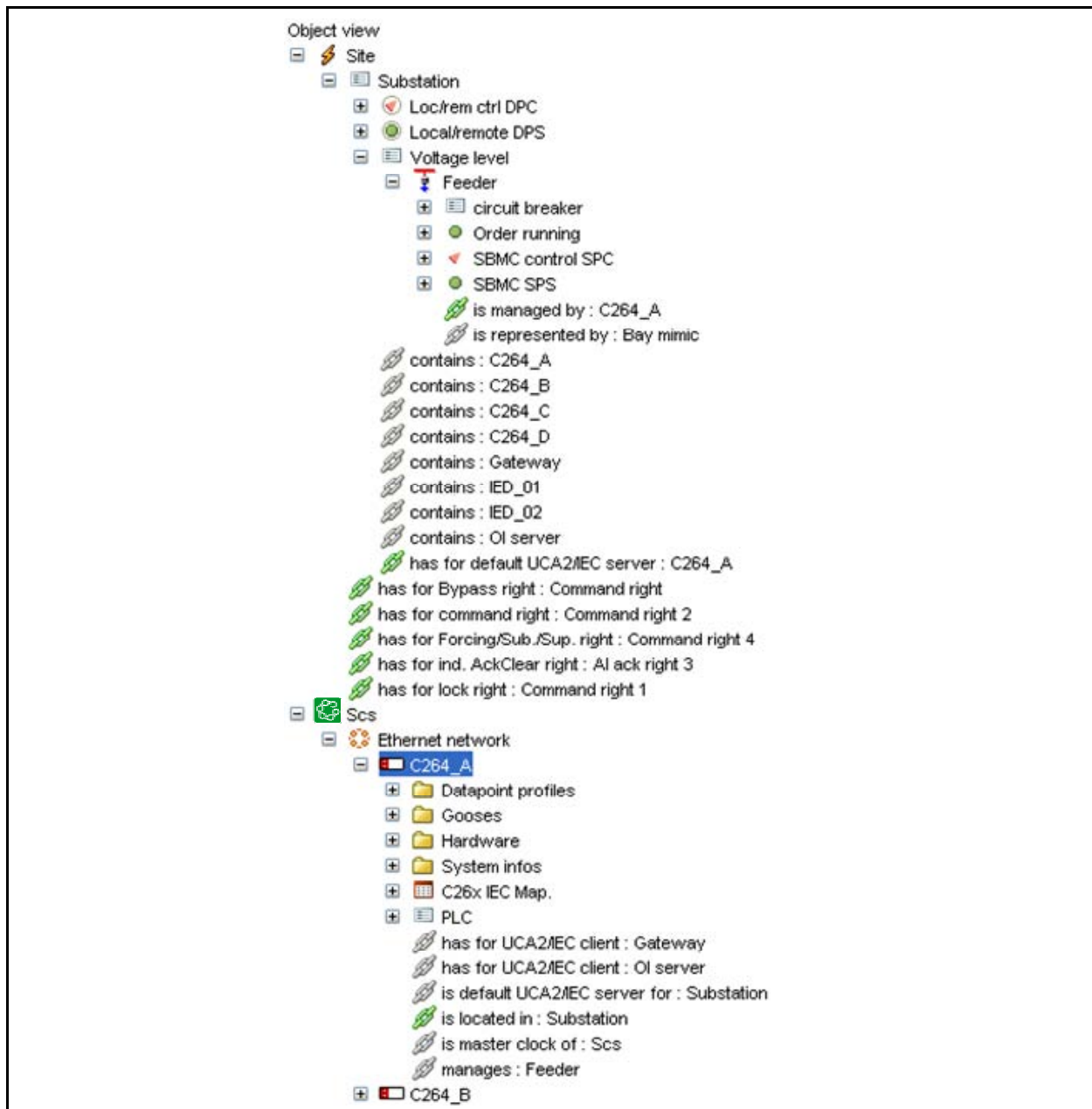


FIGURE 71 - ELAPSE OF NAVIGATOR TO THE LINKED OBJECT

4.2.8 Edit/Search...

This menu is no more available ; it's replaced by Quick search and Advanced search in Tools menu (see § 4.6.3).

4.2.9 Edit/Switch Mode

Purpose:

- Switch between Object mode and Template mode.

Availability:

- Always

Other call:

- Toolbar 

Operations:

1. Select switch mode item:
 - in **Object mode**, the **navigator** displays the complete object configuration and the current selected object;

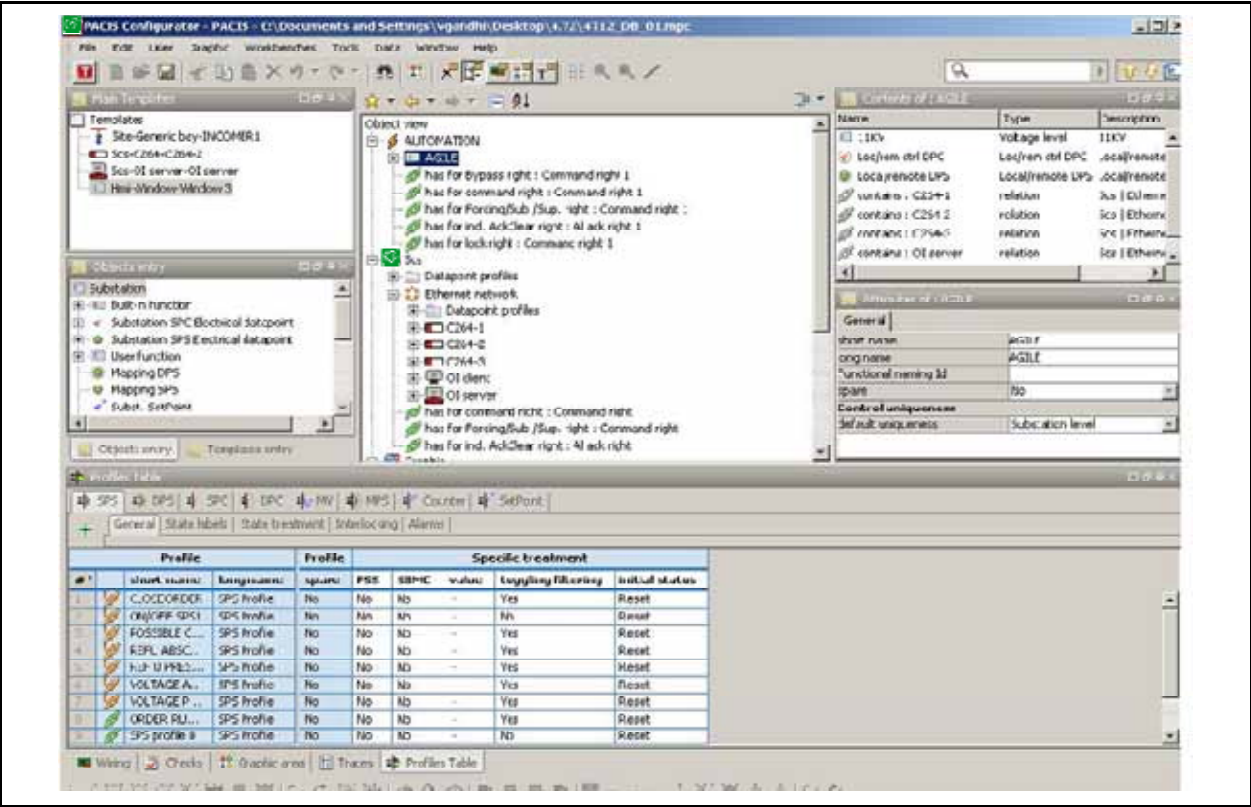


FIGURE 72 - OBJECT MODE

- in **Template mode**, the **navigator** displays the selected template of **Templates list area**;

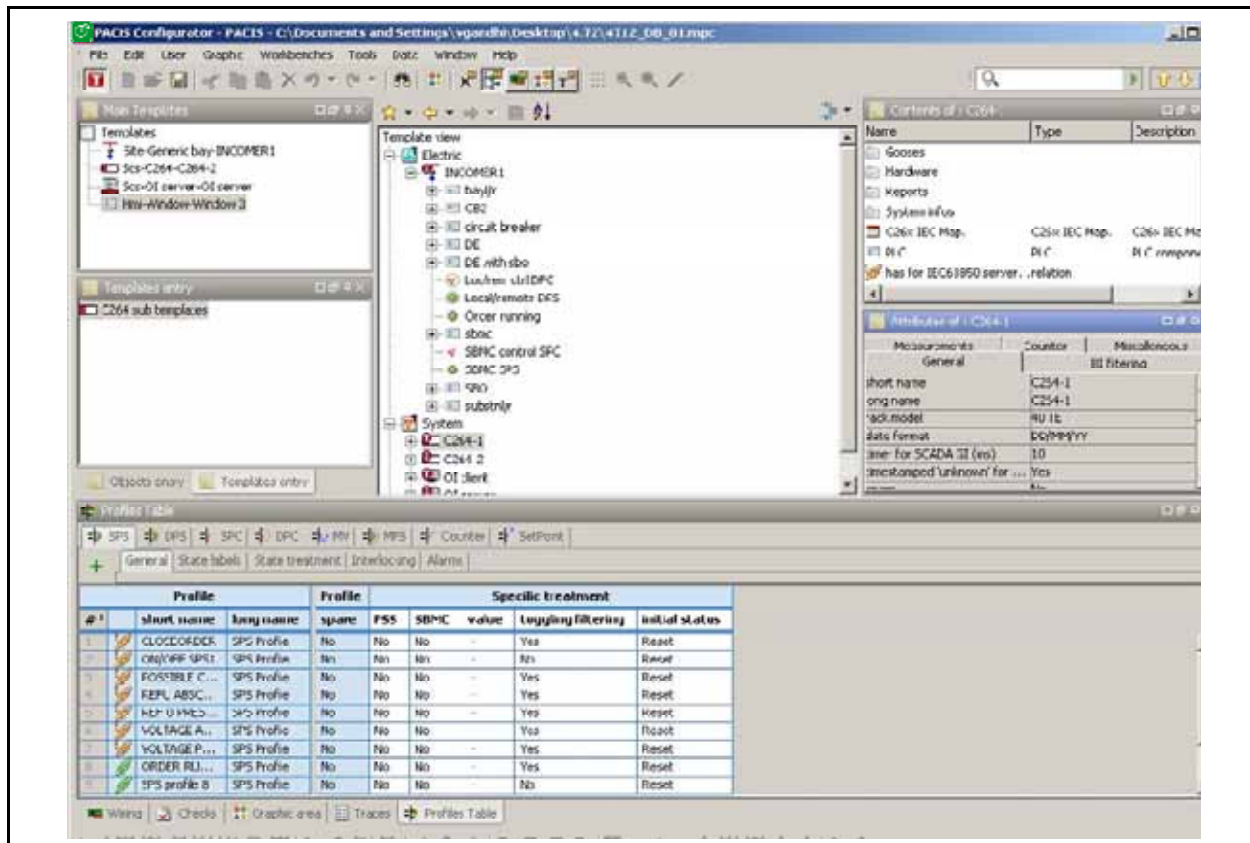


FIGURE 73 - TEMPLATE MODE

- for Template mode and Object mode, the **other areas** are updated in accordance with the current selection of the navigator.
- 2. switch again: the current selection of template or object is saved.

4.2.10 Move

Purpose:

- Move an object. Same behaviour as a sequence cut/paste, with a modal editor. This editor allows to choose the new parent of the object.



FIGURE 74 - EDIT/MOVE DIALOG BOX

Availability:

- Depending on the selected element and associated conditions

Call:

- Contextual menu (Mouse right click) in Navigator and Components list.

4.2.11 Replace

Purpose:

- Replace the selected object by the content of the clipboard if objects are compatible

Availability:

- Context dependant

Call:

- Shortcut: Ctrl+H
- Contextual menu (Mouse right click) in Navigator and Components list.

4.2.12 Add

Purpose 1:

- In a working database, add the Templates/Objects Entry selected element as a child of the active Navigator element

Purpose 2:

- Add the Second Templates List selected Unified Template to the main database

Availability:

- Context dependent

Call:

- Contextual menu (Mouse right click) in Entry helper or Template list area (second database tab)
- Double-click on element to add

Operating 1:

1. Select object in navigator area
2. Select template into **template entry** or **object entry** automatically corresponding to navigator selected object

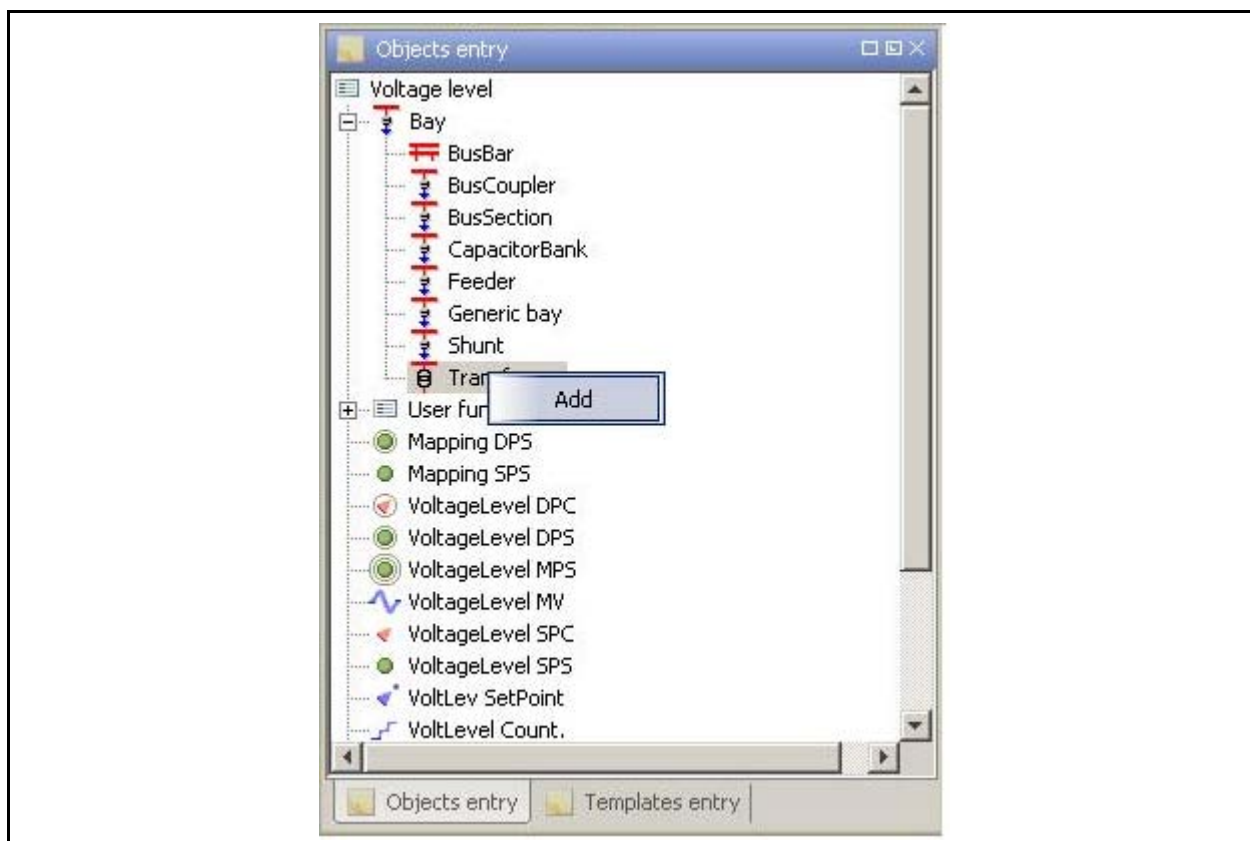


FIGURE 75 - EDIT/ADD IN OBJECT/TEMPLATE ENTRY AREA

3. Make Edit/Add or right mouse click or double-click.
4. Added object is put under navigator selected object.

Operating 2:

1. Select a template in **second database** tab in Template list area.
2. Choose Edit/Add or right mouse click or double-click.

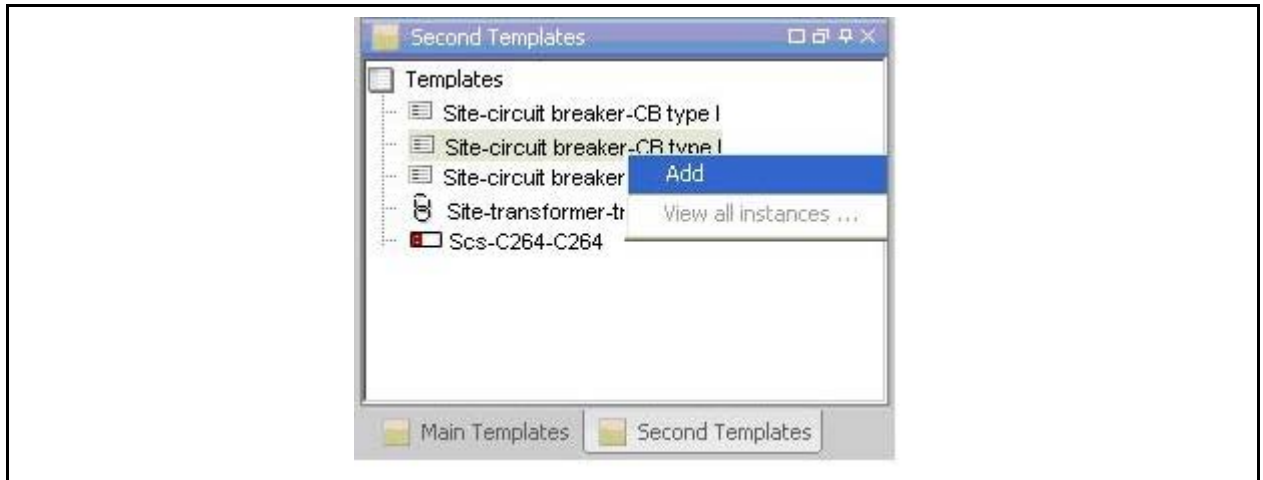


FIGURE 76 - EDIT/ADD IN TEMPLATES LIST AREA

3. Selected template is copied from template library (second database) to the current database.

4.2.13 Duplicate

Purpose:

- In Templates list area, duplicate (copy/paste) the selected template.

Availability:

- Template mode is selected.
- Template is selected in Templates list area.
- Database is opened in read/write mode (working database).

Call:

- Contextual menu (Mouse right click) in templates list area

Operation:

1. Select a template in Templates list area.
2. Choose duplicate item. The selected template is cloned in the Templates list.

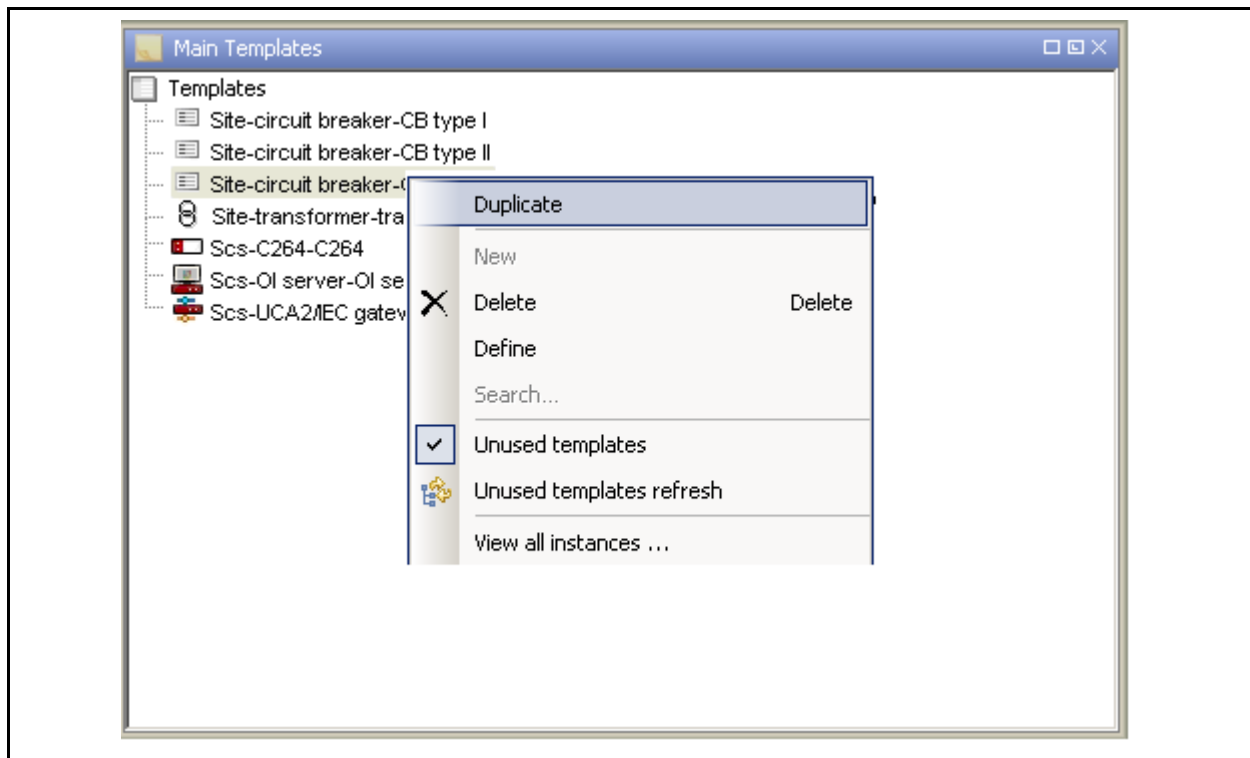


FIGURE 77 - EDIT/DUPLICATE IN TEMPLATES LIST AREA

4.2.14 Canonic Form

Purpose:

- View an **FBD interlock equation** in **two forms** (developed and factorised). It is used to visualise all the content of the logical equation selected into a normalised view (sum of products) and into the original view (factorised). See the example below.
- The view is divided in **two parts**, one to represent **the whole automation diagram** and one two represent **the developed equations** which will be generated to implement the automatism. The developed equation is displayed in **PACiS OI when a control is refused** because of interlocks.
- The development of an equation must generate much combinations of operands that can be easily **simplified using basic Morgan rules** (e.g.: $A \text{ AND } A = A$, $A \text{ OR } A = A$, $A \text{ AND NOT}(A) = 0$), so the resulting developed equation can be lighter than the factorised. More, if all the operands are cancelled, the developed equation displayed is empty, revealing that the original equation contains a conception mistake.

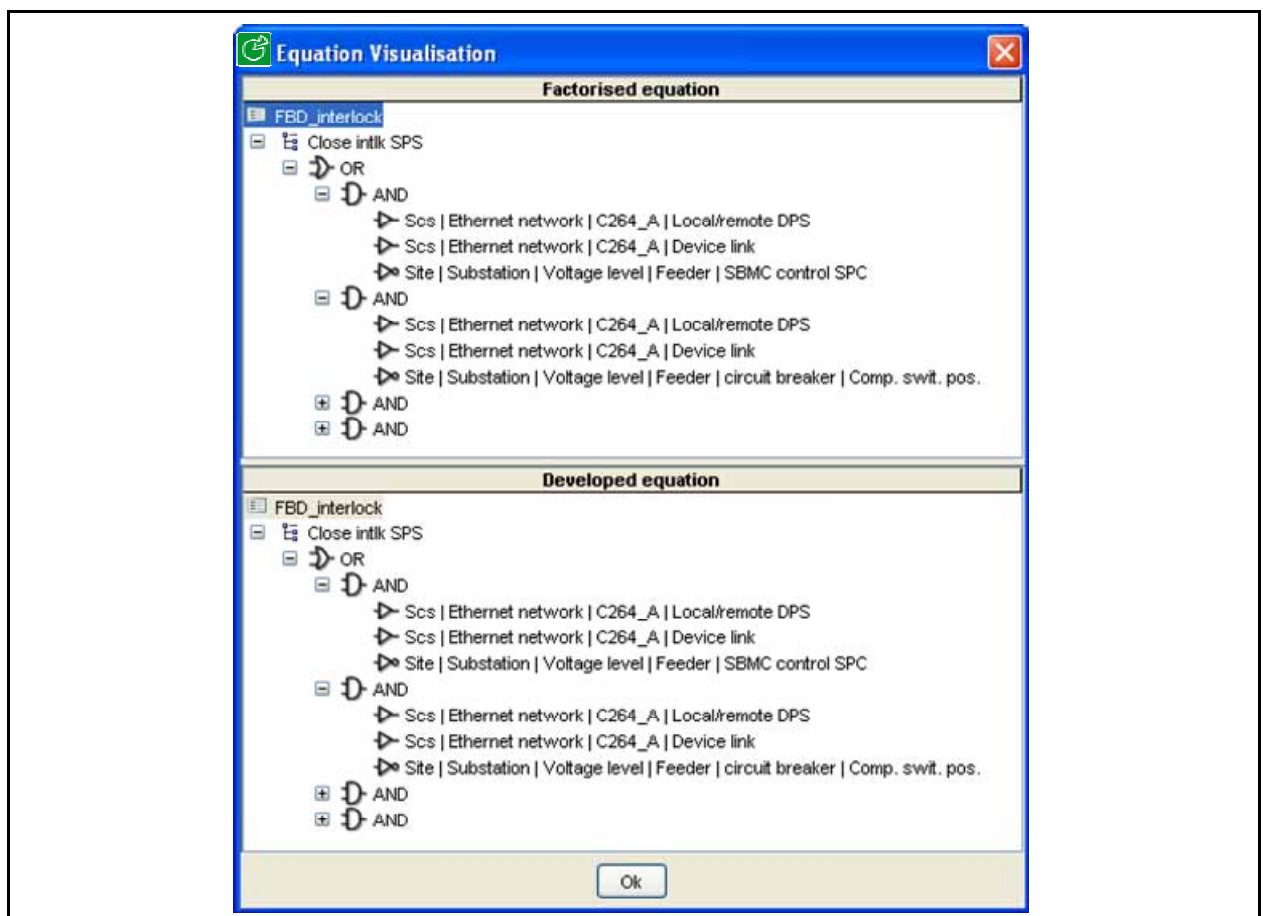


FIGURE 78: - EDIT/CANONIC FORM

Availability:

- on FBD interlock object

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operating:

1. Select in navigator area under process part, FBD object
2. Select Canonic form item
3. Pop up appears to see two forms of the equation

Equation is shown in factorised (compact) and developed (uniqueness) format in Tree Viewer where each node replaces the factorisation (). Except for NOT, all terms are displayed in list below given operator.

Operators are:

	Data Point Input
	Not Operator
	OR operator
	AND Operator
	NOR Operator
	NAND Operator
	XOR Operator
	NotXOR Operator

4.2.15 Break All Inner Template Link

Purpose:

- In Object mode, break the link between an object which is an instance of template and this template. Any template modification does not impact anymore the object. Object attributes and its component can be modified. If this instance of template contains another instances of template (inner templates), their template links are also broken.

Availability:

- On an instantiated template

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operations:

1. Select an object which is an instance of a template. This object must be the root anchor of template: 

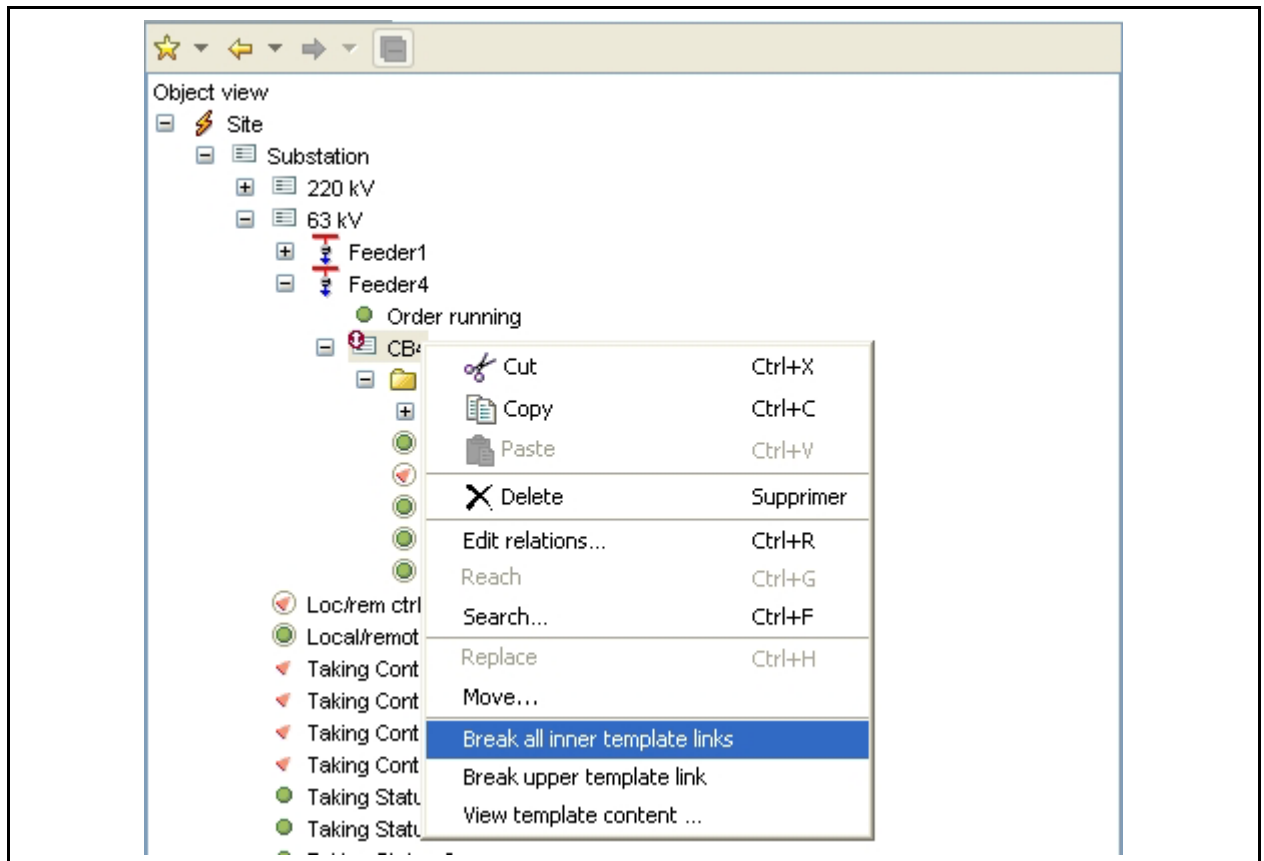


FIGURE 79 - EDIT/BREAK ALL INNER TEMPLATE LINKS

2. Choose Break all inner template link item. A confirmation dialog box appears: this message indicates that this selected object is concerned by the operation but also the others components of the template. Click on Yes/Oui to continue the operation. A click to No/Non cancels the operation.

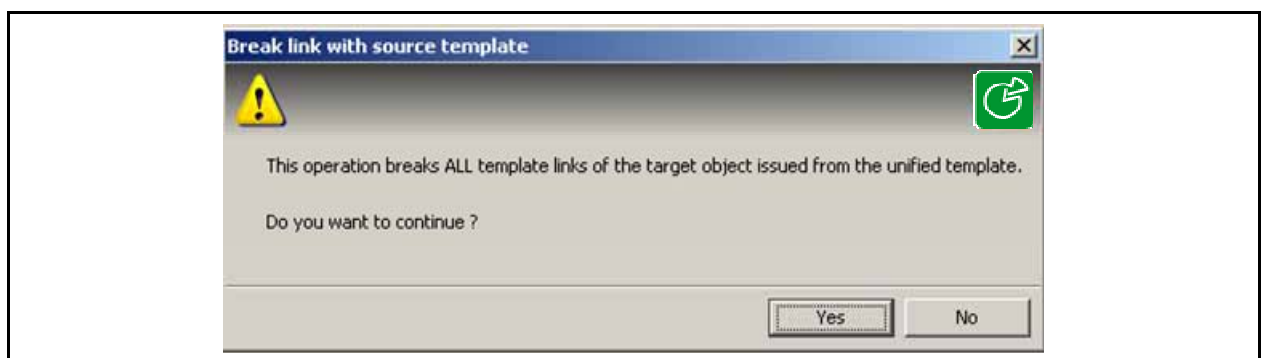


FIGURE 80: EDIT/BREAK TEMPLATE LINK CONFIRMATION

3. The link with its template is broken. Its icon becomes normal object icon. All attributes becomes RW and its components could be edited: add, remove a component.

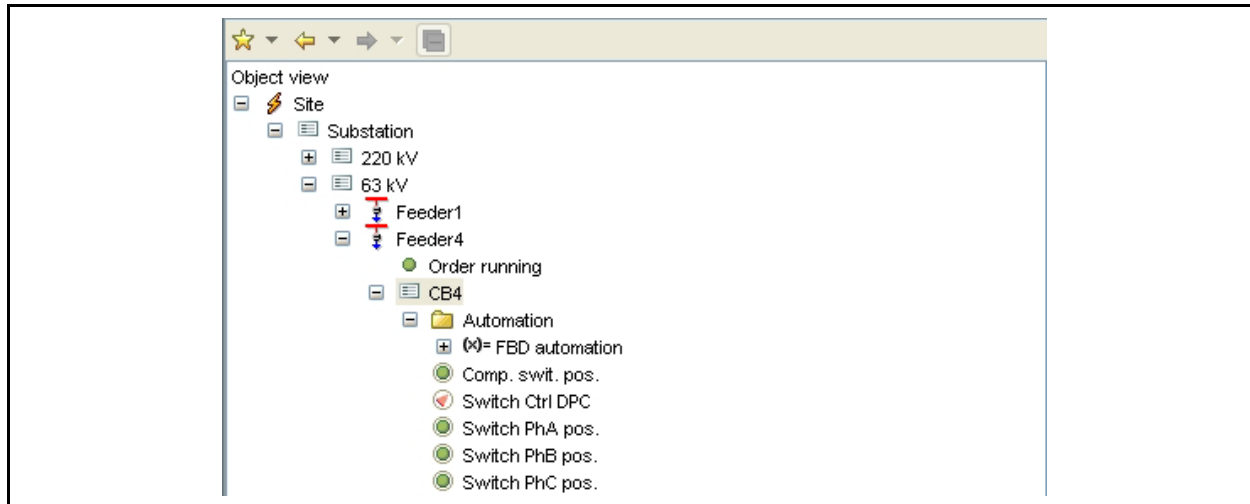


FIGURE 81 - EDIT/ALL TEMPLATE LINKS HAVE BEEN BROKEN

4.2.16 Break Upper Template Link

Purpose:

- In Object mode, break the link between an object which is an instance of a template and this template. Any template modification does not impact anymore the object. Object attributes and its component can be modified. If this instance of template contains other instances of template (inner templates), their template links are kept. So only the upper level of template is concerned by this action.

Availability:

- On an instantiated template

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operations:

1. Select an object which is an instance of a template. This object must be the root anchor of template:

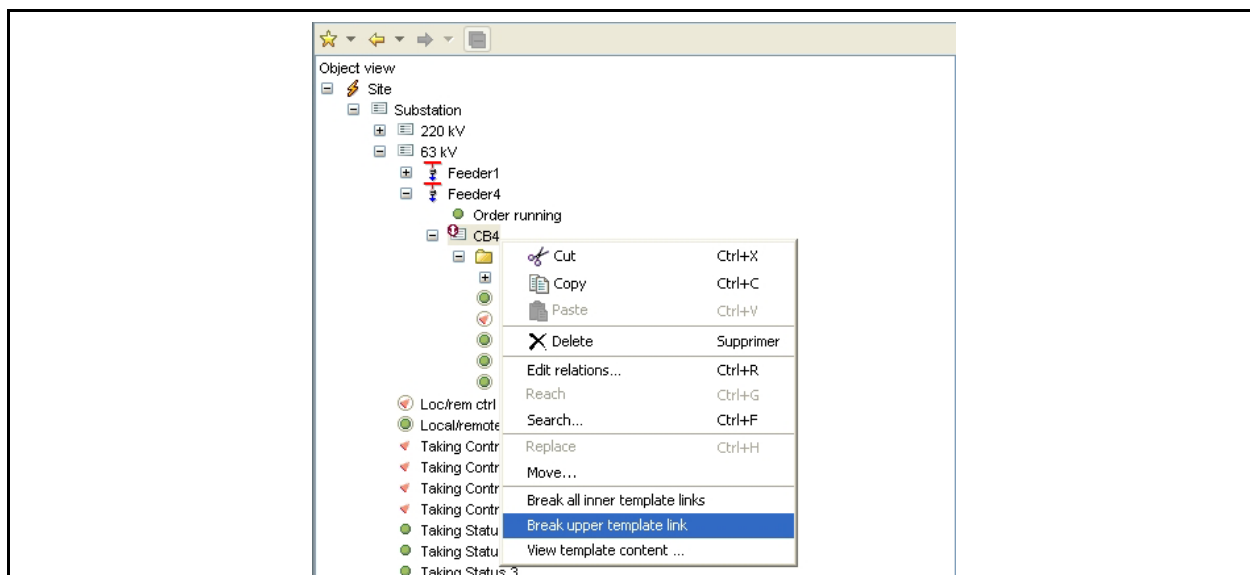


FIGURE 82: EDIT/BREAK UPPER TEMPLATE LINK

2. Choose Break upper template link item. A confirmation dialog box is displayed: this message indicates that this selected object is concerned by the operation but also the others components of the template. Click on Yes to continue the operation. A click on No cancels the operation.

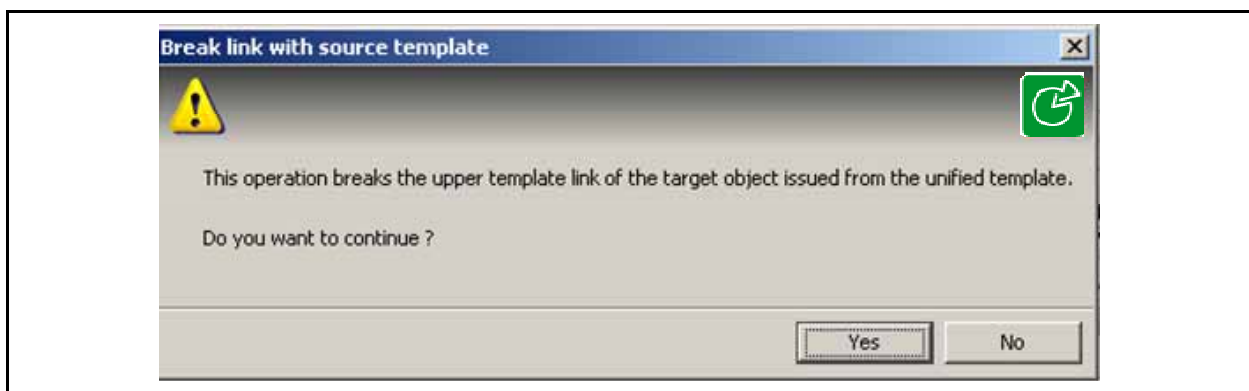


FIGURE 83: EDIT/BREAK TEMPLATE LINK CONFIRMATION

The link with its template is broken. Its icon becomes normal object icon. All attributes becomes RW and its components could be edited: add, remove a component. The inner instances of templates are not updated.

4.2.17 View Linked Attributes

Purpose:

- In object mode or template mode, view the linked attributes to a Parameter

Availability:

- An attribute which is linked to a parameter or a parameter must be selected. The parameters of template are available inside tab Parameters with Attributes Editor when the root anchor of template is selected in Navigator.

Call:

- Contextual menu (Mouse right click) in Attributes Editor

Operations:

1. Select a parameter or an attribute which is linked to a parameter

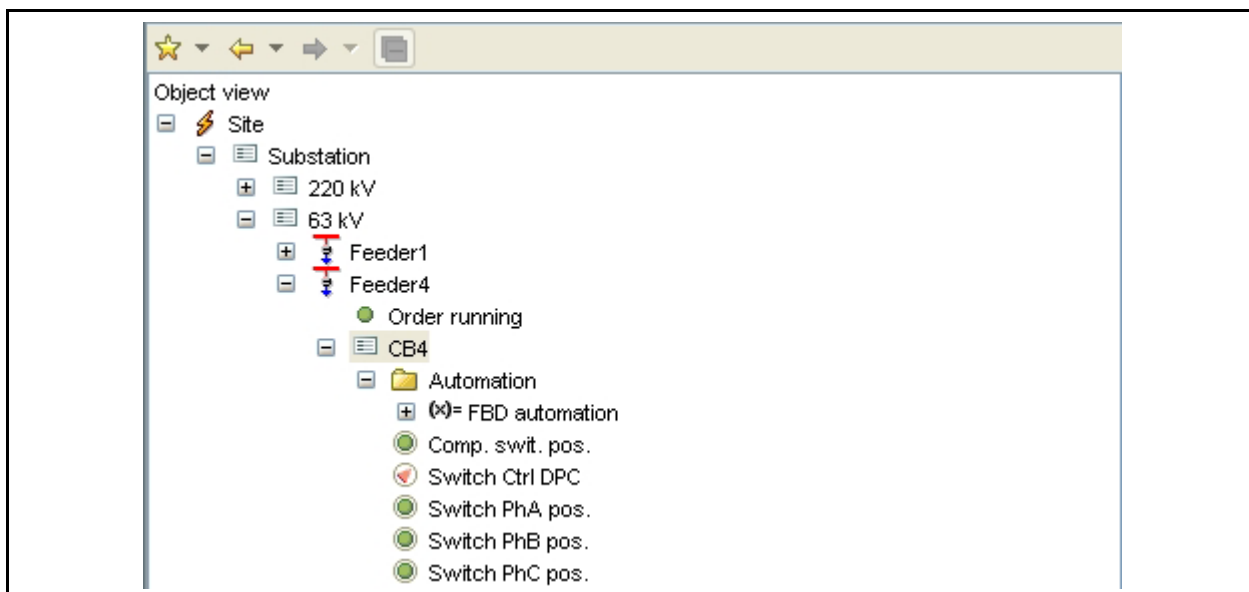


FIGURE 84 - EDIT/VIEW LINKED ATTRIBUTES

2. Choose view linked attributes: all attributes linked to the selected parameter are displayed in the following dialog box:

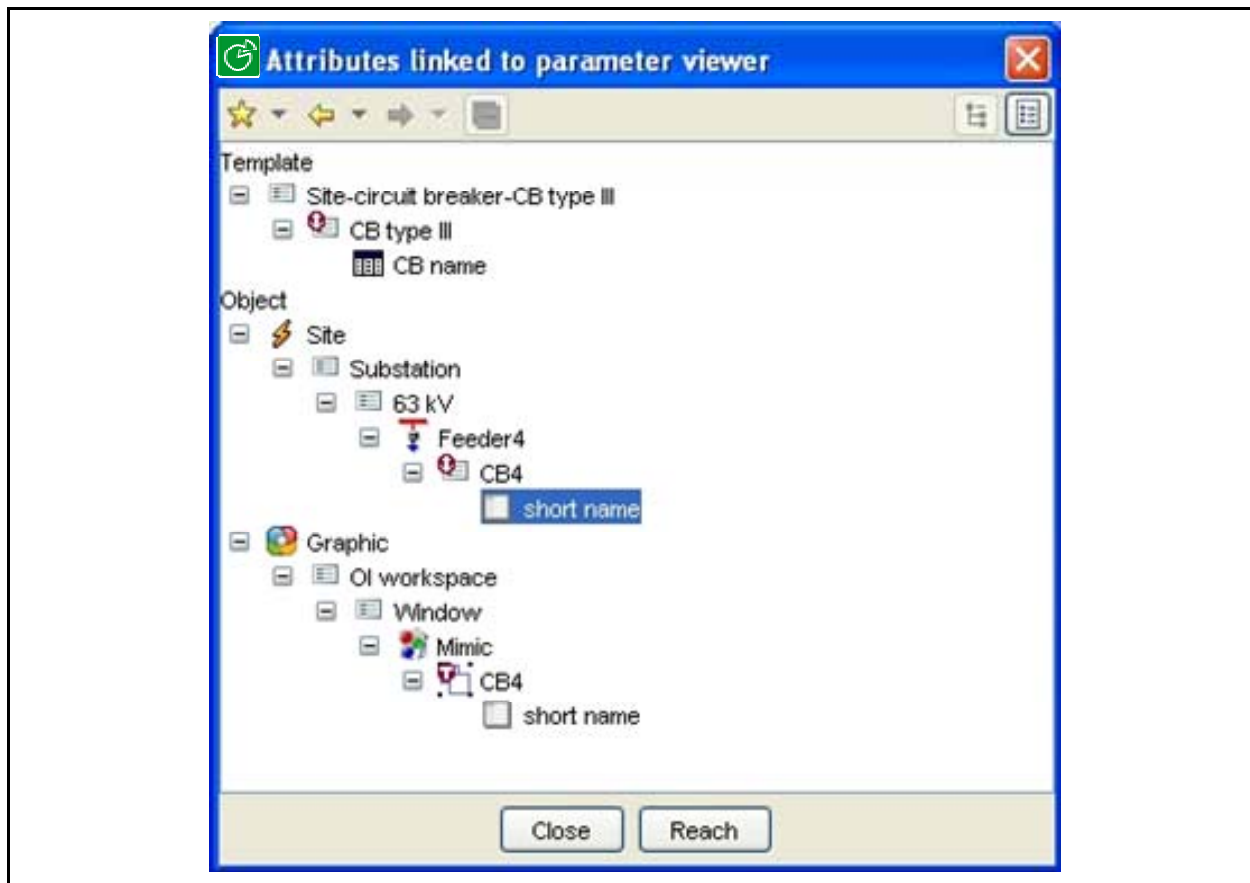


FIGURE 85 - TREE OF LINKED ATTRIBUTES

3. A list form is available with button:

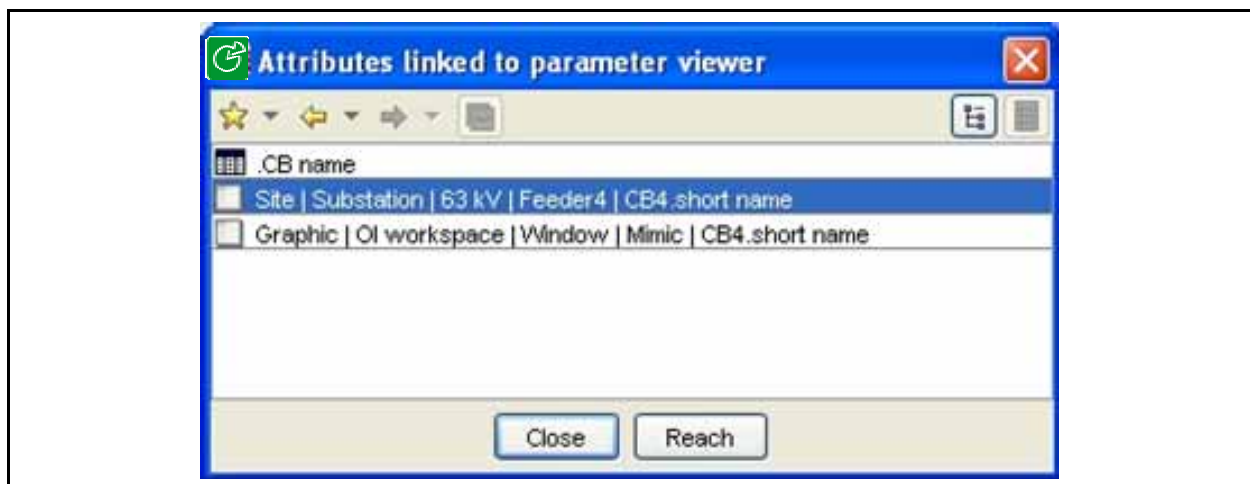


FIGURE 86 - LIST OF LINKED ATTRIBUTES

4. The **Reach** button allows to elapse the navigator to the selected object and to select in the Attribute editor the selected attribute.

4.2.18 View Template Instances

Purpose:

- View the instances of the selected template

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Templates List, Templates Entry.

Operations:

1. Select a template in Templates list area or in Template entry area

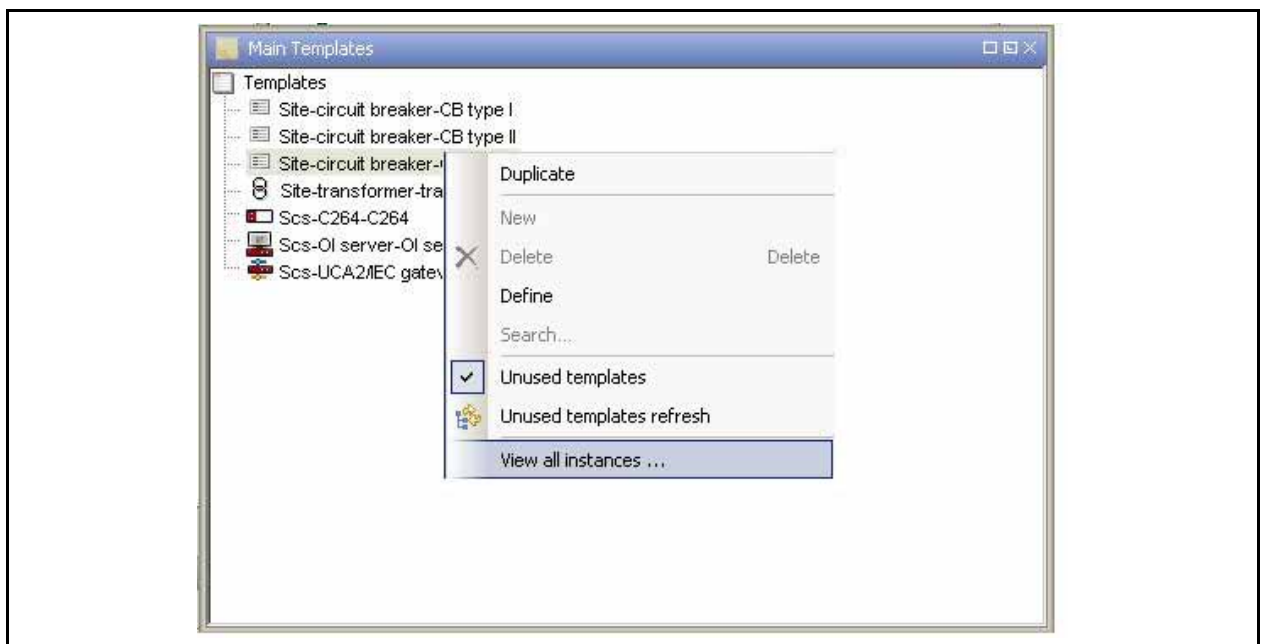


FIGURE 87 - EDIT/VIEW ALL INSTANCES

2. Choose View template instances item. This dialog box appears:

The content of the tree show all instances of the selected template in template list or template entry. Only main object of the template are shown and where it's instantiated.

A list form is available.

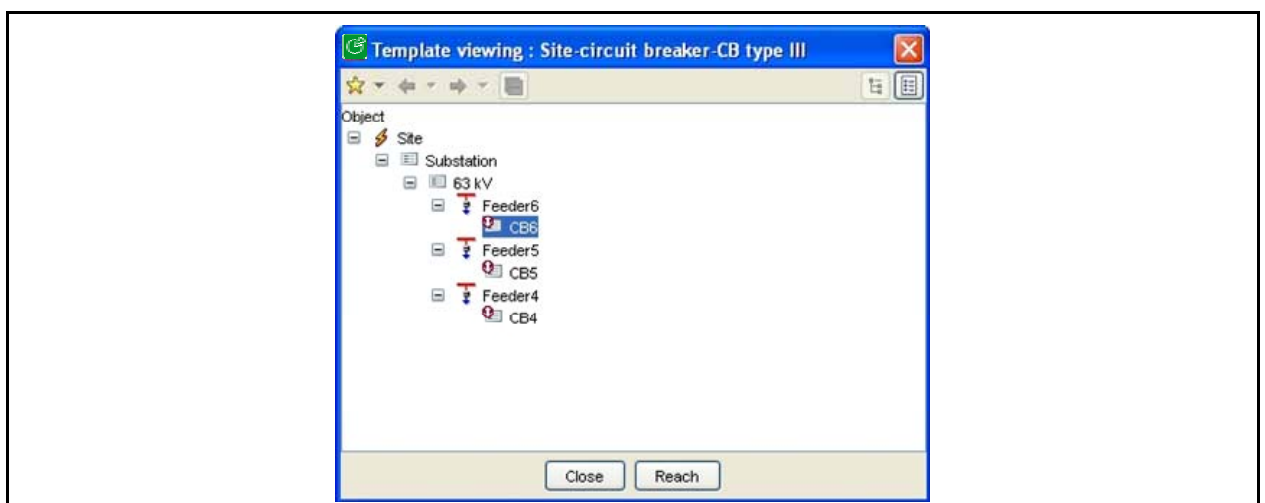


FIGURE 88 - TEMPLATE INSTANCES

4.2.19 View Template Content

Purpose:

- View all components of a template instance. This feature is useful if the template has several components: graphic, electric or system.

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operations:

1. Select a component of a template instance, the template anchor or any other component of the template instance:

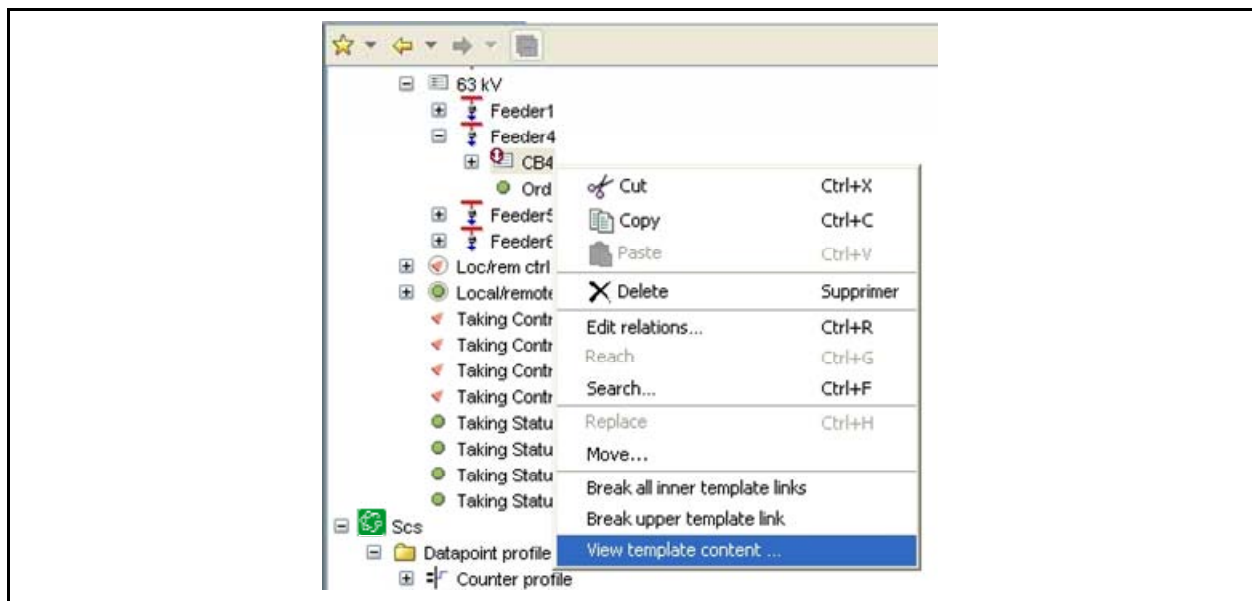


FIGURE 89 - EDIT/VIEW TEMPLATE CONTENT

2. Choose View template content item. This following dialog box appears:

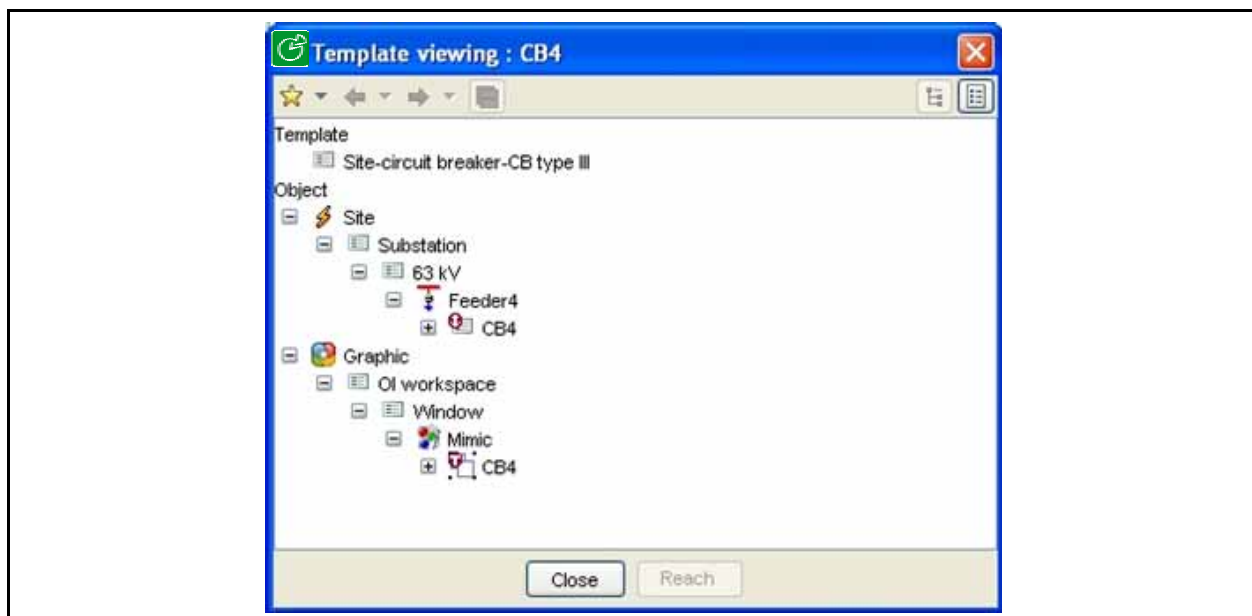


FIGURE 90 - TEMPLATE VIEWING

In **tree view**:

- template part shows the original template,
- objects part shows all components of the template instance.

The **Reach** button allows to browser the selected object in Navigator.

An object **list view** is also available with .

4.2.20 Create Backup

Purpose:

- **Create a backup device** for an IEC61850 device C264, Gateway or OI: for redundant equipment, clone the equipment as a backup and associate the created backup to its existing main equipment. This association is done with a specific relation “has for backup:”.
- Backup equipment is **read-only**. So, user can’t create, modify or delete any thing inside it. The read only state is displayed with a different icon, like templates.
- The only possibility of **change** is **system information**, like TCP/IP address and network name.
- The cloned information in backup equipment is the system datapoint which can be **used in a system mimic** definition to animate the states of the backup.
- **A complementary description** of this feature is done in **chapter Application** of PACiS C264 and PACiS OI.

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operations:

1. Select an equipment which can be redounded yet: C264 and OI Server.
2. Choose Create Backup item:

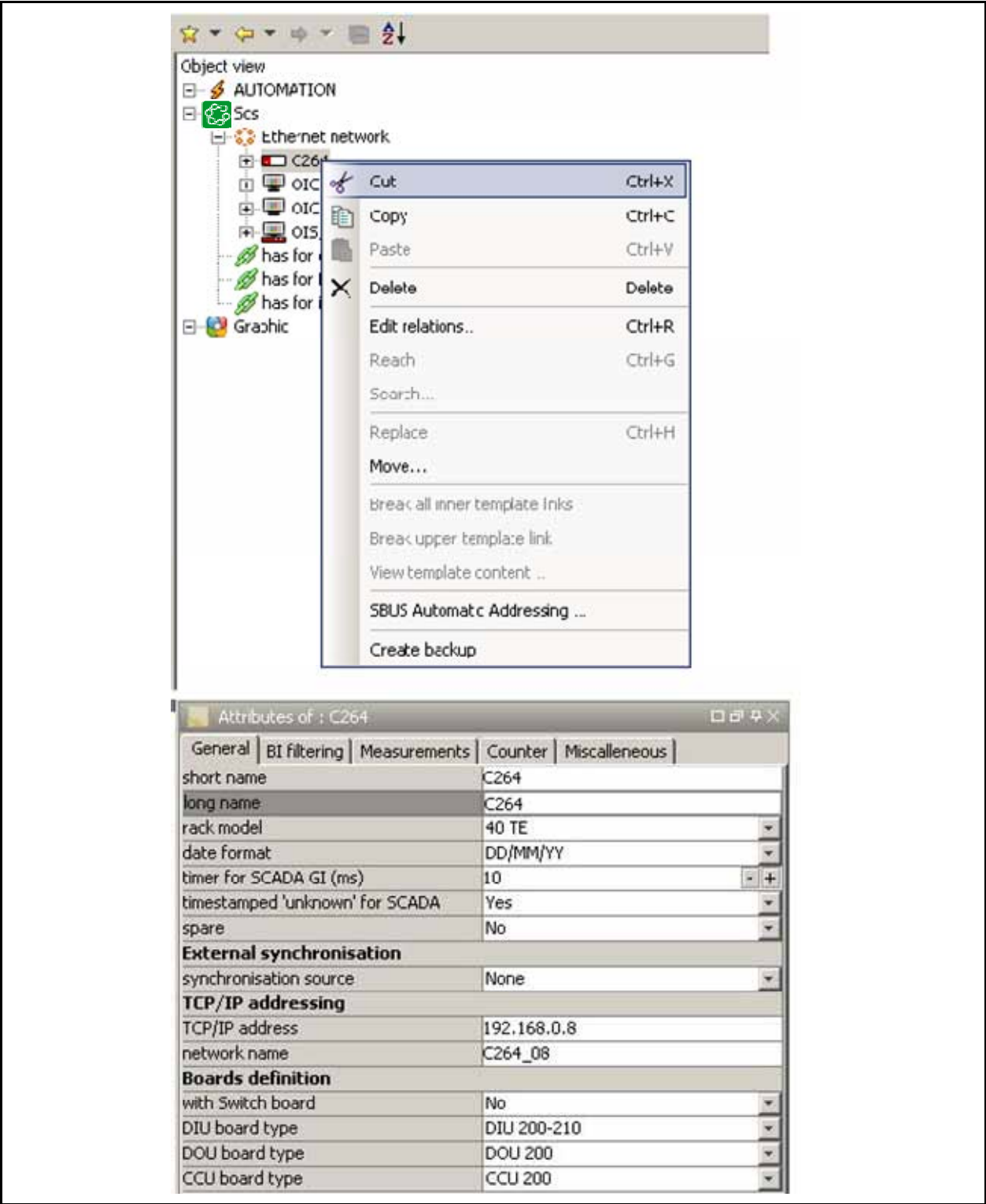


FIGURE 91 - EDIT/CREATE BACKUP

3. The selected equipment is cloned. A new relation between the two equipment is created: "is backup of". Its components are read-only except its name or network attributes:

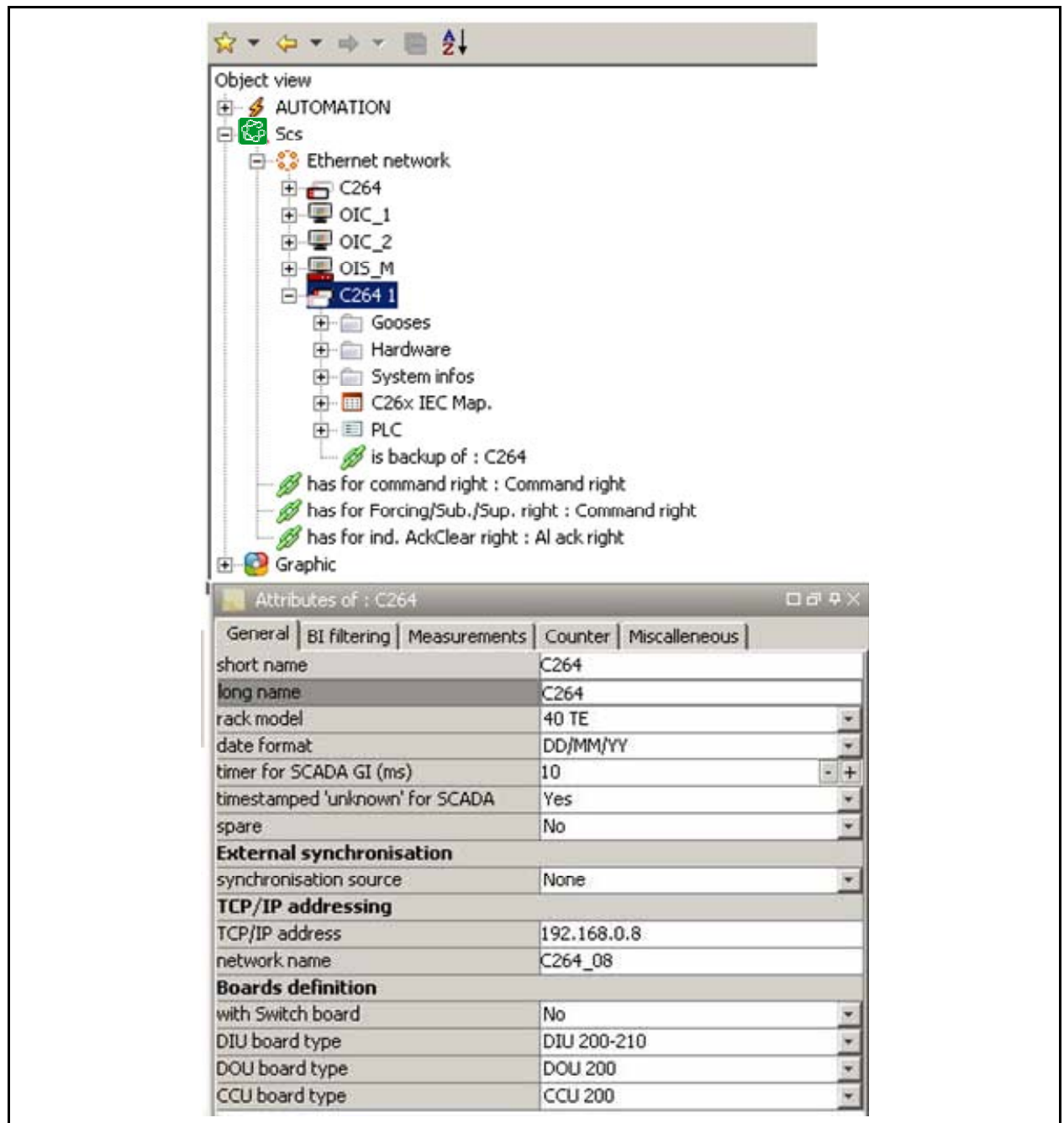


FIGURE 92 - A BACKUP EQUIPMENT

4.2.21 New

Purpose 1:

- Create a new Unified Template

Purpose 2:

- Create a new Parameter in the selected Unified Template

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Attributes Editor (Parameter tab), Templates List

Operation 1:

1. Only in **template mode**, select the **root of Templates list** area and choose New item:

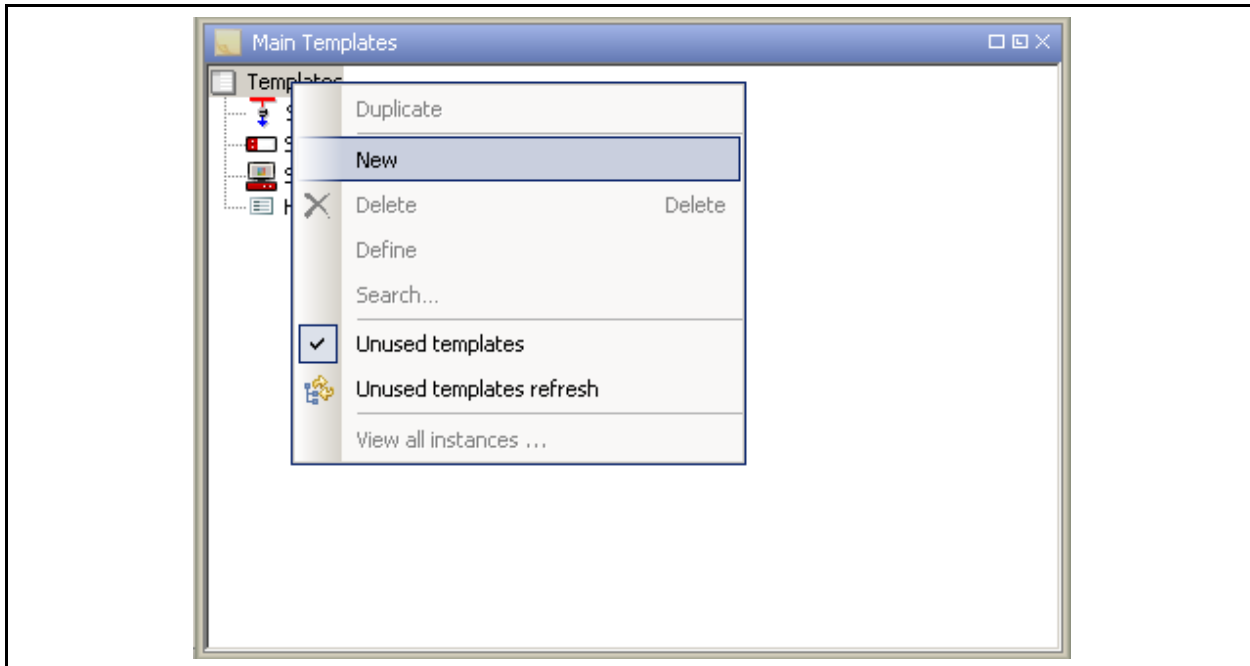


FIGURE 93 - EDIT/NEW TEMPLATE

2. A new template is created with a default name. Its name will be set after the creation of its first component: the first created component of a template is the anchor of the template. The name of the template is the name of its anchor. An anchor is the object from which the template can be instantiated.

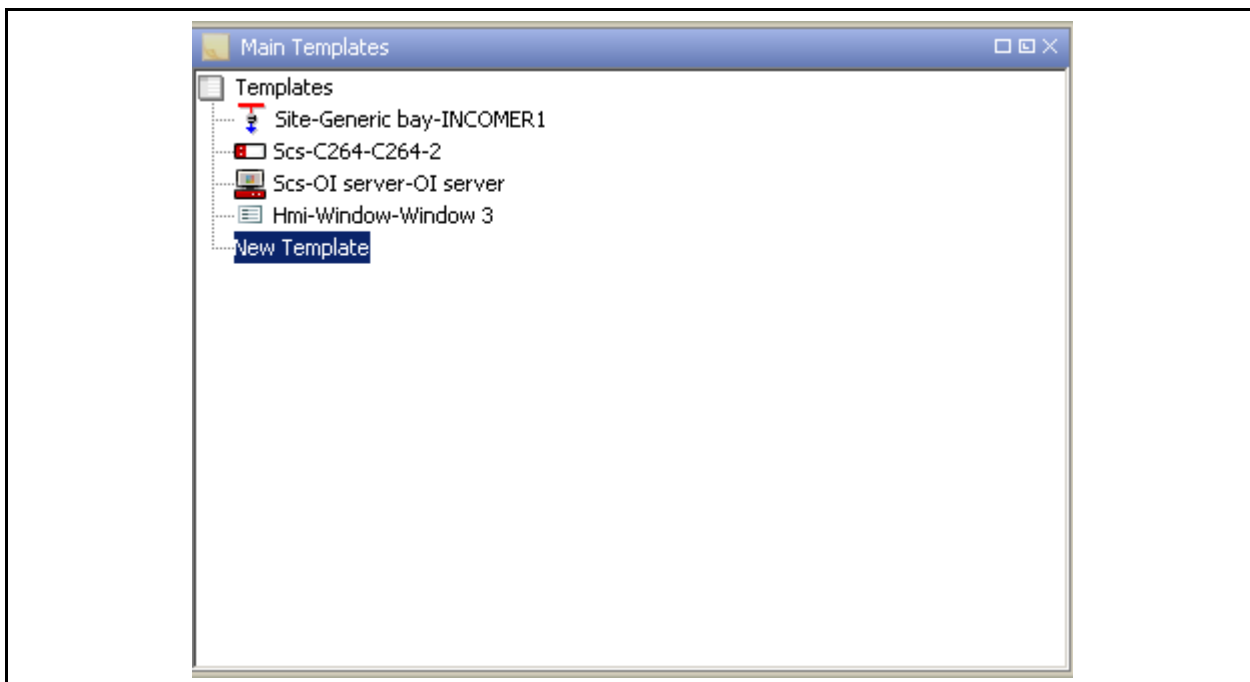


FIGURE 94 - A NEW TEMPLATE

Operation 2:

- 1. Only in template mode:
 - select a template in Templates list,
 - then select the **anchor**  of a template in Navigator,
 - then select the **parameter tab** in Attribute editor. Choose New item:

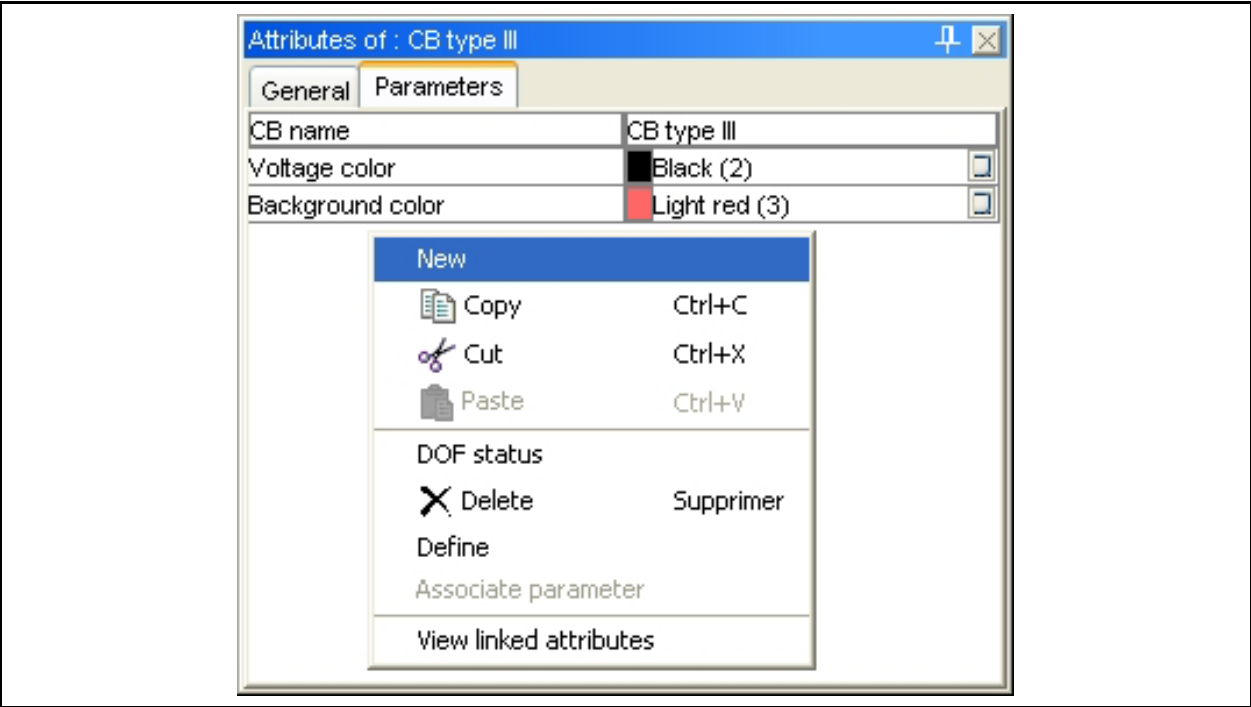


FIGURE 95 - EDIT/NEW PARAMETER

- 2. A **new parameter is created** with no linked attribute. The name of its parameter can be changed with a double click on its first column.

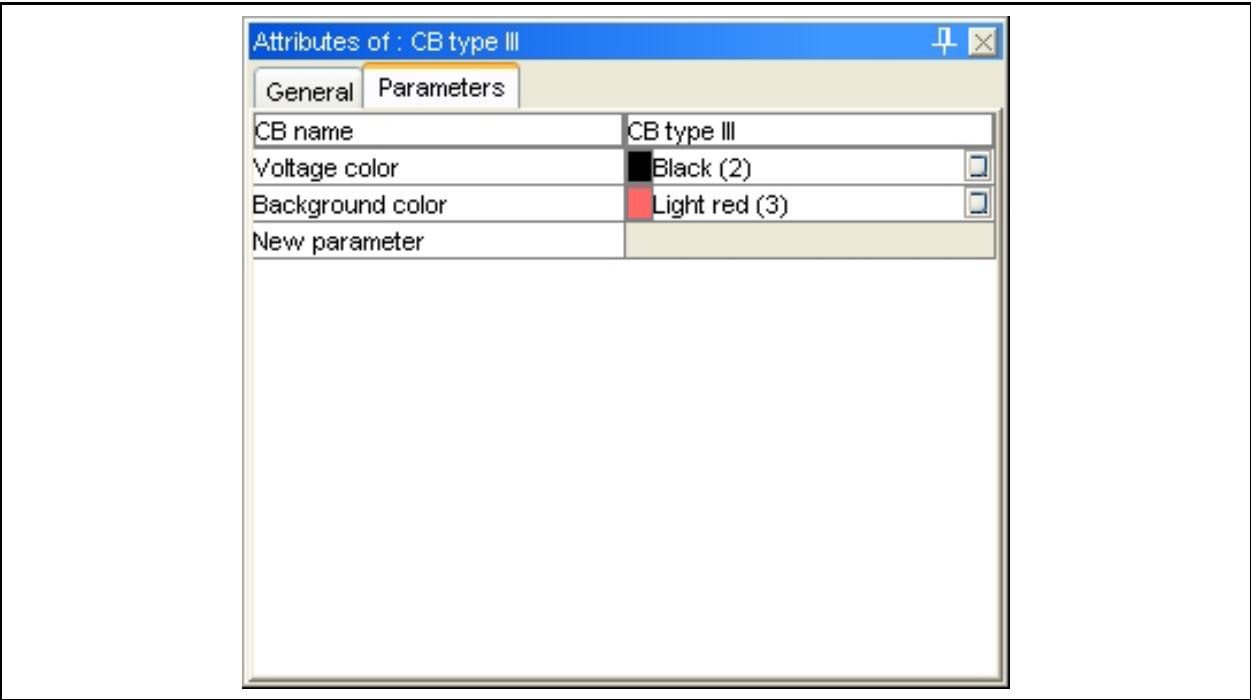


FIGURE 96 - AN EMPTY PARAMETER

4.2.22 Define

Purpose 1: define a comment available on ToolTip for a template

Purpose 2: define a comment available on ToolTip for a parameter

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Attributes Editor (Parameter tab), Templates List

Operation 1:

1. Only in **template mode**, in Templates list area, select a template and choose define item:

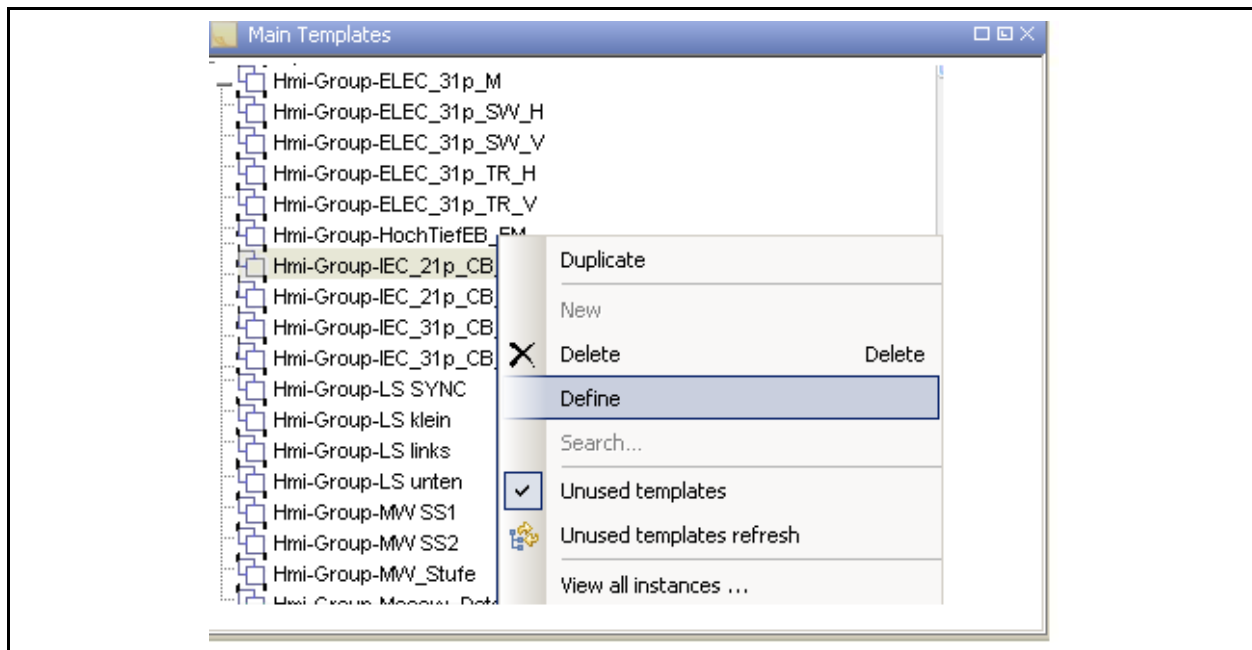


FIGURE 97 - EDIT/DEFINE TEMPLATE

2. A text field editor appears. Type template comment. HTML tags can be used.

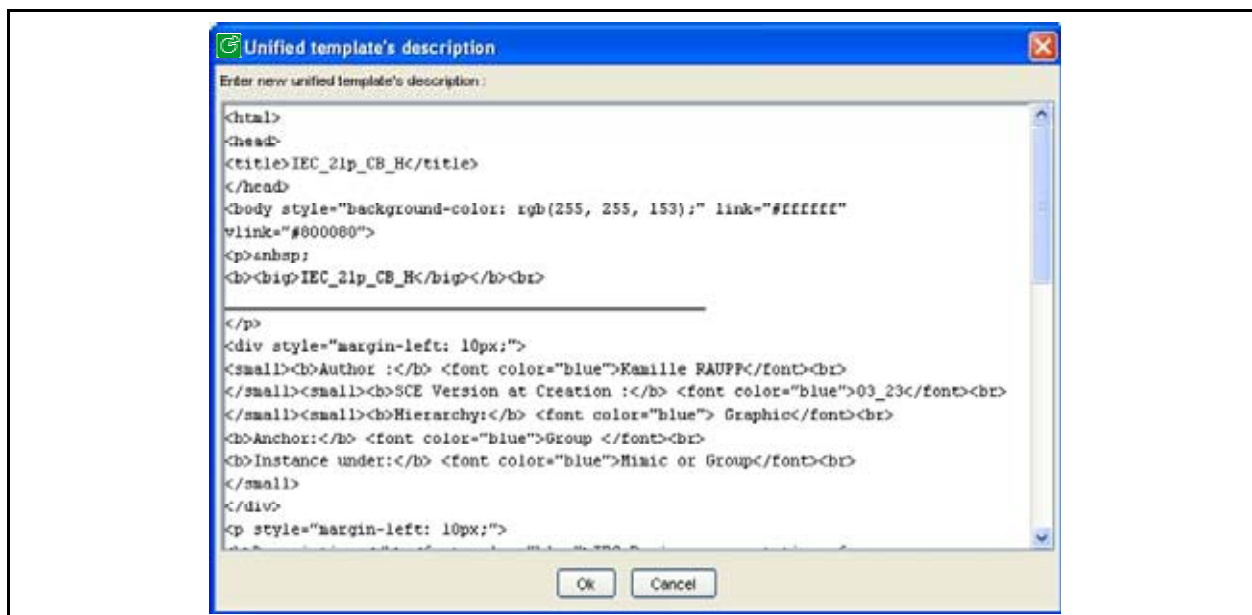


FIGURE 98 - TEMPLATE DEFINITION EDITOR

3. This comment will be displayed as ToolTip in Templates list area.

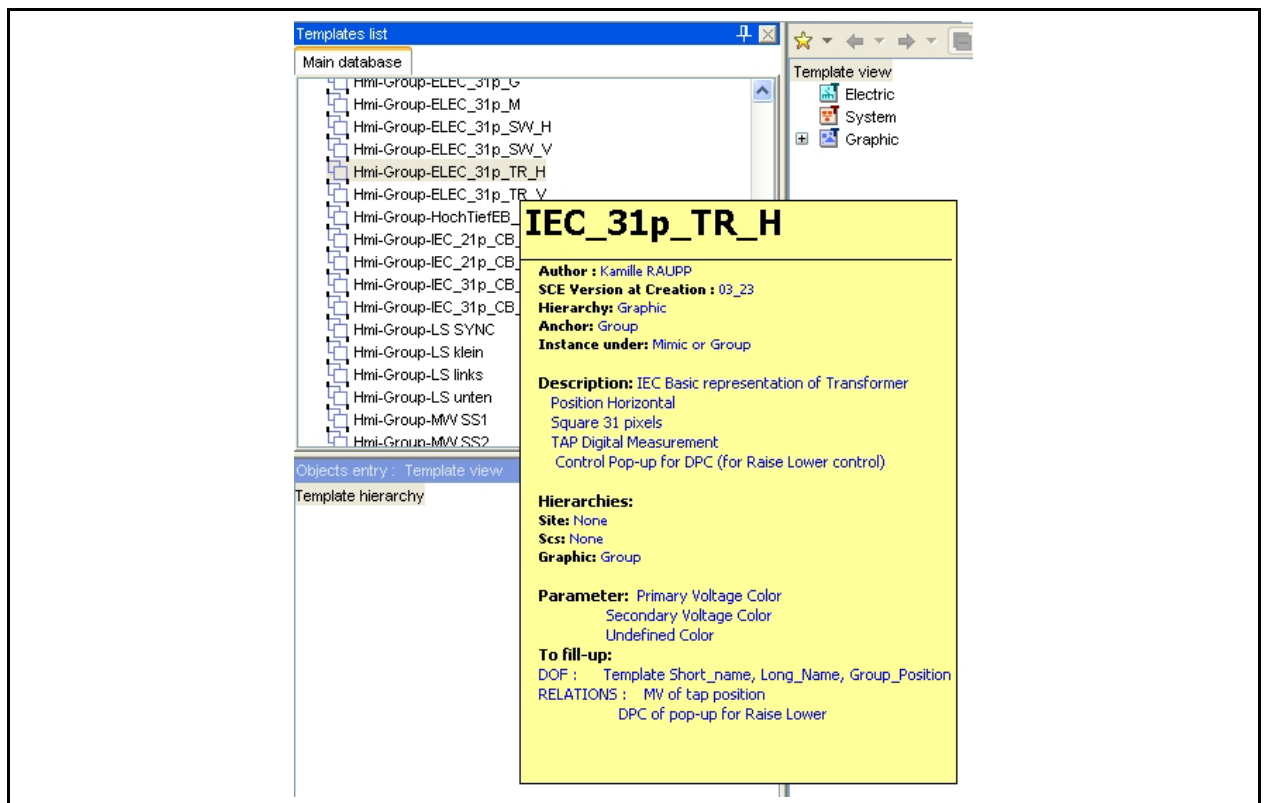


FIGURE 99 - TEMPLATE DEFINITION TOOLTIP

Operation 2:

1. Only in template mode:
 - select a template in Templates list,
 - then select the **anchor**  of a template in Navigator,
 - then select the **parameter tab** in Attribute editor. Choose Define item:

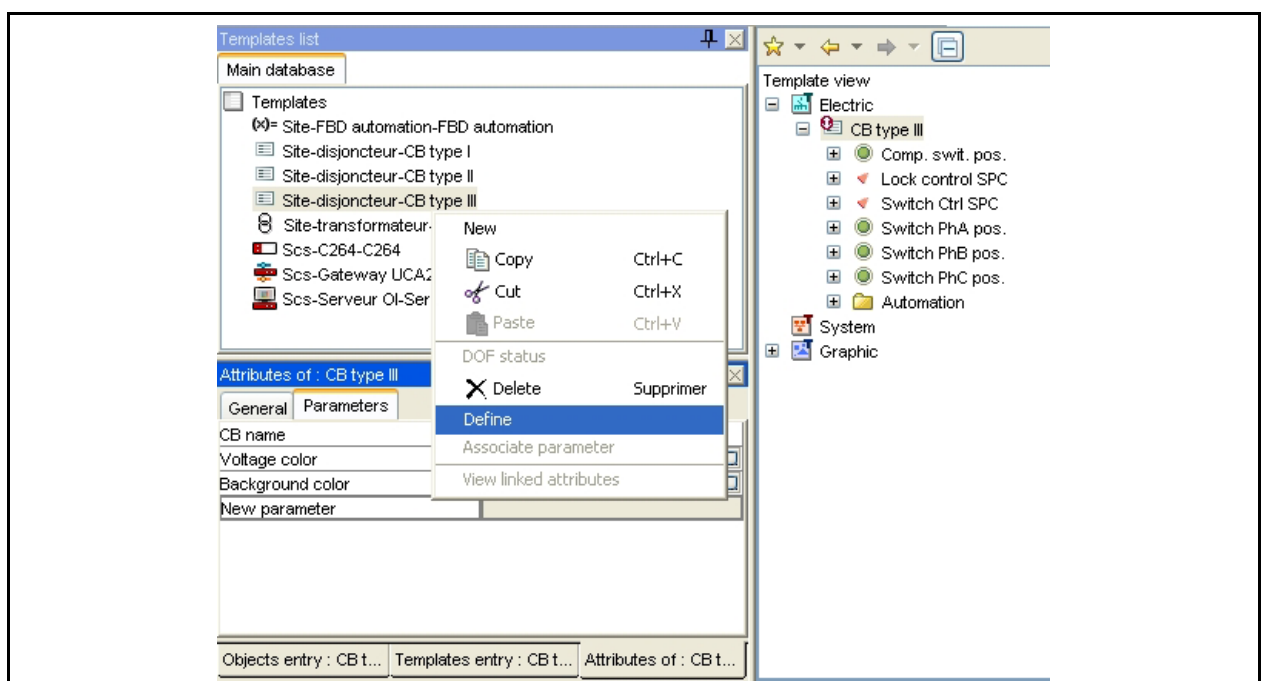


FIGURE 100 - EDIT/NEW PARAMETER

2. A text field editor appears. Type parameter comment. The HTML tags can be used.

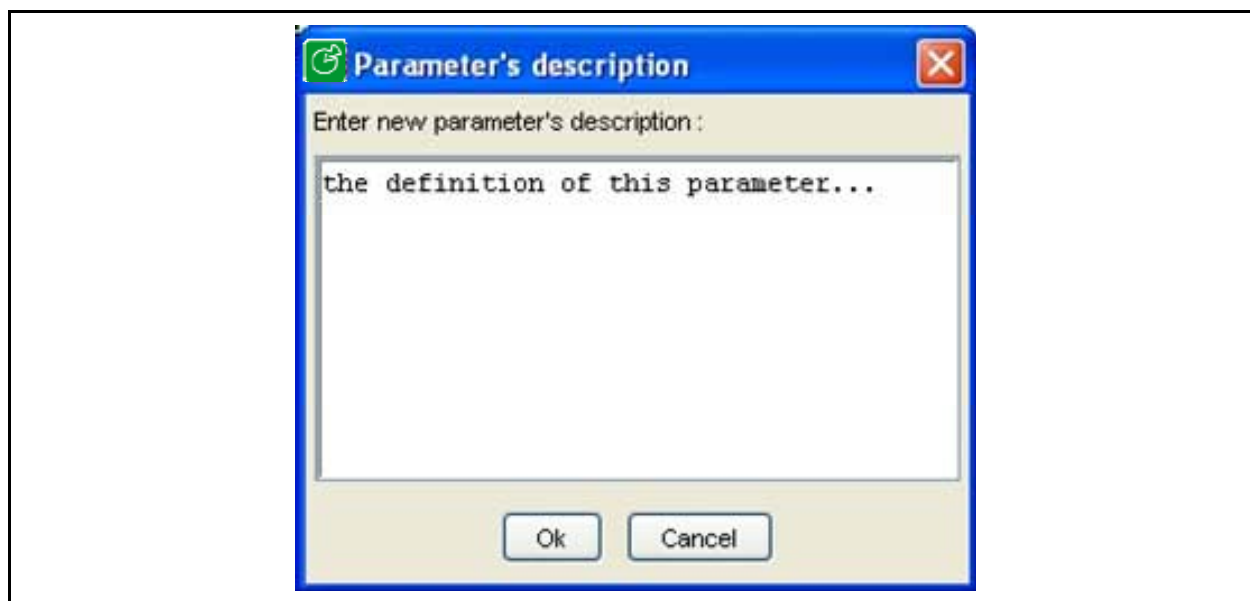


FIGURE 101 - PARAMETER DEFINITION EDITOR

3. This comment will be displayed as ToolTip in Attributes editor, tab parameter:

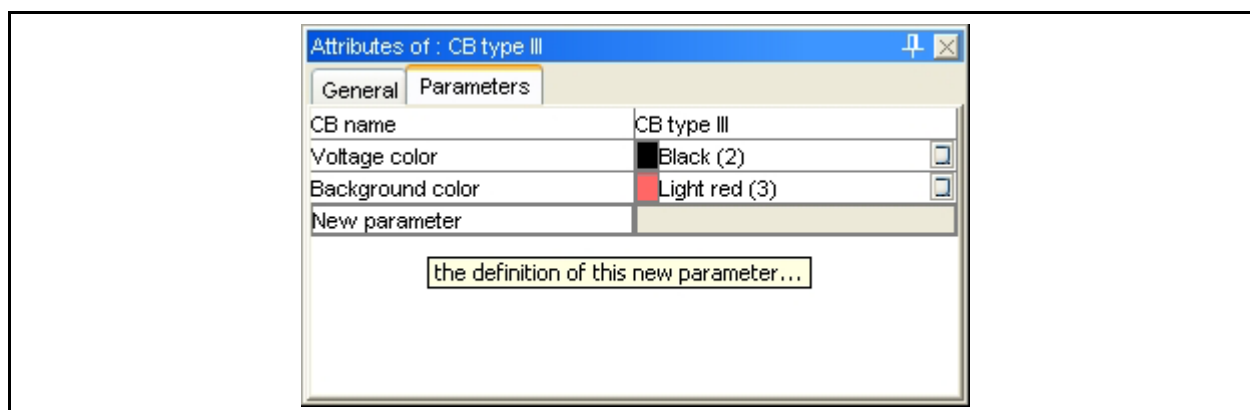


FIGURE 102 - PARAMETER DEFINITION TOOLTIP

4.2.23 Associate Parameter

Purpose:

- Associate the selected attribute as a new parameter or as an existing parameter.

A parameter is a link between several attributes. When an element of this set is modified, the other are also modified. This shortcut allows to modify only one attribute instead of modifying n times with same value n attributes.

Availability:

- Depending on the selected element

Call:

- Contextual menu (Mouse right click) in Attributes Editor

Operations:

1. Select an **attribute** in Attribute editor, in **template Mode only**
2. Choose Associate item parameter. This item is enabled **if a parameter is available** for the selected attribute:
 - an **empty parameter** with no linked attribute,
 - or a parameter already linked to another **compatible attribute**.

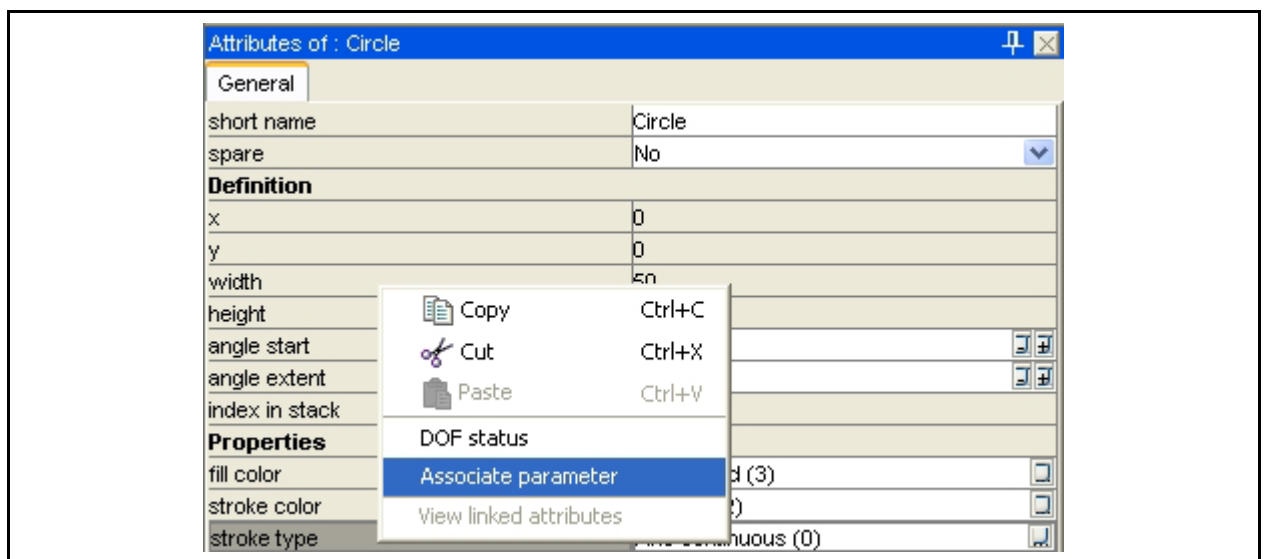


FIGURE 103 - EDIT/ASSOCIATE PARAMETER ITEM

3. The following dialog box appears. It propose available parameters which can be linked to the selected attribute.

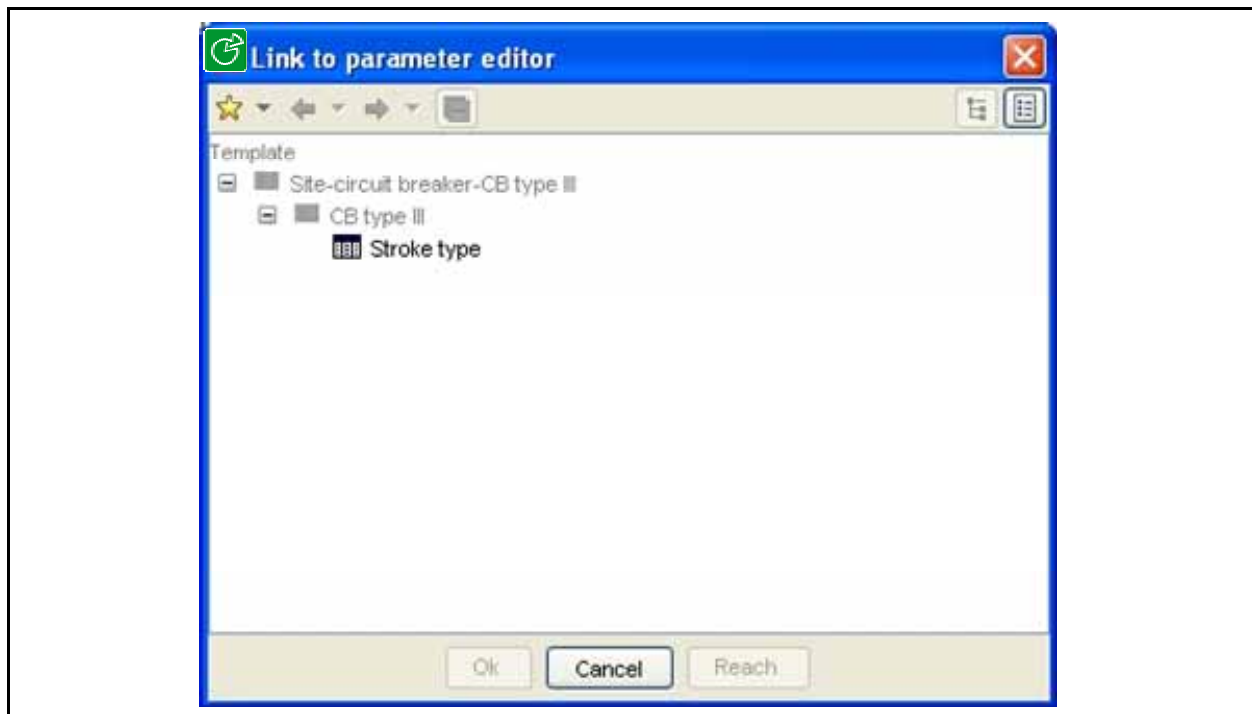


FIGURE 104 - LINK TO PARAMETER EDITOR

4. After selection of a parameter, click the **Ok** button. The selected parameter is now **linked to the chosen parameter**: any modification of one among them is propagated on the other(s). This indication appears in the **status bar** when the attribute is selected. See also **EDIT/View linked attributes** to visualise the set of linked parameter and attributes.

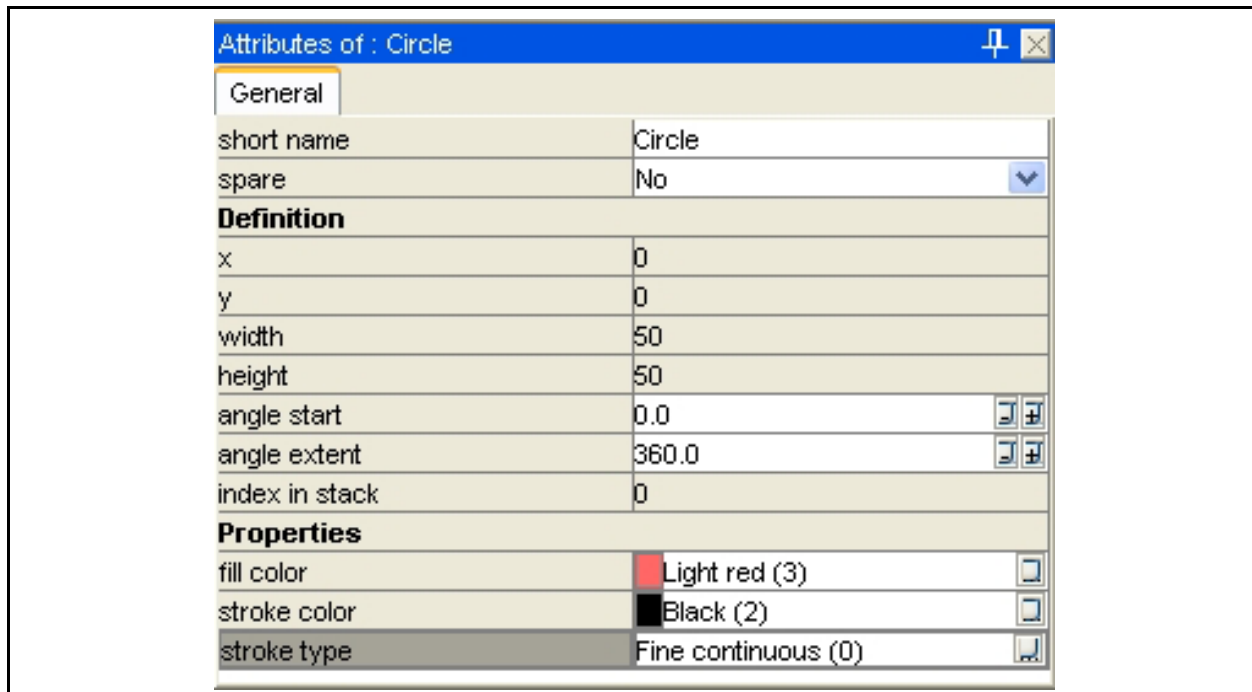


FIGURE 105 - LINKED PARAMETER

4.2.24 DOF Status

Purpose:

- Toggle the selected attribute or parameter as a **Degree Of Freedom (DOF)**.
- In that case, in object mode, for the template instance, the target object attribute/parameter value can be modified even if the object is linked to its template. The font colour of an attribute **DOF label is blue** in the template and black in the target object.

Availability:

- Depending on the selected element
- Template mode only

Call:

- Contextual menu (Mouse right click) in Attributes Editor

Operations:

1. Select **an attribute or a parameter** in Attribute editor, in **template mode only**. If the attribute is linked to a parameter, the item is not enabled: item is enabled only for the linked parameter.

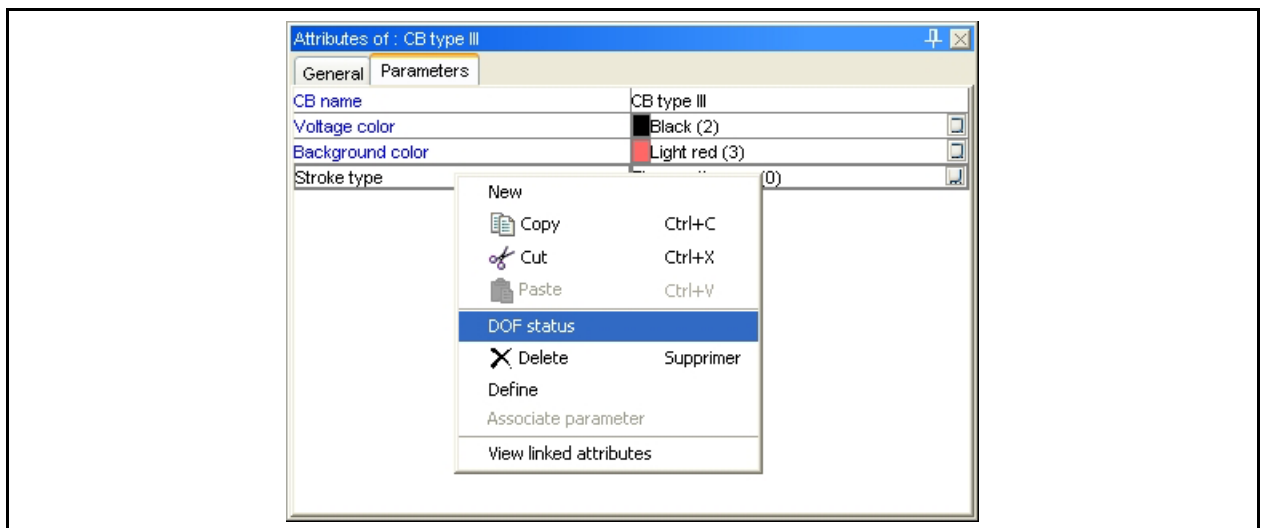


FIGURE 106 - EDIT/DOF STATUS ITEM

2. Choose DOF Status item. The DOF status of the attribute/parameter is inverted:

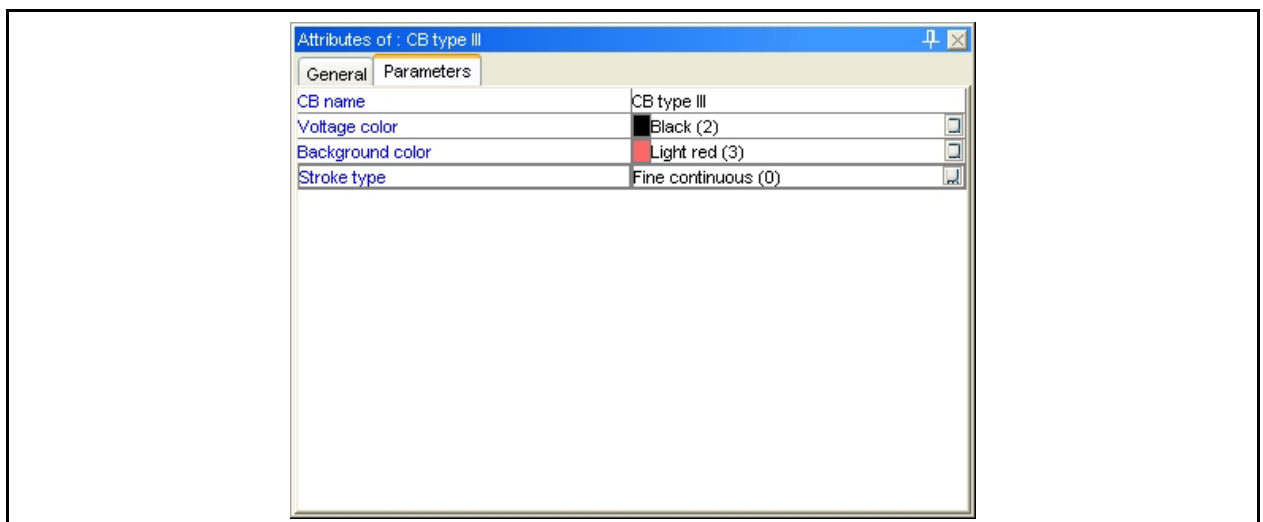


FIGURE 107 - TOGGLE DOF STATUS

3. In object mode, the DOF attribute/parameter becomes updateable:

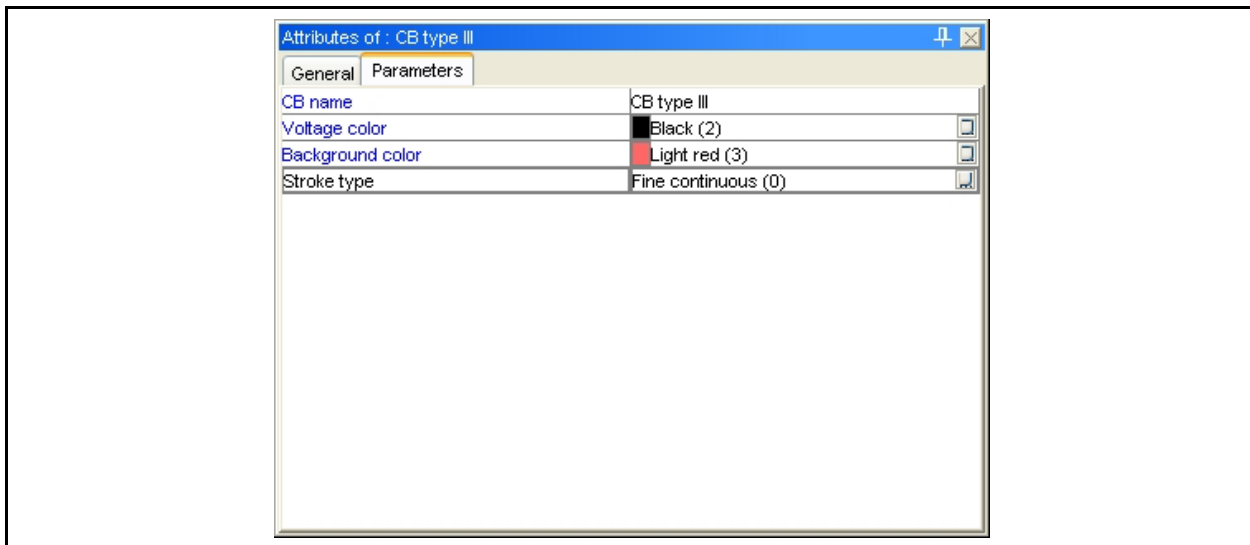


FIGURE 108 - OBJECT MODE AND DOF STATUS

4.2.25 SBus Automatic Addressing

Purpose:

- Create automatically the SBus mapping of SBus PACiS device.
- The creation rules and its limitations are described in chapter AP.

Availability:

- The procedure is available in the contextual menu of PACiS SBus devices or Ethernet, only for Object mode.

Call:

- Contextual menu (Mouse right click) in Navigator, Components List

Operation:

1. Select a PACiS SBus device (OI, C264, GTW) in navigator.
2. Select contextual menu item SBus Automatic Addressing.

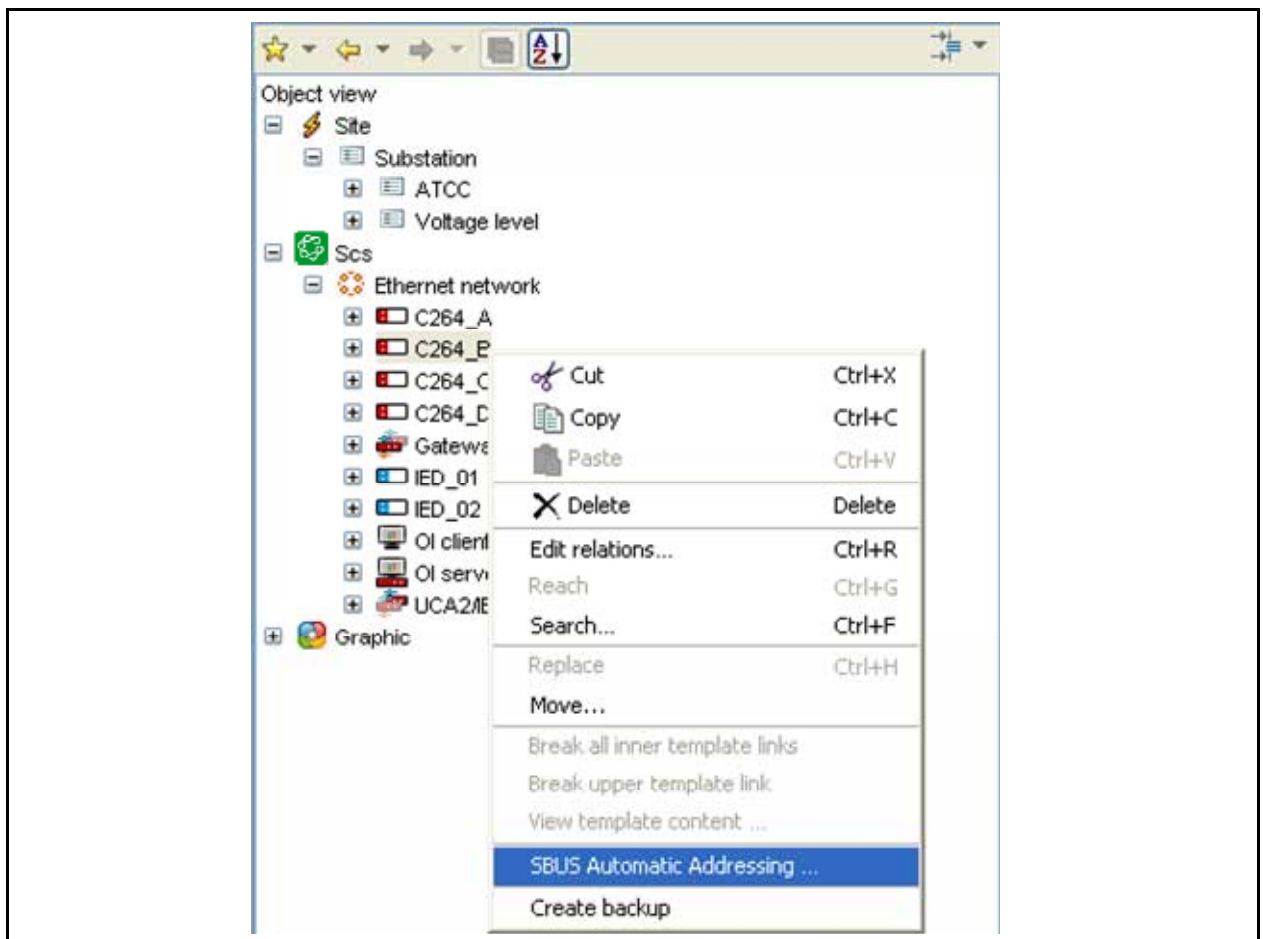


FIGURE 109 - EDIT/SBUS AUTOMATIC ADDRESSING FOR SBUS DEVICE

3. The SBus mapping of the selected device is created following the PACiS IEC 61850 projection rules.

or

4. Select Ethernet object in navigator
5. Select contextual menu item SBus Automatic Addressing.

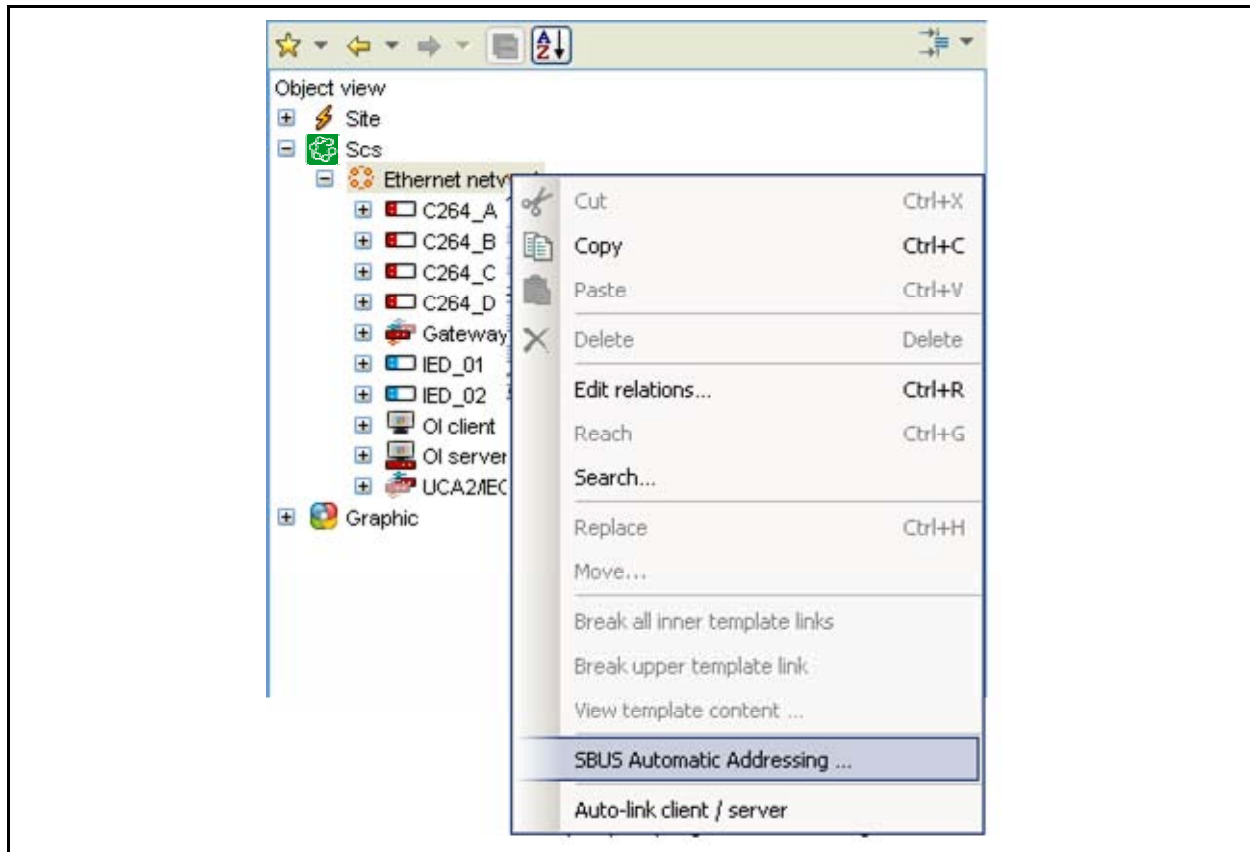


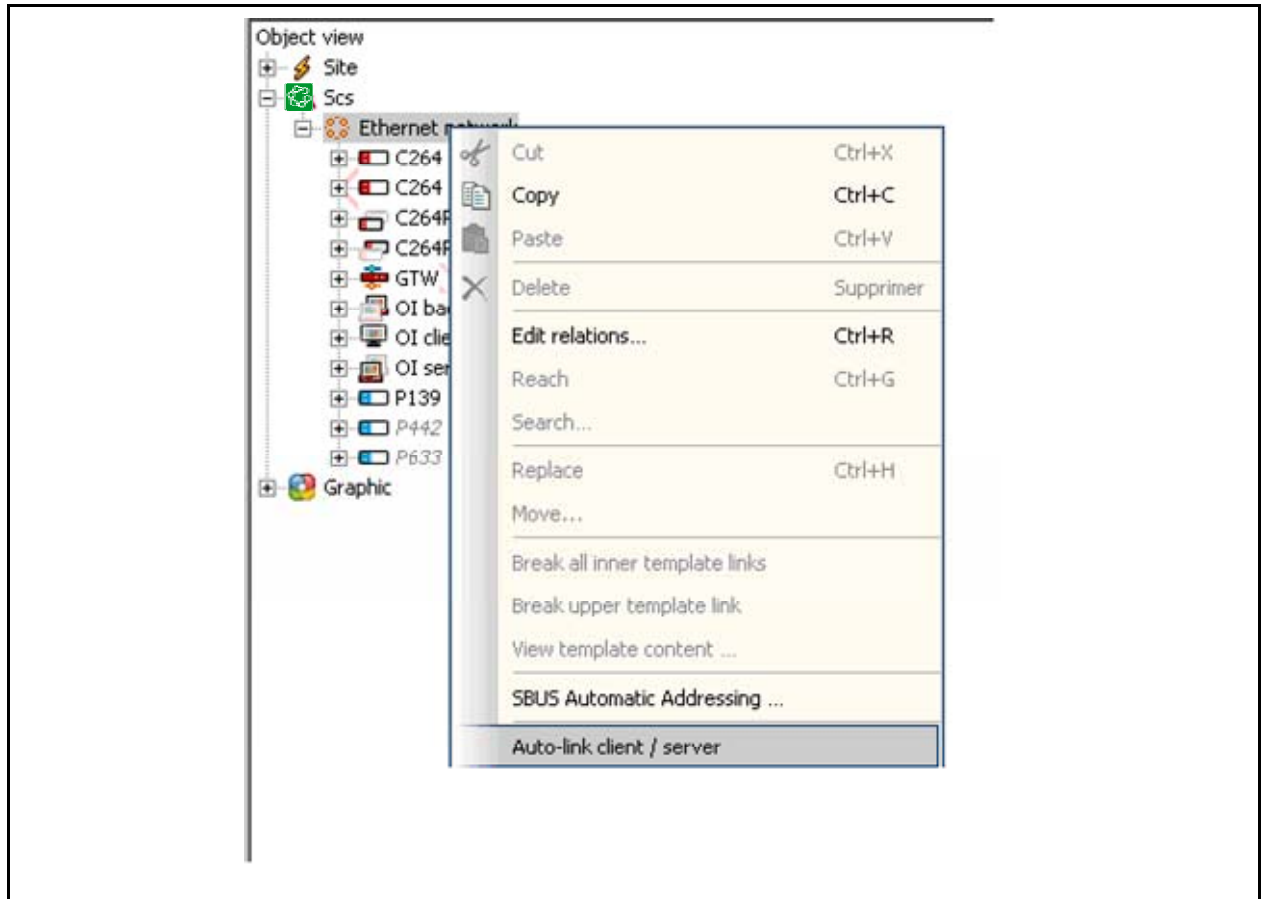
FIGURE 110 - EDIT/SBUS AUTOMATIC ADDRESSING FOR ETHERNET OBJECT

6. The SBus mapping of ALL PACiS SBus devices (OI, C264, GTW) are created following the PACiS IEC 61850 projection rules.

4.2.26 Auto Link Client Server

Auto link process manages the creation of all relations client/server between all pieces of equipment of the database. Using the client/server rules of the datapoints (see SCE_ENMF C50), relations "Has for IEC61850 server" are created under clients equipment and link to their servers. The attribute 'modelling/goose usage' is updated with right value: Data model only, Goose only, or Data model and goose.

The function auto-link is available from the contextual menu on the Ethernet Network.



4.2.27 Unused templates

Purpose:

- In Templates list area, hide/show templates that are unused at objects level or upper template level.

Availability:

- Template is selected in Templates list area.

Call:

- Contextual menu (Mouse right click) in templates list area

Operation:

1. Select a template in Templates list area.
2. Choose **Unused templates** item. If this item was not previously ticked it is "ticked": the Templates list contains used and unused templates. If this item was previously ticked it is "unticked": the Templates list contains only the used templates.

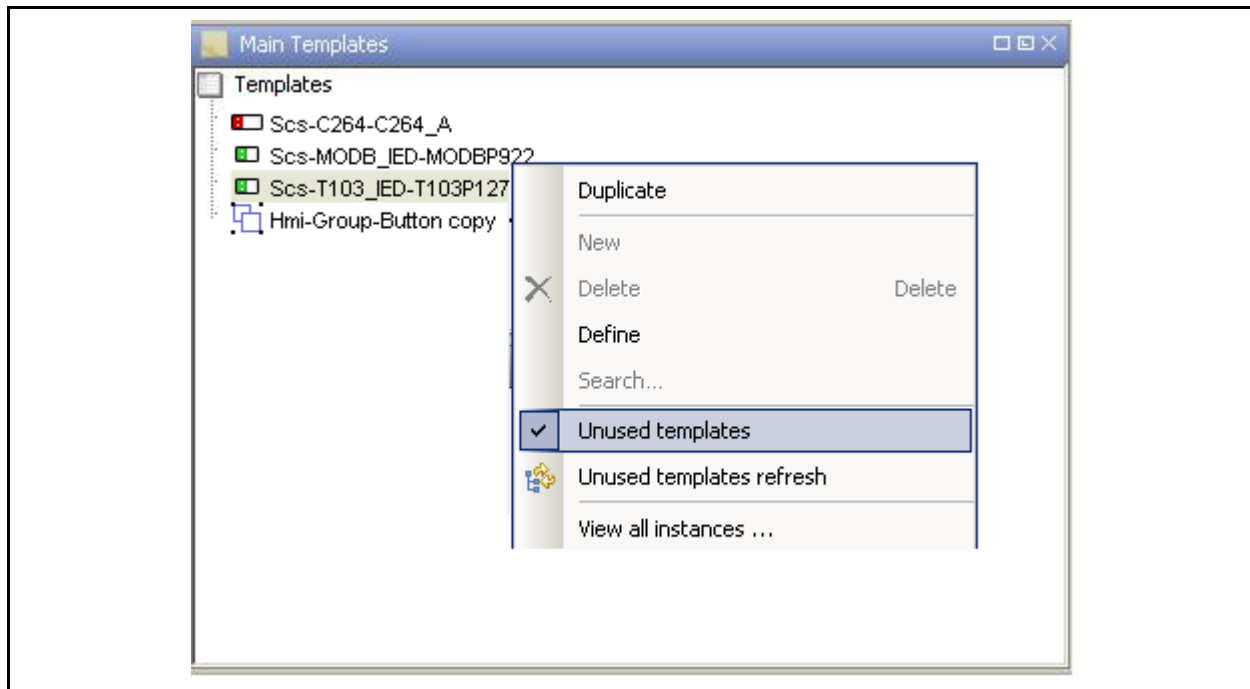


FIGURE 111: UNUSED TEMPLATES CONTEXTUAL MENU

4.2.28 Unused templates refresh

Purpose:

- Refresh the Templates list area according to the state (ticked or unticked) of the Unused templates item.

Availability:

- Template is selected in Templates list area.

Call:

- Contextual menu (Mouse right click) in templates list area

Operation:

1. Select a template in Templates list area.
2. Choose **Unused templates refresh** item.

4.3 User Menu



FIGURE 112 - USER MENU

4.3.1 User/Change Application

Purpose:

- Allows a user to log in the PACiS SCE application giving a user name and the password. The user has profile of available actions with PACiS SCE that filter information relatively to the profile. At session beginning, there is a default right defined by product options and licences.

Availability:

- Always



FIGURE 113 - USER/LOGIN POP-UP

Operation:

This window is modal.

- **User name:** a text field to enter the login name. If it is not the first time that the PACiS SCE is launched, the login name of the previous user is already entered.
- **Password:** when the user enters his password, only stars are displayed in order to hide the password actually entered.
- **Profile:** the profile that the user wants to use in the current session. The last used profile, is proposed by default. Only the profile available for the user set in the Username field are selectable in the combo box.
- A new concept has been added: **application type**. Three application types are now defined:
 1. PACiS
 2. Poste d
 3. C264-Standalone

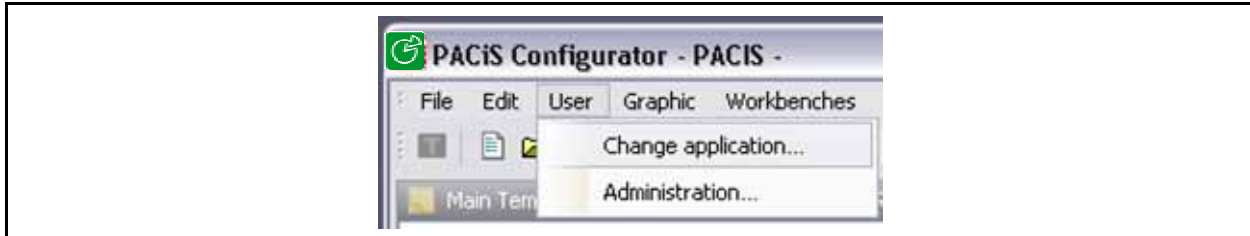
This type is used to **filter some data**.

For example, only Poste d applications see Poste d protective function;

Or C264-standalone applications don't see OI device and 61850 data.

This default type is used during the creation of configuration to set its type.

The default type could be updated when no database is open, with **User/Change Application**.



The previous user profiles have been replaced by the applications types.



Three pre-defined user name have been defined, with their own default application type:
PACiS: could be defined PACiS, C264-standalone and Poste-d applications.

- Poste-d: could be defined only Poste-d and C264-Standalone applications.
- C264-Standalone: could be defined only C264-Standalone.

To manage theses users, **User/Administration** could be used.

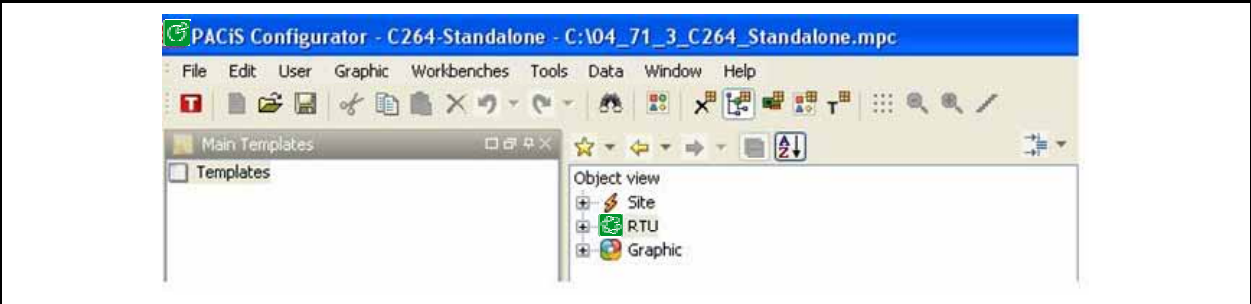
The present HMI has been kept but will be simplified.

4.3.1.1 Display current application type

- When no database is opened, the default application type is displayed in the SCE title.



- When a database is opened, the application type of the database is now displayed in the SCE title before its path.



4.3.2 User/Administration

Purpose:

- Manages the authorised users on PACiS SCE. The management includes adding or removing a user, changing passwords or profile, modify users relative description.
- Let point that the administrator user cannot remove him.

Availability:

- Only user with the administration profile.

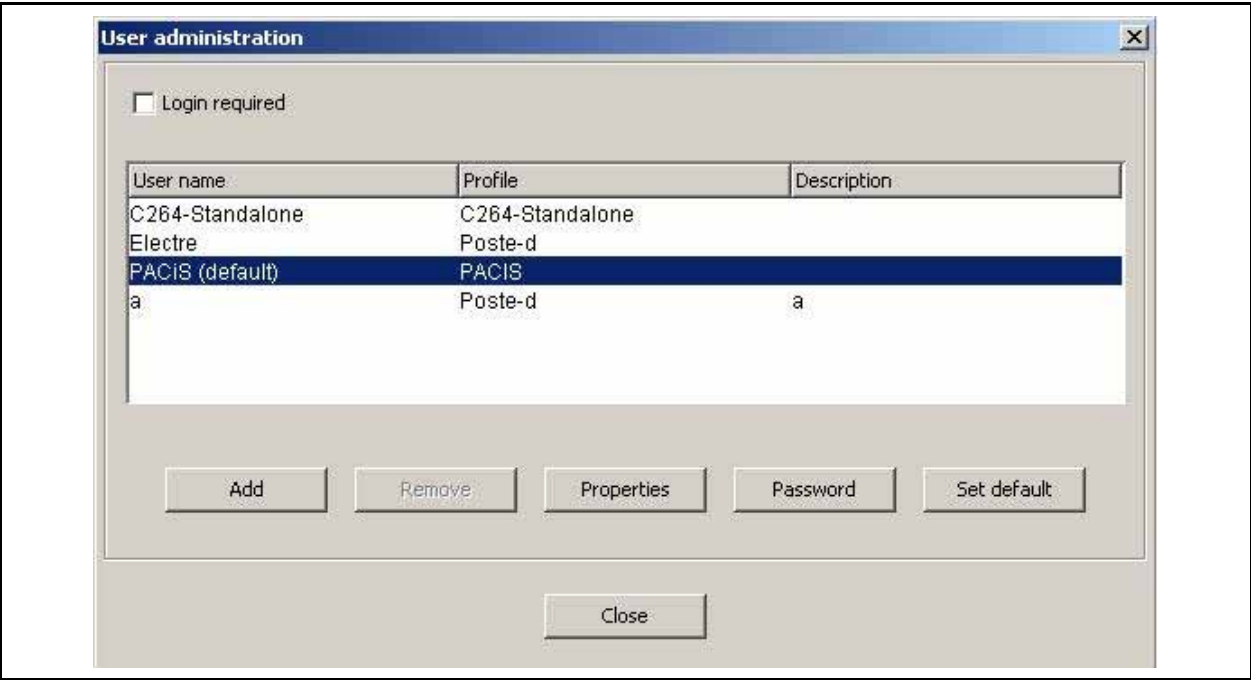


FIGURE 114 - USER/ADMINISTRATION POP-UP

Add defines new user with its profile and description. Remove acts on user selected in reverse video. "Properties" button is a separate definition of profiles, as "Set Default" used when no Login is required. Password is a facility display below to re-enter forgotten password.

Operations:

This window is modal. It displays the user list and allows to make some updates on it.

- **Checkbox Login required:**
 - if selected: the **login is set as mandatory**. The users must use a user name and a password to enter in PACiS SCE.
 - if not selected: the login is set as optional; the passwords can be “empty” strings. the users can **enter in the PACiS SCE without login**. In this case, a default profile (administrator) is given for this session.
- **User table:** display the list of the registered users with their profile and a description field. It is possible to select a user (the line is highlighted).
- **Add Button:** leads to the “user properties” dialog box and allows to add a new user.

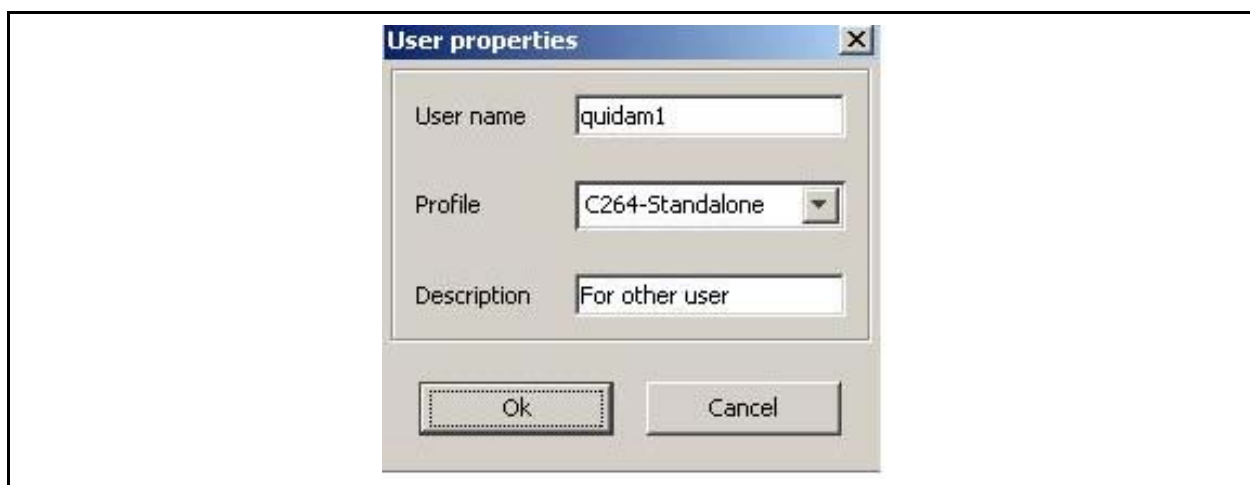


FIGURE 115 - USER PROPERTIES POP-UP

- **Remove button:** remove the selected user.
This button is disabled if:
 - no user is selected,
 - the selected user is the logged one,
 - the logged user does not hold administration rights.
- **Properties button:** leads to the “user properties” dialog and allows to modify the current properties of the currently selected user.
This button is disabled if no user is selected.
If the selected user is the only one which has the “administration” profile, it will be impossible to change the profile.
- **Password button:** leads to the “change password” dialog box and allows to change the password of the selected user. This button is disabled if no user is selected.



FIGURE 116 - USER/ADMINISTRATION REDEFINING PASSWORD

- **Set Default** button: set the selected user as the default user.
- **Close** button: close this dialog window.

4.4 Graphic Menu

Graphic menu is the collection of items which implements PACiS SCE graphic features:

- **Graphic editors** which are specialised for each kind of target equipment: OI mimic and Computer mimic. The data model and the edition constraints of each of them are different.
- **Graphic palettes:** colour, font, stroke, and bitmap. Theses palettes are used to define the graphical attributes of each graphic object of mimics.

Items are activated when a graphic object is selected in navigator.

The graphic menus are classified from the kind of graphic objects. A graphic object could be a part of an OI mimic or a Computer mimic. Two different graphic editors can be edited them: **OI mimic** editor and **Computer mimic** editor.

General menu items (Grid, Zoom, and Anti-aliasing) are independent of this classification. Theses items can be applied to an OI mimic or to a Computer mimic.

Graphic palettes can be modified at any moment.



FIGURE 117 - GRAPHIC/MENU

List of items:

	OI Mimic	All specialised menu items for OI mimic graphical objects
	Computer Mimic	All specialised menu items for Computer mimic graphical objects
Grid icon	Grid	Toggle to activate Magnetic Grid
	Zoom	Zoom factors used for the current editor (OI mimic editor or Computer mimic editor).
Anti-aliasing icon	Anti-aliasing	
	Colour editor	The editor of colour palette
	Font editor	The editor of font palette
	Stroke editor	The editor of stroke palette

4.4.1 Graphic palettes

A palette is a collection of predefined graphical attributes. Each element of a palette is **identified by a number**.

When a graphical object is defined, the graphical attributes of this object is precise with using theses palettes.

When an element of a palette is modified, all users of this element, i.e., all graphical objects which use a reference (its number) to this element are impacted by this modification.

For example, colour 21 is used for circles C1, C2, rectangles R1, R2, and R3. When colour 21 is modified in colour palette, C1, C2, R1, R2, R3 are also modified.

Colour, font, stroke palettes are based on the same editor with two parts: left part is the list of palette element, right part is the description of the selected element in the list.

Bitmap palettes use the navigator and the attribute editor to define it. A **bitmap editor** allows to edit, pixel by pixel, the selected bitmap.

4.4.1.1 Graphic/Color editor

Purpose:

- A colour editor helps to define **colour palette: 256 colours**. The 19 first colours are fixed. Specific colour palette can be set also as template in order to reuse it with several configurations. A number identifies each colour of the palette.

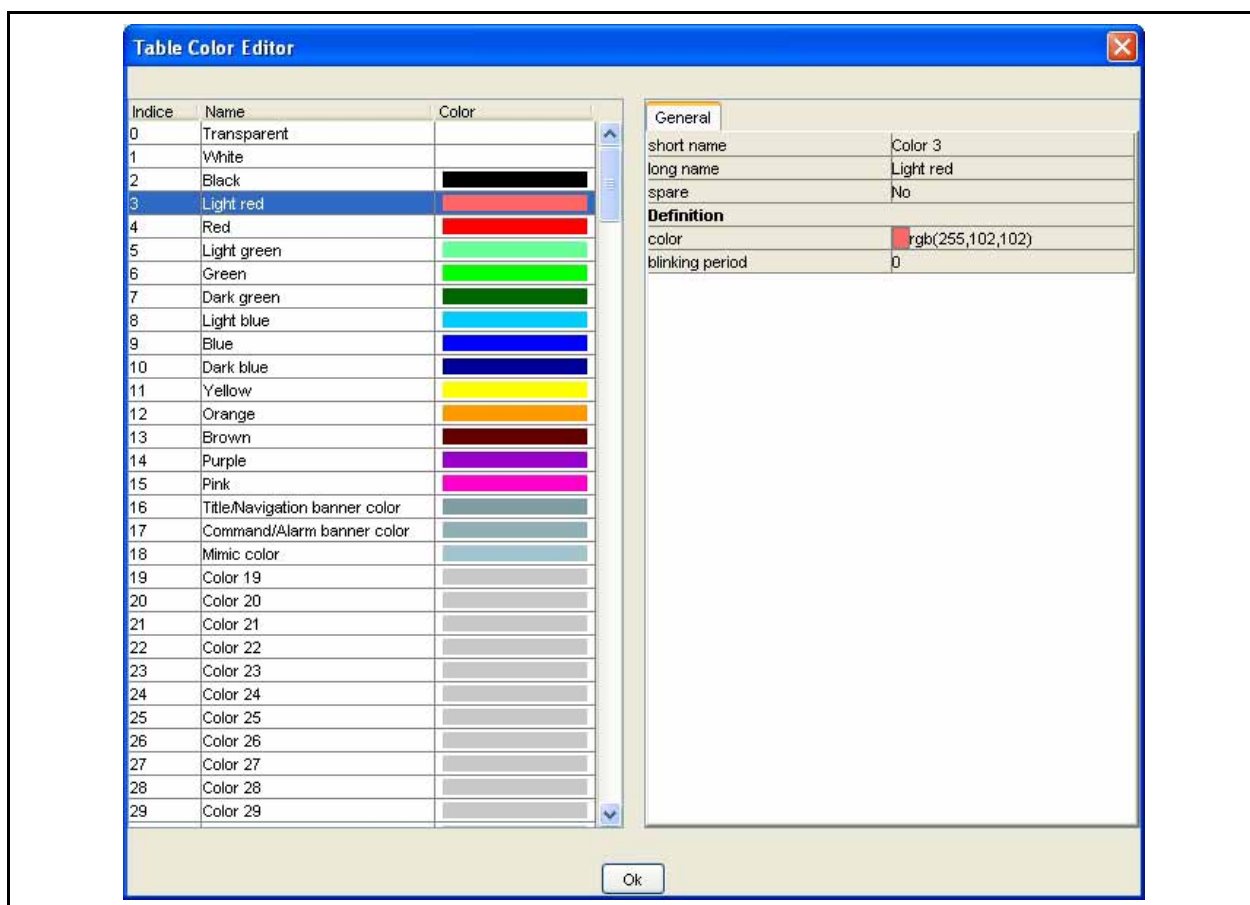


FIGURE 118 - GRAPHIC/COLOR EDITOR

Availability:

- Always

Other call:

- Select a graphical object with a colour attribute and click on button . For example a circle and fill colour attribute. The colour editor allows to edit the palette and also to choose an already defined colour. The index of colour is displayed in the attribute editor between two parentheses.

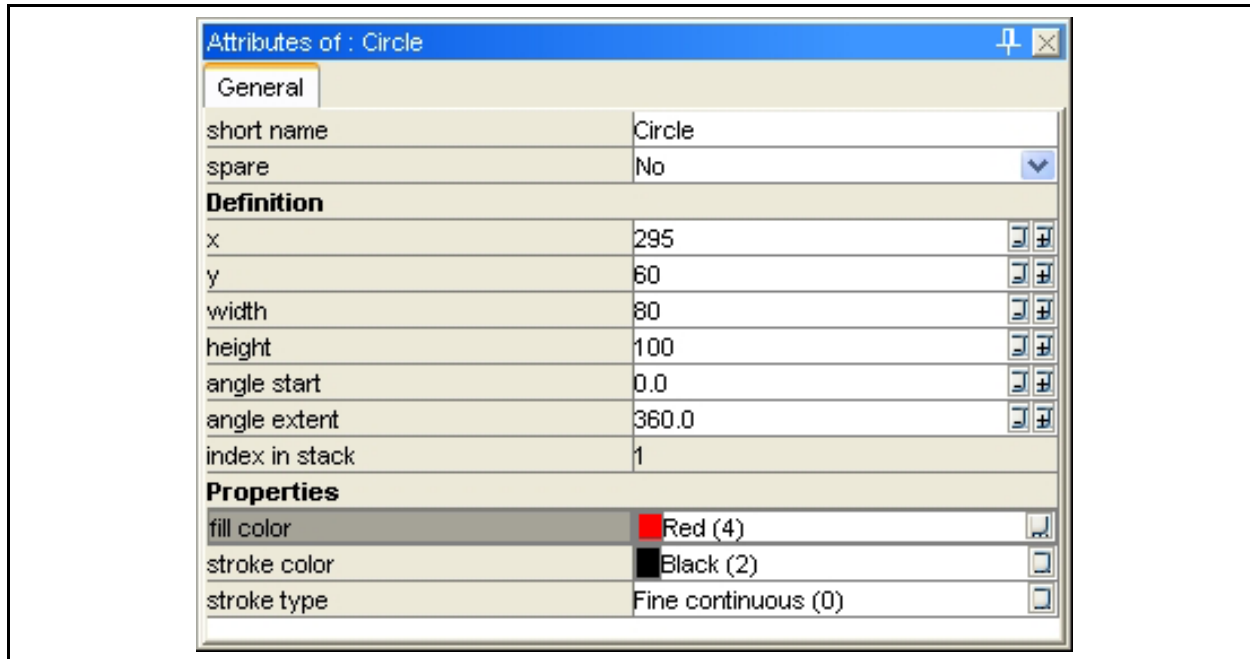


FIGURE 119 - COLOR ATTRIBUTE AND COLOR PALETTE

Operation:

1. Launch color editor from menu graphic
2. Select the color to modify (since 19)
3. Click on Definition/Color or enter directly the new value

Modify the different attributes of the colour at the right part of the table. This part contains the definition of the selected colour at the left part: long name, colour, and blinking period. The graphical representation of the colour is updated at the left part:

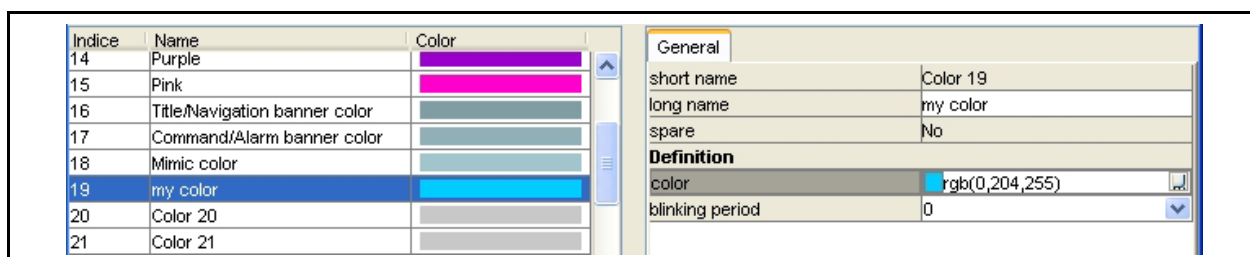


FIGURE 120 - COLOR GENERAL DEFINITION

The pop-up for colour definition propose definition in RVB, HSB format. The samples help to play with front/back policy.

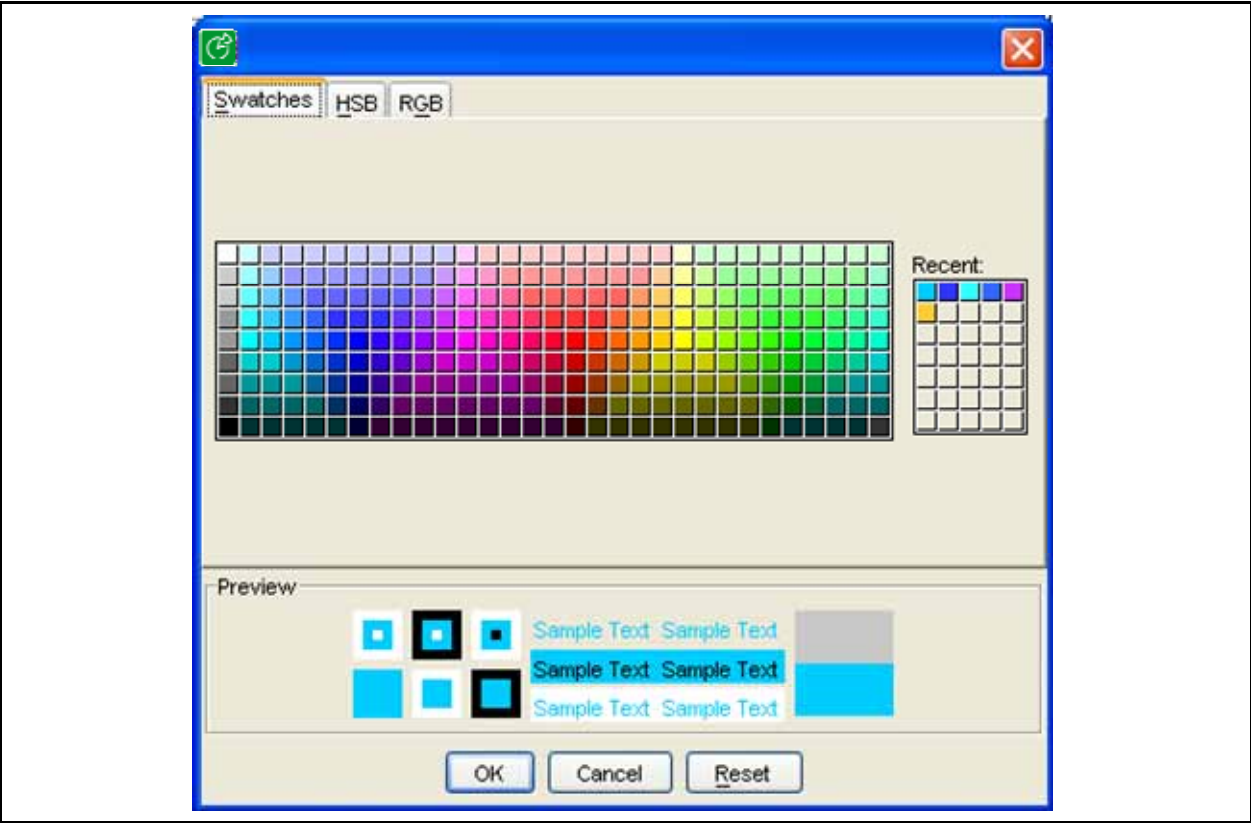


FIGURE 121: COLOR DEFINITION

4.4.1.2 Graphic/Font editor

Purpose:

- A font editor helps to define **font palette: 64 fonts**. The 4 first fonts are predefined and can not be modified. Specific font palette can be set also as template in order to reuse it with several configurations. A number identifies each font of the palette.

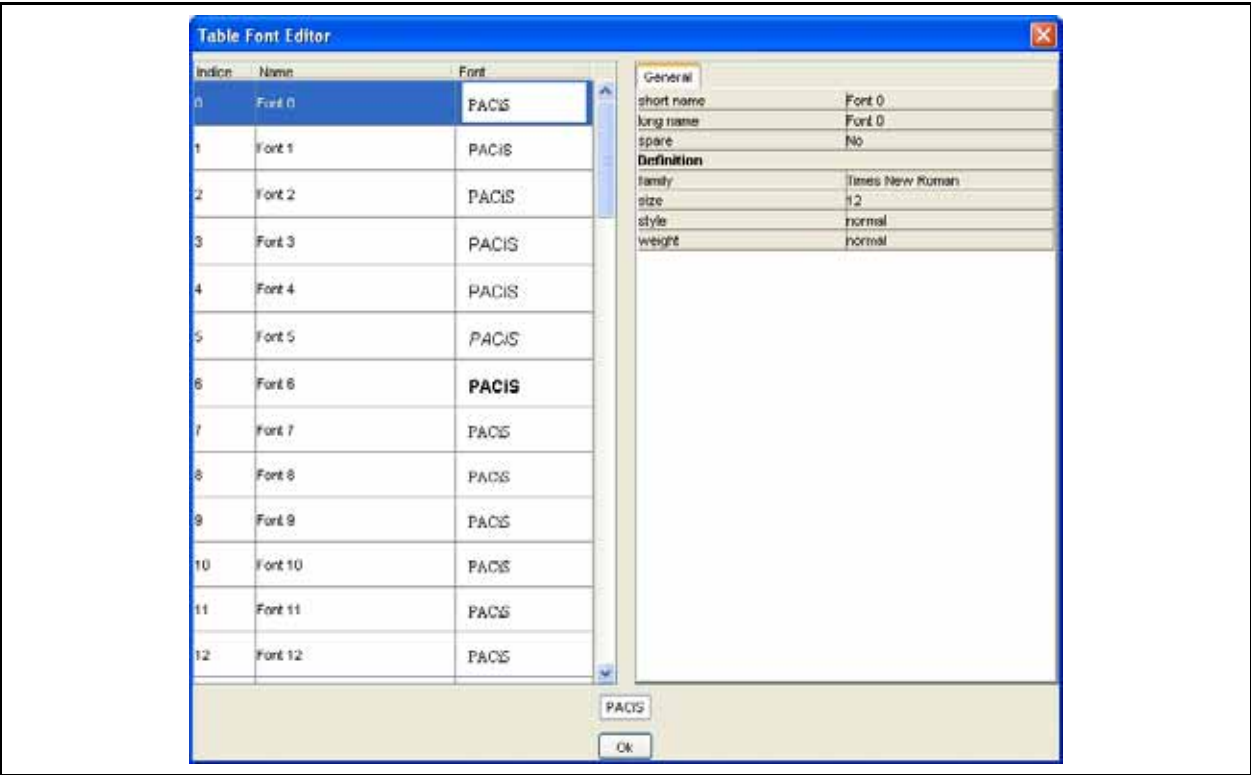


FIGURE 122 - GRAPHIC/FONT EDITOR

Availability:

- Always

Other call:

- Select a graphical object with a font attribute and click on button . For example a text and font attribute. The font editor allows to edit the palette and also to choose an already defined font. The index of font is displayed in the attribute editor between two parentheses.

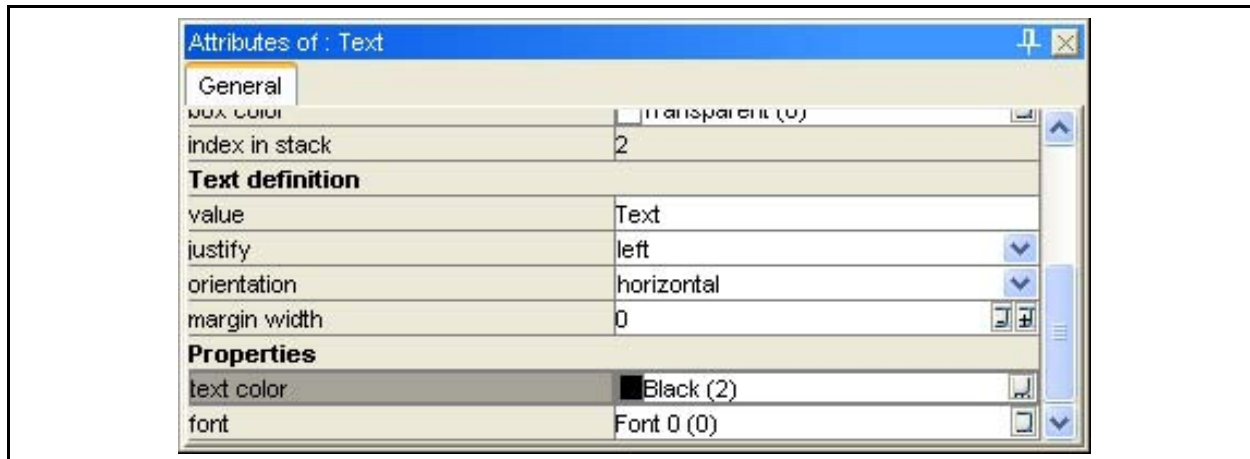


FIGURE 123 - FONT ATTRIBUTE AND FONT PALETTE

Operation:

1. Launch font editor from menu graphic
2. Select the font to modify (since 4)

Modify the different attributes of the font at the right part of the table. This part contains the definition of the selected font at the left part: long name, family, size, style and weight. The graphical representation of the font is updated at the left part:

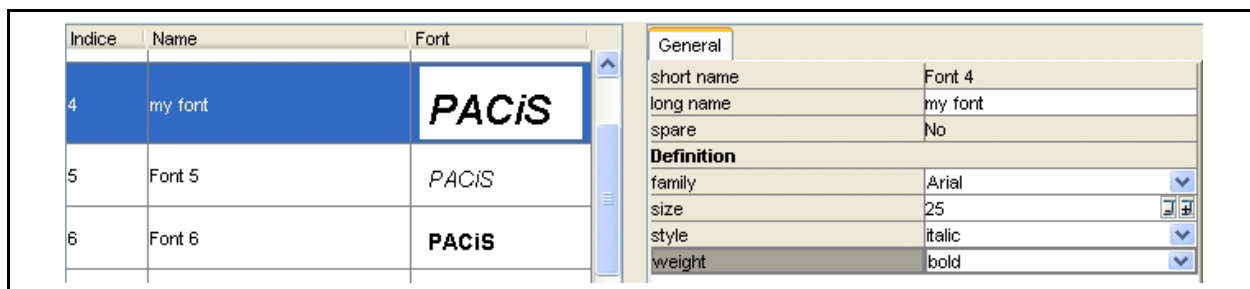


FIGURE 124 - FONT MODIFICATION

3. At any moment, the test text can be modified: edit it with the field at the bottom of the font editor, then the font column is modified with the new value.

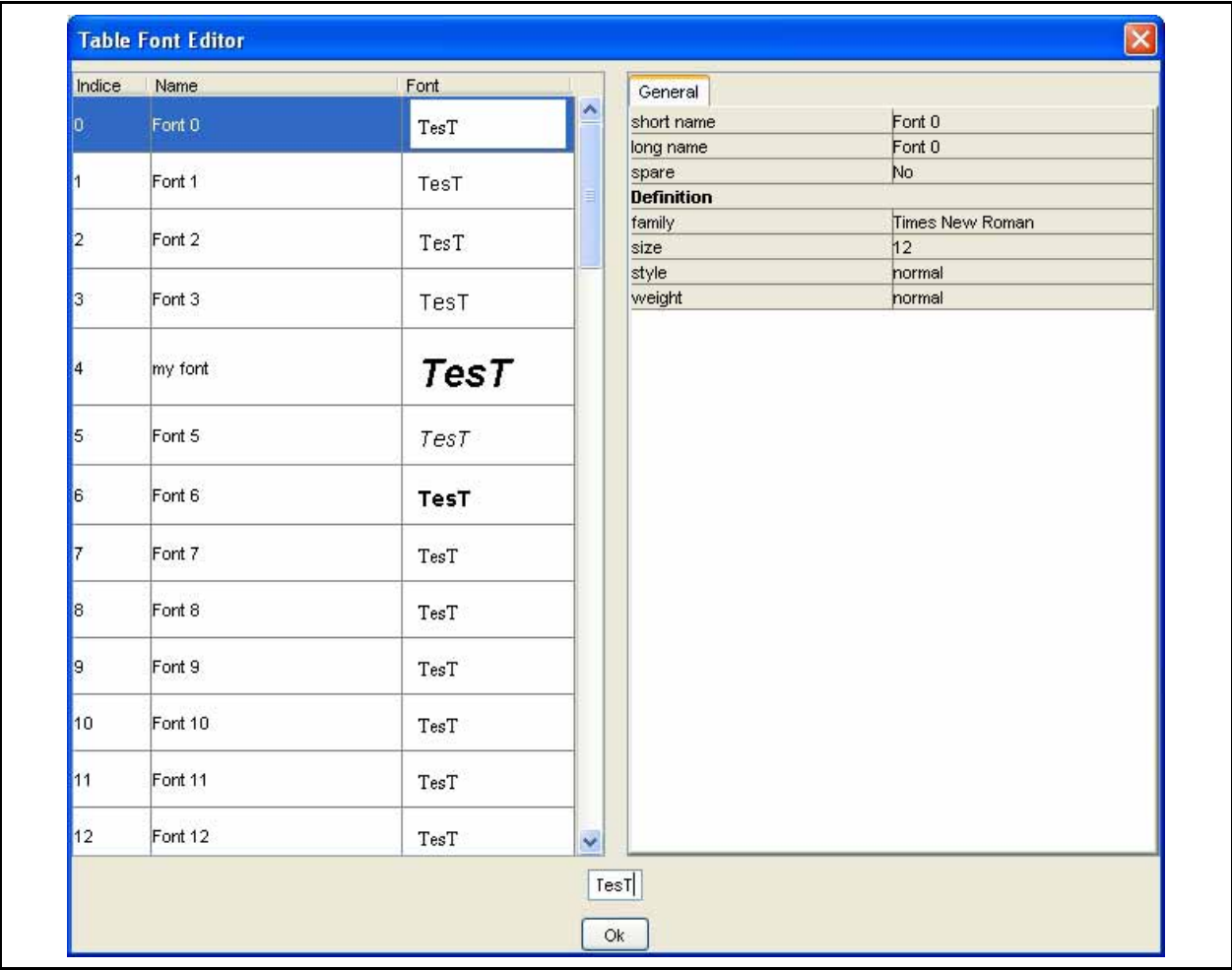


FIGURE 125 - FONT TESTING

4.4.1.3 Graphic/Stroke editor

Purpose:

- A stroke editor helps to define **stroke palette: 64 strokes**. The 5 first strokes are predefined and can not be modified. Specific stroke palette can be set also as template in order to reuse it with several configurations. Each stroke of the palette is identified by a number.

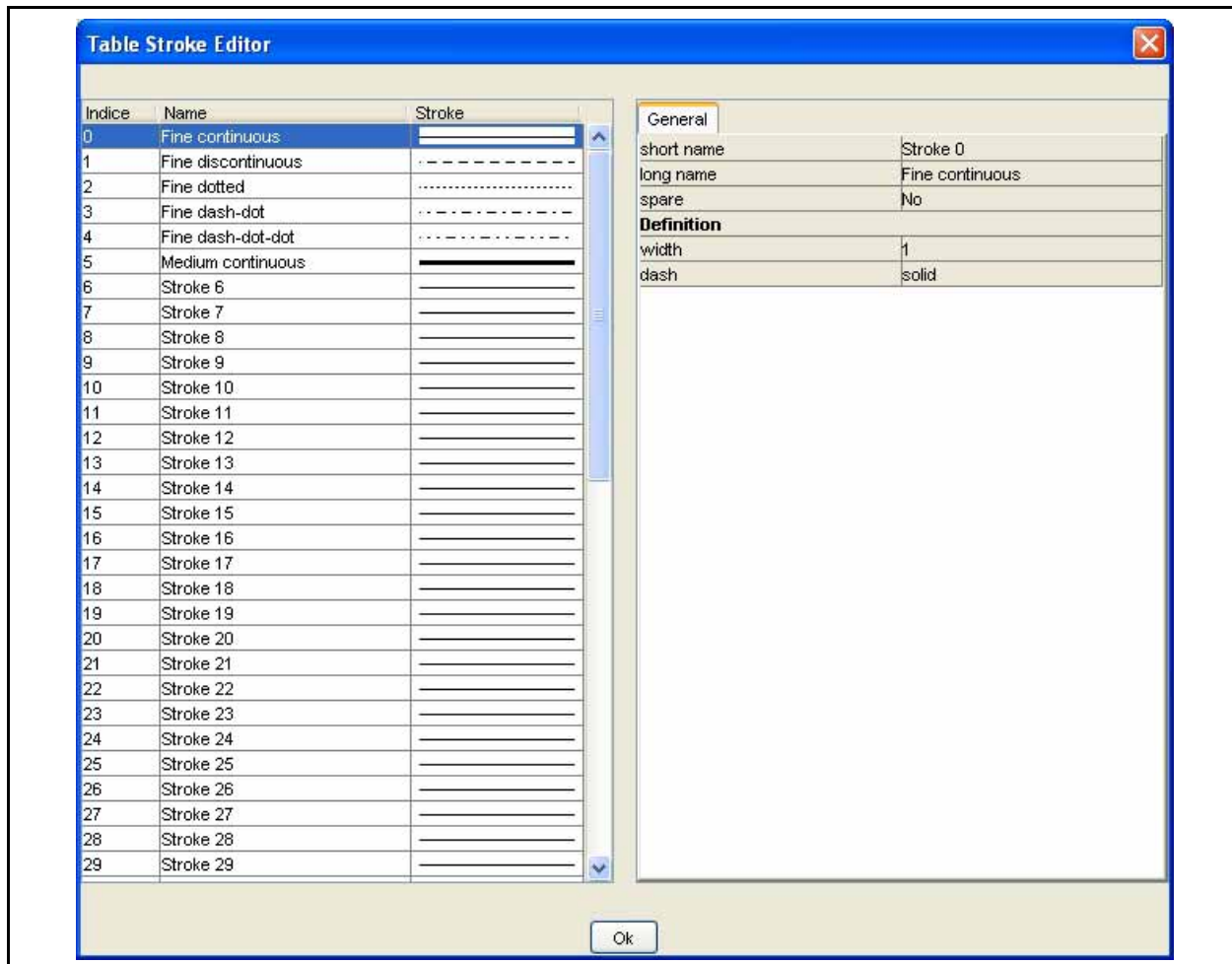


FIGURE 126 - GRAPHIC/STROKE EDITOR

Availability:

- Always

Other call:

- Select a graphical object with a stroke attribute and click on button . For example a circle and its stroke type attribute. The stroke editor allows to edit the palette and also to choose an already defined stroke. The index of stroke is displayed in the attribute editor between two parentheses.

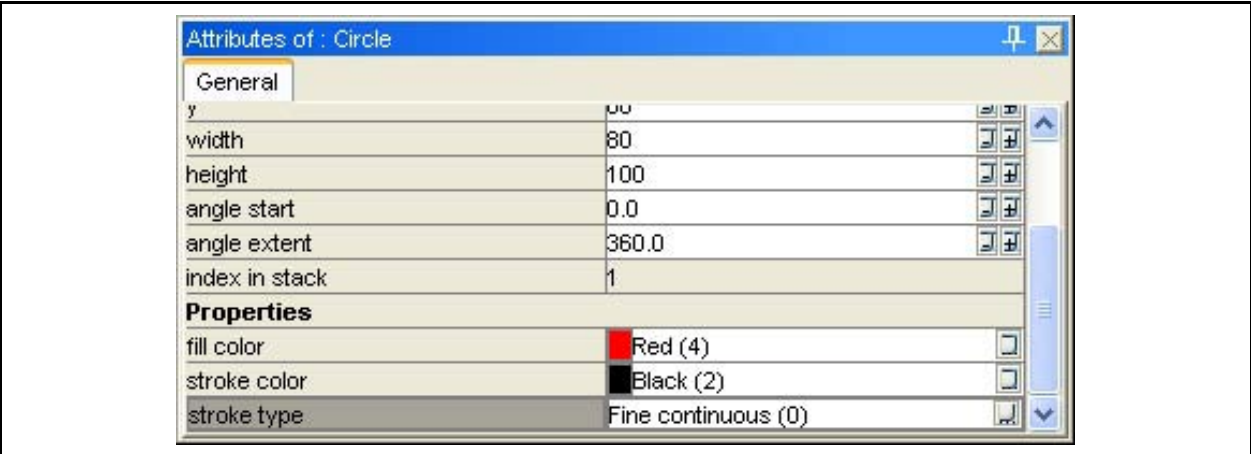


FIGURE 127 - STROKE ATTRIBUTE AND STROKE PALETTE

Operation:

- 1. Launch stroke editor from menu graphic
- 2. Select the stroke to modify (since 4)

Modify the different attributes of the stroke at the right part of the table. This part contains the definition of the selected stroke at the left part: long name, width, and dash. The graphical representation of the stroke is updated at the left part:

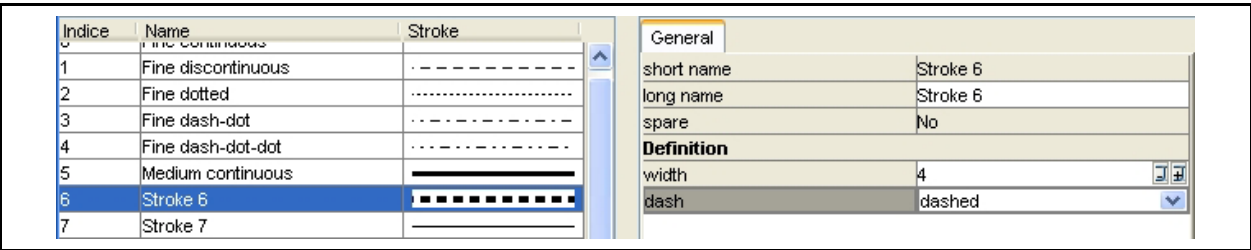


FIGURE 128 - STROKE DEFINITION

4.4.1.4 Bitmap table and bitmap editor

Purpose:

- **The bitmap table** is a bitmap palette. It contains **150 bitmaps maximum**. Each bitmap is identified by a number, its identifier. Bitmap is used during Computer mimic definition, with this unique reference (see Computer mimic section).

There is no specific editor to edit bitmap table: use navigator and attribute editor to edit it. The data model of this palette is the same than the three other palettes. Bitmap table is an object of Graphical tables of Graphical views. Each bitmap is a component of bitmap table. So for adding a bitmap, use object entry and for deleting one, use edit/delete menu item.

A **good practise** is to **name the bitmap with identifier as a prefix**.

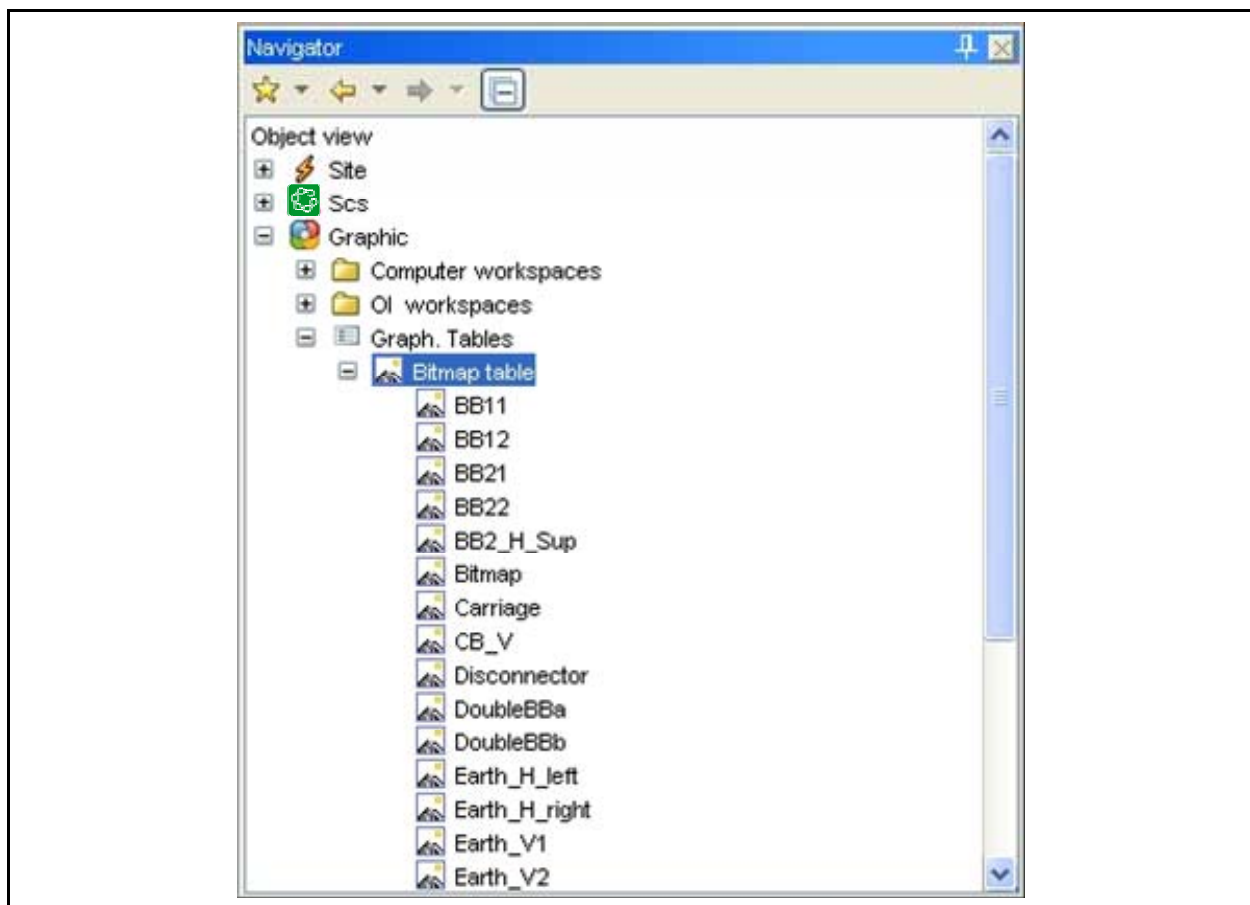


FIGURE 129 - BITMAP PALETTE THROUGH NAVIGATOR

- **A bitmap** is implemented in PACiS SCE by one or several files with *.png format.

A **bitmap file** is stored into the configuration database (.mpl or .mpc).

A bitmap file could be imported with another format (.jpg, .jpeg, .gif or .png) but it is always transcribed into .png format.

A bitmap could be a single bitmap or multiple bitmap.

Single bitmap is displayed in a mimic without any animation, only one file is necessary to define this kind of bitmap.

5-uple bitmap or multi-state bitmap is used to represent an object with different states: a bitmap file by state. A specific multi-state bitmap is defined with 5 pre-defined states: default, open, closed, withdrawn open, withdrawn closed.

The bitmap file can be edited by an external tools and import it. It can be also edited inside PACiS SCE with a **bitmap editor**.

Availability:

- Always

Operation:

1. Select the bitmap through the navigator. After this selection, a bitmap editor is displayed in graphic area to edit it. It displays the default bitmap file.

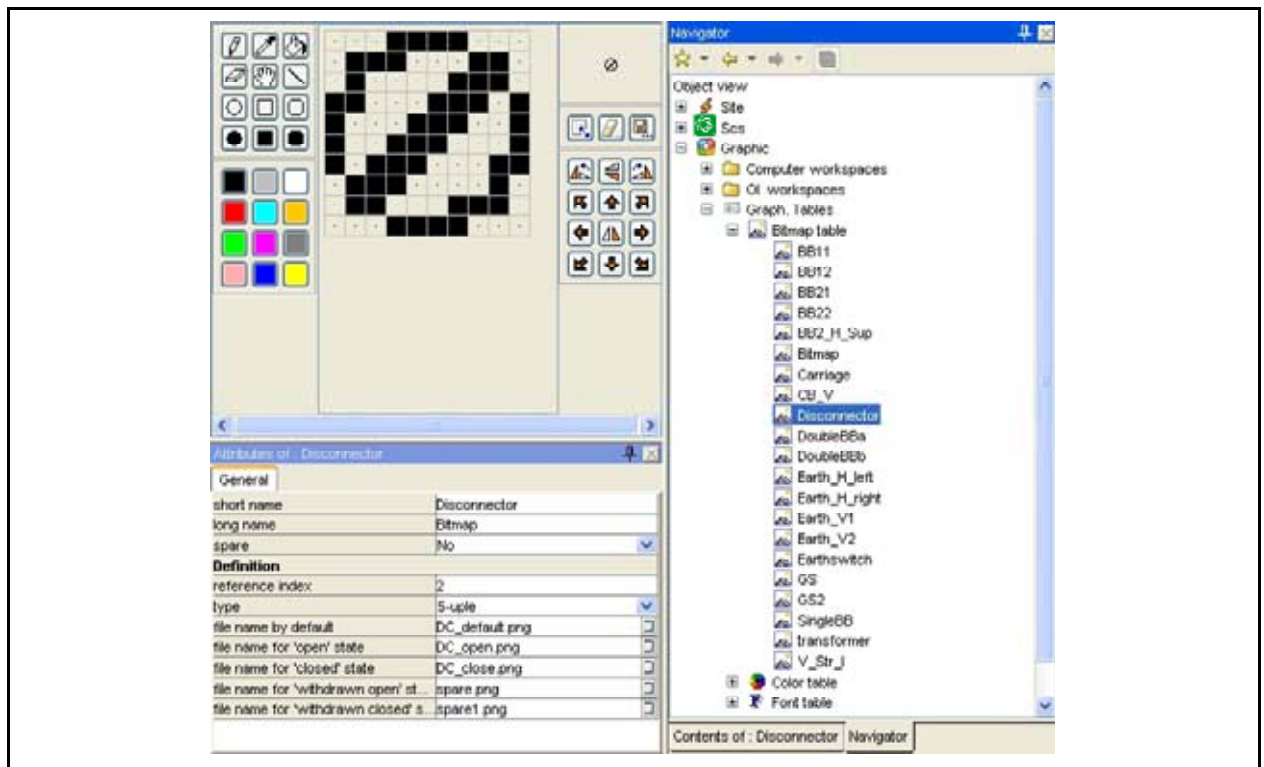


FIGURE 130 - 5-UPLE BITMAP SELECTION

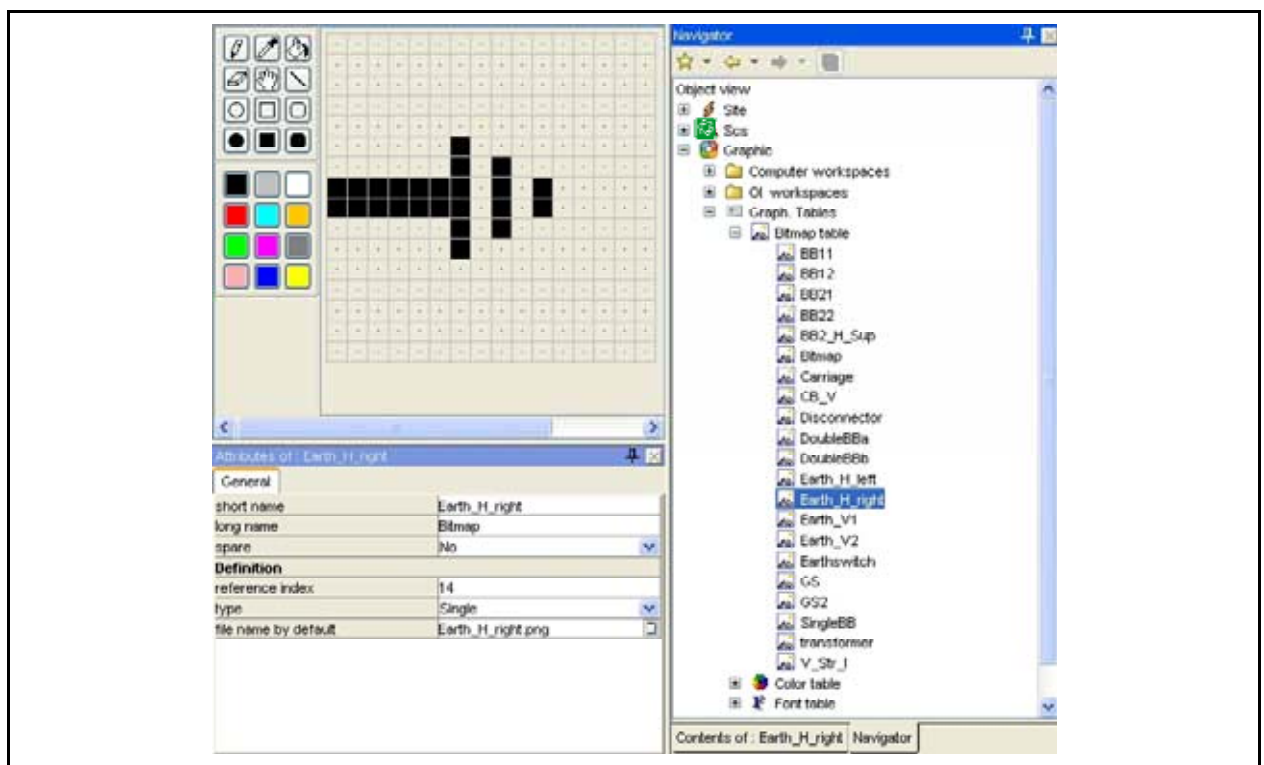


FIGURE 131 - SINGLE BITMAP SELECTION

2. Select the bitmap file to modify from Attribute editor. It is not necessary for Single bitmap because only one file can be edited for this kind of bitmap.

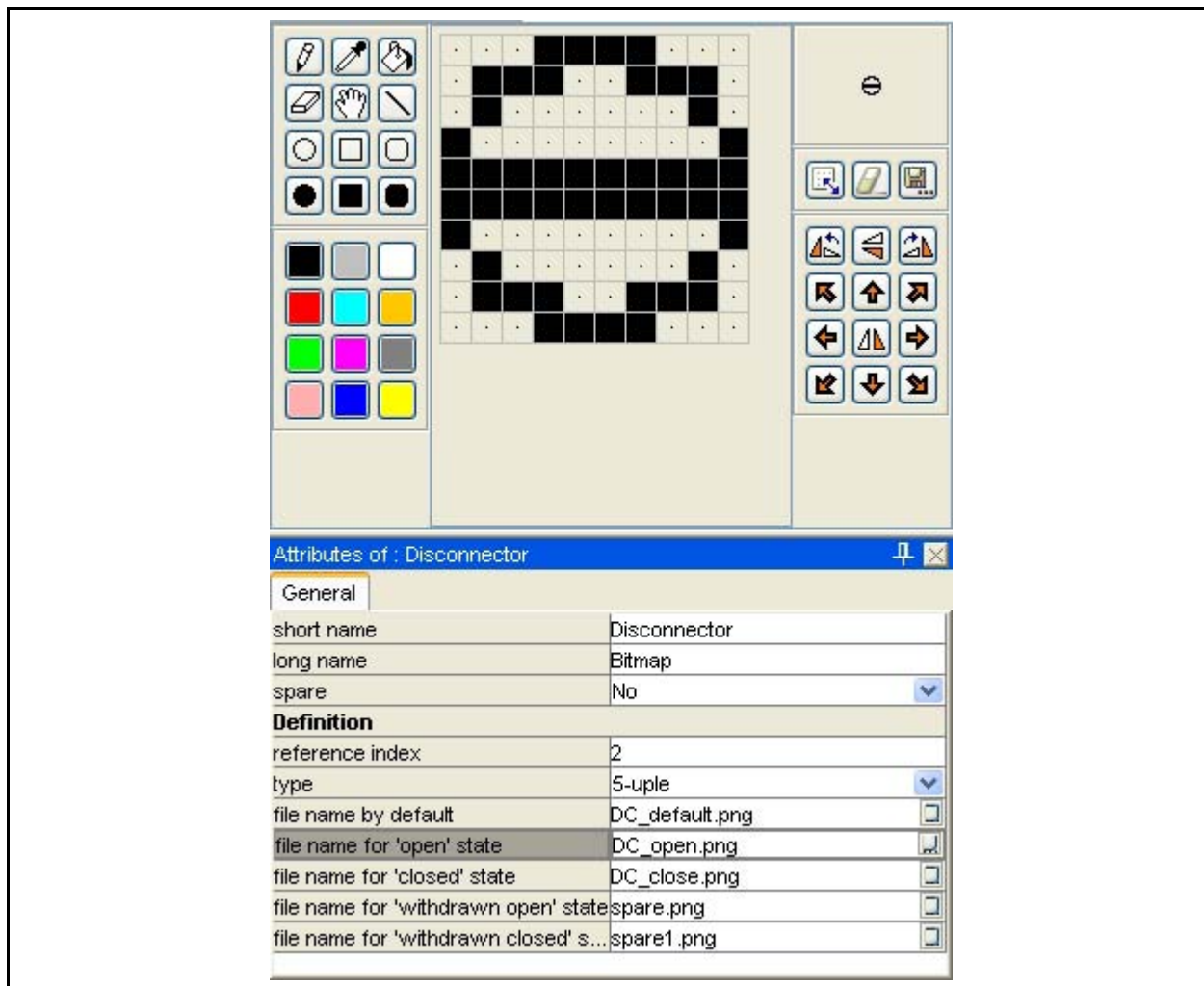


FIGURE 132 - BITMAP FILE SELECTION FOR 5-UPLE BITMAP

1. After its creation, bitmap file name is not filled:
 - You can define it with using of bitmap editor(see below),
 - Or import it through a file chooser: click the button . A file chooser appears: the bitmap files library is displayed. This library is local to the current configuration: it is included in .mpc file. You can choose among them a file or choose another directory and a bitmap file to import.  button allows to return to the local bitmap files library.

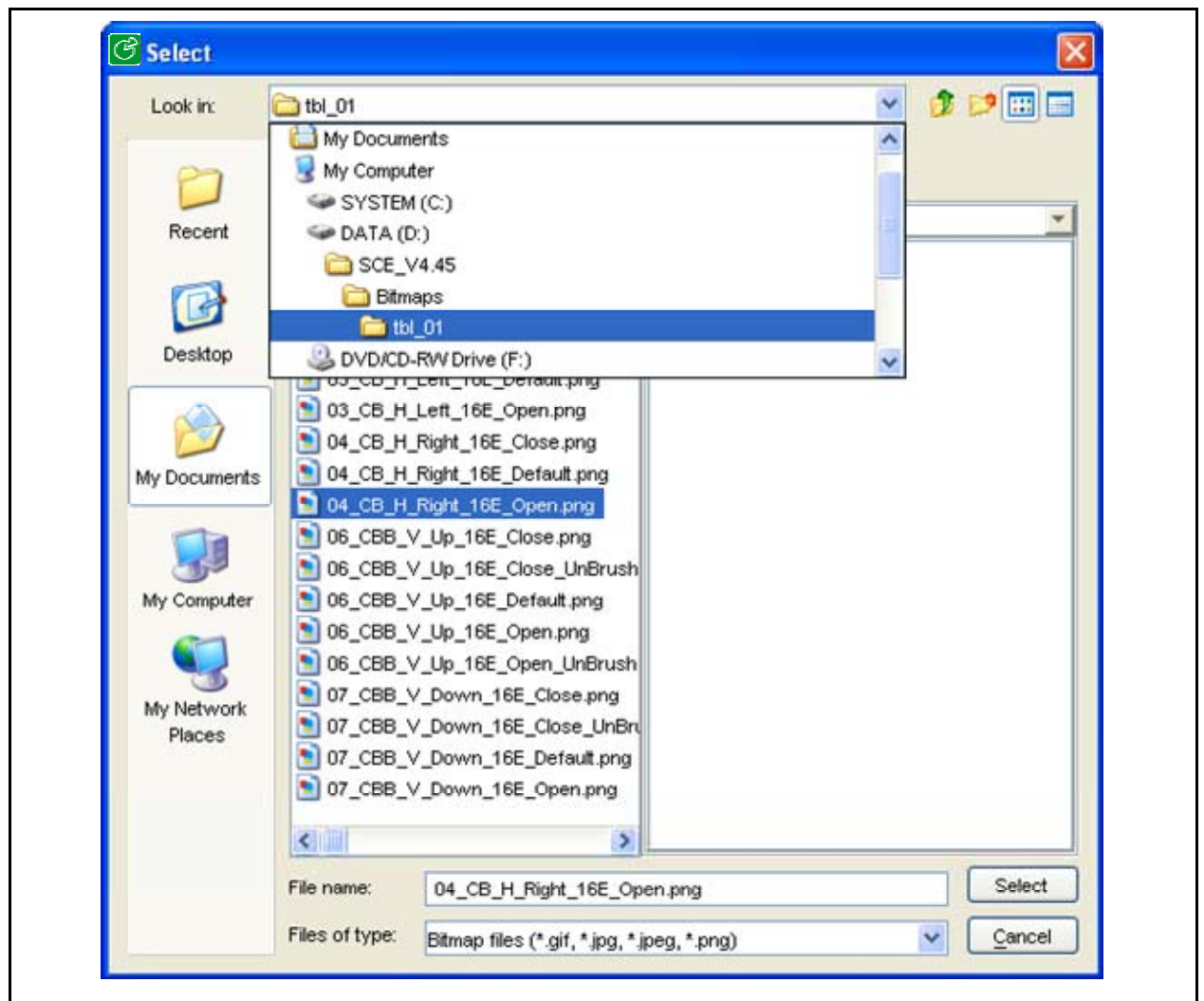


FIGURE 133: BITMAP FILE CHOOSER

2. **Edit** the selected bitmap file **with bitmap editor**. It is a standard pixel editor. It is composed of three parts:

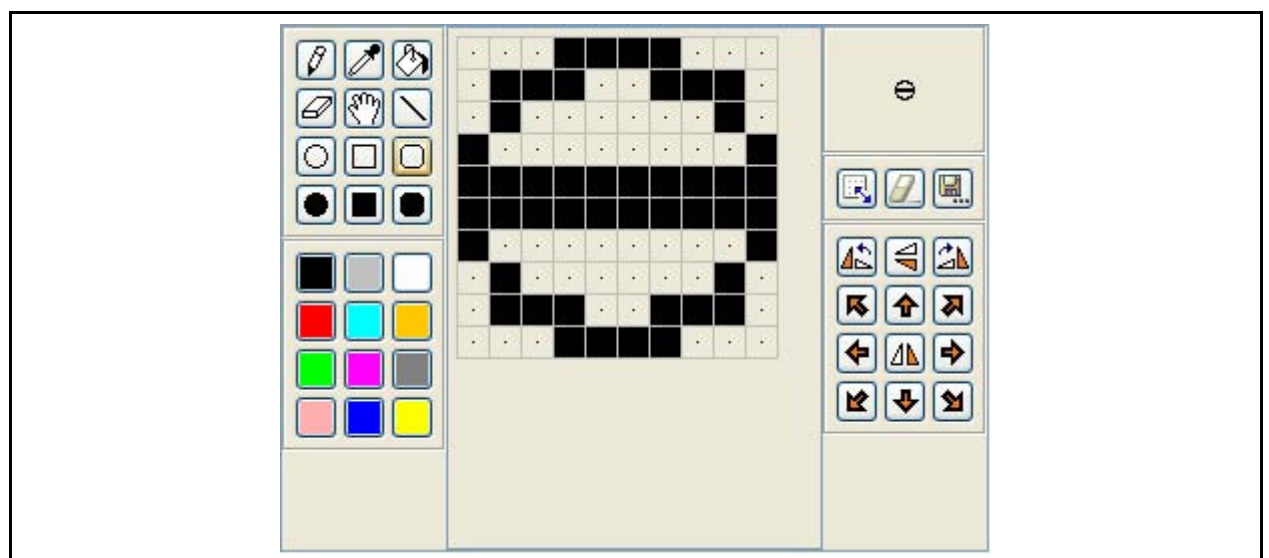


FIGURE 134 - BITMAP EDITOR

- **left part** contents the draws tools (pencil, dropper, paint, eraser, and hand to move), the predefined shapes (line, oval, rectangle, rounded rectangle and full oval, full rectangle, full rounded rectangle) and the specific colour palette.

Note: The edited bitmaps are used in computer bay mimics displayed on MiCOM C264 front panel HMI.. Otherwise, the MiCOM C264 front panel HMI is **black & white**. So the specific colour palette of bitmap editor is not useful for its actual application.

- **central part** contents the pixel editor or pixel view.
- **right part** contents the bitmap pre-viewer, the general function (resize view, erase view, save as action) and then handling tools to rotate, move or flip the current bitmap.

3. Available operations with bitmap editor:

Objective	Operations
Modify the colour of one or several pixels at the same time	select one paint tool ( or ) in the tool box on the left, select a colour in the palette on the left. click on the pixel or on a bitmap area to change the colour.
Erase the pixel colour	select the eraser tool () in the tool box on the left, in the pixel view, press the mouse button, drag the mouse to erase the desired pixels, and release the mouse button.
Draw a predefined shape	select one shape tool (, , , , , , ) in the tool box on the left, in the pixel view, press the mouse button, drag the mouse until the desired dimension, and release the mouse button.
Move the bitmap	select the hand tool () in the tool box on the left, in the pixel view, presses the mouse button, drag the mouse until the desired position, and release the mouse button.
Move the bitmap pixel by pixel	click on one arrow (, , , , , , , ) in the tool box on the right.
Rotate the bitmap	click on one rotation button ( or ) in the tool box on the right
Flip the bitmap	click on one flip button ( or ) in the tool box on the right
Resize the bitmap	click on the resize button () in the main tool box on the right. A dialog box appears and the user can modify the width and/or the height of the bitmap. If the user validates these modifications, then the bitmap is resized.
Erase the bitmap	click on the erase View button () in the main tool box on the right. a confirmation dialog box appears. If the user validates its choice, then the bitmap is erased but the physical file if it exists, isn't removed from hard disk.
Save the bitmap	The save of the modified bitmap is run automatically when one among following actions is done: - select an other attribute, - select an other object, - switch the mode, - close the configuration database, - exit of PACiS SCE. If the attribute of the modified bitmap is without value, then a dialog box appears and asks the file name. The user clicks on OK and the save is done with this name if this name isn't already use, else the name is incremented automatically (For example: open *.png becomes open1.png).
Save the bitmap with an other file name	click on the Save As button () in the main tool box on the right. A dialog box appears and asks the new file name. The user clicks on OK and the save is done with this new name, if it isn't already used, else the name is incremented automatically (For example: open *.png becomes open1.png). A new bitmap file is created. There is no specific constraint on the file name. The user can also click on the Cancel button in order to cancel his action and in this case nothing is done.

4.4.2 OI mimic

As all objects, the OI Mimic graphic objects can be manipulated from the **Navigator** and **Attribute Editor**. Nevertheless, the **OI Mimic Editor** is helpful to create graphic objects, by showing a graphical representation of the objects. The OI Mimic menus items allow to create and modify OI Mimic objects through OI Mimic Editor.

Before a full description of these items, a brief description of OI mimic editor:

- **View and specific toolbar**

The OI mimic is displayed in the graphical area. A specific toolbar can be displayed with window/OI mimic toolbar item. This toolbar contains some OI mimic item shortcuts.

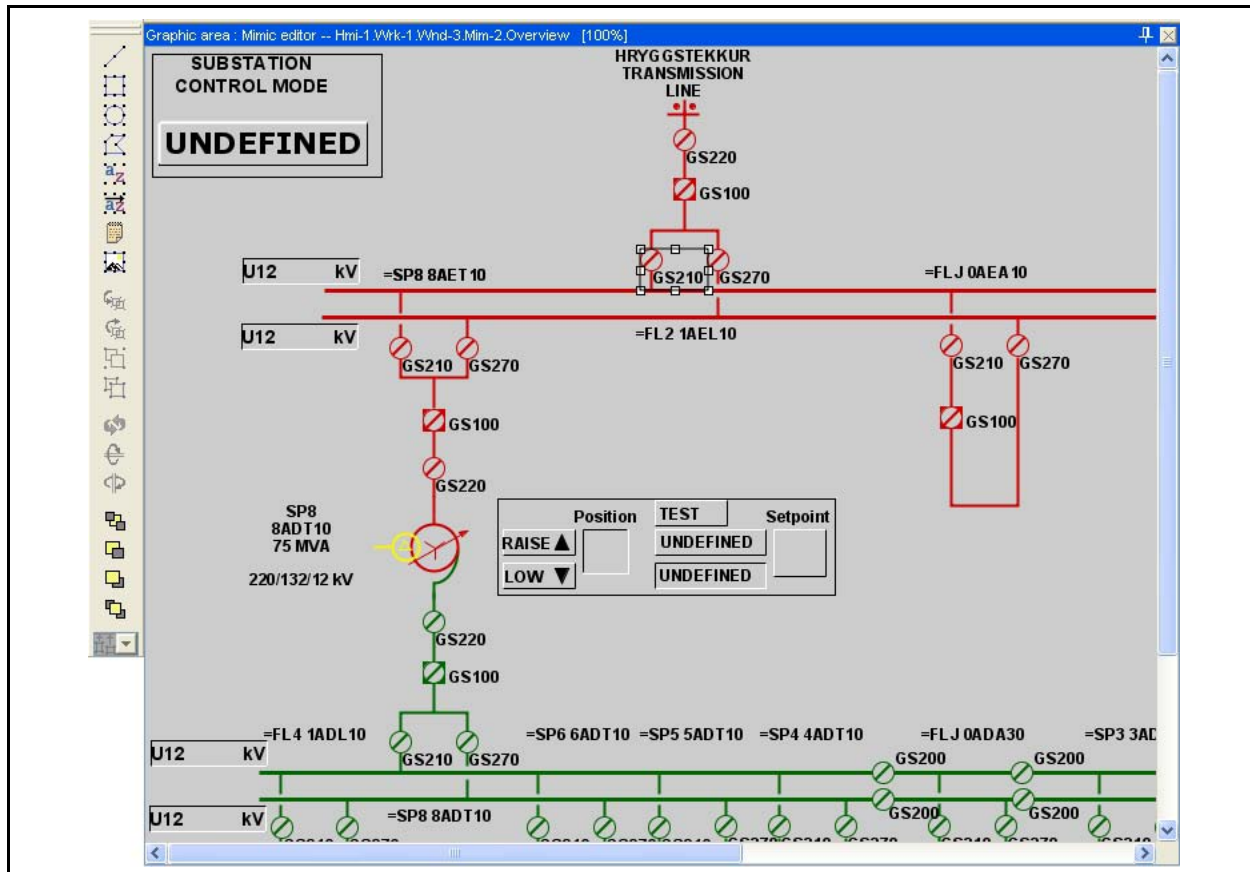


FIGURE 135 - OI MIMIC EDITOR AND ITS TOOLBAR

- **Content**

The content of OI Mimic depends on the selected object in the Navigator.

- If the selected object is a mimic or a component of a mimic, the OI Mimic Editor contains the graphical representation of the mimic.
- otherwise, the graphic area is empty.

The Navigator and the OI Mimic Editor are linked together: any modification done in the OI Mimic Editor is also visible in the Navigator and/or in the Attributes Editor. Reversibly, any modification done in the Navigator or in the Attributes Editor is also visible in the OI Mimic Editor (if the modification has a graphical effect).

- **Selection**

The selected object in the OI Mimic Editor depends on the selected object in the Navigator. More precisely:

- If the selected object is a mimic, no object is selected in the OI Mimic Editor.
- If the selected object belongs to a group or a multistate, the corresponding group or multistate is selected in the OI Mimic Editor.
- If the selected object is a feature (as animation, action, ...), the owner object is selected in the OI Mimic Editor.

Multi-selection is available with a key-sequence: shift / left mouse click.

Unselect an object in a multi-selection is available with the same key-sequence: shift / left mouse click.

- **List of items**

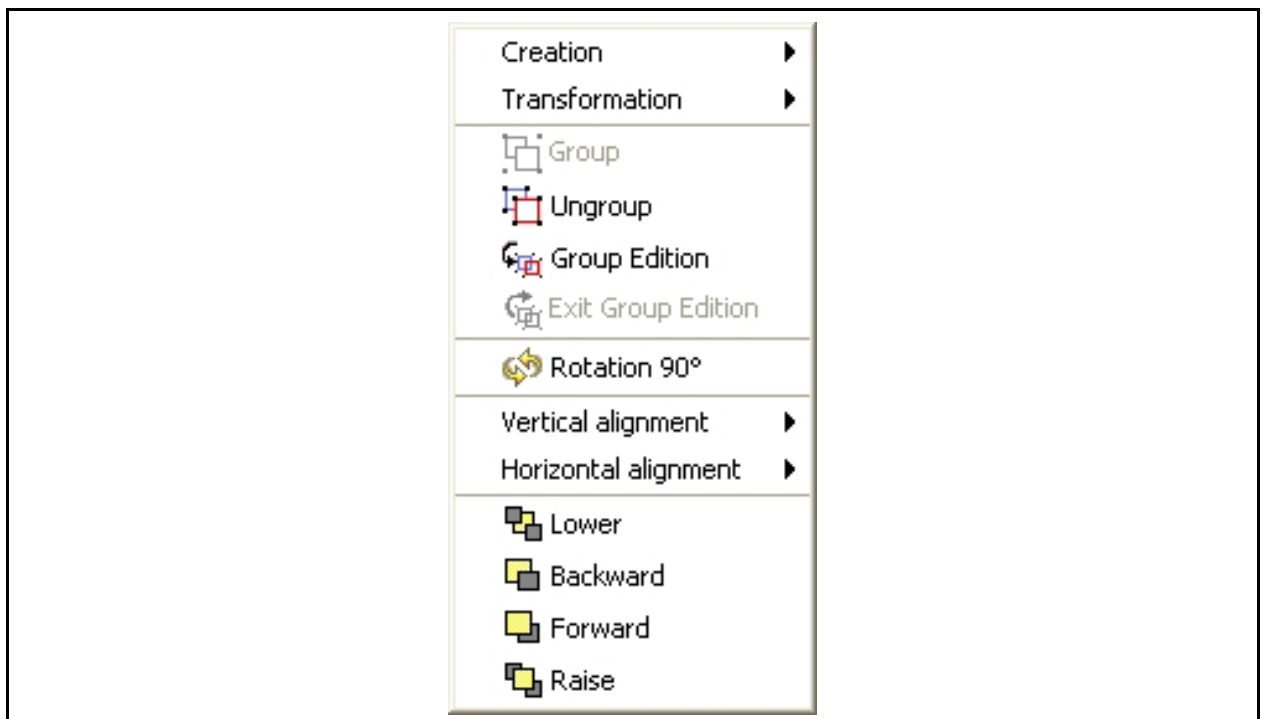


FIGURE 136 - GRAPHIC/OI MIMIC ITEMS

Hereafter, a full description of theses items with this classification:

- creation,
- transformation and rotation,
- group management,
- alignment,
- layer management.

4.4.2.1 Graphic/Creation sub-menu

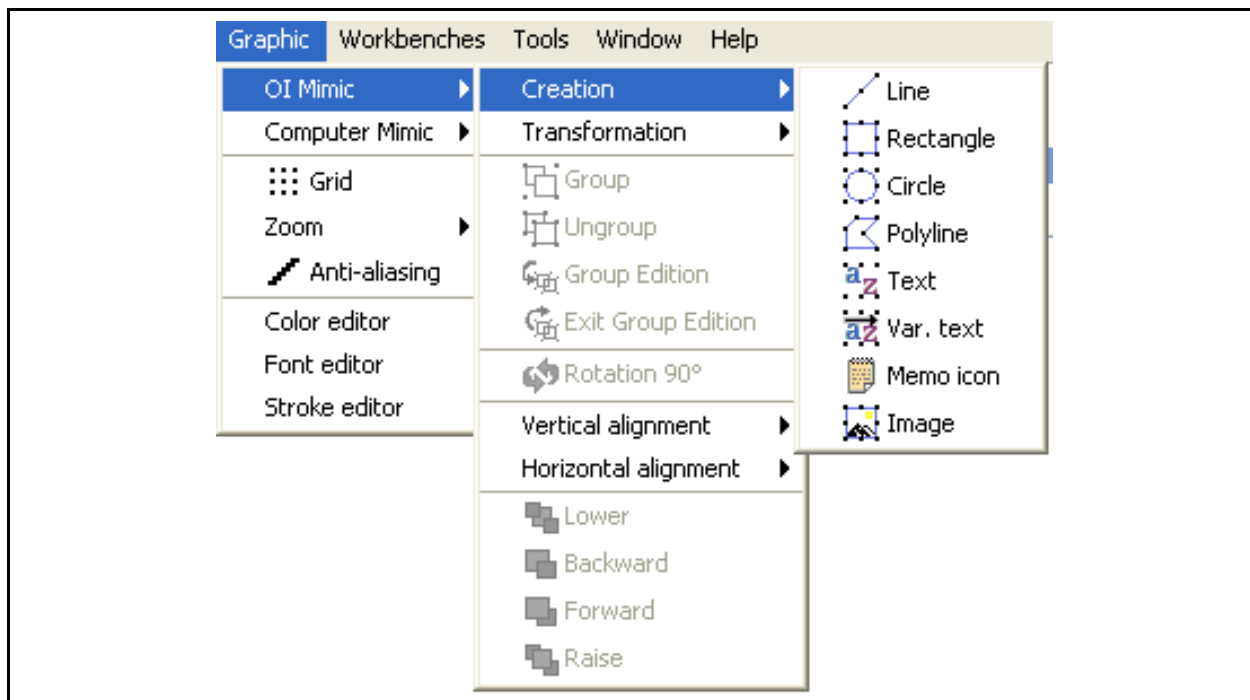


FIGURE 137: GRAPHIC/OI MIMIC/CREATION ITEMS

Purpose:

- Create a basic graphic object. Creation is interactive: the position and the size of created object are given by the user with mouse. The new object is added at bottom of navigator parent object list.

Availability:

- When a graphic object or a mimic is selected from navigator or from Mimic viewer.

Other call:

- OI Mimic toolbar.
- Object entry area: select the type of object to add. This way is not interactive. The object is created with default values at the upper left corner. If an object already exists at this position, the new object position is translated below the existing object(s).

List of available basic objects:

	Line	
	Rectangle	
	Circle	
	Polyline	
	Text	Text field
	Var. Text	Variable text: the content of this text field is defined on run-time. This kind of object can be linked to a datapoint, and the text is then the current value/state of this datapoint.
	Memo icon	The icon is animated by memo messages entered on run-time at PACiS OI. This creation is not interactive: the new memo icon is created at the upper left corner.
	Image	Insert picture/Photo from file

Operation:

1. Select Parent graphic object: a mimic or another graphic object.

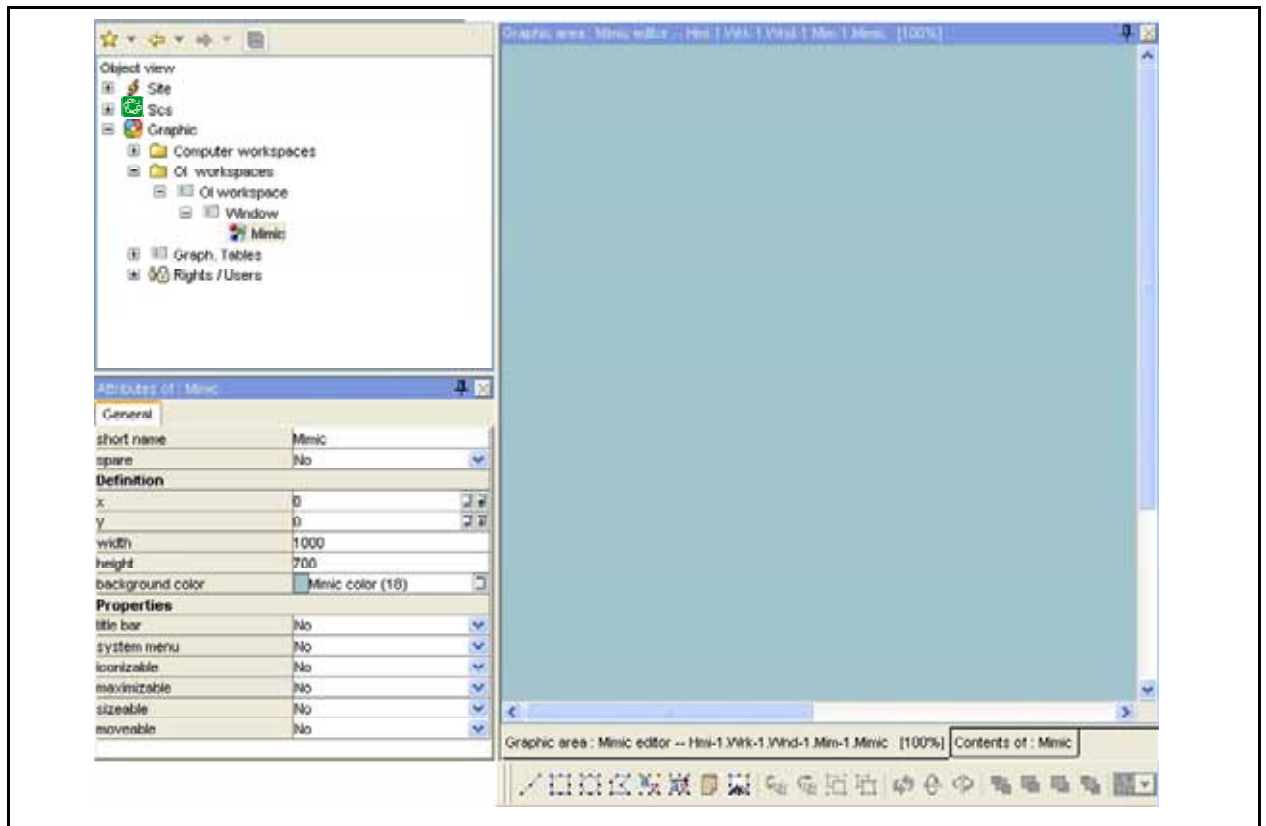


FIGURE 138 - OI MIMIC INTERACTIVE CREATION

2. Select the type of object to create (line in example).
3. A cross cursor appears in OI Mimic editor: press the mouse button at the desired position, drag the mouse until the desired dimension, and release the mouse button. The line is created at the given position with the given size.
4. The object Line appears in navigator below its parent.
5. Attribute editor is updated with the attributes of the new object. Object attributes can be adjusted. For a line, its position, stroke type or stroke color.

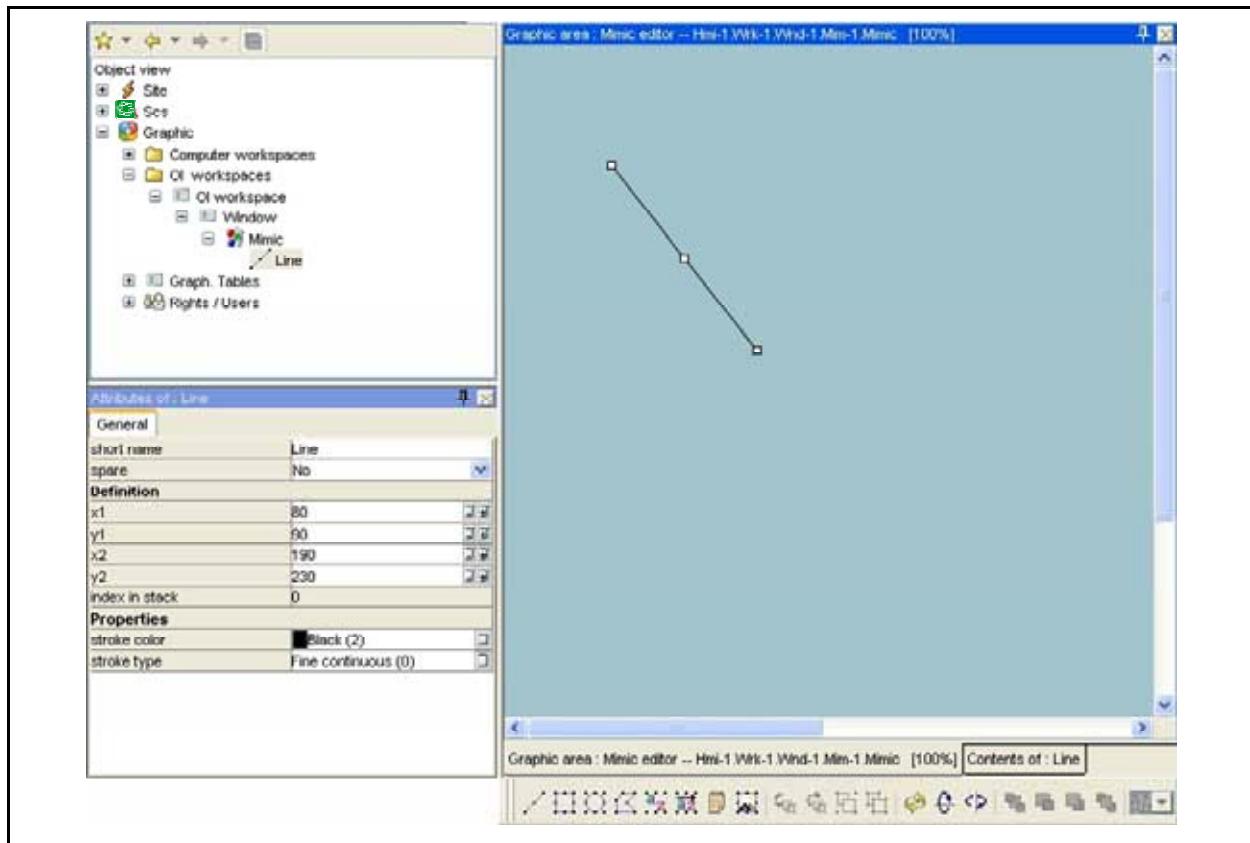


FIGURE 139 - OI MIMIC INTERACTIVE CREATION RESULT

4.4.2.2 Graphic/Transformation sub-menu and Rotation item

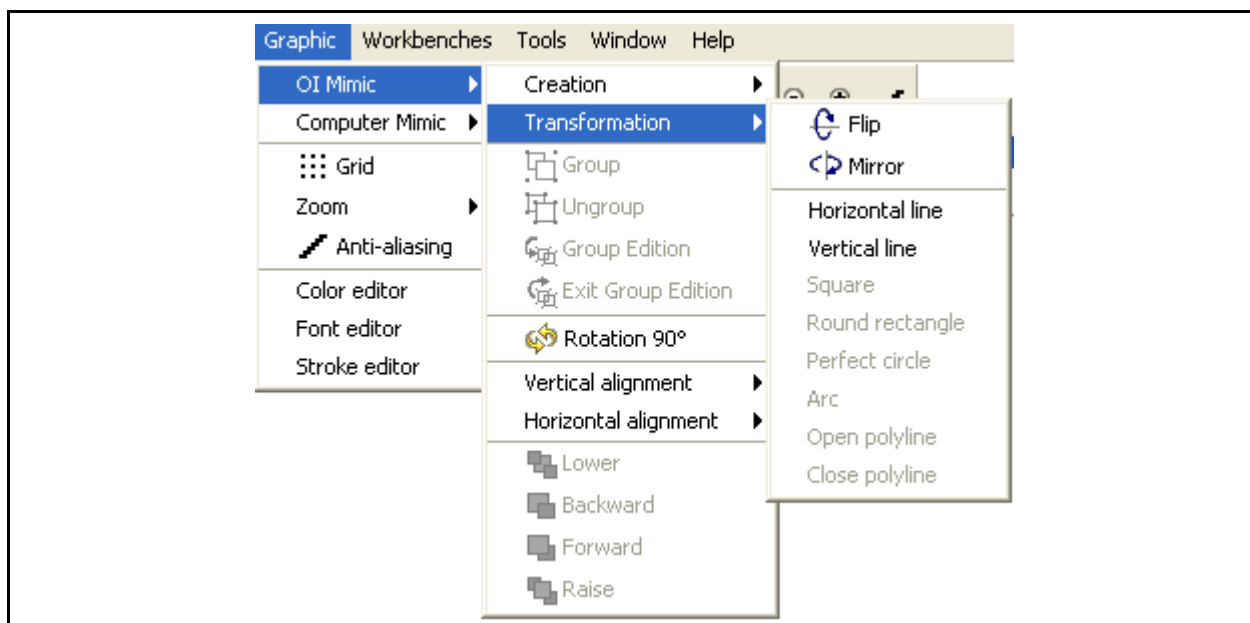


FIGURE 140: GRAPHIC/OI MIMIC/TRANSFORMATION SUB-MENU

Purpose:

- Transform a graphic object:

	Flip	Symmetry upon horizontal axis
	Mirror	Symmetry upon vertical axis
	Horizontal Line	Projection of line on Vertical axis
	Vertical Line	Projection of line on Horizontal axis
	Square	Rectangle is forced to be perfect square
	Round rectangle	Rectangle corner is rounded
	Perfect Circle	Circle is forced to be perfect circle
	Arc	Circle arc is forced to be semi-arc
	Open polyline	Linear segment between last and first polyline point is not drawn
	Close polyline	Linear segment between last and first polyline is drawn
	Rotate 90°	Rotate from 90° the selected object, left direction. Any basic graphic object could be rotated except text, var.text and Image objects.

In **bold**, the type of object for which the transformation is applied.

Availability:

- Depending on the selected element.

Other call:

- OI Mimic Toolbar for Flip, Mirror or Rotate 90°
- Contextual menu of the selected graphic object to transform. For example:

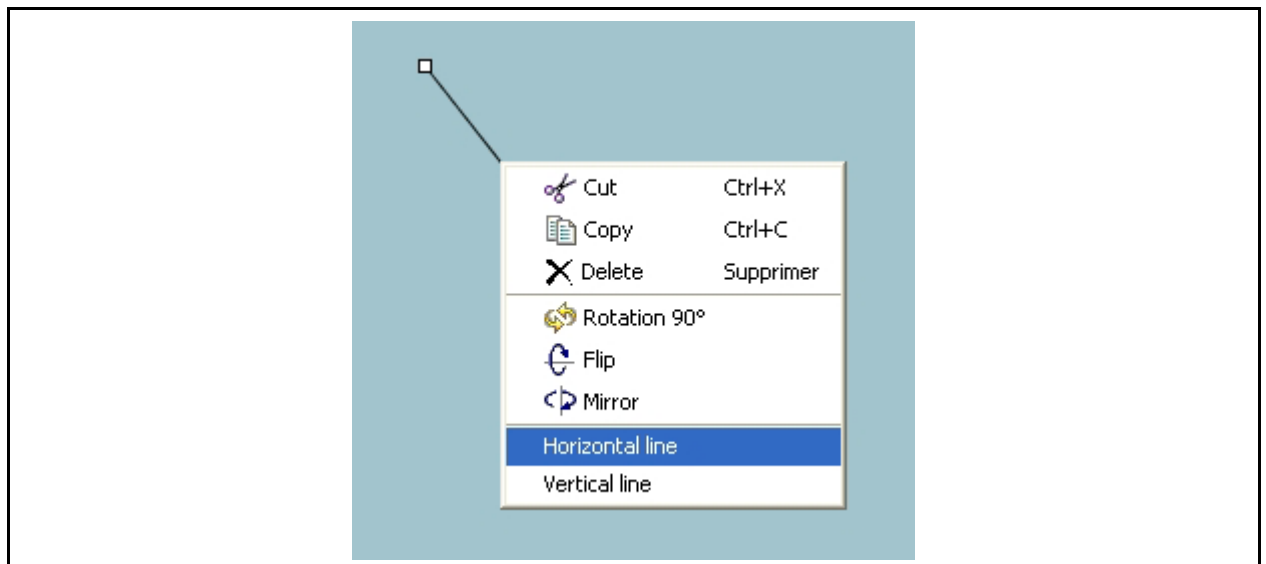


FIGURE 141 - OI MIMIC TRANSFORMATION CALL

Operation:

1. Select the graphic object to transform.
2. Select the available transformation for this kind of object. See the description table. In bold, the good type of object for the transformation.
3. The transformation is applied to the selected object. Its graphical representation is updated. For example for the previous line and Horizontal line transformation:

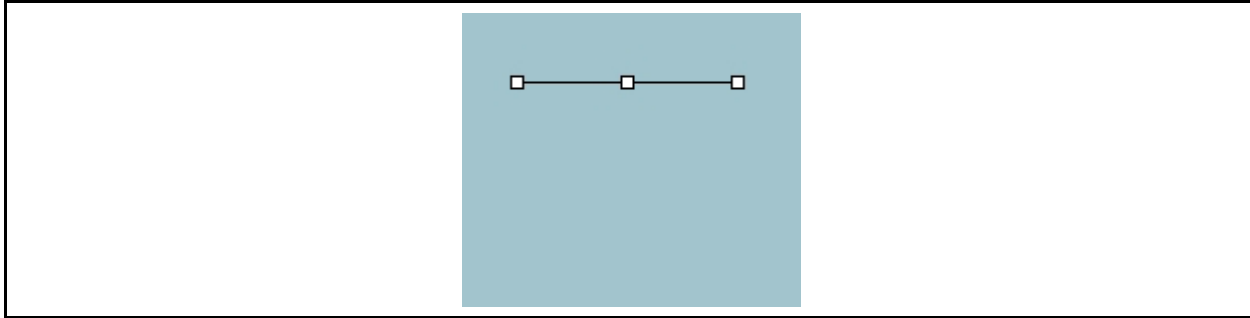


FIGURE 142 - OI MIMIC TRANSFORMATION RESULT

4.4.2.3 Graphic/Group sub-menu



FIGURE 143 - GRAPHIC/OI MIMIC/GROUP ITEMS

Purpose:

- Manage groups of graphic objects.
A group is a **container of graphic objects**. A graphic object could be also a group. So, you can have a group of group, recursively...
A group can be handled as a basic graphic object: move, resize, cut, copy, paste, etc.

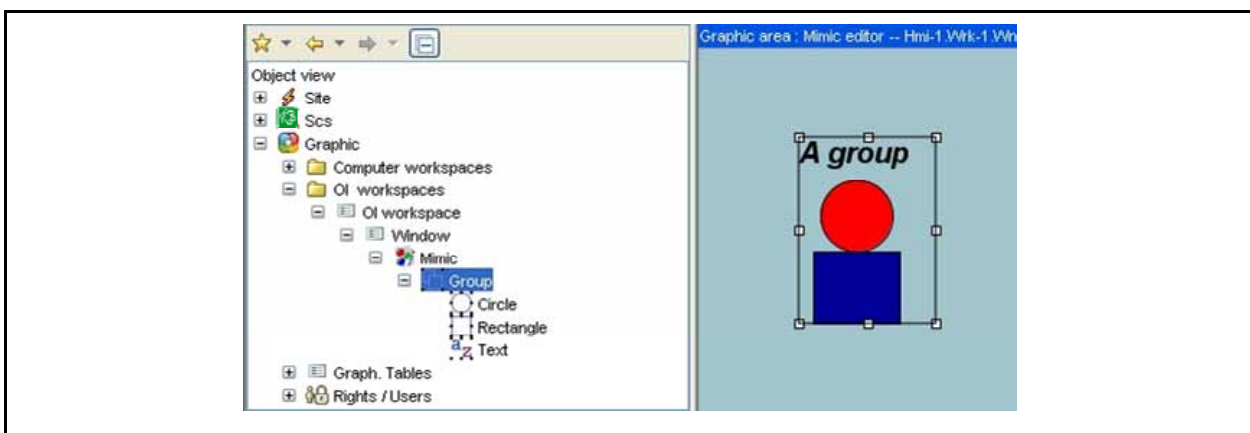


FIGURE 144 - A GROUP IN NAVIGATOR AND OI MIMIC VIEWER

- A specialised group has been defined for PACiS SCE application: a multiState. A **multiState** is a **group of symbols**. Each symbol represents the state of a datapoint. A symbol could be a basic graphic object, a group or another multiState. A complete description of its application and its relations is done in chapter Application of equipment OI. The creation of a multiState is available only from Object entry area. It is not possible to ungroup a multiState.

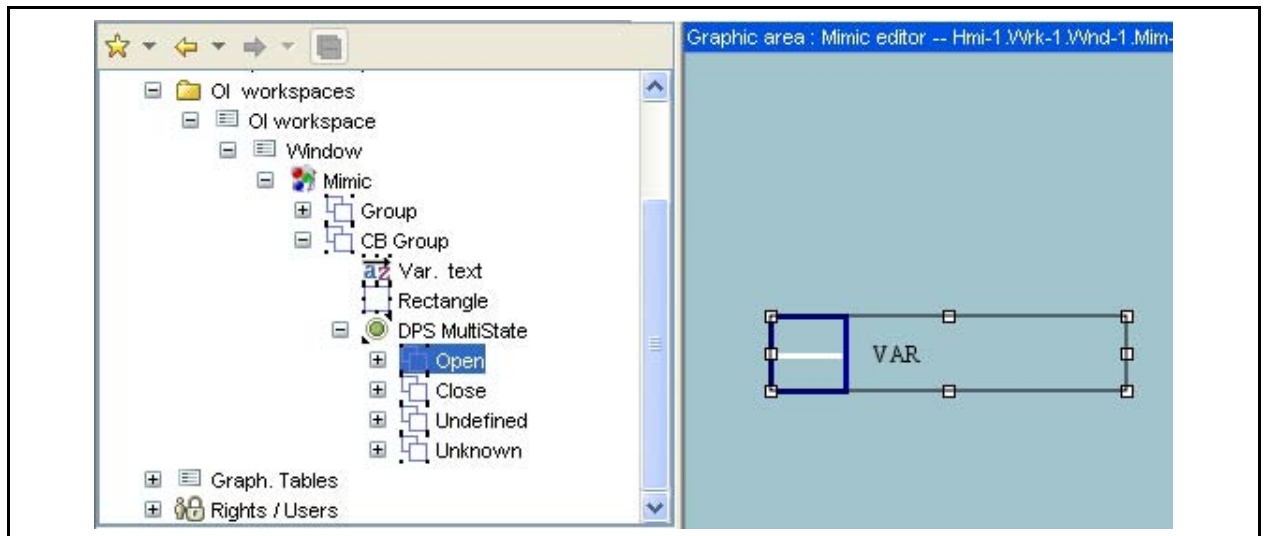


FIGURE 145 - A SPECIALISED GROUP: THE MULTISTATE

- When a group is selected, these components can not be edited individually: move, resize, etc. A special edition mode is available to edit the components of an existing group.

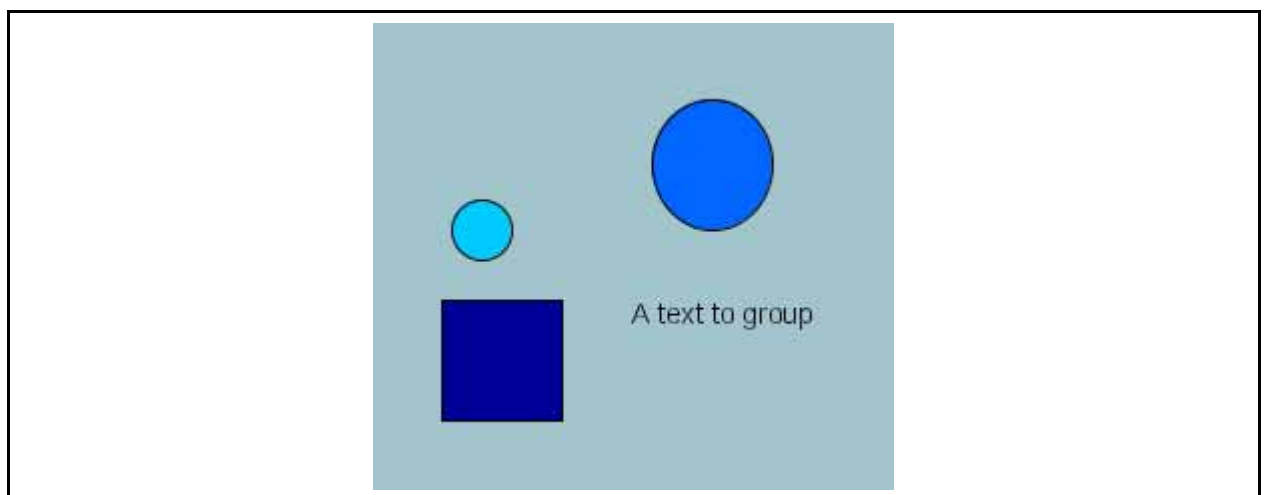


FIGURE 146 - GROUP EDITION

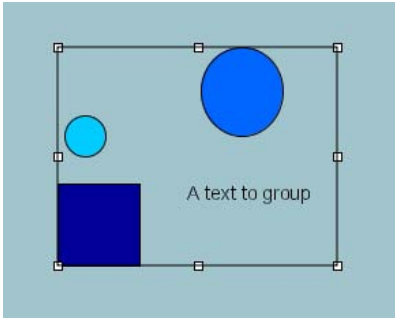
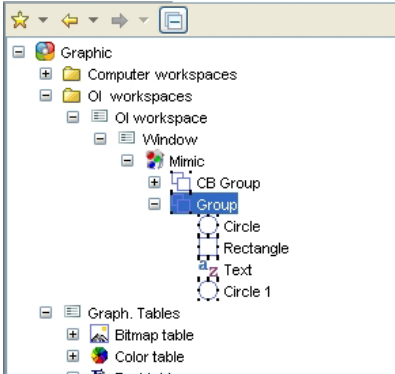
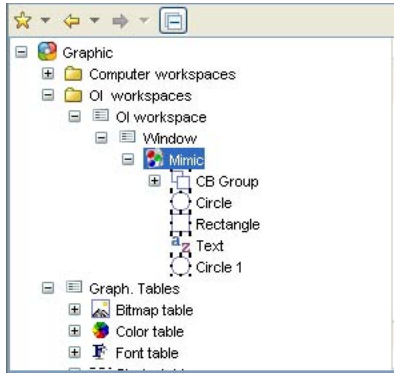
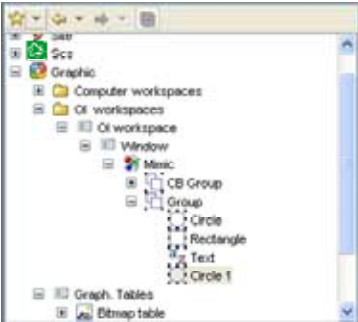
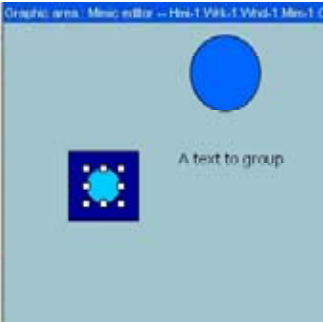
Availability:

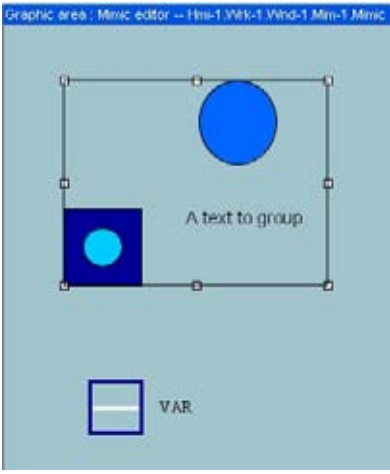
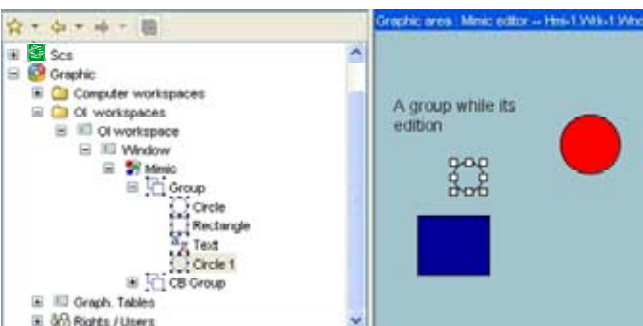
- Group: when at least two graphic objects are selected. Multi-selection is available with shift / left mouse click.
- Ungroup: when a group is selected. This item is not enabled for MultiState.
- Group edition: when a group or a multiState is selected. The selected object can be an inner group: a group of group. In this last case, the selection must be done with navigator; OI mimic viewer represents only first level group.
- Exit group edition: when a group or a multiState is going to edit.

Other call:

- OI Mimic ToolBar.
- Contextual menu when a group is selected (right click): ungroup and group edition

Operation:

	Group	- select several graphic objects with mouse: shift / left mouse click  - select group item. A new group is created. The selected objects are moved under this new group. The mimic viewer and the navigator are updated.  
	Ungroup	- select a group - select ungroup item. The group is deleted. The objects of the group are moved at the same level as the deleted group.  

	Group edition	1. select a group or multiState. 2. select group edition item: the mimic viewer is cleared and is filled with the objects of the selected group or multiState. 3. edit and arrange all children of edited group or multiState: 
	Exit group edition	1. while group edition, select Exit group edition: the mimic viewer is cleared and filled with the whole mimic. The components of the group can not be edited yet: 

4.4.2.4 Graphic/ Alignment sub-menus

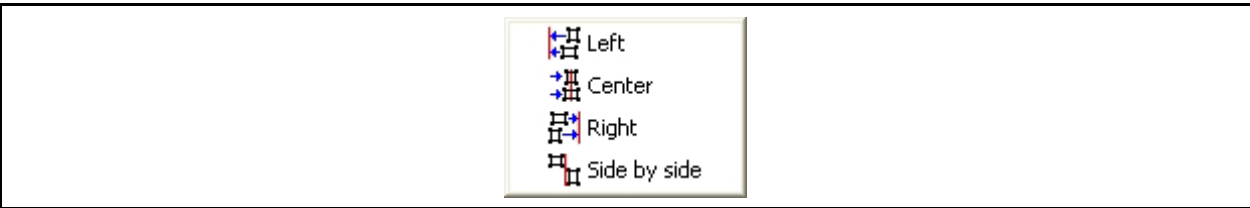


FIGURE 147 - GRAPHIC/OI MIMIC/VERTICAL ALIGNMENT ITEMS

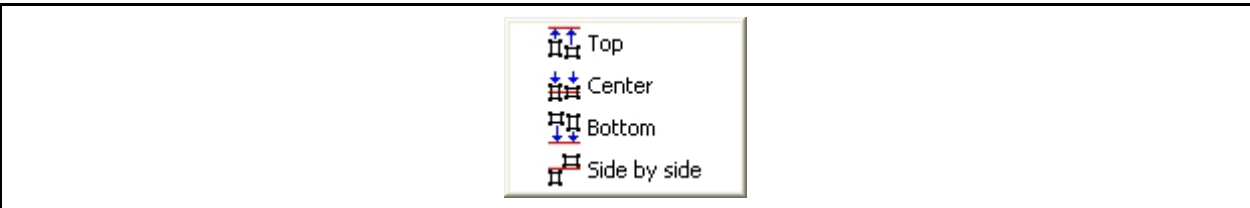


FIGURE 148 - GRAPHIC/OI MIMIC/HORIZONTAL ALIGNMENT ITEMS

Purpose:

- Align selected graphic objects

Availability:

- Two graphic objects must be selected at least in OI mimic viewer.

Other call:

- OI Mimic Toolbar

	Left	Align left selected objects
	Centre	Centre selected objects
	Right	Align right selected objects
	Side by side	Reorganise objects side by side
	Top	Align top selected objects
	Centre	Centre selected objects
	Bottom	Align top selected objects
	Side by side	Reorganise objects side by side

Operation:

1. Select the graphic objects to align, at least two objects. Multi-selection is available with shift / left mouse click.

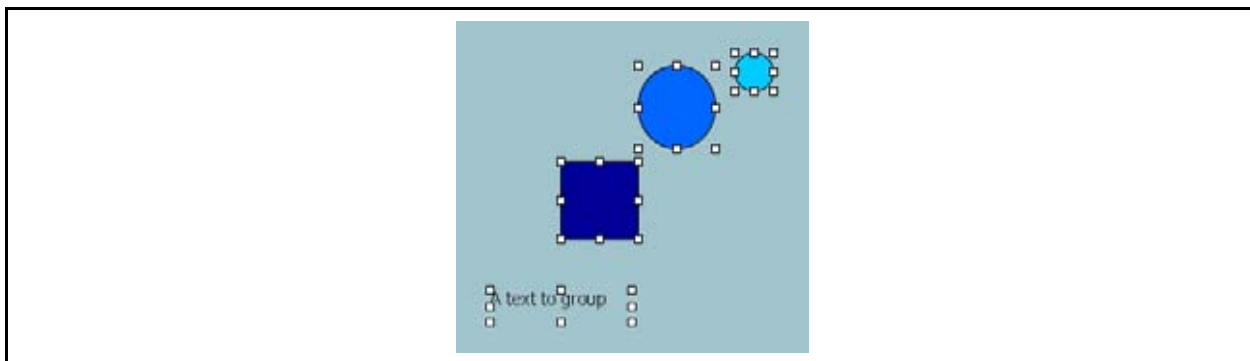


FIGURE 149 - OI MIMIC ALIGNMENT PREPARATION

2. Select the alignment rule to apply.
3. The alignment is applied to the selected objects. The position of each selected object is updated with the given rule. Their graphical representation is updated. For example, with :

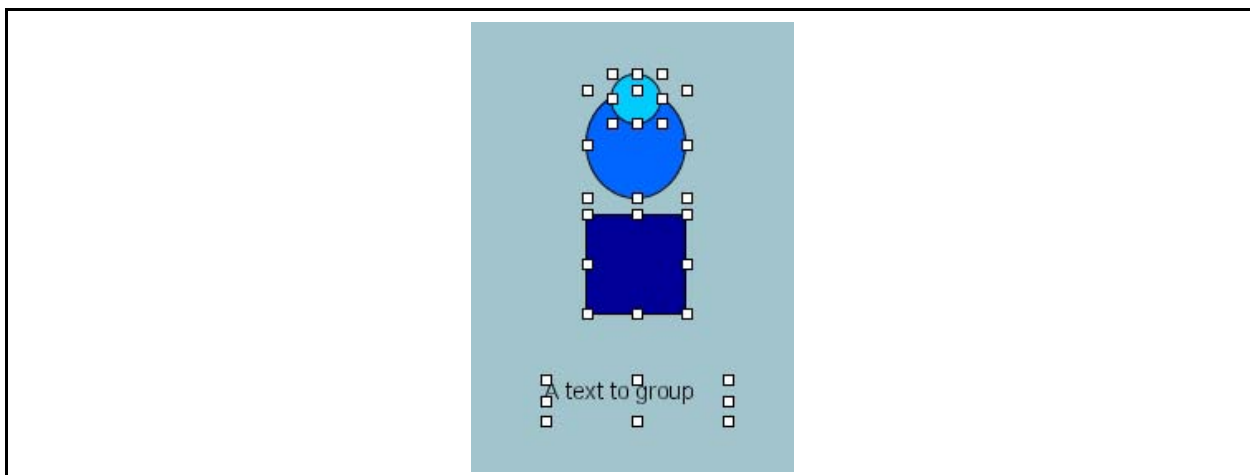


FIGURE 150 - OI MIMIC ALIGNMENT RESULT

4.4.2.5 Graphic / Layers sub-menu

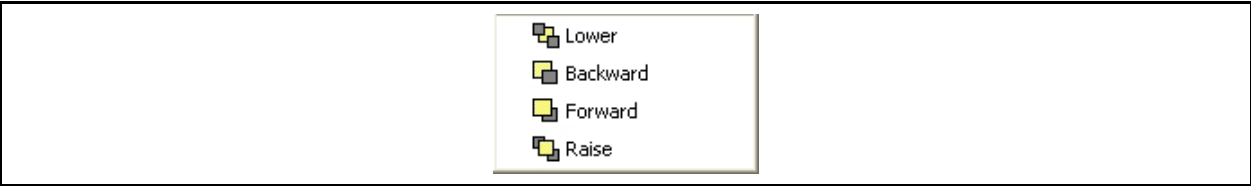


FIGURE 151 - GRAPHIC/OI MIMIC/LAYERS ITEMS

Purpose

- modifies the stack position of graphic objects which are superposed. This defines which objects will be on top or behind the selected object. This mechanism can be represented by a stack: the bottom of the stack is behind the top of the stack.

Availability:

- only one graphic object is selected.

Other call:

OI Mimic Toolbar

	Lower	Set the object at the bottom of the stack
	Upper	Set the object at the top of the stack
	Backward	Move back the object of one position in the stack
	Forward	Move up the object of one position in the stack

Operations:

1. Select one graphic object.

In the following example, the selected object, the middle red circle, is in second position in the stack. Left white circle is in top position, right blue circle is in third position and blue rectangle is in bottom position.

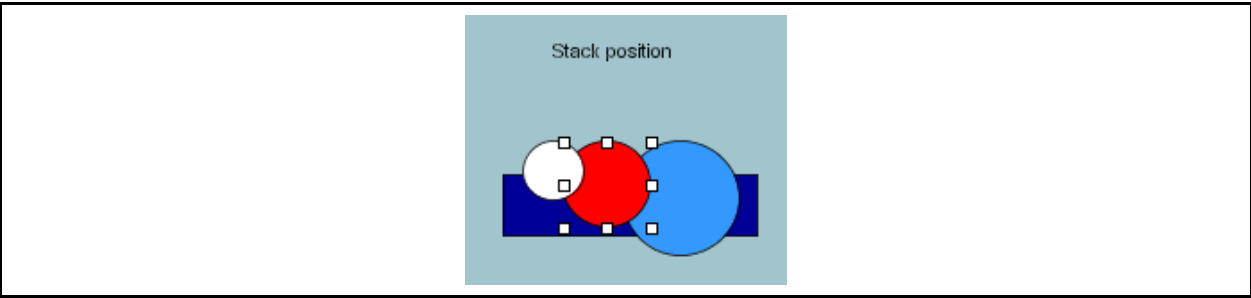


FIGURE 152 - OI MIMIC STACKED OBJECT SELECTION

2. Select the layer item. The stack position of the selected object is modified. The graphical representation of the selected object and of the stacked objects is updated. For example, with , lower, middle red circle is then in last position:

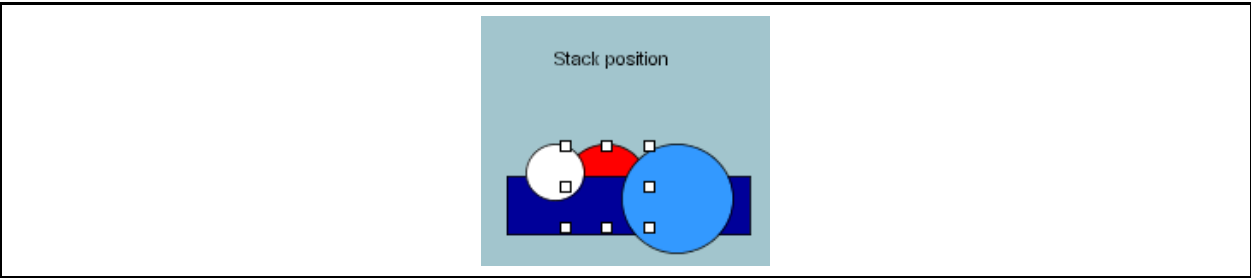


FIGURE 153 - OI MIMIC LAYERS RESULT

4.4.3 Computer mimic

As all objects, the Computer Mimic graphic objects can be manipulated from the **Navigator** and **Attribute Editor**. Nevertheless, the **Computer Mimic Editor** is helpful to create graphic objects, by showing a graphical representation of the objects. The Computer Mimic menus items allow to create and modify Computer Mimic objects through Computer Mimic Editor.

Only available items of Computer mimic are described and not the way to configure completely a bay mimic. This way is described in the chapter Application of equipment C264. This chapter describes how to configure a computer and its bay mimic. In particular, it describes all links of a bay mimic and its components with electric topology (bay, module, datapoint).

Before a full description of theses items, a brief description of Computer mimic editor:

- **View and specific toolbar**

The Computer mimic is displayed in the graphical area. A specific toolbar can be displayed with window/Computer mimic toolbar item. This toolbar contains some Computer mimic item shortcuts.

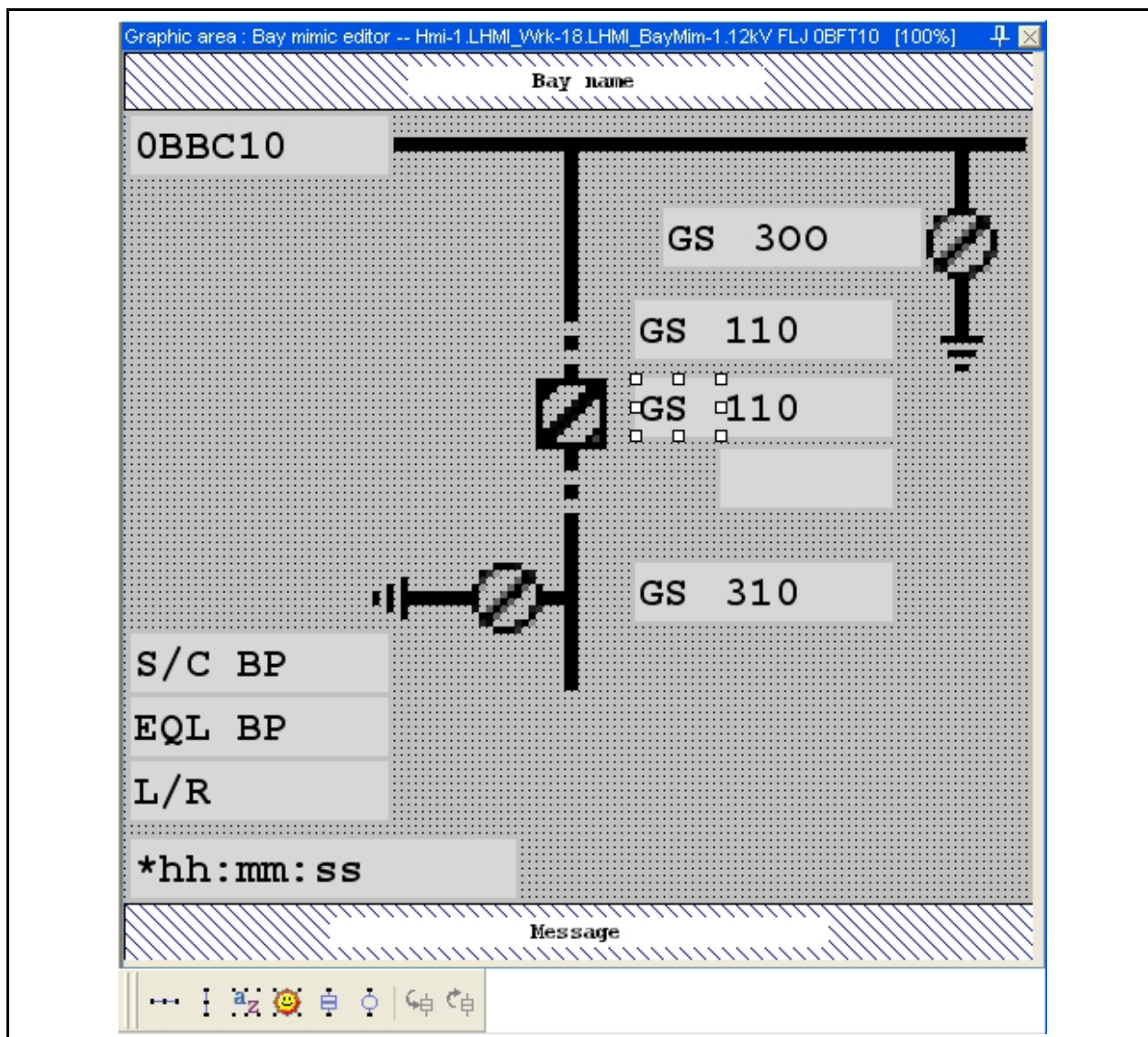


FIGURE 154 - COMPUTER MIMIC EDITOR AND ITS TOOLBAR

- **Content**

The content of Computer Mimic depends on the selected object in the Navigator.

- If the selected object is a bay mimic or a component of a bay mimic, the Computer Mimic Editor contains the graphical representation of the bay mimic.
- If the selected object belongs to a module , the corresponding module is selected in the **Computer Mimic Editor**.

The Navigator and the Computer Mimic Editor are linked together: any modification done in the Computer Mimic Editor is also visible in the Navigator and/or in the Attributes Editor. Reversibly, any modification done in the Navigator or in the Attributes Editor is also visible in the Computer Mimic Editor (if the modification has a graphical effect).

- **Selection**

The selected object in the Computer Mimic Editor depends on the selected object in the Navigator. More precisely:

- If the selected object is a bay mimic, no object is selected in the Computer Mimic Editor.
- If the selected object belongs to a module, the corresponding module is selected in the Computer Mimic Editor.

Multi-selection is available with a key-sequence: shift / left mouse click.

Unselect an object in a multi-selection is available with the same key-sequence: shift / left mouse click.

- **List of items**

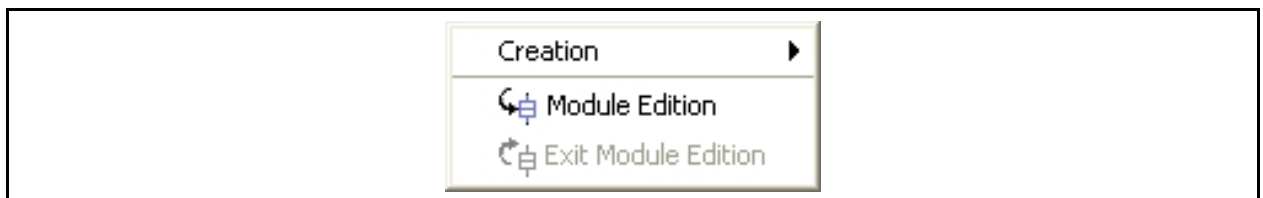


FIGURE 155 - GRAPHIC/COMPUTER MIMIC ITEMS

Hereafter, a full description of these items with this classification:

- creation,
- module management

4.4.3.1 Graphic/Creation sub-menu

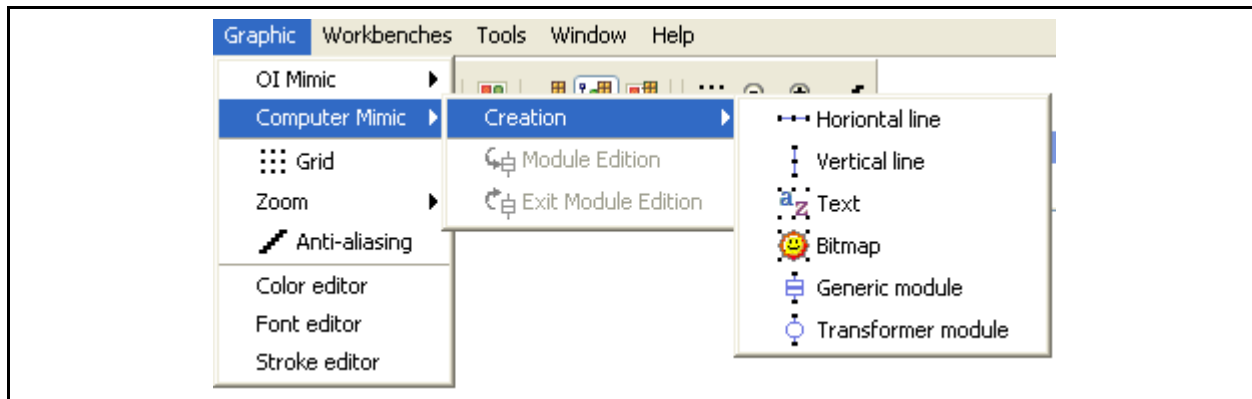


FIGURE 156: GRAPHIC/COMPUTER MIMIC/CREATION ITEMS

Purpose:

- Create a basic graphic object. Creation is not interactive: the object is created with a default position and a default size. The new object is added at bottom of navigator parent object list.

Availability:

- When a graphic object or a mimic is selected from navigator or from Mimic viewer.

Other call:

- Computer Mimic ToolBar.
- Object entry area: select the type of object to add.

List of available basic objects:

	Horizontal Line	
	Vertical line	
	Text	A text field. The text must be defined by the user.
	Predefined text	Some predefined text fields are available from Object Entry area.
	Bitmap	Bitmap defined from bitmap palette (single)
	Generic module	Specialised group that represents a generic module.
	Transformer module	Specialised group that represents a transformer module.

Operation:

- 1. Select Parent graphic object: a bay mimic or another graphic object.

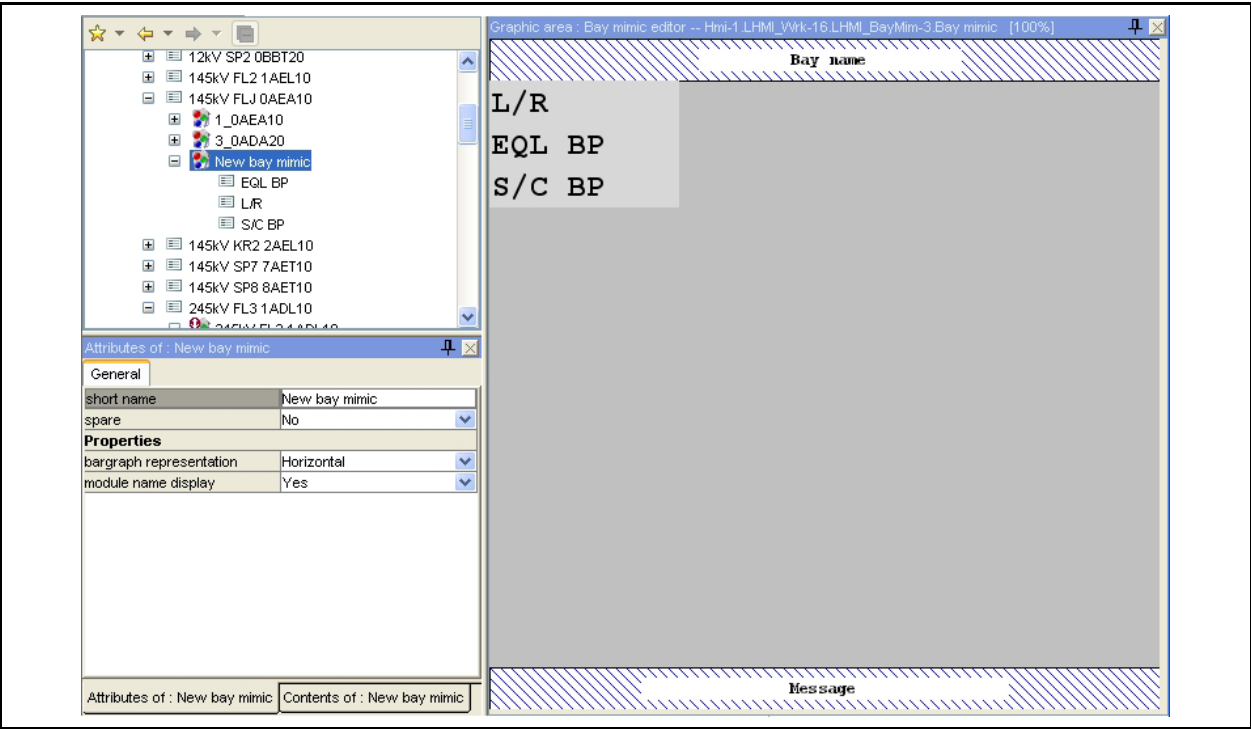


FIGURE 157 - COMPUTER MIMIC CREATION (BEFORE)

- 2. Select the type of object to create (Generic module  in example).
- 3. The object Generic module appears in navigator below its parent and the Computer mimic viewer is updated with its graphical representation. The module is created with a default position and a default bitmap. This object can be handled like all graphical objects with mouse.

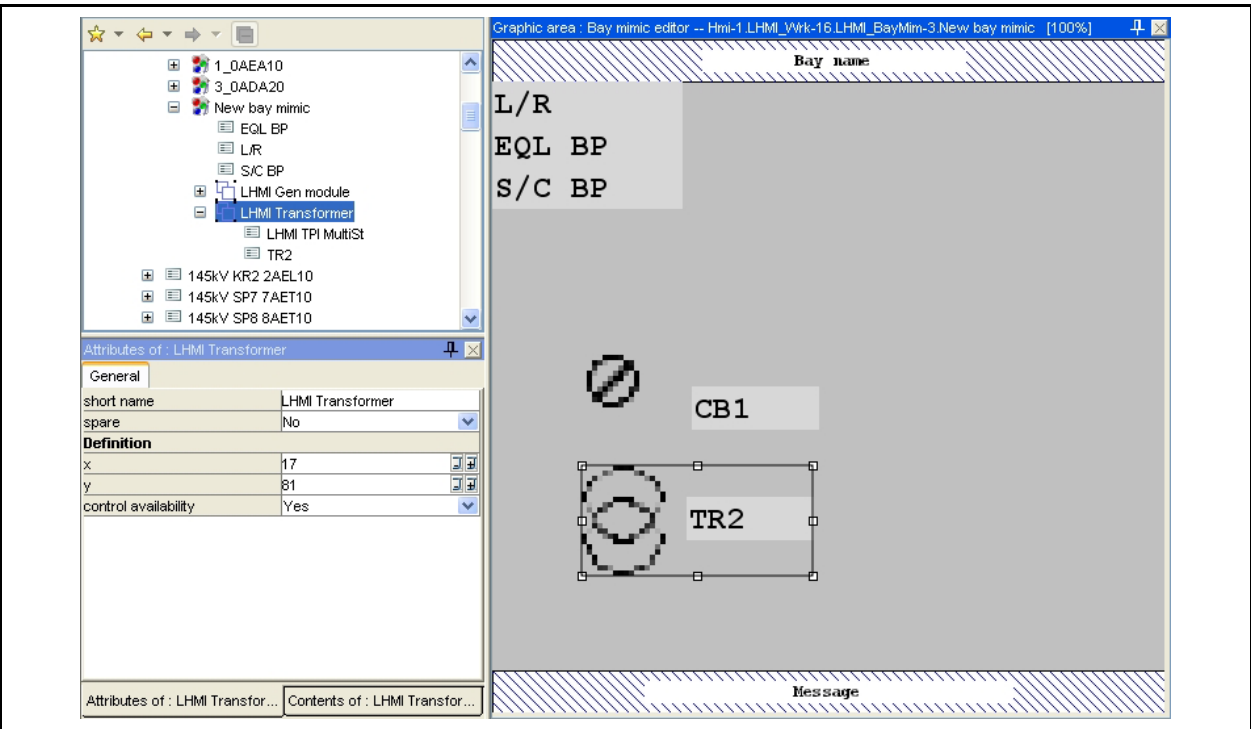


FIGURE 158 - COMPUTER MIMIC CREATION (AFTER)

4.4.3.2 Graphic/Module sub-menu

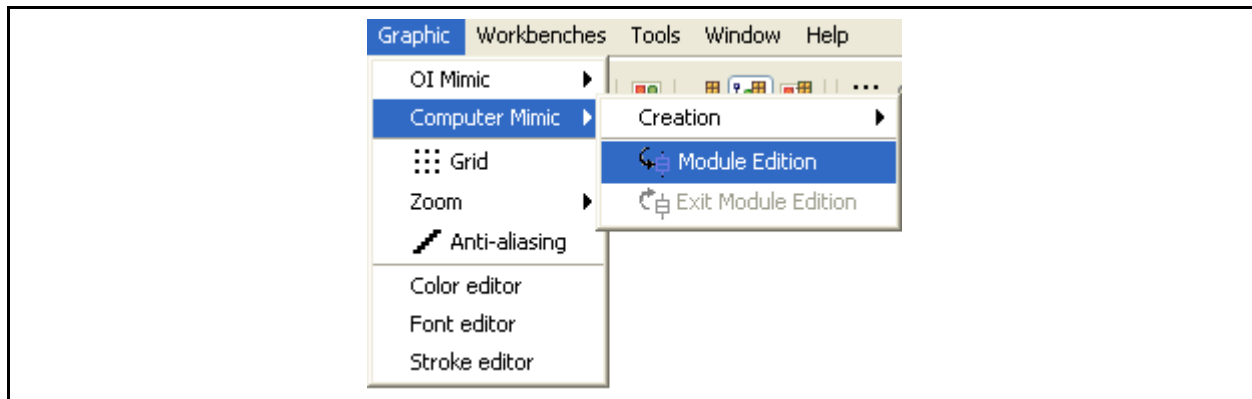


FIGURE 159: GRAPHIC/COMPUTER MIMIC/MODULE ITEMS

Purpose:

- Manage specialised groups of bay mimic: the generic module and the transformer module.
- A group is a **container of graphic objects**.
A group can be handled as a basic graphic object: move, cut, copy, paste, etc.
- Two specialised groups have been defined for PACiS SCE application and bay mimics: these groups are the graphical representation of electric module.
A complete description of their application and their relations is done in chapter Application of equipment C264.
 - **Generic module** has two fixed components: the module name and its graphic representation (LHMI xPS MultiSt) for which a bitmap is referenced from bitmap palettes.
 - **Transformer module** has two fixed components: the module name and its graphic representation (LHMI TPI MultiSt) for which a bitmap is referenced from bitmap palettes. Some optional component can be added with Object Entry Area.

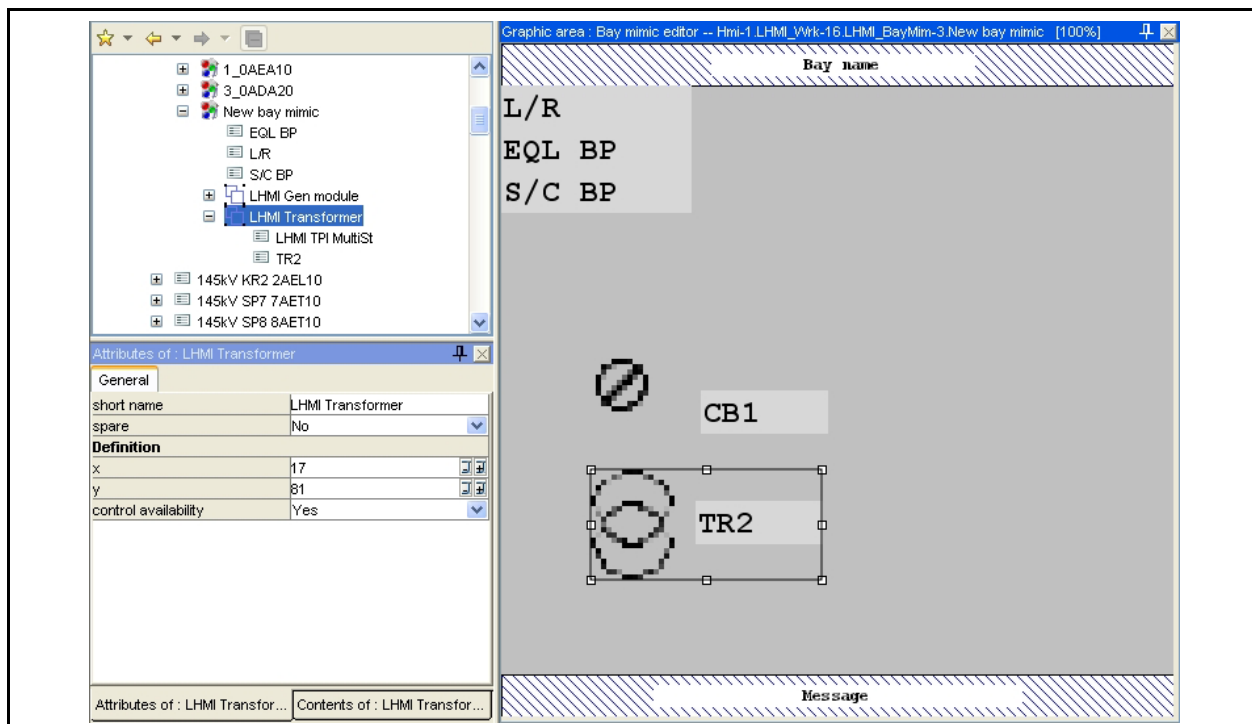


FIGURE 160 - SPECIALISED GROUPS: GENERIC & TRANSFORMER MODULE

- When a module is selected, these components can not be edited individually. A special edition mode is available to edit the components of an existing module.

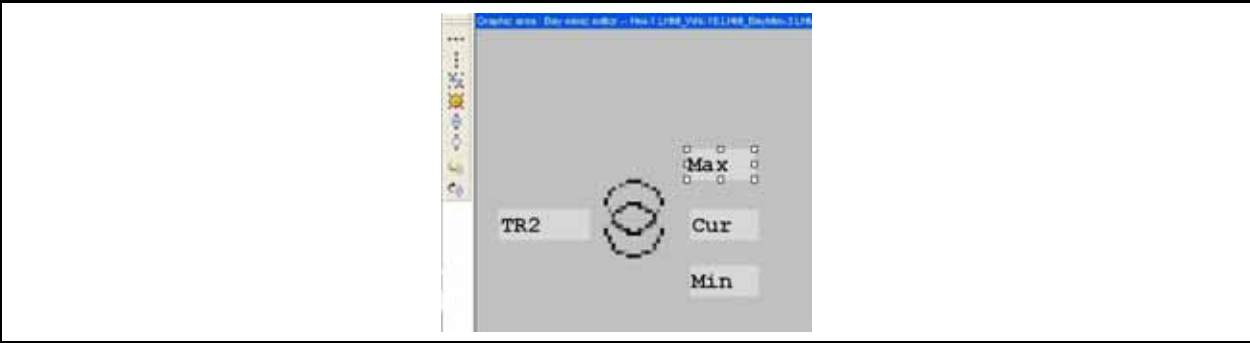


FIGURE 161 - MODULE EDITION

Availability:

- Module edition: when a module is selected.
- Exit module edition: when a module is going to edit.

Other call:

- Computer Mimic ToolBar.
- Contextual menu when a group is selected (right click): group edition

Operation:

	module edition	1. select a module 2. select module edition item: the mimic viewer is cleared and is filled with the objects of the selected module. 3. edit, add new components and arrange them:
	Exit module edition	1. while module edition, select Exit module edition: the mimic viewer is cleared and filled with the whole mimic. The components of the module can not be edited yet:

4.4.4 Graphic/Utility sub-menu



FIGURE 162 - GRAPHIC/UTILITY ITEMS

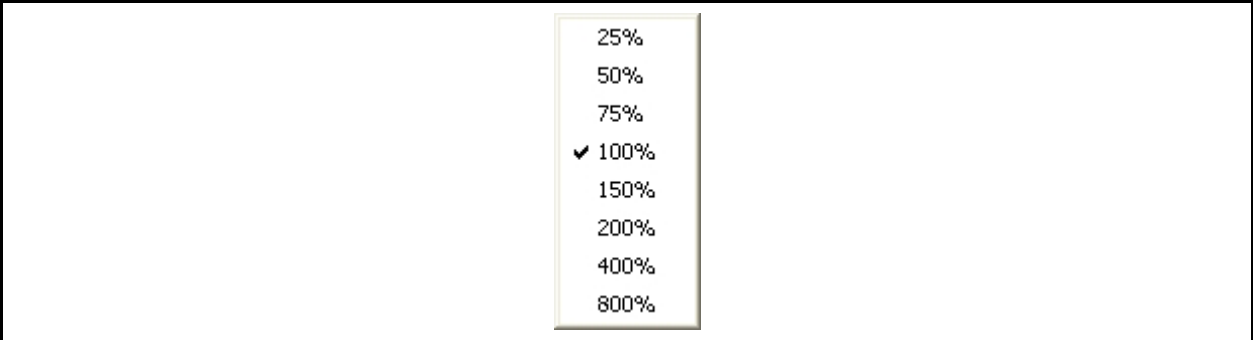


FIGURE 163 - GRAPHIC/ ZOOM ITEMS

Purpose:

- Apply general settings upon graphical objects. Theses items are available for Computer Mimic Editor and for Computer Mimic Editor.

Availability:

- Always

Other call:

- Common toolbar

	Grid	Toggle to activate Magnetic Grid. Grid is displayed in the viewer. Any moving with mouse is aligned with the magnetic grid. OI Mimic: the grid is displayed and activated with the grid settings defined with tools/setting function. Computer Mimic: the grid is displayed. The grid is always activated for this editor even if the grid is not displayed.
	Zoom	The available zoom factors are different for: OI Mimic: 25%, 50%, 75%,100%, 150%, 200%, 400%, 800% Computer Mimic: 50%, 100%, 200%, 400%, 800%
	Anti-Aliasing	Smoothing or anti-alias function

The following copies illustrate anti-aliasing action.

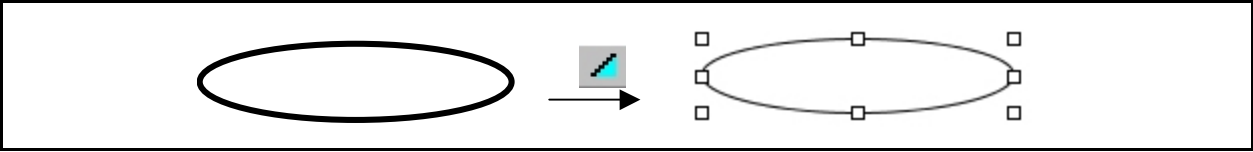


FIGURE 164 - GRAPHIC/ANTI-ALIASING EFFECT

4.5 Workbenches Menu

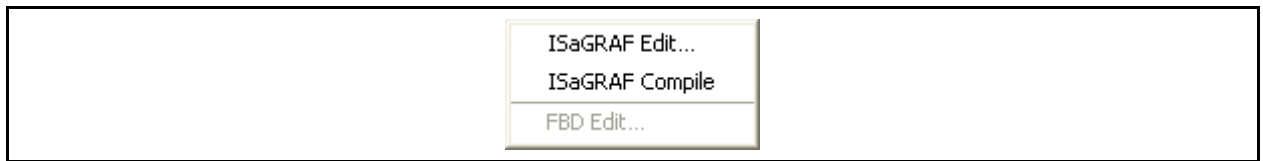


FIGURE 165 - WORKBENCHES MENU

The aim of this menu is to drive actions linked to external tools. The presented tools are:

- ISaGRAF from CJ international used to edit custom automation in IEC61131. This tool could be an option and subject to license.
- FBD
- editor used to edit Function Block Diagram.

This section describes only **how launching theses tools**.

A complementary description of ISaGRAF is available in the chapter SCE EN AP..

4.5.1 Workbenches/ISaGRAF Edit ...

Purpose:

- Launch ISaGRAF PRO Workbench, with all element already entered and needed for the tool:
 - name of automation,
 - list of interface variables into dictionary.

Availability:

- ISaGRAF Pro must be installed with its Dongle.

Other call:

- Contextual menu when type of selected object is Slow Automation or C264 PLC

Operations:

1. Select ISaGRAF edit item.

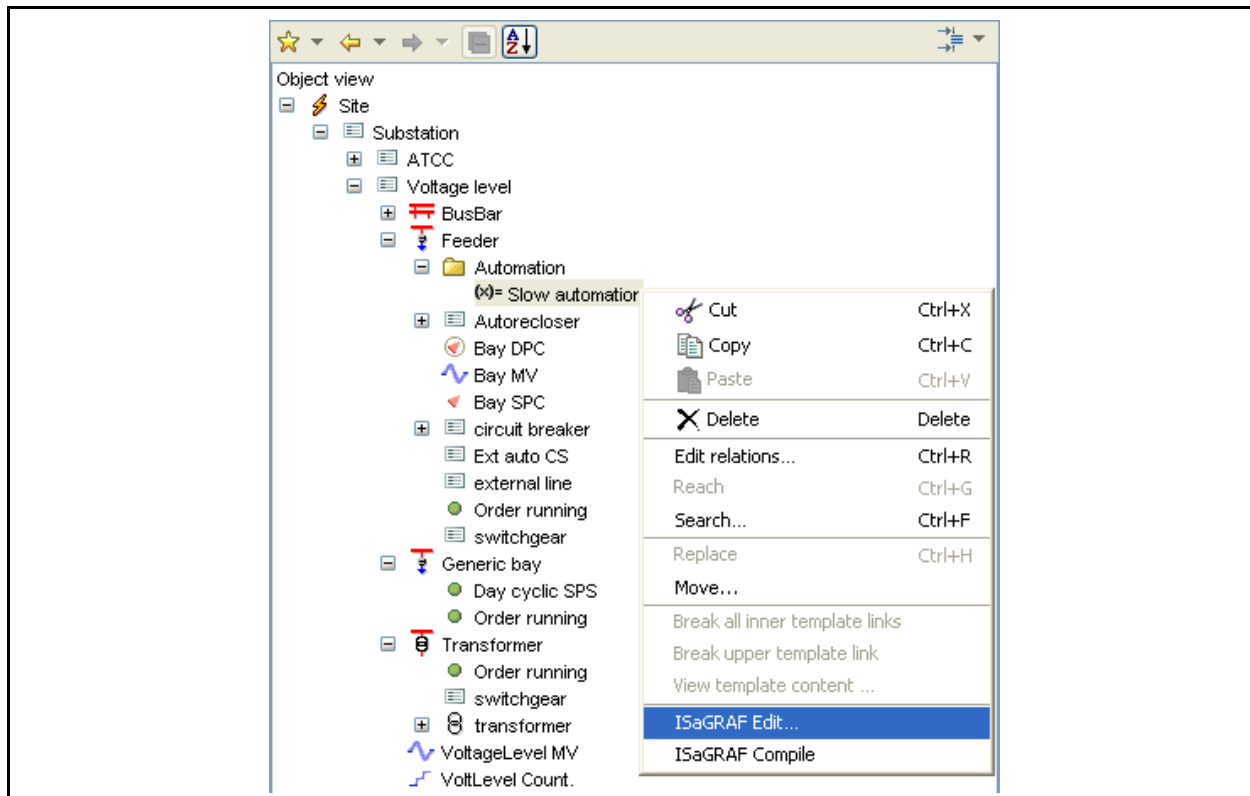


FIGURE 166 - TOOLS/ISaGRAF EDIT FROM SLOW AUTOMATION OBJECT

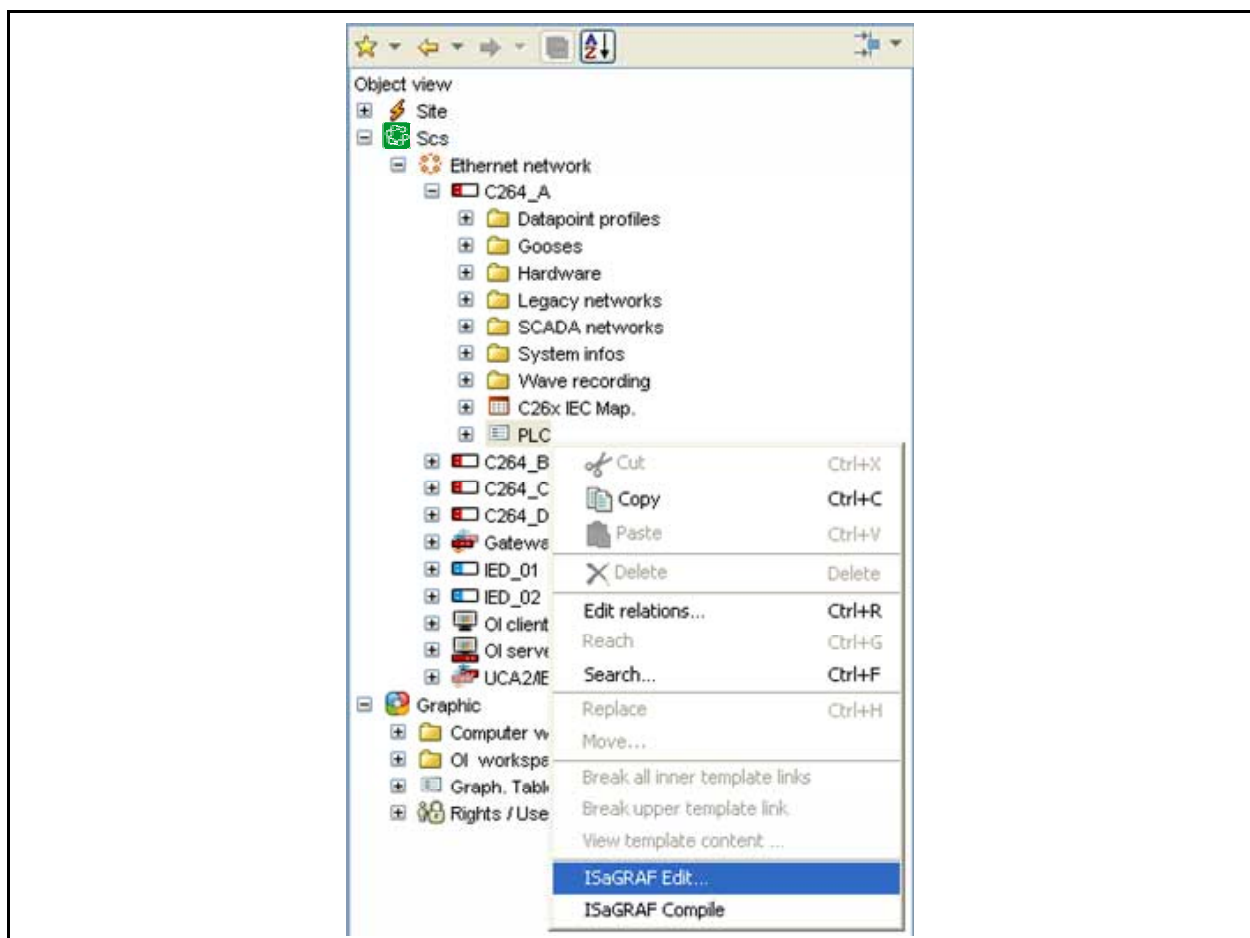


FIGURE 167 - TOOLS/ISaGRAF EDIT FROM C264 PLC OBJECT

2. The ISaGRAF workbench is launched with **modal** mode. Edit the slow automation, save it and quit workbench to come back to PACiS SCE.

4.5.2 Workbenches/ISaGRAF Compile

Purpose:

- Compile/Check ISaGRAF PRO automation made with its Workbench, to verify syntax and make the target files. This operation is made automatically in PACiS SCE File/Generate.

Availability:

- ISaGRAF Pro must be installed with its Dongle.

Other call:

- Contextual menu when type of selected object is Slow Automation or C264 PLC. See Tools/ISaGRAF edit.

Operations:

1. Select ISaGRAF compile on the available object,
2. A popup indicates the result of compilation.

4.5.3 Workbenches/FBD Edit ...

Purpose:

- Launch FBD editor which allows to define Function Block Diagram:
 - for logical equation used by interlock,
 - for FBD automation.

Availability:

- Always

Other call:

- Contextual menu when type of selected object is FBD Automation or FBD interlock.

Operations

1. Select FBD edit item on the available object

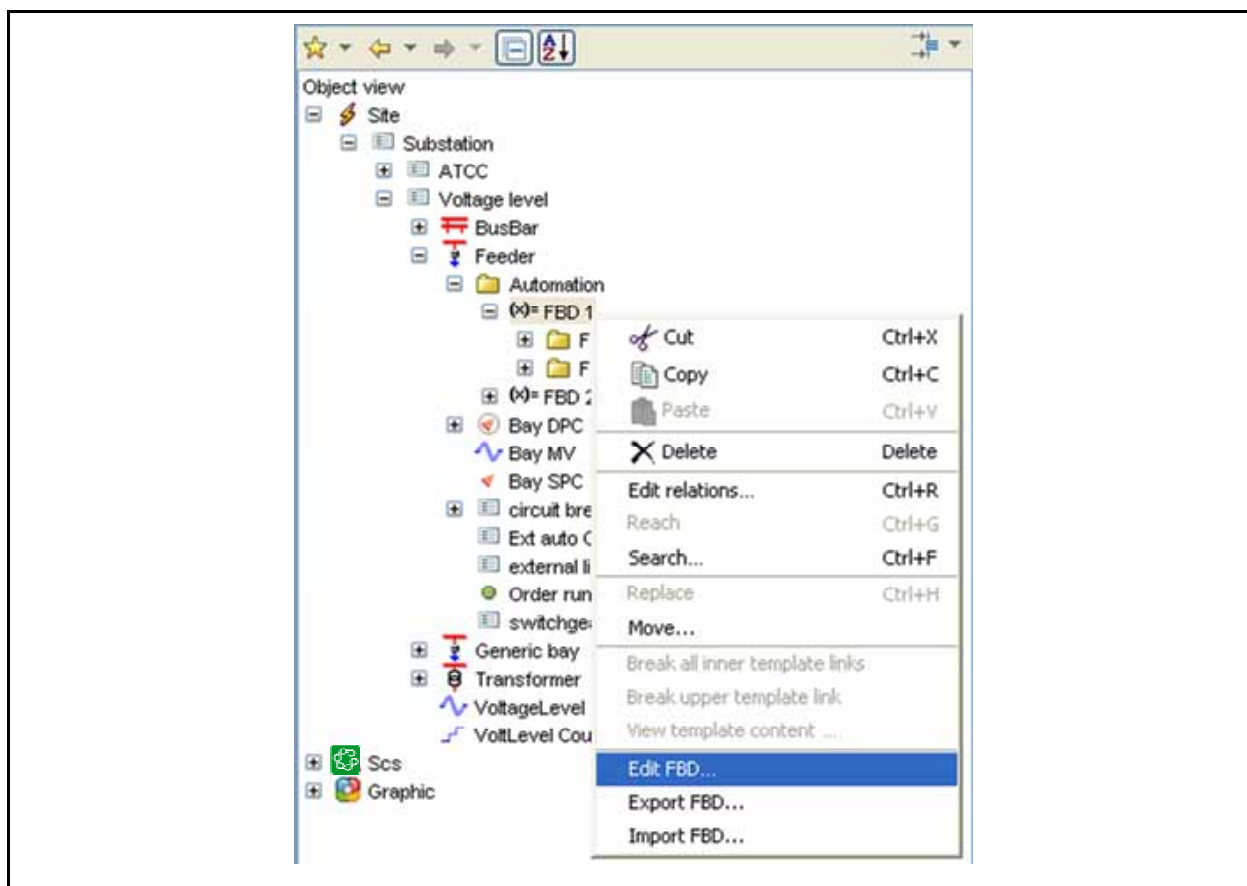


FIGURE 168 - TOOLS/FBD EDIT FROM FBD AUTOMATION

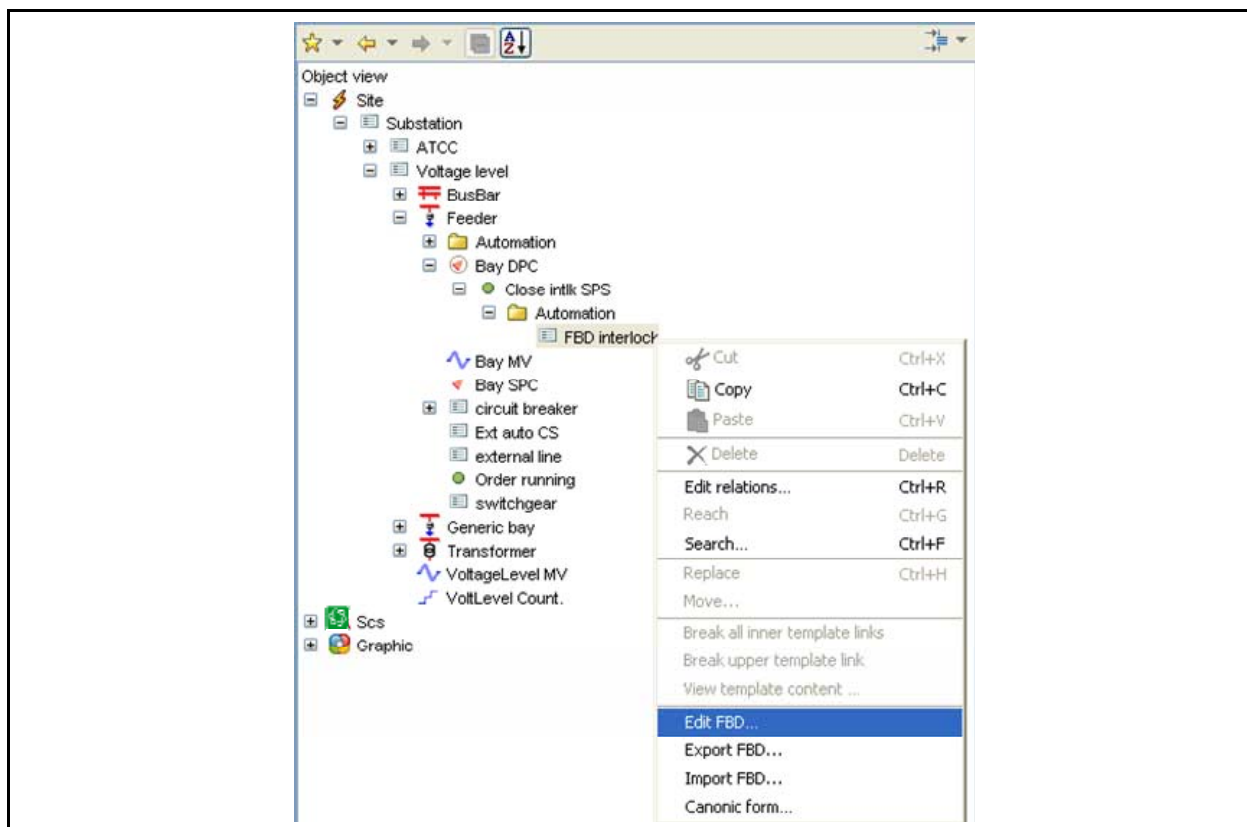


FIGURE 169 - TOOLS/FBD EDIT FROM FBD INTERLOCK

2. The FBD editor is launched for the selected FBD with **modal** mode: the PACiS SCE main editor is hidden during FBD edition. Edit it, save it and quit FBD editor to come back to PACiS SCE. For a complete description of this editor see § 6 FBD Editor.

4.6 Tools Menu

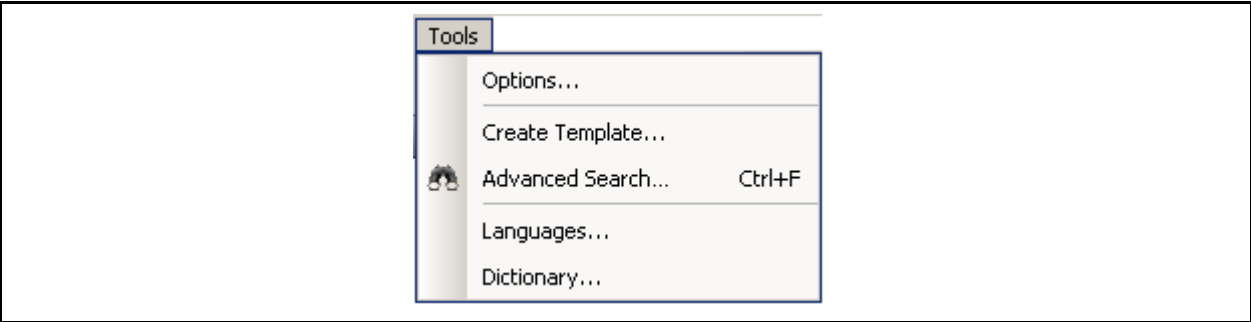


FIGURE 170: THE TOOLS MENU

4.6.1 Tools/Options

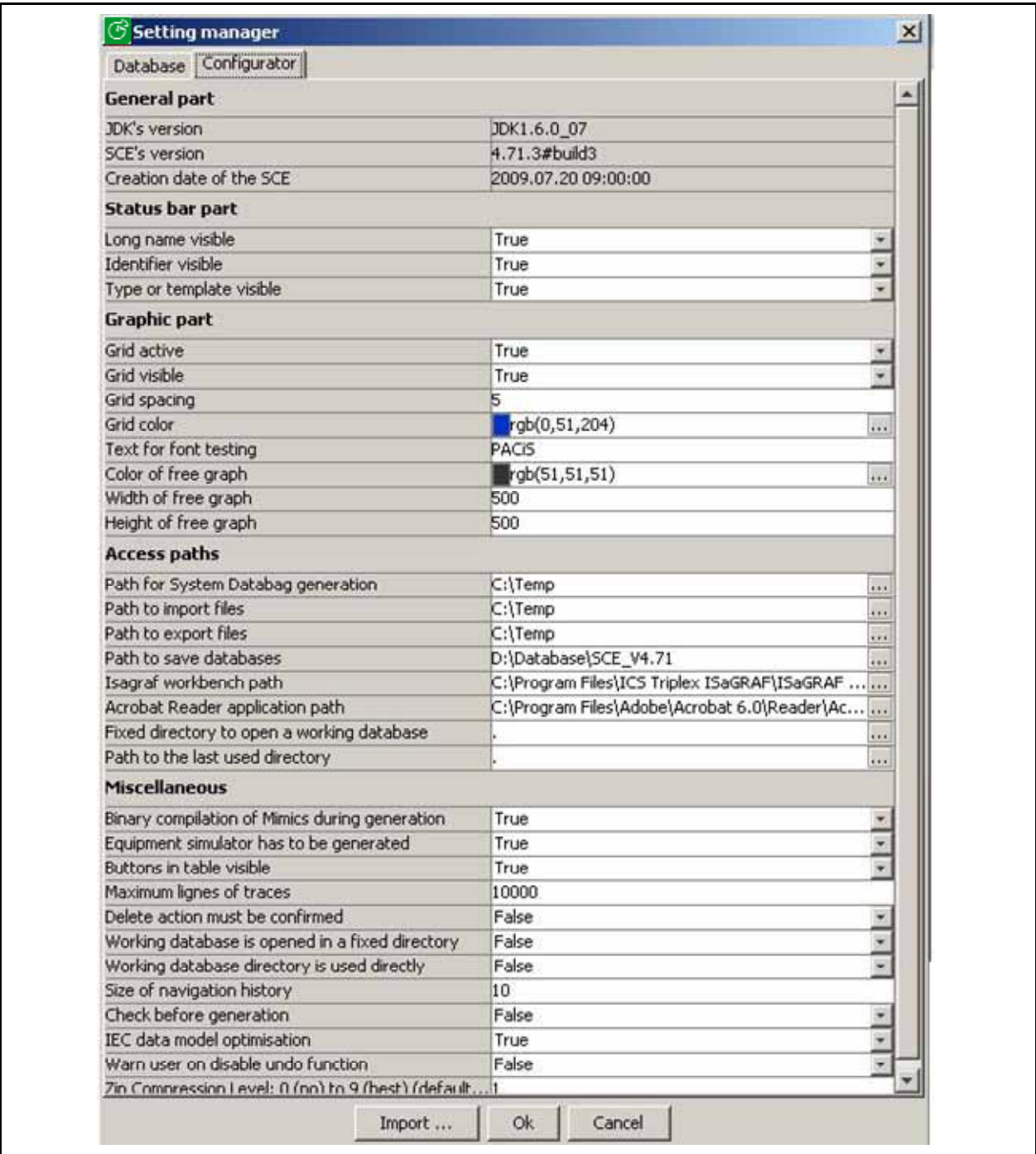


FIGURE 171: TOOLS/OPTION SETTING MANAGER ON PACiS SCE APPLICATION

Purpose: display and allow modification of PACiS SCE settings. The PACiS SCE settings are:

- PACiS SCE Version (including creation date, JDK, data model version),
- parameters upon visibility in status bar,
- parameters upon mimic graphic editors (colour, Mimic editor option,...),
- parameter upon PACiS SCE access directories (tools, component, working directories,...).

Availability:

- Right dependent

Other call:

- File/Properties and select tab Configurator

Operations:

1. Select Tools/Options item
2. Modify the value of updateable setting (white background): * indicates then that the setting has been modified.
3. Restore the previous value of the modified setting with **contextual Restore** (right click on the modified setting).
4. Save the modifications with **Close** button or cancel it with **Cancel** button.
5. A setting of a previous version of PACiS SCE can be imported with **Import** button. From the displayed file chooser, select the PACiS SCE_setting.xml file from installation directory of this old version; then click on Select button.

4.6.2 Tools/Create Template...

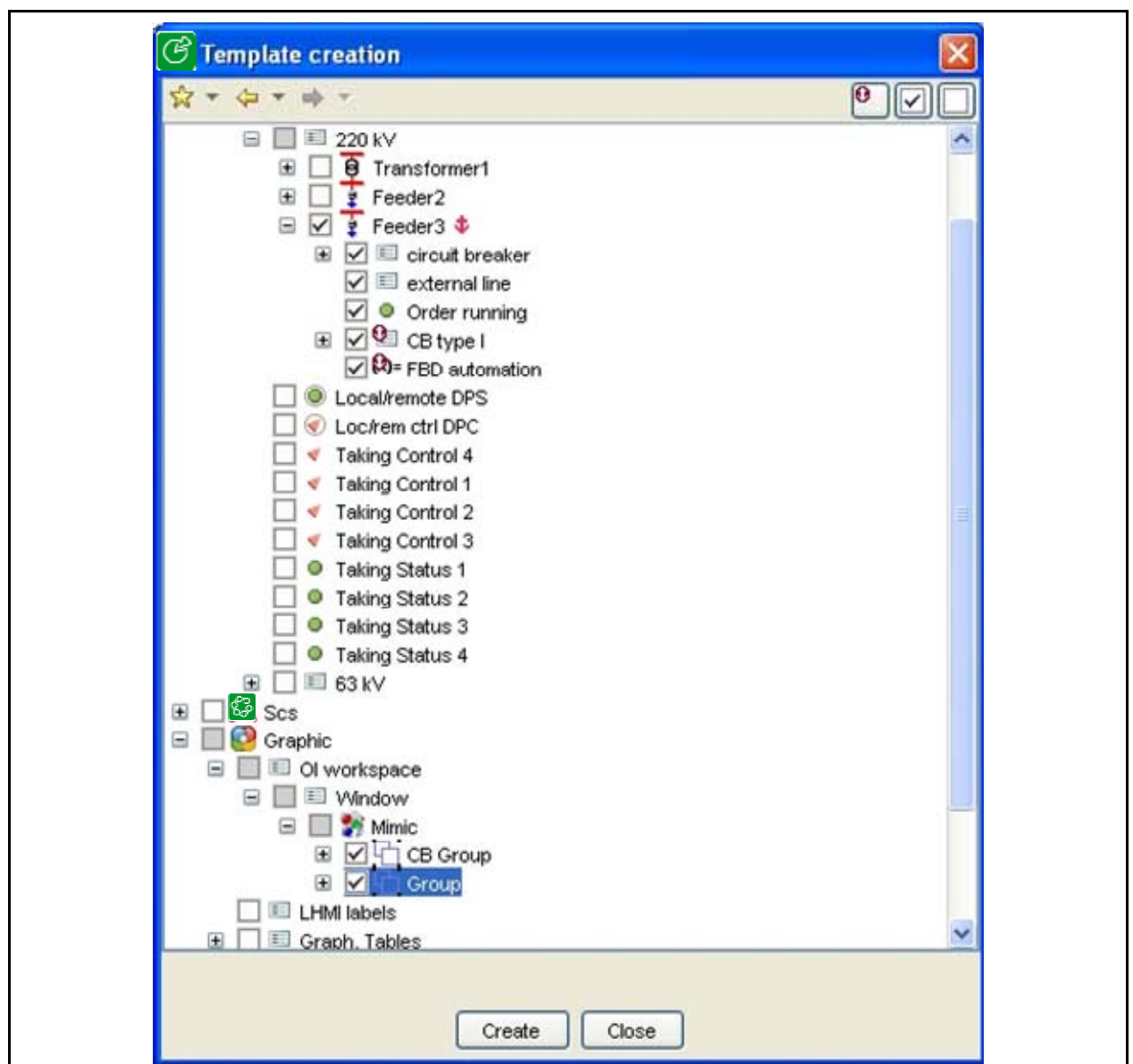


FIGURE 172 - TOOLS/CREATE TEMPLATE CREATION

Purpose:

- Create a new template from the objects hierarchy.

Availability:

- Right dependent

Other call:

- None

Operation:

1. Select Tool/Create template item: a tree view of all objects are displayed.
2. Select objects that will be the components of the new template.
3. Select an object that will be the anchor of the new template. Be care, while an anchor is not defined, the **Create** button is disabled.
4. Click the **Create** button: a new template is added in Templates List. This template contains all selected object. Its name is the name of anchor object.

4.6.3 Tools/Advanced Search

Purpose:

Creation of query from all configuration data. For a complete description of a query and its result, refer to § 4.2.8

Availability:

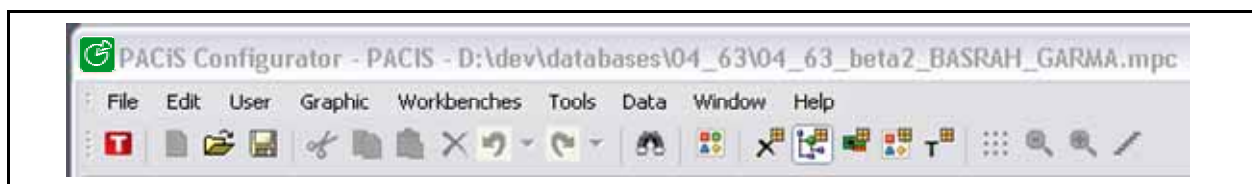
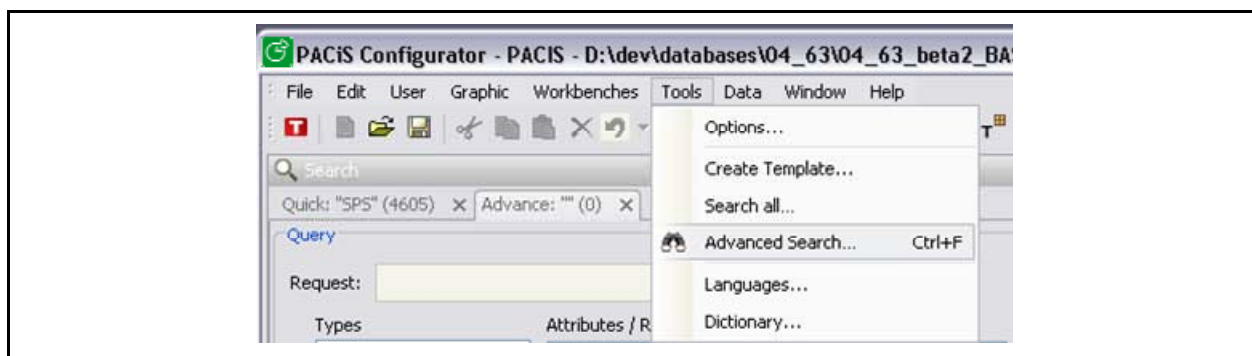
- Right dependent

Other call:

- None

Operation:

- Advanced search is **available with** the menu item tools/Advanced search or the button of the common toolbar or the shortcut ctrl-F



This HMI has two main parts:

- The **definition** of the query and its management
- The **results** of the query: a table that represents all results and allows their edition.

Select **Tools/Advanced Search ...** item. The following dialog box is displayed. For a complete description of this dialog box and the next operations, see refer to § 4.2.8

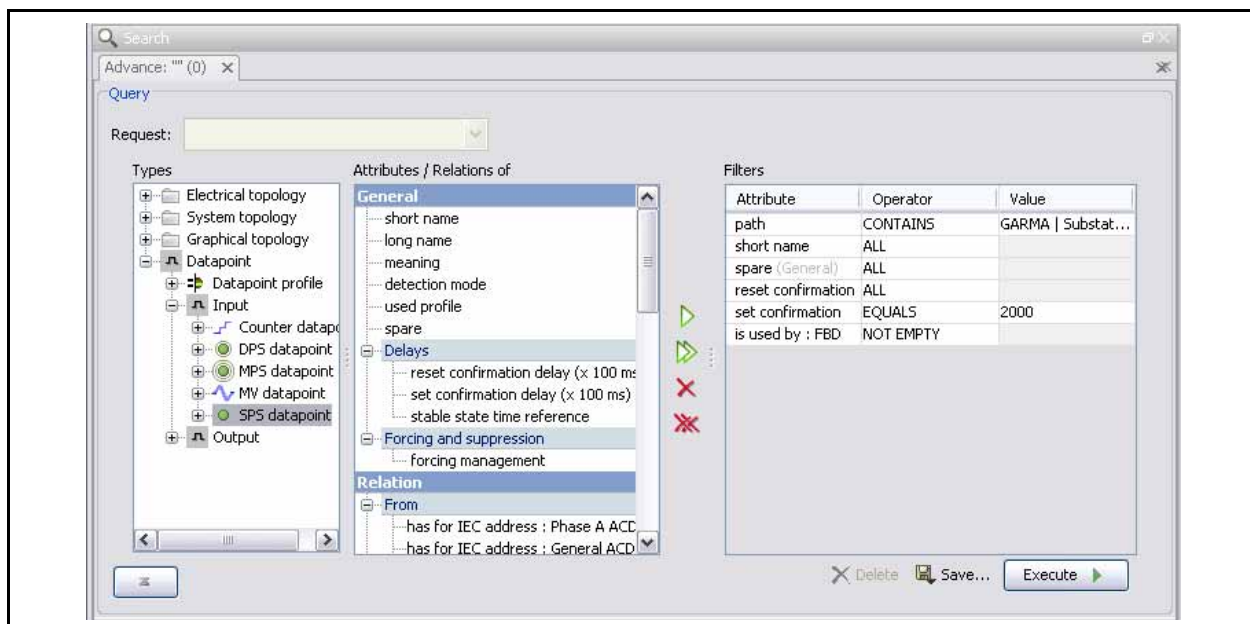
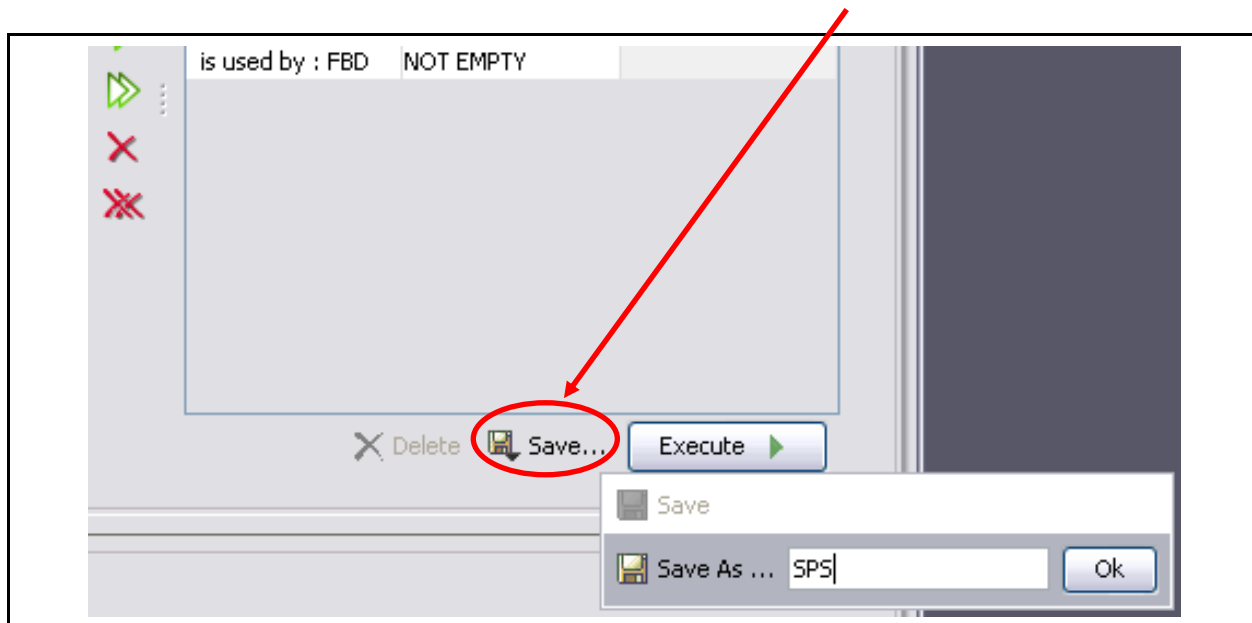


FIGURE 173 - TOOLS/QUERY ITEM

1. Object **type** must be selected from type browser.
2. When this type is selected, the list of its attributes and relations are displayed.
3. A subset of theses **attributes/relation** must be selected with theses buttons.
This subset defines on what the query will be done. The same subset will be used to display the results into a table: a table column for each attribute/relation.
4. For each element of this subset, a **filter** could be defined: with an **operator** and for some operator, a **value**.
5. An element is **pre-defined**: the **path** of the object – the path of the object parent.
For example, for a bay datapoint, it will be the path of its bay.
To fill a filter for path, the **copy** action of an object **from navigator** could be used: the path of the selected object is copied **into the system clipboard** and could be paste into the field value of the path filter..

4.6.3.1 Store a query

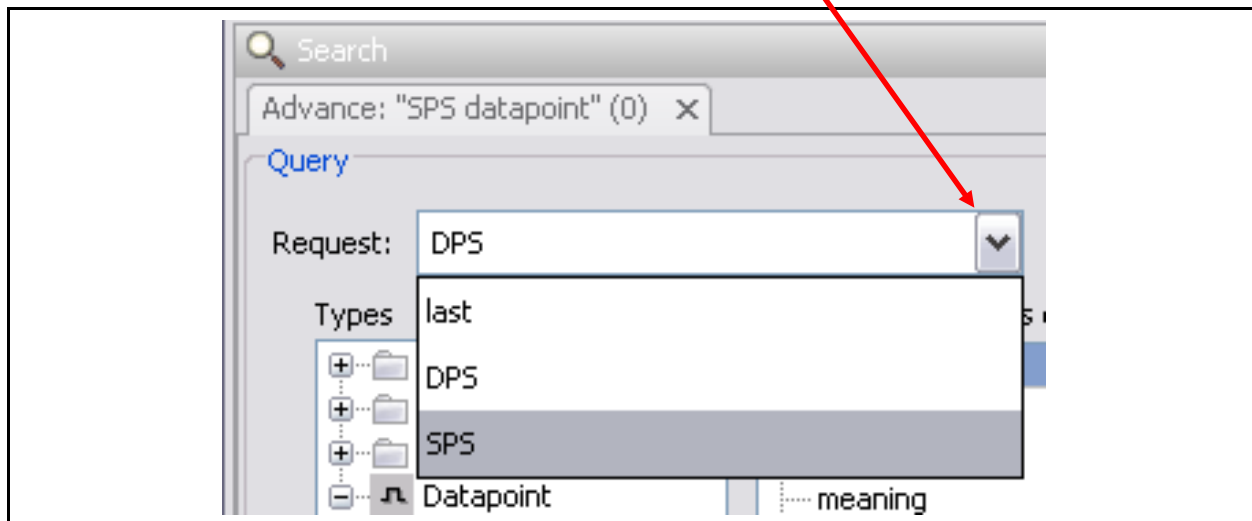
1. When a **query** is defined, it could **be saved** with this button.



A **new** saved query could be defined with the save as option. Text field allows defining its name.

The selected query could be **updated** and re-saved with this save option.

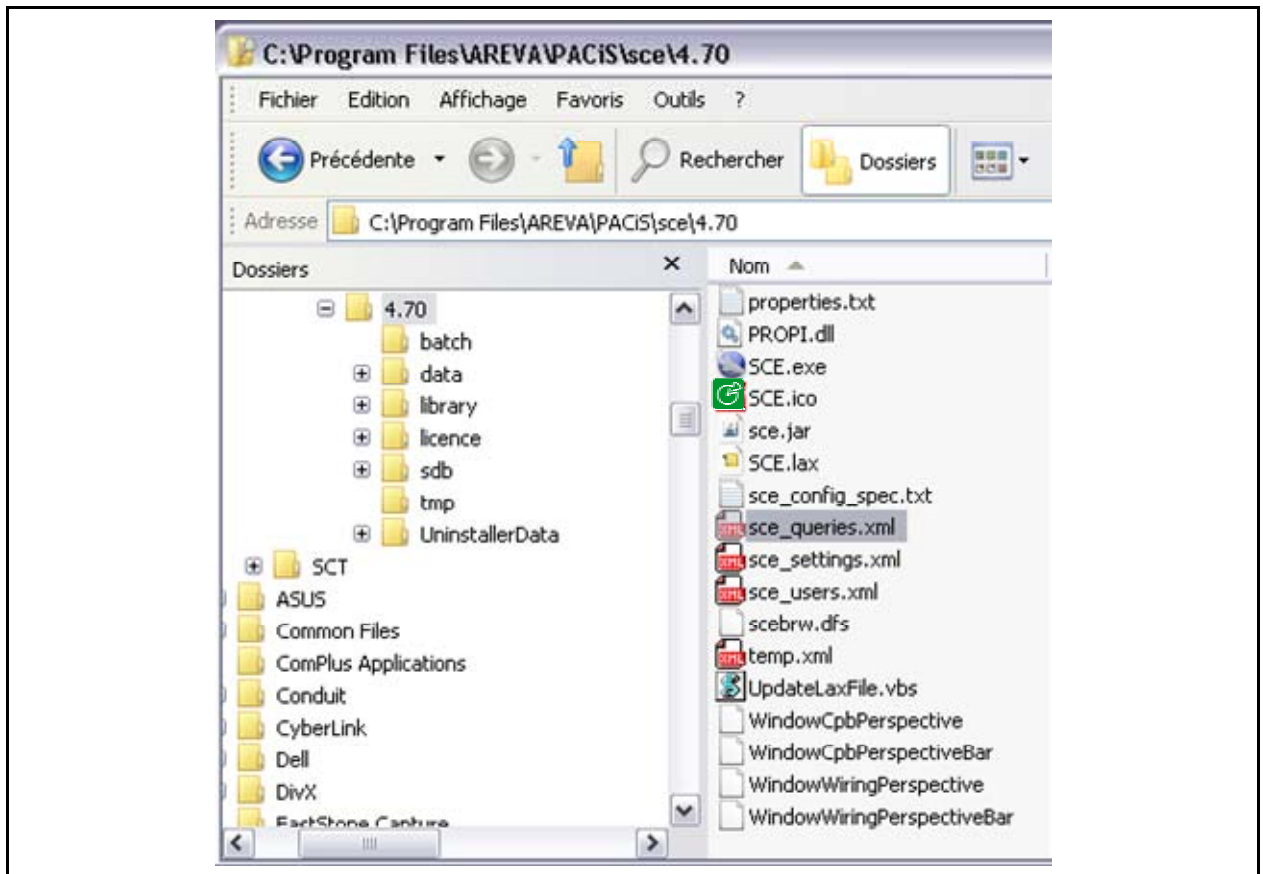
2. **Saved queries** are available from this combo.
At any moment, the last query is available with default query **last**: it is the last new executed query.



3. The selected query could be **suppressed** with the Delete button.



4. The query is saved into a file **sce_queries.xml** of SCE installation directory.



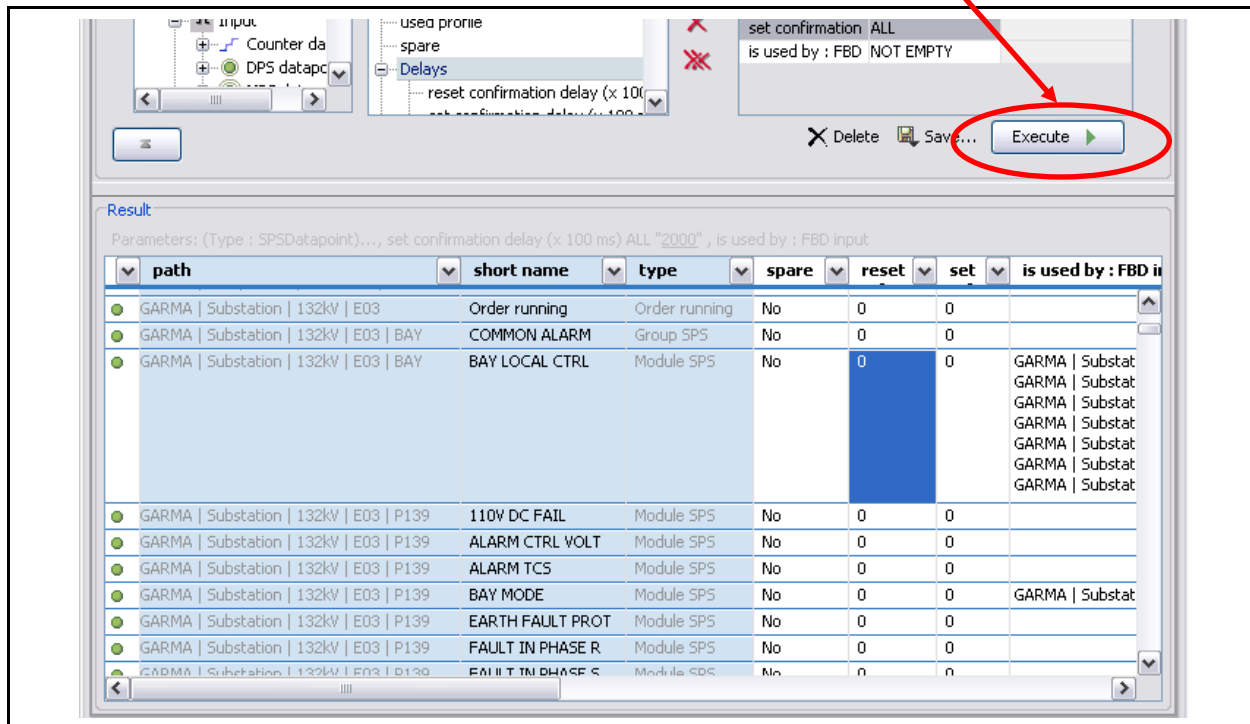
This file could be moved to another SCE version to share a **library of queries**. This operation could be done with a **copy of the file** from the origin SCE and a move to the target SCE.

The file could be **edited** with a text editor or an xml editor. Xml **Schema queries.xsd** is available into sub-directory data/dtd of SCE installation directory.

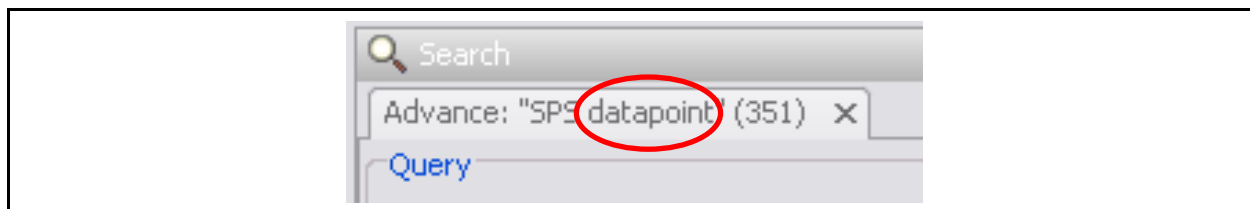
The mnemonic of types/attributes could be obtained from documentation that is included into SCE installer.

4.6.3.2 Execute a query

When a query is defined or loaded, it could be **executed** with this button.



Search tab is updated with the number of found objects.



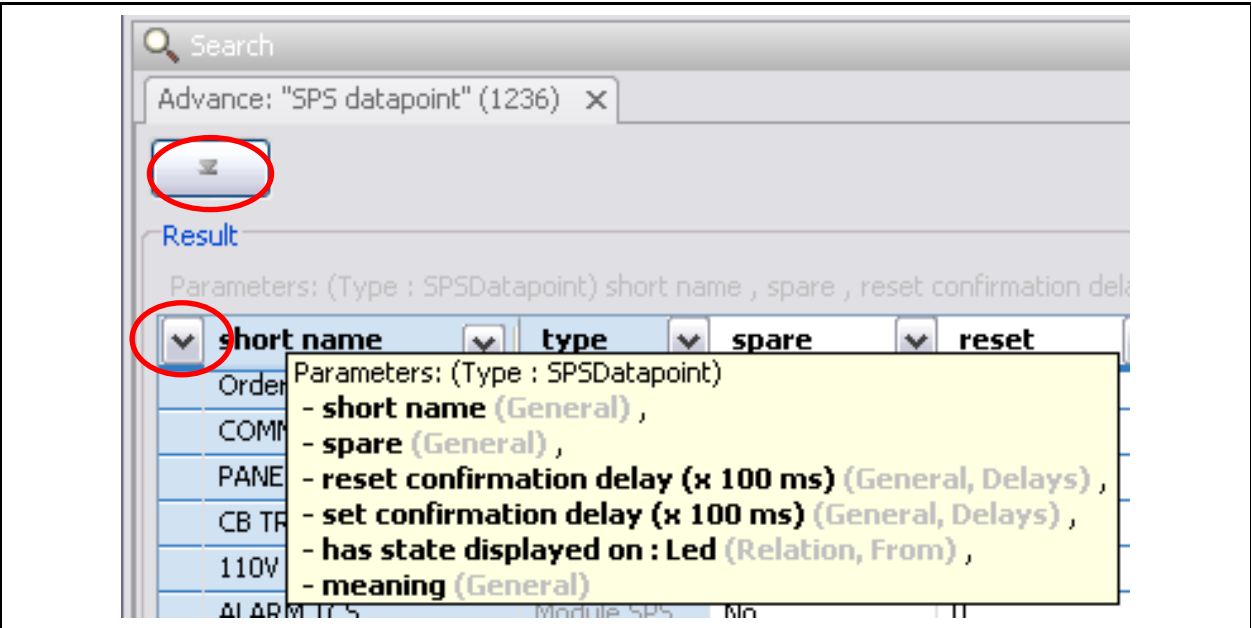
The result table is then updated with the found objects: a **column** is created for **each selected attribute/relation**.

Theses columns could be:

- **sorted**: multi-sort is available with ctrl-click sequence.
- and **filtered**: quick search feature is available for looking for the filter.

4.6.3.3 Hide query

Query part of an Advance search tab could be **hidden / displayed** by this button.



A tooltip (on a yellow background) of parameters field displays a **summary** of the current executed query.

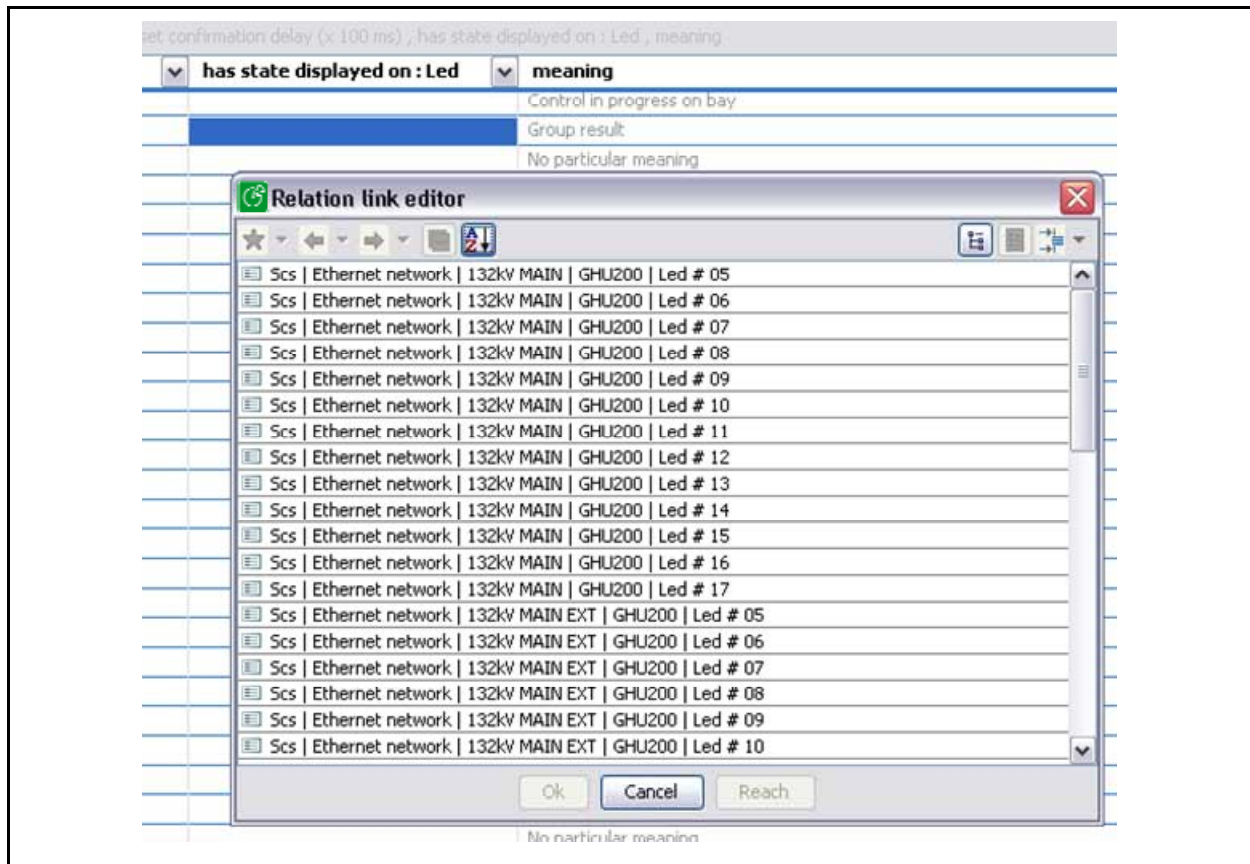
4.6.3.4 Edit the result of a query

The result table could be edited:

- **Attribute** by a direct edition of its value.

(s) , set confirmation delay (x 100 ms) , is used by : FBD input				
	▼ spare	▼ reset	▼ set	▼ is
running	No	0	0	
SPS	No	0	0	
SPS	No	0	0	GA
				GA
				GA
SPS	No	0	0	
SPS	No	0	0	

- **Relation** by the link or the relation editor and a double-click to launch it.



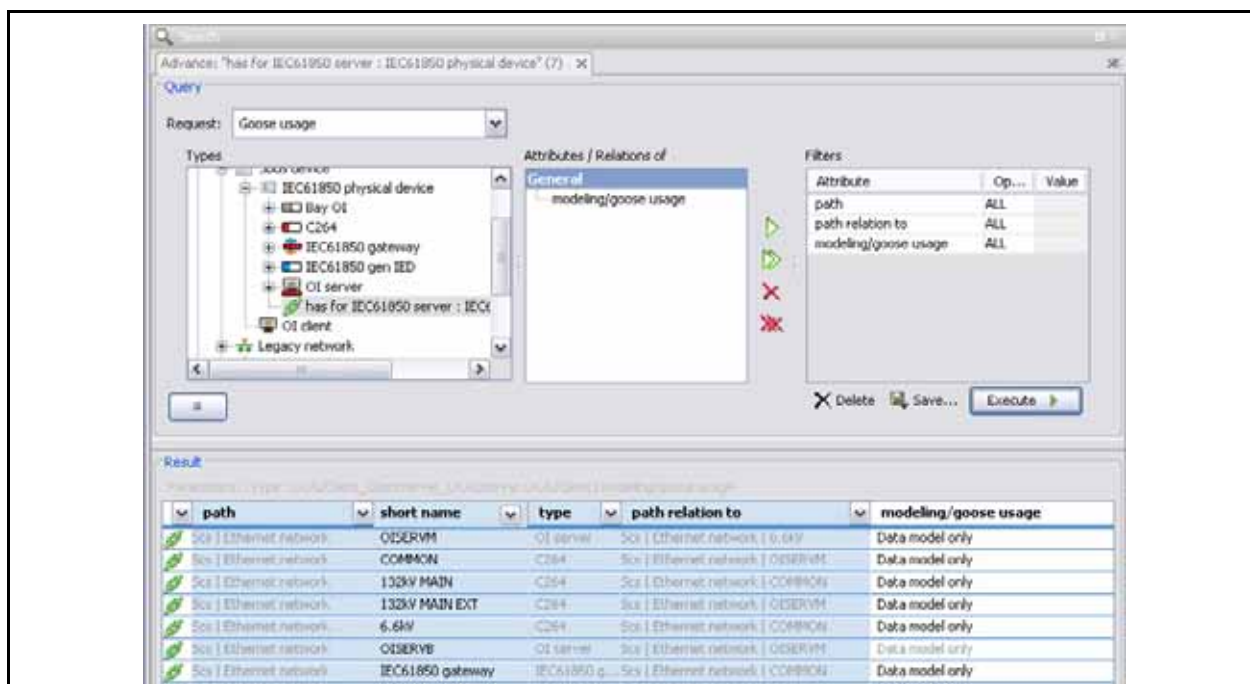
Copy/paste from/to System clipboard is available for attribute and relation cell.

4.6.3.5 Special query to find the own attribute of a relation

For example, it's the relation 'has for IEC61850 server...' and attached attribute 'modeling/goose usage'.

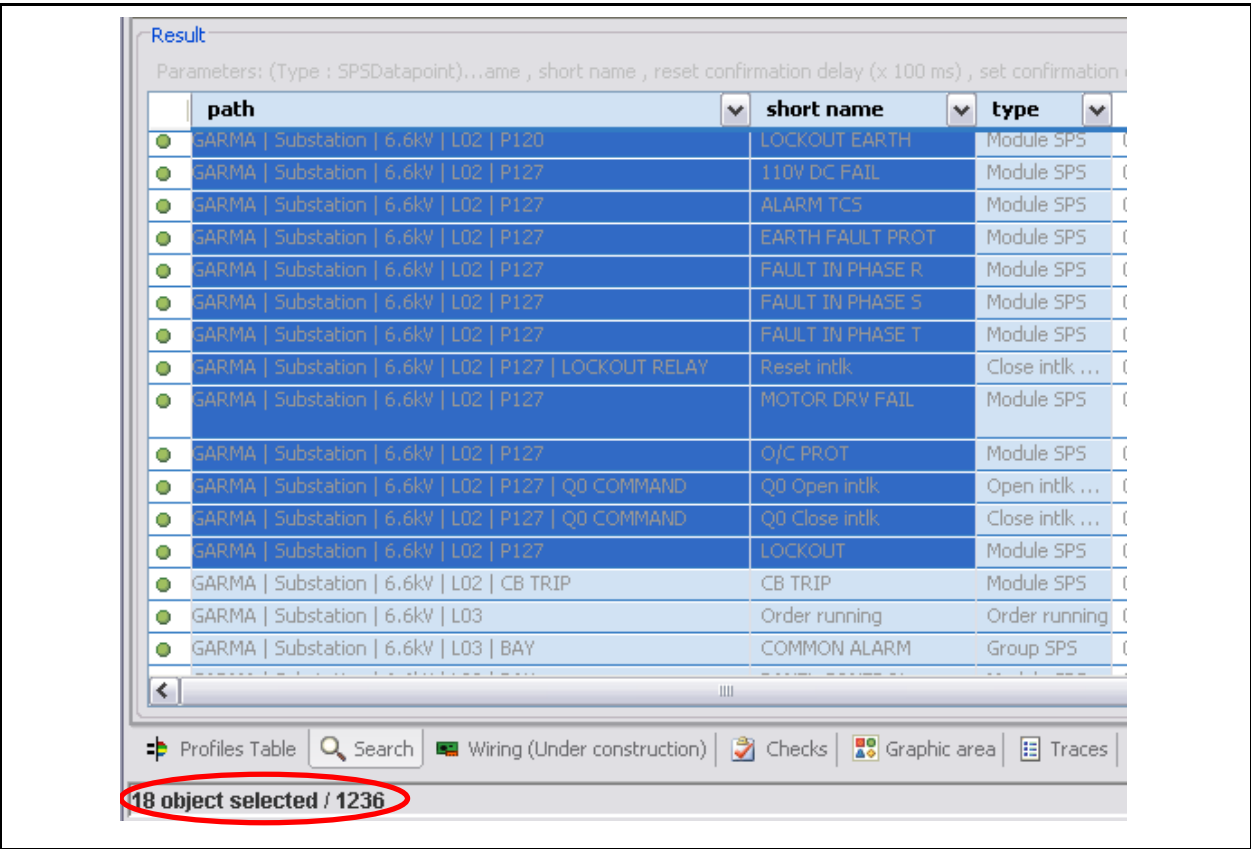
This kind of relation (=relation with attached attribute) is displayed into Types browser and **could be handled like other type**.

A special default filter element is defined, 'path relation to': with the 'path' element, they represent the two linked objects.



4.6.3.6 How to number a subset of results

When a subset of result has been selected, the **number of selected objects** is displayed into SCE status bar. This feature is available for quick and advanced search.



4.6.4 Tools/Languages...

Purpose:

This dialog box allows the user to manage the configuration and HMI languages.

This window allows to modify the following languages:

- Current languages: the language used to display user interface and database contents or creation,
- Database languages: languages that are defined in a database,
- Generation languages: used to localize C264 and OI devices.

Availability:

The dialog box is always available, even if no database is opened. Available actions depend on context:

- no database is opened:

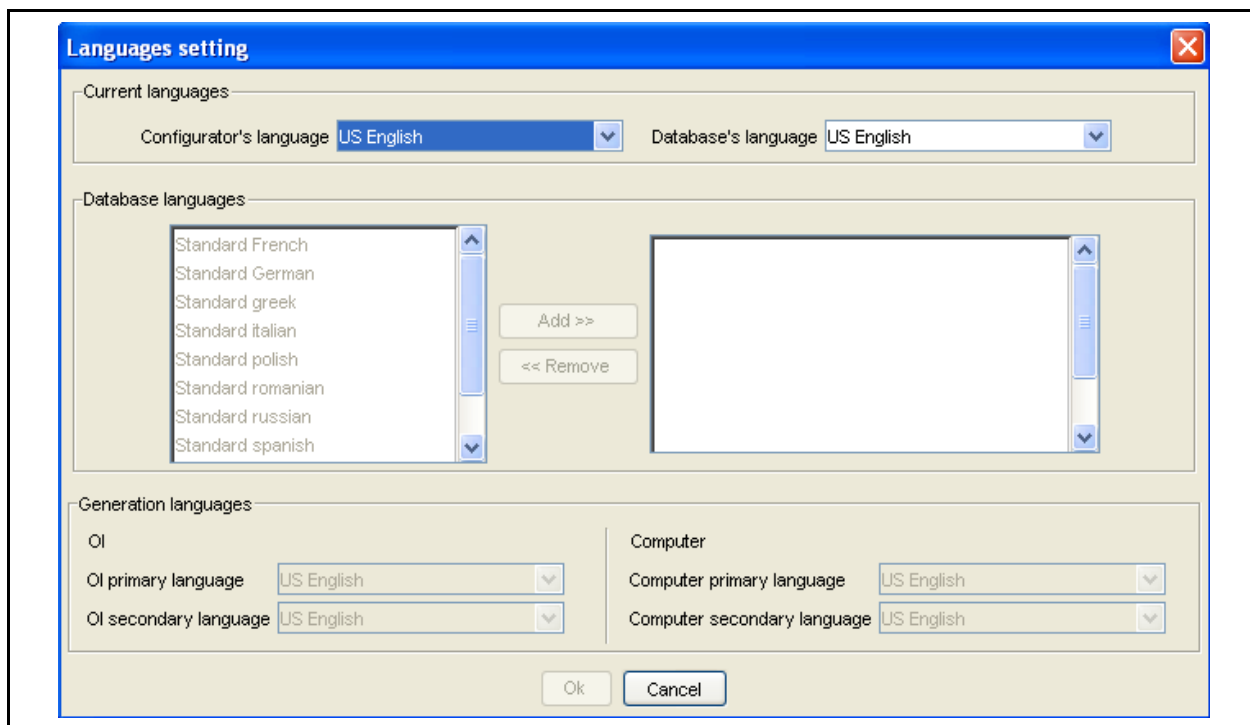


FIGURE 174: LANGUAGES SETTING WHEN NO DATABASE IS OPENED

- a database is opened:

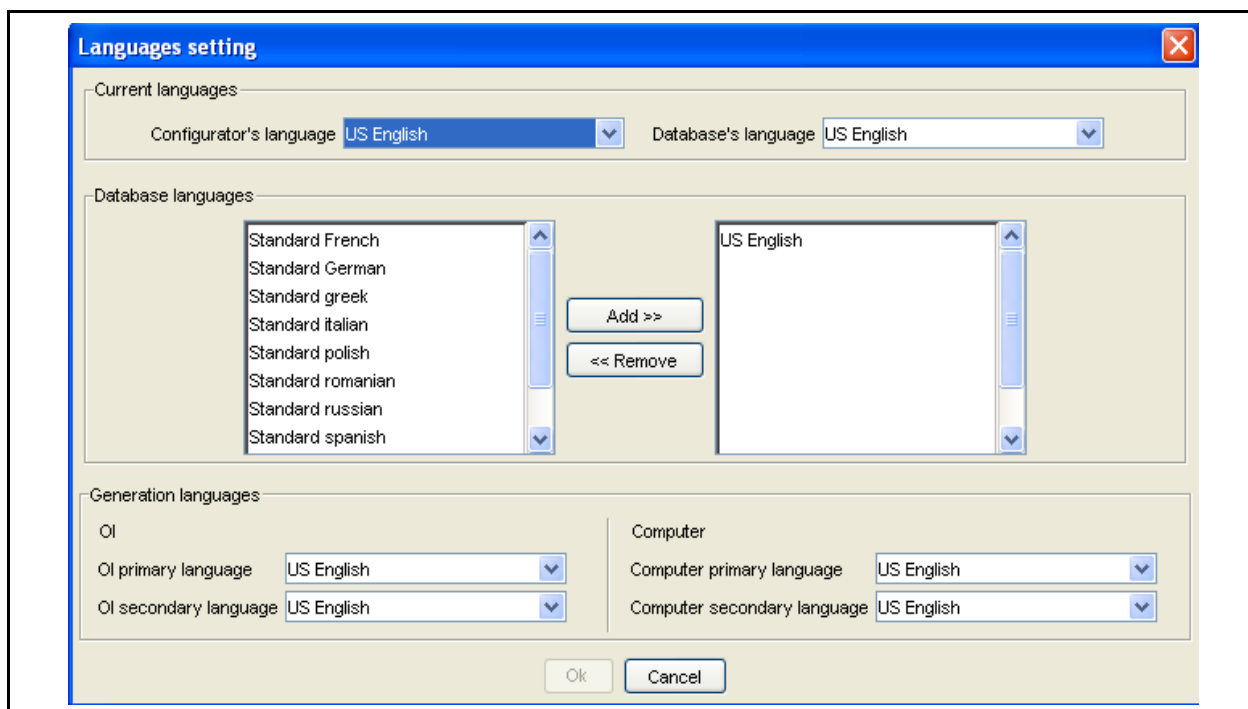


FIGURE 175: LANGUAGES SETTING WHEN A DATABASE IS OPENED

- a released database is opened:

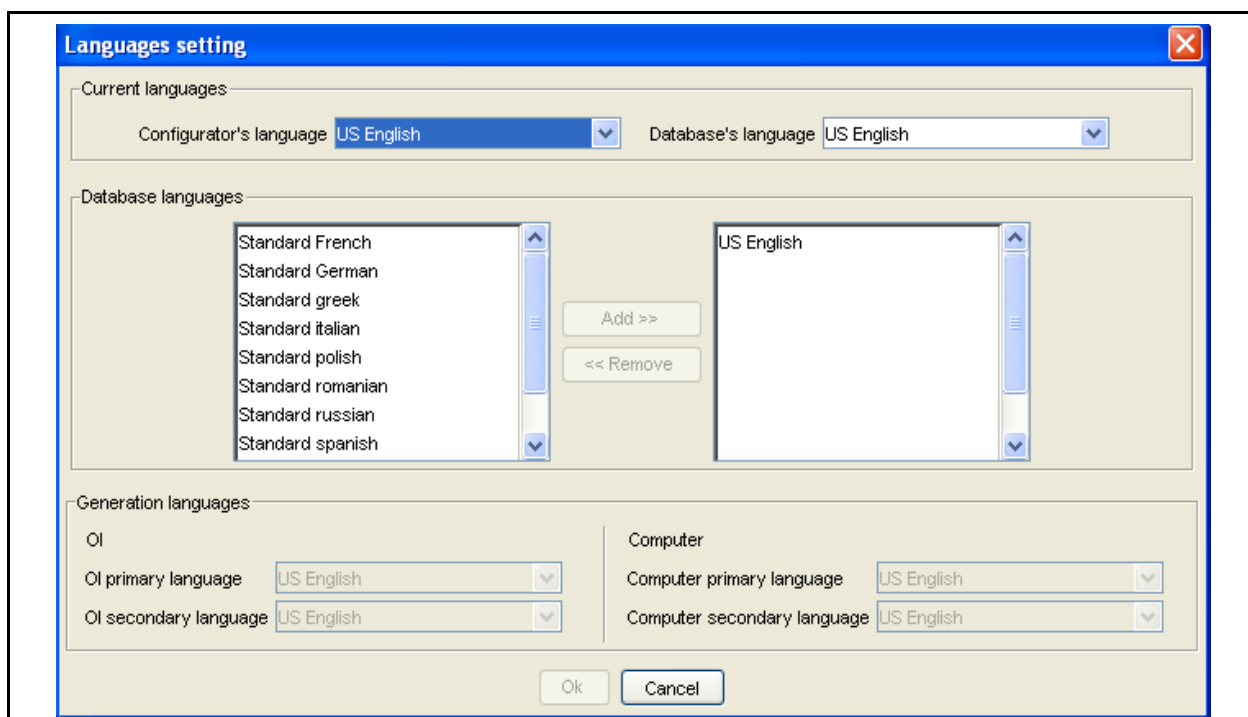


FIGURE 176 - LANGUAGES SETTING WHEN A RELEASED DATABASE IS OPENED

Cancel button is always available and close the dialog box without applying modifications.

OK button is available only if allowed modifications have been done in language selection. Modifications are identified by an asterisk (*) for each modified field. Clicking on OK validates the modifications.

Other call:

- None

Operation:

Current languages

Two combo-boxes are available:

Configurator's language stands for the language used to display the user interface (i.e. the menus, dialog boxes, the button tool tips, labels...),

Database's language has two meanings, depending on context. At first, if no database is opened, the language indicates in which language a database must be created. Secondly, if a database is opened, it indicates in which language the database content must be displayed (i.e. the values of attributes).

When a database is opened, the displayed database language is set to current configurator's language if the language is defined in database, or else, the first created language of the database is chosen.

Database languages

All languages of the current configuration appear in the list Configuration languages.

The remaining available languages appear in the list Available languages.

Add button: to add the selected languages from the "available" list to the configuration. When a language is added all its multi-languages attributes are copied from the current configuration language to the new one if its value is different than default value: if the attribute hasn't been updated by user, the translated default value is used for the new language.

Remove button: to remove the selected languages from the "configuration" list from the configuration. The current language of the PACiS SCE can not be removed.

Adding and removing are effective only when **OK button** is clicked.

Generation languages

These languages are used to localize the generated databases for PACiS OI and PACiS C264 devices.

The languages list could be a subset of configured languages. As of now, the C264 does not support Turkish language.

4.6.5 Tools/Dictionary...

Purpose:

- Open a dictionary editor with all configurable labels that can be translated.

Availability:

- Right dependent

Other call:

- None

Operations:

1. Select Tools/Dictionary item
2. Select the languages to edit and the reference language.



FIGURE 177:DICTIONARY LANGUAGES SELECTION

3. Click the **Next>>** button: the following modal dialog box appears:

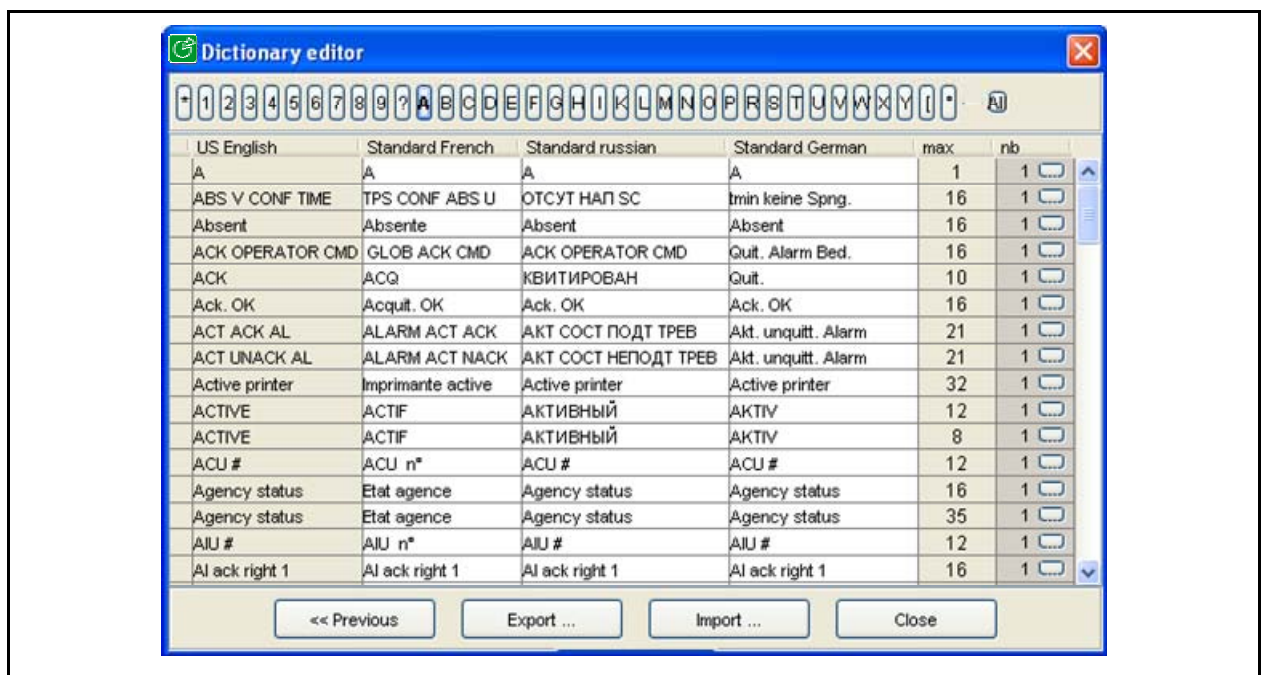


FIGURE 178: TOOLS/DICTIONARY ... DICTIONARY MANAGER

Tool bar:

- The upper tool bar is used to select the labels that must be displayed in the edition area. The selected letter corresponds to the **first letter of the label** in the reference language.
- Only the letters that actually correspond to **existing labels** in the reference language are showed. For instance, if there is no word beginning by the 'a' letter in the reference language then the 'A' letter will not be present in the tool bar.
- The **"ALL"** word allows displaying **all the entries** of the dictionary.

Edition area:

- The **greyed parts** can not be edited by the user. The reference language labels are greyed, unlike the target languages labels.
- The **first column** shows a “mark” if the translation of the corresponding entry was modified.
- A **contextual menu allows to cancel** the modifications of this entry and thus to retrieve the initial values of all translations.
- The user can directly edit a translation inside the cell of a **target language column**.
- The **max length** column contains the maximum length of the label translations.
- The **attribute column** shows the attributes number that are associated with this label. A button allows to display a windows tree structure with all attributes holding this label. This button is contextual and it is displayed when the entry is selected.

Buttons area:

- The **Previous** button leads to the dictionary language selection dialog box in order to change the languages to the current dictionary. This button is greyed if at least one entry is marked as modified by an asterisk in the first column.
- The **Apply** button updates the configuration database with the last modifications without closing the window. After pushing this button, all asterisks are removed from the first column.
- The **Close** button closes the dialog window. If there is some modified field, the PACiS SCE asks to the user to save the data before closing windows.
- The **Cancel** button closes the window discarding the last modifications.
- The **Export** button saves the dictionary as an XML file.
- The **Import** button allows entering a dictionary from an XML file.

```

<?xml version="1.0" encoding="ISO-8859-1"?>
<Root>
  <Header>
    <Date>Thu Sep 09 16:45:47 CEST 2004</Date>
    <Conf>D:\databases\338\338_mydb\338_myDb.mpc</Conf>
    <HRef>US English</HRef>
    <HTarget>Standard spanish</HTarget>
  </Header>
  <Entry max="16">
    <Ref lge="US English">GLB ACK ALARM</Ref>
    <Target lge="Standard spanish">ACQ GLOBAL ALARM</Target>
  </Entry>
  <Entry max="16">
    <Ref lge="US English">GLB CLR ALARM</Ref>
    <Target lge="Standard spanish">BORRADO GBL ALMR</Target>
  </Entry>
  <Entry max="16">
    <Ref lge="US English">GLOBAL CLR ALARM</Ref>
    <Target lge="Standard spanish">ALARMAS BORRADAS</Target>
  </Entry>

```

FIGURE 179 - EXTRACT OF A DICTIONARY XML FILE

4.7 Data Menu

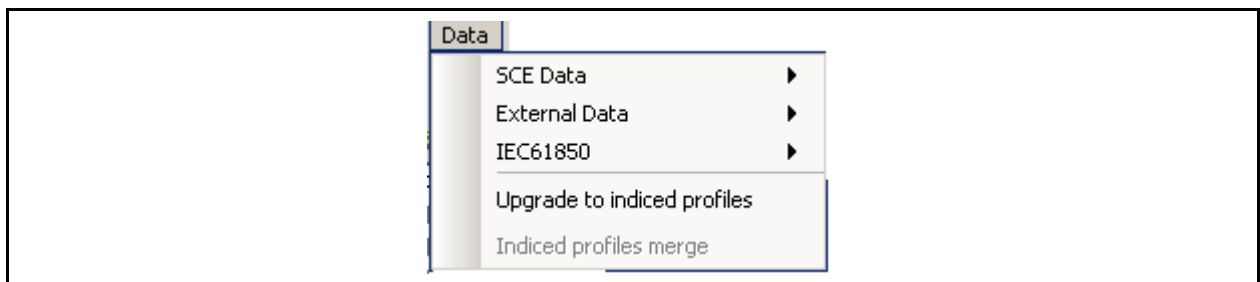


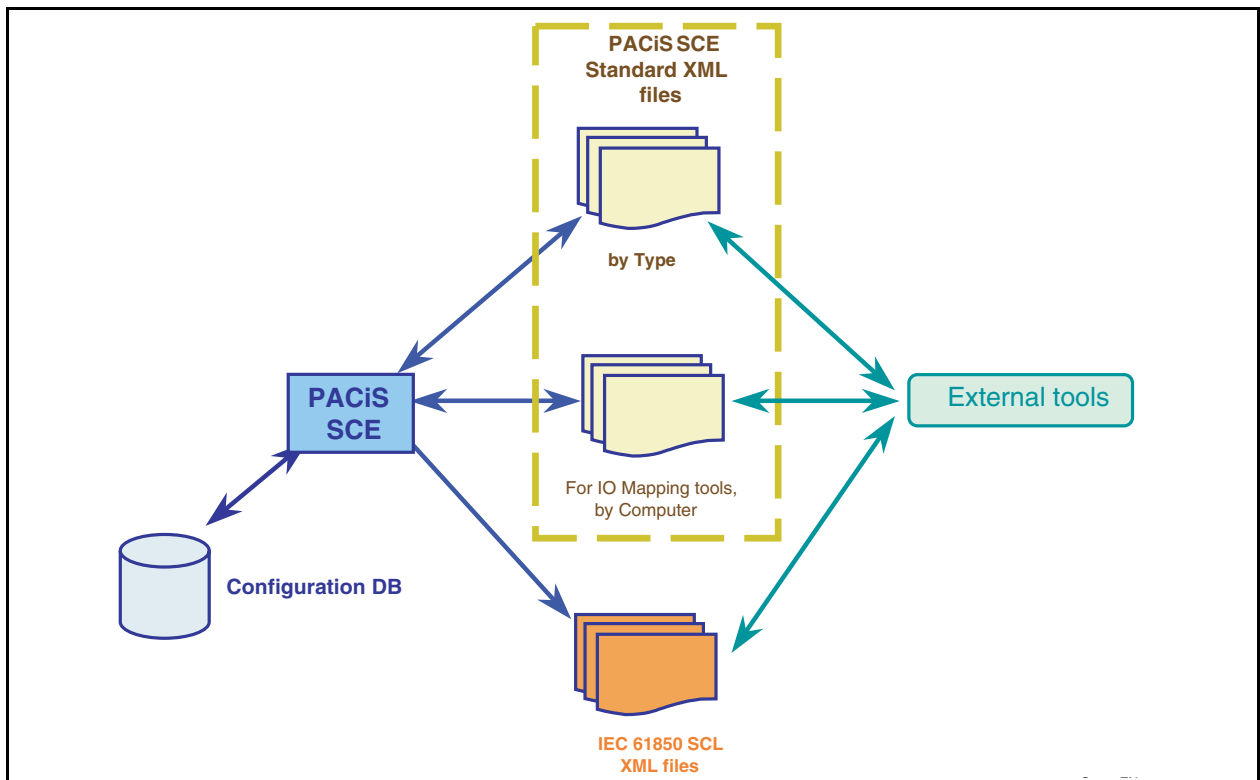
FIGURE 180: TOOLS EXPORT, IMPORT AND REPORT ACTIONS

4.7.1 Data/SCE Data/Export, Import sub-menu

The export/import actions allow to export/import a subset of configuration data to/from **XML files**.

Several **kinds** of export/import are available:

- **Standard** export/import: a PACiS SCE standard XML format has been defined to exchange any data from/to PACiS SCE.
- **IO mapping** export: a specialisation of standard XML export. This export is limited to computers and their mappings: all datapoints and their linked info (profiles, addresses, ...) that are managed by computers.
- **SCL 61850** export: use of IEC 61850 norm to export SBus data.



For export use cases, the **subset of configuration data** is defined by user and depends on the **kind** of exports:

- **Standard export**: a browser allows to select/deselect some objects/templates sub tree. The result query allows this selection too.
- **IO Mapping export**: a browser allows to select/deselect some computers.
- **SCL 61850 export**: a browser allows to select/deselect some IEC61850 devices.

Some **Extra configuration files** attached to data are **excluded** from any import and export actions:

- ISaGRAF and FBD files (Fast and slow automation description)
- Image files included in OI mimics and bay computer mimics

The others **Extra configuration files** attached to data are **included** from any import and export actions:

- XML files of FBD (Fast automation description)
- Image files of FBD (*.png)

4.7.2 Data/SCE Data

4.7.2.1 Data/Sce Data/ Import & Export schema definition

Tools/Import and Tools/Export use the same exchange format.

Object is the central XML element of this format:

Object	
Name	C264
id	Scs-1.EthernetNetwork-1.C264-1
idType	C264
ExtId	Scs Ethernet network C264
Attribute (25)	
Relation (5)	

- **Name** is the PACiS SCE attribute short name of the object,
- **id** is the internal PACiS SCE id of the object;
- **idType** is the type id of the object;
- **ExtId** is the object path name, also called External Id. This path name identifies the object and its parents. It's a concatenation of short name of each parents of the object;
- **Attribute(s)** is a PACiS SCE attribute of the object with:
 - id is the internal mnemonic of the attribute,
 - Name is the label that is used by PACiS SCE Attribute editor,
 - Value is the value of the attribute,
 - ReadOnly is a flag that indicates the attribute is read only or not
 - and eventually Desc is the textual description of an enumerate value.

In the following example, an attribute is displayed in each line, so 8 attributes are displayed:

Attribute					
Attribute (25)					
	id	Name	Value	ReadOnly	Desc
1	AliasTCPIP	network name	C264A	false	
2	RackModel	rack model	1	false	80 TE
3	ShortName	short name	C264	false	
4	LongName	long name	C264 Computer	false	
5	xPSFilteringTime	filtering delay (ms)	0	false	
6	DateFormat	date format	0	false	YY/MM/DD
7	MVFilteringTime	filtering delay (ms)	0	false	
8	AddressTCPIP	TCP/IP address	255.255.255.255	false	

- **Relation(s)** is the definition of a link between this object and another object:
 - this link or relation is typed;
 - the other object is defined by its identifiers (internal and external);
 - and, optionally, relation has its own attribute(s).

In the following example, the relation describes the link client/server between two devices. This kind of link has an attribute, DataModelAndGooseUsage, which defines the type of SBus communication between these two devices.

Relation																							
Relation <table> <tr> <td>Name</td><td></td></tr> <tr> <td>id</td><td>Scs-1.EthernetNetwork-1.UCA2Gtw-1.UCA2Client_ClientServer_UCA2Server-1</td></tr> <tr> <td>RelationType</td><td>UCA2Client_ClientServer_UCA2Server.UCA2Server</td></tr> <tr> <td>TargetObjectId</td><td>Scs-1.EthernetNetwork-1.UCA2Gtw-1</td></tr> <tr> <td>TargetObjectExtId</td><td>Scs Ethernet network GTW</td></tr> <tr> <td colspan="2"> Attribute <table> <tr> <td>id</td><td>DataModelAndGooseUsage</td></tr> <tr> <td>Name</td><td>modeling/goose usage</td></tr> <tr> <td>Value</td><td>0</td></tr> <tr> <td>ReadOnly</td><td>false</td></tr> <tr> <td>Desc</td><td>Data model only</td></tr> </table> </td></tr> </table>		Name		id	Scs-1.EthernetNetwork-1.UCA2Gtw-1.UCA2Client_ClientServer_UCA2Server-1	RelationType	UCA2Client_ClientServer_UCA2Server.UCA2Server	TargetObjectId	Scs-1.EthernetNetwork-1.UCA2Gtw-1	TargetObjectExtId	Scs Ethernet network GTW	Attribute <table> <tr> <td>id</td><td>DataModelAndGooseUsage</td></tr> <tr> <td>Name</td><td>modeling/goose usage</td></tr> <tr> <td>Value</td><td>0</td></tr> <tr> <td>ReadOnly</td><td>false</td></tr> <tr> <td>Desc</td><td>Data model only</td></tr> </table>		id	DataModelAndGooseUsage	Name	modeling/goose usage	Value	0	ReadOnly	false	Desc	Data model only
Name																							
id	Scs-1.EthernetNetwork-1.UCA2Gtw-1.UCA2Client_ClientServer_UCA2Server-1																						
RelationType	UCA2Client_ClientServer_UCA2Server.UCA2Server																						
TargetObjectId	Scs-1.EthernetNetwork-1.UCA2Gtw-1																						
TargetObjectExtId	Scs Ethernet network GTW																						
Attribute <table> <tr> <td>id</td><td>DataModelAndGooseUsage</td></tr> <tr> <td>Name</td><td>modeling/goose usage</td></tr> <tr> <td>Value</td><td>0</td></tr> <tr> <td>ReadOnly</td><td>false</td></tr> <tr> <td>Desc</td><td>Data model only</td></tr> </table>		id	DataModelAndGooseUsage	Name	modeling/goose usage	Value	0	ReadOnly	false	Desc	Data model only												
id	DataModelAndGooseUsage																						
Name	modeling/goose usage																						
Value	0																						
ReadOnly	false																						
Desc	Data model only																						

The description of PACiS SCE exchange format is completely defined by schema file (*.xsd) in PACiS SCE installation directory: PACiS SCE\y\data\dtd/**ExportDb.xsd**

4.7.2.2 Data/Sce Data/Export...

Purpose:

Export in XML zipped files the selected **part of current database**.

The selection of data is made in a browser displaying the three categories of objects (electrical, system and graphical) and templates split in the 3 previous categories, corresponding to the main entry point of the template.

The exported data can be issued from the result of a query.

Standard export **produces multiples XML files**:

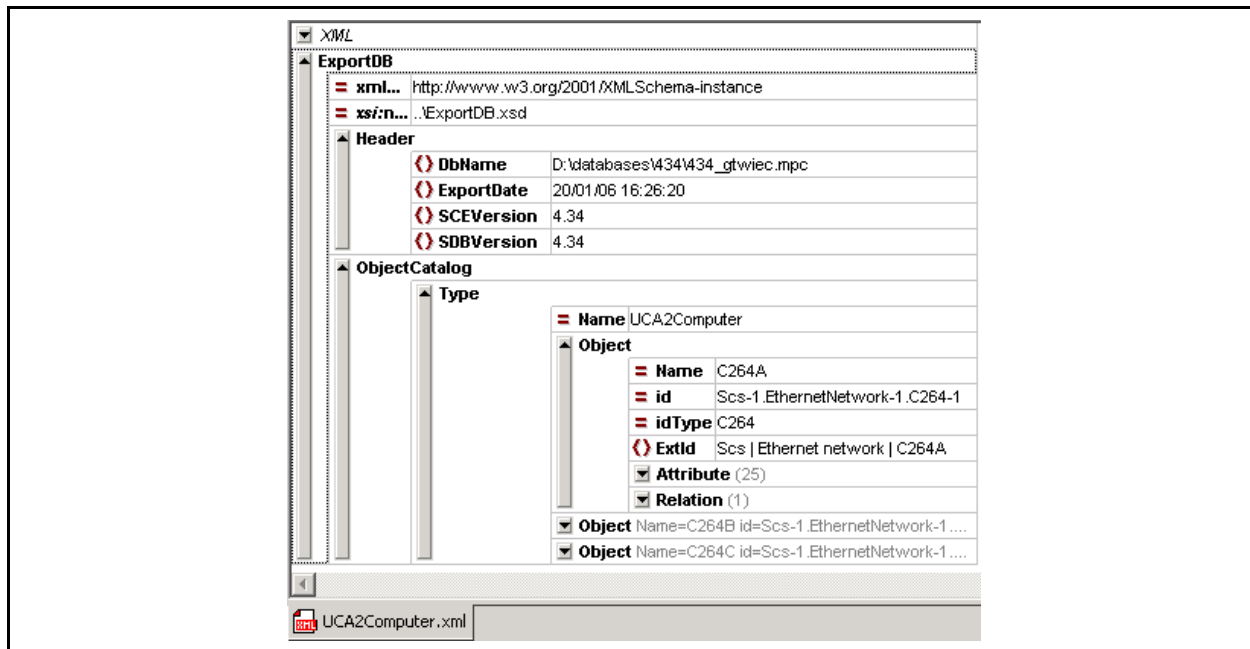
- **One file for each type** of exported objects and one file for each type of exported templates.

NOTES: - Each XML file uses the **standard PACiS SCE XML format**.

- One file contains only one type of objects.

- Two sub-directories are exported, one contains all objects files, and the other all templates files.

In the following example, the file UCA2Computer.xml contains three computers. A header element defines the context of this export.



- The **Extra configuration files**: for the FBD objects or templates, a sub-directory (Fbd) is exported and it contains all XML files image files of FBD.

Standard export produces also some files used only for **reporting use cases**. These files are not used by import use cases.

- **Hierarchy.xml**: XML file containing all the object/template hierarchy exported.
- **Catalog.xml**: XML file containing the list of files exported for each object/template types.
- **ExportDB.xsd**: schema of exported XML files. Only for info.

Availability:

- Right dependent

Other call:

- None

Operation:

1. Select Data/Sce Data/Export item
2. A browser appears. Select the part of work database to export.

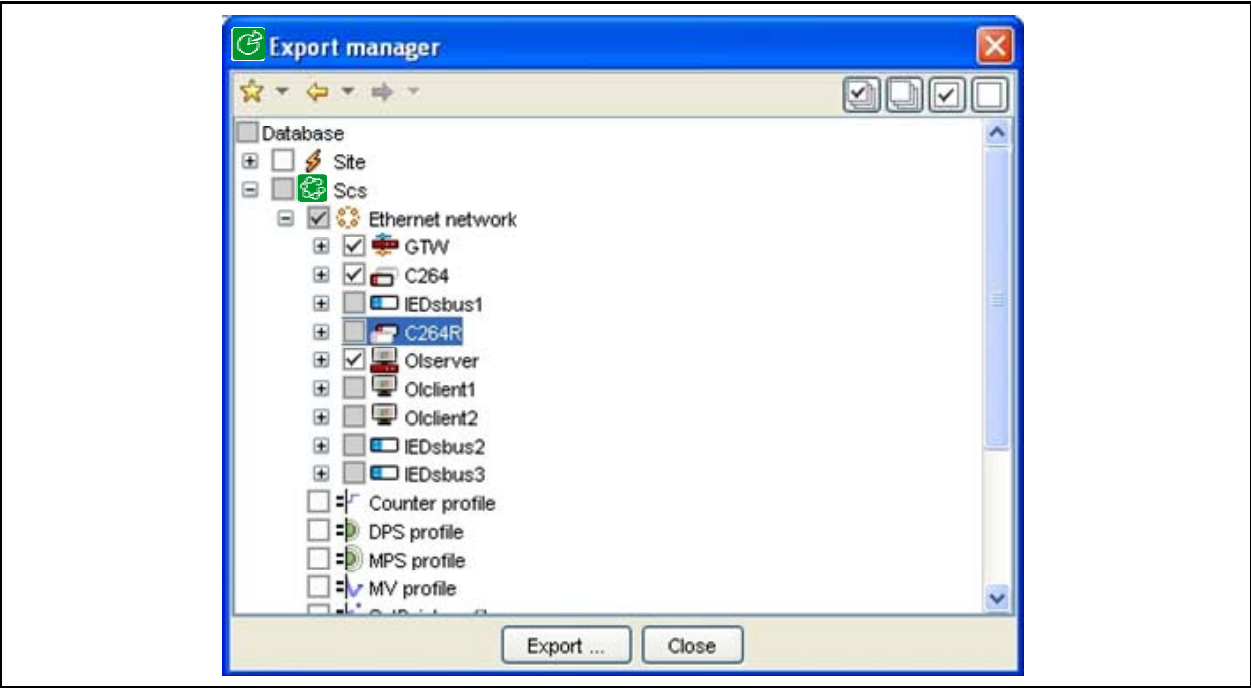


FIGURE 181 - DATA/SCE DATA/EXPORT SELECTION

1. Click the Export button.
2. A window pop-up to define directory and name of zip file
3. The exported files are stored in this ZIP file.

4.7.2.3 Data/Sce Data/Import...

Purpose:

Import XML files. The following actions are taken into account during this import:

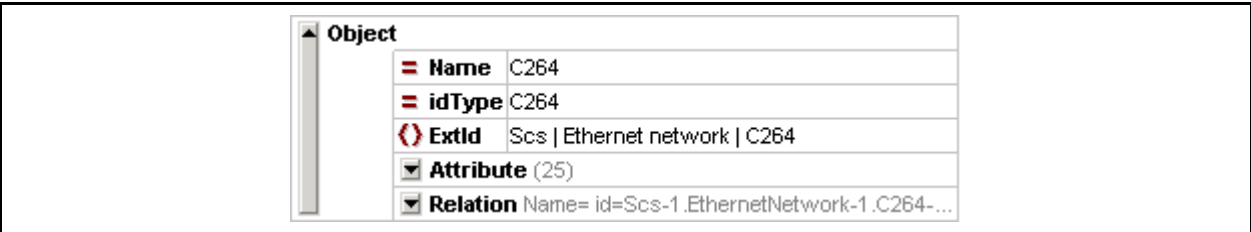
- object attributes and relations modifications,
- object creations,
- object instantiation from template,
- object deletions.

Standard import is available for one XML file or for ZIP file that contains several XML files. In this case, the XML files are imported with file name alphabetic order.

In an XML file, only **Object elements** are taken into account during import process, with file reading/parsing order. The XML element Type which could group objects with the same type is not taken into account. The Object elements that represent **PACiS SCE template are not imported**.

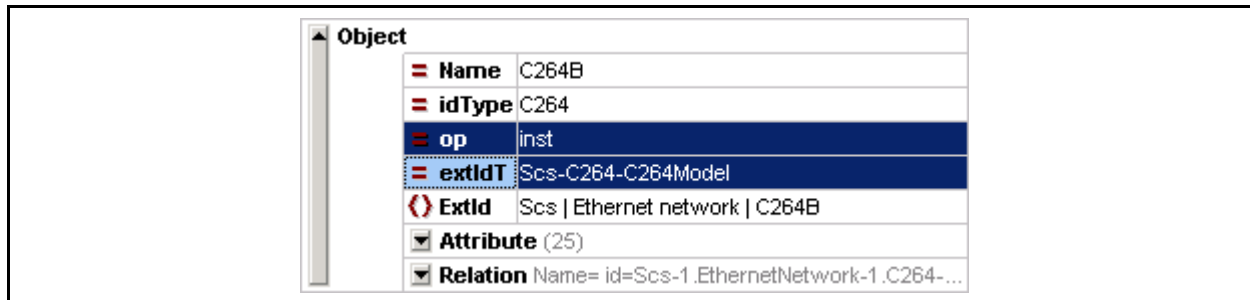
Import format is the standard **PACiS SCE XML format**. So, the complete XML description (attributes, relations) of a PACiS SCE object, is the result of the Standard export use case.

By default, Object is imported in **creation/updating** mode: if the object already exists, it is updated, otherwise it is created.

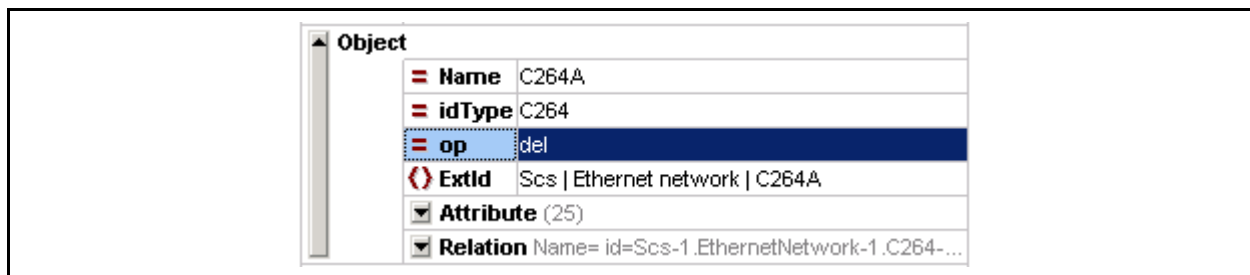


Some **other explicit actions** are available during import:

- **instantiate** a template. An attribute op with key word "inst" as value is defined. Another attribute extIdT contains the identifier of template to instantiate.



- **delete** an object. An attribute op with key word "del" as value is defined. It indicates that object must be deleted.



Remark 1:

XML Attribute Name is optional. It is used to modify the PACiS SCE attribute Shortname of the object. If XML Attribute Name is not defined, ExtId must be defined; the last part of ExtId is used instead of XML Attribute Name.

Remark 2:

XML Attribute id and sub-element ExtId are both optional, but one at least must be defined to identify the object during import into database. To search the object in database, XML Attribute Id is used at first. If Id is not defined, ExtId sub-element is used. When ExtId is used, if two objects at the same hierarchical level have the same external Id, an extra discrimination is done based on its idType. This idType is used to determine the basic class of the object. The external Id + this determined class must define a unique key.

Remark 3: (relative to Extra Configuration files of FBD)

In the sub-directory Fbd, the XML files of FBD are imported **only** if the corresponding diagram exists in database. Each XML file of FBD has a "FBType" element with the "ExtId" attribute that is the external Id of its corresponding diagram in order to find it.

Availability:

- Right dependent

Other call:

- None

NOTE: the Import function is NOT fit for importing databases especially the graphics.

Operation:

1. Select **Data/SCE Data/Import** item
2. A file chooser appears. Select one or more xml files or archive files. The import treatment is then applied on all selected files.

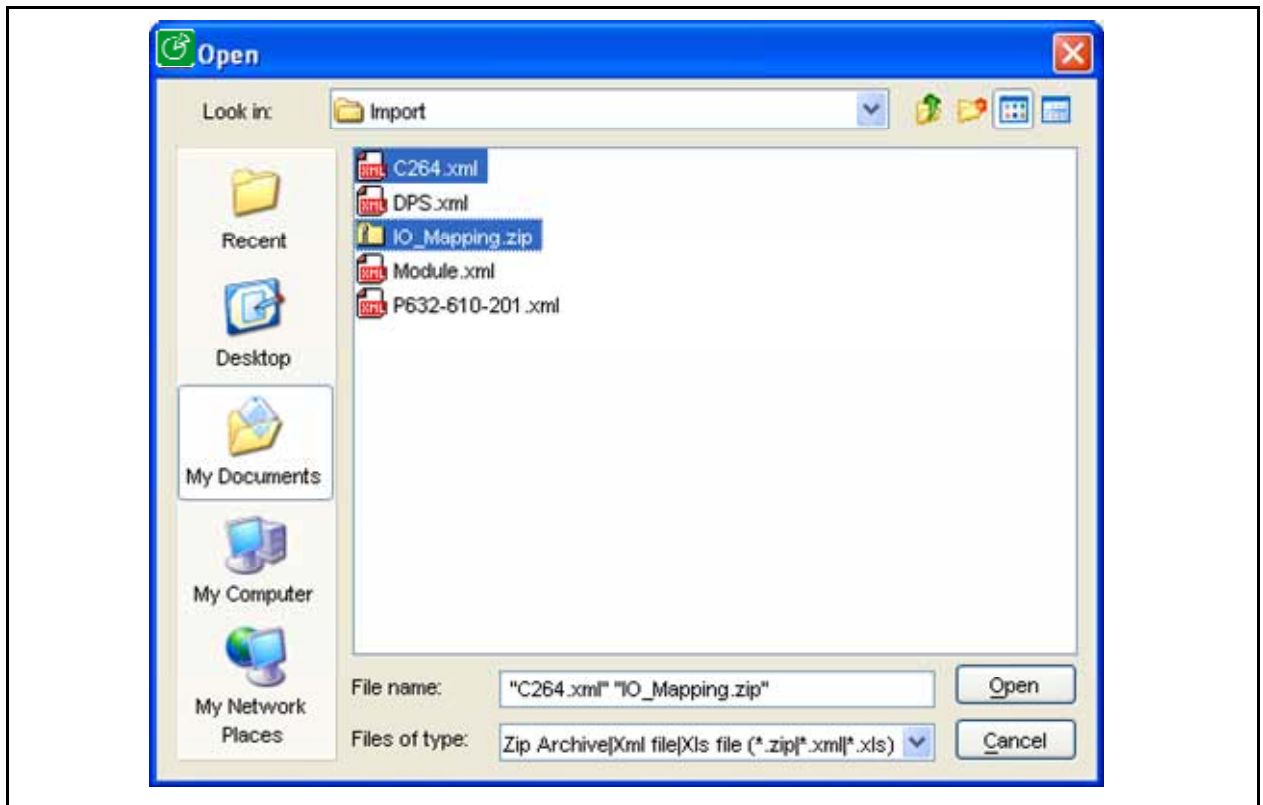


FIGURE 182: DATA/SCE DATA/IMPORT FILE CHOOSER

4.7.3 Data/Sce data/Report...

Purpose:

- Creation of a **report from an archive file** created by Data/Query or Data/Export function. The **format** of the report is ***.pdf**.

Availability:

- Right dependent

Other call:

- None

Operation:

1. Select **Data/SCE Data/Report...** item. A file chooser appears.



FIGURE 183: DATA/SCE DATA/REPORT ARCHIVE FILE SELECTION

2. Choose an archive that has been created by a previous Data/SCE Data/Export action.
3. A pdf report document is then displayed with a pdf reader. A pdf file is created in the same directory than the selected archive with the same name. This report contains a full description of all data of the selected archive.

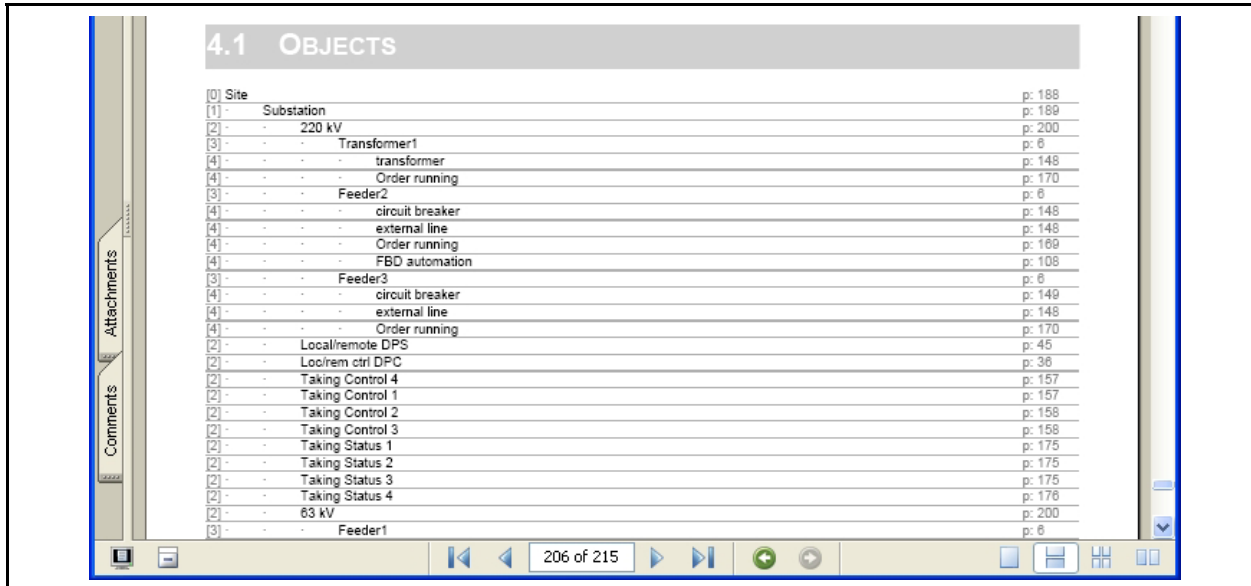


FIGURE 184 - DATA/SCE DATA/REPORT PDF FILE RESULT

Scs Ethernet network C264M	
network name	C264
rack model	1
short name	C264M
long name	C264 Computer
filtering delay (ms)	0
date format	0
filtering delay (ms)	0
TCP/IP address	100.100.100.100
spare	0
short meas. transmission cycle (ms)	500

FIGURE 185 - TOOL/REPORT OBJECT DESCRIPTION FORMAT

4.7.4 Data/External Data/Export FBD

Purpose:

- Export in XML format FBD automations or FBD interlocks.

The exported files are stored in a ZIP file which can contain in according to the user choice:

- One XML file per FBD describing the FBD plus one XSD file describing the schema of a FBD XML file. The XML file is linked to an XSD schema: therefore it must be valid. This file is used after updating by the FBD Editor (The EqViewer software); it contains:
 - the general data
 - the interface data (inputs, outputs)
 - the Function Block data (type, location)
 - the connection data (source, destination)

- One PNG file per FBD which is the graphical representation of the FBD. Even if the FBD has been created on 2 or 4 pages in the FBD Editor, only one PNG file is generated. The image size depends on the useful area of FBD.
- One PDF file which is a report of all selected FBD in the dialog box. It is generated in A4 format with the landscape orientation. It contains

- a cover page (see figure 186)
- a blank page
- the FBD list (see figure 187)

For each FBD

- the diagram picture (see figure 188)
- the input list (see figure 189)
- the output list (see figure 190)

Availability:

-

Other call:

- None

Operation:

- Export of FBD can be done by two ways: One by one and globally

NOTE: The following explanations concern a FBD automation but are valid too for a FBD interlock

- Export one by one:
 1. Right-click the FBD to export. Then in the contextual menu click **Export FBD....**

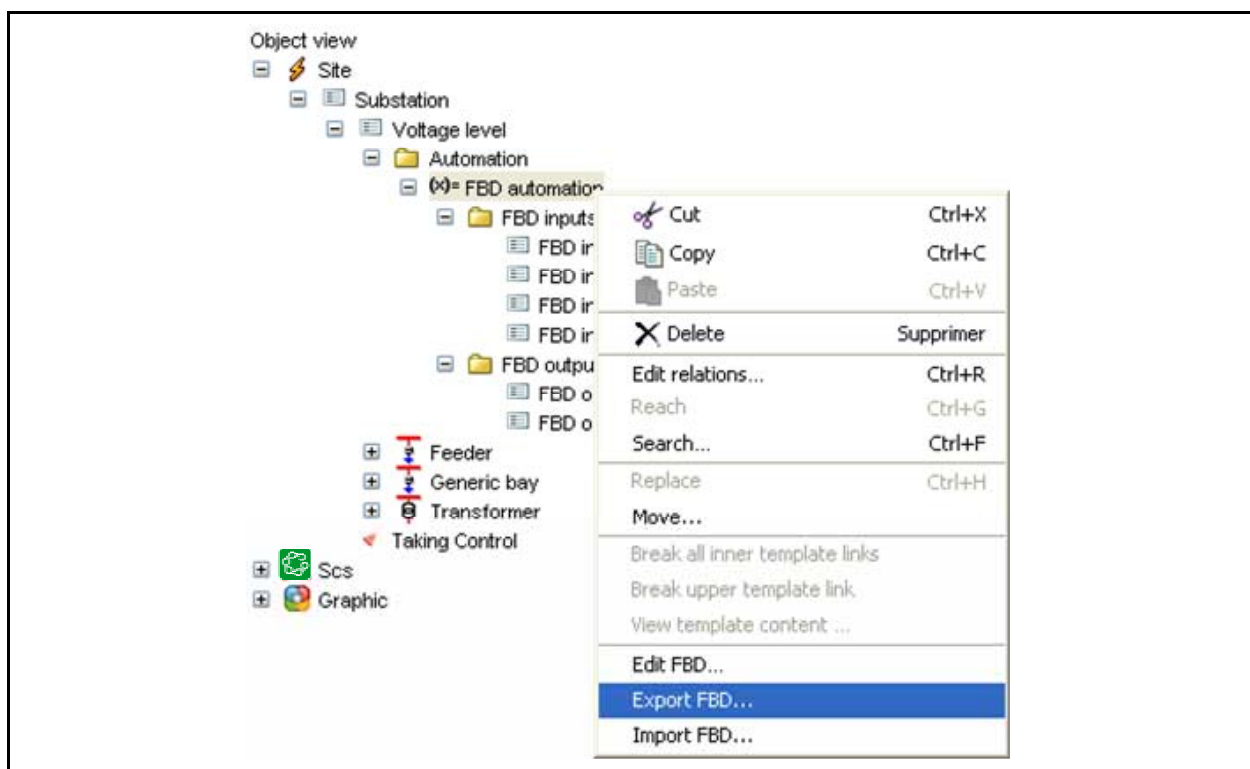


FIGURE 186: SELECTION OF THE FBD TO EXPORT

2. A **Save** dialog box is displayed in order to choose the destination folder and the filename (extension **xml**). When done click the **Save** button.

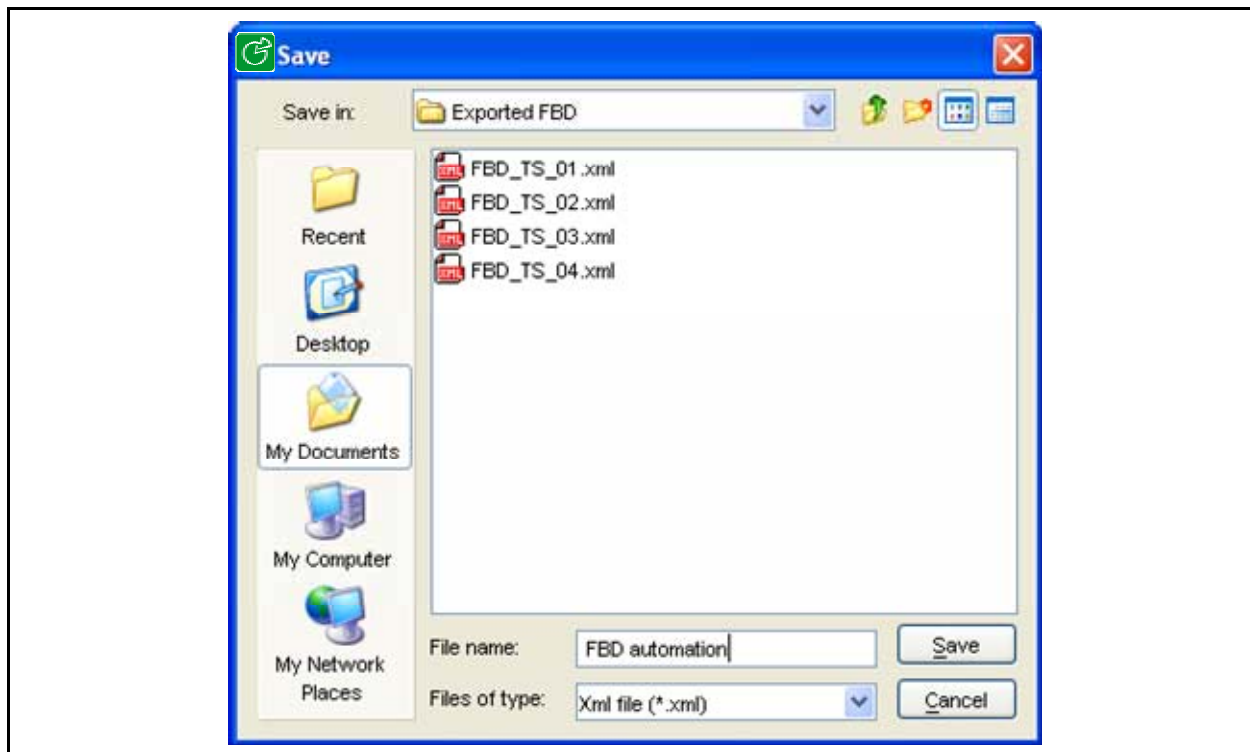


FIGURE 187: SELECTION OF THE DESTINATION FOLDER AND THE FILENAME

- Export globally:
 1. Click **Data/External data /Export** item: the **FBD Export** dialog box is then displayed
 2. Select the check box of the FBD to export
 3. Select the output file format (XML, PNG, PDF)
 4. Click the **Run** button.

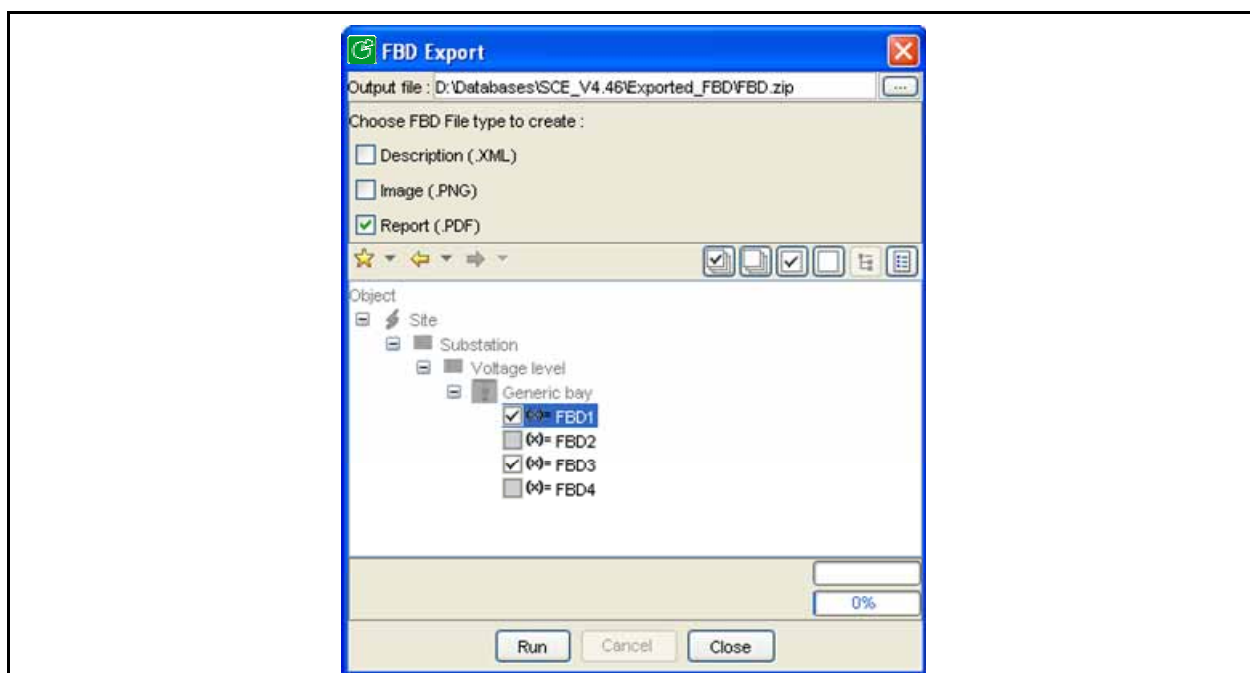


FIGURE 188: GLOBAL FBD EXPORT DIALOG BOX

- 5. A **Save** dialog box is displayed in order to choose the destination folder and the filename (extension **zip**). When done click the **Save** button. A popup window informs that the export is running.

The followings figures give an example of some pages of the pdf file generated by the FBD Export function:

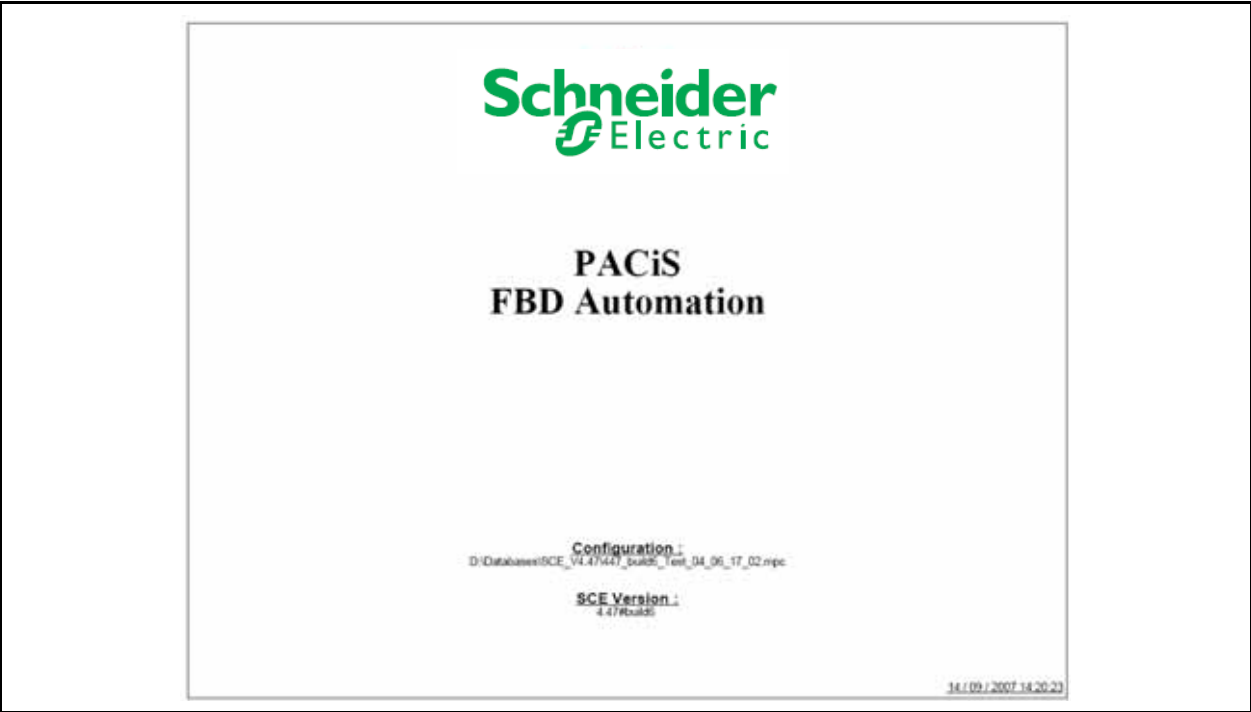


FIGURE 189: THE COVER PAGE OF THE FBD AUTOMATION REPORT



FIGURE 190: THE LIST OF EXPORTED FBD

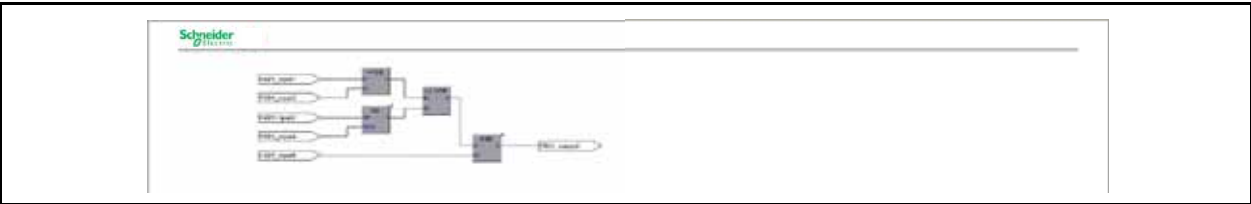


FIGURE 191: THE DIAGRAM OF FBD1

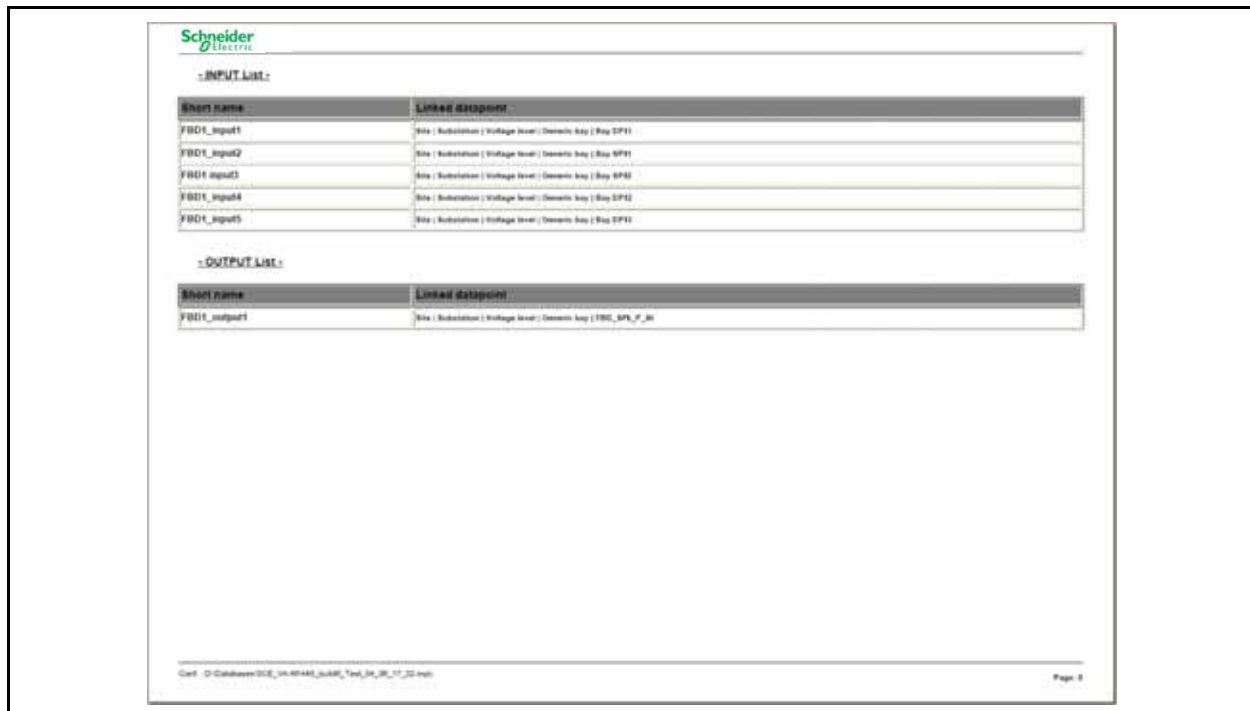
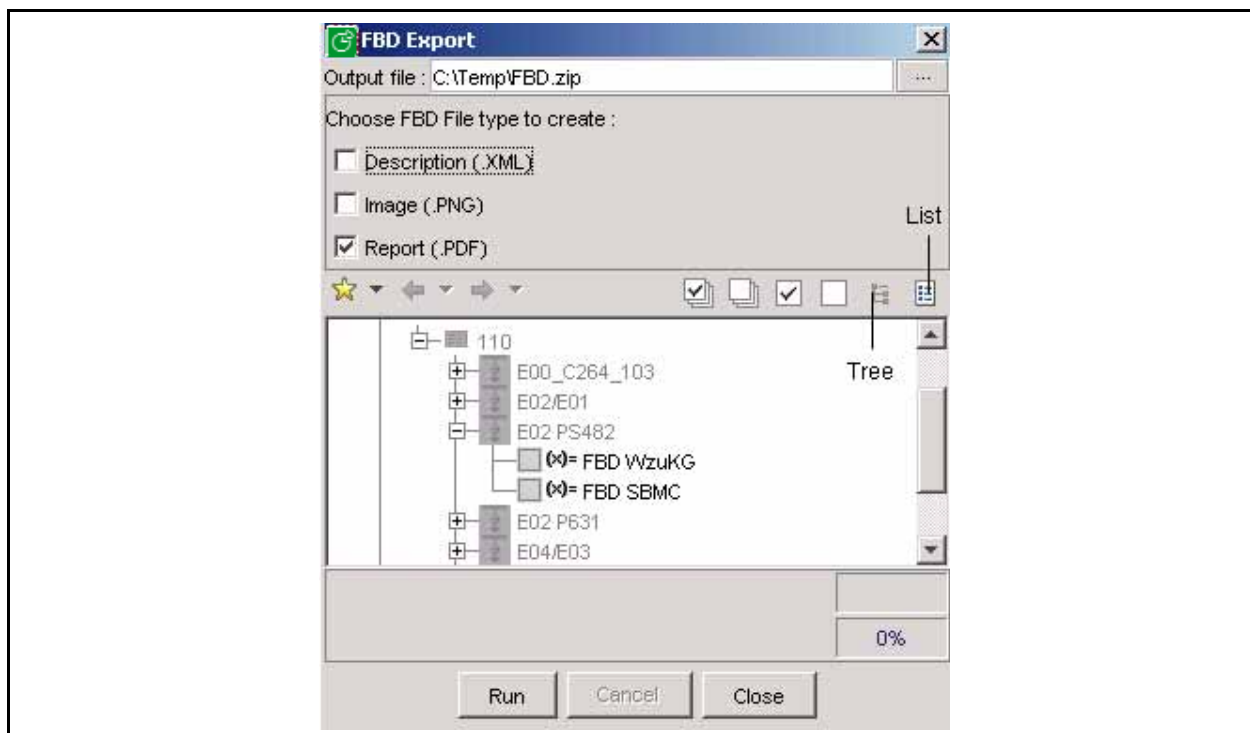


FIGURE 192: THE INPUTS AND OUTPUTS LISTS OF FBD1

- Export to file:

The user can access to this function by clicking in tools\Export FBD menu.

A dialog box presents all FBD available on database and allows selecting all or part of them. The spare and template objects are not available.



The user has to define the output file, the FBD type to create (XML, MNG or PDF file) and also has to select which FBD he wants to export. The display of FBD can be based on Tree mode or List mode

4.7.5 Data/SCE Data/Import FBD

Purpose:

- Import in XML format FBD automations or FBD interlocks.

Availability:

- A FBD (automation or interlock) is present in the working database

Other call:

- None

Operation:

- Import of FBD can be done by two ways: One by one and globally.

Note: The following explanations concern a FBD automation but are valid too for a FBD interlock

- Import one by one:
 1. Add a FBD automation to the selected level (in the example given hereafter the selected level is **Feeder**). This is done via the “**Object entry**” area associated to the selected level (**Feeder** in our example) by expanding **User function** then double-clicking **FBD automation** (or right-clicking it and then clicking **Add**)

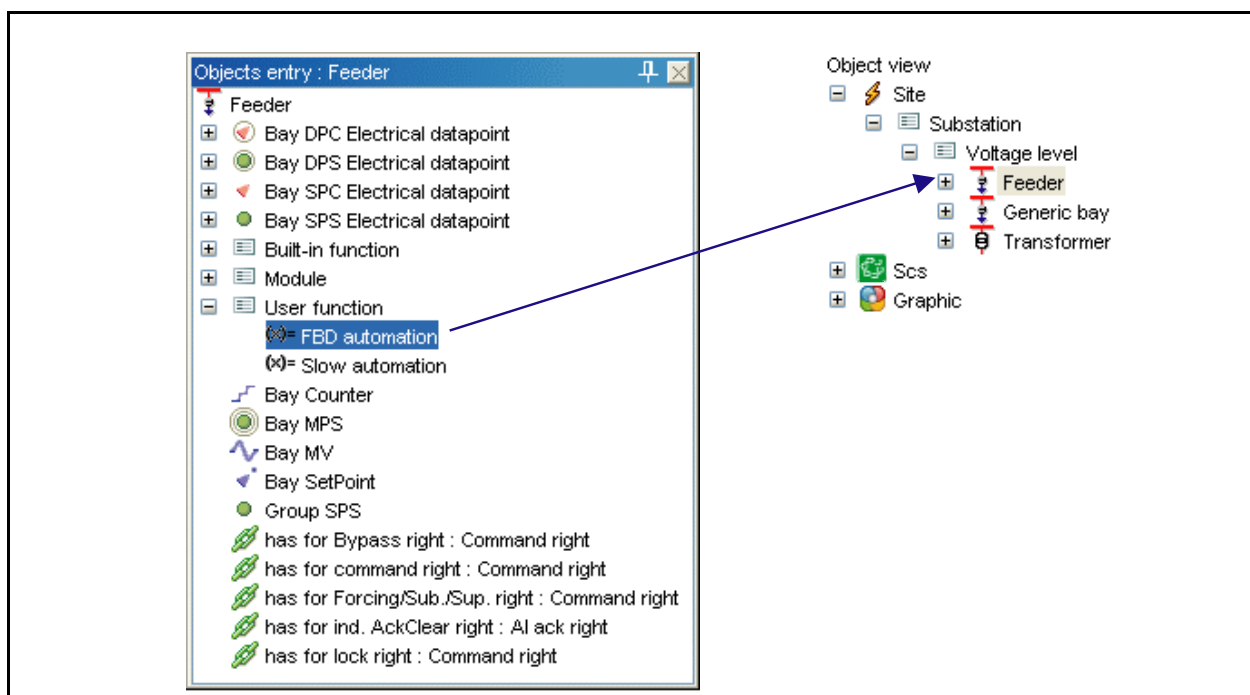


FIGURE 193: ADDING A FBD AUTOMATION TO A FEEDER

2. Right-click the newly created FBD. Then in the contextual menu click **Import FBD....**

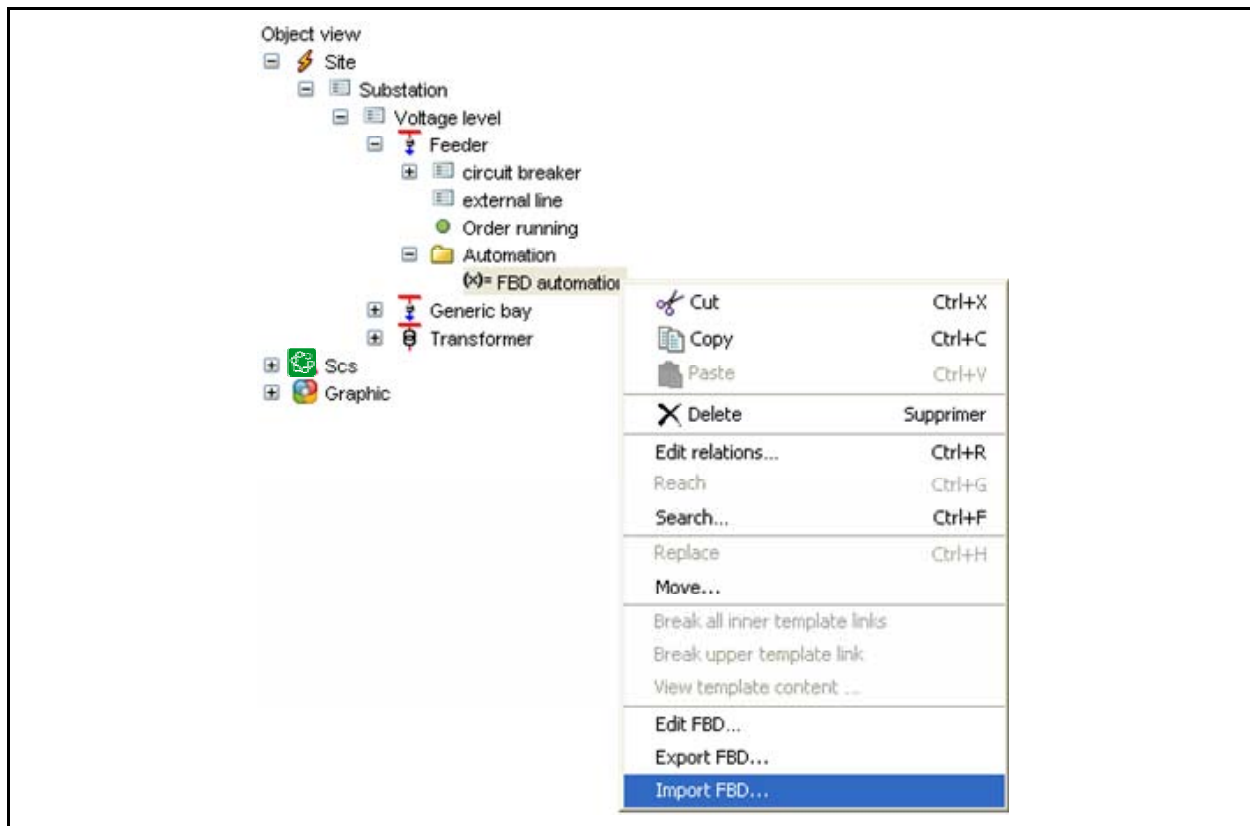


FIGURE 194: SELECTION OF THE FBD TO IMPORT

3. An **Open** dialog box is then displayed in order to choose the origin folder and the name of the xml file to import (**FBD_TS_03.xml** in our example). When done click the **Open** button.

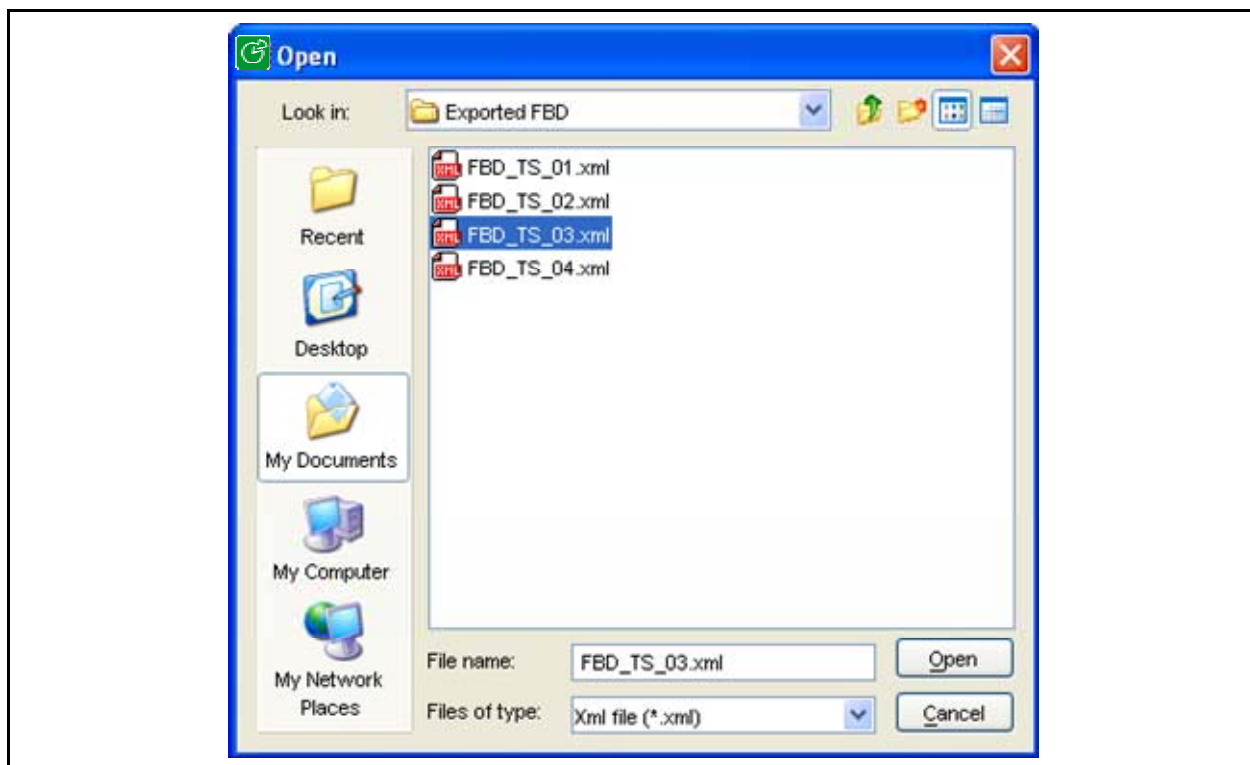


FIGURE 195: SELECTION OF THE XML FILE TO IMPORT

4. The FBD automation is then present at the **Feeder** level.

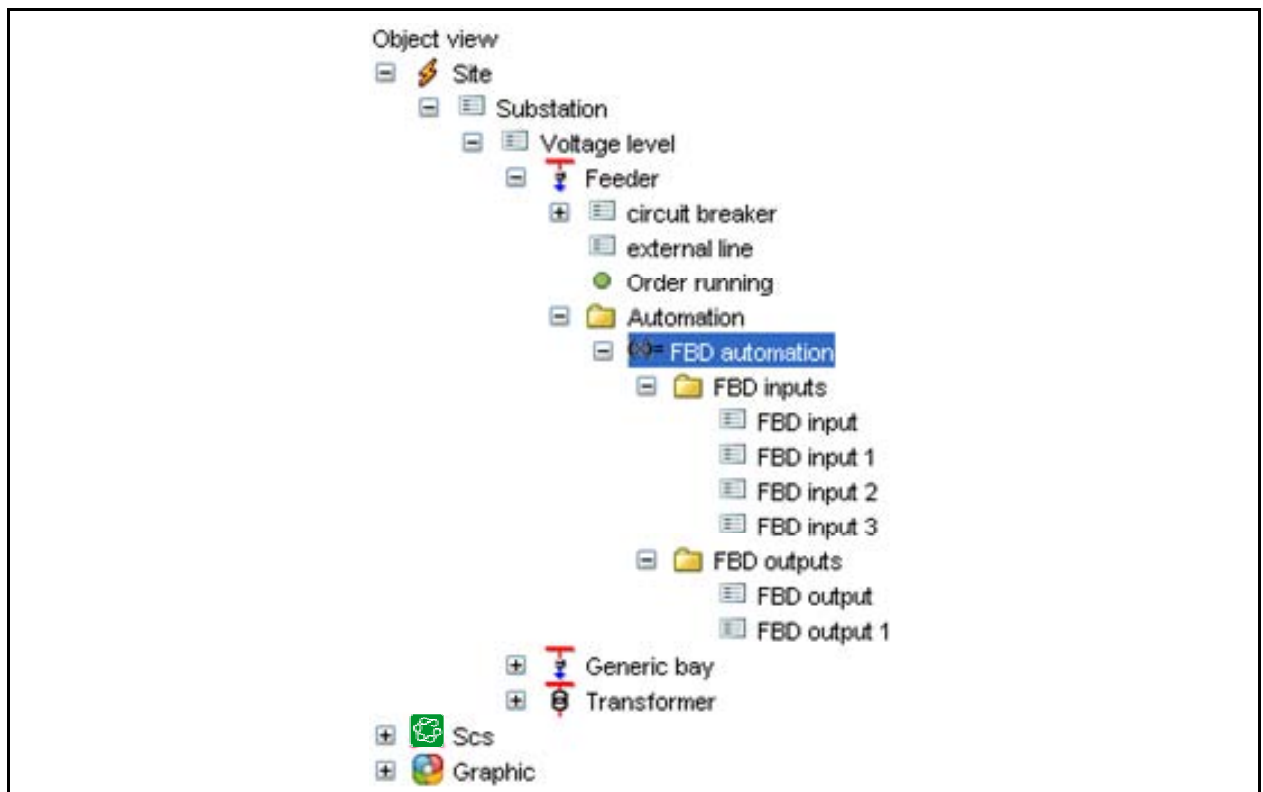


FIGURE 196: THE IMPORTED FBD AUTOMATION

- Import globally:
 1. Click **Data/SCE Data/Import** item
 2. An **Open** dialog box is then displayed in order to choose the origin folder and the name of the zip file to import (**Two_FBD.zip** in our example. This file has been previously created with the Tools/Export function and contains two FBD: FBD 1 and FBD 2). When done click the **Open** button.
 3. FBD 1 and FBD 2 are present at the feeder level

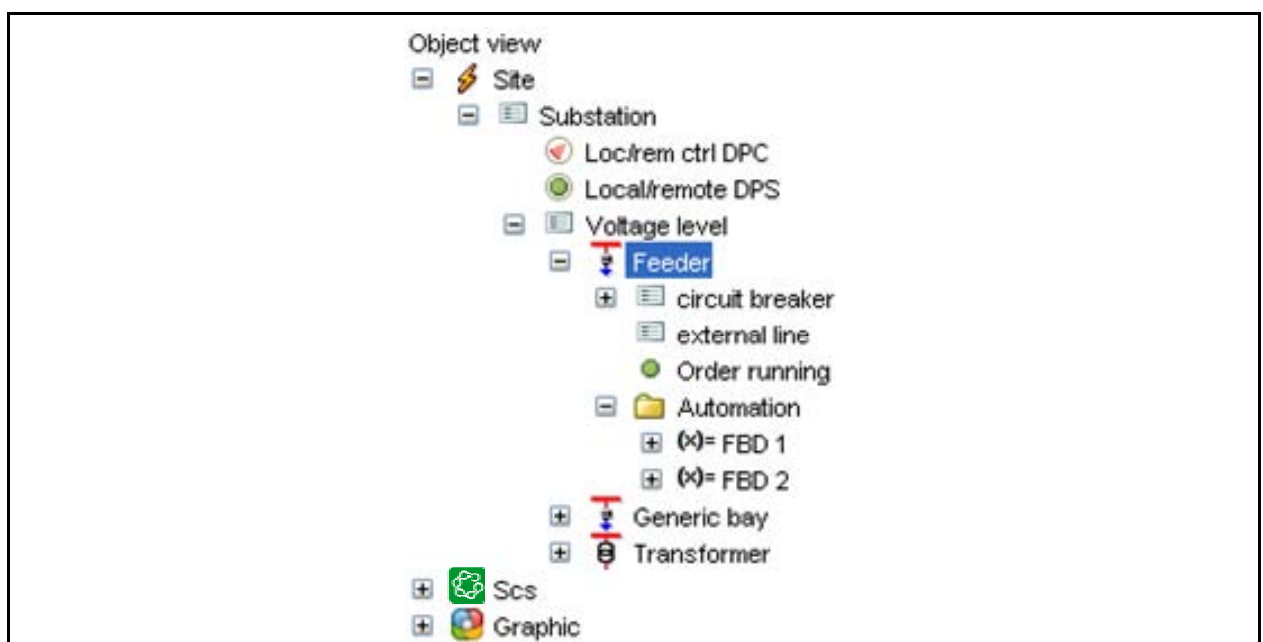


FIGURE 197: THE GLOBALLY FBD IMPORT FUNCTION

4.7.6 Data/External data/Export IOMapping...

Purpose:

- This export is a specialization of standard export: it allows to **export the IO mapping of C264 devices**.

It uses the same XML schema but the exported files and the data selection are different.

The exported files are stored in a ZIP file.

IO Mapping Export produces multiple XML files:

- **1 file for all profiles** named <1 - Profiles.xml>,
- **1 file for all selected C264**, named <2 - Equipement.xml>,
- **n files**, one for **each selected C264**, named <3 - computer's short name.xml>.

Each XML file respects the standard PACiS SCE XML format and hierarchy.

Profiles:

This file is build with all profiles found directly under Scs root and which respect the pattern *_[n].

Equipment:

This file is built with all equipment of the database (even if not selected in dialog box) and describes each one:

- for a C264, it gives all cards, SCADA networks, Legacy networks (IED) and printers,
- for a Gateway, it gives all SCADA networks,
- and for OI, it gives all printers.

Computer(s):

The last files are built for each selected C264 and define all datapoints managed by this computer and their addresses (linking + SCADA + IED). They contain the following information:

- SCADA address (of other devices or of the computer) used by datapoints managed by the computer,
- IED address of the computer,
- Voltage Level,
- datapoints on Voltage Level,
- Bays managed by computer,
- datapoints on Bays level,
- Modules,
- datapoints on Modules level

Remark 1:

In each file, the objects are sorted by their external id (= ExtId = path of short names of the hierarchy of the object).

Remark 2:

If an object is an instance of a Template and is the main object, XML attributes **op** and **extIdT** are added: **op** with "inst" as value and **extIdT** with external id of template to instantiate as value. The external id of a template is the name of template that is displayed in template navigator. For example, if a C264 is an instance of template Scs-C264-C264 Model:

Object	
Name	aC264
id	Scs-1.EthernetNetwork-1.C264-4
idType	C264
op	inst
extIdT	Scs-C264-C264Model
ExtId	Scs Ethernet network aC264
Attribute	(25)
Relation	(1)

Remark 3:

The relations are factorized. For example, an object "Group SPS" has several relations with other SPS; each one uses the same type of relation. In this case, only one XML element Relation contains all sub-element TargetObjectExtId. Each TargetObjectExtId sub-element defines the external identifier of each linked object.

Object	
Name	Group SPS
id	Site-1.Subst-1.VoltLevel-1.GenericBay-1.GroupSPS-1
idType	GroupSPS
ExtId	Site Substation Voltage level bay Group SPS
Attribute	(11)
Relation	
Name	
RelationType	GroupSPSDatapoint_ContainsSPS_SPSDatapoint.GroupSPSDatapoint
TargetObjectExtId	Site Substation Voltage level bay Bay SPS 1
TargetObjectExtId	Site Substation Voltage level bay Bay SPS 2
TargetObjectExtId	Site Substation Voltage level bay Bay SPS 3

Availability:

- Right dependent

Other call:

- None

Operation:

1. Select **Data/External data /Export IOMapping** item
2. A dialog box presents all computers available on database and allows to select a part or all of them. The spare and templates objects are not available.
3. Select the C264 devices to export. Two representations (tree or list) are available. Shortcuts could be used for selection.



FIGURE 198 - TOOLS/EXPORT IOMAPPING SELECTION

4. Select the output file by clicking the "... " button
5. Click the **Run** button
6. The action progression is displayed graphically. This progression can be followed in three ways:
 - the progress bar is animated to display the percentage of achievement of the process (the value is a ratio of number of treated items),
 - the messages displayed on status bar which are specific of each using,
 - the nodes of the browser change in function of their processing state to follow processing.

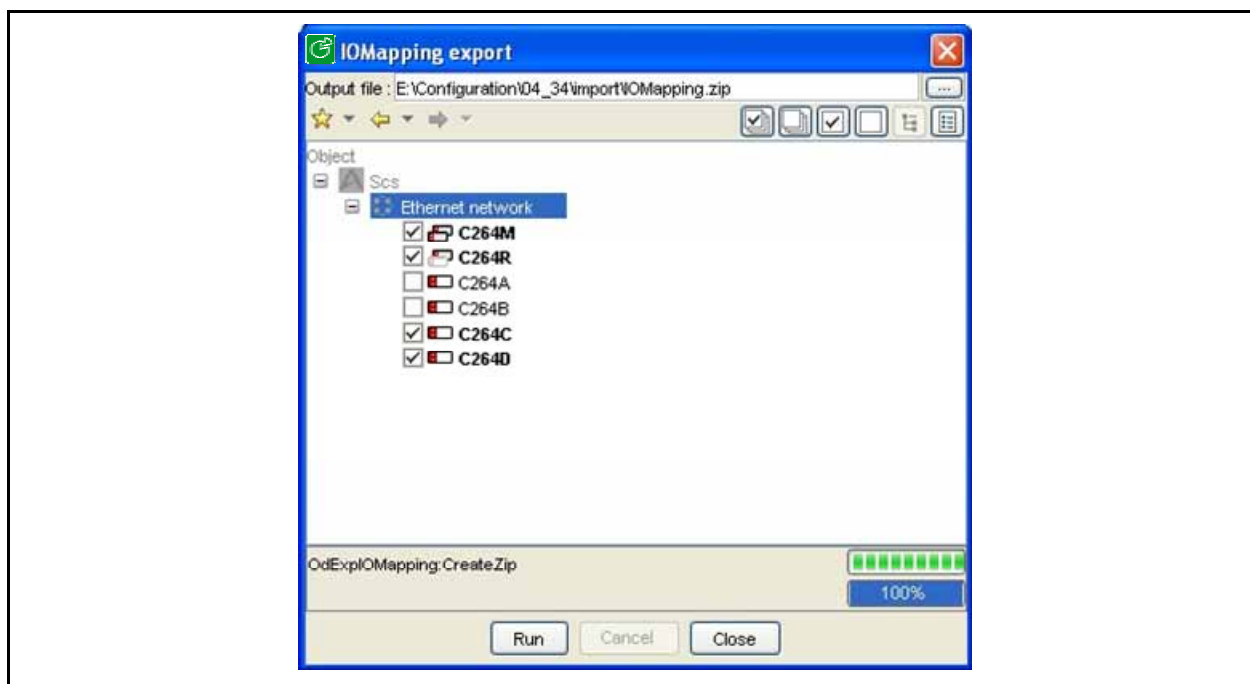


FIGURE 199 - TOOLS/EXPORT IOMAPPING RUNNING

7. The Export action could be cancelled at any moment.
8. The exported files are stored in the given ZIP file.

4.7.7 Data/ External data/Export Wiring

Purpose:

- Export the wiring information of the selected computer(s)

Availability:

- A database is open

Other call:

- None

Operation:

- 1 Select Data/ External data/**Export Wiring** item: the **Wiring Export** dialog box is then displayed.
- 2 Select the output file, its format (XML or PDF) and the computer(s) whose wiring is (are) to be exported.
- 3 Click the **Run** button

A dialog box presents all Computers available and allows selecting all or part of them. The spare and template objects are not available

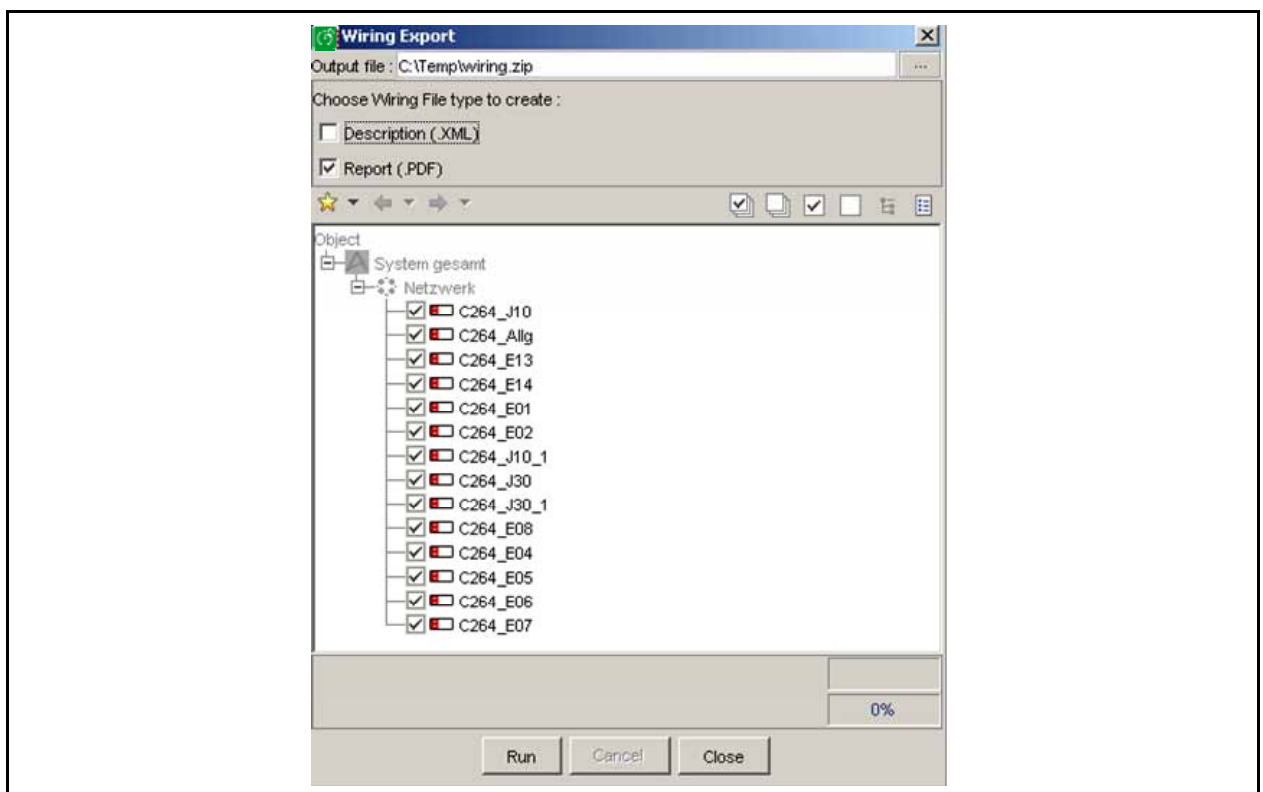


FIGURE 200: - TOOLS/EXPORT WIRING SELECTION

The action progression is displayed graphically. This progression can be followed in three ways:

- the progress bar is animated to display the percentage of achievement of the process (the value is a ratio of number of treated items),
- the messages displayed on status bar which are specific of each using,
- the look of the selected nodes of the browser change according to their processing state

The user has to define the output file to be created (XML PDF file) and also has to select which Computer he wants to export. The display of Computers can be based on Tree mode or on List mode.

When this export operation is complete the related files are created and can be opened. The "pdf" file is generated in A3 format with the "landscape" orientation. it contains:

- a cover page: title, name of the database, SCE version number, date and time of the file
- a blank page
- the list of the computers
- for each computer: composition of the rack and for each board the name of each datapoint wired to an pin of the connector of the board.

4.7.8 Data/ External data/Export SCADA

Purpose:

- Export in standard **SCE) XML format** the information related to the selected SCADA protocol(s)

Availability:

- A database is open

Other call:

- None

Operation:

- 1 Select Data/ External data/**Export Scada** item: the **Scada Export** dialog box is then displayed.
- 2 Select the output file and the SCADA protocol(s) which is (are) to be exported.
- 3 Click the **Run** button

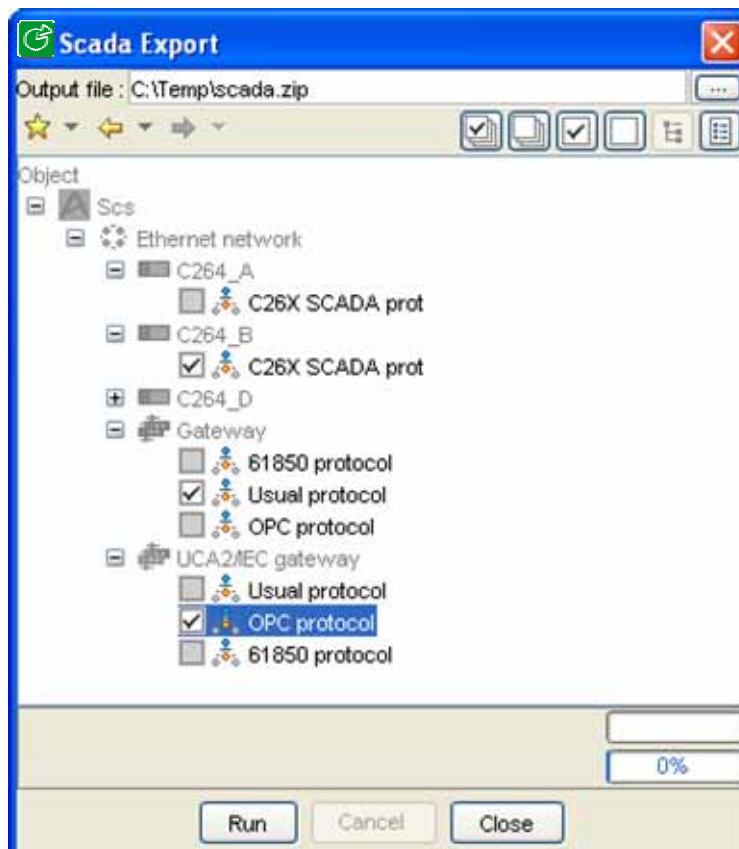


FIGURE 201: - TOOLS/EXPORT SCADA SELECTION

The action progression is displayed graphically. This progression can be followed in three ways:

- the progress bar is animated to display the percentage of achievement of the process (the value is a ratio of number of treated items),
- the messages displayed on status bar which are specific of each using,
- the look of the selected nodes of the browser change according to their processing state

4.7.9 Data/IEC61850/ExportSCL

Purpose:

This export is used to export a database (electric and system topology) in one or several XML files with a schema defined by **IEC 61850** norm:

- electric topology: electro-technical view of the substation with links between different modules (topology),
- system topology: devices definitions and their IEC61850 mapping.

Three export modes are available:

- a complete export (**.SCD**, System Configuration Description), that contains all information of the configured system, only one XML file;
- an IEC61850 IED export (**.CID**, Configured IED Description), that contains all information from an IED, one XML file by IED;
- an IEC61850 IED Model export (**.ICD**, IED Capability Description), that contains an IED template to create IED based on same model; one XML file by IED.

The XML format is described in IEC61850 norm part 6.

The exported files are stored in a ZIP file.

Availability:

- Right dependent

Other call:

- None

Operation:

1. Select Data/IEC61850/ExportSCL item
2. A dialog box displays all IEC61850 devices, except OI Server and GTW devices. It allows to select a part or all of them. The spare and templates objects are not available.
3. Select the devices to export. Two representations (tree or list) are available. Shortcuts could be used for selection.

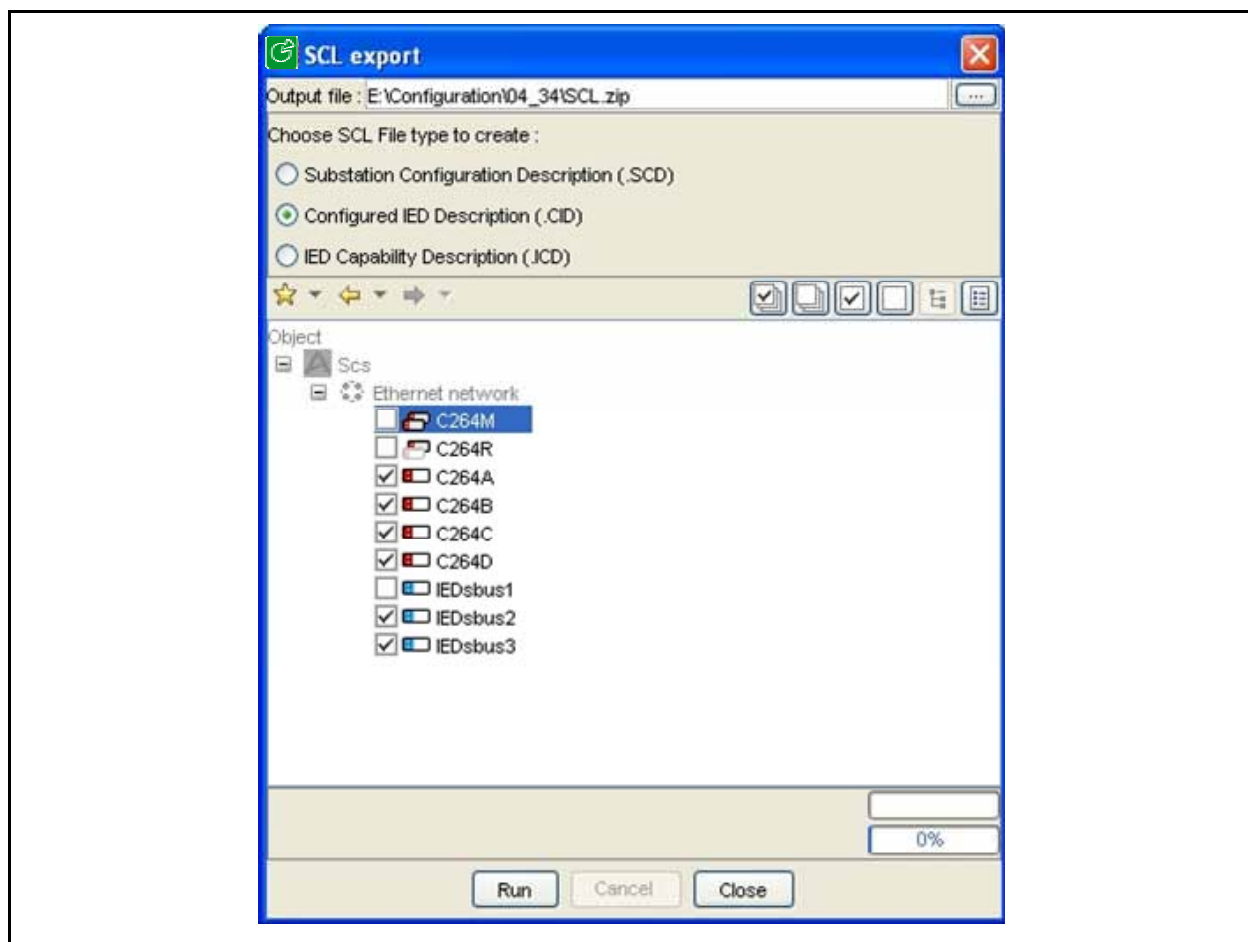


FIGURE 202 - TOOLS/EXPORT IEC61850 SELECTION

4. Enter the name of the output file in the **Output file** field (zip extension)
5. Select the SCL file type to create: .SCD, .CID or .ICD. If .SCD is chosen all devices are selected.
6. Click the **Run** button

7. The action progression is displayed graphically. This progression can be followed in three ways:
 - the progress bar is animated to display the percentage of achievement of the process (the value is a ratio of number of treated items),
 - the messages displayed on status bar which are specific of each using,
 - the nodes of the browser change in function of their processing state to follow processing.

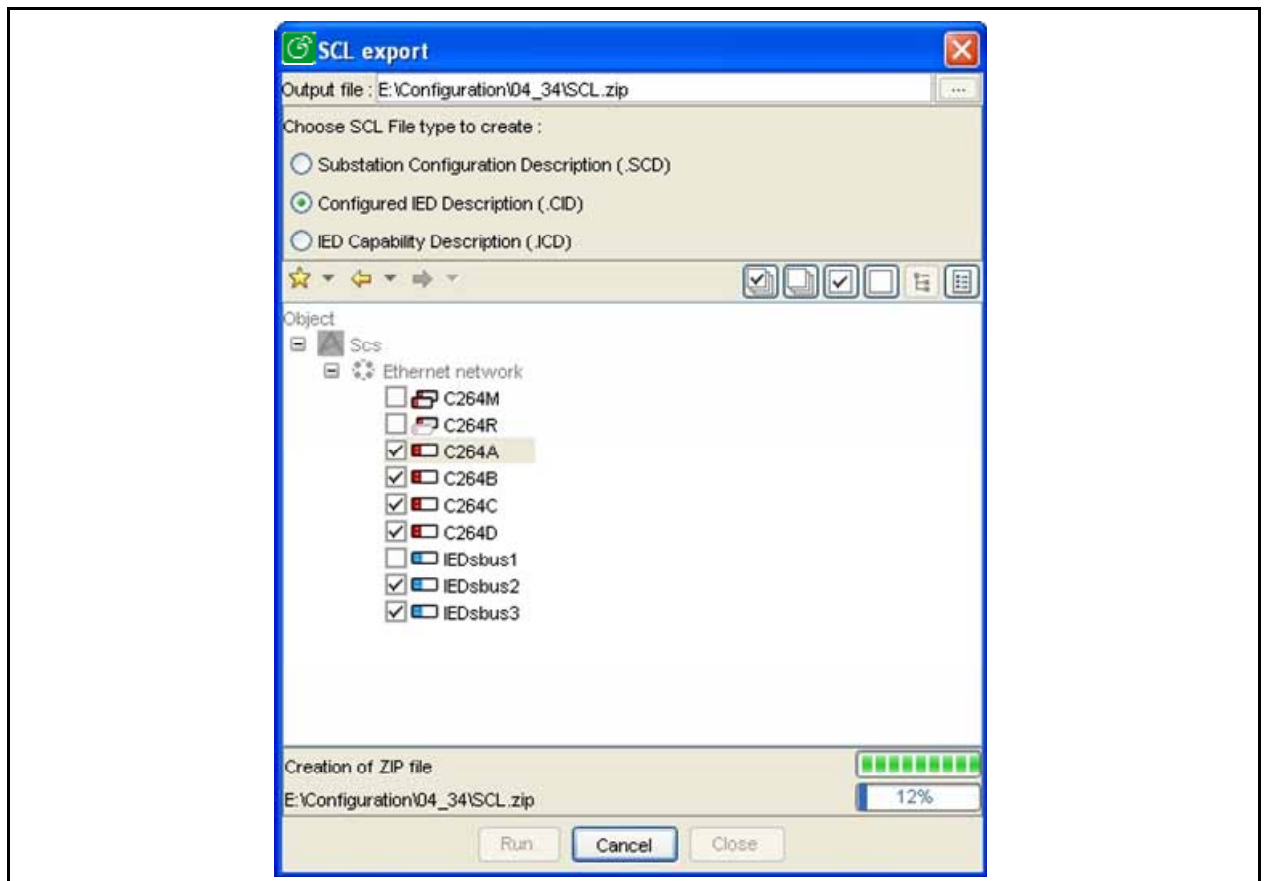


FIGURE 203 - TOOLS/EXPORT IEC61850 RUNNING

8. The Export action could be cancelled at any moment.
9. The exported files are stored in the given ZIP file.

4.7.10 Data/IEC61850/Import SCD/IID...

Purpose:

- This import is used to update a set of IEC61850 IEDs in the SCE database with data configured outside the SCE in an IEC61850 configuration file (.scd and .iid extension)

Availability:

- A database is open

Other call:

- None

Operation:

1. Select Data/IEC61850/Import SCD/IID... item. The **SCD/IID import** dialog box is displayed. In this dialog box are listed all the IEDs of the database (spare and template objects are not listed).

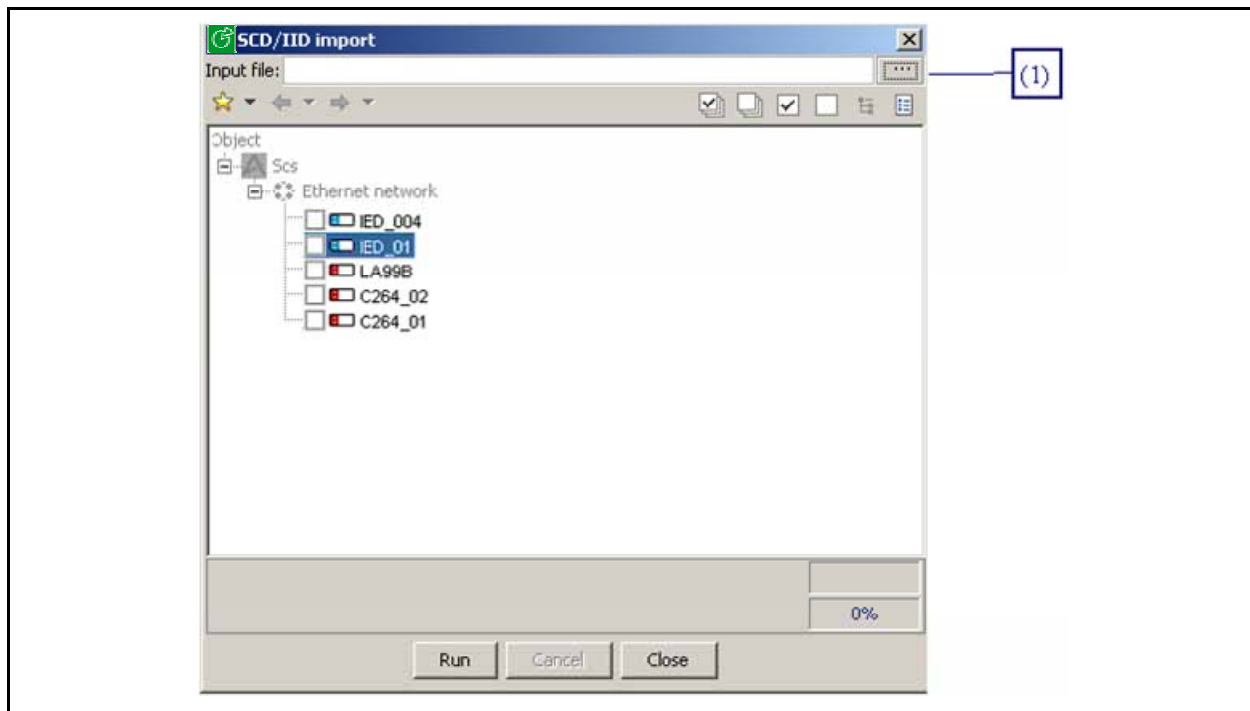


FIGURE 204: SCD/ IID IMPORT DIALOG BOX

2. Click the browse button (1) to open a **Select file** dialog box. When the **scd** file is selected its name is displayed in the **Input file** field (2). The IEDs whose network name is present in the SCD file (**IED name** field) are automatically selected and associated to the related description (3).

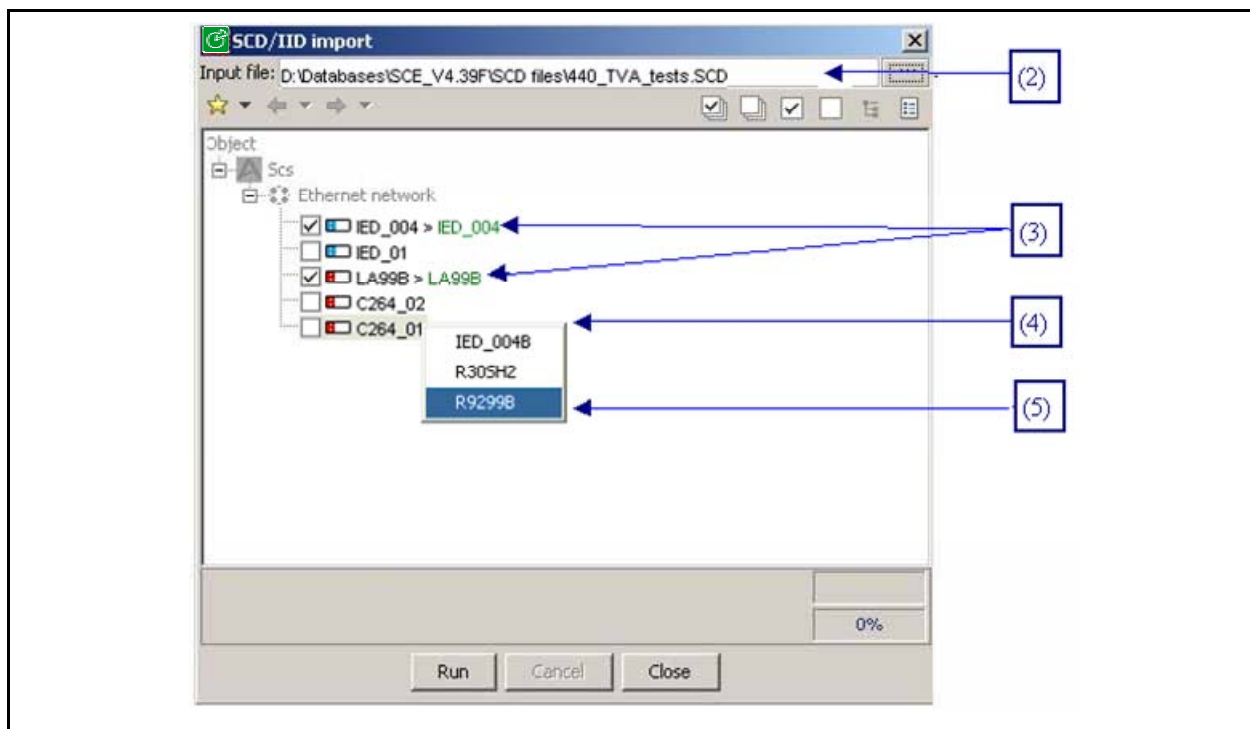


FIGURE 205: SCD/ IID IMPORT DIALOG BOX

3. By right-clicking on a no-associated IED a contextual menu is displayed (4). In this menu are listed the no-yet associated descriptions present in the SCD file. By clicking the wanted IED (5) the association is done (6).

Note: the first item of this contextual menu is **Remove association** if the right-click is done on an associated IED. This item is of course used to remove an existing association.

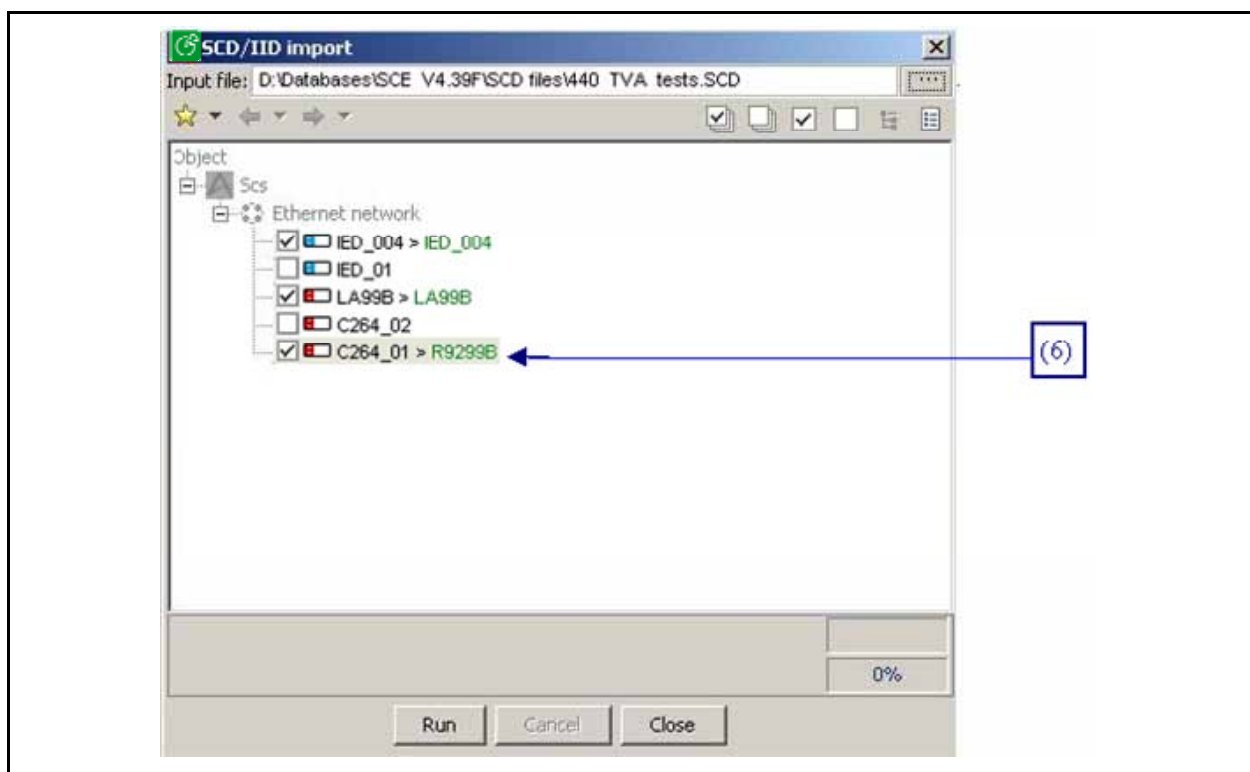


FIGURE 206: SCD/ IID IMPORT DIALOG BOX: ASSOCIATION DONE

4. After having defined the associations the user can select/unselect the IEDs to update in the the database. Only associated IEDs can be selected.
5. The user ends this import operation by clicking the **Run** button. The selected IEDs are checked for coherency with imported ones. If all IEDs are compliant they are updated with data found in the SCD file: network name, IP address and goose information. If at least one IED is not compliant the import is not done and all non compliant IEDs are displayed in red. For these IEDs the non compliant elements of imported IED are logged in the **Trace** panel.

4.7.11 Data/IEC61850/Manage IED...

Purpose:

- manage the list of IEC61850 IED model files (which are xml files)

Availability:

- Right dependent

Other call:

- None

Operation:

- Select **Data/IED61850/Manage IED...** item. The following modal dialog box appears:

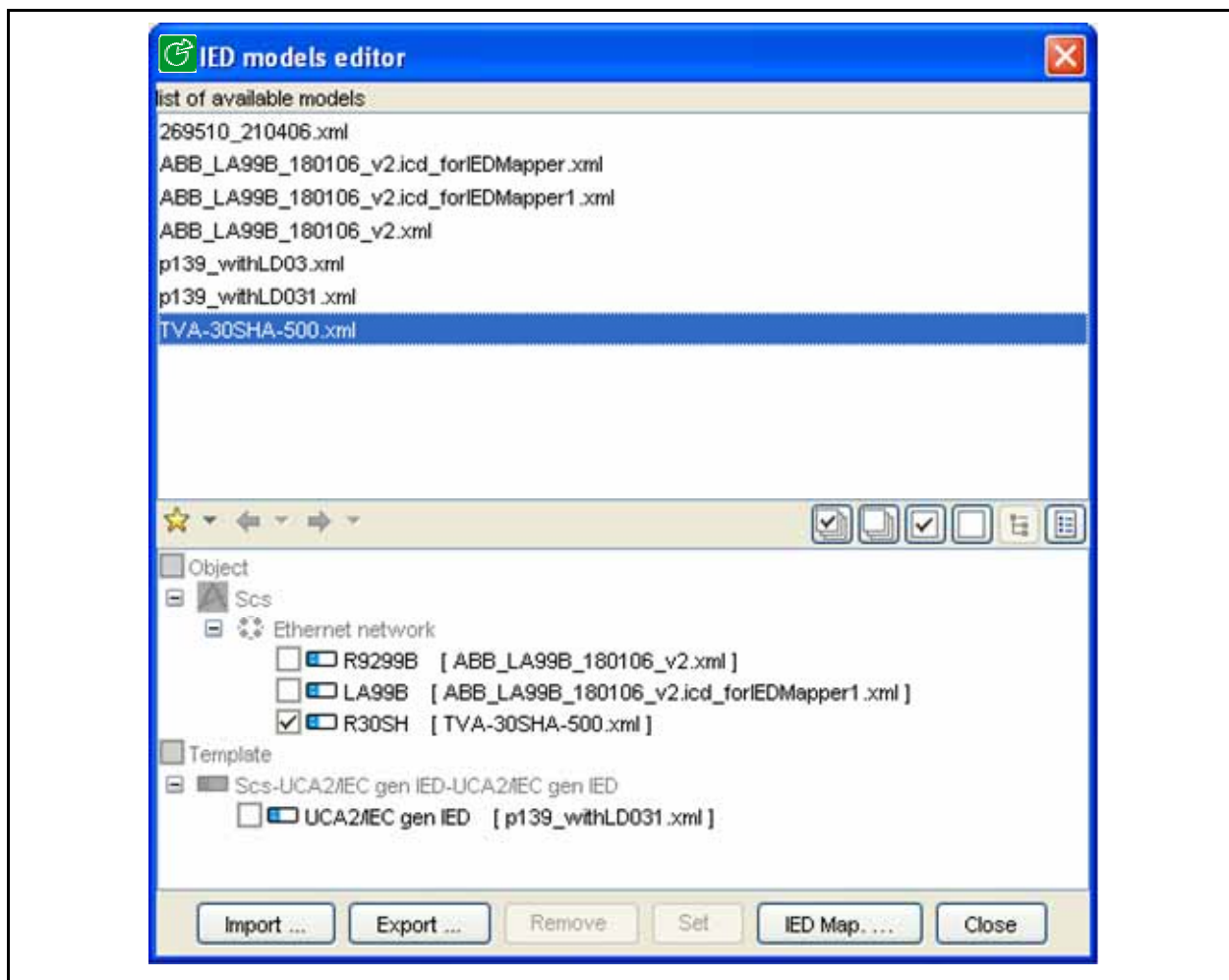


FIGURE 207:- TOOLS/IED MANAGEMENT...

In this dialog, there are two parts:

- the list of **available model files**,
- the list of **existing IEC61850 IED**.

The list of existing IEC61850 IED is always displayed, and for each, the current model is indicated if exists.

When a model is selected, the IEC61850 IED that has the selected model is ticked.

Then, five actions are possible through this dialog box. When the database is read-only, only Export action is possible.

- **Import**: to append model files (XML or ICD files)
- **Export**: to save his models outside of the database directory
- **Remove**: to delete unused models from the library. When a model is used by an IED, the **Remove** button is not active.
- **Set**: to associate (change or add) a model to an existing IED.
- **IED Mapper**: to update mapping of private classes of the IED to PACiS common classes. The **IED Mapper** button is active when a model is selected. The update of a model make all IEDs which use this model to be updated to allow structure modification if needed. When importing a model file, if it's an ICD file, it is automatically transformed to an XML file. Then, for all imported model file, the IED Mapper is called to review classes association if needed.

4.7.11.1 The IED Mapper

By clicking the **IED Mapper** button the following dialog box is displayed:

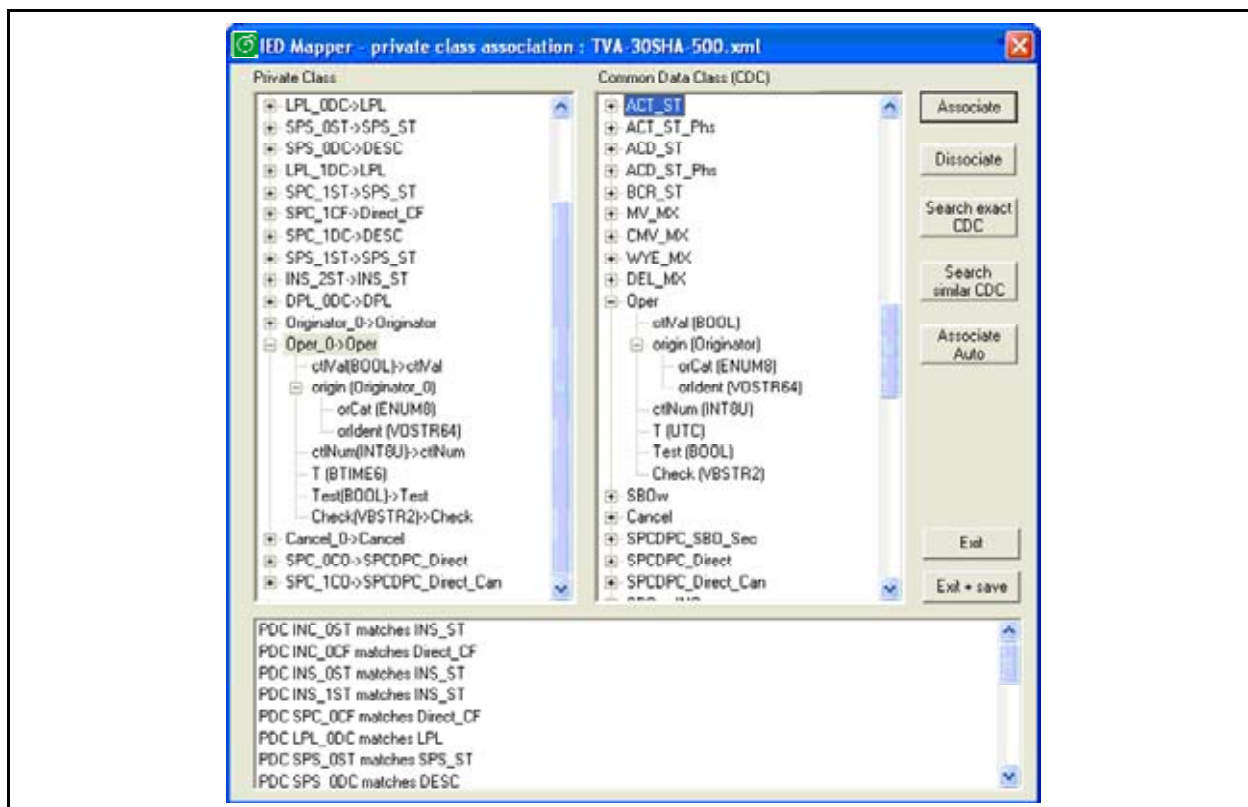


FIGURE 208: THE IED MAPPER DIALOG BOX

This window allows user to associate private classes of a non PACiS IED to common classes defined in PACiS.

This work is necessary for PACiS equipments to understand what other equipments say.

This association map an unknown type of data (called Private Class) to a known one (called Common Class). It works on attributes defined for these data to matching them.

The title bar of this dialog displays the currently edited file. In this way, when importing multiple files, the user knows on which he work.

There are three panels:

- The private class presents the list of private classes in tree view, to view the contents of each class,
- The common class presents the list of classes known by PACiS equipment, in tree view too,
- The bottom panel is a log of actions.

The goal of this dialog is to associate a private class to a common class. To do this the user has five actions represented by five buttons:

- "Associate" is used to associate the private class selected in left panel to common class selected in right panel,
- "Dissociate" remove association of currently selected private class
- "Search exact CDC" indicate to user the common class which match exactly the selected private class, if exists, select it in common class list, and write it in log panel,
- "Search similar CDC" indicate to user the common classes which looks like the selected private class, if exists, select the first one in common class list, and write them in log panel,
- "Associate Auto" launch a process which search all matching common classes for all private ones and associate them automatically if found.

The two latest buttons are use to quit IED mapper, the first without saving, and the second with saving the model.

When a private class (or sub-class) is associated to a common class, it's shown by adding the common class name on left of the arrow (->)

When an association is done manually, if some sub-classes are not automatically mapped, a subclass association dialog box is displayed to allow user mapping them manually:

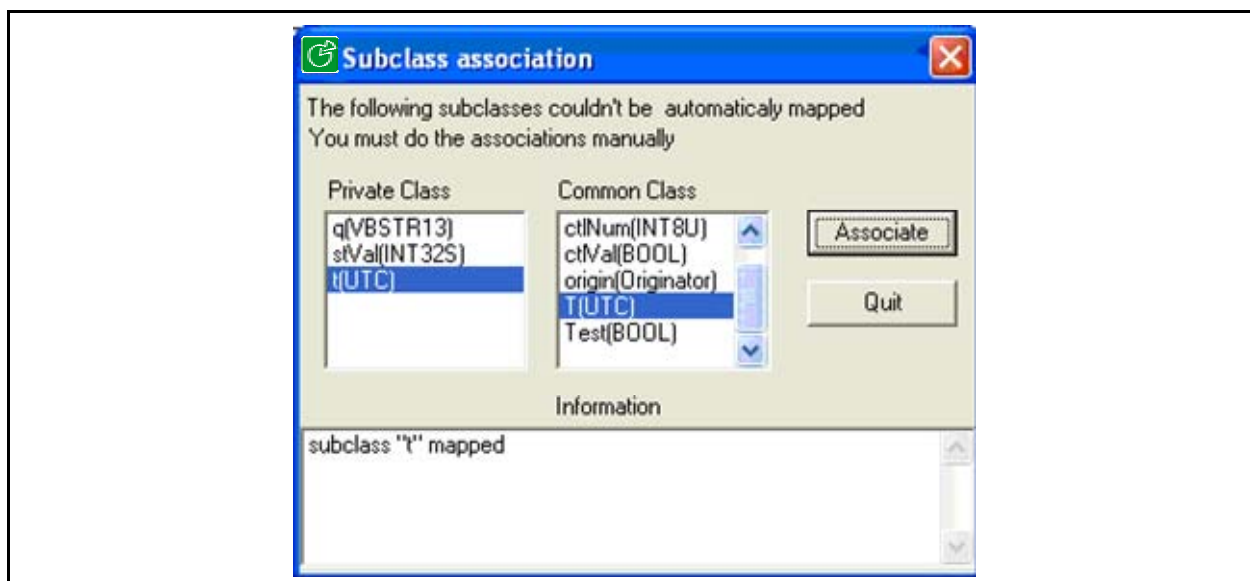


FIGURE 209: SUBCLASS ASSOCIATION DIALOG BOX

It works like main dialog box, but specialized for a sub set of classes.

After closing this dialog box, the association is done.

4.8 Window

For a full description of this menu, see §3.2.2 Selecting displayed area in working window.

4.8.1 Search tool bar

A new feature allows **searching quickly some objects inside the navigator**. The search key is the short name or the long name of the displayed objects.

Some simple shortcuts allow navigating through these found objects into the navigator.

The set of found objects can be displayed into a table and handled with copy into the system clipboard – for an use in excel doc for example.

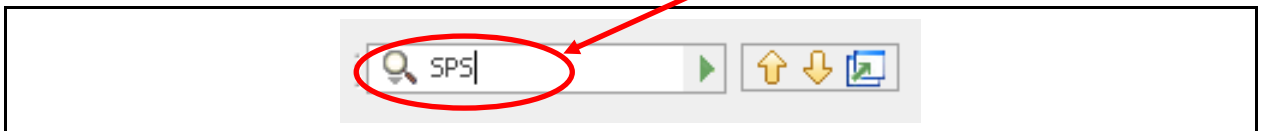
Define the criteria of the search

A dedicated toolbar allows defining the quick search criteria:

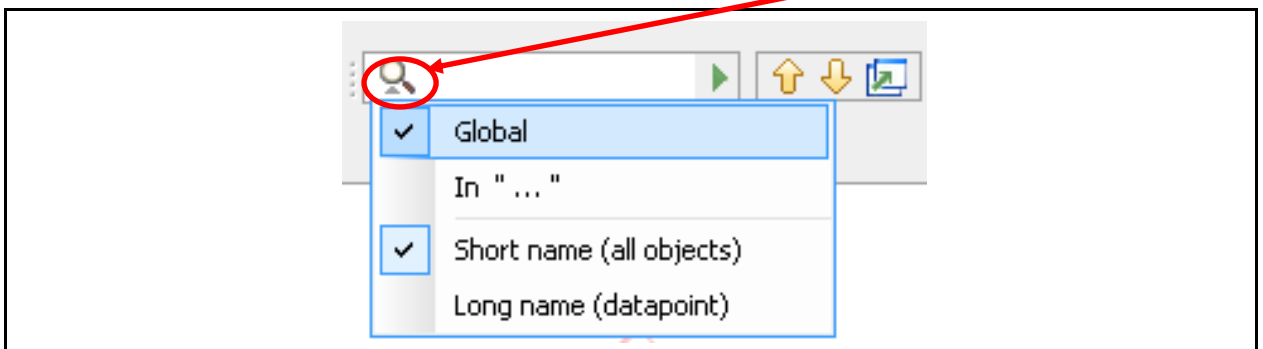


1. **At first**, the **string to search** must be input, with the toolbar text field.

The quick search is not case sensitive. The string can match only a part of the target attribute (shortname or longname).

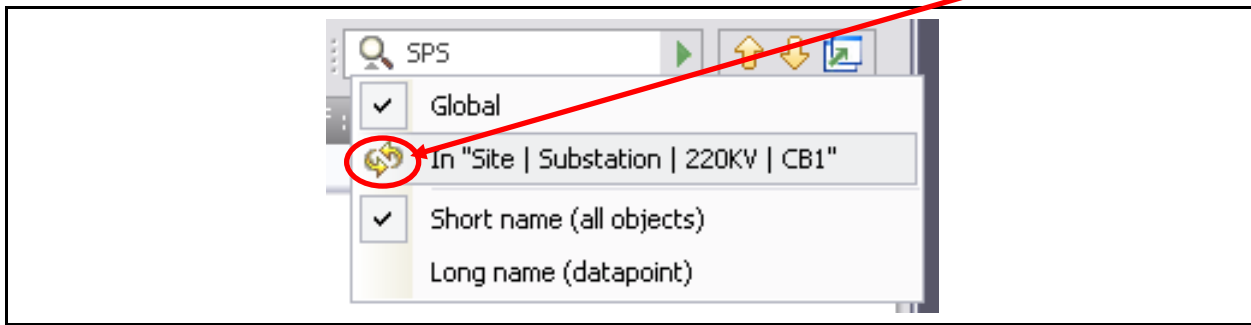


2. Two **options** could be defined with a popup menu, accessible with this button:



- The **domain** of the search - global or local to a sub-tree:
 - **Global** means that searching is done into database tree for the current mode (template / object).
 - **Local** means that searching is done into database sub-tree of the selected node.

- o To set a new local sub-tree, select a node into navigator and click on this button:



The new root of searching is then updated and the local search is activated.

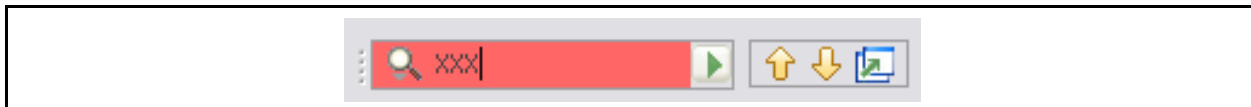
- Another option is the **choice of the target** attribute and the target object type:
 - The **Short name**: available for all kind of object. It's the attribute that is used to represent objects into navigator.
 - The **Long name**: applicable only for datapoint. Only datapoints and their long name are taken into account during the searching.

Execute and navigate inside results

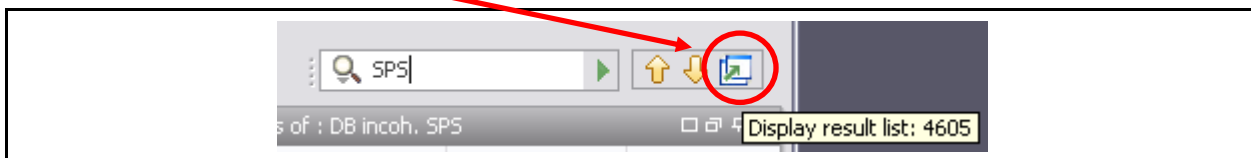
The **execution** of the quick search is done with this button:



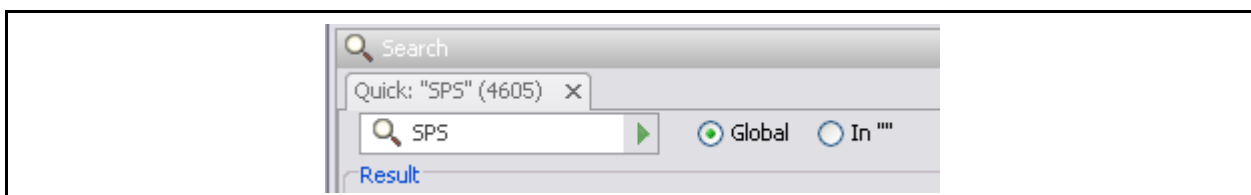
A **color code** indicates that **no result** has been found:



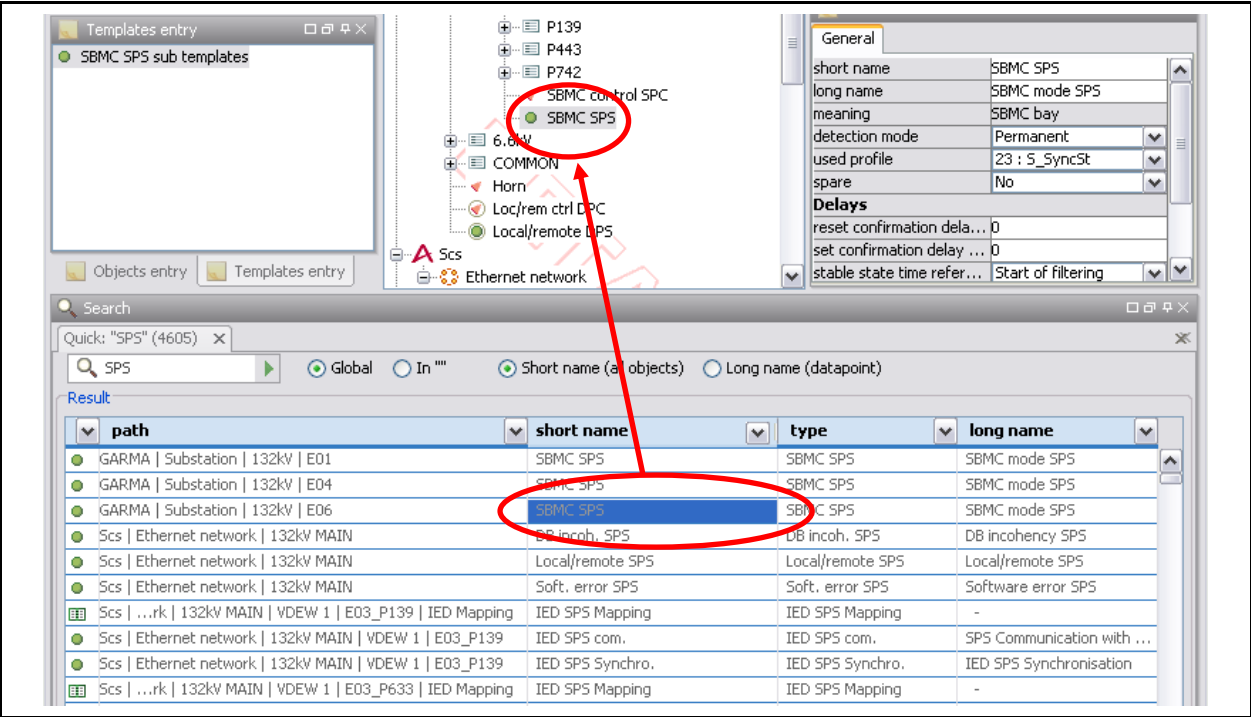
If some objects have been found, by clicking on the button the **number of results** is displayed as **tooltip** and **all found objects are displaying** in to the table available in search window.



A new tab is created with this table. The **tab name** contains the **number of found objects**.



The table allows **reaching** an object to the **navigator** with a double-click on the object row.



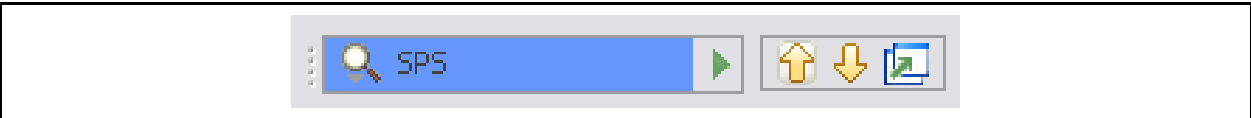
Copy to system clipboard is available for this table.

Search criteria could be **refined** in this tab: all criteria are displayed and could be updated. The quick search could be then **re-executed**.

The **navigation** between the results into the navigator is done with the two buttons:



A color code indicates that the end or the beginning of the result list has been reached:



5. TRACES WINDOW

This area of the docking window is reserved for database developers. The aim is to study trouble at maintenance level, and to **keep precise traces** of database modifications (for example between two database evolutions asked by customer).

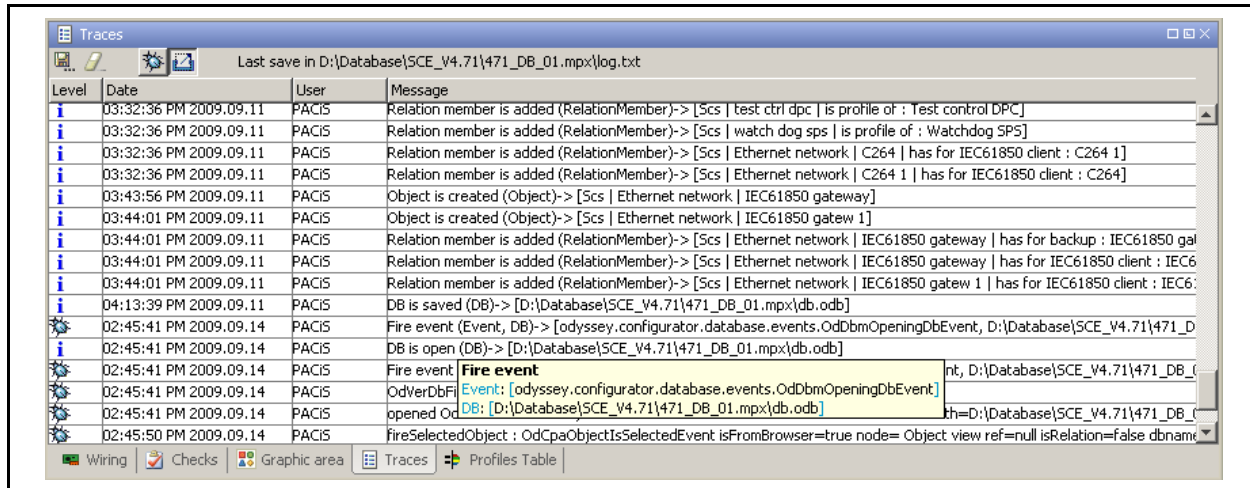


FIGURE 210 - TRACE WINDOW DISPLAY

The display is based on 5 resizable columns with:

1. The **Level** field is one of the following trace levels: Information, Error, Warning, Debug, Fatal Error.
2. The **Date** field is the recording date/time of the trace.
3. The **User** field is the identification of the logged user.
4. The **Source** field is the PACiS SCE class component that generates the trace. It is displayed **only when Debug** traces are displayed.
5. The **Message** field is the text message of the trace.

Trace management is driven by 4 icons:

	Save the displayed traces in a file selected through a file chooser.
	Clear the table. Traces are saved in the log file of the open configuration
	Toggle for DEBUG traces: If this button is selected, the DEBUG level traces are not displayed (they are filtered). Else they are.
	Toggle for traces from event manager of the PACiS SCE software (operator actions...)

5.1 Trace saving

User saving:

The User can save the displayed traces **in a file** selected through a file chooser. The current log file is then saved into the given file. The file could be edited by an text editor. Field separator is a tab character.

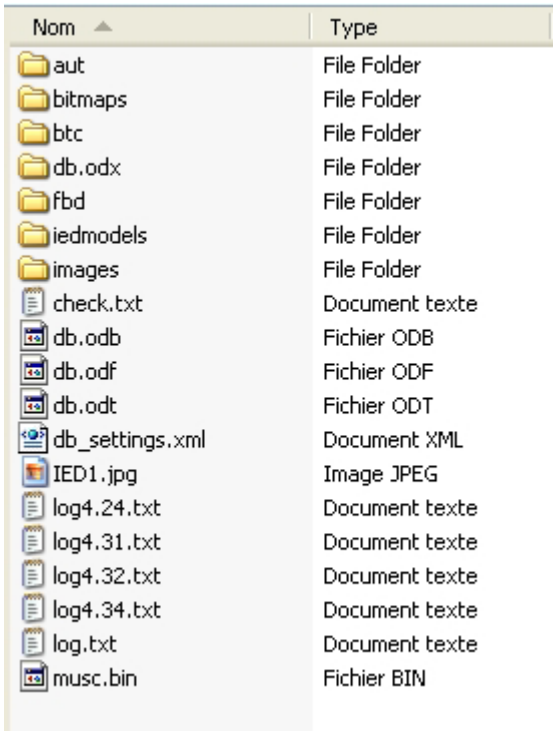
Specific saving for configuration upgrades:

During opening of a configuration, an upgrade can be occurred (see File/Open). The traces sent by the upgrade process are automatically saved in a specific file. The file name is log<v.r>.txt, where <v.r> is the release number of the target configuration. It's stored in the configuration file. This file is a zip file.

Example:

A configuration database conf.mpx is opened with PACiS SCE with a release number 3.34. This operation needs an upgrade of the configuration database. The upgrading operations are logged in a file log3.34.txt. This file is stored in configuration database file conf.mpc which is a zip file.

With this feature, all upgrading operation of configuration database in stored in its file and could be consulted. The files of .mpc are the following:



Nom	Type
aut	File Folder
bitmaps	File Folder
btc	File Folder
db.odx	File Folder
fbd	File Folder
iedmodels	File Folder
images	File Folder
check.txt	Document texte
db.odb	Fichier ODB
db.odf	Fichier ODF
db.odt	Fichier ODT
db_settings.xml	Document XML
IED1.jpg	Image JPEG
log4.24.txt	Document texte
log4.31.txt	Document texte
log4.32.txt	Document texte
log4.34.txt	Document texte
log.txt	Document texte
musc.bin	Fichier BIN

FIGURE 211 - MPC CONTENTS AND UPGRADING ACTIONS LOG FILES

Automatic saving:

The **maximum number** of traces in the table is configured in the **General Settings**.

When this maximum is reached, the non DEBUG level traces are automatically saved in the log file of the open configuration and the table is cleared. The file name is log.txt. It's stored in the configuration zip file.

If the size of the current log.txt file is greater than 15 MB, then this file is saved as log(i).txt (where i is an incremented number) and a **new log.txt file** is created for the new traces.

When the **Check-In** action is applied to a configuration, the traces are automatically saved in the frozen configuration, the log file of the current configuration is **reset**.

When the **Check-Out** action is applied to a configuration, the new work configuration is created from the frozen one, but the trace file (if any) is **discarded**.

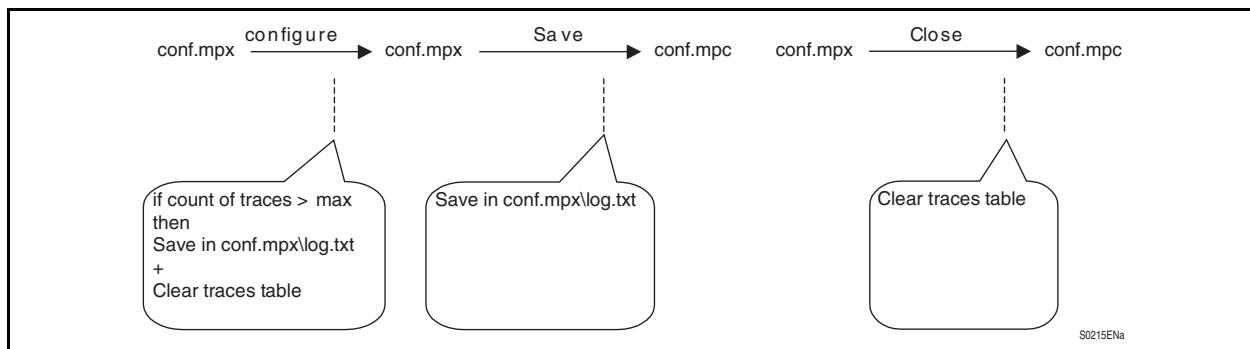


FIGURE 212 - LOG AND FILE OPERATIONS (1/3)

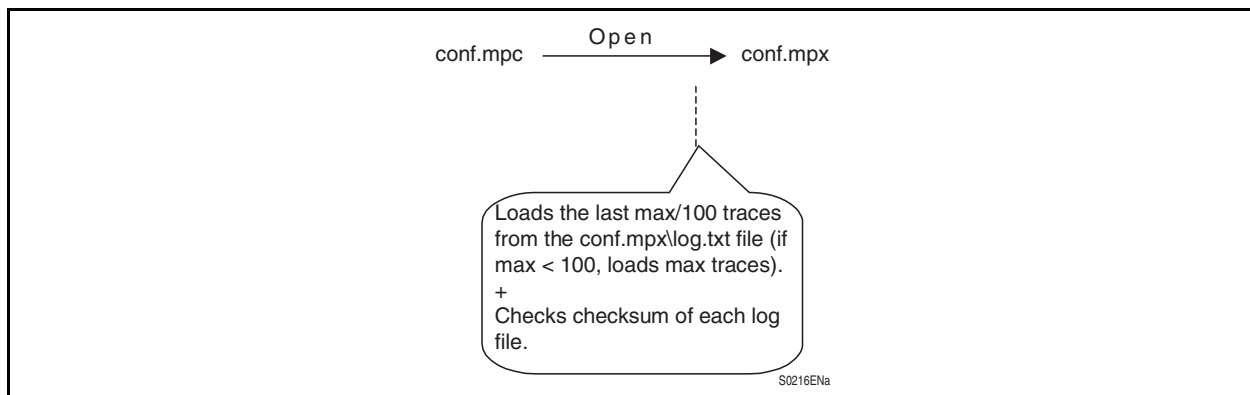


FIGURE 213 - LOG AND FILE OPERATIONS (2/3)

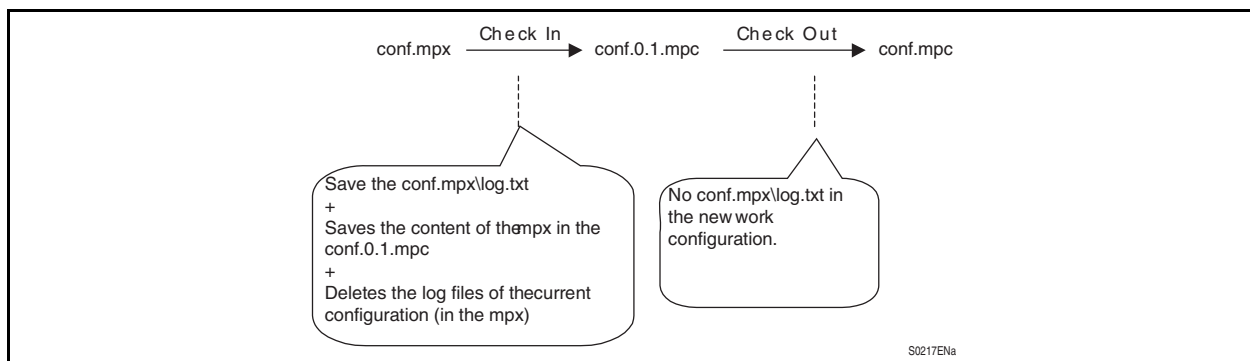


FIGURE 214 - LOG AND FILE OPERATIONS (3/3)

5.2 Trace log file checking

An ADLER32 **checksum** is associated to **each log file** (except upgrading log files).

When a configuration is opened, all the log files are checked. If one of them is missing or has its checksum not matching the one registered, then an **error trace is displayed**:

Corrupted traces log file

This feature prevents some external wrong manipulation of log files: any external modifications (add, suppress, modification of a log line; or add, suppress of a log file) are traced by this error.

6. FBD EDITOR

The **Logical Equation Viewer** is an application that allows the edition of one equation (FBD logic diagram).

It is launched from the menu item Workbenches/FBD Edit (see § 4.5.3).

- either at the **creation**: only with the I/O slots declared as I/O parameters in PACiS
- or at the **modification**: with the schema already entered and eventually a redefinition of the inputs/outputs.

The **Function Block Diagram** language combines functions and function blocks interconnected by signal flow lines in order to define function block diagram networks.

The Equation Viewer allows the programmer to build equations by taking existing blocks from libraries, defining data flow between functions, ...

The application can **print** a view on as many folios as required to cover the full content of this view. Boundaries of printed folios are clearly indicated on the FBD view.

The application is also able to open **on-line help** following the chosen language.

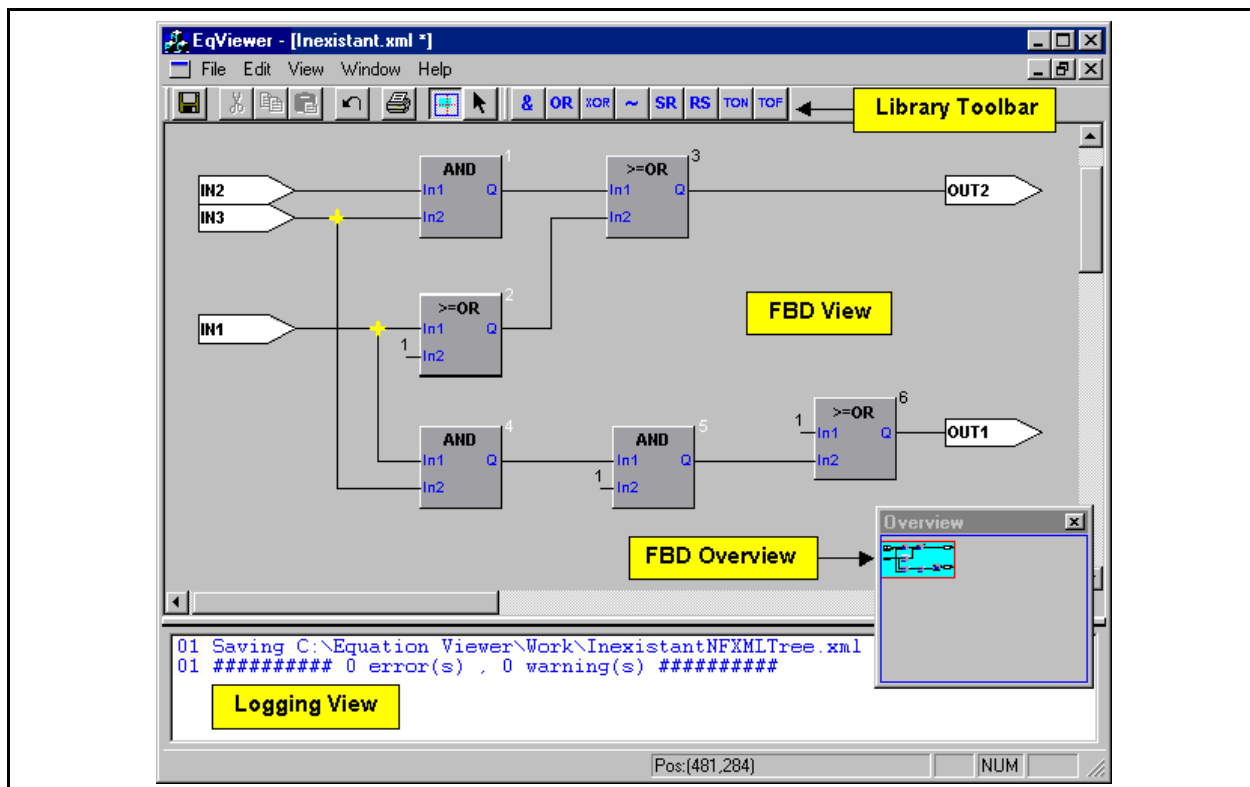
In addition, text annotations may be used to document the logic.

6.1 Generalities of FBD

The views exposed by this application are several **FBD Views** of the same document.

Through these views it is possible to edit the equation logic.

- a **Logging View** that shows warnings and error messages when the equation is saved,
- an **FBD Overview** that shows the whole content of the FBD view,
- a **Library Toolbar** containing the whole set of FBD blocks of the library.



An FBD document gathers a lot of FBD networks needed to achieve functionality.

FBD documents are divided into pages. Page boundaries are set in order to have for instance almost 40 blocks on a page. Pages are the smallest entities that can be printed.

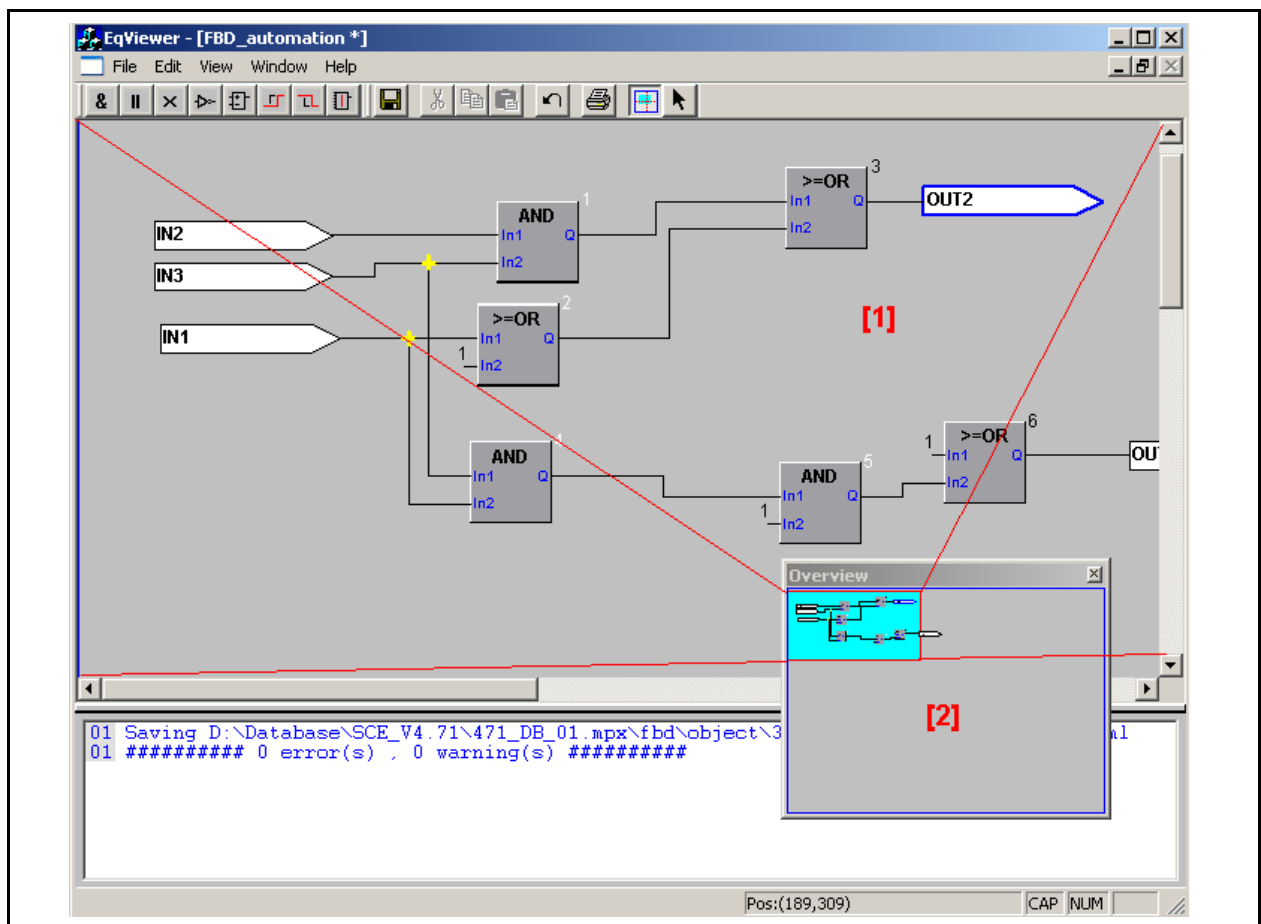
6.2 The FBD Editor Views

It displays the part of the equation logic that is currently edited.

The Editor View acts as a peephole to the document that may be too large to allow display of all FBD logic at once.

With the **scrolling facilities**, this peephole can be moved across the document to reveal different portions of it. Acting on the Overview or on the Editor View horizontal and vertical scroll bars may do this.

With the **zooming facilities**, it is possible to modify the zoom level of the Editor View for an improved readability. This may be achieved by acting on the Overview or on the Zoom dialog box.



6.2.1 FBD Editor View

[1]

Close: Like any window: you click on the **cross** at the upper right coin of the window.

Scroll: Scroll bars are available (horizontal and vertical) to move the peephole through the FBD document; this movement is visible in the Overview window by the corresponding movement of the blue rectangle. You can also move the screen one page at a time by clicking left inside the scroll bar (see "Navigation Features").

Zoom: Resizing the Editor view leads to show a larger or lower part of the FBD Document. The size of the displayed graphical components is not modified when resizing the Editor view.

On the other hand, the size of the displayed components is modified if you change the zoom ratio with the Overview blue rectangle manipulation (see "Zoom Features").

User Interactions

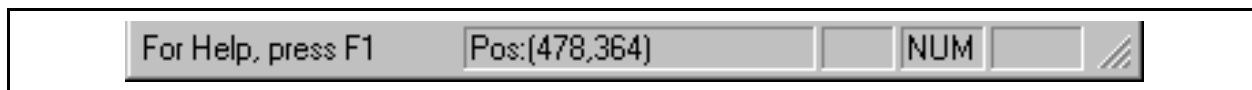
Edition: You can create a network by:

- dropping Blocks on the Editor view,
- linking these blocks with Signal Flow Lines, Connecting lines and Connections,
- defining input/output operands using slots and literals.

For more details about it, see § 6.4.5 Working with Functions and Function Blocks.

Status Bar: The status bar may be toggled on and off at the bottom of the window by using the **Status Bar** option in the **View** menu.

The status bar displays information about the activity associated to toolbar icons when the mouse cursor stays on these icons (standard behaviour of toolbar).



6.2.2 The FBD Overview

[2]

The Overview displays the whole content of the document.

On this Overview, a blue rectangle shows the current relative size and position of the active Editor View.

Resize & Move the Overview: you can move the overview like any window. On the other hand, resizing the overview has automatically an action vertically and horizontally.

Drag the blue rectangle or click any location inside the Overview in order to change the Editor view content: click left in the blue rectangle and, without releasing the mouse button, move the mouse to put the rectangle to another location **or** click left any location in the Overview ; the blue rectangle comes at this place and the Editor view is updated.

Resize the rectangle in order to change the Editor view zoom level: Select the bottom right corner of the blue rectangle: a double arrow appears. Without releasing the mouse button, resize the blue rectangle. The Editor view zoom ratio and content are updated.

Show the associated overview Choose the **menu option Window** and the item Overview.

6.2.3 Toolbar

The Toolbar may be toggled on and off at the top of the window by using the **Tool Bar** option in the **View** menu.

It may also be moved (standard behaviour of toolbar).



allows to save the current view.



allows to cut the selected element(s).



allows to copy the selected element(s).



allows to paste the element(s) held in the clipboard



allows to undo the last action.

-  allows to print the current view.
-  allows to display the Overview.
-  clears the current mouse function.

6.2.4 Library Toolbar

The Library Toolbar may be toggled on and off at the top of the window by using the **Library Toolbar** option in the **View** menu.

The Library toolbar contains all the buttons corresponding to the available function blocks. Two libraries are available: one for FBD Automation and another for FBD Interlock (only Boolean functions).

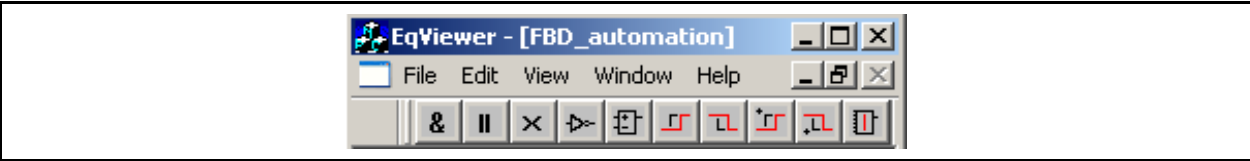


FIGURE 215 - FBD AUTOMATION LIBRARY



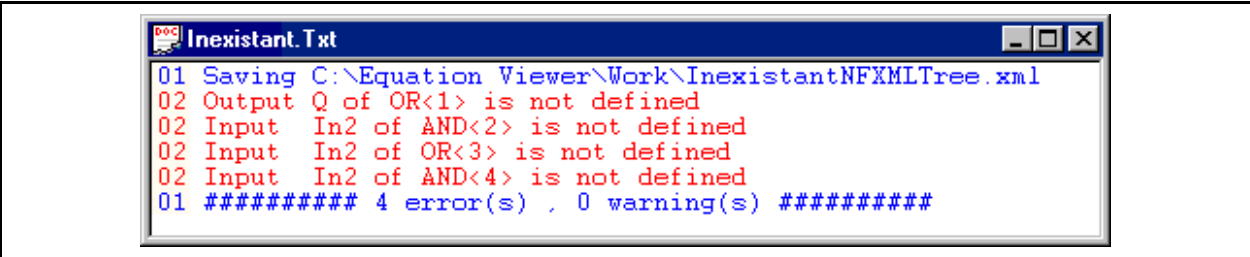
FIGURE 216 - FBD INTERLOCK LIBRARY

- Boolean operators: AND, OR, XOR, NOT
- Bistable function blocks: RS
- Timer function blocks: Standard: TON, TOFF
Accurate: TON_A  , TOFF_A 

Timer properties:

Type	Range	Step	Accuracy
Standard	50ms thru 1h	5ms	±5 ms
Accurate	5ms thru 50ms	1ms	±1 ms

6.2.5 Logging View



The Logging View will be mainly used to log messages from the ST translation process. Each time an FBD document is saved an equivalent structured text (XML) file form is created. Translation warnings and errors are logged into the logging view.

MaxLines: You can set the **maximum number of lines** that can be displayed in the Logging View:

Right-click in the background of the Logging View,

Select the **MaxLines** item,

In the edit field that appears, enter the maximum number of lines to display,



Press **OK** to confirm.

CleanUp: You can clear the content of the Logging View:

Right-click in the background of the Logging View,

Select the **CleanUp** item.

File Save As: You can save the content of this window in a file. This file must be defined with a file chooser.

6.2.6 Key Functions

Keyboard shortcuts are available for many functions in the FBD Editor window.

These functions and the corresponding keystrokes are grouped below by type.

6.2.6.1 Moving around in the FBD Editor View

KEYS	FUNCTION
↑	Move the view up by a smooth scroll
↓	Move the view down by a smooth scroll
←	Move the view left by a smooth scroll
→	Move the view right by a smooth scroll
Ctrl ↑	Move the view up by a half page
Ctrl ↓	Move the view down by a half page
Ctrl ←	Move the view left by a half page
Ctrl →	Move the view right by a half page
Page-Up	Move the view up by an entire page
Page-Down	Move the view down by an entire page
Home	Move the view at the upper right corner of the document
End	Move the view at the lower left corner of the document

6.2.6.2 Using File Functions

CTRL + S:	To save the current equation
CTRL + P:	To print the current equation

6.2.6.3 Getting Help

F1: Access to Online Help for the active window (help about the Equation Viewer) or the selected functional block (help about the selected block).

6.3 Understanding FBD

The Equation Viewer allows the programmer to build equations by taking existing blocks from libraries, assigning their input/output parameters, defining data flow between functions...

In addition, text annotations may be used to document the logic.

6.3.1 Graphical component on the Editor View

6.3.1.1 Graphical component summary

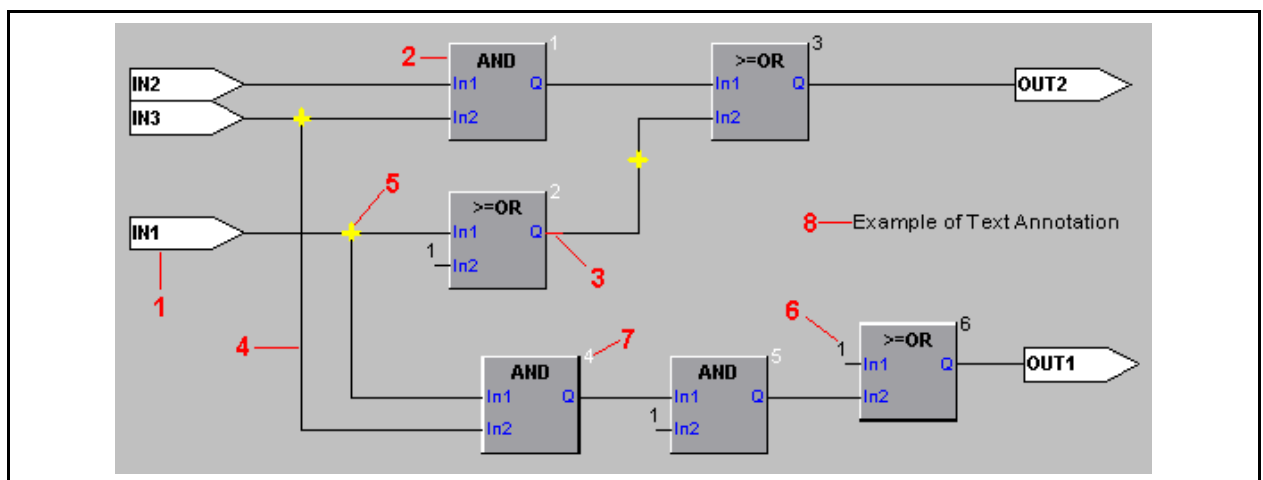
FBD Language Elements

Slots, Functions, Function Blocks, Connecting Lines, Signal Flow Lines, Horizontal/Vertical Connections, Literal

Annotations

Text Annotations

6.3.1.2 Properties



(1) **Slots** describe input/output parameters of Functions or Function Blocks.

(2) A **Function or Function Block** is a FBD instruction which, when executed, yields one or more values.

(3) A Function, Function Block or Slot can have one or more **Connecting lines**.

(4) **Signal flow lines** represent the data flow between Blocks: head and tail of a SFL may either be put on a Slot, a Function or Function Block CL or on a H/V C. Only one **Signal Flow Line** may be routed from one connecting line.

(5) A Signal Flow Line may be derived in many locations of its path inserting **Horizontal/Vertical connections** at these locations.

Inserting an H/V C in the SFL path break down this SFL into two new SFL connected to the H/V C. A H/V C may not stay alone on the Editor view.

(6) **Literal** may be used to customize Function or Function Block inputs.

NOTE: For PACiS V3, **only duration literal** is available.

(7) Network **evaluation sequence index** is automatically calculated.

(8) **Text annotations** are useful to the equation.

NOTE: Graphical components can be put anywhere on the FBD Editor view. Graphical overlapping and page boundaries crossing checks are made. Edition is Language Sensitive and allows only the building of semantically meaningful FBD networks.

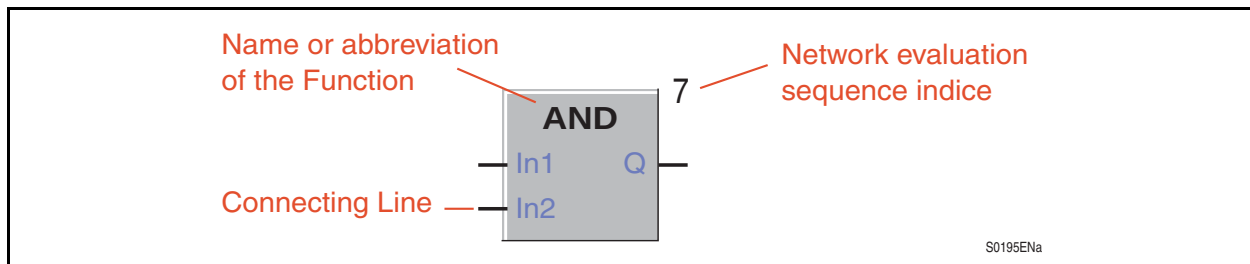
6.3.2 Language Elements

6.3.2.1 Function (F)

Definition: A Function is defined as a FBD instruction which, when executed, yields exactly one data element.

Functions are stateless (invocation of a Function with the same arguments shall always yield the same output value).

Drawing: The illustration below shows the features of a Function.



More details

- about Function usages in "Working with Functions and Function Blocks",
- about the Block pop-up menu in "Activity List of Blocks".

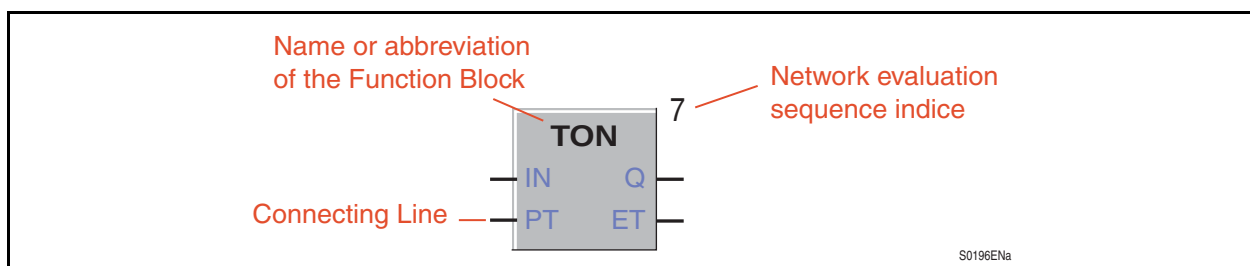
6.3.2.2 Function Block (FB)

Definition: A Function Block is a nFBD instruction which, when executed, **yields one or more values**. Multiple copies, named **instances**, of a Function Block can be created.

All the values of the output parameters and of the internal variables shall persist from one execution of the Function Block to the next; therefore, invocation of a Function Block with the same arguments needs not always yield the same output values.

Output parameters shall be accessible outside an instance of a Function Block.

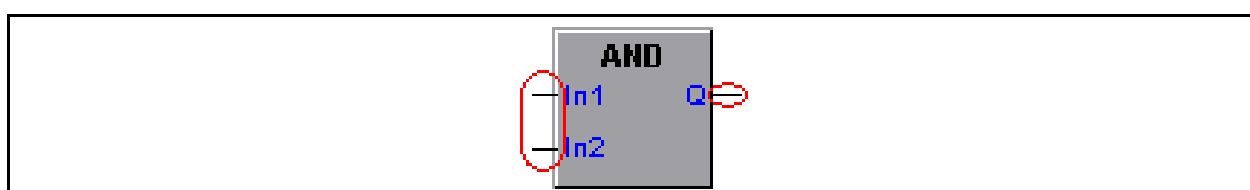
Drawing: The illustrations below show the features of a Function-Block



More details

- in "Working with Functions and Function Blocks",
- about Block pop-up menu: "Activity List of Blocks".

6.3.2.3 Connecting Lines (CL)



Connecting lines represent graphically the input and output signals of a Function or a Function Block.

Connecting lines are typed.

Examples: BOOL, TIME

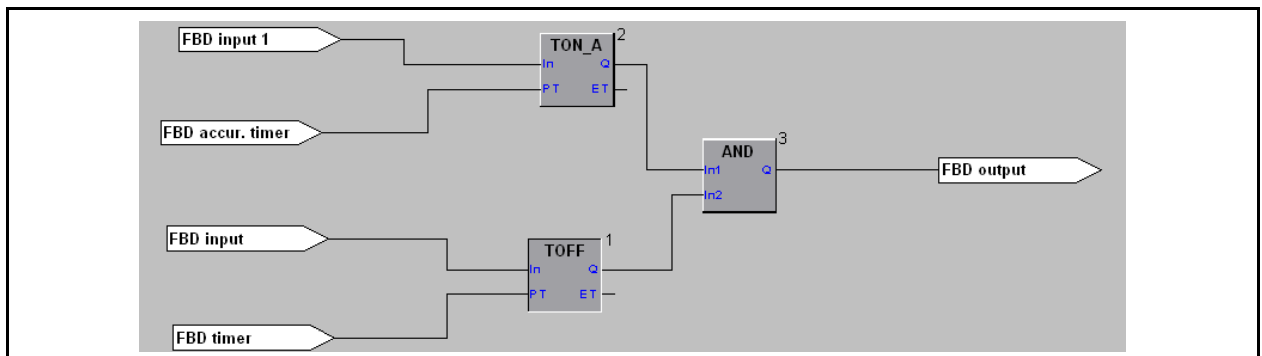
More details

- about the CL usage in "Working with Signal Flow Lines (SFL)" and in "
- TON / TOFF PT gate can only be linked to [FBD timer](#) slot.

TON_A / TOFF_A PT gate can only be linked to [FBD accur.timer](#) slot.

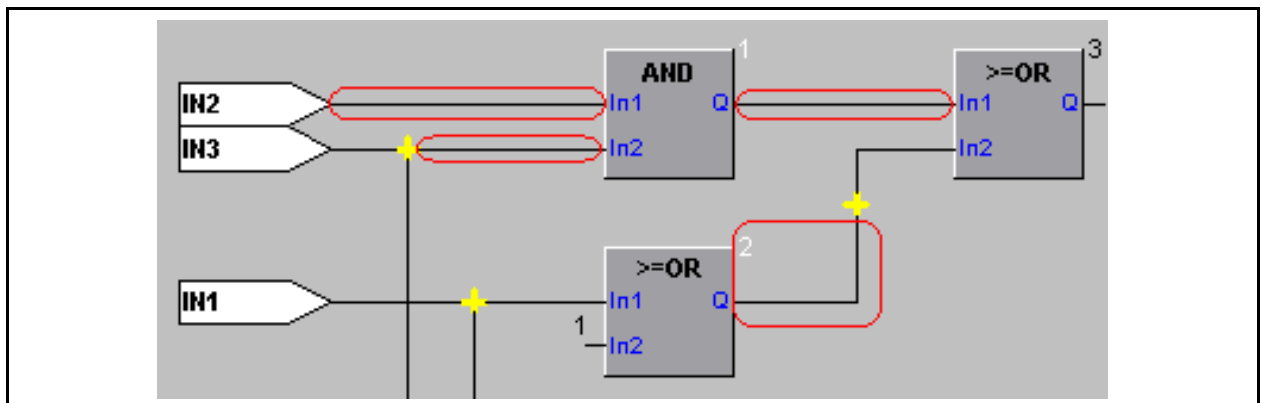
There is no warning until the equation is saved.

Right example:



- Working with Literals",
- about the CL pop-up menu: "Activity List of Connecting Lines".

6.3.2.4 Signal Flow Lines (SFL)



Signal flow lines represent the data flow between Blocks: head and tail of an SFL may either be put on a Slot, a Function or Function Block CL or on a H/V C.

An SFL is **created** by left clicking on a CL or a H/V C without releasing the mouse button, moving the mouse up to reach another CL or H/V C.

Routing is made automatically.

The SFL route can be adjusted translating SFL segments.

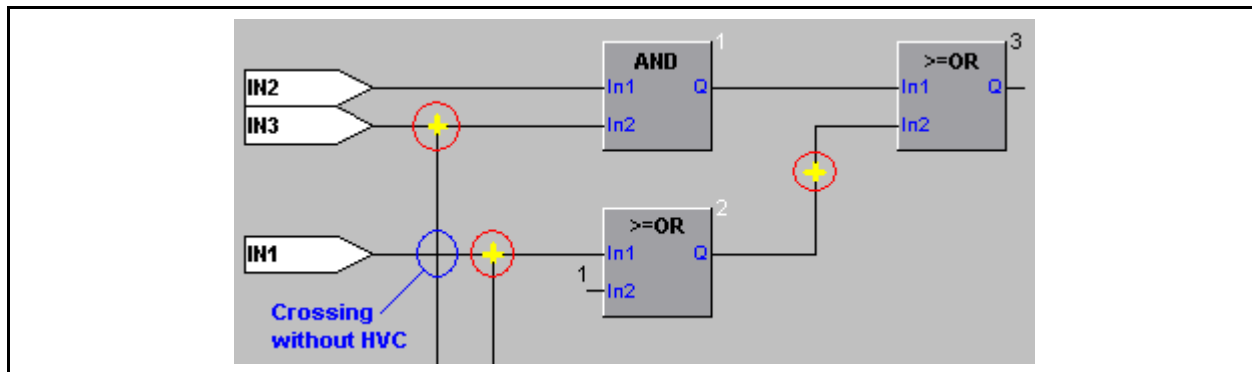
A signal flow line **must be connected on its two extremities** to a Function, Function Block CL or a H/V C.

Head and tail must be connected to CL having the same type and the same variable symbol name. If not, the connection fails.

More details

- about the SFL usage in the chapter "Working with Signal Flow Lines (SFL)",
- about the SFL pop-up menu: "Activity List of Signal Flow Lines".

6.3.2.5 Horizontal/Vertical Connections (H/V C)



Horizontal/Vertical Connections represent signal connections between Signal Flow Lines.

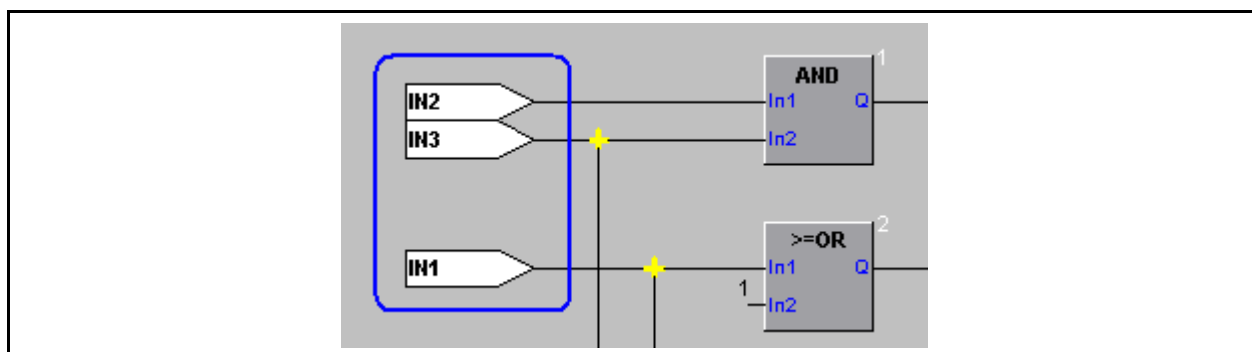
H/V connections allow quick understanding of line crossing with or without connections.

A new H/V connection is added by breaking down a horizontal or vertical signal flow line into two segments and allows the connection of a respectively vertical or horizontal new one. It can also be added at a SFL bend.

More details

- about the H/V C usage in "Working with FBD Network",
- about the H/V C pop-up menu: "Activity List of H/V Connections".

6.3.2.6 Slots



Slots describe the equation input/output parameters defined by PACiS. Therefore, new Slots can not be created.

More details

- about the Slots usage in "Working with Slots",
- about the Slots pop-up menu: "Activity List of Slots".

6.3.3 Text Annotations

Example of Text Annotation
$$\text{OUT} = (\text{NOT } (\text{IN1}) \text{ AND NOT } (\text{IN2})) \text{ OR IN3}$$

Text annotations (TA) are used in FBD documents. A Text Annotation is a comment that you can write in the background of the FBD document.

Text annotations may be left anywhere on the edition view sheet except on page boundaries.

For manipulations, see "Working with Text Annotations".

TA pop-up menu is described in "Activity List of Text Annotations".

6.3.4 Evaluation strategy

In a FBD document, each Function Block is marked with an execution order number. **FBD editor** gives itself all the sequence indexes to all the F and FB.

This number is called "**Network evaluation sequence index**" and is automatically calculated (see description of "Function (F)").

This **automatic calculation** is founded upon the IEC standard. The most important rule of the IEC standard is the obligation to evaluate at once, all the FB linked with the input Connecting Lines of the current FB to evaluate.

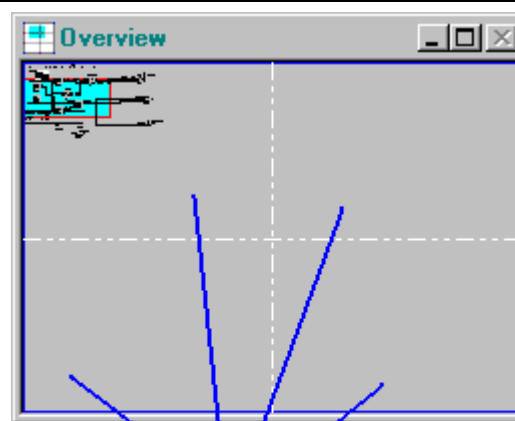
6.4 Working with the Equation Viewer

6.4.1 FBD document

An FBD Document gathers a lot of FBD networks needed to achieve equations.

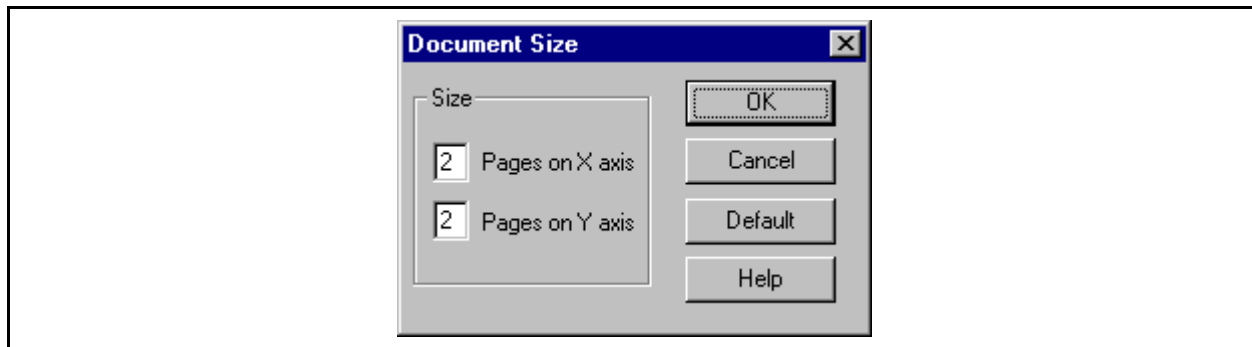
The whole document is visible in the Overview.

The document is divided into **pages** that are delimited by dashed lines (page boundaries) in the Overview and in the Editor view.



The document is divided here
into four pages : 2 x 2

Page ranges on X and Y are from 1 to 4 allowing a maximum matrix of 12 pages (3*4/2*6).



The document control panel allows resizing the FBD document matrix by specifying the number of pages.

NOTE: It is impossible to reduce a document size if it involves the removing of non-empty pages: it is necessary to delete or move these FBD networks before.

6.4.2 Navigation Features

There are different ways to change the Editor view content, from the Editor view itself or from the Overview:

To shift the view with a smooth scroll

Using **arrow keyboard interface**: ← ↑ → ↓

Using the **mouse**: left-clicking on the vertical/horizontal scroll bars arrows

To shift the view by a half page

Using **arrow keyboard interface**: Ctrl← Ctrl↑ Ctrl→ Ctrl↓

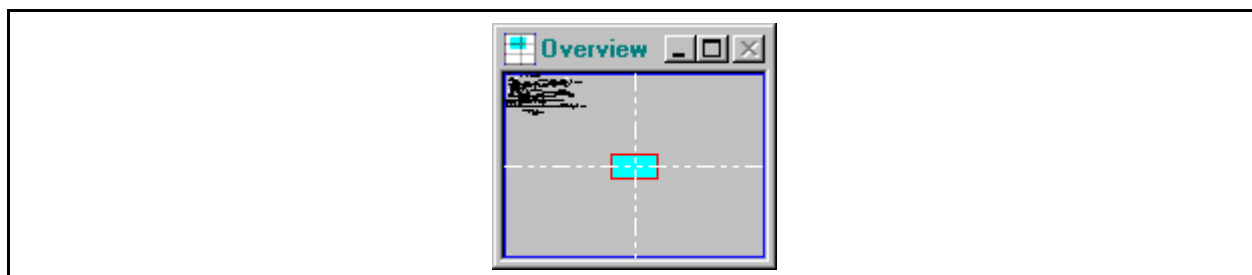
Using the **mouse**: left-clicking on the free part of the scroll bar

To shift the view by an entire page

Using keyboard interface: buttons Page-Up and Page-Down

Using the **mouse**: left-clicking on the blue rectangle and moving it up to the next page

To shift the view in the middle of the document



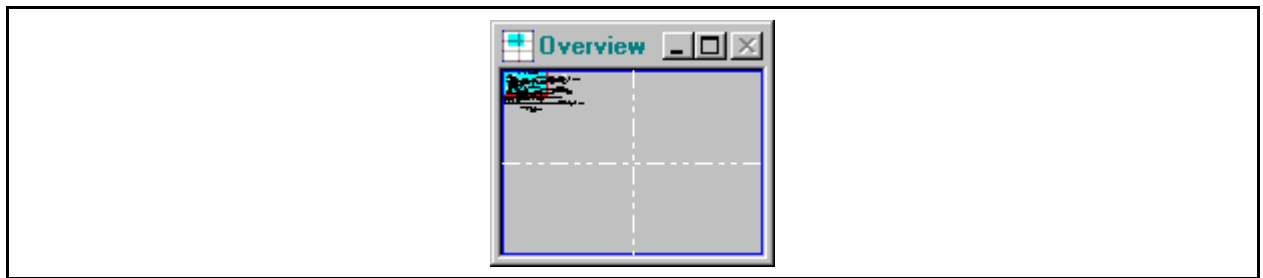
Using **keyboard interface**: button 5 of the keypad in **Num Lock** position

Using the **mouse**: left-clicking on the blue rectangle and moving it up to the middle

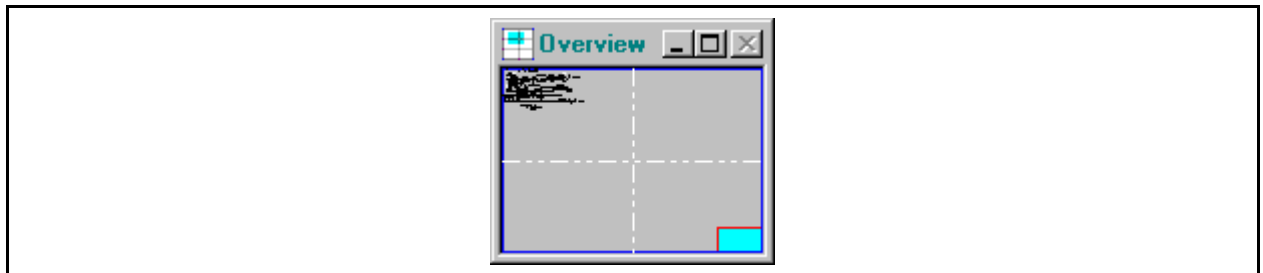
To shift the view at the beginning and at the end of the document

Using keyboard interface:

Button **Home**: the blue rectangle goes to the top left corner of the document overview.



Button **End**: the blue rectangle goes to the bottom right corner of the document overview.



Using the **mouse**: left-clicking on the blue rectangle and moving it up to the top left corner or the bottom right corner of the document

In all cases with the mouse

You can shift the view anywhere by left clicking on the blue rectangle and move it where you want in the document, keeping the left click on.

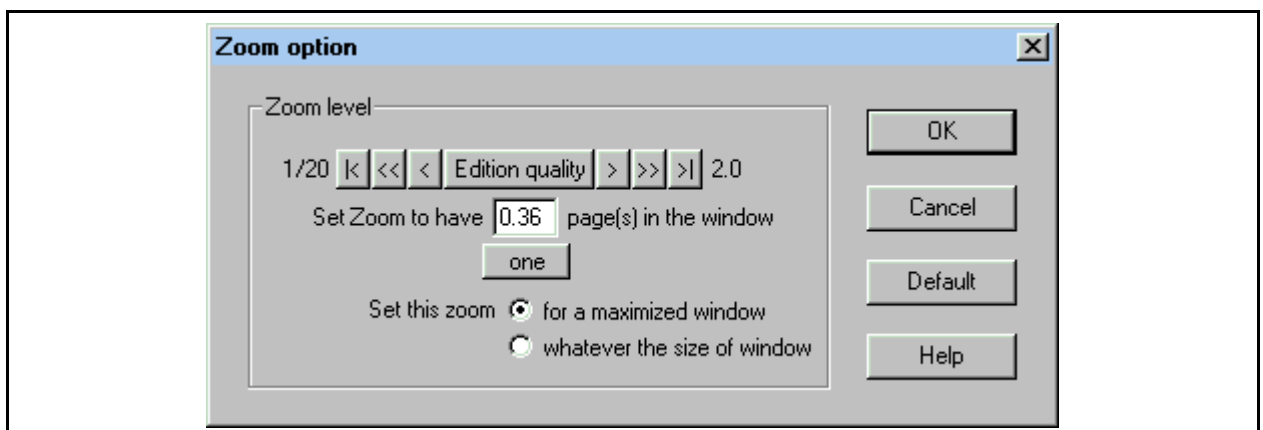
You can click anywhere in the document Overview window and the blue rectangle comes where you have clicked.

6.4.3 Zoom Features

It is possible to adjust the Zoom level of the Editor view in order to have the best compromise between the amount of information displayed and their readability.

Edition is possible for any Zoom ratio.

For example: working with a high Zoom ratio is useful for structural operation (subnetwork duplication,...)



The Zoom unit is a **page**.

The Zoom **minimum value** is 1/120th of a page.

The Zoom **maximum value** is the page number fixed by the user (see "FBD document").

The current Zoom value is displayed in the edit field.

There are different means to modify the Zoom ratio:

The arrows and double arrows are used to modify Zoom more precisely.

< and > modify the Zoom ratio of a tenth (1/10) of a page.

<< and >> modify the Zoom ratio of a half page.

|< and >| set the minimum and maximum Zoom ratio.

"Edition quality" sets the Zoom ratio to have the best readability of Blocks and comments on the chosen view. The **Default** button has the same behaviour.

The "one" button sets the Zoom ratio to "one page per view".

If you have chosen to work with the Zoom ratio set for a maximized window:

You have to select the option "for a maximized window" like in the example above.

In this case you can also modify the Zoom ratio by moving the blue rectangle in the Overview.

If you modify the Editor window size, the Zoom ratio stays the same and more or less FBD logic is visible.

If you have chosen to work with whatever size of window:

You have to select "whatever size of the window".

In this case, it is not possible to modify the Zoom ratio by the overview.

If you modify the Editor view size, the same content will be displayed with another Zoom ratio.

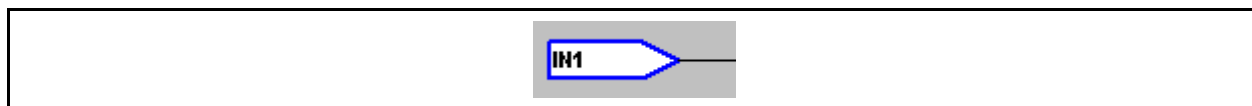
6.4.4 Selection Model

6.4.4.1 Selection of a graphical component

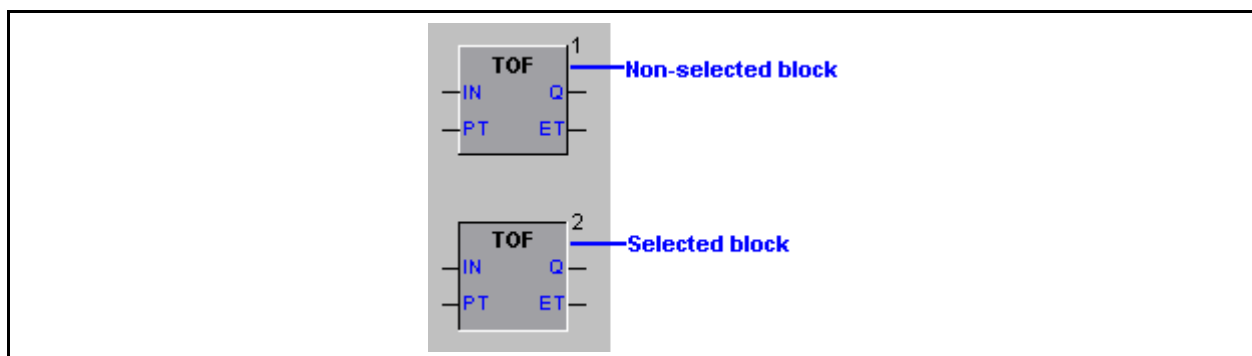
All graphical components may be individually selected by a left-click or by a right click. In the second case, a pop-up activity list is also displayed.

A. In response to this explicit selection, a selection feedback is provided.

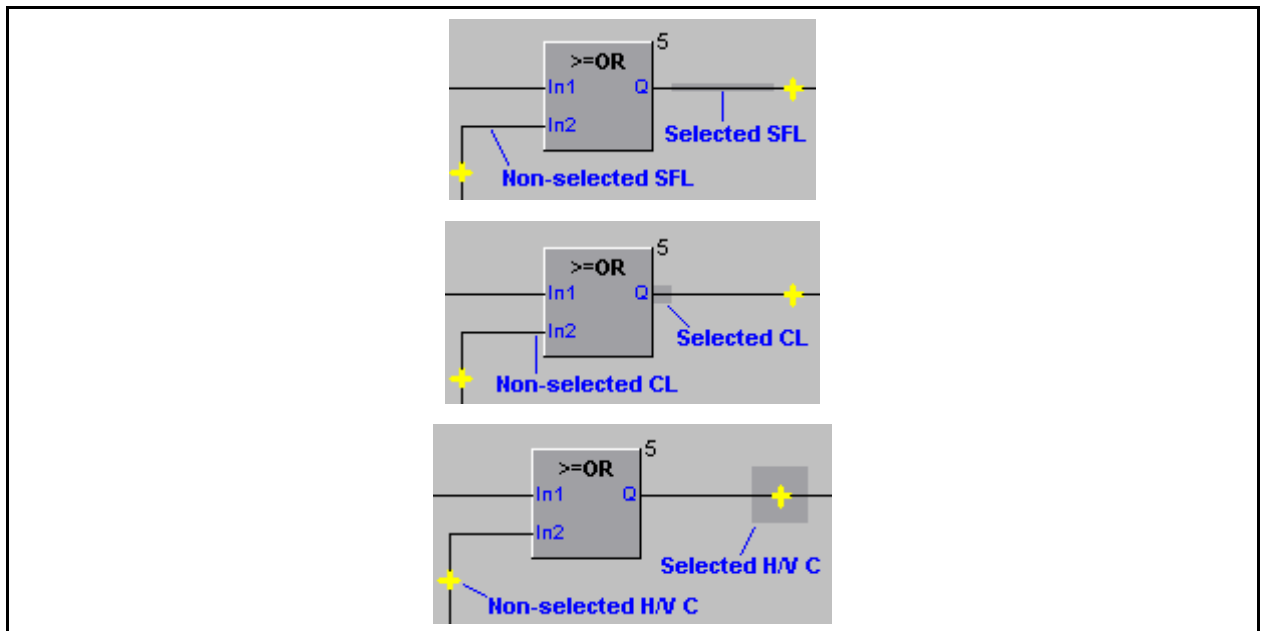
Slot: the border becomes blue.



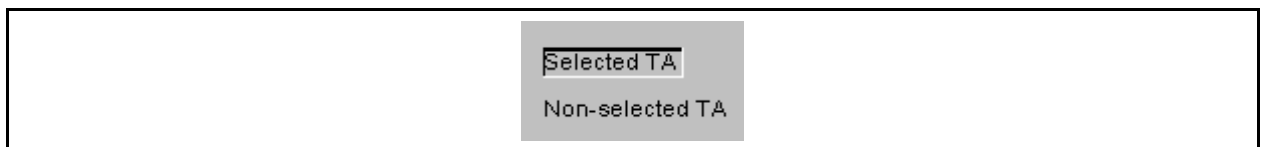
F & FB: the border colours are reversed.



SFL, CL & H/V C: a gray border is displayed around the graphical component.



TA: the text is displayed in embedded form.



B. To cancel the selection

Any left click on the background cancels previous selection.

Any left click on another graphical component selects this one cancelling the previous selection.

Ctrl key + left click.

C. Actions on the selected component

Depending on the selected component, some actions are or are not allowed.

Example: Cut or Copy are not allowed on a SFL.

Depending on the selected component and the action, some non-explicitly selected graphical components may be affected and no feedback is provided for them.

Effects of this kind of selection is indicated in another way.

Example: CL are moved and SFL are re-routed when moving a selected function block.

WYSIWYG (What You See Is What You Get) effect is provided during Move/Copy operations: dashed graphical components represent the operation result at the drop time.

More Details

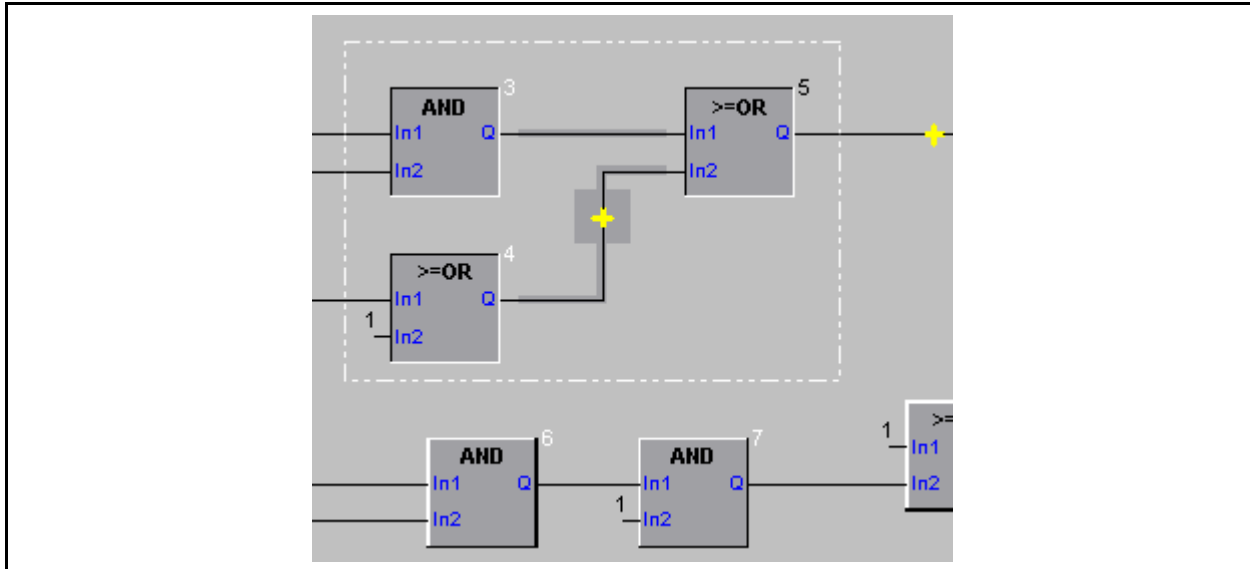
See "Block manipulation" or "Move/Copy-Paste/Cut-Paste operation for Network region".

6.4.4.2 Selection of a subnetwork

A subnetwork is a set of graphical components that have a functional meaning.

A. To select a subnetwork

A subnetwork can be selected drawing a focus rectangle around it: you left-click anywhere in the document and with the mouse button maintained on, you fully surround all the components you want in the subnetwork (the focus rectangle is composed of dashed lines).



For each graphical component fully included inside the focus rectangle, a selection feedback is provided as described in "Selection of a graphical component".

B. To aggregate several objects

You select the first object by a left click and for the others, you use the left click with the Ctrl key pushed on. All these not contiguous objects create a set that can be copied, cut or deleted as the subnetwork described below.

C. To aggregate several subnetworks

You can also add a new subnetwork to the previous selection set by drawing a focus rectangle (as above) around this new subnetwork while pressing the Ctrl key.

D. To cancel the selection:

Any left click on the background cancels the previous selection.

Any left click on another graphical component selects this one cancelling the previous selection.

Ctrl key + left click.

Ctrl key + a focus rectangle to cancel a part of the selection.

E. Actions on the selected subnetwork

See "Working with FBD Network".

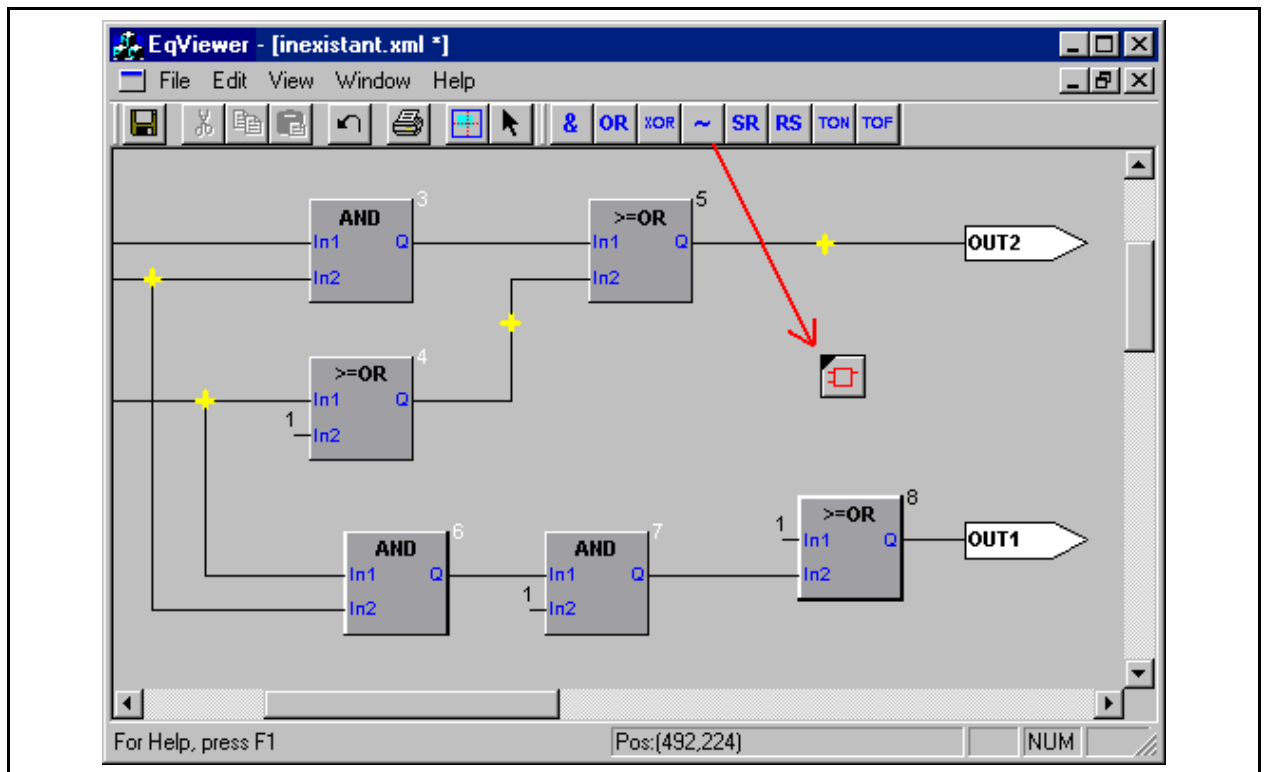
WYSIWYG effect is available as described in "Selection of a graphical component".

6.4.5 Working with Functions and Function Blocks

6.4.5.1 How to get a Block

To add an FBD Block, choose the block by left clicking on the corresponding button in the FBD toolbar and place it in the document by left clicking in the FBD View where it must be placed.

After the selection of the block, the cursor (usually an arrow) is replaced by a cursor representing the block.



When the block is added to the document, it can be moved or duplicated by traditional drag and drop operations.

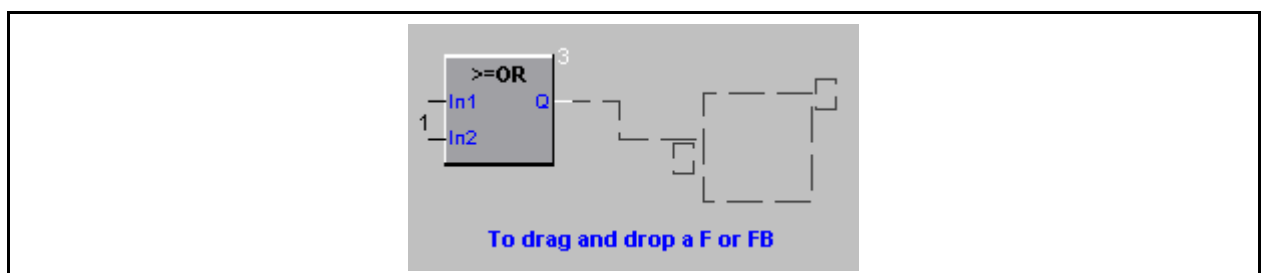
6.4.5.2 Block manipulation

A right-click on a Block selects it and also displays a pop-up activity list whose items are explained below; then it becomes possible to do some manipulations with the selected Instruction.

To move a Block

You select the chosen block and you move the mouse with the left-click on (drag and drop operation).

The borders are then drawn in dashed lines as the linked SFL which stay attached and are automatically rerouted.



The drawing stays with dashed lines until you drop the left-click. The instruction is then re-drawn in its new location.

Cut and paste operations

You select the chosen block.

You push on **Ctrl+X** *or*
 you select the **"Cut"** item in the Edit menu *or*
 you select the **"Cut"** item in the pop-up menu (right click).

You left-click at any location of the Editor view.

You push on **Ctrl+V** *or*
 you select the **"Paste"** item in the Edit menu *or*
 you select the **"Paste"** item in the Editor view pop-up menu (right click).

NOTE: By cut and paste, both source and target networks are modified; the Instruction loses its connected SFL lines.

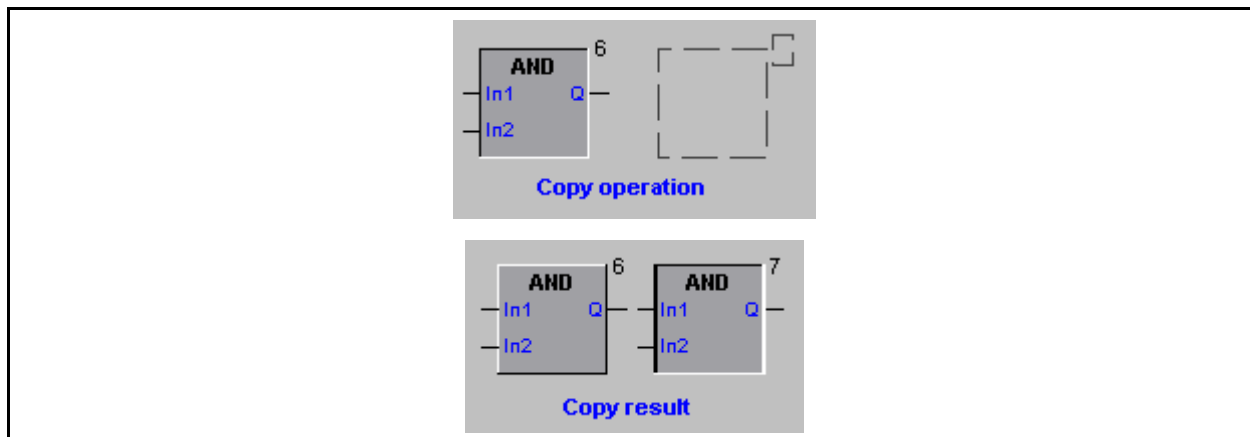
To duplicate a Block

* Drag and drop operation

You select the chosen block by a left-click.

You move the mouse with the left click on and while pushing on the Ctrl key. The new F or FB is copied without its connected SFL lines and is drawn in dashed lines (as above).

The drawing stays with dashed lines until you drop the left-click. The new block is then drawn in the current place.



or

* Copy and paste operations

You select the chosen F or FB

You push on **Ctrl+C** *or*
 you select the **"Copy"** item in the Edit menu *or*
 you select the **"Copy"** item in the pop-up menu (right click)

You left click at any location of the Editor view.

You push on **Ctrl+V** *or*
 you select the **"Paste"** item in the Edit menu *or*
 you select the **"Paste"** item in the Editor view pop-up menu (right click)
 (copy is also made without SFL lines).

NOTE: If you drop/copy on a wrong area, the element remains displayed dashed red. It is now possible to initiate a new drag&drop/copy operation in order to move the element in a right area.

To delete a F or FB

You select the chosen Instruction and then you have four possibilities:

to push on the **"Delete"** key: the Instruction is definitely deleted.

to push on **Ctrl+X**: **"Cut"** operation without following **"Paste"**.

to select the wanted operation in the Edit menu: **"Cut"** or **"Delete"**.

to select the **"Delete"** item in the pop-up menu (right click).

6.4.5.3 Extensibility

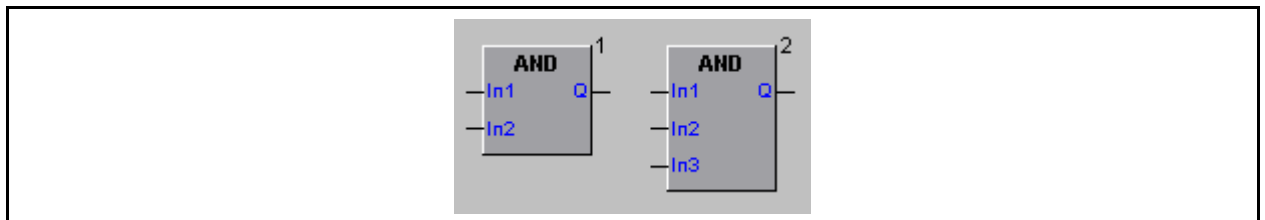
Extensibility is supported on some Boolean operators. This means that you can extend the number of input CL of a block by duplicating the last one.

The manipulation is simple:

You select the input CL you want to duplicate.

You select the **Duplicate** item in the pop-up menu of the CL.

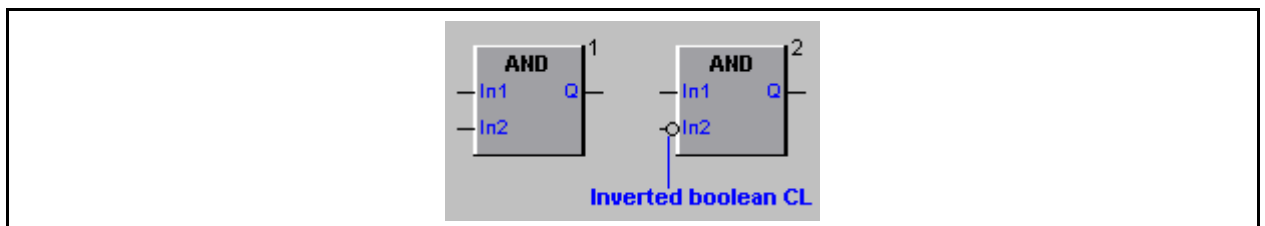
The new input CL is created, with the same attributes than the duplicated one.



You can delete a duplicated input CL by using the **Delete CL** item in the CL pop-up menu.

6.4.5.4 Negation

It is possible to negate an input or output Boolean CL, by using the **Toggle Negation** item in the pop-up menu of the CL.



This item will obviously toggle the negation on and off.

6.4.5.5 How to get Help about a Block

The on-line help may be launched (**F1 key**) from any FBD block of the FBD View.

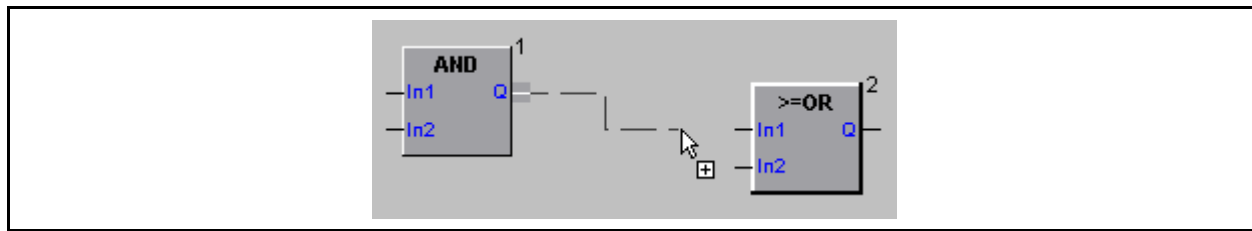
6.4.6 Working with Signal Flow Lines (SFL)

6.4.6.1 SFL manipulation

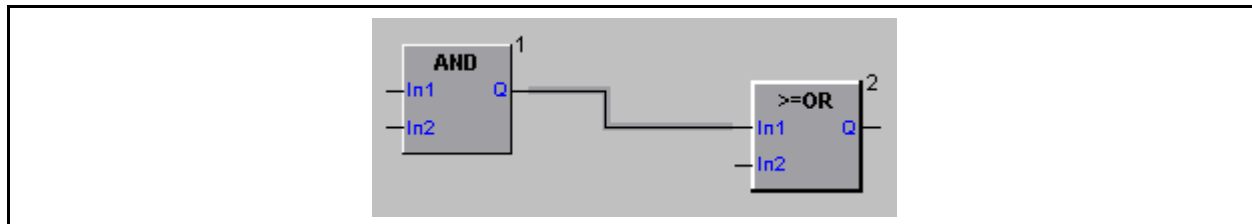
To draw an SFL from a F or FB to another one

You left click on the chosen CL of the original F or FB: it initiates a new "Signal Flow Lines (SFL)" routing; the feedback is the CL becomes white.

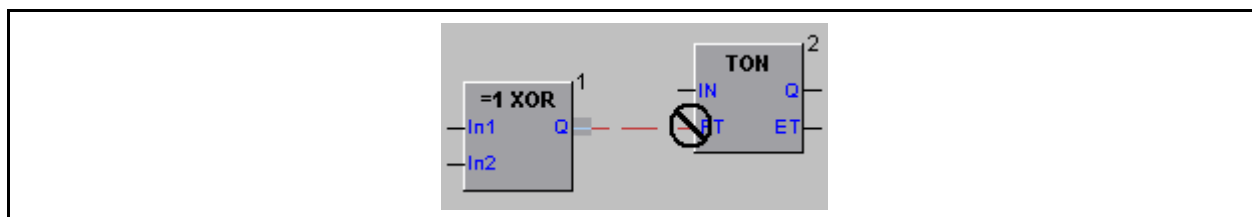
You move the cursor until the CL of the ending F or FB (with the left click pushed on); the SFL is drawing in dashed line(s).



You push off the left click when the cursor is on the destination CL; the SFL is now drawn in continuous lines and in selected mode.



NOTE: Head and Tail must be connected to CL having the same type. In this case the feedback is a white dashed SFL. If not, an error is displayed by a red dashed line feedback and a "not entry" sign.



Information about "Literal manipulation (Paste/Delete/Cut/Copy)".

To perform an SFL Routing

Each time an SFL routing is necessary, it is made automatically but roughly.

It is efficient enough for the most frequently operations made on networks.

Meanwhile, the SFL route can be adjusted translating segments:

You select the SFL segment left clicking it.

You keep the left click and move the mouse until having the right routing.

The SFL is drawn in dashed lines during the operation.

You release the left click to have the final route. The SFL is then drawn in continuous lines.

To delete an SFL

You select the chosen SFL and then:

You push on the **"Delete"** key **or**

You select the item **"Delete SFL"** of the pop-up activity list (right click) **or**

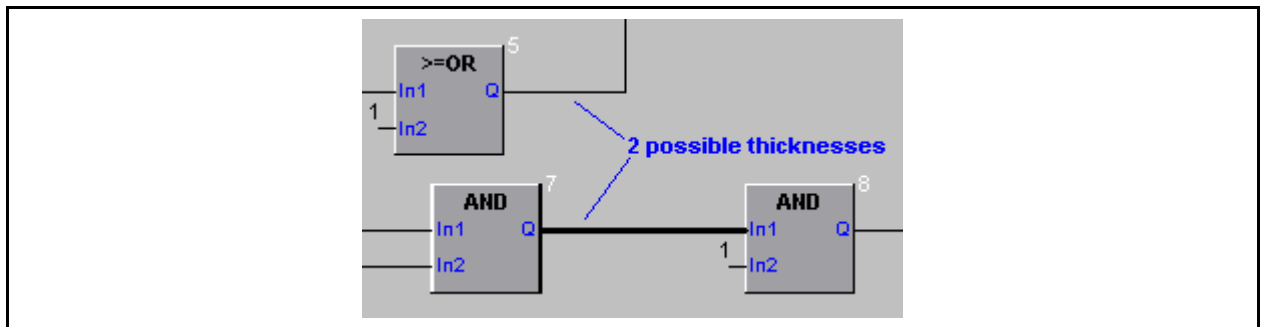
You select the **"Delete"** operation in the Edit menu

Then SFL is definitely deleted,

To choose the SFL thickness

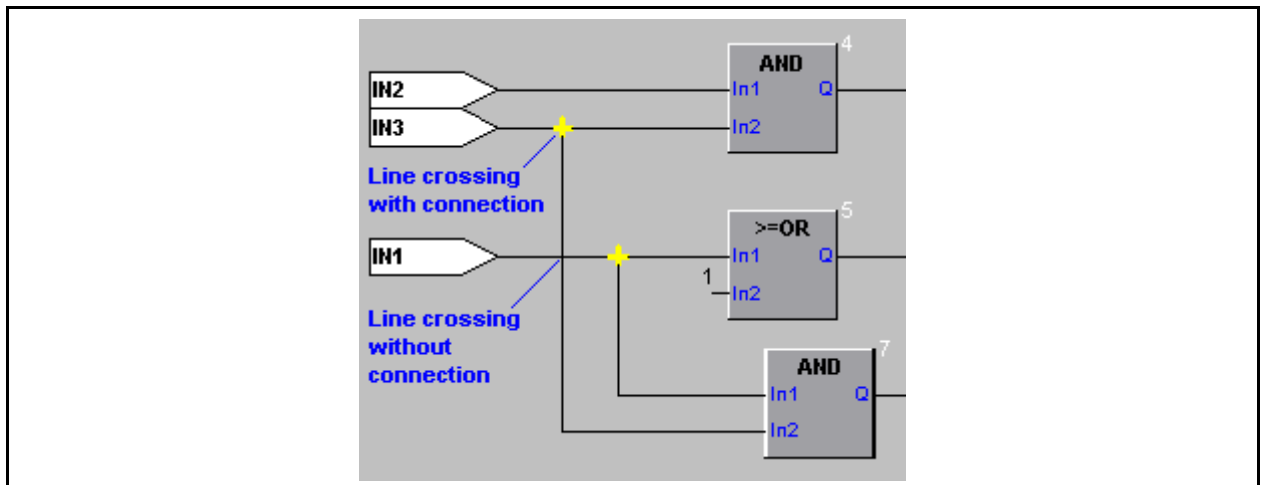
You can change the SFL drawing thickness by the **"Toggle thickness"** option of the SFL pop-up activity list (right click).

The result is showed below:



6.4.6.2 SFL derivation: H/V C

A H/V C connection breaks down an horizontal or vertical Signal Flow Line into two segments and allows connection of respectively vertical or horizontal new one. It allows quick understanding of line crossing with or without connections.



To **insert** a Horizontal/Vertical Connection in a SFL, you have to do the following actions:

You select the **SFL** where you want insert a H/V C.

You right-click with the mouse and a pop-up activity list is displayed.

You select the item "Insert H/V C" and the H/V C symbol is displayed at the cursor location on the SFL drawing.

To **delete** a Horizontal/Vertical Connection, you have to do the following actions:

You select the **H/V C**.

You right-click with the mouse and a pop-up activity list is displayed.

You select the item

"Delete H/V C & SFL": the selected H/V C and all the SFL linked to are deleted.

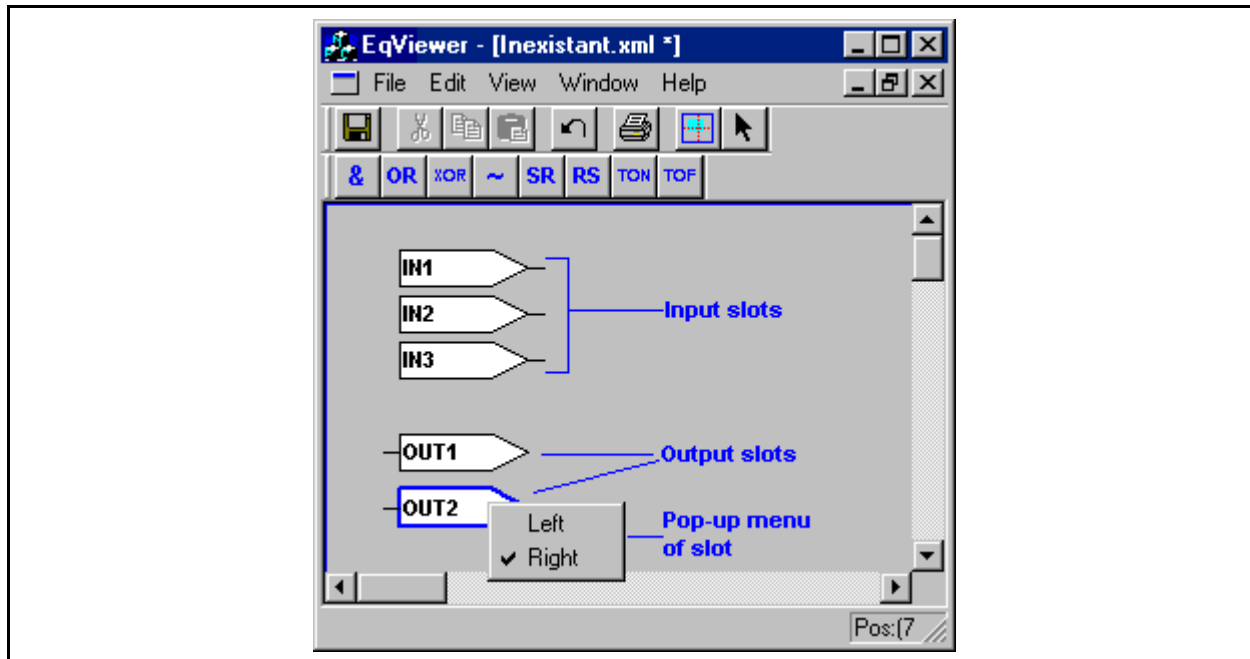
"Delete H/V C, SFL & symbol": the selected H/V C, all the SFL connected to and the corresponding symbol are deleted.

6.4.7 Working with Slots

Slots are graphical FBD elements representing input/output list.

That list is written in the XML input file by the PACiS Environment before the calling of the Equation Viewer application.

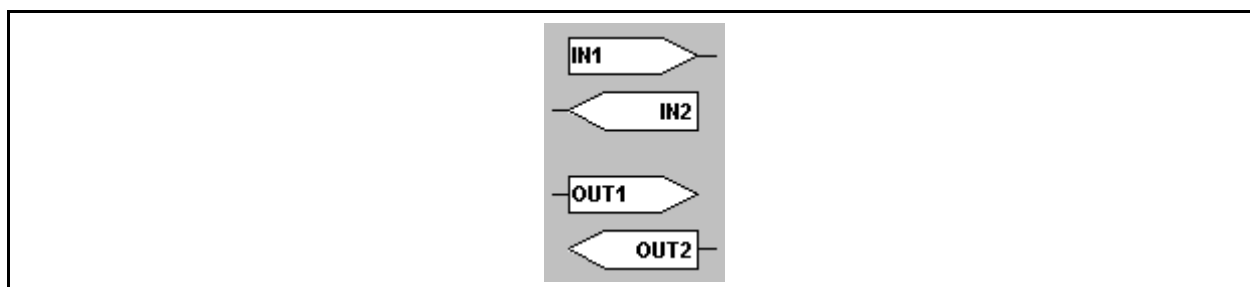
Slots are represented as shown below:



Each slot has a Connecting Line that is a link between:

- an input slot and the input of a block or function block (SFL)
- an output of a block or function block and an output slot (SFL)

The orientation of the Slots can be toggled thanks to the **Left** and **Right** items of their pop-up menu.



6.4.8 Working with FBD Network

6.4.8.1 Move/Copy-Paste/Cut-Paste operation for Network region

The general mechanism is quite the same using clipboard or drag and drop facilities:

Select a network region on the Editor view
(see "Selection of a subnetwork").

Initiate a Cut-Paste/Copy-Paste or drag and drop operation.

Terminate this operation either by cancelling it or by entering it (you can stop the operation by pushing on the **Esc** key or by dropping in a "no entry"  area).

To move a network region

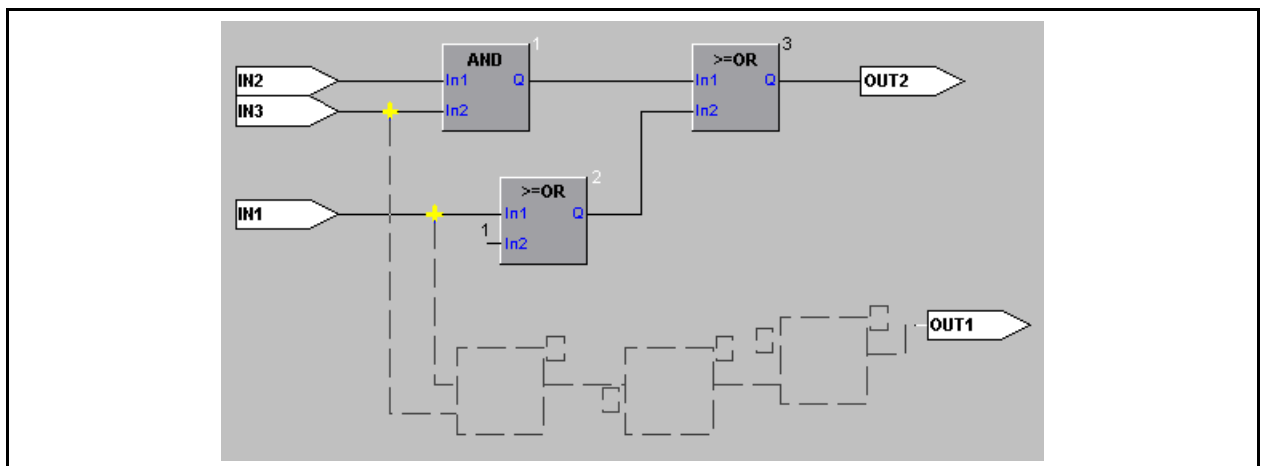
* Drag and drop operation

You select the network.

You left click on one of selected objects.

You move the mouse with the left-click on.

The borders are then drawn in dashed lines as the linked SFL which stay attached and are automatically rerouted.



The drawing stays with dashed lines until you drop .The subnetwork is then re-drawn in its new location.

or

* Cut and paste operations

You select the subnetwork.

You push on **Ctrl+X** or select the "**Cut**" item in the Edit menu.

You move the cursor where you want in the Editor window and left-click on.

You push on **Ctrl+V** or select the "**Paste**" item in the Edit menu.

NOTE: Connexion (SFL) between the cut subnetwork and the remaining network are lost.

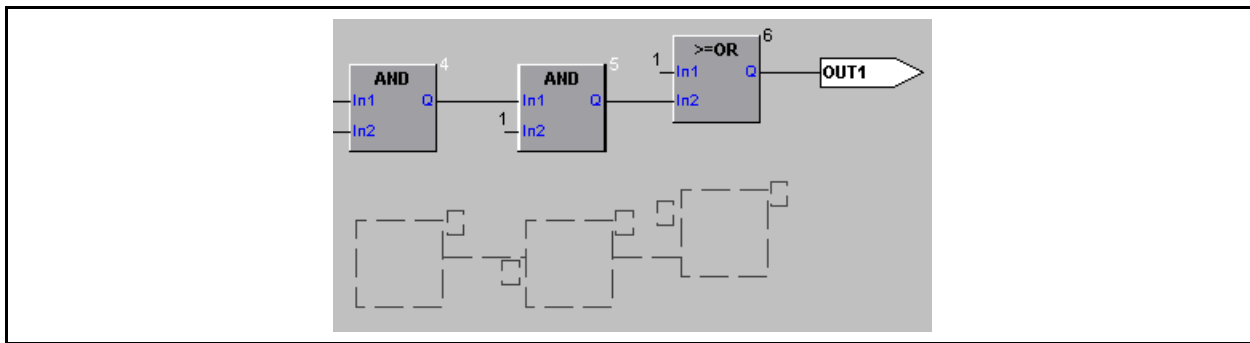
To duplicate a subnetwork

* Drag and drop operations

You select the subnetwork and you move the mouse with the **Ctrl** key pressed.

The new subnetwork loses all its connected SFL lines with the remaining network . It is drawn in dashed lines (as below). The draw stays with dashed lines until you drop (WYSIWYG effect).

The new instruction is then drawn in continuous lines at the current place.



During the copy operation, the subnetwork is displayed red as long as it is in a wrong area.

or

* Copy and paste operations

You select the subnetwork.

You push on **Ctrl+C** or select the **"Copy"** item in the Edit menu.

You move the cursor where you want in the Editor window and left-click on.

You push on **Ctrl+V** or select the **"Paste"** item in the Edit menu
(SFL lines are lost).

NOTE: If you drop/copy on a **wrong area**, the subnetwork remains displayed dashed red.
It is now possible to initiate a new drag&drop/copy operation in order to move the subnetwork in a right area.

To delete a subnetwork:

You select the subnetwork and then you have three possibilities:

To push on the **"Delete"** key: subnetwork is definitely deleted.

To push on **Ctrl+X**: "Cut" operation.

To select the wanted operation in the **Edit** menu: **"Cut"** or **"Delete"**.

6.4.8.2 Working with several Editor Views

When you are working in a document, you can probably have to move or copy a Block or a subnetwork from a document area to another or to draw a SFL from a Block to another.

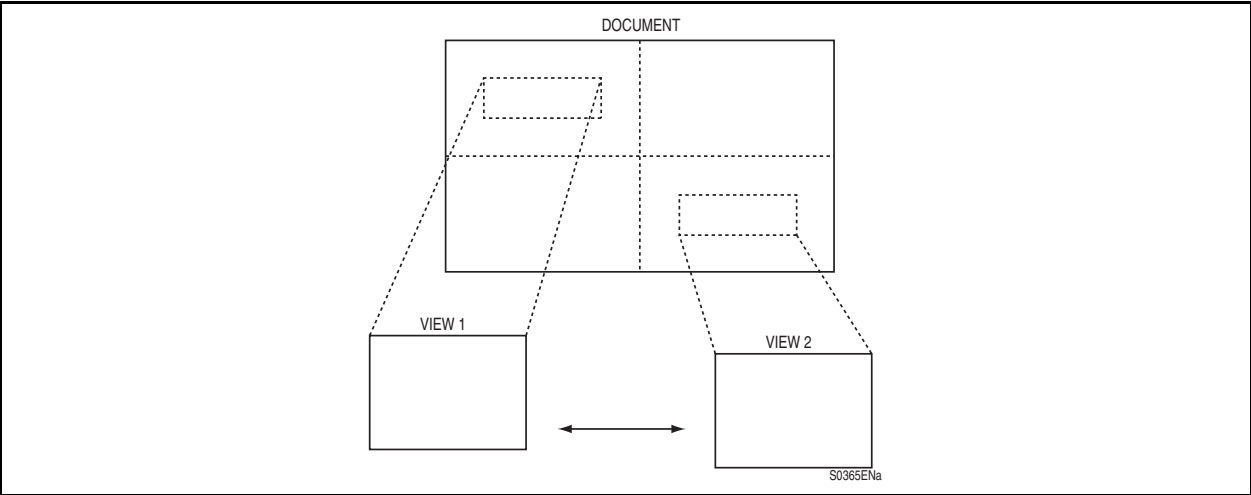
If the two areas or blocks are not visible in the same view, you have two solutions:

1. You can perform a drag-scroll through the document with the drawback of not seeing the beginning AND the end of your operation at the same time.
2. You can open another view of the same document:

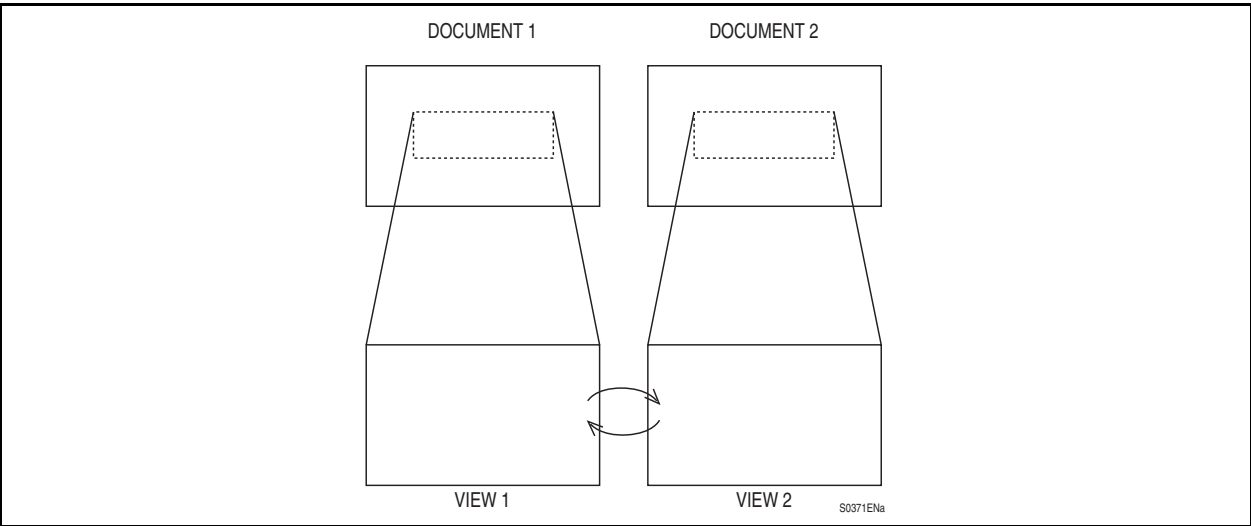
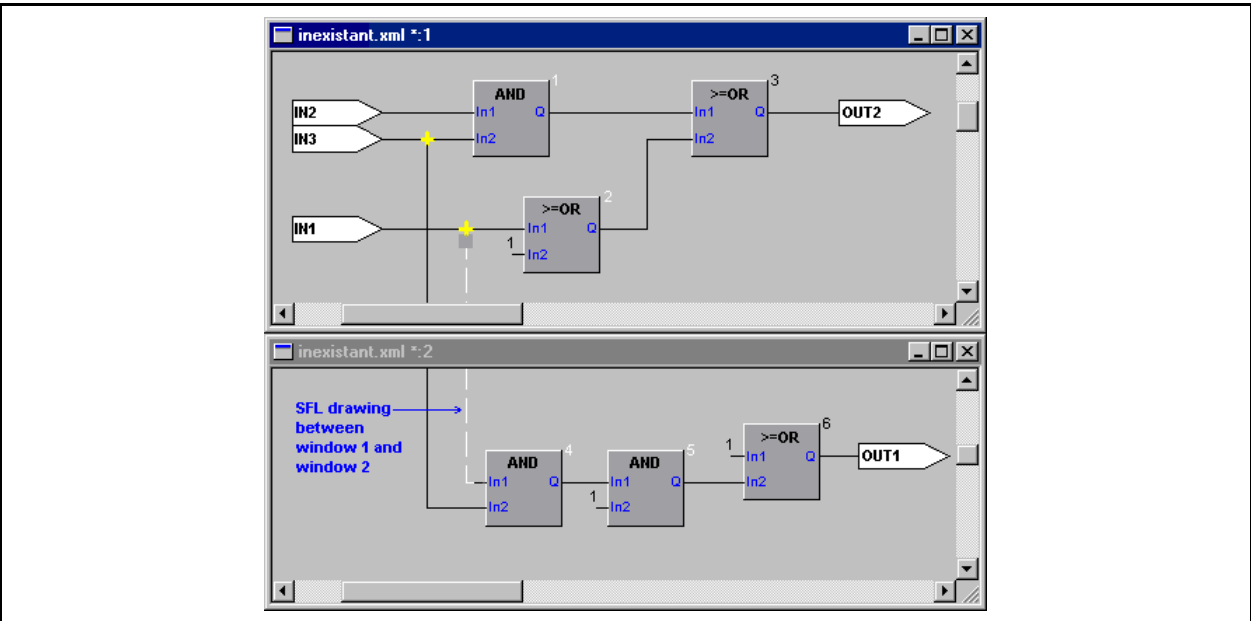
At the main toolbar, you select the "New Window" item of the "Window" menu.

A second window of the same document is opened and is independent of the first one.

You can choose different Zoom ratios, focus on different document areas, ...



Now, it is possible to perform drag and drop, SFL drawing, ... from one view to the other but in the same document and seeing the two views at the same time.



NOTE: The sequence index is automatically modified, adapted to the new network. SFL connections are not allowed between different documents.

6.4.9 FBD Graphical Controls

You cannot put FBD graphical elements anywhere in the Editor Window:

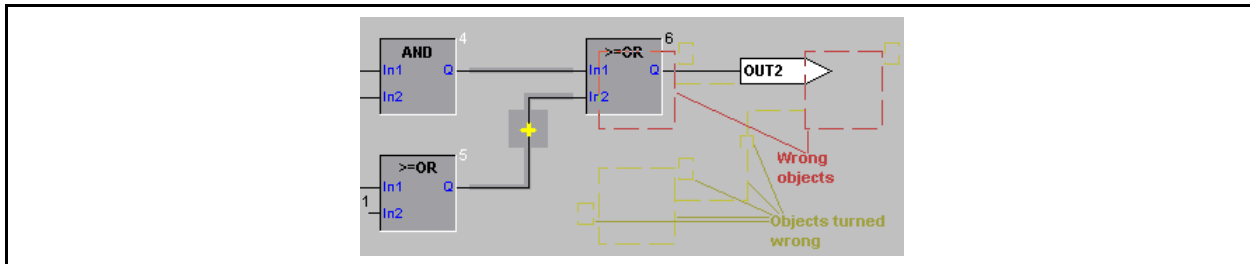
- not on or quite near a Block or a Text Annotation,
- not on the page boundaries.

In these cases, FBD returns a feedback to show the problem:

RED dashed lines to indicate what draw part is in a forbidden zone, with a "no entry"  sign.

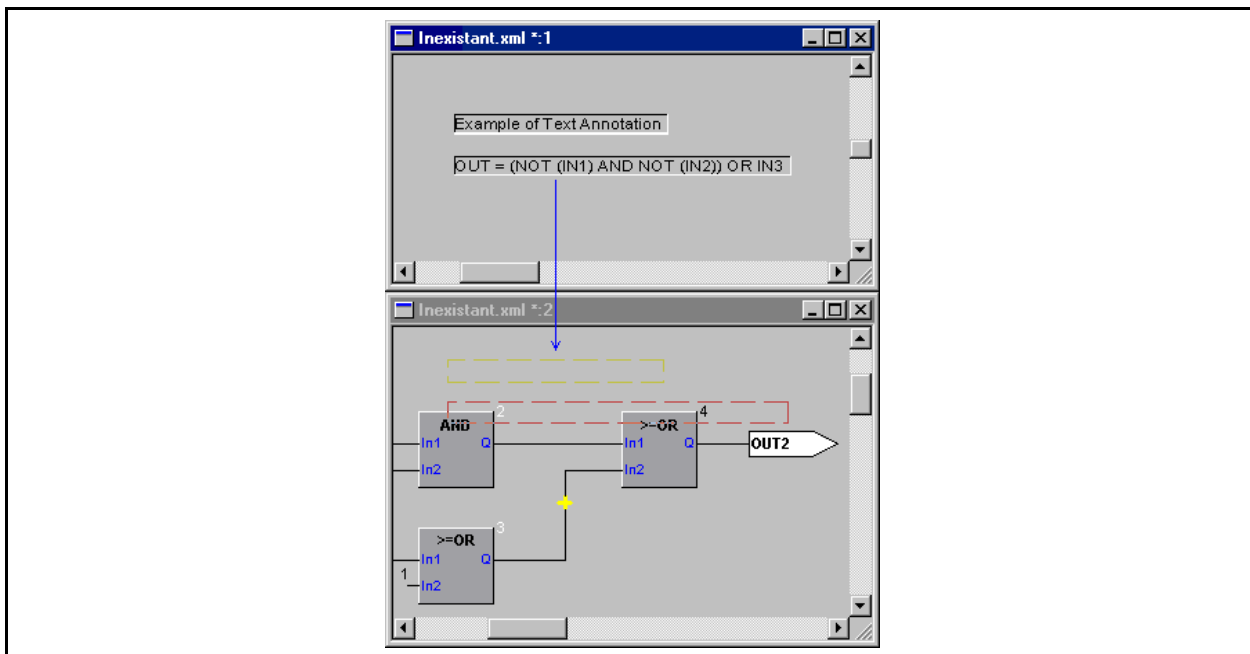
YELLOW dashed lines to indicate the objects which becomes unacceptable because of the attached wrong (RED) object.

Example 1: MOVE operation



During the Move operation, these colours (red and yellow) are displayed as long as the moved object is in a wrong area. If you drop in a wrong situation, the drawing is like before the move operation and the colour dashed lines are removed.

Example 2: Copy/Paste between two Editor windows



During the Copy operation, the graphical element is displayed red as long as it is in a wrong area. If you drop it on this wrong area, the element remains displayed dashed red. It is now possible to initiate a new drag & drop operation in order to move it on a right area.

6.4.10 FBD Semantical Controls

6.4.10.1 Prototypical FBD network notion

In the description of a Function or a Function Block, each connecting line has definite characteristics which fix the data types choice possibilities for each of them.

The Equation Viewer controls that the edited variable meets the CL criteria.

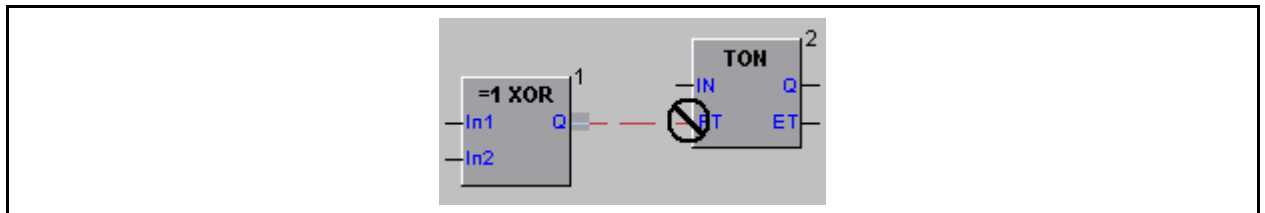
Connecting Lines prototypes are characterized by Data type. A CL can accept variables of one or several data types (ex: Bool, Time, ...). Supported data types depend on target types.

Two CL of two F or FB which has to be linked by an SFL must have compatible data types ; if not, the Equation Viewer doesn't allow the SFL drawing as explained in "Prototypical Controls".

6.4.10.2 Prototypical Controls

The Equation Viewer controls CLs link. The data type must be compatible.

Example with no compatible data type: Error feedback

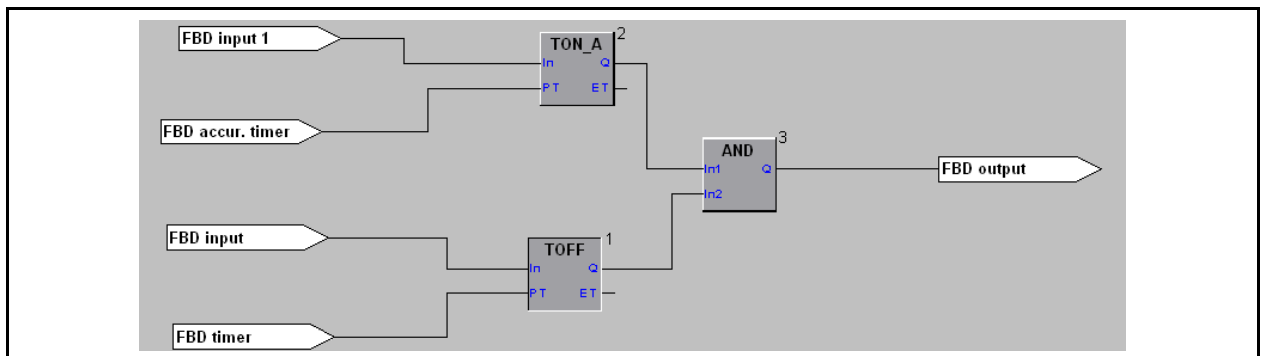


TON / TOFF PT gate can only be linked to [FBD timer](#) slot.

TON_A / TOFF_A PT gate can only be linked to [FBD accur.timer](#) slot.

There is no warning until the equation is saved.

Right example:



6.4.11 Working with Literals

The Equation Viewer allows the creation of boolean and duration literals. For PACiS V3, only duration literal are available.

When assigning a literal, users will be prompted to enter its value:

Duration:

duration::= (T| t)#[-] interval

interval::= days| hours | minutes | seconds | milliseconds

fixed_point::= integer[.integer]

days::= Fixed_Point (d |D)

hours::= Fixed_Point (h | H)

minutes::= Fixed_Point (m | M)

seconds::= Fixed_Point (s | S)

milliseconds::= Fixed_Point (ms | MS)

Example: T#100ms, t#10H30m15s

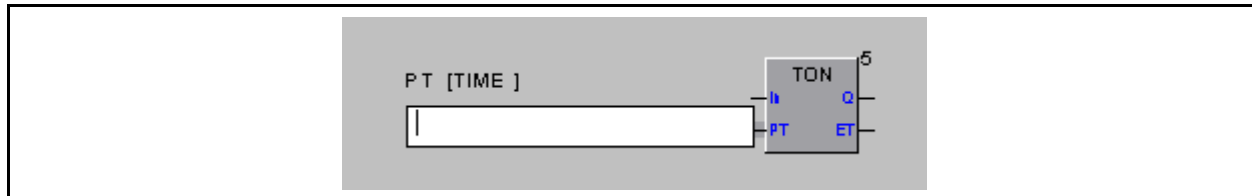
When the user assigns a literal to a function or function block input parameter, checks are made in order to evaluate if the data type complies with this one expected on this parameter.

If not, the assignment will fail.

6.4.11.1 Associate Symbol

You double click the left mouse button on the **CL** or you click the right mouse button and select the **Associate symbol** item in the activity list of a **SFL**, a **CL** or a **H/V C**.

An edit field is then opened where you can type the literal you wish to associate to the CL. Near the name of the CL, you can see in square brackets the data types which can be associated.



As we enter a literal which does not match with the duration type constraint, we obtain the following error message:



As the right literal is in the field, press the Enter key of your keyboard. The literal is then associated to the CL and an edit field is automatically shifted to the next CL to define (if there is one...).

6.4.11.2 Literal manipulation (Paste/Delete/Cut/Copy)

To move a literal

Drag and drop operation

Initially, the literals are put around the F or the FB, but they may be moved anywhere on the sheet according graphical and semantic control:

Select the literal by clicking the left mouse button.

You can then move the literal by maintaining the left mouse button clicked on, up to another place (drag and drop operation).

Cut and paste operations

Select the chosen literal.

Press **Ctrl+X**,

or

Select the Cut item in the Main Edit menu,

or

Select the Cut symbol item in the literal pop-up activity list (click the right mouse button on the literal).

Move the cursor to another CL, SFL or H/V C in the Editor window and click the left mouse button on it.

Press **Ctrl+V**,

or

Select the **Paste** item in the Edit menu,

or

Select the **Paste** symbol item in the CL or SFL or H/V C pop-up activity list.

Arrange symbol

Arrange symbol is an operation of the pop-up activity list obtained by clicking the right mouse button on an F or an FB.

The result is a display in normal form and near the current F or FB, at the **initial position** of the symbol.

To duplicate a literal

Drag-and-drop operation:

Select the chosen literal.

Move the mouse with the left mouse button clicked on and while pressing the Ctrl key.

The drawing stays within dashed lines until you drop. The new literal is then drawn in the current place.

Copy and paste operations:

Select the chosen literal.

Press **Ctrl+C**,

or

Select the **Copy** item in the **Edit** menu,

or

Select the **Copy symbol** item in the literal pop-up activity list (click the RH mouse button on literal).

Move the cursor to another CL, SFL or H/V C in the Editor window and click the left mouse button on it.

Press **Ctrl+V**,

or

Select the **Paste** item in the Edit menu,

or

Select the **Paste symbol** item in the CL or SFL or H/V C pop-up activity list.

To remove a literal assignment

Select the chosen literal; then you have several possibilities:

- to press the Delete key: the literal is definitely deleted,
- to press Ctrl+X (cut operation),
- to select the desired operation in the Edit menu: Cut or Delete,
- to select the Delete symbol item in the literal, CL or H/V C pop-up activity list.

6.4.11.3 Literal controls

If you try to move or copy a literal on a CL which has not the same type

or

If you try to move or copy a literal:

- on or quite near an F or FB,
- on or quite near an annotation (TA),
- on the window boundaries,
- between two equation logics,

the Equation Viewer gives you a feedback as below: the literal is displayed in red dashed line with the "no entry" sign and when you release the left mouse button, the literal stays at its initial position.

6.4.12 Working with Text Annotations

Example of Text Annotation

$$OUT = (NOT (IN1) AND NOT (IN2)) OR IN3$$

6.4.12.1 Creation of TA

You right click on the Editor view background. An activity list is displayed.

You select the option **"Insert Text Annotation"** and an Edit field is displayed at the left-top of the active view, where you can enter your text.

You move by drag & drop the entered text at the location you want in the active view or in another view.

6.4.12.2 Manipulations of Text Annotation

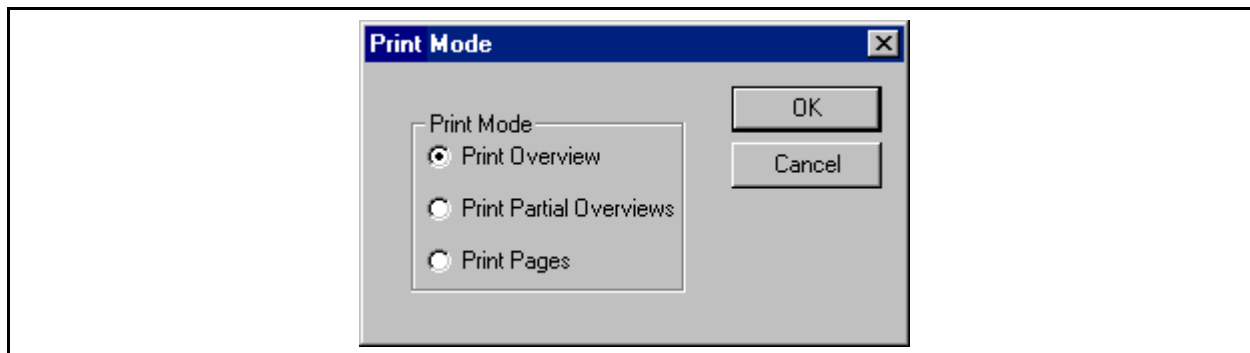
These manipulations are the same as those described in "Literal manipulation (Paste/Delete/Cut/Copy)" and as the use of the **Paste** option in the Activity List of the Editor View.

In order to modify a TA, you have to double-click on the TA and an Edit field appears which is initialized by the current TA. It is so possible to modify it.

6.5 Printing FBD Documents

Print, **Print Preview** and **Print Setup** features will be provided in order to allow printing of documents.

When printing a document, a **Print Mode** dialog prompts user to choose one of the following topics:



Print Overview

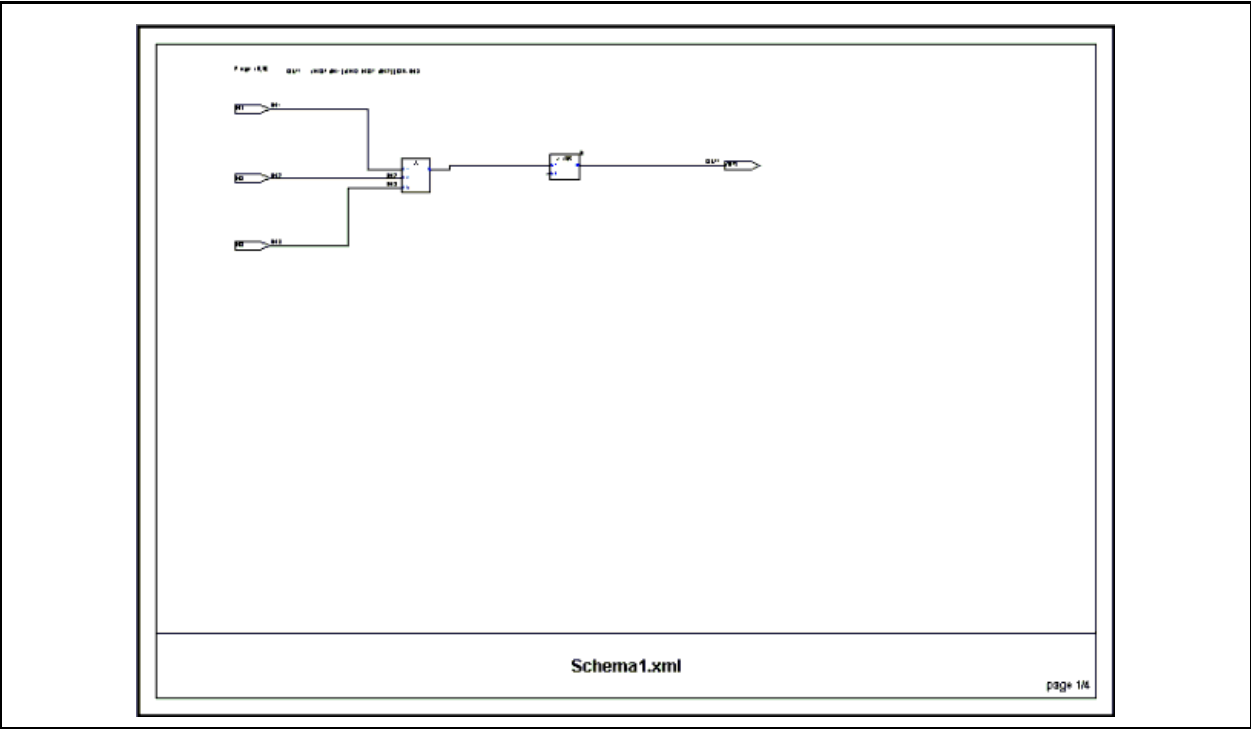
To print the whole document into one sheet of paper

Print Partial Overviews

To print as many sheet as there are matrix of 4x4 pages into the equation logic

Print Pages

To print as many sheet as there are pages in the document



6.6 **Popup Activity Lists**

6.6.1 Activity List of the Editor View

Paste	Ctrl+V
Undo	Ctrl+Z
Insert Text Annotation	

Paste: Displays in the Editor View what has been stored by a **Cut** or a **Copy** instruction

Undo: Cancels the last operation

Insert Test Annotation: "Working with Text Annotations".

6.6.2 Activity List of Blocks

Arrange symbol	
Cut	Ctrl+X
Copy	Ctrl+C
Delete	Del

Arrange symbol: "Literal manipulation (Paste/Delete/Cut/Copy)"

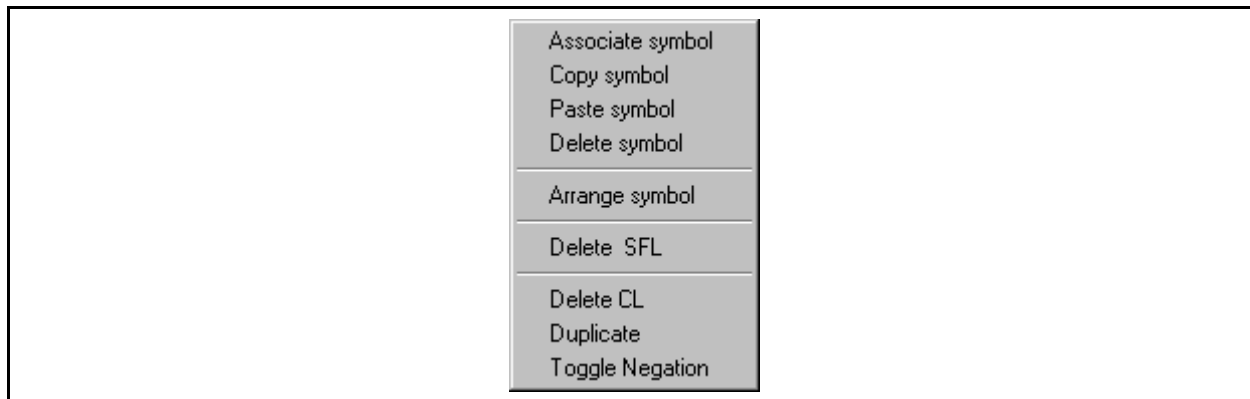
Cut/Copy/Delete: "Literal manipulation (Paste/Delete/Cut/Copy)"

6.6.3 Activity List of Slots

Left
✓ Right

Left/Right: "Working with Slots".

6.6.4 Activity List of Connecting Lines



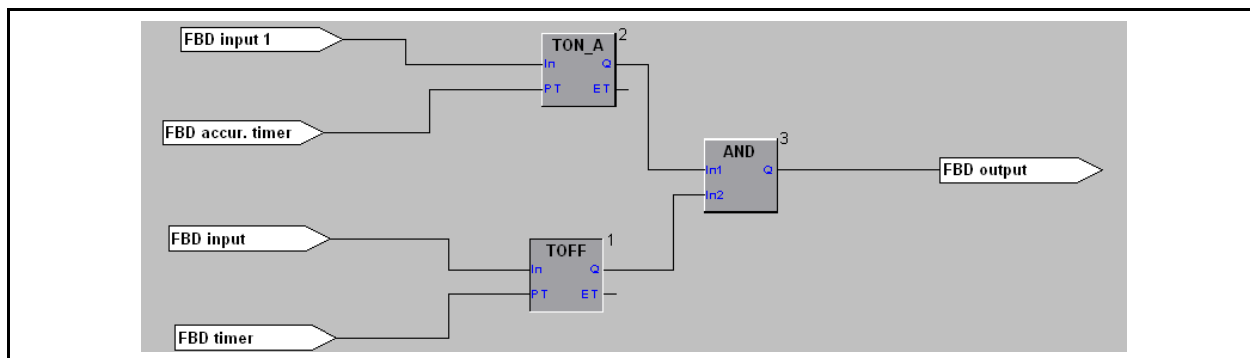
Associate symbol: "

TON / TOFF PT gate can only be linked to [FBD timer](#) slot.

TON_A / TOFF_A PT gate can only be linked to [FBD accur.timer](#) slot.

There is no warning until the equation is saved.

Right example:



Working with Literals"

Paste symbol/Delete symbol: "Literal manipulation (Paste/Delete/Cut/Copy)"

Arrange symbol: "Literal manipulation (Paste/Delete/Cut/Copy)"

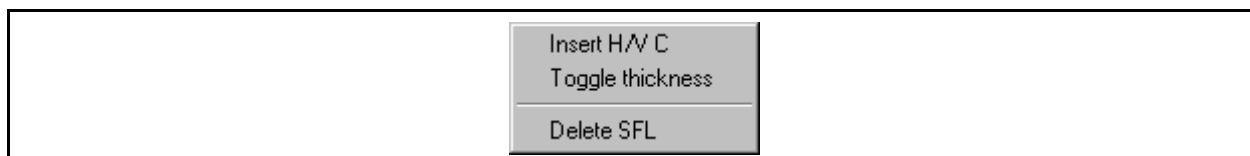
Delete SFL/Delete SFL & symbol: "SFL manipulation"

Delete CL: "Extensibility"

Duplicate: "Extensibility"

Toggle negation: "Negation"

6.6.5 Activity List of Signal Flow Lines



Insert H/V C: "SFL derivation: H/V C"

Toggle thickness: "SFL manipulation"

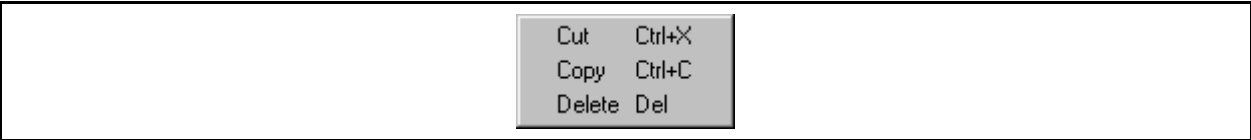
Delete SFL: "SFL manipulation"

6.6.6 Activity List of H/V Connections



Delete H/V C & SFL: "SFL derivation: H/V C"

6.6.7 Activity List of Text Annotations



Cut/Copy/Delete: "Manipulations of Text Annotation"

6.6.8 Activity List of the Logging View



MaxLines: "Logging View"

Cleanup: "Logging View"

File Save As: "Logging View"

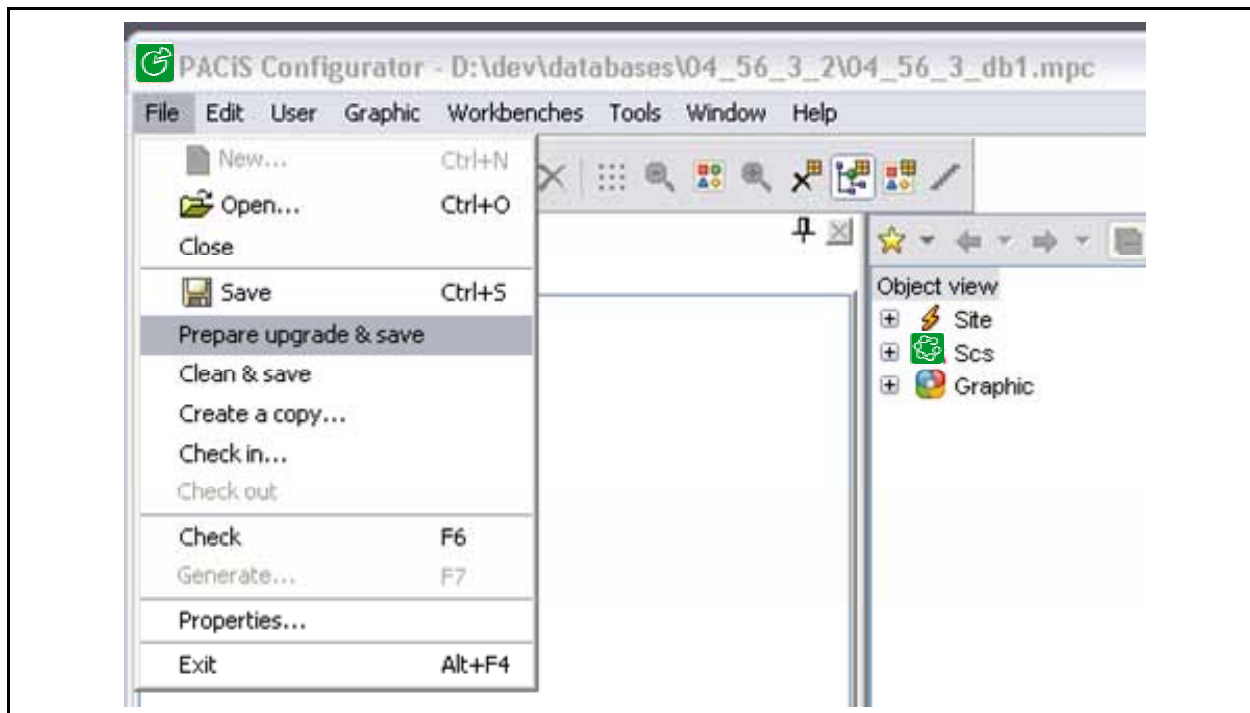
7. SCE2.0

7.1 How to migrate a database to SCE PACiS 4.7

The migration is **automatic** but needs to **prepare the upgrading** with the previous version of SCE.

Before using SCE PACiS 4.7, the file action **‘Save for mandatory upgrade’** (or **‘Save and prepare upgrade’** or **‘Prepare upgrade & save’**) must be launched with the latest version of SCE PACiS 4.6.

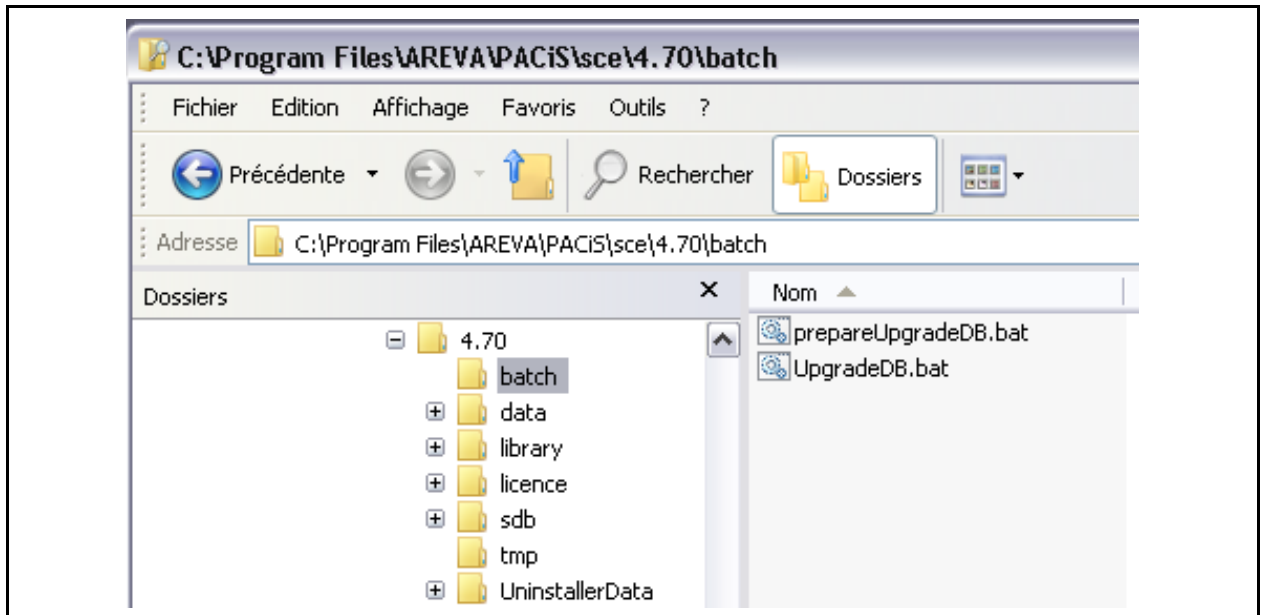
For example, for a database that is now edited with a SCE PACiS 4.6, launch a “File/Prepare upgrade & save action”. Be care, do not save again the database with File/Save action.



This prepared configuration could be now opened with SCE PACiS 4.7.

7.2 How to migrate a set of database with a script

Two scripts have been delivered in the latest version of SCE PACiS 4.6 and PACiS 4.7 to make some scripts for launching upgrade **batches**:



- Available in **sub-directory batch** of SCE installation directory.
- **prepareUpgradeDB.bat**: open and save for mandatory upgrade the given database.
- **UpgradeDB.bat**: open, upgrade and save the given database.

7.3 How to define a profile

This new table **shares profiles** between **templates** and a **final configuration** (instance of template).

This is done by a weak reference of a profile by a datapoint. This weak reference is an **index** in a **table of profiles**: like colour table or bitmaps table. This weak reference is implemented by two integer attributes; one for each datapoint and another for each profile:

- For a datapoint, this attribute contains an index value that references a profile.
- For a profile, this attribute contains a unique value (in the set of profiles with same type – SPS, DPS, SPC...) that is referenced by some datapoint.

The profile table is filled by all profiles defined directly under Scs root object. The same table is used for templates and for objects.

Profiles Table							
SPS DPS SPC DPC MV MPS Counter SetPoint General State labels State treatment Interlocking Alarms Mean value							
Profile			Profile	Specific treatment			Graphic
#1	short name	long name	spare	F55	SBMC	unit	default format
1	S_MainStatusMV	MV Profile	No	No	No	MVar	##0.0# U
2	Current_1	MV Profile	No	No	No	A	#0 U
3	X_Current_1	MV Profile	No	No	Yes to suppressed	A	#0 U
4	X_Power_1	MV Profile	No	No	Yes to suppressed	MW	##0.0# U
5	X_tap Position	MV Profile	No	No	Yes to suppressed	-	#0
6	X_React. Power_1	MV Profile	No	No	Yes to suppressed	Mvar	##0.0# U
7	X_Voltage_1	MV Profile	No	No	Yes to suppressed	kV	##0.0# U
8	X_Voltage_A	MV Profile	No	No	Yes to suppressed	kV	##0.0# U
9	React. Power_1	MV Profile	No	No	No	Mvar	##0.0# U
10	Power_1	MV Profile	No	No	No	MW	##0.0# U
11	Voltage_1	MV Profile	No	No	No	kV	##0.0# U
12	Frequency	Hz Profile	No	No	No	Hz	##0.0# U
13	HUMIDITY	MV Profile	No	No	No	%	##0.0# U
14	TEMPERATURE	MV Profile	No	No	No	°C	##0.0# U
15	X_FREQUENCY_1	Hz Profile	No	No	Yes to suppressed	Hz	##0.0# U
16	VOLTAGE	V Profile	No	No	No	V	##0.0# U

User stories:

1. A special attribute renderer and editor facilitate the selection of a **profile from a datapoint**.
2. The configuration of profiles via its attributes has been updated and simplified:
 - The **default values** and the labels of some profile attributes have been updated.
 - The **configuration of state treatment** is now specific for OI and C264: 'Treatment on' category is replaced by 2 others categories 'OI treatment on' and 'C264 treatment on'. Attributes are duplicated and their values are simplified. Printer usage is only defined for OI.
 - The **configuration of printer** linked to a profile is done now by some attributes. For C264, link between profile and a C264 is not useful yet. There is only one untyped printer by C264 and there is no ambiguity. For OI, links between **profile and OI printers** are given now by an **index**: each printer has an index that identifies the printer (1..2 for SOE printer, 1..2 for LB printer). This index is used to set the SOE and LB used printers by each profile. For MV profile and Setpoint profiles, only LB printers are available.

- The **configuration of alarm is updated**.
 - **Spurious** attribute is **suppressed**. This info is now computed from the acquisition type of datapoint.
 - **'Masking due to control'** attribute is kept only for Open/Close states of DPS, Set/Reset states of SPS and bit states of MPS. This new default value is 'No'. This attribute is suppressed for all other states.
3. The edition of object **datapoint profile from a profile** is available in the table via the second column that indicates by an icon if some datapoints are linked or not to the profile.
- Double-click** on this **icon** displays Datapoint link editor. This editor presents all template and object datapoints with updateable profile index; these datapoints have not profile index or have their profile index as the current profile:
- Datapoints with read-only index are not included in this editor.
 - In **Object mode**: only object datapoint and all instances of template datapoint (ONLY if 'Profile reference' attribute is set to DOF).
 - In **Template mode**: only template datapoint (no instances of template datapoint). In this mode, only selected template is used to parse template datapoint available.
4. The button  allows creating a new profile.
5. Contextual actions **Copy-paste-delete-add** are available on **line selection** (or multi-line). These actions work on the whole profile
6. Contextual action **Copy-paste** is available on **cell selection** and then works on profile attributes.
7. A **migration action** (menu tools) is available to compute the new profile reference of each datapoint (object and template) to the profile table. The previous way to define a profile for a datapoint, by a relation and a link between a datapoint and a profile, is kept but hidden: when the new way is chosen, all profile relations are hidden.
8. A **merge action** (menu tools) is available to automatically delete the same profiles into an unique profile. All attributes are taken into account in the comparison, shortname and longname exclude.
9. During a **library template import**, the source profiles that are referenced by the template are imported into the target profile table.

7.4 How to wire a datapoint

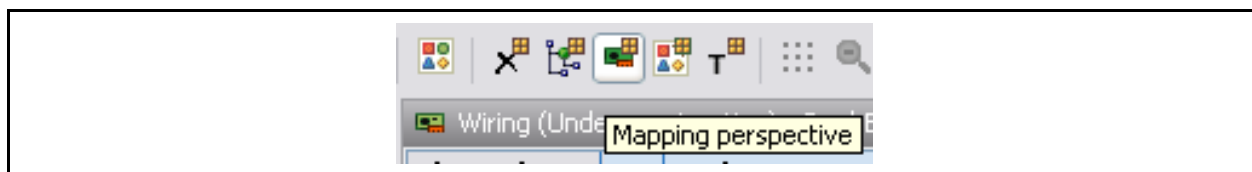
This new table is linked to the wiring activity: wire a datapoint to a C264 board.

This activity is driven by some **wiring best practices**:

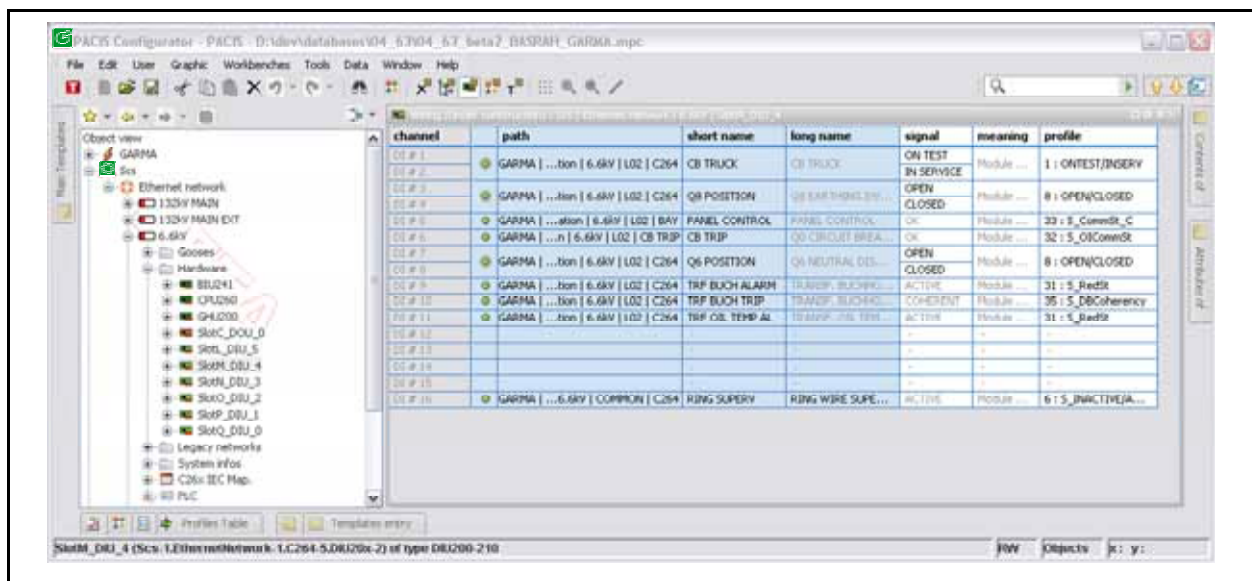
- The first channel of DPS/DPC must be wired in an ODD channel.
- The two channels of a DPS/DPC must be contiguous.
- The channels of a MPS must be contiguous.
- A digital MV must be wired into 4 channels at least.

7.4.1 Display wired datapoints on a board

- Use the new perspective: **mapping perspective**. This perspective displays wiring table as the center window of workspace.



- Wiring table is filled when a **C264 board** is selected from Navigator.



- A **row represents a channel** of the selected board. This row is filled by the wired datapoint on this (theses) channel(s).

Case of the column “signal”:

The column **signal** depends of the datapoint kinds.

For a DPS/DPC, this cell contains the label of open or closed states.

For a SPS/SPC, this cell contains the label of set state.

For a MV, this cell contains the label of bit type: Read Inhibit, Sign Bit or number of bits used for data from 4 to 63 (the number of data bit is limit to possible value depending on free row on the current board).

For a SetPoint, this cell contains the label of bit type: Read Inhibit, Refresh, Sign Bit or number of bits used for data from 3 to 47 (the number of data bit is limit to possible value depending on free row on the current board).

For a counter wired on one channel, this cell contains the value “primary”.

For a counter wired on two channels, this cell contains the value “primary” for the first channel and the value “secondary” for the second channel. These values can't be inverted.

The signal displays nothing in case of analog channels (AI and AO) and is not editable for TMU210 board

Case of columns “sensor range”, “acquisition period” and “output current maintained”:

These three columns are visible only for AIU and AOU type boards.

For AIU board, only columns “sensor range” and “acquisition period” are used.

For AOU board, only columns “sensor range” and “output current maintained” are used.

Wiring (Under construction) : Scs Ethernet network 6.6kV SlotM_DIU_4							
channel		path	short name	long name	signal	meaning	profile
DI # 1		GARMA Substation 6.6kV L02 C264	CB TRUCK	CB TRUCK	ON TEST	Module DPS	1 : ONTEST/IN...
DI # 2		GARMA Substation 6.6kV L02 C264	Q8 POSITION	Q8 EARTH...	IN SERVICE	Module DPS	8 : OPEN/CLOS...
DI # 3		GARMA Substation 6.6kV L02 C264	PANEL CON...	PANEL CO...	OPEN	Module DPS	33 : S_CommSt...
DI # 4		GARMA Substation 6.6kV L02 C264	CB TRIP	Q0 CIRCU...	CLOSED	Module DPS	32 : S_OICommSt
DI # 5		GARMA Substation 6.6kV L02 BAY	Q6 POSITION	Q6 NEUTR...	OK	Module SPS	8 : OPEN/CLOS...
DI # 6		GARMA Substation 6.6kV L02 CB TRIP	TRF BUCH ...	TRANSF. B...	OPEN	Module SPS	31 : S_RedSt
DI # 7		GARMA Substation 6.6kV L02 C264	TRF BUCH T...	TRANSF. B...	CLOSED	Module SPS	35 : S_DBCohe...
DI # 8		GARMA Substation 6.6kV L02 C264	TRF OIL TE...	TRANSF. ...	ACTIVE	Module SPS	31 : S_RedSt
DI # 9			-	-	-	-	-
DI # 10			-	-	-	-	-
DI # 11			-	-	-	-	-
DI # 12			-	-	-	-	-
DI # 13			-	-	-	-	-
DI # 14			-	-	-	-	-
DI # 15			-	-	-	-	-
DI # 16		GARMA ...bstation 6.6kV COMMON C264	RING SUPERV	RING WIR...	ACTIVE	Module SPS	6 : S_INACTIV...

- When a wired channel is selected, the **attribute table** and the **profile table** are **synchronized** with the attributes and the profile of the datapoint.

The screenshot displays the PACiS System Configuration Editor interface. The top window, titled 'Wiring (Under construction) : SCS | Ethernet network | 6.6kV | SlotN_DIU_3', contains a table with columns: channel, path, short name, long name, signal, meaning, and profile. The table lists 16 channels (DI #1 to DI #16) with various attributes. The right panel shows the 'Attributes of : SlotN_DIU_3' for a selected channel, including fields for short name, long name, meaning, used profile, spare, and delays. The bottom window, titled 'Profiles Table', shows a table with columns: #, short name, long name, spare, F55, SBMC, value, toggling filtering, and initial status. The table lists 14 profiles (1 to 14) with various attributes.

channel	path	short name	long name	signal	meaning	profile
DI # 1				ON T...	Module ...	1 : ONTEST/INSERV
DI # 2	GARMA ...6kV L03 C264	CB TRUCK	CB TRUCK	IN SE...	Module ...	1 : ONTEST/INSERV
DI # 3	GARMA ...6kV L03 C264	Q8 POSITION	Q8 EARTH...	OPEN	Module ...	8 : OPEN/CLOSED
DI # 4	GARMA ...6kV L03 C264	Q8 POSITION	Q8 EARTH...	CLOS...	Module ...	8 : OPEN/CLOSED
DI # 5	GARMA ...6kV L03 BAY	PANEL CON...	PANEL CO...	OK	Module ...	33 : S_CommSt_C
DI # 6	GARMA ...6kV L03 BAY	PANEL CON...	PANEL CO...	OK	Module ...	33 : S_CommSt_C
DI # 7	GARMA ...6kV L03 CB TRIP	CB TRIP	Q0 CIRCU...	OK	Module ...	32 : S_OICommSt
DI # 8						
DI # 9	GARMA ...6kV L04 C264	CB TRUCK	CB TRUCK	ON T...	Module ...	1 : ONTEST/INSERV
DI # 10	GARMA ...6kV L04 C264	CB TRUCK	CB TRUCK	IN SE...	Module ...	1 : ONTEST/INSERV
DI # 11	GARMA ...6kV L04 C264	Q8 POSITION	Q8 EARTH...	OPEN	Module ...	8 : OPEN/CLOSED
DI # 12	GARMA ...6kV L04 C264	Q8 POSITION	Q8 EARTH...	CLOS...	Module ...	8 : OPEN/CLOSED
DI # 13	GARMA ...6kV L04 BAY	PANEL CON...	PANEL CO...	OK	Module ...	33 : S_CommSt_C
DI # 14	GARMA ...6kV L04 BAY	PANEL CON...	PANEL CO...	OK	Module ...	33 : S_CommSt_C
DI # 15	GARMA ...6kV L04 CB TRIP	CB TRIP	Q0 CIRCU...	OK	Module ...	32 : S_OICommSt
DI # 16						

#	short name	long name	spare	F55	SBMC	value	toggling filtering	initial status
1	ONTEST/INSERV	DPS Profile	No	No	No	-	Yes	Open
2	X_MANUAL/AUTO	DPS Profile	No	No	Yes	Suppressed	Yes	Open
3	X_OPEN/CLOSED	DPS Profile	No	No	Yes	Suppressed	Yes	Open
4	X_FOLLOW/MASTER	DPS Profile	No	No	Yes	Suppressed	Yes	Open
5	X_REMOTE/LOCAL	DPS Profile	No	No	Yes	Suppressed	Yes	Open
6	X_OFF/ON	DPS Profile	No	No	Yes	Suppressed	Yes	Open
7	X_OUTSERV/INSERV	DPS Profile	No	No	Yes	Suppressed	Yes	Open
8	OPEN/CLOSED	DPS Profile	No	No	No	-	Yes	Open
9	OFF/ON	DPS Profile	No	No	No	-	Yes	Open
10	X_INACT/ACTIVE	DPS Profile	No	No	Yes	Suppressed	Yes	Open
11	X_STALON/PARALLE	DPS Profile	No	No	Yes	Suppressed	Yes	Open
12	S_OIModeDS	DPS Profile	No	No	No	-	Yes	Open
13	S_LocRemDS	DPS Profile	No	No	No	-	Yes	Closed
14	S_ModeDS	DPS Profile	No	No	No	-	Yes	Open

- Wiring table works for object and template

The last selected board is kept when user switch between object/template mode and the board is displayed again when go back to previous mode.

7.4.2 Wire an existing datapoint from a clear channel.

The datapoints are SPS, DPS, MPS, SPC, DPC, MV, Counter and SetPoint.

The columns Kind, path, shortname and long name are used to edit the data point to wire.

Theses columns could be edited in any order to select the datapoint to wire into the channel. Each column allows filtering of displayed data for the other column.

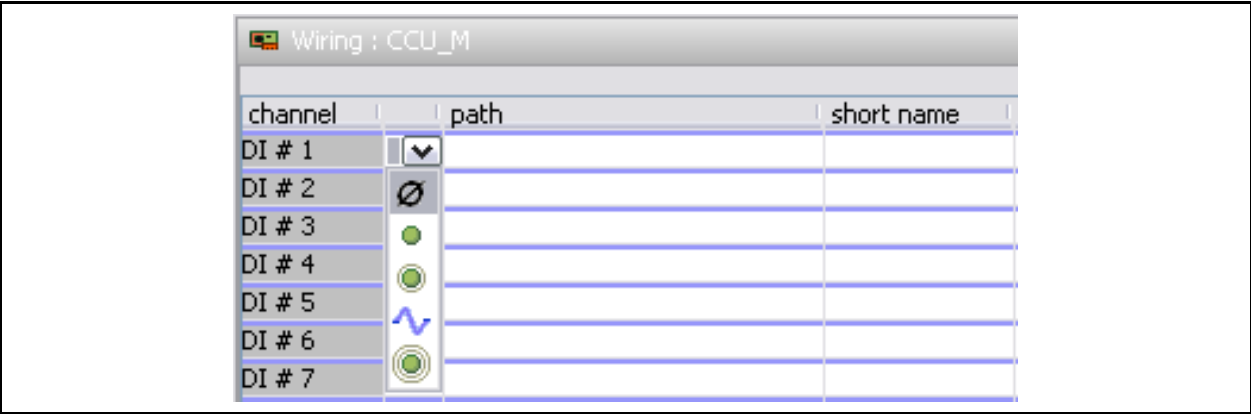
When a datapoint is selected via this edition, the data point is wired from the edited channel and the [wiring best practices rules](#).

A channel can be edited if it is not already wired inside a template source.

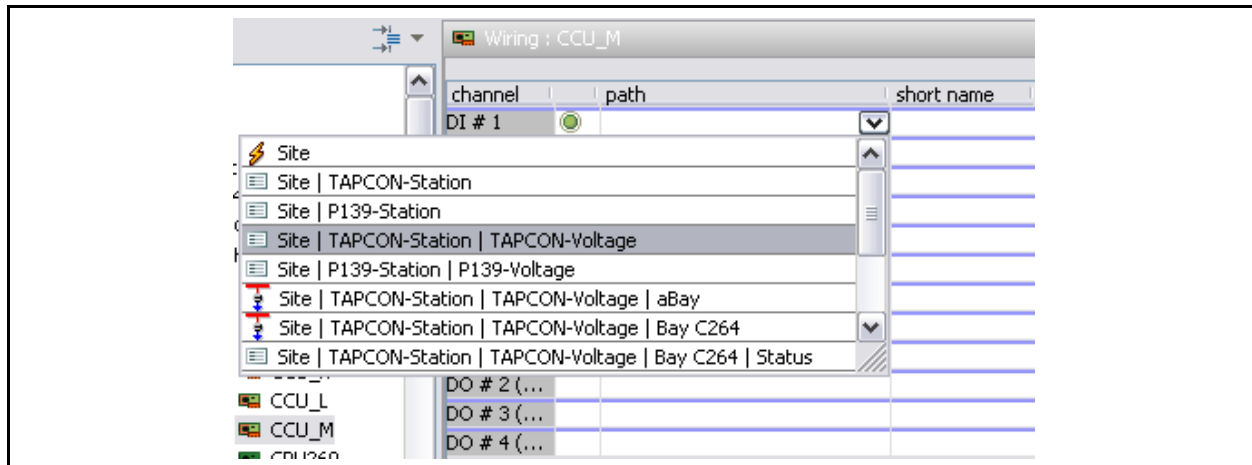
Each kind of channel can be used by only specific data points, like following table shows:

	DI	DO	AI	AO	TMU200 TMU220	TMU210
SPS	X					
DPS	X					
SPC		X			-	-
DPC		X			-	X
MV	X		X		X	X
Setpoint		X		X		
Compteur	X					
MPS	X					
TPI	X		X			

- The **column kind** is the class of the datapoint available for the channel. This choice is computed from the [wiring best practices rules](#).

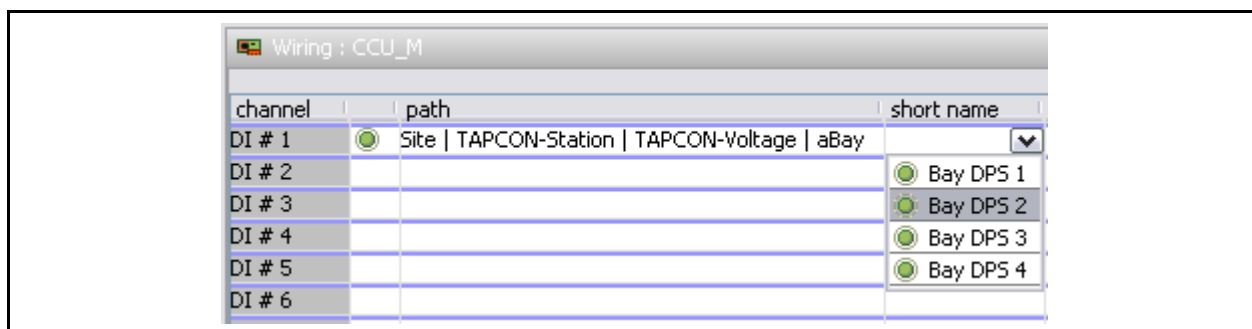


- The **column path** is the path of the datapoint PARENT: a bay, a module ...

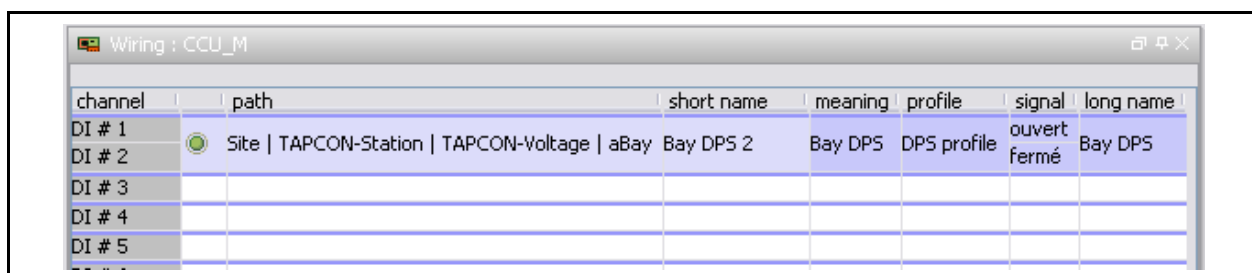


The path displays **only available object**. An object is available if respect following **rules**:

- Site, Substation or Voltage level which contain datapoint
- Computer's bays and inner objects which contain datapoint
- In template mode, unified template if datapoints are defined directly as root
- In template mode, if board is not defined under a computer, all electric element with datapoint
- In template mode, only local templates (inside same unified template) are visible
- The **column shortname** is the datapoint short name. Only wire-able datapoint are proposed during edition mode.



- When minimal info is set to specify the datapoint, the **wiring is automatically done**.



- When wiring has been done, the long name of the datapoint is editable

- For MPS data point by default, only three data bits are wired

Wiring (Under construction) : DIU200-210

channel	path	short name	meaning	profile	signal
DI # 1					3 bits data
DI # 2	 GARMA Substation 132kv E07	Bay MPS	Bay MPS		-
DI # 3					-
DI # 4					
DI # 5					

- For Digital MV data point by default, only four data bits are wired

Wiring (Under construction) : DIU200-210

channel	path	short name	meaning	profile	signal
DI # 1					4 bits data
DI # 2	 GARMA Substation 132kv E07	MV.01	Bay MV	Current_1	-
DI # 3					-
DI # 4					-
DI # 5					

- For Analog MV data point by default only one channel is wired

Wiring (Under construction) : Scs | Ethernet network | C264 | AIU210-211

channel	path	short name	signal	meaning	profile
AI # 1	 Site TAPCON-Station TAPC...	ControlVoltage		Module MV	MV profile V
AI # 2					
AI # 3					
AI # 4					

- For Counter data point by default, only one channel (for primary) is wired

Wiring (Under construction) : DIU200-210

channel	path	short name	meaning	profile	signal
DI # 1	 GARMA Substation 132kv E07	Bay Counter	Bay Counter		primary
DI # 2					
DI # 3					

- For digital SetPoint data point by default, only three data bits are wired

Wiring (Under construction) : Scs | Ethernet network | C264 | DOU_E

channel	path	short name	signal	meaning	profile
DO # 1 (...)			3 bits data		
DO # 2 (...)	 Site TAPCON-Station TAPC...	VoltLev SetPoint	-	VoltLev SetP...	
DO # 3 (...)			-		
DO # 4 (...)					

- For analog SetPoint data point only one channel is wired

Wiring (Under construction) : Scs Ethernet network C264 AOU200						
channel	path	short name	signal	meaning	profile	
AO # 1	Site TAPCON-Station TAPC...	Bay SetPoint		Bay SetPoint	SetPoint profile	
AO # 2						
AO # 3						
AO # 4						

- Specific case: TMU210 wiring

In case of DO of the TMU210 board, only one datapoint may be wired, the Switch Control DPC of a Circuit Breaker managed by the computer.

Then, kind, path and short name are restricted for this usage.

Only first channel may be used by Open state and second by Close state of the datapoint. So, only first channel is editable

Wiring (Under construction) : Scs Ethernet network C264 TMU210						
Computed MV DSP I/O						
channel	path	short name	signal	meaning	profile	
DO # 1 (...)						
DO # 5 (...)						

Wiring (Under construction) : Scs Ethernet network C264 TMU210						
Computed MV DSP I/O						
channel	path	short name	signal	meaning	profile	
DO # 1 (...)						
DO # 5 (...)	Site TAPCON-Station TAPC...	Switch Ctrl DPC	Open Close	Switch Ctrl DPC	DPC profile	

7.4.3 Unwire a datapoint from a channel

Wiring (Under construction)						
channel	path	short name	long name	signal	meaning	
DI # 1	GARMA Substation 132kv COMMON...	BCU GRP ALA...	Module SPS A_IN...	ACTIVE		
DI # 2	GARMA Substation 132kv COMMON...	BCU WD GRP ...	Module SPS A_IN...	ACTIVE		
DI # 3						
DI # 4	GARMA Substation 132kv E07	SPS.02	Bay SPS			

Unwire the datapoint SPS.02 from channel DI#4 is done by clearing the **short name** or **path** cell and validate this new value. The link between SPS.02 and DI#4 is deleted.

- Clear the short name cell

Wiring (Under construction)						
channel	path	short name	long name	signal	meaning	
DI # 1	GARMA Substation 132kv COMMON...	BCU GRP ALA...	Module SPS A_IN...	ACTIVE		
DI # 2	GARMA Substation 132kv COMMON...	BCU WD GRP ...	Module SPS A_IN...	ACTIVE		
DI # 3						
DI # 4	GARMA Substation 132kv E07		Bay SPS			
DI # 5		SPS.01				
DI # 6		SPS.03				
DI # 7						
DI # 8						
DI # 9	GARMA Substation 132kv COMMON...	=E04 COM TX...	Module SPS A_IN...	ACTIVE		

- After validation of empty short name

channel		path	short name	long name	signal	meaning
DI # 1	●	GARMA Substation 132kV COMMON...	BCU GRP ALA...	Module SPS A_IN...	ACTIVE	
DI # 2	●	GARMA Substation 132kV COMMON...	BCU WD GRP ...	Module SPS A_IN...	ACTIVE	
DI # 3						
DI # 4	●	GARMA Substation 132kV E07				
DI # 5						
DI # 6						
DI # 7						

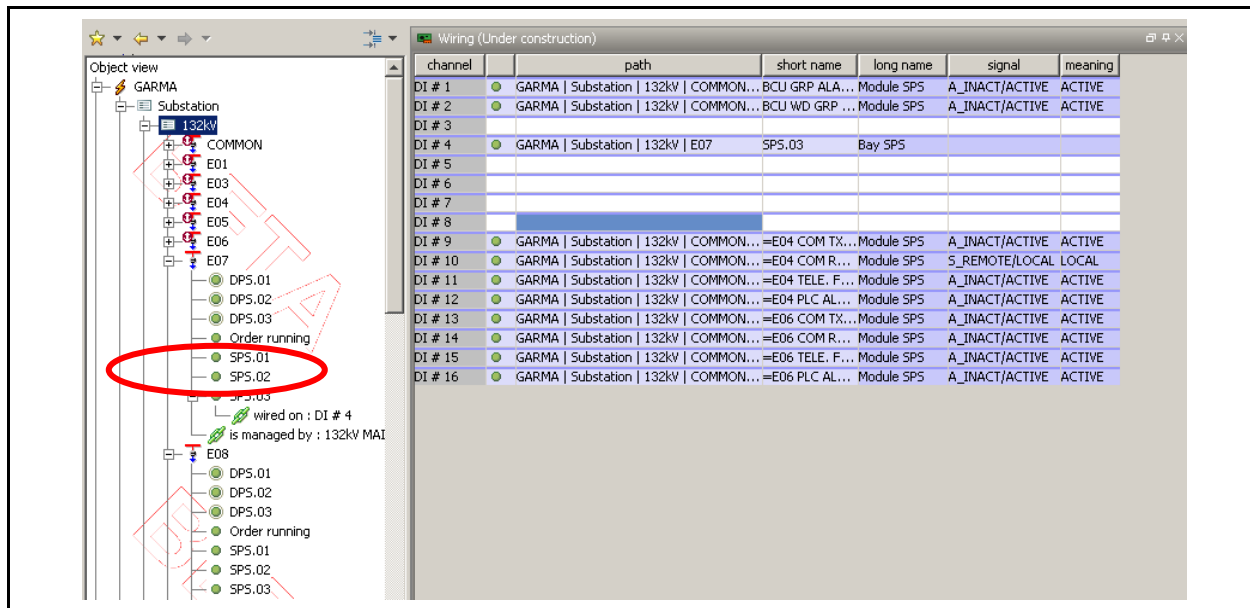
Channel is unwired from datapoint SPS.03. Not updated cell like path or kind is not erased to easily rewire other datapoint.

7.4.4 Unwire a set of datapoints from a channel selection

channel		path	short name	signal	meaning	profile
DI # 1	●	Site Substation Voltage lev...	Bay DPS		Bay DPS	
DI # 2						
DI # 3				read inhibit		
DI # 4				sign bit		
DI # 5				4 bits data		
DI # 6		Site Substation Voltage lev...	Bay MV	-		
DI # 7				-		
DI # 8				-		
DI # 9						
DI # 10						
DI # 11						
DI # 12	●	Site Substation Voltage lev...	Bay SPS		Bay SPS	
DI # 13						
DI # 14						
DI # 15						
DI # 16						

By selecting a set of contiguous channels of the same board, all the associated data points can be unwired via item “unwire” of the contextual menu. Unwiring channels linked to data points inside the unity of templates is ineffective.

7.4.5 Wire data point on changing path or kind cells

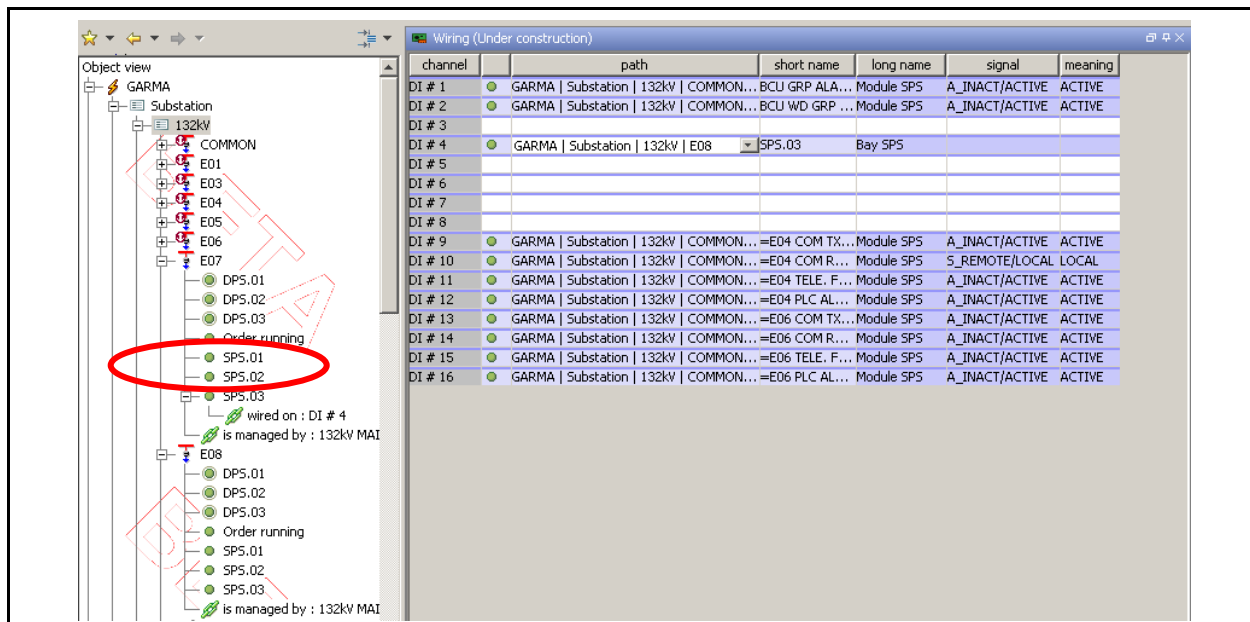


On a wired channel it's possible to change the path cell.

In this case, if under the new path a data point with the same short name and same kind exists and if this data point is wire-able (not already wired and not acquire from an IED), the wiring operation is done automatically.

In this example data point SPS.03 exists under bay E07 and E08 so on changing path from E07 to E08 the channel DI#4 is wired with E08/SPS.03.

- Changing the path from bay E07 to E08



- After validate the new path value

The datapoint SPS.03 under E07 bay has been unwired; the channel DI#4 is now wired to the datapoint SPS.03 under E08 bay.

channel	path	short name	long name	signal	meaning
DI # 1	GARMA Substation 132kV COMMON...	BCU GRP ALA...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 2	GARMA Substation 132kV COMMON...	BCU WD GRP ...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 3					
DI # 4	GARMA Substation 132kV E08	SPS.03	Bay SPS		
DI # 5					
DI # 6					
DI # 7					
DI # 8					
DI # 9	GARMA Substation 132kV COMMON...	=E04 COM TX...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 10	GARMA Substation 132kV COMMON...	=E04 COM R...	Module SP5	S_REMOTE/LOCAL	LOCAL
DI # 11	GARMA Substation 132kV COMMON...	=E04 TELE. F...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 12	GARMA Substation 132kV COMMON...	=E04 PLC AL...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 13	GARMA Substation 132kV COMMON...	=E06 COM TX...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 14	GARMA Substation 132kV COMMON...	=E06 COM R...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 15	GARMA Substation 132kV COMMON...	=E06 TELE. F...	Module SP5	A_INACT/ACTIVE	ACTIVE
DI # 16	GARMA Substation 132kV COMMON...	=E06 PLC AL...	Module SP5	A_INACT/ACTIVE	ACTIVE

On changing datapoint kind if a data point exists with the new kind, the short name under the path the same behavior than path update is apply.

7.4.6 Wire a not existing data point from a clear channel

The practice is the same that to wire existing data points (see the paragraph above). The only difference is in the editability of the **shortname** column.

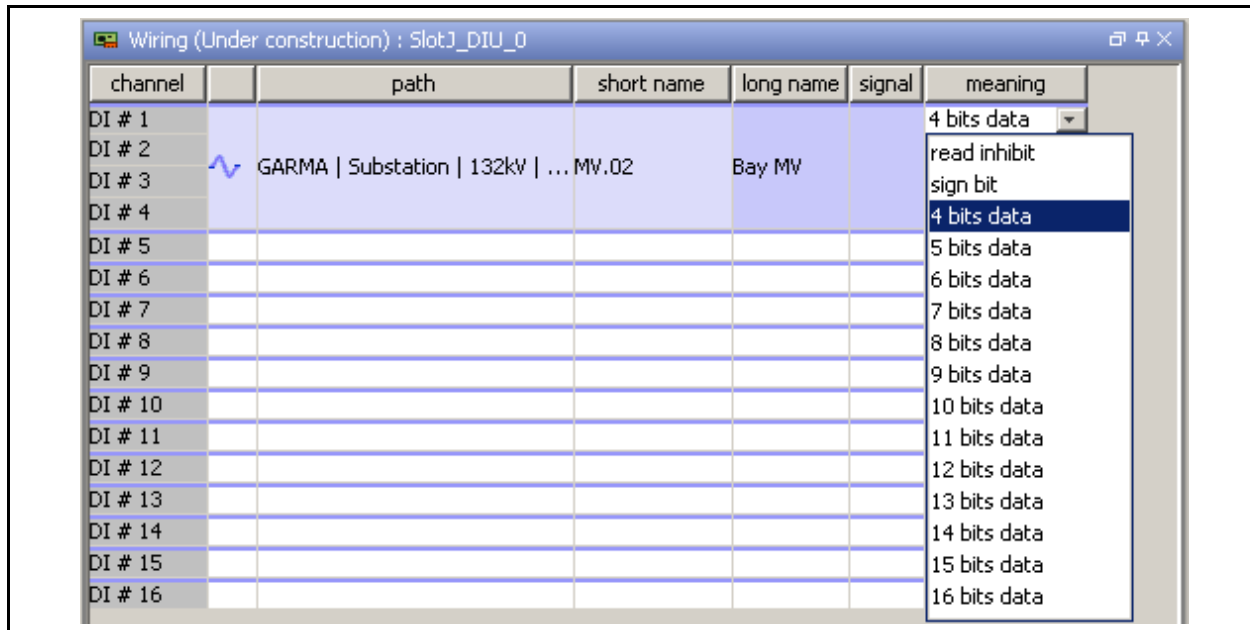
7.4.7 Change MV signal type

- Default wiring of a MV data point

When a MV datapoint is wired, by default the data bit 0 to 3 are wired. The signal column is editable to extend or reduce the number of data bit or to add / remove a sign bit or a read inhibit.

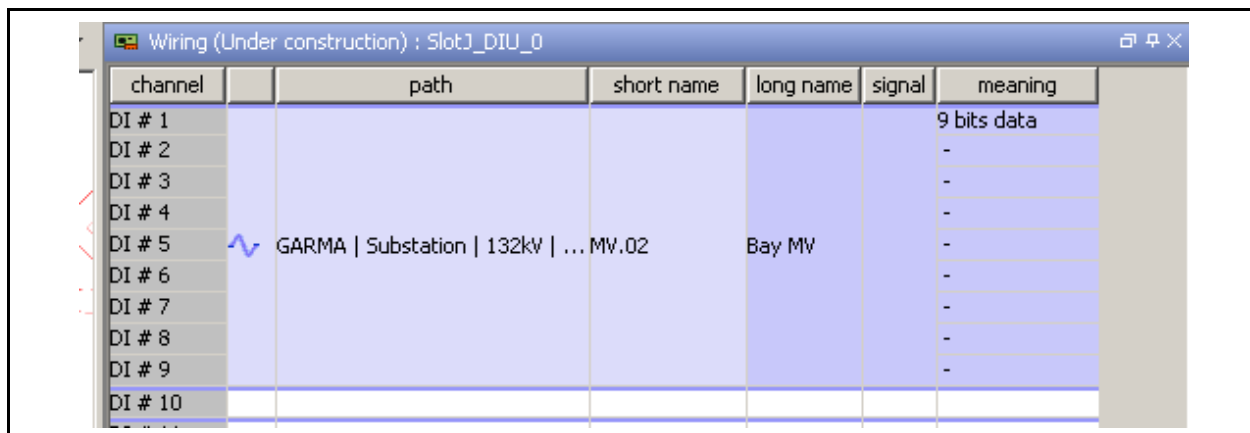
channel	path	short name	long name	signal	meaning
DI # 1					
DI # 2	GARMA Substation 132kV ... MV.02	Bay MV			4 bits data
DI # 3					
DI # 4					
DI # 5					
DI # 6					

- Edit the signal column



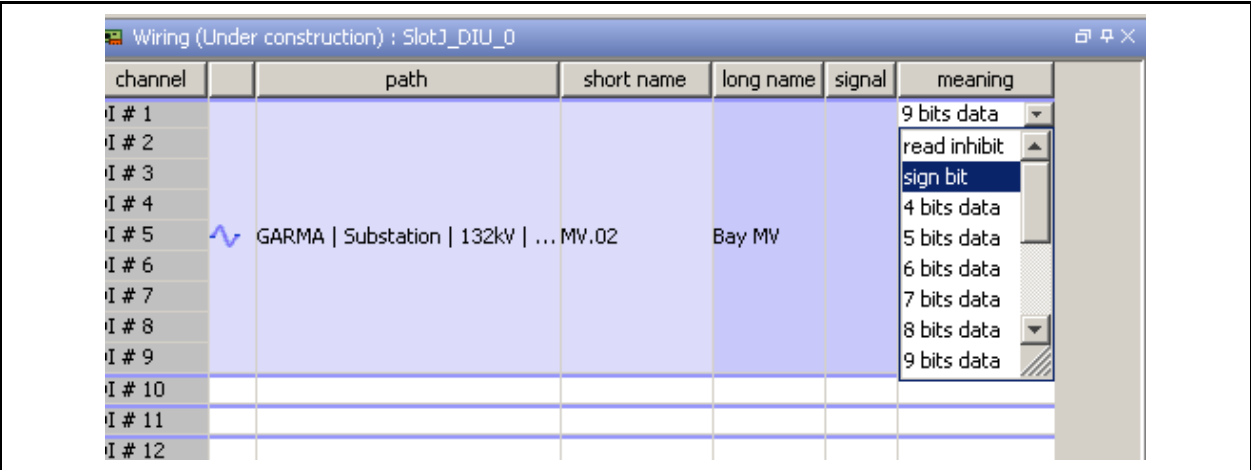
The combo box shows all possible value for signal. It's possible to extend the number of bit used for data to 16 the board has 12 free channels after DI#4. The combo offer possibility to add a sign bit or a read Inhibit.

- After choosing '9 bits data'

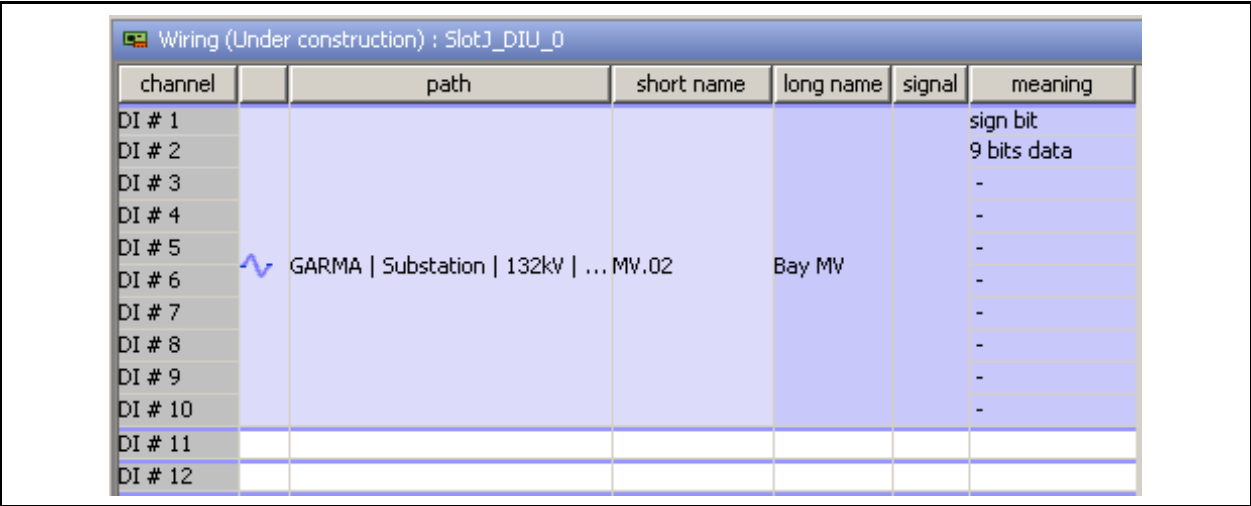


The wiring of MV.02 is extending to 9 bits data.

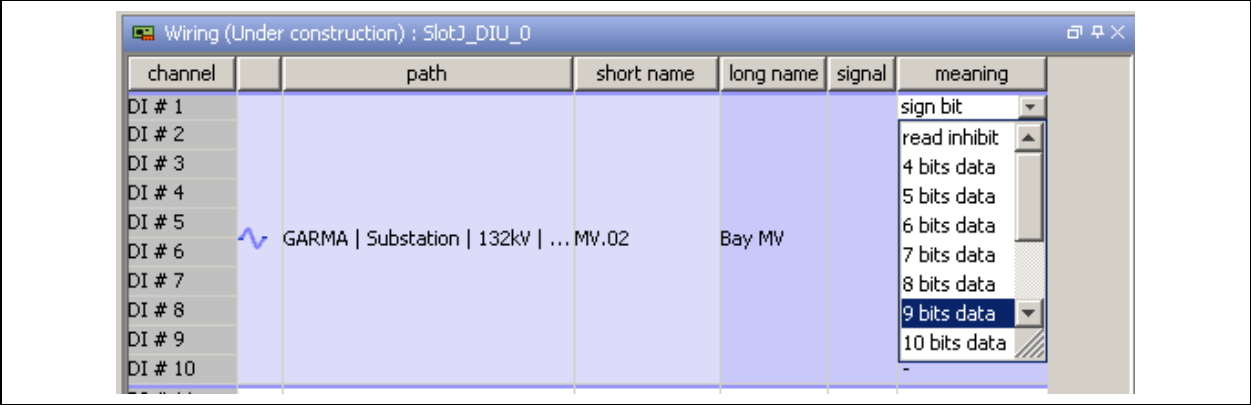
- Add Sign Bit / Read Inhibit



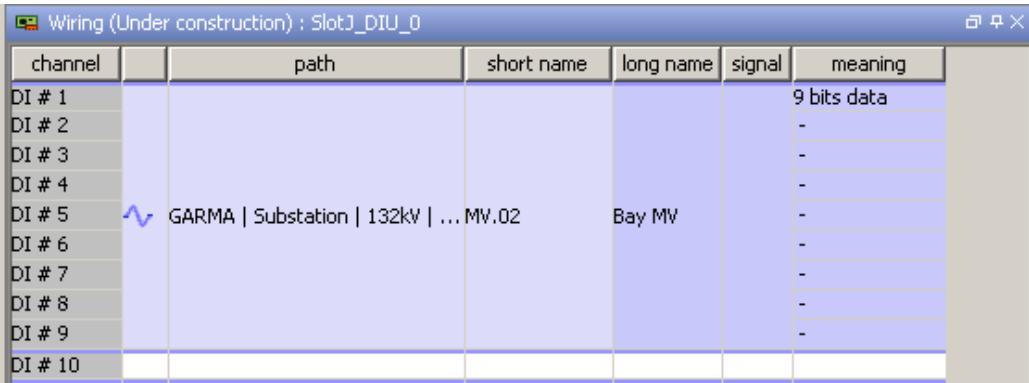
By choosing 'sign bit' or 'read inhibit' from the signal cell which indicate the number of data, 'sign bit' or 'read inhibit' will be add to 'MV.02'. After choose the value, 'sign bit' or 'read inhibit' will be wired on first channel for 'read inhibit', on the second channel for 'sign bit' if 'read inhibit' exists else on first channel.



To remove 'sign bit' or read inhibit' to MV.02 wiring, just choose the number of data bits to use.

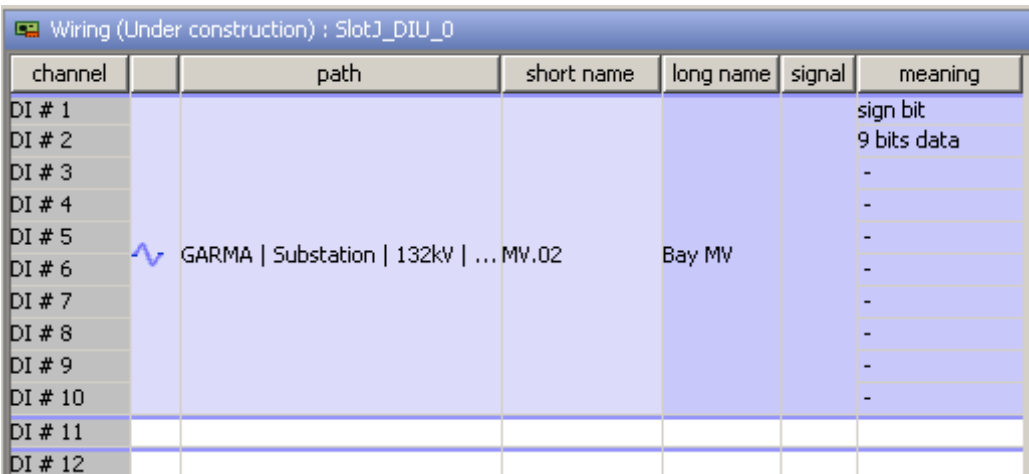


After validate '9 bits data' the sign bit is deleted.



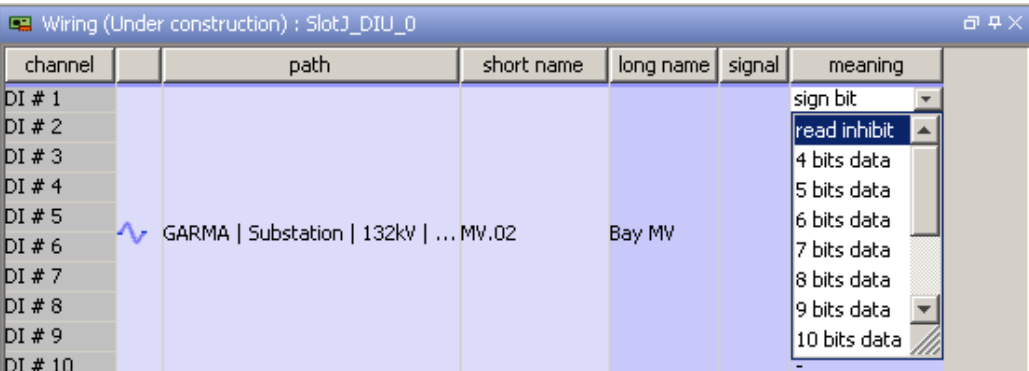
channel	path	short name	long name	signal	meaning
DI # 1	GARMA Substation 132kV ... MV.02		Bay MV		9 bits data
DI # 2					-
DI # 3					-
DI # 4					-
DI # 5					-
DI # 6					-
DI # 7					-
DI # 8					-
DI # 9					-
DI # 10					-

- Interchange 'read inhibit' and 'sign bit'



channel	path	short name	long name	signal	meaning
DI # 1	GARMA Substation 132kV ... MV.02		Bay MV		sign bit
DI # 2					9 bits data
DI # 3					-
DI # 4					-
DI # 5					-
DI # 6					-
DI # 7					-
DI # 8					-
DI # 9					-
DI # 10					-
DI # 11					
DI # 12					

If the sign bit has to be change to read inhibit, or read inhibit to sign bit, select the 'read inhibit' value on the 'sign bit' cell.



channel	path	short name	long name	signal	meaning
DI # 1	GARMA Substation 132kV ... MV.02		Bay MV		sign bit
DI # 2					9 bits data
DI # 3					-
DI # 4					-
DI # 5					-
DI # 6					-
DI # 7					-
DI # 8					-
DI # 9					-
DI # 10					-

The 'sign bit' has been replaced by the 'read inhibit'.

Wiring (Under construction) : SlotJ_DIU_0						
channel		path	short name	long name	signal	meaning
DI # 1						read inhibit
DI # 2						9 bits data
DI # 3						-
DI # 4						-
DI # 5						-
DI # 6		GARMA Substation 132kV ... MV.02		Bay MV		-
DI # 7						-
DI # 8						-
DI # 9						-
DI # 10						-

7.4.8 Change signal type of others data points

To change the signal type of data point, the way is the same that described in the previous chapter (§ 5) for MV. Only possible values change in according to the data point type.

- For TPI MV: idem MV but the sign bit value don't exist,
- For MPS: idem MV but the sign bit value don't exist,
- For Counter: only two possible values 'primary' and 'secondary' respectively on one and two channels.
- For digital SetPoint: idem MV with an extra bit refresh potentially existing between 'read inhibit' and 'sign bit'
- For DPS or DPC: the signal values are labels of states 'Open' and 'Closed' defined at level profile of this data point. If you change the value of the first channel of data point then there is inversion of two channels such as the following example:

Here, the DPS is wired with the 'Open' state first (label 'ON TEST') and the 'Closed' state second (label 'IN SERVICE')

DI # 15						
DI # 16		GARMA Substation 132kV E07	DPS.01	Bay DPS	ONTEST/INSERV	ON TEST IN SERVICE

Here, an extract of the profile table to see labels of profile:

Profiles Table					
SPS DPS SPC DPC MV MPS Counter SetPoint					
General State labels State treatment Interlocking Alarms					
Profile #	short name	long name	States		
			'Open'	'Closed'	
25	ONTEST/INSERV	DPS Profile	ON TEST	IN SERVICE	

To do an inversion of signal, you double click on the first signal and you choose the other value using the combo box:

DI # 15		GARMA Substation 132kv E07	DPS.01	Bay DPS	ONTEST/INSERV	ON TEST
DI # 16						ON TEST
						IN SERVICE

After inversion of signal, the result is:

DI # 15		GARMA Substation 132kv E07	DPS.01	Bay DPS	ONTEST/INSERV	IN SERVICE
DI # 16						ON TEST

The signal of a DPC can't be change in case of TMU210.

7.4.9 Log exception

When any exception occurs, a new popup displays this exception and the displayed trace is added to a log file. A log file is created for each database opening session: at the first exception, a new log file is created and named with the use of the current database name and the current date. This file is stored into the database directory.

7.4.10 Copy/Paste

The copy/paste is allowed on wiring table. **Two ways** are available to perform it.

At First, in **cellule edition**, user can copy one cellule and paste it in multiple lines, but one column. The cellule paste is available for Kind, Path, Profile, long name and AIU/AOU info columns.

Secondly, in **row selection**, user can copy one or more channels. The result of the copy is stored in system clipboard, so, it can be paste in external editor (like Excel). In Clipboard, empty cells are filled with keyword "null".

Then, if clipboard contain well formed data (like after a copy from SCE), user can paste them by selecting first row.

When user pastes one or more lines, the SCE unwire all necessary channel and wire datapoints as describe in clipboard. If any one is already wired, it is unwired before.

When in clipboard a line exists with all fields set to null, the matching channel in SCE is unwired.

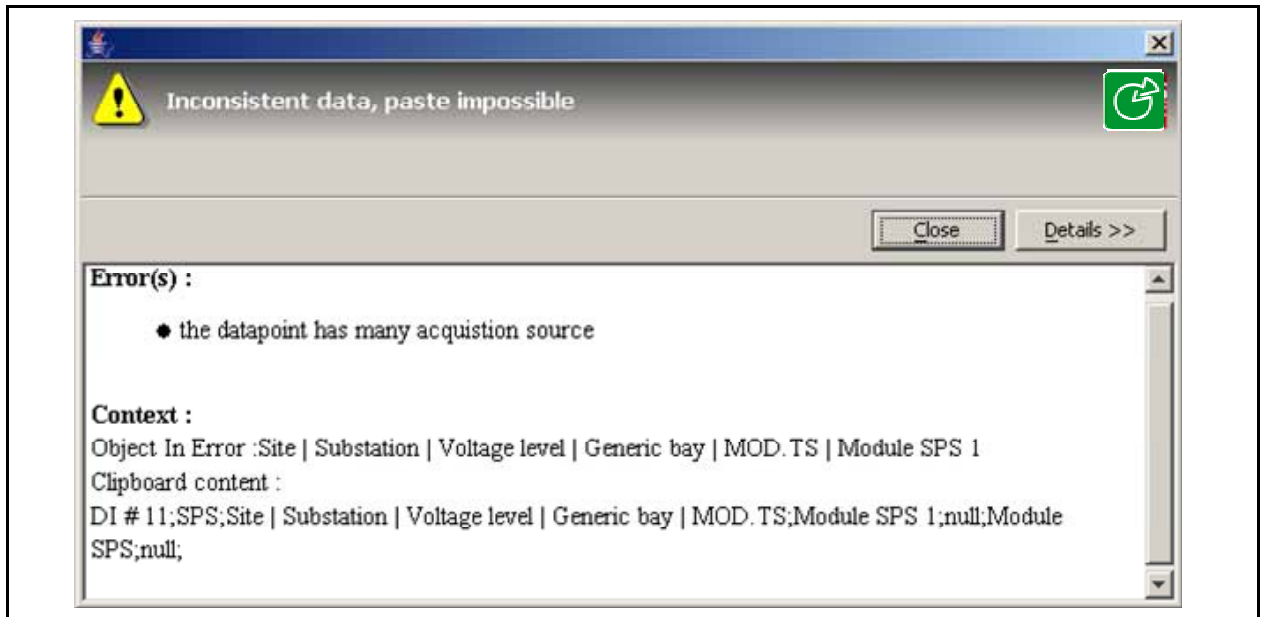
Then, if one datapoint in clipboard is not found or cannot be unwired, or more generally, if anything make paste not complete, the paste is not done.

Using this line copy/paste, the user can move datapoints between channels or boards inside SCE

Warning: The AIU or AOU boards have three additional columns.

- Possible Error on paste Action

On a paste action if the clipboard content inconsistent data a message box is displayed with error message and the error details.



Error message on trying to paste on a DIU board a datapoint which has already an IED address.

List of possible errors:

- Invalid path
- Invalid kind
- MV Type of datapoint not compatible to wire it on the current board
- Invalid rows number for datapoint kind
- Invalid signal for datapoint
- Profile attribute is read-only
- Datapoint creation impossible under specified path
- Datapoint has too many acquisition source
- Datapoint meaning is invalid for datapoint creation
- Datapoint is not compatible with selected channel.
- Relation for wiring are not compatible with current datapoint

7.5 How to create a datapoint from its acquisition table

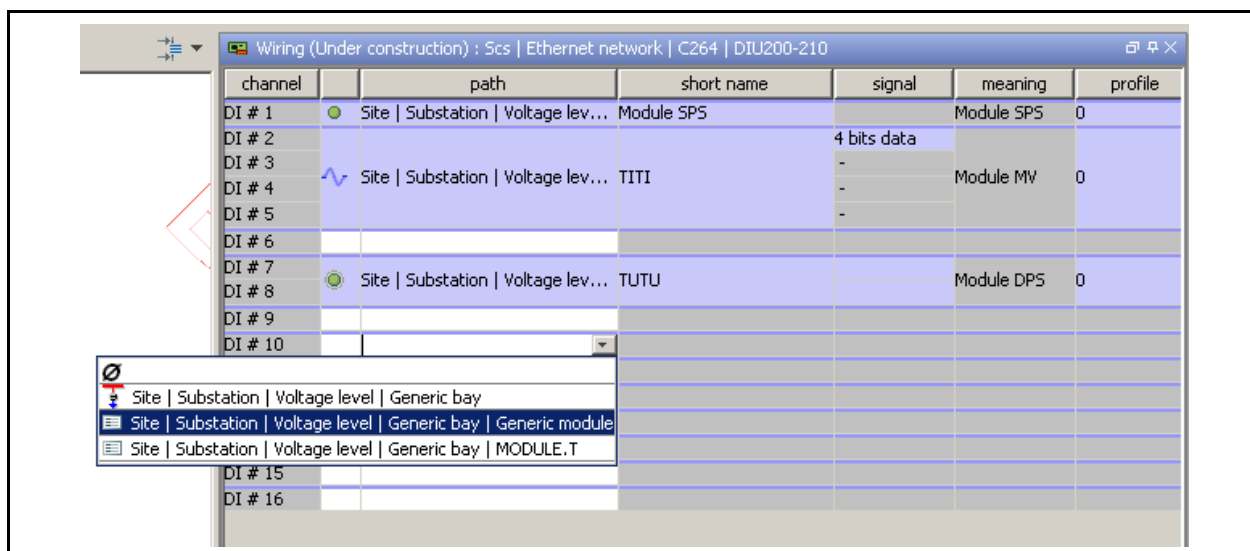
Table offer possibility to create a new datapoint directly in the table by selecting a path and input a non existing short name the meaning cell become editable and display all type of datapoint which is possible to create.

The tables which allow datapoint creation are:

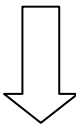
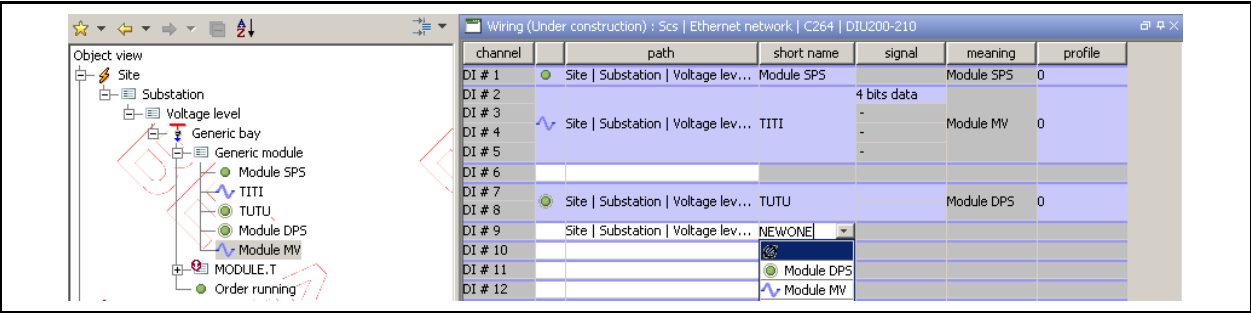
- wiring table
- TMU table
- IED addressing table

Follow the steps to create a datapoint:

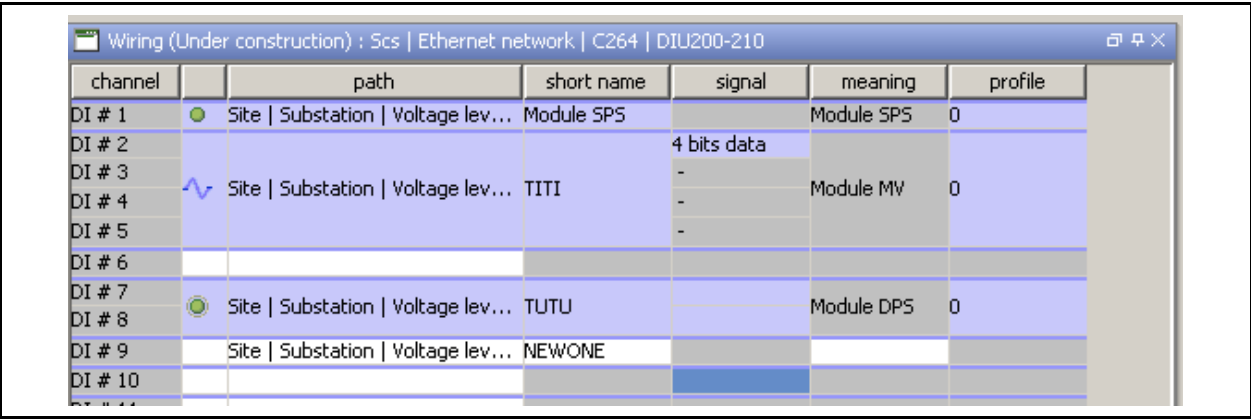
- select a path for the new datapoint
- input a short name which is not present in the short name combo box
- cell meaning become editable, select the type of data point to create
- An optional step is to select a kind, so the meaning list will be reduce to display only possible type according the selected kind.
- Select a path:



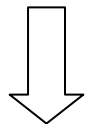
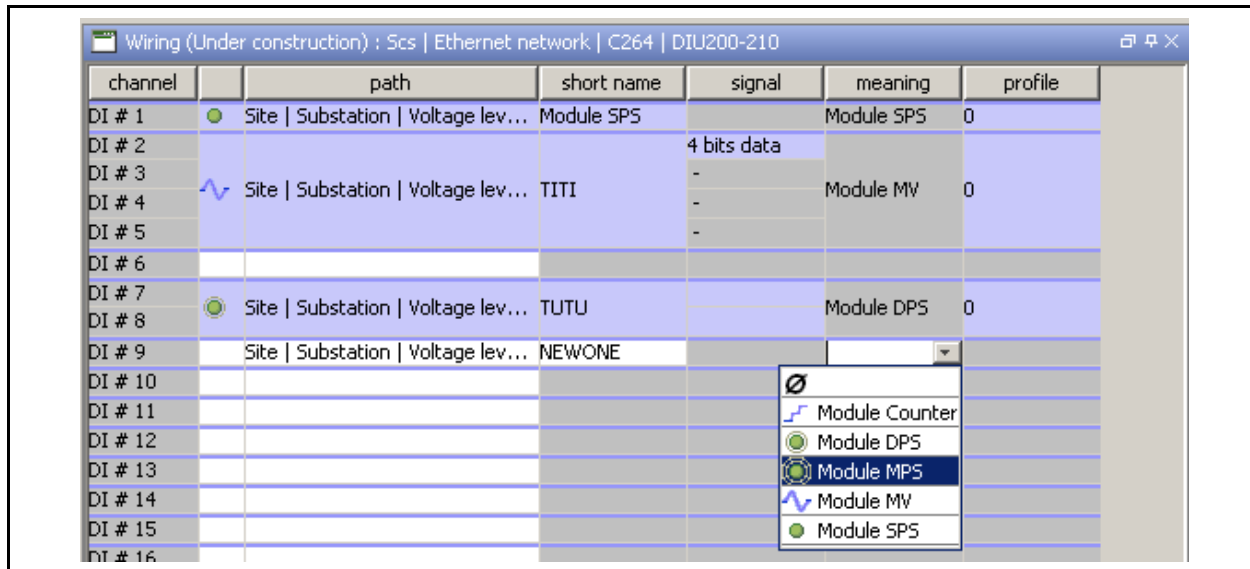
- Input a non existing short name:



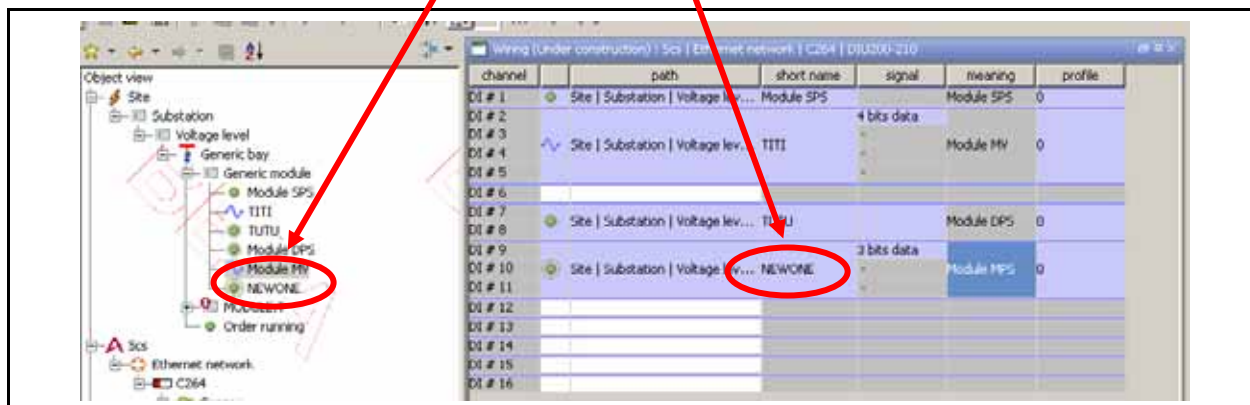
Meaning cell becomes editable.



- Choose the type of data point to create:



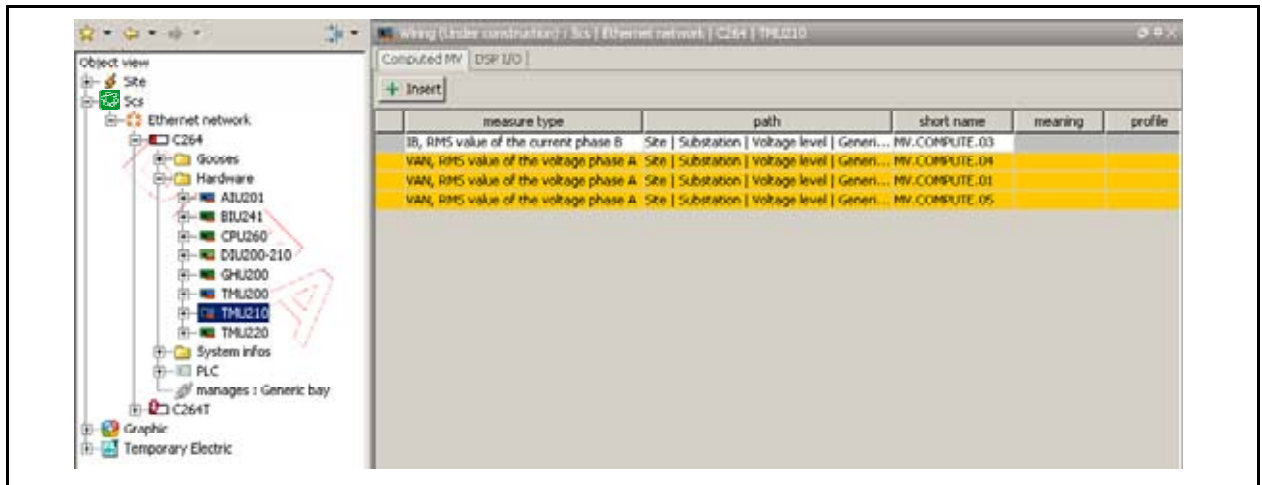
The new data point is created and wired.



Once a datapoint has been created via its acquisition table, its long name is directly editable in the table.

7.6 How to configure MV of a TMU board 200 / 210 / 220

For TMU 200 / 210 / 220 boards wiring table add management of computed measurement data point.



When a **TMU board is selected** in the browser the wiring **table displays all MV computed by this board** with presenting data of the computed MV:

- Measure type of the computed MV.
- Path of the computed MV.
- Short name of the computed MV.
- Long name of the computed MV.
- Meaning of the computed MV.
- Profile of the computed MV.

Lines which are in white color are lines which are rightly computed. Lines which are in orange are lines which present some errors as the other wiring table.

Possible errors:

- Same measure type is used for more than one computed MV on the TMU board
- MV is computed by more than one TMU board.
- MV is computed and issue from IED.
- MV is computed and physically wired on a board.
- MV is not analog.

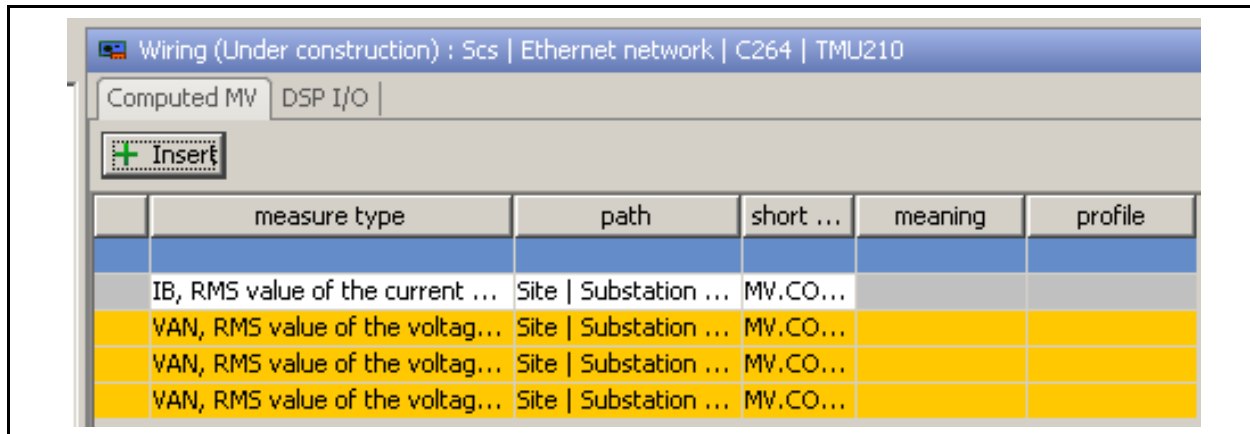
7.6.1 Insert an new computed MV

By clicking on the insert button a **new line is added** in table and selected. This new line is empty. By selecting one or more lines into table and clicking insert button as many lines as selected are inserted.

If selected lines are empty the new inserted lines will be empty too. If selected lines are not empty possible data are copied into the new inserted lines:

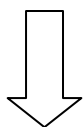
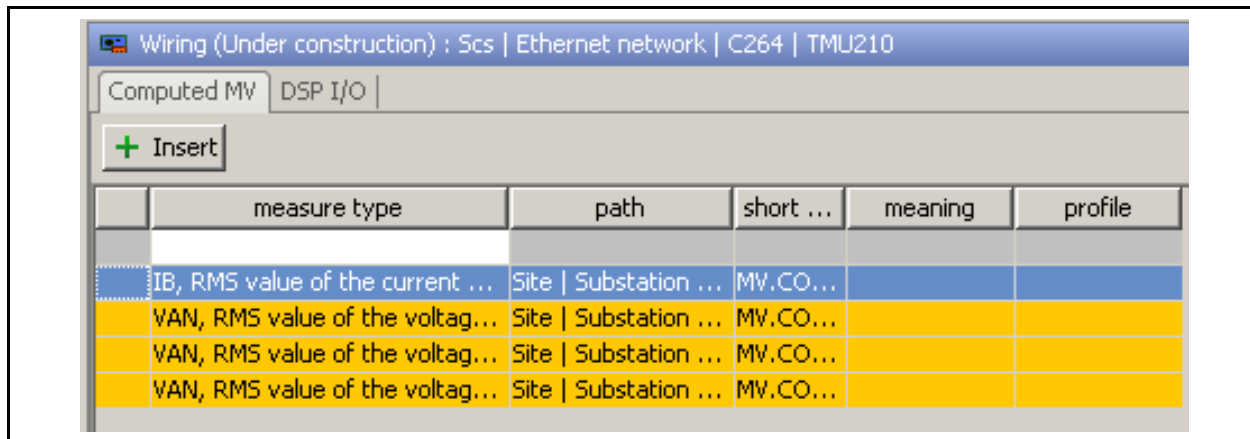
- The path is duplicated from selected lines in the selection order.
- The measure type is calculated as possible, the next measure type as the last selected is chosen.
If the measure type is already used by a computed MV (not a row without MV associated) the new measure type will be empty.

- Insert a new empty line

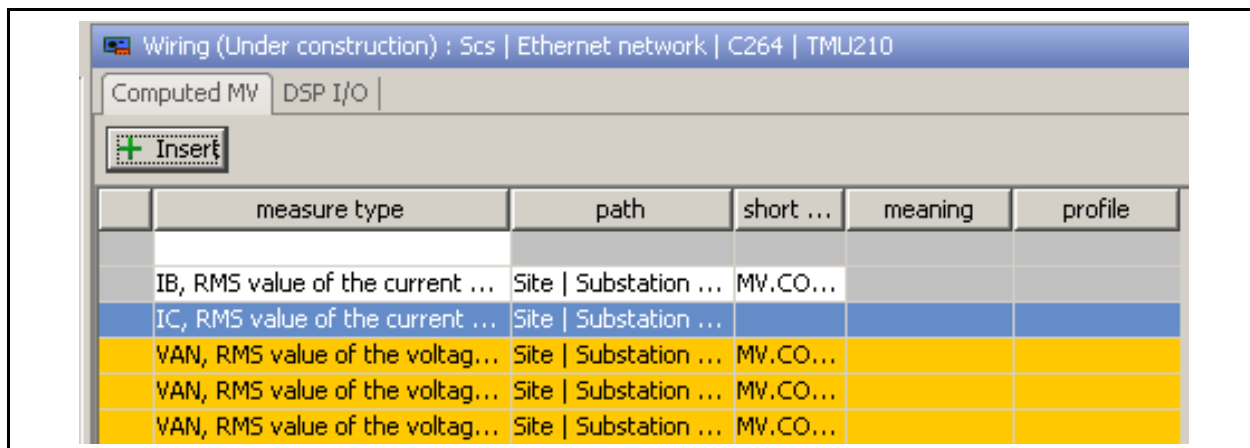


After clicking “Insert” without select line a new empty row is inserted as first line.

- Insert line(s) from a selection



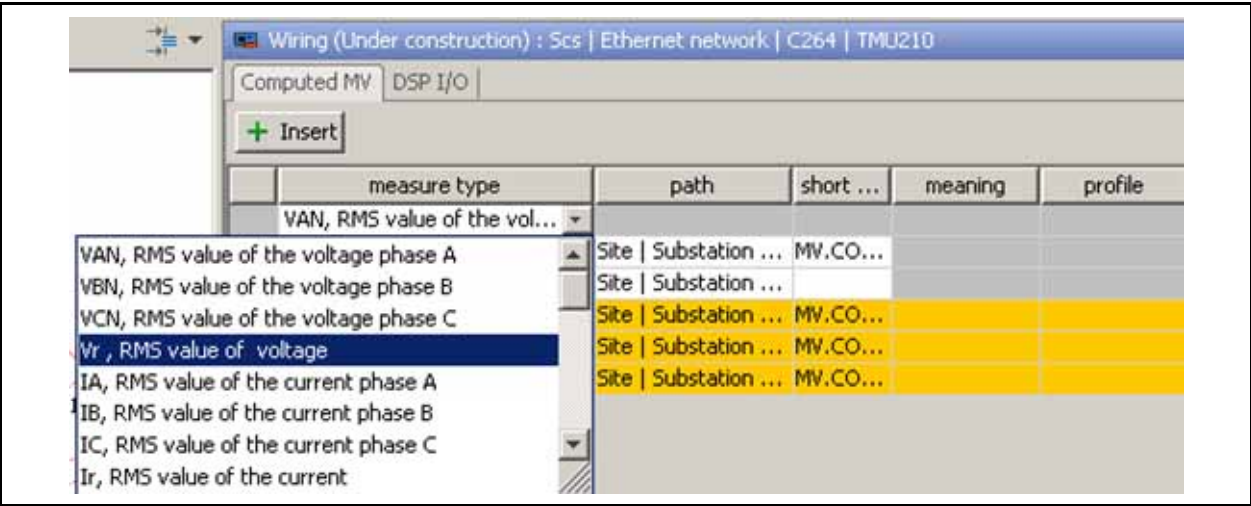
Click on « Insert »: insert a line after the selected one with duplicating 'Path' cell and calculate the next 'measure type'.



7.6.2 Computing an existing MV from table

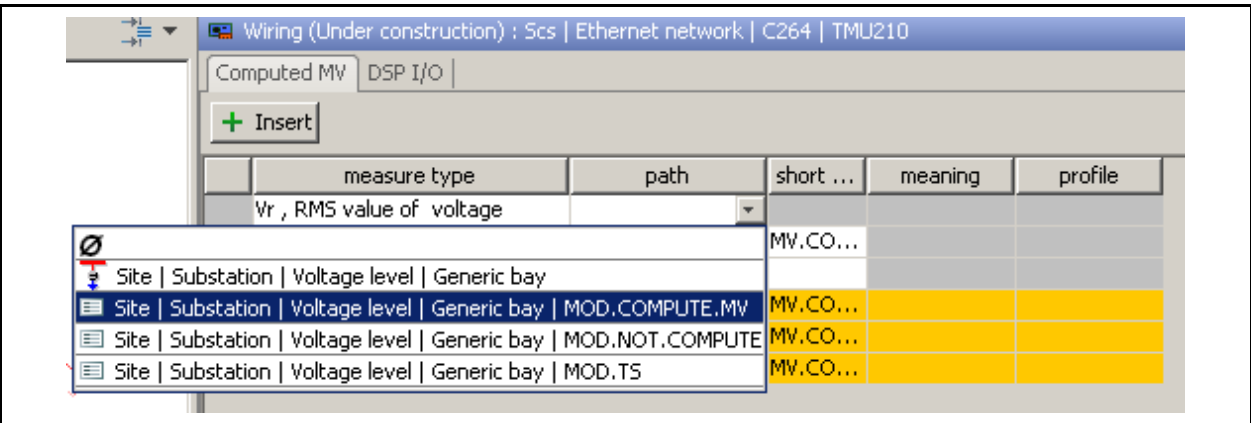
To compute an existing MV from the table follow the steps:

- Select a measure type.
 - Select a path.
 - Finally the MV which has to be compute by the current TMU board.
- Measure type selection

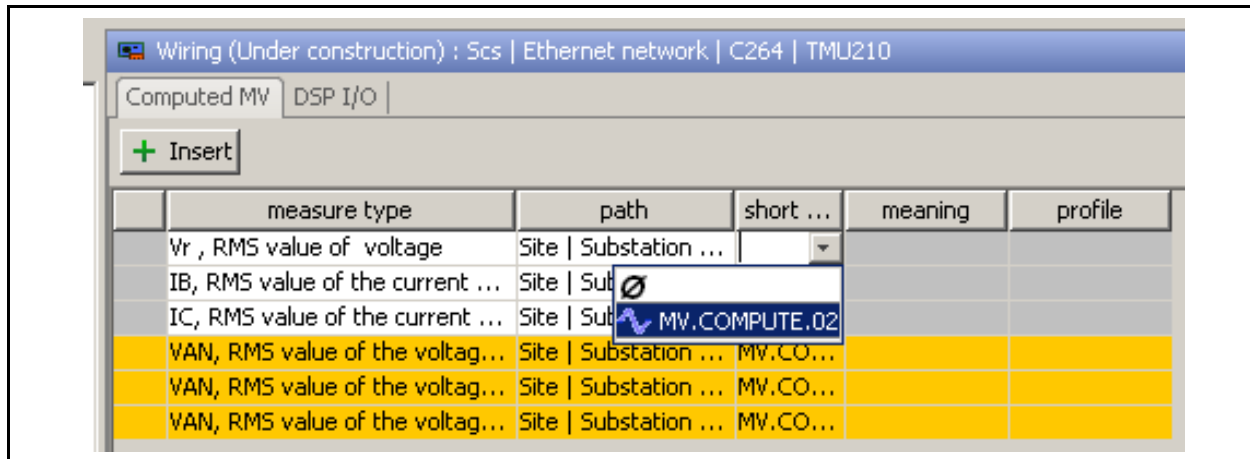


The combo box 'measure type' presents only the measure types which are not used in the TMU table.

- Path Selection



- Short name selection



7.6.3 Update the measurement type of a computed MV

Table offers the possibility to update an existing one by changing the measure type value.

7.6.4 Modify an existing computed MV

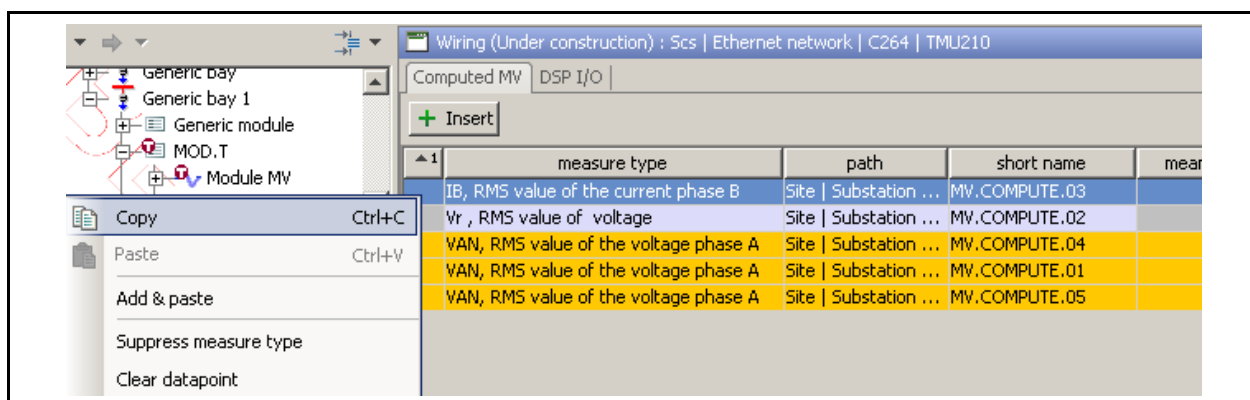
On an existing computed MV the path and the short name are updateable. On changing short name, the old MV is "un-computed" and the newly chosen one is computed on the TMU board.

On changing the path cell, if an existing MV exists under the new selected path, the new MV is computed and the old one is "un-computed" else the current MV is "un-computed".

7.6.5 Contextual actions on TMU board

Actions are possible on TMU boards by using the contextual menu. This menu offers:

- Copy value of the cell path or copy the value of one or more entire lines.
- Paste value in cell path from clipboard content.
- Add and paste line from the content of clipboard.
- Clear one or more data point which is compute on the TMU board.
- Clear one or more lines.



Contextual menu for the first line of the TMU board.

• Add & Paste action:

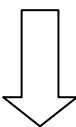
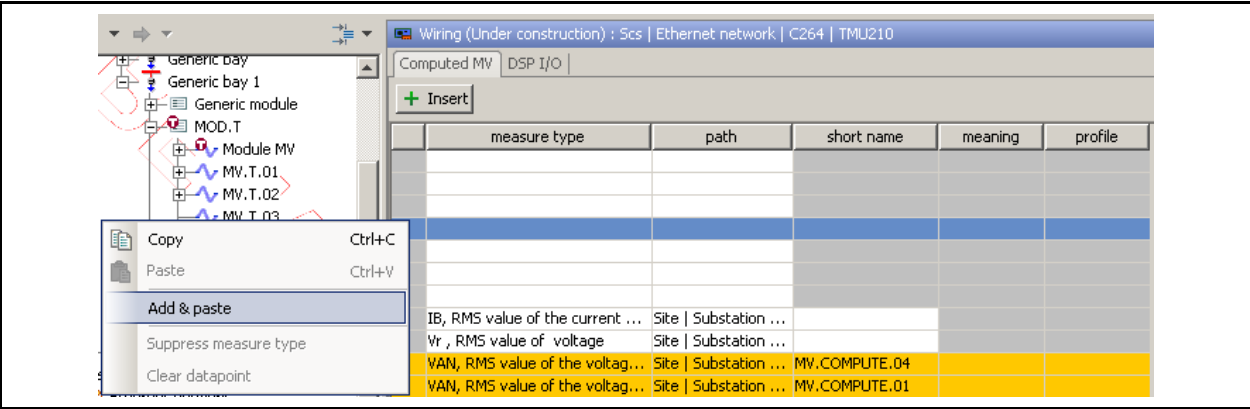
This action allows user to paste one or more compute MV containing in the clipboard. This action allows text paste into SCE and from external tool if data are well formatted. This format presents all column of the TMU table separated by a tabulation character. Empty value must be presented by a text value equals to "null".

Add & paste inserts the selected line(s). The new insert lines are selected. Existing lines are updated and kept data as possible:

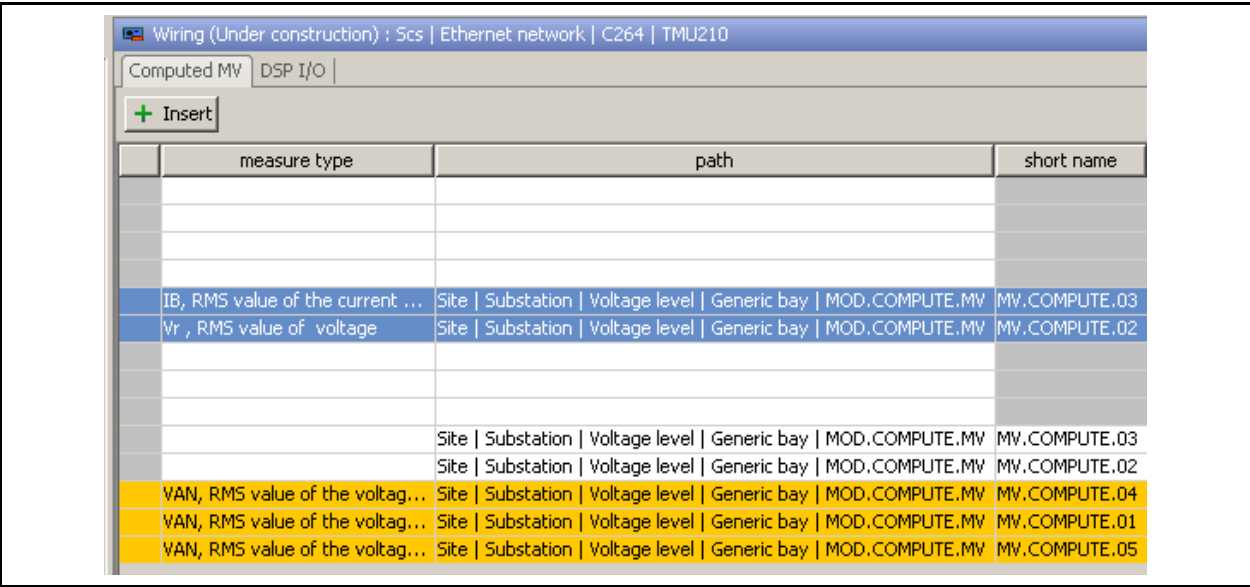
- if a datapoint was all ready used, it's 'recomputed' with the new measure type and the old type is always displayed but path and short name are deleted.
- If a measure type was all ready used, the new data point used this measure type and the old datapoint is always displayed but the measure type cell is deleted.

Example: Copy this text selection on TMU board

null	IB, RMS value of the current phase B	Site Substation Voltage level Generic bay MOD.COMPUTE.MV	MV.COMPUTE.03	null	null
null	Vr , RMS value of voltage	Site Substation Voltage level Generic bay MOD.COMPUTE.MV	MV.COMPUTE.02	null	null

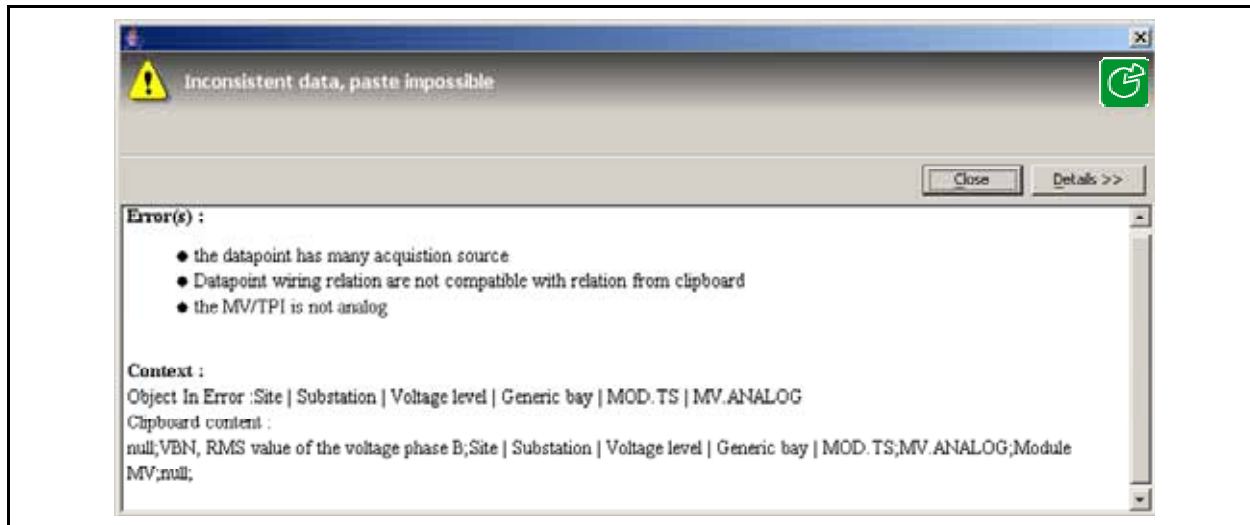


Click on 'Add & paste', lines are added and selected. The all ready used measure type are deleted and used for the on the added lines. The old lines keep the datapoints.



- Possible Error on paste Action

On a paste action if the clipboard content inconsistent data a message box is displayed with error message and the error details.



Error message on trying to paste on a DIU board a datapoint which has an IED address, relation to compute MV is not compatible with current datapoint and the MV type is not analog.

List of possible errors:

- Invalid path
- MV Type of datapoint not compatible to compute on the current board, not analog.
- Invalid MV type for current TMU
- Profile attribute is read-only
- Datapoint creation impossible under specified path
- Datapoint has many acquisition source
- Datapoint meaning is invalid for datapoint creation
- Relation for wiring are not compatible with current datapoint
- Relation attribute measure type is read-only
- Suppress measure type:

This action clears the all selected line(s).

- Clear Datapoint:

This action clear the data point information: short name, long name and path and “un-compute” the selected line(s).

- Copy Column headers:

Copy in clipboard all column title of the TMU table.

- Copy all measure types:

This action allows user to copy in the clipboard all measure types available of the current TMU board. It is always enabled whatever the selected cell or line in the wiring table.

7.7 How to define the mapping of a legacy IED

IED wiring table add management of IED addressing.

When an IED **MODBUS/DNP3/T101/T103** is selected in the browser the wiring table displays all address existing under the mapping of the IED. The address are grouped by type, five types exists:

- xPS present SPS / DPS / MPS address
- xPC present SPC / DPC
- MV present measurement address
- SetPoint present SetPoint address
- Counter present Counter address

Table is divided in two parts which present addresses data and data point data. The left part of the table is not scrollable; the right part can be scroll horizontally.

- For address data attributes displayed are:
 - Kind
 - Attributes which define the address uniqueness in the address part of the left table
 - Other attributes of the address in the address part of the right table
- For datapoint data attributes displayed are the same than other table:
 - Path
 - Short name
 - Long name
 - Meaning
 - Profile

Wiring : Scs | Ethernet network | C264 | Modbus | Modbus IED

xPS xPC MV SetPoint Counter

+ Insert Validate

Address				Datapoint						
	Addr	Bit	Fct	Contact	Label	path	short name	long name	meaning	profile
	0	0	0	Open (01)	DPS addr 1	Site ... Istage level Generic bay	DPS	Bay DPS	Bay DPS	1 : DPS profile
	5	2	0	Closed (10)	DPS addr 2	Site ... Istage level Generic bay	DPS	Bay DPS	Bay DPS	1 : DPS profile
	1	1	1		SPS addr 1					
	1	1	1	Unused	DPS addr 3					

Address attributes which define the uniqueness of the address in the mapping

Other address attributes

Data point path and attribute using the current address

S0612ENa

Lines which are in white color are lines which are rightly addressed. Lines which are in orange are lines which present some errors as the other wiring table.

“On demand” errors:

The errors are computed on demand by clicking on button Validate, and then they appear only after a first click. After first update of the table (by editing, pasting or modifying outside the table), the orange becomes lighter and the button is available again, to signal that the errors may be obsoletes. Then a new validation must be done to have up to date errors.

Possible errors:

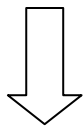
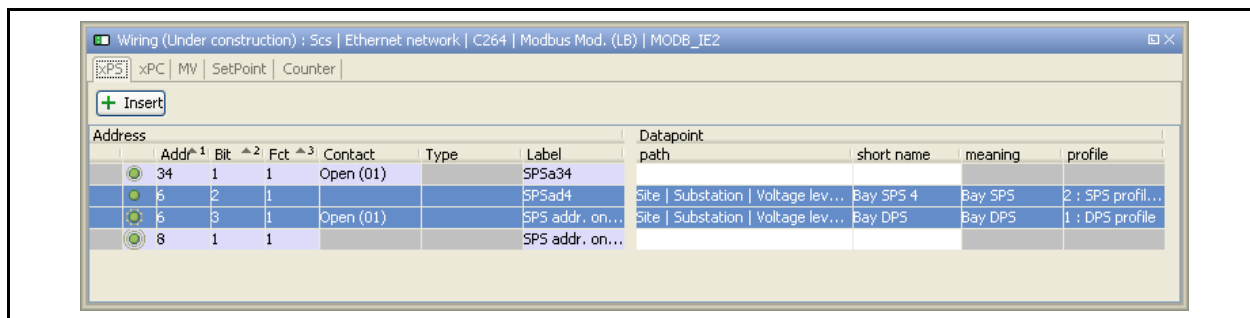
- Address is not unique in the mapping
- Datapoint has more the on acquisition source
- Address is equals to zero value, zero is not a valid address
- Contact value for a DPS/DPC address has not the right value. If same DPS/DPC use two address Contact value must be equals Open on one address and Close on the other one.

When a line is in error only the attributes of the address are editable.

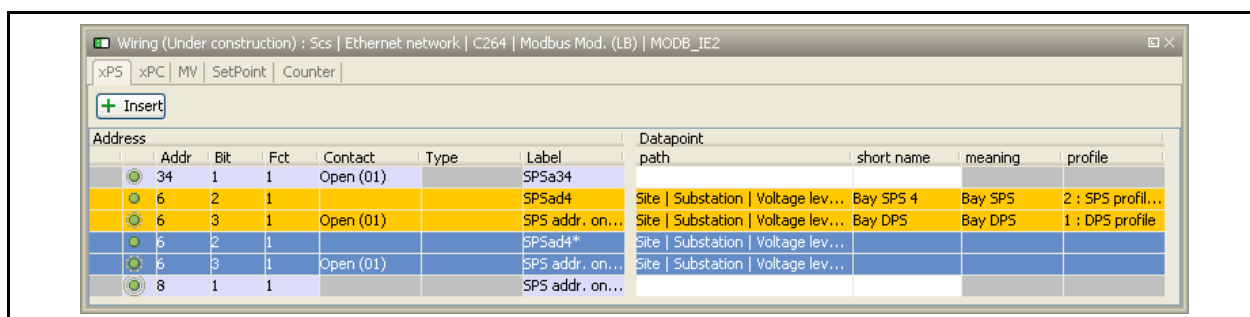
7.7.1 Insert a new address in the mapping

On click the insert button, a new line is inserted in the mapping. If no lines are selected, a new address of the default type is created in the mapping. If one or more lines are selected as many lines as selected are created in the mapping and address information are duplicated as much as possible.

For example, if a DPS address is selected the insert button will insert a DPS address and address value, information Contact and label are duplicated from selected. For the datapoint part only the path is duplicated from the selected lines.



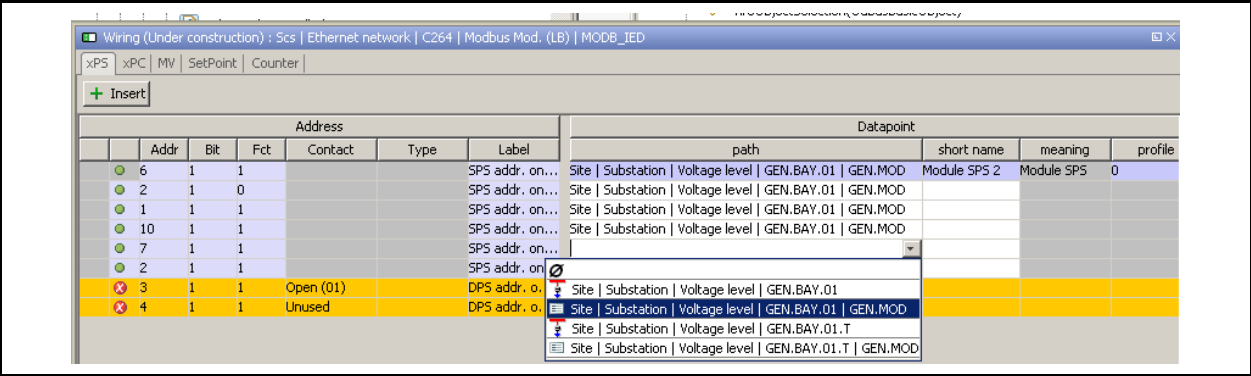
Click on Insert button, a new line is created and attributes are duplicated as much as possible. The new inserted line is selected.



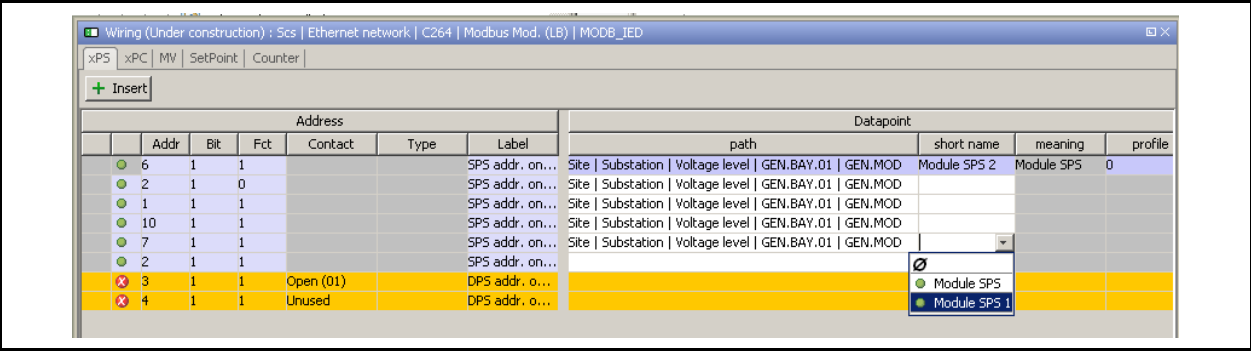
7.7.2 Edit an existing address in the mapping

To address a datapoint in the IED table follow this two steps:

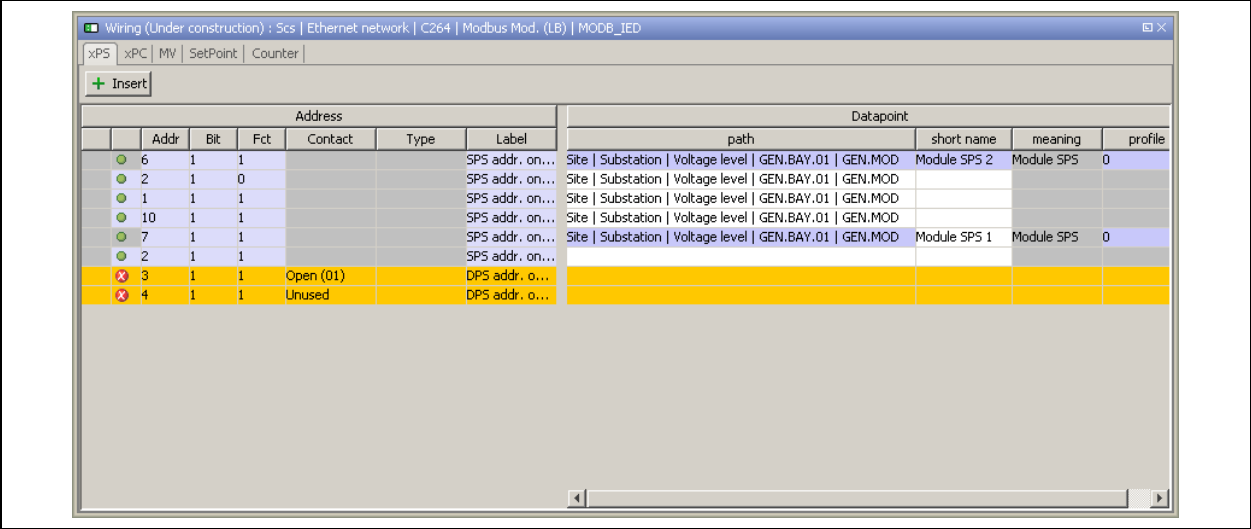
- Select a path
- Select a Short name
- Selection of a path



- Selection of a short name

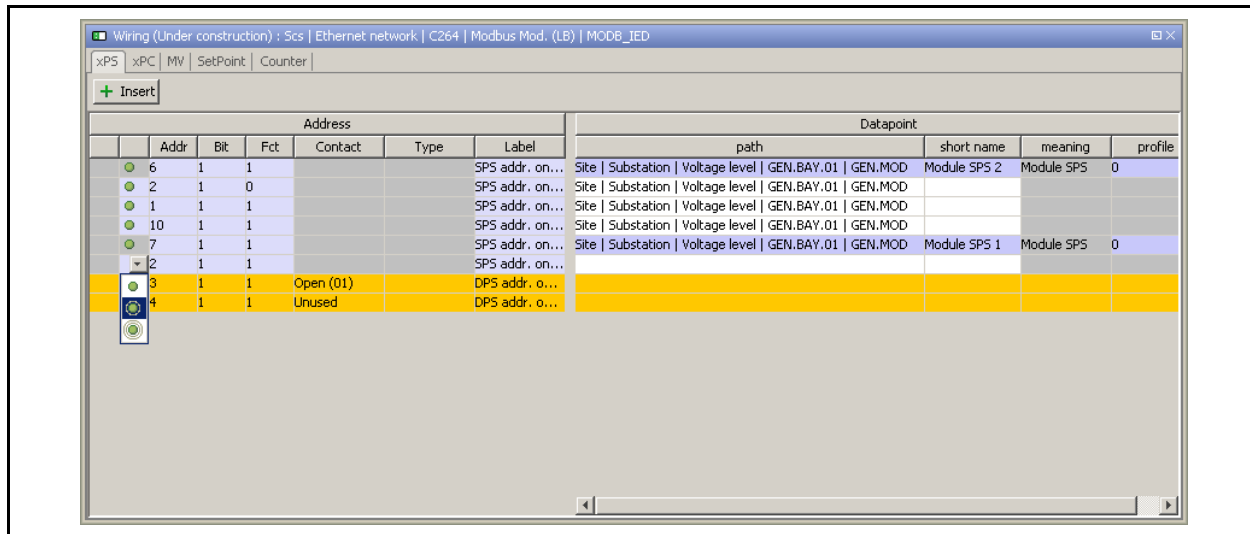


- The selected datapoint is addressed on the selected address (7/1/1)

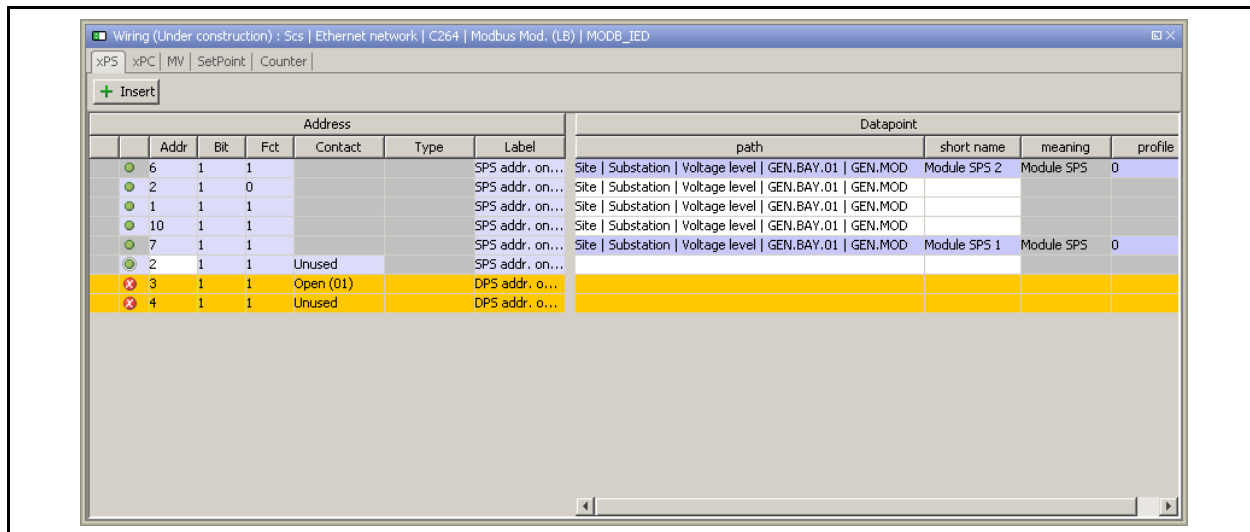


7.7.3 Change type of an address

If an address is not used by a datapoint it's possible to change the type of the address, for example user can transform SPS address into a DPS address.



For example the SPS address 2/1/1 can be transformed into DPS or MPS.



Address 2/1/1 is transformed into a DPS address. The values of the address are not updated, only the type of the address is transformed.

7.7.4 Copy/Insert and Paste

The copy/Insert and Paste is allowed on IED table. The only way to perform it is by row selection.

Copy action

By row selection, user can copy one or more addresses. The result of the copy is stored in the system clipboard that can be paste in external editor (like Excel). In this clipboard, empty cells are filled with keyword "null".

Insert And Paste

If the system clipboard contains well formed data (like after a copy from SCE), user can insert and paste them by selecting first row of insertion in the table. These new rows appear after the selected row of insertion.

After a paste, the principle is to keep unused datapoints and addresses.

The behavior of a row insertion at the IED table level is based on the key (address, datapoint) existing in this row:

If the key exists in the table, the previously corresponding existing address is moved to its new point of insertion in the table. Some attributes of the associated address and datapoint can be updated via values given in the clipboard.

If the address still exists in the table, but not the datapoint, a new row is inserted in the table for the address and datapoint given in the clipboard. Some attributes of the associated address and datapoint can be updated via values given in the clipboard. The previously corresponding existing address is set to its default value and its associated datapoint is hold.

If the datapoint still exists in the table, but not the address, a new row is inserted in the table for the address and datapoint given in the clipboard. Some attributes of the associated address and datapoint can be updated via values given in the clipboard. The previously corresponding existing address of the datapoint is kept without datapoint.

If an address using a datapoint is set with another datapoint, the previous datapoint is kept with a default address. But other address attributes remind unchanged.

- If the both address and datapoint do not exist in the table, a new row is inserted in the table for the address and datapoint given in the clipboard. Some attributes of the associated address and datapoint can be updated via values given in the clipboard..

When inserting and pasting from clipboard, the user can refer to datapoints that do not still exist in the database. In that case, they are automatically created during insertion.

The insert and paste action is disabled for instance or clone IEDs.

Possible Error on Insert and Paste Action

The error mechanism is same as other mapping tables.

List of general errors:

- Clipboard structure is not valid

List of possible errors for address part:

- Invalid type of address
- The address of the 'xxx address on IED' is not unique in the Mapping
- Update of mapping address attributes is not allowed
- The mapping address is an instance/clone of template, but mapping object not

List of possible errors for datapoint part:

- Invalid type of datapoint for creation
- Impossible to create a datapoint under path object
- Path is invalid for this mapping
- Datapoint mapping relations are not compliant with relations from clipboard
- The datapoint has many acquisition source
- The contact value is not right for a double addressing
- Datapoint profile is read-only attribute
- Datapoint mapping relation are read-only

7.7.5 Copy/Paste datapoint infos

The copy/Paste datapoint info is allowed on IED table. The only way to perform it is by row selection.

Copy action

By row selection, user can copy one or more datapoint information. The result of the copy is stored in the system clipboard that can be paste in external editor (like Excel). In this clipboard, empty cells are filled with keyword "null".

Paste datapoint info

If the system clipboard contains well formed data (like after a copy from SCE), user can paste them by selecting first row of insertion in the table. These new rows appear after the selected row of insertion.

WARNING: Insert a new row is not possible. Just change datapoint information of existing row(s) in the table.

After a paste, the principle is to keep unused datapoints.

This action is disabled for instance or clones IEDs.

7.7.6 Copy/Paste cells

The copy action is available in all cells of the table.

The paste action for cells is available in address part (from kind to label) and for Path and Profile columns.

The paste of address part is same as profile cellule paste.

7.7.7 Delete a set of IED addresses

By selecting a set of rows, user can delete one or more addresses via contextual menu.

7.8 How to reach a mapped datapoint

By selecting a row where a mapped datapoint exists in wiring/IED table, user can select directly this datapoint in the database browser via the menu item “reach” of the contextual menu. A shortcut exists for this action: ctrl-g.

7.9 How to configure a mapping of a SCADA network

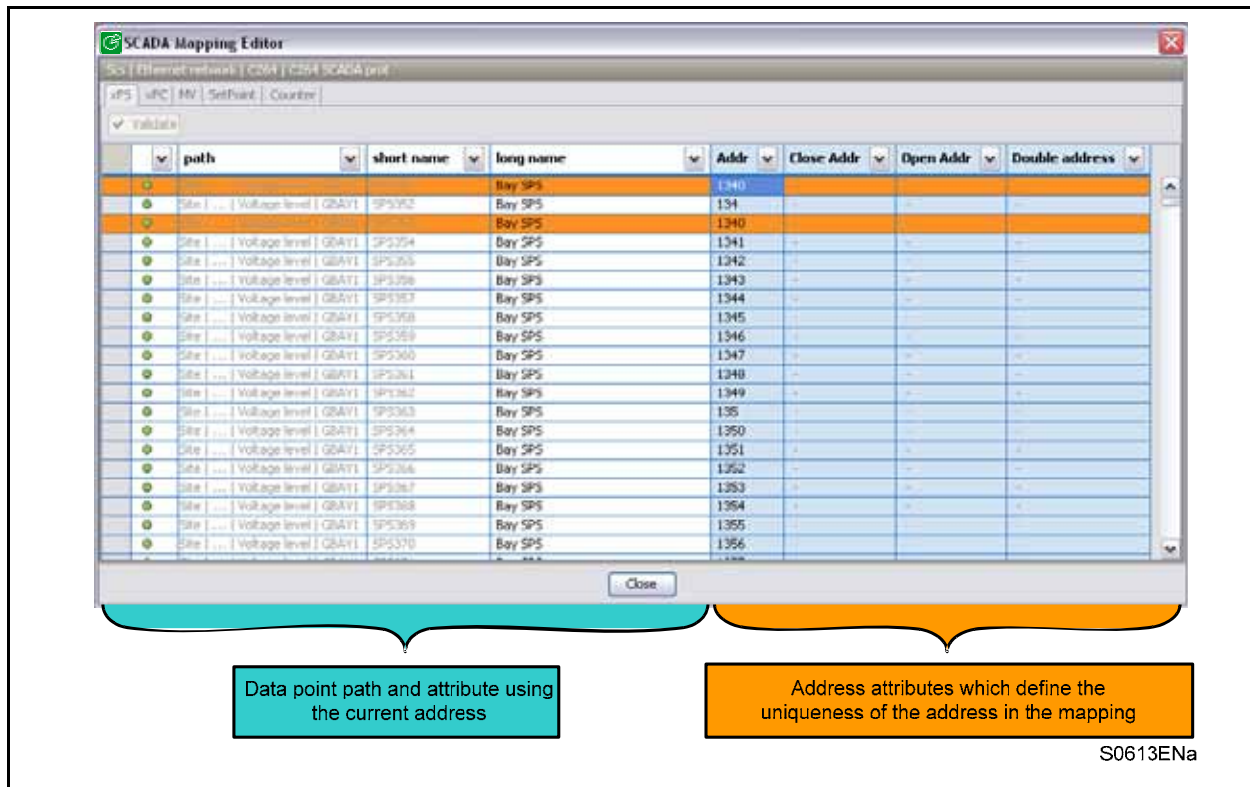
When a SCADA network is selected in the browser a extra item in its contextual menu is available: “Edit Scada mapping”. When selected, a modal window appears. It displays all addresses existing under the mapping of the SCADA. The addresses are grouped by type, five types exists:

- xPS present SPS / DPS addresses
- xPC present SPC / DPC addresses
- MV present measurement addresses
- SetPoint present SetPoint addresses
- Counter present Counter addresses

The following protocols of gateway: IEC61850 and G174 are not concerned by this edition.

Each tab present addresses datapoint data in left part of the table and address data in the right part of the table.

- For datapoint data, attributes displayed are the same than other table:
 - Kind
 - Path
 - Short name
 - Long name
- For address data, attributes displayed are different for each type of protocol:
 - For example given of MODBUS C26x Protocol attributes are:
 - For xPS:
 - Addr: value of the SCADA address, only active for SPS address, or DPS address if Double address usage is set to ‘No’.
 - Close Addr: value of the close state address for DPS address, only active for DPS address if Double address usage is set to ‘Yes’.
 - Open Addr: value of the open state address for DPS address, only active for DPS address if Double address usage is set to ‘Yes’.
 - Double address usage: flag to indicate if address is double or not, only active for DPS address.
 - For xPC:
 - Addr: value of the SCADA address.
 - For MV
 - Addr: value of the SCADA address.
 - Format: format of the SCADA address.
 - Precision: accuracy of the analog input point in number of bits.
 - For Counter
 - Addr: value of the SCADA address.
 - Format: format of the SCADA address.
 - For SetPoint
 - Addr: value of the SCADA address.
 - Format: format of the SCADA address.



Lines which are in blue color are lines which are rightly addressed or not already addressed. Lines which are in orange are lines which present some errors as the other mapping tables.

“On demand” errors:

The errors are computed on demand by clicking on button Validate, and then they appear only after a first click. After first update of the table (by editing, pasting or modifying outside the table), the orange becomes lighter and the button is available again, to signal that the errors may be obsoletes. Then a new validation must be done to have up to date errors.

Possible errors:

- Address is not unique in the mapping
- Address is not associated to a datapoint
- Address value doesn't respect the predefined format
- Datapoint is not visible by the SCADA equipment

When a line is in error only the attributes of the address are editable if possible, if address has no datapoint associated the only possible action is to delete this address.

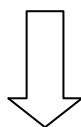
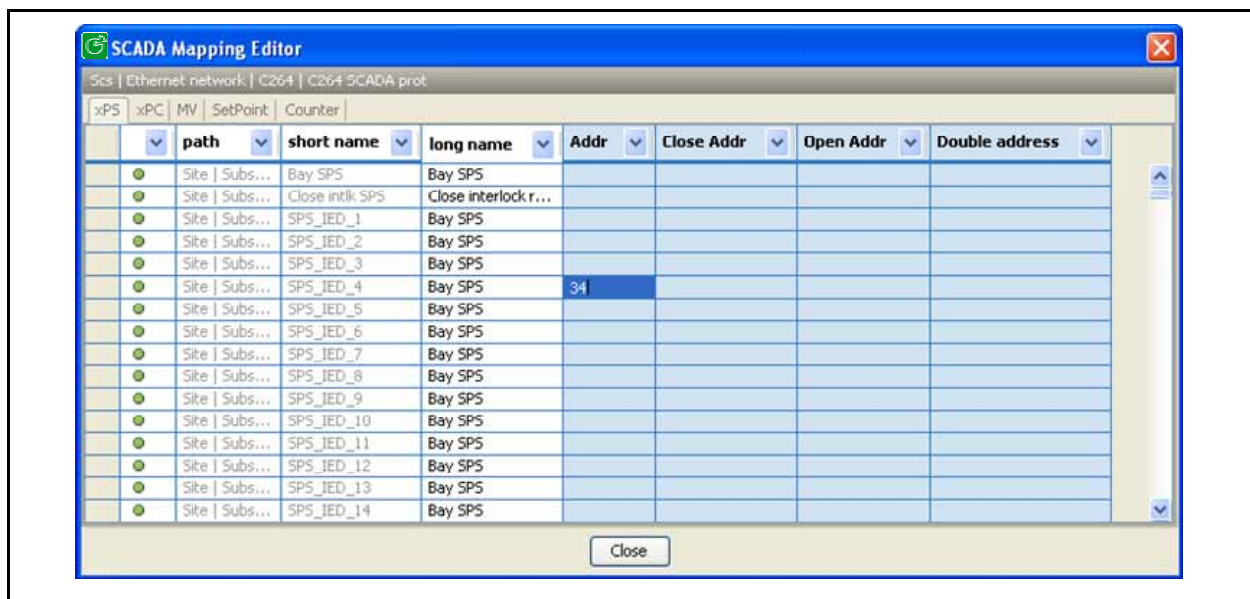
7.9.1 Displayed datapoints in the SCADA mapping table

Via the contextual menu of a SCADA network the SCADA mapping table is displayable. Datapoints displayed in this table are all datapoints with particular criteria:

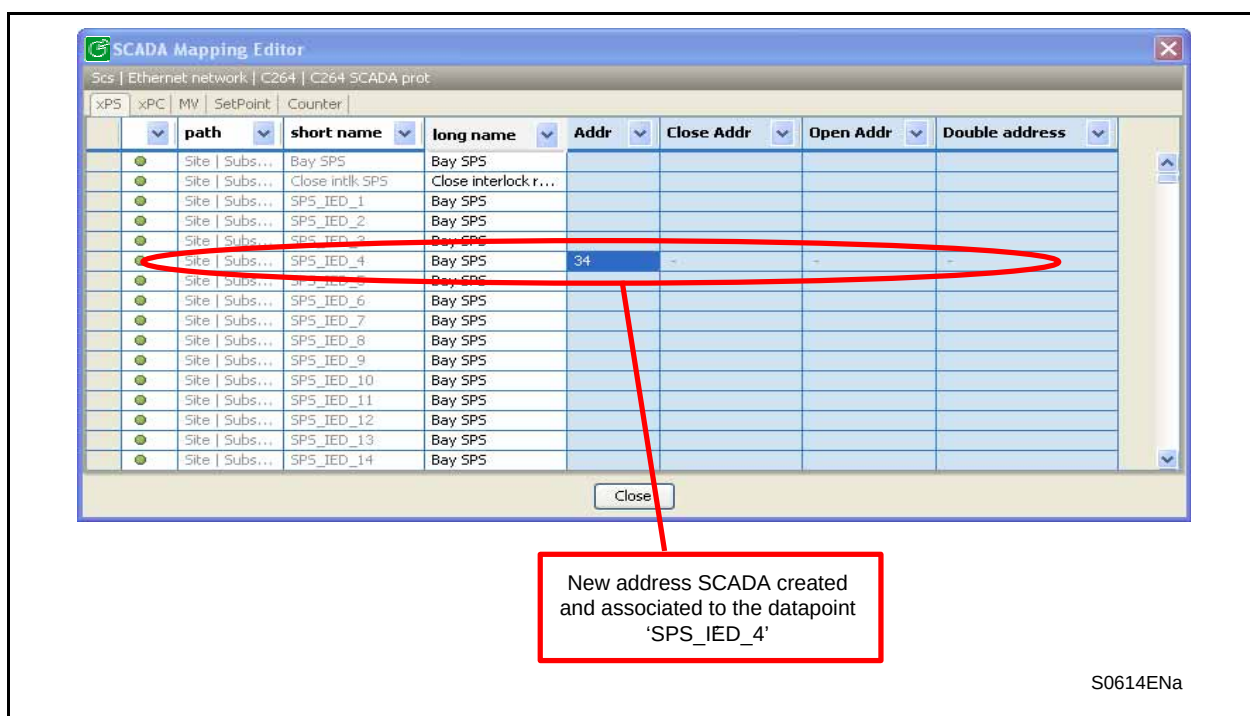
- The datapoint can has a SCADA address
- The datapoint is IEC addressed on IEC61850 equipment of the SCADA father equipment (Computer or gateway) or which is server of the SCADA network father equipment.

7.9.2 Create a new SCADA address on an existing datapoint

To create a **new address** for a datapoint just **input the new value address** in the 'Addr' column (if no address is associated to the datapoint only the 'Addr' column is editable in the address part) and the new address will be created and associated to the current datapoint.



Input the value of the SCADA address for the datapoint SPS_IED_4.



- Particular cases of double addressing:

For double datapoint (DPS, DPC), some SCADA protocol can use a double addressing. For the example given of computer Modbus SCADA protocol, the following DPS address fields 'Addr', 'Close Addr', 'Open Addr' are editable.

If a new value is input in 'Addr' column the DPS SCADA address will be created with forcing value of 'Double address' to 'No'

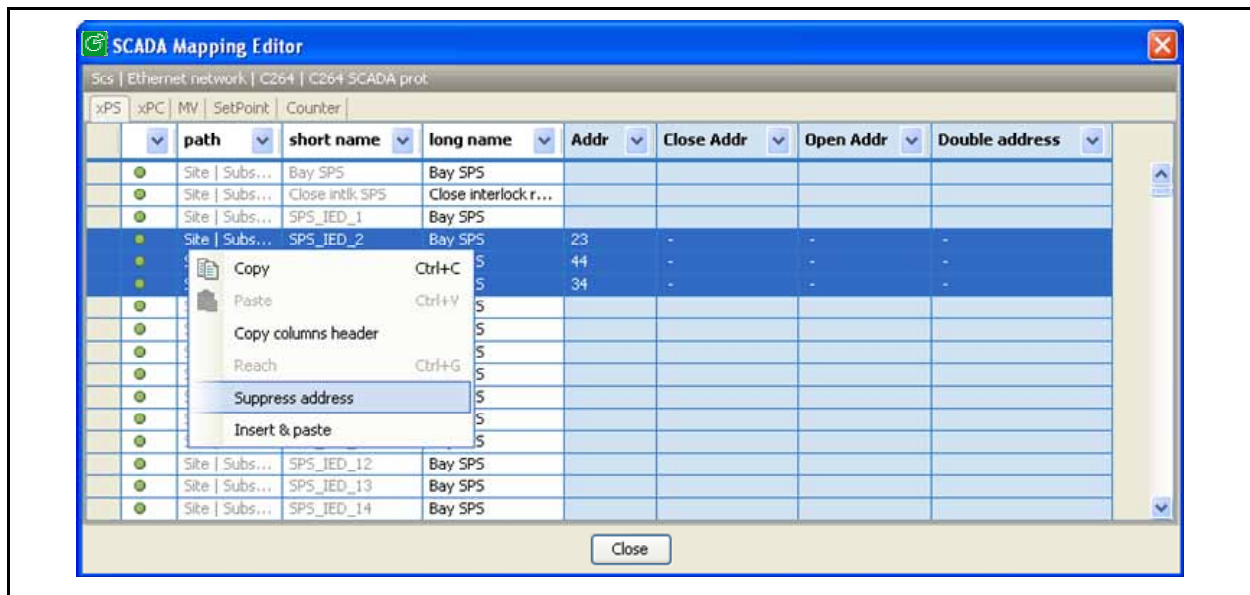
If a new value is input in 'Addr Close' or 'Addr Open' column the DPS SCADA address will be created with forcing value of 'Double address' to 'Yes'

7.9.3 Update attributes of datapoint or SCADA address

For datapoints, the 'long name' attributes are also editable. When SCADA address is associated to the data point, all address attributes become editable.

7.9.4 How to delete a set of SCADA addresses

By selecting a set of rows, user can delete one or more addresses via contextual menu.



When an address is suppressed if the datapoint is not visible by the SCADA, it's removed from table.

7.9.5 How to copy paste information in SCADA table

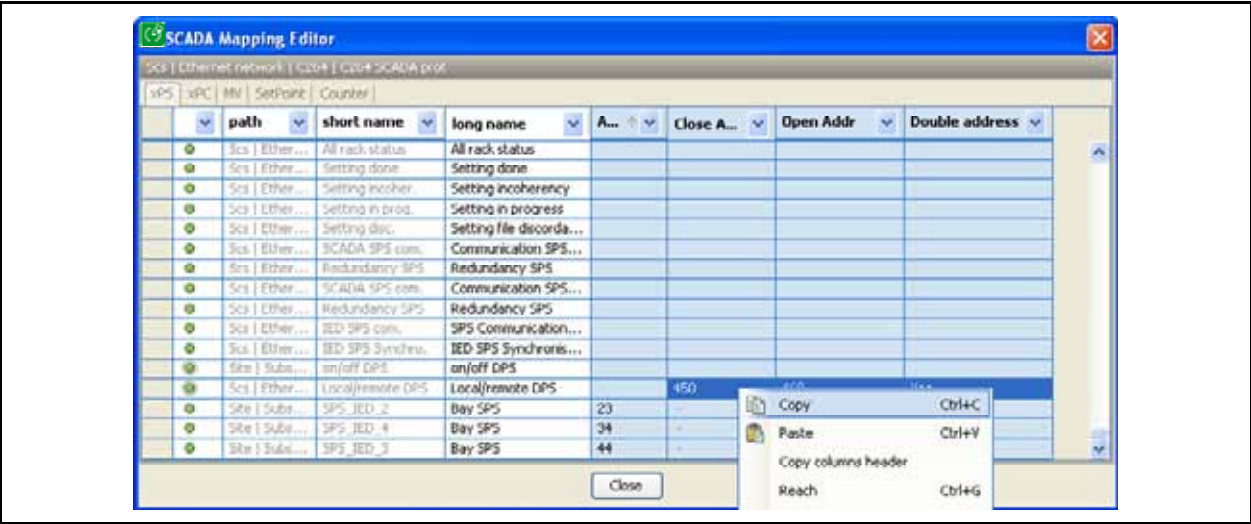
- Copy paste cells mode:

In SCADA table copy/paste on cells is enabled. The copy is available on all cells.

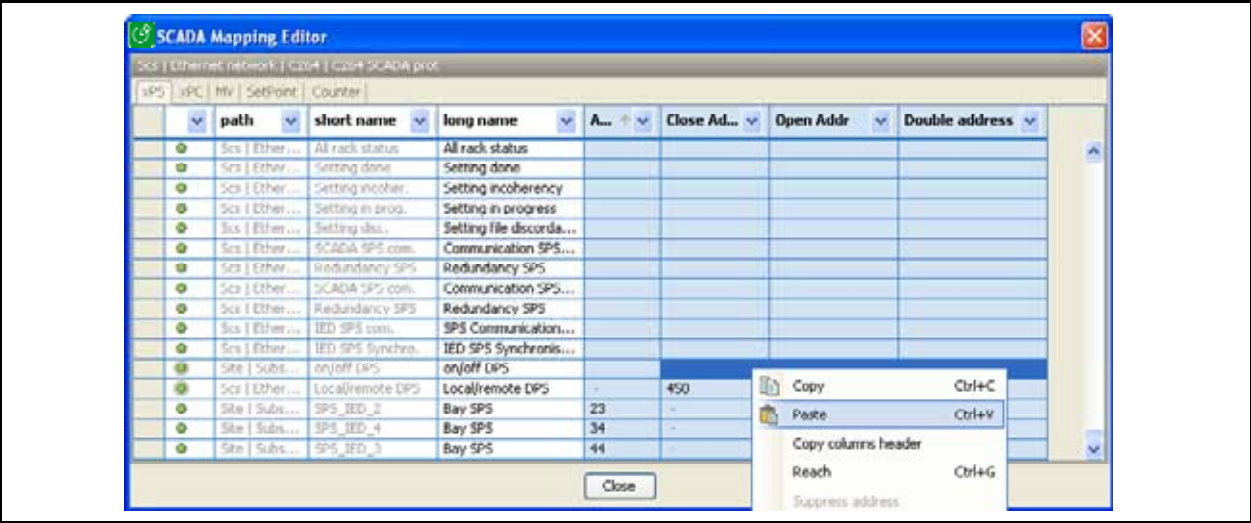
For datapoint part, paste on cell work on column 'long name' only if one column at time is selected.

For address part, paste on cell work on all editable column. In address part of the table multi column paste is enabled (ex: for a DPS address it's possible to copy attributes: 'Open address' and 'Double address' and to paste them on another DPS address).

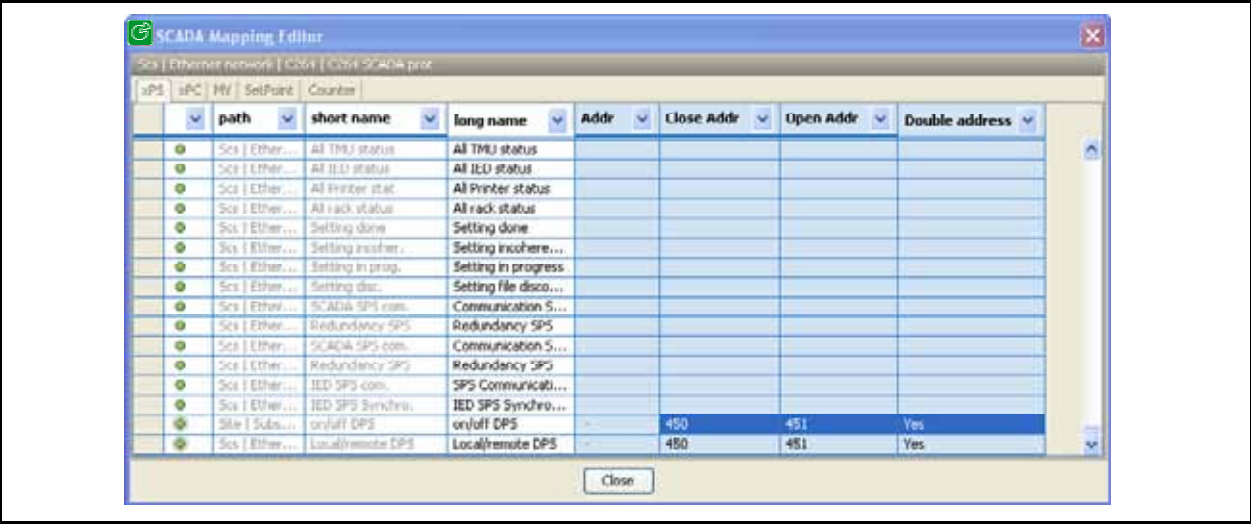
If paste is done on an empty address, a new address is created.



Copy the cells values.



Paste the cells values.



- Copy /paste line mode:

In SCADA table copy / paste in line mode is enabled. This action offers some possibility to copy or paste a selection of entire lines.

One paste of an entire line the datapoint is mapped on the address described by copied information. The paste behavior is:

- If address/datapoint already exist and used by another datapoint/address the address is unmapped from the old datapoint and used with the new one.

The pasted information are added at the end of the table and selected. After paste information, the address which has been unlinked from datapoint are deleted. The datapoint which has been unlinked from address and which are not visible by the SCADA network are removed from SCADA table.

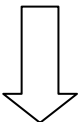
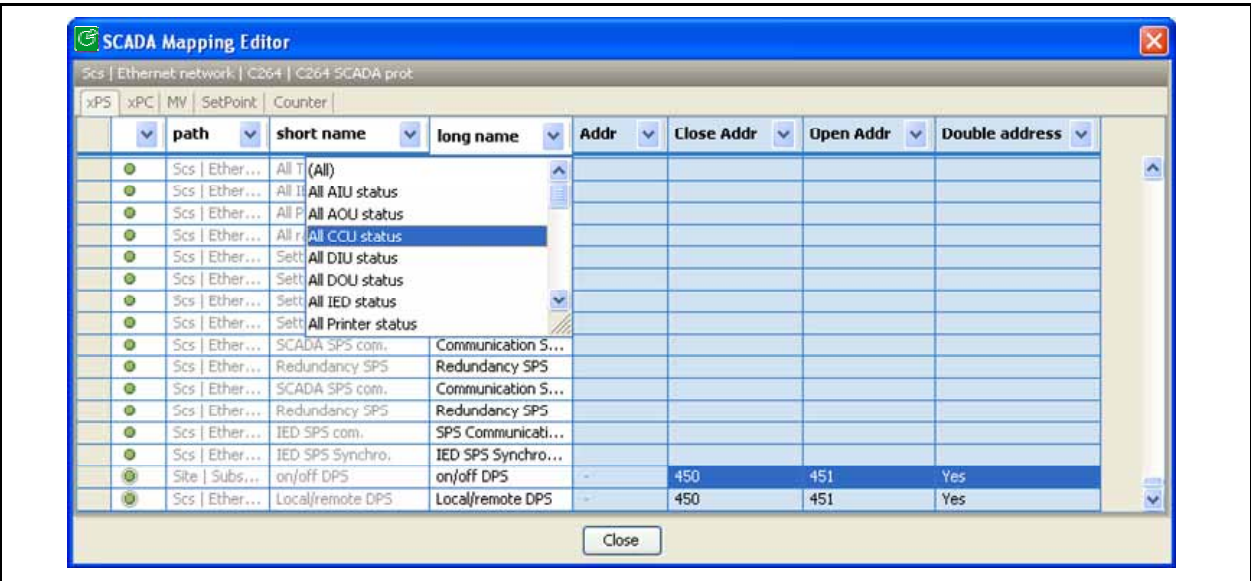
Possible errors on Copy/Paste line actions:

- Clipboard content has not the right structure (all columns must be copied to paste in SCADA table even if null value).
- Value of address has wrong format.
- Datapoint not exist, SCADA table doesn't permit the datapoint creation.

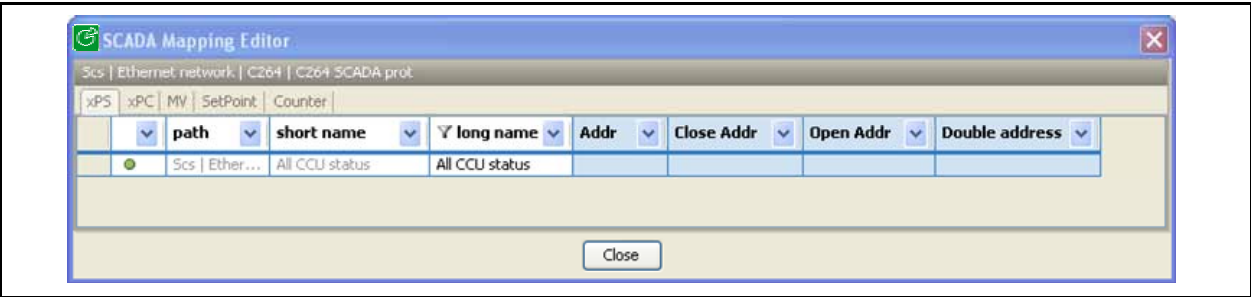
On error detected no information are pasted in database.

7.9.6 How to filter information in SCADA table

SCADA table permit to filter data on each column by selecting a specific value in the header to only view in the table the row which corresponding to the value selected.



Select only values with 'long name' equals to 'Module SPS'.



Only rows with the 'long name' attribute are displayed. A funnel icon is displayed in the headers which are filters.

- Specific filter:

For column Path a specific filter is enabled, when filter on a path, rows of this path and of the sons of this path are displayed.

For Address Column two specific values can be filter 'Defined Address' and 'Undefined address':

- Defined Address filters only the rows with an address value.
- Undefined Address filters only the rows with no address value.

8. SCE LOCALIZATION

8.1 Introduction

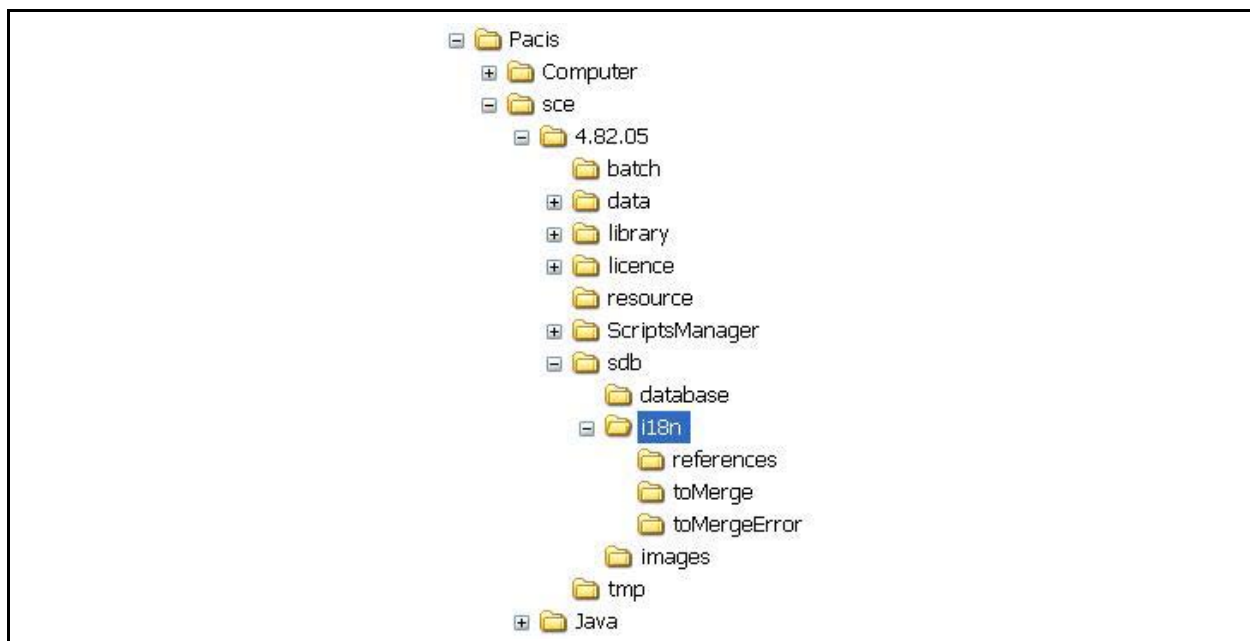
The SCE provides a way to localize each label appearing at HMI level for a list of pre-defined languages and its associated xml files.

Language	Pre-defined local language file available in SCE
English	English_US_0409.xml
French	French_Std_040c.xml
German	German_Std_0407.xml
Spanish	Spanish_Std_040a.xml
Italian	Italian_Std_0410.xml
Russian	Russian_Std_0419.xml
Romanian	Romanian_Std_0418.xml
Polish	Polish_Std_0415.xml
Greek	Greek_Std_0408.xml
Turkish	Turkish_Std_041f.xml
Chinese	Chinese_Tr_0404.xml

The SCE localization process is a mean to translate the human machine interface of the SCE to a customized language (modified a pre-defined language xml file, create a new pre-defined language xml file).

8.2 User process of language translation

In an installed SCE version, under the [sdb](#) directory, a directory called "[i18n](#)" contains all files related to the internationalization. The directory "[i18n](#)" contains two sub-directories:



- The "**references**" sub-directory contains all local language files in XML format for all languages available in the SCE.
- The "**toMerge**" sub-directory is empty at the installation. It receives a modified local file to update translations.
- The "**toMergeError**" sub-directory contains localization files in error after the localization processing.

The user localization process follows these steps:

- Quit the running SCE.
- Makes a copy of the language local file :

For example for Chinese:

copy file \sdb\i18n\references\Chinese_Trld_0404.xml into the directory \sdb\i18n\ToMerge

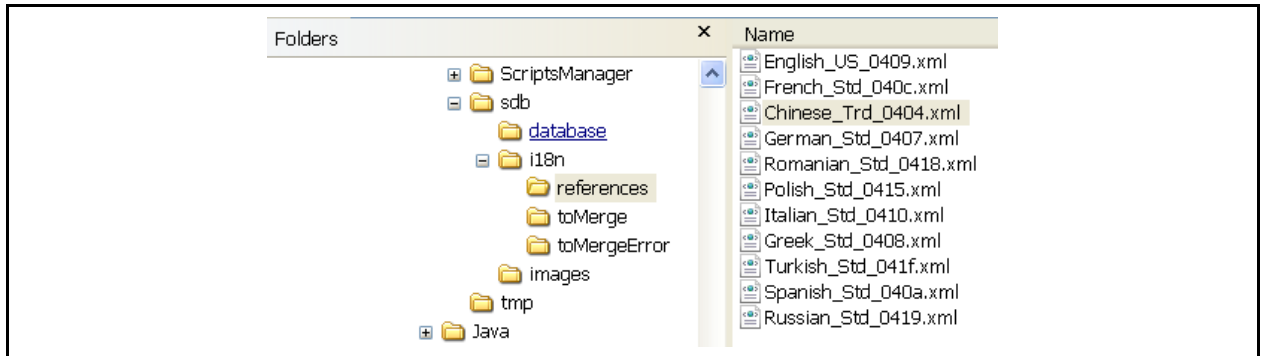


FIGURE 217: REFERENCE LANGUAGE FILES

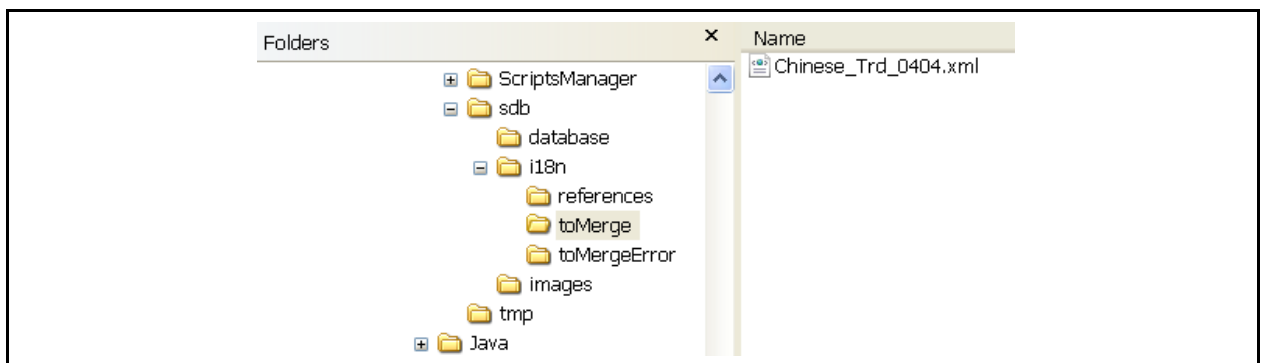


FIGURE 218: LANGUAGE LOCAL FILE COPIED INTO TOMERGE DIRECTORY

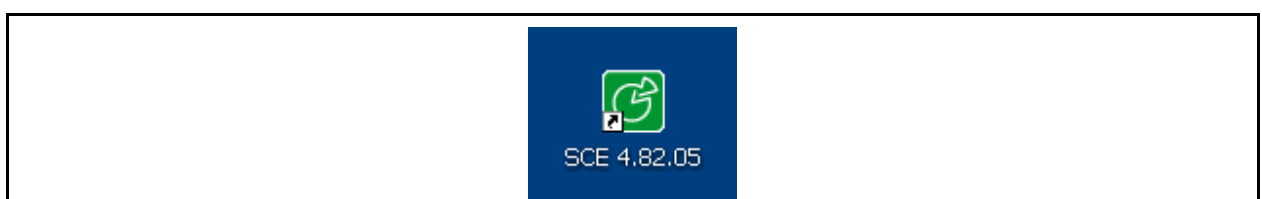
- Modify the content of the language local file copied with an XML editor supporting UTF-8 encoding and save it.

NOTE: For each translation to modify inside the language file copied, the user has to update the **"valueLanguage"** attribute and set to **"Yes"** the **"translated"** attribute. Others attributes mustn't be modified.

In this example below, the user has modified one translation with the value *2011* and authorizes the translation:

```
valueLanguage="(c) Schneider Electric T&D. 2011 中文" translated="Yes"/>
```

- Save the language local file and launch the SCE



The localization process is automatically run by SCE and the progress can be verified onto SCE window trace:

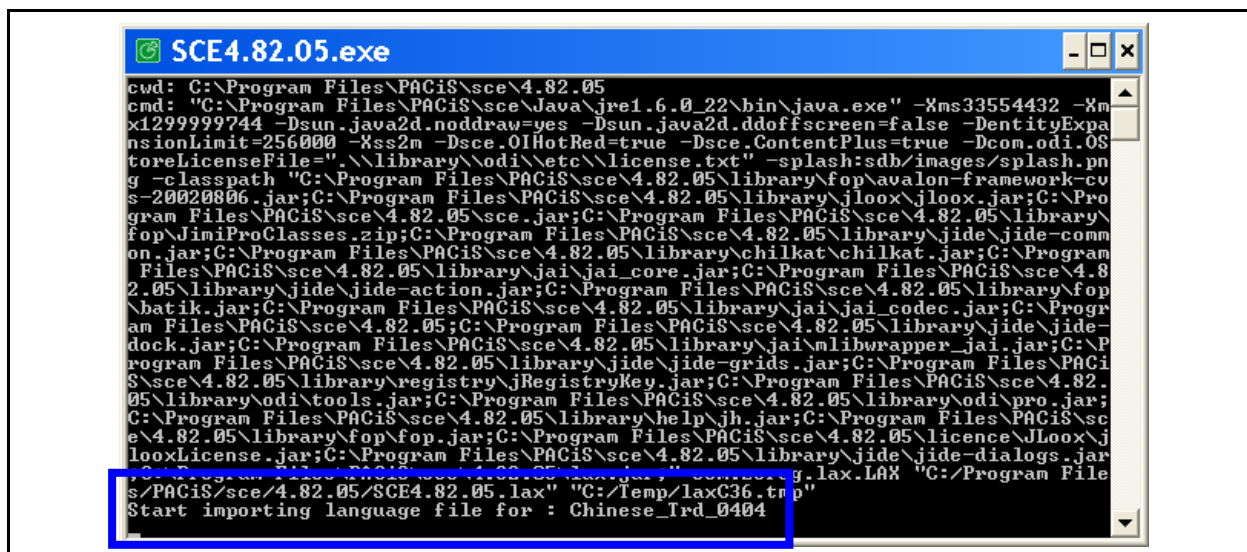


FIGURE 219: START IMPORTING LANGUAGE LOCAL FILE

A new reference file is produced into "[references](#)" sub-directory. It contains the merge of the previous reference file and the localization file existing in "[toMerge](#)" sub-directory. This folder "[toMerge](#)" is cleaned at the end of localization.

NOTE: If errors or uncompleted translations are detected during the merge, the folder "[toMergeError](#)" contains a localization file that lists them. This resulting file can be directly used and updated to fix errors or missing translations. For that, the corrected file must be copied into the "[toMerge](#)" folder. The localization process will take it into account for next time the SCE launching.

At any time and especially at the successful end of the (iterative) localization process, the "[references](#)" folder should be manually archived and backup by user. This backup can be re-used to re-localize a new release of SCE by the same process.

Two possibilities are offered:

- Keep the new language local file and merge it for each new SCE installation,
- Send it to Schneider Electric support in order to integrate it in a future SCE version.

8.3 Limitations

The following parts of SCE are NOT translated:

- OI XML Parser messages during the OI generation,
- Gateway post processor error messages during gateway generation,
- Foundry error messages during IEC61850 generation,
- SetBuilder error messages during setting generation,
- FBD editor software,
- reports (wiring, FBD).

All values associated with a pattern aren't translated.

General exclusions
TCPIP addresses and Alias TCPIP (network Name)
Slot Numbers of computer boards
Addresses (MAC, Scada, other)
Legacy IED names (ShortName)
Path definitions or file/directory names
Identifiers (FBD, DataObject IEC, Goose, Report)
IEC Names (ShortNames of DIAG, LD, LN, FC, DO)
IOReference and IsagrafPrefix of UserFunctions
Printing formats
other numerical values (versions, ...)

Specific exclusions	
id of AttributeType	Label in English
Datapoint.IDRC	IDRC
DisturbLD.DRPath	disturb. rec. path
Scs.Password	computer password
UCA2PhysicalDevice.APTitle	AP-Title
UCA2PhysicalDevice.AEQualifier	AE-Qualifier

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APPLICATION

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1. SCOPE OF THE DOCUMENT

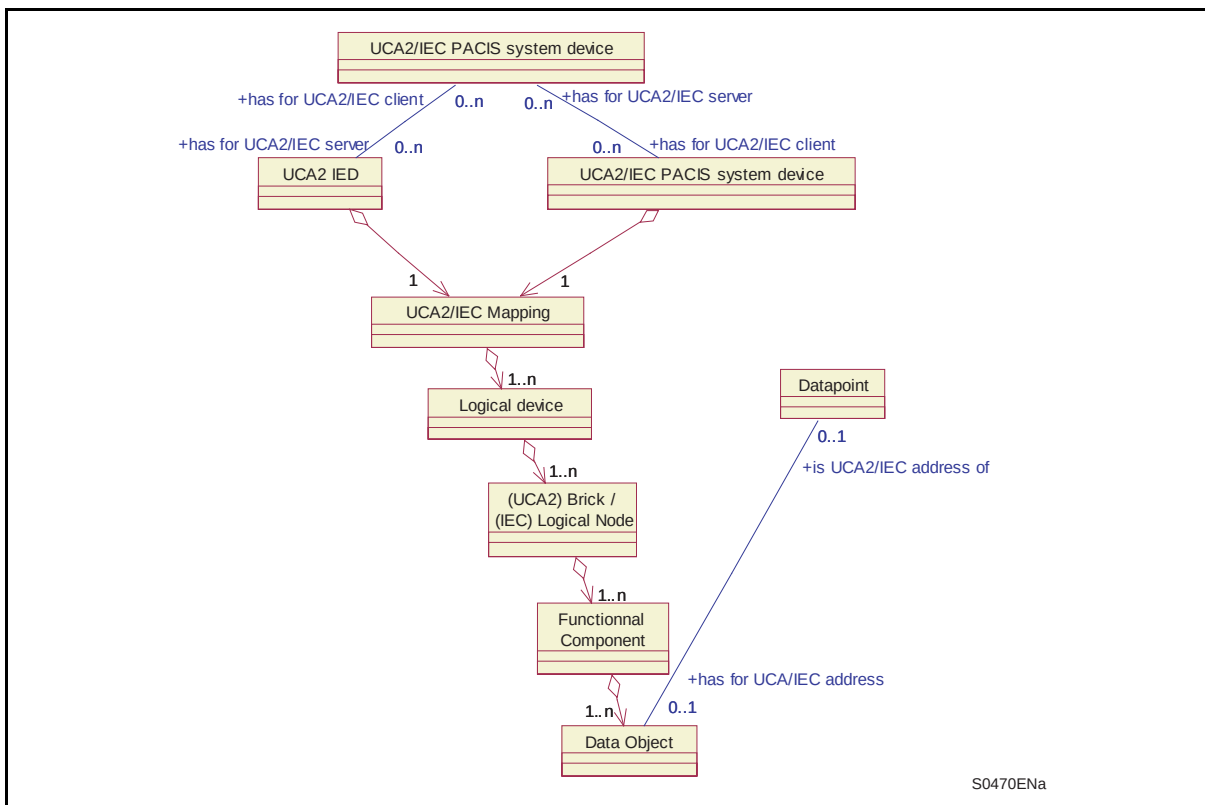
The present document is a chapter of PACiS SCE documentation.

It describes:

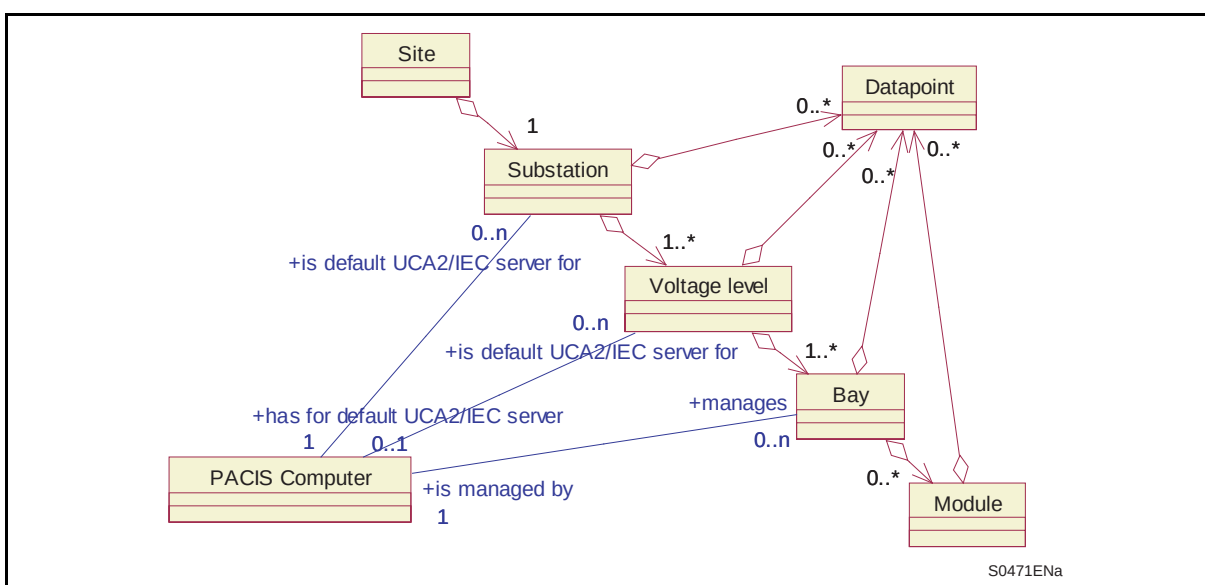
- The station bus automatic addressing of datapoints. Implemented PACiS Station Bus (SBus) protocol is IEC 61850 compliant. The non-PACiS IEDs are out of the scope of this document,
- The command lines,
- The ISaGRAF workbench.

2. PACiS IEC 61850 PROJECTION

IEC61850 mapping of an IED is an aggregation of Logical Devices (LD), composed of Logical Nodes (LN), Functional Components (FC) and DataObjects (DO). This mapping is used to model the subset of substation's electrical devices managed by the server.



Electrical plant items are modelled with the following structure:



Automatic-addressing consists to create IEC61850 mapping and in particular DataObjects and to link them with Datapoints. This creation process follows some **rules**.

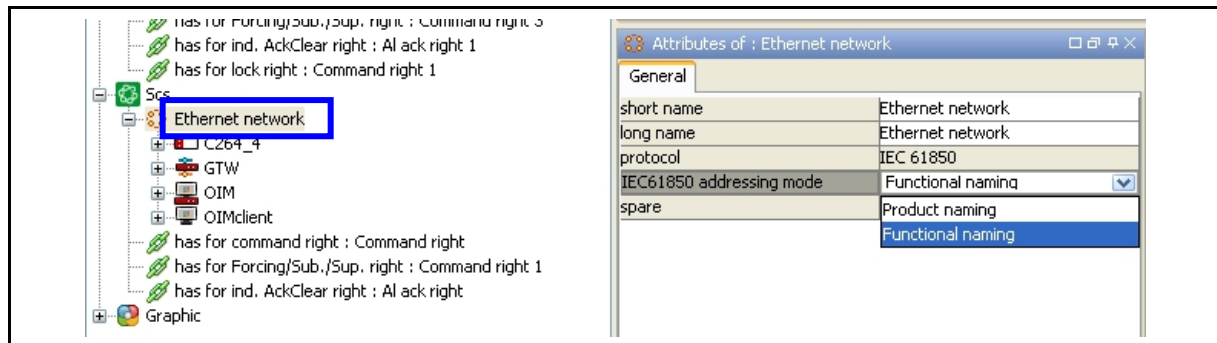
Theses rules are defined by hierarchical level: Logical Devices, then Logical Nodes then DataObjects.

2.1 Logical Device Rules

2.1.1 IEC61850 addressing mode

For all servers, there is the possibility to choose two IEC61850 addressing modes at the substation level:

- Product naming mode
- Functional naming mode



Functional naming: The logical device name and logical node name are created based on the electrical topology:

- For a IEC61850 IED, when an SCL file using "functional naming" is imported, the mapping and the electrical topology are created / updated following SCL description (1)
- During the auto-addressing of PACiS IED, shortname of electrical objects are used to build IEC61850 functional names.
- The language used for functional name in IEC61850 mapping must be chosen before IEC61850 auto-addressing.

NOTE 1: The import of a SCL file is not impacted with the addressing mode. Whatever the setting is, the SCL file is imported the same way.

2.1.2 Product naming mode

One Logical Device LD0 is created for each PACiS SBus devices.

LD0 is pre-defined for each type of IED (C264, GTW, OI) and contains some system information of the IED: an LN DIAG (only for GTW and OI), an LN LLN0 and two empty LN DBID and LPHD are defined and used by system datapoints of the device.

Each LN DIAG contains all device status.

For the OI, there is the DataObjects of status (relative to SPS datapoint OI Client link) referenced by index of each OI Client linked to this OI Server.

One Logical Device SYSTEM is created for the C264 and for its Extensions (Legacy IED, SCADA Network and Extension Rack).

Under this LD SYSTEM is defined a DIAG Logical Node named as:

- C26xDIAG for the C264,
- IEDDIAG_y for a legacy IED _y with _y in the interval [1, _n],
- TCIDIAG_y for a SCADA Network _y with _y in the interval [1, _n],
- C26xEDIAG_y for an Extension Rack _y with _y in the interval [1, _n].

The DIAG contains DataObjects on the state of the communication between OI Client and OI server. For the C264 and its Extension Racks, each input or output of board has its DataObject of status referenced by index.

For the C264 and its Legacy IED, the LD SYSTEM contains also an LN LLN0 and an empty LN LPHD.

During edition, this LD is named only SYSTEM. Nevertheless during generation of .dm file for the Legacy IEDs, this Logical Device is prefixed by the <IED_name> (e.g. IEDMB1SYSTEM).

One Logical Device CONTROL is created for each MiCOM C264 device. It contains Logical Nodes and DataObjects used for mapping Electrical objects (Substation / Voltage Level / Bays / Module / Datapoints).

One Logical Device PROTECTION is created for a MiCOM C264P that manages Relay Built-in functions.

One Logical Device MEASUREMENT is created for a C264 that manages:

- Measurements computed by a C264 TMU 200 or TMU 210 or TMU220 board
- Measurements linked to an Energy counting function.

2.1.3 Functional naming mode for PACiS servers

The principle of functional naming is to have inside the IEC61850 address definition the description similar to the electrical topology of the substation.

The functional naming uses the electrical topology to name the logical devices and logical nodes. When reading the mapping, the user can know where the dataobject's mapped datapoint is localized in the topology. This attribute is called [SCL name](#).

The functional naming adds a new functional naming ID attribute for substations, voltage levels, bays and modules.

A computer contains one logical device per substation, voltage level or bay it manages.

For a datapoint under a substation, the logical device name is the substation's IEC name.

For a datapoint under voltage level, the logical device name is the substation's IEC name aggregated to the voltage level's IEC name.

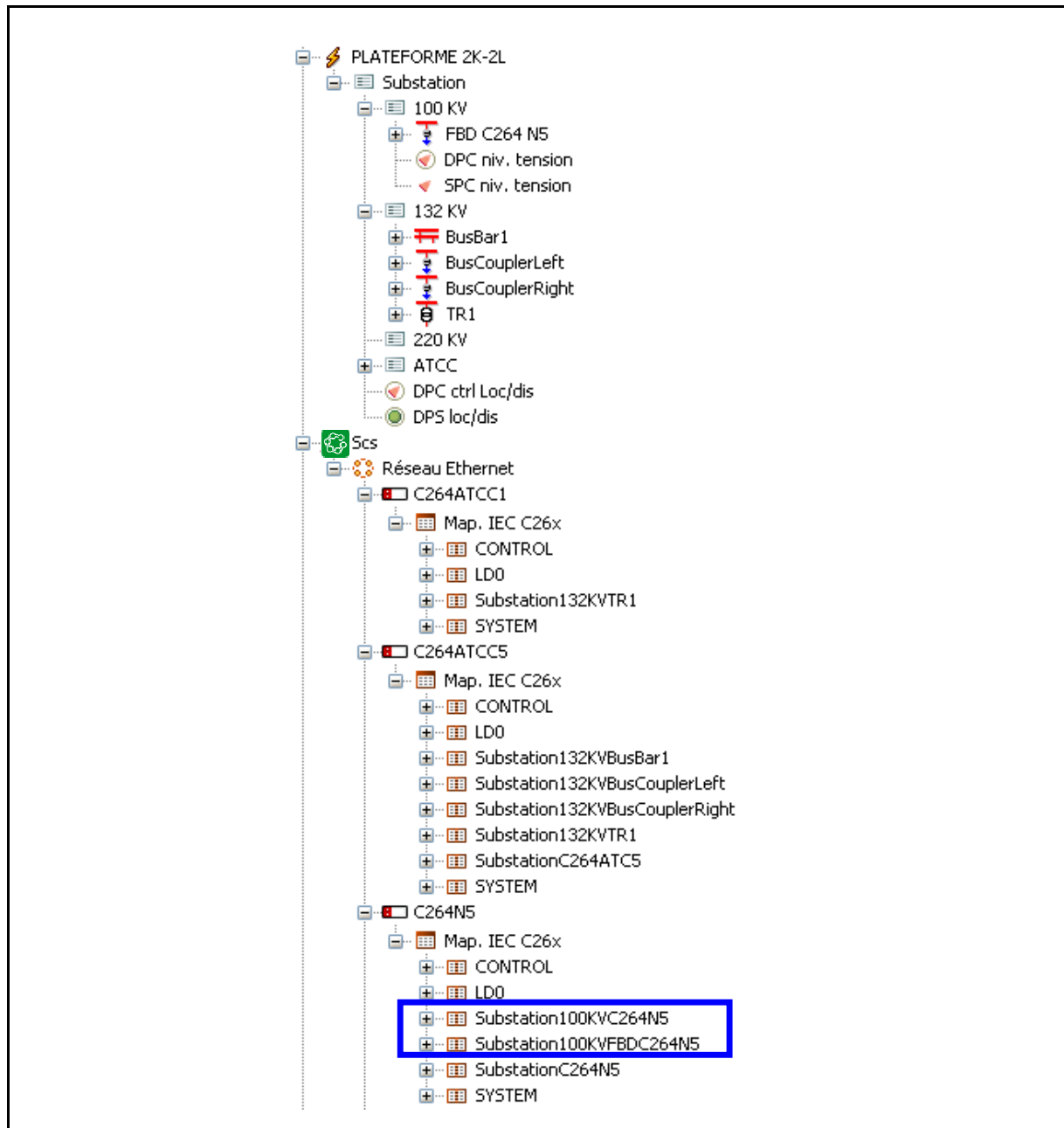
For a datapoint under a bay, the logical device name is the substation's IEC name aggregated to the voltage level's IEC name and the bay's IEC name.

To avoid having the same logical device name under different computers, each logical device which refers a substation or a voltage level will be suffixed by the computer's Ethernet alias.

As for product naming, each system datapoint is under the SYSTEM logical device.

Example:

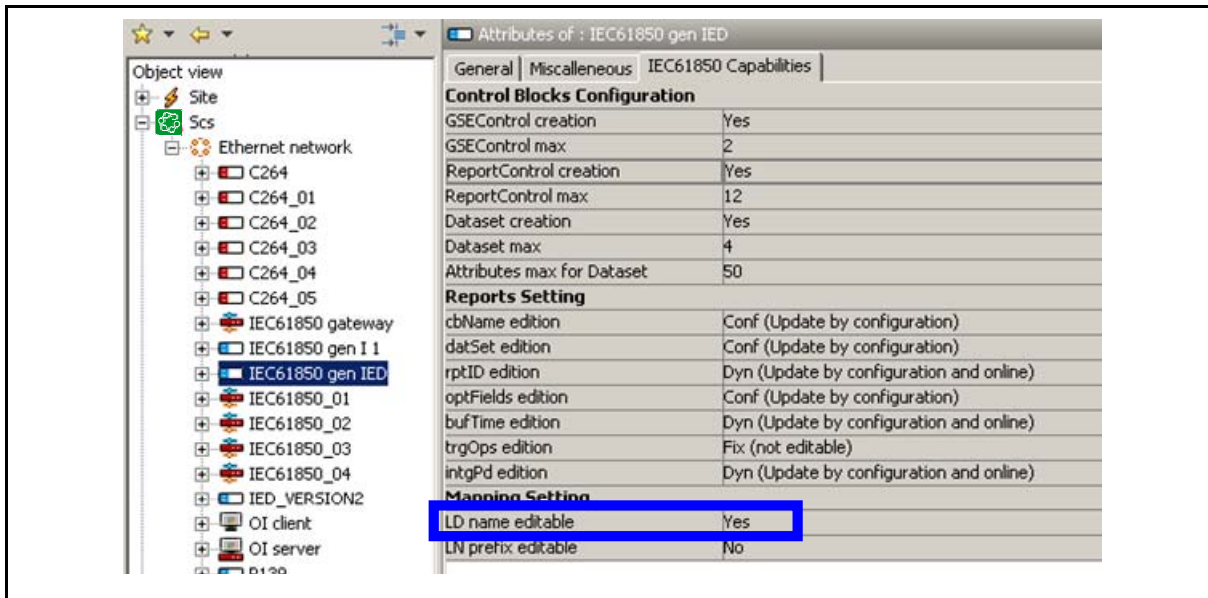
- In this example all IEC names are equal to the short names



- The computer **C264ATCC1** manages the transformer **TR1**.
- The computer **C264ATCC5** manages the bays **BusBar1**, **BusCouplerLeft** and **BusCouplerRight** and is the default computer for the **132 KV** voltage level.
- The computer **C264N5** manages the bay **FBD C264 N5** and is the default computer for the substation and the **100 KV** voltage level.
- The datapoints under **Substation** will have their IEC address under the logical device **SubstationC264N5**. (Aggregation of Substation and C264N5).
- The datapoints under **100 KV** will have their IEC address under the logical device **Substation100KVC264N5**. (Aggregation of Substation, 100KV and C264N5).
- The datapoints under **FBD C264 N5** will have their IEC address under the logical device **Substation100KVFBDC264N5**. (Aggregation of Substation, 100KV and FBDC264N5).

2.1.4 Functional naming mode for Non-PACiS servers

The non-PACiS server logical device can be updated by auto addressing. If IED allows the renaming of the logical device name (attribute LD name editable) then the logical device will be renamed to be coherent with the configured electrical topology. If the renaming is not allowed or if a new logical device name can not be defined from electrical topology, then an error is raised into the trace panel to alert user.



If the attribute **LD name editable** is set to 'No', then the logical device name of the IED is not updated.

If the attribute **LD name editable** is set to 'Yes', then the logical device name of the IED is updated from the electrical topology.

Error cases:

- If two datapoints under different bays are mapped under same logical device, an error is raised and the logical device name is not updated.
- If the IED doesn't allow LD name modification, an error is raised into the trace panel to alert incoherency in the logical device mapping and non-possibility to update the logical device

2.2 Logical Node Rules

2.2.1 Functional naming

All datapoints are under an equipment or a sub-equipment will have equipment and sub-equipment IEC name as prefix for the logical node.

- All Logical Nodes are **suffix**ed by a number: default value is **1**, range is [1..9 999 999]; except for LLN0 and some LNs of LD0.
- A **Logical Node name** must be **unique** in the whole IEC61850 mapping, except LLN0, DBID & LPHD. The uniqueness is done with number suffix (see previous rule).
- One Logical Node SYSTEM/**C26xDIAG** is created for each **C264**.
- One Logical Node SYSTEM/**IEDDIAG** is created for each **C264 Legacy IED**.
- One Logical Node SYSTEM/**TCIDIAG** is created for each **C264 SCADA protocol**.
- An LN SYSTEM/**RDRE** is created for the **Legacy IED** SPS 'disturbance file ready'.
- A Logical Node CONTROL/**GBAY** is created for each bay that is managed by a server and that contains some particular bay datapoints.
- A Logical Node is created for **each module** of bay that is managed by a server:

Bay module	IEC61850 LD and LN
Circuit breaker	CONTROL/CSWI or CONTROL/XCBR
Switchgear	CONTROL/CSWI
Capacitor	CONTROL/ZCAP
Converter	CONTROL/ZCON
Generator	CONTROL/ZGEN
Motor	CONTROL/ZMOT
Transformer	CONTROL/YPTR
Auto-recloser	CONTROL/RREC
Synchro-check	CONTROL/RSYN
ATCC	CONTROL/ATCC
Tap Changer	CONTROL/YLTC
AVR	CONTROL/AVCO

- A logical Node CONTROL/**GAPC** is created for each User function/Slow Automation (ISaGRAF) under the server where the automation runs (relation 'runs on:').
- Some Logical Nodes CONTROL/**GGIO** are created for generic modules. A generic module is a non-typed module. Numerical suffix is used when several GGIO exists. The **number of GGIO is minimized** with the following assertion:
No more 50 ST DataObjects could be defined under the same GGIO.
No more 50 MX DataObjects could be defined under the same GGIO.
No more 50 SP DataObjects could be defined under the same GGIO.
No more 50 CO DataObjects could be defined under the same GGIO.
- A Logical Node CONTROL/**CILO** is created for all xPC datapoints for which **Interlocking datapoints** are defined.
- A Logical Node CONTROL/**RDRE** is created for the **C264** SPS 'disturbance file ready'.

- A Logical Node is created for **each threshold** of bay **relay** function that is managed by a server.

Bay relay built-in function	IEC61850 LD and LN / threshold
[27] Phase undervoltage	PROTECTION/PTUV
[32N] Earth wattmetric	PROTECTION/PDOP
[37] Phase under current	PROTECTION/PTUC
[46] Seq inv overcurrent	PROTECTION/sqPTOC
[49] Thermal overload	PROTECTION/PTTR
[50BF] Breaker failure	PROTECTION/RBRF
[59] Phase overvoltage	PROTECTION/phPTOV
[59N] Earth over voltage	PROTECTION/gndPTOV
[67] Phase dir overcurrent	PROTECTION/phPTOC
[67N] Earth dir overcurrent	PROTECTION/gndPTOC
[81U] Under Frequency	PROTECTION/PTUF
[81O] Over Frequency	PROTECTION/PTOF
[81R] Range Frequency	PROTECTION/PFRC
General Trip	PROTECTION/PTRC
Automation	PROTECTION/GGIO

2.3 DataObject Rules

- **Default dataObject naming rule:** a **dataObject** is created with a **name** and a **common class** under a Functional Component and a Logical Node. This Logical Node represents the parent of the datapoint: a bay, a module, a built-in function or a user function. Logical Node rules are defined in the previous section.

Datapoint could be linked to another datapoint through relation 'has for feedback'.

With SBO or without SBO is the SBO mode value of the datapoint profile.

The column Functional Component indicates the dataobjects created for one datapoint: a dataObject by component. SV components are optional.

The column DataObject Common classes indicates the common class used for each dataObject of datapoint.

SCE Datapoint class	FC	DO default Name	IEC61850 CDC
SPS without associated xPC	ST, SV	Ind	SPS_ST, SPS_SV ACT_ST, ACD_ST ACx_ST_Phs.general, ACx_ST_Phs.phsA, ACx_ST_Phs.phsB, ACx_ST_Phs.phsC, ACx_ST_Phs.neut
SPS with linked xPC without SBO	ST, SV	SPCSO	SPC_Orig_ST, SPS_SV
SPS with linked xPC with SBO	ST, SV	SPCSO	SPC_Orig_ST, SPS_SV
DPS without associated xPC	ST, SV	Ind	DPS_ST, DPS_SV
DPS with linked xPC without SBO	ST, SV	DPCSO	DPC_Orig_ST, DPS_SV
DPS with linked xPC with SBO	ST, SV	DPCSO	DPC_Orig_ST, DPS_SV
MPS (16 states max)	ST, SV	Mod,Beh, Health, AutoRecSt, Intln, ...	INS8_ST, INS_SV (INC_ST) ACD_ST_Phs.dirGeneral, ACD_ST_Phs.dirPhsA, ACD_ST_Phs.dirPhsB, ACD_ST_Phs.dirPhsC, ACD_ST_Phs.neut
MPC (16 states max)	CO	Mod, FanCtl, ...	INC8_Direct, Direct_CF
MV without associated Setpoint	MX, SV, CF	AnIn	MV_MX, MV_SV, MV_CF CMV_MX WYE.phsA, WYE.phsB, WYE.phsC, WYE.neut DELTA.phsAB, DELTA.phsBC, DELTA.phsCA
MV with linked Setpoint	MX, SV, CF	AnIn	APC_Orig_MX, MV_SV, APC_CF
Tap position MV with linked Raise/lower DPC (=BSC)	ST, SV	TapChg	BSC_Orig_ST, BSC_SV

SCE Datapoint class	FC	DO default Name	IEC61850 CDC
Accumulator	ST, CF	Cnt	BCR_ST, BCR_CF
INS Generic integer status without linked INC (operation counter)	ST, SV	OpCnt, FltNum, IntIn, ...	INS_ST (32 bits), INS_SV
INS Generic integer status with linked INC (resetable operation counter)	ST, SV	OpCntRs, ISCSO, ...	INC_Orig_ST (32 bits), INS_SV
INC without SBO Controlable Integer	CO, CF	OpCntRs, ISCSO, ...	INC_Direct, Direct_CF
INC with SBO Controlable Integer	CO, CF	OpCntRs, ISCSO, ...	INC_SBO_Sec, SBO_CF
SPC without SBO	CO, CF	SPCSO	SPCDPC_Direct, SBO_CF
SPC with SBO	CO, CF	SPCSO	SPCDPC_SBO_Sec, SBO_CF
DPC without SBO	CO, CF	DPCSO	SPCDPC_Direct, SBO_CF
DPC with SBO	CO, CF	DPCSO	SPCDPC_SBO_Sec, SBO_CF
Raise/Lower DPC(BSC) for TPI without SBO	CO, CF	TapChg	BSC_Direct, BSC_CF
Raise/Lower DPC(BSC) for TPI with SBO	CO, CF	TapChg	BSC_SBO_Sec, BSC_CF
Analog Setpoint without SBO	CO, CF	APC	APC_Direct, APC_CF
Analog Setpoint with SBO	CO, CF	APC	APC_SBO_Sec, APC_CF

- **Particular dataObject naming rule** is refined for some datapoint. The Logical Node under which the DataObject is created depends of Logical Node rules.

Only common classes different from the default common classes are re-defined in this table. The default common class is done then throw the type of the datapoint and the previous table. The type of datapoint is done by the last part of datapoint mnemonic. For example AR_Status_MPS is an MPS.

Parent	Datapoint mnemonic	Datapoint name	DataObject Name	Specific common classes
Substation	LocRemSubstation	Local/remote DPS	LocSubst	
	LocRemSubstation_DPC	Loc/rem ctrl DPC	LocSubst	
Bay	LocRemBay	Local/remote DPS	Loc	
	LocRemBay_DPC	Loc/rem ctrl DPC	Loc	
	OrderInProgress (SPS)	Order running	OrdRun	SPS_ST
	SBMCBay	SBMC SPS	SBMCDS	
	SBMCBay_SPC	SBMC control SPC	EnaSBMC	
Module	LockModule	Lock SPS	Lock	
	LockModule_SPC	Lock control SPC	Lock	
	OrderInProgress (SPS)	Order running	OrdRun	SPS_ST
Circuit breaker	Select (SPS)	Phys. selection	Sel	
	Switch_DPC_PhA	Switch phA DPC	PosA	
	Switch_DPC_PhB	Switch phB DPC	PosB	
	Switch_DPC_PhC	Switch phC DPC	PosC	
	CBHealthy_SPS	CB Healthy	CBOpCap	
	Switch_SPC	Switch Ctrl SPC	PosSPC	
	Switch_DPC	Switch Ctrl DPC	Pos	
	ComputedSwitchPos_DPS	Comp. swit. pos.	Pos	
Switchgear	Select	Phys. selection	Sel	
	Switch_SPC	Switch Ctrl SPC	Pos	
	Switch_DPC	Switch Ctrl DPC	Pos	
	SwitchPos	Switchgear pos.(DPS)	Pos	
	SwitchPos_SPS	Switchgear pos.	Pos	

Parent	Datapoint mnemonic	Datapoint name	DataObject Name	Specific common classes
Synchrocheck built-in function	CS_AcceptForcing_SPS	Accept forcing	ForcAlw	
	CS_AuthoState_SPS	Possible closing	EnaCls	
	CS_CloseOrderState_SPS	Close order	ClsOpSt	
	CS_CtrlOnOff_DPC	on/off ctrl DPC	Ena	
	CS_CtrlOnOff_SPC	on/off ctrl SPC	Ena	
	CS_Locked_SPS	CS locked	LockSt	
	CS_OnOff_DPS	on/off DPS	Ena	
	CS_OnOff_SPS	on/off SPS	SyncSt	
	CS_VoltageAbsence_SPS	Voltage absence	VAbs	
	CS_VoltagePresence_SPS	Voltage presence	VInd	
	CS_VoltageRefAbsence_SPS	Ref. U absence	VRefAbs	
	CS_VoltageRefPresence_SPS	Ref. U presence	VRefInd	
Autorecloser built-in function	AR_CtrlOnOff_DPC	on/off ctrl DPC	Ena	
	AR_FaultReason_MPS	Autorecloser flt	ARFlt	
	AR_OnOff_DPS	on/off	Ena	
	AR_Status_MPS	Autorecloser st	ARSt	
	Trip_SPS	Trip 3 phases	Trip3P	
	Ctrl3PhaseTrip_SPC	Force trip 3P	Trip3P	
Tap changer built-in function	TAPHigherPos_SPS	Higher position	HiTapPos	
	TAPInProgress_SPS	Tap in progress	TCIP	
	TAPLowerPos_SPS	Lower position	LoTapPos	
	TAPSelect_SPC	TAP Select SPC	TapPos	
	MCBCtrlOpen_SPC	MCB open SPC	OpnMCB	
	SPI	Tap pos ind	TapChg	BSC_ST
	RaiseLower_DPC	Raise/lower DPC	TapChg	BSC_DIRECT BSC_SBO_Sec BSC_CF
Relay built-in function threshold	XX_thresholdY_inst with: XX = function number Y = threshold number	* inst.	Str	ACD_ST

Parent	Datapoint mnemonic	Datapoint name	DataObject Name	Specific common classes
	XX_threshold_Y_mode with: XX = function number Y = threshold number	* mode	Mod	INC_ST, INS_SV
	XX_thresholdY_temp with: XX = function number Y = threshold number	* temp.	Op	ACT_ST
Relay [49] built-in function	49_th_alarm	49 th alarm	AlmThm	ACT_ST
	49_th_overload	49 th overload	Op	ACT_ST
Relay [50] built-in function	50BF_breaker_failure	break fail	OpIn	ACT_ST
ATCC built-in function	ATCC_Alarmed_SPS	ErrorLog	AtcFlt	
	ATCC_BusbarCtrlOnOff_SPC	ATCC on/off ctrl	EnaBus1	
	ATCC_BusbarInhibited_SPS	ATCC inhibited	BusInh1	
	ATCC_BusbarInterTargetRunning_SPS	ATCC to target	TargIP1	
	ATCC_BusbarInvalidModule_SPS	ATCC inv module	BusDvInv1	
	ATCC_BusbarInvalidVoltage_SPS	ATCC inv voltage	BusVInv1	
	ATCC_BusbarMaxTRFReached_SPS	ATCC max transfo	MoreTrf1	
	ATCC_BusbarOnOff_SPS	ATCC on/off	EnaBus1	
	ATCC_BusbarTarget1Running_SPS	ATCC target 1	EnTg1Bus1	
	ATCC_BusbarTarget2Running_SPS	ATCC target 2	EnTg2Bus1	
	ATCC_BusbarTarget3Running_SPS	ATCC target 3	EnTg3Bus1	
	ATCC_BusbarTarget4Running_SPS	ATCC target 4	EnTg4Bus1	
	ATCC_BusbarTarget5Running_SPS	ATCC target 5	EnTg5Bus1	
	ATCC_BusbarVoltage_MV	BusBar voltage	Vbus1	
	ATCC_CtrlClearAlarm_SPC	ATCC clear alarm	ClearFlt	
	ATCC_CtrlOnOff_SPC	ATCC on/off ctrl	Ena	
	ATCC_DBIOVERRIDE_SPS	DBI override	DBIOver	
	ATCC_MCBPos_DPS	MCB position DPS	MCBPos	
	ATCC_MCBPos_SPS	MCB position SPS	MCBPos	
	ATCC_MCBTrip_SPS	MCB trip	MCBTr1	
	ATCC_OnOff_SPS	on/off	Ena	

Parent	Datapoint mnemonic	Datapoint name	DataObject Name	Specific common classes
	ATCC_TAPBadTCIP_SPS	TAP bad TCIP	BadTCIP1	
	ATCC_TAPInvalidTCIP_SPS	TAP invalid	InvPos1	
	ATCC_TAPLongTCIP_SPS	TAP long TCIP	LongTCIP1	
	ATCC_TAPRunAway_SPS	Run away	RunAway	
	ATCC_TXFFaultOnEqptDisc_SPS	ATCC disc eqpt	DcnxTrf1	
	ATCC_TXFFaultOnLocalBay_SPS	ATCC local bay	LocTrf1	
	ATCC_TXFHoming_MPS	ATCC homing	HomTrf1	
	ATCC_TXFHunting_SPS	ATCC hunting	HuntTrf1	
	ATCC_TXFInvalidVoltage_SPS	ATCC inv voltage	Vinv	
	ATCC_TXFLowerActivePower_MV	Second. active P	PTrf1	
	ATCC_TXFLowerCurrent_MV	Second. current	ITrf1	
	ATCC_TXFLowerReactivePower_MV	Second. react. Q	QTrf1	
	ATCC_TXFLowerVoltage_MV	Second. voltage	VTrf1	
	ATCC_TXFOnOff_SPS	ATCC on/off	ModTrf1	
	ATCC_TXFOverCurrent_SPS	ATCC overcurrent	OCTrf1	
	ATCC_TXFOverVoltage_SPS	ATCC overvoltage	OVTrf1	
	ATCC_TXFUnderVoltage_SPS	ATCC low-voltage	UVTrf1	
	ATCC_TargetNotReached_SPS	target unreached	TarNach	
xPC	OpenIntlkSPS	Open intlk SPS	EnaOpn	
	CloseIntlkSPS	Close intlk SPS	EnaCls	

- Particular dataObject naming rule is refined for some datapoints:
 - MV computed by TMU 200, TMU 210 or TMU220,
 - Counter which integrates energy (function energy counter)

For a C264, **only one** Logical Node rmsMMXU, powMMXU, effMMXU and MMTR exists.

Bold columns indicate all IEC61850 objects (LD, LN, FC, DO) for each type of MV/ counter.

Common classes	DataObject Parent path (LD/LN/FC/DO)	DataObject Name	MV type Name	MV type id
WYE_MX, WYE_CF, WYE_SV	MEASUREMENT/rmsMMXU1/MX/phV	phsA	VAN, RMS value of the voltage phase A	0
		phsB	VCN, RMS value of the voltage phase B	1
		phsC	VCN, RMS value of the voltage phase C	2
		neut	Vr, RMS value of voltage	3
DEL_MX, DEL_CF, DEL_SV	MEASUREMENT/rmsMMXU1/MX/PPV	phsAB	VAB, RMS value of the voltage phase AB	4
		phsBC	VBC, RMS value of the voltage phase BC	5
		phsCA	VCA, RMS value of the voltage phase CA	6
WYE_MX, WYE_CF, WYE_SV	MEASUREMENT/rmsMMXU1/MX/A	phsA	IA, RMS value of the current phase A	7
		phsB	IB, RMS value of the current phase B	8
		phsC	IC, RMS value of the current phase C	9
		neut	Ir, RMS value of current	10
MV_MX, MV_CF, MV_SV	MEASUREMENT/rmsMMXU1/MX	Hz	network frequency	36
MV_MX, MV_CF, MV_SV	MEASUREMENT/powMMXU1/MX	TotW	Pt, total active power	26
MV_MX, MV_CF, MV_SV	MEASUREMENT/powMMXU1/MX	TotVar	Qt, total reactive power	27
MV_MX, MV_CF, MV_SV	MEASUREMENT/powMMXU1/MX	TotPF	cos φt: Power factor	29
WYE_MX, WYE_CF, WYE_SV	MEASUREMENT/effMMXU1/MX/A	phsA	mod Ia (ADC)	184
		phsB	mod Ib (ADC)	185
		phsC	mod Ic (ADC)	186
		neut	mod Io (ADC)	187
DEL_MX, DEL_CF, DEL_SV	MEASUREMENT/effMMXU1/MX/PPV	phsAB	mod Vab (ADC)	188
		phsBC	mod Vbc (ADC)	189

Common classes	DataObject Parent path (LD/LN/FC/DO)	DataObject Name	MV type Name	MV type id
		phsCA	mod Vca (ADC)	190

Common classes	DataObject Parent path (LD/LN/FC/DO)	DataObject Name	Counter Name
BCR_ST, BCR_CF	MEASUREMENT/MMTR1/ST	TotWh	Counter which integrates Reactive Energy of a MV
		TotVARh	Counter which integrates Active Energy of a MV
INC_Orig_St, INC_SV	MEASUREMENT/GGIO	OpCntRS	Operating Counter (feedback of Setpoint)
INC_Direct, Direct_CF	MEASUREMENT/GGIO	OpCntRS	Setpoint having as feedback an Operating Counter
INC_ST, INC_SV	MEASUREMENT/GGIO	OpCnt	Operating Counter (alone)

- DataObjects of datapoints linked with 'has for **feedback**' relation have the **same name**: the dataObject name of the xPC.
- **Coupling** between DataObjects linked to the same datapoint is done **by naming**: theses DataObjects located under different Functional Components (SV, CF) have the same name.
- **SV dataObject is optional**. It exists if flag 'enable Force/Subst/Sup' of profile of datapoint is set to 'Yes'.
- Only **no-Spared** datapoints have **taken into account** in auto-addressing. If a datapoint is unspared then an auto-addressing treatment must be done again.
- Some **datapoints are out of scope** of auto-addressing. Theses datapoints are identified by their data model mnemonic and their short name.

Parent	Excluded mnemonic datapoint	Excluded Datapoint name
Module Circuit breaker	SynCheck_Close_DPC	Sync CB close
	SynCheck_Close_SPC	Sync CB close
	Select_SPC	Selection SPC
	Switch_SPC_Ph[A B C]	Switch ph[A B C] SPC
	SwitchPos_SPS_Ph[A B C]	Switch Ph[A B C] pos.
	SwitchPos (DPS)	Switchgear pos.
	SwitchPos_SPS	Switchgear pos.
	PhaseNotTogether_SPS	Ph not together
External automatic synchrocheck built-in function	CS_CtrlOnOff_DPC	on/off ctrl DPC
	CS_CtrlOnOff_SPC	on/off ctrl SPC

Parent	Excluded mnemonic datapoint	Excluded Datapoint name
Relay built-in functions	XX_thresholdY_trip With:XX = function number Y = threshold number	* Trip
	XX_thresholdY_inst_dir_rev With:XX = function number Y = threshold number	* in di rev
	XX_thresholdY_interlock With:XX = function number Y = threshold number	* interlock
Relay [automation] built-in function	start_disturbance	start dist ctrl
Relay [49] built-in function	49_trip_th_overload	49 trip th over.
Relay [67N] built-in function – optional EPATR function	EPATR_DSP_RSE_Mode	EPATR DSP RSE
	EPATR_enable_disable	EPATR.ON.OFF
	EPATR_in_out_service	EPATR.IN.OUT.SER
	EPATR_Tri	EPATR.TRI
	EPATR_State	EPATR.STATE
Electre built-in functions	ElecARS_tccyc1p	bCYC.MONO

Wild char (*) or pseudo regular expression ([A|B|C]) is used to specify several datapoints.

- Some **computed measurements are out of scope** of auto-addressing. Theses MV are identified by their type name and their type id.

MV type name	MV type id
mod Vo (ADC)	307
mod I1 (ADC)	308
mod I2 (ADC)	309
mod V1 (ADC)	310
mod V2 (ADC)	311
thermal status	312

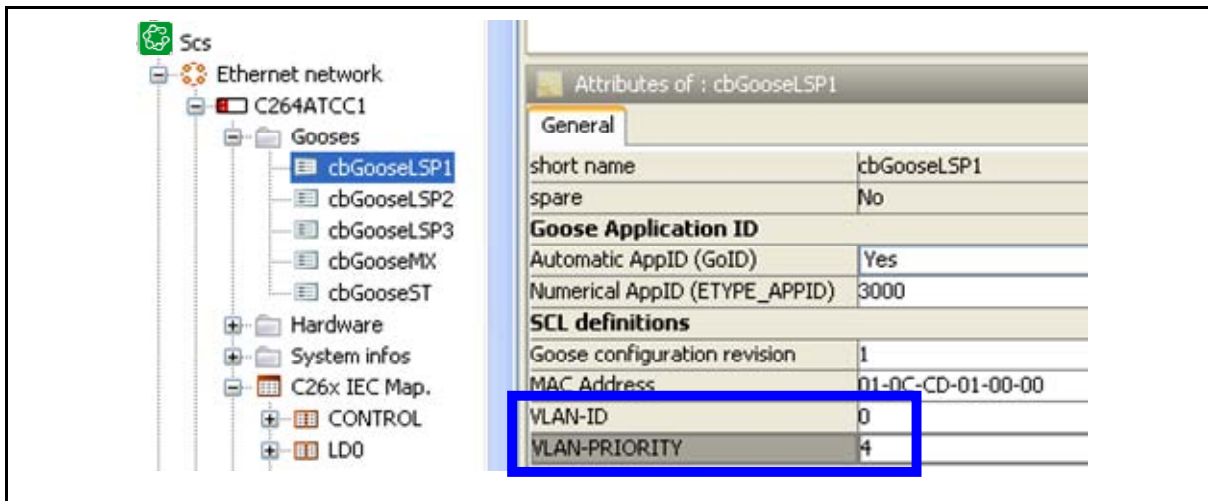
2.4 Goose Rules

2.4.1 GOOSE and VLAN

Each GOOSE Control Block can be separately defined with the SCE under <SCS><EthernetNetwork><Computer><Gooses>Goose element:

Using two attributes:

- “VLAN-ID”
- “VLAN-PRIORITY”



- The default **VLAN-ID** is 0 (range 0x0000 - 0x3FFF)
 - The default **VLAN-PRIORITY** is 4 (range 0 - 7)
- Only **MX** or **ST** DataObjects under Functional Components MX and ST could be goosed.
 - DataObject is transmitted by goose if the linked datapoint is used in a remote automation (FBD, ISaGRAF). Remote means the server of datapoint is not the server of automation.

‘Global Alarm Acknowledgement’ SPS is always transmitted by goose.
 ‘Main status MV’ SPS (FailSt) is always transmitted by goose for redundant C264 (main+backup). IEC61850 comm between a main C264 and its backup uses only goose: the attribute ‘goose usage’ of this relationship client/server is forced to ‘Goose only’.

Automatic Goose transmission flag of a dataObject contains these conditions.

- **Manual Goose transmission flag** of a dataObject is set manually by user. Between two auto-addressing, the value of this flag is kept if the dataObject exists yet.
- DataObject is transmitted by goose if its **Automatic or Manual** Goose transmission flags are true.
- **Capacity of each goose** (one for ST, one for MX) is limited to 1250 bytes.

- For each kind of object, the data transmitted by goose may differ. Here is the list of data leaves transmitted using goose for each kind of DO:

DO	Data leaves
SPS_ST SPC_ST, SPC_Orig_ST DPS_ST DPC_ST, DPC_Orig_ST INS_ST, INS8_ST, INS16_ST INC_ST, INC8_ST, INC16_ST INC_Orig_ST, INC8_Orig_ST, INC16_Orig_ST INCSel_ST	stVal q
ACT_ST ACD_ST	general q
ACT_ST_Ph ACD_ST_Ph	general phsA phsB phsC neut q
BCR_ST	actVal frVal q
BSC_ST, BSC_Orig_ST	valWTr.posVal q
MV_MX	mag.f range q
WYE_MX	phsA.cVal.mag.f phsA.range phsA.q phsB.cVal.mag.f phsB.range phsB.q phsC.cVal.mag.f phsC.range phsC.q neut.cVal.mag.f neut.range neut.q

DO	Data leaves
DEL_MX	phsAB.cVal.mag.f phsAB.range phsAB.q phsBC.cVal.mag.f phsBC.range phsBC.q phsCA.cVal.mag.f phsCA.range phsCA.q
APC_MX, APC_Orig_MX	mxVal.f q
LSP	stVal

2.5 SCE: driving the import process through command lines

The SCE is now delivered with sample scripts and documentation that allow launching silent mode commands such as OPEN, IMPORT, EXPORT, CHECK IN, CHECK OUT, GENERATE, AUTO-ADRESSING, AUTOLINK, SAVE, CLOSE, VALIDATE using an appropriate scripting manager environment.

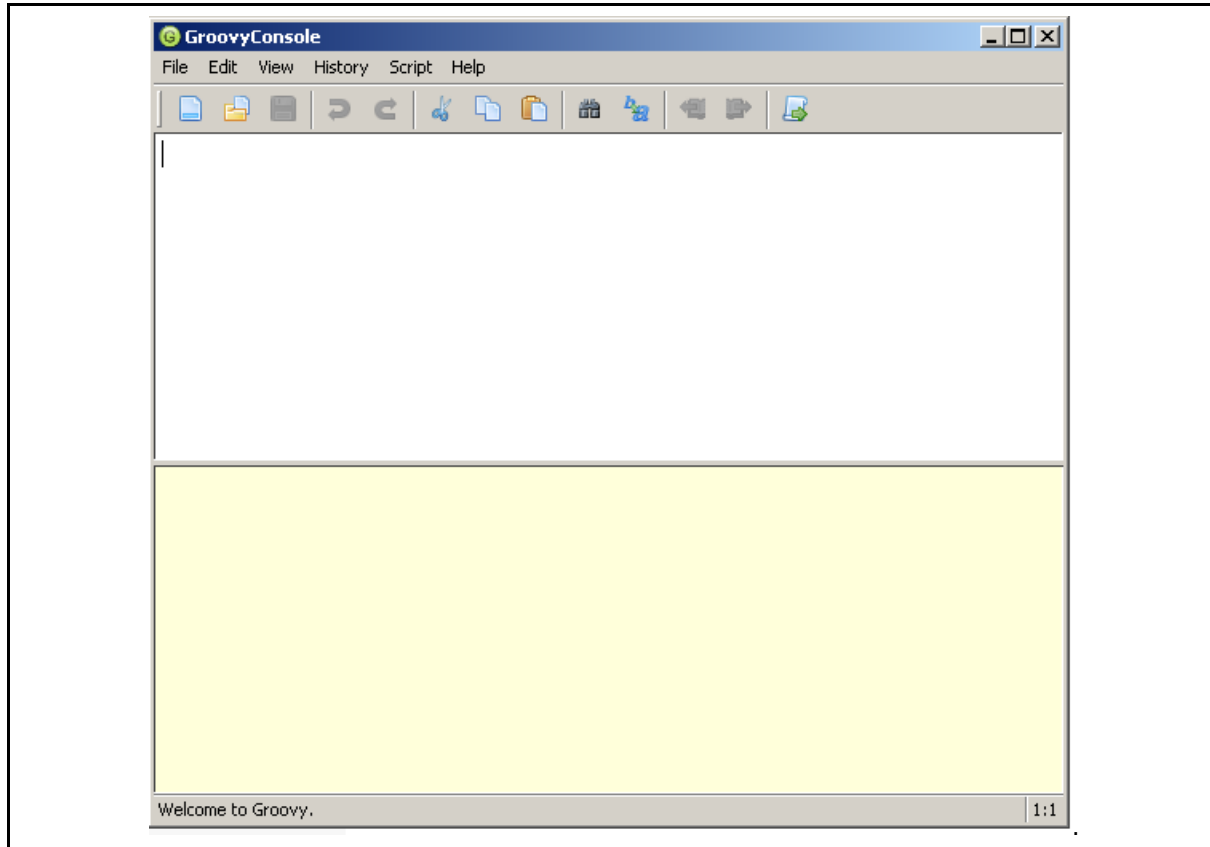
NOTE: For Installation of Groovy Environment, please See **SCE_ENIN_C50**

The SCE Scripting Manager allows processing

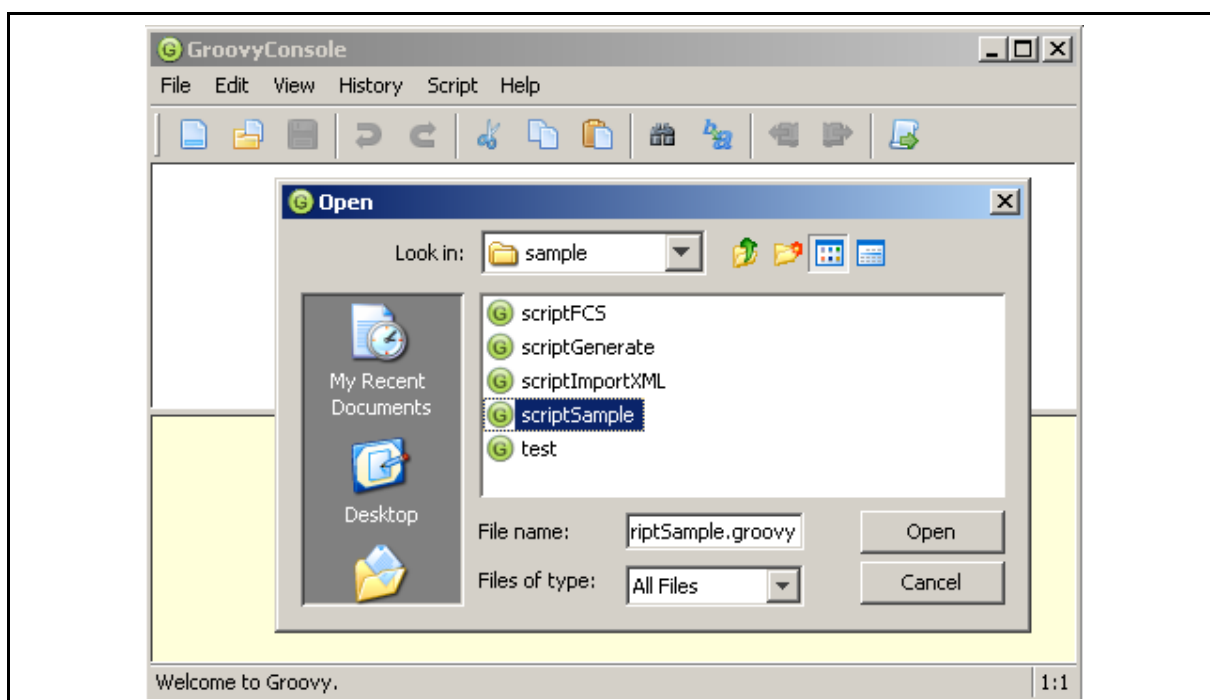
- PACIS data bases
- The *Open a data base* action
- The *Open data base library* action
- The importing an FCS file
- The importing an XML file
- The *Check a data base* action
- The *Auto-addressing a data base* action
- The *Auto-link a data base* action
- The *CheckIn a data base* action
- The *Generate a versioned data base* action
- The *Close a data base* action
- The *Save a data base* action
- The *CheckOut a data base*

Example: Open and generate a standard PACiS db

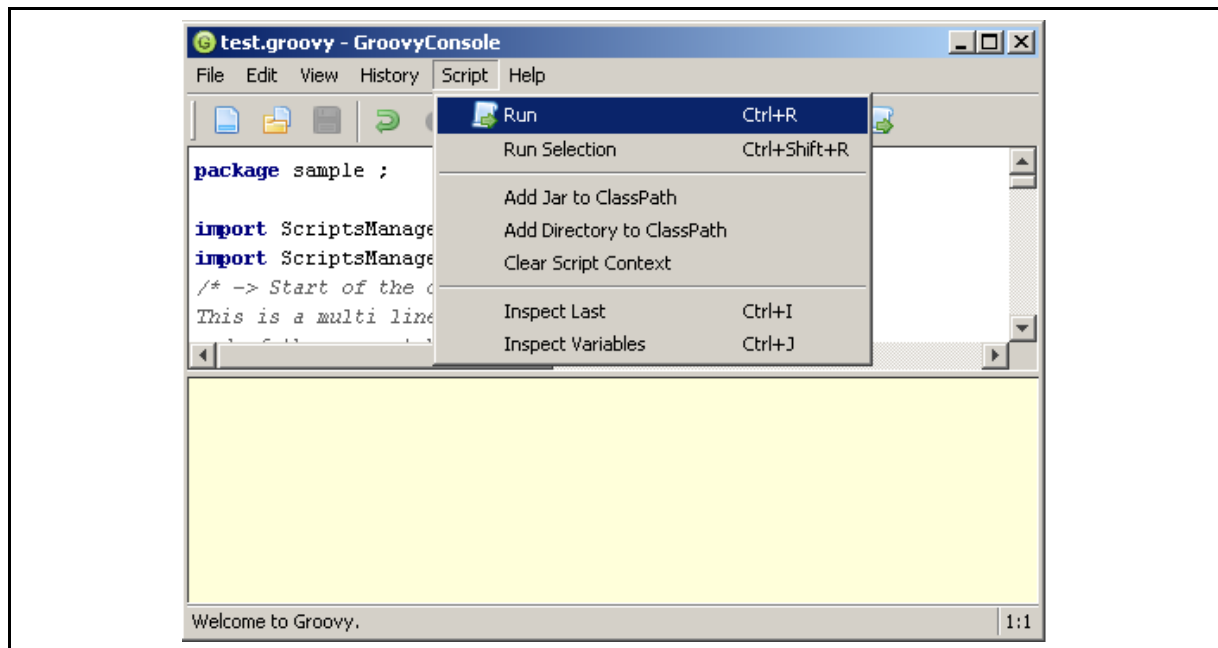
1. Run the batch file
{PACiS_SCE_DIRECTORY}\ScriptsManager\launchGroovy.bat
2. Groovy Console appears as below



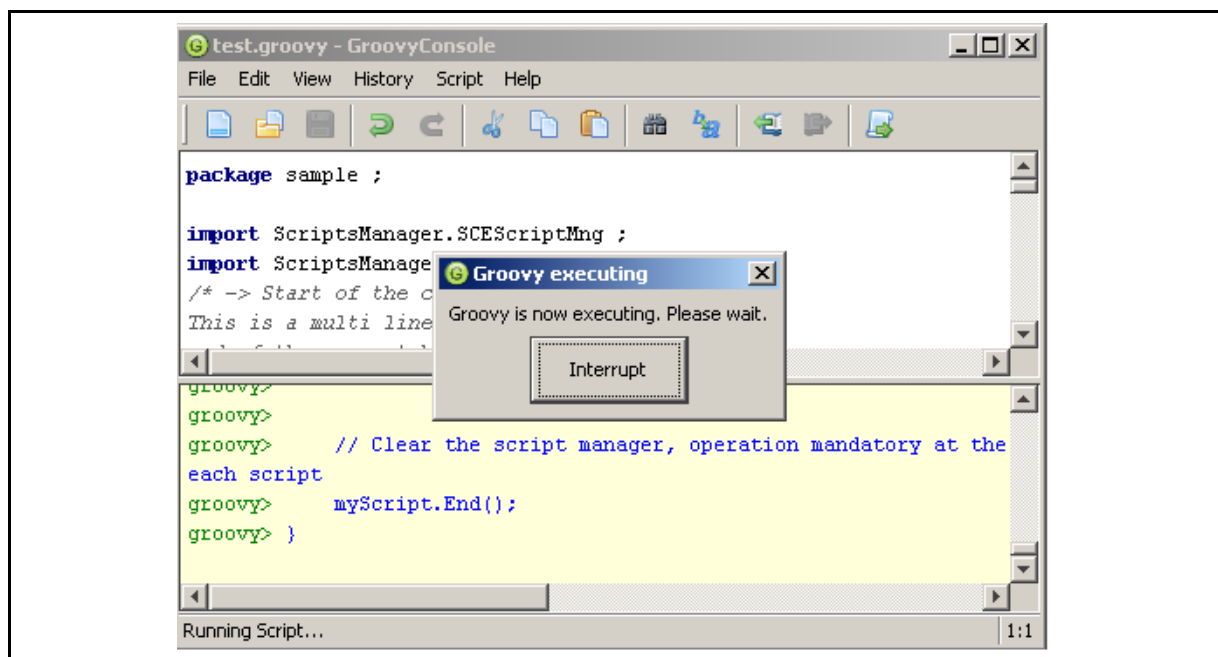
3. Open Groovy script from file menu of the Groovy console



4. Run the Script



5. Groovy will execute the action as per script and it will generate new database.



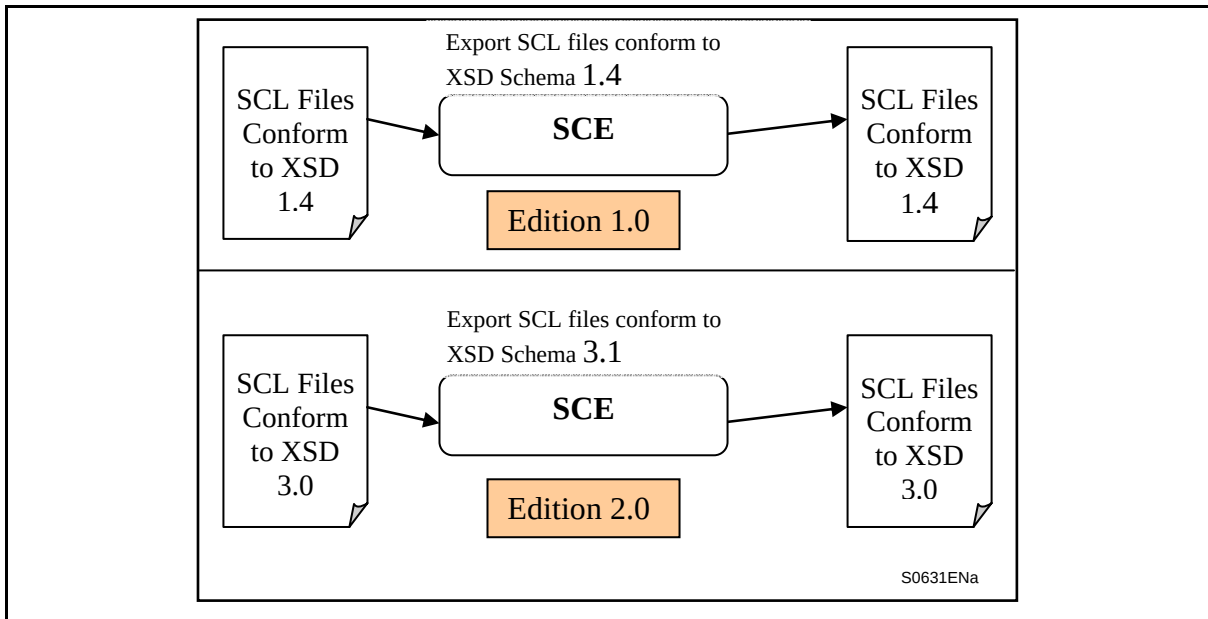
- NOTE:
- If database which is in Read/Write MPC file DB with no errors nor warnings then Groovy return error as:
ERROR_SCE_SCRIPT_MNGR_SAVE_DATABASE_NOT_READ ONLY.
 - If database which is Read Only DB with errors but no warnings then Groovy return error as:
ERROR_SCE_SCRIPT_MNGR_GENERATE_CHECK_ON_ERROR
 - If database which is Read Only DB with errors but no warnings without check then Groovy return error as:
ERROR_SCE_SCRIPT_MNGR_GENERATE ERROR ON_EQUIPMENT

2.6 XSD Version edition 2.0

SCL files are used to exchange IEC61850 Data Model definition from one IEC61850 device to others. The description of the SCL format has changed in the IEC61850 standard edition 2.

SCE can import and export SCL files which are conformed to the new XSD schema edition 2 and the previous edition 1.

An option permits to export with the appropriated format.



WARNING:

- All IEDs configured in the same ring must have the same IEC61850 Edition.
- The Edition 1.0 uses INS8/INC8 class for enumerated status.
- The Edition 2.0 uses new ENS/ENC class.
- The supported XSD for edition 1 is XSD 1.4_Schneider.

3. COUPLING SCE DATA MODEL AND ISAGRAF

3.1 ISaGRAF presentation

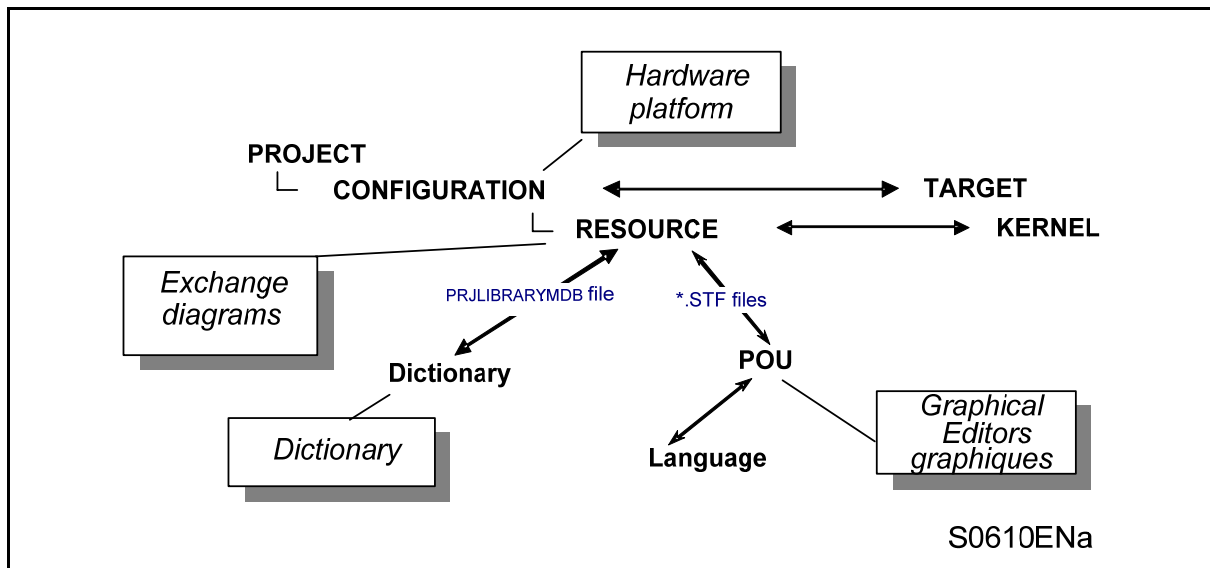
The ISaGRAF workbench 5.21 from ICS Triplex is integrated into the SCE.

3.1.1 ISaGRAF workbench description

- The workbench is used to design and develop distributed process control applications. These applications are organised in projects.
- A project gathers the whole of all program elements and is composed of configurations.
- A configuration is a hardware platform which supports kernels that executes resources. In our version there is only one resource.
- A resource is composed of several units of program (POU). In the current version there is exactly one resource per configuration.
- The POUs (Program Organisation Unit) can be programs, functions or functional blocs. They are described using the IEC1131-3 compliant textual or graphic languages. They are organised on a hierarchical basis architecture.
- The kernel or virtual machine is the real time software that runs the resource code.
- A target is attached to a configuration. It must be installed on a platform that support a multi-task operating system such NT or VxWorks.
- The dictionary includes all the variables (input, output or internal), all the function parameters definitions, all the types (simple or user defined) and all the defined words (constants definition).
- The languages can be either graphic or textual. They are used to describe the Program organisation units (POU). They are compliant with the IEC1131-3 standard.
 - SFC : Sequential Function Chart (grafcet)
 - FBD : Function Block Diagram (functional diagram)
 - LD : Ladder Diagram (Boolean logic based language)
 - ST : Structured Text
 - IL : Instruction List

There is another graphic language in the workbench: FC (*Flow Chart*) outside the standard.

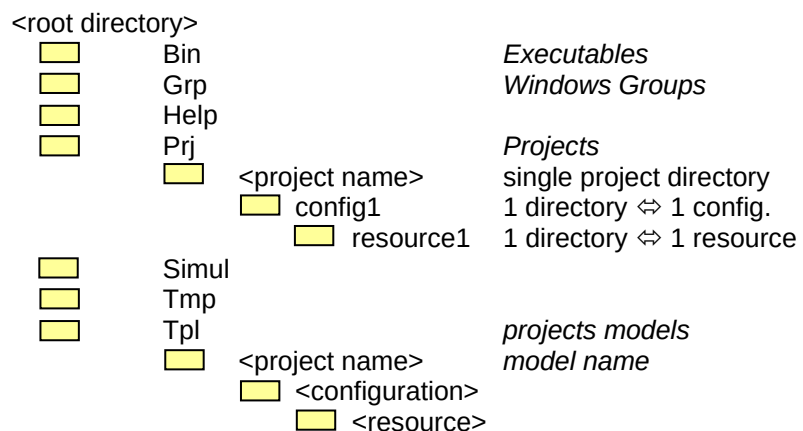
The automatism functions can be designed from any of the graphic or textual languages proposed by ISaGRAF. According to the problem which the automata must solve, a language can be fitter than another. All languages except the SFC can be instantiated, i.e. they can be used for creation of a functional block.



The workbench contains an exchanges diagram (display of the resources and their possible links), a view of material architecture (presentation of the configurations with their resources), the data dictionary and the graphic editors which allow to visualise the POU's (SFC editor, FC editor and multi-language editor for FBD, LD, ST and IT languages).

3.1.2 Directories structure of ISAGRAF

When the workshop is installed, the following directories tree structure is created:



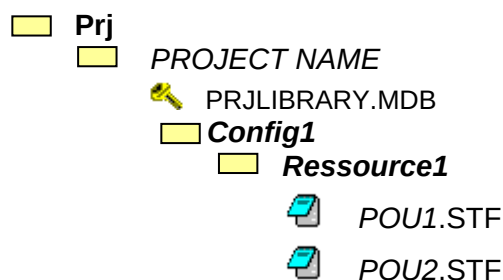
A project is composed of:

- the MS Access database file in the root directory of the project
- the source files of the POU of the resource in the repertory /config1/ressource1

All the data dictionary is saved in the MS Access database file.

The POU files have the STF extension.

When a POU is added into a resource, a STF file is created in the resource folder. It contains the graphic description (elements coordinates in the editor) as well as the algorithms.



ISAGRAF PROJECT STRUCTURE

The compilation of a project produces several files such *.XTC embedding the TIC code. The TIC code is the “interpretable code” of the automation.

3.1.3 Uploaded files towards the target

During upload, the workbench transfers several files to hardware platforms.

The files that are transferred are the following ones:

- Resource (for each resource of that platform):
 - A resource configuration file is downloaded.
Name of that file on workbench = RESOURCENAME_Conf.xtc.
Name of that file (or memory module) on hardware platform = ISPxxx03 (with xxx being resource number in hexadecimal).
 - A file containing resource symbols (variable names and so on) will be downloaded if ‘embed symbol table’ option has been checked in resource properties).
Name of that file on workbench = RESOURCENAME_SymbolsTarget.xtc (this table is complete or reduced according to resource properties option at last compiling).
Name of that file on target = IDSxxx01
- Pou (for each POU of a resource):
 - All POU TIC code files on workbench (file name = ResourceName_POUName_xtc) will be concatenated into a single file.
 - Order for the concatenation is the one given by workbench file ResourceName_DWLOrder.xtc.
 - On hardware platform side, the name of that file will be ISPxxx01.
- Hardware platform:
 - The hardware configuration file is downloaded.
 - On workbench, file is stored in the project configuration directory, (not in a resource directory).
 - The workbench file name is: ConfigName_NetworkConf.xtc.
 - On hardware platform side, the name of that file is ISPffe0d.

Note that this document does not speak about which files are transferred in on-line modification case (ISPxxx15).

Thus, the files must be modified before download to the target:

- RESOURCE1_Conf.xtc must be renamed as ISP00103
- RESOURCE1_SymbolsTarget.xtc must be renamed as IDS00101
- Config1_NetworkConf.xtc must be renamed as ISPffe0d

All POU TIC files will be concatenated in file ISP00101 in the order described the DwlOrder.txt file.

3.2 Usage of SCE datapoints in ISaGRAF

The DataPoints (DP) are defined inside the SCE. They are used by the automation as I/Os. An automation can interact with the system only via these DataPoints.

Any DP used in the code of an automation must be defined beforehand in the SCE.

There are three different kinds of relation between an automation and DataPoints:

- The function owns the DataPoint (hierarchical relation)
- The function is server of the Data Point (server relation)
- The function is client of the Data Point (client relation)

For the interface definition, refer to the computer AP chapter.

3.2.1 Hierarchical relation: Function management DPs

In the electrical tree structure these DPs are defined under the function. The function is the owner of the DP. Examples:

- ON/OFF command of the automation
- functions parameters
- current values and current state of the automation

The function has the following rights on the real time attributes of the DP:

- status (SPS, DPS, MPS, SPC, DPC, SetPoint): read/write
- value (MV, TPI, Counter): read/write
- quality (all DP except SPC, DPC, SetPoint): read/write
- threshold value (MV, Counter): read
- alarm (global alarm status): read

The hierarchical relation implies that the DP can be seen as input as well as output of the function.

3.2.2 Server relation

The DPs are supplied by the function. They are not attached to the tree structure of the function. Their parents are components from the electric tree structure or the system tree structure (bay, module, physical device). The function is charged to update the status/value and quality attributes of these DPs.

Examples:

- DP resulting from a logical or analogic mathematical formula which is implemented by an automation
- synthesis DP (for example a device position)
- commands received and treated by the automation

The function has the following rights on the real time attributes of its supplied DPs:

- status (SPS, DPS, MPS, SPC, DPC, SetPoint): read/write
- value (MV, Counter, TXT): read/write
- quality (all DP except SPC, DPC, SetPoint): read/write
- threshold value (MV, Counter): read
- alarm (global alarm status): read

3.2.3 Client relation

The function is client of the DP. The DP is not attached to the tree structure of the function. Its parent is a component from the electric tree structure or the system tree structure (bay, module, physical device).

The function reads and uses the status/value and quality attributes of the DP.

If the type of the DP is SPC, DPC or SetPoint, the function can also send command requests. In this event, the equipment that manages the DP acknowledges this request, executes the command and updates the status and value attributes.

The command requests include parameters and quality modification. This is done in the same way (acknowledge + attributes updates by the equipment that manages the DP). Thus, the DP is known as controllable. Examples:

- commands sent by an automation toward a device
- devices or bay state influencing the automation execution
- threshold modification request
- forcing, deletion, substitution request
- extended counter driving

The function has the following rights on the real time attributes of the DPs which the function is client of:

- status (SPS, DPS, MPS) read
- status (SPC, DPC, SetPoint): read/control
- value (MV, Counter, TXT): read
- quality (all DP except SPC, DPC, SetPoint): read/control
- threshold value (MV, Counter): read/control
- alarm (global alarm status): read

3.2.4 Access rights summary table

	DataPoint type	Access types	ISaGRAF variables type
The function owns the DP	whatever DP	read/write	input/output
	Threshold, alarm	read	input
The function serves the DP (the function provides values)	whatever DP	read/write	input/output
	Threshold, alarm	read	control
The function is client of the DP (the function reads the values)	SPS, DPS, SPS	read	input
	SPC, DPC, SP	read & control	input/output
	MV	read	input
	COUNTER	read & control	input/output
	Threshold, alarm	read	input

3.2.5 Equivalence of SCE datapoint in ISaGRAF

The DataPoints are represented by variables inside the ISaGRAF projects. The type of these variables is chosen according to the access type to the DataPoint.

The input DPs correspond to read-only variables of a structured type. These structures contain only the DataPoint attribute usable inside the automations (see further).

Within the calculators ISaGRAF kernel, the output DPs are reached by C functions, using an ID. Therefore, the DPs are projected in the ISaGRAF workbench by an integer which represents the address of the DP (its ID). This integer is stored in the equivalences table. In an ISaGRAF project, this table contains some aliases: a name and its value. These aliases must be used in the ISaGRAF programs to identify a variable. The name of an equivalence is made with the name of the variable, plus the suffix ADR. The value of an equivalence is the address of the DP. The final values are set during the compilation of PLC project. An equivalence is added automatically when a datapoint is added from the SCE application. The input/output DPs (read/write access) are represented as input as well as output the workbench.

Relation	Variable name	Defined word (ref_dp)	Signal Flow				
When		PACiS DP type→	xPS	MV	Counter	xPC	SP
ISaGRAF "is client of" DP	<prefix>_in_XX	<prefix>_in_XX_ADR	Kernel→ISaGRAF			ISaGRAF→Kernel	
DP belongs to ISaGRAF UserFctDP	<prefix>_in_out_XX	<prefix>_in_out_X X_ADR	ISaGRAF→Kernel			Kernel→ISaGRAF	
DP "is managed" by ISaGRAF	<prefix>_in_out_XX	<prefix>_in_out_X X_ADR	ISaGRAF→Kernel			Kernel→ISaGRAF	

<prefix>: optional free text given by the user in SCE

XX: incremented number fixed by the SCE

All "DP variables" have unique Ids stored in the equivalences table. The I/O symbols of the ISaGRAF workbench must correspond to the configuration DPs of the SCE. They must be unique, easily recognisable to facilitate the programming in the workbench but they must be short enough not to weigh down the diagrams and the POU's texts either.

To give a name to the variables inside the ISaGRAF projects, consider that:

- ⇒ The name must be unique
- ⇒ ISaGRAF is not case sensitive
- ⇒ The maximum length of name is 128 characters
- ⇒ The first character must be a letter
- ⇒ The following characters must be either a letter, a digit or an underscore

So the identifier of I/O symbols is made by concatenation of a prefix given by the user, a prefix automatically given by the SCE (in, out, in_out) and an identifier number.

In the workbench, the user will have an alias made up of the short names of the bay, module and DataPoint in the form bay_module_datapoint. The used short name language will be the one which is declared as "automata language", i.e. one of the 4 basic languages: English, French Spanish or German. Complete identifier SCE appears in the data dictionary of the workbench inside the comment field. The dictionary is provided through the menu Workbenches > ISaGRAF Edit and the icon Parchment.

The "DP variables" are located in different groups according to their type and relation to the function. These groups are not created to prevent the user from adding variables to them.

In SCE, the address is stored as an attribute of the link between the function and the DP. This attribute is updated during the fusion of the functions projects towards the PLC project and the equivalence table is updated with the new values of the variables addresses.

3.2.6 ISaGRAF dictionary data structure

SCE	ISaGRAF		Usable
Status	Status	<i>DINT</i>	x
Quality	Quality	<i>DINT</i>	x
GlobalAlarmStatus	Alarm	<i>SINT</i>	

An xPS has all these fields, an xPC or SP has no Quality.

To improve ISaGRAF applications source code readability and maintainability, a set of Defined words is also defined for each type of DP in the project template used by the SCE. The status words are prefixed with the DP type:

ISaGRAF type	PACiS type	Status field	Value																
xPS: <table><tr><th>Quality field</th><th>Value</th></tr><tr><td>VALID</td><td>0</td></tr><tr><td>SELFHECK_FAULTY</td><td>1</td></tr><tr><td>UNKNOWN</td><td>2</td></tr><tr><td>FORCED</td><td>4</td></tr><tr><td>SUPPRESSED</td><td>8</td></tr><tr><td>SUBSTITUTED</td><td>16</td></tr><tr><td>TOGGLING</td><td>32</td></tr></table> When the field Quality is different of VALID, the Status field has no meaning	Quality field	Value	VALID	0	SELFHECK_FAULTY	1	UNKNOWN	2	FORCED	4	SUPPRESSED	8	SUBSTITUTED	16	TOGGLING	32	SPS	SPS_RESET SPS_FORCED_RESET SPS_SUBSTITUTED_RESET	1
	Quality field	Value																	
	VALID	0																	
	SELFHECK_FAULTY	1																	
	UNKNOWN	2																	
	FORCED	4																	
	SUPPRESSED	8																	
	SUBSTITUTED	16																	
	TOGGLING	32																	
	DPS	SPS_SET SPS_FORCED_SET SPS_SUBSTITUTED_SET	2																
		DPS_MOTION00	3																
		DPS_OPEN DPS_FORCED_OPEN DPS_SUBSTITUTED_OPEN	4																
		DPS_CLOSED DPS_FORCED_CLOSED DPS_SUBSTITUTED_CLOSED	5																
	MPS	DPS_UNDEFINED=SELFHECK_FAULTY	6																
MPS_STATE1 MPS_FORCED_STATE1 MPS_SUBSTITUTED_STATE1		ANY 1 ...16 0...15 (comp.)																	
xPC	SPC	SPC_OFF	0																
		SPC_ON	1																
		SPC_SELECT_OFF	2																
		SPC_SELECT_ON	3																
		SPC_SELECT_RAISE	4																
		SPC_SELECT_LOWER	5																
		SPC_RAISE	6																
		SPC_LOWER	7																
	DPC	DPC_OFF	0																
		DPC_ON	1																
		DPC_SELECT_OFF	2																
		DPC_SELECT_ON	3																
		DPC_SELECT_RAISE	4																
		DPC_SELECT_LOWER	5																
		DPC_RAISE	6																
		DPC_LOWER	7																
	SP																		

SCE for MV and TPI	IsaGRAF		Usable
Value	Value	REAL	x
HHHThresholdValue	Threshold_hhh	REAL	x
HHThresholdValue	Threshold_hh	REAL	x
HthresholdValue	Threshold_h	REAL	x
LthresholdValue	Threshold_l	REAL	x
LLThresholdValue	Threshold_ll	REAL	x
LLLThresholdValue	Threshold_III	REAL	x
Quality	Quality	DINT	x
GlobalAlarmStatus	Alarm	SINT	

SCE for Counter	IsaGRAF		Usable
Value	Value	REAL	x
FrozenCumulativeValue	FrozenCValue	REAL	
HHHThresholdValue	Threshold_hhh	REAL	
HHThresholdValue	Threshold_hh	REAL	
HthresholdValue	Threshold_h	REAL	
LthresholdValue	Threshold_l	REAL	
LLThresholdValue	Threshold_ll	REAL	
LLLThresholdValue	Threshold_III	REAL	
Quality	Quality	DINT	x
GlobalAlarmStatus	Alarm	SINT	

MV	MV, TPI	VALID	0
		SELF CHECK FAULTY	1
		UNKNOWN	2
		FORCED	4
		SUPPRESSED	8
		SUBSTITUTE	16
		SATURATED	64
		UNDEFINED	128
		OPEN CIRCUIT	256
		L_THRESHOLDVIOLATION	512
		LL_THRESHOLDVIOLATION	1024
		LLL_THRESHOLDVIOLATION	2048
		H_THRESHOLDVIOLATION	4096
		HH_THRESHOLDVIOLATION	8192
		HHH_THRESHOLDVIOLATION	16834

Counter	Counter	VALID	0
		SELF CHECK FAULTY	1
		UNKNOWN	2
		OVER RANGE	64
		UNDEFINED	128

One value is possible at a time (e.g.: cannot be FORCED and THRESHOLDVIOLATION). Thresholds have low priority: they are signaled only when the quality is VALID.

3.2.7 Kernel Interface API

This part details API available to the system engineer while designing the ISaGRAF application to exchange data and commands with the kernel. 2 mechanisms are used:

Direct access to the dictionary when DP is of type xPS, MV, Counter:

Flow	Role	Description
Kernel→ISaGRAF	Reading xPS/MV	At the cycle end, if an event has been received for the DP since the previous cycle, the new value is copied into the ISaGRAF variable. Only one event is extracted for a given DP at each cycle; the execution starts when all DPs for which an event has been received have been updated
ISaGRAF→Kernel	Writing xPS/MV	The IEC1131 application writes in the DP structure. The ISaGRAF output hook checks for variables that have changed during the cycle, and sends corresponding messages to kernel. For MV: to avoid sending messages for very small changes in the value (lower than a deadband), some parameters are associated by the SCE, and sent in isa.bin

Explicit call for functions from the ISaGRAF application to read or write a DP:

- Receiving commands from outside (via kernel) for DP using the relation "User Function DP":

Functions group 1	Used when
Wait_Binary_Order	ISaGRAF module must wait to the execution of an order on a SPC or a DPC
Wait_Digital_Order	ISaGRAF module must wait to the execution of an order on a setpoint.
Send_Ack_Order	PLC manages a datapoint feedback of an expected command (Wait_xxx_Order). It permits to acknowledge the received order

- Sending commands to outside (via kernel) for DP using the relation "is client" or "manages":

Function group 2	Usable for which DP
Send_Binary_Order	• SPC, DPC, • Select part of an SBO on AO
Send_Digital_Order	AO datapoint and Setpoint The select of SBO is done using Send_Binary_Order function.
Send_Quality_Order	Allows the FSS and relates to xPS, MV, COUNTER datapoints
Wait_Ack_Order	ISaGRAF module must wait for the acknowledgement of one of its order (Send_xxx_order)

- Sending other datapoints to outside (via kernel):

Set_xPS, Set_MV and Set_LSP (Load Shedding Priority) are used by the ISaGRAF module to modify all the attributes of, respectively, the xPS, MV, LSP, that it manages.

It allows transmitting the corresponding attributes to the computer that holds the runtime.

Set_xPS, Set_MV are for DP using the relation "User Function DP".

Set_LSP is for DP using the relation "is client" or "manages".

- Is_Connected_To is used to know if two nodes are connected.

Functions general use:

Flow	Function	Description
Kernel→ISaGRAF	Group 1 Is_Connected_To	The command received by the kernel remains in the stack until the ISaGRAF application explicitly reads and acknowledges it
ISaGRAF→Kernel	Group 2	Sending commands
	Set_xxx	Writing outputs

3.2.8 Prototype and usage of PACiS function for ISaGRAF

IMPORTANT:

- All the following described functions must never be called in ISaGRAF SFC transitions but only in actions.
- When an action calls the function Wait_Ack_Order, the subsequent transition must at least test the TRUE value of the function return code (indicating that control has been well received)

3.2.8.1 Send_Binary_Order

This function concerns the following DP used in 'is client of' or 'manages' relations:

- SPC, DPC
- Select part for SBO on SetPoint

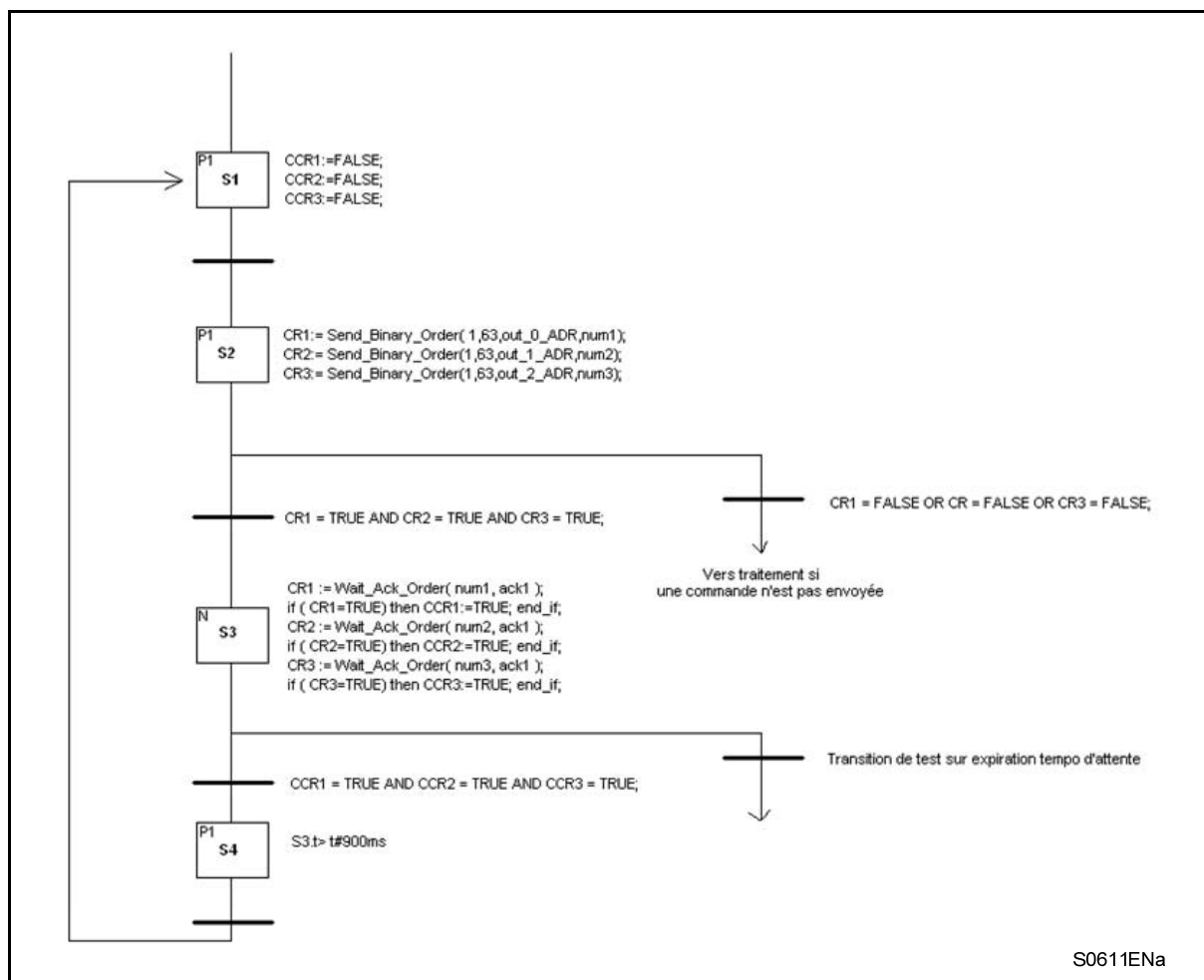
Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Order	Order	Parameter	Input	Char (SINT)	0 : OFF / OPEN 1 : ON / CLOSE 4 : SELECT OFF / OPEN or SELECT Setpoint 5 : SELECT ON / CLOSE
Bypass	Forcing (unused if Order=SELECT)	Parameter	Input	Long (DINT)	Masks : 1 = Interlock bypass 2 = Locking bypass 4 = Mode bypass 8 = Uniqueness bypass 16 = Automation bypass 32 = Synchrocheck bypass Several masks can be set simultaneously
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)
Ref_cmd	Command Identifier	Parameter	Output	Long (DINT)	Use a local variable

Prototype C:

unsigned char Send_Binary_Order(char Order, long Bypass, long Ref_DP, long Ref_Cmd)

The state of this function is FALSE if the number of controls in progress is larger than NB_MAX_ISA_CONTROL (typical value: 1000).

The function Send_Binary_Order must be into a P1 step (run only one time) as illustrated in the Grafcet that follows:



3.2.8.2 Send_Digital_Order

This function concerns SetPoints used in 'is client of' or 'manages' relations.

Select for SBO is done via function Send_Binary_Order.

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Order	Value order	Parameter	Input	Float (REAL)	
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)
Ref_cmd	Identifier of the command	Parameter	Output	Long (DINT)	Use a local variable

Prototype C:

Unsigned char Send_Digital_Order(float Order, long Ref_DP, long Ref_cmd)

The state of this function is FALSE if the number of controls in progress is larger than NB_MAX_ISA_CONTROL (typical value: 1000).

The function must be into a P0/P1 step.

3.2.8.3 Send_Quality_Order

This function concerns SPS, DPS, MPS, MV, TPI, COUNTER used in 'is client of' or 'manages' relations for Forcing/Suppression/Substitution functionality.

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Quality	Asked quality	Parameter	Input	Char (SINT)	1 : FORCING 2 : SUBSTITUTING 3 : UNFORCING 4 : UNSUBSTITUTING 5 : SUPPRESSING 6 : UNSUPPRESSING
Binary_Value	Forcing or substitution value for SPS, DPS, MPS	Parameter	Input	Char (SINT)	<u>SPS</u> 1 : RESET 2 : SET <u>DPS</u> 3 : JAMMED 4 : OPEN 5 : CLOSE <u>MPS</u> 7 : STATE1 8 : STATE2 9 : STATE3 10 : STATE4 11 : STATE5 12 : STATE6 13 : STATE7 14 : STATE8 15 : STATE9 16 : STATE10 17 : STATE11 18 : STATE12 19 : STATE13 20 : STATE14 21 : STATE15 22 : STATE16
Digital_Value	Forcing or substitution value for MV, TPI, COUNTER	Parameter	Input	Float (REAL)	
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)
Ref_cmd	Identifier of the command	Parameter	Output	Long (DINT)	Use a local variable

Prototype C:

*unsigned char Send_Quality_Order(char Quality, char Binary_Value, float Digital_Value,
long Ref_DP, long Ref_cmd)*

3.2.8.4 Send_Ack_Order

This function is used when the automatism manages a DP to answer a awaited command (Wait_xxx_Order). It allows acknowledgement of received order. It is only used for "User Function DP".

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)
Order	Order of the run command	Parameter	Input	Char (SINT)	0 : ORDER_OFF / ORDER_OPEN 1 : ORDER_ON / ORDER_CLOSE 4 : SELECT OFF / OPEN or SELECT Setpoint 5 : SELECT ON / CLOSE
Value	Digital order value	Parameter	Input	Float (REAL)	
Ack_code	Acknowledgement code	Parameter	Input	Long (DINT)	See hereafter

Prototype C:

unsigned char Send_Ack_Order(long Ref_DP, char Order, real Value, long Ack_code)

Available acknowledgement codes

0. ACK_OK - positive acknowledgement
1. INCOHERENT_REQUEST - incoherent command
2. MICOM C264 COMPUTER_NOT_READY - command when MiCOM C264 is initializing
3. BAY_SUBST_MODE_FAULT - error on substation or bay Local/remote mode
4. CONTROL_MODE_FAULT - command when MiCOM C264 is in maintenance or faulty
5. DEVICE_LOCKED - locked device
6. REQUEST_IN_PROGRESS - command in progress for the device or reception of a command during delay of forbidden command (inter-control delay)
7. INTERLOCK_NOK - refused by interlock
8. DEVICE_ALREADY_IN_POS - command similar to device current state
9. HW_FAULT - DO board fault
10. POS_INVALID - invalid position of device
11. TIMEOUT_FAILED - time-out between selection & execution or time-out in IED answer
12. AUTOMATION_RUNNING - device locked by relevant AutoManu information
13. DEVICE_ALREADY_SELECTED - reception of a selection request as device is still selected
14. DEVICE_NOT_SELECTABLE - reception of a selection request as device is Direct Execute
15. UNIQUENESS_INCOHERENCY - failure in command uniqueness
16. NO_SELECTED - reception of a execution demand as device is not yet selected
17. OPERATOR_CANCEL - cancel operator

18. EXTERNAL_FAULT - time-out on feedback
19. ACK_FAILED_ORDER - acknowledgement failed
20. ACK_BAD_TCIP - time-out waiting presence of TCIP SPS
21. ACK_TCIP_TOO_LONG - time-out waiting OFF state of TCIP information
22. ACK_BAD_TAP - bad tap position following a command
23. ACK_MIN_TAP - reception of order "lower" as TPI is on Min value
24. ACK_MAX_TAP - reception of order "raise" as TPI is on Max value
25. DEVICE_FAILED_TO_OPERATE - command towards disconnected IED
26. SYNCHRO_NOK – command refused by synchrocheck
27. GLOBAL_ATCC_OFF - ATCC stopped.
28. TOO_MANY_TRANSFORMER
29. INVALID_TOPOLOGY
30. INVALID_TPI
31. TRANSFORMER_BAY_DISCONNECTED
32. MCB_TRIP
33. INVALID_TRANSFORMER_VOLTAGE
34. INVALID_BUSBAR_VOLTAGE
35. PARAMETER_CHANGE_IN_EXECUTION - IEC61850
36. ELECT_FAILED
37. ICT_OPEN

3.2.8.5 Wait_Binary_Order

This function is used when the ISaGRAF module must wait for an execution order relevant to SPC or DPC. It is only used for "User Function DP".

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Order	Order	Parameter	Output	Char (SINT)	0 : OFF / OPEN 1 : ON / CLOSE
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint(<var>_ADR)

Prototype C:

Unsigned char Wait_Binary_Order(char Order, long Ref_DP)

If the order has a SBO type, the Select will be computed outside ISaGRAF (so Select can only be soft). A Wait_Binary_Order must be followed by a Send_Ack_Order.

Return code:

The returned value is FALSE when no order is received for this DP. When an order is received by the kernel, the return code is TRUE for the first call after the order receipt. The order is then un-stacked from the kernel, and the order value is returned by the function to the ISaGRAF application in the parameter "Order".

An input parameter can be used as a function output value.

3.2.8.6 Wait_Digital_Order

This function is used when the ISaGRAF module must wait for an execution order relevant to SetPoint. It is only used for "User Function DP".

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Order	Order	Parameter	Output	Float (REAL)	
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)

Prototype C:

Unsigned char Wait_Digital_Order(float Order, long Ref_DP)

If the order is of SBO type, the Select is computed out of ISaGRAF (so Select must be soft).

A Wait_Digital_Order must be followed by a Send_Ack_Order.

3.2.8.7 Wait_Ack_Order

This function is used when the ISaGRAF module is waiting for an acknowledgement of one of its commands (Send_xxx_order). It concerns the DP used in 'in client' or 'manages' relation.

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
Ref_cmd	Command reference on which acknowledgement is awaited	Parameter	Input	Long (DINT)	Use the variable associated to Ref_cmd used in the function Send_xxx_order
Ack_code	Acknowledgement code	Parameter	Sortie	Long (DINT)	Cf. Send_Ack_Order

Prototype C:

Unsigned char Wait_Ack_Order(long Ref_cmd, long Ack_code)

It's possible to have several Wait_Ack_Order (10 at maximum) in the same step, under the condition to get back the return value in an intermediary variable. Once the acknowledgement is returned, the reference of the control is suppressed and doesn't exist any more, so every new call of this function sends the FALSE return value.

The function Wait_Ack_Order must be into an N step (run every cycle). See the preceding Grafcet.

3.2.8.8 Set_xPS

This function is used to give to the host equipment the SPS, DPS, MPS whose all attributes can be updated by ISaGRAF module. This function uses "User Function DP".

Name	Comment	Parameter/ return code	Access	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
DP_value	DP to update	Parameter	Input	Struct_xPS { long Status (DINT); long Quality (DINT); char Alarm (SINT); }	Status field: SPS : 1 : Reset 2 : Set DPS : 3 : Jammed 4 : Open 5 : Close 6 : Undefined MPS : 7 : State1 8 : State2 9 : State3 10 : State4 11 : State5 12 : State6 13 : State7 14 : State8 15 : State9 16 : State10 17 : State11 18 : State12 19 : State13 20 : State14 21 : State15 22 : State16 Quality field: 0 : VALID 1 : INVALID Alarm field: (not significant)
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)

Prototype C:

Unsigned char Set_xPS(struct_xPS DP_Value, long Ref_DP)

For DPS managed through Set_xPS function, the non-complementarity delays (00 and 11) must be set to 0 in configuration.

3.2.8.9 Set_MV

This function is used to give to the host equipment the MV whose all attributes can be updated by ISaGRAF module. This function uses "User Function DP".

Name	Comment	Parameter/ return code	Acces	C Type (IEC Type)	Available values
		Return code	Output	Unsigned char (BOOL)	FALSE : KO TRUE : OK
DP_value	DP to update	Parameter	Input	Struct_MV { float Value (REAL); float Threshold_hhh (REAL) ; float Threshold_hh (REAL) ; float Threshold_h (REAL) ; float Threshold_I (REAL) ; float Threshold_II (REAL) ; float Threshold_III (REAL) ; long Quality (DINT); char Alarm (SINT); }	Value field: any real value compatible with configuration data of the DP Quality field: 0 : VALID 1 : INVALID Threshold_xxx & Alarm fields: (not significant)
Ref_DP	Internal reference of the DP in host equipment	Parameter	Input	Long (DINT)	Use equivalent word linked to the datapoint (<var>_ADR)

Prototype C:

```
Unsigned char Set_MV(struct_xMV DP_Value, long Ref_DP)
```


GLOSSARY

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1. SCOPE OF THE DOCUMENT

This document is the last chapter of each PACiS documentation. It is the glossary.

2. GLOSSARY

AC	Alternating Current
AccI	Accumulator Input
ACSI	Abstract Communication Service Interface Mapping from the standard IEC 61850 abstract specification of communication service to a concrete communication infrastructure based on CORBA.
A/D	Analog/Digital
ADC	Analog to Digital Converter
AE qualifier	Application Entity qualifier Used internally by IEC 61850 to identify a server application
AI	Analog Input (Measurement Value including state attribute) Commonly Voltage or current DC signals delivered by transducers, and representing an external value (refer to CT/VT for AC).
AIS	Air Insulated Substation
AIU	Analog Input Unit (C264 Bay Computer board name for DC Analog Input)
Alarm	An alarm is any event tagged as an alarm during the configuration phase
AO	Analog Output Value corresponding to a desired output current applied to a DAC.
AOU	Analog Output Unit (C264 Bay Computer board name for Analog Output)
API	Application Programming Interfaces
AR	Auto-Reclose
ARS	Auto-Recloser
ASCII	American Standard Code for Information Interchange
ASDU	Application Specific Data Unit Name given in the OSI protocol for applicable data (T103, T101..)
ASE	Applied System Engineering
ATCC	Automatic Tap Change Control Automation in charge of secondary voltage regulation, more specific than AVR
AVR	Automatic Voltage Regulator Automatic system used to regulate the secondary voltage by automatic tap changer control (see ATCC). Set of features can be added, see chapter C264 FT.
Bay	Set of LV, MV or HV equipment (switchgears and transformers) and devices (Protective, Measurement...) usually encompassing a Circuit Breaker and ancillary devices, and controlled by a bay computer.
BCD	Binary Coded Decimal One C264 supported coding on a set of Digital Inputs, that determine a Digital Measurement, then a Measurement value (with specific invalid code when coding is not valid). Each decimal digit is coded by 4 binary digits.
BCP	Bay Control Point Name given to the device or part used to control a bay. It can be Mosaic Panel, C264 LCD, usually associated with Remote/Local control.
BCU	Bay Control Unit Name given to the C264 controlling a bay. Usually in contrast to Standalone.

BI	Binary Input (or Information) Designation of already filtered data entered into the C264 Bay Computer before they become SPS, DPS with time tag and quality attributes
BIU	Basic Interface Unit C264 board for auxiliary power supply, watchdog relay, redundancy I/O
BNC	A connector for coaxial cable.
B-Watch	Monitoring and control device for GIS substation.
CAD	Computer Aided Design Computer application dedicated to the design of wiring, for example.
CAS	CASe C264 Bay Computer rack
CAT	Computer Administration Tool
CB	Circuit Breaker Specific dipole switch with the capability to make line current and break fault current. Some have isolation capability, i.e. nominal grounding (earthing) at each side.
CBC	Compact Bay Controller Small capacity Bay Computer for Medium Voltage applications, typically C264C
CC	Complemented Contact
CCU	Circuit breaker Control Unit C264 Bay Computer board dedicated to switch control with 8DI, 4 DO
CDM	Conceptual Data Modeling This is the modeling of system/devices data using a hierarchy of structured data (called object or class) with their attributes, methods or properties and the relations between each other. It maps common data to devices or components of devices, with guarantee of interoperability.
Class	Defined in IEC 61850 as: description of a set of objects that share the same attributes, services, relationships, and semantics
Client	Defined in IEC 61850 as: entity that requests a service from a server and that receives unsolicited messages from a server
CM	Commissioning
CMT	Computer Maintenance Tool
CO	Command, logic information Output (Functional Component) / Contact Open
COMTRADE	Common Format For Transient Data Exchange (international standard IEC 60255-24)
CPU	Central Processing Unit C264 Bay Computer main board based on a Power PC
CRC	Cyclic Redundancy Check Coding result sent with packet of transmitted data to guarantee their integrity. Usually result of a division of transmitted data by polynomial.
CSV	Character Separate Values ASCII values separated by a predefined character or string as in Excel or ASCII Comtrade.
CT	Current Transformer Basically the electric device connected to process and extract a current measurement. By extension, part of a device (C264) that receives an AC value and converts it into a numerical measurement value.
CT/VT (Conventional)	Current and Voltage transformers By extension, the C264 TMU board.

CT/VT (Non- Conventional or intelligent)	Current and Voltage transformers New generation of transducer based for example on light diffraction under an electric field. Without transformer, gives a direct numerical measurement of voltage and current as a communicating IED.
CSV	Character Separated Values ASCII values separated by predefined character or string as in Excel or ASCII Comtrade.
DAC	Data Acquisition component of the GPT
DAC	Digital to Analog Converter Used to generate an analog signal (usually DC) from a digital value.
DB	DataBase Tool or set of data that defines the entire configuration of a system or specific device such as a computer. In contrast to a setting or parameter, the DB has a structure that cannot be modified on-line. DBs are always versioned.
DB-9	A 9-pin family of plugs and sockets widely used in communications and computer devices.
DBI	Don't Believe It Term used for an undefined state of a double point when inputs are not complementary. DBI00 signifies dynamic state or jammed. DBI11 signifies undefined.
DBID	Databases Identity Brick
DC	Direct Current
DC, DPC	Double (Point) Control Two digits and/or relay outputs used for device control with complementary meaning (OPEN, CLOSE).
DCF77	External master clock and protocol transmission LF transmitter located at Mainflingen, Germany, about 25 km south-east of Frankfurt/Main, broadcasting legal time on a 77.5 kHz standard frequency.
DCO	Double Control Output
DCP	Device Control Point Located at device level (electric device or IED). It should have its own Remote/Local switch.
DCS	Digital Control System Generic name of system based on numeric communication and devices, to be opposed to traditional electrically wired control.
DCT	Double Counter Counter based on 2 DI with complementary states (counting switching operations, for example)
DE	Direct Execute
DELTA	Phase-to-phase delta values
Device	Term used for one of the following units: Protective relays, metering units, IED, switchgear), disturbance or quality recorders. Switchgear: switching device such as a CB, disconnector or grounding (earthing) switch
DHMI	C264 Display HMI
DI	Digital Input Binary information related to the presence or to the absence of an external signal, delivered by a voltage source.

DIN	Deutsche Institut für Normung The German standardization body.
DIU	DC Input Unit C264 Bay Computer board name for Digital Input
DLL	Dynamic Link Library. Available on Windows XP. A feature that allows executable code modules to be loaded on demand and linked at run time. This enables the library-code fields to be updated automatically, transparent to applications, and then unloaded when they are no longer needed.
DM	Digital Measurement A measurement value with acquisition by DI and a specific coding BCD, Gray, 1-out-of-n, and so on.
DNP3.0	Distributed Network Protocol DNP3 is a set of communication protocols used between components in process automation systems.
DO	Digital Output Used to apply a voltage to an external device via a relay, in order to execute single or dual, transient or permanent, commands.
DOF	Degree Of Freedom Used for a template attribute that can be modified or not when used. An attribute has a degree of freedom if a user can modify its values on its instances
DOU	Digital Output Unit C264 Bay Computer board name for Digital Output
DP	Double Point Information/control derived from 2 digital inputs/output; usually employed for position indication of switching devices (OPEN, CLOSE).
DPC	Double Point Control
DPS	Double Point Status Position indication of switching devices (OPEN, CLOSE).
ECDD	Coherent Extract of Distributed Data
ECU	Extended Communication Unit. External module connected to the CPU board. This module converts non-insulated RS232 into optical signal or insulated RS485/RS422.
EH90	Transmission protocol dedicated to time synchronization and standardized by EDF. Specification document: D.652/90-26c, March 1991.
EMC	Electro-Magnetic Compatibility
EPATR	Ensemble de Protection Ampèremétrique de Terre Résistante (French legacy: very resistive earth current module)
Event	An event is a time-tagged change of state/value, acquired or transmitted by a digital control system.
EWS	Engineering Workstation
FAT	Factory Acceptance Test Validation procedures execution with the customer at factory.(i.e. SAT)
FBD	Functional Block Diagram One of the IEC 61131-3 programming languages (language used to define configurable automation).
FIFO	First In First Out
FO	Fiber-Optic
FP	Front Panel

FTP	Foil Twisted Pair
FLS	Fast Load Shedding
FSS	Force Suppress Substitute
Gateway	Level 6 session of OSI, the gateway is any device transferring data between different networks and/or protocols. The RTU function of the C264 gives a gateway behavior to SCADA or RCP level. PACiS Gateway is separate PC base device dedicated to this function.
GHU	Graphic Human interface Unit C264 Bay Computer Front Panel digital part (LCD, buttons, Front RS)
GIS	Gas Insulated Substation
GLOBE	GLOBE Brick
GMT	Greenwich Mean Time Absolute time reference
GPS	Global Positioning System Based on triangulation from satellite signals. Also transmits absolute GMT time used to synchronize a master clock
GOOSE	Generic Object Oriented Substation Event
GPT	Generic Protocol Translator software, supplied by ASE
Group	Logical combination of BI (i.e. SP, DP, SI or other groups).
GSSE	Generic Substation Status Event
Hand Dressing	Facility for an operator to set the position of a device manually (position acquired by other means) from the HMI at SCP level; e.g. from OPEN to CLOSE (without any impact on the “physical” position of the electrical switching device).
HELPS	Hostable Emulator for Load and Protocol Simulation. HELPS simulates an Intelligent Electronic Device (IED)
HMGA	Horizontal Measurement Graphical Area
HMI	Human Machine Interface Can be PACiS OI (Operator Interface) or C264 LCD (Local Control Display) or set of LEDs, mosaic...
HSR	High Speed Auto-Recloser, first cycles of AR
HTML	Hyper Text Mark-up Language Used as standard format for web display
HV	High Voltage (for example 30kV to 150kV)
I/O	Input/Output
ICD	IED Capability Description
IEC	International Electro-technical Commission
IED	Intelligent Electronic Device General expression for a whole range of microprocessor based products for data collection and information processing
IP	Internet Protocol
IRIG-B	Inter-Range Instrumentation Group standard format B. This is an international standard for time synchronization based on an analog signal.

JAMMED	Invalid state of a Double Point: Occurs when two associated digital inputs are still in state 0 after a user-selected delay, i.e. when the transient state “ motion ” is considered as ended
Kbus (Kbus Courier)	Term used for the Courier protocol on a K-Bus network (RS 422 type).
LAN	Local Area Network
L-BUS	Legacy Bus Generic name of Legacy or field networks and protocols that are used to communicate between C264 (Legacy Gateway function) and IED on field bus. Networks are based on (RS232,) 422, 485. Protocols are IEC 60850-5-103 (T103 or VDEW), Modbus Schneider Electric or MODICON
LCD	Liquid Crystal Display or Local Control Display (on C264)
LD	Ladder Diagram, one of the IEC 1131-3 programming languages (language used to define configurable automation).
LED	Light Emitting Diode
LF	Low Frequency
LOC	Local Operator Console Dedicated to maintenance operation
L/R	Local / Remote
Local / Remote Control Mode	When set to local for a given control point, it means that the commands can be issued from this point, or in remote control from higher-level devices.
LSB	Least Significant Bit
LSP	Load Shedding Pre-Selection
LV	Low Voltage
MAFS	Marketing And Functional Specification
MC	Modular Computer
MCB	Mini Circuit Breaker. Position associated to the tap changer.
MDIO	Management Data Input/Output A standard driven, dedicated-bus approach that is specified in IEEE 802.3
Measurements	Values issued from digital inputs or analog inputs (with value, state, time tag)
Metering (non-tariff)	Values computed depending on the values of digital or analog inputs during variable periods of time (time integration).
Metering (tariff)	Values computed depending on the values of digital or analog inputs during variable periods and dedicated to the energy tariff. These values are provided by dedicated “tariff computers” external to the MiCOM Systems.
MIDOS	Schneider Electric Connector: Used for CT/VT acquisition
MMC	Medium Modular Computer
MMS	Manufacturing Message Specification (ISO 9506)
Modbus	Communication protocol used on secondary networks with IED or with SCADA RCP. 2 versions. Standard MODICON or Schneider Electric.
Module	Word reserved in PACiS SCE for all electric HV devices. It groups all switch-gear devices, transformers, motors, generators, capacitors, ...

MOTION	Transient state of a Double Point Occurs when the two associated digital inputs are momentarily in state 0 (e.g. position indication when an electrical device is switching). The concept of “momentarily” depends on a user-selectable delay.
MPC	Protection Module for Computer
MV	Medium Voltage
MVAR	Mega Volt Ampere Reactive
NBB	Numerical Busbar Protection
NC	Normally Closed (for a relay)
NO	Normally Open (for a relay)
OBS	One-Box Solution Computer that provides protection and control functions with local HMI. The prime application of this device is intended for use in substations up to distribution voltage levels, although it may also be used as backup protection in transmission substations. Likewise, the OBS may be applied to the MV part of a HV substation that is being controlled by the same substation control system.
OI	Operator Interface
OLE	Object Linking and Embedding OLE is a Microsoft specification and defines standards for interfacing objects.
OLTC	On Line Tap Changing
OMM	Operating Mode Management
OPC	OLE for process control OPC is a registered trademark of Microsoft, and is designed to be a method to allow business management access to plant floor data in a consistent manner.
Operation hours	Sum of time periods during which, a primary device is running in the energized state. For example, a circuit breaker is in Closed state and the current is not equal to 0 A.
OSI	Open System Interconnection Split and define communication in 7 layers : physical, link, network, transport, session, presentation, application
OWS	Operator WorkStation (PACiS OI)
PACiS	Protection, Automation and Control Integrated Solutions
PLC	Programmable Logic Control /Chart. Includes PSL and ISaGRAF. The configurable control sequences or automations taken into account by the MiCOM Systems are defined within the PLC program.
POW	Point On Wave Point on wave switching is the control process of the three poles of an HV-circuit breaker in a manner that to minimizes the effects of switching.
PSL	Programmable Scheme Logic
PSTN	Public Switched Telephone Network
RCC	Remote Control Centre Computer or system that is not part of a MiCOM system. RCC communicates with and supervises a MiCOM system using a protocol.

RCP	Remote Control Point Name given to the device or part used to control remotely several bays or sub-stations. Usually associated with Remote/Local sub-station control. It is a SCADA interface managed by the MiCOM system through the Telecontrol BUS. Several RCPs can be managed with different protocols.
Remote Control Mode	When set for a control point, it means that the commands are issued from an upper level and are not allowed from this point.
Remote HMI	Remote HMI is a client of the substation HMI server. The client may provide all or part of functions handled by the substation HMI.
RI	Read Inhibit This output indicates the availability of an analog output (e.g. during DAC converting time)
RJ-45	Registered Jack-45 A 8-pin female connector for 10/100 Base-T Ethernet network
RMS	Root Mean Square
RRC	Rapid ReClosure
RSE	Régime Spécial d'Exploitation French grid function when work is being done on an HV feeder
RSVC	Re-locatable Static VAR Compensator
RS-232	Recommended Standard 232 A standard for serial transmission between computers and peripheral devices.
RS-422	A standard for serial interfaces that extends distances and speeds beyond RS 232. Is intended for use in multipoint lines.
RS-485	A standard for serial multipoint communication lines. RS 485 allows more nodes per line than RS 422.
RSVC	Re-Locatable Static Var Compensator
RTC	Real Time Clock
RTU	Remote Terminal Unit Stand-alone computer that acquires data and transmits them to RCP or SCADA. Typically it is the C964. RTU link is the TBUS.
SAT	Site Acceptance Test Validation procedures executed with the customer on the site.
SBMC	Site Based Maintenance Control mode A bay in SBMC mode does not take into account the commands issued from RCP. Moreover, some of its digital points & measurements (defined during the configuration phase) are not sent to the RCP anymore (they are "automatically" suppressed).
SBO	Select Before Operate A control made in two steps, selection and execution. The selection phase gives a feedback. It can be used to prepare, reserve during time, configure a circuit before execution. Controls are done into a protocol, or physically (select with DI Select then DO execute).
S-BUS	Station Bus, network between PACiS devices.
SCADA	Supervisory Control And Data Acquisition Equivalent to RCC
SCD	Description file extension
SCE	System Configuration Editor
SCL	Substation automation system Configuration Language (IEC 61850-6)

SCP	Substation Control Point Name given to the device or part used to control several bays or substation locally. Usually associated with Remote/Local substation control. It is commonly the PACiS Operator Interface.
SCS	Substation Control System
SCSM	Specific Communication Service Mapping
SCT	Single Counter
SER	Sequence of Event Recorder Combines SOE with accurate Time synchronization and Maintenance facilities over Ethernet communication
Server	Defined in IEC 61850 as: entity that provides services to clients or issues unsolicited messages
Setpoints (analog)	Analog setpoints are analog outputs delivered as current loops. Analog setpoints are used to send instruction values to the process or auxiliary device
Setpoints (digital)	Digital values sent on multiple parallel wired outputs. Each wired output represents a bit of the value. Digital setpoints are used to send instruction values to the electrical process or to auxiliary devices.
SFC	Sequential Function Chart One of the IEC 1131-3 programming languages (language used to define configurable automation).
SI	System Indication Binary information that does not come from an external interface. It is related to an internal state of the computer (time status, hardware faults, and so on). It is the result of all inner functions (AR, ...), PSL, or ISaGRAF automation.
SICU 4	Switchgear Intelligent Control Unit Control unit of an intelligent circuit breaker (fourth generation)
SIG	Status Input Group
SINAD	Signal-plus-Noise-plus-Distortion to Noise-plus-Distortion ratio, in dB
SIT	Status Input Double Bit
SMT	System Management Tool
SNTP	Simple Network Time Protocol
SOE	Sequence Of Events Other term for the event list.
SP SPS SPC	Single Point Single Point Status Single Point Control
ST	Structured Text An IEC 1131-3 programming languages to define configurable automation
STP	Shielded Twisted Pair
Substation computer	Bay computer used at substation level
SUI	Substation User Interface
Suppression (Automatic)	A binary information belonging to a bay in SBMC mode will be automatically suppressed for the remote control. However changes of state will be signaled locally, at SCP
Suppression (Manual)	A binary information can be suppressed by an order issued from an operator. No subsequent change of state on "suppressed information " can trigger any action such as display, alarm and transmission

SWR	Switch Redundant C264 Bay Computer board Ethernet switch with redundant Ethernet
SWU	Switch Unit (C264 Bay Computer board Ethernet switch)
T101	Term used for IEC 60870-5-101 protocol
T103	Term used for IEC 60870-5-103 protocol
T104	Term used for IEC 60870-5-104 protocol
TBC / TBD	To Be Completed / Defined
T-BUS	Telecontrol Bus, generic name of networks and protocols used to communicate between PACiS Gateway or C264 Telecontrol Interface function and the RCP. Networks are based on RS 232, RS 485 or Ethernet (T104). Protocols are IEC 60850-5-101 (T101), Modbus MODICON
TC	True Contact
TCIP	Tap Change in Progress
TCU	Transformer Current Unit C264 Bay Computer CT/VT board : Current acquisition
TDD	Total Demand Distortion, similar to the THD but applied to currents and with a rated current (I_n) as reference
TG	Telecontrol Gateway
THD	Total Harmonic Distortion, sum of all voltage harmonics
TI	Tele Interface
TM	Analog Measurement
TMU	Transducer-Less Measurement Unit
Topological interlocking	Interlocking algorithm, based on evaluation of topological information of the switchgear arrangement in the HV network, the switchgear type and position, and defined rules for controlling this kind of switch (e.g. continuity of power supply)
TPI	Tap Position Indication (for transformers). Frequently acquired via a Digital Measurement
TS	Logic position
TVU	Transformer Voltage Unit C264 Bay Computer CT/VT board : Voltage acquisition
UCA	Utility Communications Architecture Communication standard (mainly US) used for PACiS SBUS communication
UPI	Unit Per Impulse Parameter of counter to convert number of pulses to Measurement value. Both data (integer and scaled floating) are in a common class UCA2 Accumulator.
UTC	Universal Time Co-ordinates (or Universal Time Code) This designation replaces GMT (but it is practically the same for our purposes).
VdBS	Versioned data Base System, databag generated by SCE & ready to download
VDEW	Term used for IEC 60870-5-103 protocol
VDU	Visual Display Unit
VMGA	Vertical Measurement Graphical Area

Voltage level	Set of bays, whose plants & devices deal with the same voltage (for example, 275 kV)
VT	Voltage Transformer Electric device connected to process and extract a voltage measurement. By extension, part of a device (C264) that receives this AC value and converts it to a numerical measurement value. VTs are wired in parallel.
WTS	Windows Terminal Server, Microsoft remote desktop connection
WYE	Three phases + neutral AI values
xPC	Single Point Control, Double Point Control



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