

EcoStruxure™ Control Expert

Topology Manager

User Manual

Original instructions

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Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE
NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

Document Scope

This manual describes the functionality of the Topology Manager of Control Expert.

It is written for users who are familiar with the engineering of control systems by using Control Expert Classic.

Validity Note

This document is valid for EcoStruxure Control Expert V15.1 or later.

Related Documents

Title of documentation	Reference number
Modicon M580 Standalone, System Planning Guide for Frequently Used Architectures	HRB62666 (Eng), HRB65318 (Fre), HRB65319 (Ger), HRB65320 (Ita), HRB65321 (Spa), HRB65322 (Chs)
Modicon M580 Standalone, System Planning Guide for Complex Topologies	NHA58892 (Eng), NHA58893 (Fre), NHA58894 (Ger), NHA58895 (Ita), NHA58896 (Spa), NHA58897 (Chs)
Modicon M580 Hot Standby, System Planning Guide for Frequently Used Architectures	NHA58880 (Eng), NHA58881 (Fre), NHA58882 (Ger), NHA58883 (Ita), NHA58884 (Spa), NHA58885 (Chs)
Modicon M580 BMENOC0301/11, Ethernet Communication Module, Installation and Configuration Guide	HRB62665 (Eng), HRB65311 (Fre), HRB65313 (Ger), HRB65314 (Ita), HRB65315 (Spa), HRB65316 (Chs)
Modicon M580 BMENOC0321, Control Network Module, Installation and Configuration Guide	NVE24232 (Eng), NVE24233 (Fre), NVE24237 (Ger), NVE24240 (Ita), NVE24239 (Spa), NVE24242 (Chs)
Modicon M580 BMENOS0300, Network Option Switch, Installation and Configuration Guide	NHA89117 (Eng), NHA89119 (Fre), NHA89120 (Ger), NHA89121 (Ita), NHA89122 (Spa), NHA89123 (Chs)
Unity Pro, Program Languages and Structure, Reference Manual	35006144 (Eng), 35006145 (Fre), 35006146 (Ger), 35013361 (Ita), 35006147 (Spa), 35013362 (Chs)
EcoStruxure™ Control Expert, Installation Manual	35014792 (Eng), 35014793 (Fre), 35014794 (Ger), 35014795 (Spa), 35014796 (Ita), 35012191 (Chs)

Title of documentation	Reference number
EcoStruxure™ Control Expert, Operating Modes	33003101 (Eng), 33003102 (Fre), 33003103 (Ger), 33003104 (Spa), 33003696 (Ita), 33003697 (Chs)
Unity Loader, User Manual	33003805 (Eng), 33003806 (Fre), 33003807 (Ger), 33003809 (Ita), 33003808 (Spa), 33003810 (Chs)
Unity Pro, System Bits and Words, Reference Manual	EIO0000002135 (Eng), EIO0000002136 (Fre), EIO0000002137 (Ger), EIO0000002138 (Ita), EIO0000002139 (Spa), EIO0000002140 (Chs)
Modicon Controllers Platform Cyber Security, Reference Manual	EIO0000001999 (Eng), EIO0000002001 (Fre), EIO0000002000 (Ger), EIO0000002002 (Ita), EIO0000002003 (Spa), EIO0000002004 (Chs)

You can download these technical publications and other technical information at www.se.com.

Product Related Information

The examples in this manual are given for information only.

▲ WARNING
UNINTENDED EQUIPMENT OPERATION
Adapt examples that are given in this manual to the specific functions and requirements of your industrial application before you implement them.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

▲ WARNING
LOSS OF CONTROL
<ul style="list-style-type: none"> • Perform a Failure Mode and Effects Analysis (FMEA) of your application, and apply preventive and detective controls before implementation. • Provide a fallback state for undesired control events or sequences. • Provide separate or redundant control paths wherever required. • Supply appropriate parameters, particularly for limits. • Review the implications of transmission delays and take actions to mitigate. • Review the implications of communication link interruptions and take actions to mitigate. • Provide independent paths for control functions (for example, emergency stop, over-limit conditions, and fault conditions) according to the safety analysis and applicable codes, and regulations. • Apply local accident prevention and safety regulations and guidelines. ¹ • Test each implementation of a system for proper operation before placing it into service.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

¹ For additional information, refer to NEMA ICS 1.1 (latest edition), *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* and to NEMA ICS 7.1 (latest edition), *Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems* or their equivalent governing your particular location.

Getting Started With the Topology Manager

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Terminology

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Terminology Used In This Manual

Usage of Terms

To make reading of this manual easier, the term *software* may be used to refer to the Topology Manager.

Interaction Between Topology Manager and Control Expert Editor

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Scope of the Topology Manager

Overview

The Topology Manager is the user interface, page 29 that opens when you start Control Expert with the appropriate license. It lets you engineer control systems that contain several PACs and provides additional functionality.

Control Expert Editor is the name given to Control Expert Classic that opens inside the Topology Manager when you edit the control project, page 17 of a **Modicon PAC controller**. Certain configuration parameters, page 239 and commands are now unavailable in the editor. You need to configure the corresponding attributes and use the corresponding commands in the Topology Manager instead.

General Actions

The table indicates in which tool you need to perform a given action.

Action	Topology Manager	Control Expert Editor
Configuration - Offline		
Creating PACs and controllers with their associated control project - all platforms	Yes	
Configuring M580 CPU modules (replace, configuration other than communication, such as I/O objects).		Yes
All actions on modules (add, move, replace, delete, and configuration other than communication).		Yes
All actions on a rack (add, move, replace, delete)		Yes
Configuration - Online		
All actions		Yes
Programs		
All actions		Yes
Animation Tables		
All actions		Yes
Operator Screens		
All actions		Yes
Documentation		
All actions		Yes
Data		
Derived data types		Yes
Derived FB types		Yes
Variables and FB instances		Yes
Ethernet Networks (M580 platform)		
Creating and managing networks, assigning IP addresses	Yes	
Communication Networks (platforms other than M580)		
Creation, assigning IP addresses		Yes

I/O Devices and Master Modules

The table indicates in which tool you need to create and configure I/O devices and configure master modules of Modicon M580 PACs.

Action	Topology Manager	Control Expert Editor
EtherNet/IP/Modbus TCP I/O Devices		
Creating devices	Yes	
Network configuration of devices	Yes	
Configuring parameters of DTMs	Yes (inside the DTM, page 222)	
Creating DTMs from EDS and GSD files	Yes	
Updating the local DTM catalog	Yes	
Master Module Network Configuration		
M580 CPU	Yes	
Communication modules (Other than those listed below)	Yes	
BMECRA31310	Yes	Yes (some I/O scanning parameters, time stamping buffer)
BMECXM0100	Yes (IP and DHCP configuration)	Yes (security, services, Ethernet I/O, CANopen configuration)
BMENOP0300	Yes	Yes (by using the IEC 61850 configuration Tool)
BMENOR0200		Yes (I/O objects)
BMENOR2200	Yes	Yes (communication channels and services)
BMENOS0300	Yes	
BMENUA0100	Yes	Yes (time stamping for version .2)
BMXNGD0100 BMXNOC0402 BMXNOM0200 BMXEIA0100		Yes
HART analog input/output modules	Yes (network and fieldbus)	Yes (analog module)
PROFIBUS remote master (PRM)	Yes	
BMXPRA0100 (Additional actions, page 301 to be performed in Control Expert Classic)	Yes	
PMEPXM0100	Yes (IP configuration, services, I/O profile, and DTM, page 222)	Yes (by using the ProSoft Configurator for Modicon Tool)

Action	Topology Manager	Control Expert Editor
Implicit Messaging (I/O scanning)		
Communication and I/O mapping	Yes	
Local slaves	Yes	

The table indicates in which tool you need to configure communication parameters of Modicon M340 and MC80 PACs, and Quantum, Premium, and Momentum controllers.

Action	Topology Manager	Control Expert Editor
Ethernet Devices Network Configuration		
Communication module network configuration		Yes
I/O scanning		Yes

Downloads to Controllers or Devices and Uploads From Controllers

The table indicates in which tool you need to perform a given action.

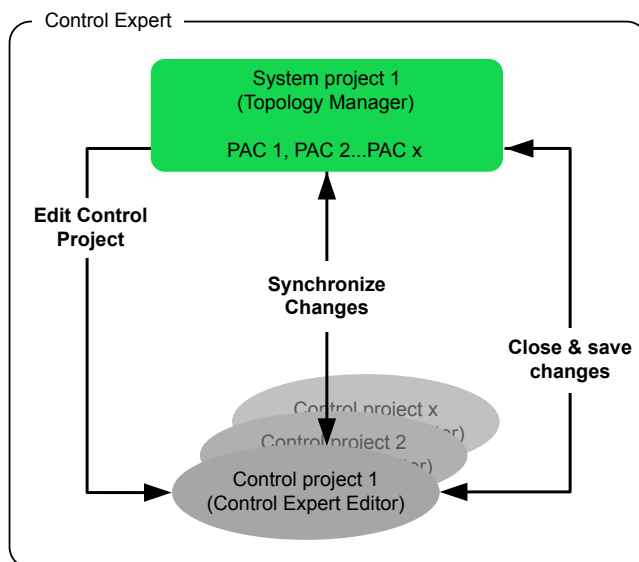
Action	Topology Manager	Control Expert Editor
Download to Controllers or Devices		
Transferring the full project to controllers	Yes (to one or more M580 PACs)	Yes (to single controller only ⁽¹⁾)
Transferring project changes to controllers		Yes (to single controller only ⁽¹⁾)
Downloading the configuration to one or more I/O devices	Yes	
Upload From Controllers		
Uploading application from M580 PACs.	No (only supported in Control Expert Classic)	
Uploading application from controllers other than M580 platform	Yes	No
(1) All supported Modicon controllers and PACs.		

Interaction Between Topology Manager and Control Expert Editor

Managing Changes in System Projects and Control Projects

The following figure illustrates how the software propagates changes that you perform on an M580 PAC and its dependencies (for example, scanned devices) in the system project and/or in its control project, page 230 depending on the command, page 194 that you use.

System projects and control projects are stored in the Control Expert repository of the system server.



NOTE: When you synchronize changes or close the control project and save changes, only data pertaining to objects that are managed by the Topology Manager, page 14 is propagated to the system project. For example, the PAC configuration but not the program.

System Project Engineering Workflow

This topic contains the steps to engineer a system project from the creation to the deployment of configurations and provides links to the topics describing these steps in detail.

Step	Highlights
Create a system project	A system project, page 45 can contain the complete configuration of several PACs and devices. It can be edited by several users simultaneously.
Import a Control Expert Classic project	You can import, page 241 existing projects to take advantage of the Topology Manager functionality.
Add devices to a system project	You can create your topology by adding various types of equipment, page 191, configuring their properties, page 118, and using context menu commands, page 194.
Edit a PAC control project	You can visualize and modify the configuration of PACs, page 110 and complete the engineering of control projects, page 229 by opening them in Control Expert Editor.
Configure local slaves	Local slaves, page 294 are configured in the Topology Manager.
Configure I/O scanning of devices and local slaves	I/O scanning, page 296 for each PAC is configured in an easy-to-use communication mapping view. There is one view per communication protocol.
Analyze the system project	The software checks the configuration, page 254 of PACs and scanned devices or entire system projects against several predefined rules and reports inconsistencies and incorrect configurations.
Build the PAC control project	The state of the executable, page 125, which is the result of the build process is indicated at the PAC level. You can build, page 237 the control projects of several PACs in one step.
Deploy the PAC or device configuration	A dedicated view lets you deploy the configuration, page 303 of several PACs and devices with a few clicks.
Create a network topology	Creating logical networks, page 178 is simplified and you can see which devices are assigned to which logical network, page 82 at a glance.
Diagnose the system project	System monitoring, page 273 lets you see the communication status and operational state of equipment at a glance.

Working With the Topology Manager

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Capabilities

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Supported Equipment

Overview

The equipment that you can add to a system project by using the Topology Manager appears in the **TOOLBOX** pane, page 170, which displays the catalog of equipment. It is grouped in several product types.

Each product type contains one or more product ranges.

When you add equipment to your system project to engineer the hardware architecture of your control system, it becomes a configurable device, page 203.

NOTE: Other equipment that is supported by Control Expert but does not appear in the **TOOLBOX** (for example, modules of a PAC), can be added to your system project by using Control Expert Editor, page 229.

List of Supported Equipment

Product type	Product range	Equipment description
Modicon PAC Controllers	Modicon M580 ePAC	Object representing a predefined standalone and redundant local main rack configuration. Each one consists of: <ul style="list-style-type: none"> • An Ethernet backplane X80. • A Modicon M580 processor module. Safety PACs also contain a coprocessor module. <ul style="list-style-type: none"> • A power supply module. The M580 redundant PAC is composed of a pair of local racks with roles A and B.
	Modicon M340 PAC	Object representing a predefined standalone local main rack configuration consisting of: <ul style="list-style-type: none"> • An Ethernet backplane X80. • A Modicon M340 processor module. • A power supply module.
	Modicon Momentum PAC	Object representing a predefined configuration consisting of: <ul style="list-style-type: none"> • A Momentum processor module. • A discrete input module.
	Modicon MC80 PAC	Object representing a predefined configuration consisting of: <ul style="list-style-type: none"> • A BMK C80 processor module. • A high-speed counter function. • A digital I/O function. • An analog input function.
	Modicon Legacy Controller	Objects representing a predefined controller of the following platforms: <ul style="list-style-type: none"> • Modicon Quantum • Modicon Premium Each controller is represented as a single object only.
Automation Devices	Altivar Variable Speed Drives	Represents families of configurable Schneider Electric Altivar Process ATV600 and ATV900 drives. <p>The corresponding DTM, page 222 needs to be installed on the local computer to configure the device.</p>
	TeSys Motor Controllers	Represents several references of configurable Schneider Electric TeSys T motor controllers that communicate by using Ethernet-based protocols. You can select, page 192 a reference based on the DTM, page 222 that is installed on the local computer. <p>It also contains a configurable TeSys island.</p>
	Generic Devices	Contains configurable devices that communicate by Modbus TCP or EtherNet/IP protocol. <p>For both device types, you can select a device type manager (DTM), page 222 to be used to configure the device (for example, STB NIC and NIP modules).</p>
HMI Panel	Generic Panels	Object representing a generic dual port touchscreen panel, which you can configure.

Product type	Product range	Equipment description
Network Infrastructure Devices	ConneXium Switches and Hubs	Contains various references of Schneider Electric ConneXium devices that communicate by using Ethernet-based protocols.
	ConneXium Firewalls	
	Generic Switches	Contains various references of generic, managed, and unmanaged switches with and without routing capability. You can configure and use them to represent your hardware.
	Hirschmann Switches and Hubs	Contains various references of RED25 customizable entry-level redundancy switches for M580 applications.
	Modicon Switches	Contains various references of Modicon managed, unmanaged, and extended switches.
Network Fieldbus Devices	Gateway	Contains various references of communication gateways (for example, a PROFIBUS remote master (PRM)) enabling you to connect Modbus TCP and other fieldbus networks.
Workstations and Servers	Generic	Represent computers of the control room on which SCADA systems or Control Expert are running. They are connected to the control and/or operation network and belong to level 2 of process control systems as defined by the ISA-95.00.01 standard.

Management of Concurrent Actions

Overview

Thanks to the client/server architecture of Control Expert, several users can work on the same component or different components of a system project at the same time.

For example, User A and User B can work in the **Default Physical View** of the same system project to design the architecture. Or, User A can add devices to the architecture of the system project while User B configures logical networks and communication properties of devices. These operations could also be performed by a single user.

In both multiuser and single user environments, the Topology Manager manages system-wide concurrent user access to views and configuration screens to preserve the integrity of data of the system project.

In case of conflict, the Topology Manager may allow access to data in read-only mode only or forbid certain actions. Dialog boxes open to inform you.

If desired, a user can lock a system project, page 55 to restrict access by other users.

NOTE: Locking mechanisms may also operate when a single user is performing certain concurrent tasks, page 55.

Change Propagation

Changes made to data of a system project are reflected right away in other instances of the Topology Manager in which the same system project is open.

Concurrent User Activity Management

When the command that you have selected cannot be completed, you can obtain information about the reason through:

- Dialog boxes that open when you try to access system data that is being used or edited by another user.
- Information displayed in the **Activities** tab, page 166 of the notification pane about activity of other users connected to the same system server.

Naming Rules

Overview

The following are the naming rules that apply when you edit the identifier of a system project or the name of an object it contains (for example, a device, an attribute, a folder, a logical network, a physical view).

Rules for Names

The following rules apply to identifiers and names:

- Must start with a letter.
- Can contain spaces except for leading or trailing spaces.
- Cannot contain any special character other than underscore (_).

NOTE: Additional rules may apply, such as length limitations. In such case, these rules are mentioned in the description of the attribute.

Log Files

This topic describes how to generate various log files when requested by Schneider Electric support. You can save log files to disk as archive files.

Generating Log Files

Step	Action
1	In the toolbar of the Topology Manager, click Help > Technical Support . Result: The Save As dialog box opens.
2	Enter a location and name for the archive file (.zip) and click OK to save the log files to disk.

Managing Configuration File Extensions

Overview

To be able to attach, open, or save a configuration file, page 194, its file name extension must be on the allowlist.

You can manage the configuration file extension allowlist by opening the **Manage File Extensions** tab of the **Server Configuration** tool. The list applies to

By default, the following file name extensions are allowed and cannot be removed:

- .stu
- .spe
- .cfg

NOTE: You need administrator rights on the computer to open the **Server Configuration** tool.

Allowing File Extensions for Configuration Files

Step	Action
1	On the computer acting as system server, page 104, from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration . Result: The Server Configuration tool opens.
2	Select the Manage File Extensions tab, page 61 and click the add button in the toolbar.
3	Enter the file name extensions that you want to allow and click OK . Result: The file name extensions are shown in the tab.
4	Click Apply and close the Server Configuration tool.

Removing File Extensions for Configuration Files From the Allowlist

Step	Action
1	<p>On the computer acting as system server, page 104, from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration.</p> <p>Result: The Server Configuration tool opens.</p>
2	<p>Select the Manage File Extensions tab, page 61.</p>
3	<p>Select the file name extensions that you want to remove from the allowlist and click the delete button in the toolbar.</p>
4	<p>Click Apply, confirm the command, and close the Server Configuration tool.</p> <p>Result: Configuration files whose extension you have removed cannot be used anymore.</p>

User Interface

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Overview

This chapter describes the Topology Manager user interface (UI), its main components, and UI-related functionality. It also describes how you can customize its layout to suit your needs.

Topology Manager User Interface Description

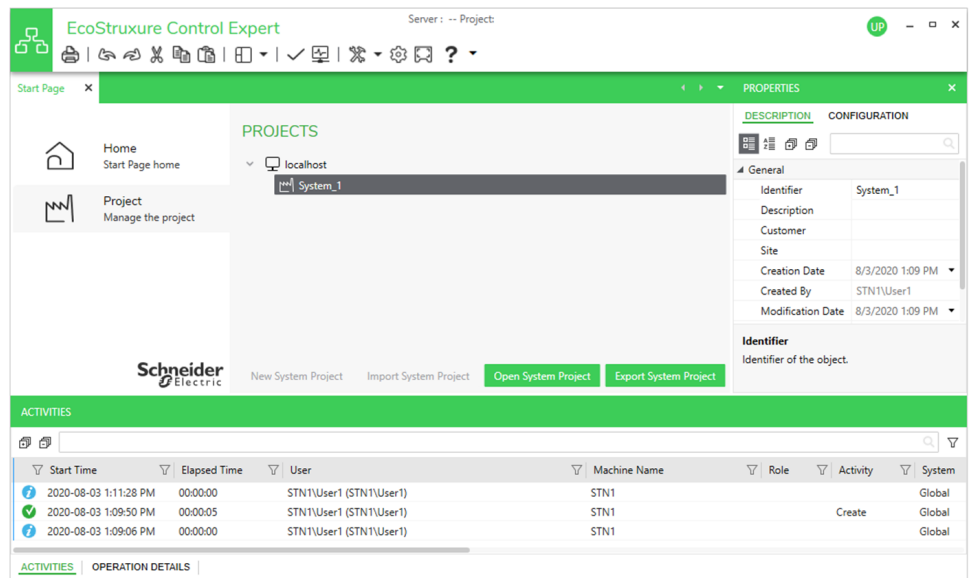
Context Menu Commands

The Topology Manager makes extensive use of context menu commands, which you can access by right-clicking various objects of the user interface, such as windows, panes, nodes, rows, devices.

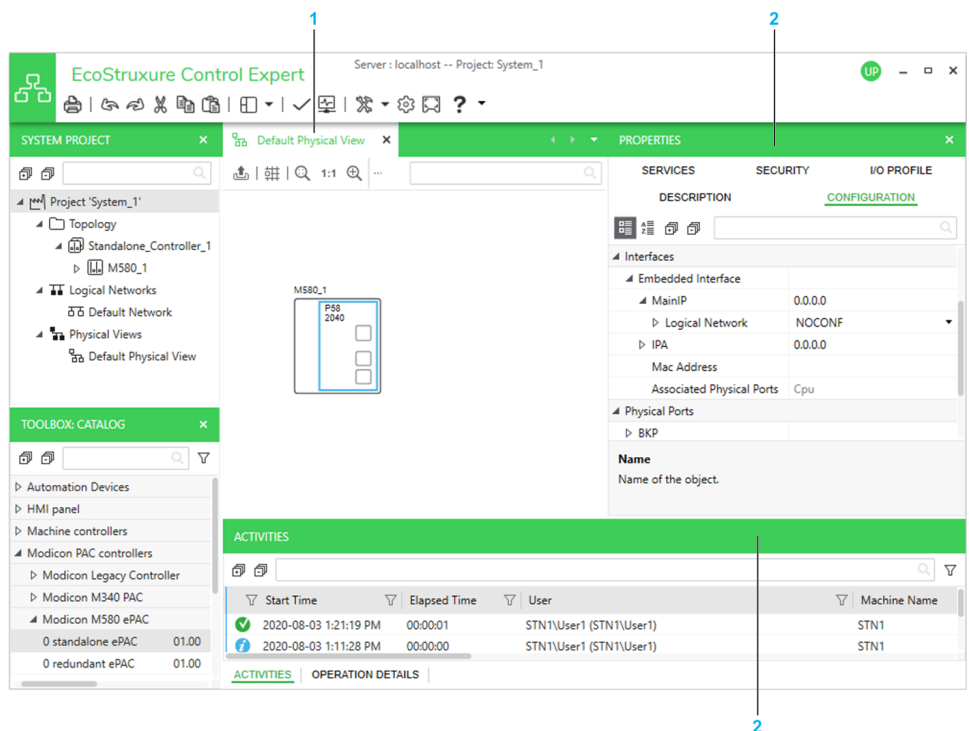
NOTE: To change the display language, use the Control Expert language selection tool (see EcoStruxure™ Control Expert, Installation Manual).

Topology Manager Window

The following figure shows an example of the Topology Manager window when Control Expert is connected to a system server but no system project is open. By default, the **Start Page** opens.

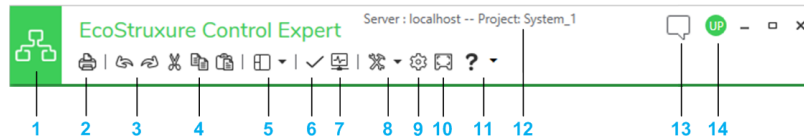


The following figure shows an example of the Topology Manager window when a system project is open.



Item	Description
1	Refer to the topic describing views, page 72.
2	Refer to the topic describing panes, page 106.

Toolbar Description



Item	Description										
1	Opens the Start Page .										
2	Lets you print the contents of the active window to file (for example, PDF). The button is available only for certain views, such as physical views or rack views.										
3	Undo and redo buttons. Lets you undo/redo actions recorded in the history of actions of the system project that is open. You can view the history of actions and undo/redo several actions at once by using the HISTORY pane, page 41.										
4	Cut, copy, and paste buttons. Refer to the description of views and panes, page 71 for more information on how to use the functionality.										
5	Opens the Views menu, which lets you open various views and panes, page 71 of the Topology Manager. If a view or pane is already open, it becomes the active one. The menu does not let you to open views of which you can open several instances per system project, such as physical views.										
6	Analyzes the consistency of the system project, page 255.										
7	Activates/deactivates system monitoring, page 274. The button is highlighted when system monitoring is active.										
8	Opens the Tools menu, which contains the following submenus: <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 30%;">Update DTM Catalog</td> <td>Lets you update the local DTM Hardware Catalog with the DTMs, page 222 that you have installed by using an executable or the EDS/GSD installation tool. This also updates the DTM Hardware Catalog of Control Expert Classic.</td> </tr> <tr> <td>Analyze DTMs</td> <td>Opens the DTM Audit Tool, which compares the DTMs, page 270 that are used by devices of the system project with those installed on the computer and informs you of discrepancies.</td> </tr> <tr> <td>Manage EDS Library</td> <td>Contains commands that let you manage the EDS files, page 222, which are used to create DTMs for EtherNet/IP devices.</td> </tr> <tr> <td>Manage GSD Library</td> <td>Contains commands that let you add and remove GSD files, page 222, which are used to create DTMs for PROFIBUS devices. Additional commands let you export the GSD files, page 222 that are installed on the local computer to a library file and import such a file.</td> </tr> <tr> <td>Control Engineering</td> <td>Contains commands that open the EcoStruxure Control Engineering web platform in a window inside the Topology Manager. The URL appears in the Networks And Servers section of the User Preferences window, page 104. Internet connection and registration required. NOTE: Microsoft Edge WebView2 runtime needs to be installed on the local computer.</td> </tr> </tbody> </table>	Update DTM Catalog	Lets you update the local DTM Hardware Catalog with the DTMs, page 222 that you have installed by using an executable or the EDS/GSD installation tool. This also updates the DTM Hardware Catalog of Control Expert Classic.	Analyze DTMs	Opens the DTM Audit Tool , which compares the DTMs, page 270 that are used by devices of the system project with those installed on the computer and informs you of discrepancies.	Manage EDS Library	Contains commands that let you manage the EDS files, page 222, which are used to create DTMs for EtherNet/IP devices.	Manage GSD Library	Contains commands that let you add and remove GSD files, page 222, which are used to create DTMs for PROFIBUS devices. Additional commands let you export the GSD files, page 222 that are installed on the local computer to a library file and import such a file.	Control Engineering	Contains commands that open the EcoStruxure Control Engineering web platform in a window inside the Topology Manager. The URL appears in the Networks And Servers section of the User Preferences window, page 104. Internet connection and registration required. NOTE: Microsoft Edge WebView2 runtime needs to be installed on the local computer.
Update DTM Catalog	Lets you update the local DTM Hardware Catalog with the DTMs, page 222 that you have installed by using an executable or the EDS/GSD installation tool. This also updates the DTM Hardware Catalog of Control Expert Classic.										
Analyze DTMs	Opens the DTM Audit Tool , which compares the DTMs, page 270 that are used by devices of the system project with those installed on the computer and informs you of discrepancies.										
Manage EDS Library	Contains commands that let you manage the EDS files, page 222, which are used to create DTMs for EtherNet/IP devices.										
Manage GSD Library	Contains commands that let you add and remove GSD files, page 222, which are used to create DTMs for PROFIBUS devices. Additional commands let you export the GSD files, page 222 that are installed on the local computer to a library file and import such a file.										
Control Engineering	Contains commands that open the EcoStruxure Control Engineering web platform in a window inside the Topology Manager. The URL appears in the Networks And Servers section of the User Preferences window, page 104. Internet connection and registration required. NOTE: Microsoft Edge WebView2 runtime needs to be installed on the local computer.										

Item	Description	
9	Opens the User Preferences window, page 104.	
10	Switches the active view to full screen mode. Does not work when the active view is a floating window, page 36.	
11	Opens the Help menu, which contains the following submenus:	
	Help	Opens the Control Expert global HTML help.
	System Project Engineering Workflow	Opens a help page, which describes the main steps to engineer a control system.
	Modicon Community	Contains commands that open the Schneider Electric Exchange web platform in a window inside the Topology Manager. It lets you: <ul style="list-style-type: none"> • Suggest an idea and search ideas and features. • Search the Modicon knowledge base. Internet connection required. NOTE: Microsoft Edge WebView2 runtime needs to be installed on the local computer.
	Technical Support	Opens a dialog box from where you can save log files, page 26.
	About	Opens the About dialog box from where you can start a self-test (see Modicon Controllers Platform, Cyber Security, Reference Manual) of the local Control Expert installation. The Technical Information section lets you see which hotfixes are installed and what they apply to. <ul style="list-style-type: none"> • Control Expert: The hotfix applies to the Topology Manager. • Control Expert Classic: The hotfix applies to Control Expert Editor and Control Expert Classic.
12	Network address of the system server to which Control Expert is connected and name of the system project that is open.	
13	Notification icon. Lets you view notifications generated by the system server to which you are connected. Click the icon to view the list of notifications. Once you delete a notification, you cannot view it anymore.	
14	Click the icon to view the following information: <ul style="list-style-type: none"> • Name that was entered to log in to the Control Expert instance (top). • Domain\Username of the user who is logged in to the local computer (bottom). The Lock command locks the user interface of the Control Expert instance. Operations that are in progress continue executing while the lock is active. To unlock, you must enter in the Login dialog box the password of the user who is logged in . NOTE: You can disable the automatic lock and configure the inactivity period, page 104 after which the lock is active.	

Using Workspaces

Overview

This topic describes ways to change the view in workspaces (for example, the workspace of a physical view).

It also describes how to select multiple objects displayed in a workspace.

NOTE: You can configure settings such as zoom level and snap-to-grid for each physical view individually. They are persisted when you close the system project or the Topology Manager and reopen it on the same computer.

Aligning Devices in a Physical View

By default, when you move one or more devices in a physical view, a soft snapping is applied by using elements of other devices as guides. In addition, horizontal and vertical guide lines appear, which let you align various elements of a device (for example, edges or ports) with those of others. The lines also help you position devices at equal distance one from another.

When you right-click an empty area of the physical view and select **Snap Device to Grid**, a more pronounced snapping to an invisible grid is applied and the guide lines do not appear anymore.

When you select and move multiple devices in the workspace, the relative position of the selected devices is unchanged when snapped to grid.

For information on features that help you route physical links, refer to the topic describing how to [modify existing links](#), page 212.

NOTE: Devices that you had positioned in the physical view before enabling the functionality are not moved even if they are not snapped to a grid point.

Moving the Workspace (Panning)

To move the workspace, click an empty area of the workspace and hold down the left mouse button. The pointer turns into a hand icon. You can now drag the workspace in any direction by moving the pointer.

Alternatively, use the following methods to move the workspace.




Mouse wheel up	Moves down the workspace.
Mouse wheel down	Moves up the workspace.
Shift + Mouse wheel up	Moves the workspace to the left.
Shift + Mouse wheel down	Moves the workspace to the right.

Magnifying and Reducing the Workspace View

To magnify or reduce the workspace view gradually, use the following method.

Ctrl + Mouse wheel up	Zoom in. The position of the pointer becomes the center of the magnification. Maximum zoom level is 400%.
Ctrl + Mouse wheel down	Zoom out. The position of the pointer becomes the center of the reduction. Minimum zoom level is 10%.

To change the workspace zoom level, right-click an empty area of the workspace and select a command of the **View** submenu.

Command	Button	Description
Fit to Content		Selects a zoom level that lets you view all the objects displayed in the workspace.
Actual Size	1:1	Resets the zoom level to 100%.
Zoom In		Magnifies the view in small increments.
Zoom Out		Reduces the view in small increments.

NOTE: Some information may be hidden or represented differently when selecting a low zoom level (for example, device labels and diagnostic information shown in a physical view).

Selecting Multiple Objects in Windows

You can select multiple objects that appear in a window. The method to use depends on the workspace or editor you are working in. You can use one or a combination of the following methods:

- In workspaces (for example, the workspace of a physical view):
 - Press and hold **Ctrl**, click an empty area of the workspace, and hold down the mouse button. Then, drag the pointer to draw a rectangle. Objects that overlap with the rectangle are selected when you release the mouse button. Last, release **Ctrl**.
- In workspaces, editors, viewers:
 - Click an object, press and hold **Ctrl**, and click other objects.
 - Press **Ctrl+A**. All objects in the view are selected.

The number of objects that are selected is indicated at the top of the **PROPERTIES** pane.

Customizing the User Interface Layout

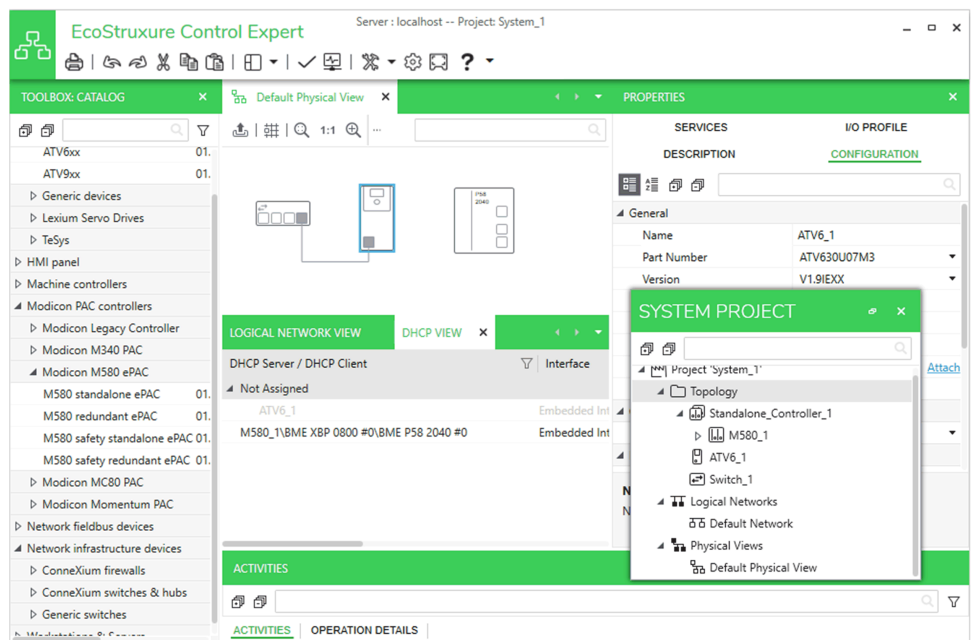
Overview

You can customize the appearance of the Topology Manager UI by modifying the layout of windows and panes. You can modify their size but also their position.

- Windows can be arranged:
 - Tabbed inside the workspace.
 - Docked inside the workspace or to outer window borders.
 - Floating on multiple monitors.
- Panes can be arranged:
 - Docked to outer window borders.
 - Floating on multiple monitors.

The customized layout is saved when you close the Topology Manager and is applied when you connect to any system server.

The following figure shows an example of a customized UI layout.



Contextual Menus of Windows and Panes

Right-click the title bar of a window or pane to open a contextual menu.

Command	Description
Close	Closes the window or pane. Appears only for windows and panes that you can close.
Close All	Closes all windows in all workspaces. This also closes additional workspaces that you have created.
Close All But This	Closes all windows except this one. This also closes the other workspaces.
Float	Turns the window or pane into a floating one that you can move. The docking menus, page 35 remain hidden. Alternatively, you can drag the window or pane by its title bar away from its current location.
Dock	Moves the pane to its previous docked position.
Dock as Tabbed Document	Moves the window to the workspace and displays it as a tab.

Command	Description
New Horizontal Tab Group	Creates a new workspace with the window below the current workspace.
New Vertical Tab Group	Creates a new workspace with the window next to the current workspace.
Move To Next Tab Group	Moves the window to the next/previous workspace respectively. The commands are available only when more than one workspace is open.
Move To Previous Tab Group	

Using the Docking Menus

As soon as you drag a window or pane that is either *tabbed* or *floating*, page 34, a central docking menu appears. It can appear at the center of either:

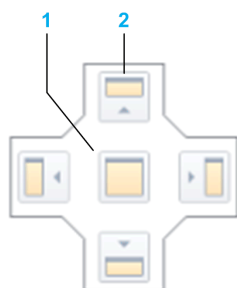
- A workspace, allowing you to:
 - Add a window to the workspace.
 - Create a new workspace with a window.
 - Dock a pane around the workspace.
- A pane, allowing you to position a pane around another one.

You can arrange windows and panes by dragging them to one of the five tabs of the docking menu. A shaded area shows you where the window or pane will be positioned once you release it.

In addition, docking menus feature external docking tabs, which allow rearranging panes along the edges of the Topology Manager window.

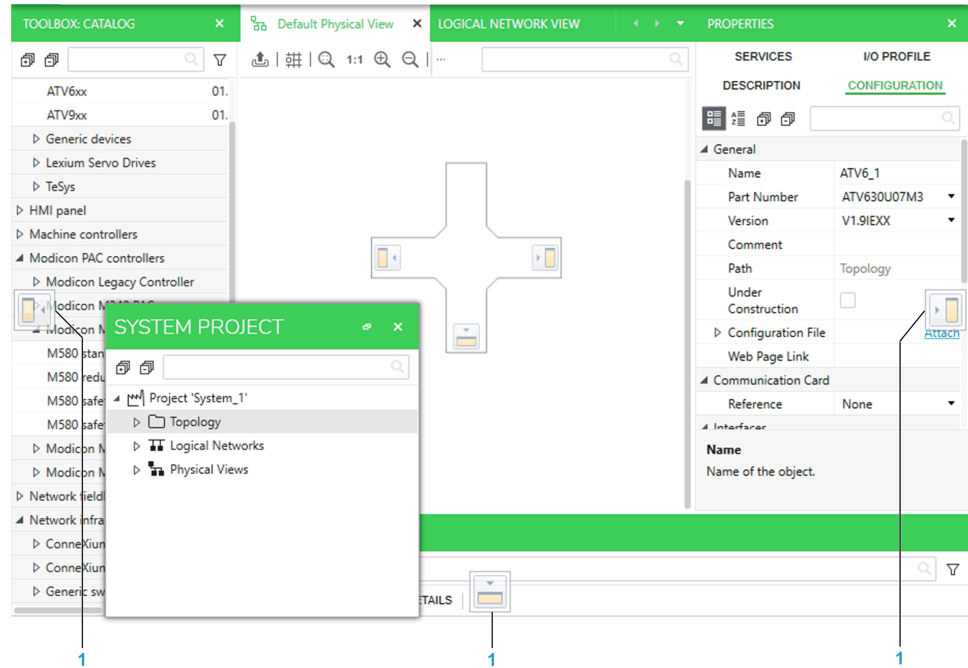
NOTE: If you drag a window or pane outside a docking menu or tab, it remains floating.

The following figure shows an example of docking menu.



Item	Description
1	Central tab that creates a new tab with a window inside the workspace or a new tab with a pane.
2	Peripheral tabs that let you create a new workspace with a window or dock a pane.

The following figure shows the external docking tabs that appear when you drag a pane.



Item	Description
1	External docking tabs that let you dock panes.

Making a Window or Pane Floating

To turn a tabbed window or pane into a floating element, click its tab or title bar and drag it away from its current position and outside a docking menu. The window or pane appears floating.

You can drag a floating window or pane anywhere inside and outside the Topology Manager window, even to another monitor.

Docking a Pane

To dock a floating pane or reposition a docked pane, drag it to one of the peripheral or external tabs of the docking menu.

Adding a Floating Window to an Existing Workspace

Right-click the title bar of a floating window and select **Dock as Tabbed Document**. The window appears tabbed in the workspace.

NOTE: You cannot add a pane to a workspace as a tabbed window. You can dock it inside or around the workspace.

Creating New Workspaces

Drag a tabbed window to one of the peripheral tabs of the docking menu to create a new workspace in the corresponding area of the Topology Manager window.

If the window is floating, you cannot create a new workspace with it. First, add it to an existing workspace so it becomes a tabbed window.

NOTE: Once you have created several workspaces, you can drag tabs of windows from one workspace to the other. Dragging the last tab of a workspace to another one closes this workspace.

Grouping, Filtering, and Sorting Data

Overview

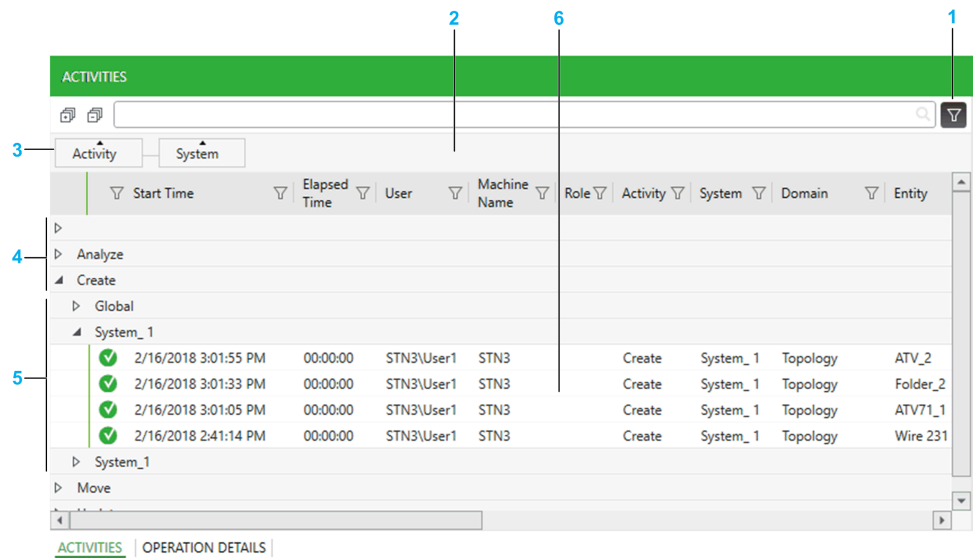
Some tables let you group data in categories, which correspond to one or more column headers.

You can also open a filter menu that lets you refine data that is displayed according to criteria and/or conditions that you define.

In addition, you can sort data in ascending or descending alphanumeric order.

Grouping Data

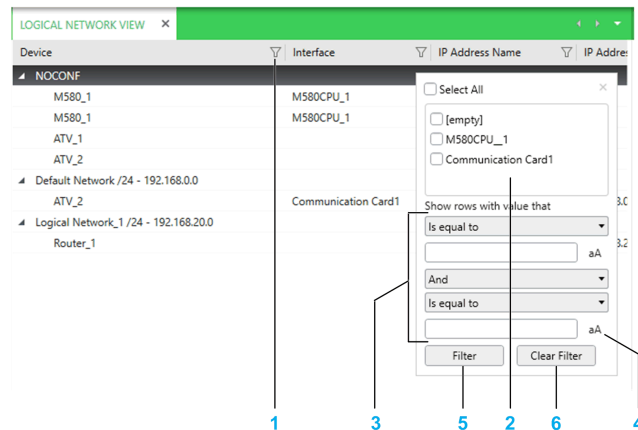
The following figure shows the **ACTIVITIES** tab of the notification pane as an example where two categories have been created to group entries shown in the tab.



Item	Description
1	Button to toggle the grouping bar. Groupings that you have defined remain when you hide the bar.
2	Grouping bar.
3	Drag any category (column header with a label) to the bar to group data by that category. The column is removed from the table: <ul style="list-style-type: none"> You can group by several levels of categories and sort data for each category. To change the order of groupings, swap the category labels. To remove a grouping, hover with the pointer over the category label and click the close icon. The corresponding column is displayed again in the table.
4	Group that corresponds to the first-level category (Activity in this example).
5	Group that corresponds to the second-level category (System in this example).
6	Data that is displayed in the table. You can use the sorting and filter features of each column.

Using the Filter Menu

The following figure shows an example of the filter menu that is displayed for the **Interface** column.



Item	Description
1	<p>Column filter icon.</p> <p>Click the icon to open the filter menu of the column.</p> <p>The icon turns green to indicate that you have applied a filter on the column.</p> <p>NOTE: You can filter data of several columns simultaneously by using the filter menu of each of the columns.</p>
2	<p>Data field.</p> <p>The field displays in a flat list one of each of all the entries that the column contains. That is, if an entry appears more than once in the column, it is displayed only once in the data field. If the column contains only partial data because, for example, a keyword search has been performed, the data field displays also only the partial data.</p> <p>Select one or more entries. Only entries that you select will be displayed when you apply the filter.</p>
3	<p>Expression builder.</p> <p>Lets you build custom filter expressions by selecting one or two conditions and an operator from a list.</p> <p>The list of available conditions varies and is adapted to the data type of the column.</p> <p>NOTE: If you build an expression and select an entry in the data field, your selection is used as an additional condition in the expression with the AND operator. If you select several entries in the data field, each one is treated as OR condition before the result is used as an additional condition.</p>
4	<p>Match case button.</p> <p>Click the button to enable case-sensitive filtering as an additional condition.</p> <p>The button appears only for columns showing data of String type.</p>
5	<p>Click the button to apply the filter to the column.</p>
6	<p>Click the button to clear the filter for the column.</p>

Sorting Data

When sorting is enabled, a triangle appears in the column header.

Click a column header to enable sorting of the data that the column contains.

Clicking the column header repeatedly toggles between the following states:

- Arrow up: Sorts in ascending alphanumeric order.
- Arrow down: Sorts in descending alphanumeric order.
- No arrow: No sorting. Data is displayed by using the default display order defined for the column.

NOTE:

- Hold **Shift** to enable sorting of multiple columns (when available). Maintain **Shift** pressed to change the sorting order.
- When data is grouped by category, objects are sorted within their respective category.

Keyboard Shortcuts

Available Keyboard Shortcuts

In the Topology Manager, you can use the following keyboard shortcuts.

Keyboard shortcut	Corresponding command name
2	Display Part Number Labels
3	Display Device Labels
4	Display Link Labels
5	Display IP Addresses
6	Display Logical Networks
Ctrl+Plus sign	Zoom In
Ctrl+Minus sign	Zoom Out
Ctrl+0	Fit to Content
Ctrl+1	Actual Size
Ctrl+7	Export In the physical view workspace menu
Ctrl+V	Paste
Ctrl+A	No corresponding command. Selects all the objects in a node, category, or view.
Ctrl+C	Copy
Ctrl+R	Snap Device to Grid
Ctrl+V	Paste
Ctrl+X	Cut
Ctrl+Shift+X	Cut From View (physical views)
Ctrl+Y	Redo button
Ctrl+Z	Undo button
Del	Delete
Shift+Del	Remove From View (physical views)
F1	Help
F2	No corresponding command. Makes the objects editable (when available). You can also click the object twice.
T	Tag for Connection (toggles).
W	Connect to (when only one port is tagged for connection, page 208).

Using the Undo/Redo Functionality

What's in This Chapter

Using the Undo/Redo Functionality 41

Using the Undo/Redo Functionality

Overview

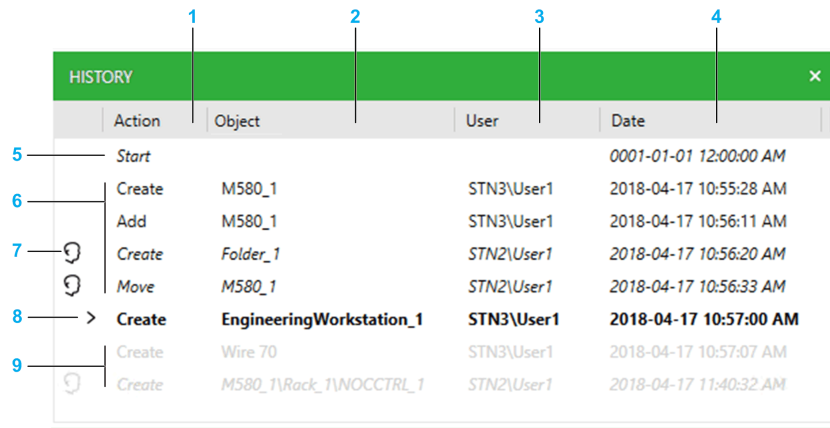
You can undo/redo the actions that appear in the **HISTORY** pane of the system project that is open. The history of actions is recorded since the system server service was started. You can undo/redo the last action or several consecutive actions at once out of the 100 most recent actions.

You can undo/redo your own actions but also those that another user has performed on this system project even if this user is no longer connected to the system project.

Any user opening the system project can view the same history of actions. When actions are undone/redone by any user, the history of actions is updated in each Topology Manager instance simultaneously. Closing the system project or the Topology Manager does not clear the history of actions.

HISTORY Pane

The following figure shows an example of the **HISTORY** pane that opens when you click **History** in the **Views** menu, page 30, which is located in the toolbar. The pane shown is that of the Topology Manager running on computer *STN3*.



Item	Description
1	Description of the action that has been performed. You can see details for each action in the PROPERTIES pane.
2	Name of the object (for example, a device, a physical link, or a folder) on which the action was performed. For certain objects, their path in the SYSTEM PROJECT pane is also indicated.
3	Name of the computer and user who has performed the action.
4	Date and time when the action was performed initially.
5	Starting point of actions for this system project since the system server service was started. The history pane can contain up to 100 actions. After that the most recent actions replace the earliest ones.
6	History of actions that were performed. They are shown in black and before the last action/current state.

Item	Description
	You can undo and redo these actions. If an action was performed by another user, you need to confirm the command in a dialog box, which indicates the name of the user who has performed it.
7	Actions performed by other users. They are shown in italic preceded by the user icon. You can undo or redo these actions after confirming the command.
8	Last action that was performed or current state of the system project if actions were undone/redone. It is shown in bold and preceded by an arrow.
9	Actions that were undone. They are shown in gray and after the current state. You can redo these actions only as long as no new action is performed.

Action Details Shown in the PROPERTIES Pane

The table describes the additional information that is shown in the **PROPERTIES** pane when you select an entry in the **HISTORY** pane.

Attribute	Description
Description	Provides additional information on the action that was performed.

Using Undo/Redo on Changes to Control Projects

Saving changes, page 231 when closing a control project or synchronizing changes, page 233 appears as **Synchronize** action in the **HISTORY** pane. The object is the PAC. Each entry encompasses as a whole the changes that were saved last.

Undoing either action reverts to the previously saved control project. Redoing it replaces the current control project by the one you have undone.

The table describes the impact of using the **Undo** command at different levels immediately after performing various actions and while the control project is open in Control Expert Editor. Use the **HISTORY** pane to verify which action is undone.

Action	Impact of using Undo from the Control Expert Editor toolbar	Impact of using Undo from the Topology Manager toolbar
Making a change in the system project, which displays the change indicator, page 233 on the PAC whose control project is open.	N/A	You cannot use the Undo command while the control project is open. Once you have closed the control project, you can undo the change that you have made in the system project but this requires undoing also the changes that you have made in the control project if you had saved them. NOTE: If you use the Synchronize Changes command after making a change in the system project, using the Undo command once closes the control project and discards the changes that have been applied to the control project by the synchronization and also changes that you had made in the control project. To undo the change that you have made in the system project itself, use the Undo command again.
Making a change in the control project.	Lets you undo the change in the control project (if applicable).	You cannot use the Undo command while the control project is open. Instead, close the control project without saving the change.

Action	Impact of using Undo from the Control Expert Editor toolbar	Impact of using Undo from the Topology Manager toolbar
		<p>If you close the control project and save changes, using the Undo command discards these changes.</p> <p>NOTE: If you have built the change online and transferred it to the controller, after using the Undo command the control project of the PAC is different from the control project that is deployed in the controller. As a result, any build changes online operation requires stopping the controller and deploying the executable again.</p>
<p>Making a change in the control project, building it offline, and deploying the control project.</p>	<p>N/A</p>	<p>You cannot use the Undo command while the control project is open.</p> <p>Once you have closed the control project, using the Undo command once discards the changes making the control project of the PAC different from the control project that is deployed in the controller.</p> <p>As a result, any build changes online operation requires stopping the controller and deploying the executable again.</p>
<p>Changes in the system project⁽¹⁾ and control project and using the Synchronize Changes command.</p>	<p>Lets you undo changes made in the control project only (if applicable).</p> <p>Displays the change indicator again.</p>	<p>Using the Undo command once closes the control project and discards all the changes that have been applied by the synchronization and also the changes that you have made in the control project.</p> <p>To undo also the change that you have made in the system project, use the Undo command again.</p>
<p>(1) Change, which displays the change indicator, page 233 on the PAC whose control project is open.</p>		

Undo/Redo Functionality When Configuring Devices by Using a DTM

Saving changes, page 232 when closing the device type manager (DTM), page 222 of a device creates an entry in the **HISTORY** pane. This entry encompasses as a whole the changes that you have saved last.

Undoing such an action reverts to the previously saved DTM state. Redoing it applies again the changes you had undone.

The following restrictions apply to the undo/redo functionality while configuring a device by using the DTM:

- You cannot undo/redo any action that you had performed on the device before opening its DTM. The functionality becomes available again after you close the DTM.
- You cannot undo/redo changes performed in the DTM while the DTM is open.

Undoing Actions by Using the HISTORY Pane

To undo actions shown in the history of actions, proceed as follows.

Step	Action
1	In the list of actions shown in black, select the action that is immediately before the action that you want to undo. To undo all the actions that appear in the HISTORY pane, select Start .
2	Right-click the selected action and select Navigate . Result: <ul style="list-style-type: none"> The actions that follow the selected action up to and including the action preceded by an arrow are undone and shown in light gray. The selected action is marked as the current state of the system project. The actions and the history of actions are synchronized in Topology Manager instances in which the system project is open. <p>NOTE: If the list of actions to be undone contains one or more actions that were performed/redone by other users, you need to confirm the command for each one.</p>

Redoing Actions by Using the HISTORY Pane

To redo actions shown in the history of actions, proceed as follows.

Step	Action
1	In the list of actions shown in light gray, select the action up to which you want to redo.
2	Right-click the selected action and select Navigate . Result: <ul style="list-style-type: none"> The actions that follow the action preceded by an arrow up to and including the action that you have selected are redone and shown in black. The action you have selected is marked as the current state of the system project. The actions and the history of actions are synchronized in Topology Manager instances in which the system project is open. <p>NOTE: If the list of actions to be redone contains one or more actions that were performed/undone by other users, you need to confirm the command for each one.</p>

Creating and Managing System Projects

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Managing System Projects of the Earlier Version	59

Overview

This chapter describes how to create and manage system projects by using the **Start Page** of the Topology Manager.

A system project is created in the Control Expert repository of the system server to which you are connected. It can be accessed concurrently by other Control Expert instances connected to the same system server.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Organizing System Projects

Overview

In the **Projects** section, page 73 of the **Start Page**, you can create and manage a folder structure to organize system projects.

Each folder can contain one or more subfolders and system projects.

Creating Folders

To create a folder, proceed as follows.

Step	Action
1	In the Projects section of the Start Page , right-click the Control Expert repository root node, page 74 and select New Folder . NOTE: To create a subfolder, repeat step 1 at the folder level.
2	If needed, edit the identifier of the folder in the PROPERTIES pane.

Folder Actions

Right-click the Control Expert repository root node or any to open a context menu with the following commands.

Command	Description
New System	Creates a new system project.
New Folder	Creates a new folder or subfolder.
Delete	Deletes the folder after confirming the command. The command is not available if the folder contains subfolders or system projects. NOTE: The command is not available from the Control Expert repository root node.
Import	Opens the Import dialog box that lets you import, page 58 system project data contained in an export file.

Moving Folders

To move a folder, drag it to its new position in the tree of the Control Expert repository, which appears in the **Projects** section of the **Start Page**.

If a folder with the same name already exists at the target location, the contents of both folders (system projects and subfolders) is merged.

Folder Properties

Click a folder to display its properties in the **PROPERTIES** pane.

You can view and edit the following properties.

Category	Attribute	Description
General	Identifier	Click the field to edit the identifier. The software accepts only identifiers that are unique within the folder level.

Creating System Projects

Overview

In the **Project** section, page 73 of the **Start Page**, you can create system projects.

System projects and the data they contain are stored in the Control Expert repository of the system server whose IP address is indicated next to the root node, page 74.

When you create a system project, it automatically uses the hotfixes, page 50 that are installed on the local computer at that time.

For each system project, you can view and/or edit its properties.

Setting a Password

When you create a system project, you can set a password, page 52 for it.

NOTE: Schneider Electric recommends setting a password for your system projects and storing them securely to help protect against data tampering. The password is used as application password of control projects and to enable file encryption, page 53.

Creating a System Project

To create a new blank system project, proceed as follows.

Step	Action
1	Connect Control Expert to the system server on which you want to create the system project.
2	Open the Start Page .
3	In the Project section, right-click the Control Expert repository root node or a folder and select New System Project . Result: The New System Project dialog box opens.
4	Enter a name for the system project and enter a password. Click OK . Result: A new system project is created. The system project password is used as application password of control projects and to enable file encryption. NOTE: You can set and manage the password also from the User Preferences window, page 104 once the system project is created. To create the system project without setting a password, leave the password text boxes blank.

System Project Actions

Right-click a system project to open a context menu with the following commands.

Command	Description
Delete	Deletes the system project including all of its contents after confirming the command. You cannot delete a system project if it is being used by another user.
Export	Opens the Export dialog box that lets you create an export file, page 57 containing the system project data.

Moving System Projects

To move a system project, drag it to its new position in the tree of the Control Expert repository, which appears in the **Project** section of the **Start Page**.

You cannot move a system project if it is open in the Topology Manager.

System Project Properties

Select the system project in the **Start Page** or the **SYSTEM PROJECT** pane to show its properties in the **PROPERTIES** pane.

You can view and/or edit the following attributes.

Category	Attribute	Description
General	Identifier	Editable name, page 25 of the system project. The software accepts only identifiers that are unique within the System project repository of the system server.
	Description	Optional. You can enter a description of the system project by using free-form text. Default value: Blank
	Customer	Optional. You can enter a description of the customer that the system project pertains to by using free-form text. Default value: Blank
	Site	Optional. You can enter a description of the site that the system project pertains to by using free-form text. Default value: Blank
	Creation Date ⁽¹⁾	Date of the system project creation.
	Created By ⁽¹⁾	User name, page 166 that was entered to log in to the Control Expert instance.
	Modification Date ⁽¹⁾	Date of the last modification of properties of the system project.
	Modified By ⁽¹⁾	User name, page 166 that was entered to log in to the Control Expert instance.
	Supports Upward Compatibility ⁽¹⁾	When enabled (check box selected), indicates that you can export the system project, page 57 and import it in a later version of the software to continue using it. Otherwise, you can import the file only in the same version. This applies also to the topology, page 216 of a system project. To enable upward compatibility, it requires that the control projects of all Modicon PAC controllers of the system project have been built and no changes have been made thereafter, which impact the build state. For M580 PACs, this is indicated by the Build State Built , page 125.
	Change Description	Optional. You can enter a description of the changes made to the system project by using free-form text. Default value: Blank
Syslog Server	For a description of the attributes, refer to the topic describing the Syslog Server category, page 147 of the SERVICES tab. NOTE: The values that are set for the system project are applied to the PACs that you create from that point on but can be overridden for each PAC. The values configured for the PAC are the ones that are used for communication with the Syslog server.	
(1) The attribute is read-only and managed by the software.		

Opening and Closing System Projects

Overview

You can open only one system project at a time in an instance of the Topology Manager.

Data of objects that you edit by using the Topology Manager is automatically persisted in the Control Expert repository.

Hotfix Availability

To open, a system project requires the hotfixes that were installed on the computer at the time of its [creation, page 47](#) plus, any additional hotfixes that are installed on the computer on which you open it.

Thereafter, you can reopen the system project only on computers on which all these hotfixes are installed; otherwise, a dialog box opens, which indicates the hotfixes that are missing.

You need to install these hotfixes to be able to open the system project.

NOTE: To see which hotfixes are installed on a computer, open the **About** dialog box, [page 30](#) and click **Technical Information**.

Opening a System Project

To open a system project, proceed as follows.

Step	Action
1	<p>Open, page 30 the Start Page.</p> <p>Result: The system projects that exist in the Control Expert repository of the system server to which you are connected are displayed in the Projects section.</p>
2	<p>Double-click a system project or select it and click Open.</p> <p>Result: The software:</p> <ul style="list-style-type: none"> • Closes the Start Page. • Opens the Default Physical View window of the system project and related panes, page 71. • Displays the identifier of the system project in the title bar of the Topology Manager. <p>NOTE: If the system project is password-protected, page 52, you must enter the password when prompted. Otherwise, you cannot open it.</p> <p>NOTE: If a system project is already open, a dialog box is displayed. You need to confirm closing the open system project first.</p>

Closing a System Project

You cannot close a system project unless you:

- Open another system project in the same Topology Manager instance.
- Connect to another system server.
- Close Control Expert.

You need to confirm closing the system project that is open.

NOTE: You can close a system project even if it is [locked, page 55](#).

Recovered System Projects

In case the software is not able to read the metadata of existing system projects (for example, their identifier) from the Control Expert repository, the next time the system server is started, the system projects are recovered and remain functional. Only their original [properties, page 48](#) are lost and the system project identifier is

replaced with *Recovered_ID* where *ID* is a randomly generated string to maintain identifier uniqueness.

NOTE: If you have an up-to-date backup of the database, page 60, you can restore it to recover the properties.

Setting Passwords for System Projects

Overview

The **System Project** section of the **User Preferences** window, page 104 allows you to set, modify, and clear a password for the system project that is open.

Scope of the Password Protection

Once you have set a password for a system project, you must enter it when prompted to be able to perform the following actions.

- Open the system project (except if you just imported it and entered the password).
- Export the system project (except if it is open).
- Import, page 58 the system project.
- Import, page 218 a topology file (.xpt) that was exported from this system project.
- Paste a device, page 200 that you have copied or cut from this system project in another system project.

The password is also used as application password of control projects, page 53 and enables file encryption.

Password Requirements

To be valid, a password must contain at least 8 characters and at least one character from each of the following categories:

- Uppercase characters from the classical Latin alphabet (A...Z)
- Lowercase characters from the classical Latin alphabet (a...z)
- Base-10 digits (0...9)
- Special characters (~, !, @, \$, %, ^, &, *, _ , +, -, =, ` , |, \, (,), [,], ; , " , ' , < , > , { , } , ; , #)

Setting a Password

To set a password for the system project that is open, proceed as follows.

Step	Action
1	Open the User Preferences window and select the System Project section.
2	Click Define Password...
3	In the dialog box that opens, enter the password, confirm it by entering it again, and click OK . Result: If the password is valid, a confirmation message is shown and the password is set. Otherwise, you need to reenter the password.

Changing the Password

To change the password of the system project that is open, proceed as follows.

Step	Action
1	Open the User Preferences window and select the System Project section.
2	Click Define Password...
3	In the dialog box that opens, enter the current password, the new password, confirm it by entering it again, and click OK . Result: If the current and new passwords are valid, a confirmation message is shown and the new password is set. Otherwise, you need to reenter the passwords.

Clearing the Password

To clear the password of the system project that is open, proceed as follows.

Step	Action
1	Open the User Preferences window and select the System Project section.
2	Click Clear Password....
3	In the dialog box that opens, enter the current password and click OK . Result: If the password is valid, password protection for the system project is removed. Otherwise, you need to reenter the password. NOTE: If you had exported the topology of this system project (.xpt) before clearing the password, you will be prompted for the password when you import the file.

Recovering a Forgotten Password

If you are prompted to enter the password of a system project and have forgotten it, proceed as follows to receive a temporary password.

Step	Action
1	In the dialog box prompting you to enter the password that is set, click I forgot my password . Result: An unlock code is displayed in the dialog box.
2	Contact Schneider Electric support and provide the unlock code. Result: You receive a temporary password.
3	Enter the temporary password in the Password text box.
4	Follow the procedure describing how to change the password and use the temporary password as the current password.

Managing the Application Password of Control Projects

When you set a password for a system project, it is also used as application password and enables file encryption for control projects of **Modicon PAC Controllers** in this system project.

The corresponding section in the properties of a control project in Control Expert Editor is disabled and both application password and file encryption can only be managed at the system project level.

For details on the application password and file encryption (**Project > Properties > Project & Controller Protection > Application**), refer to the topic describing application protection (see EcoStruxure™ Control Expert (Classic), Operating Modes).

The table describes the impact on the control projects of **Modicon PAC Controllers** in a system project when you perform the following password-related actions.

Action	Result for Modicon PAC Controllers
Set a password for the system project.	<p>The password is set as application password and file encryption is enabled the first time you edit or build the control project⁽¹⁾⁽²⁾.</p> <p>If you edit it, you need to build the project in Control Expert Editor or the Topology Manager to apply the change.</p>
Clear the password for the system project.	<p>The application password is cleared and file encryption is disabled for the control project the next time you edit or build it⁽¹⁾⁽²⁾.</p> <p>If you edit it, you need to build the project in Control Expert Editor or the Topology Manager to apply the change.</p>
Change the system project password.	<p>The application password is changed for the control project the next time you edit or build it. File encryption remains enabled⁽¹⁾⁽²⁾.</p> <p>If you edit it, you need to build the project in Control Expert Editor or the Topology Manager to apply the change.</p>
No password is set for the system project.	<p>No application password can be set and file encryption cannot be enabled.</p> <p>For controllers for which an application password was already set and file encryption enabled, the password is cleared and file encryption is disabled the first time you edit or build their control project⁽¹⁾.</p> <p>If you edit it, you need to build the project in Control Expert Editor or the Topology Manager to apply the change.</p>
<p>(1) Applies without editing the control project for projects of M580, page 242 and legacy, page 253 controllers that you have pasted, page 200 or imported in the system project by using a ZEF file or a topology export file, page 218. However, you need to build the control project to apply the change.</p>	
<p>(2) If the control project is open in Control Expert Editor while you perform the action on the password, use the Synchronize Changes command or close the control project and save changes. You need to build the control project to apply the change.</p>	

Locking and Unlocking System Projects

Overview

You can lock a system project so that it becomes read-only for any other user whether the system project is already open in the Topology Manager or they open it after you locked it. A system project that is locked is indicated by a lock icon in the **SYSTEM PROJECT** pane.

Use this functionality when you are working on a system project and do not want anyone else to be able to modify it or start an operation that may prevent you from completing an action.

Certain actions can still be performed by other users on a locked system project.

Only the user who locked the system project can unlock it.

Other users connected to the same system project are informed about the locked/unlocked condition in the **ACTIVITIES** tab, page 166.

Authorized Actions on Locked System Projects

While a system project is locked, other users can:

- View it in read-only mode. Changes that you make are visible to others connected to the same system project.
- Switch from offline to online mode, page 274 and vice versa.
- Open the control project, page 231 of a PAC in read-only mode.

Implicit System Project Lock

The use of certain commands automatically locks the system project while the operation is in progress (for example, exporting the system project or the process of opening a control project after clicking **Edit Control Project**).

The temporary lock may prevent you from completing certain actions like opening a control project or saving changes when closing a control project.

The temporary lock comes into effect whether the same user or several users perform actions concurrently on the same system project.

The lock is automatically released when there is no more conflict (for example, when the export operation is completed or the control project is open).

NOTE: When a system project is locked automatically, the lock icon does not appear in the **SYSTEM PROJECT** pane but dialog boxes open to inform you.

Locking a System Project

To lock a system project, proceed as follows.

Step	Action
1	<p>With the system project open, right-click the system project name in the SYSTEM PROJECT pane and select Lock.</p> <p>Result: The system project is locked and a red lock icon appears next to its name in the SYSTEM PROJECT pane. Other users cannot modify the system project anymore.</p>

Unlocking a System Project

To unlock a system project, proceed as follows.

Step	Action
1	<p>With the system project open, right-click the system project name in the SYSTEM PROJECT pane and select Unlock.</p> <p>Result: The system project is unlocked and the red lock icon is removed. Other users can modify the system project.</p>

Exporting System Projects

Overview

You can save an entire system project to file by using the **Export** command, for example:

- To create a backup of your work that you can restore by importing it, page 58.
- To import the system project in another Control Expert repository (system server).

During the export operation, no changes can be made to the system project.

NOTE: Schneider Electric recommends setting a password, page 52 for your system projects before exporting them to help protect export files against data tampering.

System Project Upward Compatibility

You can import, page 58 system project export files in the next version of Control Expert only if at the time of export, the **Supports Upward Compatibility** attribute, page 48 was enabled.

Otherwise, you can use an export file only with the version of Control Expert that was used to create it.

When you update the software, System projects that exist in the Control Expert repository are automatically exported, page 74.

Contents of the Export File

An export file (.ece) contains the complete system project data including:

- The identifier, page 48 of the system project (for example, *System_1*). It is independent of the name of the export file, which you can modify without impacting the identifier.
- Devices, their attribute configuration, and physical links.
- The control projects, page 229 that are associated to PACs and controllers.
- Configuration files.
- Communication mapping.
- Logical networks.
- Physical views.

Exporting a System Project

Step	Action
1	<p>Select the Export context menu command by right-clicking either the system project in the Projects section of the Start Page or the system project root node in the SYSTEM PROJECT pane.</p> <p>Result: The Export dialog box opens.</p> <p>NOTE: If the system project is password-protected, you must enter the password when prompted. Otherwise, you cannot export it.</p>
2	<p>Edit the export file name, and/or select a location, and click Save.</p> <p>Result: The export file is created.</p>

Importing System Projects

Overview

You can import an entire system project contained in an export file (.ece) by using the **Import** command.

The export file must have been created by using the **Export** command, page 57.

NOTE: The version compatibility and import rules described in this topic apply also to system projects that you import from the **Earlier Projects** section, page 74 of the **Start Page**.

Software Version Compatibility

You may be able to import a system project in a later version of Control Expert. For details, refer to the topic describing the upward compatibility, page 57 of system projects.

System Project Import Rules

When you import a system project and one with the same identifier, page 57 already exists in the Control Expert repository, the following rules apply:

- The existing system project is overwritten unless you select to rename the one you are importing. A dialog box opens where you can choose which action you want to perform.
- The existing system project must be closed to be overwritten.

NOTE: If you select to rename the imported system project, the new identifier is indicated in the ACTIVITIES tab under **Object** for the entry corresponding to the import operation.

Importing a System Project

Step	Action
1	In the Projects section of the Start Page , right-click the Control Expert repository root node or a folder and select Import . Result: The Import dialog box opens.
2	Browse to the export file containing the system project and click Open . Result: The system project is imported at the selected location. NOTE: If the system project is password-protected, page 52, you must enter the password when prompted. Otherwise, you cannot import it.

Managing System Projects of the Earlier Version

Overview

This section describes the actions that you can perform on system projects created with the earlier version of Control Expert and that appear in the **Earlier Projects** section of the **Start Page**, page 73.

NOTE: System projects with status **Not Imported** or **Not Compatible** are not backed up, page 65.

Importing Earlier System Projects

Step	Action
1	<p>In the Earlier Projects section, select a system project with status Not Imported and click Import.</p> <p>Result: The selected system project is imported, page 58 into the current version of Control Expert.</p> <p>Once import is completed, it appears in the Projects section and is added to the Control Expert repository.</p> <p>NOTE: If the system project is password-protected, page 52, you must enter the password when prompted. Otherwise, you cannot import it.</p>

Deleting Earlier System Projects

Step	Action
1	<p>In the Earlier Projects section, select one or more system projects, right-click either one, and select Delete.</p> <p>Result: The selected system projects are permanently deleted from the Migration folder after you confirm the command.</p> <p>NOTE: To permanently delete all the system projects of a same Control Expert version, right-click the corresponding node instead.</p>

Backing Up and Restoring Databases

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Scheduling Database Backups

Overview

The **Back Up Database** tab of the **Server Configuration** tool lets you create a database backup file, page 65 containing data of system projects that are stored in the Control Expert repository of the system server. That is, the system projects that appear in the **Projects** section, page 73 of the **Start Page** when you are connected to the server.

You can back up the database automatically either way:

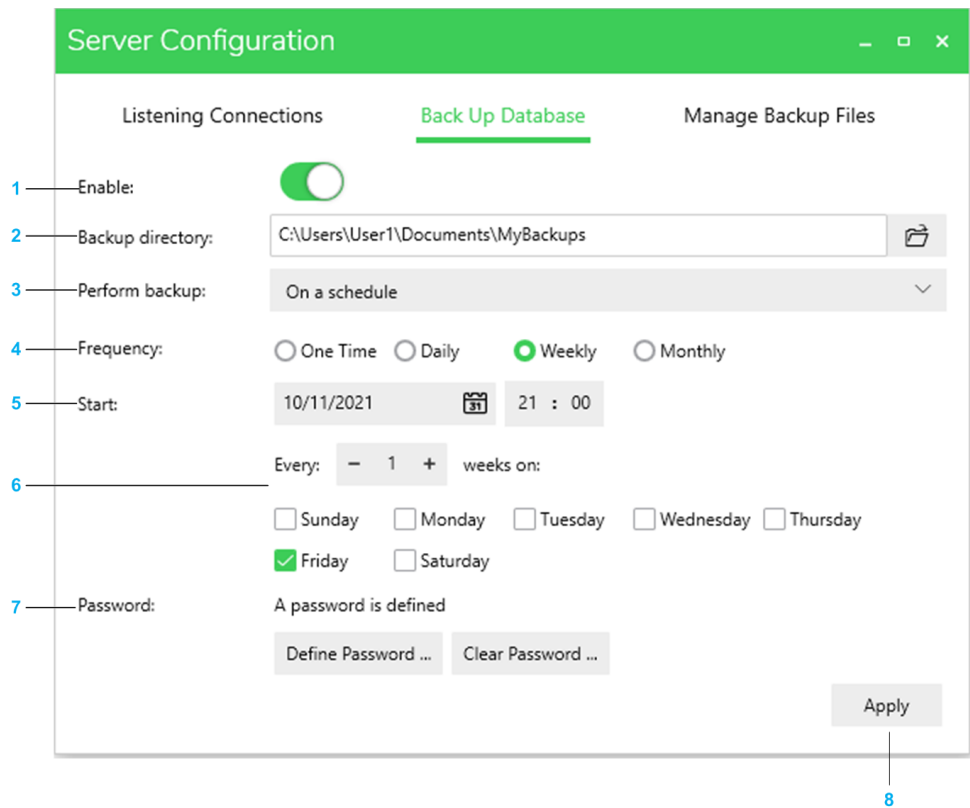
- When the computer that acts as the system server is restarted.
- On a one-time or recurring schedule.

You can set a password, which is applied to database backup files when they are created. The password is required to restore, page 67 a password-protected backup file.

NOTE: Open the **Server Configuration** tool on the computer that acts as the system server, page 104 in your Control Expert architecture. You need administrator rights on the computer to open the tool.

Back Up Database Tab

The following figure shows an example of database backups that have been scheduled on a weekly basis.



Item	Description
1	<p>Off (gray): No database backup is performed. Your settings are not discarded when you turn off backups and apply.</p> <p>On (green): Database backups are performed according to the backup mode and/or schedule that has been applied.</p>
2	<p>Location where you want to store backup files that are created with either backup mode. Browse to select an existing folder or create a new one.</p> <p>NOTE: When you select a network location, verify that the folder can be accessed from the computer running the system server. You need to enter credentials to set the network path. The Windows user account must have a password to be able to use the scheduled backup.</p>
3	<p>Database backup mode.</p> <ul style="list-style-type: none"> • On a schedule: Performs database backups based on the schedule that has been applied. • On server start: Performs a database backup each time the computer on which the system server runs is restarted. The server starts after the backup is completed. The mode is not available when you select a backup directory on the network.
4	Database backup frequency.
5	<p>Lets you set the date and time when the backup will be performed (One Time) or the date when the schedule will start. When scheduled, the backup will be performed at the time that is set.</p> <p>NOTE: Once, before a scheduled backup is performed, a notification about the upcoming system server stop is shown in the toolbar, page 30 of connected clients. The notification appears two hours before the scheduled time (or immediately if a schedule is created for a backup in less than two hours).</p>
6	<p>Lets you refine the schedule for the selected frequency (except for One Time).</p> <p>Daily</p> <p>You can select intervals from 1 to 365 days.</p> <p>For example, every 10 days.</p>
	<p>Weekly</p> <p>You can select:</p> <ul style="list-style-type: none"> • One or more days of the week.

Item	Description	
		<ul style="list-style-type: none"> Intervals from 1 to 52 weeks. For example, every 3 weeks.
	Monthly	You can select: <ul style="list-style-type: none"> The day of the month. For example, 3rd day of the month. Intervals of 1, 2, 3, 4, 6 or 12 months. For example, every 2 months.
7	Lets you manage password-protection for database backup files. NOTE: The status of the password protection cannot be indicated and the password cannot be managed when the Server Administration Console system server console window is open (EcoStruxure Control Expert > Server Administration Console from the Windows® Start menu) or if the system server is not running (see EcoStruxure™ Control Expert, Installation Manual).	
8	Applies your settings and keeps the Server Configuration tool open. Setting, changing, and clearing the password does not require clicking Apply . NOTE: If you opened the tool and a network location was already selected for Backup directory , you need to enter credentials for this location to apply changes.	

Setting A Backup File Password

To set a password for database backup files, proceed as follows.

Step	Action
1	In the Back Up Database tab of the Server Configuration tool , click Define Password...
2	In the dialog box that opens, enter the password, confirm it by entering it again, and click OK . Result: If the password is valid, page 52, a confirmation message is shown and the password is applied to database backup files that are created from now on. Otherwise, you need to reenter the password.

Changing the Password

To set a new password for database backup files, proceed as follows.

Step	Action
1	In the Back Up Database tab of the Server Configuration tool , click Define Password...
2	In the dialog box that opens, enter the current password, the new password, page 52, confirm it by entering it again, and click OK . Result: If the current and new passwords are valid, a confirmation message is shown and the new password is applied to database backup files that are created from now on. Otherwise, you need to reenter the passwords. NOTE: The password of existing database backup files is not changed.

Clearing the Password

To clear the password for database backup files, proceed as follows.

Step	Action
1	In the Back Up Database tab of the Server Configuration tool , click Clear Password...
2	In the dialog box that opens, enter the current password and click OK . Result: If the password is valid, a confirmation message is shown and no password is applied to database backup files that are created from now on. Otherwise, you need to reenter the password. NOTE: The password of existing database backup files is not cleared.

Recovering a Forgotten Password

If you are prompted to enter the password for a database backup file and have forgotten it, proceed as follows to receive a temporary password.

Step	Action
1	In the dialog box prompting you to enter the password that is set, click I forgot my password . Result: An unlock code is displayed in the dialog box.
2	Contact Schneider Electric support and provide the unlock code. Result: You receive a temporary password.
3	Enter the temporary password in the Password text box.
4	Follow the procedure describing how to change the password and use the temporary password as the current password. NOTE: The password of existing database backup files is not changed.

Backing Up Databases

Overview

Backing up the database stops the system server. It restarts automatically after the operation is completed. For a large database, this may take one hour or more.

NOTE: Always store database backup files in a secure location to help prevent data tampering. This includes, but is not limited to, [setting a password, page 63](#), restricting users who can access backup storage folders and defining the appropriate permissions for each user.

Backup File Name

The name of database backup files has the following format `<Computer name>_<YYYY-MM-DD>T<HH_MM_SS>.dbk` where:

- `<Computer name>` is the name of the computer on which you have configured database backups.
- `<YYYY-MM-DD>T<HH_MM_SS>` is the date and time when the backup was started.

Example: Station1_2021-10-25T09_45_10.dbk

NOTE: Do not modify the file name format because it may not appear in the **Manage Backup Files** tab anymore.

Backup File Content

A database backup contains the complete data of the system projects that exist in the Control Expert repository of the computer on which the backup is performed.

But it does not contain the following:

- *DTMs* (including *EDS* and *GSD* files).
- Installed hotfixes.
- The history of activities (notification and **HISTORY** panes).
- System projects of the earlier Control Expert version with status, [page 74](#) **Not Imported** or **Not Compatible**.

Backing Up the Database On Server Start

Step	Action
1	On the computer acting as system server, page 104 , from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration . Result: The Server Configuration tool opens. NOTE: You need administrator rights on the computer to open the tool.
2	Select the Back Up Database tab, page 61 and enable database backup.
3	Browse to a folder with sufficient free space to store the backup files, select the On server start backup mode, and click Apply . Result: A confirmation dialog box opens.
4	Confirm the operation and close the Server Configuration tool. Result: Each time this computer system server is restarted, a database backup is performed. NOTE: You can view the result of the backup operation either way: <ul style="list-style-type: none"> • By opening the Windows® Event Viewer (Windows Logs > Application, Source = SE.Automation.SystemManager.Configuration). • By selecting the Manage Backup Files tab, page 67 of the Server Configuration tool and verifying the presence of the file.

Backing Up the Database On a Schedule

Step	Action
1	<p>On the computer acting as system server, page 104, from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration.</p> <p>Result: The Server Configuration tool opens.</p> <p>NOTE: You need administrator rights on the computer to open the tool.</p>
2	<p>Select the Back Up Database tab, page 61 and enable database backup.</p>
3	<p>Browse to a folder in which to store the backup files and select the On a schedule backup mode.</p> <p>NOTE: Verify that the disk has sufficient free space (up to 1 GB of disk space is needed for one large database backup file) and that the computer acting as system server can write to this folder.</p> <p>NOTE: When you browse to a network location as backup directory, verify that the folder can be accessed from the computer acting as system server now and at the scheduled dates. You need to enter credentials to set the network path.</p>
4	<p>Configure the database backup frequency and refine the schedule.</p> <p>NOTE: Verify that the system server can be stopped at the configured dates and time. That is, no system project is open in a Control Expert instance.</p>
5	<p>Click Apply.</p> <p>Result: A confirmation dialog box opens.</p>
6	<p>Confirm the operation and close the Server Configuration tool.</p> <p>Result:</p> <ul style="list-style-type: none"> • Two hours before the scheduled dates and time, a notification about the upcoming system server stop is shown in the toolbar, page 30 of connected clients. • At the scheduled dates and time, the system server that is running on this computer will be stopped, connected clients disconnected, and a database backup performed. The server will restart automatically and clients will be reconnected. <p>NOTE:</p> <p>You can view the result of the backup operation either way:</p> <ul style="list-style-type: none"> • By opening the Windows® Event Viewer (Windows Logs > Application, Source = SE.Automation.SystemManager.Configuration). • By selecting the Manage Backup Files tab, page 67 of the Server Configuration tool and verifying the presence of the file.

Restoring and Managing Databases

Overview

The **Manage Backup Files** tab of the **Server Configuration** tool lets you restore a database from a backup file manually.

Restoring a database stops the system server. It restarts automatically after the operation is completed. This may take one hour or more for a large database.

Before a backup file is restored, the software creates a copy of the current database, which lets you undo the restore operation.

If a password, page 63 has been applied to the database backup file, you need to enter it when prompted to be able to restore the file.

NOTE: Restoring a database overwrites the database that is mounted.

NOTE: You need administrator rights on the computer on which you open the **Server Configuration** tool.

Software Version Compatibility

You can restore a database backup file only with the same version of Control Expert.

NOTE: To make your system projects compatible with the next version of Control Expert, export them, page 57 while the **Supports Upward Compatibility** check box is selected.

Managing Disk Space

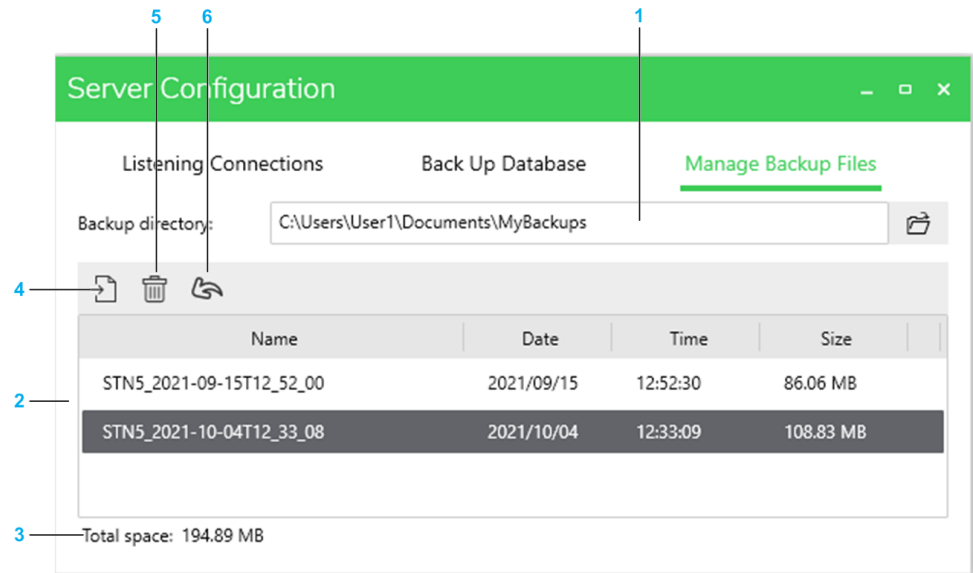
Depending on the selected schedule and the size of the database, backup files that the software creates can use up a lot of disk space over time. Manage the folders containing backup files regularly to make sure sufficient disk space remains available for new files to be created.

Restoring Databases on a Different System Server

Avoid restoring a database to a Control Expert system server on another computer. If it is required, before you restore the database, verify that the same Control Expert hotfixes and Device Type Managers (*DTMs*) are also installed on the other computer. Otherwise, system projects may not be usable.

Manage Backup Files Tab

The following figure shows an example of backup files that you can use to restore the database.



Item	Description
1	Path to the folder containing the database backup files that have been created last. NOTE: When you select a network location, verify that the folder can be accessed from the computer running the system server. You need to enter credentials to set the network path and to view the content of the network location when you reopen the Server Configuration tool.
2	List of database backup files, page 65 that have been created in the selected folder. The file name, creation date, the time the backup was started, and the file size are indicated. Files in subfolders are not shown. The view is automatically refreshed.
3	Total size of backup files inside the selected folder.
4	Lets you restore the selected backup file.
5	Lets you permanently delete the selected backup files.
6	Lets you undo the last restore operation. The button is disabled once the restore has been undone.

Restoring a Database

NOTE: Database restore does not work when the **Server Administration Console** system server console window is open (**EcoStruxure Control Expert > Server Administration Console** from the Windows® Start menu) or if the system server is not running (see EcoStruxure™ Control Expert, Installation Manual).

Step	Action
1	Verify that no system project is open in theControl Expert instances that are connected to the system server, page 104.
2	On the computer acting as system server, from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration . Result: The Server Configuration tool opens.
3	Select the Manage Backup Files tab.
4	Browse to a folder in which the backup files for this system server are stored and select one file. NOTE: When you select a network location, verify that the folder can be accessed from the computer running the system server. You may need to enter credentials.
5	Click the Restore button. Result: A confirmation dialog box opens.
6	Confirm the operation. Result: The system server is stopped, a copy of the current database is created, and the database restore operation starts. This overwrites the database that is mounted. The server restarts automatically. NOTE: If a password has been applied, a dialog box opens and you need to enter the password that was in effect in the Back Up Database tab, page 61 when the database backup file was created. Otherwise, you cannot restore the backup file.
7	Open the Windows® Event Viewer (Windows Logs > Application, Source = SE.Automation.SystemManager.Configuration) and confirm that the database restore operation completed successfully.

Undoing a Restore Operation

You can undo only the last database restore operation. This mounts again the database that was mounted before the last restoration.

NOTE: Undo does not work when the **Server Administration Console** system server console window is open (**EcoStruxure Control Expert > Server Administration Console** from the Windows® Start menu) or if the system server is not running (see EcoStruxure™ Control Expert, Installation Manual).

Step	Action
1	Verify that no system project is open in theControl Expert instances that are connected to the system server, page 104.
2	On the computer acting as system server, from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration . Result: The Server Configuration tool opens.
3	Select the Manage Backup Files tab and click the Undo last restore button if it is enabled. Result: A confirmation dialog box opens. NOTE: The backup directory and the file that are selected have no impact on the undo operation.
6	Confirm the operation. Result: The system server is stopped and the last restore operation is undone. A confirmation dialog box opens once it is completed. The Undo last restore button is disabled. NOTE: If a password was in effect in the Back Up Database tab, page 61 when the database was restored, you need to enter this password to be able to perform the undo.
7	Open the Windows® Event Viewer (Windows Logs > Application, Source = SE.Automation.SystemManager.Configuration) and confirm that the database restore operation completed successfully.

Deleting Database Backup Files

Step	Action
1	<p>On the computer acting as system server, page 104, from the Windows® Start menu, click EcoStruxure Control Expert > Server Configuration.</p> <p>Result: The Server Configuration tool opens.</p>
2	<p>Select the Manage Backup Files tab.</p>
3	<p>Browse to a folder in which the backup files for this system server are stored and select one or more files that you want to delete.</p> <p>NOTE: When you select a network location, verify that the folder can be accessed from the computer running the system server. You may need to enter credentials.</p>
4	<p>Click Delete.</p> <p>Result: A confirmation dialog box opens, which contains the names, page 65 of the selected backup files.</p>
5	<p>Verify the file names and confirm the operation.</p> <p>Result: The selected backup files are permanently deleted.</p>

Views and Panes

What's in This Part

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Overview

This part describes the various views that are available to engineer a control system. Each view shows different information of the same system project.

In addition, various panes complement these views. They provide more details or let you manage data of system project objects.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES tab**, page 166 of the notification pane provide details.

Views

What's in This Chapter

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Start Page

Overview

The **Start Page** opens when the Topology Manager opens.

It contains various information such as:

- The connection status to the system server service.
- Latest information on Schneider Electric.
- Recently opened system projects.
- System projects that were created with an earlier version of Control Expert.

The information is organized in sections and available only when Control Expert is connected to a system server.

The page lets you view, configure, open, and export the system projects that are stored in the Control Expert repository of the system server to which you are connected. You can also import system projects.

NOTE: For information about the security database, refer to the *Security Editor Operation Guide*.

NOTE: The **Start Page** closes when you open a system project.

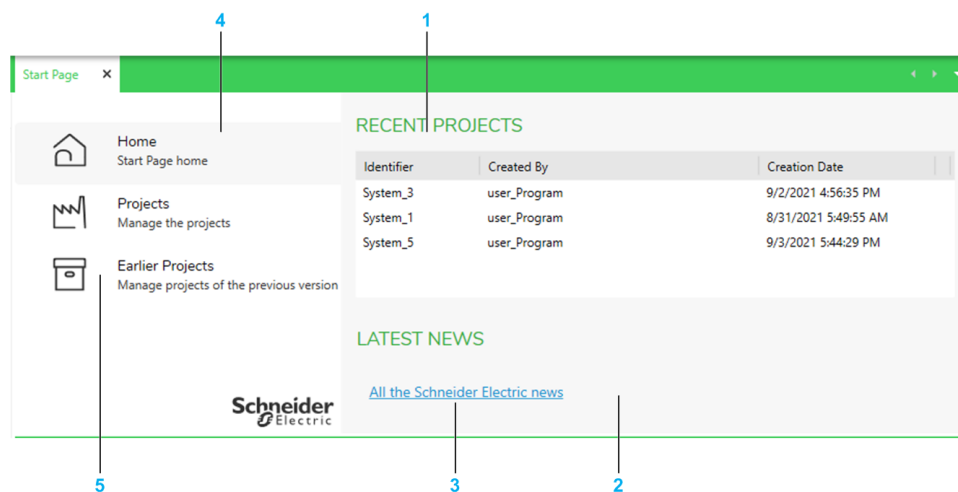
Opening the Start Page

To open the **Start Page**, click its icon in the title bar.



Home Section Description

The following figure shows the **Home** section of the **Start Page** when Control Expert is connected to a system server.

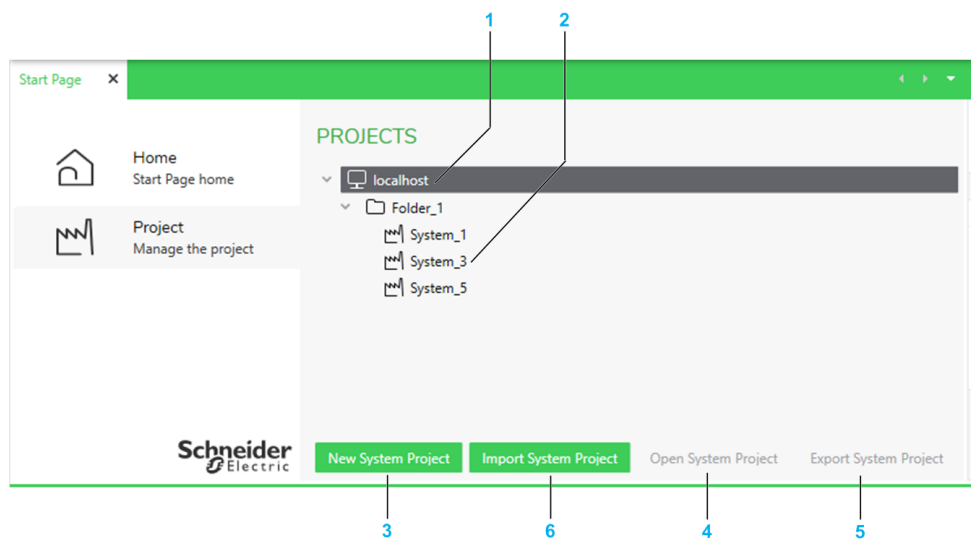


Item	Description
1	Displays the system projects that you have opened last on the system server to which you are connected. Double-click a system project to open it.
2	Displays latest news about Schneider Electric when a connection to the Internet exists.
3	Link to https://blog.se.com . A connection to the Internet is required.

Item	Description
4	Opens the Projects section.
5	<p>Opens the Earlier Projects section, page 74.</p> <p>NOTE:</p> <p>The section appears in the following cases:</p> <ul style="list-style-type: none"> You have updated the software and system projects created with the earlier version have been exported during the update. An earlier version of the software was removed and the system projects that were exported during the removal are still present on the computer that is used as system server for the current version.

Projects Section Description

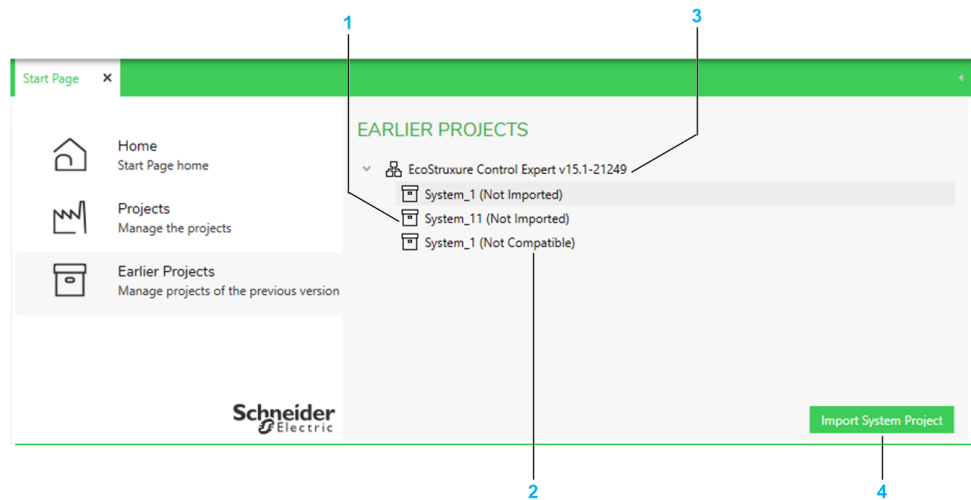
The following figure shows an example of the **Projects** section.



Item	Description
1	<p>Control Expert repository root node of the system server to which you are connected. Indicates the IP address of the system server.</p> <p>Expand the node to view the system projects, page 45 that are available on this system server. Data is displayed only while you are connected to the system server.</p> <p>NOTE: By default, Control Expert is connected to the local system server and the IP address appears as localhost.</p>
2	Tree showing the folder structure of the Control Expert repository. Select an item to view its properties in the PROPERTIES pane.
3	Creates, page 47 a new system project under the Control Expert repository root node or folder that is selected.
4	Opens, page 50 the selected system project and closes the Start page.
5	Lets you export, page 57 the selected system project.
6	Lets you import, page 58 a system project.

Earlier Projects Section Description

The following figure shows an example of the **Earlier Projects** section from where you can manage, page 59 system projects of the earlier version of Control Expert.



Item	Description
1	<p>System projects that were created with an earlier version of Control Expert and that have been exported automatically from the Control Expert repository at the time the software was uninstalled.</p> <p>They are located at the path %ProgramData%\Schneider Electric\ControlExpert.Topology.X\Migration on the system server computer (where X is the version of Control Expert they were created with).</p>
2	<p>Status of the system project.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • Imported: The system project has already been made compatible with the current version of Control Expert and added to the Control Expert repository. You can open it from the Projects section. • Not Imported: The system project has not been migrated when the earlier version of the software was updated. You can import it to be able to use it with the current version of Control Expert. • Not Compatible: The system project cannot be used with the current version of Control Expert because it was not upward compatible, page 48 when it was exported from the earlier version of the software.
3	Node that represents the system projects that were created with a given version of Control Expert.
4	Lets you import, page 59 the system project.

Physical Views

Overview

The first time you open a system project, the **Default Physical View** opens.

Thereafter, you can open a physical view either way:

- By double-clicking it in the **Physical Views** node of the **SYSTEM PROJECT** pane, page 108.
- By clicking **Physical View Editor** in the **Open With** submenu of a device.

The physical view lets you design in a graphical way the hardware architecture (which is composed of devices and racks of M580 PACs), connect, page 208 the ports of devices and modules, and view network-related information of devices.

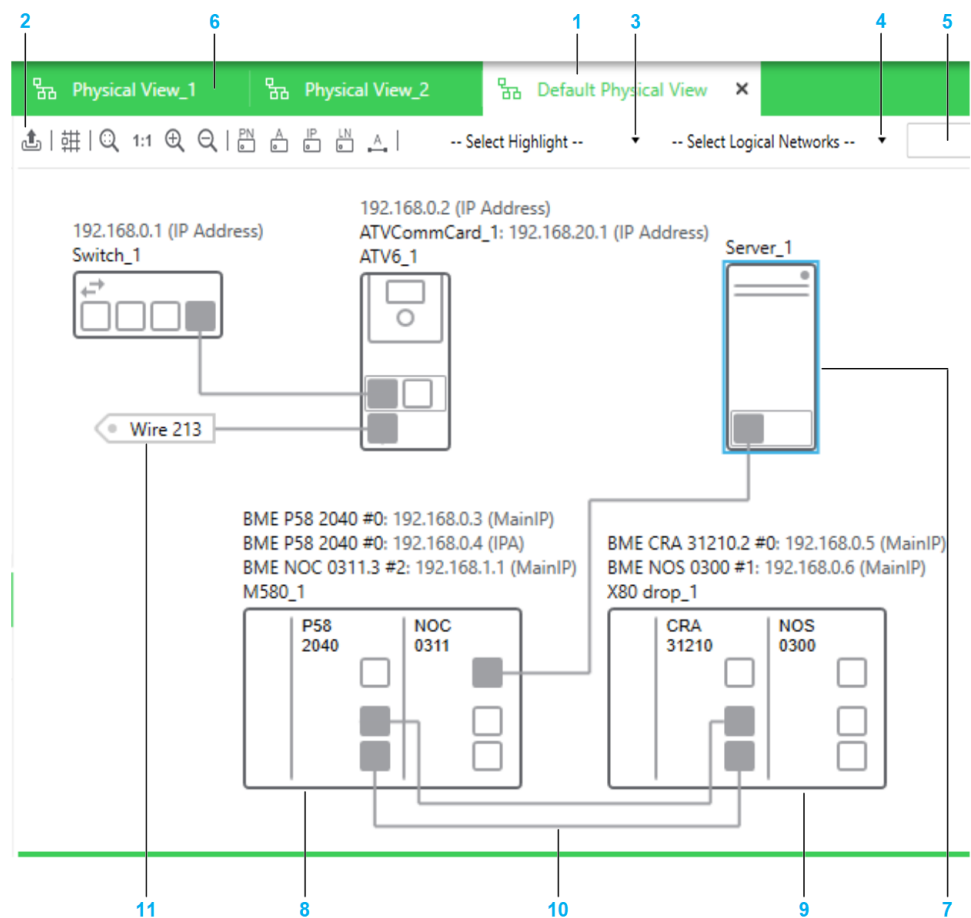
You can add equipment, page 190 to a physical view either from the **TOOLBOX** or from the **SYSTEM PROJECT** pane.

You can create additional physical views in the **SYSTEM PROJECT** pane and move devices, page 199 between physical views.

NOTE: For information on features that are available while working in physical views, refer to the topic describing how to use workspaces, page 32.

Description

The following figure shows an example of a physical view of a system project.



Item	Description
1	Tab of the physical view that is active.
2	Toolbar of the physical view. Buttons that have a toggle function are highlighted when the command is enabled. For details, refer to the description of the context menu commands of the physical view workspace, page 77.

Item	Description
3	List, which lets you identify graphically one of the following in the physical view: <ul style="list-style-type: none"> Port types, page 79 Redundant networks, page 79 Select None or close the physical view to remove highlights.
4	List, which lets you select one or more existing logical networks and highlight the objects, page 180 that belong to them.
5	Search field, which lets you locate objects, page 81, such as devices, modules, ports in the physical view that is active.
6	Tabs of other physical views that are open.
7	Representation of the device, page 184. The highlighted outline indicates that it is selected.
8	Representation of the local rack, page 185 of an M580 PAC whose configuration has been modified by editing its control project, page 229 with Control Expert Editor.
9	Representation of the drop of the PAC. You can reposition it, remove it from the view, or add it to another physical view.
10	Physical link, page 208 connecting the ports of two devices located in the same physical views.
11	Connector of a physical link connecting the ports of two devices located in different physical views.

Workspace Actions

The actions that you can perform by using the commands that are described in this table apply to each physical view individually. Modifications to the appearance or the behavior are persisted when you close the Topology Manager and reopen the system project on the same computer.

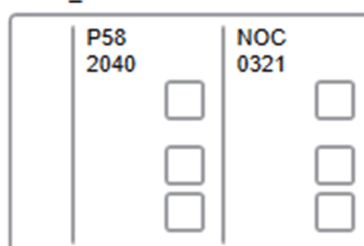
The table describes the commands of the context menu of the physical view workspace.

Command	Description
Snap Device to Grid	Enables a functionality, page 32 that lets you position devices by aligning them with an invisible grid.
View	Opens a submenu that lets you modify the zoom level, page 32 of the view.

Command		Description
Display	Display Part Number Labels	When selected, shows the Part Number attribute, page 125 of devices and PACs. For devices for which you have selected a DTM at the time of creation, the DTM Device Name attribute is displayed. The name is displayed above each device, left-aligned.
	Display Device Labels	When selected, shows the Name attribute, page 125 of devices. The name is displayed above each device, left-aligned.
	Display Link Labels	When selected, shows the Label attribute, page 213 of physical links. The label is displayed approximately in the middle of the link length with an orientation that is parallel to the link.
	Display IP Addresses	When selected, shows IP addresses and logical networks of devices and modules respectively. The information is shown on top of the label of the device (if shown).
	Display Logical Networks	When both are selected, the format is <i>Name: logical network/CIDR - IP address (IP address name)</i> , where: <ul style="list-style-type: none"> <i>Name</i> appears only for modules and for communication cards. It corresponds to the Name attribute. <i>Logical network</i> corresponds to the Logical Network attribute. If the device belongs to more than one logical network, one line for each network is displayed. <i>CIDR</i> corresponds to the CIDR notation suffix. <i>IP address</i>: If the device has more than one IP address, one line for each IP address is displayed. For example, for a CPU module of an M580 PAC, <i>BMEP582040 #0: MyNetwork/16 - 192.168.0.2 (MainIP)</i> NOTE: The following applies to the display of network data: <ul style="list-style-type: none"> IP address and logical network are not displayed if set to NOCONF. The data described in the table may not appear if the magnification is too low, page 32. You can view the <i>Logical network/CIDR - IP address</i> information at any time by hovering with the pointer over a device, module, or port, including the NOCONF configuration.
Paste		Refer to the topic describing the Paste command, page 200.
Export		Lets you save to a file the layout of the entire physical view independently of the current zoom level. The complete data that appears in the workspace (for example, objects, links, names of objects, highlights) is captured. It enables you to open the graphical layout by using a CAD software. You can create files of the following types: <ul style="list-style-type: none"> Microsoft® XPS GraphML

The following figure shows an example of the information that is displayed for a local rack when the display of names, IP addresses, and logical networks is enabled.

M580CPU_1: Default Network /24 - 192.168.0.2 (Main)
 M580CPU_1: Default Network /24 - 192.168.0.3 (A)
 NOCTRL_1: Logical Network_1 /24 - 192.168.10.1 (Main)
 NOCTRL_1: Logical Network_1 /24 - 0.0.0.0 (A)
 M580_1



Identification of Port Types

When you select **Port Types** from the **Select Highlights** list, ports are shown in a specific color depending on the type of network that they support.

Network type	Color
DIO	Orange
RIO	Green

NOTE: Disabled ports are shown in a lighter shade of gray.

Identification of Redundant Networks

When you select **Redundant Networks** from the **Select Highlights** list, the redundant ports of the following devices are shown in a specific color.

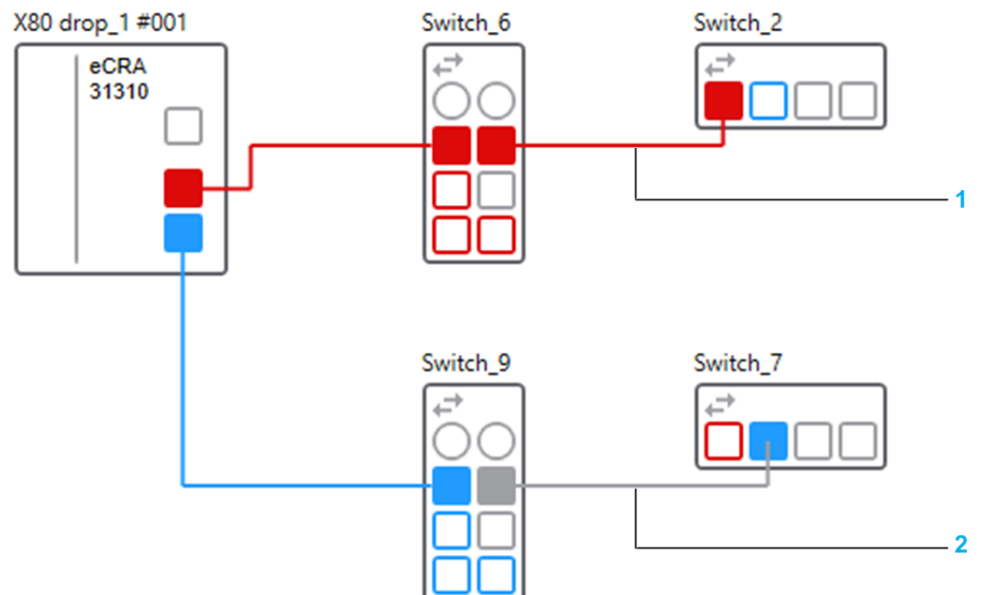
Network type	Color	Device	Port
Primary network	Red	BMECRA31310 adapter module	ETH2
		Hirschmann switches	Port1
Redundant network	Blue	BMECRA31310 adapter module	ETH3
		Hirschmann switches	Port2

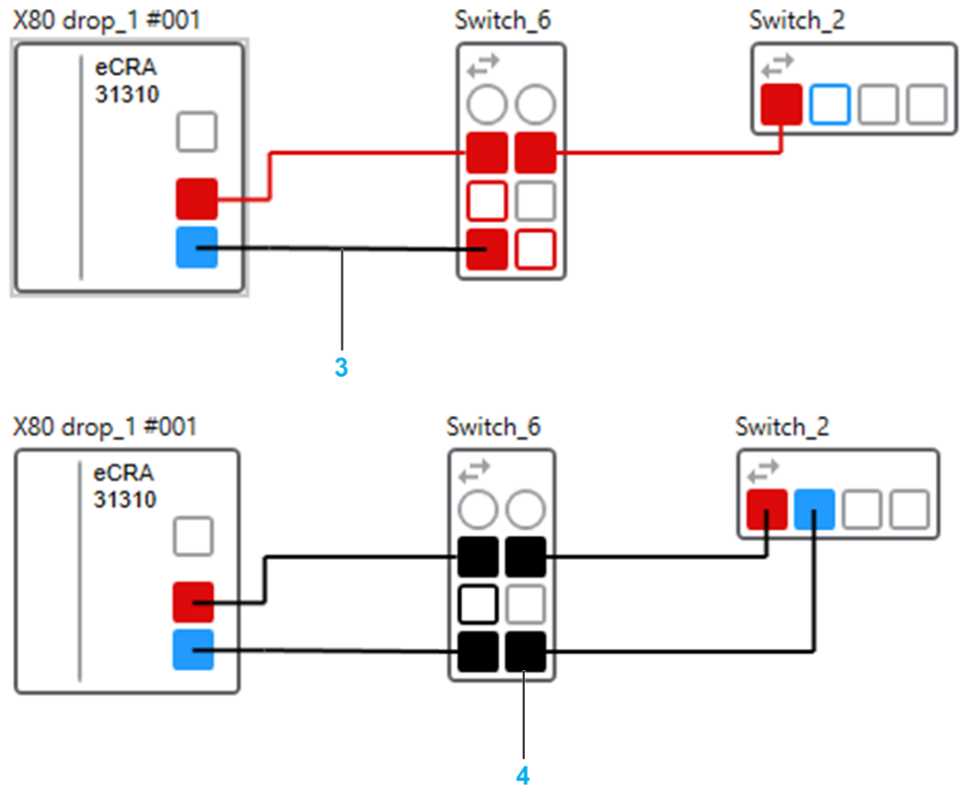
NOTE: Disabled ports are shown in a lighter shade of gray.

In addition, physical links that connect ports of the same color are shown in that color. The link must be direct or connect in between ports of one or more ConneXium switches that are configured as **RIO** type.

Physical links connecting ports that belong to different redundant networks are shown in black. *Analyze, page 254* the system project to obtain details.

The following figures show some examples of physical links connecting redundant ports.





Item	Description
1	Links connecting the redundant port of a module, a ConneXium switch (Switch_6), and a Hirschmann switch. The ports of the ConneXium switch that are of type RIO are also shown in red.
2	Link that is shown in gray because port 4 of the ConneXium switch (Switch_9) is of type DIO .
3	Link that is shown in black because of an incorrect connection. Port 7 of the ConneXium switch (Switch_6) is connected to a blue redundant port while its other ports already belong to a red redundant network.
4	Ports and links of the ConneXium switch (Switch_6) are shown in black because of a redundant network conflict. Two different redundant networks are connected to the switch.

Device Actions

The table describes the commands of the context menu of a device that are specific to physical views. For a description of the other commands, refer to the topic describing the device context menu, page 194.

Command	Description
Cut	Refer to the topic describing the Paste command, page 200.
Copy	You cannot cut or copy the local rack or drop of an M580 PAC in a physical view. Use command from the PAC in the SYSTEM PROJECT pane.
Cut From View	Refer to the topic describing the Paste command, page 200.
Remove From View	Removes only the representation of the device (or the selection of devices) from the physical view. Ports that this device is connected to remain connected and are specially identified, page 208. The corresponding physical links are hidden but appear again when the device is added to a physical view again. NOTE: If you want ports that the device is connected to to remain available for connection, remove the links before removing the device from the view.

Locating Objects by Using the Search Field

The search field lets you locate the following objects by typing their entire or part of their name:

- Devices
- Modules
- Network interface cards
- Ports
- Physical links

The search field is not case-sensitive and you do not need to use wildcards.

The full name of objects whose name contains the string are displayed in a list as you type. Results are listed in ascending alphanumeric order.

To locate an object from the list, double-click it. The object is shown centered in the physical view. To locate several objects, select each one in the list, then double-click any one of them. Objects that are selected in the list remain selected until you clear them by clicking them again.

The list of results remains available until you clear the search field. To show the list again, click inside the search field (if it has lost the focus) and press the **Down Arrow** key.

NOTE:

You can also use the following keys with the search field.

Key	Action
The Down Arrow key	Shows and/or enters the list of results. Once in the list, lets you move down the list. The object that has the focus is highlighted.
The Up Arrow key	Lets you move up in the list of results.
The Spacebar key	Selects a highlighted object. To clear a selected object, put the focus on the object again and press the key.
Enter	Locates the selected objects in the physical view.

Multiselection of Devices

When you select multiple objects in a physical view, the **PROPERTIES** pane shows the tabs and attributes that the objects have in common, page 203.

LOGICAL NETWORK VIEW

Overview

You can open the **LOGICAL NETWORK VIEW** either way:

- By clicking **Open Logical Network View** in the context menu of the system project name, the **Logical Networks** node, or a logical network in the **SYSTEM PROJECT** pane.
- By clicking **Logical Network View** in the **Open With** submenu of a device.
- By using the **Views** menu in the toolbar, page 30.

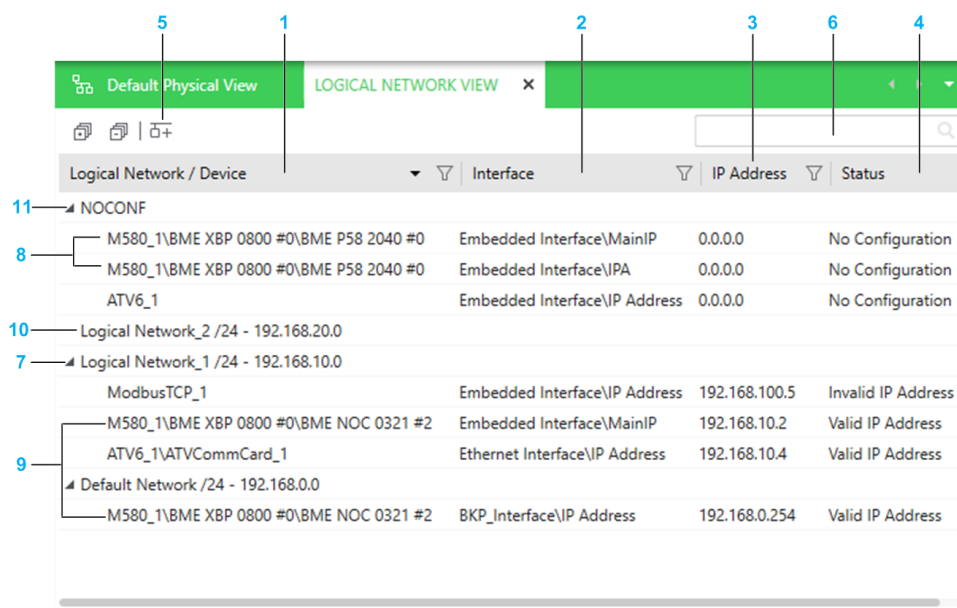
It gives you an overview of the network configuration of devices that exist in your system project and that manage at least one IPv4 address. As such, it facilitates the management of many devices, page 205 at system project level.

The view is refreshed when you or other users modify the configuration of objects that are shown.

NOTE: IPv6 addresses are not shown in this view.

Description

The following figure shows an example of the **LOGICAL NETWORK VIEW** of a system project.



Item	Description
1	The column shows the name of the following objects that exist in the system project: <ul style="list-style-type: none"> • Logical networks. • Devices and modules that manage at least one IP address.
2	Name of the interface, page 129 of the device to which an IP address is assigned. When the interface manages several IP addresses, their name is indicated. The following syntax is used in this column to identify interfaces and their IP addresses: <ul style="list-style-type: none"> • <i>Embedded Interface</i>: Identifies the interface of the internal processor of the device (host address). • <i><Port name>_Interface</i>: Indicates that the interface is not the embedded one (for example, it is one of the external ports of a routing switch, <i>Port1_Interface</i>).
3	IP address that is assigned to the interface. You can modify the address, page 205.
4	Indicates the validity of the IP address in relation to the logical network that the interface belongs to. Possible values:

Item	Description
	<ul style="list-style-type: none"> • No Configuration: The interface is not yet assigned to a logical network. • Valid IP Address: The IP address is valid on the logical network to which the interface belongs. • Invalid IP Address: The IP address is not valid on the logical network to which the interface belongs. You can reassign it.
5	Lets you create a logical network, page 178.
6	Search field. Enter one or more terms separated by a space and the window displays objects whose name contains any of these terms. Objects are displayed with the logical network they belong to.
7	<p>Entries are grouped by logical network. The logical network group indicates the name of the logical network that the interface belongs to. In addition, the CIDR notation suffix and address of the network are indicated.</p> <p>You can change the logical network assignment, page 205 but you cannot create logical networks in this view.</p>
8	For devices that manage several IP addresses, an entry is displayed for each one of them. The entry appears under the respective logical network group.
9	Interfaces pertaining to a same device appear under different logical network groups if the assignment of their respective interfaces is different.
10	Existing logical networks to which no interface is assigned are also shown.
11	Interfaces for which no logical network is defined are shown in the NOCONF group.

NOTE: You can shift columns and sort and filter, page 37 entries.

Context Menu Commands

The table describes the commands of the context menu of a device that are specific to the **LOGICAL NETWORK VIEW**. For a description of the other commands, refer to the topics describing the context menu commands for logical networks, page 114 and devices, page 194.

Command	Description
Reassign IP Address	<p>Lets you replace the invalid IP address of the selected interfaces with the next available IP address on the logical network.</p> <p>If the status of an address is Valid IP Address, it remains unchanged except if it is not unique, in which case the software assigns the next available IP address to the interface.</p> <p>When you select several interfaces in the view, IP addresses are reassigned in the order that you have selected the interfaces.</p> <p>Within a logical network, when you select all the interfaces that have a same IP address, the IP address of the interface that you have selected first is unchanged (given it is valid).</p> <p>NOTE: If you select several interfaces to reassign their IP addresses and not enough IP addresses are available, the reassignment of IP addresses is done only partially and a notification is displayed.</p>

Multiselection of Entries

When you select multiple entries in the **LOGICAL NETWORK VIEW**, the **PROPERTIES** pane shows the tabs and attributes that the devices have in common, page 203.

Communication Mapping Views

Overview

You can open the Communication Mapping View from the context menu of the device or module whose scanner service you want to use either way:

- By clicking a protocol in the **PAC > Communication Mapping** submenu.
- By clicking **Open With > Communication Mapping <Protocol> View**.

It lets you establish communication, page 296 between devices of the system project and scanner services of a given PAC and between PACs.

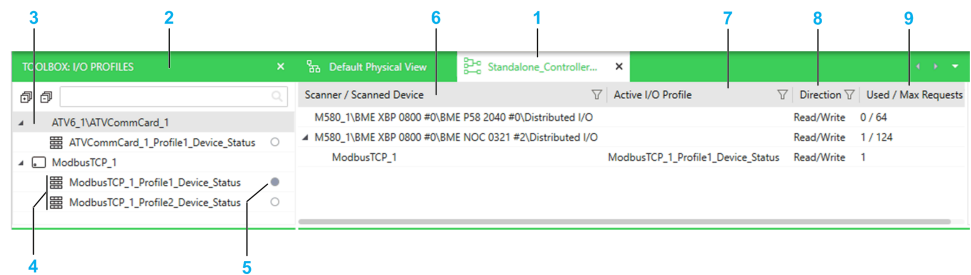
Two distinct views exist to manage communication for the following protocols:

- Modbus TCP
- EtherNet/IP

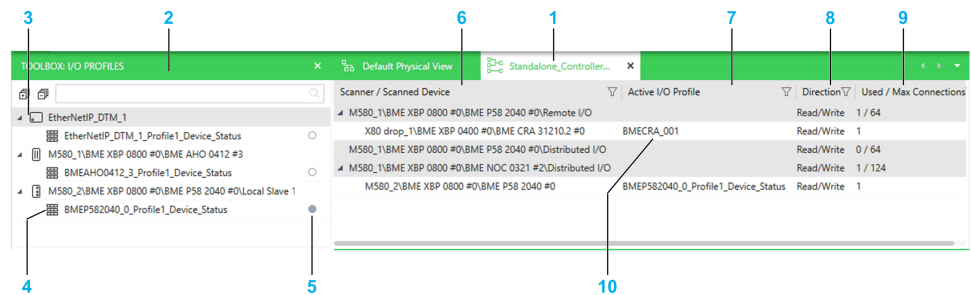
NOTE: You can also open the Communication Mapping View from the context menu of a device given it has already been added to a scanner. If the device is scanned by several scanners that belong to different PACs, it opens a Communication Mapping View for each one.

Communication Mapping Views

The following figure shows an example of the Communication Mapping View for devices communicating by using the Modbus TCP protocol.



Communication Mapping View for devices communicating by using the EtherNet/IP protocol.



Item	Description
1	Name of the PAC whose scanner services appear in this view. The communication protocol is indicated in a tooltip.
2	TOOLBOX pane that lists the devices and their modules that exist in the system project and which can be scanned. Devices appear in the pane only once their I/O profile data is available, page 156. The content of the pane is contextual and related to the Communication Mapping View that is active. You can filter the list by using the search field. NOTE: Devices that appear under this node may already be scanned by using the scanner services of another PAC.
3	Node representing a device that can be scanned.
4	I/O profiles, page 156 that exist for each device including local slaves, page 156.

Item	Description
	NOTE: The values that you see in the PROPERTIES pane when you select an I/O profile in this pane are those that re configured for the device.
5	An indicator that is shown selected indicates that an instance of the I/O profile has been added to a scanner. The information is related to the Communication Mapping View that is active.
6	Column showing the scanner services of the PAC and the devices that they are scanning including local slaves. When a PAC is equipped with an RIO scanner, it appears in the Communication Mapping View for EtherNet/IP.
7	Column showing the I/O profile of the device that is being used for scanning and that is the <i>active</i> profile. It is an instance of the I/O profile of the device. You can <i>edit certain attributes</i> , page 293 of the active profile and its requests/connections without impacting the values of the device I/O profile.
8	For each scanner and I/O profile, indicates the direction of the communication.
9	<ul style="list-style-type: none"> • Used: <ul style="list-style-type: none"> ◦ For each active I/O profile, indicates the number of requests or connections, page 156 that are defined. ◦ For each scanner, indicates the total number of requests or connections that are defined in the active I/O profiles. <p>The values are updated when you add/remove requests or connections in the I/O profile of the device.</p> <ul style="list-style-type: none"> • Max Requests/Max Connections: The maximum number of requests or connections that the scanner supports.
10	When you add a drop with a CRA adapter module to a PAC and apply changes, the adapter module and its I/O profile appear automatically under the RIO scanner of the CPU module and cannot be moved. In general, modules of a PAC that appear automatically under a scanner in the Communication Mapping View cannot be moved and do not appear in the TOOLBOX pane.

NOTE: You can shift columns and sort and filter, page 37 entries.

Context Menu Commands

The table describes the commands of the context menu of the active I/O profile.

Command	Description
Reset To Default	Replaces the values of the active I/O profile with the values that are configured in the I/O profile of the device, page 156. (These are the values that appear in the I/O PROFILE tab of the PROPERTIES pane when you select the device or its I/O profile in the TOOLBOX pane.) The command applies to the following attributes: <ul style="list-style-type: none"> • For Modbus TCP: <ul style="list-style-type: none"> ◦ UnitID ◦ Health Timeout (ms) ◦ Repetitive Rate (ms) ◦ Last Value ◦ Gateway/Bridge Device • For EtherNet/IP: <ul style="list-style-type: none"> ◦ RPI T->O ◦ Timeout Multiplier ◦ Input Fallback Mode ◦ RPI O->T
Cut	Removes the active I/O profile from the scanner and adds it to the Clipboard.
Copy	Adds the active I/O profile to the Clipboard.

Command	Description
Remove From Scanner	Removes the active I/O profile from the scanner. Values that you have changed, page 293 in the active I/O profile are discarded.
Device	Opens a submenu containing commands, page 194 that pertain to the device that is scanned.

The table describes the commands of the context menu of the scanner. For a description of the other commands, refer to the topic describing device context menu commands, page 194.

Command	Description
Paste	Adds the communication profile that you have cut or copied to a scanner in the same or another compatible Communication Mapping View.

Multiselection of Entries

When you select multiple entries in the Communication Mapping View or **TOOLBOX** pane, the **PROPERTIES** pane shows the tabs and attributes that the objects have in common, page 203.

I/O Mapping Editor

Overview

You can open the editor either way:

- By clicking **I/O Mapping Editor** in the **Open With** submenu of a device that communicates by using Modbus TCP or EtherNet/IP.
- By clicking **Edit** in the properties of a communication profile that is shown in the **I/O PROFILE** tab of the **PROPERTIES** pane, page 156.

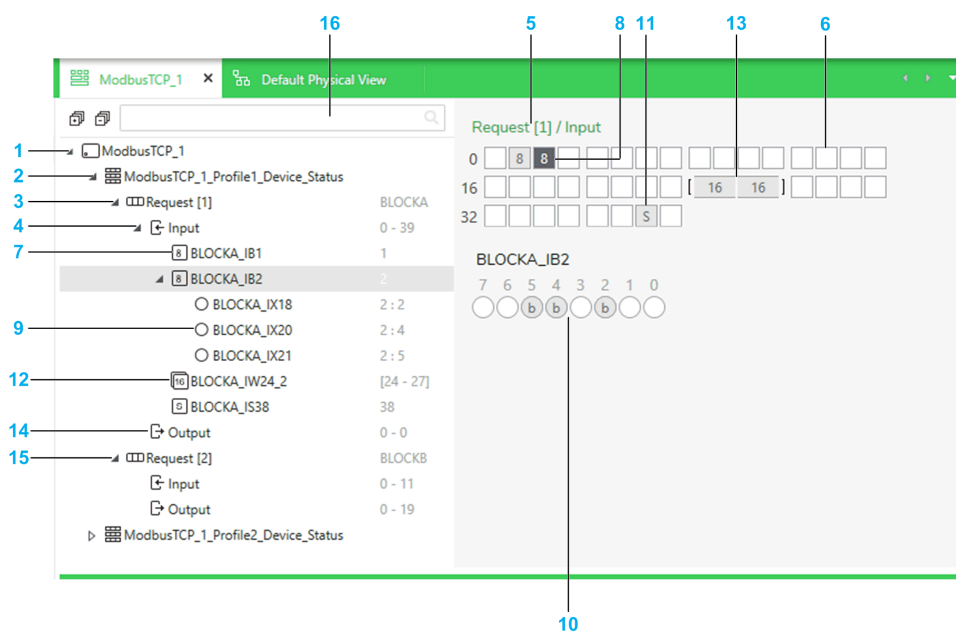
It lets you view, create, and modify I/O items, page 297 of communication profiles as well as the following that are configured for devices:

- Read/write requests (Modbus TCP)
- Input/output connections (EtherNet/IP)

Modifications that you make to the read/write length and input/output size of a request or connection are reflected automatically in the editor.

Description

The following figure shows an example of the **I/O Mapping Editor** showing the items that exist for the first read request (input) of *Profile1* of a sample device communicating by using Modbus TCP. Manual mapping mode is enabled for this communication profile. The view is similar for EtherNet/IP devices.



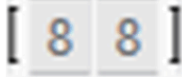




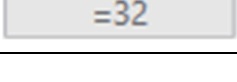

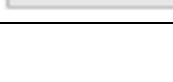



Item	Description
1	Name of the device whose I/O mapping is being edited.
2	Node representing the first communication profile, page 156 that exists for the device. The other profiles that exist appear below.
3	Node representing the first request or connection of the communication profile. By default, registers that are addressed by a request/connection are assigned the name <i>BLOCKx</i> where <i>x</i> is an alphabetical index from A to BL that is incremented for each request/connection of a profile.
4	Node representing the input register that is addressed by the request/connection. The register size, page 156 that you have configured appears next to it (format, 0 - <length (bytes) -1>). Select the node to view a graphical representation of the items that are defined.
5	Graphical representation of the register size that is read or written for each request/connection.

Item	Description
6	Representation of bytes for which no mapping has been performed.
7	<p>Items that have been created appear under the Input and Output nodes with the name, page 297 that you have configured. An icon indicates their data type.</p> <p>Their offset appears next to them.</p> <p>Select an item to show it in the graphical representation of the register.</p>
8	<p>Example of representation of an item of type Byte that is selected. The number indicates the size in bits.</p> <p>(This data type is shown for illustration only and cannot be created with the Modbus TCP protocol.)</p>
9	<p>When bit mappings are defined for an item, each one is shown as a subitem.</p> <p>The offset of the item and the position of the bit appear next to them (format, <offset> : <position>).</p>
10	<p>Representation of the bit field of the selected item (when applicable). The name, page 297 of the item appears on top.</p> <p>In the example, bits have been mapped at positions 2, 4, and 5 of item <i>BLOCKA_IB2</i> of type Byte at offset 2.</p>
11	<p>Example of representation of an item of type String.</p> <p>The number indicating the size is replaced by S.</p> <p>(This data type is shown for illustration only and cannot be created with the Modbus TCP protocol.)</p>
12	<p>Item consisting of an array of words.</p> <p>The offset of the low byte of the first word and of the high byte of the last word are indicated next to it in brackets (format, [<offset low byte> - <offset high byte>]).</p>
13	Example of representation of an item of type Array of Word with two words.
14	<p>Node representing the output register that is addressed by the request/connection.</p> <p>For requests, the register write length, page 156 that you have configured appears next to it (format, 0 - <length (bytes) -1>).</p> <p>Select the node to view a graphical representation of the items that are defined.</p>
15	Second request/connection of the first communication profile for which no mapping has been performed.
16	Search field. Enter one or more terms separated by a space and the pane displays objects whose name contains any of these terms. Objects are displayed with their parent structure.

Item Representation

The table shows how items of the various types appear in the graphical representation of the register.

Item	Representation	Representation of arrays
Bit item		n/a
Byte item		
String item		
Word, Int, and UInt items		
DWord, DInt, and DUInt items		
Real and Time items		

Context Menu Commands

The table describes the context menu commands that are available for the various elements shown in the **I/O Mapping Editor**. For a description of the other commands, refer to the topic describing device context menu commands, page 194.

Command	Description
Define Items	Opens a dialog box that lets you create one or more items, page 297 by using compatible data types.
Delete	Deletes the selected items including bit mappings when applicable.

NOTE: The commands are not available when the mapping mode, page 156 for the communication profile is set to **Automatic**.

DHCP VIEW

Overview

You can open the **DHCP VIEW** either way:

- By clicking **Open DHCP View** in the context menu of the system project name in the **SYSTEM PROJECT** pane.
- By clicking **DHCP View** in the **Open With** submenu of a module that features the DHCP service.
- By using the **Views** menu in the toolbar, page 30.

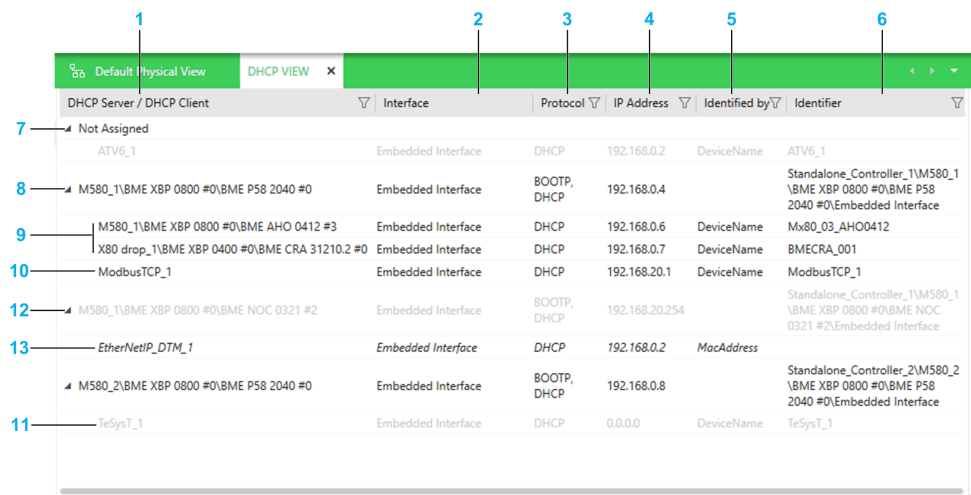
It lets you view and modify, page 207 the DHCP client/server relationship of devices of the system project that feature the service.

Depending on the status of their DHCP service, devices can appear in light gray or italic.

The **DHCP VIEW** is refreshed when you or other users modify the topology of the system project and/or change the DHCP attribute values of a device in the **PROPERTIES** pane.

Description

The following figure is an example of the **DHCP VIEW** that shows the DHCP-capable devices of a system project and their relationship.



Item	Description
1	Lists the devices of the system project that feature a DHCP server or client.
2	For a DHCP server, indicates the name of the interface, page 129 that provides the DHCP services. For a DHCP client, indicates the name of the interface to which the DHCP server provides the IP address settings.
3	Protocol, page 142 that is configured for the device.
4	IP address of the interface that is indicated in the Interface column.
5	Value of the Identified by attribute, page 142 that is configured for the client device.
6	Value of the Identifier attribute, page 142 that is configured for a client device and of DHCP Name for a server.
7	Node that lists the devices that do not subscribe to a DHCP service yet. Devices whose DHCP client is disabled, page 142 appear in light gray.
8	Device that features a DHCP server, which is enabled. For redundant PACs, only DHCP servers of local rack A appear.

Item	Description
9	Devices that are automatically added to the list of clients of the DHCP server of the parent device. Their DHCP client is enabled and the DHCP Server Name attribute read-only.
10	Device that you have moved to add it to the list of clients of the DHCP server of the parent device. Its DHCP client is enabled.
11	Device whose DHCP client is disabled, page 142 (appears in light gray).
12	Device that features a DHCP server, which is disabled, page 142 (appears in light gray).
13	Device that belongs to the list of clients of a device whose DHCP server is disabled (appears in italic). As a result, it does not receive IP addresses and network parameters from the server.

NOTE: You can shift columns and sort and filter, page 37 entries.

Context Menu Commands

You can open a context menu for devices, page 194.

Multiselection of Entries

When you select multiple entries in the **DHCP VIEW**, the **PROPERTIES** pane shows the tabs and attributes that the devices have in common, page 203.

Fieldbus Editor

Overview

You can open the **Fieldbus Editor** either way:

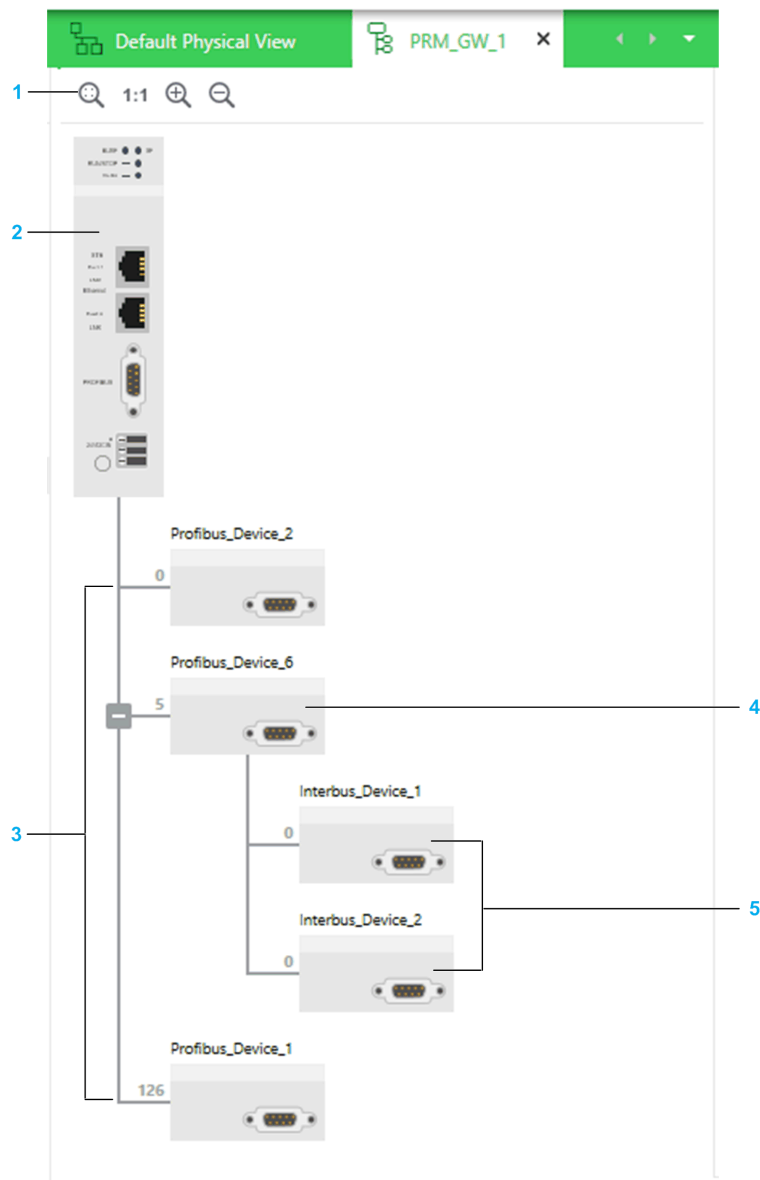
- By clicking **Edit Fieldbus** in the context menu of a device that manages a fieldbus (for example, a PROFIBUS remote master (PRM) gateway or a HART module).
- By clicking **Fieldbus Editor** in the **Open With** submenu of a field device.

The **Fieldbus Editor** shows the field devices that are slaves of the gateway from which the editor was opened. It lets you view and edit the fieldbus, page 227 by adding field devices and network coupling devices from the **TOOLBOX** and configure them.

You can edit several fieldbusses at the same time by opening a **Fieldbus Editor** for the gateway of each fieldbus.

Description

The following figure shows an example of the **Fieldbus Editor** showing a PROFIBUS gateway and three slave devices.



Item	Description
1	Toolbar, page 32.
2	PRM gateway.
3	PROFIBUS slave devices. The software positions them automatically on the fieldbus as you create them.
4	PROFIBUS-to-INTERBUS gateway (coupling module) device.
5	INTERBUS slave devices.

Context Menu Commands

The table describes the context menu commands that are specific to the **Fieldbus Editor**. For a description of the other commands, refer to the topic describing device context menu commands, page 194.

Com-mand	Description
Cut/Copy	Lets you copy or cut a field device and its DTM. NOTE: When you copy a PROFIBUS-to-INTERBUS gateway, its slave devices are also copied.
Paste	Lets paste copied or cut field devices within the same fieldbus or another one of the same type that is open in another Fieldbus Editor .

Multiselection of Devices

When you select multiple devices in the **Fieldbus Editor**, the **PROPERTIES** pane shows the tabs and attributes that the devices have in common, page 203.

ACCESS CONTROL VIEW

Overview

You can open the **ACCESS CONTROL VIEW** either way:

- By clicking **Open Access Control View** in the context menu of the system project name in the **SYSTEM PROJECT** pane.
- By clicking **Access Control View** in the **Open With** submenu of a module.
- By clicking **Edit** in the **Access Control** attribute of the **SECURITY** tab, page 138 of modules managing security attributes.
- By using the **Views** menu in the toolbar, page 30.

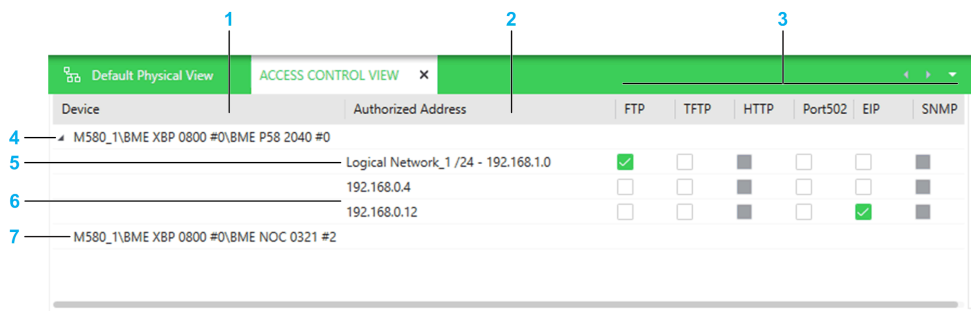
It gives you an overview of the Ethernet communication permissions that are configured for devices that exist in your system project and that manage security attributes.

The view is refreshed when you or other users modify the configuration of objects that are shown.

NOTE: You need to enable Ethernet services and access control at the module level by using the **SECURITY** tab, page 138 of the **PROPERTIES** pane before you can configure them in this view.

Description

The following figure shows an example of the **ACCESS CONTROL VIEW** of a system project.



Item	Description
1	Column showing modules of devices that exist in the system project and that manage security attributes related to Ethernet communication.
2	For each module that appears in the Device column, the IP addresses of devices that are authorized to communicate with the device by sending requests to it. Instead of or in addition to individual IP address, existing logical networks can appear. This allows any device that belongs to the logical network to communicate with the module. The field is empty by default.
3	Shows the Ethernet services that are featured by the modules and which ones are used when access control, page 140 is enabled at the module level. You can enable (check box selected) or disable services individually for each authorized address. The corresponding service, page 138 must be enabled at the module level first (if applicable). Disabling a service at the module level makes the service unavailable in this view and resets its value for all authorized entries of the module.
4	Device for which the IP address of an authorized device and a logical network have been added.
5	Authorized logical network. The CIDR notation suffix and subnet address of the network are indicated.
6	IP address of a device authorized to communicate with the module.
7	Module for which no authorized IP address nor logical network has been added.

NOTE: You can shift columns and sort and filter, page 37 entries.

Context Menu Commands

The table describes the context menu commands of objects that are specific to the **ACCESS CONTROL VIEW**. For a description of the other commands, refer to the topic describing device context menu commands, page 194.

Object	Command	Description
Device	Add Authorized Address	Opens a dialog box that lets you add: <ul style="list-style-type: none">• An existing logical network, page 108.• An IP address
Authorized address	Delete	Removes the address or the selection of addresses from the view and revokes the permission to communicate with the device.

Multiselection of Entries

When you select multiple devices in the **ACCESS CONTROL VIEW**, the **PROPERTIES** pane shows the tabs and attributes that they have in common, page 203.

DEPLOYMENT VIEW

Overview

You can open the **DEPLOYMENT VIEW** either way:

- By selecting more than one PAC or device and clicking **Deploy > Configuration** in the context menu of either one. This selects the corresponding objects when the view opens.
- By using the **Views** menu in the toolbar, page 30.

The view lists the PACs and devices that exist in your system project and to which you can deploy an executable, page 307 or a DTM configuration, page 311 respectively from the Topology Manager. It shows the status of these objects and lets you deploy to several objects in sequence.

The view lets you also perform the following actions on one or more PACs:.

- Build their control project, page 237.
- Send run and stop commands.

The view is refreshed when you or other users update the topology of the system project.

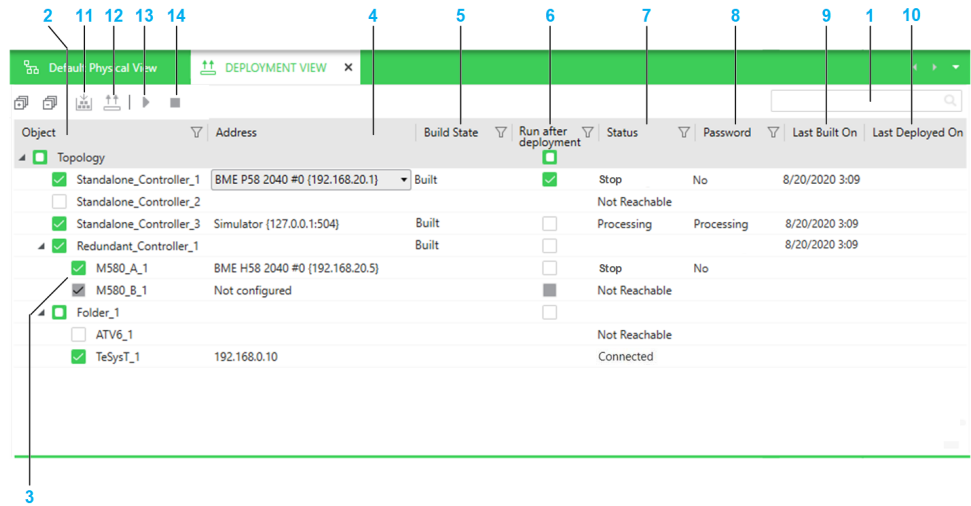
NOTE: You cannot use this view to load data from devices.

Closing the DEPLOYMENT VIEW

When you close the view, the action that is in progress completes but actions that are queued are canceled.

Description

The following figure shows an example of the **DEPLOYMENT VIEW**.



Item	Description
1	Search field. Enter one or more terms separated by a space and the pane displays objects whose name contains any of these terms. Objects are displayed with their parent structure.
2	The column shows the name of the following objects that exist in the system project: <ul style="list-style-type: none"> • M580 PACs • Automation devices For redundant PACs, local racks A and B are shown separately. The view reproduces the entire folder structure of the Topology node. When you select an object by selecting its check box, the software attempts to connect to the object and a status is indicated in the Status column. The simulator is automatically started if Build Target , page 125 is set to Simulator .

Item	Description
	<p>NOTE: Selecting or clearing the check box of an object after clicking the Build or Deploy button adds it to or removes it from either queue respectively.</p>
3	<p>For redundant PACs, local racks A and B are shown separately.</p> <p>The executable is deployed to the respective controller only if its rack is selected.</p> <p>When the Control Mode attribute, page 128 is set to Primary A Only or Primary B Only, the check box of the corresponding rack is disabled and you cannot deploy to it.</p>
4	<p>The column indicates the IP address, page 129 that is used to connect to the object and deploy to it. You can choose from the following once the object is selected:</p> <ul style="list-style-type: none"> • For a PAC, depending on the value, page 125 of Build Target: <ul style="list-style-type: none"> ◦ Real: The IP address of the CPU or a communication module. ◦ Simulator. Indicates the IP address of the local simulator (127.0.0.1) and the Port value, in the format <i>Simulator (IP address:Port)</i>. If you are connected to a remote system server, the IP address is the address of the local computer. <p style="text-align: center;">NOTE: Verify that the listening IP address, page 309 of the simulator is configured with the same IP address.</p> • For a device: The IP address of the embedded interface of the device or its communication card. <p>The address remains visible when the check box is cleared.</p> <p>Selecting an IP address attempts to connect to the object by using this address.</p>
5	<p>Indicates the build state, page 125 of the control project of the PAC.</p> <p>In addition, the following states can be indicated:</p> <ul style="list-style-type: none"> • Building: The build operation is in progress. • In Queue: The PAC is selected and the build command has been initiated. Build will begin once the operation in progress is completed. <p>For devices, the column is always blank.</p>
6	<p>Selecting the check box sends a run command after deployment completes successfully.</p> <p>The check box appears only for a PAC and when it is selected.</p>
7	<p>Status of the object.</p> <p>The following statuses can be indicated:</p> <ul style="list-style-type: none"> • Not Reachable: Default status of all objects. Once you have selected the object in the Object column, indicates either condition: <ul style="list-style-type: none"> ◦ No IP address is configured. ◦ An attempt to connect to the object did not succeed. ◦ The object has become unreachable while deploying to it (for example, because the physical connection to the object is not established anymore). • Processing: The software is attempting to connect to the object or is refreshing its status. • No Configuration: The object is connected and no executable or DTM configuration is deployed to it. • Connected: The device is connected and you can deploy to it. Or, the DTM configuration has been deployed to it, in which case a value appears in the Last Deployed On column. The status appears only for devices. • Deploying: Deployment is in progress. • Deployed: Deployment is completed. The status appears only for PACs and appears while deployment to other objects is in progress. It is replaced by the status of the CPU module once the software has refreshed the status. • In Queue: The object is selected and the deploy command has been initiated. Deployment will begin once deployment to one or more other objects is completed. • Run/Stop: State of the CPU module of the PAC. The other possible states of the CPU module (see Modicon M580, Hardware, Reference Manual) (for example, HALT or PRIMARY for a redundant PAC) and the operating modes of tasks (for example, for a safety CPU) are not indicated. <p style="text-align: center;">NOTE: To view the CPU states and task operating modes, edit the control project.</p> <p>After having deployed to all selected objects, successfully or not, the software refreshes the status of all these objects.</p>
8	<p>The DEPLOYMENT VIEW lets you store a password that it uses when a password is required to deploy to a PAC. You can set and change the password by using the Edit Password context menu command, page 308. This has no impact on the application password that is set in the control project.</p>

Item	Description
	<p>The following application password-related, page 53 conditions can be indicated:</p> <ul style="list-style-type: none"> • Blank: The PAC is not connected. • No: The PAC is connected and either no executable has been deployed to it or the deployed executable is not protected by an application password. • Required - Not Set: The executable that has been deployed is protected by an application password, which is required to deploy again but no password has been stored in the DEPLOYMENT VIEW or the stored password does not match the application password of the deployed executable. You cannot deploy until you set the correct password, page 308. • Required - Set: The executable that has been deployed is protected by an application password and the password has been stored in the DEPLOYMENT VIEW. You will not be prompted to enter the password the next time you deploy. <p>For devices, the status is always No.</p>
9	<p>A value, page 125 is shown only when Build State is either Built or Out Of Date and the PAC is selected.</p> <p>For devices, the column is always blank.</p>
10	<p>A value (date and time) is shown only if the configuration has been successfully deployed and the object is selected. Otherwise, blank.</p> <p>For a PAC, the deployment may have been performed either from the Topology Manager or Control Expert Editor.</p>
11	<p>Builds the control projects of the PACs that are selected, in sequence, after you confirm the command.</p> <p>For each control project, the build operation starts only if the prerequisites, page 237 are fulfilled.</p>
12	<p>Starts the deployment, page 307 to the objects that are selected, in sequence, after you confirm the command. If a CPU is in run state, it is stopped.</p> <p>The button is enabled only if at least one object is selected and the software was able to connect to it.</p>
13	<p>Sends a run command to the CPU of each PAC that is selected and whose status is shown as Stop in the view. You need to confirm the command.</p> <p>NOTE: For a redundant PAC, the command is sent to the CPU modules of controllers A and B based on their respective selection. To view the controller states, edit the control project.</p>
14	<p>Sends a stop command to the CPU of each PAC that is selected and whose status is shown as Run in the view. You need to confirm the command.</p> <p>NOTE: For a redundant PAC, the command is sent to the CPU modules of controllers A and B based on their respective selection. To view the controller states, edit the control project.</p>

NOTE: You can shift columns and sort and filter, page 37 entries.

Basic Diagnostic

Overview

You can open the basic diagnostic window by right-clicking a device and selecting **Open Basic Diagnostic**.

Once connected to the device, it displays various diagnostic codes, page 287 for the device.

You can open diagnostic windows for several devices at the same time.

The diagnostic window is refreshed when you or other users modify the configuration of the device.

Devices Supporting Basic Diagnostics

Basic diagnostics are available for devices of the **Altivar Variable Speed Drives** product range, page 22.

Prerequisites

Diagnostic data can be displayed only if the system server can communicate with the device for which the **Open Basic Diagnostic** command has been selected. If communication cannot be established or is interrupted, a message is shown.

Description

The figure shows an example of the basic diagnostic window.

Item Name	Item Short Description	Item Extended Description
▲ STATUS		
RDY	Drive ready	Drive ready = 2
▲ LAST ERROR DETECTED		
NOF	No fault memorized	No fault memorized = 0
▲ WARNING / ALARMS		
NOA	No alarm memorized	No alarm memorized = 0

Item	Description
1	Diagnostic codes are grouped in three categories. If no diagnostic data is received for a given category, the corresponding column is empty.
2	Short description of the condition that is detected.
3	The extended description provides additional data about the condition.

Troubleshooting

If you experience difficulties obtaining diagnostic information, verify that the SE SODB ControlExpert Host X service (where X represents the version) of the Service Oriented Device Bus (SODB) diagnostic engine is running on the system server computer (**Services** window of the Windows® operating system). If not, start it.

EXPORT Window

Overview

You can open the **EXPORT** window by right-clicking, in the **SYSTEM PROJECT** pane, a device, a selection of devices, or the **Topology** node and selecting **Export**.

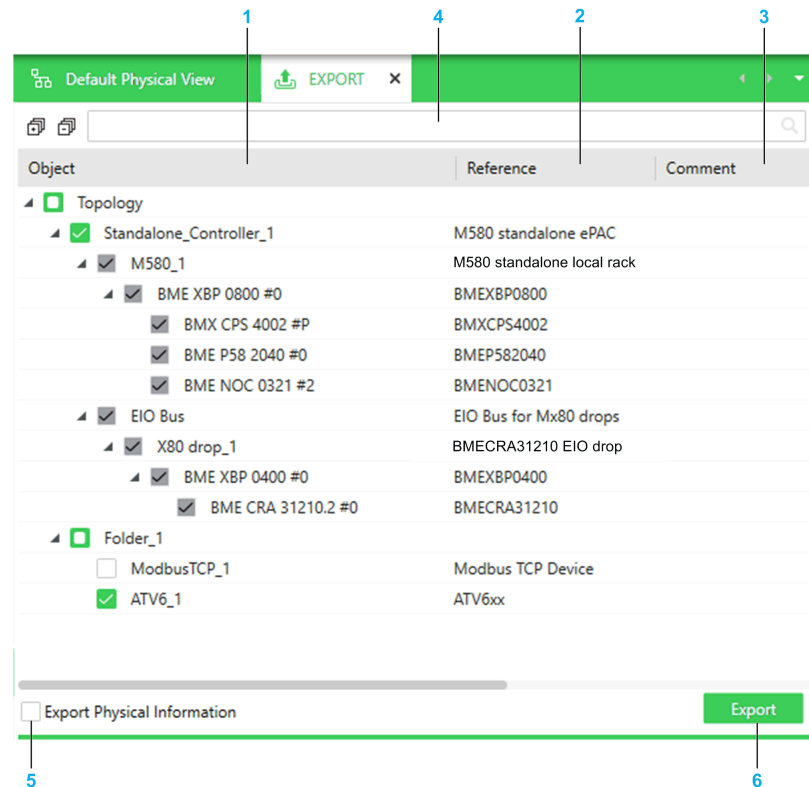
It lets you export to file, page 216 the content of the **Topology** node or parts of it including related objects such as physical views and physical links.

You can open only one **EXPORT** window at a time.

The view is refreshed when you or other users modify the topology of the system project or the configuration of objects.

Description

The following figure shows an example of the **EXPORT** window in which some devices of the system project have been selected for export.



Item	Description
1	Displays all the objects of the Topology node that you can export. You can modify the selection by selecting/clearing check boxes of objects, including topological folders. The default selection of objects varies depending from where you have selected the Export command: <ul style="list-style-type: none"> • From one or more devices: Only these devices are selected. • From the Topology node: All the devices and folders are selected. • From a folder: The folder itself and its content. Selecting a device automatically selects its modules.
2	Reference of the device as it appears in the PROPERTIES pane, page 123.
3	Comment that you have entered for the object in the PROPERTIES pane.
4	Search field. Enter one or more terms separated by a space and the pane displays objects whose name contains any of these terms. Objects are displayed with their parent structure.

Item	Description
	NOTE: Exporting the topology while a search result is displayed also exports the other objects that are selected even though they are not displayed.
5	Select the check box to include in the export file the following: <ul style="list-style-type: none">• The <i>physical view</i>, page 76 to which an object that is exported has been added. The exported physical view contains only objects that are selected for export.• Physical links.
6	Opens the Export dialog box, which lets you select an export file name, file location, and proceed with the export operation.

Rack Viewer

Overview

You can open the **Rack Viewer** either way:

- By clicking **Open Rack Viewer** in the context menu of a rack of an M580 PAC.
- By double-clicking the handle of a local rack or drop in a physical view.
- By clicking **Rack Viewer** in the **Open With** submenu of a backplane or module of a PAC.

The **Rack Viewer** shows the physical configuration of the local rack or a drop of a PAC in a graphical way. Local racks of standby controllers are shown in a separate view as well. The view is read-only.

The view is refreshed when you or other users apply changes that were made to the rack configuration by editing the control project, page 229.

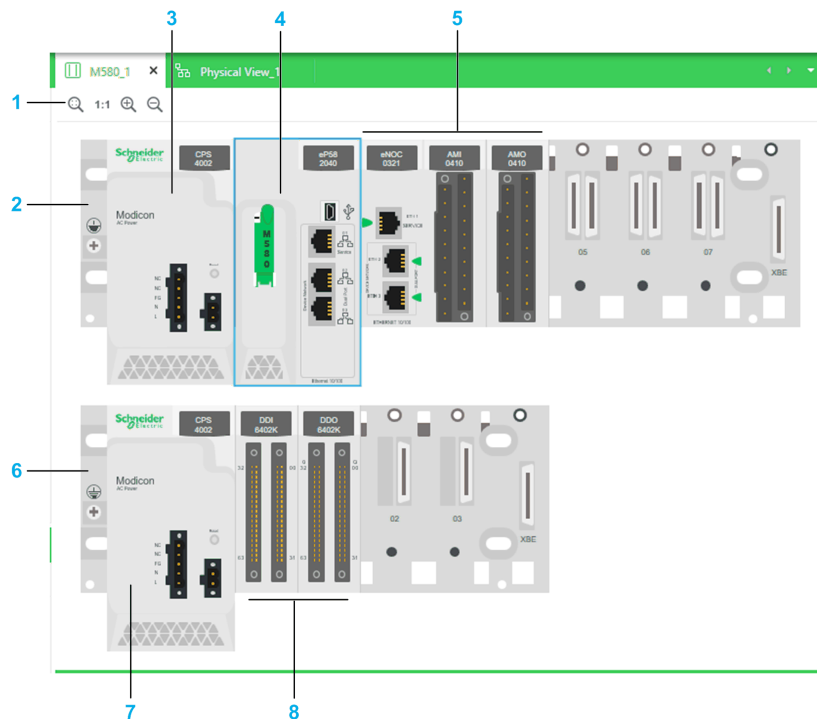
Select a backplane or a module to view and/or edit its properties.

You can view the configuration of several racks at the same time by opening a **Rack Viewer** for each one.

NOTE: When the **Rack Viewer** is the active view, the **TOOLBOX** is empty.

Description

The following figure shows an example of an M580 local rack that is open in the **Rack Viewer**. An extended rack and various modules have been added to the local rack by editing the control project.



Item	Description
1	Toolbar, page 32.
2	X-bus/Ethernet backplane of the local main rack. Click either end to select it.
3	Power supply module.
4	CPU module (shown selected).
5	Various X80 communication and I/O modules that have been added.
6	4-slot X-bus backplane of the local extended rack.

Item	Description
7	Power supply of the local extended rack.
8	Various X80 I/O modules.

Workspace Actions

The table describes the commands of the context menu of the **Rack Viewer** workspace.

Command	Description
View	Opens a submenu that lets you modify the zoom level, page 32 of the view.

Context Menu Commands

You can open a context menu for the backplane and modules, page 194.

NOTE: For the backplane, right-click either end.

Multiselection of Objects

When you select multiple objects in the **Rack Viewer**, the **PROPERTIES** pane shows the tabs and attributes that the objects have in common, page 203.

User Preferences

Overview

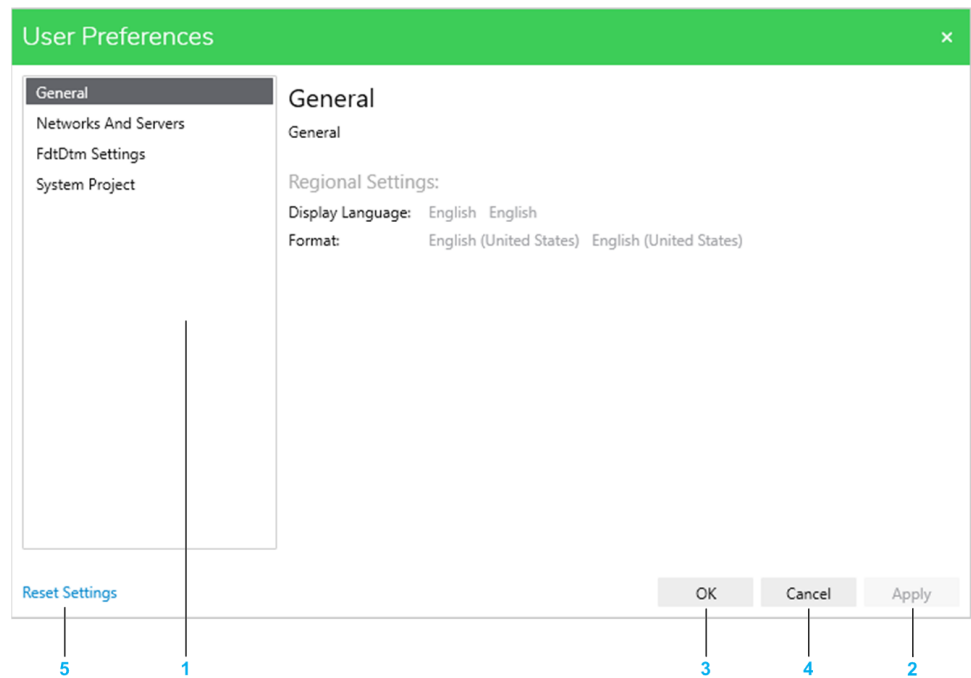
You can open the **User Preferences** window by clicking its button in the toolbar of the Topology Manager.



It lets you view and configure various settings of the Control Expert client instance and system projects.

Description

The following figure shows the **User Preferences** window.



Item	Description	
1	Click a section to open it.	
	General	<p>Regional Settings lets you view the following settings:</p> <ul style="list-style-type: none"> • Display Language: Language used for the user interface. To change it, use the Control Expert language selection tool (see EcoStruxure™ Control Expert, Installation Manual). • Format: Name of the language culture. The setting defines the formatting of dates, time, currency, and numbers in the software. <p>Both settings are followed by the name of the setting in English.</p> <p>Lock Settings lets you disable the automatic lock of the user interface and configure after how much time of user inactivity the lock is active.</p> <p>To unlock, you must enter in the Login dialog box the password of the user who is logged in .</p> <p>Range: 1 to 60 minutes.</p> <p>When the setting is disabled, you can lock the user interface, page 30 of the Control Expert instance manually.</p> <p>NOTE: The user interface does not lock automatically if Control Expert Editor is open and it is the active window.</p>
	Networks And Servers	<p>Lets you view and edit the address of the following servers:</p> <ul style="list-style-type: none"> • Control Engineering Server: Lets you access the EcoStruxure Control Engineering web platform by using

Item	Description	
		<p>commands of the Tools menu, page 30. Internet connection and registration required.</p> <p>URL (read-only): https://ecostruxure-control-engineering.se.app/</p> <ul style="list-style-type: none"> • Control Expert Server: System server (see EcoStruxure™ Control Expert, Installation Manual) that this Control Expert instance connects to and which hosts the repository of system project data. <p>Use the format <i>IP address:Port</i>.</p>
	FdtDtm Settings	Lets you configure FdtDTM settings, page 222.
	System Project	<p>Lets you manage the following passwords, page 52:</p> <ul style="list-style-type: none"> • The system project password. • The control project application password. • The control project file encryption password.
2	Applies your changes ⁽¹⁾ and keeps User Preferences open.	
3	Applies your changes ⁽¹⁾ and closes User Preferences .	
4	Discards your changes and closes User Preferences .	
5	Reverts the settings of all the sections ⁽¹⁾ , except System Project , to their default values after you confirm the command.	
(1) If Control Expert Server Address has been modified or if you are not connected to a Control Expert server, the client attempts to connect to the configured address. If a system project is open it is closed.		

Panels

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SYSTEM PROJECT Pane

SYSTEM PROJECT Pane

Overview

The **SYSTEM PROJECT** pane opens when you open a system project. You can reopen the pane by using the **Views** menu in the toolbar, page 30.

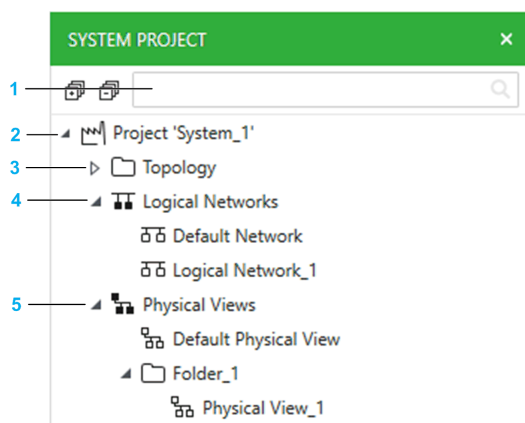
It lets you view, create, organize, and/or interact with the following objects of the system project:

- The structure of the topology and the devices, page 110 therein.
- Logical networks, page 114.
- Physical views, page 116.

You can view and configure properties, page 119 of each object by selecting it and perform other actions by opening its context menu.

SYSTEM PROJECT Pane General Description

The following figure shows an example of the **SYSTEM PROJECT** pane and the nodes that it contains.



Item	Description
1	Search field. Enter one or more terms separated by a space and the pane displays objects whose name contains any of these terms. Objects are displayed with their parent structure.
2	System project node, which indicates the name of the system project that is open. Right-click the system project node to open a context menu, page 108.
3	Topology node, page 110 (root folder).
4	Logical Networks root node, page 114.
5	Physical Views root node, page 116.

System Project Node Actions

The table describes the commands of the context menu of the system project node.

Command	Description
Open Logical Network View	Opens the LOGICAL NETWORK VIEW , which lets you view and edit communication attributes of devices of the system project.
Open DHCP View	Opens the DHCP VIEW , which lets you view and modify the DHCP client/server relation of devices of the system project that feature the DHCP service.
Open Access Control View	Opens the ACCESS CONTROL VIEW , which lets you view and edit which devices are authorized to communicate with devices of the system project that manage security attributes. It lets you also manage their communication protocols.

Command	Description
Open With	Opens a submenu containing a list of views that you can open for the system project.
Export	Opens the Export dialog box, which lets you export the system project, page 57.
Lock	Locks, page 55 the system project so that other users cannot modify it.
Unlock	Unlocks, page 55 the system project that you had locked so that other users can modify it.

SYSTEM PROJECT Pane - Topology Node

Overview

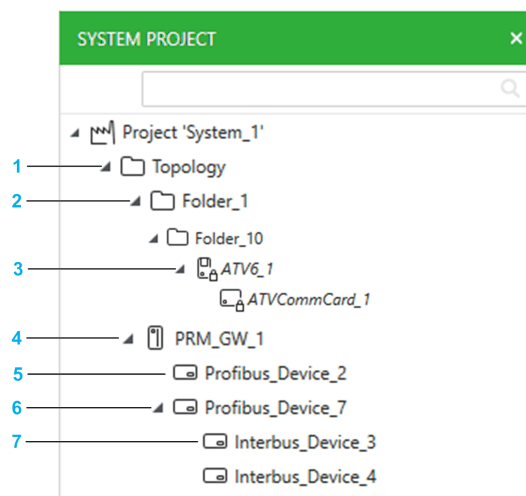
The **Topology** node shows the devices that your system project contains. Their location depends on how you create the devices, page 191.

You can view and configure properties, page 119 of each device by selecting it and opening a context menu, page 194. You can also export and import devices.

The node lets you organize the topology by creating a folder structure, page 176. You can change the order in which folders and devices are displayed by dragging an object to its new position within the node, the same folder, or to a different folder.

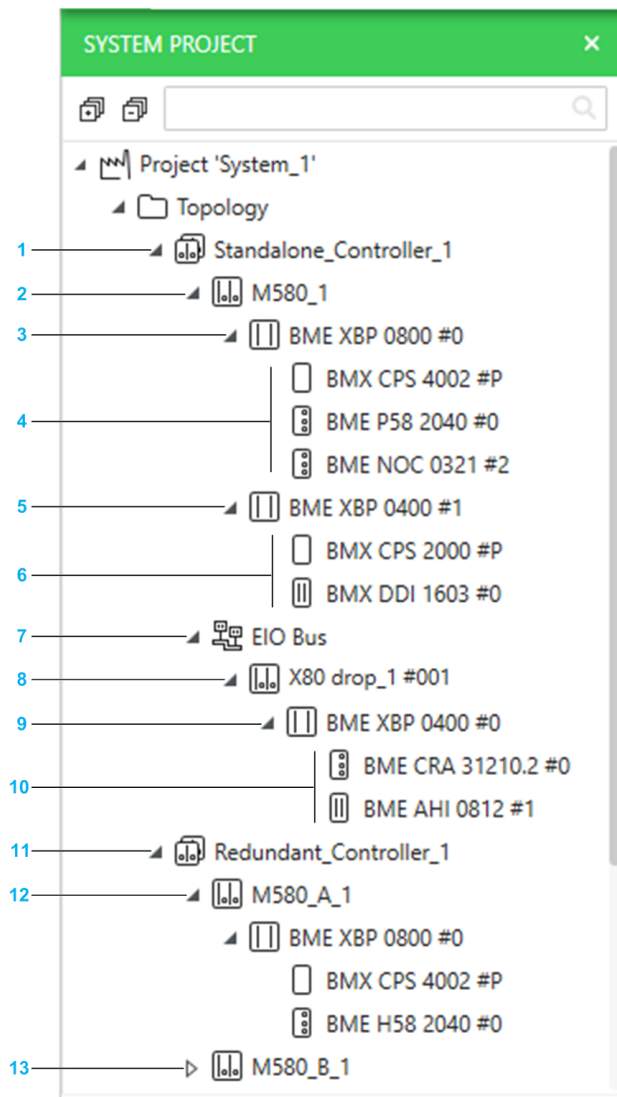
Topology Node Description

The following figure shows a partial view of the **SYSTEM PROJECT** pane with examples of various objects that the **Topology** node contains.



Item	Description
1	Topology node (root folder). By default, each device that you add directly from the catalog to a physical view is assigned to it. Right-click it to open a context menu, page 112.
2	User-generated folder.
3	Device with module (for example, a communication card) assigned to a user-generated folder. The device and child elements are shown with a lock and their name appears in italic when the device is locked, page 112.
4	PROFIBUS remote master (PRM) gateway device.
5	PROFIBUS slave devices.
68	PROFIBUS-to-INTERBUS gateway.
7	Slave devices of the PROFIBUS-to-INTERBUS gateway.

The following figure shows a partial view of the **SYSTEM PROJECT** pane with examples of M580 PACs that have been added.



Item	Description
1	Object representing the standalone PAC as a whole. The node is created with its default configuration when you add it to the system project. Changes that you make to the hardware configuration of the PAC by editing the control project, page 229 are reflected in this pane. NOTE: For non-M580 controllers, page 252, no child elements are shown.
2	Local rack. Racks and modules are shown with a lock and their name appears in italic when the PAC is locked, page 112.
3	Backplane of the main local rack. The name, page 125 of a backplane is followed by its address in the rack.
4	Modules of the main local rack. The name, page 125 of a module is followed by its position (address) on the backplane.
5	Backplane of the extended local rack.
6	Modules of the extended local rack.
7	EIO bus that is shown only when you add a drop.
8	Remote rack (drop). The name, page 125 of the drop is followed by the values of the rotary switches of its CRA adapter module.

Item	Description
	NOTE: The address of the drop on the bus is indicated by the Device Number attribute, page 156 of its CRA adapter module when you select it in the Communication Mapping View.
9	Backplane of the main remote rack.
10	Modules of the main remote rack.
11	Object representing the redundant PAC as a whole.
12	Local rack with role A. You can change the hardware configuration by editing the control project, page 229 of either local rack. Changes are reflected in both racks.
13	Local rack with role B.

Devices Locked for Editing

A device and its child elements are shown with a lock and their name appears in italic when they are locked because you have opened an associated object in an editor. For example, you are editing the control project of a PAC, the fieldbus of a gateway device, or have opened a DTM.

Once the object editor is closed, the representation of the node returns to normal and is updated (if applicable).

Selecting Multiple Folders and/or Devices

You can select a combination of folders and devices, including PACs that appear in the **Topology** folder structure. However, your selection cannot contain individual modules of a device (for example, only the rack or a communication module of a PAC or only the communication card of a drive). That is, nodes need to be collapsed.

Moving Devices to Another Topological Folder

You can change the location of devices inside the folder structure of the topology by selecting one or more devices and dragging them onto another existing topological folder:

- If the target folder is expanded, you can select the position of the device among existing devices.
- If the target folder is collapsed, the device is added in last position. Holding over a collapsed folder expands it.

For PACs and other devices with child elements (such as gateways), you cannot move child elements individually (for example, the communication module of a rack or a PROFIBUS slave device).

Topology Node Actions

The table describes the commands of the context menu of the **Topology** node.

Command	Description
New Folder	Creates a new folder, page 176 with properties set to default values.
Paste	Pastes the objects that have been added to the Clipboard from the SYSTEM PROJECT pane. For details, refer to the topic describing the paste action for folders, page 176 or devices, page 200.

Command	Description
Export	Opens the EXPORT window, page 100, which lets you export to file the complete topology of the system project, a selection of devices, or a single one. You can also export the corresponding physical views and physical links.
Import	Opens the Topology: Import dialog box, which lets you select a topology export file (.xpt), page 216 that has been created by using the Export command. It lets you import the objects, page 218 contained in the file.

Topology Folder Actions

The table describes the commands of the context menu of the **Topology** root folder or topological folders.

Command	Description
New Folder	Creates a new folder, page 176 with properties set to default values.
Cut	Adds the folder, any subfolders, and devices that it contains to the Clipboard, and removes it from the system project. You can use the command when multiple objects are selected, page 112.
Copy	Adds the folder, any subfolders, and devices that it contains to the Clipboard. You can use the command when multiple objects are selected, page 112. NOTE: You cannot copy from the Topology root folder.
Paste	Refer to the description of the command in the topic describing Topology node actions, page 112.
Export	
Import	
Delete	Deletes the folder after confirming the command. Deleting a folder also deletes the devices, page 194 contained in the folder and all subfolders. You can use the command when multiple objects are selected, page 112. NOTE: You cannot delete the Topology root folder.

Device Actions

The table describes the commands of the context menu of a device that are specific to the **SYSTEM PROJECT** pane. For a description of the other commands, refer to the topic describing the device context menu, page 194.

Command	Description
Cut	Adds the device, its child elements (for example, slave devices for a gateway), and configuration files to the Clipboard and removes them from the system project. For devices with child elements (such as gateways), the child elements are cut. You can use the command when multiple objects are selected, page 112.
Copy	Adds the device, its child elements (for example, slave devices for a gateway), and configuration files to the Clipboard. You can use the command when multiple objects are selected, page 112.
Export	Opens the EXPORT window, page 100, which lets you export to file the device or a selection of devices. You can also export the corresponding physical views and physical links.

SYSTEM PROJECT Pane - Logical Networks Node

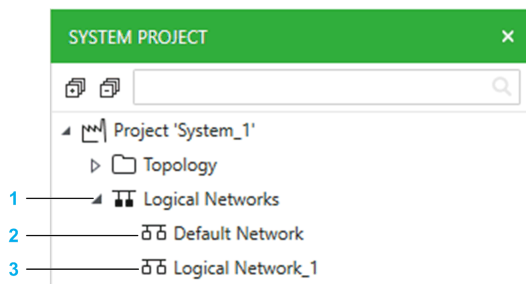
Overview

The **Logical Networks** node shows the logical networks that exist in your system project. It lets you create, page 178 and manage them.

You can view and configure properties, page 119 of each logical network by selecting it and opening a context menu.

Logical Networks Node Description

The following figure shows an example of the **Logical Networks** node and its content.



Item	Description
1	<p>Logical Networks root node.</p> <p>NOTE: Devices assigned to a logical network are not shown in this view. To view the logical network that a device is assigned to, select the device and verify the value of the Logical Network attribute in the PROPERTIES pane (CONFIGURATION tab) or open the LOGICAL NETWORK VIEW.</p>
2	<p>Default logical network.</p> <p>NOTE: You can assign devices to a logical network by configuring the Logical Network attribute of the device.</p>
3	<p>User-generated logical network.</p> <p>You can change the order in which logical networks are displayed by dragging a logical network to its new position.</p>

Logical Networks Node Actions

The table describes the commands of the context menu of the **Logical Networks** node.

Command	Description
New Logical Network	Creates a new logical network, page 178 with properties set to default values.
Open Logical Network View	Opens the LOGICAL NETWORK VIEW , which lets you view and edit communication attributes of devices of the system project and reassign them to other existing logical networks.

Logical Network Actions

The table describes the commands of the context menu of logical networks.

Command	Description
Open With	Opens a submenu that contains a list of views that are suited to view the logical network.
Show in Active Views	Selects and shows the logical network in the other windows and panes that are open and where the logical network appears (for example, in the LOGICAL NETWORK VIEW).
Delete	Deletes the logical network after confirming the command. You cannot delete a logical network if devices are assigned to it. In such case, first change the <i>Logical Network</i> attribute of the devices assigned to it to a different logical network, page 82.

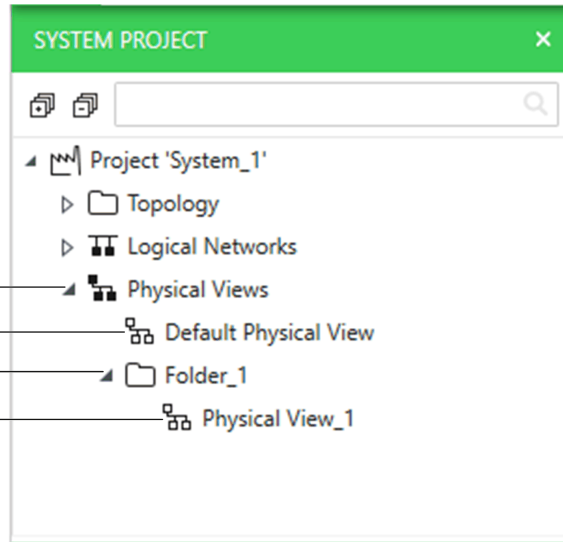
SYSTEM PROJECT Pane - Physical Views Node

Overview

The **Physical Views** node shows the physical views, page 76 that exist in your system project. It lets you create and manage them.

Physical Views Node Description

The following figure shows an example of the **Physical Views** node and its content.



Item	Description
1	Physical Views root node. NOTE: Devices assigned to a physical view are not shown in this view. To view them, open the physical view, page 116.
2	Default physical view, page 76.
3	User-generated physical view folder. NOTE: You can change the order in which folders are displayed by dragging a folder to its new position within the same folder or move it to a different folder, page 176.
4	User-generated physical view. You can change the order in which physical views are displayed by dragging a view to its new position.

Physical Views Node and Folder Actions

The table describes the commands of the context menu of the **Physical Views** node and folders therein.

Command	Description
New Folder	Creates a folder.
New Physical View	Creates a new physical view and opens it.

Physical View Actions

The table describes the commands of the context menu of physical views.

Command	Description
Open	Opens the physical view. You can select several physical views and open them at once.
Delete	Deletes the physical view after you confirm the command. NOTE: Deleting a physical view does not delete the devices that appear in it from the system project. Physical links are deleted however.

PROPERTIES and Properties Inspector Panes

PROPERTIES and Properties Inspector Panels

Overview

The **PROPERTIES** pane lets you view and/or configure the attributes of the object is currently selected.

The tabs, page 122 that it contains and the information shown in each tab are context-sensitive and depend on the object that is selected.

NOTE: You can reopen the pane by using the **Views** menu in the toolbar, page 30.

Properties Inspector Pane

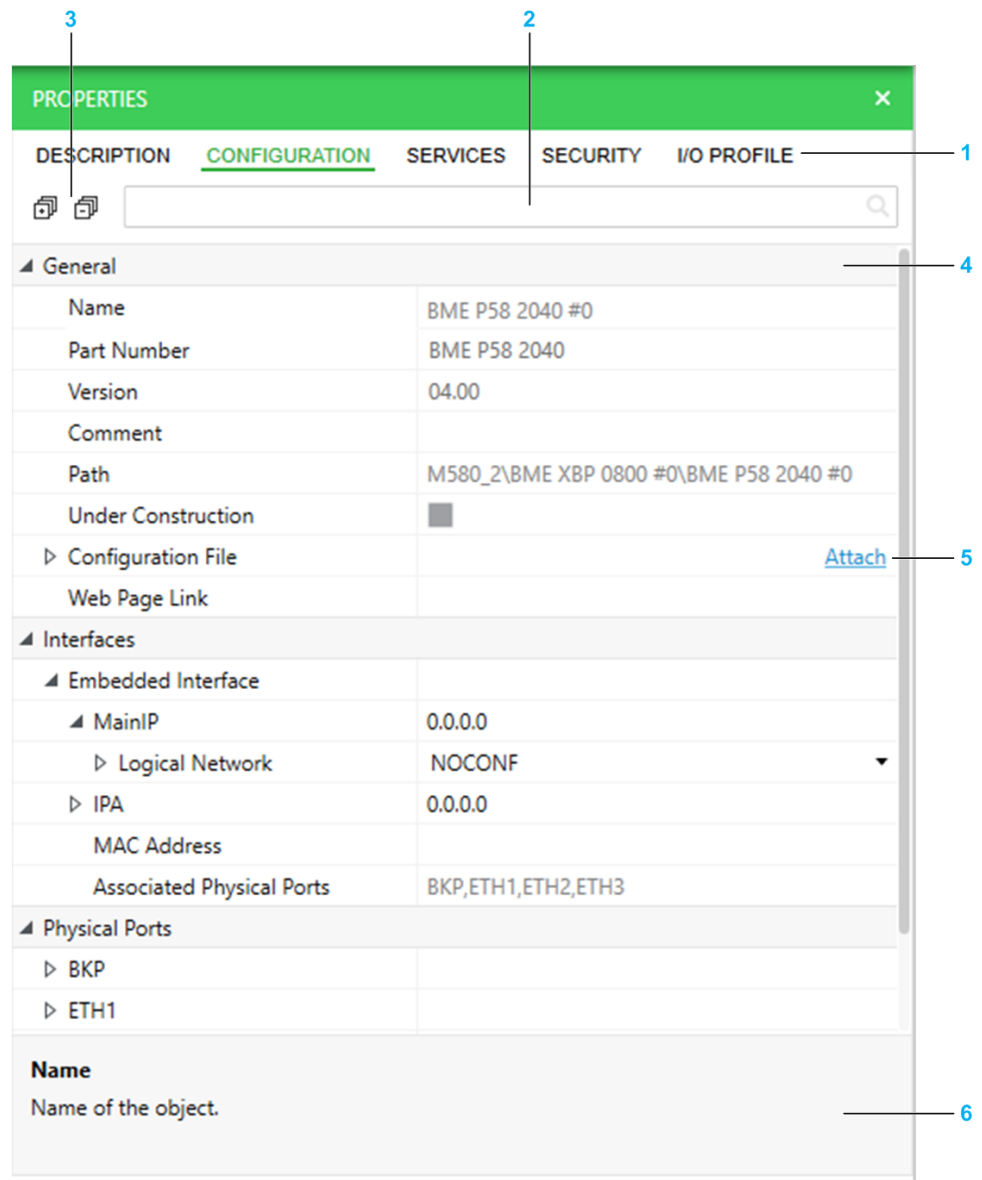
Properties Inspector panes are additional panes that you can open by using the **Open With** context-menu command of an object.

Each pane displays the same type of information as the **PROPERTIES** pane but only of the object from which you open it. The name of the object appears in the title bar of the pane.

It makes it possible to view the properties of several objects at the same time.

PROPERTIES Pane Description

The following figure shows an example of the content of the **PROPERTIES** pane when a device is selected in the Topology Manager.



Item	Description
1	Lets you access the various tabs, page 123 showing the attributes of the selected object. When you select equipment from the catalog, only its description is available.
2	Search field. Enter a string to display only categories and attributes whose name contains the string.
3	Controls to expand/collapse attribute categories and nodes.
4	Attributes are grouped by category.
5	Controls located on the right-hand side let you create, delete, and open objects that are managed in this view (when applicable).
6	Name and/or description of the selected attribute/object.

Properties of Objects in the Topology Manager

The table indicates where you can find the description of properties of objects managed by the Topology Manager.

Object	Refer to the topic
System projects	Creating system projects, page 48
Folders in the system project repository	Organizing system projects, page 46
Topological folders in the SYSTEM PROJECT pane	Managing topological folders, page 176
Logical networks	Creating logical networks, page 179
Devices and PACs	Tabs of the SYSTEM PROJECT pane, page 125
Physical links	Connecting devices through physical links, page 213

PROPERTIES Pane - DESCRIPTION Tab

General Category - DESCRIPTION Tab

Overview

The **DESCRIPTION** tab appears when you select a device or module in a view or pane of the system project.

NOTE: When you select equipment in the **TOOLBOX**, the same attributes appear but without showing the tab. Values may differ.

NOTE: The attributes that appear in this tab when you select a system project are described in a separate topic, page 47.

Description of Attributes

Attribute	Description
Icon	Picture of device.
Part Number	Part number of the device.
Short Description	Description of the product range.
Version	Version of the device.
Description	Description of the device.
Online Documentation	Hyperlink to the product page of the device on the Schneider Electric website. An Internet connection is required.

PROPERTIES Pane - CONFIGURATION Tab

Overview

The **CONFIGURATION** tab is available for devices that have attributes related to hardware and network services. It lets you view and configure their attributes.

The various attributes are grouped in categories.

This topic describes all the attributes that are available. However, the ones that appear in the tab depend on the device that is selected.

General Category - CONFIGURATION Tab

Description of Attributes

Attribute	Default value	Description	
Name	–	Name of the object in the system project. When the name is editable, page 25, the software accepts only values that are unique within the system project. NOTE: For a redundant PAC, by default, both local racks have the same name but each one is identified by the <i>_A</i> or <i>_B</i> suffix that corresponds to the role of the controller. For the following objects, the suffix that is added after their name is not editable.	
		Remote racks (drops)	The drop address. It is shown in a 3-digit format. For example, by default, #001 for drop 1. The value is based on the configuration of <i>Device Name</i> of its CRA adapter module in Control Expert Editor when you add the drop. Thereafter, it is updated when you edit the DHCP client Identifier , page 142 of the CRA adapter module. It lets you easily configure the rotary switches of the module with the first two digits representing the <i>Tens</i> and the third the <i>Ones</i> switch.
		Backplanes of local and remote racks and their modules	The position (address) of the backplane in the rack and the position of the module on the backplane. The format is #<position>. For example, #0.
		Power supply modules	<Position> is replaced by <i>P</i> . For racks that support redundant power supplies, <i>PL</i> and <i>PR</i> are used to identify the two power supplies.
		Part Number	–
Version	–	Version of the device. For certain devices that are added to the system project from the TOOLBOX , you can select the version from a list.	
Build Target	Real	Indicates at the PAC level, page 110, the target for which the control project of an M580 PAC was built. NOTE: Changing the value sets the build state to Not Built .	
		Real	Builds the control project with the configuration data of the PAC and its dependencies so that you can deploy the executable to the physical controller.
		Simulator	Builds the control project without the data of the associated PAC configuration and restricts the IP address selection in the deployment dialog box, page 309 to the simulator. The simulator starts automatically when you use the Deploy command or select the PAC in the DEPLOYMENT VIEW . NOTE: If you are connected to a remote system server, you need to configure the listening IP address, page 309 of the simulator before you can use it.

Attribute	Default value	Description
Port	First available value in the range.	Port used for communication with the simulator. Changing the value does not modify the build state. Valid range: 502 to 65535 The attribute is visible only when Build Target is set to Simulator .
Build State	Not Built	Indicates the current state of the control project of an M580 PAC. The attribute is managed by the software. If the build operation does not complete successfully, the build state is unchanged.
		<p>Not Built</p> <p>The control project is not built and cannot be deployed.</p> <p>This is the state when:</p> <ul style="list-style-type: none"> You create a PAC. You change the value of Build Target.
		<p>Built</p> <p>The control project has been built with the current data of the PAC, its dependencies, and the Build Target setting. You can deploy it to the physical controller.</p>
		<p>Out Of Date</p> <p>You have modified the PAC configuration after the control project was built by changing its properties or those of dependencies, mappings, or editing its associated control project.</p> <p>Or, you have set, changed, or cleared the system project password, page 52.</p> <p>You need to build the control project again to integrate these changes and set the build state to Built.</p> <p>NOTE: You can deploy the executable but you must confirm the command. In such case, the executable that is deployed is the one that was created by the last successful build operation.</p>
Last Built On	Blank	Date and time when the control project of an M580 PAC was last built successfully.
Last Deployed On	Blank	Date and time when the control project of an M580 PAC was last deployed successfully either from the Topology Manager or Control Expert Editor.
Label	–	Refer to the description of physical link properties, page 208.
Source	–	
Destination	–	
Comment	Blank	Optional. You can enter a comment by using free-form text.
Path	–	Read-only. Path to the object in the System Project Explorer pane. A tooltip indicates the entire path. NOTE: For racks and modules, the PAC object and its parent folders are not part of the path.
Under Construction	False (cleared)	When you select the check box (true): <ul style="list-style-type: none"> You cannot deploy to the device. Attributes of the device are not analyzed, page 256 or only partially. No diagnostic information, page 275 is shown. In a physical view, the device is shown with light gray fill. <p>NOTE: For certain devices and modules, the value is read-only and inherited from the parent object.</p>

Attribute	Default value	Description
Configuration File	Blank	<p>Optional.</p> <p>Lets you save a copy of a file to the repository of Control Expert. The file can be, for example, a configuration project that is managed by an external program.</p> <p>Click Attach to select a file on the local computer or a network location. You can attach a file only if its file extension is allowed, page 26.</p> <p>Each file is saved with a unique, randomly created name.</p> <p>Once attached, the file can be managed from the context menu, page 194 of the device by one user at a time.</p>
Last Attached By	Blank	<p>User name, page 166 that was entered to log in to the Control Expert instance and date/time when the file specified under Configuration File was attached last.</p>
Last Attached On		<p>The attributes are also updated when you have opened a file by using the Configuration File > Open command, page 194 and your changes have been saved to the repository.</p>
Web Page Link	Blank	<p>Optional.</p> <p>Enter a URL that uses the HTTP or HTTPS protocol to open the corresponding webpage, page 288.</p> <p>(The URL needs to start with <i>http://</i> or <i>https://</i>.)</p> <p>NOTE: Leave the attribute blank to open the embedded webpage of the module or device (when available).</p>
Index	–	<p>Read-only.</p> <p>Address of the rack in the bus editor.</p>

Management Category - CONFIGURATION Tab

Description of Attributes

The attribute is available only for the redundant PAC, page 110.

Attribute	Description
Control Mode	<p>Defines how a redundant PAC is managed by the software.</p> <p>To switch between the available modes, you must confirm your selection.</p> <ul style="list-style-type: none">• Primary And Standby (default):<ul style="list-style-type: none">◦ Regular mode of operation for a redundant PAC.◦ The standby PAC is synchronized.• Primary A Only or Primary B Only:<ul style="list-style-type: none">◦ Redundancy is not available.◦ The standby PAC is not synchronized.◦ The Under Construction attribute, page 125 of the standby PAC is set to true and its state is not inherited from the parent device anymore.◦ You cannot deploy to the standby PAC.◦ Modifications that you perform on either redundant local rack (A or B) are still repeated on the counterpart rack (for example, modifying attribute values or changing to the rack configuration).◦ In physical views, the high-speed cable link is shown as a dotted line.

Interfaces Category - CONFIGURATION Tab

Overview

The **Interfaces** category regroups attributes related to the TCP/IP configuration of devices.

It always contains at least one subcategory.

When a device manages other IP addresses in addition to the host addresses, their attributes are shown in separate interface subcategories, which correspond to the respective ports, for example, *Port1_Interface*. Typically, enabling the routing capability of a port (**Interface** attribute, page 132) creates such a subcategory.

Embedded Interface Subcategory

The subcategory is present for devices that manage at least one IP address. It contains the attributes of the host IP addresses. A device can manage more than one host IP address.

NOTE: When the interface of the device is located on a communication card, the name of the interface is **Ethernet Interface**.

Each interface subcategory features one or more of the following attributes.

Attribute	Description
Ethernet Protocol	Indicates the communication protocol that is used by the interface. Possible values: <ul style="list-style-type: none"> • Modbus TCP • EtherNet/IP For devices that support it, you can select either value.
Associated Physical Ports	Lists the ports, page 132 of the device to which the interface settings (such as Ethernet protocol, IP address, logical network) apply. NOTE: CPU represents the processor of the device itself.
MAC Address	Lets you enter the identification number of the physical device. The value is used as identifier for DHCP clients, page 142 that are identified by their MAC address. Format: <i>MM-MM-MM-SS-SS-SS</i> where <i>MM</i> (vendor identification) and <i>SS</i> (device-specific identification) are hexadecimal numbers.
Scanning Device Outside Logical Network	The attribute is available only for BMENOC03*1.4 modules. When the check box is selected (true), the information message related to analysis rule ID 3008, page 262 is not displayed. NOTE: Selecting this check box clears the Automatic Device(s) subnet update check box in the IP address configuration tab of the module in the control project and vice versa.

Attributes of IP Addresses

IP addresses can be configured manually or automatically by assigning the device to a logical network, page 131 or by using the **LOGICAL NETWORK VIEW**, page 82.

Each interface subcategory features one or more of the following attributes.

Attribute	Description
IP Address	IP address of the device.
MainIP	<p>MainIP is an IP address that is available for:</p> <ul style="list-style-type: none"> The CPU module. It is used for services other than the RIO scanner. Certain communication modules. <p>NOTE: For the second BMECRA31310 module in each drop of a redundant PAC, MainIP is read-only and set to the value of MainIP of the first CRA module +1.</p>
IPA	<p>IPA is used by the RIO scanner.</p> <p>NOTE: For BMENUA0100 modules, IPA contains the IP address of the backplane port. It is automatically configured with an IP address that belongs to the same logical network as MainIP of the CPU module.</p>
MainIP+1	<p>Available only for interfaces in local rack B of a redundant PAC.</p> <p>The attribute is read-only and calculated automatically based on the value of MainIP.</p>
IPB	<p>Available only for interfaces in local rack B of a redundant PAC.</p> <p>Used by the RIO scanner.</p> <p>NOTE: For BMENUA0100 modules, IPB is the IPv4 address of the backplane port.</p>

IPv4 Control Port Sections

The **IPv4 A** and **IPv4 B** sections and their attributes are available for BMENUA0100 modules and apply to the control port, page 132.

The **IPv4 B** section pertains to the module in local rack B of a redundant PAC. Its attributes are automatically configured based on the values of attributes in the **IPv4 A** section and vice versa.

Attribute	Description
Enabled	When the check box is selected (true, default value) enables IPv4 communication for the control port and shows the other attributes of the section.
IPv4 A	<p>IPv4 address of the module.</p> <p>By default, an IP address is configured that belongs to a new logical network that is created.</p>
IPv4 Mode	<p>Identifies the source of the IPv4 address.</p> <p>Possible values:</p> <ul style="list-style-type: none"> Default: Disables the Logical Network section and IPv4 A, which shows as <i>0.0.0.0</i> (default setting). The module is automatically configured with IPv4 address <i>10.10.MAC5.MAC6</i> where: <ul style="list-style-type: none"> <i>MAC5</i> is the fifth byte of the MAC address of the module. <i>MAC6</i> is the sixth byte of the MAC address of the module. Static : Enables the Logical Network section, which lets you configure a static IP address.

IPv6 Control Port Sections

The **IPv6 A** and **IPv6 B** sections and their attributes are available only for BMENUA0100 modules and apply to the control port, page 132.

The **IPv6 B** section pertains to the module in local rack B of a redundant PAC. Its attributes are automatically configured based on the values of attributes in the **IPv6 A** section and vice versa. Except for **Gateway Address**, which you can configure independently.

Attribute	Description
Enabled	Selecting the check box (true) enables IPv6 communication for the control port and shows the other attributes of the section.
IPv6 A	128-bit IPv6 IP address. Format: 8 groups of 4 hexadecimal numbers separated by a colon. NOTE: IPv6 addresses are not shown in the LOGICAL NETWORK VIEW and Communication Mapping Views.
IPv6 Mode	Identifies the source of the IPv6 address. Possible values: <ul style="list-style-type: none"> • Static: Enables the IPv6 address, Subnet Prefix A, and Gateway Address attributes, which let you configure a static IP address and network domain (default setting). • SLAAC: Disables and hides the IPv6 address and the Subnet Prefix A attribute. The IP address is provided by the DHCP server, page 142 by using the SLAAC method.
Gateway Address	128-bit IPv6 IP address. Format: 8 groups of 4 hexadecimal numbers separated by a colon. NOTE: IPv6 addresses are not shown in the LOGICAL NETWORK VIEW and Communication Mapping Views.
Subnet Prefix A	The number of bits of the user-configured IPv6 address that are used to define the subnet network. Default: 64 Range: 0 to 128

Logical Network Section

For each IP address, the following attributes are available.

Attribute	Description
Logical Network	Logical network that the interface of the object belongs to. You can assign an interface to an existing logical network or to a new one by using the list. This sets the IP address to the next available address on this logical network. The list contains the following entries: <ul style="list-style-type: none"> • NOCONF: Not configured. Sets the IP address, Subnet Mask, and Gateway Address to <i>0.0.0.0</i>. The interface of the object is not assigned to a logical network. • Existing logical networks: Assigns the interface to the logical network that you select. • New: Create a new logical network by entering its name and configuring its properties, page 179. The interface of the object is assigned to the newly created logical network. NOTE: <ul style="list-style-type: none"> • For certain interfaces, the value is preconfigured or inherited from another device (for example, a module may have the same value as the CPU module of the same PAC) and may be read-only (for example, for CRA adapter modules). • For redundant PACs, changing the value for the interface of a module in one local rack changes it also for the counterpart module in the other rack.
Subnet Mask	The attribute is read-only and configured based on the configuration of the logical network, page 179 that the interface of the object is assigned to (Logical Network attribute)
Gateway Address	

Physical Ports Category - CONFIGURATION Tab

<Port Name> Section

For a description of specific ports of modules of the M580 platform, refer to the next sections.

Attribute	Description
Enabled	Clearing the check box (false) disables the port and its services. If possible, disable a port when it is not used. NOTE: When the attribute is not present, the port is enabled and cannot be disabled.
Interface	Selecting the check box (true) enables the routing capability of the port and creates an interface subcategory, page 129 for the port.
Service L2	You can select None or any combination of services from the following: <ul style="list-style-type: none"> • QoS • RSTP The services that are enabled are shown in the box when the list is collapsed.
Redundant Port	Creates a second redundant port with the same configuration.
Port Type	Indicates the type of network that the port supports. For example, a DIO or RIO ring. For certain devices, you can select the port type from a list. NOTE: To change the port type of several editable ports at once, select them on the device in a physical view (without selecting the device itself) and change the value of Port Type in the PROPERTIES pane.

BKP Backplane Port Section

Attribute	Description
Enabled	Clearing the check box (false) disables the port and its services. If possible, disable a port when it is not used. NOTE: When the attribute is not present, the port is enabled and cannot be disabled.
Baud Rate	100 Mbits/s full duplex. Read-only.
Interface	Selecting the check box (true) enables the routing capability of the port and creates an interface subcategory, page 129 for the port. NOTE: To use the routing capabilities of the communication module, configure the BKP_interface with an IP address that belongs to the device network; that is, the same logical network as the embedded interface of the CPU module.
Port Type	Indicates the type of network that the port supports. For example, a DIO ring.

ETH1 Service Port Section

NOTE: For BMENOS0300 modules, the configuration of the Ethernet ports is performed exclusively by using the rotary switch located on the module. Configuring **Service L2** has no impact. For details, refer to the module installation and configuration guide.

Attribute	Description
Enabled	Clearing the check box (false) disables the port and its services. If possible, disable a port when it is not used. NOTE: When the attribute is not present, the port is enabled and cannot be disabled.
Baud Rate	Possible values: <ul style="list-style-type: none"> • Auto 10/100 Mbits/s (default)

Attribute	Description
	<ul style="list-style-type: none"> 10 Mbits/s half duplex 10 Mbits/s full duplex 100 Mbits/s half duplex 100 Mbits/s full duplex <p>The attribute is set to the default value and read-only for CPUs modules.</p>
Service Port Mode	<p>Possible values:</p> <ul style="list-style-type: none"> Access Mode Mirroring Mode: Enables Mirrored Ports. Extended Network: Creates the ETH1_Interface interface, page 129, which you can configure. Applies to BMENOP0300 modules only. <p>NOTE: For BMENOP0300 modules, setting ETH1 to Access Mode automatically associates the ports that are enabled (for example, BKP or ETH2) to the embedded interface of the module and configures its ETH-1 IP address with that of MainIP.</p> <p>Setting ETH1 to Mirroring Mode configures its ETH-1 IP address with <i>0.0.0.0</i>.</p>
Mirrored Ports	<p>The ports that are mirrored are shown in the text field when the list is collapsed.</p> <p>You can select any combination of ports from the following:</p> <ul style="list-style-type: none"> Internal: Embedded interface ETH2 ETH3 BKP: Backplane port <p>To be selected, a port must be enabled.</p>
Interface	<p>The attribute is available only when Interface of BKP is enabled (if applicable).</p> <p>Selecting the check box (true) enables the routing capability of the port and creates an interface subcategory, page 129 for the port.</p> <p>NOTE: To use the routing capabilities of the port, configure ETH1_interface with an IP address that belongs to the extended network.</p>
Port Type	<p>Indicates the type of network that the port supports. For example, a DIO ring.</p>

ETH2 and ETH3 Device Network Port Sections

NOTE: For BMENOS0300 modules, the configuration of the Ethernet ports is performed exclusively by using the rotary switch located on the module. Configuring **Service L2** has no impact. For details, refer to the module installation and configuration guide.

Attribute	Description
Enabled	<p>Clearing the check box (false) disables the port and its services.</p> <p>The attribute is not available when Interface of BKP is enabled (if applicable).</p> <p>If possible, disable a port when it is not used.</p> <p>NOTE: When the attribute is not present, the port is enabled and cannot be disabled.</p>
Baud Rate	<p>Possible values:</p> <ul style="list-style-type: none"> Auto 10/100 Mbits/s (default) 10 Mbits/s half duplex 10 Mbits/s full duplex 100 Mbits/s half duplex 100 Mbits/s full duplex <p>The attribute is set to the default value and read-only for CPUs with both DIO and RIO scanner service.</p>

Attribute	Description
Service L2	<p>You can select None or any combination of services from the following:</p> <ul style="list-style-type: none"> • QoS • RSTP <p>The services that are enabled are shown in the box when the list is collapsed.</p> <p>NOTE: Some devices support only one service or require that RSTP is enabled.</p>
Port Type	Indicates the type of network that the port supports. For example, a DIO or RIO ring.

NOTE: The values of attributes of both dual ports are cloned.

Control Port Section

The section is available only for BMENUA0100 modules.

Attribute	Description
Enabled	<p>Selecting the check box (true) enables the control port, which becomes the exclusive interface for IPv4 or IPv6 communication, page 129 to the embedded OPC UA server.</p> <p>Clearing the check box (false) disables the control port and the backplane port (BKP) supports IPv4 communication to the OPC UA or Edge server.</p> <p>If possible, disable a port when it is not used.</p> <p>NOTE: In a redundant PAC, the value of the attribute is cloned for modules in racks A and B.</p>
Port Type	Indicates the type of network that the port supports. For example, a DIO ring.

Communication Card Category - CONFIGURATION Tab

Description of Attributes

Attribute	Description
Reference	Defines the type of communication card in the device. Possible values: <ul style="list-style-type: none"><li>• None: No communication card is present or it is present but not configured. The communication card, the corresponding ports, and their attributes are not visible.<li>• ATV Communication Card: Shows the communication card, the corresponding ports, and enables their attributes.<li>• PC Network Interface Card: Shows an additional NIC, the corresponding ports, and enables their attributes.

Fieldbus Category - CONFIGURATION Tab

Description of Attributes

The category appears only when you select a slave device in the **Fieldbus Editor**.

Attribute	Description
Logical Number	<ul style="list-style-type: none">• For PROFIBUS devices:<ul style="list-style-type: none">◦ Address of the device on the bus.◦ Range: 0 to 126. 1 is reserved and cannot be used.◦ Read-only.• For HART devices:<ul style="list-style-type: none">◦ Channel number of the module.◦ Range: 0 to x-1 (where x is the number of channels that the module is equipped with).

DTM Category - CONFIGURATION Tab

Description of Attributes

Attribute	Description
Device Name	The information is related to the DTM, page 222 that is installed on the local computer and used by the device.
Device Version	
Vendor	
DTM Name	
DTM Version	

PROPERTIES Pane - SECURITY Tab

Overview

The **SECURITY** tab is available for devices that have attributes related to communication security services. It lets you view and/or configure their attributes.

The various attributes are grouped in categories.

This topic describes all the attributes that are available. However, the ones that appear in the tab depend on the device that is selected.

Global Policy Category - SECURITY Tab

Description of Attributes

Attribute	Description
Security Level	<p>Predefined security level that is applied to the Ethernet services of the module.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • No: Enables Ethernet services and disables access control. This is the lowest security level. • Enforced: Disables Ethernet services and enables access control. • Custom: The value is selected automatically to indicate that you have modified an attribute value in the Services category that is normally set for the predefined Enforced or No security level.
Secure Protocol	<p>Communication protocol that is used for deployment.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • No (HTTP): Uses the <i>HTTP</i> protocol. • HTTPS • FTPS • SNMPv3 • IPsec
Pre-Shared Key⁽¹⁾	<p>The attribute cannot be left blank.</p> <p>Enter a 16-character string containing at least one character from each of these categories:</p> <ul style="list-style-type: none"> • Uppercase characters from the classical Latin alphabet (A...Z) • Lowercase characters from the classical Latin alphabet (a...z) • Base-10 digits (0...9) • Special characters (~, !, @, \$, %, ^, &, *, _ , +, -, =, ` , , \, (,), [,] , ; , ' , < , >)
Enable DH 2048⁽¹⁾	<p>When the check box is selected (true), generates 2048-bit Diffie-Hellman parameters.</p>
Enable Confidentiality⁽¹⁾	<p>When the check box is selected (true), Ethernet services are encrypted.</p>
<p>(1) Available only when Secure Protocol is set to IPsec.</p>	

Services Category - SECURITY Tab

Description of Attributes

NOTE: The value of these attributes may change when you change the value of the **Security Level** attribute, page 139.

Attribute	Description
FTP	Possible values: <ul style="list-style-type: none"> • Enabled: Enables the service for the module. This setting is required to be able to configure the service for each authorized address of a device in the ACCESS CONTROL VIEW. • Disabled: Makes the service unavailable for the module. In the ACCESS CONTROL VIEW, disables and resets the corresponding service for the authorized entries of a device.
TFTP	
HTTP	
EIP	
SNMP	
DHCP	<ul style="list-style-type: none"> • The service is disabled when Security level is set to Enforced. • The service is enabled when Security level is set to No.
IPsec	<ul style="list-style-type: none"> • The service is enabled when Security level is set to Enforced. • The service is disabled when Security level is set to No.
Access Control	Possible values: <ul style="list-style-type: none"> • Enabled: Lets you configure the enabled Ethernet services for each authorized address of a device in the ACCESS CONTROL VIEW. • Disabled: Disables the possibility to configure Ethernet services individually for the authorized entries of a device. The existing configuration is retained. Click Edit to open the ACCESS CONTROL VIEW .

PROPERTIES Pane - SERVICES Tab

Overview

The **SERVICES** tab is available for devices that have attributes related to Ethernet communication services. It lets you view and/or configure their attributes.

The various attributes are grouped in categories.

This topic describes all the attributes that are available. However, the ones that appear in the tab depend on the device that is selected.

DHCP Server and DHCP Client Categories - SERVICES Tab

Overview

This topic describes the attributes related to the DHCP service.

DHCP Server (Address Server) Category

Attribute	Description
Enabled	When the check box is cleared (false), the DHCP server service of the module is disabled. NOTE: When the attribute is not present, the module provides the DHCP server service to any client device that is configured to subscribe to the service of this module. The service can be disabled in the SECURITY tab.
DHCP Name	Path and name of the interface, page 129 of the device that provides the DHCP server service. The attribute is available only when Enabled is selected. NOTE: You can see the list of modules in the DHCP VIEW .
DHCP Prefix	Editable prefix that is used to create the DHCP identifier, page 142 of certain modules whose DHCP server is the M580 CPU module. The prefix must satisfy the following rules: <ul style="list-style-type: none"> • 3 characters maximum. • Can contain only letters and numbers. • Cannot consist of the letter C (or c) followed by two digits. Default value: <ul style="list-style-type: none"> • For a standalone M580 PAC: <i>Mx8</i> • For a redundant M580 PAC: <i>M58</i>

DHCP Client Category

Attribute	Description
Enabled	When the check box is selected (true), the device can subscribe to a DHCP server service, page 207. NOTE: For certain devices, it is selected by default and read-only (for example, CRA adapter modules). NOTE: The other attributes of this category are available only when Enabled is selected.
DHCP Server Name	Name of the device and its interface, page 129 that provides the DHCP server services. Select a value from the list of devices and their interface that exist in the system project and feature a DHCP server service, whether it is enabled or not. NOTE: For certain devices, the attribute value is predefined and read-only (for example, CRA adapter modules).
Protocol	Indicates the protocol that the device supports. Possible values: <ul style="list-style-type: none"> • DHCP • BOOTP NOTE: The possible values depend on the type of device and/or the value of Identified by .

Attribute	Description
Identified by	<p>Indicates how the DHCP server identifies the device:</p> <ul style="list-style-type: none"> By MAC address By device name (identifier) <p>NOTE: The possible values depend on the type of device.</p>
Identifier	<p>Enter the appropriate value depending on the setting that you have selected for Identified by. The software accepts only unique identifiers for a given PAC.</p> <p>For certain modules the software accepts only values that comply with module-specific format requirements. Refer to the manual of the module for details.</p> <p>For the following modules, the identifier must be in the format <i>[DHCP Prefix][Controller]_[Slot]_[Part Number]</i> where:</p> <ul style="list-style-type: none"> <i>[DHCP Prefix]</i> is the prefix, page 142 of the M580 controller. <i>[Controller]</i> is 0 for an M580 standalone and A or B for a redundant controller. The same convention applies to M580 safety controllers. <i>[Slot]</i> is the slot number of the backplane where the module is installed. <i>[Part Number]</i> is the part number, page 123 of the module. <p>Modules:</p> <ul style="list-style-type: none"> BMEAHI0812 and BMEAHO0412 BMECXM0100 BMENOS0300 BMENUA0100 BMEPXM0100 BMESWT0100 <p>When a device is identified by MAC address, the attribute is read-only and the value provided by the MAC Address attribute, page 129.</p> <p>The attribute cannot be left blank when Enabled is selected.</p> <p>NOTE: For PMEPXM0100 modules and TeSys devices, the value must not exceed 16 characters.</p> <p>NOTE: For certain devices, the attribute is predefined and read-only.</p> <p>NOTE:</p> <p>For CRA adapter modules the device name includes a 3-digit number (for example, by default, <i>001</i> in <i>PCRA_001_0</i> for a BMECRA31310 adapter module located in drop 1).</p> <p>The initial value of the 3 digits is based on the configuration of their <i>Device Name</i> in Control Expert Editor when you add the drop. Thereafter, you can only edit the 3 digits by using the Identifier attribute.</p> <p>Verify that the setting of the rotary switches on the physical CRA adapter module always matches these 3 digits. The first two digits represent the <i>Tens</i> and the third digit the <i>Ones</i> rotary switch.</p> <p>This 3-digit number also appears after the name of the drop, page 125 containing the CRA adapter module.</p>

FDR Server Category - SERVICES Tab

Description of Attributes

Attribute	Default value	Description
Enabled	True (selected)	When selected (true), the FDR server service of the module is enabled. The attribute may be read-only for certain modules.

RSTP Category - SERVICES Tab

Overview

This topic describes the attributes related to the RSTP service.

Operational State

Attribute	Description
Bridge Priority	2-byte value for the switch. Possible values: <ul style="list-style-type: none"> • Root(0) • Backup Root(4096) • Participant(32768): Represents the midpoint of the range (0 to 65535). Select a value from the list.

Bridge Parameters

For CPUs, the following attributes are available only for those without RIO scanner service.

Attribute	Default value	Description
Forward Delay (ms)	21,000	Read-only.
Maximum Age Time (ms)	40,000	Range: 6,000 to 40,000
Transmit Hold Count (ms)	40	Range: 1 to 40
Hello Time (ms)	2,000	Range: 1,000 to 2,000

NTP Category - SERVICES Tab

Overview

This topic describes the attributes related to the NTP service.

Configuration

Attribute	Description
NTP State	Possible values: <ul style="list-style-type: none"> • Disabled • NTP Client: The network time service (SNTP) synchronizes the clock of the device to that of the time server. • NTP Server: The device can synchronize clocks of NTP clients. NOTE: The possible values depend on the type of device.
Update CPU Time	When the check box is selected (true), the device acts as an NTP client, which provides the NTP time to the CPU clock. The attribute is available only when NTP State for the device is set to NTP Client .

Server Configuration

The attributes of this subcategory are available only when the **NTP State** attribute is set to **NTP Client**.

Attribute	Description
Primary NTP Server IP Address	Enter the IP address of the server that is used to synchronize the clock of NTP clients.
Secondary NTP Server IP Address	Enter the IP address of the backup server that is used to synchronize the clock of NTP clients.
Polling Period (s)	Time (in seconds) between updates from the NTP server. Range: 1...120 seconds in 1 sec. increments. NOTE: For certain devices, the attribute is not available.
Format	Lets you select the IP address format that you can use for each NTP server. Possible values: <ul style="list-style-type: none"> • IPv4 (default) • IPv6 The attribute is available only for BMENUA0100 modules.

NOTE: In a redundant PAC, the primary and secondary NTP server attribute values that are configured for a BMENUA0100 module in local rack A are not automatically applied to the module in rack B.

Syslog Server Category - SERVICES Tab

Description of Attributes

For more information on the events that are logged, refer to *Logging DTM and Module Events to the SYSLOG Server* help of the module.

Attribute	Default value	Description
Enabled	False (cleared)	<p>When selected (true):</p> <ul style="list-style-type: none"> Enables event logging for each possible originator of logged events in the architecture. Syslog server attributes are enabled and the configured values are propagated to each event-logging originator in the architecture. <p>The attribute is not available for system projects.</p> <p>NOTE: When the attribute is selected, clearing it and selecting it again replaces the values that were configured for IP Address and Port with those of the system projects.</p>
Reset to default	N/a	<p>Replaces the current values of IP Address and Port with the values that are configured for the system project, page 48.</p> <p>The attribute is not available for system projects.</p>
IP Address (1)	<ul style="list-style-type: none"> For a system project, page 48: 0.0.0.0 For a PAC: Value that is configured for the system project 	<p>IP address of the Syslog server to which event logs are sent.</p> <p>This address is embedded in the application.</p>
Protocol	TCP	<p>Protocol that is used for communications with the Syslog server.</p> <p>Read-only.</p>
Port (1)	<ul style="list-style-type: none"> For a system project: 601 For a PAC: Value that is configured for the system project 	<p>Port that is used for communications with the Syslog server.</p> <p>Range: 0...65535</p>
<p>(1) The attributes are editable only if in the Security Editor (see EcoStruxure™™ Control Expert, Security Editor, Operation Guide of the computer acting as system server, security is either on in Standard mode or off.</p>		

SNMP Category - SERVICES Tab

Overview

This topic describes the attributes related to the SNMP service.

Description of Attributes

Attribute	Description
Enabled	<p>When selected, enables SNMP for the module and lets you configure attributes of the SNMP category.</p> <p>For certain devices, the check box is selected and read-only.</p> <p>Your configuration is retained when you select/clear the check box.</p> <p>NOTE: For M580 CPU modules, the check box is read-only and its state is inherited from the SNMP security service, page 140 of the module.</p> <p>NOTE: For BMECRA31310 adapter modules, the check box is selected and read-only when Version is set to V1.</p>
Version	<p>Version of SNMP that is used for communication.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • V1 • V3. For CPU modules, the value is available only for firmware versions 04.00 and later. <p>The possible values depend on the type and version of device.</p> <p>Your configuration is retained when you switch SNMP versions.</p>

IP Address Managers

Attribute	Description
IP Address Manager 1	IP addresses of the first and second SNMP managers to which the agent that runs in the device sends trap notifications.
IP Address Manager 2	

Authentication

This subcategory is available only for SNMPv3.

Attribute	Description
User Name	<p>Required.</p> <p>To be valid, the user name must satisfy the following rules:</p> <ul style="list-style-type: none"> • 32 characters maximum. • Contains only any combination of ASCII characters from 33 to 122. • Spaces are not allowed.

Agent

Attribute	Description
Enable SNMP Manager	When selected (true), the Location (SysLocation) and Contact (SysContact) attributes are hidden and managed by the SNMP manager.
Location (SysLocation)	Enter the physical location of the device by using characters of the US-ASCII table (32 characters maximum).
Contact (SysContact)	Enter the contact information of the person in charge of device maintenance by using characters of the US-ASCII table (32 characters maximum).

Community Names

This subcategory is available only for SNMPv1.

Attribute	Default value	Description
Set	<i>private</i>	Password that the agent requires before it executes write commands received from the SNMP manager.
Get	<i>public</i>	Password that the agent requires before it executes read commands received from the SNMP manager.
Trap	<i>alert</i>	Password that the SNMP manager requires before it accepts trap notifications from an agent.

Security

This subcategory is available only for SNMPv1.

Attribute	Description
Enable "Authentication Failure" Trap	When selected (true), the agent sends a trap notification to the SNMP manager in case it receives a <i>Get</i> or <i>Set</i> request from a device that it cannot authenticate.

QoS Category - SERVICES Tab

Overview

This topic describes the attributes related to the QoS service.

For CPUs, the following attributes are available only for those without RIO scanner service.

Description of Attributes

Attribute	Description
Enabled	When selected (true), the module adds DSCP tags to the IP header of each Ethernet packet that it transmits to indicate its priority. It also enables the attributes of the other subcategories of QoS .

PTP

Attribute	Default value	Description
DSCP PTP Event Priority	59	Range: 0 to 63
DSCP PTP General Priority	47	Range: 0 to 63

EtherNet/IP Traffic

Attribute	Default value	Description
I/O Data Scheduled Priority Messages	47	DSCP value for I/O data scheduled priority messages that use the EtherNet/IP protocol. Range: 0 to 63
Explicit Messages	27	DSCP value for explicit messages that use the EtherNet/IP protocol. Range: 0 to 63
I/O Data Urgent Priority Messages	55	DSCP value for I/O data urgent priority messages that use the EtherNet/IP protocol. Range: 0 to 63
I/O Data High Priority Messages	43	DSCP value for I/O data high priority messages that use the EtherNet/IP protocol. Range: 0 to 63
I/O Data Low Priority Messages	31	DSCP value for I/O data low priority messages that use the EtherNet/IP protocol. Range: 0 to 63

Modbus TCP Traffic

Attribute	Default value	Description
I/O Messages	43	DSCP value for I/O messages that use the Modbus TCP protocol. Range: 0 to 63
Explicit Messages	27	DSCP value for explicit messages that use the Modbus TCP protocol. Range: 0 to 63

Network Time Protocol Traffic

Attribute	Default value	Description
Network Time Protocol Messages	59	DSCP value for network time protocol (NTP) messages. Range: 0 to 63

Advanced Category - SERVICES Tab

Overview

For CPUs, the following attributes are available only for those without RIO scanner service.

EtherNet/IP Timeout Settings

Attribute	Default value	Description
FW_Open I/O Connection Timeout (ms)	4960	Specifies the amount of time the scanner waits for FW_Open response of an I/O connection.
FW_Open EM Connection Timeout (ms)	3000	Specifies the amount of time the scanner waits for FW_Open response of an EM connection.
EM Connection RPI (ms)	10,000	Sets T->O and O->T RPI for all EM connections.
EM Request Timeout (ms)	10	Specifies the amount of time the scanner will wait between the request and the response of an explicit message.

EtherNet/IP Scanner Behavior

Attribute	Default value	Description
Allow RESET via explicit message	False (cleared)	When selected (true), the scanner resets when an identity object reset service request is received; otherwise, it ignores the request.
Behavior when CPU state is STOP	Idle	Possible values: <ul style="list-style-type: none"> Idle: The EtherNet/IP I/O connection stays open, but the <i>Run/Idle</i> flag is set to <i>Idle</i>. Stop: The EtherNet/IP I/O connection is closed.

Email Category - SERVICES Tab

Overview

This topic describes the attributes related to the electronic mail service.

Configuration

Attribute	Description
Enabled	When selected (true), the module sends an email message to the defined mail server, which is triggered by the DATA_EXCH function block. It also enables the attributes of the other subcategories of Email .

SMTP Server Configuration

Attribute	Description
SMTP Server Address	Enter the IP address of the SMTP mail server.
SMTP Server Port	TCP port number for SMTP transmissions. The value must match the port of the SMTP mail server you are using.

Authentication

Attribute	Description
Enabled	When selected (true), the Login and Password values are used by the SMTP server to authenticate the client.
Login	Enter your ID: <ul style="list-style-type: none"> Any printable character is allowed. 64 characters maximum.
Password	Enter your password: <ul style="list-style-type: none"> Any printable character is allowed. 64 characters maximum.

Email Header 1–Email Header 3

Each email message contains a user-defined header. You can configure up to three headers. Each header contains data from the following attributes.

Attribute	Description
From	Email address of the sender.
To	Email addresses of the recipients: <ul style="list-style-type: none"> Separate each email address by a comma or semi-colon. 128 characters maximum.
Subject	Fixed part of the subject. 32 characters maximum.

OPC UA Category - SERVICES Tab

Description of Attributes

The attribute is available only for BMENUA0100 modules.

In a redundant PAC, values that you configure for the module in local rack A are automatically applied to the module in local rack B.

Attribute	Default value	Description
OPCUA TCP Listening Port	4840	Number of the port that is used by the OPC UA server. Range (if different from default port): 49152 to 65535
Sampling Rate	Default	Possible values: <ul style="list-style-type: none">• Default• 20 ms

PROPERTIES Pane - I/O PROFILE Tab

Overview

The I/O PROFILE tab is available for devices whose inputs/outputs and/or diagnostic data is managed by using device derived data types (DDDT). It lets you view and configure some of the DDDT attributes.

The various attributes are grouped in categories.

This topic describes all the attributes that are available. However, the ones that appear in the tab depend on the device that is selected.

Ethernet Modbus TCP and Ethernet EtherNet/IP Categories - I/O PROFILE Tab

Overview

For devices that are configured by using a device type manager (DTM), data becomes available only after you have opened, page 194 and closed the DTM once. Typically, for Modbus TCP and EtherNet/IP devices, a request/connection is created by using the default data of the DTM. For certain devices (for example, TeSys T), a request is created only once you have selected a device reference and saved the change while closing the DTM.

For details about the relation between DTM and I/O profile data, refer to the topic describing how to configure I/O profiles, page 292.

NOTE: For redundant M580 PACs, the **I/O PROFILE** tab is available only for modules of rack A.

Description of Attributes

Attribute	Description
Service	Name and category of the I/O scanner service of the device Read-only.
Server	Name of the server that is used to communicate by using the respective protocol. Read-only.
DTM Reference⁽¹⁾	Part number and version of the module. Click Select to select from the list the DTM version that corresponds to the version of the module that you are using. Once a DTM is selected, you can create and configure local slaves. The box is empty by default. NOTE: Selecting a different value while local slaves exist deletes these local slaves.
(1) The attribute appears only for M580 CPU and BMENOC03•1 modules.	

Local Slaves Subcategory

The **Local Slaves** subcategory is created once you have selected a DTM. It shows the local slaves that exist for the module.

Clicking **Plus Sign (+)** creates an empty **Local Slave 1** and opens the selected DTM to let you configure the local slave.

Closing the DTM renames the local slave and adds its connection type according to the configuration that you have made in the DTM and creates the **Profile [1]** subcategory. You can then configure the profile, the connections in its memory registers, and the item mapping if needed. Refer to the tables further in this topic for details.

Each local slave has only one I/O profile, which you can add to a scanner, page 296.

Clicking **Edit** reopens the DTM, which lets you perform changes (for example, removing the connection and replacing it by another local slave connection).

NOTE: The number of local slaves that you can create depends on the module.

Communication Profiles Subcategory

A communication profile is the definition of the data exchanged by a device, which can contain one or more requests or connections. Creating several profiles for a device lets you, for example, preconfigure requests for various scanners by adjusting certain attributes to each one. The profile that is used for

communication, page 296 between the device and the scanner is the *active* profile.

When a device has an active communication profile, it is added to the device list of the master DTM of the scanner, which creates a device DDT type and variable in the associated control project. The structure of the device DDT takes into account the I/O mapping, page 297.

For each device, you can create up to 6 profiles. Minimum is 1.

Each profile features the following attributes.

Attribute	Default value	Description
Profile Name	The name of the device when it is created followed by <i>ProfileX_Device_Status</i> .	Name of the I/O profile, which is used as default value for the active I/O profile, page 296. Optional. NOTE: For certain modules, the default value is the device name (DHCP identifier, page 142) and is read-only (for example, CRA adapter modules).
Instance Name	The name of the device when it is created followed by <i>ProfileX</i> .	The name is used as default value for the active I/O profile, page 296. The value of this attribute in the active I/O profile becomes the name of the device DDT variable that is used in the control project to manage the device data. When the attribute is editable, the value cannot be null and must satisfy the following rules: <ul style="list-style-type: none"> • 30 characters maximum. • Can contain only alphanumeric characters of the US-ASCII character table and underscore (_). • Must start with a letter and cannot end with underscore. • Cannot contain two consecutive underscores. • Cannot contain spaces. The software accepts only unique names for a given control project. NOTE: For certain modules, the default value is the name of the associated device DDT variable and is in read-only (for example, CRA adapter modules).
Type Name	The value of Instance Name preceded by <i>T_</i> .	The name is used as default value for the active I/O profile, page 296. It becomes the name of the device DDT type that is used in the control project to manage the device data. Read-only.

Attribute	Default value	Description
Device Number	First available number in the range that corresponds to the scanner.	<p>Indicates the relative position of the device in the device list of the master DTM of the scanner.</p> <p>The list contains all the numbers that can be assigned to the device when it scanned by a given scanner. This includes numbers that may already be assigned to other devices, which are scanned by the same scanner independently of the communication protocol used by the device.</p> <p>The attribute is shown only when you select the I/O profile in a Communication Mapping View (active I/O profile, page 156).</p> <p>NOTE: For some devices, the attribute is read-only.</p> <p>NOTE: For local slaves, the attribute is not shown. A device number is assigned to each local slave by the master DTM of the scanner.</p>
Mapping	–	<p>Mapping mode that is used to perform and manage the I/O mapping for the profile.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • Manual: <ul style="list-style-type: none"> ◦ Data in the I/O Mapping Editor is editable. ◦ Some I/O profile attributes are editable. • Automatic: <ul style="list-style-type: none"> ◦ I/O mapping and request/connection data of the DTM of the device is used and overwrites changes that you have made. ◦ Data in the I/O Mapping Editor is read-only. ◦ Some I/O profile attributes are read-only. ◦ Adding and removing requests or connections is disabled. ◦ Requests/connections added manually are deleted. <p>Click Edit to open the I/O Mapping Editor for the device.</p> <p>NOTE: For a CRA adapter module, automatic mode is selected by default and is read-only.</p>

For each active I/O profile, the following additional attributes are available when you select the profile in a Communication Mapping View.

Attribute	Description
Path	Name of the scanning device. Read-only.
Comment	You can enter a comment for the active I/O profile by using free-form text.

NOTE: If the value of **Instance Name**, **Type Name**, or **Profile** already exists in the system project, the software adds the **_x** suffix, where **x** is an integer.

Memory Registers Section for Ethernet Modbus TCP

For each profile, you can create up to 64 requests. Minimum is 1.

Subsec-tion	Attribute	Default value ⁽¹⁾	Description
Request [x]	Default UnitID ⁽²⁾	255	Number that is used to identify the target of the connection. Typically, a device behind a gateway. Range: 0 to 255
	Default Health Timeout (ms) ⁽²⁾	1500	Maximum allowed interval between device responses before a timeout is detected. Range: 5 to 65535 in 5 ms intervals.
	Default Repetitive Rate (ms) ⁽²⁾	60	Data scan rate. Range: 5 to 60000 in 5 ms intervals.
	Read Address ⁽³⁾	0	Range: 0 to 65535
	Read Length ⁽³⁾	1	Number of words that are allocated to read from the server when you create a communication channel. The corresponding memory size is reserved in both the client and server memory heap. Range: 0 to 125
	Default Last Value ⁽²⁾	Hold Value	Input value that is retained when a communication interruption occurs. Possible values: <ul style="list-style-type: none"> • Hold Value • Set to Zero
Request [x]	Write Address ⁽³⁾	0	Range: 0 to 65535
	Write Length ⁽³⁾	0	Number of words that are allocated to write to the server when you create a communication channel. The corresponding memory size is reserved in both the client and server memory heap. Range: 0 to 120
	Default Gateway/Bridge Device	False	When selected (true), lets slower TCP/IP devices communicate with the I/O scanner of BMENOC0301/ 11.4 communication modules. The modules double the timeout setting by increasing the number of retransmissions to 6 instead of the typical 3.
<p>(1) Values for devices without DTM and for additional requests created in manual mapping mode. Otherwise, default values of the first request are those of the device DTM.</p> <p>(2) The value of the attribute can be modified independently in the active I/O profile, page 296 where the name appears without the term <i>Default</i>. Switching to automatic mapping mode resets the value of the attribute in the active and device I/O profiles.</p> <p>(3) For devices that are configured by using a DTM, in the first request, the value is read-only and provided by the DTM. In requests added manually, you can change the value, page 297 when the mapping mode is set to manual.</p>			

Memory Registers Section for EtherNet/IP

For each profile, you can create up to 2 connections.

For certain devices, the following may apply:

- Additional connections can only be created in the DTM.
- Connection data is managed in Control Expert Editor and does not appear in the **I/O PROFILE** tab (for example, for CRA adapter and BMECXM0100 modules).

Subsection	Attribute	Default value ⁽¹⁾	Description
Connection [x]	Default RPI T->O ⁽²⁾	30	Request packet interval. The data refresh period (ms) of the input connection. Range: 2 to 65535
	Default Timeout Multiplier	–	This value multiplied by the RPI produces a value that triggers an inactivity timeout. Use the recommended value (see Modicon M580, Hardware, Reference Manual) depending on the RPI value. Range: 4 (default) to 512 in multiples of 4. NOTE: You can change the value of the attribute independently in the <i>active I/O profile</i> , page 296 where the name appears without the <i>Default</i> prefix. NOTE: Switching to automatic mapping mode resets the value of the attribute in the active and device I/O profiles.
	Default Input Fallback Mode	Set to Zero	Behavior of inputs when the communication is interrupted. Read-only.
	Input Size ⁽²⁾⁽³⁾	1	Number of words configured in the device. Range: 1 to 509.
	Input Mode ⁽²⁾	Multicast	Transmission type.
	Input Type ⁽²⁾	Fixed	Ethernet packet type (fixed or variable length) to be transmitted. Possible value: Fixed
	Input Priority ⁽²⁾	Scheduled	The transmission priority depends on the DTM. Possible value: Scheduled
	Input Trigger ⁽²⁾	Cyclic	Transmission trigger. Possible values: <ul style="list-style-type: none"> • Cyclic • Change of State • Application
Connection [x]	Default RPI O->T ⁽²⁾	30	Request packet interval. The data refresh period (ms) of the output connection. Range: 2 to 65535
	Output Size ⁽²⁾⁽³⁾	1	Number of words configured in the device. Range: 1 to 505.
	Output Mode ⁽²⁾	Point to Point	Transmission type. Possible values: <ul style="list-style-type: none"> • Multicast • Point to Point
	Output Type ⁽²⁾	Fixed	Ethernet packet type (fixed or variable length) to be transmitted. Possible value: Fixed
	Output Priority ⁽²⁾	Scheduled	The transmission priority depends on the DTM. Possible value: Scheduled
<p>(1) Values for devices without DTM and for additional connections created in manual mapping mode. Otherwise, default values of the first connection are those of the device DTM.</p> <p>(2) For devices that are configured by using a DTM, the value is read-only and provided by the DTM.</p> <p>(3) In connections added manually, you can change the value, page 297 of the attribute from the I/O Mapping Editor.</p>			

PROPERTIES Pane - DIAGNOSTIC Tab

Overview

The various attributes are grouped in categories.

This topic describes all the attributes that are available. However, the ones that appear in the tab depend on the device that is selected.

System Diagnostics Category - DIAGNOSTIC Tab

Overview

The topic describes the attributes that you can configure to obtain diagnostic data when system monitoring, page 273 is enabled.

The DIAGNOSTIC tab is available for generic automation devices that communicate by using Modbus TCP and that are capable of providing diagnostic data based on requests that are sent to the device. It lets you view and configure the services that you want to monitor.

Description of Attributes

Attribute	Default value	Description
Presence	True (selected)	When selected, enables sending requests to the device in order to display a diagnostic icon, page 275, which indicates the communication status of the device. NOTE: The <i>Service not available</i> (gray dot) icon is displayed by default when Presence is cleared.
Protocol	<i>Ping</i>	Protocol that is used to send requests to the device to obtain its communication status.
Request Code	Blank	The request that is sent to the device to obtain diagnostic data including the data address to be read. The request is protocol and device specific. Format: Byte array using decimals, comma separated, without spaces, in brackets. Example: For a Modbus request to read the content of analog output holding registers 40108 to 40109 from the device with address 17 which is <i>11 03 006B 0002 7687</i> Where: <ul style="list-style-type: none"> • <i>11</i> is the hexadecimal slave address • <i>03</i> is Function Code 3 • <i>006B</i> is the address of the first register to read (decimal 107 with 4001 offset) • <i>0002</i> is the number of registers to read • <i>7687</i> is the cyclic redundancy check (CRC) Enter the following: [17, 03, 00, 107, 00, 03, 118, 135]

Operating State Subcategories

Each subcategory corresponds to an operating state that can display the corresponding diagnostic icon, page 285. More than one icon can be displayed at the same time for a device.

To configure these attributes, **Presence** must be enabled.

The table describes the set of attributes that are available for each operating state.

Attribute	Default value	Description
Enabled	False (cleared)	When selected, enables sending requests (Request Code) to the device in order to display the corresponding operating state icon based on the result of Request Expression .
Protocol	Modbus TCP	Protocol that is used to send requests to the device to obtain its operating status. Read-only.

Attribute	Default value	Description	
Request Expression	Blank	<p>Logical expression, which is applied to the reply that is received from the device for Request Code. When true, the software displays the corresponding operating state icon.</p> <p>The expression is device-specific.</p> <p>Example:</p> <p>If the reply to the above request code example is</p> <p><i>11 03 06 AE41 5652 4340 49AD</i></p> <p>you can enter:</p> <ul style="list-style-type: none"> • [4]=174 to check the high value of register 40108 (hexadecimal AE is 174) • [4] . 0 to check bit 0 of byte 4 <p>Syntax example:</p> <p>LEN>3 AND ([1]=0 OR [1]=2)</p> <p>You can use operators AND, OR, and NOT and the following functions.</p>	
		Function	Description
		[ByteIndex] . BitIndex	Specifies the bit in the byte at <i>ByteIndex</i> , which is the offset of the byte in the reply.
		[ByteIndex] = <i>value</i>	Checks if the value of the byte is equal to <i>value</i> .
		[ByteIndex] != <i>value</i>	Checks if the value of the byte is different from <i>value</i> .
		LEN > <i>value</i>	Checks if the length of the reply is greater than <i>value</i> .
		LEN <= <i>value</i>	Checks if the length of the reply is smaller than <i>value</i> .

Other Panes

Notification Pane

Overview

The notification pane, page 29 lets you view and trace engineering activity. The pane is displayed automatically when the Topology Manager opens. It contains two tabs:

- **ACTIVITIES:** Indicates the status of actions and events.
- **OPERATION DETAILS:** Provides details of actions when available.

You can sort, filter, and copy to the Clipboard the information that is displayed.

Both tabs feature a search functionality. Further, you can customize the order of columns and select which ones appear.

ACTIVITIES Tab Description

The **ACTIVITIES** tab displays information about events at the Topology Manager infrastructure level and actions at the system project level. The information that is displayed is the same for each Control Expert instance that connects to the same system server independently of the system projects that are open.

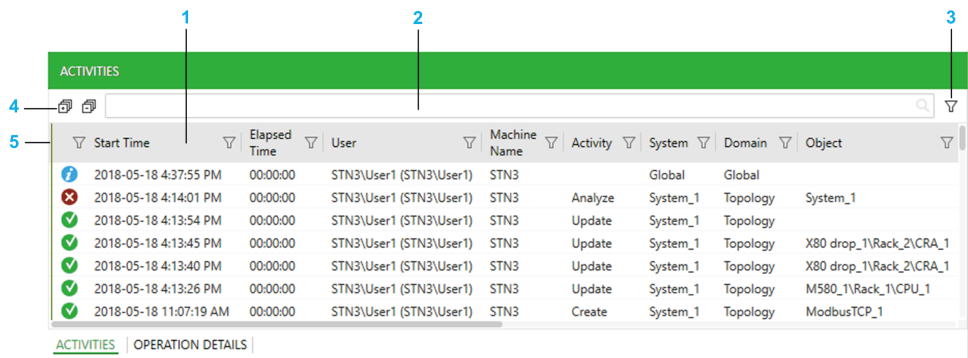
When a second Topology Manager instance opens, you can see in this tab the history of actions starting from the moment the first instance got connected to the system server.

Certain system server tasks are displayed as well (for example, the server shutting down).

An entry is logged when you initiate an action and it is updated when its execution is complete. A colored icon indicates the status of the action. For certain actions, details are available in the **OPERATION DETAILS** tab, page 168.

The information remains available as long as the system server to which Control Expert is connected is running. Closing Control Expert does not delete the entries. However, you can clear the entries.







The following figure shows an example of the **ACTIVITIES** tab.



Item	Description
1	<p>You can shift columns; the order of columns is persisted for each Topology Manager instance running on the computer.</p> <p>To show/hide a column, right-click any column header and select/clear the column respectively.</p> <p>You can filter, and sort data, page 37 in columns.</p>
2	<p>Enter one or more strings (not case sensitive, separated by a space) in the text field to show only entries that contain the string (an OR operator is applied to searched strings). Only columns containing data that is related to system project objects are searched (for example, Start Time is not). The string is highlighted in each row. The filter remains active until you clear the string. You can use the other filter and sorting features in addition.</p>
3	<p>Button to toggle the grouping bar, page 37.</p>

Item	Description
4	Expands/collapses data when it is grouped.
5	Drag the line horizontally along column headers. It freezes any columns that are to the left of the line when you use the horizontal slider. To unfreeze columns, drag the line all the way to the left.

The table describes the information that appears in the columns of the **ACTIVITIES** tab.

Column header	Description
Status icons	 In progress (spinning).
	 Completed successfully (green). <i>Success</i> ⁽¹⁾
	 Not completed successfully (red). <i>Not successful</i> ⁽¹⁾
	 Completed with notifications (yellow). <i>Warning</i> ⁽¹⁾
	 Information (blue). <i>Information</i> ⁽¹⁾
	 Action canceled by the user (red). <i>Aborted</i> ⁽¹⁾
Start Time	Date and time when the action was initiated.
Elapsed Time	The time it took to execute the action independently of its final status.
User	Name that was entered to log in to the Control Expert instance (Topology Manager). If actions are recorded before you log in, the column indicates Domain \Username where Username is the user who is logged in to the computer on which the action is initiated.
Machine Name	Name of the computer on which the action was initiated.
Activity	Keyword describing the action that was executed. Typically, this corresponds to the command you selected.
System	Identifier of the system project in which the action was executed. If it is not related to a system project, Global is indicated.
Domain	Identification of the domain or system project component on which the action was executed. When the action or event is not related to a system project (for example, when a user logs in), Global is indicated.
Object	Full name of the device, module, communication card, port, or object (for example, a physical link or logical network) of the system project on which the action was executed.
Description	Short description of the action that was executed.
(1) Corresponding keyword when you copy and paste, page 169 the information of an entry.	

Viewing Details of an Action

To view more detailed information about an action in the **OPERATION DETAILS** tab, you can:

- Select an action in the **ACTIVITIES** tab and click the **OPERATION DETAILS** tab.
- Double-click an entry in the **ACTIVITIES** tab.
- Select the **Display Operation Details** command in the context menu of an entry.

If no details are available, the **OPERATION DETAILS** tab is not shown or empty.

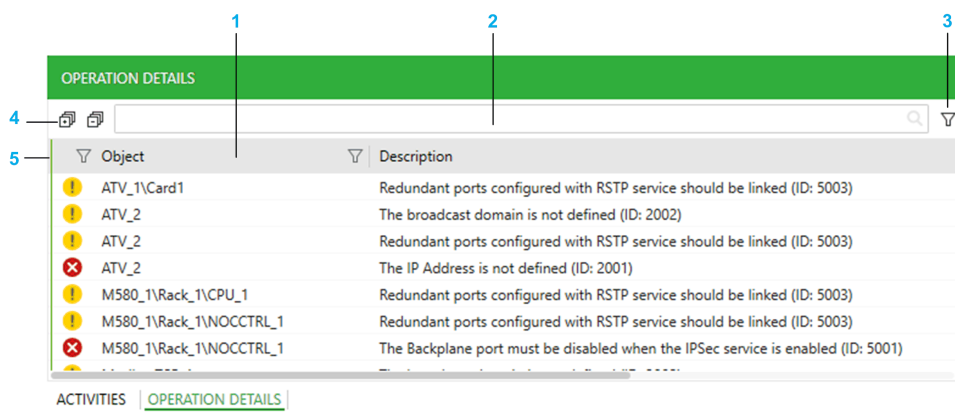
OPERATION DETAILS tab Description

The **OPERATION DETAILS** tab serves the following purpose:

- Displays more detailed information about activities displayed in the **ACTIVITIES** tab.
- Displays diagnostic information about transversal activities (such as build or import tasks) that are performed by any user on the system project, which is open in the Topology Manager.
- Lets you locate a device for which information is displayed by double-clicking the corresponding entry in the tab.

When details for an action or event are available, you can view them as long as the corresponding entry in the **ACTIVITIES** tab is present.

The following figure shows an example of the **OPERATION DETAILS** tab.



Item	Description
1	You can shift columns; the order of columns is persisted for each Topology Manager instance running on the computer. To show/hide a column, right-click any column header and select/clear the column respectively. You can filter, and sort data, page 37 in columns.
2	Enter a string (not case sensitive) in the text field to show only entries that contain this string in either column. The string is highlighted in each row. The filter remains active until you clear the string. You can use the other filter and sorting features in addition.
3	Button to toggle the grouping bar, page 37.
4	Expands/collapses data when it is grouped.
5	Drag the line horizontally along column headers. It freezes any columns that are to the left of the line when you use the horizontal slider. To unfreeze columns, drag the line all the way to the left.

The table describes the information that appears in the columns of the **OPERATION DETAILS** tab.

Column header	Description
(Status)	Icons indicate the severity: <ul style="list-style-type: none"> • Detected error (red). <i>Not successful</i>⁽¹⁾ • Alert (yellow). <i>Warning</i>⁽¹⁾ • Information (blue). <i>Information</i>⁽¹⁾
Object	Name of the object, such as device, module, communication card, port, logical network of the system project to which the information applies. For example, M580_1\Rack_1\M580CPU_1

Column header	Description
Description	Short description of the detected error, alert, or information message. The ID in brackets refers to the rule, page 260 that is not satisfied.
(1) Corresponding keyword when you copy and paste, page 169 the information of an entry.	

Message Actions

The table describes the context menu commands of entries in the **ACTIVITIES** or **OPERATION DETAILS** tab.

Command	Description
Display Operation Details	Shows the OPERATION DETAILS tab and displays additional information about the selected action. NOTE: The command appears only in the ACTIVITIES tab and is enabled when additional information is available.
Copy	Copies the content of the selected entry to the Clipboard. You can paste the information contained in each column in comma-separated format. The column headers are not copied. NOTE: You can only copy information of one entry at a time.
Object	Commands, page 194 are available only for entries related to devices or modules, NICs, communication cards, and ports.

TOOLBOX Pane

Overview

The **TOOLBOX** pane opens when you open a system project.

Its content varies depending on the current selection. When the content of the **TOOLBOX** is related to a specific view, a suffix is added to indicate it. For example, **TOOLBOX: I/O PROFILES** when a Communication Mapping View is the active view.

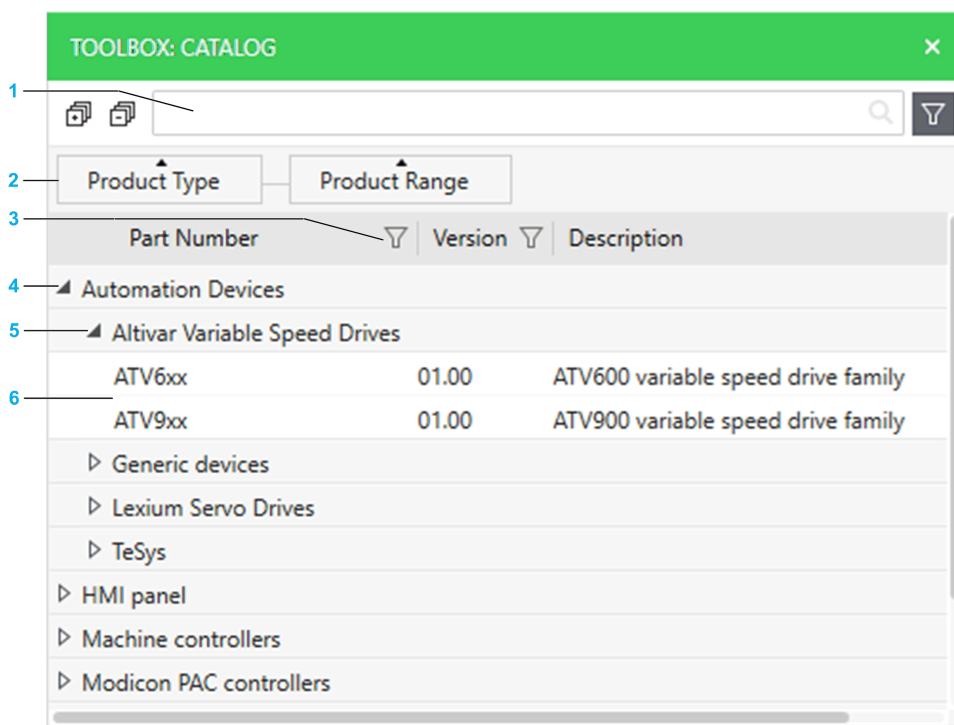
This topic describes the **TOOLBOX: CATALOG** pane, which displays the supported equipment that you can use to design the hardware architecture, page 190 of your system project. The product types and product ranges that are shown vary depending on the window that is active in the Topology Manager.

When you select equipment, you can view its description in the **Description** tab of the **PROPERTIES** pane.

NOTE: The contents that the **TOOLBOX** pane shows for other views is described in the topics documenting these views.

TOOLBOX: CATALOG Pane Description

The following figure shows an example of the **TOOLBOX** pane when a physical view is selected and it displays the catalog of supported equipment.



Item	Description
1	Search field. Enter one or more terms separated by a space and the pane displays objects whose name contains any of these terms. Objects are displayed with their parent structure.
2	By default, devices are shown grouped by Product Type then Product Range categories. You can change or remove the grouping, page 37. Show/hide the grouping bar by clicking the filter icon next to the search field. You can sort, page 38 the contents of each column/category.
3	Click the filter icon, page 37 to use a default filter, create custom expressions, or remove a filter.
4	Product Type category, page 21.

Item	Description
5	Product Range category.
6	Equipment that you can drag to a view or pane to create devices.

HISTORY Pane

Description of the Pane

To open the **HISTORY** pane, click **History** in the **Views** menu, page 30, which is located in the toolbar.

For a description of the pane, refer to the topic describing how to use the undo/redo functionality, page 41.

Engineering Control Systems

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Overview

This part describes the various steps that are involved in the engineering of a control system by using a system project.

Designing Hardware Architectures

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Overview

This chapter describes how to design and configure the hardware architecture of a system project, which consists of devices (such as PACs, workstations, motor starters, switches) and networks.

As a first step, it describes how to create and configure topological folders and logical networks to which you need to assign these devices.

Managing Topological Folders, Logical Networks, and Physical Views

Overview

This section describes how to manage topological folders in the **SYSTEM PROJECT** pane, page 108. It also describes how to create and configure logical networks and physical views of your system project.

This step is optional at this point because, by default, when you add equipment to your system project, the corresponding device is:

- Located in the **Topology** root folder.
- Not assigned to a logical network but you can assign it to **Default Network**, which is the default logical network.

You can change the folder structure and the configuration of the default logical network, create additional logical networks, modify the assignment of devices, and/or create additional physical views at any time during the system project design phase depending on your needs.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Managing Topological Folders

Overview

In the **SYSTEM PROJECT** pane, page 108, you can create topological folders in either way:

- By using the context menu of the root folder or one of its subfolders.
- By copying existing folders and pasting them.

You can move folders and view their properties in the **PROPERTIES** pane, page 119.

NOTE: For a description of the actions that you can perform on topological folders and devices assigned to them, refer to the topic describing the **SYSTEM PROJECT** pane.

Creating Topological Folders

To create a topological folder in the **SYSTEM PROJECT** pane, proceed as follows.

Step	Action
1	Right-click the Topology node or any subfolder in the SYSTEM PROJECT pane. Result: A context menu opens.
2	Click New Folder . Result: A new topological folder is created under the node/subfolder.

Topological Folder Properties

The table describes the attributes of topological folders that appear in the **CONFIGURATION** tab of the **PROPERTIES** pane.

Attributes	Default value	Description
Name	<i>Folder_n</i> where <i>n</i> is an incremental number starting at 1.	Editable name, page 25 of the folder. The software accepts only names that are unique within the same folder level. NOTE: You cannot rename the Topology root folder.
Comment	Blank.	Comment for the folder. Click the field to edit the value by using free form text.
Path	N/A	Path of the folder in the system project. Read-only.

Impact When Pasting and Moving Folders

The table describes the impact on objects when you paste or move topological folders.

Action	Particular condition	Impact
Copying a folder and pasting it in the same parent folder.	N/A	The folder is pasted and renamed.
Pasting a folder at a different level of the hierarchy.	A folder with the same name already exists at this level.	The contents of the two folders is merged after you confirm the command.
Moving a folder to a different level of the hierarchy.		
Pasting a folder.	The folder contains devices.	The devices are pasted, page 200.

Copying and Pasting Topological Folders

Step	Action
1	Select one or more folders in the SYSTEM PROJECT pane and right-click the selection. Result: A context menu opens.
2	Select Copy .
3	Right-click the target folder and select Paste . Result: The selection is pasted. You may need to confirm the command.

You can also use the corresponding keyboard shortcuts, page 40.

Moving Topological Folders

Step	Action
1	Select one or more folders in the SYSTEM PROJECT pane and drag them to the new position, which is the Topology root folder, its parent folder, or another existing folder. Result: A line and/or tooltip appears.
2	Release the mouse button where you want to move the folder: <ul style="list-style-type: none">• If the target folder is expanded, you can select the position of the folder among existing folders and devices.• If the target folder is collapsed, the folder is added in last position. Hovering over a collapsed folder expands it. Result: The folder is pasted according to applicable rules, page 176. You may need to confirm the operation in case conflicts are detected.

Creating and Configuring Logical Networks

Overview

You can create logical networks in either way:

- From the **Logical Networks** node of the **SYSTEM PROJECT** pane, page 114. This creates a new logical network with default settings.
- From the interface of a device, page 129 that exists in your system project and that manages at least one IP address. This assigns the associated port of the device to the newly created logical network, which appears in the **SYSTEM PROJECT** pane. By using this method, you can configure the logical network as you create it.
- By using the **Create Logical Network** button in the toolbar of the **LOGICAL NETWORK VIEW**.

When you add certain modules, page 235 to a PAC and apply changes, the software may create a new logical network and assign an interface to it.

NOTE: When you create a logical network and assign an interface of the device to it, properties of the interface related to the logical network are automatically configured. For a description of the properties of devices, refer to the topic describing the **PROPERTIES** pane, page 118.

Creating Logical Networks from the SYSTEM PROJECT Pane

To create a logical network from the **Logical Networks** node of the **SYSTEM PROJECT** pane, proceed as follows.

Step	Action
1	Right-click the Logical Networks node in the SYSTEM PROJECT pane. Result: A context menu opens.
2	Click New Logical Network . Result: A new logical network is created with properties set to default values, page 179.

Creating Logical Networks from a Device Interface

To create a logical network from the interface of a device that exists in your system project, proceed as follows.

Step	Action
1	Select the device in one of the views (for example, the SYSTEM PROJECT pane or a physical view).
2	In the CONFIGURATION tab of the PROPERTIES pane, click the Logical Network list of under an IP Address . Result: The list opens showing existing logical networks.
3	Click New . Result: The Create Logical Network dialog box opens.
4	Edit the name if necessary and configure the properties, page 179 of the logical network.
5	Click OK . Result: <ul style="list-style-type: none"> • The logical network is created and appears in the SYSTEM PROJECT pane. • The next available IP address on the newly created logical network is assigned or reassigned to the corresponding ports. NOTE: If not enough IP addresses are available on the logical network, the logical network is created but no IP address is assigned.

Logical Network Actions

For a description of the commands that are available for logical networks, refer to the topic describing their context menu, page 114 in the **SYSTEM PROJECT** pane.

Logical Network Properties

The table describes the attributes that appear in the **PROPERTIES** pane when you select a logical network.

Attributes	Default value	Description
Name	–	Editable name, page 25 of the logical network. The software accepts only names that are unique within the system project.
Subnet Address	<i>192.168.0.0</i>	IP address whose host ID is 0 (based on the subnet mask) to indicate the address of the subnet. NOTE: Modifying this attribute does not modify the IP addresses of device interfaces that belong to this logical network. You need to reassign IP addresses, page 82.
Subnet Mask	<i>255.255.255.0 (class C)</i>	Lets you define the portion of the IP address that represents the subnet address and, as a result, the range of host addresses on this subnet. NOTE: Modifying this attribute does not modify the IP addresses of device interfaces that belong to this logical network in case the logical network does not have enough addresses anymore. You need to reassign IP addresses, page 82.
Gateway Address	<i>192.168.0.254</i>	IP address of the default gateway of the network.

Highlighting Logical Networks in Physical Views

Overview

In a physical view, by using the **Select Logical Networks** list, you can highlight the ports whose interface belongs to a given logical network as well as the physical links connecting them. You can select more than one network.

It lets you view, in a graphical way, which objects a logical network encompasses and how it is laid out.

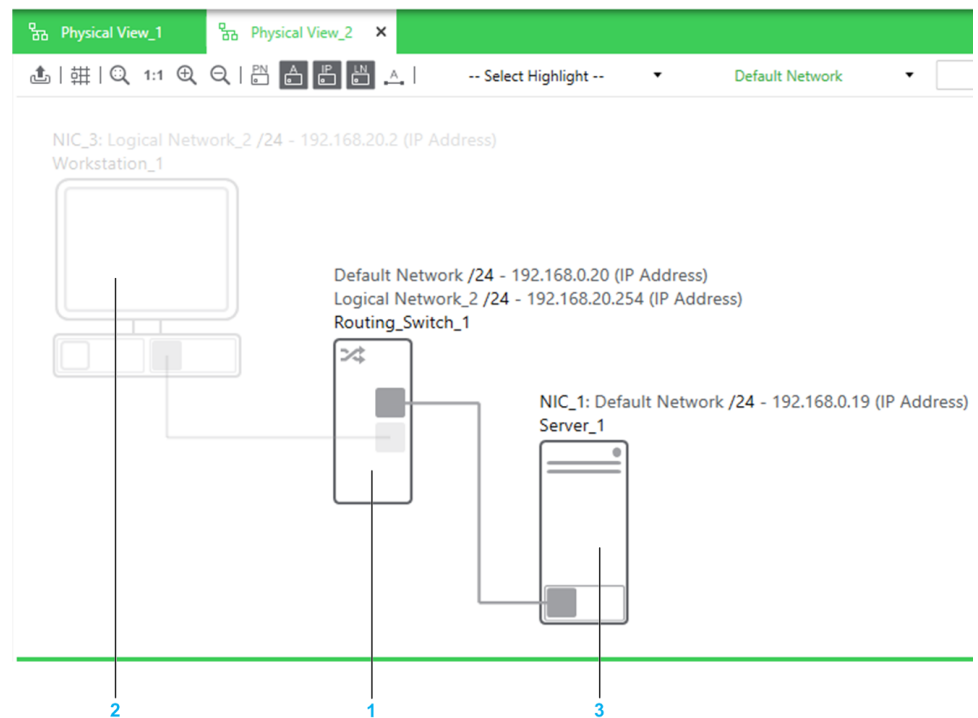
Working Principle

Scope	The functionality highlights only objects that appear in the physical view in which you make the logical network selection.
Representation	<p>Highlighted objects maintain their regular aspect.</p> <p>Non-highlighted objects appear in a lighter shade.</p> <p>As soon as one port of a device is highlighted, the outline of the entire device is highlighted too (for example, the entire PAC).</p> <p>The physical link between two highlighted ports is also highlighted.</p> <p>NOTE: The enabled ports of unmanaged switches are highlighted as soon as one of them is connected to a port that is highlighted.</p>
Refresh	The highlighting is automatically updated to reflect changes that you make to the configuration of ports (for example, changing the Logical Network setting of a port from <i>NOCNF</i> to a logical network that is already highlighted highlights the port).
Persistence	The network selection is cleared when you close the physical view.

NOTE: If you select several logical networks, the objects, their ports, and physical links that belong to them are all highlighted without distinction by logical network.

Example

The following example shows several devices in a physical view, which have their interfaces configured with different logical networks while *Default Network* is selected to be highlighted.



Item	Object	Description
1	Routing_Switch_1	<p>Port2 (bottom) belongs to <i>Logical Network_2</i> and is therefore not highlighted.</p> <p>Port1 (top) belongs to <i>Default Network</i> and is therefore highlighted. This also highlights the device itself.</p>
2	Workstation_1	Its first port (not connected) is not configured, the second belongs to <i>Logical Network_2</i> and therefore, none of them are highlighted; nor is the physical link.
3	Server_1	<p>Its port belongs to <i>Default Network</i> and is therefore highlighted along with the device itself.</p> <p>The physical link is also highlighted because it connects two ports that belong to <i>Default Network</i>.</p>

Creating and Configuring Physical Views

Overview

You can create additional physical views from the **Physical Views** node of the **SYSTEM PROJECT** pane, page 108.

Settings, page 32 such as zoom level, snap-to-grid, and **Display** options, page 77 are persisted for each physical view individually.

Creating Physical Views

Step	Action
1	Right-click the Physical Views node in the SYSTEM PROJECT pane. Result: A context menu opens.
2	Click New Physical View . Result: A new physical view is created and opens.

Physical View Properties

The table describes the attributes that appear in the **PROPERTIES** pane when you select a physical view in the **SYSTEM PROJECT** pane.

Attributes	Description
Name	Editable name, page 25 of the physical view. The software accepts only names that are unique within the system project.

Representation of Devices and Ports

Representation of Devices in Physical Views

Overview

Each equipment or device that you add to a physical view, page 191 is represented by one or more graphical objects.

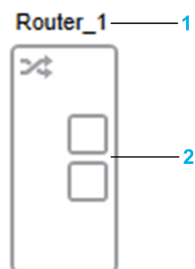
Controllers of platforms other than M580 are represented by the same single object independently of their configuration.

This topic describes how various types of objects are represented in a physical view.

NOTE: For information on the diagnostic icons that appear on devices, refer to topic describing system monitoring, page 273.

Devices

The following figure shows an example of a device that has been created by using a managed switch of the **ConneXium Switches and Hubs** product range.



Item	Description
1	Name of the device. Additional information, page 77 can be shown.
2	Ports, page 188

The following figure shows the same device but with its **Under Construction** attribute set to true (selected). The device is shown in a lighter shade of gray.



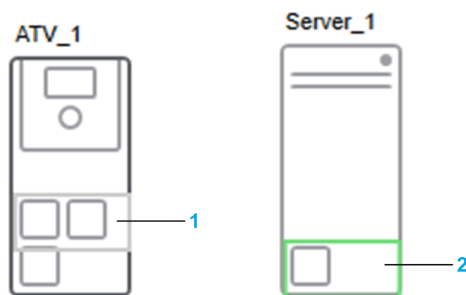
NOTE: You can show/hide the following attributes of devices by using the **Display** menu, page 77:

- The name
- IP addresses
- Logical networks

Devices Containing Modules

Devices that contain modules, which have Ethernet connectivity features a distinct graphical area, which represents the module and that you can select individually. It lets you view properties and open a context menu that are specific to the module.

The following figure shows an example of devices that contain a module.

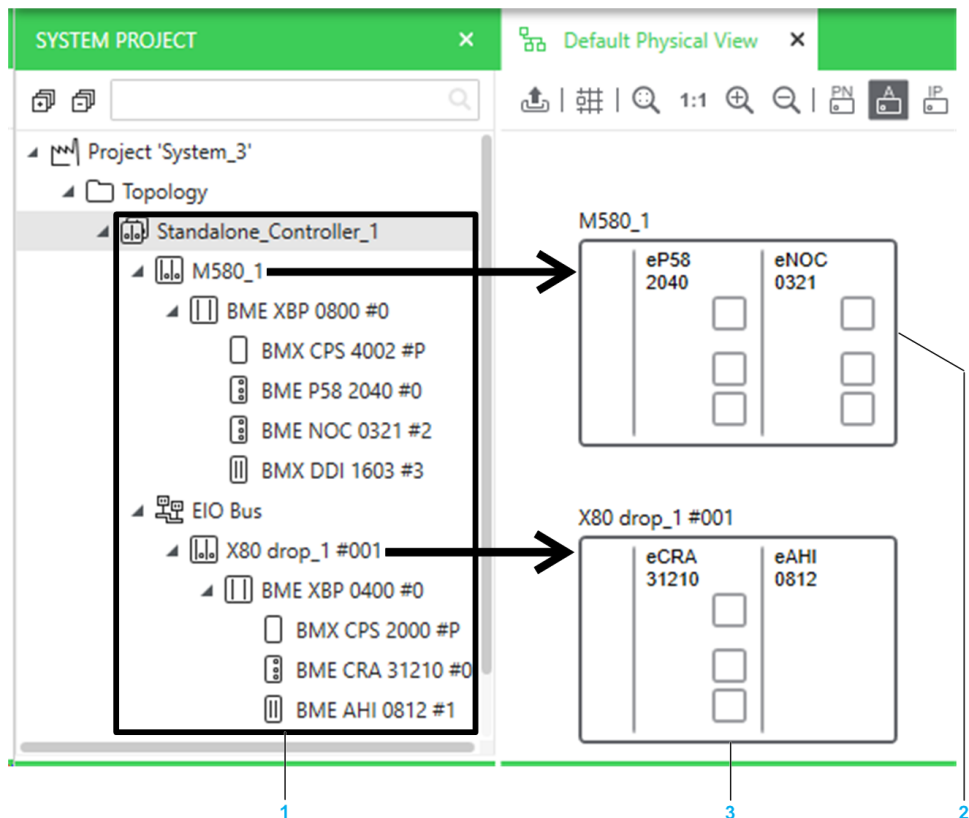


Item	Description
1	Graphical area that represents the communication card, page 135 of a drive. The outline of the area is highlighted when you hover over it with the pointer.
2	Graphical area that represents the NIC of the server station. Click the empty space inside the area to make it active and view properties of the NIC. Right-click it to open a context menu.

M580 PACs

In a physical view, the local rack and drops of standalone and redundant M580 PACs are represented as distinct objects.

The following figure shows an example of how an M580 PAC is represented in a physical view.



Item	Description
1	The PAC represented by the <i>Standalone_Controller_1</i> node in the SYSTEM PROJECT pane, page 110.
2	The local rack.
3	The drop.

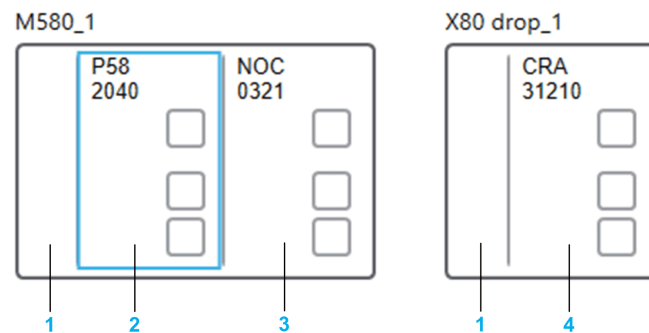
A rack or drop is composed of several graphical areas, which you can select individually. Areas represent modules that have Ethernet connectivity (for example, the CPU module for a local main rack, the adapter module for a remote rack, or a communication module). Modules let you open a menu containing commands that are specific to the selected module.

To view the modules and their position, open the rack or drop of a PAC by using the **Rack Viewer**.

When you modify the configuration, page 231, the representation of the device is updated in the physical view depending on the nature of the change (for example, extended racks and their modules are not shown).

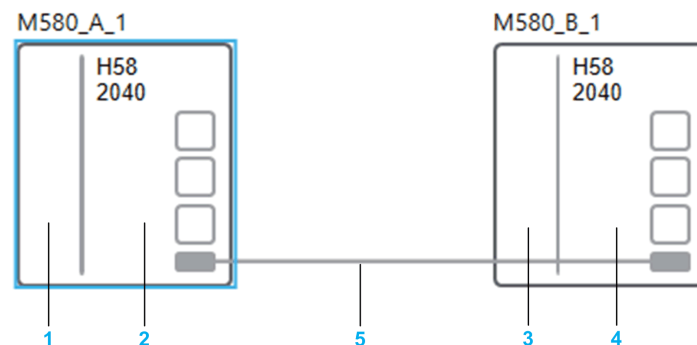
When you add a drop to a PAC whose local rack already appears in a physical view, the drop is automatically added to the same physical view. It overlaps the local rack and you need to reposition it.

The following figure shows an example of the local rack and drop that are displayed when you drag a standalone M580 PAC to a physical view. The drop has been repositioned.



Item	Description
1	Handle, which lets you move the rack and open a context menu.
2	Area that represents the CPU module. The highlighted outline indicates that only the CPU module is selected. Right-click it to open the context menu of the module and the PAC.
3	Area that represents a communication module that has been added by editing the control project.
4	Area that represents the adapter module of the drop.

The following figure shows an example of the two local racks and the high-speed cable link that are displayed when you drag a redundant M580 PAC to a physical view. If drops exist, they are displayed as well.



Item	Description
1	Handle of local rack A. The rack is shown selected.
2	CPU module.
3	Handle of local rack B. The rack is automatically positioned at a distance and you can move either rack individually.

Item	Description
4	CPU module.
5	High-speed cable link represented by a solid line. You can enter a label, modify the routing, page 212, but not delete the link.

Representation of Ports of Devices in Physical Views

Overview

Every device features at least one port that you can connect to the port of another device.

Only ports that use a communication protocol are shown (for example, Modbus TCP or EtherNet/IP).

This topic describes how ports are represented in a physical view.

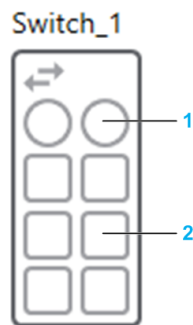
For details on the representation of the status of ports and on port actions, refer to the topic describing how to connect ports of devices, page 208.

NOTE: You can identify port types graphically, page 76.

NOTE: Select a port to view and/or modify its properties, page 132 by using the **PROPERTIES** pane.

Types of Connectors

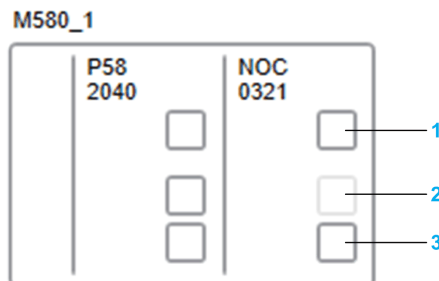
The following figure shows a device that features ports having two different types of connectors.



Item	Description
1	Fiber optic connectors are represented by a circle.
2	RJ45 connectors are represented by a square.

Ports of Modules of PACs

The following figure shows an example of a local rack containing a CPU and a communication module.



Item	Description
1	Service port
2	ETH1 shown disabled
3	ETH2

The backplane port is not shown.

Ports of Communication Cards

Ports of the following cards are managed separately from the device:

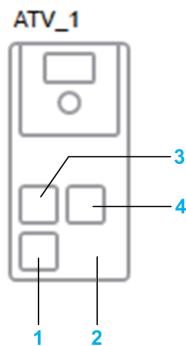
- Network interface cards (NICs)
- Communication cards of Altivar Process devices

The following figure shows an example of the representation of ports of the NICs of a device representing a workstation.



Item	Description
1	Areas in which Ethernet communication ports can be shown depending on the configuration of the device.
2	Port 1 of NIC1.
3	Redundant port 2 of NIC1.
4	Port 1 of NIC2 (non-redundant)

The following figure shows an example of the representation of ports of a device representing an ATV6xx device.



Item	Description
1	Embedded port 1.
2	Ports of devices that use non-Ethernet communication protocols are not shown.
3	Port 1 of the communication card when the card is present.
4	Port 2 of the communication card.

Managing Devices

Overview

This section describes how to add and manage devices in the context of the system project in order to create the hardware architecture of the control system.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Adding Equipment to System Projects

Overview

To design the hardware architecture, you need to add equipment from the catalog, page 170 to the system project. Each instance of equipment that you add represents a device.

You can also create more devices by copying and pasting one or more existing ones.

NOTE: For information on features that are available while working in a physical view, refer to the topic describing how to use workspaces, page 32.

Ways to Create Devices

You can create devices in the following ways.

Drag equipment from the TOOLBOX to...	Result
the SYSTEM PROJECT pane.	You can select in which topological folder and in which position inside the folder you create it. NOTE: <ul style="list-style-type: none"> Consider creating the topological folder structure first. You can add the device to a physical view, page 198 afterwards.
a physical view, page 76.	<ul style="list-style-type: none"> You can position the device, page 184 in the workspace of the physical view. The device is created in the Topology folder of the SYSTEM PROJECT pane. You can relocate it, page 108.

Selecting References

For most objects of the catalog, page 170 (**TOOLBOX** pane), the reference is predefined by the equipment that you select.

For the following objects, however, you can select a reference manually.

Object type	Reference selection
M580 PACs	In the Select CPU Reference dialog box after dragging the equipment to a physical view or the SYSTEM PROJECT pane. NOTE: To change the CPU reference once the PAC is created, edit its control project, page 194.
Devices that use a device type manager (DTM)	You may need to select the specific reference, page 37 that you want to use either way: <ul style="list-style-type: none"> By selecting a DTM, page 222 from the local DTM catalog in the Select DTM Reference dialog box after dragging the equipment to a physical view or the SYSTEM PROJECT pane. Once the device is created, you cannot change the DTM reference anymore. By selecting a specific part number and version in the PROPERTIES pane after the device is created. By selecting a reference in the DTM window, page 222 after the device is created. Use the Open context menu command of the device.
TeSys T devices	Refer to the topic describing how to add TeSys T devices, page 192.
Modicon managed and extended switches	By selecting a specific part number in the PROPERTIES pane after the device is created.

Adding Devices to a System Project by Using the Physical View

Step	Action
1	Open the system project.
2	Create and/or open the physical view.
3	In the TOOLBOX pane, select the equipment and drag it to the workspace of the physical view. Result: The corresponding device is added to the system project with properties set to default values and a graphical representation of the device is displayed in the physical view.

Adding Devices to a System Project by Using the SYSTEM PROJECT Pane

To add a device to a system project, proceed as follows.

Step	Action
1	Open the system project.
2	Verify that the SYSTEM PROJECT pane is visible.
3	If required, create the folder in which you want the device to be located.
4	In the TOOLBOX pane, select the equipment and drag it to the folder or between existing devices. Hover over the folder to expand its child structure. Result: The corresponding device is added to the system project with properties set to default values. If you drag a device to a folder that contains other devices, it is added in last position.

Adding TeSys T Devices to a System Project

To add a TeSys T device to a system project, proceed as follows.

Step	Action
1	Drag the TeSysT equipment to a physical view or the Topology node of the SYSTEM PROJECT pane. Result: The device is added to the system project with Part Number and Version attributes blank.
2	Right-click the device and select Open .
3	In the DTM window, select a commercial reference that supports communication by using the Modbus TCP or EtherNet/IP protocol and click OK .
4	To view the I/O profile data, page 156 of the device (PROPERTIES pane), in the Process Data section of the Parameter List tab, select a value other than None , and apply changes.
5	Close the DTM.
6	Result: The Part Number and Version attributes are populated with the information of the reference you have selected.

NOTE: If you select a reference that communicates by using another protocol (for example, PROFIBUS), a notification opens when you close the DTM, and the device is deleted from the system project when you acknowledge the notification.

Such a device can be added only to a control project after installing the required library and it does not appear in the system project . For example, for a Modbus serial TeSys T device, follow these steps:

1. Install the Modbus Communication Library on the local computer.
2. Edit the control project of the PAC that is scanning the device.
3. In the **DTM Browser**, add the Modbus Serial Communication DTM to the **Host PC** node.
4. Add the TeSys T device to this DTM.
5. Open the TeSys T DTM and select a reference.

Device Context Menu Commands

Overview

This topic describes the commands of the context menu of devices and their modules in general. Some commands may not appear depending on the device and from where you have opened the context menu.

The description of commands that are specific to a given view or pane can be found in the topic describing this view/pane.

The description of the context menu commands of other objects can be found in the topic describing the view or pane where they appear.

NOTE: In physical views, commands that appear in the contextual menu of modules but that apply to the PAC are grouped in the **PAC** submenu.

Description of Commands

The table describes the commands of the context menu of devices and their modules.

Command	Description			
Analyze	Performs an analysis, page 256 of the configuration of the PAC and its dependencies at the Topology Manager level and displays the result in the notification pane.			
Build	Performs an analysis, page 256 of the PAC and its dependencies. The build operation starts only if the prerequisites, page 237 are fulfilled.			
Build Target	<p>Lets you select the target, page 125 for which the control project of the PAC will be built and deployed.</p> <p>When you select Simulator, the first available value is automatically selected for the simulator Port. This value becomes visible when you select Built Target again.</p> <p>You can change the port value in the properties of the PAC.</p> <p>NOTE: Changing the target sets the build state to Not Built.</p>			
Communication Mapping	Opens a submenu containing the following commands:			
	<table border="1"> <tbody> <tr> <td>EtherNet/IP</td> <td>Each command opens the corresponding Communication Mapping View, page 84 to which the device has been added.</td> </tr> <tr> <td>Modbus TCP</td> <td>It lets you configure communication between I/O scanner services and devices of the system project for each protocol.</td> </tr> </tbody> </table>	EtherNet/IP	Each command opens the corresponding Communication Mapping View, page 84 to which the device has been added.	Modbus TCP
EtherNet/IP	Each command opens the corresponding Communication Mapping View, page 84 to which the device has been added.			
Modbus TCP	It lets you configure communication between I/O scanner services and devices of the system project for each protocol.			

Command	Description	
<p>Configuration File</p>	<p>The menu is available only if you have stored a file in the repository, page 125.</p> <p>Commands are disabled while the file is open in a user session.</p>	
	<p>Open</p>	<p>Opens the file that is specified under Configuration File in the PROPERTIES pane, page 125 by using the program that is associated to the file type on the local computer.</p> <p>The file extension must be allowed, page 26 to open the file.</p> <p>When you make changes to the file and save them in the program in which the file is open, the file that is stored in the repository of Control Expert is replaced and a confirmation message is shown. You may need to close the program.</p> <p>The command does not appear if no program is associated to the file type.</p> <p>NOTE: Saving changes automatically to the repository is not supported by all programs (for example, those that perform a save as) nor all file types (for example, full application exchange files (.zef) and archived application files (.sta). Once opened, these files are saved in the project file format (.stu)).</p>
	<p>Attach...</p>	<p>Lets you replace the file that is currently stored in the repository by a new one.</p> <p>Use this command, for example, to save to the repository of Control Expert changes that cannot be saved automatically.</p> <p>The file extension must be allowed, page 26 to replace the file.</p>
	<p>Save As...</p>	<p>Lets you save to disk a copy of the file that is stored in the repository.</p> <p>Use this command, for example, to open a file that you cannot open directly by using the Open command.</p> <p>The file extension must be allowed, page 26 to save the file.</p>
	<p>Delete</p>	<p>Deletes the file from the repository after you confirm the command.</p>
<p>Connect</p>	<p>Switches the device type manager (DTM) to online mode, connecting it to the physical device.</p> <p>Connecting a gateway or device DTM also connects its parent DTM.</p>	
<p>Delete</p>	<p>Deletes the device (or the selection of devices) from the system project after you confirm the command.</p> <p>Deleting a device also deletes the associated data such as communication mappings, device DDT variables in the control project. For certain devices, the device DDT variable is deleted only after you perform a build.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • The command may not be available for child objects of a device. • When you use the command from the PAC submenu of a module in a physical view, the local racks, drops, and the control project of the PAC are deleted. • You cannot delete a PAC while the associated control project is open in Control Expert Editor. 	

Command	Description			
Deploy	Opens a submenu with the following commands:			
	<table border="1"> <tr> <td>Set IP Address by USB</td> <td> <p>Lets you deploy to the physical CPU module, page 305 that is connected by USB cable to the computer running Control Expert, the IP addresses that are configured for it in the Topology Manager.</p> <p>This operation stops the CPU.</p> </td> </tr> <tr> <td>Configuration</td> <td> <p>For M580 PACs, lets you connect to the corresponding physical CPU or communication module and deploy, page 307 the associated executable. This operation stops the CPU.</p> <p>For certain devices that support configuration by using a device type manager (DTM), lets you connect to the corresponding physical device and deploy its DTM configuration, page 311.</p> <p>The command is not available if the IP address of the device or CPU module is not configured, if Under Construction is enabled, page 125 (standalone PACs and devices only), or if the DEPLOYMENT VIEW is open and the PAC is selected.</p> <p>NOTE: The simulator starts automatically when Build Target, page 125 is set to Simulator.</p> </td> </tr> </table>	Set IP Address by USB	<p>Lets you deploy to the physical CPU module, page 305 that is connected by USB cable to the computer running Control Expert, the IP addresses that are configured for it in the Topology Manager.</p> <p>This operation stops the CPU.</p>	Configuration
Set IP Address by USB	<p>Lets you deploy to the physical CPU module, page 305 that is connected by USB cable to the computer running Control Expert, the IP addresses that are configured for it in the Topology Manager.</p> <p>This operation stops the CPU.</p>			
Configuration	<p>For M580 PACs, lets you connect to the corresponding physical CPU or communication module and deploy, page 307 the associated executable. This operation stops the CPU.</p> <p>For certain devices that support configuration by using a device type manager (DTM), lets you connect to the corresponding physical device and deploy its DTM configuration, page 311.</p> <p>The command is not available if the IP address of the device or CPU module is not configured, if Under Construction is enabled, page 125 (standalone PACs and devices only), or if the DEPLOYMENT VIEW is open and the PAC is selected.</p> <p>NOTE: The simulator starts automatically when Build Target, page 125 is set to Simulator.</p>			
Diagnosis	<p>Attempts to connect to the device and opens the diagnostic screen of the device type manager (DTM).</p> <p>The command is available only for devices whose DTM supports the diagnostic functionality and while the DTM is open. An IP address needs to be configured for the device.</p> <p>NOTE: For devices or modules that manage a fieldbus, the command is available within the Fieldbus Editor.</p>			
Disconnect	<p>Switches the device type manager (DTM) to offline mode, disconnecting it from the physical device.</p> <p>Disconnecting a DTM also disconnects its child DTMs.</p>			
Edit Control Project	<p>Lets you view and modify the hardware configuration and other elements of the control project, page 229 that is associated to the controller by using the corresponding editor, page 14.</p> <p>For M580 PACs, first performs an analysis, page 256 of the PAC and its dependencies and, if no incorrect configurations are detected, opens Control Expert Editor.</p>			
Edit Fieldbus	<p>Opens the corresponding Fieldbus Editor, which lets you add slave devices to a master gateway and configure them.</p> <p>The command is available only for devices or modules that manage a fieldbus.</p>			
Load Data From Device	<p>For certain devices that support configuration by using a device type manager (DTM), lets you connect to the corresponding physical device, upload from the device its DTM configuration, page 311, and update its I/O profile with this data.</p> <p>The command is not available if the IP address of the device is not configured or if its Under Construction attribute is enabled.</p>			
Local Slaves	<p>Opens a submenu with the following commands for each local slave, page 156 that exists in a PAC.</p> <p>The command is available only on M580 CPU and BMENOC03•1 modules.</p>			
	Open	For a description, refer to these commands in this table, which apply to the DTM reference, page 156 that is selected for the module.		
	Connect			
	Disconnect			

Command	Description
Move Local Slave To	<p>The command appears only for EtherNet/IP devices that are created in the Local Slaves folder as a result of an import, page 243 operation.</p> <p>Opens a menu that lists the M580 CPU and BMENOC03*1 modules of existing M580 PACs that have a part number that matches the device name of the EtherNet/IP device DTM (for example, BMEP582040).</p> <p>if a DTM reference, page 156 has been selected for such a module, the module appears in the menu only if the device version also matches that of the EtherNet/IP device (for example, 3.10).</p> <p>The existence of a local slave, page 156 is irrelevant.</p> <p>If a module that appears in the menu has the same IP address as the EtherNet/IP device, it is shown separately in first position.</p> <p>Clicking a module in the list adds a local slave for the module, which has the same configuration as the EtherNet/IP device. The device is then automatically deleted from the system project.</p>
Open	<p>Opens the device type manager (DTM) for the selected device.</p> <p>The command is available only for devices that support configuration by using a DTM, page 222 and requires that the DTM that supports the part number and version is installed on the local computer.</p> <p>NOTE: For devices or modules that manage a fieldbus, the command is available within the Fieldbus Editor.</p>
Open Basic Diagnostic	<p>Opens the basic diagnostic window, page 99 for the selected device.</p> <p>The command is available only for devices of the Altivar Variable Speed Drives product range, page 22.</p>
Open Rack Viewer	<p>Opens the Rack Viewer, which lets you view the configuration of a local rack or drop.</p> <p>The command is available only for M580 modules and racks.</p>
Open Web Browser	<p>Lets you open an external or embedded web page, page 288 in the default web browser of the computer depending on the configuration of the device or module.</p> <p>The command is available only for devices and modules that support the functionality.</p>
Open With	<p>Opens a submenu containing a list of views that are available for the selected object (for example, a physical view or the Logical Network View). Selecting a view from the list shows or opens it and selects the corresponding object.</p> <p>The available views depend on the type of object.</p> <p>To be able to open a physical view, you must have added the device to it first.</p>
Save Control Project As...	<p>Opens a Save Control Project As... dialog box, which lets you save to disk a copy of the control project that is associated to the controller (.stu).</p> <p>The command is not available for M580 PACs. Instead, export the PAC or the system project.</p> <p>NOTE: If an application password is set, page 53 for the control project, it is saved with file encryption disabled.</p>
Show in Active Views	<p>Selects and shows the device in the other windows and panes that are open (for example, in the topological folder structure of the SYSTEM PROJECT pane or in the LOGICAL NETWORK VIEW (if open)).</p>
Synchronize Changes	<p>Lets you apply changes, page 233 that you have made to properties of a PAC in the Topology Manager to the associated control project and vice versa.</p>
Upload	<p>Lets you upload, page 314, from the controller to the system project, the application of the controller by using Ethernet communication. This operation replaces the control project that is associated to the controller.</p> <p>The command is disabled when the control project of the controller is being edited.</p> <p>The command is available only for controllers of the following platforms:</p> <ul style="list-style-type: none"> • M340 • MC80 • Momentum

Adding Devices to a Physical View from the SYSTEM PROJECT Pane

Overview

Once you have added a device to a system project, page 191, you can add it to a physical view to design the hardware architecture in a graphical way, connect, page 208 the ports of devices, and view network-related information of devices.

You can show a device only in one physical view at a time.

NOTE: For information on features that are available while working in a physical view, refer to the topic describing how to use workspaces, page 32.

Adding Several Devices at Once

You can add to a physical view all the devices contained in a folder by dragging the folder. The operation is not allowed if a device already appears in another physical view.

Working with PACs

When you add to a PAC that already appears in a physical view a component that is normally represented separately in a physical view (for example, a drop), it is not added automatically to the view.

When you replace a component of a PAC that is normally represented separately in a physical view (for example, a drop), it is removed from the view.

You can add local racks and drops of a PAC to different physical views by dragging them individually. To add all the drops of a PAC to a physical view, drag the EIO bus to the view.

For details of how PACs appear in physical views, refer to the topic describing the representation of devices, page 184.

Adding Devices to a Physical View from the SYSTEM PROJECT Pane

Step	Action
1	Create and/or open a physical view.
2	In the Topology section structure of the SYSTEM PROJECT pane, select one or more devices and drag them to the workspace of the physical view. Result: A graphical representation of the device is displayed in the physical view.

Moving Devices Inside the Physical View

To move one or more devices to another area of the same physical view, proceed as follows.

Step	Action
1	Click one device and hold the mouse button. To move several devices, select them, page 33 first. Result: An arrowed cross appears next to the pointer. NOTE: If no arrowed cross appears when you select one device, click another part of the device.
2	Drag the device to its new position, page 32. Result: The device is repositioned and existing physical links are redrawn (except for remote links, page 209). If you move several devices at once, their relative position to each other is unchanged.

Moving Devices Between Physical Views

You can move one or more devices to another physical view by dragging them. The physical views must be open side by side or overlapping, page 35 in the same Topology Manager instance.

Existing physical links are redrawn according to the following rules:

- A physical link is moved only if both linked devices are moved. It is converted into a remote link, page 209 if only one of the linked devices is moved.
- A remote link is moved together with the device it is connected to.
- A remote link is not converted into a solid link.
- The path of a link that has been moved may be modified in the target physical view to minimize collisions with other objects. This applies only to links for which automatic routing, page 212 is enabled.

Pasting Devices and Physical Links

Overview

You can paste devices that you have copied or cut from a physical view or the **SYSTEM PROJECT** pane of either:

- The same system project.
- Another system project that you open in the same Control Expert instance (after closing the source system project).
- Another system project open in another Control Expert instance running on the same computer.

You can paste devices only in a window or pane that is of the same type as that from which you had copied them. For example, within or between physical views or within the **SYSTEM PROJECT** pane, page 108 but not between a physical view and the **SYSTEM PROJECT** pane.

In a physical view, you can also paste physical links.

NOTE: You cannot paste while a system project is locked, page 55.

NOTE: For information about pasting folders, refer to the topic describing how to manage topological folders, page 176.

Pasting After Copying or Cutting From Another Password-Protected System Project

When the system project from which you have copied or cut a device is password protected, page 52 and you paste the device in a different system project, which is open in another Control Expert instance running on the same computer, you must enter the password of the source system project when prompted. Otherwise, you cannot paste it.

Pasting After Copying or Cutting in a Physical View

The table describes the result of the **Paste** command depending on the command, page 80 that you have used on a device in a physical view. Specific scenarios and the impact on the attributes, page 201 of the pasted device are described further in this topic.

Command	Result of the Paste command
<p>Copy</p> <p>Adds the representation of the device in the physical view and the device itself to the Clipboard.</p> <p>Child elements (such as slave devices of gateways) and configuration files are added too.</p> <p>A physical link is added to the Clipboard only if both source and target devices and the link itself are selected before using the command.</p> <p>Does not apply to the local rack or drop of an M580 PAC. Use the SYSTEM PROJECT pane instead.</p>	<p>Copied objects are duplicated in the physical view and the SYSTEM PROJECT pane.</p>
<p>Cut</p> <p>Removes the representation of the device from the physical view and deletes the device from the SYSTEM PROJECT pane and adds them to the Clipboard. Includes child elements of devices or modules (such as slave devices of gateways) and configuration files.</p> <p>A physical link is removed and added to the Clipboard only if both source and target devices and the link itself are selected before using the command.</p> <p>You can also use the Cut button in the toolbar.</p> <p>Does not apply to the local rack or drop of an M580 PAC. Use the SYSTEM PROJECT pane instead.</p> <p>NOTE: Physical links that are not connected at both ends anymore are removed.</p>	<p>The objects in the Clipboard are added to the physical view and created in the SYSTEM PROJECT pane.</p>
<p>Cut From View</p> <p>Removes only the representation of the device from the physical view and adds it to the Clipboard.</p> <p>Physical links to the device are added to the Clipboard as well.</p>	<p>The objects in the Clipboard are added to the physical view.</p> <p>Physical links are recreated when possible.</p>

NOTE: Pasted links maintain their properties.

NOTE: Using the **Paste** command rather than the **Ctrl+V** keyboard shortcut lets you paste the device where the cursor is positioned.

Pasting PACs

The table describes the impact on data associated to a PAC, which you have copied or cut in the **SYSTEM PROJECT** pane when you paste it in the same system project or another one that is open on the same computer.

Associated data	Result
Control project	<p>The control project is pasted.</p> <p>If the build state of the control project was Built, it is set to Out Of Date; otherwise, the state is unchanged.</p> <p>The build target is unchanged.</p>
Communication mapping	<p>Communication mapping is recreated for scanned devices that are copied or cut together with the PAC.</p>

Impact on Attributes When Pasting Devices

The behavior is different whether you paste devices in the same system project or in another system project (open in the same or another Control Expert instance running on the same computer). The following tables describe for each case the impact on attribute values when you paste a device in the workspace of a physical view or in the **SYSTEM PROJECT** pane.

NOTE: The description also applies to racks and their modules.

When pasting in the same system project.

Device attribute	Result
Name	The device is renamed ⁽¹⁾ . If you had cut the device, it is pasted with the same name unless a device with this name has been created in the meantime. In such case, the device is renamed ⁽¹⁾ .
IP addresses	IP addresses of the copied or cut device are set to the first available address in the logical network to which the device belongs. If no more IP addresses are available, the logical network is set to <i>NOCONF</i> and the IP addresses are set to 0.0.0.0. The following exceptions apply: <ul style="list-style-type: none"> • IP addresses that correspond to the gateway address of a logical network (for example, IP addresses of ports whose routing capability is enabled (interface)) are set to 0.0.0.0 and the corresponding logical network to <i>NOCONF</i>. • Optional IP addresses (for example, IP address A of a NOC communication module) are set to the first available address in the logical network only if they were configured in the device that you have copied. • If the logical network does not exist anymore (for example, because it has been deleted or renamed after the device was copied or cut), the logical network is set to <i>NOCONF</i> and the IP address is kept.
I/O profile	I/O profile attribute names are renamed ⁽¹⁾ .
Path	When you paste a device: <ul style="list-style-type: none"> • In a physical view, it is also pasted in the SYSTEM PROJECT pane in the same folder from where it was copied or cut. As a result, Path is identical. • In the SYSTEM PROJECT pane, Path is set according to the location where you paste the device.
DHCP Server Name	The attribute value is unchanged unless the configured DHCP server does not exist anymore when the device is pasted. When you copy or cut several devices between which a DHCP client/server relationship exists, the relationship is maintained.
Other attributes	Attribute values are identical to values of the copied or cut device.
(1) To satisfy the name uniqueness rule, the software adds a <i>_x</i> suffix where <i>x</i> is an integer starting at 1 or increments existing <i>_x</i> suffixes.	

When pasting in another system project.

Device attribute	Result
Name	If a device with the same name already exists, the pasted device is renamed ⁽¹⁾ .
I/O profile	If I/O profile attributes with the same name already exist, the I/O profile attribute names are renamed ⁽¹⁾ .
Logical Network	The logical network is set to <i>NOCONF</i> .
IP addresses	IP addresses are kept.
Path	When you paste a device: <ul style="list-style-type: none"> • In a physical view, it is also pasted in the Topology folder of the SYSTEM PROJECT pane; Path is set accordingly. • In the SYSTEM PROJECT pane, Path is set according to the location where you paste the device.
DHCP Server Name	The attribute value is set to <i>None</i> . When you copy or cut several devices between which a DHCP client/server relationship exists, the relationship is maintained.
Other attributes	Attribute values are identical to values of the copied or cut device.
(1) To satisfy the name uniqueness rule, the software adds a <i>_x</i> suffix where <i>x</i> is an integer starting at 1 or increments existing <i>_x</i> suffixes.	

Configuring Devices

Overview

After you have added a device to your system project, you can configure its attributes to meet your specific requirements by using various tabs and windows of the Topology Manager.

When multiple devices are selected, you can view and/or configure attributes that they have in common.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Configurable Attributes of Devices

The attributes that you can configure depend on the type of device. Typically, attributes encompass the name, hardware settings (for example, the number of ports, communication cards), services of ports, IP addresses, and logical networks. Other attributes may be available depending on the type of device or module.

The attributes of devices are documented in the topic describing the **PROPERTIES** pane, page 124.

IP addresses and DHCP settings are easily configured by using the **LOGICAL NETWORK VIEW** and **DHCP VIEW** respectively.

Refer also to the Control Expert Classic parameter correspondence table, page 239.

Configuring Properties of Redundant PACs

For redundant PACs, when you modify the properties of a module in one of the local racks, the modifications are repeated in the counterpart module of the other rack. The software may apply rules that are specific to the configuration of redundant PACs.

For example, if you disable the service port of the CPU module of rack M580_A_1, the service port of the CPU module of rack M580_B_1 is disabled as well.

Viewing and Configuring Attributes of Multiple Devices

When you select multiple, page 33 devices, modules, and/or communications cards, the **CONFIGURATION** tab of the **PROPERTIES** pane shows the attributes that your selection has in common.

When you select devices or modules that are not of the same catalog reference, the **Description** tab of the **PROPERTIES** pane is hidden.

You can select multiple objects either in the **SYSTEM PROJECT** pane or a physical view but not a mix of both.

When multiple objects are selected, some attribute values may not be shown but you can modify configurable attributes.

Value of a displayed attribute	Value shown	Result after configuring the attribute
Same value for all the selected objects.	The actual value of the attribute.	The new value is applied to the selected objects.
Value is different for at least one selected object.	None.	The new value is applied to the selected objects. Existing values that were not shown are overwritten.

NOTE: When several objects are selected and they have an attribute in common, if the value of this attribute must remain unique for each object, the attribute becomes read-only. This is the case, for example, for the **Name** attribute of a device.

Changing IP Address Assignments to Logical Networks at System Project Level

Overview

This topic describes how you can manage the assignment of IPv4 addresses to logical networks, page 82 at system project level by using the **LOGICAL NETWORK VIEW**.

Modifying IP Addresses

To modify an IP address, double-click it and enter the new value.

You cannot modify an IP address in the **LOGICAL NETWORK VIEW** if the corresponding attribute is read-only when accessed from the **PROPERTIES** pane.

NOTE: The syntax of the IP address and its validity in relation to the logical network are checked. If the status is invalid, you can let the software assign a new valid IP address to the interface by using the corresponding context menu command, page 83. The uniqueness of the IP address is verified when you analyze, page 256 the system project.

Rules When Changing Assignments to Logical Networks

The table describes the rules that apply when you move an interface to a new logical network in the **LOGICAL NETWORK VIEW**.

Scope	Description
Selection of devices	You can select one or more interfaces belonging to the same or different logical networks.
	When you select an interface that is associated to another one (for example, because the IP addresses must belong to the same logical network) and move it to a new logical network, the associated interface is automatically moved to the same network. (For example, when you move only the MainIP address of a PAC, IPA is moved too. In case of a redundant PAC, MainIP+1 and IPB are moved as well.)
Target logical network	You can drag your selection to the logical network group or onto the list of interfaces inside the group. The result is the same in terms of IP address assignment.
IP address assignment	The interface that you move to a new logical network is automatically assigned the next available IP address on this network. The values of the corresponding attributes of the interface are updated. If there are not enough IP addresses available in the target logical network, the action is canceled and a notification displayed.

Modifying Logical Networks

When you modify the subnet address or subnet mask of a logical network to which interfaces are assigned, the software verifies the validity of each IP address in relation to the new logical network data and updates its status in the corresponding column of the **LOGICAL NETWORK VIEW**. If the status is invalid, you can let the software assign a new valid IP address to interfaces by using the corresponding context menu command, page 83.

Assigning IP Addresses by Logical Network

To assign one or more IP addresses by logical network, proceed as follows.

Step	Action
1	<p>In the LOGICAL NETWORK VIEW, select one or more interfaces in the NOCONF node.</p> <p>Result: Your selection is highlighted.</p> <p>NOTE: Your selection can also include one or more interfaces that are already assigned to a logical network if you want to reassign them to another logical network.</p>
2	<p>Drag your selection to a logical network</p> <p>Result: The interfaces now belong to this logical network and each IP address is replaced by the next available address, page 205 on this network.</p>

Clearing Assignments to Logical Networks

To clear the logical network assignment for one or more interfaces, select them, and drag your selection to the **NOCONF** node.

The logical network and IP address information is cleared.

Assigning Devices to DHCP Servers

Overview

This topic describes how you can assign a device of the system project that features a DHCP client to a DHCP server by using the **DHCP VIEW**. It also describes how to unsubscribe a device from the DHCP service.

For certain devices, the DHCP client/server relation cannot be modified (for example, CRA adapter modules).

You can perform an analysis, page 256 of the system project to detect inconsistencies.

NOTE: Alternatively, you can add a device to a DHCP server or unsubscribe it by configuring its DHCP client attributes, page 142 in the **Services** tab of the **PROPERTIES** pane.

Adding Devices to a DHCP Server

To add one or more devices to a DHCP server, proceed as follows.

Step	Action
1	Select one or more devices in the Not Assigned node. NOTE: Your selection can also include one or more devices that are already assigned to a DHCP server if you want to reassign them to another server.
2	Drag your selection to a DHCP server node. Result: <ul style="list-style-type: none"> • The selected devices now belong to the list of clients of the DHCP server. • The DHCP Client setting, page 142 of the devices is updated. NOTE: Adding a device to a DHCP server does not imply that the DHCP service is working. Services may be disabled and/or protocols incompatible.

Unsubscribing Devices from the DHCP Service

To unsubscribe one or more devices from the DHCP service, proceed as follows.

Step	Action
1	Select one or more devices.
2	Drag your selection to the Not Assigned node. Result: <ul style="list-style-type: none"> • The selected devices are not subscribed to a DHCP service anymore. • The DHCP Client setting, page 142 of the devices is updated.

Connecting Ports of Devices by Physical Links

Overview

After you have added at least two devices to a physical view of your system project, you can connect their communication ports by a physical link. This link represents a cable connection. A color coding indicates the types of networks, page 79.

You can connect ports of devices that appear in the same or in different physical views.

Once you have created the connection, the software draws the path of the physical link automatically. You can change the routing of the link manually.

When you reposition a connected device in a physical view or move it to another one, physical links are redrawn as needed to adapt to the new layout. You may need to rework links that you have routed manually.

The high-speed cable link that connects the local racks of a redundant PAC is considered a physical link but some of the functionality described in this topic may not apply to it.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Connection Rules

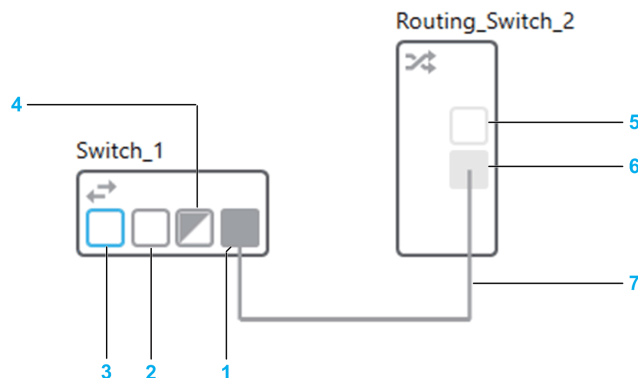
The following rules apply when you connect devices by a physical link:

- A link can create only a one-to-one connection between two ports of the same or distinct devices.
- Each port can be connected only once.
- If you connect devices that appear in different physical views:
 - One of the ports to be connected by a physical link must be tagged for connection.
 - The two physical views must be open.

NOTE: You can connect a port that is disabled but it is reported when you analyze, page 256 the system project.

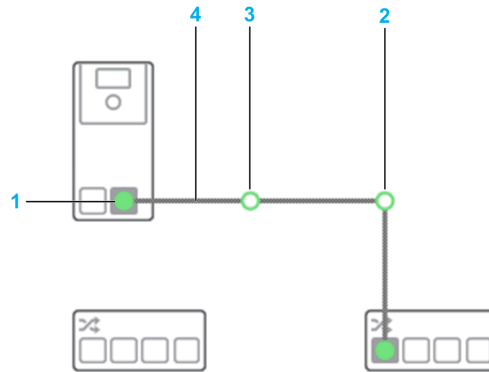
Port Status and Physical Link Representation

The following figure shows an example of the representation of two devices, page 184 with various port configurations in a physical view. The devices are connected by a physical link.



Item	Description
1	Linked port
2	Port available for connection (port enabled)
3	Port that is tagged for connection, page 210
4	Port that is connected to a device that has been removed from the physical view, page 80. The port is not available for connection anymore.
5	Port available for connection (port disabled)
6	Disabled and linked port
7	Physical link

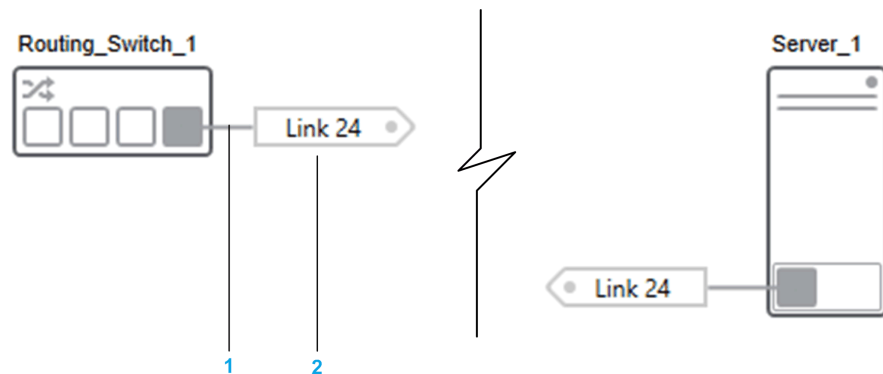
The following figure shows an example of a physical link that is selected.



Item	Description
1	Link endpoint
2	Joint created by the software
3	User-created joint
4	Segment of the link (portion of the link that is between two joints or a joint and an endpoint)

Remote Link Representation

The following figure shows an example of a remote link between a switch and a server station that are located in the same or different physical views. When devices are located in the same physical view, showing the link as a remote link, page 212 is optional.



Item	Description
1	Physical link stub
2	Connector. The same connector is shown for each of the two connected ports. To rename it, edit its Label attribute in the PROPERTIES pane.

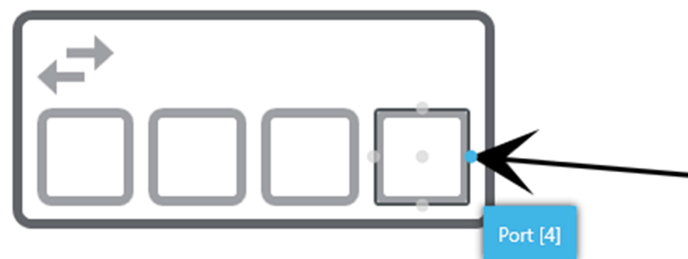
A tooltip indicates:

- The value of the **Label** attribute. If blank, a numerical ID is shown.
- The destination of the link in the format *physical view name\device name\port name* where:
 - *physical view name* is shown only if the device is located in a different physical view.
 - *device name* can be followed by the name of one or more child objects in case of racks. For example, *Standalone_Controller_2\M580_1\BMEXP0800 #0\BMEP582040 #0* where *Standalone_Controller_2* is the name of the PAC object (device) and *M580_1* the local rack.

Port Name, Anchors, and Link Direction

The name of a port is indicated by a tooltip when you position the pointer over the port.

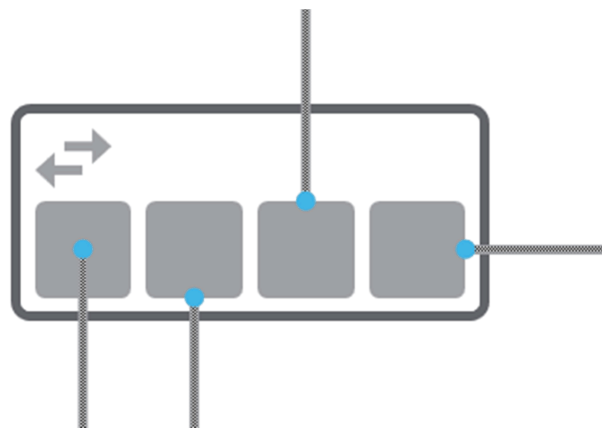
Each port has five anchors from which you can start a link or to which you can connect a link.



The anchors appear only on the target port when you position the pointer over it.

The anchor that you select to start or connect the link dictates the initial direction of the link. When you select the center anchor, the software routes the link automatically.

The following figure shows four links connected to different anchors of ports and the resulting link direction as an example.



NOTE: You can move an existing physical link to a different anchor of the same port to modify the link direction.

Port Actions

Right-click the available port of a device to open a context menu containing the following commands (the port can be in disabled state).

Command	Description
Tag for Connection	<p>When selected, lets you connect the port, page 211 from a device located in another open physical view. The name of the port appears in a submenu of the Connect to command when you select the command on the other device.</p> <p>NOTE:</p> <ul style="list-style-type: none"> Closing a physical view clears the tags for connection for all ports of devices appearing in this physical view. Deleting or removing a remote link removes tag for connection if it had been set for the port.
Connect to	<p>Lists the ports of devices that are tagged for connection. The devices are those of the current system project that have been added to a physical view that is open.</p> <p>If Tag for Connection has not been selected for any port, the command is unavailable.</p> <p>Ports are shown by using the format <i>physical view name\device name\port name</i> where:</p> <ul style="list-style-type: none"> <i>physical view name</i> is shown only if the device is located in a different physical view. <i>device name</i> can be followed by the name of one or more child objects in case of racks. For example, <i>Standalone_Controller_2\M580_1\BMEXBP0800 #0\BMEP582040 #0</i> where <i>Standalone_Controller_2</i> is the name of the PAC object (device) and <i>M580_1</i> the local rack. <p>NOTE: Once you have connected one of the listed ports, it is not tagged for connection anymore.</p>

Connecting Ports of Devices in the Same Physical View

To connect two ports by a physical link, proceed as follows.

Step	Action
1	<p>In a physical view, position the pointer over the center or one of the edges of a port, which is available for connection.</p> <p>Result: A link symbol appears next to the pointer.</p>
2	<p>Press and hold the left mouse button and drag the pointer away from the port.</p> <p>Result: A line with arrow end is drawn.</p>
3	<p>You can release the mouse button and move the arrow over the port that is the target for the connection.</p> <p>Result: The anchors, page 210 of the port are shown.</p> <p>NOTE: To cancel the link drawing, press Esc.</p>
4	<p>Move the arrow over one of the anchors, page 210 of the port so that it is highlighted and click it.</p> <p>Result: The port is connected and the link between the devices is drawn. The link is shown selected, which lets you view endpoints and joints.</p>

Connecting Ports of Devices Appearing in Different Physical Views

NOTE: You can use this procedure also to connect devices inside the same physical view. In such case, a physical link is drawn between the ports.

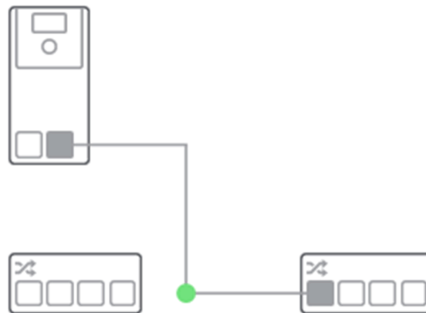
To connect two ports by a physical link when devices are located in different physical views, proceed as follows.

Step	Action
1	In one of the physical views, right-click the port of a device and select Tag for Connection . Result: The port is outlined.
2	In the other physical view, right-click the port to be connected and select Connect to . Result: The name of the port that is tagged for connection is shown. (Any other port that is tagged for connection appears as well.)
3	Select the port. Result: A remote link is created between both ports in each physical view. The software selects the anchors, page 210 automatically.

Changing the Connected Port or Routing of an Existing Physical Link

To connect either endpoint of an existing physical link to another available port, select the endpoint and drag it to the other port. The physical link is rerouted automatically; manual changes to the route and joints that you have added are discarded.

You can also modify the route of a link. The following figure shows the automatically routed link from the previous example, which has been rerouted manually by dragging the left-hand joint to a new position. The joint is shown selected. This action disables the automatic routing, page 212 feature of the link.



For remote links, you can drag the connector, page 209 to a new position.

NOTE: When you route links manually, a soft snapping is applied and guide lines appear that help you align with graphical elements and maintain distances.

NOTE: You can delete both software and user-created joints by right-clicking them and selecting **Delete**.

Physical Link Actions

Right-click a physical link or the stub of a remote link, page 209 to open a context menu containing the following commands.

Command	Description
Add Point	Inserts a joint where you have right-clicked the link. It creates two segments and lets you: <ul style="list-style-type: none"> • Move either segment by dragging it. • Modify the direction of either segment to change the routing by dragging the joint. NOTE: Deleting a joint aligns the two segments again.
Source	Opens a submenu that lets you configure in which direction the link exits the port from which it originates. You can use it, for example, to change the default routing of links. For a description of the submenu entries, refer to the topic describing physical link properties.

Command	Description
	NOTE: You can use the port anchors, page 210 instead.
Destination	<p>Opens a submenu that lets you configure in which direction the link enters the port to which it is connected. You can use it, for example, to change the default routing of links.</p> <p>For a description of the submenu entries, refer to the topic describing physical link properties.</p> <p>NOTE: You can use the port anchors, page 210 instead.</p>
Auto Routing	<p>Selected by default after you create the link.</p> <p>Cleared if you add a joint or change the routing of the link.</p> <p>Selecting it again discards changes and routes the link automatically.</p>
Show as remote link	<p>When selected, shows only both ends of the physical link. Each stub ends with a connector that displays the five first characters of the label.</p> <p>When you clear the check box, a solid link is redrawn and the tag removed. Other existing links may be repositioned as needed.</p> <p>NOTE: The command is selected and disabled for remote links connecting devices that are located in different physical views.</p>
Delete	<p>Deletes the link and makes the ports that were connected available again.</p> <p>You need to confirm the command.</p> <p>For remote links, also deletes the counterpart link in the other physical view.</p>

Remote Link Connector Actions

Right-click the connector, page 209 of a remote link to open a context menu containing the following commands.

Command	Description
Navigate	<p>Shows the device that is connected at the other end and highlights the counterpart connector in the physical view. If it is located in another physical view, it is opened and/or made active.</p> <p>You can also double-click the connector.</p>
Horizontal/Vertical	<p>Defines the orientation of the connector.</p> <p>NOTE: Corresponds to the Orientation attribute of the connector.</p>
Delete	<p>Deletes the connector, the link, and their counterparts in the other physical view after you confirm the command.</p>

Physical Link Properties

Click a physical link or the stub of a remote link, page 209 to display its properties in the **CONFIGURATION** tab of the **PROPERTIES** pane.

You can view and/or edit the following properties of the **General** category.

Attribute	Description
Label	Click the field to edit the name. The name does not need to be unique in the system project. NOTE: When you enter a value, it is used as label for the link in the physical view. You can show or hide the label, page 77.
Source	The following settings let you configure how the link exits the port from which it originates. The link is connected to the corresponding anchor, page 210. <ul style="list-style-type: none">• Default: The software uses the direction that is defined by default for this type of device.• Top: The link exits the port from the top.• Bottom: The link exits the port from the bottom.• Right: The link exits the port from the right.• Left: The link exits the port from the left.
Destination	The following settings let you configure how the link enters the port to which it is connected. The link is connected to the corresponding anchor, page 210. <ul style="list-style-type: none">• Default: The software uses the direction that is defined by default for this type of device.• Top: The link enters the port from the top.• Bottom: The link enters the port from the bottom.• Right: The link enters the port from the right.• Left: The link enters the port from the left.

Exporting and Importing the Topology of a System Project

Overview

This section describes the various actions that you can perform on the topology of a system project.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Exporting the Topology of a System Project

Overview

The **EXPORT** window, page 100 lets you create an export file (.xpt), which contains selected objects of the topology of a system project and their configuration. Optionally, you can include physical views in which exported devices appear as well as physical links.

You can use the file to import objects, page 218 into the topology of the same or another system project.

The system project is locked, page 55 while the software creates the export file.

NOTE: Schneider Electric recommends setting a password, page 52 for your system projects before exporting the topology to help protect export files against data tampering.

Topology Upward Compatibility

You can import topology export files in a later version of Control Expert only if at the time of export, the **Supports Upward Compatibility** attribute, page 48 of the system project was enabled.

Otherwise, you can use an export file only with the version of Control Expert that was used to create it.

Exporting Physical Links

Physical links are exported only if the following conditions are fulfilled:

- You have selected the **Export Physical Information** check box, page 100.
- Both linked devices are selected for export.

Exporting Configuration Files

Stored configuration files, page 194 of a device are exported.

Exporting PACs

When you export a PAC, the associated control project is exported. If an application password, page 53 is set, it is persisted.

Communication mapping data of scanned devices is included in the export file if the devices are exported together with the PAC.

Exporting From Password-Protected System Projects

When you export the topology from a password-protected, page 52 system project, you will be prompted to enter this password when you import the topology export file.

Exporting Objects

To export objects of the topology of a system project, proceed as follows.

Step	Action
1	Right-click the Topology node in the SYSTEM PROJECT pane or one or more devices and select Export . Result: The EXPORT window opens.
2	Select the objects that you want to export.

Step	Action
	NOTE: Close the EXPORT window from its tab to cancel the operation without exporting objects. Your selection is discarded.
3	Optionally, select the Export Physical Information check box.
4	Click Export . Result: The Export dialog box opens.
5	Select an export file name and location and click Save . Result: The software creates the export file (.xpt) based on your selection. NOTE: You can see a list of devices and physical views that have been exported by double-clicking the entry that corresponds to the export operation in the notification pane, page 166.
6	Close the EXPORT window.

Importing Objects in the Topology of a System Project

Overview

The **Import** command lets you add to the **Topology** node, page 110 of a system project the objects that are contained in a compatible export file (.xpt), page 216.

The software may modify the attribute values of imported objects in some cases. Existing objects of the target system project are not impacted.

NOTE: The system project is locked, page 55 during the import operation.

Software Version Compatibility

You may be able to import a topology export file in a later version of Control Expert. For details, refer to the topic describing the upward compatibility, page 216.

DTM Requirements

You can import a device, which is configured by using a device type manager (DTM), page 222 even if the DTM is not present in the **Hardware Catalog** of the target system project. However, you cannot open the DTM.

Import Settings

You can select the strategy that the software applies to create objects that you are importing.

Keep relative folder organization	Result
Yes	The hierarchy of objects (folder structure) as it is contained in the export file is recreated. The parent folder of this hierarchy is the folder from which you select the Import command.
No	The devices contained in the export file are imported without the original folder structure into the folder from which you select the Import command.

Importing PACs

The table describes the impact on the data associated to an exported PAC when you import it.

Associated data	Result
Control project	The control project is imported. If the build state of the control project was Built , it is set to Out Of Date ; otherwise, the state is unchanged. The build target is unchanged.
Communication mapping	Communication mapping is recreated for scanned devices that are exported and imported together with the PAC.

Impact on Attributes When Importing Objects

The objects contained in the export file are created in the topology of the target system project with the same configuration. Existing objects are not impacted.

In some scenarios however, the software may modify the value of certain attributes of imported objects.

The table describes the impact on attributes of imported objects depending on the scenario.

Attribute of Imported object	Object in the target system project		Result
Folder name	A folder with the same name already exists for the same parent folder.		The folder is renamed ⁽¹⁾ .
Device and/or module name	A device/module with the same name already exists.		The device is renamed ⁽¹⁾ .
I/O profile of imported device	A profile attribute with the same name already exists.		I/O profile attribute name is renamed ⁽¹⁾ .
Logical network and IP addresses of imported device	Import in the same system project	A logical network with the same name already exists.	The logical network is kept and IP addresses ⁽²⁾ are recalculated if already used. NOTE: <ul style="list-style-type: none"> The software does not verify if the subnet addresses are identical. You need to analyze the system project, page 30. If no more IP addresses are available in the logical network, its value is set to <i>NOCONF</i> and IP addresses are set to 0.0.0.0.
		A logical network with the same name does not exist.	The import does not create logical networks. The logical network is set to <i>NOCONF</i> and IP addresses ⁽²⁾ are kept.
	Imported in a different system project	The logical network is set to <i>NOCONF</i> and IP addresses are kept.	
DHCP Server Name	Import in the same system project	The attribute value is unchanged unless the configured DHCP server does not exist anymore when the device is pasted. When import several devices between which a DHCP client/server relationship exists, the relationship is maintained.	
	Imported in a different system project	The attribute value is set to <i>None</i> . When you import several devices between which a DHCP client/server relationship exists, the relationship is maintained.	
Name of physical view in which imported devices appear	A physical view with the same name already exists.		The physical view is renamed ⁽¹⁾ .
<p>(1) To satisfy the name uniqueness rule, the software adds a <i>_x</i> suffix where <i>x</i> is an integer starting at 1 or increments existing <i>_x</i> suffixes.</p> <p>(2) Does not apply to IP addresses that correspond to the gateway address of the logical network (for example, IP addresses of ports whose routing capability is enabled (interface)). These IP addresses and the logical network are set to 0.0.0.0 and <i>NOCONF</i> respectively.</p>			

Importing Objects

To import the content of a topology export file into a system project, proceed as follows.

Step	Action
1	<p>Right-click the Topology node or a topology folder in the SYSTEM PROJECT pane and select Import.</p> <p>Result: The Topology: Import dialog box opens.</p>
2	<p>Select a topology export file (.xpt).</p>
3	<p>Click Open.</p> <p>Result: A dialog box opens prompting you to select import settings, page 218.</p> <p>NOTE:</p> <p>The dialog box opens even if the export file contains no folder structure.</p> <p>Closing the dialog box cancels the import operation.</p> <p>NOTE: If the topology export file was exported from a password-protected, page 52 system project, you must enter the system project password when prompted. Otherwise, you cannot import the file.</p>
4	<p>Select an import setting.</p> <p>Result: The software imports the contents of the export file in the topology of the system project.</p> <p>NOTE: You can see a list of devices and physical views that have been imported by double-clicking the entry that corresponds to the import operation in the notification pane, page 166.</p>

Using Device Type Managers

Using DTMs

Overview

Certain devices can be configured in depth by using a device type manager (DTM).

DTMs are managed in the Topology Manager where they can be opened and configured.

A certain number of DTMs are provided with Control Expert but you can add additional ones to the local DTM catalog. These DTMs can be used, for example, with generic devices or slave devices on a fieldbus.

Only one user can edit parameters in the DTM of a device at a time. While a DTM is open, editing attributes of the device in the **PROPERTIES** pane is not allowed.

You may be able to deploy and load, page 194 the DTM configuration to and from a device.

NOTE: Certain concurrent actions or actions performed by other users may temporarily lock a DTM and you cannot save changes when you close it. A dialog box informs you of the lock when you open the DTM. In such case, close the DTM and reopen it once the lock has been released.

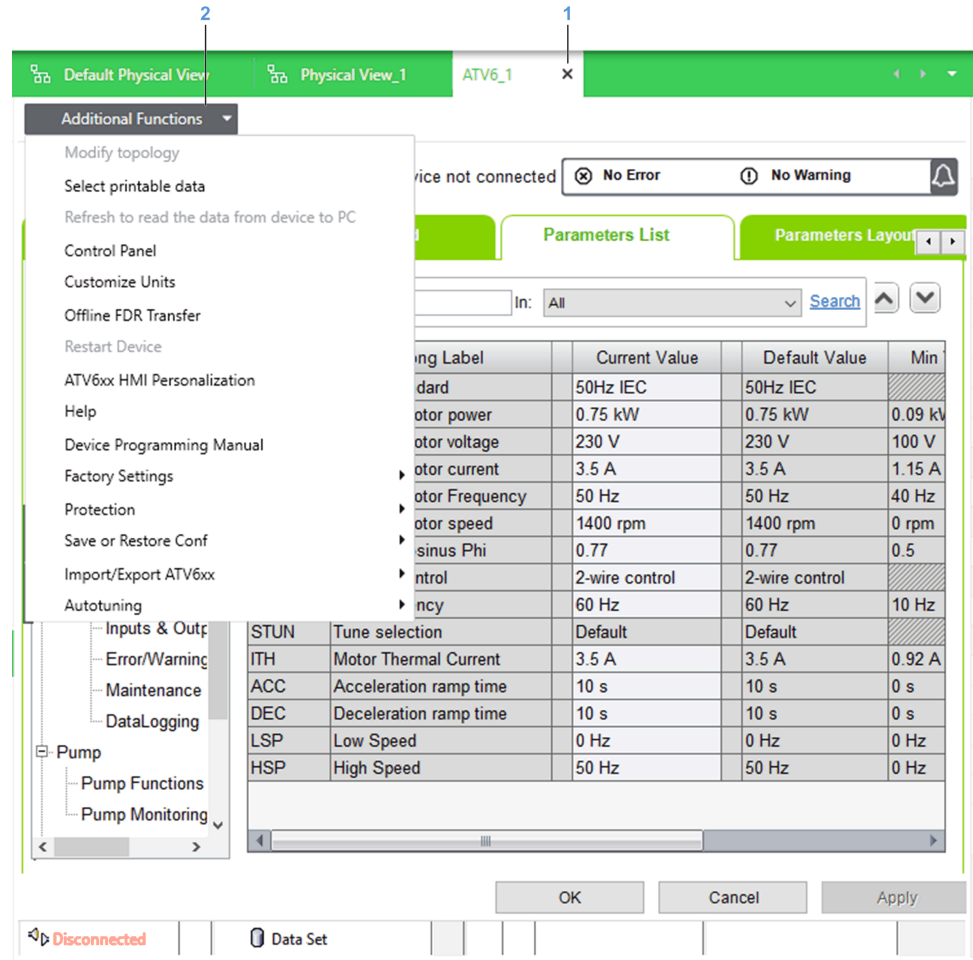
Prerequisites

To be used, the DTM of a device must be created on the local computer and the local DTM **Hardware Catalog** updated, page 30.

NOTE: Schneider Electric strongly recommends keeping the DTM **Hardware Catalog** identical on all computers connecting to a same system server.

DTM Window

The following figure shows an example of DTM window that opens when you use the **Open** command of the device context menu. In the example, the **Additional Functions** menu is expanded to show the additional DTM commands that are available while the device is disconnected.



Item	Description
1	Button to close the DTM.
2	Menu that lets you access quickly, various additional functions that are featured by the DTM. The content of the menu is DTM-specific. The availability of commands depends on the connection state of the device. That is, when the device is disconnected, commands that require the device to be connected are shown disabled, and vice versa.

Placeholder DTMs in the Control Project

When a device that is configured by using a DTM is scanned, page 296 by using an I/O scanner, a corresponding DTM appears in the connectivity tree of the **DTM Browser** when you edit the control project.

This DTM is only a placeholder for the DTM of the device, which you need to manage from the device in the Topology Manager.

File Types Used to Create DTMs

DTMs can be created by using the following types of files.

File type	Description
Executable	The installation method of the DTM is defined by the device manufacturer.
EDS	This file type is used for EtherNet/IP devices and requires using an installation tool.
GSD	This file type is used for PROFIBUS devices and requires using an installation tool.

FdtDTM Settings

The **FdtDtm Settings** section of the **User Preferences** window, page 104 lets you configure the following:

- Which network adapter of the computer is used to connect to a device.
- The path where the installation tool for EDS and GSD files is located.

Managing EDS Files

The table describes the commands of the **Tools > Manage EDS Library** submenu in the toolbar of the Topology Manager.

Command	Description
Add Device From EDS	Opens a wizard (see EcoStruxure™ Control Expert, Operating Modes) that lets you add a DTM to the Hardware Catalog by using an EDS file.
Remove Device From EDS	Opens a wizard that lets you remove a DTM from the Hardware Catalog by removing the corresponding EDS file.
Export EDS Library	Lets you create an export file (see EcoStruxure™ Control Expert, Operating Modes), which contains the EDS files of the local EDS library.
Import EDS Library	Lets you import an EDS library to the local computer.

Managing GSD Files

The table describes the commands of the **Tools > Manage GSD Library** submenu in the toolbar of the Topology Manager.

Command	Description
Add Device From GSD	Opens a wizard that lets you add a DTM to the Hardware Catalog by using a GSD file.
Remove Device From GSD	Opens a wizard that lets you remove a DTM from the Hardware Catalog by removing the corresponding GSD file.
Export GSD Library⁽¹⁾	Opens a wizard that lets you export to a library file (.glb) the GSD files that are installed on the local computer at a path that you select. You can enter the name and location of the GSD library export file.
Import GSD Library⁽¹⁾	Opens a wizard that lets you import the content of a GSD library export file (.glb) to the local computer.
(1) Requires that the PRM Gateway DTM version 1.3.2.0 or later is installed on the computer. Verify that GSD Path in the User Preferences window, page 104 is configured with the path where the PRM Gateway DTM has installed the tool.	

Device Properties to Be Configured Outside of the DTM

You need to configure the values of the following attributes of the device by using the **PROPERTIES** pane.

The table describes which values are propagated to the DTM and their state depending on the type of DTM that the device uses.

Attribute configured in the PROPERTIES pane	Third-party DTM	Schneider Electric DTM
Device Name and Part Number	Values are propagated and are read-only.	Values are propagated and are read-only.
Communication card Reference (if applicable)		
Ethernet Protocol ⁽¹⁾	Not propagated.	
IP Address ⁽¹⁾	Value is propagated and remains editable ⁽²⁾ .	Values are propagated if supported by the DTM and are read-only.
Subnet Mask ⁽¹⁾	Values are not propagated.	
Gateway Address ⁽¹⁾		
DHCP configuration information ⁽¹⁾		
(1) For embedded interfaces of the device and its communication cards (if applicable).		
(2) The values in PROPERTIES pane and in the DTM need to be identical.		

Pasting and Importing Devices That Use a DTM

When you configure parameters inside the DTM of a device and cut, copy, or export this device, the values that you have configured are retained when you paste or import the device.

Opening the DTM of a Device and Editing Values

Step	Action
1	Right-click the device and select Open . Result: The DTM opens in a new window.
2	Edit values as required and apply them (if applicable).
3	Close the DTM from its tab. Result: Depending on the DTM, the DTM closes and changes are saved or a confirmation dialog box opens, which prompts you to save changes before closing.

Configuring Fieldbusses

Managing Field Devices on Fieldbuses

Overview

You can edit the fieldbus of the following types of gateways:

- PROFIBUS remote master (PRM) gateways, page 22. Lets you add slave devices and INTERBUS network coupling devices.
- HART modules of a PAC. Lets you add field devices to a channel.

Once you have added field devices from the **TOOLBOX**, you can configure their parameters, page 221 to meet your specific requirements.

You can perform these tasks by using the **Fieldbus Editor**.

While the **Fieldbus Editor** or the device type manager (DTM) of a device is open, you cannot edit the attributes of the device and its slaves by using the **PROPERTIES** pane.

The representation of the gateway in the **SYSTEM PROJECT** pane is updated after you close the **Fieldbus Editor** and save changes.

NOTE: In a physical view, field devices of gateways are not shown.

Adding and Configuring Field Devices

To add a field device to the fieldbus of an existing gateway device and configure it, proceed as follows.

Step	Action
1	Open the Fieldbus Editor of the gateway.
2	In the TOOLBOX pane, select a field device and drag it onto the gateway or along the fieldbus. Result: The Select DTM Reference dialog box opens.
3	Select a reference, page 222 from the list and click OK . You can sort and filter DTMs, page 37. Result: Independently of where you have dragged the field device, a logical number, page 136 is automatically assigned to it. The newly added field device is shown selected. NOTE: If the field device is a network coupler, such as a PROFIBUS-to-INTERBUS gateway, you can add compatible slave devices to it in the same way.
4	To modify the configuration of the field device, open, page 194 its DTM by using the context menu of the field device.
5	To modify the configuration of the gateway, open its DTM by using the context menu of the gateway. NOTE: This lets you also change the station address of PROFIBUS slave devices.
6	Close the Fieldbus Editor . Result: A confirmation dialog box opens.
7	Click Yes . Result: Your changes are saved and the Fieldbus Editor closes. This operation saves also other changes that you have made such as editing values in the DTM of the gateway or field devices. NOTE: Click No to close the Fieldbus Editor and discard changes.

Changing the Channel Number of a HART Field Device

To assign a HART field device to a different channel of the gateway, proceed as follows.

Step	Action
1	Open the Fieldbus Editor of the gateway and select the HART field device.
2	In the PROPERTIES pane, enter a valid channel number in Logical Number . Result: The value is applied to the DTM of the gateway and the field device is repositioned in the Fieldbus Editor . NOTE: If you have entered a channel number that is already used, both field devices swap channels.
3	Close the Fieldbus Editor and save changes.

Working with Control Projects

Overview

This section describes how to manage and edit the control project that is associated to an M580 PAC, page 22, the scope of changes, and the limitations that apply.

NOTE: When one or more users work on the same system project simultaneously (for example, on the controller configuration, network layout, or device properties), locking mechanisms may restrict certain concurrent actions, page 24. In such case, dialog boxes and/or the **ACTIVITIES** tab, page 166 of the notification pane provide details.

Managing Control Projects

Overview

When you create a Modicon PAC or controller, page 191 by using the Topology Manager, it automatically creates a control project, page 17, which is associated to the object and stored in the repository of Control Expert.

For redundant M580 PACs, page 108, there is only one control project that you can manage from the PAC or either local rack.

M580 Control Project Description

When using the Topology Manager, control projects reflect the configuration of the properties of M580 PACs and their dependencies (such as scanned devices) that you have performed in the Topology Manager. They differ from Control Expert Classic control projects.

In addition, you can edit control projects, page 231 by using Control Expert Editor.

NOTE: You cannot save M580 control projects to disk or export them. However, you can export the system project, page 57.

Simultaneous Operations on Control Projects

You can use a maximum of four control projects simultaneously per Control Expert instance.

The following actions each use one control project:

- Editing a control project.
- Building a control project from the Topology Manager.

Editing M580 Control Projects

Overview

You can edit the control project that is associated to a Modicon PAC by using Control Expert Editor, which opens inside the Topology Manager.

It lets you change the configuration of the PAC and perform actions that are not managed by the Topology Manager, page 14.

You can edit several control projects, page 230 simultaneously from the same Topology Manager instance but one control project can only be edited by one user at a time.

NOTE: For M580 PACs, certain menus, parameters, page 239, and commands in Control Expert Editor are disabled. Typically, this indicates that you need to perform the corresponding configuration by using the Topology Manager.

For non-M580 controllers, page 252, Control Expert Editor opens with full functionality except for some commands of the **File** menu that are not available.

Prerequisites

To be able to edit the control project the analysis must not detect incorrect configurations, page 256 for the M580 PAC and its dependencies.

Scope of Changes

You can modify the hardware configuration, page 235 by adding, moving, replacing, and deleting:

- Local main and extended backplanes.
- Remote main and extended backplanes including EIO adapter modules.
- I/O, communication, and other specialized modules.
- Power supply modules.
- CPU modules (replace only).

You can also create and modify any other part of the control project such as the application, data types and instances. You can configure project settings and options.

NOTE: For more information on how to use Control Expert Editor, refer to its help, which you can open from the **Help** menu inside the window.

Applying Changes to the System Project

Closing Control Expert Editor lets you save and apply changes.

Before you can save changes, the software analyzes, page 256 the M580 PAC and its dependencies and you need to fix incorrect configurations.

When you save changes, changes to objects that are managed by the Topology Manager are applied to the system project. Other changes are saved to the control project only.

In addition, changes that you have made to the PAC in the system project while the control project was open are applied to the control project.

NOTE: If an operation that locks, page 55 the system project is in progress when you close the control project, you cannot save changes. Wait for the operation to complete to close the control project and save changes.

NOTE: You can also apply changes to the system project and the control project and leave Control Expert Editor open, page 233.

Undoing Changes in the Topology Manager

Using the **Undo** command, page 41 in the Topology Manager may undo changes that you have made to the control project and saved. Before proceeding, open the **HISTORY** pane to verify which action will be undone.

Editing and Closing the Control Project

To edit the control project associated to an M580 PAC, proceed as follows.

Step	Action
1	<p>In a physical view or the SYSTEM PROJECT pane, right-click the rack of the PAC and select Edit Control Project.</p> <p>Result: The PAC and its dependencies are analyzed. If no incorrect configuration is detected, the control project opens in Control Expert Editor.</p>
2	Edit the control project.
3	<p>Close Control Expert Editor by clicking the close button of its tab.</p> <p>Result: The PAC and its dependencies are analyzed. If no incorrect configuration is detected, a dialog box prompting you to save changes opens.</p>
4	<p>In the dialog box, click either button:</p> <ul style="list-style-type: none">• Yes to save your changes and close the control project. The system project is updated.• No to discard changes and close the control project.• Cancel to close the dialog box and revert to Control Expert Editor.

Applying Changes to Devices and to the Associated M580 Control Project

Overview

The **Synchronize Changes** command lets you apply to the control project changes that you make to properties of an M580 PAC in the Topology Manager and the vice versa, page 17, in a single step, while Control Expert Editor is open.

When you use the command, changes to the control project are saved.

Change Indicator

An asterisk is displayed next to the name of the PAC in the **SYSTEM PROJECT** pane to indicate that a modification to its properties in the Topology Manager has not been applied to the control project and/or a change to its configuration in Control Expert Editor has not been applied to the system project.

The asterisk appears only when Control Expert Editor is open and a modification is made after opening it. Also, it appears only for the user who has made the modification.

The change that you make in the Topology Manager needs to have an impact on the control project. Changing the **Under Construction** attribute, for example, does not display the change indicator.

When the asterisk is displayed and Control Expert Editor is open, the **Synchronize Changes** command is available.

NOTE: The asterisk appears also when you make a change in Control Expert Editor to data that is not managed in the Topology Manager, page 14 (for example, changes in the **Programs** directory).

Working Principle

The table outlines the process that is performed when you select the **Synchronize Changes** command and changes have been made in both the system project and the control project.

Step	Description
1	The PAC is analyzed, page 254. If incorrect configurations are detected, no changes are applied to either project.
2	Changes to the configuration of the control project are applied to the properties of the PAC in the system project.
3	Changes to the properties of the PAC are applied to the control project.
4	The control project is saved.
5	When the process is completed, the Synchronize Changes command is disabled. Control Expert Editor remains open.

Synchronizing Changes in Virtual Connected Mode

You cannot use the **Synchronize Changes** command while virtual connected mode is enabled for the control project.

Synchronizing Changes After Deploying

Once you have deployed the executable, page 307 to a PAC, using the **Synchronize Changes** command requires that you stop the controller to deploy any modification. Some exceptions apply, page 316.

Canceling the Synchronize Changes Command

If after selecting the **Synchronize Changes** command, you close Control Expert Editor and select to discard changes before the save operation can complete, the synchronization of changes is canceled both ways.

Undoing the Synchronization of Changes

Using the **Undo** command, page 41 in the Topology Manager immediately after synchronizing changes discards the changes that you have made in the control project and those that have been applied by the synchronization. Open the **HISTORY** pane to verify which action is undone.

Modifying the M580 PAC Hardware Configuration

Overview

By using the Control Expert Editor, page 231, you can modify the configuration of local racks and drops of M580 PACs that you have added to your system project.

Changes to the hardware configuration of the PAC are reflected in the various views and panes when you save the changes. When a rack is displayed in a physical view, changes that you make are visible only for the objects that normally appear in this view, page 185 (for example, modules with Ethernet connectivity in the main local and main remote racks).

NOTE: When you add a module to the configuration that is not supported in the Topology Manager, it is represented as a plain module in the **Rack Viewer**, has minimal properties, and may not appear in some views (for example, physical views).

IP Address Management

Default IP addresses of modules that you add may be replaced in the Topology Manager when you save changes. This is because the consistency of communication parameters of the system project is managed by the Topology Manager.

Also, adding a module that manages an IP address may create an additional logical network, page 178 in the system project when you save changes. This is the case, for example, when the IP address of the embedded interface of the module must belong to a different logical network than the IP address of the CPU.

Impact of CPU Module Replacement on the System Project

When you save changes after replacing an M580 CPU module, the software updates the necessary data automatically.

The table describes some specific impacts of a CPU module replacement on system project objects and data depending on the replacement scenario.

System project object or data	From stand-alone to stand-alone	From redundant to redundant	From standalone to redundant	From redundant to standalone
PAC name	No change.		PACs that have their default name are renamed <i>Redundant_Controller_x</i> where <i>x</i> is an integer suffix.	PACs that have their default name are renamed <i>Standalone_Controller_x</i> .
Local racks			The name is replaced by <i>M580_A_x</i> . An identical local rack B is added with name <i>M580_B_x</i> .	Local rack B is deleted. The name of the former local rack A is kept.
IP addresses of modules			IP addresses may be reassigned depending on the availability of specific addresses in the same logical network (for example, MainIP+1).	No change.
Scanner services	The Communication Mapping Views are updated depending on the scanner services of the CPU reference that you have selected.		Scanner services of modules in local rack A are used.	Scanner services of modules in former local rack A are used.

System project object or data	From stand-alone to stand-alone	From redundant to redundant	From standalone to redundant	From redundant to standalone
DHCP servers	No change.		Modules in local rack A become the DHCP server. The name of the DHCP server is updated in clients.	Modules in former local rack A become the DHCP server. The name of the DHCP server is updated in clients.
Modules in local racks			Modules present in local rack A are automatically added to local rack B.	Modules present in former local rack A are kept.
Physical links			Only the high-speed cable link with local rack B is created.	Physical links to and from local rack B are removed.

Deleting Modules

To delete a module from the configuration right after closing Control Expert Editor or using the **Synchronize Changes** command, page 233, you may need to fix incorrect configurations, page 256 in the Topology Manager first.

This is required to be able to open Control Expert Editor again to delete the module or close Control Expert Editor to apply the deletion in case it is still open.

Copying and Pasting HART Modules

When you copy and paste a HART module in a rack, the following applies:

- The DTM of the module is not copied.
- If you have added HART field devices to the module by using the **Fieldbus Editor**, they are not copied.

Editing Racks of Redundant PACs

When you modify the configuration of either local rack of a redundant PAC (for example, adding or deleting a module), the modification is automatically applied to the other local rack when you save changes.

Building Control Projects of M580 PACs

Overview

You can build one or more, page 230 control projects by using the context menu command of the M580 PAC or the **DEPLOYMENT VIEW**. This operation builds the full control project and the executable is created as a result.

You must build the control project before you can deploy the executable.

The software analyzes, page 256 the control project before proceeding with the build. Alerts are ignored.

Information, page 125 pertaining to the executable is available in the **PROPERTIES** pane when you select the PAC.

You can also build the control project by using Control Expert Editor.

Prerequisites

The following are prerequisites to building the control project:

- The analysis does not detect incorrect configurations, page 256 for the M580 PAC and its dependencies.
- The system project and the control project are synchronized, page 237.
- For control projects using M580 CPU modules version 4.00 and later, you have changed the default firmware and data storage/web diagnostics passwords (see *Project Browser* in EcoStruxure™ Control Expert, Operating Modes) by using Control Expert Editor.

Ways to Build the Control Project

The table indicates which changes are integrated in the executable depending on the command that you use to build the control project and whether the control project is open or not.

Command that is used to build the control project	Changes performed in the Topology Manager	Changes performed in Control Expert Editor	Build state and build date attributes, page 125 of the executable
Context menu command of the M580 PAC or Build button of the DEPLOYMENT VIEW	Integrated.	Integrated if Control Expert Editor is closed and changes were saved. If Control Expert Editor is still open and changes have not been synchronized, you must synchronize them and save the control project when prompted. This is required to perform the build and integrate changes.	Updated.
In Control Expert Editor after editing the control project	Integrated if you have used the Synchronize Changes command before building.	Integrated.	Updated after closing Control Expert Editor or using the Synchronize Changes command.

Building the Control Project by Using the Context Menu Command

To build the control project of an M580 PAC, proceed as follows.

Step	Action
1	Select the M580 PAC.
2	In the PROPERTIES pane, select a value, page 125 for Build Target .
3	<p>Right-click the PAC and select Build.</p> <p>Result: The control project is analyzed. If no incorrect configuration is detected, the build is performed. Once the operation is completed:</p> <ul style="list-style-type: none"> • The build state and date attributes, page 125 are updated if the operation completed successfully. • Information about the build operation is available in both tabs of the notification pane.

Building Control Projects by Using the DEPLOYMENT VIEW

Step	Action
1	In the DEPLOYMENT VIEW , select the M580 PACs whose control project you want to build.
2	<p>For each selected PAC, in the PROPERTIES pane, select a value, page 125 for Build Target.</p> <p>NOTE: If you select the simulator as target, it is started when the build is performed.</p>
3	<p>Click the Build button in the toolbar of the view.</p> <p>Result: A confirmation dialog box opens.</p>
4	<p>Click OK.</p> <p>Result: The control project of the first PAC is analyzed. If no incorrect configuration is detected, the build is performed. Otherwise, the incorrect configurations are displayed and the build operation is canceled.</p> <p>If this control project is still open and changes have not been synchronized, a dialog box opens and you must agree to synchronize them and save the control project; otherwise, the build operation of this control project is canceled.</p> <p>Once the operation is completed for this control project, the following is performed:</p> <ul style="list-style-type: none"> • The build state and date attributes, page 125 are updated if the operation completed successfully. • Information about the build operation is available in both tabs of the notification pane. • The build of the control project of the next PAC in queue is initiated independently of the result of the current operation. <p>NOTE: While the build operation is in progress, you can modify the selection of PACs. Selecting the check box of a PAC adds it to the build queue. Clearing its check box removes it from the queue.</p>

Control Expert Classic Parameter Correspondence

Overview

When you edit an M580 control project, certain configuration parameters are unavailable. You need to configure, page 13 the corresponding attribute in the Topology Manager instead.

This topic lists the main parameters of Control Expert Classic that are unavailable and the name of the corresponding attribute in the Topology Manager.

List of Parameters

Module/Service	Parameter name and/or location in Control Expert Classic	Attribute name and/or location in the PROPERTIES of the Topology Manager
CPU	ServicePort\Service Port and Service Port Mode	Configuration\Physical Ports\ETH1 = Enabled and Service Port Mode
	CRA IP address configuration	Configuration\Interfaces\Embedded Interface when you select the CRA adapter module
BMECRA31310	CRA adapter module configuration \Parameters\IP Address Redundant CRA	Configuration\Interfaces\Embedded Interface\MainIP when you select the redundant CRA adapter module
BMENOC03-1	DTM\Channel Properties\Switch	Configuration\Physical Ports
	DTM\Services\Service Port	Configuration\Physical Ports\ETH1
	DTM\Services\Network Time Service	Services\NTP State
BMENOC0321	DTM\Services\IP Forwarding	Configuration\Physical Ports\BKP= Enabled and Interface = Enabled
	DTM\Services\IP Forwarding\Control Network	Configuration\Interfaces\Embedded Interface\MainIP
	DTM\Services\IP Forwarding\Fieldbus Network	Configuration\Interfaces\BKP_Interface\IP Address
	DTM\Services\IP Forwarding\Extended Network	Configuration\Physical Ports\BKP= Enabled and \ETH1\Interface= Enabled and Interfaces\ETH1_Interface\IP Address
BMENUA0100	IPConfig\Control Port\IPv4	Configuration\Interfaces\Embedded Interface\IPv4 A
	IPConfig\Backplane Port\IPv4	Configuration\Interfaces\BKP_Interface\IPA
BMENUA0100	IPConfig\Fast Sampling Rate	Services\OPC UA\Sampling Rate
	IPConfig\OPCUA TCP Listening Port	Services\OPC UA\OPCUA TCP Listening Port
Module or DTM \Security	Enforce Security	Security\Security Level = Enforced
	Unlock Security	Security\Security Level = No
	Access Control = Enabled	Security\Services\Access Control = Enabled and click Edit
	Pre-Shared Key	Security\Secure Protocol = IPsec
DHCP	Services\Address Server	Services\DHCP Client\DHCP Server Name and DHCP VIEW
	Device Name (including Tens and Ones parameters)	Services\DHCP Client\Identifier
	Project Settings\General\Configuration \Device name prefix for DHCP Address Server	Services\DHCP Server\DHCP Prefix
DTMs	Advanced Configuration (to open the DTM. May vary by device.)	Device context menu and select Open . For devices managing fieldbusses, edit the fieldbus first.
	DTM context menu\Device menu\Additional functions	Device context menu, select Open , and Additional Functions button. For devices managing fieldbusses, edit the fieldbus first.

Module/Service	Parameter name and/or location in Control Expert Classic	Attribute name and/or location in the PROPERTIES of the Topology Manager
I/O scanning	DTM\Device List\Device X\Properties\Number	Add device I/O profile to scanner in Communication Mapping view and select active I/O profile and Device Number
	DTM\Device List\Device X\Properties\Active Configuration	Add device I/O profile to scanner in Communication Mapping view
	DTM\Device List\Device X\Properties\IO Structure Name\Structure Name	I/O Profile\Profile Name X\Type Name
	DTM\Device List\Device X\Properties\IO Structure Name\Variable Name	I/O Profile\Profile Name X\Instance Name
Item mapping	DTM\Device List\Device X\Properties\Items Management\Import Mode = Automatic/Manual	I/O Profile\Profile Name X\Mapping = Automatic/Manual
	DTM\Device List\Device X\Properties\Items Management\Reimport Items	I/O Profile\Profile Name X and change Mapping from Manual to Automatic
Scanner\local slaves	DTM\EtherNet/IP Local Slaves\Local Slave X \Active Configuration (adapter project)	I/O Profile>Select DTM Reference and add local slave. When the local slave is deleted, Active Configuration is set to false in the control project.
	DTM\EtherNet/IP Local Slaves\Local Slave X \Items (scanner and adapter projects)	I/O Profile>Select DTM Reference and add local slave and Local Slave X\Mapping = Manual and click Edit (for adapter only, page 294)
Syslog server	Project Settings\General\PLC diagnostics \PLC Event Logging	Services\Syslog Server\Enabled

Importing Control Projects

Importing Control Expert Classic M580 Control Projects

Overview

The **Import** command lets you add an M580 control project created with Control Expert Classic to a system project. Data that is managed by the Topology Manager becomes available in its various views and panes. The other project data remains available in the control project, which you can edit by using Control Expert Editor.

During the import operation, the system project is locked.

Details about an import operation are available in the **OPERATION DETAILS** pane of the notification pane.

NOTE: To import a control project containing a non-M580 controller, refer to the topic describing the import of legacy controllers and non-M580 PACs, page 253.

Prerequisites

The following table describes the requirements that need to be satisfied by the Control Expert Classic M580 control project to be able to import it.

Scope	Requirement
Supported file type	Full application exchange file (.zef) created by using Control Expert 15.1 Classic. NOTE: You cannot import the file if the data that it contains originates from the Topology Manager. This is the case if an M580 control project is deployed from the Topology Manager or Control Expert Editor then, uploaded from the controller to Control Expert Classic, and from there, exported in .zef format.
Supported CPUs	M580 CPUs of version 2.70 or later.
DTMs	If a DTM of the following modules has been added in the DTM Browser of the control project, the corresponding module must be present in the configuration: <ul style="list-style-type: none"> • BMEAHI0812 • BMEAHO0412 • PMPX0100 • PMESWT0100 • PMPGPS0100 • PMPUCM0302 If it is not the case, either add the module or remove the DTM.
Device name	For each device, the DHCP device name (Identifier) that is entered must comply with the specific requirements for this device. For example, for a BMEAHI0812 module, the device name must be <i>Mx80_02_AHI0812</i> for a module located at slot 2 of the main rack. Refer to the user manual of the device for a description of the device name requirements.
IPsec	When IPsec is enabled, the Pre-Shared Key that is entered must contain at least 16 characters and comply with the format requirements , page 139.
Control project settings	The I/O Scanning Mode is set to Enhanced . NOTE: The control project must have been built successfully by using Control Expert 15.1 Classic with the I/O Scanning Mode set to Enhanced before creating the export file (.zef). This is required because the I/O scanning mode cannot be changed after import and the Topology Manager only supports Enhanced mode.
File encryption	The file must be exported with the With Encryption property cleared if file encryption is active (see EcoStruxure™ Control Expert (Classic), Operating Modes).

DTM Audit Tool

When you import a control project that contains DTMs, if any DTM that is required on the local computer is missing or incompatible, the **DTM Audit Tool**, page 270 opens and provides the necessary information.

Closing the tool cancels the import operation and you need to install the required DTMs, page 222 on the local computer, and start over the import operation.

Importing Deployed Control Projects

If you import a control project that has already been transferred to a PAC, the control project that is created in the system project is different from the deployed one.

You need to build and deploy it again to the PAC by using the Topology Manager.

Importing Control Projects with Local Slaves

When you import two control projects containing a local slave that is activated (adapter) and a scanner scanning the local slave respectively, some manual configuration is required after the import to recreate the connection between the scanner and the adapter.

It is also required if you are importing only either one of these control projects.

Refer to the [example](#), page 247 that illustrates an import scenario.

The table describes various scenarios where a control project with a local slave configuration is imported into a system project, the result, and the required actions to recreate the connection.

In the imported control project	In the target system project	Result after import	Action to perform
A local slave is configured and active (adapter)	Irrelevant	The local slave configuration is not imported.	You need to recreate the local slave, page 156 manually for the corresponding module by using the PROPERTIES pane.
A CPU or BMENOC03•1 module is configured to scan a local slave	No PAC exists	The local slave (adapter) is recreated as a device by using the EtherNet/IP DTM Device equipment of the catalog. The device is configured, page 156 with the data of the local slave of the imported control project. It is located in the Local Slaves subfolder of the imported PAC.	You need to create a PAC that contains a module with the same part number and version as the local slave or import the control project that contains the corresponding local slave (adapter). Then, move the local slave configuration of the EtherNet/IP device to the appropriate module listed in the Move Local Slave To submenu, page 194.

In the imported control project	In the target system project	Result after import	Action to perform
A CPU or BMENOC03•1 module is configured to scan a local slave	A PAC that contains a module with the same part number exists. However, the DTM reference that is selected for this module does not match the DTM of the local slave in the imported control project.	The Move Local Slave To command, page 194 is not available in the context menu of the EtherNet/IP device (see above).	You need to update the PAC so that it contains a module with the same part number and version as the local slave or import the control project that contains the corresponding local slave (adapter). You can also create a new PAC. Then, move the local slave configuration of the EtherNet/IP device to the appropriate module listed in the Move Local Slave To submenu, page 194.
	A PAC that contains a module with the same part number exists. And, no DTM reference is selected for this module or a DTM reference is selected and it matches the DTM of the local slave in the imported control project. (A local slave is not required in the existing PAC.)	The Move Local Slave To command, page 194 is available in the context menu of the EtherNet/IP device (see above). Also, the EtherNet/IP device is added to the scanner of the imported PAC in the EtherNet/IP Communication Mapping View.	You can move the local slave configuration of the EtherNet/IP device to the appropriate module listed in the Move Local Slave To submenu.

NOTE: Moving the local slave configuration to a module that appears in the **Move Local Slave To** submenu is optional and not required to enable the data exchange. However, it is recommended to perform this step to be consistent with other local slaves that you may have created by using the Topology Manager.

Control Project Data Migration

The table describes the result of the import operation in the system project for various types of data of the imported control project.

Type of data	In the Control Expert Classic project	Result in system project
Topology folder structure	N/a	Creates a folder in the SYSTEM PROJECT pane with the name of the imported project file. The name may be indexed to maintain uniqueness. If the project file name is not compatible, the folder name is <i>Folder_x</i> .
Project name	Project name in imported project file.	The name of the project becomes the name of the M580 PAC. The name may be indexed to maintain uniqueness.
Racks and drops	–	Are recreated in the SYSTEM PROJECT pane. For a redundant PAC, the rack of the controller with role B is created also.
Network data and IP addresses	–	A new logical network, page 178 is created with the appropriate network address for the CPU module and each isolated module. The same IP addresses are kept. The logical network is created even if a logical network with the same network address already exists in the system project.
Master modules (M580 CPU and BMENOC03•1 modules) and other modules with Ethernet communication capability	Port and security configurations. Services.	The configurations, page 124 and services, page 141 are kept.

Type of data	In the Control Expert Classic project	Result in system project
Devices scanned by the CPU or a BMENOC03•1 module	Devices on the Device List .	Devices for which corresponding equipment, page 21 exists in the Topology Manager catalog are added to the system project by using this equipment. Others are added by using either of the following generic equipment depending on the protocol they use: <ul style="list-style-type: none"> EtherNet/IP: EtherNet/IP DTM Device and the corresponding DTM. Modbus TCP: Modbus TCP DTM Device and the corresponding DTM or Modbus TCP Device when no DTM is required. NOTE: In the control project of the PAC, DTMs of scanned devices are replaced with placeholder DTMs. This is because the DTMs are managed in the Topology Manager and can be opened from the context menu, page 194 of these devices.
	Port, interface, and network configurations. Services.	The configurations, page 124 and services, page 141 are kept. If the scanned device belongs to a different logical network than the scanner, its interface configuration is modified to be on the same network.
	Device DDT	The same values are used to configure the Instance Name and Type Name of the I/O profile.
	I/O scanning data	For each device, the corresponding I/O profile, page 156 is created. In the <i>Communication Mapping Views</i> , page 84, the active I/O profile of each scanned device is added to the respective scanner. NOTE: This applies even if Active Configuration is disabled for the device in the Control Expert Classic project. To disable I/O scanning, remove the I/O profile of the device from the scanner in the Communication Mapping view after import.
	Local slaves	Some manual configuration may be required after import is completed to recreate the connection. Refer to the topic describing the import of control projects with local slaves, page 243.
DTM configuration	–	The values configured in the DTMs are kept. The DTM can be opened from the context menu of the device it pertains to.
Configuration files	Files imported into or exported from the Control Expert Classic project.	You can attach, page 125 to the PAC or a device configuration files that you have used (for example, for PMPXM0100 modules).
DHCP server name and identifiers	–	DHCP client/server relationships, page 90 are maintained and DHCP identifiers are kept.
Fieldbus devices	–	Slave devices appear under the master module in the SYSTEM PROJECT pane and the Fieldbus Editor is available.
Data types, variables, the program, animation tables, operator screens, and documentation.	–	The data is the same as in the migrated project and accessible when you edit the control project of the PAC.
Build state	–	The build state, page 125 is Not Built .

Importing M580 Control Projects

To import a control project containing an M580 PAC into a system project, proceed as follows.

Step	Action
1	Right-click the Topology node or a topology folder in the SYSTEM PROJECT pane and select Import . Result: The Topology: Import dialog box opens.
2	Select *.zef as file type.
3	Select a project file.
4	Click Open . Result: If the control project contains DTMs and a missing DTM or incompatibility is detected, the DTM Audit Tool opens. Otherwise, the control project import starts. Proceed to step 7.

Step	Action
5	<p>Review the information in the DTM Audit Tool and click Cancel.</p> <p>Result: The DTM Audit Tool closes and the import is canceled.</p>
6	<p>Install the necessary DTMs on the local computer and start over the procedure.</p>
7	<p>Import is completed once a notification is displayed informing you that the project has been upgraded successfully.</p> <p>Result: Data of the imported control project that is managed in the Topology Manager is represented by the corresponding PAC and its dependencies in the SYSTEM PROJECT pane. Their configuration data visible in the other panes and views. The other data is available in Control Expert Editor when you edit the control project from the PAC.</p>
8	<p>Review the information that is displayed in the ACTIVITIES and OPERATION DETAILS tabs of the notification pane related to this Import activity.</p> <p>If the imported control project contains a local slave, a message is displayed and you need to recreate the connection, page 243 with the local slave manually.</p>

Importing Control Expert Classic Control Projects With Local Slaves - Example

Overview

This example illustrates the import into an existing system project of two Control Expert Classic M580 control projects, PAC1 and PAC2.

The PACs of both control projects can exchange data by using a local slave configuration:

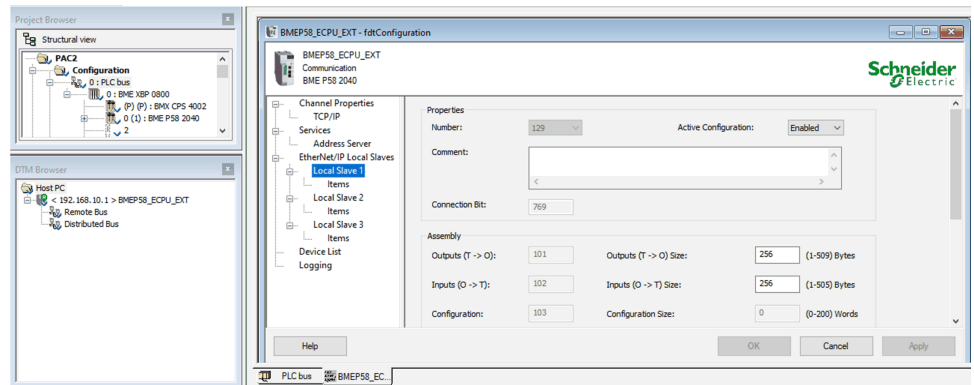
- PAC2: Adapter. The BMEP582040 M580 CPU module is configured as Local Slave 1.
- PAC1: Scanner. Contains a BMENOC0311 communication module in the local rack, which is configured to scan Local Slave 1 of PAC2.

The target system project does not contain any devices or PACs. The example also describes an alternate scenario in which the system project already contains a PAC that is configured with the same CPU module as Local Slave 1.

NOTE: For this example, the PACs do not contain other modules than those required for the local slave connection.

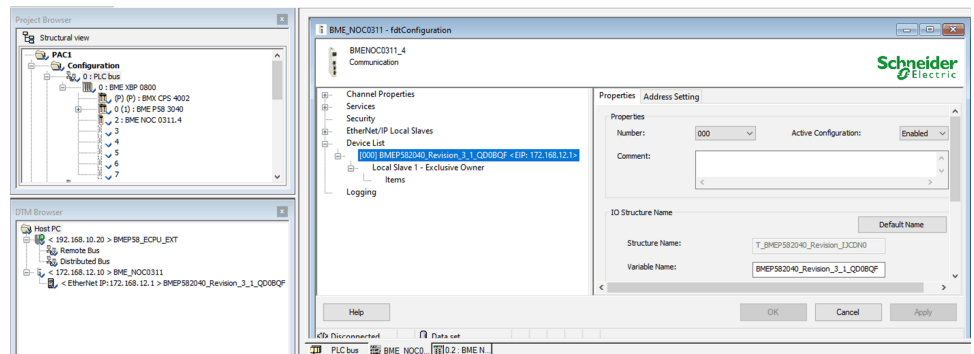
M580 Control Project Containing the Local Slave

The figure shows the CPU module of the adapter configured as Local Slave 1 with a configuration that is active in the Control Expert Classic control project PAC2 (.zef).



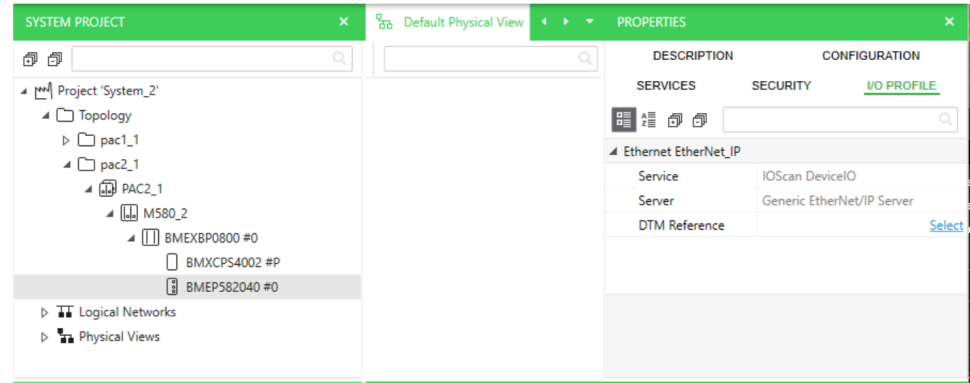
M580 Control Project Containing the Communication Module Scanning the Local Slave

The figure shows the BMENOC0311 module configured to scan Local Slave 1 with a configuration that is active in the Control Expert Classic control project PAC1 (.zef).



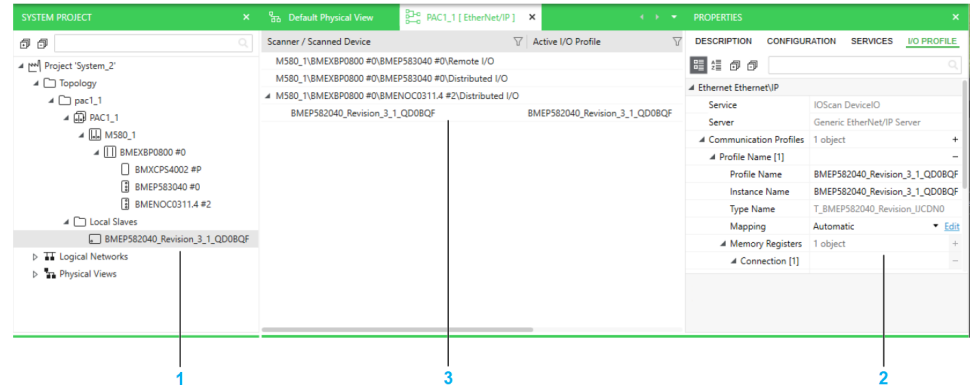
Importing the Control Project Containing the Local Slave

The figure shows the PAC of control project PAC2 (adapter) in the system project after import of the file (.zef) is completed. The CPU module is selected and Local Slave 1 has not been imported as shown in the **I/O PROFILE** tab.



Importing the Control Project Containing the Scanner

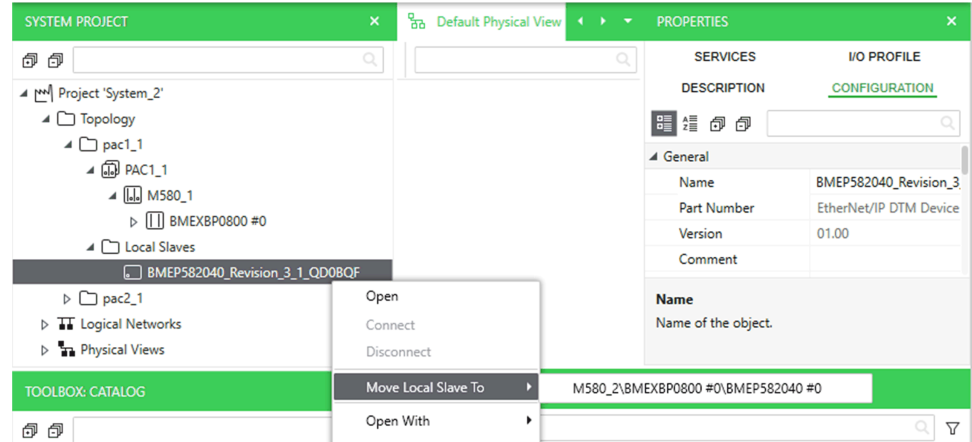
The figure shows the PAC of control project PAC1 (scanner) in the system project after import of the file (.zef) is completed.



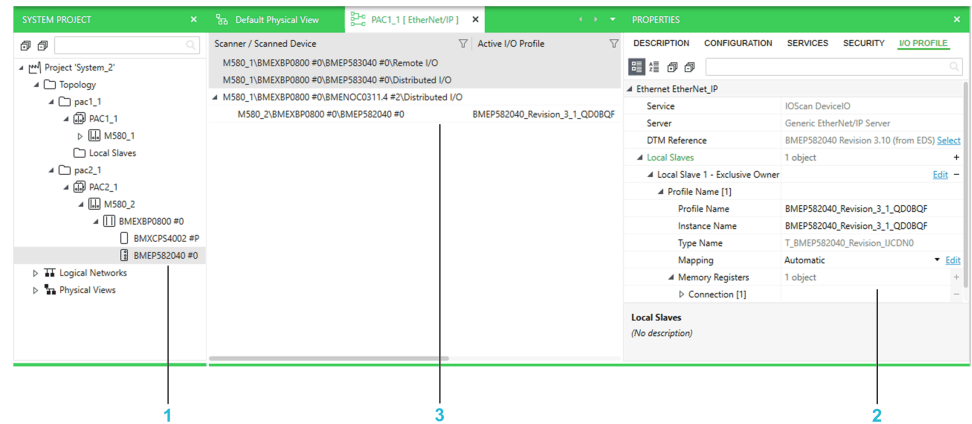
Item	Description
1	The Local Slaves folder contains an EtherNet/IP device that is created during the import and configured with the data of Local Slave 1.
2	The Local Slave 1 connection data is visible in the I/O PROFILE tab of the EtherNet/IP device.
3	The active I/O profile of the EtherNet/IP device appears under the BMENOC0311 scanner in the EtherNet/IP Communication Mapping View of PAC1.

Moving and Viewing the Imported Local Slave Configuration

The figure shows the submenu of the **Move Local Slave To** command where the BMEP582040 CPU module of PAC2 appears because its part number matches the device name of the EtherNet/IP device DTM. You can therefore transfer to it the Local Slave 1 configuration, which is currently associated to the EtherNet/IP device.

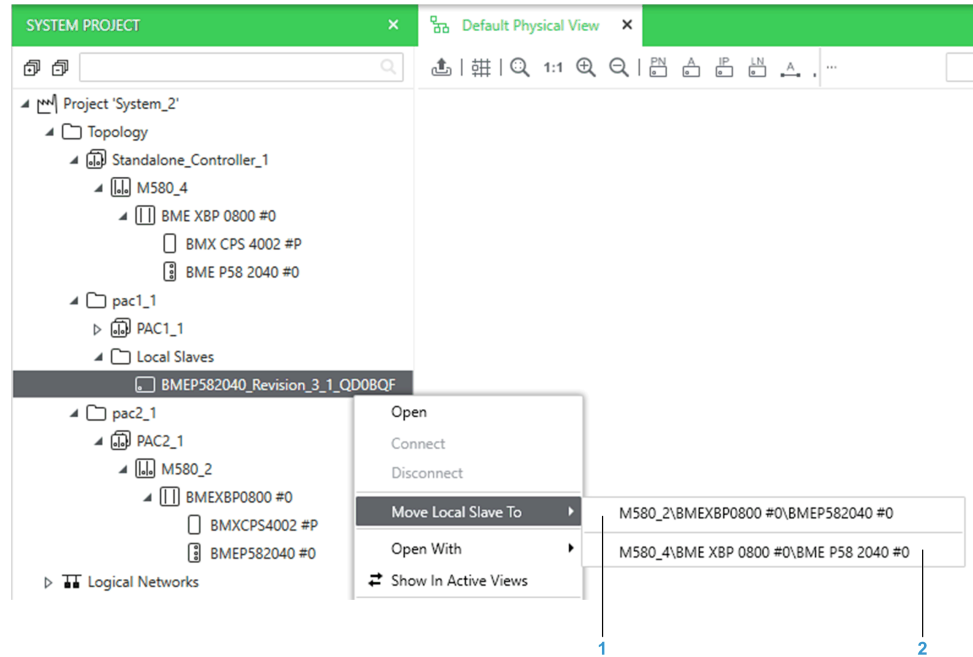


The figure shows the result of the move of the configuration of the EtherNet/IP device (representing Local Slave 1) to the CPU module of PAC2, which is configured as the adapter in the imported file (.zef). The device is automatically deleted from the system project after the transfer. The step of moving the local slave is optional.



Item	Description
1	CPU module of PAC2, which has been selected in the Move Local Slave To submenu.
2	The Local Slave 1 has been transferred to the CPU module and its connection data is visible in the I/O PROFILE tab.
3	The active I/O profile that appears under the BMENOC0311 scanner in the EtherNet/IP Communication Mapping View of PAC1 refers now to the CPU module of PAC2, similarly to when you configure data exchange with a local slave, page 294 directly in Topology Manager.

The following figure shows an alternate scenario where the target system project already contains a PAC with a CPU module that has the same reference (part number) but a different IP address than the CPU module of the imported PAC2 (adapter). You can move the Local Slave 1 configuration to this CPU module instead.



Item	Description
1	CPU module of PAC2, which has been imported. It appears separately in first position because its main IP address matches the one that is configured for the EtherNet/IP device representing Local Slave 1.
2	BMEP582040 CPU module of Standalone_Controller_1 that existed at the time of import. It appears in the submenu because its part number matches the device name of the EtherNet/IP device DTM. The PAC can be created from the catalog or imported before or after PAC2. Selecting this module enables data exchange with the BMENOC0311 communication module of PAC1.

Managing Modicon Legacy Controllers and Other PACs

Managing Modicon Legacy Controllers and non-M580 PACs

Overview

The following are considered legacy controller platforms:

- Modicon Premium
- Modicon Quantum

The information in this topic also applies to the following non-M580 PACs:

- Modicon M340
- Modicon Momentum
- Modicon MC80

You can add these devices to a system project but the services that the Topology Manager offers to manage them are limited.

Scope of Services

The table describes the scope of the services that are available for legacy and non-M580 controllers in a system project.

Service/pane/view	Description
SYSTEM PROJECT pane	Only one node is created. Drops, backplanes, and modules are not represented.
Control project	A control project is associated to these devices. You must edit it by using the Edit Control Project command to perform the entire configuration with the help of Control Expert Editor, which opens with full functionality except for some commands of the File menu that are not available.
Physical views	Controllers are represented as a single object without Ethernet connectivity.
System Monitoring	Not supported.
Network consistency analysis	
Other views of the Topology Manager	
Import	Supported, page 253.

Importing Modicon Legacy Controllers and non-M580 PACs

Overview

The **Import** command lets you import into a system project control projects containing a legacy controller or non-M580 PAC, page 252.

The corresponding device is created in the **Topology** node of the **SYSTEM PROJECT** pane and the control project is associated to the device.

NOTE: To import a control project containing an M580 controller, refer to the topic describing the import of Control Expert Classic projects, page 242.

Prerequisites

To complete the import of a control project that contains a DTM, a compatible version must be installed on the local computer.

Missing DTMs and incompatibilities are reported by the **DTM Audit Tool**, page 270.

Supported File Formats

You can only use full application exchange files (.zef) to import a control project.

Importing a Control Project

To import a control project containing a legacy controller or non-M580 PAC into a system project, proceed as follows.

Step	Action
1	Right-click the Topology node or a topology folder in the SYSTEM PROJECT pane and select Import . Result: The Topology: Import dialog box opens.
2	Select a file (.zef).
3	Click Open . Result: If the control project contains no DTM, it is imported and the corresponding device is created; otherwise, the DTM Audit Tool opens.
4	In the DTM Audit Tool , click Continue . Result: The the DTM Audit Tool closes and the control project is imported. NOTE: If an incompatibility is detected, you cannot continue but need to click Cancel in the DTM Audit Tool and install the required DTM, page 222 first.

Managing the Consistency of System Projects

What's in This Chapter

Analyzing the System Project	255
Analysis Rules	259
Analyzing DTM Usage	270

Overview

This chapter describes how you can check the consistency of a system project and the rules that are used. It helps troubleshoot and fix configuration issues of communication attributes of devices and their modules.

Use these features any time during the initial engineering phase and when you make changes thereafter.

Analyzing the System Project

Analyzing the System Project

Overview

You can perform an analysis, page 30 of the complete system project by using the analyze button in the toolbar of the Topology Manager or analyze PACs by using the **Analyze** context menu command.

The software may also perform an analysis automatically when you use certain commands, for example, to edit or build the control project.

The analysis checks the consistency of communication and/or hardware configuration data that is managed at the Topology Manager level (such as IP addresses, ports, communication-related attributes, logical networks, and/or hardware compatibility) against a set of predefined rules, page 259. The scope of the analysis depends on the object that is analyzed.

The global result of the analysis is shown in the **ACTIVITIES** tab of the notification pane and if incorrect configurations are detected, details are available in the **OPERATION DETAILS** tab.

While an analysis is in progress, you or other users connected to the same system project can modify the attributes of devices or logical networks but changes may not be taken into account in the analysis.

NOTE: Depending on the number of devices, their type, and the number of logical networks that the system project contains, the analysis may take several minutes to complete.

Scope of the Analysis

The table outlines the scope of the analysis depending on the objects on which the analysis is performed.

Analyzed object	Scope of the analysis
The system project that is open	<p>The communication configuration of the complete system project (networking) and the devices it contains.</p> <p>Includes hardware configuration aspects.</p> <p>Applies only to data managed at the Topology Manager level.</p>
One or more PAC	<p>Analyzes the configuration of the PAC and its dependencies such as scanned devices, page 84.</p> <p>Includes hardware and communication aspects.</p> <p>Applies only to data managed at the Topology Manager level.</p>

Analysis Principle

Rules, page 259 are grouped in categories and each rule is assigned a priority. The software performs the analysis in an iterative way. In each iteration, it checks the configuration of the selected objects against one rule of each category.

The analysis ends when the objects have been checked against each rule of each category.

Rules that are not satisfied trigger a notification in the notification pane. The ID of each rule is indicated.




NOTE: The setting of the **Under Construction** attribute, page 125 of a device can limit the extent of the analysis or exclude the device completely.

Result of the Analysis

When an analysis is performed, it creates an entry in the **ACTIVITIES** tab showing *Analyze* in the **Activity** column.



When the software initiates the analysis, it shows incorrect configurations also in a notification.

Once the analysis is complete, either icon appears for this entry.

Icon	Description
	The software did not detect incorrect configurations and there are no alerts. Details are available.
	There is at least one alert for communication and/or hardware configurations. You can see details in the OPERATION DETAILS tab, page 168.
	The software has detected at least one incorrect configuration. You can see details in the OPERATION DETAILS tab.

Because of the iterative analysis method that is used, you may see several notifications for the same object.

The table describes the types of notifications that appear for each entry in the **OPERATION DETAILS** tab, page 168 and their impact. Double-click an entry to highlight the object in the open views and panes.

Detection	Icon	Description
Incorrect configuration		You must correct the configuration before you can perform actions on the control project. Example: The IP addresses of a CPU module are not configured. This prevents you from editing or building the control project.
Alert		You can perform actions on the control project but the current configuration may have an impact on the execution. Example: A device has a port that is disabled but connected by a physical link. Communication with this port is not possible.

Correcting Incorrect Configurations

Similarly to the way the software performs the analysis, it is recommended to fix incorrect configurations in an iterative way.

Start by fixing incorrect configurations one by one for each logical network (if applicable). Fixing these may solve other less severe incorrect configurations for this logical network and/or incorrect configurations of devices.

Once you have fixed an incorrect configuration, perform a new analysis and repeat the process.

When no more incorrect configurations for logical networks are reported, start fixing those of devices. Perform an analysis each time you modify a configuration.

NOTE: Typically, when you use a command, which triggers an analysis, the command will execute only once you have fixed incorrect configurations that have been detected. Alerts are ignored.

Performing an Analysis

To perform an analysis of the system project or PACs and view detailed results, proceed as follows.

Step	Action
1	Open the system project.
2	Optionally, you can lock the system project, page 55 so that no changes can be made while the analysis is in progress.
3	To analyze:

Step	Action
	<ul style="list-style-type: none">The system project: Click the analysis button, page 30 in the toolbar.One or more PACs: Select the Analyze command in the context menu of each PAC. <p>Result: The analysis starts and an entry appears in the ACTIVITIES tab.</p>
4	If the analysis detects an issue, double-click the entry. Result: Details are shown in the OPERATION DETAILS tab.
5	Refer to the description of rules that are not satisfied by using their ID, page 259.

Canceling an Analysis

To cancel an analysis that is in progress, right-click the entry in the **ACTIVITIES** tab that corresponds to the analysis and select **Cancel**.

No global nor detailed results are available when you cancel an analysis.

Analysis Rules

Overview

This section describes the rules against which the software checks the configuration of IP addresses, ports, communication-related attributes, and logical networks of the system project when you analyze it, [page 256](#).

Analysis Rules - 1000 ID Series - Logical Networks

Rule Description

ID	Detection	Rule
1001	Incorrect configuration	The subnet address, page 179 must be valid.
1002		The gateway address must belong to the logical network and be different from the subnet address and the broadcast address. NOTE: The value 0.0.0.0 is accepted.
1003		The subnet address: <ul style="list-style-type: none"> • Must be valid in relation to the subnet mask. • Must start at 1.0.0.0. • Cannot be a class D address. • Cannot start with 227 (loop back address) or 169.254. (APIPA). The subnet mask: <ul style="list-style-type: none"> • Cannot be a class D subnet. • Must comply with required format when addressing classful devices.
1004	Alert	Each logical network must have unique attribute values, page 179.

Analysis Rules - 2000 ID Series - IP Addresses

Rule Description

The rules that appear in the following table apply to Internet Protocol version 4 (IPv4) addresses unless mentioned otherwise.

ID	Detection	Rule
2001	Incorrect configuration	An IP address must be configured except if the value of the Under Construction attribute is true (check box selected). For NOC communication modules, IP address A is optional.
2002	Alert	IP addresses must be associated to a valid logical network except if the value of the Under Construction attribute is true (check box selected).
2003	Incorrect configuration	IP addresses must satisfy the following rules to be valid: <ul style="list-style-type: none"> • Must start at 1.0.0.0. • Cannot be a class D address (>223.255.255.255). • Cannot be a loopback address (starting with 127). • Cannot start with 169.254, which is reserved for Automatic Private IP Addressing (APIPA) in a class B network. • Cannot be equal to the subnet address, page 179. • Cannot be equal to the broadcast address. <p>NOTE: The value 0.0.0.0 is accepted for both SNMP managers, page 148. Refer also to rule 6028, page 265.</p>
2004	Incorrect configuration	An IP address must be valid for the configured logical network.
		An IP address cannot be equal to the subnet address, page 179 or broadcast address.
		When the NTP service of a module is configured as NTP Client , the primary and secondary NTP server IP addresses must satisfy the following rules: <ul style="list-style-type: none"> • They must belong to the logical network of one of the enabled interfaces of the module (for example, the embedded or the backplane interface). • They cannot be equal to the network address of this logical network. • They cannot be equal to the broadcast address. That is, an address that ends with the following value regardless of the value of the subnet mask: <ul style="list-style-type: none"> ◦ 255.255.255 in a class A network. ◦ 255.255 in a class B network. ◦ 255 in a class C network. <p>NOTE: The rules do not apply to BMENOC03•1 communication modules.</p> <p>NOTE: The value 0.0.0.0 is accepted.</p>
The IP address of either SNMP manager, page 148 is invalid if it ends with the following value regardless of the value of the subnet mask: <ul style="list-style-type: none"> • 255.255.255 in a class A network. • 255.255 in a class B network. • 255 in a class C network. 		
2005	Incorrect configuration	An IP address must be unique in the logical network.
2006	Alert	The same IP address must not be used in different logical networks of a system project.
2007	Incorrect configuration	For the following modules, when IPv6 addresses are enabled and/or selected, the IPv6 addresses of the embedded interface, page 129 and of the primary and secondary NTP servers, page 146 cannot be null. <ul style="list-style-type: none"> • BMENUA0100 • BMENUA0100.2
2008	Alert	An IPv6 address must be unique within the system project. The rule applies to the following modules: <ul style="list-style-type: none"> • BMENUA0100 • BMENUA0100.2
2009	Incorrect configuration	The IP address of each CRA adapter module in an M580 PAC must be unique .

Analysis Rules - 3000 ID Series - Logical Network Configuration

Rule Description

ID	Detection	Rule
3000	Incorrect configuration	IP addresses MainIP and IPA of a CPU module must belong to the same logical network.
3001		In a redundant PAC, IP addresses MainIP , MainIP + 1 , IPA , and IPB of the CPU modules must be unique and belong to the same logical network. The rule applies also to IP addresses IPA and IPB of communication modules of the PAC.
3002		If the following conditions are satisfied for the backplane port of a communication or gateway module that is located in the local rack or drop of a PAC: <ul style="list-style-type: none"> It is enabled. It is associated to the embedded interface, page 129. That is, if the module has routing capability, its Interface attribute, page 132 is disabled (no IP forwarding). Then, the IP addresses of the embedded interface of the module and the CPU module of this PAC must belong to the same logical network. NOTE: The rule does not apply to BMENOS0300 modules.
3003		When the Interface attribute of the backplane port of a communication module is enabled, the IP address of the backplane port (BKP_Interface) must belong to the same logical network as the IP addresses of the embedded interface of the CPU module.
3004	Alert or incorrect configuration	Typically, the IP addresses of two ports that are connected by a physical link, page 208 must belong to the same logical network. The type of detection depends on the type of objects that are connected: <ul style="list-style-type: none"> A managed switch and a device: Alert. The link may be valid depending on the configuration of the switch. Two devices: Incorrect configuration. The link is not valid. Modify the configuration of either device or delete the link. The detection is performed only for direct connections between two ports. That is, if a device that does not manage an IP address, such as an unmanaged switch, is connected in between, the logical network discrepancy is not detected.
3005	Incorrect configuration	The the IP addresses of the embedded interfaces of the CRA adapter module and the CPU module of a same PAC must belong to the same logical network.
3006		In a redundant PAC, the IPv4 addresses A and B, page 129 of the control port of a BMENUA0100 module must belong to the same logical network.
3007	Incorrect configuration	The interface of a scanned device must belong to the same logical network as the interface of the scanner. An exception exists for BMENOC0301.4 and BMENOC0311.4 modules. They are able to scan devices that communicate by using the Modbus TCP protocol although their interface belongs to a different logical network. ID:3008 is an information and may not be displayed depending on the configuration of the Scanning Device Outside Logical Network attribute, page 129.
3008	Alert	Verify and, if necessary, correct the configuration in the Communication Mapping View, page 84 and/or LOGICAL NETWORK VIEW .
3009	Incorrect configuration	The IP addresses of the Embedded Interface of a CPU module must be different.
3010	Incorrect configuration	If the control port of a BMENUA0100 module is enabled, either IPv4 or IPv6, page 130 must be enabled.
3011		When the primary or secondary NTP server IP address format, page 146 of a BMENUA0100 module is set to IPv6, the control port, page 132 and the IPv6 embedded interface of the module must be enabled.
3012	Incorrect configuration	When the ETH1 port, page 132 of a BMENOP0300 module is set to Extended Network , its BKP port must be disabled.
3013	Alert	Authorized addresses in the ACCESS CONTROL VIEW cannot be identical to the following IP addresses of M580 CPU modules and BMENOC03•1 communication modules: <ul style="list-style-type: none"> MainIP IPA IPB
3014	Incorrect configuration	For a BMENUA0100 module, the IPv4 A or IPv4 B address, page 130 of the embedded interface must not belong to the same subnet as the IP A or IP B address of its backplane interface respectively.

Analysis Rules - 4000 ID Series - Routing

Rule Description

ID	Detection	Rule
4000	Alert	When dynamic routing is used and the Interface attribute of a port is enabled, the IP address of the port (attributes of Interface) must be the gateway address of the logical network. (The rule does not apply to BMENOC0321 communication modules in redundant PACs).
4001	Incorrect configuration	For a device or module, the Logical Network attribute of each interface, page 129 that is associated to a port (for example, ETH1_Interface) must be unique and/or different from that of the Embedded Interface . Typically, this applies when interfaces are created by enabling the Interface attribute, page 132 of a port (for example, BKP) but other settings can also create port-specific interfaces.
4002		The host address of a router must not belong to a logical network that any other of its ports belong to (except for BMENOC0321 communication modules).
4006		When several BMENOC0321 communication modules are installed on the rack of a standalone PAC, only one of them can have the Interface attribute of its backplane port enabled.
4007		In a redundant PAC, a BMENOC03•1 communication module in local rack A must not have either of its dual ports linked to the BMENOC03•1 communication module in local rack B when their backplane port is enabled.
4009	Alert	For a given logical network, only one device can have a port that is configured with the gateway address of this network (IP address of the Interface attribute of the port).
4010	Incorrect configuration	Within a system project, the Port value, page 125 that is configured for the simulator must be unique.
4011	Incorrect configuration	For BMENOC03•1 communication modules, the backplane port cannot be enabled if the IPsec service is enabled.

Analysis Rules - 5000 ID Series - Physical Links

Rule Description

ID	Detection	Rule
5000	Alert	A port that is disabled should not be linked.
5003		When a device has redundant ports for which RSTP is enabled, a link needs to exist on both ports.
5004	Incorrect configuration	A physical link connects two port types, page 132 that support different networks (for example, RIO and DIO). If one of the ports is disabled, the message is not shown.
5007	Alert	A physical link connects two ports that have different RSTP settings. If one of the ports is disabled, the message is not shown.
5008		A physical link connects two ports that have different connector types, page 188. If one of the ports is disabled, the message is not shown.
5009	Incorrect configuration	A physical link connects two ports that belong to different redundant networks, page 79. If one of the ports is disabled, the message is not shown.

Analysis Rules - 6000 ID Series - Services

Rule Description

ID	Detection	Rule
6001	Alert	When a local slave, page 156 is configured for the CPU or BMENOC03*1 module of an M580 PAC, the EIP service of this module must be enabled in the Services tab of the PROPERTIES pane.
6002	Incorrect configuration	For the following modules, when the NTP client service, page 146 is enabled, the NTP polling value must be configured in the range from 1 to 120: <ul style="list-style-type: none"> • BMENOC0301 • BMENOC0311 • BMENOC0321 • Modicon M580 CPU
6003		Using a CRA adapter module requires that the following services, page 138 of the associated CPU module be enabled: <ul style="list-style-type: none"> • TFTP • EIP • DHCP
6004	Alert	When the DHCP server is disabled, client devices that subscribe to it in the DHCP VIEW do not receive IP addresses and network parameters. Enable the service in the Services tab of the PROPERTIES pane.
6005	Alert	When the DHCP server does not support the protocol, page 142 that is used by a client device, it cannot provide IP addresses and network parameters to the device. Assign the device to a server that supports the protocol in the DHCP VIEW or change its protocol in the Services tab of the PROPERTIES pane if possible.
6006	Incorrect configuration	When the DHCP client, page 142 service is enabled and a DHCP server is configured for a device, Identifier cannot be empty. For some devices, the DHCP identifier must satisfy device-specific format requirements. Default identifiers may not fulfill these requirements; for example, for generic devices.
6007	Alert	When the DHCP client, page 142 service is enabled for a device that is scanned, page 84 by a scanner, the DHCP server that is configured for this device must be the scanner.
6008	Incorrect configuration	When the control port, page 132 of a BMENUA0100 module is disabled, the primary and secondary NTP server IP addresses, page 146 in IPv4 format must belong to the same logical network as the BKP interface of the module. The same applies when the control port is enabled but the IPv4 interface of the module is disabled. In a redundant PAC, when the control port and the IPv4 interface of the module are enabled, the NTP server IP addresses, page 146 in IPv4 format of modules in local racks A and B must belong to the same logical network. NOTE: The incorrect configuration is not detected if the IP addresses are set to 0.0.0.0. An alert may be raised (see rule 6018).
6009		Using a BMENUA0100 module requires that the following services, page 138 of the associated CPU module be enabled: <ul style="list-style-type: none"> • TFTP • DHCP
6010		Using a BMENUA0100 module requires that Data Dictionary be enabled in the project settings of the associated control project
6011	Alert	One or more of the following settings is disabled: <ul style="list-style-type: none"> • TFTP • DHCP Verify that the configuration of security services, page 138 is appropriate for your particular application.

ID	Detection	Rule
6012	Incorrect configuration	When the Update CPU Time functionality, page 146 is used, enable it only for one communication module of the PAC and verify that the CPU module is not configured as NPT client.
6013		When the IPsec service, page 140 is enabled, Secure Protocol must be set to IPsec and the Pre-Shared Key attribute, page 139 cannot be left blank.
6014		When QoS is selected for the L2 Service of a physical port, page 132, the QoS service, page 150 must be enabled for the module.
6015		When the DHCP client, page 142 service is enabled for a device, the DHCP server name must be configured.
6016		For TeSys devices, the DHCP identifier, page 142 cannot exceed 16 characters.
6017		When the DHCP client, page 142 service is enabled and configured to use the MAC address to identify the device, this address, page 129 must be properly configured.
6018	Alert	To use the NTP service, page 142, at least the IP address of the primary NTP server must be configured.
6019	Incorrect configuration	When the DHCP client, page 142 service is enabled for a device, the DHCP service, page 140 of its DHCP server must be enabled.
6021		Verify that for each DHCP client that subscribes to the same DHCP server, the DHCP identifier, page 142 is unique.
6022		For a BMENUA0100 module, when the control port is enabled, the IP address that is configured for the primary or secondary NTP server must be different from the static IP address of the control port (Embedded Interface). This applies to IPv4 and IPv6 addresses. For a redundant PAC, applies to any combination of roles A and B.
6024		When SNMPv3 is enabled, the User Name attribute, page 148 cannot be empty.
6025		When the Syslog server is enabled, page 147, NTP State must be set to NTP Client .
6026		When the Syslog server is enabled, page 147, the following IP addresses of the M580 CPU module must belong to the same logical network: <ul style="list-style-type: none"> • IP Address of the Syslog server • MainIP • Primary NTP Server • Secondary NTP Server
6027	Alert	The attributes of the Syslog Server category, page 147 for a PAC can be configured independently of the values that are set for the system project. The values configured for the PAC are the ones that are used for communication with the Syslog server.
6028	Incorrect configuration	The IP addresses of the first and second SNMP managers, page 148 must be different. Applies to the following modules: <ul style="list-style-type: none"> • All M580 standalone CPU modules • BMECRA31210, BMECRA31310 • BMENOC0301, BMENOC0310, BMENOC0321 • BMENUA0100 • BMXCRA31200, BMXCRA31210

Analysis Rules - 7000 ID Series - M580 Control Projects

Rule Description

ID	Detection	Rule
7001	Incorrect configuration	<p>For a given scanner, the following rules must be satisfied:</p> <ul style="list-style-type: none"> The total number of requests (Modbus TCP) and connections (EtherNet/IP) of the active I/O profiles, page 156 that appear in the Communication Mapping Views, page 84 does not exceed the capacity of the scanner. The total number of devices (Modbus TCP and EtherNet/IP) that are scanned does not exceed the capacity of the scanner. <p>For details on the capacity, refer to manual of the module, which is used for scanning.</p>
7002		When the DHCP client of a CRA adapter module is enabled, the Identifier attribute, page 142 must be correctly configured.
7003		For a given scanner, each scanned device needs to have a unique device number, page 156 independently of the communication protocol that is used by the device.
7007		For a given module, all local slave connections, page 156 of a same type (for example, Exclusive Owner) that appear in the Local Slaves subcategory must have a unique number.
7008		The Default Gateway/Bridge Device attribute can only be used when the scanner is a BMENOC0301/11.4 communication module.
7009		For a given module, if two local slave connections, page 156 have the same number (for example, Local Slave 1) but a different connection type, the values of their Default RPI T->O , Input Size , and Default RPI O->T attributes must be identical.
7010	Alert	For BMENOP0300 modules, the values that you enter for interfaces and ports, page 132 in the Topology Manager also need to be entered manually in the IEC 61850 Configuration Tool. You can open the tool from Control Expert Editor after it is installed.
7011		<p>For BMENOS0300 modules, the configuration of the Ethernet ports, page 132 needs to be performed by using the rotary switches located on the module. Configuring Service L2 in the PROPERTIES pane has no impact.</p> <p>For details, refer to the module installation and configuration guide.</p>

Analysis Rules - 9000 ID Series - I/O Profiles

Rule Description

ID	Detection	Rule
9001	Incorrect configuration	For a given register, page 155, Read Length and Write Length cannot be null at the same time.
9002		For a given communication profile, page 155: <ul style="list-style-type: none">• The Read Address values configured for several registers cannot overlap.• The Write Address values configured for several registers cannot overlap. A read or write address is verified only if a non-null value is entered in the corresponding Length attribute.

Analysis Rules - 10000 ID Series - Hardware

Rule Description

ID	Detection	Rule
10000	Incorrect configuration	The maximum number of BME Ethernet communication modules that you can install in a rack with a BMEP582040 CPU is 2.

Analyzing DTM Usage

Analyzing DTM Usage

Overview

The **Analyze DTMs** command lets you compare the DTMs that are used by devices of the system project that is open with those installed on the local computer.

The command is available from the **Tools** menu in the toolbar of the Topology Manager.

Results of the analysis are shown in the **DTM Audit Tool**.

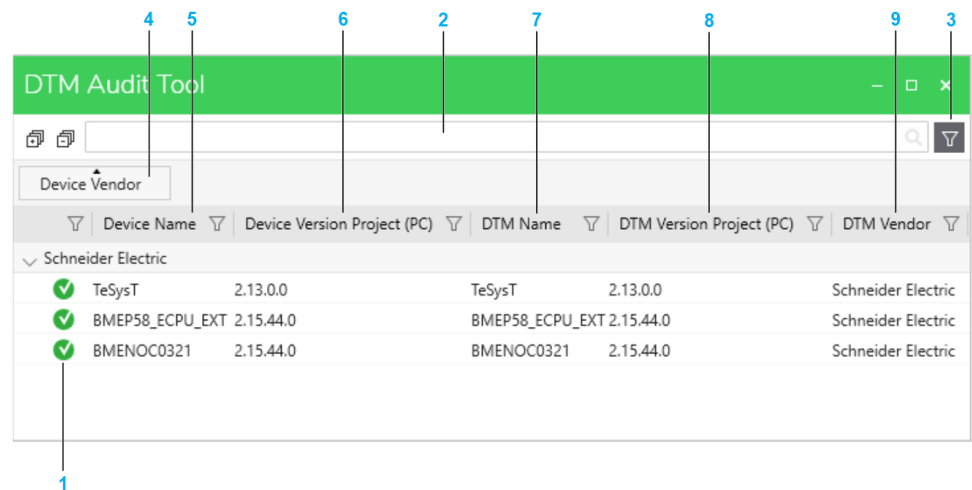
Prerequisites

To be able to analyze the compatibility of a DTM, the following conditions must be satisfied:

- The DTM **Hardware Catalog** is up-to-date, page 30.
- The device that is using the DTM must exist in the system project and the DTM must have been opened from the device once.

DTM Audit Tool Description

The following figure shows an example of the **DTM Audit Tool** window.



Item	Description
1	Icon.
2	Search field. Enter one or more terms separated by a space and the window displays objects that contain any of these terms.
3	Button to toggle the grouping bar and column headers. Groupings that you have defined remain when you hide the bar.
4	By default, DTMs are shown grouped by Device Vendor . You can change or remove the grouping, page 37. In addition, you can sort, page 38 the contents of each column/category.
5	Device that uses the DTM. NOTE: If the DTM of an existing device has not been opened yet, it does not appear in this window.
6	Version of the DTM that is required by the device.
7	Name of the DTM.
8	Version of the DTM in the local Hardware Catalog .
9	DTM vendor.

Result of the Analysis

The table describes the meaning of the icons in the **DTM Audit Tool**.

Icon	Description
	The DTM used by the device is compatible with a DTM installed on the computer.
	The DTM used by the device is not installed on the computer. Or, the DTM version installed on the computer is earlier than the version used by the device.

Diagnostics

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System Monitoring

What's in This Chapter

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Displaying the Communication Status of Devices in Physical Views

Overview

System monitoring lets you know whether devices of a system project that appear in a physical view are active by using a diagnostic engine. The engine sends requests to the IP address of each device and monitors responses.

The communication status of a device, PAC, or module is indicated by a diagnostic icon in the physical view. You can add, modify, and remove objects while system monitoring is active. The status is indicated or refreshed automatically.

Status Detection Method

Unless mentioned otherwise, the diagnostic engine that runs on the computer acting as Control Expert server sends ping requests to the IP address that is configured for the **Embedded Interface**, page 82 of the device and monitors responses.

For modules of M580 PACs, the following IP addresses are used:

- Standalone PACs: **MainIP**
- Redundant PACs: **IPA** and **IPB**

NOTE: While system monitoring is active, objects that do not support the functionality do not show diagnostic information (for example, objects that do not manage an IP address or for which an IP address cannot be configured in the Topology Manager).

Prerequisites

The following are prerequisites for using system monitoring with devices:

- The devices have been added to a physical view.
- The system server can communicate with the devices.
- For generic automation devices, you have enabled diagnostics, page 163.
- The SODB service, page 276 is running.
- The firewall is configured to allow communication between the computer acting as Control Expert server and devices by using port 502.

Connecting to the Diagnostic Engine

For a given Control Expert client/server infrastructure, the first Topology Manager instance to activate system monitoring connects to the diagnostic engine. System monitoring is readily available for any other Control Expert instance that is connected to this system server.

To start using system monitoring, proceed as follows.

Step	Action
1	Open the system project.
2	Click the Activate System Monitoring button in the toolbar. Result: The button appears selected, Diagnostic engine ready is displayed in the ACTIVITIES tab, and diagnosis starts. The communication status, page 275 is indicated on devices that appear in a physical view.

Disconnecting the Diagnostic Engine

For a given Control Expert client/server infrastructure, once the diagnostic engine is ready, it remains available until the last Control Expert instance that is connected to this system server deactivates system monitoring from its Topology Manager.


When you close a system project, the Topology Manager, or if the connection to the system server is interrupted, the diagnostic engine is stopped.

To stop using system monitoring, proceed as follows.

Step	Action
1	<p>Click the Activate System Monitoring button in the toolbar.</p> <p>Result: Diagnosis stops and the communication status is not indicated on devices anymore.</p> <p>NOTE: When the last Topology Manager instance to use the diagnostic engine in a given Control Expert infrastructure deactivates system monitoring, Diagnostic engine stopped is displayed in the ACTIVITIES tab.</p>



Impact of Device Configuration on System Monitoring

The table indicates the impact of the configuration of devices on the diagnostic information.

Configuration	Result
No IP address for the embedded interface is configured (independently of the configuration of the Logical Network attribute).	<p>Only the <i>service not available</i> icon is shown.</p>  <p>(Gray dot)</p>
An IP address for the embedded interface is configured but the logical network attribute is set to NOCONF .	Diagnostic information is available normally.
The Under Construction attribute, page 125 is set to true (selected).	<p>The device does not show diagnostic information.</p> <p>NOTE: This applies also to modules that inherit their under construction status from the parent device.</p>
The Build Target attribute, page 125 of the PAC is set to Simulator .	The diagnostic information shown applies to the physical device based on its IP address and not to the simulator.

Statuses Indicated by Diagnostic Icons

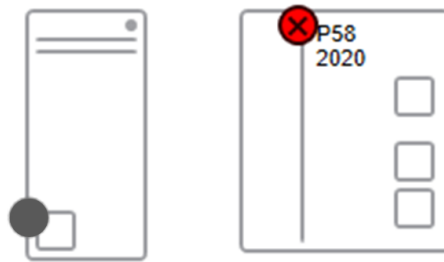
The table describes the meaning of the icons that appear on devices displayed in a physical view. Their description is indicated in a tooltip.

Icon	Description	Device status
	Service being started or not available (gray dot).	<p>Diagnostic information is not valid. This can be caused by a non-operational diagnostic engine, page 276.</p> <p>Default icon for devices and modules whose IP address for the embedded interface is not configured.</p>
	Not reachable (red dot with black cross).	The device is not reachable or did not respond to the request.
No icon appears.		The device responded successfully to the request. If several requests were sent by using different protocols (for example, ping and SNMP), the device responded to at least one of them.

NOTE: Other diagnostic icons, page 273 may appear on specific devices and modules such as automation devices and CPU modules.

Representation of the Communication Status

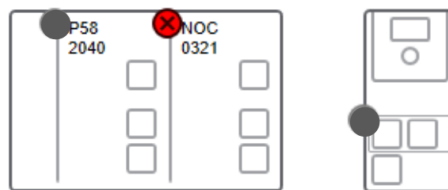
The following figure shows an example of a server station and an M580 CPU module displaying diagnostic icons.



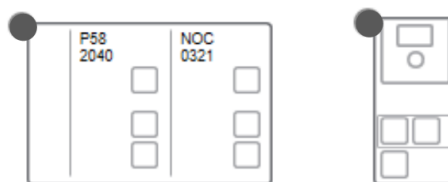
Representation of the Communication Status for Devices Containing Modules

Depending on the zoom level, page 32 that is applied in a physical view, the diagnostic icons for devices that contain modules are shown as follows.



100% and higher: The icon is shown on each module.



Less than 100%: A global diagnostic icon is shown at the local rack or device level.



The table describes the resulting global diagnostic icon based on the icon of each module.

Icon of individual modules	Resulting global icon for rack or device
No icon for all modules of the device.	None
<ul style="list-style-type: none"> At least one module has the gray dot icon. The icon of other modules of the device is not relevant. 	 <p>Gray dot. Service being started or not available</p>
<ul style="list-style-type: none"> At least one module has the red dot with black cross icon. No module has the gray dot icon. 	 <p>Red dot with black cross. Not reachable</p>

NOTE: Other diagnostic icons, page 279 may appear on certain devices or modules.

Troubleshooting

If you experience difficulties obtaining diagnostic information, verify that the SE SODB ControlExpert Host X service (where X represents the version) of the Service Oriented Device Bus (SODB) diagnostic engine is running on the system server computer (**Services** window of the Windows® operating system). If not, start it and enable system monitoring again.

Displaying the Identification Mismatch Icon

Overview

When system monitoring, page 274 is active, you can see whether a module or device of the system project is incompatible with or different from the physical module or device that is configured with the same IP address.

An incompatibility or identification mismatch is indicated by an icon on the representation of the object in physical views and you cannot deploy to it nor load data from a device. A dialog box opens when you attempt to do so.

For more information on M580 CPU module compatibility, refer to the topics describing PC to PAC transfer (see Compatibility Rules, EcoStruxure™ Control Expert and Application Version, User Manual) and CPU application compatibility (see Modicon M580, Hardware, Reference Manual).

NOTE: The incompatibility or identification mismatch is detected also when system monitoring is inactive but no icon indicates it.

Identification Mismatch Icon

The icon that indicates an incompatibility or identification mismatch is the same as the yellow triangle icon indicating a not operational device.



The tooltip indicates **Device different**.

Detection Method and Supported Devices

The diagnostic engine that runs on the computer acting as Control Expert server sends a Modbus request with function code 43, subcode 14 to objects by using the IP address of their embedded interface.

The compatibility or identification mismatch detection functionality is supported only for modules and devices that respond with a *ProductCode* (product code) value that is identical to their **Part Number** as it appears in the Schneider Electric catalog.

For example, the functionality is supported for an M580 CPU module because the returned *ProductCode* value and its **Part Number** are both equal to, for example, BMEP582040.

Displaying Operating States of M580 CPU Modules

Overview

System monitoring lets you obtain information about operational states of Modicon M580 CPU modules by using the diagnostic engine, page 274:

The engine sends requests to their IP address and monitors responses.

The state of the module is indicated by a diagnostic icon in the physical view in which the module appears.

NOTE: Use the indication of the operating state for commissioning only as it does not replace the use of proper system monitoring.




NOTE: For BMENOC03•1 communication modules, the indication of the operating state in a physical view is not available. To view their operating state, edit the control project, open the module, and connect to the controller. At the top of the screen, the state LEDs of the module are shown.

Detection Method

The diagnostic engine that runs on the computer acting as Control Expert server sends Modbus TCP requests to the IP address of the CPU module, page 274 to obtain information about its state.

Operating State Representation

The table describes which operating states can be represented on M580 CPU modules in a physical view and the icons that are used. Their description is indicated in a tooltip.

Icon	Description	CPU module state
	RUN ⁽¹⁾ . Green arrow.	Refers to the state of the RUN LED of the CPU module (see <i>Modicon M580 Hardware, Reference Manual</i> and <i>Modicon M580, Safety Manual</i>). Indicates that the LED is either on or blinking. If another diagnostic icon is already shown, the run icon appears below.
	Not fully operational ⁽¹⁾ . Blue diamond.	Non-blocking condition linked to an I/O detected error and the CPU module is not in HALT state. NOTE: When this icon is displayed while the <i>RUN</i> icon is present, indicates that at least one task is not in RUN state. To know the operating mode of a task, edit the control project and open the Task tab of the PLC Screen .
	Out of Order/Not operational ⁽¹⁾ . Yellow triangle. NOTE: Can also indicate an incompatibility or mismatch, page 278 between the configured and the physical object.	Non-blocking condition linked to an I/O detected error and the CPU module is in HALT state. Blocking condition that lead the CPU module to go in HALT state. The CPU module may still be able to communicate.
(1) Implies that the device is reachable and responded, page 275.		











NOTE: For more information on states of M580 CPU modules and blocking/non-blocking conditions, refer to the topic describing M580 diagnostics (see *Modicon M580, Hardware, Reference Manual*).

Representation of the Operating State for PACs

Depending on the zoom level, page 32 that is applied in the physical view, the diagnostic icons for PACs are shown as follows:

- 100% and higher: Icons are shown on each module of the local rack.
- Less than 100%: One or more global diagnostic icons are shown at the local rack level.

The table describes the resulting global diagnostic icon based on the icon of modules on the local rack.

Icons of CPU module	Icon of other modules on the local rack	Resulting global icons on local rack
 or  and/or 	No module has the <i>not reachable</i> icon, page 276  .	Same as on the CPU module
 or  and 	At least one module has the <i>not reachable</i> icon  .	 (not reachable) and 

Displaying Operating States of Altivar Process Devices

Overview

System monitoring lets you obtain information about operating states of Altivar Process devices by using the *diagnostic engine*, page 274. The engine sends requests to their IP address and monitors responses.

The state of the device is indicated by a diagnostic icon in the physical view in which the device appears.

NOTE: Use the indication of the operating state for commissioning only as it does not replace the use of proper system monitoring.

Detection Method

The diagnostic engine that runs on the computer acting as Control Expert server sends Modbus TCP requests by using the following IP address, page 82 to obtain information about the state of the device:



- For ATV6xx devices, the IP address of the embedded interface of the device or of the communication card.

NOTE: If both IP addresses are configured, only that of the communication card is used.

- For ATV9xx devices, the IP address of the embedded interface of the device.

States Indicated by Diagnostic Icons

The table describes which operating states can be represented on Altivar Process devices in a physical view and the icons that are used. Their description is indicated in a tooltip.

Icon	Description	Device state description
	Not fully operational ⁽¹⁾ . Blue diamond.	Bit 7 of the [CIA402 State Reg] EtA status word = 1.
	Out of Order/ Not operational (¹). Yellow triangle. NOTE: Can also indicate an incompati- bility or mismatch, page 278 between the configured and the physical object.	Bit 3 of the [CIA402 State Reg] EtA status word = 1. The operating state of the device is <i>Fault</i> .
(1) Implies that the device is reachable and responded, page 275.		

NOTE: The representation of the diagnostic icon varies depending on the zoom level, page 281.

NOTE: For more information on the status word bits, refer to the *Programming Manual* of the corresponding Altivar Process variable speed drive.

Displaying Operating States of TeSys Devices

Overview

System monitoring lets you obtain information about operating states of TeSys devices by using the diagnostic engine, page 274. The engine sends requests to their IP address and monitors responses.

The state of the device is indicated by a diagnostic icon in the physical view in which the device appears.



NOTE: Use the indication of the operating state for commissioning only as it does not replace the use of proper system monitoring.

Detection Method

The diagnostic engine that runs on the computer acting as Control Expert server sends Modbus TCP requests to TeSys devices by using the IP address of their embedded interface, page 82 to obtain information about their state.


States Indicated by Diagnostic Icons

The table describes which operating states can be represented on TeSys T devices displayed in a physical view and the icons that are used. Their description is indicated in a tooltip.

Icon	Description	Device state description
	Not fully operational ⁽¹⁾ . Blue diamond.	Bit 3 of the register 455 status word = 1 (system status register 1).
	Out of Order/ Not operational ⁽¹⁾ . Yellow triangle. NOTE: Can also indicate an incompatibility or mismatch, page 278 between the configured and the physical object.	Bit 2 of the register 455 status word = 1 (system status register 1). The operating state of the device is <i>Fault</i> .
(1) Implies that the device is reachable and responded, page 275.		

NOTE: For more information on the status word bits, refer to the *User Manual* of the corresponding TeSys motor controller.

The table describes which operating state can be represented on TeSys island devices displayed in a physical view and the icon that is used. Its description is indicated in a tooltip.

Icon	Description	Device state description
	Not fully operational ⁽¹⁾ . Blue diamond.	The device is in a pre-operational state or encountered a minor event. Bit 4 of the register 3201 = 1 (pre-operational). Bit 3 of the register 3201 = 1 (minor event).
(1) Implies that the device is reachable and responded, page 275.		

NOTE: For more information on the *SystemAvatar* function block, refer to the *Third Party Function Block Guide* of the TeSys island.

Displaying Operating States of Generic Automation Devices

Overview

System monitoring lets you obtain information about operating states of generic automation devices by using the diagnostic engine, page 274. The engine sends requests to their IP address and monitors responses. The functionality is available for devices that support it.

The state of the device is indicated by a diagnostic icon in the physical view in which the device appears.

To use this functionality, you must configure the diagnostic attributes, page 163 of the device first.




NOTE: Use the indication of the operating state for commissioning only as it does not replace the use of proper system monitoring.

Detection Method

The diagnostic engine that runs on the computer acting as Control Expert server sends requests to the IP address of the embedded interface, page 82 to obtain information about the state of the device based on the configuration of its diagnostic attributes.

Icons Representing Operating States

The table describes which operating states can be represented on a generic automation device in a physical view and the icons that are used. The indication of an operating state implies that the device is reachable and responded, page 275.

Operating state	Icon
Not Fully Operational	 (blue diamond)
Out Of Order	 (yellow triangle)
Run/Stop Status	 (Run state. Green arrow.) No icon to indicate the stop state.

Displaying Operating States of Hirschmann Switches

Overview

System monitoring lets you obtain information about operating states of Hirschmann switches by using the diagnostic engine, page 274. The engine sends requests to their IP address and monitors responses.

The state of the device is indicated by a diagnostic icon in the physical view in which the device appears.

NOTE: Use the indication of the operating state for commissioning only as it does not replace the use of proper system monitoring.


Detection Method

The diagnostic engine that runs on the computer acting as Control Expert server sends Modbus TCP requests to Hirschmann switches by using the IP address of their embedded interface, page 82 to obtain information about their state.

NOTE: The detection of device incompatibility or mismatch, page 278 is not supported for Hirschmann switches.

States Indicated by Diagnostic Icons

The table describes which operating state can be represented on Hirschmann switches in a physical view and the icon that is used. Its description is indicated in a tooltip.

Icon	Description	Device state description
	Not fully operational ⁽¹⁾ . Blue diamond.	The value of at least one of the <i>Port [1..X] Link Status</i> registers = 0 (where X is the number of ports that the switch is equipped with).
(1) Implies that the device is reachable and responded, page 275.		

NOTE: For more information, refer to the manual of the switch.

Basic Diagnostics

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Basic Diagnostics for Altivar Process Devices

Overview

The basic diagnostic window, page 99 lets you view a number of diagnostic codes for devices of the **Altivar Variable Speed Drives** product range by using the diagnostic engine, page 274. The engine sends requests to the IP address that is configured for the device and monitors responses.

NOTE: Devices that are configured by using a DTM, may also feature the **Diagnosis** context menu command, which lets you use the diagnostic functionality of their DTM.

Detection Method

The detection method, page 282 that is used is the same as the one used to detect the operating state of Altivar Process devices.

Available Diagnostic Data

The table describes the diagnostic codes that are available for each basic diagnostic category. For a description of the codes and the corresponding register, refer to the *Programming Manual* of the corresponding Altivar Process variable speed drive.

Status [Drive State]	Last Detected Error [Last_ Error]	Warning/Alarms [Last Warning]
HMIS register number 3240	LFT register number 7121	LALR register number 12890
RDY	NOF	NOA
NST	CFF	FRF
RUN	CFI	RLS
ACC	CNF	STT
DEC	EPF1	SRA
FLT	OPF1	
NLP	PHF	
	EPF2	
	ETHF	
	FDR1	
	FDR2	

Viewing Web Pages

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Viewing Webpages

Overview

The **Open Web Browser** command lets you view, by using the default web browser of the computer, the webpage of a module or automation device featuring the service (for example, the embedded webpage for tuning or diagnostics). This is the webpage with the address *http://<IPv4>* where *<IPv4>* is the IP address of the module/device.

When you enter a URL in the **Web Page Link** attribute of the module or device (when available), it opens the corresponding external webpage instead.

For details on software requirements, the availability of embedded webpages, and the services they provide, refer to the *webpages* topic in the help of the corresponding module or device.

Prerequisites

A web browser must be installed on the computer running Control Expert.

In addition:

- To view external webpages by using the URL configured in the **Web Page Link** attribute, page 124, the computer must be connected to the Internet.
- To view the webpage of a module or device, its IP address must be configured in the **CONFIGURATION** tab of the **Properties** pane and it must be reachable, page 274 from the computer at this IP address.

Opening Webpages

To open a webpage, proceed as follows.

Step	Action
1	Right-click the module or device and select Open Web Browser . Result: A webpage opens depending on the configuration of the Web Page Link attribute.

Communication

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Implicit Messaging

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Configuring Implicit Messaging and I/O Items

Configuring I/O Profiles of Devices

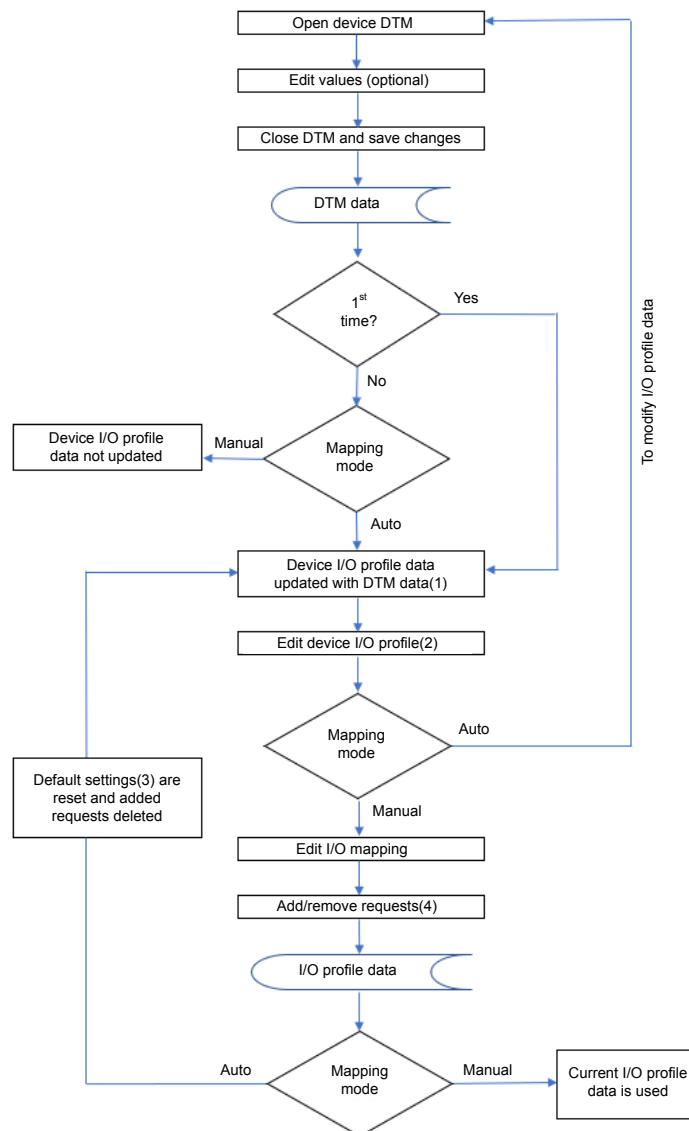
Overview

Typically, for devices that are configured by using a DTM, page 222, the mapping mode, page 156 is set to automatic and properties of the device I/O profile are set by the DTM.

Depending on the device, you may be able to modify the properties by using the manual mapping mode.

Configuration Workflow

The following workflow shows the relation between the DTM of a device and its I/O profile depending on the setting of the mapping mode.



(1) The first time, may create one request or connection, which cannot be deleted.

(2) Properties that can be edited independently of the mapping mode. Includes editing attributes, page 156 of requests/connections that are indicated as **Default**, editing profile and instance name, adding and removing I/O profiles, and changing the mapping mode, page 156.

(3) The values of the attributes of requests/connections that are indicated as **Default** are reset to DTM/default values when you switch the mapping mode from manual to automatic.

(4) If adding requests/connections from the **PROPERTIES** pane is supported by the device.

Editing Properties of Active I/O Profiles

When an I/O profile is active, page 296 and you select it in the Communication Mapping View, you can edit the values of the following attributes, page 156 in the **PROPERTIES** pane to customize the requests or connections of this active profile and the associated device DDT. This does not modify the default values of the I/O profile of the device:

- For Modbus TCP:
 - **UnitID**
 - **Health Timeout (ms)**
 - **Repetitive Rate (ms)**
 - **Last Value**
 - **Gateway/Bridge Device**
- For EtherNet/IP:
 - **Timeout Multiplier**

In an active I/O profile, the values of the other attributes are read-only and you cannot create new requests or connections.

Conversely, editing the attributes of the I/O profile of a device (including requests and connections that you add or remove) automatically modifies the active I/O profile except for the protocol-specific attributes listed above. To apply the values of these attributes to the active I/O profile, use the **Reset To Default** command, page 85.

Data Exchange with Local Slaves - Example

Overview

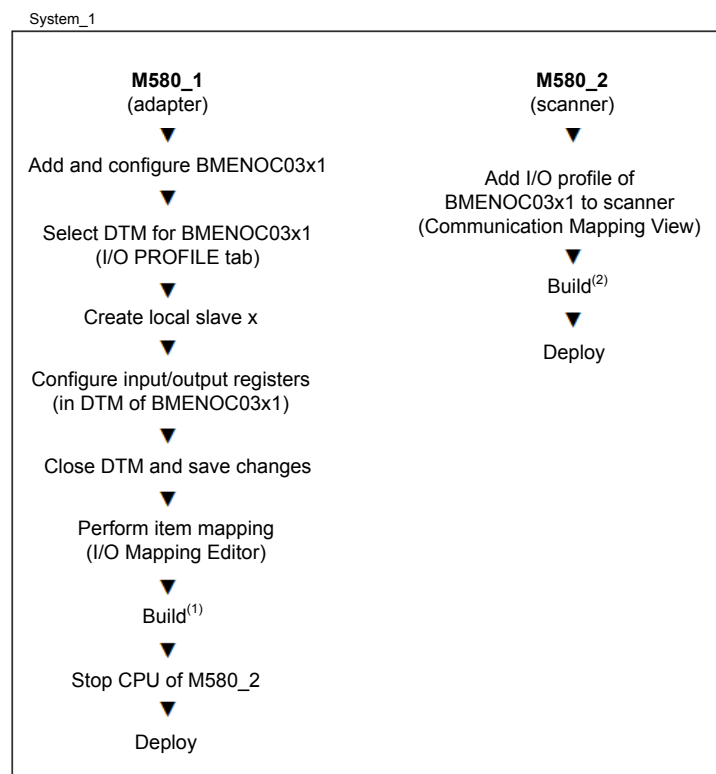
By using an example, this topic shows the workflow to implement data exchange between the following devices that exist in system project *System_1*:

- M580_1, which is the local rack of an M580 standalone PAC in which a BMENOC03•1 communication module is configured as local slave, page 156.
- M580_2, which is the local rack of a second M580 standalone PAC whose CPU module scans, page 296 the local slave.

A second example using the same devices shows the workflow to apply changes to the data that is exchanged.

Data Exchange Implementation Workflow

The first example shows the steps to be performed on both PACs to implement the data exchange. Proceed with M580_1 first.



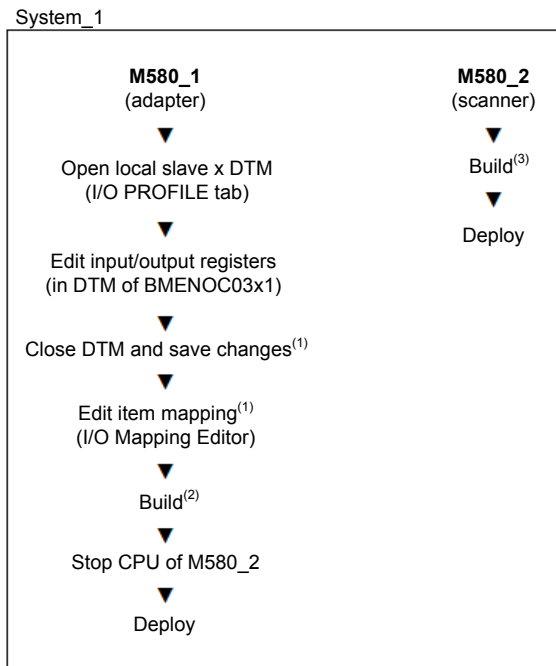
(1) Creates a device DDT named **Instance Name_LSx** in the control project. It is based on the DTM configuration of the local slave but without the mapped items.

(2) Adds the BMENOC03•1 to the device list in the control project of the scanner and creates a device DDT named **Instance Name** with the register sizes and item mapping as defined in the I/O profile of the local slave but where:

- The input register corresponds to the output register of the local slave.
- The output register corresponds to the input register of the local slave.

Data Exchange Modification Workflow

The second example is the continuation of the first one. It shows the steps to be performed on both PACs to apply changes to the item mapping that are performed in the I/O profile of the BMENOC03•1 local slave (for example, changing the input register size and item mapping). Proceed with M580_1 first.



(1) Sets the build state of the executable of M580_2 to **Out Of Date**.

(2) Updates the **Instance Name**_LSx device DDT in the control project with the new input register size but not the item mapping.

(3) Updates in the **Instance Name** device DDT of the control project, the output register size and item mapping.

Configuring I/O Scanning of Devices and Local Slaves

Overview

This topic describes how to add one I/O profile, page 156 of a device to an I/O scanner of a PAC by using the Communication Mapping View, page 84 that corresponds to the communication protocol, page 129 of the device.

Adding the I/O profile of a device to a scanner creates an instance of this profile, which is the *active* I/O profile. It enables the communication between the two devices.

For each active I/O profile, a device DDT structure is created in the control project, page 229, which lets you use the device data in the program. The structure of the device DDT is based on the item mapping, page 297.

The description also applies to adding the I/O profile of local slaves, page 156 to the I/O scanner of a PAC.

NOTE: For redundant M580 PACs, communication mapping and local slaves are managed only for modules of rack A.

Prerequisites

The following are prerequisites for establishing communication:

- I/O profile data of the device must be available, page 156 in the **I/O PROFILE** tab of the **PROPERTIES** pane.
- For scanning of local slaves, at least one local slave, page 156 must be configured.

Scanner Capacity Limit Notification

In the Communication Mapping View for Modbus TCP, you can add I/O profiles to a scanner even if the maximum number of requests supported by the scanner is exceeded. However, in such case:

- You cannot edit the control project, page 229 that is associated to the PAC or build it and a message is shown.
- An incorrect configuration is detected when you analyze the system project, page 256.

Adding I/O Profiles to an I/O Scanner

Step	Action
1	Open the appropriate Communication Mapping View.
2	From the TOOLBOX pane, drag one or more I/O profiles of devices to a scanner that appears in the view. Result: An instance of each profile is assigned to the scanner and becomes the active profile. NOTE: A device can only have one active I/O profile for a same scanner.
3	If you need to customize the properties of active I/O profile, page 156, depending on the attribute, select the active profile in the Communication Mapping View or the device to edit the value in the PROPERTIES pane.

Modifying the Scanner Assignment

To scan a device by using another scanner service of the PAC, drag the I/O profile of the device to the other scanner.

Creating Items in Input/Output Registers

Overview

This topic describes how to create elementary, array, and bit type I/O items by using the **I/O Mapping Editor**. You can create items for read/write requests (Modbus TCP) and input/output connections (EtherNet/IP) of communication profiles that are configured for devices.

You can modify various attributes of existing items including their type and offset.

The I/O mapping is reflected in the structure of the device DDT that is created, page 156 for the device in the control project of the scanner. For registers in which no I/O mapping is defined, an array of Byte is automatically created in the device DDT.

Prerequisites

- You have added to the system project a device that uses the Modbus TCP or EtherNet/IP communication protocol.
- In the I/O profile of the device, you have configured the *read and/or write length*, page 156 of at least one request or the *input and/or output size*, page 159 of at least one connection.
- The mapping mode, page 156 for the communication profile is set to **Manual**.

Changing Register Size and/or Address

The table describes the procedure to change register size and/or address if the corresponding attribute is read-only in the I/O profile of the device. The procedure does not apply to the first request or connection of a device.

Step	Action
1	In the I/O Mapping Editor , select the Input or Output node of a request or connection. Result: The properties of the corresponding register appear in the Request or Connection section of the PROPERTIES pane.
2	Edit the value of Length and/or Address as needed. Result: The graphical representation of the register size is updated and the new value is shown in the properties of the I/O profile of the device.

Item Name Syntax

By default, item names use the syntax *BLOCKx_<Input/Output><Type abbreviation><Offset>_<Array elements>*, where:

- *BLOCKx* is the name of the register, page 87 that is addressed by the request/connection.
- *<Input/Output>* corresponds to I for a read and to Q for a write request/connection.
- *<Type abbreviation>* is defined in the table.
- *<Offset>* is expressed in bytes except for single bit items, for which it is expressed in bits.
- *<Array elements>* is the number of elements (for arrays only).

For example, *BLOCKA_IW24_2* is the name of an item of the first read request/input connection of type Array of Word containing two words.

You can edit the name during or after item creation.

NOTE:

When you create more than one item, <Offset> is replaced by an asterisk (*).

If you edit the item name, insert one or more asterisks at any position after the first letter. The asterisk is replaced by an incremented number when the items are created and appear in the **I/O Mapping Editor**.

NOTE: Only default names are automatically updated when you modify, page 299 an item.

Data type	Type abbreviation	Designation
Bit	X	Bit
Byte ⁽¹⁾	B	Byte
String ⁽¹⁾	S	String
Word	W	Word
Int	I	Integer
UInt	UI	Unsigned integer
DWord ⁽¹⁾	DW	Double word
DInt	DI	Double integer
UDInt	UD	Unsigned double integer
Real	R	Real
Time ⁽¹⁾	T	Time

(1) The data type is not available for Modbus TCP communication.

NOTE: An array of a type uses the same abbreviation as the type.

Creating Items

To create elementary or array type items, proceed as follows.

Step	Action
1	In the I/O Mapping Editor , right-click Input , Output , or a selection of free consecutive bytes in the graphical representation and select Define Items . Result: The Item Definition dialog box opens. NOTE: For Modbus TCP communication, in the graphical representation, you must select an even number of bytes to be able to define items.
2	Edit Name if required.
3	Select the type of the item. To create an array, select ARRAY . NOTE: If you have selected the command from the graphical representation, only types that are compatible with your selection are available.
4	Select the offset of the item and how many items to create. NOTE: Offset and Count are read-only when you create items by using the graphical representation. The software creates as many items as your selection allows starting at the lowest selected byte.
5	Click OK . Result: If sufficient space is available, the items are created and appear in the editor; otherwise, a notification is shown.

Creating Bit Items

To create one or more single bit items, create an item of a data type that supports bit mapping first.

The data types are Byte, Word, Int, and UInt.

To create bit items, proceed as follows.

Step	Action
1	In the I/O Mapping Editor , right-click an existing item that supports bit mapping in the tree view or free bits in its bit field and select Define Items . Result: The Bit Item Definition dialog box opens. NOTE: To create several non-consecutive bits, select each bit in the bit field of the item.
2	Edit Name if required.
3	Select the position of the first bit item in the bit field (Offset) and how many items to create. NOTE: Offset and Count are read-only when you create bit items by using the bit field. The software creates as many bit items as you have selected bits.
4	Click OK . Result: If sufficient space is available, the items are created and appear in the editor; otherwise, a notification is shown.

Modifying Items

To modify an item, select it in the tree view or graphical representation and edit its attributes in the **PROPERTIES** pane.

The table indicates which attributes you can modify.

Attribute	Elementary types	Array types	Bit types
Name	Yes ⁽¹⁾		
Comment	Yes		
Type	Yes ⁽²⁾	Yes ⁽²⁾	No
Offset	Yes	Yes	No
Rank	N/A	N/A	Yes
Number of elements	N/A	Yes	N/A
(1) The software accepts only unique names within a communication profile.			
(2) Selecting a type that does not support bit mapping removes existing bit mappings. You cannot change an elementary type to an array and vice versa.			

Deleting Items

To delete one or more items, select them and press **Del**.

Deleting an item also deletes its bit mappings if applicable.

Configuring Implicit Messaging with Specific Modules

Communication with BMXPRA0100 Modules

Overview

This topic describes how to set up communication between a BMXPRA0100 module and an M580 PAC acting as master in a system project.

The procedure requires using both Control Expert Classic and the Topology Manager.

The BMXPRA0100 module is represented in the system project by a generic Modbus TCP device, which is scanned by the M580 PAC.

NOTE: Attaching the control project file (configuration file, page 194) containing the BMXPRA0100 module to the generic Modbus TCP device only saves a copy of the file to the repository of Control Expert. This can be done, for example, to use the control project file as reference or to export it along with the device.

Creating the BMXPRA0100 Control Project With Control Expert Classic

Step	Action
1	Open Control Expert Classic.
2	Create a new control project of the Modicon M340 platform and select the BMXPRA0100 module. NOTE: You can also open an existing control project in .sta or .zef file format, which contains a BMXPRA0100 module. In such case, proceed to step 4.
3	Configure the modules and create the logic that will be exchanged with the M580 PAC.
4	Save the project to disk as project file (.stu).
5	Close Control Expert Classic.

Configuring Communication in the Topology Manager

Step	Action
1	Open the system project.
2	In the Topology node of the SYSTEM PROJECT pane, create a generic Modbus TCP Device , which represents the BMXPRA0100 module.
3	Attach, page 125 the control project file (.stu) containing the BMXPRA0100 to the device.
4	Configure the I/O profile, page 156 of the device and create the item mapping according to the data to be exchanged with the M580 PAC.
5	Create and configure the M580 PAC.
6	Open the Modbus TCP Communication Mapping View, page 84 from the M580 CPU module.
7	Add the I/O profile of the device, page 296 to a scanner of the PAC.
8	Complete the engineering life cycle of the system project.

Communication with Pmegps0100 and Pmeucm0302 Modules

Overview

This topic describes how to set up communication with a module installed in an M580 PAC by using I/O scanning.

The procedure applies to the following modules:

- Pmegps0100
- Pmeucm0302

It requires adding the module to the configuration of the PAC and creating a device in the system project, which represents the module and which is used to create the communication mapping, page 296.

Prerequisites

You must have installed the DTM, page 222 of the module and updated the **Hardware Catalog**.

Configuring the Module in the Control Project

Step	Action
1	Open the system project.
2	Edit the control project of the M580 PAC.
3	Add the module to the configuration, close the control project, and save changes. Result: The module is added to the PAC in the SYSTEM PROJECT pane.

Configuring Communication with the Module in the system project

Step	Action
1	Create a device in the Topology node of the SYSTEM PROJECT pane by using the generic EtherNet/IP DTM device from the TOOLBOX and select the DTM that corresponds to the module. Result: The device represents the module that you have configured in the M580 PAC.
2	Select the device in the SYSTEM PROJECT pane.
3	In the SERVICES tab of the PROPERTIES pane, enable the DHCP client service, page 142 of the device and enter its DHCP identifier. For details on the identifier format, refer to the help of the module.
4	Open the DTM of the device, page 194, configure it as needed, close the DTM, and save changes. Result: When you select the I/O PROFILE tab of the device, the I/O profile of the device is updated with the values configured in the DTM.
5	From the CPU module of the PAC to which you have added the module, open the EtherNet/IP Communication Mapping View, page 84. Result: The I/O profile of the module appears in the TOOLBOX pane.
6	Add the I/O profile of the device, page 296 to the scanner of the M580 PAC.
7	Complete the engineering life cycle of the system project.

Commissioning Control Systems

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Deploying to M580 PACs

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Deploying IP Addresses to CPU Modules

Overview

The **Deploy > Set IP Address by USB** command lets you deploy to the physical CPU module the IP addresses that you have configured in the **PROPERTIES** pane.

The PAC is locked, page 55 while deployment is in progress.

NOTE: This command does not deploy IP addresses and other communication settings to other modules of the PAC.

Prerequisites

The following are prerequisites for the deployment of IP addresses:

- The computer running Control Expert is connected to the CPU module by a USB cable.
- The IP addresses of the CPU module are configured in the **PROPERTIES** pane.
- The reference and firmware version of the CPU module in the Topology Manager are compatible, page 278 with the physical module.
- Confirm that the physical CPU module is in STOP state or that it can be stopped.
- If an application has already been deployed to the controller, no application password, page 53 is set.

Working Principle

When you proceed with the **Set IP Address by USB** command, an empty application is deployed to the physical CPU module. It contains the IP addresses that you have configured in the **PROPERTIES** pane. The communication **Security** settings of this application are disabled.

The table describes the impact on the CPU operating state and on the application that may be present in the physical CPU module when you deploy IP addresses.

CPU module operating state	Result
The physical CPU module is in NOCONF operating state.	An empty application, which contains the configured IP addresses is deployed to the physical CPU module.
The physical CPU module is in RUN state.	The CPU module goes into STOP state and the application that is present is replaced by an empty application, which contains the configured IP addresses.
The physical CPU module is in a state other than NOCONF or RUN.	The application that is present is replaced by an empty application, which contains the configured IP addresses.

Deploying IP Addresses to a Standalone PAC

To deploy IP addresses to the physical CPU module, proceed as follows.

Step	Action
1	Right-click the PAC or its rack and select Deploy > Set IP Address by USB . Result: A confirmation dialog box opens.
2	Read the information that is shown in the dialog box, and click Yes . Result: The software stops the CPU, transfers the empty application, and indicates the status of the operation in the notification pane.

Deploying IP Addresses to a Redundant PAC

To deploy IP addresses to the physical CPU modules of racks A and B, proceed as follows.

Step	Action
1	Turn on power to the backplane whose controller A/B/Clear switch is set to A.
2	Connect the USB cable to the CPU module on this backplane.
3	Right-click the PAC or its rack and select Deploy > Set IP Address by USB . Result: A confirmation dialog box opens.
4	Read and understand the information that is shown in the dialog box, and click Yes . Result: The software stops the CPU, transfers the empty application, and indicates the status of the operation in the notification pane.
5	Repeat the procedure for the backplane whose controller A/B/Clear switch is set to B.

Deploying Control Project Executables

Overview

The **Deploy** command lets you transfer the executable of a control project, page 230 of an M580 PAC to the CPU or communication module of the physical controller that it represents.

For a redundant PAC, you can select to deploy only to rack A or B or to both.

Depending on the value of the **Build Target** attribute, page 125, it may allow deployment only to the simulator.

The PAC is locked, page 55 while deployment is in progress.

When you use the **Deploy** command when more than one PAC is selected, the **DEPLOYMENT VIEW** opens, page 96.

Prerequisites

The following are prerequisites to deploying the executable to a physical module:

- The control project must be built, page 237 with the **Build Target** value set to **Real**.
- For the physical CPU module, the following applies:
 - It must be reachable, page 274 at its configured main IP address and compatible, page 278.
 - Confirm that it is in STOP state or that it can be stopped.
 - It is not reserved.

For a redundant PAC, the prerequisites apply to the CPU modules of racks A and B.

- In case you are deploying to a NOC communication module instead, it must be reachable at its configured IP address and compatible, page 278.
- The SODB service, page 276 is running.

NOTE: Verify that in the control project whose executable you are deploying, the following conditions are satisfied:

- The IP addresses, page 305 match those of the physical module you are deploying to.
- The security settings, page 138 permit future connections to the module from your engineering stations.

Otherwise, you may not be able to connect to this module after deploying the executable.

Modifying the Control Project After Deploying

Once you have deployed the executable to a PAC, performing either action described in the following table requires that you stop the controller to deploy the modification.

For actions that you perform in the Topology Manager, a message is shown to inform you of the required controller stop. You can select to proceed or cancel the action. If you proceed, this message is not shown anymore until you deploy to the PAC.

Control project	Controller mode when the action is performed	Action in the Topology Manager	Action in Control Expert Editor
Closed	n/a	Any modification that changes the build state, page 125.	n/a
Open in Control Expert Editor	Disconnected.	Any modification that changes the build state, page 125.	Closing the control project and saving modifications that have not been deployed to the controller. The modification can be the result of a Synchronize Changes command (except in virtual connected mode where the command is not allowed).
	Virtual connected mode.		
	Equal online mode.		Closing the control project and saving modifications that have not been deployed to the controller online.

Password Management When Deploying by Using the Context Menu Command

The following applies when you use the **Deploy > Configuration** command in the context menu of a PAC.

If an application password, page 53 is set in the control project that is deployed in the controller, you must enter it when prompted before you can deploy the executable.

If you select to reuse the password for next deployments, you are not required to reenter it when you deploy again to the same PAC or to another PAC by using its context menu command. This applies until you close Control Expert or the password does not match the application password that is set for project deployed in the controller.

If you copy a PAC after having selected to reuse the password and deployed, it is also reused for the pasted PAC.

Password Management When Using the DEPLOYMENT VIEW

The following applies when you deploy to a PAC by using the **DEPLOYMENT VIEW**.

If the **Password** column, page 96 indicates **Required - Not Set** and you click **Deploy**, a dialog box opens and you cannot deploy. Right-click the PAC, select **Edit Password**, and enter the application password, page 53 that is set for the control project deployed in the controller.

If you choose to use the password for all the selected, page 96 PACs, you are not required to enter it when the software deploys to the next PACs in queue neither when you deploy again to the same PACs given the password matches the application password of the deployed control project (if set); this, until you close Control Expert.

If the **Password** column, page 96 indicates **Required - Set** but the password does not match the application password of the control project that is deployed in the controller, the deployment is not performed and you need to enter the correct password by using the **Edit Password** context menu command.

Deploying to Redundant PACs

For a redundant PAC, you can select **IPA** and/or **IPB** for deployment.

Only the controller that you are deploying to is stopped.

When you deploy to both controllers of a redundant PAC, the executable is first deployed to controller A (**IP Address A**) then to controller B (**IP Address B**). if

deployment to controller A does not complete successfully, deployment to controller B is canceled.

To view the states of the controllers, edit the control project of the PAC.

Deploying to the PLC Simulator

To be able to use the PLC simulator, its listening IP address setting must be the same as the IP address that it is using. That is, 127.0.0.1 when you are connected to the local system server or the IP address of local computer when you are connected to a remote system server. You can see this IP address in the **Address** column of the **DEPLOYMENT VIEW**.

The setting applies only to simulator instances that you start thereafter.

To configure the listening IP address of the PLC simulator and apply it, proceed as follows.

Step	Action
1	If no simulator instance is running, start one by using either method: <ul style="list-style-type: none"> • Selecting the check box in the DEPLOYMENT VIEW or using the Deploy > Configuration context menu command of a PAC whose Build Target attribute is set to Simulator. • Clicking EcoStruxure Control Expert > PLC Simulator from the Windows Start menu.
2	Right-click the icon of a simulator instance in the task bar and select Options...
3	In the Simulator Panel Options , configure Listening IP Address with the IP address that is used by the simulator and click OK . Result: The simulator instance closes and a message prompting you to restart it opens. NOTE: If other simulator instances are running, close them.
4	Restart the simulator instances that were running. NOTE: If you are using the DEPLOYMENT VIEW , clear the check boxes of the PACs that are selected and select them again.

Deploying the Executable by Using the Context Menu Command

To deploy to a PAC by using the **Deploy > Configuration** command, proceed as follows.

Step	Action
1	Verify that the prerequisites, page 307 are satisfied.
2	Right-click the PAC and select Deploy > Configuration . Result: The Confirm Deploy Control Project dialog box opens.
3	In the IP Address menu, select the module that you want to deploy to. Result: The software verifies the status of the module and displays it. If the status is Not Reachable , you cannot proceed with the deployment. NOTE: For a redundant PAC, deployment is performed only to the controller (A and/or B) for which you select an IP address.
4	Verify the information that is displayed in the Project Information section.
5	Select Run controller after deployment to send a run command to the CPU once deployment completes successfully. NOTE: For a redundant PAC, the command is sent to the CPU modules of controllers A and B.
6	Click OK . Result: The Deploy confirmation dialog box opens.
7	Read the information that is shown in the dialog box and click Yes . Result: The software stops the CPU and transfers the executable to the module and indicates the status of the operation in the notification pane.

Deploying the Executable by Using the DEPLOYMENT VIEW

To deploy to selected PACs by using the **DEPLOYMENT VIEW**, proceed as follows.

Step	Action
1	Verify that the prerequisites, page 307 are satisfied.
2	If a password-protected application has already been deployed to one of the selected PACs, set the same password, page 307 by using the Edit Password command.
3	Verify that the status, page 96 of each of the selected PACs and/or racks allows deploying to it.
4	In the row of a selected controller, select the check box in the Run after deployment column to send a run command to the CPU once deployment completes successfully. NOTE: For a redundant PAC, the command is sent to the CPU modules of controllers A and B.
5	Click the Deploy button in the toolbar of the view. Result: The Deploy: Configuration dialog box opens.
6	Read the information that is shown in the dialog box and click OK . Result: The software stops the CPU of the first selected PAC and/or rack (if it is running) and transfers the executable to the module. In case the deployment to a PAC does not complete successfully because the password is incorrect or it is reserved, the Deploy: Control Project dialog box opens. Otherwise, deployment to the next object in queue is initiated. Proceed to step 9. NOTE: If a deployment does not complete successfully for another reason, the software proceeds with the next object in queue. Details about unsuccessful deployments are available in the OPERATION DETAILS tab after the last deployment is completed.
7	While deployment is in progress, you can modify the selection of objects. Selecting the check box of an object adds it to the deployment queue. Clearing its check box removes it from the queue.
8	In the dialog box, click either button: <ul style="list-style-type: none"> Yes: Deployment to the next object in queue is initiated. No: Cancels the deployment operation. Deployments that have already completed successfully are not impacted.
9	Once the entire deployment operation is completed, the status of the operation is indicated in the notification pane and the status of the objects is refreshed.

NOTE: If the selection of objects includes a device, refer to the topic describing the deployment, page 311 to this type of object for more information.

Troubleshooting Information

The table describes the diagnostic messages that the software may display in the **OPERATION DETAILS** tab when you attempt to deploy an executable and their corrective actions.

Diagnostic message	Corrective actions
The control project is not built.	Build the control project, page 237.
The server cannot connect to the SODB service because the service is not running.	Verify that the diagnostic engine, page 276 is ready.
Controller cannot be reached.	Verify that the physical CPU module is reachable, page 274.
The physical controller is different from the controller that is configured.	Verify that the physical controller you are trying to deploy to has the same configuration as the PAC (for example, CPU reference, firmware version, module reference and position) and that the IP addresses are matching.

Deploying and Loading DTM Configuration to and from Devices

What's in This Chapter

Deploying and Loading DTM Configuration to and from Devices 311

Deploying and Loading DTM Configuration to and from Devices

Overview

The **Deploy > Configuration** command connects to the corresponding physical device and transfers to it its DTM configuration.

The **Load Data From Device** command connects to the corresponding physical device and uploads from it the DTM configuration to the DTM in the Topology Manager. It also updates the I/O profile, page 156.

The device is locked, page 55 while deployment or upload is in progress.

When you use the **Deploy** command when more than one device is selected, the **DEPLOYMENT VIEW** opens.

Prerequisites

The following are the prerequisites for using either command:

- The computer running the system server service or Control Expert is connected to device on the network.
- At least the IP address of the embedded interface of the device is configured.
- No identification mismatch, page 278 is detected.

Not Supported Devices

For the following devices that support configuration by using a device type manager (DTM), the deployment to and upload from the device of the DTM configuration is not supported:

- Modbus TCP STB NIP2x1x.
- EtherNet/IP DTM devices created from EDS.
- EtherNet/IP generic and generic explicit messaging devices.
- EtherNet/IP STB NIC2212.
- PROFIBUS slave devices.
- HART field devices.

Deploying the DTM Configuration to the Device by Using the Context Menu Command

To deploy to a physical device by using the **Deploy > Configuration** command, proceed as follows.

Step	Action
1	Right-click the device and select Deploy > Configuration . Result: The Deploy dialog box opens showing the progress of the deployment to the device.
2	Depending on the device, a notification may open, which requires that you confirm the command. Follow the instructions on screen. Result: After you confirm the command, deployment to the device starts. If the software is unable to deploy to the device, a notification opens to inform you.

Deploying the DTM Configuration to the Device by Using the DEPLOYMENT VIEW

To deploy to selected devices by using the **DEPLOYMENT VIEW**, proceed as follows.

Step	Action
1	Verify that the prerequisites, page 311 are satisfied.
2	Verify that the status, page 96 of each of the selected devices allows deploying to it.
3	Click Deploy . Result: Depending on the device, a notification may open, which requires that you confirm the command.
4	Follow the instructions on screen. Result: The software transfers the DTM configuration to the devices one after the other and indicates the status of the operation in the notification pane once completed. It also refreshes the status of the objects. NOTE: If the deployment to a device does not complete successfully, details are available in the OPERATION DETAILS pane after the last deployment to a device is completed.
5	While deployment to a device is in progress, you can modify the selection of objects. Selecting the check box of an object adds it to the deployment queue. Clearing its check box removes it from the queue.

NOTE: If the selection of objects includes a PAC, refer to the topic describing the deployment, page 307 to this type of object for more information.

Troubleshooting Information

The table describes the diagnostic messages that the software may display in the **OPERATION DETAILS** tab when you attempt to deploy to a device a DTM configuration and their corrective actions.

Diagnostic message	Corrective actions
The server cannot connect to the SODB service because the service is not started.	Verify that the SODB service, page 274 is ready.
Device cannot be reached.	Verify that the physical device is reachable, page 274.

Loading the DTM Configuration from the Physical Device

Proceed as follows.

Step	Action
1	<p>Right-click the device and select Load Data From Device.</p> <p>Result: The Load Data From Device dialog box opens showing the progress of the upload from the device.</p>
2	<p>Depending on the device, a notification may open, which requires that you confirm the command. Follow the instructions on screen.</p> <p>Result: After you confirm the command, upload from the device starts.</p> <p>If the software is unable to load data from the device, a notification opens to inform you.</p>

Uploading Applications from Controllers

What's in This Chapter

Uploading Applications from Non-M580 Controllers 314

Uploading Applications from Non-M580 Controllers

Overview

The **Upload** command lets you upload the application from controllers of the following Modicon platforms:

- M340
- MC80
- Momentum

The application uploaded from the controller replaces the control project that is associated to the controller in the system project.

The upload from a controller by USB cable is not supported.

NOTE: To upload the application from an M580 PAC, Premium, or Quantum controller, connect to the controller by using Control Expert Classic.

Prerequisites

- The controller from which you want to upload the application is reachable at its configured IP address from the system server and it is not reserved.
- The part number and version of the physical controller match the values of the controller in the **PROPERTIES** pane.
- The SODB service, page 276 is running.
- The firewall is configured to allow communication between the computer acting as Control Expert server and the controller by using port 502.

Controller Status

The **Upload** dialog box indicates only either controller status:

- **Run**
- **Stop**
- **No configuration**

For details on the operating state of the controller or the operating mode of a task, edit the control project and connect to the controller.

Password Management for Applications Uploaded From Controllers

To upload from a controller an application that is protected by an application password, you must enter the application password when prompted.

After the upload from the controller completes successfully and if a password is set for the system project:

- The application (.STA) is stored in the Control Expert repository and the original application password is replaced by the system project password. File encryption is enabled.
- The first time you edit the control project associated to the controller and save changes, the system project password is also applied to the control project and file encryption is enabled, page 52.

As a result, when you reconnect to the controller, the state may be DIFFERENT and you need to deploy the control project again to the controller, page 307.

NOTE: The password and file encryption management applies also after successfully uploading from a controller an application that is not protected by an application password.

NOTE: If you have encrypted the application by using Control Expert Classic, you cannot upload it from the controller. In such case, upload the application from the controller by using Control Expert Classic, disable file encryption, build the project, and deploy it to the controller. You can now upload the application from the controller by using Topology Manager.

Uploading the Application From the Controller

Step	Action
1	Right-click the controller and select Upload . Result: The Upload dialog box opens.
2	Enter the IP address of the physical controller from which you want to upload the application.
3	Click the refresh button. Result: The software attempts to connect to the IP address that you have entered and displays the status of the device once the connection is established.
4	Verify the information that is displayed in the dialog box and click OK . Result: If the part number and version indicated in the dialog box match the values of the controller object to which you are uploading, the software initiates the upload from the controller. This replaces the control project that is associated to the controller object. Otherwise, a message about the detected discrepancy is displayed. If the application that you are uploading from the controller is protected by an application password, the Enter Password dialog box opens and you must enter the password of the application. Otherwise, you cannot upload the application. The result of the upload from the controller is indicated in the notification pane.

Online Modifications

What's in This Chapter

Online Modification of the M580 PAC Hardware Configuration 316

Online Modification of the M580 PAC Hardware Configuration

Overview

To make modifications in online mode, edit the control project and connect to the controller from Control Expert Editor.

Equal Online Mode

To connect in equal online mode, you can proceed either way:

- Build and deploy latest modifications from the Topology Manager before editing the control project.
- Build and deploy modifications from Control Expert Editor. If there are outstanding modifications that you have made in the Topology Manager, you need to synchronize them first to maintain the ability to connect in an equal state after closing the control project.

Once you have deployed to the controller, any modification that you make in the Topology Manager and that impacts its control project requires that you stop the controller to deploy this modification. In such case, a dialog box opens, page 307 and you have the possibility to cancel the modification and maintain the ability to connect in an equal state.

Also, using the **Synchronize Changes** command is forbidden except if you have made a change configuration on the fly (CCOTF).

Building CCOTF Changes

The table describes the requirements to be able to build a CCOTF modification from Control Expert Editor while you are connected in equal online mode.

Type of CCOTF modification	Requirement to build changes	Result when reopening the control project
Allowed online modification that has an impact on the network configuration of the PAC or its dependencies in the Topology Manager. (For example, adding a drop.)	You need to use the Synchronize Changes command, page 233.	You can connect to the controller in equal online mode given you have made no modification in the Topology Manager that impacts the PAC.
Other allowed online modifications. (For example, adding a digital I/O module to the local rack.)	None.	

Glossary

A

adapter:

An adapter is the target of real-time I/O data connection requests from scanners. It cannot send or receive real-time I/O data unless it is configured to do so by a scanner, and it does not store or originate the data communications parameters necessary to establish the connection. An adapter accepts explicit message requests (connected and unconnected) from other devices.

architecture:

Architecture describes a framework for the specification of a network that is constructed of these components:

- Physical components and their functional organization and configuration.
- Operational principles and procedures.
- Data formats used in its operation.

automation asset:

Consists of the equipment but without motors, valves, pipes, sensors, and so on.

B

BOOTP:

Abbreviation for Bootstrap Protocol. Client/server protocol whereby a client sends a broadcast to obtain an IP address from a server. The client identifies itself to the server by providing its MAC address. The server, which maintains a preconfigured table of client device MAC addresses and associated IP addresses sends the client its predefined IP address. The BOOTP protocol can also provide other IP addressing data such as the default gateway and host name. BOOTP operation consists of two phases and uses UDP ports 67 and 68.

broadcast address:

Address that is the ending address of the address range on a subnet. For example, in subnet 10.101.128.0/17, the ending address is 10.101.255.255. Messages sent to the broadcast address are received by all hosts of the subnet. The broadcast address is one of the two reserved IP addresses that must not be assigned to a host.

broadcast domain:

Represents the range of host addresses of a subnet that receive a broadcast. For example, the broadcast domain of subnet 192.168.1.0/24 (class C) encompasses usable host addresses 192.168.1.1 to 192.168.1.254, which receive a broadcast addressed to 192.168.1.255.

broadcast:

A message sent to all devices on a subnet by using the broadcast address as host address.

C

CIDR:

Abbreviation for classless inter-domain routing. A method that allows defining subnet masks without the constraint of using 8-bit boundaries that is normally created by classful networks. It uses variable-length subnet masking (VLSM). In CIDR notation, an IPv4 address is written by using the format <IP address/suffix> where *suffix* is the number of bits set to 1, starting from the left, when the mask is written in binary format and that represent the network ID portion of the IP address. For example, in 192.168.10.1/26, 26 corresponds to 11111111.11111111.11111111.11000000 in binary, which is subnet mask 255.255.255.192. The remaining 6 bits are used for IP addresses of the subnet (63 in this example, from 192.168.10.1 to 192.168.10.63).

classful device:

Defines a device that can only be assigned an IP address belonging to one of the existing classes of networks (for example, class B).

classless device:

Defines a device that can be assigned an IP address that does not belong to one of the existing classes of networks (for example, it can be assigned an IP address belonging to subnet 10.101.128.0/17 or starting with 192.168. and having 255.255.0.0 as subnet mask).

control network:

An Ethernet-based network containing but not limited to engineering stations (server and clients), SCADA systems, other computers. It is connected to the device network by a routing device.

D

device network:

An Ethernet-based network within an RIO network that contains both RIO and distributed equipment. Devices connected on this network follow specific rules to allow RIO determinism.

device:

Configurable instance of an equipment of the Topology Manager catalog. These objects are used in a system project to engineer the hardware architecture of a control system.

Examples of devices are a switch, a motor controller, a station node, or a PAC. *Modules* may also be referred to as devices when a mix of modules and devices are described.

DHCP:

Abbreviation for Dynamic Host Configuration Protocol. Client/server protocol that is an extension of the Bootstrap Protocol (BOOTP) and automatically assigns an IP host with IP addressing data such as IP address, subnet mask, gateway address, and DNS server name. DHCP does not require maintaining a table, which identifies each network device. The client identifies itself to the DHCP server by providing its MAC address or a uniquely assigned device identifier. DHCP uses UDP ports 67 and 68.

DIO network:

A network containing distributed equipment, in which I/O scanning is performed by a CPU with DIO communication server service on the local rack. DIO network traffic is delivered after RIO traffic, which takes priority in an RIO network.

distributed equipment:

Any Ethernet device (Schneider Electric device, PC, servers, or third-party devices) that supports exchange with a CPU or other Ethernet I/O scanner service.

DTM:

Abbreviation for device type manager. Device driver running on the host computer. It provides a unified structure for accessing device parameters, configuring and operating the devices, and troubleshooting devices. DTMs can range from a simple graphical user interface (GUI) for setting device parameters to a highly sophisticated application capable of performing complex real-time calculations for diagnosis and maintenance purposes. In the context of a DTM, a device can be a communications module or a remote device on the network.

E**Ethernet DIO scanner service:**

This embedded DIO scanner service of M580 CPUs manages distributed equipment on an M580 device network.

Ethernet I/O scanner service:

This embedded Ethernet I/O scanner service of M580 CPUs manages distributed equipment **and** RIO drops on an M580 device network.

EtherNet/IP:

A network communication protocol for industrial automation applications that combines the standard Internet transmission protocols of TCP/IP and UDP with the application layer common industrial protocol (CIP) to support both high-speed data exchange and industrial control. EtherNet/IP employs electronic data sheets (EDS) to classify each network device and its functionality.

Ethernet:

A 10 Mb/s, 100 Mb/s, or 1 Gb/s, CSMA/CD, frame-based LAN that can run over copper twisted-pair or fiber optic cable, or wireless. The IEEE standard 802.3 defines the rules for configuring a wired Ethernet network; the IEEE standard 802.11 defines the rules for configuring a wireless Ethernet network. Common forms include 10BASE-T, 100BASE-TX, and 1000BASE-T, which can utilize category 5e copper twisted-pair cables and RJ45 modular connectors.

explicit messaging:

TCP/IP-based messaging for Modbus TCP and EtherNet/IP. It is used for point-to-point, client/server messages that include both data (typically, unscheduled information between a client and a server) and routing information. In EtherNet/IP, explicit messaging is considered class 3 type messaging and can be connection-based or connectionless.

F**FTP:**

Abbreviation for file transfer protocol. Protocol that copies a file from one host to another over a TCP/IP-based network, such as the Internet. FTP uses a client-server architecture as well as separate control and data connections between the client and server.

G**gateway:**

A gateway device interconnects two different networks, sometimes using different network protocols. When it connects networks using different protocols, a gateway converts a datagram from one protocol stack into the other. When used to connect two IP-based networks, a gateway (also called a router) has at least two IP addresses, each one belonging to only one network.

H

HTTP:

Abbreviation for hypertext transfer protocol. A networking protocol for distributed and collaborative information systems. HTTP is the basis of data communication for the web.

I

I/O scanner:

An Ethernet service that continuously polls I/O modules to collect data, status, event, and diagnostics information. This process monitors inputs and controls outputs. This service supports both RIO and DIO logic scanning.

IP address:

The 32-bit identifier that is written in decimal format by using four sets of three numbers separated by a dot. It represents the address of a device connected to a network using TCP/IP. The IP address contains the identity of the network and of the host. Both are defined by the network address and the subnet mask. IP addresses can be assigned manually or dynamically.

IP:

Abbreviation for Internet Protocol. Messaging protocol that operates at OSI layer 3, the network layer. The protocol is responsible for transmitting packets towards a host IP address.

L

logical network:

Logical representation of a network or subnet. It is defined by a broadcast domain.

M

mask:

See subnet mask.

module:

Describes hardware that mounts on the rack of a modular entity or inside a device such as network interface cards (NICs) or communication cards.

N

network address:

The address of a network is the starting address of the IP address range on that network in which the host address is 0. For example, 192.168.1.0 is the network address of class C network 192.168.1 (subnet mask 255.255.255.0). The network address is one of the two IP addresses that are reserved and must not be assigned to a host.

NTP:

Abbreviation for network time protocol. Protocol to synchronize computer system clocks. The protocol uses a jitter buffer to resist the effects of variable latency.

O

object:

Generic term that is used to describe a variety of items that are part of a system project, such as devices, physical links, executables, logical networks.

OSI:

Abbreviation for Open Systems Interconnection. A reference model that describes the seven layers required for network activity and designed by the International Organization for Standardization (ISO). It is intended to allow the connection of heterogeneous computer systems. A protocol is associated to each layer.

P**PAC:**

Abbreviation for programmable automation controller. It is the brain of an industrial manufacturing process. It automates a process as opposed to relay control systems. PACs are computers suited to survive the harsh conditions of an industrial environment. A PAC is composed of one or more local racks, remote racks (drops), and a variety of modules in each rack.

port mirroring:

In this mode, data traffic that is related to the source port on a network switch is copied to another destination port. This allows a connected management tool to monitor and analyze the traffic.

Q**QoS:**

Abbreviation for quality of service. Refers to the practice of assigning different priorities to traffic types for the purpose of regulating data flow on the network. In an industrial network, QoS is used to provide a predictable level of network performance.

R**redundant controller:**

Generic term that is used to refer a Quantum Hot Standby controller and/or an M580 redundant controller.

router:

Electronic device that forwards data packets between networks.

RSTP:

Abbreviation for rapid spanning tree protocol. Allows a network design to include spare (redundant) links to provide automatic backup paths if an active link stops working, without the need for loops or manual enabling/disabling of backup links.

S**service port:**

A dedicated Ethernet port on M580 modules. The port may support these major functions depending on the module type:

- Port mirroring: Used for diagnostics.
- Access: To connect an HMI/Control Expert/ConneXview to the CPU.
- Extended: To extend the device network to another subnet.
- Disabled: Disables the port so that no traffic is forwarded.

SMTP:

Abbreviation for simple mail transfer protocol. An email notification service that allows controller-based projects to report alarms or events. The controller monitors the system and can automatically create an email message alert with data, alarms, and/or events. Mail recipients can be either local or remote.

SNMP:

Abbreviation for simple network management protocol. Protocol that provides network management services between a central management console and network devices such as routers, printers, and PACs.

The protocol encompasses three parts:

- Software agents that reside in the device.
- An agent management application.
- A network management system (NMS) terminal.

The protocol is part of the Internet protocol (IP) suite as defined by the Internet engineering task force (IETF), which consists of network management guidelines, including an application layer protocol, a database schema, and a set of data objects.

SNTP:

Abbreviation for simple network time protocol. See NTP.

subnet address:

The address of a subnet is the starting address of the IP address range on that network and in which the host address is 0. For example, 192.168.1.0 is the network address of class C network 192.168.1 (subnet mask 255.255.255.0). The subnet address is one of the two IP addresses that are reserved and must not be assigned to a host.

subnet mask:

A 32-bit value that indicates the number of available host addresses on a subnet, which uses TCP/IP knowing that the first and last addresses are reserved (for example, subnet mask 255.255.192.0 allows 317 addresses for classless devices). In classful addressing, the subnet mask follows a convention as to the number of available hosts (for example, for a class C network, the subnet mask is 255.255.255.0, which allows 254 host addresses).

switch:

A multi-port device used to segment the network and limit the likelihood of collisions. Packets are filtered or forwarded based upon their source and destination addresses. Switches are capable of full-duplex operation and provide full network bandwidth to each port. A switch can have different input/output speeds (for example, 10, 100, or 1000Mbps). Switches are considered OSI layer 2 (data link layer) devices.

system project:

Means to engineer a control system by using the Topology Manager of Control Expert. It consists of a hardware architecture encompassing one or more PACs with their control projects, devices, and logical networks.

system server:

Server software component of a Control Expert infrastructure that manages system project data and requests from Topology Manager clients.

T**TCP/IP:**

Also known as *Internet protocol suite*, TCP/IP is a collection of protocols used to conduct transactions on a network. The suite takes its name from two commonly used protocols: transmission control protocol and Internet protocol. TCP/IP is a connection-oriented protocol that is used by Modbus TCP and EtherNet/IP for explicit messaging.

TCP:

Abbreviation for transmission control protocol. Used together with the IP, the TCP/IP protocol stack is described as a 5-layer model. TCP is responsible for the reliability of the transmission.

TFTP:

Abbreviation for trivial file transfer protocol. A simplified version of *file transfer protocol* (FTP), TFTP uses a client-server architecture to make connections between two devices. From a TFTP client, individual files can be uploaded to or downloaded from the server by using the user datagram protocol (UDP) to transport data.

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