SoMachine

Device Type Manager (DTM)
User Guide

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www.schneider-electric.com

Schneider Electric

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Table of Contents

Safety Information

Important Information

NOTICE

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.

BEFORE YOU BEGIN

Do not use this product on machinery lacking effective point-of-operation guarding. Lack of effective point-of-operation guarding on a machine can result in serious injury to the operator of that machine.

⚠ WARNING

UNGUARDED EQUIPMENT

- Do not use this software and related automation equipment on equipment which does not have point-of-operation protection.
- Do not reach into machinery during operation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

This automation equipment and related software is used to control a variety of industrial processes. The type or model of automation equipment suitable for each application will vary depending on factors such as the control function required, degree of protection required, production methods, unusual conditions, government regulations, etc. In some applications, more than one processor may be required, as when backup redundancy is needed.

Only you, the user, machine builder or system integrator can be aware of all the conditions and factors present during setup, operation, and maintenance of the machine and, therefore, can determine the automation equipment and the related safeties and interlocks which can be properly used. When selecting automation and control equipment and related software for a particular application, you should refer to the applicable local and national standards and regulations. The National Safety Council's Accident Prevention Manual (nationally recognized in the United States of America) also provides much useful information.

In some applications, such as packaging machinery, additional operator protection such as point-of-operation guarding must be provided. This is necessary if the operator's hands and other parts of the body are free to enter the pinch points or other hazardous areas and serious injury can occur. Software products alone cannot protect an operator from injury. For this reason the software cannot be substituted for or take the place of point-of-operation protection.

Ensure that appropriate safeties and mechanical/electrical interlocks related to point-of-operation protection have been installed and are operational before placing the equipment into service. All interlocks and safeties related to point-of-operation protection must be coordinated with the related automation equipment and software programming.

NOTE: Coordination of safeties and mechanical/electrical interlocks for point-of-operation protection is outside the scope of the Function Block Library, System User Guide, or other implementation referenced in this documentation.

START-UP AND TEST

Before using electrical control and automation equipment for regular operation after installation, the system should be given a start-up test by qualified personnel to verify correct operation of the equipment. It is important that arrangements for such a check be made and that enough time is allowed to perform complete and satisfactory testing.

⚠ WARNING

EQUIPMENT OPERATION HAZARD

- Verify that all installation and set up procedures have been completed.
- Before operational tests are performed, remove all blocks or other temporary holding means used for shipment from all component devices.
- Remove tools, meters, and debris from equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Follow all start-up tests recommended in the equipment documentation. Store all equipment documentation for future references.

Software testing must be done in both simulated and real environments.

Verify that the completed system is free from all short circuits and temporary grounds that are not installed according to local regulations (according to the National Electrical Code in the U.S.A, for instance). If high-potential voltage testing is necessary, follow recommendations in equipment documentation to prevent accidental equipment damage.

Before energizing equipment:

- Remove tools, meters, and debris from equipment.
- Close the equipment enclosure door.
- Remove all temporary grounds from incoming power lines.
- Perform all start-up tests recommended by the manufacturer.

OPERATION AND ADJUSTMENTS

The following precautions are from the NEMA Standards Publication ICS 7.1-1995 (English version prevails):

- Regardless of the care exercised in the design and manufacture of equipment or in the selection and ratings of components, there are hazards that can be encountered if such equipment is improperly operated.
- It is sometimes possible to misadjust the equipment and thus produce unsatisfactory or unsafe operation. Always use the manufacturer's instructions as a guide for functional adjustments. Personnel who have access to these adjustments should be familiar with the equipment manufacturer's instructions and the machinery used with the electrical equipment.
- Only those operational adjustments actually required by the operator should be accessible to the operator. Access to other controls should be restricted to prevent unauthorized changes in operating characteristics.

About the Book

At a Glance

Document Scope

This manual provides a summary on FDT/ DTM standards and explains how to set devices configured with DTMs in association with SoMachine. This document will help you to install DTMs within SoMachine and how to access those DTMs.

For information specific to the DTMs each DTM has its own online help system.

Validity Note

This document has been updated for the release of SoMachine V4.3.

The technical characteristics of the devices described in this document also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the reference or product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
SoMachine Programming Guide	EIO0000000067 (ENG) EIO0000000069 (FRE) EIO0000000068 (GER) EIO0000000071 (SPA) EIO0000000070 (ITA) EIO0000000072 (CHS)
SoMachine Industrial Ethernet User Guide	EIO0000002215 (ENG) EIO0000002216 (FRE) EIO0000002217 (GER) EIO0000002218 (SPA) EIO0000002219 (ITA) EIO0000002220 (CHS)

You can download these technical publications and other technical information from our website at http://www.schneider-electric.com/en/download

Product Related Information

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.[1]
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed 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.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in this manual, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.

In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as *safety*, *safety function*, *safe state*, *fault*, *fault reset*, *malfunction*, *failure*, *error*, *error message*, *dangerous*, etc.

Among others, these standards include:

Standard	Description
EN 61131-2:2007	Programmable controllers, part 2: Equipment requirements and tests.
ISO 13849-1:2008	Safety of machinery: Safety related parts of control systems. General principles for design.
EN 61496-1:2013	Safety of machinery: Electro-sensitive protective equipment. Part 1: General requirements and tests.
ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN 1088:2008 ISO 14119:2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
ISO 13850:2006	Safety of machinery - Emergency stop - Principles for design
EN/IEC 62061:2005	Safety of machinery - Functional safety of safety-related electrical, electronic, and electronic programmable control systems
IEC 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: General requirements.
IEC 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Requirements for electrical/electronic/programmable electronic safety-related systems.
IEC 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems: Software requirements.
IEC 61784-3:2008	Digital data communication for measurement and control: Functional safety field buses.

Standard	Description
2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility Directive
2014/35/EU	Low Voltage Directive

In addition, terms used in the present document may tangentially be used as they are derived from other standards such as:

Standard	Description
IEC 60034 series	Rotating electrical machines
IEC 61800 series	Adjustable speed electrical power drive systems
IEC 61158 series	Digital data communications for measurement and control – Fieldbus for use in industrial control systems

Finally, the term *zone of operation* may be used in conjunction with the description of specific hazards, and is defined as it is for a *hazard zone* or *danger zone* in the *Machinery Directive* (*2006/42/EC*) and *ISO 12100:2010*.

NOTE: The aforementioned standards may or may not apply to the specific products cited in the present documentation. For more information concerning the individual standards applicable to the products described herein, see the characteristics tables for those product references.

Chapter 1
Field Device Tool (FDT) / Device Type Manager (DTM) in SoMachine

Overview

This chapter provides information about the use of FDT/DTM in SoMachine.

What Is in This Chapter?

This chapter contains the following topics:

SoMachine as an FDT Frame Application

Overview

FDT/DTM is a manufacturer-independent concept which allows the parameterization of field devices from different manufacturers using only one program in automation technology.

SoMachine is an FDT Frame Application for preferred fieldbusses.

NOTE: The use of third-party DTMs is not documented in the document. If you want to use one with SoMachine software, contact your local Schneider Electric representative.

FDT Concept with SoMachine

The FDT standard is used to define the interfaces between device-specific software components (DTMs) and SoMachine. The focus of the current version of FDT is on engineering, commissioning, diagnostics, and documentation of fieldbus based control systems.

Device Type Manager (DTM) Installation

Overview

The device-specific software component is called a Device Type Manager (DTM), which is supplied with the device by the manufacturer.

DTM installation in SoMachine is composed of two steps:

- Install the DTMs on the PC with SoMachine. This makes the DTMs detectable by SoMachine.
- Import the DTMs in the **Device Repository** of SoMachine.

DTM Installation on the PC

A base set of DTMs is included with the SoMachine software delivery and can be installed during the SoMachine software installation by the SoMachine Configuration Manager.

You can download other Schneider Electric DTMs from *www.schneider-electric.com*.

Refer to your DTMs provider to install third-party DTMs on your PC.

NOTE: The DTMs are installed/uninstalled on the PC that runs SoMachine and are accessible in the **Start → Control Panel → Add or Remove Programs** window.

DTM Uninstallation on the PC

If you installed a DTM using the SoMachine Configuration Manager, you must use the SoMachine Configuration Manager to uninstall the DTM. If you installed a DTM not using the SoMachine Configuration Manager, you must use **Start → Control Panel → Add or Remove Programs** window to uninstall the DTM.

Device Type Manager (DTM) Import

Overview

NOTE: The DTM installed with SoMachine Configuration Manager are automatically imported in SoMachine.

There are 3 methods to import DTMs in SoMachine:

- **DTM Repository** to import DTMs officially supported by SoMachine
- **DTM Repository** for third-party DTM: to import other Schneider Electric and third-party DTMs (see note below)
- **Device Repository** to import all DTMs (it can be slow if many DTMs are installed on the computer because no filter is used during the DTM discovery process).

NOTE: If you wish to use a third-party DTM with SoMachine software, contact your local Schneider Electric representative.

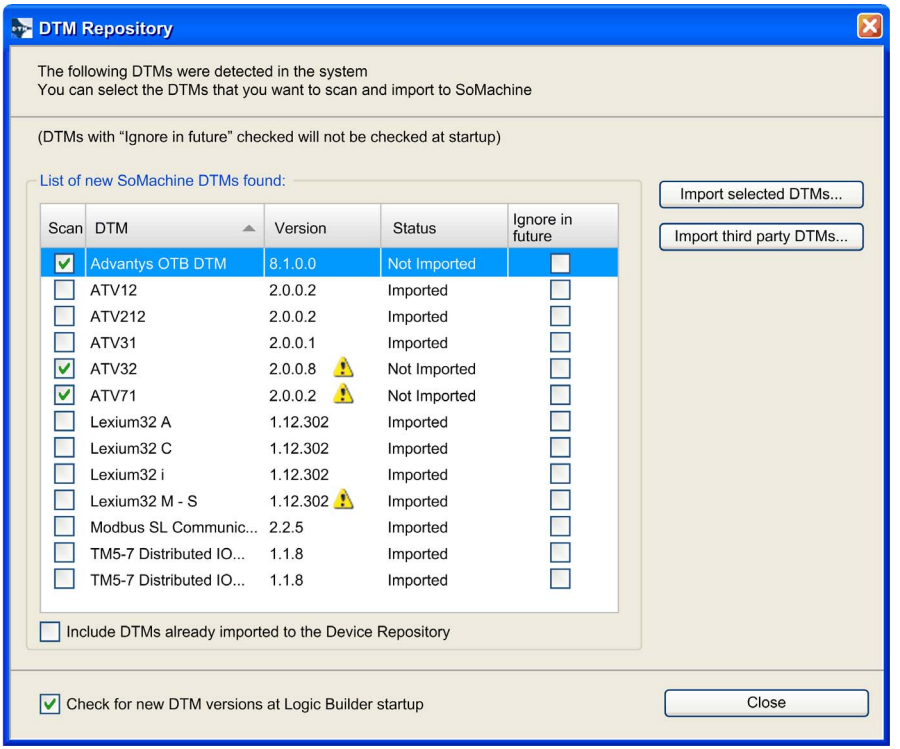
DTM Import into SoMachine with the DTM Repository

NOTE: The first time SoMachine Logic Builder is opened, the **DTM Repository** is automatically displayed if DTMs are installed on the computer and not yet imported into the **Device Repository**. The **DTM Repository** is also accessible from SoMachine Central *(see SoMachine Central, User Guide)*.

The table describes how to import DTMs in SoMachine from the DTMs list in the **DTM Repository**:

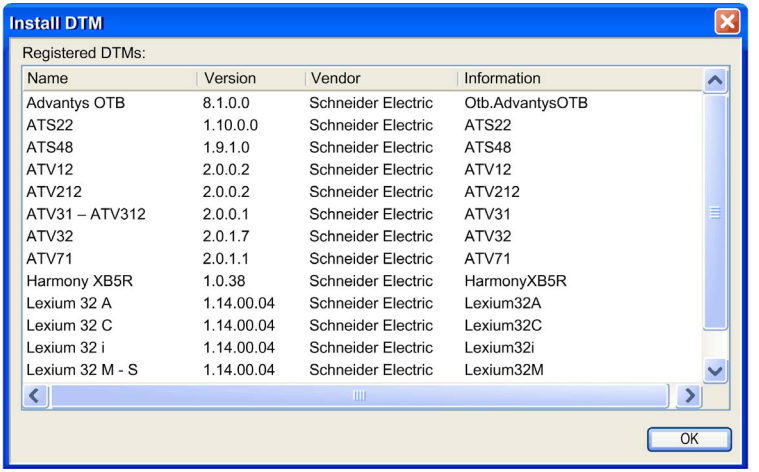
Step	Action
1	In the menu bar, select **Tools → DTM Repository**. **Result:** The **DTM Repository** window is displayed.

Step	Action
2	Select the DTMs to import into the **Device Repository**:



Window description:

- **Scan**: if unchecked, the DTM will not be imported in the **Device Repository**.
- **DTM**: name of the DTM.
- **Version**: version of the DTM installed on the PC.
- **Status**:
  - **Not Imported**: The DTM is not imported in the **Device Repository**.
  - **Imported**: The DTM is imported in the **Device Repository**.
  - **Update Needed**: The DTM update is required.
- **Ignore in future**: if checked, the DTM will no longer appear in subsequent calls of the **DTM Repository**.
- **Include DTMs already imported to the Device Repository**: if checked, the DTMs that have already been imported to the **Device Repository** are displayed.
- **Check for new DTM versions at Logic Builder startup**: if checked and there are new DTM versions, causes an automatic launch of the **DTM Repository** at SoMachine Logic Builder startup.

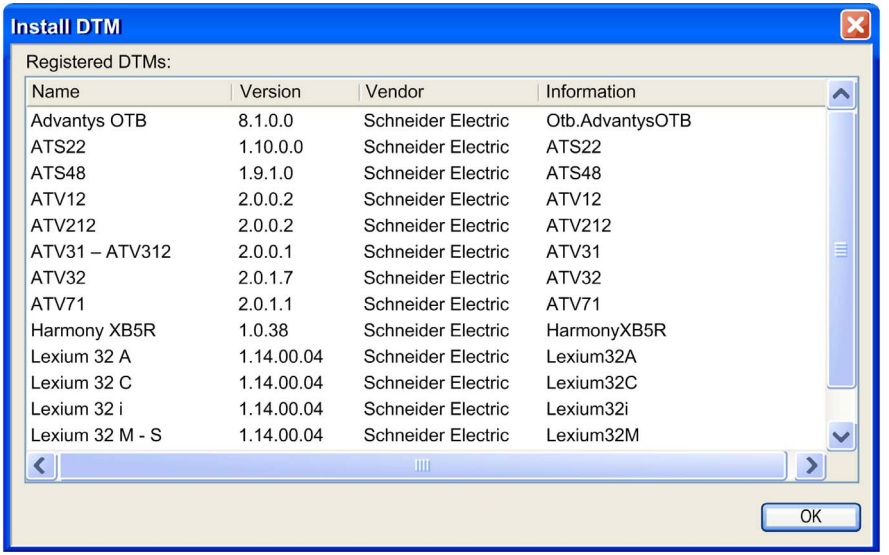
Step	Action
3	Click **Import Selected DTMs**. **Result:** The **Install DTM** window is displayed. The PC is scanned to detect DTMs installed and registered on the PC. All DTMs officially supported by SoMachine which have been detected as installed and registered on the PC are listed.
4	Wait for the end of the scan. **Result:** All DTMs officially supported by SoMachine which are currently installed and registered on the PC are displayed: 
5	Click **OK**. **Result:** The selected DTMs are now imported and available in the **Device Repository** window and the **Hardware Catalog**.

NOTE: The imported DTMs are available for all your existing and future projects.

DTM Import in SoMachine with the Device Repository

The table describes how to import DTMs in SoMachine from the DTMs list in the **Device Repository**:

Step	Action
1	Launch SoMachine Logic Builder.
2	In the menu bar, select **Tools → Device Repository**. **Result:** The **Device Repository** window is displayed.
3	Click **Install DTM**. **Result:** The **Install DTM** window is displayed. The PC is scanned to detect DTMs installed and registered on the PC. All DTMs which have been detected as installed and registered on the PC are listed.

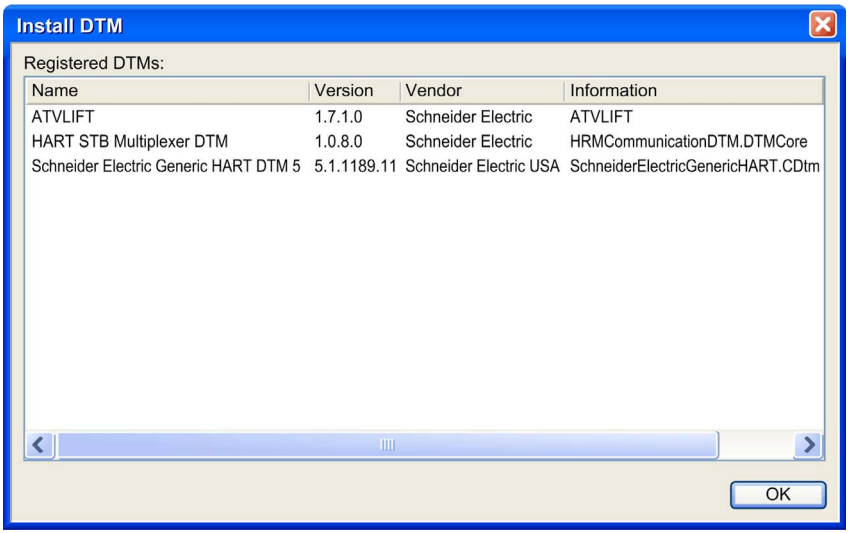
Step	Action
4	Wait for the end of the scan. **Result:** All DTMs which are currently installed and registered on the PC are displayed: 
5	Click **OK**. **Result:** The selected DTMs are now imported and available in the **Device Repository** window and the **Hardware Catalog**.
6	Click **Close**.

NOTE: For more information, refer to Device Repository *(see SoMachine, Menu Commands, Online Help)*.
The imported DTMs are available for all your existing and future projects.

Third-Party DTM Import in SoMachine with the DTM Repository

The table describes how to import third-party DTMs in SoMachine:

Step	Action
1	In the menu bar, select **Tools → DTM Repository**. **Result:** The **DTM Repository** window is displayed.
2	Click **Import third party DTMs**. **Result:** The **Install DTM** window is displayed. The PC is scanned to detect third-party DTMs installed and registered on the PC. All third-party DTMs which have been detected as installed and registered on the PC are listed.

Step	Action
3	Wait for the end of the scan. **Result:** All third-party DTMs which are currently installed and registered on the PC are displayed (the list is an example): 
4	Click **OK**. **Result:** The selected DTMs are now imported and available in the **Device Repository** window.

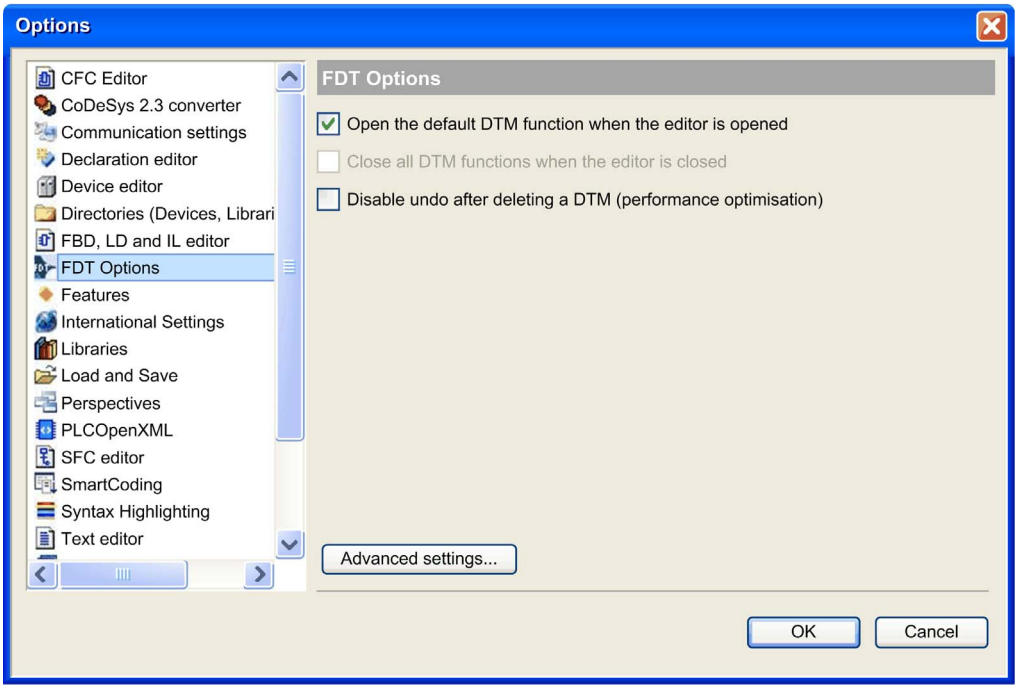
NOTE: If you wish to use a third-party DTM with SoMachine software, contact your local Schneider Electric representative.

FDT Options

Presentation

The **Tools → Options → FDT Options** dialog box allows selection of options concerning the Device Type Manager (DTM) functionality.

FDT Options dialog box



This table describes the **FDT Options**:

Option	Description
Open the default DTM function when the editor is opened	By double-clicking the device in the **Devices tree**: ● If activated: the DTM configuration tab is opened. ● If deactivated: only the usual SoMachine tabs are opened.
Close all DTM functions when the editor is closed	Not used.

Option	Description
Disable undo after deleting a DTM (performance optimization)	If activated, the **Undo** *(see SoMachine, Menu Commands, Online Help)* command is not available after deleting a DTM. Consequently, the SoMachine project size increases if a DTM is added to the project, and decreases if the DTM is subsequently deleted. If deactivated, the **Undo** command is available after deleting a DTM. Consequently, the SoMachine project size increases if a DTM is added to the project, but does not decrease if the DTM is subsequently deleted.
Advanced settings	Opens the second **FDT Options** window for advanced settings.

Advanced Settings

The table describes the advanced settings of **FDT Options**:

Option	Description
User management according to FDT specification	Not used.
Check for changed DTM parameters before application login	If selected, an automatic parameter download to the devices is performed before login if parameters have been changed since the last download. This is useful to keep consistency, but it can result in longer execution time for login (depends on DTM).
Set DTMs offline after application logout	If selected, the DTMs are switched to offline mode after logout from controller. Each DTM instance occupies memory. This memory is freed up again as soon as the editor is closed.
Restrict DTM instance count to control memory usage	Not used.
Maximum number of DTM instances	Not used.
Minimum amount of free memory (in MB)	Not used.
Create temporary device description files when updating the catalog	Not used.
Verbose mode	If this option is activated, detailed information and messages will be displayed in the **Messages** view. **NOTE:** Use verbose mode for debug purposes. When this mode is active, many messages are logged in memory and thereby restrict memory availability to SoMachine.
Show Popups for errors reported by a DTM	If activated, the DTM reports detected errors in a pop-up window. If deactivated, there is no detected error notification. However, if verbose mode is activated, the DTM reports its detected errors in the **Messages** view. **NOTE:** Pop-up windows need to be confirmed. This can slow down operation (for example: for communication interruptions, if a device is not responding, a number of pop-up messages can be displayed).

DTM Commands

Overview

The availability of DTM commands depends on the device and the state of the device.

DTM commands are available by either:

- Double-clicking the device node in the Devices tree to display the **Configuration of the device** tab, which has a toolbar containing a subset of the DTM commands.
- Right-clicking the device node in the Devices tree to display contextual menu commands.

If a dialog or function is currently not available, the corresponding menu command or toolbar icon is grayed out.

DTM Commands

This table describes the DTM commands:

Toolbar Icon	Menu Command	Description
N/A	**Configuration**	Accesses the configuration user interface *(see page 27)*, which allows you to configure the selected device. **NOTE:** This interface is specific to the device and is provided by the DTM manufacturer.
	**Edit Connection**	Displays the **Edit Connection** window *(see page 25)*, which allows you to configure the connection parameters.
	**Connect**	Connects to the device.
N/A	**Upload and Connect**	Connects to the device and transfers the configuration from the selected device to the PC.
	**Disconnect**	Disconnects from the device.
	**Upload from Device**	Transfers the configuration from the selected device to the PC.
	**Download to Device**	Transfers the configuration from the PC to the selected device.

Toolbar Icon	Menu Command	Description
Device	Advanced configuration > Additional functions	Opens a submenu containing additional menu commands representing operations on the selected device. NOTE: These additional operations are specific to the device and are provided by the DTM manufacturer. If no additional operations are available, this menu command appears dimmed.
Documentation	Advanced configuration > Documentation	Opens a submenu containing a list of additional information provided by the DTM manufacturer for the selected device. NOTE: If no additional information is provided, this menu command appears dimmed.

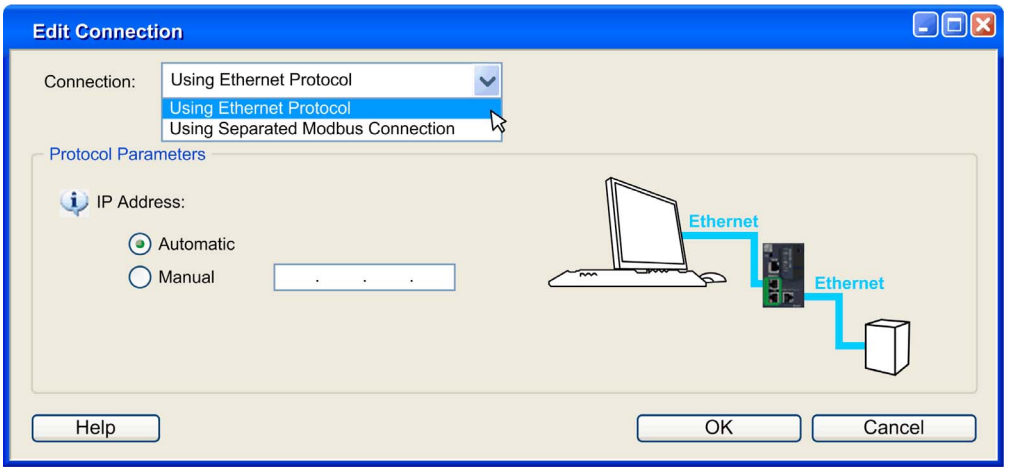
Edit Connection Window

Overview

The **Edit Connection** window allows you to define an alternative communication channel between the DTM and the device. This is used in the following cases:

- You want to connect the device with an intermediate IP address, different from the address configured in the project (for example, the default address)
- Your PC is connected to the controller via USB, this communication channel is not suitable for communications between the DTM and the device. You can switch to another protocol to make the configuration (for example with a TSXCUSB485 USB to Modbus SL dongle).

Right-click the device node in the **Devices tree** and click **Edit Connection...** to display the **Edit Connection** window:



Description

This table describes the **Edit Connection** window:

Item	Description
Connection	Selects the connection type from the drop-down list: ● **Using Ethernet Protocol**: connection through an Ethernet protocol (Modbus TCP or EtherNet/IP). ● **Using Separated Modbus Connection**: connection through the Modbus serial line port of the device.
Protocol Parameters	Defines the associated parameters of the selected protocol.

Item		Description
Using Ethernet Protocol	**IP Address**	Selects the addressing mode: ● **Automatic**: the IP address is automatically retrieved from the project configuration. ● **Manual**: enter the device IP address.
Using Separated Modbus Connection	**COM Port**	Selects the **COM Port** from the drop-down list. **NOTE:** If the port is not in the list, click the Refresh button.
	Modbus Address	Selects the Modbus Serial Line address: ● **Automatic**: the Modbus Serial Line address is automatically selected. ● **Manual**: enter the Modbus Serial Line address of the device.

NOTE: If the protocol is changed, the device is displayed in red in the **Devices tree** to inform that this setting is for temporary use.

Advanced Configuration Menu

Access

Right-click the device node in the **Devices tree** and click **Advanced Configuration** to display the contextual menu.

Description

The availability in this menu of dialogs or functions depends on the device and the state of the device. If a dialog or function is currently not available, then the menu command is grayed out.

This table describes the **Advanced Configuration** submenu:

Menu command	Description
Standard functions	Opens another submenu which contains standard functions, for example the configuration user interface which enables you to configure the selected device. **NOTE:** This interface is specific to the device and is provided by the DTM manufacturer.
Additional functions	Opens another submenu which contains additional menu commands representing operations on the selected device. **NOTE:** These additional operations are specific to the device and are provided by the DTM manufacturer. If no additional operations are available, this menu command appears dimmed.
Documentation	Opens a submenu which contains a list of additional information provided by the selected device. **NOTE:** If no additional information is provided, this menu command appears dimmed.
Export DTM	Exports the selected device with all stored parameters to a .zip file. **NOTE:** The exported file is intended to be imported in SoMachine only. This file cannot be used with another FDT application.
Import DTM	Imports a device including all parameters from a file which was created by **Export DTM**. The export must have been executed within SoMachine. **NOTE:** This menu command is supported only by the CANopen manager, Industrial Ethernet manager, and Modbus Serial Line manager. You can only import a device from the same network from which it was exported.
Connect	Connects to the selected device if the device is offline.
Disconnect	Disconnects from the selected device if the device is online.

Menu command	Description
Parameter download to all attached devices...	Transfers stored parameters from the PC to all devices represented by DTMs. **NOTE:** This menu command is supported only by the CANopen manager, Industrial Ethernet manager and communication DTM.
Download to Device	Transfers stored parameters from the PC to the selected device.
Upload from Device	Transfers current parameters from the selected device to the PC.

Devices with Device Type Manager (DTM)

Device DTMs

The table lists all DTMs which are delivered with the standard installation of SoMachine:

DTM name	Supported function	CANopen supported	Modbus SL supported	Modbus TCP supported	EtherNet/IP supported
Advantys OTB DTM	Configuration of Advantys OTB islands	Yes	No	No	No
TM5-TM7 DTM	Configuration of TM5 and TM7 devices	Yes	No	No	No
ATS22 DTM	Configuration of Altistart 22	No	Yes	No	No
ATS48 DTM	Configuration of Altistart 48	No	Yes	No	No
ATV12 DTM	Configuration of Altivar 12	No	Yes	No	No
ATV212 DTM	Configuration of Altivar 212	No	Yes	No	No
ATV31-312 DTM	Configuration of Altivar 31	No	Yes	No	No
	Configuration of Altivar 312	Yes	Yes	No	No
ATV32 DTM	Configuration of Altivar 32	Yes	Yes	Yes	Yes
ATV320 DTM	Configuration of Altivar 320	Yes	Yes	Yes	Yes
ATV340 DTM	Configuration of Altivar 340	Yes	Yes	Yes	Yes
ATV61 DTM	Configuration of Altivar 61	No	Yes	No	No
ATV6•• DTM	Configuration of Altivar 6••	No	Yes	Yes	Yes
ATV71 DTM	Configuration of Altivar 71	Yes	Yes	Yes	Yes
ATV9•• DTM	Configuration of Altivar 9••	No	Yes	Yes	Yes
Lexium 32 A DTM	Configuration of Lexium 32 A	Yes	Yes	No	No
Lexium 32 C DTM	Configuration of Lexium 32 C	No	Yes	No	No
Lexium 32 i DTM	Configuration of Lexium 32 i	Yes	Yes	No	No
Lexium 32 M - S DTM	Configuration of Lexium 32 M	Yes	Yes	Yes	Yes
	Configuration of Lexium 32 S	No	Yes	No	No
TeSysT DTM	Configuration of TeSys T	No	Yes	No	No
TeSysU DTM	Configuration of TeSys U	No	Yes	No	No
Harmony XB5R DTM	Configuration of ZBRN2 access point	No	Yes	No	No
	Configuration of ZBRN1 access point	No	No	Yes	No

NOTE: At any time, new DTMs, or new versions of existing DTMs, can be installed into the SoMachine environment. For more information, refer to *DTM Installation* *(see page 15)*.

Communication DTM

Communication DTMs provide communication paths to a device for a certain fieldbus protocol (for example Modbus).

This table lists the communication DTM in SoMachine:

DTM name	Supported function	Supported fieldbus
Modbus Serial Line Manager	Establishes a Modbus serial communication for any Modbus serial line device	Modbus SL

Rules and Regulations

The limitations for the different DTMs are the following:

DTM	Rule / regulation
Lexium 32 A DTM Lexium 32 C DTM Lexium 32 M - S DTM Lexium 32 i DTM ATS22 DTM ATS48 DTM ATV12 DTM ATV212 DTM ATV31-312 DTM ATV320 DTM ATV340 DTM ATV61 DTM ATV6•• DTM ATV71 DTM ATV9•• DTM TeSysU DTM TeSysT DTM	Only one of these DTMs can be in connected mode simultaneously.
All	To configure a device on a fieldbus using the corresponding DTM, a valid application must have been previously downloaded to the corresponding controller.

When connecting a DTM to a device using the network, the DTM communicates in parallel with the running application. The overall performance of the system is impacted and may overload the network, and therefore have consequences for the coherency of data across devices under control.

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION Do not connect DTMs that communicate across the device network on a running application if the DTM causes deleterious effect on performance. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Compatibility of SoMachine Projects Using DTM Devices

Overview

Generally the DTM design supports only one DTM of a certain version on a PC.

Installing DTMs

Before you open a project using DTM devices, you have to install the respective DTMs using SoMachine Configuration Manager.

Launching SoMachine and Updating the Device Repository

Step	Action	Comment
1	After installing the DTMs, launch SoMachine.	The **SoMachine DTMs Monitor** dialog box is displayed showing a **List of new SoMachine DTMs found**.
2	Select the DTMs you want to import to the **Device Repository**.	This is done by activating the check boxes in the **Scan** column.
3	Click **Import selected DTMs**.	The selected DTMs are imported to the **Device Repository**.

Opening and Updating Your Project

Step	Action	Comment
1	After updating the **Device Repository**, open your project.	The **Update project** dialog box is displayed.
2	Select **OK** in the **Update project** dialog box.	The devices (and DTMs) are updated.

Chapter 2
Using DTM to Configure Devices on CANopen

Introduction

This chapter explains how to set up distributed devices using DTM to configure devices on the CAN bus in SoMachine.

What Is in This Chapter?

This chapter contains the following sections:

Section 2.1
General Overview

Adding a CANopen DTM

Introduction

To add a DTM to your controller, select the required supported device in the **Hardware Catalog**, drag it to the **Devices tree**, drop it on one of the highlighted nodes, then select the corresponding DTM name.

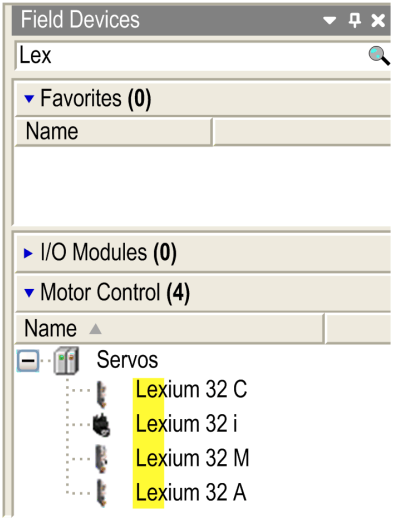
For more information on adding a device to your project, refer to:

• Using the Drag-and-drop Method *(see SoMachine, Programming Guide)*

• Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*

NOTE: The CANopen manager is automatically added to the CAN port (it is also possible to add it manually).

You can use the search area  of the **Hardware Catalog** to filter the devices:



Supported Devices

This table lists the supported devices:

Supported Device	DTM Name
Altivar 312	Altivar 312 Advanced Settings
Altivar 32	Altivar 32 Advanced Settings
Altivar 320	Altivar 320
Altivar 340	Altivar 340
Altivar 6••(1)	Altivar 6••
Altivar 71(2)	Altivar 71 Advanced Settings
Altivar 9••	Altivar 9••
Lexium 32 A	Lexium 32 A Advanced Settings
Lexium 32 i	Lexium 32 i Advanced Settings
Lexium 32 M	Lexium 32 M - S Advanced Settings
OTB 1C0DM9LP	OTB 1C0DM9LP Advanced Settings
TM5NCO1	TM5NCO1 Interface
TM7NCOM08B	TM7COM08B Interface
TM7NCOM16A	TM7COM16A Interface
TM7NCOM16B	TM7COM16B Interface

(1) This does not include Altivar 61.
(2) Altivar 71 is not supported if one of the following option boards is mounted on it:
- VW3A3310 Ethernet Card
- VW3A3316 EtherNet/IP Card
- VW3A3320 Ethernet RSTP Card

CANopen DTM Compatibility

The following controllers can support the CANopen DTM:
- M238
- ATV IMC
- XBTGC
- HMISCU
- M258
- LMC058
- LMC078
- M241
- M251

CANopen Manager

The CANopen manager is a mandatory node below the **CAN** port in a CANopen configuration.

The CANopen manager provides dialogs or functions for configuration and maintenance of the devices. Those dialogs or functions are available in the **Advanced Configuration** *(see page 23)* submenu.

NOTE: The CANopen manager supports only the menu items **Import DTM** and **Parameter download to all attached devices**. Both menu items are not supported by any other CAN bus device.

NOTE: For more information about the configuration of the CANopen manager, refer to the SoMachine online help, chapter *Programming with SoMachine / Device Editors / CANbus Configuration Editor / CANopen Manager*.

Section 2.2
Creating an OTB Island with DTM

Overview

This chapter describes how to create an OTB island on the CANopen fieldbus with DTM.

NOTE: An OTB island is the association of a network interface module with expansion modules. It offers a modular and flexible I/O solution.

What Is in This Section?

This section contains the following topics:

Adding and Configuring an OTB CANopen Interface DTM

Overview

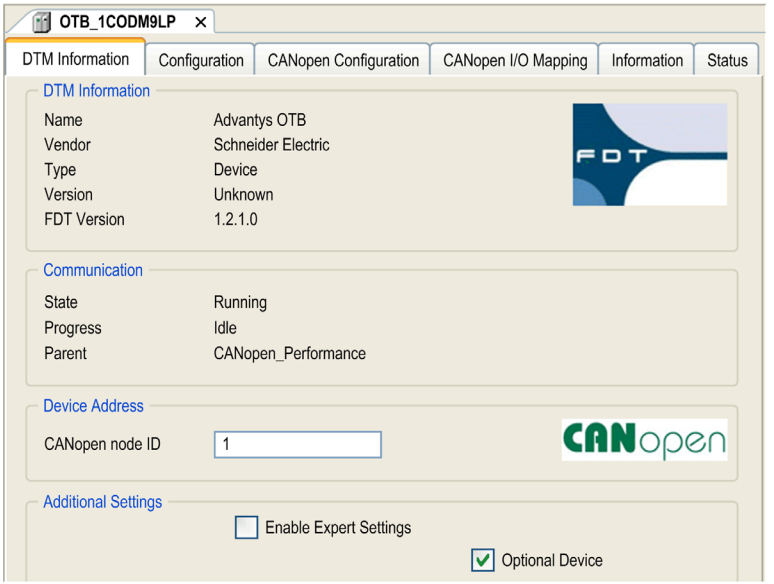
Verify that the OTB DTM is installed on your computer and in your device repository before starting.

The CANopen interface DTM provides dialogs or functions for configuration and maintenance of the devices. Those dialogs or functions are available in the **Advanced Configuration** *(see page 23)* submenu.

Step	Action
1	To add an OTB CANopen interface DTM to your controller, select **OTB 1C0DM9LP** in the **Hardware Catalog**, drag it to the **Devices tree**, and drop it on one of the highlighted nodes, then select **OTB 1C0DM9LP Advanced Settings**. For more information on adding a device to your project, refer to: • Using the Drag-and-drop Method *(see SoMachine, Programming Guide)* • Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*
2	Double-click the added node to access the device editor screen.

Device Editor Screen

The figure shows the device editor screen:



The device editor screen contains the following tabs:

- **DTM Information** *(see page 39)*
- **Configuration** *(see page 40)*
- **CANopen Configuration** *(see page 40)*
- **CANopen I/O Mapping** *(see page 40)*
- **Information** *(see page 40)*
- **Status** *(see page 40)*

DTM Information Tab

Section	Description
DTM Information	General information about the CANopen interface DTM.
Communication	Monitoring of the state, progress, and parent of the CANopen interface.
Device Address	The node ID (device address) serves to identify the CAN DTM uniquely and corresponds to the set number on the device itself which is from 1 to 126. Enter the ID as a decimal number.
Additional Settings	**Enable Expert Settings**: This enables additional CANopen settings in the **DTM Information** tab and in the **Status** tab. **Optional Device**: If this option is activated, the master will try to read from this node only once. If the node does not answer, it will be ignored.

When selecting the **Enable Expert Settings** option, additional configuration elements appear in the **DTM Information** tab:

Section	Description
Additional Settings	**SDO Channels...**: This button displays the SDO channel configuration. **Reset Node**: This option is activated by default. Resets the CANopen communication parameters of the slaves to their default values before downloading the new configuration. The parameters which can be reset depends on the device used. The subindex defines which configuration parameter is to be set. For example, by default via subindex 2 (1000h to 1FFFh, object 1011h), the CANopen communication settings are addressed. Refer to the CANopen standard for more information about objects. **No Initialisation**: When this option is activated, the master activates the node without sending configuration SDOs (The SDO data nevertheless will be created and saved on the controller).
Node Guard	When this option is activated, a message will be sent to the device according to the **Guard Time** interval (in milliseconds, 200 by default). If the device does not then send a message with the given Guard COB-ID (Communication Object Identifier), it will receive the status 'timeout'. As soon as the number of attempts (**Life Time Factor**; 2 by default if there are no other default settings within the device configuration file or if this default setting equals 0) has been reached, the device will receive the status "not OK". The status of the device will be stored in a diagnostic object. **NOTE:** No monitoring of the device will occur if the variables **Guard Time** and **Life Time Factor** are not defined (=0).

Section	Description
Emergency	When this option is activated, a device will send an emergency message with a unique COB-ID, as soon as an internal error is detected. These messages, which vary from device to device, are stored in a diagnostic object.
Heartbeat	**Enable Heartbeat Producing**: When this option is activated, the device will send heartbeats according to the interval defined in **Heartbeat Producer Time** (in ms, 200 by default or if this setting equals 0). **Change Properties Heartbeat**: This button opens a dialog to enter the desired value in milliseconds in the Heartbeat time field. If the Heartbeat Consumer option is activated, then the respective device will listen to heartbeats which are sent by the master. As soon as no more heartbeats are received, the device will switch off the I/Os.
Checks at Startup	This function compares the Check Vendor ID, Check Product Number, Check Revision Number object values with those configured in SoMachine.

Configuration Tab

The DTM is opened in this tab.

For more information on the DTM, click the **Help** button within the **Configuration** tab or consult the documentation for the particular DTM.

CANopen Configuration Tab

This tab provides a summary of the CANopen configuration parameters.

CANopen I/O Mapping Tab

This tab is the standard Device Editor dialog for the configuration of the I/O-mapping of a device, that is for assigning IEC variables to input and output channels of the hardware.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Status Tab

This tab provides status information (for example "Running", "Stopped") and device-specific diagnostic messages.

When **Enable expert settings** is selected, NMT and SDO commands are available.

Functional Description

Overview

The Advantys DTM island window itself does not provide the functions to create or modify your configuration. To create or modify your configuration, Advantys DTM activates the Advantys Configuration Software.

Interactions when Starting Advantys Configuration Software

You can start the Advantys Configuration Software from SoMachine.

To do this, click the **Start Advantys** button  in the configuration tab of the DTM.

Only 1 instance of the Advantys Configuration Software can be started at a time. For this reason, the following interactions with Advantys DTM are possible:

Status	Action	Result
Advantys Configuration Software is already running as a standalone application – started from the **Start** menu.	You click the **Start Advantys** button in SoMachine to start Advantys Configuration Software.	You are prompted to close the running instance before starting the software from SoMachine.
Advantys Configuration Software is already running – started from the SoMachine software.	You want to start Advantys Configuration Software from the **Start** menu.	You are prompted to close the running instance before Advantys Configuration Software is started as standalone application.

Interactions when Starting a Second Configuration

If you have opened an Advantys Configuration Software instance and you open a new or a different configuration in the same instance of the tool, the following interactions are possible:

If...	Then ...
you have not modified the current configuration,	Advantys Configuration Software automatically closes the currently open configuration and opens the newly selected configuration of the Advantys you were about to open.
you have modified the current configuration,	you will be prompted to either save or discard your modifications before attempting to open the newly selected configuration.

Section 2.3
Creating a TM5/TM7 Distributed I/O Configuration with DTM

Overview

This chapter describes how to create a TM5/TM7 distributed I/O island on the CANopen field bus with DTM.

NOTE: An TM5/TM7 distributed island is the association of a network interface module with expansion modules. It offers a modular and flexible I/O solution.

What Is in This Section?

This section contains the following topics:

Adding and Configuring a TM5/TM7 CANopen Interface

Adding the CANopen Interface

Verify that the TM5/TM7 DTMs are installed on your computer and in your device repository before starting.

Step	Action
1	To add a TM5/TM7 CANopen interface DTM to your controller, select **TM5NC01 Interface** or **TM7NCOMxxx Interface** in the **Hardware Catalog**, drag it to the **Devices tree**, and drop it on one of the highlighted nodes. For more information on adding a device to your project, refer to: • Using the Drag-and-drop Method *(see SoMachine, Programming Guide)* • Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*
2	Double-click the added node to access the device editor screen.

Device Editor Screen

The device editor screen contains the following tabs:

- **DTM Information** *(see page 43)*
- **Configuration** *(see page 44)*
- **CANopen Configuration** *(see page 45)*
- **CANopen I/O Mapping** *(see page 45)*
- **Information** *(see page 45)*
- **Status** *(see page 45)*

DTM Information Tab

Section	Description
DTM Information	General information about the CANopen interface DTM.
Communication	Monitoring of the state, progress, and parent of the CANopen interface.
Device Address	The node ID (device address) serves to identify the CAN DTM uniquely and corresponds to the set number on the device itself which is from 1 to 126. Enter the ID as a decimal number.
Additional Settings	**Enable Expert Settings**: This enables additional CANopen settings in the **DTM Information** tab and in the **Status** tab. **Optional Device**: If this option is activated, the master will try to read from this node only once. If the node does not answer, it will be ignored.

When selecting the **Enable Expert Settings** option, additional configuration elements appear in the **DTM Information** tab:

Section	Description
Additional Settings	**SDO Channels...**: This button displays the SDO channel configuration. **Reset Node**: This option is activated by default. Resets the CANopen communication parameters of the slaves to their default values before downloading the new configuration. The parameters which can be reset depends on the device used. The subindex defines which configuration parameter is to be set. For example, by default via subindex 2 (1000h to 1FFFh, object 1011h), the CANopen communication settings are addressed. Refer to the CANopen standard for more information about objects. **No Initialisation**: When this option is activated, the master activates the node without sending configuration SDOs (The SDO data nevertheless will be created and saved on the controller).
Node Guard	When this option is activated, a message will be sent to the device according to the **Guard Time** interval (in milliseconds, 200 by default). If the device does not then send a message with the given Guard COB-ID (Communication Object Identifier), it will receive the status 'timeout'. As soon as the number of attempts (**Life Time Factor**; 2 by default if there are no other default settings within the device configuration file or if this default setting equals 0) has been reached, the device will receive the status "not OK". The status of the device will be stored in a diagnostic object. **NOTE:** No monitoring of the device will occur if the variables **Guard Time** and **Life Time Factor** are not defined (=0).
Emergency	When this option is activated, a device will send an emergency message with a unique COB-ID, as soon as an internal error is detected. These messages, which vary from device to device, are stored in a diagnostic object.
Heartbeat	**Enable Heartbeat Producing**: When this option is activated, the device will send heartbeats according to the interval defined in **Heartbeat Producer Time** (in ms, 200 by default or if this setting equals 0). **Change Properties Heartbeat**: This button opens a dialog to enter the desired value in milliseconds in the Heartbeat time field. If the Heartbeat Consumer option is activated, then the respective device will listen to heartbeats which are sent by the master. As soon as no more heartbeats are received, the device will switch off the I/Os.
Checks at Startup	This function compares the Check Vendor ID, Check Product Number, Check Revision Number object values with those configured in SoMachine.

Configuration Tab

The DTM is opened in this tab.

For more information on the DTM, click the **Help** button within the **Configuration** tab or consult the documentation for the particular DTM.

CANopen Configuration Tab

This tab provides a summary of the CANopen configuration parameters.

NOTE: The available PDO parameters involving **Inhibit Time** and **Event Timer**, available in SoMachine, are set to their default value when the configuration is modified in the DTM (add module, delete module, etc.).

CANopen I/O Mapping Tab

This tab is the standard device editor dialog for the configuration of the I/O-mapping of a device, that is for assigning IEC variables to input and output channels of the hardware.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Status Tab

This tab provides status information (for example "Running", "Stopped") and device-specific diagnostic messages.

When **Enable expert settings** is selected, NMT and SDO commands are available.

Adding TM5/TM7 Expansions

Overview

After adding a CANopen interface, the TM5/TM7 distributed I/O island *(see Modicon TM5 / TM7 Flexible System, System Planning and Installation Guide)* can be integrated.

This table describes how to add a TM5/TM7 expansion in the **Devices tree**:

Step	Action
1	Select the **TMxxxxx** expansion module in the **Hardware Catalog**, drag it to the **Devices tree**, and drop it on one of the highlighted nodes. For more information on adding a device to your project, refer to: • Using the Drag-and-drop Method *(see SoMachine, Programming Guide)* • Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*
2	Double-click the added node to access the device editor screen.

Device Editor Screen

The device editor screen contains the following tabs:

- **DTM Information** *(see page 46)*
- **Configuration** *(see page 46)*
- **Information** *(see page 46)*
- **Status** *(see page 46)*

DTM Information Tab

There are 2 sections in the **DTM Information** tab:

Section	Description
DTM Information	General information about the CANopen interface
Communication	Monitoring of the state, progress, and parent of the CANopen interface

Configuration Tab

The DTM is opened in this tab.

For more information on the DTM, click the **Help** button within the **Configuration** tab or consult the documentation for the particular DTM.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Status Tab

Displays device-specific status and diagnostic messages.

Section 2.4
Creating a Drive Configuration with DTM

Adding and Configuring a Drive with DTM via CANopen

Overview

Verify that the drive DTM is installed on your computer and in your device repository before starting.

The CANopen interface DTM provides dialogs or functions for configuration and maintenance of the devices. Those dialogs or functions are available in the **Advanced Configuration** *(see page 23)* submenu.

Step	Action
1	To add a drive to your controller, select the required supported device in the **Hardware Catalog**, drag it to the **Devices tree**, drop it on one of the highlighted nodes, then select the corresponding DTM name. For more information on adding a device to your project, refer to: • Using the Drag-and-drop Method *(see SoMachine, Programming Guide)* • Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*
2	Double-click the added node to access the device editor screen.

Device Editor Screen

The device editor screen contains the following tabs:

- **CANopen Remote Device** *(see page 48)*
- **PDO Mapping** *(see page 49)*
- **Receive PDO Mapping** *(see page 49)*
- **Send PDO Mapping** *(see page 49)*
- **Service Data Object** *(see page 49)*
- **DTM Information** *(see page 49)*
- **Configuration of the device** *(see page 50)*
- **CANopen Configuration** *(see page 50)*
- **CANopen I/O Mapping** *(see page 50)*
- **Status** *(see page 50)*
- **Information** *(see page 50)*

CANopen Remote Device Tab

Section	Description
General	The **Node ID** (device address) serves to identify the CAN DTM uniquely and corresponds to the set number on the device itself which is from 1 to 126. Enter the ID as a decimal number.
Additional Settings	**Enable Expert Settings**: This enables additional CANopen settings in the **DTM Information** and **Status** tabs and adds 2 tabs **Receive PDO Mapping** and **Send PDO Mapping**.

When selecting the **Enable Expert Settings** option, additional configuration elements appear in the **CANopen Remote Device** tab:

Section	Description
General (Additional Settings)	**SDO Channels**: Addition of a second SDO channel, in case of performance issue while the DTM is exchanging data with the physical device. **Optional Device**: If this option is activated, the master will try to read from this node only once. If the node does not answer, it will be ignored. **Create all SDOs**: All objects, regardless whether their values have been changed, will be downloaded to the controller. **No Initialisation**: When this option is activated, the master activates the node without sending configuration SDOs (The SDO data nevertheless will be created and saved on the controller).
Nodeguarding	When this option is activated, a message will be sent to the device according to the **Guard Time** interval (in milliseconds, 200 by default). If the device does not, then send a message with the given Guard COB-ID (Communication Object Identifier), it will receive the status 'timeout'. As soon as the number of attempts (**Life Time Factor**; 2 by default if there are no other default settings within the device configuration file or if this default setting equals 0) has been reached, the device will receive the status "not OK". The status of the device will be stored in a diagnostic object. **NOTE:** No monitoring of the device will occur if the variables **Guard Time** and **Life Time Factor** are not defined (=0).
Heartbeat	**Enable Heartbeat Producing**: When this option is activated, the device will send heartbeats according to the interval defined in **Heartbeat Producer Time** (in ms, 200 by default or if this setting equals 0). **Heartbeat Consuming**: This button opens a dialog to enter the desired value in milliseconds in the Heartbeat time field. If the Heartbeat Consumer option is activated, then the respective device will listen to heartbeats which are sent by the master. As soon as no more heartbeats are received, the device will switch off the I/Os.
Emergency	When this option is activated, a device will send an emergency message with a unique COB-ID, as soon as an internal error is detected. These messages, which vary from device to device, are stored in a diagnostic object.
TIME	This option is deactivated.
Checks at Startup	This function compares the Check Vendor ID, Check Product Number, Check Revision Number object values with those configured in SoMachine.

PDO Mapping Tab

Section	Description
Select receive PDO (RPDO)	Displays the configured RPDO and allow their selection.
Select send PDO (TPDO)	Displays the configured TPDO and allow their selection.

Receive PDO Mapping and Send PDO Mapping Tabs (Expert Settings)

This tab allows the manual configuration or modification of the RPDO and TPDO:

Button	Description
Add PDO...	Add a PDO channel.
Add Mapping...	Add item from the object directory to the selected PDO.
Delete...	Delete the PDO channel.
Edit...	If a PDO is selected, modification of the PDO channel properties (COB-ID, Transmission Type). If an object is selected, modification of the object contained in the PDO.

Service Data Object Tab

This tab allows the manual configuration or modification of the SDOs:

Element	Description
Move up	Change the PDO order.
Move down	
New...	Add a SDO channel.
Delete...	Delete a SDO channel.
Edit...	Modify the SDO channel properties and objects contained in the SDO.
SDO Timeout (ms)	Configure the SDO timeout in ms (default 1000 ms).

DTM Information Tab

Section	Description
DTM Information	General information about the CANopen interface DTM.
Communication	Monitoring of the state, progress, and parent of the CANopen interface.
Device Address	The node ID (device address) serves to identify the CAN DTM uniquely and corresponds to the set number on the device itself which is from 1 to 126. Enter the ID as a decimal number.

Configuration of the Device Tab

The DTM is opened in this tab.

For more information on the DTM, click the **Help** button within the **Configuration** tab or consult the documentation for the particular DTM.

CANopen Configuration Tab

This tab provides a summary of the CANopen configuration parameters.

CANopen I/O Mapping Tab

This tab is the standard Device Editor dialog for the configuration of the I/O-mapping of a device, that is for assigning IEC variables to input and output channels of the hardware.

Status Tab

This tab provides status information (for example "Running", "Stopped") and device-specific diagnostic messages.

When **Enable expert settings** is selected, NMT and SDO commands are available.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Section 2.5
CANopen DTM Connectivity

Executing an Online DTM Command over CANopen

Overview

To execute the four Online DTM commands *(see page 23)*, **Connect**, **Upload and Connect**, **Upload from Device** and **Download to Device**, log in to the controller.

How to Execute a Command

To execute a command over CANopen:

Step	Action
1	Build the application and download it to the controller.
2	Log in to the controller. Refer to Login in the SoMachine Programming Guide.
3	Execute the required DTM command.

Chapter 3
Using DTMs to Configure Devices on Modbus Serial Line

Introduction

This chapter explains how to set up devices using DTMs to configure devices on Modbus SL in SoMachine.

What Is in This Chapter?

This chapter contains the following topics:

Adding the Modbus Serial Line Manager

Adding the Modbus Serial Line Manager

Verify that the Modbus SL Communication DTM is installed on your computer and installed in your device repository in SoMachine.

This table describes how to add the Modbus serial line manager in a project:

Step	Action
1	Tick the check box **Use DTM Connection** below the **Devices tree**. **Result**: The **FDTConnections** node is automatically added to the project, and the **Modbus_Serial_Line_Manager** is automatically added to this node.
2	Double-click **Modbus_Serial_Line_Manager** to access the **Modbus Serial Line Manager** editor screen.

Modbus Serial Line Manager Editor Screen

The manager editor screen contains the following tabs:

- **DTM Information** *(see page 54)*
- **Configuration** *(see page 54)*
- **Information** *(see page 54)*
- **Status** *(see page 54)*

DTM Information Tab

There are 2 sections in the DTM Information tab:

Section	Description
DTM Information	General information about the Modbus serial line manager.
Communication	Monitoring of the state, progress, and parent of the Modbus serial line manager.

Configuration Tab

This tab allows you to configure the Modbus serial line manager.

For more information, click the **Help** button within the **Configuration** tab.

Information Tab

This tab displays general information about the DTM (name, description, provider, version, image).

Status Tab

Displays DTM-specific status and diagnostic messages.

Adding and Creating a Device Interface with DTM via Modbus SL

Supported Devices

The Modbus serial line manager supports the following devices:

Supported Device	DTM Name
Altistart 22	Altistart 22 Advanced Settings
Altistart 48	Altistart 48 Advanced Settings
Altivar 12	Altivar 12 Advanced Settings
Altivar 212	Altivar 212 Advanced Settings
Altivar 31	Altivar 31 - 312 Advanced Settings
Altivar 312	Altivar 31 - 312 Advanced Settings
Altivar 32	Altivar 32 Advanced Settings
Altivar 320	Altivar 320 Advanced Settings
Altivar 340	Altivar 340 Advanced Settings
Altivar 61	Altivar 61 Advanced Settings
Altivar 6••	Altivar 6••
Altivar 71	Altivar 71 Advanced Settings
Altivar 9••	Altivar 9••
Lexium 32 A	Lexium 32 A Advanced Settings
Lexium 32 C	Lexium 32 C Advanced Settings
Lexium 32 i	Lexium 32 i Advanced Settings
Lexium 32 M	Lexium 32 M - S Advanced Settings
Lexium 32 S	Lexium 32 M - S Advanced Settings
TeSys U	TeSysU Advanced Settings
TeSys T	TeSysT Advanced Settings
Harmony XB5R	ZBRN2 Advanced Settings

Adding a DTM

To add a DTM to your project, select the required supported device in the **Hardware Catalog**, drag it to the **Devices tree**, drop it on the **Modbus_Serial_Line_Manager**.

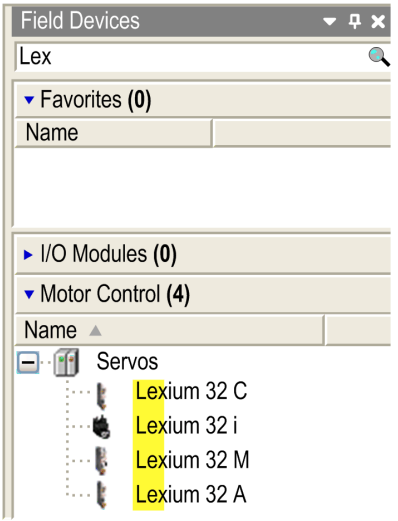
For more information on adding a device to your project, refer to:

• Using the Drag-and-drop Method *(see SoMachine, Programming Guide)*

• Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*

NOTE:

You can use the search area  of the **Hardware Catalog** to filter the devices:



Device Editor Screen

Double-click the DTM node to access the device editor screen.

The device editor screen contains the following tabs:

- **DTM Information** *(see page 56)*
- **Configuration** *(see page 57)*
- **Information** *(see page 57)*
- **Status** *(see page 57)*

DTM Information Tab

There are 2 sections in the DTM Information tab:

Section	Description
DTM Information	General information about the device
Communication	Monitoring of the state, progress, and parent of the device

Configuration Tab

The DTM is opened in this tab.

For more information about the DTM, this table describes how to access the DTM documentation from SoMachine:

Step	Action
1	Right-click the device in the **Devices tree** then select **Advanced Configuration → Documentation.** **Result:** The device documentation menu is opened.
2	Select a help document. **Result:** The device DTM documentation menu is displayed.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Status Tab

Displays device-specific status and diagnostic messages.

Chapter 4
Using DTMs to Configure Devices on Modbus TCP or EtherNet/IP

Introduction

This chapter explains how to set up devices using DTMs to configure devices on Modbus TCP or EtherNet/IP in SoMachine.

What Is in This Chapter?

This chapter contains the following topics:

Adding a Modbus TCP or EtherNet/IP DTM

Description

To add a DTM to your controller, select the required supported device in the **Hardware Catalog**, drag it to the **Devices tree**, drop it on one of the highlighted nodes, then select the corresponding DTM name.

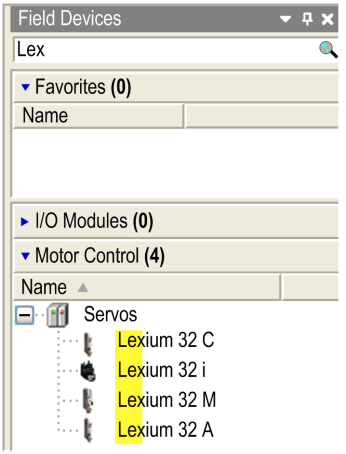
For more information on adding a device to your project, refer to:

• Using the Drag-and-drop Method *(see SoMachine, Programming Guide)*

• Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*

NOTE: The **Industrial Ethernet Manager** is automatically added to the Ethernet port (it is also possible to add it manually).

You can use the search function  of the **Hardware Catalog** to filter the devices:



Supported Devices

This table lists the supported devices:

Supported device	DTM name	Modbus TCP	EtherNet/IP
Altivar 32	Altivar 32	Yes	Yes
Altivar 320	Altivar 320	Yes	Yes
Altivar 340	Altivar 340	Yes	Yes
Altivar 6••(1)	Altivar 6••	Yes	Yes
Altivar 71	Altivar 71	Yes	Yes
(1) This does not include Altivar 61.			

Supported device	DTM name	Modbus TCP	EtherNet/IP
Altivar 9••	Altivar 9••	Yes	Yes
Lexium 32 M	Lexium 32 M	Yes	Yes
Harmony XB5R	ZBRN1	Yes	No
(1) This does not include Altivar 61.			

NOTE: Some third-party DTM can also be supported if they provide Modbus TCP communication capabilities.

Modbus TCP and EtherNet/IP DTM Compatibility

The TM251MESE, TM241CE24•, and TM241CE40• controllers support the Modbus TCP and EtherNet/IP DTMs on the Industrial Ethernet port *(see SoMachine Industrial Ethernet, User Guide)*.

Industrial Ethernet Manager

The **Industrial Ethernet Manager** is a mandatory node in a Modbus TCP or EtherNet/IP configuration with DTMs.

NOTE: For more information about the configuration of the **Industrial Ethernet Manager**, refer to Industrial Ethernet Manager Configuration *(see SoMachine Industrial Ethernet, User Guide)*.

Modbus TCP and EtherNet/IP DTM Connectivity

Overview

The connection to your device via Modbus TCP or EtherNet/IP depends on many settings:

- Device settings
- PC settings
- Controller settings
- Network infrastructure
- Architecture

How to Connect

Proceed as follows to connect to your device:

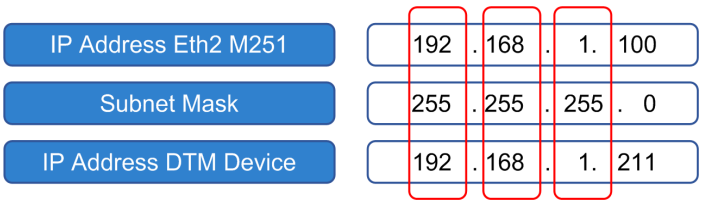
Step	Action
1	Build and download the application into the controller.
2	Configure the device IP address or the addressing method (DHCP, BOOTP).
3	Perform a device power cycle. It is necessary for some devices to take the correct network settings.
4	If needed you can edit the connection *(see page 25)* for accessing the device.
5	Select the required DTM function in the contextual menu of the device (upload from device, download to device,...). Refer to DTM Contextual Menu *(see page 23)*.

DTM on Modbus TCP and EtherNet/IP are only reachable via Ethernet directly.

NOTE: A transparent USB to Ethernet connection via the controller to the device is not supported.

Manual IP Address Setting

- The IP address in the DTM configuration must match the actual IP address of the device. Verify the IP address of the device itself (display or similar).
- Verify that the IP address is not been occupied by another device in the network (verify by pinging the address over Ethernet, or consult your Information Systems manager).
- Verify that the IP address of the Ethernet port of the controller is set as a gateway address in the device.
- Verify that your device is in the same subnet as defined by the IP address settings of the Ethernet port of the controller.



Automatic IP Address Setting by DHCP

- If the IP address was set automatically by the DHCP server of the M251 controller, verify the **Network Manager** table of the M251 controller (see Network Manager *(see SoMachine Industrial Ethernet, User Guide)*).
- Verify that the IP address of the Ethernet port is set as the gateway address of the device in the **Network Manager** table.

Routing and IP Forwarding

- Regard your controller as a gateway or router between your PC (control network) and the device (Industrial Ethernet port).
- Verify that the IP forwarding service is enabled (check box **Enable IP forwarding**, refer to Security Parameters *(see Modicon M251 Logic Controller, Programming Guide)*).
- Verify that the IP address of the Ethernet port of the controller is set as a gateway address in the device.
- Verify that your device is in the same subnet as defined by the IP address settings of the Ethernet port of the controller.
- Verify that your PC is in the same subnet as one of the Ethernet ports of the controller.

Modbus TCP to Modbus SL Gateway and Unit ID

If a device is connected via Modbus SL behind a Modbus TCP/Modbus SL gateway, the **Unit ID** must match the Modbus SL address of the device.

Modbus TCP Device and Unit ID

The DTM **Unit ID** must be set to 248.

Adding and Configuring a Device with DTM via Modbus TCP

Overview

Verify that the device DTM *(see page 15)* is installed on your computer and installed in your device repository before starting.

Step	Action
1	To add a device to your controller, select the device in the **Hardware Catalog**, drag it to the **Devices tree**, drop it on one of the highlighted nodes, then select the corresponding DTM name. For more information on adding a device to your project, refer to: • Using the Drag-and-drop Method *(see SoMachine, Programming Guide)* • Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*
2	Double-click the added node to access the device editor screen.

Device Editor Screen

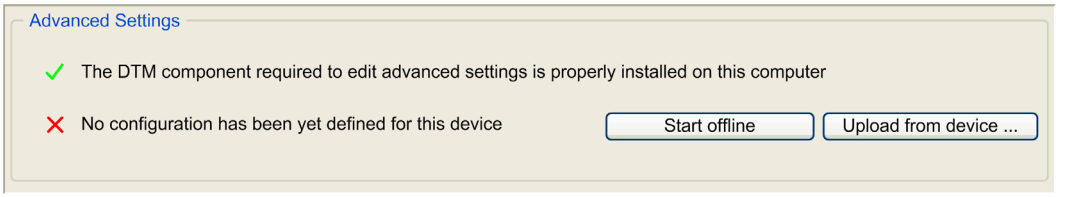
The device editor screen contains the following tabs:

- **Overview** *(see page 64)*
- **Modbus TCP Slave Configuration** *(see page 65)*
- **Modbus TCP Channel Configuration** *(see page 65)*
- **ModbusTCPSlave I/O Mapping** *(see page 66)*
- **Configuration of the device** *(see page 66)*
- **Status** *(see page 66)*
- **Information** *(see page 66)*

Overview Tab

This tab indicates if a DTM is installed and if a configuration exists.

This illustration presents the **Overview** tab:

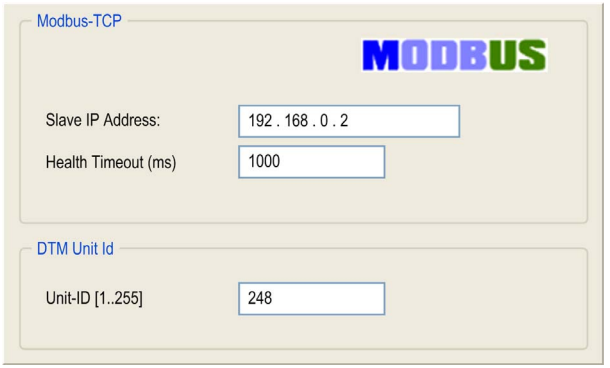


This table describes the available buttons of the **Overview** tab:

Button	Description
Start offline	Creates an offline device configuration. **NOTE:** The **Configuration of the device** tab is created and opens when clicking the button.
Upload from device...	Uploads the parameters from the device to the PC and creates the **Configuration of the device** tab.
Edit configuration	Displays the **Configuration of the device** tab (only if a configuration has been already defined).
Install component	Opens the SoMachine Configuration Manager for installing the missing components.

Modbus TCP Slave Configuration Tab

This figure illustrates the Modbus TCP slave configuration tab:



Section	Description
Modbus-TCP	**Slave IP Address**: Configure the IP address of the drive. **Health Timeout (ms)**: Configure the Modbus TCP IOScanner timeout in ms (default 1000 ms). It represents the maximum delay between a request of the Modbus TCP IOScanner and a response of the slave.
DTM Unit Id	**Unit-ID [1...255]:** If a gateway from Modbus TCP to Modbus SL is used, configure the address of the device on the Modbus SL fieldbus, otherwise the **DTM Unit Id** must be set to 248.

Modbus TCP Channel Configuration Tab

This tab is the standard device editor dialog for the configuration of the Modbus TCP channel of a device (for more information, refer to Configure the Modbus TCP slave device channels *(see SoMachine Industrial Ethernet, User Guide)*).

ModbusTCPSlave I/O Mapping Tab

This tab is the standard device editor dialog for the configuration of the I/O-mapping of a device, that is for assigning IEC variables to input and output channels of the hardware.

Configuration of the Device Tab

The DTM is opened in this tab.

For more information on the DTM, click the **Help** button within the **Configuration** tab or consult the documentation for the particular DTM.

Status Tab

This tab provides status information (for example "Running", "Stopped") and device-specific diagnostic messages.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Adding and Configuring a Device with DTM via EtherNet/IP

Overview

Verify that the device DTM *(see page 15)* is installed on your computer and installed in your device repository before starting.

Step	Action
1	To add a device to your controller, select the device in the **Hardware Catalog**, drag it to the **Devices tree**, drop it on one of the highlighted nodes, then select the corresponding DTM name. For more information on adding a device to your project, refer to: • Using the Drag-and-drop Method *(see SoMachine, Programming Guide)* • Using the Contextual Menu or Plus Button *(see SoMachine, Programming Guide)*
2	Double-click the added node to access the device editor screen.

Device Editor Screen

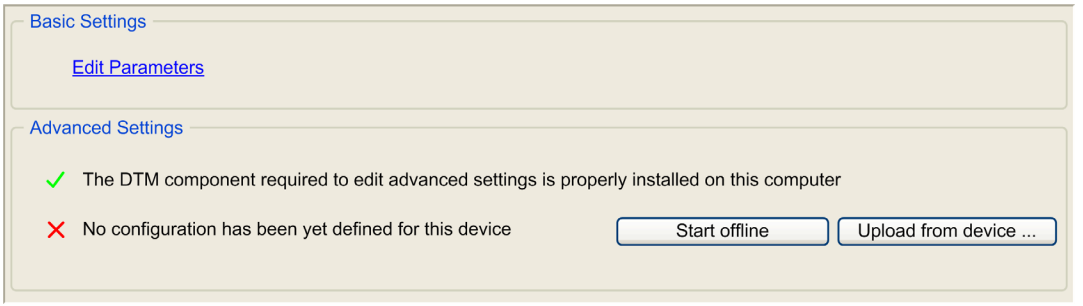
The device editor screen contains the following tabs:

- **Overview** *(see page 67)*
- **Target settings** *(see page 68)*
- **Connections** *(see page 68)*
- **User Parameter** *(see page 68)*
- **Configuration of the device** *(see page 68)*
- **EtherNet/IP I/O Mapping** *(see page 68)*
- **Status** *(see page 69)*
- **Information** *(see page 69)*

Overview Tab

This tab indicates if a DTM is installed and if a configuration exists.

This illustration presents the **Overview** tab:



This table describes the available buttons of the **Overview** tab:

Button	Description
Edit Parameters	Displays the **User Parameter** tab.
Start offline	Creates an offline device configuration. **NOTE:** The **Configuration of the device** tab is created and opens when clicking the button.
Upload from device...	Uploads the parameters from the device to the PC and creates the **Configuration of the device** tab.
Edit configuration	Displays the **Configuration of the device** tab (only if a configuration has been already defined).
Install component	Opens the SoMachine Configuration Manager for installing the missing components.

Target Settings Tab

This tab is the standard device editor dialog for the configuration of the address and the electronic keying signature of EtherNet/IP devices. For more information, refer to EtherNet/IP Target Settings *(see SoMachine Industrial Ethernet, User Guide)*.

Connections Tab

This tab is the standard device editor dialog for the configuration of the connections of EtherNet/IP devices. For more information, refer to EtherNet/IP Device Connection Tab *(see SoMachine Industrial Ethernet, User Guide)*.

User Parameter Tab

This tab is the standard device editor dialog for the configuration of the user parameters of EtherNet/IP devices. For more information, refer to User Parameters *(see SoMachine Industrial Ethernet, User Guide)*.

EtherNet/IP I/O Mapping Tab

This tab is the standard device editor dialog for the configuration of the I/O-mapping of a device, that is for assigning IEC variables to input and output channels of the hardware. For more information, refer to EtherNet/IP I/O Mapping *(see SoMachine Industrial Ethernet, User Guide)*.

Configuration of the Device Tab

The DTM is opened in this tab.

For more information on the DTM, click the **Help** button within the **Configuration** tab or consult the documentation for the particular DTM.

Status Tab

This tab provides status information (for example "Running", "Stopped") and device-specific diagnostic messages.

Information Tab

This tab displays general information about the device (name, description, provider, version, image).

Glossary

A

application

A program including configuration data, symbols, and documentation.

ATV

The model prefix for Altivar drives (for example, ATV312 refers to the Altivar 312 variable speed drive).

C

CAN

(*controller area network*) A protocol (ISO 11898) for serial bus networks, designed for the interconnection of smart devices (from multiple manufacturers) in smart systems and for real-time industrial applications. Originally developed for use in automobiles, CAN is now used in a variety of industrial automation control environments.

configuration

The arrangement and interconnection of hardware components within a system and the hardware and software parameters that determine the operating characteristics of the system.

control network

A network containing logic controllers, SCADA systems, PCs, HMI, switches, ...

Two kinds of topologies are supported:

- flat: all modules and devices in this network belong to same subnet.
- 2 levels: the network is split into an operation network and an inter-controller network.

These two networks can be physically independent, but are generally linked by a routing device.

controller

Automates industrial processes (also known as programmable logic controller or programmable controller).

D

DTM

(*device type manager*) Classified into 2 categories:

- Device DTMs connect to the field device configuration components.
- CommDTMs connect to the software communication components.

The DTM provides a unified structure for accessing device parameters and configuring, operating, and diagnosing the devices. DTMs can range from a simple graphical user interface for setting device parameters to a highly sophisticated application capable of performing complex real-time calculations for diagnosis and maintenance purposes.

E

expansion bus

An electronic communication bus between expansion I/O modules and a controller.

F

FDT

(*field device tool*) The specification describing the standardized data exchange between the devices and control system or engineering or asset management tools.

function

A programming unit that has 1 input and returns 1 immediate result. However, unlike FBs, it is directly called with its name (as opposed to through an instance), has no persistent state from one call to the next and can be used as an operand in other programming expressions.

Examples: boolean (AND) operators, calculations, conversions (BYTE_TO_INT)

I

I/O

(*input/output*)

ID

(*identifier/identification*)

IEC

(*international electrotechnical commission*) A non-profit and non-governmental international standards organization that prepares and publishes international standards for electrical, electronic, and related technologies.

M

Modbus
The protocol that allows communications between many devices connected to the same network.

Modbus SL
(*Modbus serial line* The implementation of the protocol over a RS-232 or RS-485 serial connection.

ms
(*millisecond*)

N

NMT
(*network management*) CANopen protocols that provide services for network initialization, detected error control, and device status control.

O

OTB
(*optimized terminal block*) Used in the context of STB I/O distributed modules.

P

PDO
(*process data object*) An unconfirmed broadcast message or sent from a producer device to a consumer device in a CAN-based network. The transmit PDO from the producer device has a specific identifier that corresponds to the receive PDO of the consumer devices.

program
The component of an application that consists of compiled source code capable of being installed in the memory of a logic controller.

protocol
A convention or standard definition that controls or enables the connection, communication, and data transfer between 2 computing system and devices.

R

RPDO
(*receive process data object* An unconfirmed broadcast message or sent from a producer device to a consumer device in a CAN-based network. The transmit PDO from the producer device has a specific identifier that corresponds to the receive PDO of the consumer devices.

run

A command that causes the controller to scan the application program, read the physical inputs, and write to the physical outputs according to solution of the logic of the program.

S

scan

A function that includes:

- reading inputs and placing the values in memory
- executing the application program 1 instruction at a time and storing the results in memory
- using the results to update outputs

SDO

(*service data object*) A message used by the field bus master to access (read/write) the object directories of network nodes in CAN-based networks. SDO types include service SDOs (SSDOs) and client SDOs (CSDOs).

T

TPDO

(*transmit process data object*) An unconfirmed broadcast message or sent from a producer device to a consumer device in a CAN-based network. The transmit PDO from the producer device has a specific identifier that corresponds to the receive PDO of the consumer devices.

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