

PACTware

Process Automation Configuration Tool

Edition 3.0 FDT 1.2



Copyright

© by PACTware Consortium e.V., Karlsruhe, Germany.

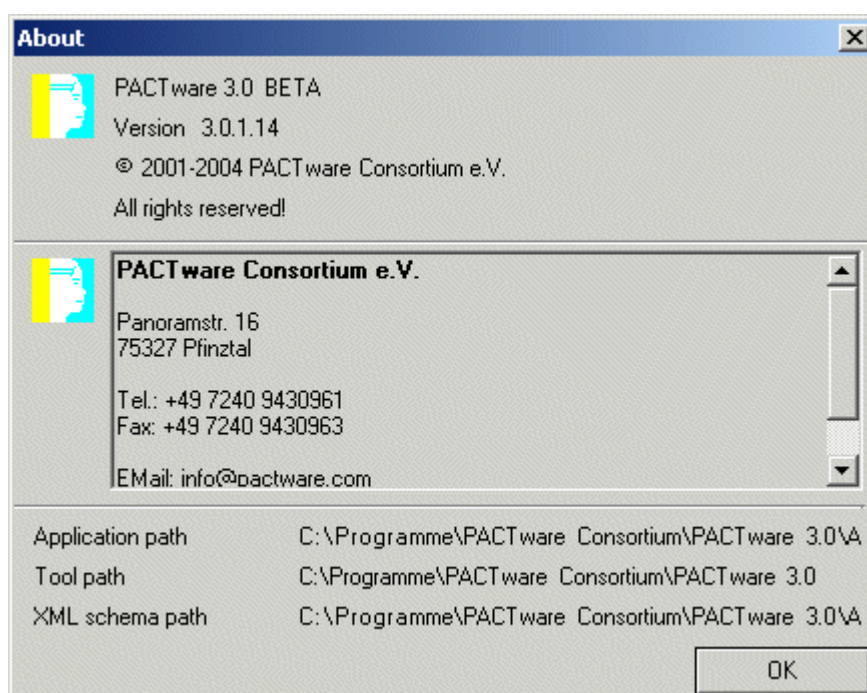
All rights reserved.

Enduser License

The terms of the license agreement are contained in file **PWEULAENG.TXT** of the PACTware installation directory.

Program version

The program version is displayed via menu **Help** using menu item **About...** . Example:



Document history

| Version | Date |
|---------|------------|
| 3.0.0 | 29.07.2004 |
| 3.0.1 | 08.08.2005 |



Table of Contents

| | | |
|-----------|--|-------------|
| | Copyright | 2 |
| | Table of Contents | TOC1 |
| 1. | Overview | 1-1 |
| 1.1 | Software Requirements | 1-1 |
| 1.2 | Hardware Requirements | 1-1 |
| 1.3 | Installation | 1-1 |
| 1.4 | Start | 1-3 |
| 1.5 | Deinstallation | 1-4 |
| 2. | Main Window | 2-1 |
| 2.1 | Menu bar | 2-1 |
| 2.2 | Toolbar | 2-2 |
| 2.3 | Status bar | 2-2 |
| 2.4 | Project window | 2-3 |
| 2.5 | Operating range | 2-5 |
| 3. | Functions | 3-1 |
| 3.1 | Menus | 3-1 |
| 3.1.1 | File | 3-1 |
| 3.1.2 | Edit | 3-2 |
| 3.1.3 | View | 3-2 |
| 3.1.4 | Project | 3-3 |
| 3.1.5 | Device data | 3-4 |
| 3.1.6 | Extras | 3-5 |
| 3.1.7 | Window | 3-6 |
| 3.1.8 | Help | 3-6 |
| 3.2 | Context menu | 3-7 |
| 3.2.1 | Connection between DTM and device | 3-8 |
| 3.2.2 | Data exchange between DTM and device | 3-9 |
| 3.2.3 | Edit device data with a DTM | 3-11 |
| 3.2.4 | Additional Functions | 3-12 |
| 3.2.5 | Add device or delete device | 3-14 |
| 3.2.6 | Device properties | 3-14 |
| 4. | Working with PACTware | 4-1 |
| 4.1 | Generate/Open project | 4-1 |
| 4.2 | Device Catalog | 4-3 |
| 4.3 | Edit project | 4-6 |
| 4.3.1 | Add DTM | 4-6 |
| 4.3.2 | Remove DTM | 4-7 |
| 4.3.3 | Add part of a project | 4-8 |
| 4.4 | Parameterize device | 4-10 |
| 4.5 | Load parameters from device | 4-10 |
| 4.6 | Store parameters to the device | 4-11 |
| 4.7 | Save project | 4-13 |
| 4.8 | Debug monitor | 4-14 |
| 4.9 | Error Monitor | 4-16 |
| 4.10 | Problem Report | 4-17 |
| 5. | PACTware Add-Ins | 5-1 |
| 5.1 | HART Advanced Scan Add-In | 5-2 |
| 5.1.1 | Start Add-In | 5-2 |
| 5.1.2 | Prepare Scan Operation | 5-3 |



| | | |
|-----------|---|---------------|
| 5.1.3 | Execute scan operation | 5-4 |
| 5.1.4 | Identify DTMs of detected devices | 5-5 |
| 5.1.5 | Apply found DTMs to a project | 5-8 |
| 5.1.6 | Edit topology..... | 5-9 |
| 5.1.7 | Close Add-In, Stop Scan | 5-9 |
| 6. | Glossary | 6-1 |
| | Index | Index1 |



1. Overview

PACTware (Process Automation Configuration Tool) is a program which allows to select communication-capable field devices of different manufacturers from a device catalog and combine them in projects.

In accordance with the FDT Specification 1.2 (Field Device Tool Specification) PACTware is used as a frame program for DTMs (Device Type Manager), which is delivered as configuration software by the manufacturers of field devices. DTMs enable the configuration of the field devices and the modification of the device parameters. Configuration and parameter values may be saved to data carriers and printed in PACTware.

Via ComDTM (Communication DTM) a communication with the field devices using protocols like e.g. the HART or Profibus protocol is established.

The functionality of PACTware is extended or modified by so called Add-Ins. The standard PACTware service pack contains the following Add-Ins:

- the device catalog,
- the project window,
- the error monitor and
- the debug monitor which logs all debug outputs of PACTware

1.1 Software Requirements

PACTware runs under the operating systems Windows NT 4.0 as of Service Pack 4, Windows 2000 and Windows XP. To print field device parameter values, a Microsoft Internet Explorer as of Release 4.0 must be installed.

1.2 Hardware Requirements

PACTware requires 100 MByte disk space and 45 MByte main memory. A computer with Pentium II 200 MHz processor or better, XGA Graphics and a Microsoft compatible mouse or an equivalent pointing device is recommended.

1.3 Installation

Prior to installing PACTware to the computer, all running programs must be closed. The .net Runtime Environment Release 1.1.4322.573 or higher must be installed.

The Setup-file includes the following programs:

- a program library to read PACTware 2.4 project files
- PACTware Release 3.0
- a ComDTM for the HART-Protocol
- a HART Scan Add-In for HART field devices which are connected point-to-point by modem or via multi-drop communication
- a generic HART Device-DTM
- Manuals and Online-Helps for PACTware in several languages



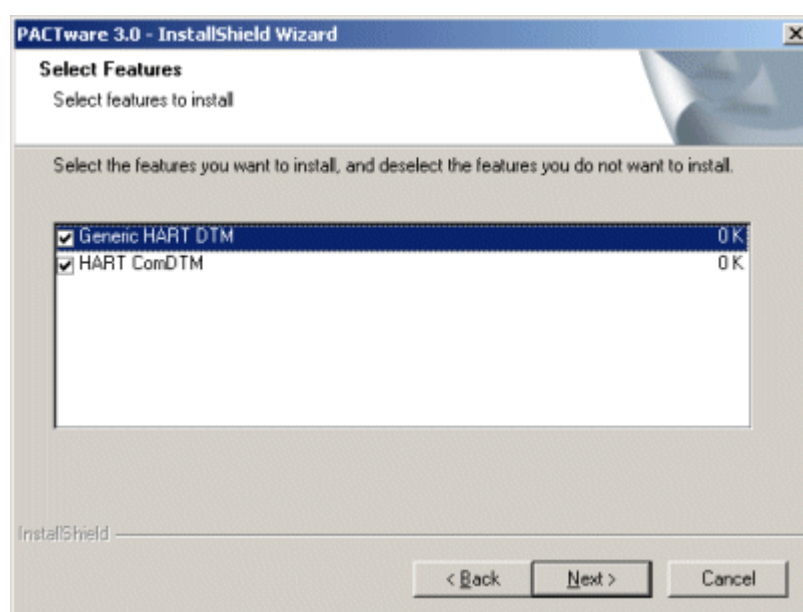
Overview

After unpacking the installation file the following files are available:

| | | | |
|--------|------------------|------------------------------------|------------------|
| Folder | CWHARTFDTSetup | Dateiordner | 11.10.2004 08:16 |
| Folder | IGenHartSetup | Dateiordner | 11.10.2004 08:16 |
| File | 0x0407.ini | 7 KB Konfigurationseinstellungen | 15.04.2004 15:24 |
| File | 0x0409.ini | 6 KB Konfigurationseinstellungen | 24.04.2004 18:21 |
| File | 0x040a.ini | 7 KB Konfigurationseinstellungen | 07.04.2004 11:24 |
| File | 0x040c.ini | 7 KB Konfigurationseinstellungen | 07.04.2004 14:04 |
| File | 0x0419.ini | 6 KB Konfigurationseinstellungen | 07.04.2004 16:29 |
| File | 1031.mst | 20 KB MST-Datei | 08.10.2004 16:11 |
| File | 1033.mst | 45 KB MST-Datei | 08.10.2004 16:11 |
| File | 1034.mst | 48 KB MST-Datei | 08.10.2004 16:11 |
| File | 1036.mst | 49 KB MST-Datei | 08.10.2004 16:11 |
| File | 1049.mst | 47 KB MST-Datei | 08.10.2004 16:11 |
| File | Data1.cab | 14.085 KB WinZip-Datei | 08.10.2004 16:11 |
| File | instmsiw.exe | 1.780 KB Anwendung | 11.03.2002 10:06 |
| File | ISScript10.Msi | 877 KB Windows Installer Package | 24.05.2004 19:38 |
| File | LIESMICH.TXT | 7 KB Textdatei | 17.08.2004 12:21 |
| File | PACTware 3.0.msi | 8.174 KB Windows Installer Package | 08.10.2004 16:11 |
| File | PACTware.bmp | 770 KB Bitmap | 07.10.2004 18:20 |
| File | PACTware.ini | 1 KB Konfigurationseinstellungen | 05.10.2004 18:35 |
| File | PACTware.ver | 1 KB VER-Datei | 15.03.2004 11:03 |
| File | PWEULAENG.TXT | 1 KB Textdatei | 07.06.2002 09:18 |
| File | PWEULAGER.TXT | 1 KB Textdatei | 07.06.2002 09:17 |
| File | README.TXT | 6 KB Textdatei | 20.07.2004 12:47 |

The installation is started by double-clicking **setup.exe**. After selecting the installation language and confirming the license agreement either the complete or the user-defined setup must be chosen.

The user-defined setup allows to specify a target directory for PACTware and to exclude some components from the installation.





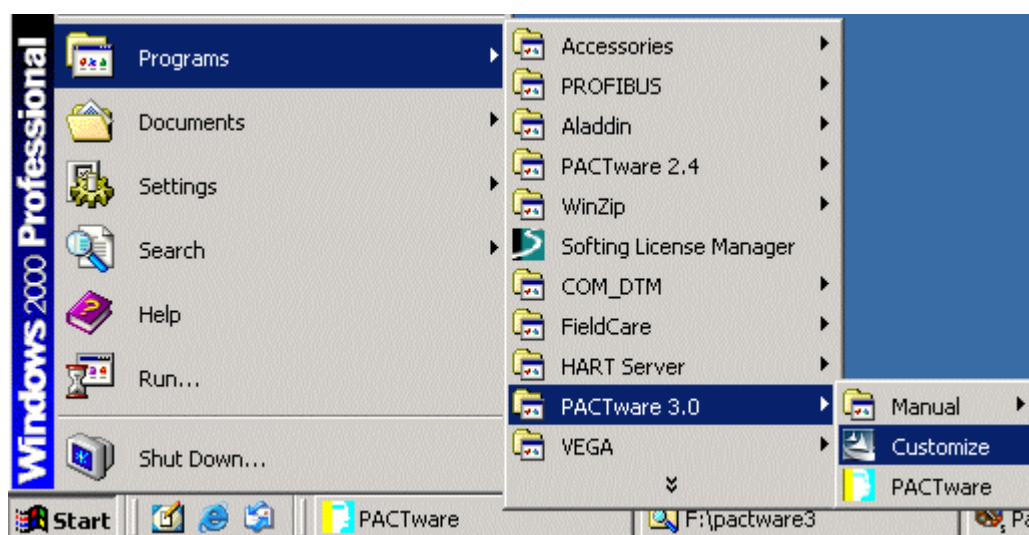
Overview

In the following PACTware setup procedure, the selected components and the system components are installed. The components are installed via an own setup, in which the special license terms must be noted. At the end of the PACTware setup, passwords which were valid for users of an earlier installed version of PACTware can be applied.

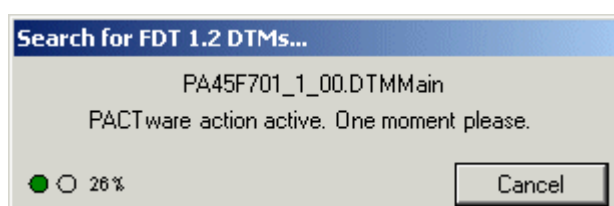
A program group for all users is entered to the Windows start menu. In addition, a link to start PACTware is created on the desktop.

1.4 Start

PACTware is either started by double-clicking the link or via the Windows Start Menu by opening <Programs> in the installed program group via menu item PACTware 3.0.



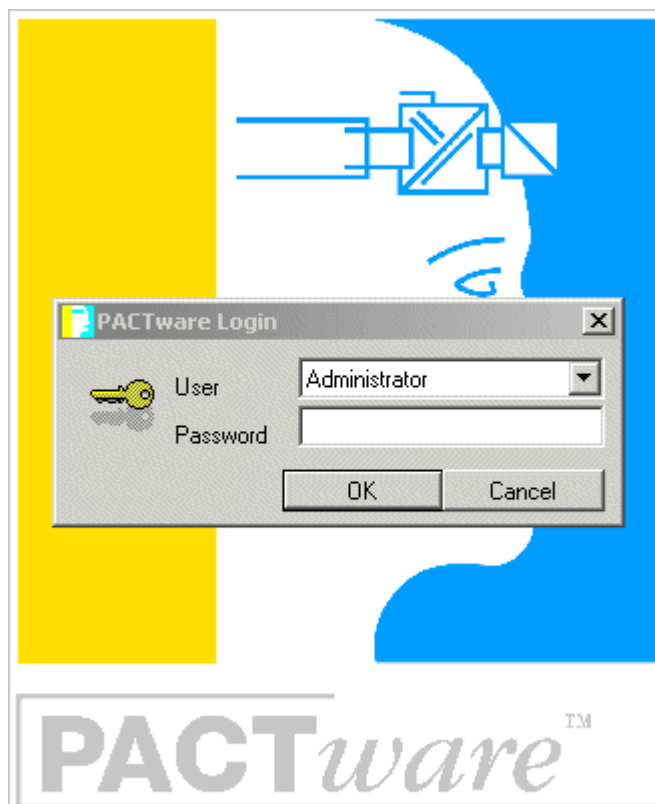
At the initial start the device catalog is automatically generated by searching the PC for all installed DTMS and entering them. The search can take some minutes when many DTMs were installed.





Overview

Following the program start a form is displayed prompting the entry of a password.



If PACTware is installed for the first time, the Administrator is predefined as the sole user. The password is: manager.

It is recommended to change this password in menu item **Extras** - user administration.

Before PACTware can be used at least one DTM must be installed.

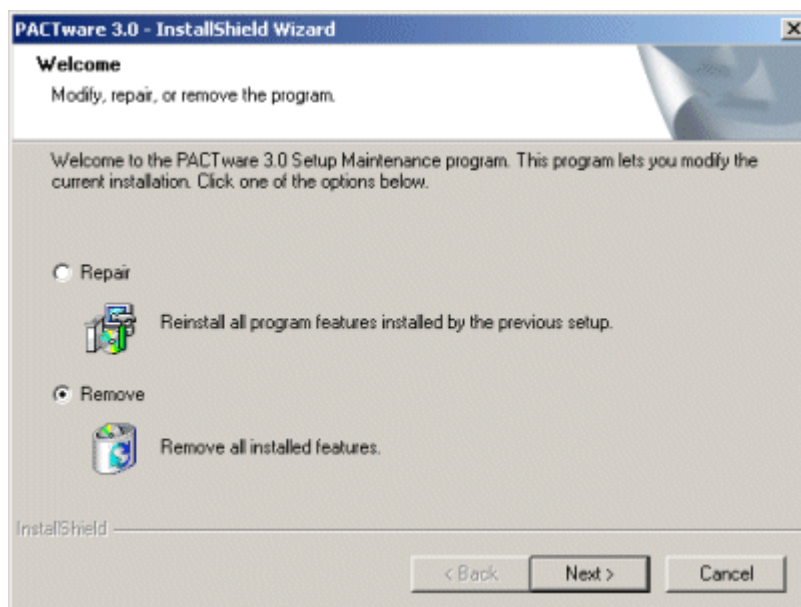
1.5 Deinstallation

PACTware is deinstalled via the entry **Customize** in the program group named PACTware 3.0.



Overview

The installation program is called via this menu item.

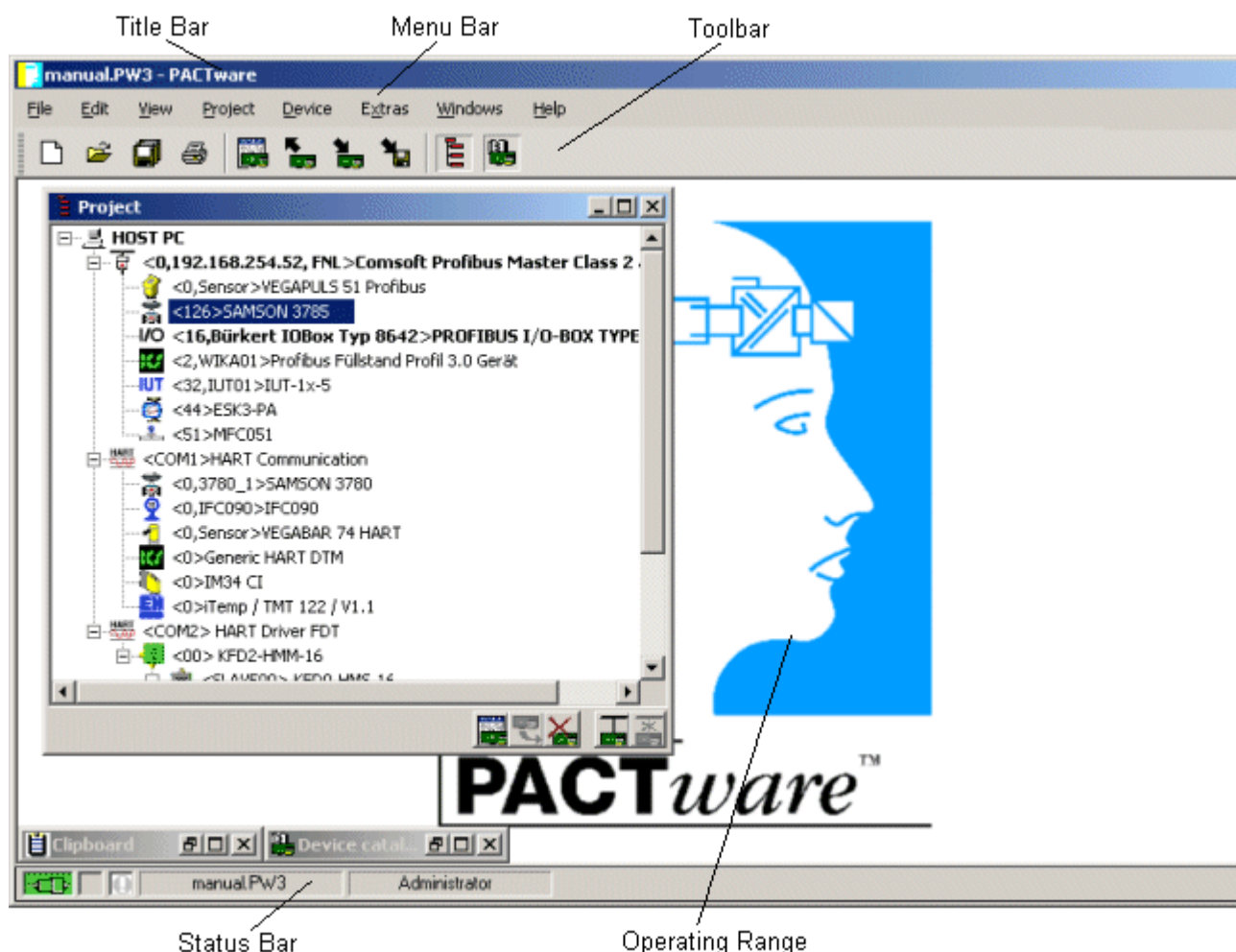


The .net Runtime Environment and the library to read PACTware 2 projects are not removed.



2. Main Window

Following a successful Login PACTware displays the main window containing several components.



2.1 Menu bar

The menu bar contains pull-down menus to start all available program functions. The requested menu item is selected via the mouse or the corresponding shortcut key (ALT-⟨letter⟩).





Main Window

2.2 Toolbar

Frequently used commands of the menu bar are contained in the toolbar.

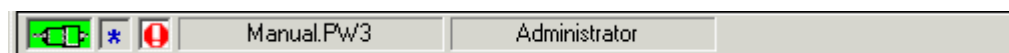


The symbols have the following meaning (from left to right):

- Create new project
- Open project
- Save project
- Print project
- Edit parameter of selected field device
- Load parameters from the field device
- Store parameters to the field device
- Write parameters of the **DTM** to file
- Open/Close project window
- Open/Close device catalog

2.3 Status bar

The status bar contains information about the current status of the edited project.



The displays have the following meaning (from left to right):

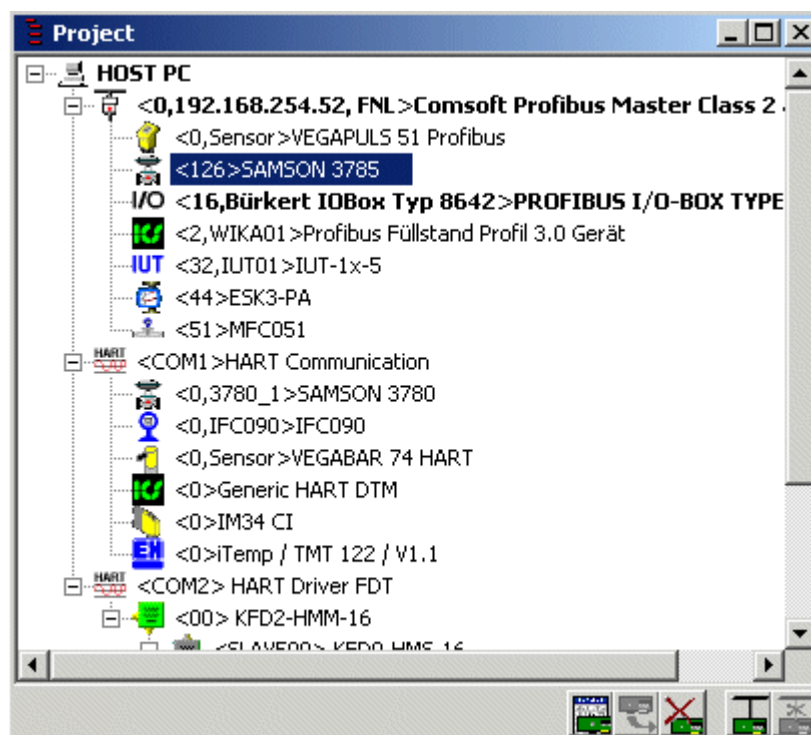
- Connected with a **ComDTM**
- Project was changed (identified by an asterisk)
- Error messages exist (flashing, if they have not yet been displayed on an error monitor)
- Name of the project
- Active user role



Main Window

2.4 Project window

The project displays the structure of a project with **ComDTM** and field devices. The project structure is based on the Host PC to which one or several communication modules are connected. Field devices, remote I/O systems or multiplexers are assigned to the communication modules. Field devices are contained in the lowest level of the hierarchical project structure.



The **DTM**-name of a project is preceded by a designation (so called tag written in <>). The display of the DTM-name characterizes the current processing status of the DTM:

- a selected DTM is displayed in blue color
- an edited DTM is displayed in gray color
- a DTM, providing online-functions is written bold. The # character identifies whether a connection to communicate is established between the DTM and the device.
- an asterisk [*] preceding the name of a DTM characterizes a DTM with edited parameters

The bottom edge of the window contains several buttons which are activated when displayed in color. The buttons have the following meaning:



Opens the DTM to edit the device data



Adds an additional device-DTM to the DTM selected in the project



Removes the selected DTM from the project structure



Connects the DTM with the device

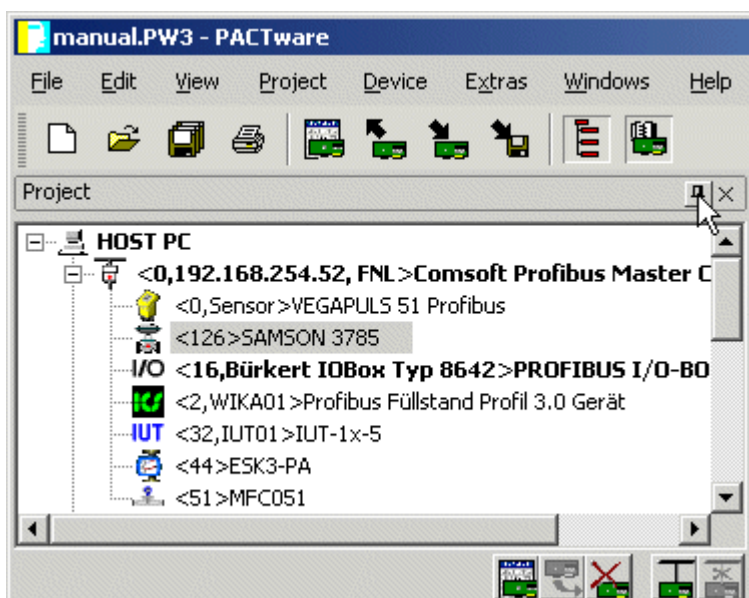


Disconnects the DTM from the device

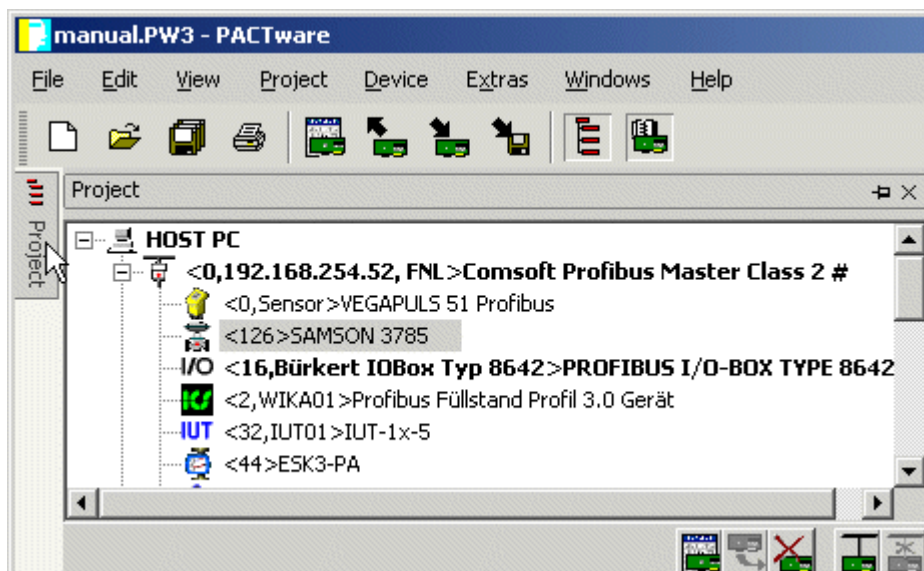


Main Window

The project window can dock on the main window as it is moved to the left upper border of the operating range. The pin symbol in the title line of the project window shows that the project window is always visible.



When clicking on the needle symbol, the project window is moved to the window bar at the left border of the operating range and can be faded in dynamically, by moving the cursor along the window frame.



The project window is docked on the main window again by a click on the needle symbol in this status.

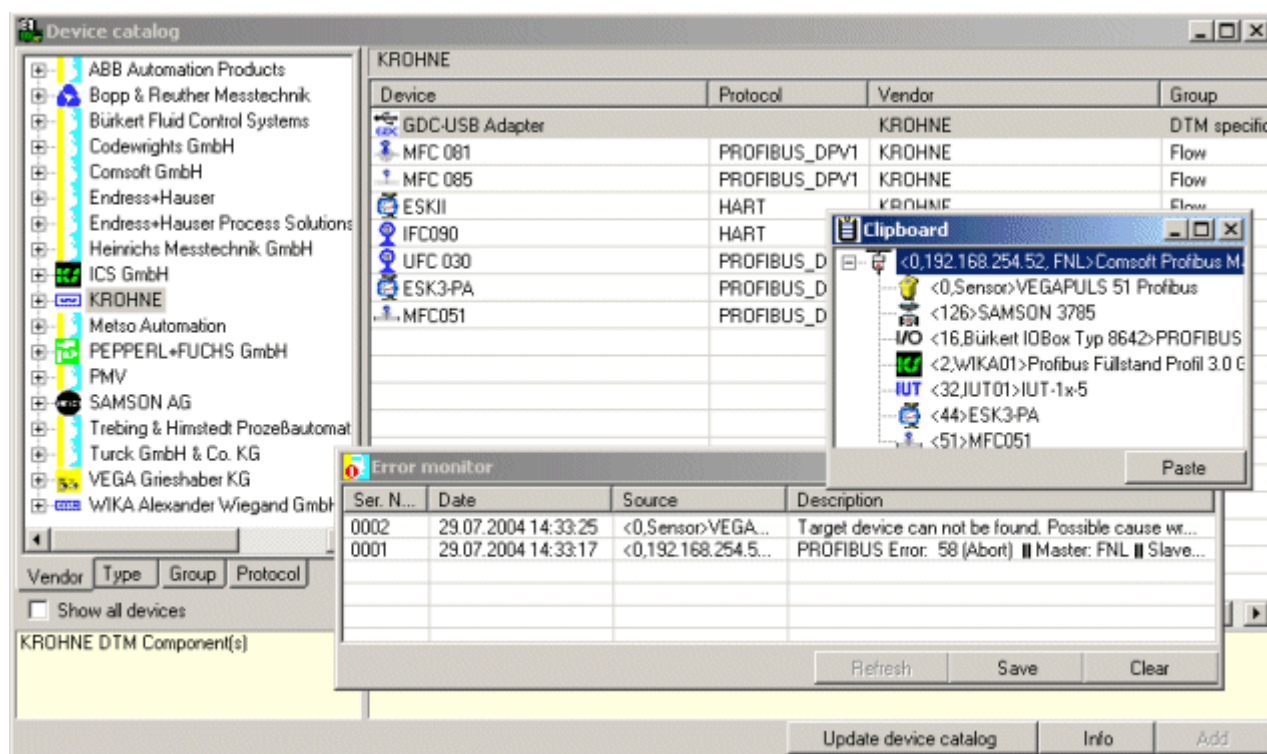


Main Window

2.5 Operating range

Different window types are opened which are required to edit the project like e.g.:

- The device catalog containing all DTM's installed on the PC.
- The error monitor listing acknowledged and unacknowledged error messages.
- The Clipboard in which parts of a project can be buffered.
- One or several windows of one or several DTM's which are being edited. The size and contents of the window are predefined by the DTM.



When actions require some time - like for example **Load parameters from device** - a progress bar is displayed at the lower border of the operation range. This progress bar can be closed again, when the action cannot be terminated.



3. Functions

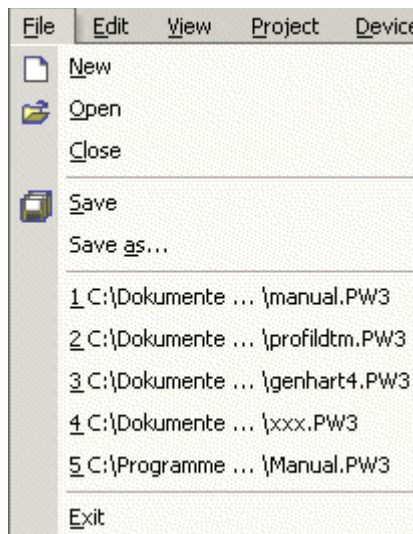
The functions of PACTware relate to project editing, parameterization and working with field devices as well as to the settings of the program settings itself.

3.1 Menus

The menus contain all functions of PACTware in groups:.



3.1.1 File



Menu **File** contains all functions pertaining to project editing.

New

Creates a new project. The project window is empty. To create a new project the **User Rights** of a planning engineer are required.

Open...

Opens a project file. Every user may open a project.

Close

Closes the currently edited project. When changes are not saved, a dialog window is displayed prompting the user to save them. Every user may close a project.

Save

Saves the current configuration of a project. This function requires **User Rights** of a planning engineer.

Save as...

Saves the project file under a new name. This function requires maintenance **User Rights**.

1 C:\Programs...

A list displays the most recently edited projects. The requested project can be selected and opened directly from this list.

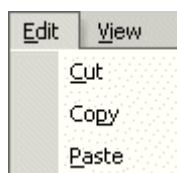
Exit

Exits PACTware. When changes are not saved, a dialog window is displayed prompting the user to save them. Every user may exit a project.



Functions

3.1.2 Edit



Menu **Edit** provides functions to edit a project.

Cut

A DTM or a part of a project which is connected to the selected **ComDTM** is copied to the PACTware **Clipboard** and removed from the project. This function requires **User Rights** of a planning engineer.

Copy

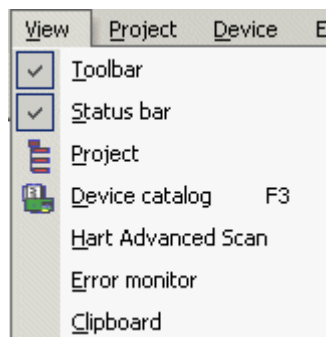
A DTM or a part of a project which is connected to the selected **ComDTM** is copied to the PACTware Clipboard. This function requires **User Rights** of a planning engineer.

Paste

The part of a project or DTM which is contained in the PACTware Clipboard is pasted to a selected position of the project. This function requires **User Rights** of a planning engineer.

The use of the clipboard is described in section **Add part of a project**.

3.1.3 View



The **toolbar** and the **status bar** can be displayed and hidden using menu item **view**.

The **project window**, the **device catalog**, the **clipboard** and the **error monitor** as well as the windows of additional **Add-Ins** can be displayed and hidden in the **operating range**.

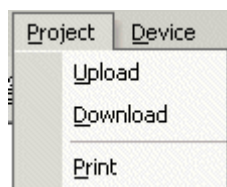
The **HART Advanced Scan** is an Add-In, which is included in the PACTware software pack. This Add-In detects field devices which are connected to a HART Modem and finds a suitable DTM in the device catalog.

All error messages which display DTMs are collected in the error monitor.



Functions

3.1.4 Project



Upload

The parameters of all field devices assigned to the selected communication field device (e.g. Remote I/O System or HART-Multiplexer) are read and applied to the project. This function requires maintenance [User Rights](#).

Download

The parameters of all field devices which are assigned to the selected field device (e.g. Remote I/O System or HART-Multiplexer) are downloaded from the project to the field devices. This function requires maintenance [User Rights](#).

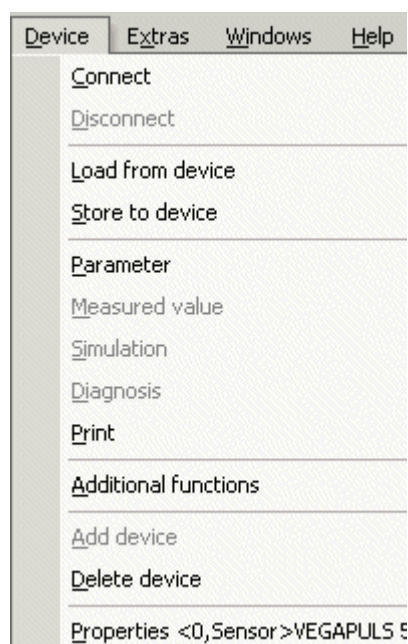
Print

Prints the project in a list which is displayed in a preview window. The project can subsequently be printed out on a printer. Every user may print a project.



Functions

3.1.5 Device data



All functions a **DTM** can execute with the field devices are combined in menu **device data**. The content of the menu corresponds to the **Context menu**, which can be activated for each DTM in a project via the right mouse key.

The first two groups of menu items are provided by each DTM. The menu items of the third group are provided by most DTMs. Functions which are not provided by the selected DTM are displayed in gray color.

Special functions of the selected DTM can be called via menu item **Additional Functions**. The content of the submenu depends entirely on the functions of the DTM.

The functions Connect/Disconnect, Measured Value and Diagnostics, Print and the Properties are enabled to all users.

The operator has the right to **Load data from device** and view parameters offline and online. Maintenance personnel may additionally modify parameters offline and online and **Store data to device** or write data into a project file or execute a **Simulation**.

An additional device can be added to the project structure via **Add device**. A check verifies whether the selected DTM can be connected to a communication field device like e.g. a multiplexer or a communication component like e.g. a profibus interface connection.

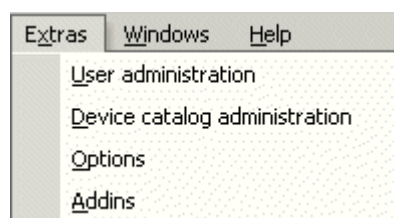
Delete device removes the selected device from the project - in case of a ComDTM also any device connected to it is removed. These functions require the **User Rights** of a planning engineer.

Menu item **Properties** displays a form with information about the selected DTM and the field device. The information is entered to the project database.



Functions

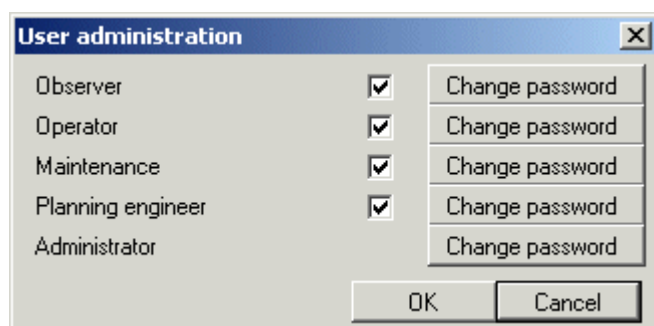
3.1.6 Extras



Administrative functions and program settings for PACTware are executed in menu **Extras**. The settings are called via menu item **Options**. The settings are either immediately effective or they are saved at the program exit and become visible at the next program start.

The administrative functions allow to edit the passwords of the user groups, the DTMs to be displayed in the **Device Catalog** can be selected and to define the **Add-Ins** to extend the functions of PACTware.

Passwords for the user groups are assigned in the **User Administration**. Only the administrator is permitted to change the user administration. He must also possess administrator rights in the Windows User Administration.



The rights of each user group are defined in the **User Rights** table in the glossary.

The button **Change password** calls a form to enter a new password. The password must be confirmed in the second line to eliminate spelling mistakes.

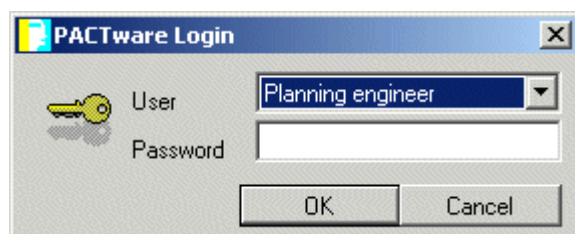


Caution: If an empty password is defined for user group **Administrator**, no login form is displayed at the PACTware start. The user is automatically logged in as administrator. If a new password is entered for the user group administrator, the Login form is displayed again.

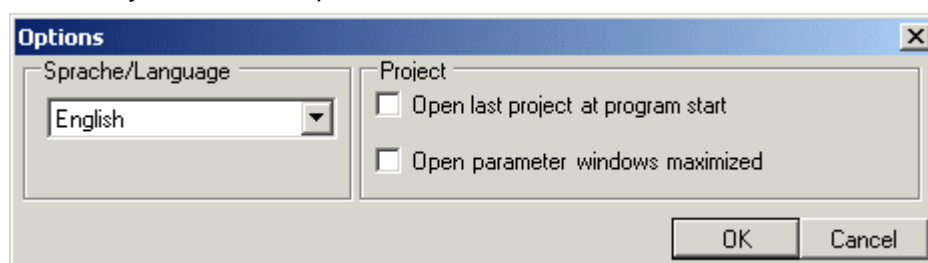


Functions

Up to 4 PACTware user groups can be created on a PC in the user administration. At PACTware program start the user can select one of the default user groups from the Login form and must enter the respective password.



The settings which are entered to form **Options** are effective immediately or at the next program start. Every user can set options.



In the event that e.g. **language** is changed text in the requested language appears everywhere after confirming the form by OK. This also applies to the user interface of the **DTM** if the selected language is supported by the DTM.

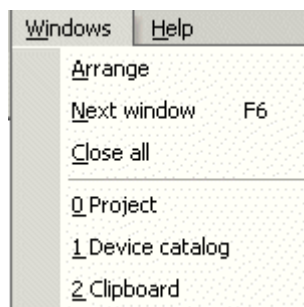
The following default settings can be made to edit projects:

- The most recently edited project can be opened directly at the program start.
- If only one field device is edited at the same time, the view in the operating range can be reduced to the form of one field device.



Functions

3.1.7 Window



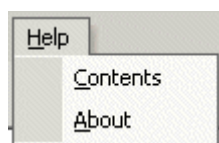
Menu **Window** supports the handling of **DTM**-windows in the operating range.

The DTM-windows can be cascaded such that a specific DTM-window can easily be found in a multitude of windows.

Next window switches from one DTM-window to the next and displays it in the foreground.

The operating range is emptied by activating **Close all windows**.

3.1.8 Help



This documentation is called via the first menu item of the **Help** menu.

Information about the program version and the location of the components of the **PACTware** program are displayed via entry **About** of the **Help** menu.



3.2 Context menu

A **context menu** is provided in the project for each item. It consists of entries that are predefined by **PACTware** and entries defined by the respective **DTM**.



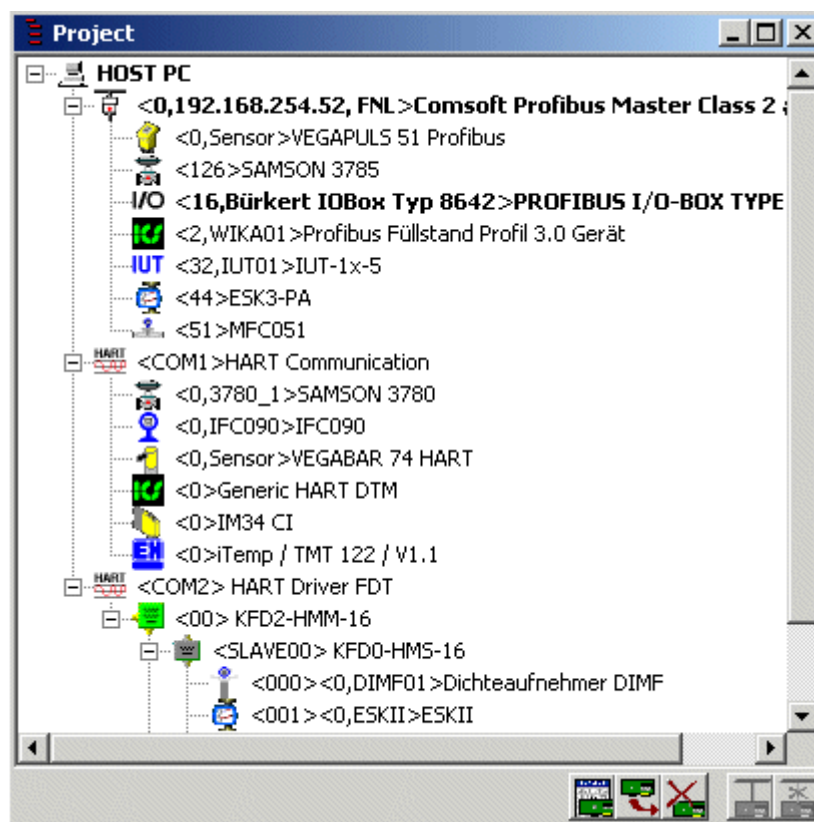


3.2.1 Connection between DTM and device

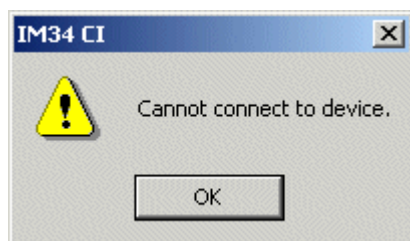
The following two menu items are provided by each DTM.

Connect

Regardless of the communication protocol a connection setup is started between the DTM and the device. In the project window all involved DTMs and the **ComDTM** are displayed in bold letters and marked by a # character when a connection was successfully established.



An error message is displayed if establishing an initial communication with the device was not successful, because e.g. the device was not physically connected.



Disconnect

When the device has been edited, with this function the connection can be disconnected. The connection is disconnected automatically when PACTware is exited.

Disconnecting a **ComDTM** results in a simultaneous disconnection of all connected DTMs.



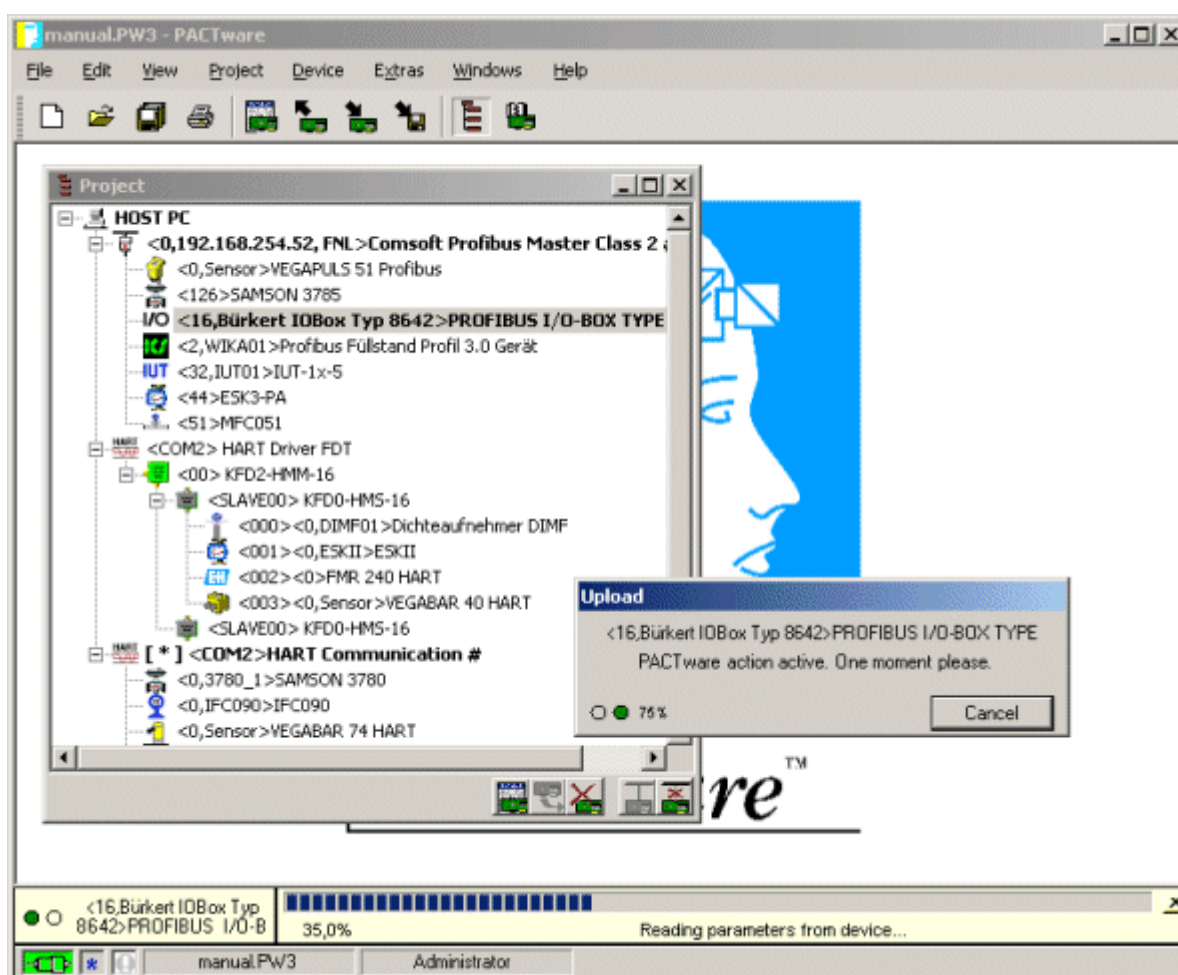
Functions

3.2.2 Data exchange between DTM and device

The following two menu items are provided by each DTM. A connection to the device must have been established before data can be uploaded from the device or downloaded to the device.

Load data from device

After successfully establishing a connection, the DTM starts to read data from the device. A message displays this progress.



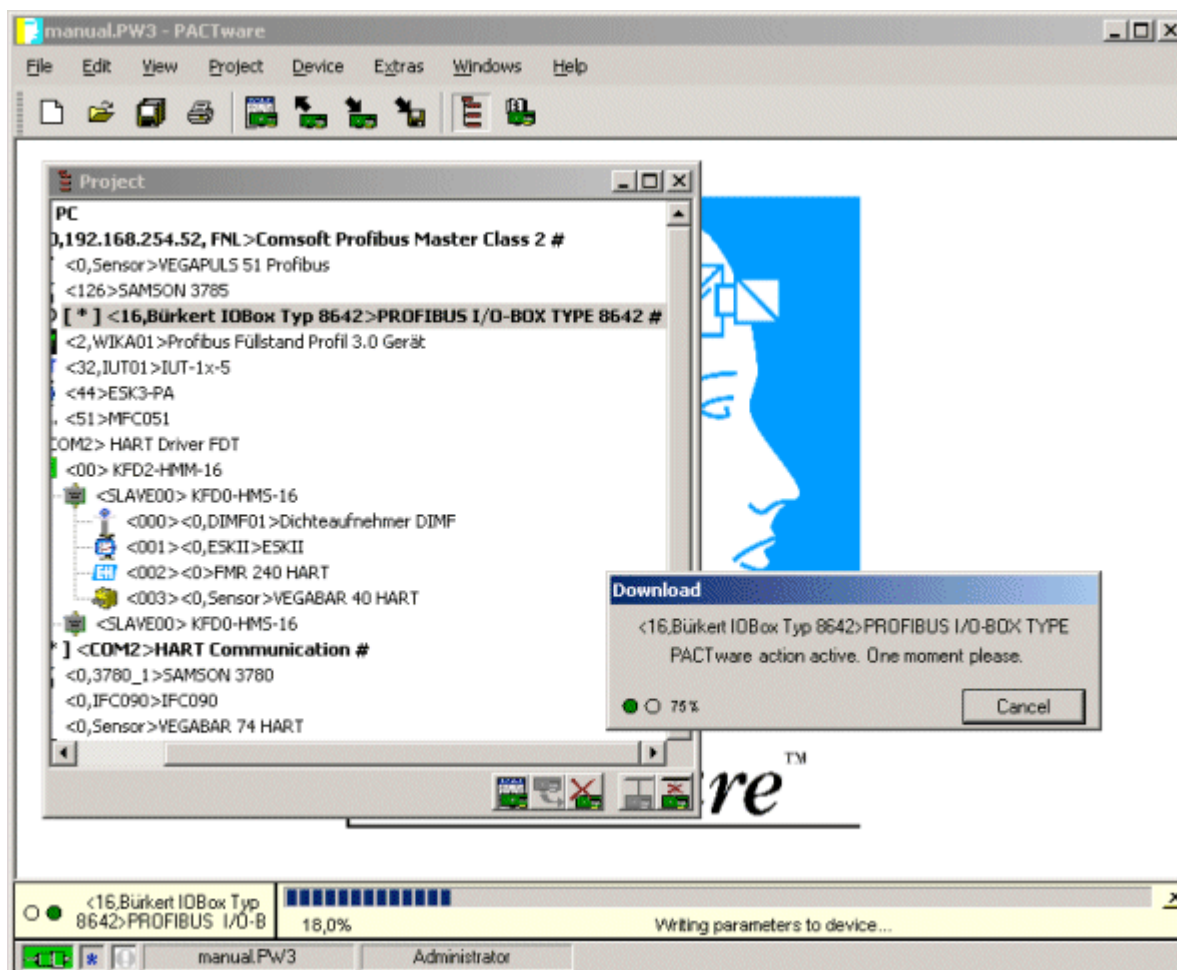
Which data are read from the device is defined in the DTM. Different data can be read depending on the user group. Data that was successfully read from the device can be displayed in the DTM window.



Functions

Store data to the device

After successfully establishing a connection, the DTM starts to store data to the device. A message displays this progress.

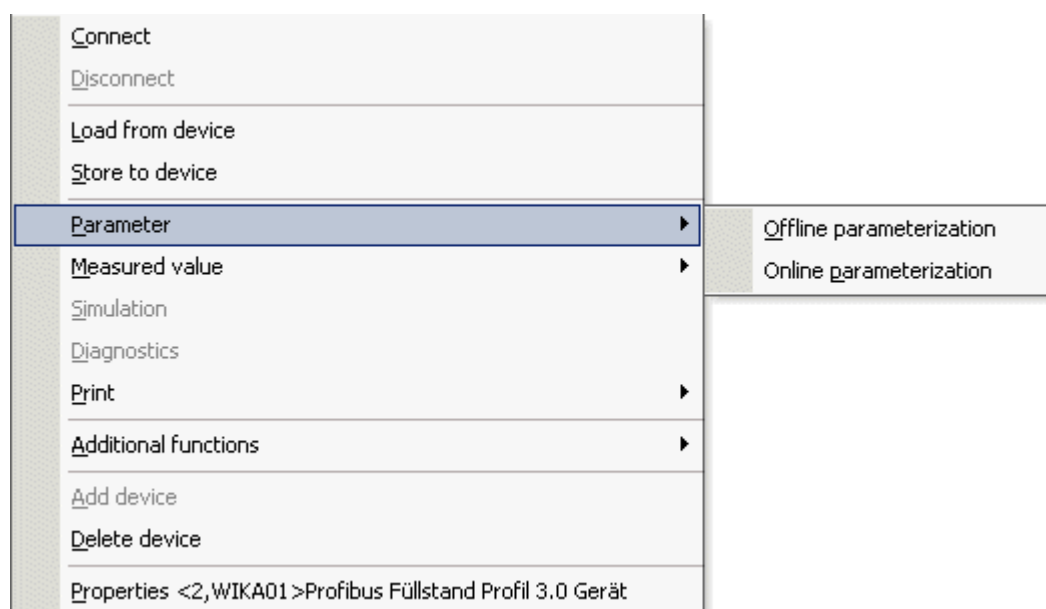


The DTM defines the data that is written to the device. Depending on the user group, different data can be stored.



3.2.3 Edit device data with a DTM

The first menu item of this group is provided by each DTM. The other menu items are only offered by the DTM if the field device possesses the respective functions or if the DTM supports these functions.



The realization of the supported functions and the look of the displayed forms depend on the implementation of the DTM.

Parameter

A distinction can be made between **Offline Parameterization** and **Online Parameterization** depending on the implementation of a DTM. If a connection has been established with a DTM, the online parameterization is automatically displayed otherwise a window for Offline Parameterization of the device is displayed.

In the offline parameterization all parameters of a device are projected, which can also be defined without a connected device. In this manner a project with all its devices can already be completed before the system start-up.

The online parameterization changes parameters during the plant operation, e.g. to set control parameters.

Measured value

Depending on the DTM measured values are either displayed in a scaled measured value display or in a trend display if the measured values can be called cyclically.

Simulation

The simulation allows to test a field device during its operation. Given states are set in the field device via DTM in order to detect e.g. malfunctions. A connection to the field device must be active.

Diagnostics

Field devices often offer substantial information on their status. This information can be called and displayed via this menu item. A connection to the field device must be active.



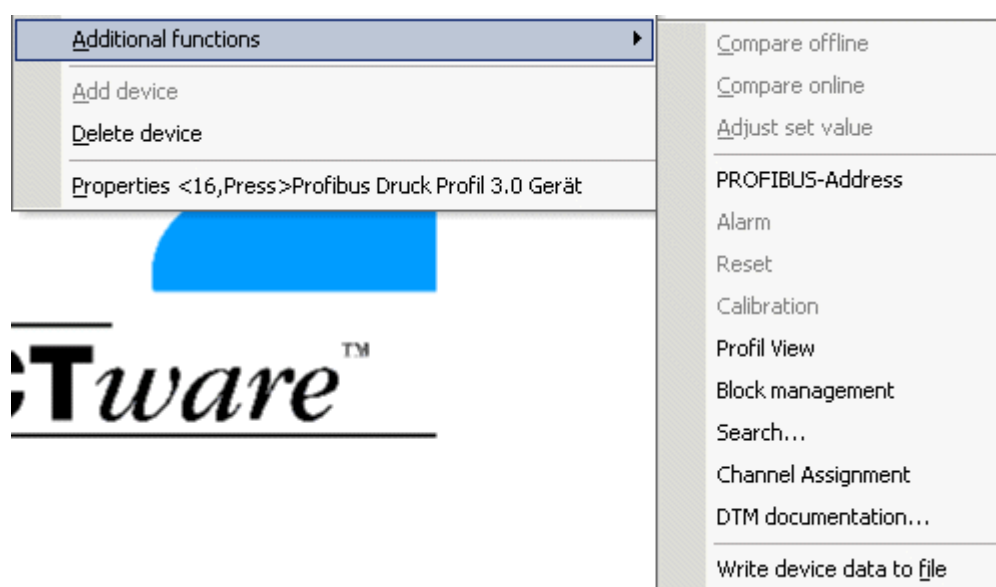
Functions

Print

A hard copy is made for predefined functions. Its form can be defined in so-called style sheets. The form of the printout can be defined individually by each DTM. The printout is displayed as preview in a window and can then be output on a printer.

3.2.4 Additional Functions

Menu item **Additional Functions** displays a submenu providing all device-specific functions or functions which are used less frequently. The submenu is DTM-dependent and is divided into several groups.



The first group contains three menu items which are provided for all **DTMs**. These functions are only active when they are supported by the DTMs.

The second group contains all device-specific DTM functions.

The third group is displayed when a device is connected to a communication device, e.g. like a HART-Multiplexer.

The fourth group of menu items is obligatory for all DTMs.

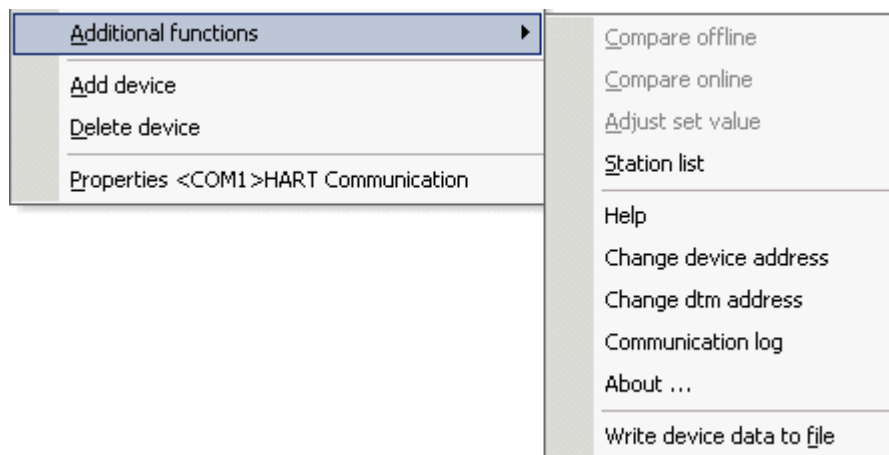
Write device data to file

This function is called to save changes to parameters which were made in the DTM.



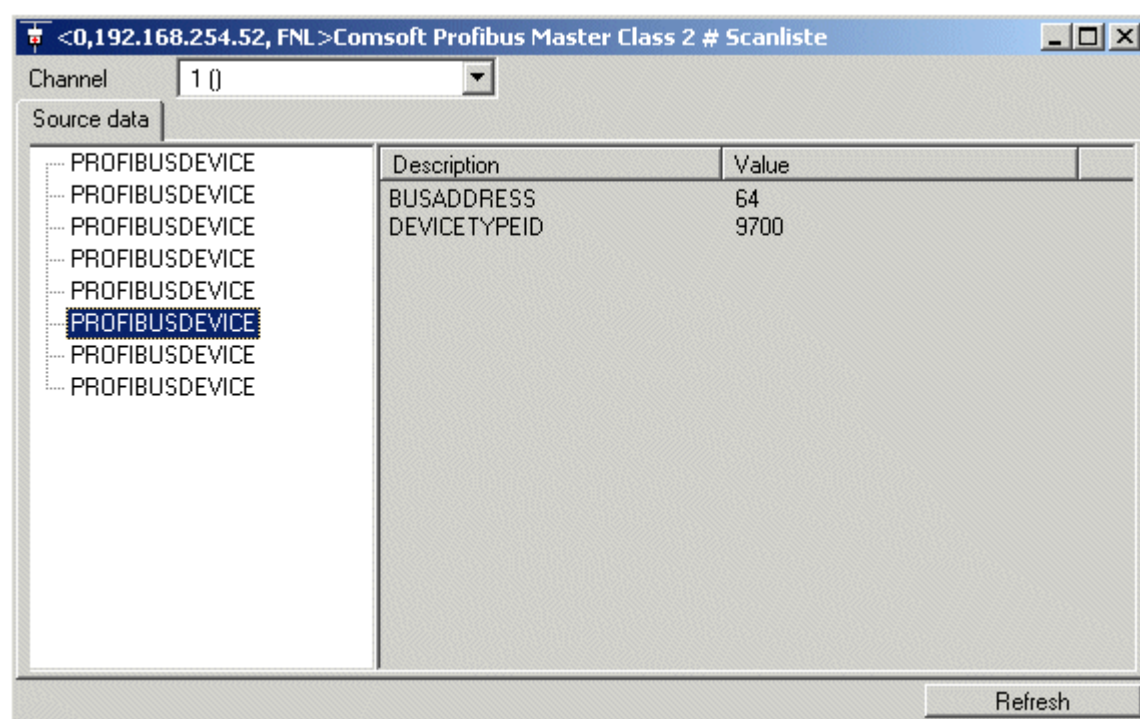
Functions

ComDTMs provide a function to set up a **list of all field devices** that are e.g. connected to a bus.



The possible number of the connected field devices may vary depending on the bus structure. The search procedure may therefore take some time.

A window displays all detected field devices.



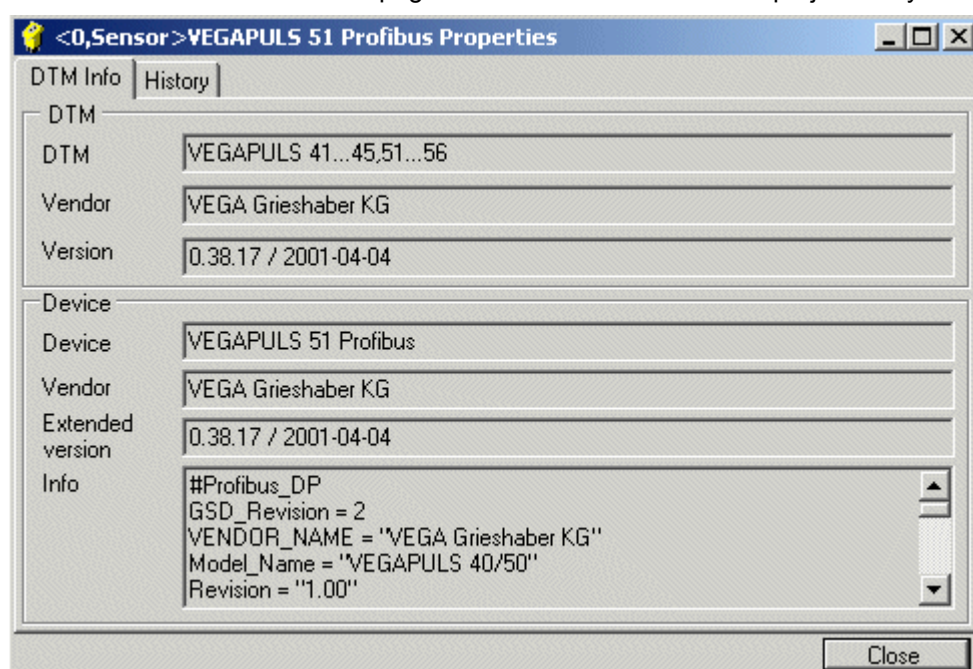


3.2.5 Add device or delete device

These menu items are accessible if at least the user rights of a planning engineer are set and the project structure can be extended at this position or a DTM is selected for deletion. Devices may be added to a **ComDTM**, which realizes a specific protocol or to field devices such as Multiplexers or Remote I/O-Systems. If a ComDTM or Multiplexer is removed, the associated subproject is also deleted.

3.2.6 Device properties

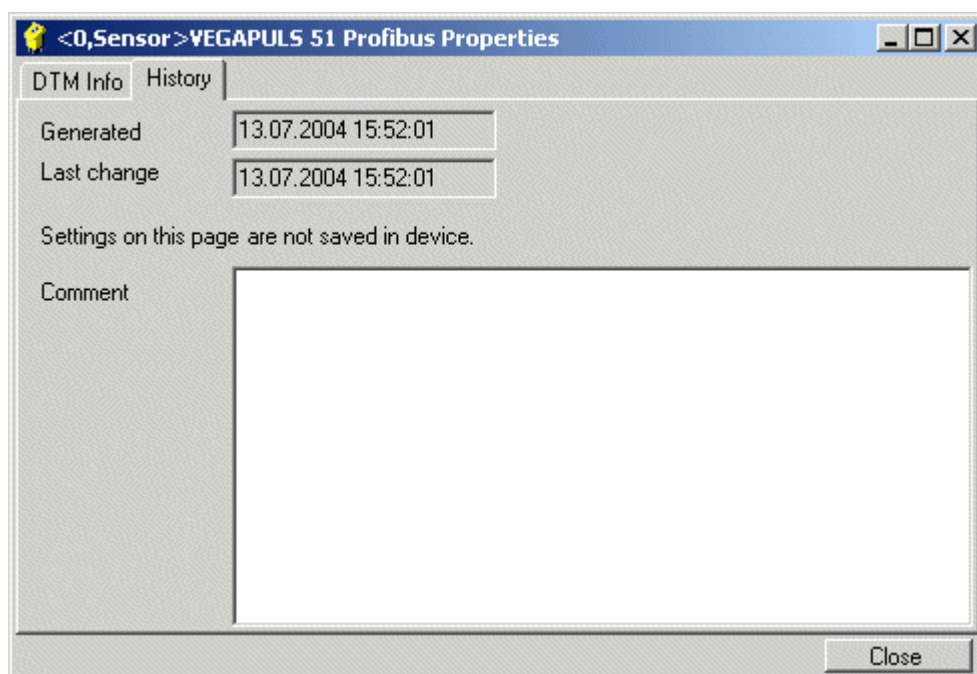
Every **DTM** provides information about itself and about the device it can work with. 2 pages are offered in the window. The first page contains information on the project entry of the DTM.





Functions

The second page contains the history of the DTM instance as well as a comment which is entered to the project database. This comment is displayed on a hard copy of the project associated to the respective DTM.





4. Working with PACTware

PACTware is designed for the configuration and parameterization of field devices used in an automation system. PACTware allows to configure projects in which the structure of the automation system is reproduced.

In the simplest case only one field device is connected to a PC via a modem or via a bus coupler. Complex projects can comprise several even different bus systems, connecting multiplexer or remote I/O systems to the PC. Field devices sensing the measured values from the process (sensors) or influencing the process sequence (actors) are connected to the multiplexer.

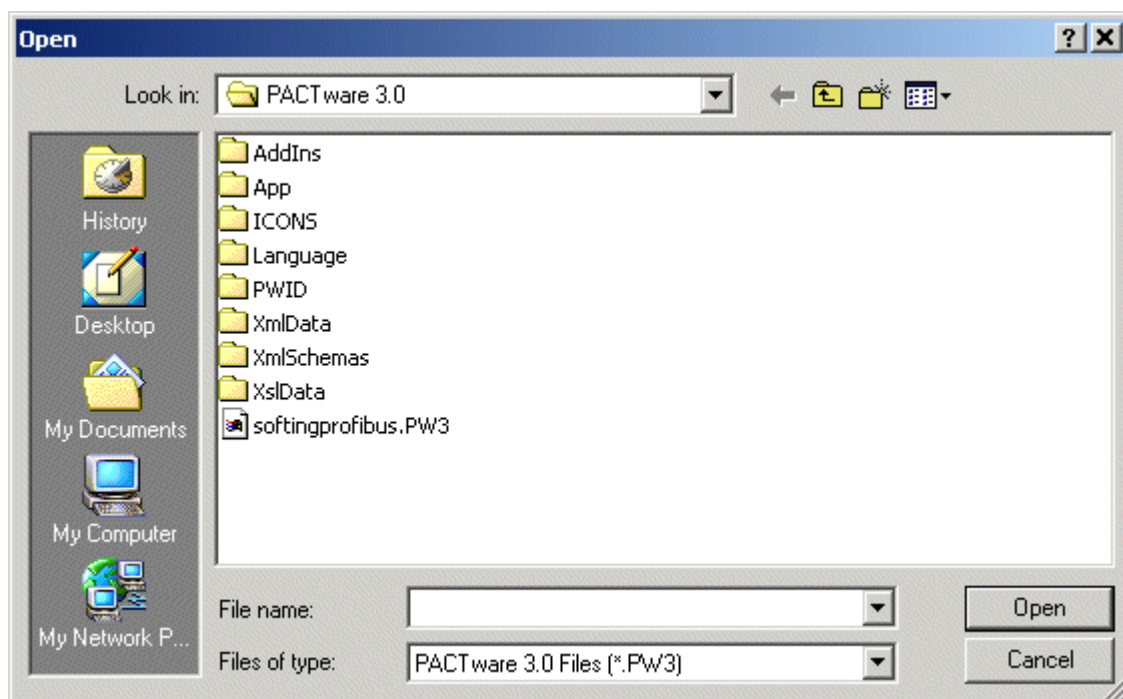
As PACTware is a frame application according to the **FDT** Specification, **DTMs** of different manufacturers and bus systems providing a **ComDTM** can be combined in one project.

4.1 Generate/Open project

A new project is generated via menu item **New** in menu **File**. The project has no name and only consists of the HOST PC.



An existing project is either opened via menu item **Open...** in menu **File** or via the adjacent tool symbol of the toolbar. A selection form displays the existing project.

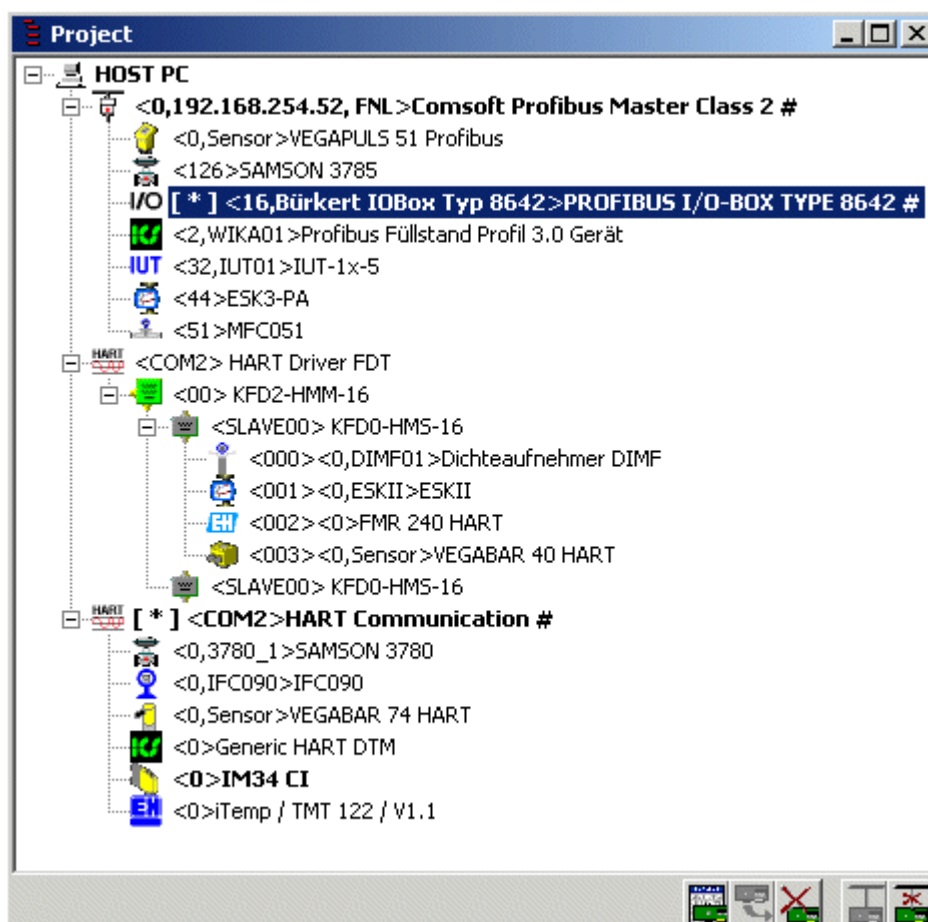


If a project is contained in the list of the most recently edited projects, it can also be opened directly via menu item **File**.



Working with PACTware

The project structure is displayed in the **project window**, the name of the project is displayed in the status bar and in the title line.





4.2 Device Catalog

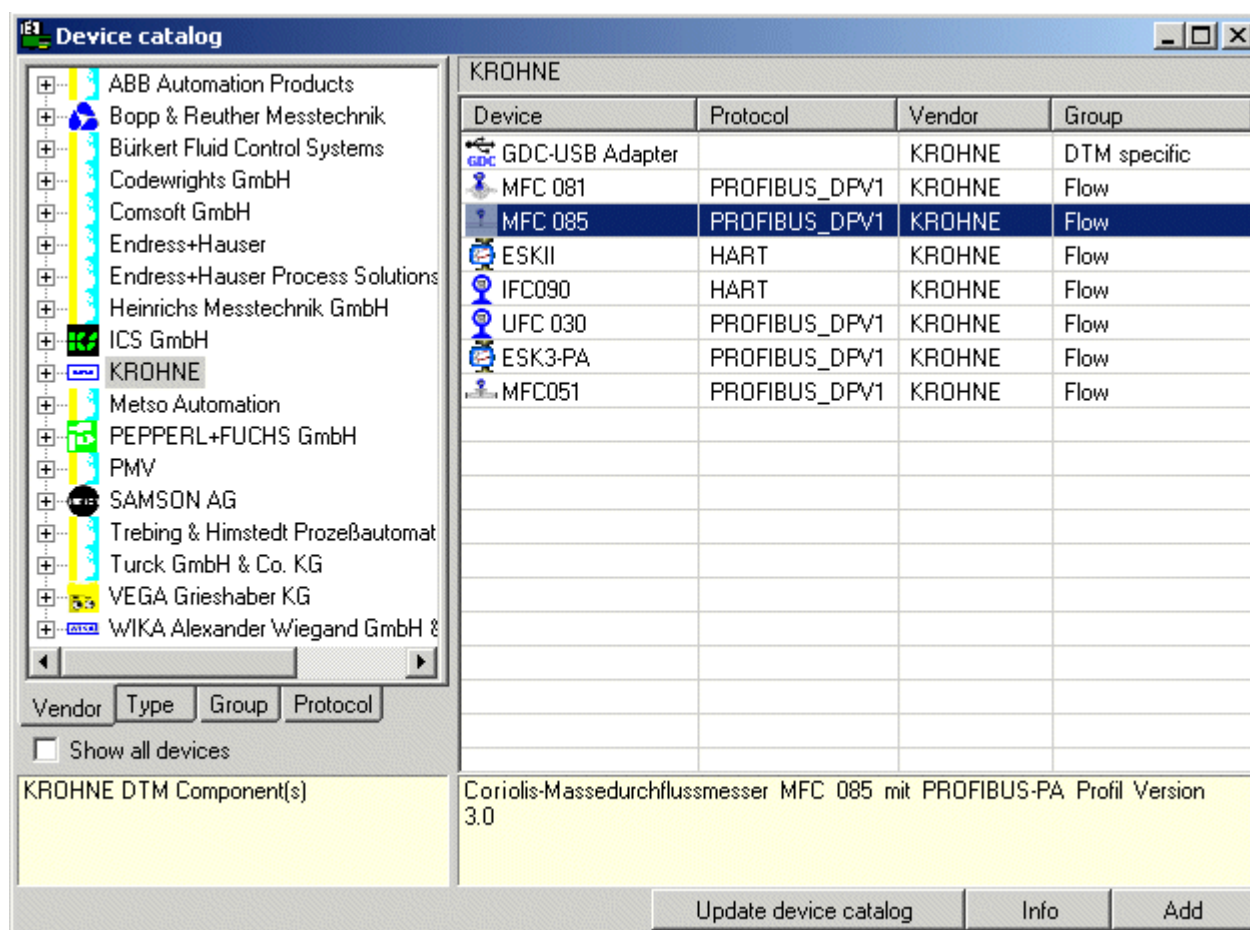
The **device catalog** displays all **DTMs**, which are available for the configuration of a project. The device catalog can be displayed as follows:

- using function key **F3**
- via menu item **Device catalog** in menu **View**



- using the adjacent tool symbol

The device catalog is displayed in a window providing an overview of all DTMs in tree structure on the left and the currently selected DTM group in tabular form on the right. The tree structure can be displayed grouped by vendors, DTM-Type, DTM-group and communication protocol.

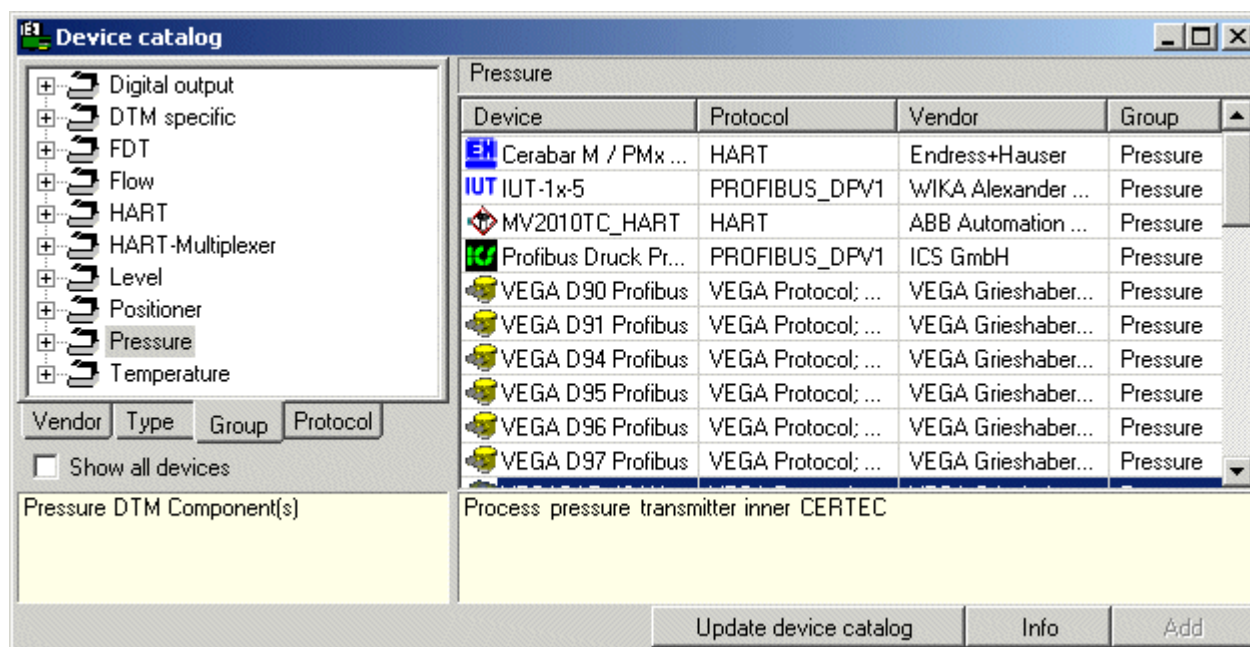


The initial start of the device catalog displays the DTMs sorted by vendors.



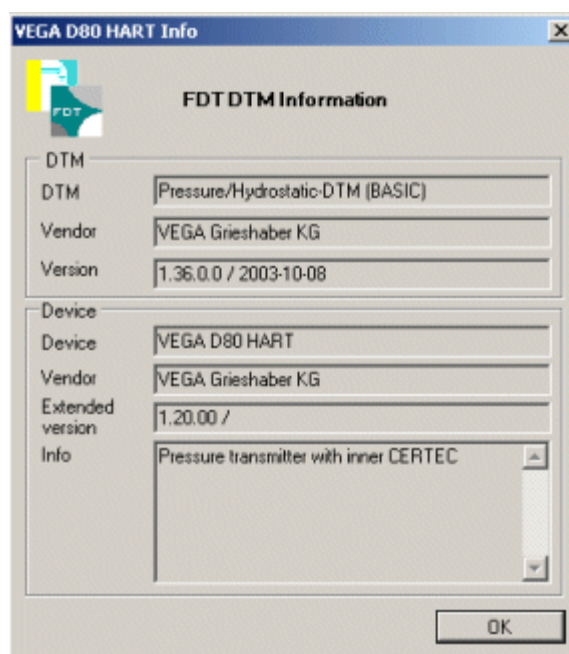
Working with PACTware

The columns in the table on the right side of the window can be sorted alphabetically by selecting the heading of the requested column. The device catalog can such have the following appearance:



Button **Update device catalog** allows to enter DTMs to the device catalog which were later installed to the PC. This procedure must always be executed when a new DTM is installed. This function requires the **User Rights** of a planning engineer.

Button **Info** provides information on the currently selected DTM and the device type it can work with.



Button **Add** allows to add the selected DTM to the current position in the project structure. This function requires at least the **User Rights** of a planning engineer.



Working with PACTware

The number of DTMs displayed in the device catalog can be restricted to keep the device catalog clearly arranged. Menu item **Device catalog administration** in menu **Extras** lists all installed DTMs in a window. All DTMs, which are to be displayed in the device catalog, can be selected in this window. Ticked off DTMs are visible to all users in the device catalog. The device catalog is automatically reorganized when the window is closed.

| Device catalog administration | | | |
|---|-------------------|------------------------------------|---------------|
| Device | Protocol | Vendor | Group |
| <input type="checkbox"/> ET200iS | PROFIBUS_DPV1 | Siemens | DTM specific |
| <input checked="" type="checkbox"/> FMR 230 | Profibus DP/V1 | Endress+Hauser Process Solution... | Level |
| <input checked="" type="checkbox"/> FMR 230 HART | HART | Endress+Hauser Process Solution... | Level |
| <input checked="" type="checkbox"/> FMR 240 | Profibus DP/V1 | Endress+Hauser Process Solution... | Level |
| <input checked="" type="checkbox"/> FMR 240 HART | HART | Endress+Hauser Process Solution... | Level |
| <input checked="" type="checkbox"/> GDC-USB Adapter | | KROHNE | DTM specific |
| <input checked="" type="checkbox"/> Generic Hart | HART (PW-IDL) | PEPPERL+FUCHS GmbH | HART |
| <input checked="" type="checkbox"/> Generic HART DTM | HART | Endress+Hauser | DTM specific |
| <input checked="" type="checkbox"/> Generic HART DTM | HART | Metso Automation | DTM specific |
| <input checked="" type="checkbox"/> Generic HART DTM | HART | ICS GmbH | DTM specific |
| <input checked="" type="checkbox"/> HART Communication | | Codewrights GmbH | FDT |
| <input checked="" type="checkbox"/> HART Driver FDT | | Codewrights GmbH | HART |
| <input checked="" type="checkbox"/> IFC090 | HART | KROHNE | Flow |
| <input checked="" type="checkbox"/> IM34 CI | HART | Turck GmbH & Co. KG | Temperature |
| <input checked="" type="checkbox"/> IM34 CRI | HART | Turck GmbH & Co. KG | Temperature |
| <input checked="" type="checkbox"/> iTemp / TMT 122 / V1.1 | HART | Endress+Hauser | Temperature |
| <input checked="" type="checkbox"/> IUT-1x-5 | PROFIBUS_DPV1 | WIKA Alexander Wiegand GmbH ... | Pressure |
| <input type="checkbox"/> JIG Styleguide Prototype DTM | Profibus DP/V1 | FDT Joint Interest Group | FDT |
| <input type="checkbox"/> JIG Styleguide Prototype DTM HA... | HART | FDT Joint Interest Group | FDT |
| <input checked="" type="checkbox"/> KFD0-HMS-16 | P+F HART Multi... | PEPPERL+FUCHS GmbH | HART-Multiple |
| <input checked="" type="checkbox"/> KFD2-HMM-16 | P+F HART Multi... | PEPPERL+FUCHS GmbH | HART-Multiple |
| <input checked="" type="checkbox"/> Liquisys M PH / CPM 2x3 / V2.50 | HART | Endress+Hauser | DTM specific |
| <input checked="" type="checkbox"/> Logix500si/D2 | HART | PMV | Positioner |
| <input checked="" type="checkbox"/> MFC 081 | PROFIBUS_DPV1 | KROHNE | Flow |
| <input checked="" type="checkbox"/> MFC 085 | PROFIBUS_DPV1 | KROHNE | Flow |

Ticked off devices in the device catalog are enabled to all users.

OK

This function requires administrator **User Rights**.



4.3 Edit project

After opening or after creating a new project, its structure can be edited by adding or removing a **DTM** or by editing parts of the project.

Even if a field device is connected, additional DTMs can be added to the project. When DTMs are to be removed from a project, active connections with the respective DTMs must be closed.

4.3.1 Add DTM

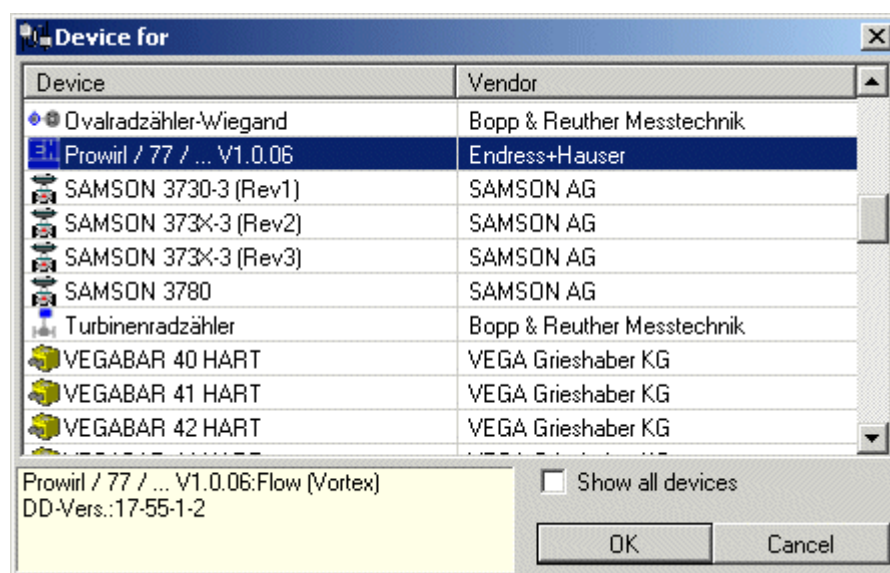
At first the position of the project structure must be selected to which an additional **DTM** is to be added.

The following options allow to add a DTM to the project:

- by using button **Add** in the device catalog
- by double-clicking on a DTM in the device catalog
- by 'drag and drop' from the device catalog to the project window
- by the adjacent tool symbol which is located in the project window
- by using menu item **Add device** in the context menu or in the device menu of a DTM



When using one of the latter two options, a list of the admissible DTMs is displayed to select the requested DTM .



Whether a DTM can be added to the selected position of the project structure depends on the following conditions which are controlled by **PACTware**:

- the **User Rights**
- the type of DTM to which the new DTM should be added.



PACTware ensures that e.g. only DTMs for Profibus-capable devices are added to a Profibus ComDTM or only DTMs for HART-capable devices are added to HART-Multiplexers. If that is not the case, an error message is displayed.

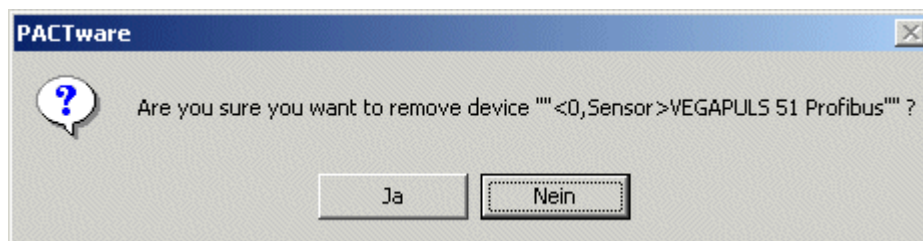
4.3.2 Remove DTM

The following options allow to remove a DTM from the project structure:



- by using the adjacent tool symbol located in the project window
- by using the DEL key on the keyboard
- by using menu item **Delete Device** in the context menu of the DTM

Before a DTM is removed from the project, a query is displayed to avoid an erroneous removal of the DTM.



Removing a DTM to which additional DTMs are assigned results in the removal of the entire project part.

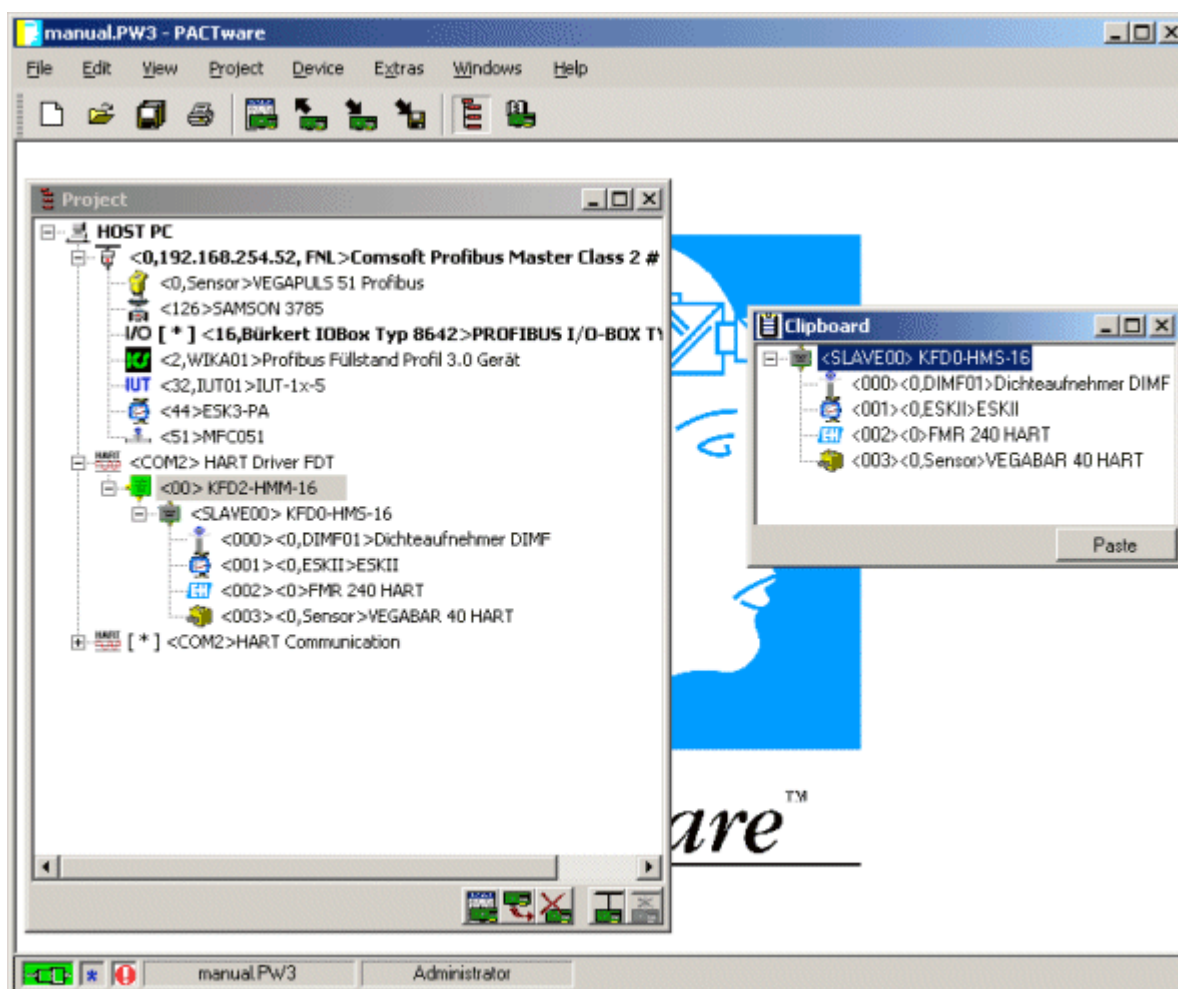
Caution: PACTware offers no Undo function.



4.3.3 Add part of a project

When a project consists of multiple consistent parts, the configuration can be accelerated considerably by copying parts of the project.

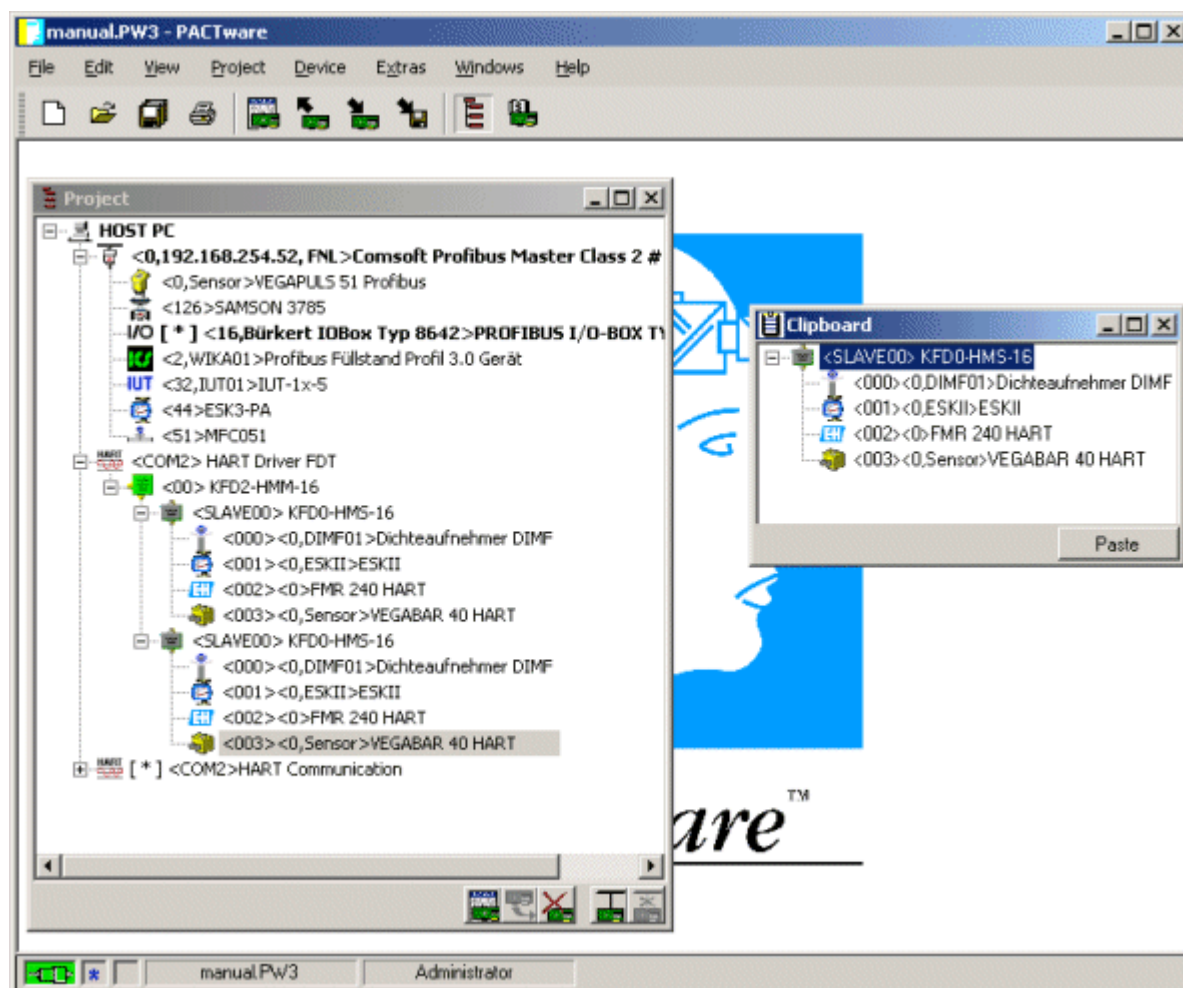
In the project illustrated below SLAVE00-String was selected. This part project was copied to the **PACTware Clipboard** by using menu item **Copy** in menu **Edit**



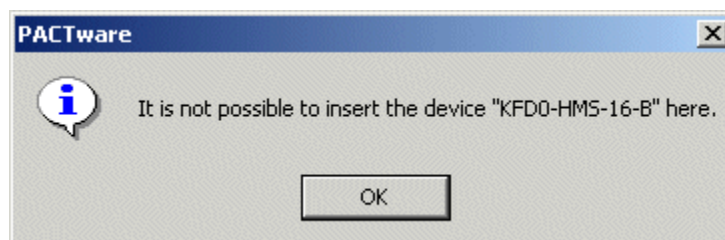


Working with PACTware

The content of the PACTware Clipboard can now be inserted to a previously designated position of the project by using the **Paste** button of the Clipboard window. This function requires the **User Rights** of a planning engineer. The result may be seen in the following figure.



PACTware now checks if the part project can be pasted to the selected position of the project. In the event of an error, the following message may e.g. be displayed:





4.4 Parameterize device

A distinction is made between **Offline Parameterization** and **Online Parameterization**. When a **DTM** has been successfully connected, the Online Parameterization is automatically displayed, otherwise the window for Offline Parameterization of the device is displayed.

Offline parameterization is used to project all parameters of a device that can also be defined without a connected device. In this manner, a project with all its devices can already be finalized before the system startup.

The Online Parameterization is used to change parameters during the plant operation, e.g. to set control parameters.

The following options allow to display the parameterization of a device:

- via menu item **Parameter** in menu **device data**
- via menu item **Parameter** in the context menu of a DTM
- via the adjacent symbol in the toolbar
- via the same symbol in the toolbar of the project window
- and via a double click on a DTM name in the project window



The structure of the parameterization window depends on the respective device. Depending on the complexity of the DTM the parameters can be displayed in different windows. In this case following the selection of the parameterization a submenu is displayed to select the requested window.

4.5 Load parameters from device

In order to read parameters from a field device, a connection must be set up. The type of error messages a user receives when a connection fails is **DTM**-dependent.

A connection to a field device can be established in the following ways:

- by using menu item **Connect** in menu **Device data**
- by using menu item **Connect** in the context menu of a DTM
- implicitly via the symbol **Load from device**
- implicitly by using menu item **Load from device** in the menu **device data**
- implicitly by using menu item **Load from device** in the context menu of a DTM



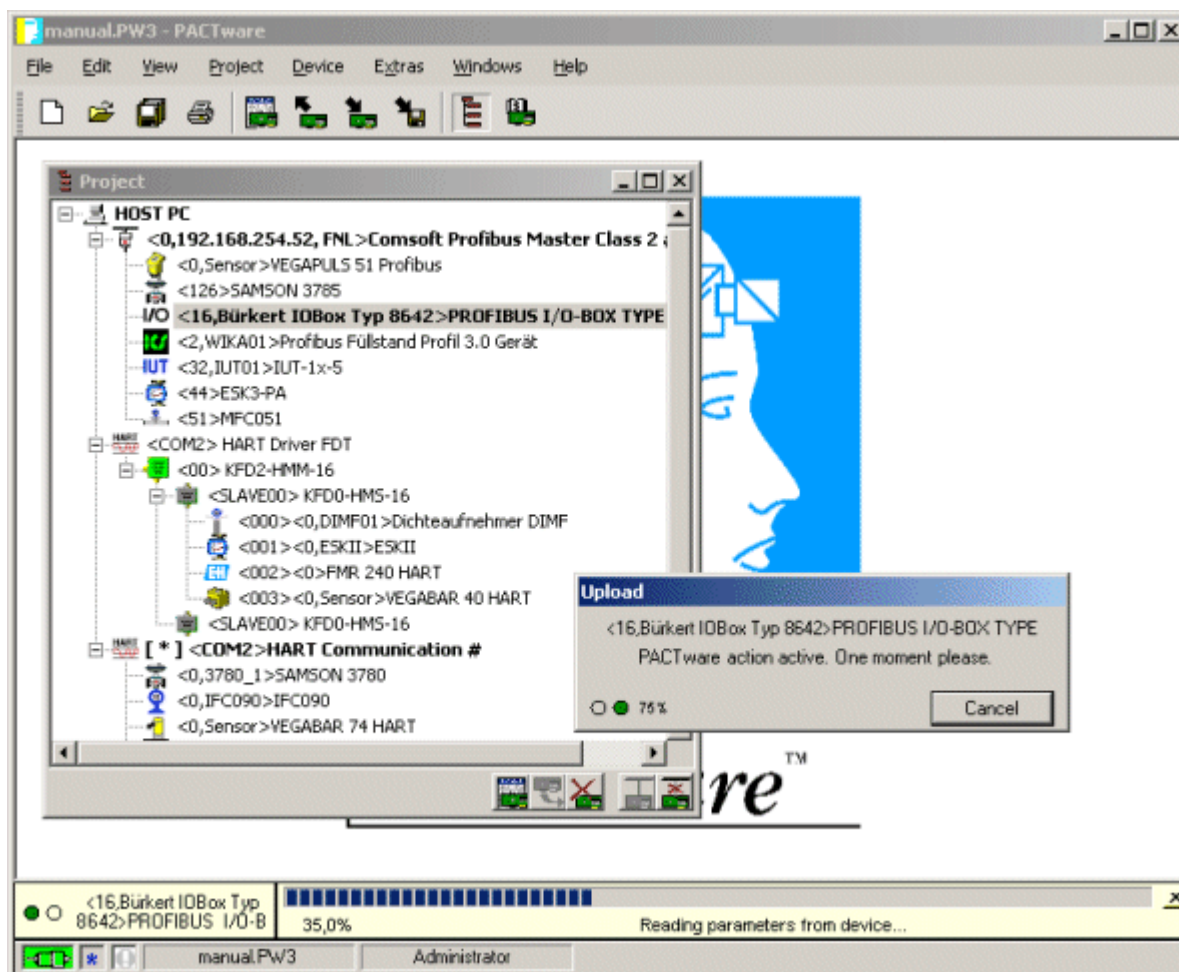
When a connection to a field device was set up all DTMs involved in the communication line are identified in bold characters in the project window. Simultaneously the status line is colored in green and the symbols are assigned their respective operating status.

Several field devices can be connected simultaneously.



Working with PACTware

Parameters are read from a field device when the corresponding symbol of the menu item **Load from device** in the menu **Device data** or in the context menu of a DTM is activated. The following form with a progress bar is displayed:



If the DTM allows to cancel the Upload, the progress bar must subsequently be closed using the close button.

4.6 Store parameters to the device

In order to store parameters to a field device, a connection must be setup. The type of displays a user receives following a connection failure are DTM-dependent.

A connection with a field device can be established in the following ways:

- via menu item **Connect** in menu **device data**
- via menu item **Connect** in the context menu of a DTM
- implicitly via the symbol **Store to device**
- implicitly via menu item **Store to device** in menu **device data**





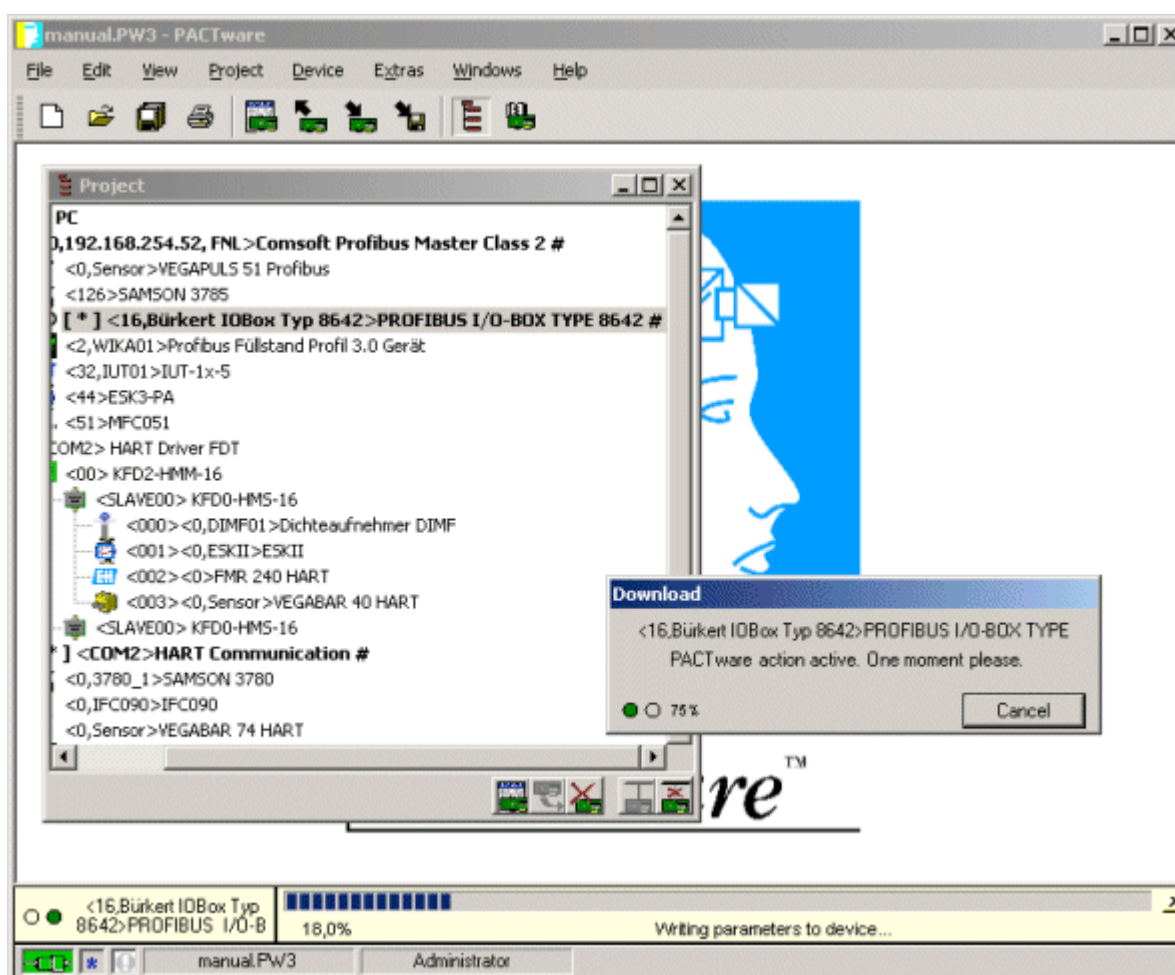
Working with PACTware

- implicitly via menu item **Store to device** in the context menu of a DTM

When a connection to a field device was established, all DTMs involved in the communication line are displayed in bold characters in the project window. Simultaneously the status line is colored in green and the symbols are assigned their respective operator status.

Multiple connections to several field devices can be set up simultaneously.

Parameters are stored to a field device when the corresponding symbol of the menu item **Store to device** in menu **Device data** or in the context menu of a DTM is activated. The following form with a progress bar is displayed:



When the DTM allows to cancel the download, the progress bar must subsequently be closed using the Close button.

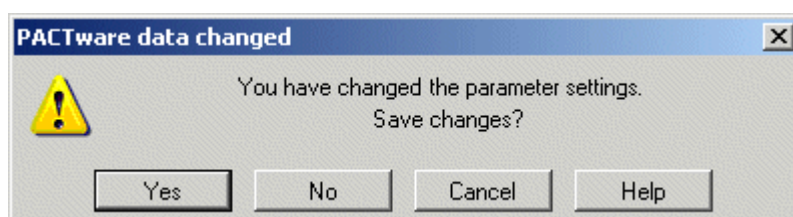


4.7 Save project

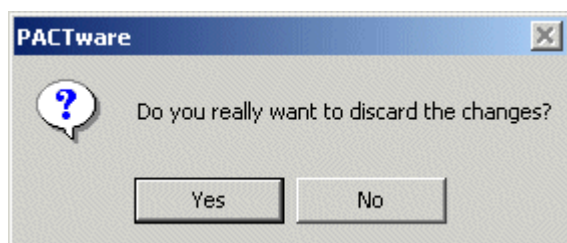


The project can be saved any time via the adjacent symbol or the entries **Save** or **Save as...** in menu **File**.

When the project is closed via menu item **Close** in menu **File** or when the user wants to exit **PACTware** the following query is displayed:



When this query is acknowledged using **No**, another query is output for safety reasons:

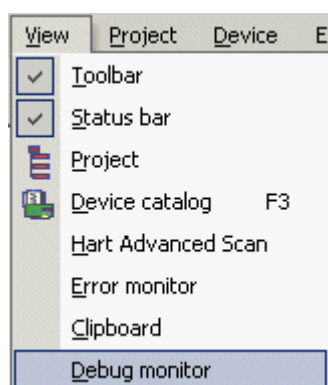


to avoid that modified parameters are deleted by mistake.



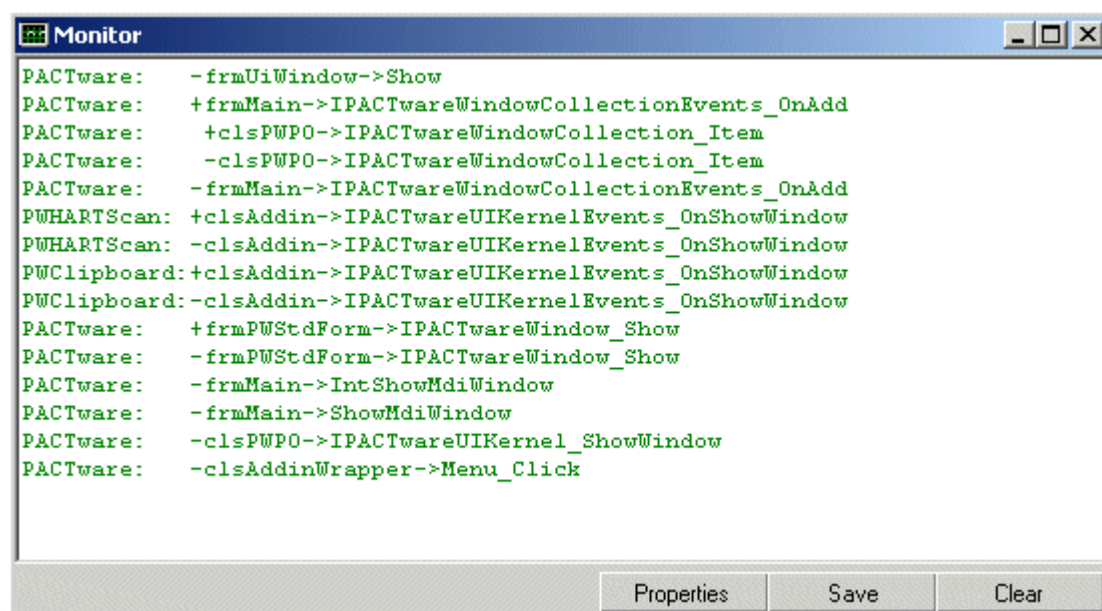
4.8 Debug monitor

The **Debug monitor** is provided for error analysis. PACTware uses this window to document error states and program flows.



The debug monitor can be displayed via menu **View** when the associated Add-In is loaded. Section [PACTware Add-Ins](#) describes how to load the Add-In for the debug monitor.

Caution: This window should only be opened for trouble-shooting. It is not recommended to open this window permanently in operated systems. The performance of PACTware is reduced by permanent logging.

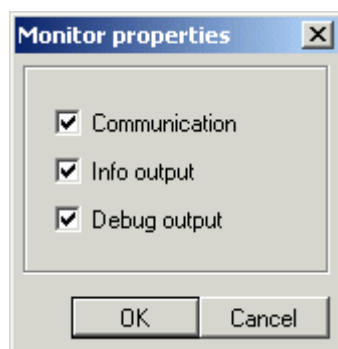


Error messages are displayed in red and debug-messages of the FDT functions are displayed in green color.



Working with PACTware

A filter for the recorded data is defined by using button **Settings**. In addition to the datasets that are exchanged with the field device via the HART-Protocol, the calls instantiated by the FDT interfaces or resulting errors can be recorded. The development of DTMs is supported by the Debug outputs.



The recorded data can be saved to a text file by using button **Save**.

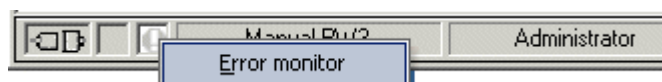
Button **Delete** deletes the records from the monitor window.



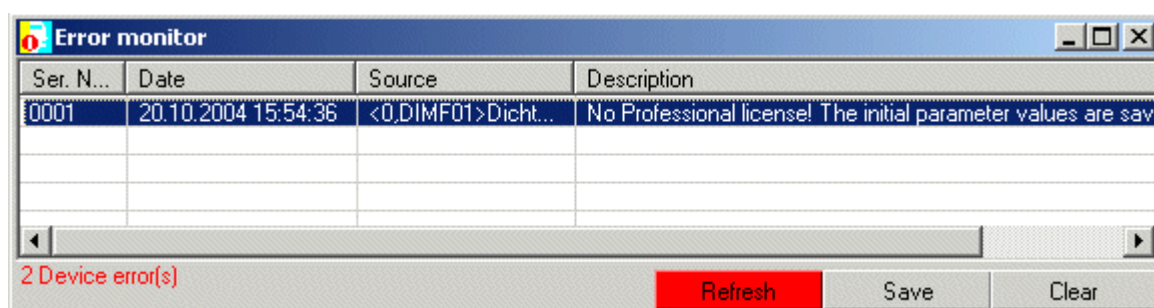
4.9 Error Monitor

All error messages of the DTMs are recorded in a list which is displayed by either using submenu item **Error Monitor** in menu **View** or via the context menu of the error display in the status line.

To display the error monitor, the associated Add-In must be loaded.



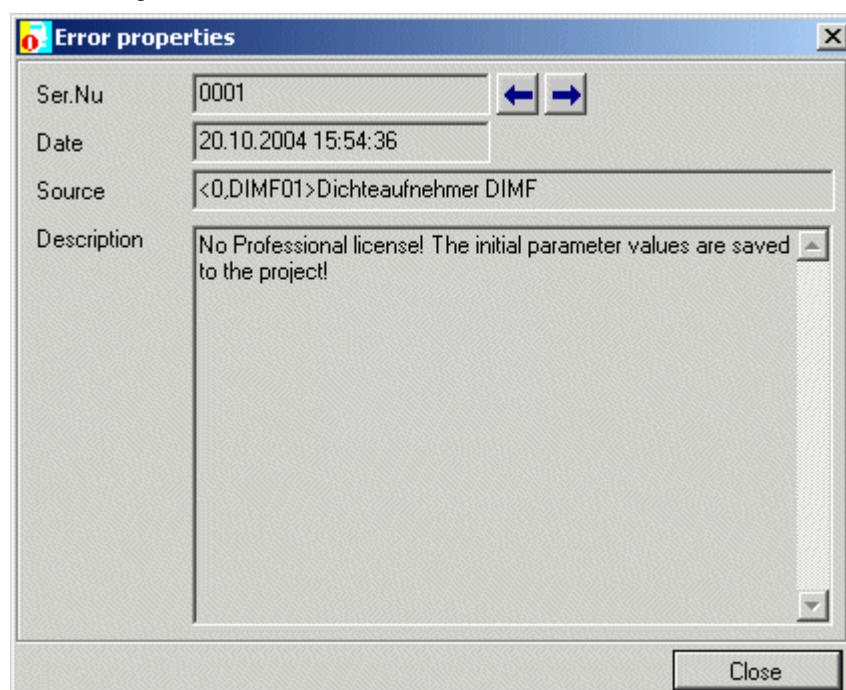
All error messages which were displayed since the start of PACTware or since the last time the error list was acknowledged by using the **Delete** button are displayed on the error monitor.



The error list can be sorted in columns by clicking on the heading of one of the four columns. The sorting sequence can be changed by another click on the heading.

A new error is signalled by a flashing exclamation mark in the status bar. At the same time, the number of errors is displayed on the error monitor. Using the **Refresh** button provides a list of all pending errors on the error monitor. Using the **Save** button outputs all error messages in a text file.

Long error texts can be displayed by a double-click on an error message on the error monitor using the following form:





4.10 Problem Report

When a DTM- or PACTware-related problem occurs, please inform the device manufacturer who delivered the DTM or PACTware.

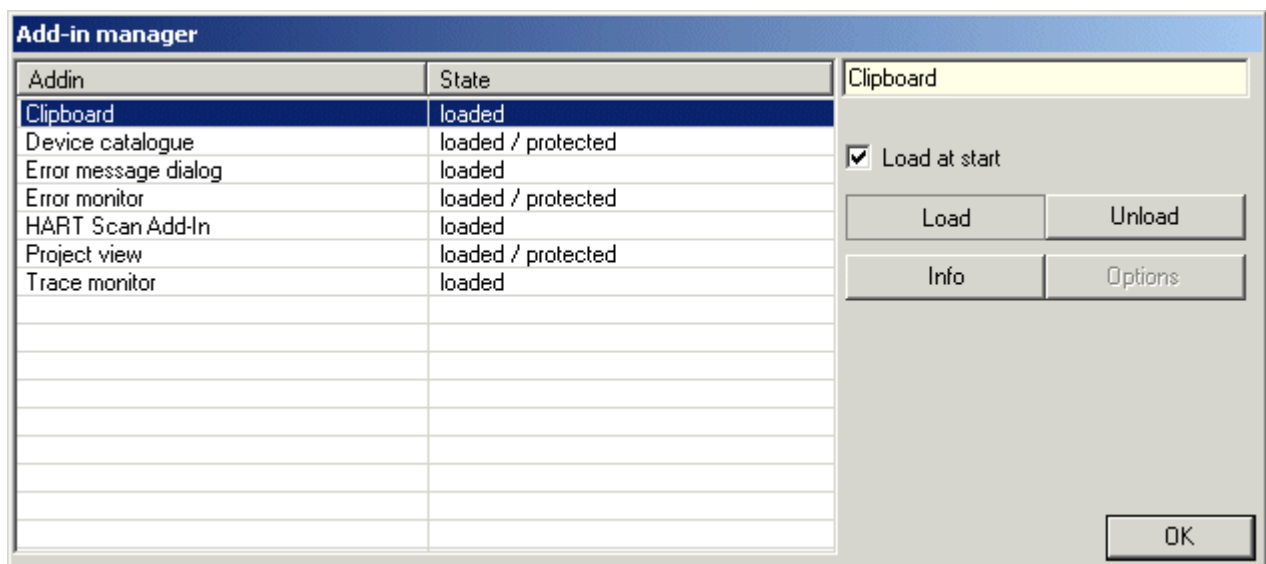
Information about the PACTware supplier is contained in a form which is displayed via menu item **About...** in the **Help** menu. Information about the DTM is called via entry **Properties** in the Context menu of the device in the project structure or by using the **Info** button in the device catalog selecting the respective device from the catalog.

Please state the operating system PACTware runs under and the PACTware and DTM program versions in your problem description. Any details about interactions or executed functions that may have caused the problem help find a solution. In addition, screenshots are useful in the analysis.



5. PACTware Add-Ins

The functions of PACTware can be modified and extended by so-called Add-Ins. All known Add-Ins are listed and managed via menu item **Add-Ins** in menu **Extras**.



These functions require administration **User Rights**.

All Add-Ins shown in the figure are included in the PACTware pack. Some Add-Ins must always be loaded so that PACTware functions. They are characterized by status loaded/protected.

Functions like e.g. the error monitor are not available when the corresponding Add-In is not loaded.

The **Clipboard** function is described in section **Add part of a project**. The error monitor is detailed in section **Error Monitor** and the trace monitor in section **Debug monitor**.

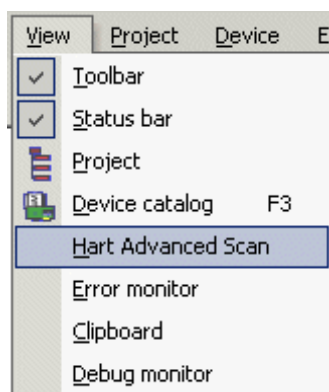
While PACTware is running, Add-Ins can be loaded or unloaded. The functions of the Add-In are immediately available after loading and are respectively no longer available after unloading. Add-Ins, that should be available after every PACTware start are marked **Load at start**.



5.1 HART Advanced Scan Add-In

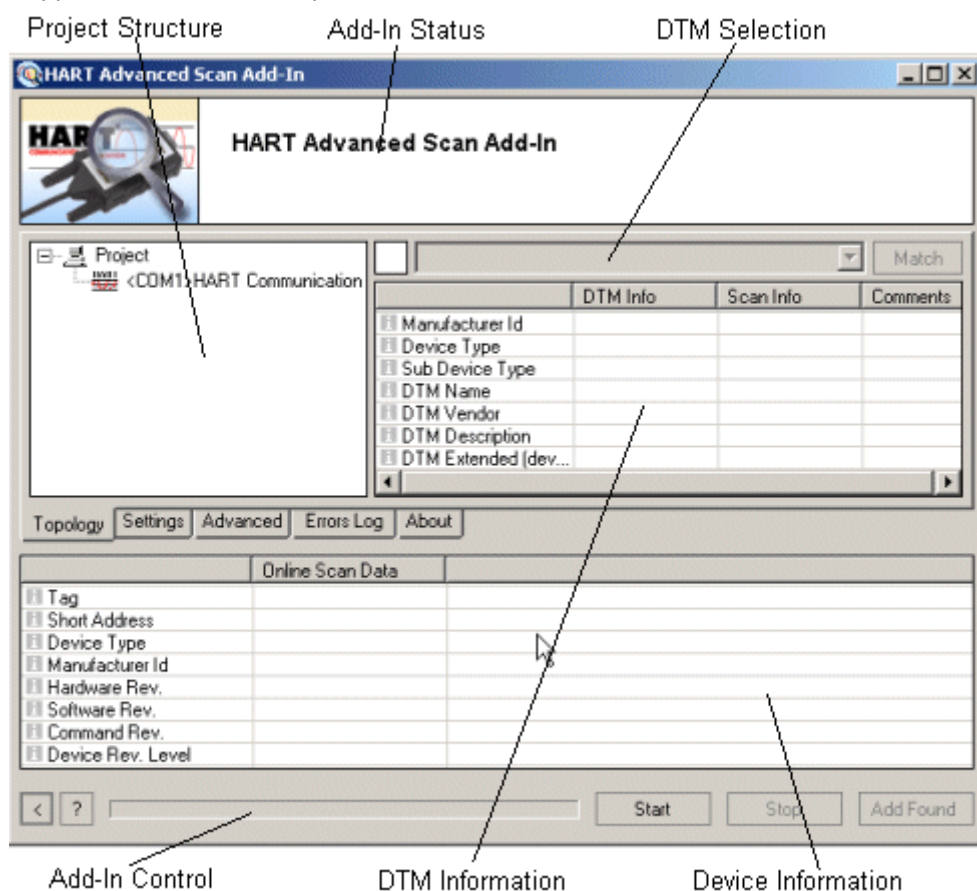
This Add-In detects field devices which are connected to a HART modem in point-to-point or in multidrop mode, a suitable DTM is searched in the device catalog and entered to the project.

5.1.1 Start Add-In



The HART Scan Add-In is started by using menu item **HART Advanced Scan** in menu **View**. This menu item is only displayed in the menu, if the Add-In is loaded.

Following the start, a window with the following components is displayed in the workspace to support the manual scan procedure:





PACTware Add-Ins

The **Topology** displays all ComDTMs of the project the Add-In could work with. When a ComDTM is switched online, all DTMs associated to the detected devices are displayed after the scan procedure.

The **Add-In Status** provides general information about the current activity of the Add-In.

When a device was found in the Scan procedure to which no unique DTM could be assigned automatically, a suitable DTM for the device can be selected from the **DTM Selection** out of a series of suggested DTMs.

The **DTM Information** supports the DTM selection by displaying the information read from device and the selected DTM adjacent to one another.

The **Device Information** displays additional information which was read from a connected device.

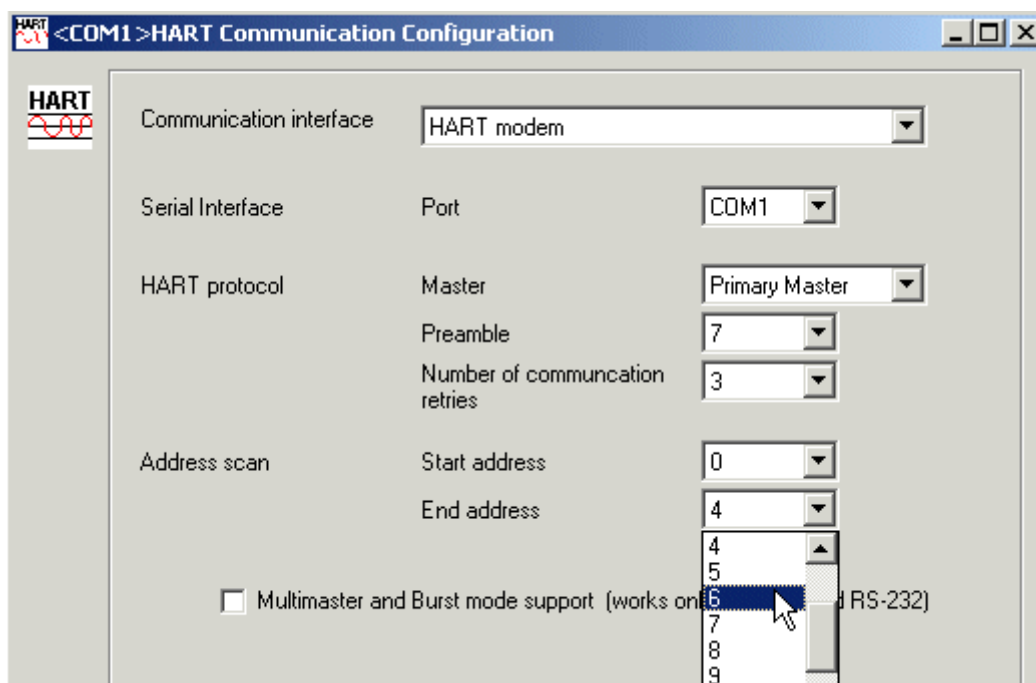
The following buttons are combined in the **Add-In Control**:

| | |
|--|--|
| | the window of the Add-In is minimized or maximized |
| | the Online Help of the Add-In is activated |
| | the Scan procedure is started |
| | the Scan procedure is stopped |
| | the detected DTMs are added to the project |

The scanning progress is displayed by a bar.

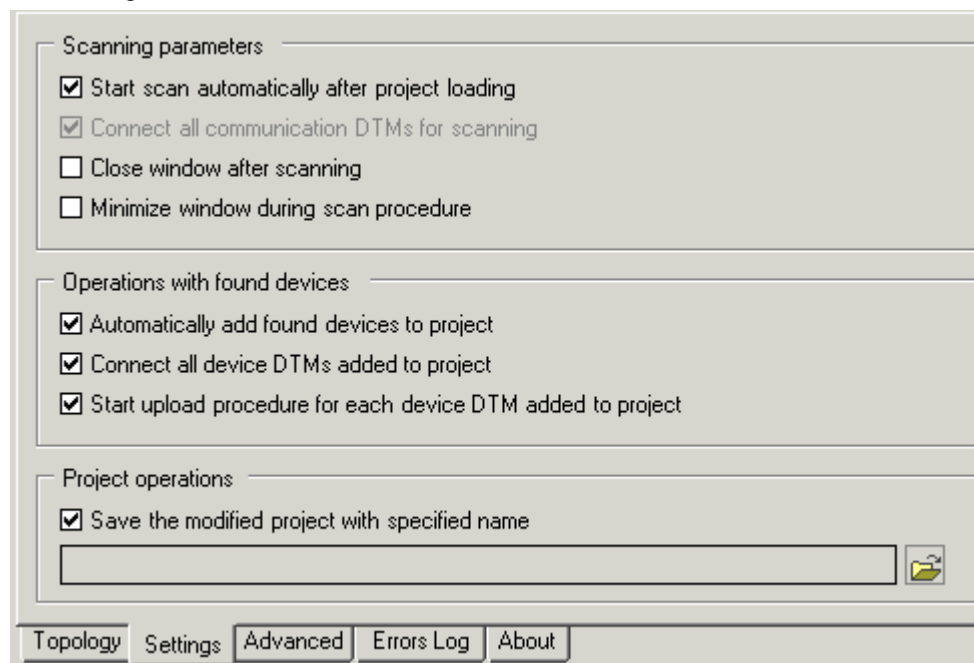
5.1.2 Prepare Scan Operation

At first, the addresses of the HART Network to be scanned must be defined. This may minimize the duration of scan.





The settings of the Add-In allow to define the scan mode.

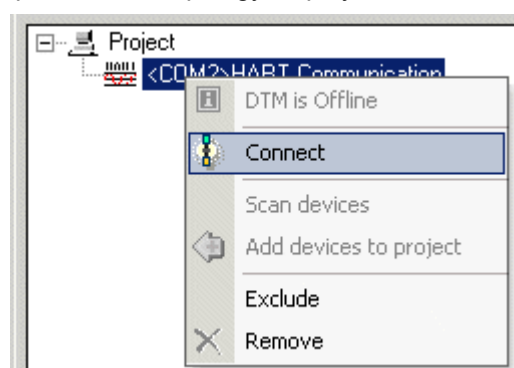


It is such possible to set up a project completely automatically after the scan operation, to read the data from the connected devices and to save the project with all parameter values. A requirement for a successful automatic run is that all DTM's which match the devices are contained in the catalog and all devices are unambiguously identified.

If a mapping of the HART network is to be automatically generated in the scan process, the project to which the detected DTM's are entered may only contain the ComDTM's at the scan start. Otherwise additional DTM's are entered to the DTM's already contained in the project and address conflicts may result.

5.1.3 Execute scan operation

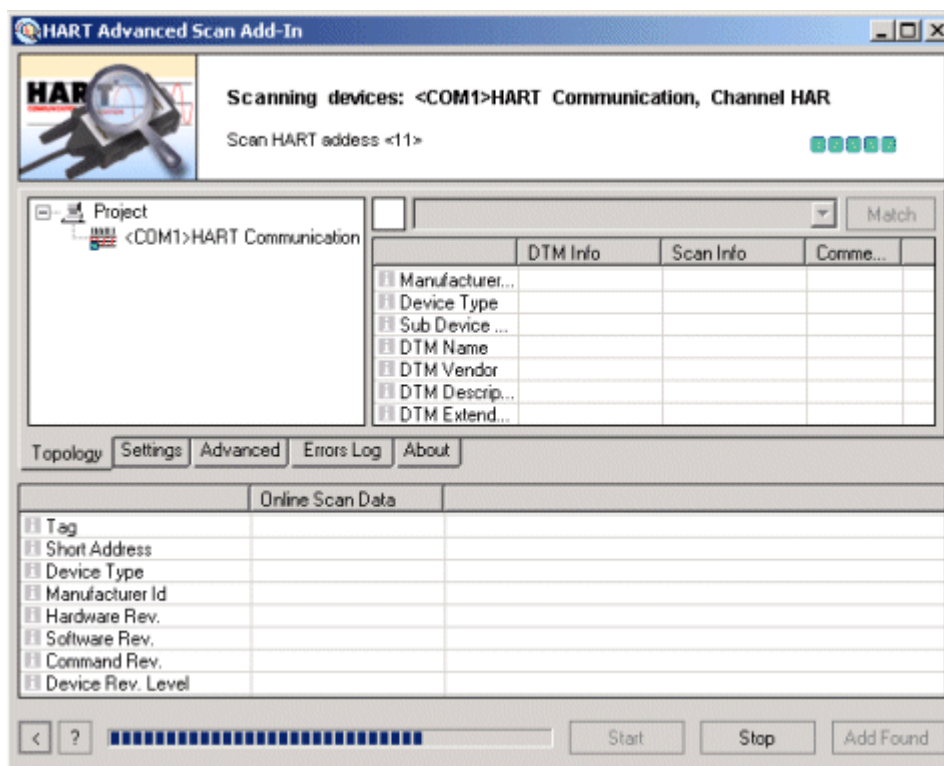
The scan operation is either started automatically after opening a project or manually. The ComDTM must be switched online automatically or manually for the scan. At the beginning of the scan operation the topology displays the ComDTM's whose devices are to be scanned.





PACTware Add-Ins

After switching the ComDTM to online, a green dot is displayed in the icon of the ComDTM and the icons of the HART Channel is displayed in the topology.



During the scan operation a progress bar is displayed in the Add-In control. The currently edited HART address is displayed in the Add-In status.

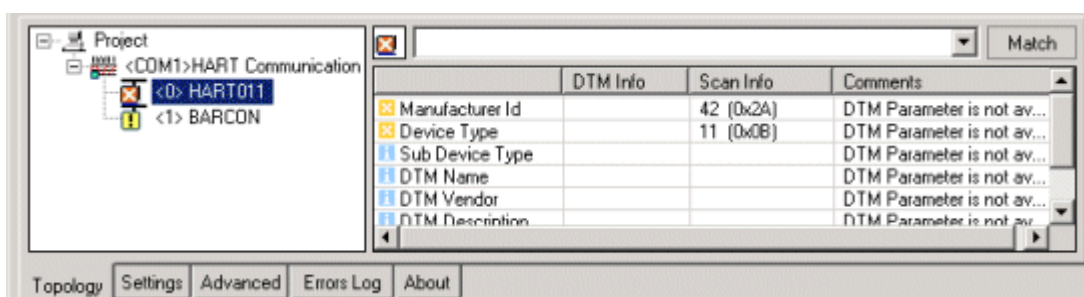
5.1.4 Identify DTMs of detected devices

At the end of the scan operation all detected devices including device icon and address are displayed in the topology. Subsequently a match of devices and DTMs that are contained in the device catalog is tried. The following results may be produced:



No DTM found which matches the vendor Id or device type of the device

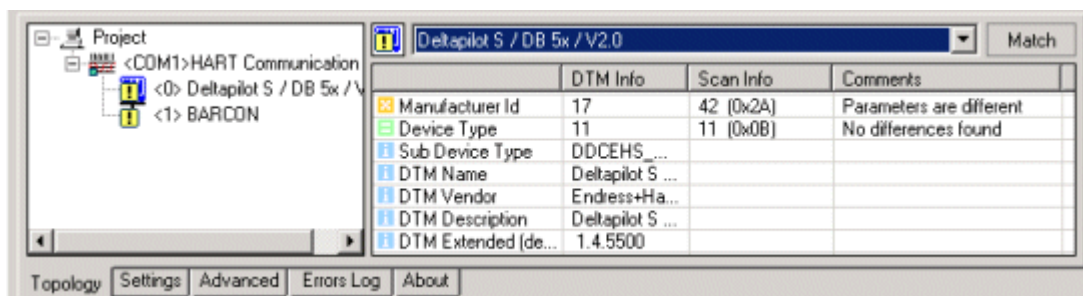
Vendor Id and device type are respectively identified in the DTM information. The DTM selection is empty.

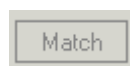




DTM found which matches the vendor Id or device type of the device

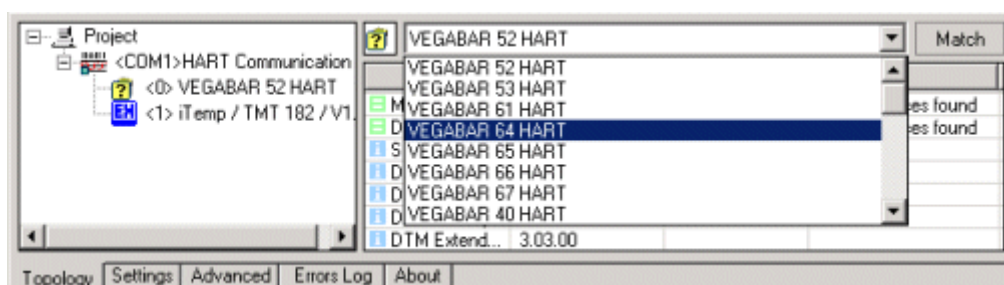
Vendor Id and device type are respectively identified in the DTM Information. The found device information (Scan Info) as well as information from a selected DTM (DTM Info) are entered to the table.



 Following the selection of the device icon, a list is displayed in the DTM selection. A matching DTM can be selected from this list either automatically using button 'Match' or manually.

More than one DTM found which matches the vendor device and device type of the device.

If several DTMs are found, the selection of the matching DTM is to be executed via the Sub Device Type.



After selecting the device icon a list is displayed in the DTM selection. The matching DTM can be selected manually.

A DTM can be automatically assigned to a matching device with Sub Device Type, when the required information was read using command 0.



PACTware Add-Ins

Using tab **Advanced** allows to enter another XML-file which describes what command to use to read the Sub Device Type and what DTM the answer is to be assigned to.

Additional settings

☒ Use Additional .XML file for getting SubDeviceType

`<?xml version="1.0" encoding="UTF-8"?><root><deviceIdentList manufacturerId="98"><!-- Device type VEGABAR hart--><deviceType DeviceTypeId="236"><DataExchangeRequest commandNumber="128"><CommunicationData byteArray="0104025D00" /></DataExchangeRequest><subDeviceList><subType SubDeviceTypeId="51040"><DataExchangeResponse><CommunicationData byteArray="04002800" /></DataExchangeResponse></subType><subType SubDeviceTypeId="51041"><DataExchangeResponse><CommunicationData byteArray="04002900" /></DataExchangeResponse></subType><subType SubDeviceTypeId="51042"><DataExchangeResponse><CommunicationData byteArray="04002A00" /></DataExchangeResponse></subType></subDeviceList></deviceType></deviceIdentList></root>`

Load Clear

Topology Settings **Advanced** Errors Log About



Exactly one DTM found which matches the vendor Id and the device type of the device.

In the topology all unambiguously identified DTMs are labeled with the device Icon.

Project

- COM1>HART Communication
 - VEGABAR 64 HART

VEGABAR 64 HART

| | DTM Info | Scan Info | Comments |
|------------------|--------------------|------------|----------------------|
| Manufacturer Id | 98 | 98 (0x62) | No differences found |
| Device Type | 226 | 226 (0xE2) | No differences found |
| Sub Device T... | 51064 | | |
| DTM Name | VEGABAR 64 ... | | |
| DTM Vendor | VEGA Grieshab... | | |
| DTM Descripti... | Pressure transm... | | |
| DTM Extende... | 3.03.00 | | |

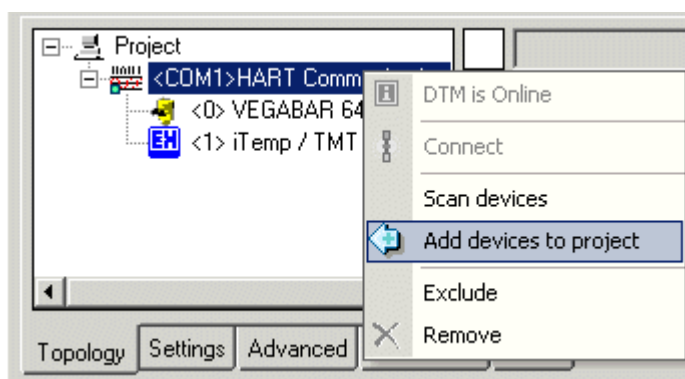
Topology Settings **Advanced** Errors Log About

If a DTM is selected in the topology, any associated information is displayed in the DTM Information.

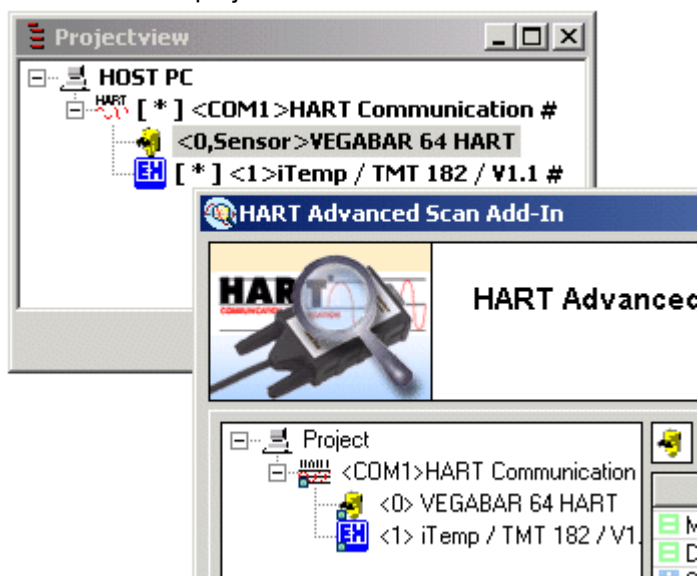


5.1.5 Apply found DTMs to a project

All unambiguously found DTMs can be applied to a project in one step. This function is called via the context menu of the ComDTM. All remaining not clearly identified DTMs are not applied from the topology.



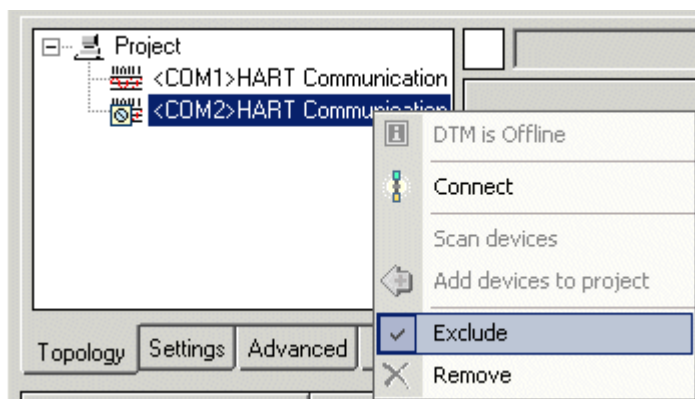
If the respective entry in the settings of the Scan Add-In is marked, all applied DTMs can be automatically switched online. The parameters of the devices can also be automatically read out and saved to the project.





5.1.6 Edit topology

A ComDTM can temporarily be excluded from the scan or entirely removed from the topology tree. ComDTMs which are excluded from the scan are identified by a symbol.



Before DTMs of the topology are manually applied to the project, individual DTMs can be removed.

5.1.7 Close Add-In, Stop Scan

The Add-In is closed via the close button in the tile bar.

If the connection with the devices is interrupted during the scan operation, the progress bar pauses for a longer time. In this case the **Stop** button stops the scan operation. This button can also be used to cancel the scan process.



6. Glossary

ComDTM

Communication Device Type Manager

A Software component which must be provided once in each communication protocol, used in a project (e.g. HART, Profibus). In the project structure all other DTMs used for field devices, multiplexers or Remote I/O-systems are assigned to the ComDTMs.

DTM

Device Type Manager

A Software component that executes the parameterization, configuration, calibration or the test of field devices depending on the individual device type. The DTM may have a graphical interface. A DTM that was developed in accordance with the FDT-specification may be integrated into Engineering Tools, Control Systems or configuration software like PACTware.

The PNO Guideline 2.172 provides a style guide describing the design of the user interface of a DTM.

FDT

Field Device Tool

The FDT Specification (PNO Guideline 2.162) describes how a DTM communicates with a frame application. All interfaces between a DTM and a frame application are described in detail.

PACTware

Process Automation Configuration Tool

Configuration software that is available as Open Source to every field device manufacturer who is a member of the PACTware Consortium e.V.. For the first time it is such possible to configure and parameterize all field buses and field devices of a plant regardless of the vendor using one single engineering tool. The further development of this configuration software is sponsored by the PACTware Consortium e.V

PACTware is a frame application according to the definition of the FDT Specification.



Glossary

User Rights

There are 5 user groups who edit projects, parameterize and configure field devices and the user administration:

Observer, Operator, Maintenance engineer, Planning engineer and Administrator.

The following table lists the actions every user group may execute in PACTware.

| Action | Observer | Operator | Maintenance Engineer | Planning engineer | Administrator |
|-----------------------|----------|----------|----------------------|-------------------|---------------|
| File | | | | | |
| New | - | - | - | X | X |
| Open... | X | X | X | X | X |
| Close | X | X | X | X | X |
| Save | - | - | - | X | X |
| Save as... | - | - | X | X | X |
| [last projects] | X | X | X | X | X |
| Exit | X | X | X | X | X |
| Edit | | | | | |
| Cut | - | - | - | X | X |
| Copy | - | - | - | X | X |
| Paste | - | - | - | X | X |
| View | | | | | |
| Toolbar | X | X | X | X | X |
| Status bar | X | X | X | X | X |
| Project window | X | X | X | X | X |
| Device catalog | X | X | X | X | X |
| [Add-In] | X | X | X | X | X |
| Clipboard | X | X | X | X | X |
| Error monitor | X | X | X | X | X |
| Communication monitor | X | X | X | X | X |
| Project | | | | | |
| Upload | - | - | X | X | X |
| Download | - | - | X | X | X |
| Print | X | X | X | X | X |
| Device data | | | | | |



Glossary

| Action | Observer | Operator | Maintenance Engineer | Planning engineer | Administrator |
|-------------------------------|----------|----------|----------------------|-------------------|---------------|
| Connect | X | X | X | X | X |
| Disconnect | X | X | X | X | X |
| Load data from device | - | X | X | X | X |
| Store data to device | - | - | X | X | X |
| Offline Parameterization | - | - | X | X | X |
| Online Parameterization | - | - | X | X | X |
| Measured value | X | X | X | X | X |
| Simulation | - | - | X | X | X |
| Diagnostics | X | X | X | X | X |
| (Compare offline) | X | X | X | X | X |
| (Compare online) | X | X | X | X | X |
| (setpoint) | - | X | X | X | X |
| Print | X | X | X | X | X |
| Write device data to file | - | - | X | X | X |
| Add device | - | - | - | X | X |
| Remove device | - | - | - | X | X |
| Properties | X | X | X | X | X |
| Extras | | | | | |
| User administration | - | - | - | - | X |
| Device catalog administration | - | - | - | - | X |
| Options | X | X | X | X | X |
| Add-Ins | - | - | - | - | X |
| Windows | | | | | |
| Arrange | X | X | X | X | X |
| Next window | X | X | X | X | X |
| Close all | X | X | X | X | X |
| Help | | | | | |
| Contents | X | X | X | X | X |
| About... | X | X | X | X | X |



Index

A

- About 3-6
- About... 4-17
- Add Device 4-4
- Add device 3-4, 3-14
- Add DTM 4-6
- Add part of a project 4-8
- Add-In 3-2, 3-5, 4-14, 4-16, 5-1
- Add-In Status 5-3
- Additional Functions 3-12
- additional functions 3-4

C

- Change password 3-5
- Clipboard 3-2, 4-8, 5-1
- Close 3-1, 4-13
- Close all windows 3-6
- Connect 4-11
- context menu 3-7
- Copy 3-2, 4-8
- Cut 3-2

D

- Debug monitor 4-14
- Delete device 3-4
- delete device 3-14
- Delete Monitor Window 4-15
- device catalog 3-2
- Device catalog administration 4-5
- device data 3-4
- Device Information 5-3
- Device properties 3-14
- Diagnostics 3-11
- Disconnect 3-8
- Download 3-3
- DTM Information 5-3
- DTM Selection 5-3

E

- Edit 3-2
- Error Monitor 4-16
- error monitor 3-2
- Exit 3-1
- Extras 3-5

F

- File 4-1

H

- HART Advanced Scan 3-2, 5-2
- Help 3-6

I

- Info 4-4

L

- language 3-6
- list of all field devices 3-13
- Load data from device 3-9

- load data from the device 3-4

- Load from device 4-10

M

- Measured value 3-11
- Monitor Window Settings 4-15

N

- New 3-1
- New Project 4-1
- Next window 3-6

O

- Offline Parameterization 3-11, 4-10
- Online Parameterization 3-11, 4-10
- Open Project 4-1
- Options 3-5, 3-6

P

- Parameter 3-11, 4-10
- Paste 3-2, 4-9
- Print 3-3, 3-12
- project structure 4-2
- project window 3-2, 4-2
- Properties 3-4

R

- Refresh Error Monitor 4-16
- Remove DTM 4-7

S

- Save 3-1, 4-13
- Save as 3-1, 4-13
- Save Monitor Window 4-15
- Scan Operation 5-3
- Simulation 3-4, 3-11
- status bar 3-2
- Store data to device 3-4
- Store data to the device 3-10
- Store to device 4-11

T

- toolbar 3-2
- Topology 5-3

U

- Update device catalog 4-4
- Upload 3-3
- User Administration 3-5

V

- View 4-14
- view 3-2

W

- Window 3-6
- Write device data to file 3-12