

SIMATIC HMI

ProTool
Configuring Windows-based
Systems

User's Manual

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Preface

1

Overview

This chapter explains how the manual is organized and where to find what information.

Trademarks

The following names are registered trademarks of Siemens AG:

- SIMATIC®
- SIMATIC HMI®
- HMI®
- ProTool/Pro®
- ProTool®
- ProTool/Lite®
- ProAgent®
- SIMATIC Multi Panel®
- MP270®
- SIMATIC Multifunctional Platform®

1.1 Guide to the Manual

Contents

This manual provides all the information you require to

- install and configure ProTool
- configure your operating unit to suit your installation
- upload the executable project file to the system and test it
- manage your project

What you should already know about

This manual assumes that you already have general experience of working with Windows® applications. The information given in this manual is therefore limited to a description of the functions and routines provided by ProTool and which are not involved in the standard operation of the operating system.

This manual also assumes that you have a basic familiarity with the configuration of your PLC, e.g. SIMATIC S5 or SIMATIC S7.

Where to find what

The chapters of this manual are arranged by topic as follows:

- The **Introduction** explains the advantages of the ProTool configuration software and demonstrates how easy it is to create an executable project file for your operating unit using ProTool.
- The chapter **Installing and configuring ProTool** explains the requirements your system must satisfy, how to integrate ProTool in STEP 7 and how to install ProTool on your configuration computer.
- The chapter **Creating projects** shows you the basic considerations that are worth making before creating a project and what a project consists of. It also explains for what tasks you set up which data areas on the PLC and must specify in ProTool as area pointers.
- The chapter **Configuration techniques</**

- The chapter **Documenting and managing projects** introduces the Project Manager. It shows you how to print project data, for example.
- Finally, the **Appendix** provides details of the system limitations and an overview of the SIMATIC HMI documentation, for instance.

Other sources of information

- You will find more examples and guidance together with reference material, for example, on functions, libraries, PLC drivers in *online Help*.
- For device-specific information, please refer to your equipment manual.
- Detailed information about the ProTool/Pro RT visualization software is given in the *ProTool/Pro Runtime User's Guide*.
- The fundamentals of communication between the operating unit and the PLC are described in the *Communication for Windows-based Systems User's Guide*.
- The *ProTool ReadMe* contains important notes on installation and configuration.

1.1.1 History

This manual describes the configuration of Windows-based systems with ProTool.

The various issues of the user's guide correspond to the following versions of ProTool:

Issue 07/98	Configuring Windows-based systems Valid for ProTool/Pro CS 5.0 or higher
Issue 01/99	Inclusion of MP270 and editorial reworking of manual. Software runs under Windows® 95, Windows® 98, and WindowsNT® 4.0 or higher. Valid for ProTool/Pro CS 5.1 or higher
Issue 12/99	Extensions and incorporation of new operating units: software runs under Windows® 95/98, Windows® 2000 and WindowsNT® 4.0 or higher. Valid for ProTool/Pro CS 5.2 or higher

1.1.2 Notation

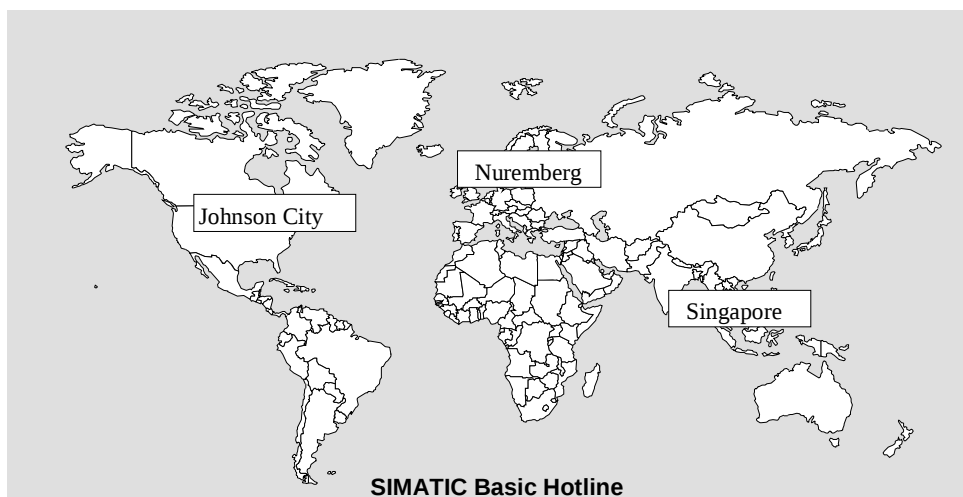
There are a number of character formats used in this manual to assist reader orientation.

Output	Words printed in Courier typeface represent input and output data as it appears on the screen of the operating unit.
F1	The names of keys are printed in bold type.
<i>File → Edit</i>	Menu items are printed in italics. Succeeding levels are separated by arrows. The complete sequence of menu items leading to the final menu item required is always shown.
<i>Messages</i> dialog box	The names of dialog boxes, tabs and buttons are printed in italics.

1.2 Other Sources of Assistance

SIMATIC Customer Support Hotline

Available worldwide around the clock:



Nuremberg SIMATIC BASIC Hotline	Johnson City SIMATIC BASIC Hotline	Singapore SIMATIC BASIC Hotline
Local time: Mon - Fri 7:00 to 17:00	Local time: Mon - Fri 8:00 to 19:00	Local time: Mon - Fri 8:30 to 17:30
Tel.: +49 (911) 895-7000	Tel.: +1 423 461-2522	Tel.: +65 740-7000
Fax: +49 (911) 895-7002	Fax: +1 423 461-2231	Fax: +65 740-7001
E-mail: simatic.support@ nbgm.siemens.de	E-mail: simatic.hotline@ sea.siemens.com	E-mail: simatic.hotline@ sae.siemens.com

SIMATIC Customer Support Online Services

SIMATIC Customer Support Online Services offer extensive additional information about SIMATIC products as follows.

- Up-to-date general information is available
 - on the Internet at <http://www.ad.siemens.de/simatic>
 - by fax polling on 08765–93 02 77 95 00
- Up-to-date product information and downloads for practical use can be obtained from
 - the Internet at <http://www.ad.siemens.de/support/html-00/>
 - the bulletin board system (BBS) in Nuremberg (SIMATIC Customer Support Mailbox)
on +49 (911) 895–7100.

To call the mailbox, you should use a modem with a transmission rate of up to V.34 (28.8 kbd) using the following settings: 8, N, 1, ANSI, or you can connect via ISDN (x.75, 64 kbit).

Introduction

2

2.1 What is ProTool?

Configuring Windows-based systems

ProTool/Pro consists of the ProTool/Pro CS (Configuration System) configuration software and the ProTool/Pro RT (Runtime) process visualization software.

- **Configuration software**

With ProTool/Pro CS, you create your configuration on a PC in Windows® 95, Windows® 98 or Windows® NT.

You use the same configuration software to configure all the devices in the family. Regardless of the device for which you are creating your project, ProTool always presents you with the same, familiar user interface.

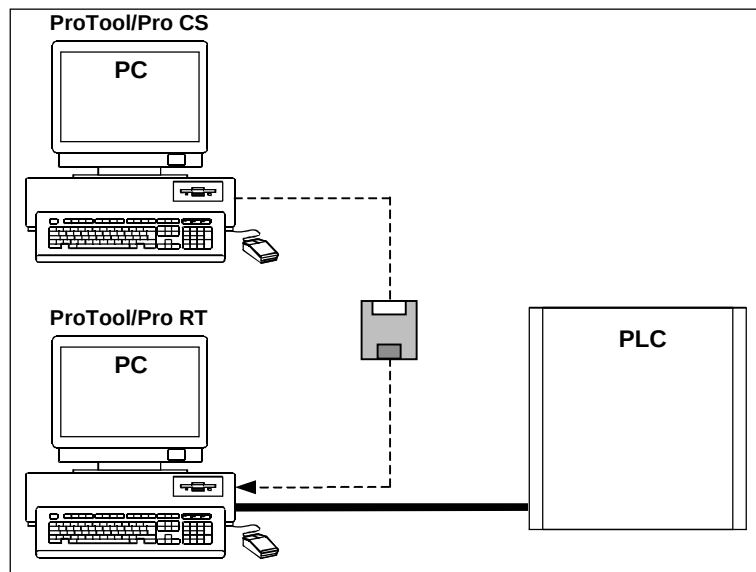
- **Process visualization software for the runtime system**

With ProTool/Pro RT, you run your configuration in Windows® 95, Windows® 98 or Windows® NT. ProTool/Pro RT can run on both a standard PC and the OP37/Pro.

The ProTool/Pro RT runtime software is software-protected. This means every runtime software installation on standard PCs requires valid permission for it to run without restrictions. If the permission is not available, ProTool/Pro RT runs in Demo mode.

Note

No license is required for the following devices: TP170A, MP270, OP37/Pro, FI25, FI45, PC670 and PC670T.

Example of the structure:

Example: one PC for configuration and a second PC as the operating unit:

ProTool is easy to use and versatile

The fully graphical user interface of ProTool/Pro CS allows you to create object-oriented, symbol-based projects easily by mouse click. No special programming knowledge is required. ProTool/Pro features:

- Convenient process visualization with a large selection of standardized input/output fields, bar graphs, trend graphics, raster and vector graphics and attributes with dynamic capability
- An integrated message system
- Archiving of process values and messages
- User functions on the basis of Visual Basic Script®
- Drivers for connection to the SIMATIC S5, SIMATIC S7, SIMATIC 505 and many PLCs from other manufacturers.

ProTool and SIMATIC STEP 7

ProTool can be integrated in the SIMATIC STEP 7 configuration software. Thus allowing you to select STEP 7 symbols and data blocks as tags in ProTool. This not only saves you time and money but also eliminates the possibility of errors made when entering the same data several times.

You will find more information on configuring ProTool with SIMATIC STEP 7 at *Configuring with ProTool integrated in STEP 7 (Chapter 3.2)*.

Offline configuration

With ProTool you create and edit your projects offline. The device need not yet be available at this time. The configuration computer displays the configured project data as it will subsequently be displayed on the device.

On completion of configuration you can download the executable project file from the configuration computer to the device.

2.2 What is supplied with ProTool

PLC drivers

ProTool is shipped as standard with drivers for the following PLCs:

- Siemens PLCs
 - SIMATIC S5
 - SIMATIC S7
 - SIMATIC 505
 - SIMATIC WinAC (version 2 or higher)
- OPC network
- PLCs of other manufacturers:
 - Allen-Bradley DF1
 - MITSUBISHI FX
 - Telemecanique Uni-Telway

Sample projects

ProTool is shipped with ready-made sample projects for different PLCs.

Specially for Windows-based systems, there are examples for SIMATIC S7-300/400 for the PC and MP270.

The examples are located in the ProTool directory under `..\SAMPLES`. The directory also contains the associated PLC programs. The sample project and PLC program are matched to each other.

Libraries

Once ProTool is installed, the following libraries are available to you in the `..\Library` directory:

- PC-Dynamic-Objects.lib
- PC-MP-Pipes-and-more.lib
-

2.3 Getting started: configuring Windows systems

If you are not all that familiar with the ProTool/Pro visualization software, we would recommend you read this brief introduction and *get started* with ProTool/Pro with the help of the example. The printed version is enclosed with this manual.

Requirements for working with the brief introduction

To do the exercises for ProTool/Pro CS in this brief introduction, you require

- a PC as a configuration computer
- the **SIMATIC ProTool/Pro 5.2** software package

ProTool/Pro includes the ProTool/Pro CS configuration software and ProTool/Pro RT runtime software.

- an operating unit - for example, OP37/Pro.

Other documents on ProTool/Pro CS

You will find the electronic manuals on the ProTool CD under:
Docs\...\UsersManual_win.pdf

You can find all the information contained in this manual in ProTool's online Help.

Installing and configuring ProTool

3

Overview

In this chapter you will learn

- the requirements the configuration computer must meet and
- how to install ProTool.

3.1 Installing ProTool

System requirements

The following table shows the recommended system requirements for running the ProTool configuration software.

Configuration	Recommendation
CPU	Pentium 133 MHz
Main memory	64 MB
Free hard disk space	150 MB for ProTool/Pro CS 20 MB for ProTool/Pro RT 5 MB for every further language
Drive	CD-ROM
Operating system	Microsoft® Windows® 95 with Service Pack 1 (Build 950a) Microsoft® Windows® 95 OSR 2 (Build 950b) Microsoft® Windows® 98 Microsoft® Windows NT® 4.0 with Service Pack 3 Microsoft® Windows® 2000

Remark

Service Pack 1 must not be installed on a Windows 95 OSR 2 (Build 950b) or higher.

Integration in STEP 7

If you have STEP 7 programming software as of V4 on your computer, you can also install ProTool integrated in STEP 7.

This has the following advantages:

- You manage ProTool projects using SIMATIC Manager (i.e. the same management tool that you use for your STEP 7 projects).

Selecting languages

The installation program prompts you for the options and languages to be installed.

If you wish to install several languages simultaneously, select the *User defined* option when you are installing. You can then change the ProTool language later without having to reinstall ProTool by opening *Start Menu* → *Simatic* → *ProTool CS* → *ProTool Setup*. During installation you specify the language that you want to be active after installation.

Installing ProTool from a CD-ROM

To install ProTool, proceed as follows:

1. Insert the installation CD in the CD-ROM drive. If the autorun function for your CD-ROM drive is activated, the browser starts automatically when you insert the CD.

Alternatively, select the CD-ROM drive in Explorer, and double-click `install.exe` to start the installation program.

2. Select the installation language you want at *Language*.
3. Select Installation and install ProTool/Pro CS first, followed by ProTool/Pro RT.

When installing, follow the instructions on the screen.

Note:

Make sure when you are installing ProTool

Installing ProTool from floppy disk

The installation disks can be ordered separately. However, you can create them yourself by copying the subfolders DISK 1 to DISK n of the folder called \PROTOOL from the CD to separate floppy disks. The DISK n folders on the CD can each be copied to a floppy disk.

Begin the installation with DISK 1.

Uninstalling ProTool

On the Windows start menu at *Settings* → *Control Panel* → *Software*, choose ProTool and installed options from the and click *Add/Remove*.

Starting ProTool

After ProTool has been installed, you will find a folder on the *Start menu* called *Simatic*, in which the following symbols are available:

ProTool Pro CS V5.20	 ProTool Help  ProTool Pro CS  ProTool ReadMe  ProTool Setup
ProTool Pro RT V5.20	 ProTool Pro Disk - Transfer

3.2 Configuring with ProTool integrated in STEP 7

Requirements

If the PLC you are using is a **SIMATIC S7** and you have installed STEP 7 configuration software on your system, you can integrate ProTool in STEP 7.

Advantages of STEP 7 integration

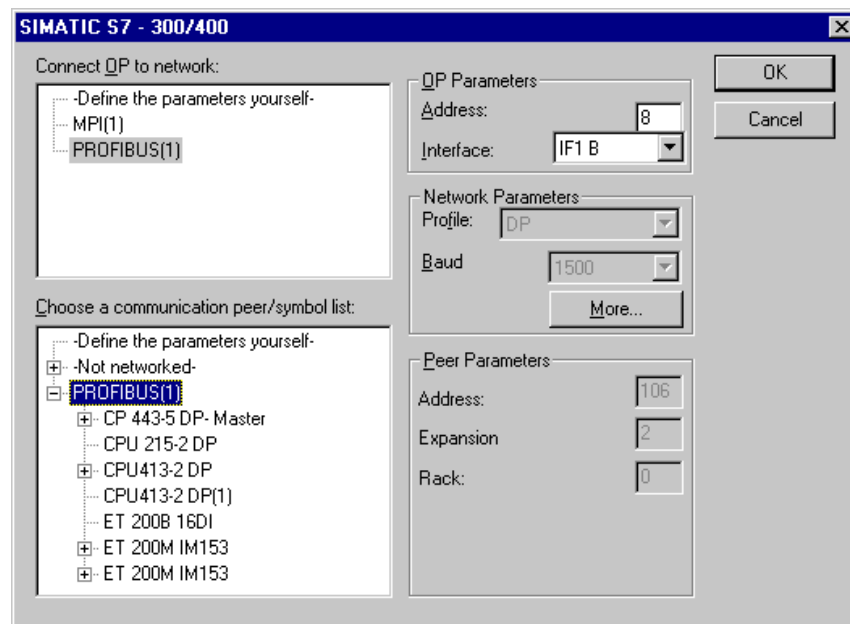
As you are using the same database as STEP 7, you have the following advantages:

- You assign your **symbolic name** once only and can then use it everywhere.

Note

If you use an instance DB in the STEP 7 program, the corresponding instance FB must also be defined in the symbol table in STEP 7. If this is not the case, this DB is not offered for selection in ProTool.

- When you configure variables and area pointers, you access the STEP 7 symbol table. Changes to the symbol table in STEP 7 are updated in ProTool (refer to the figure at *Properties of tags (Chapter 5.3.2)*).
- When the project is compiled, the data is synchronized.
- In STEP 7 you can configure ALARM_S messages and output them to the operating unit.
- The communication parameters of the PLC are transferred directly to your project.



Integrating ProTool projects

Projects created in ProTool on a *stand-alone* basis cannot be called directly using SIMATIC Manager. To include projects like this in a STEP 7 project, they have to be integrated.

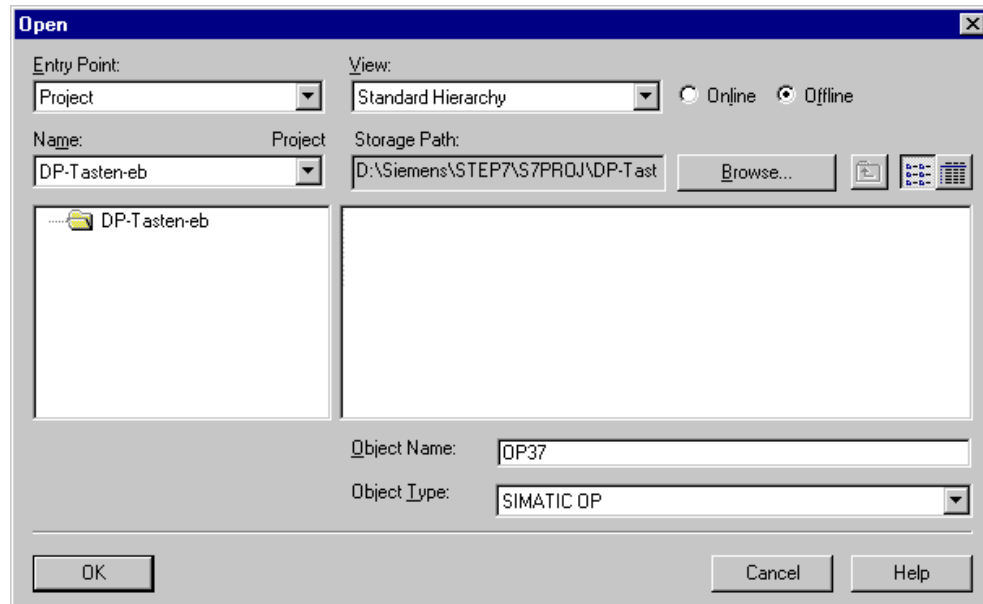
To do this, choose the *File → Integrate menu command in ProTool*. In the STEP 7 configuration, give the ProTool project a different name to the original project.

Note

Conversely, projects created with ProTool on an integrated basis must on no account be edited with ProTool on a stand-alone basis. If they were, the connection to the STEP 7 symbol table would be lost.

Starting ProTool

Start ProTool directly under Windows. Choose *File → New*. This opens a dialog box in which you select a STEP 7 project and create a ProTool project in it. You then select the operating unit.



Creating projects

4

Overview

In this chapter you are given an overview

- of the project structure and
- the procedure for creating a project.

4.1 Fundamental considerations when creating a project

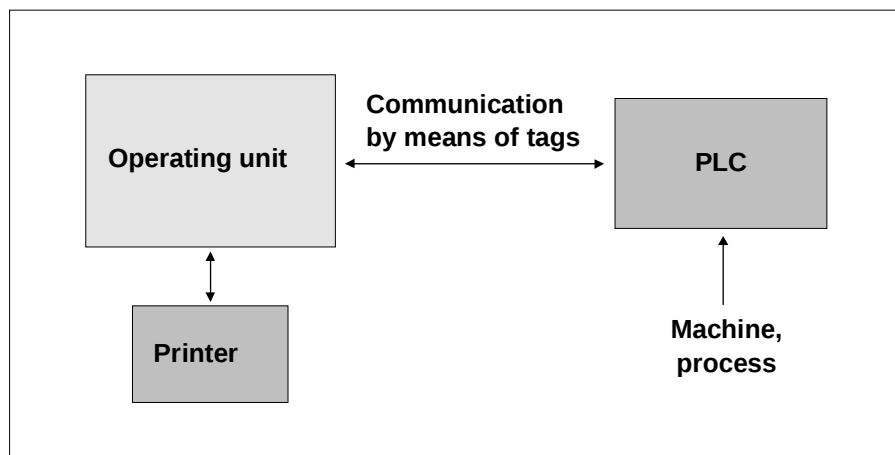
Objective

To operate and monitor a machine or process. To do this, you map the machine or process on the operating unit as accurately as is necessary.

System configuration

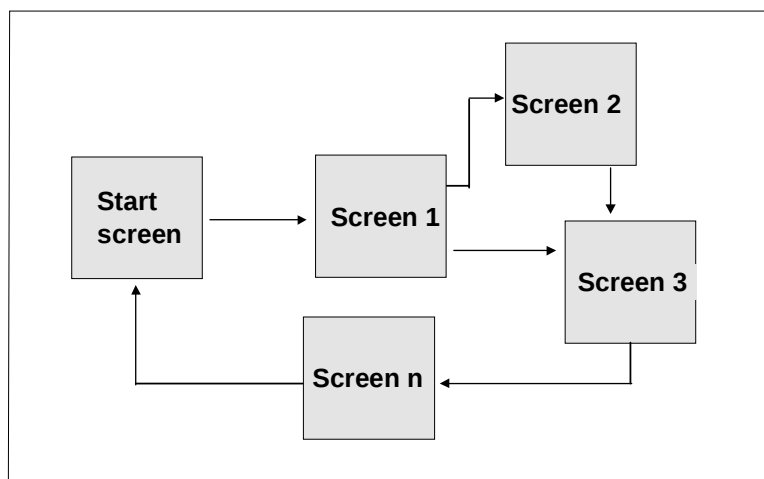
Communication takes place between the operating unit and the machine or process by means of **tags** via the PLC. The value of a tag is written to a memory area (address) on the PLC, from where it is read by the operating unit.

The following diagram provides an overview of the fundamental structure:



A typical structure

Defining an operating philosophy



Example of screen creation

You can create a number of screens with display elements and controls, for switching between screens, for example, for the user interface with which the operator is subsequently faced on the operating unit.

2. Process data entry and transfer

In order to enter process data or set new values, you configure input/output fields, for example. This is also possible as a symbolic display.

3. Process state reporting

To enter and log or archive process states and operating modes on the operating unit, you configure messages.

4. Defining communication areas

A defined address area on the PLC for data interchange with the operating unit is addressed by means of an area pointer.

The number of area pointers available varies depending on the selected operating unit

4.3 Steps to be taken when creating a project

To create a project, proceed as follows:

1. **Create a new project** (*File → New or File → Open*)

Choose *File → New* to create a new project. The project assistant guides you through a number of selection dialogs.

2. **Select a PLC**

Select a driver for your PLC. Only those drivers with which the operating unit can be run are displayed.

3. The project assistant allows you to enter information on the project in the *summary*. If you click the *Create* button, the project window opens.

4. **Define communication areas** (*System → Area Pointers*).

To enable the operating unit and PLC to communicate with each other, you have to define communication areas (*Setting up area pointers (Chapter 4.5)*) that are to be used by them both.

5. **Create a project**

This is the most involved part of the work. You can approach it in one of two ways: Either you create all the individual parts first and then link them to form a meaningful structure (the bottom → up approach), or you begin by designing a structure and then fill it with the individual elements (the top → down approach).

To do this, you basically

4.4 Selecting a PLC driver

Select the PLC driver with the project assistant in the *Select PLC* dialog box.

You can also define or later edit the parameters there if you select *PLC Properties* in the project window.

Available PLC drivers

You can select the following drivers for Windows-based systems:

- SIMATIC S5 - AS511
- SIMATIC S5 - DP
- SIMATIC S7-300/400
- SIMATIC S7-200
- SIMATIC WinAC
- SIMATIC 500/505
- OPC
- Allen-Bradley DF1
- MITSUBISHI FX
- Telemecanique Uni-Telway

Repercussions for tags

The address depends on the PLC you are using. The way in which the address of a tag with a PLC connection is displayed depends on the PLC selected.

Select the available data types and data formats in the *Tag* dialog box under Type or Format.

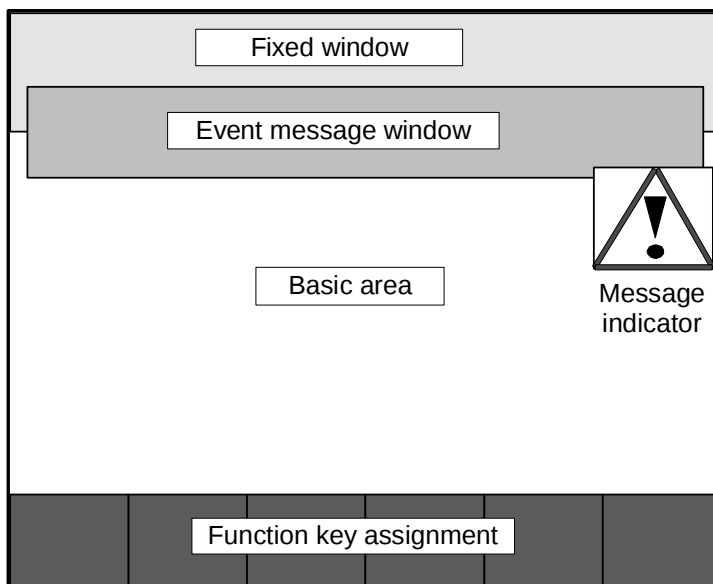
4.6 Subdividing the display on the operating unit

The operating unit's display area can be split into different areas.

Where do you set the areas?

Choose *System* → *Screen/Keys* to set the areas. The settings made here apply to the whole project, so set the areas before you begin configuration.

The example below shows one possible way of splitting the OP's display:



A typical display subdivision

Basic area

The basic area covers the whole screen. All the other areas are superimposed on parts of the basic area. The position and size of the basic area cannot be changed. Screens are configured in the basic area. The contents of

Message indicator

The message indicator is a symbol indicating alarm messages that are still applicable on the operating unit. You can switch the message indicator on or off by choosing *System* → *Screen/Keys*. You cannot change the size, but you can the position.

Alarm message window

The alarm message window is the window in which alarm messages appear. The window only opens when there is an alarm message. When you acknowledge the alarm message, the window closes again.

The display of alarm messages cannot be switched off. Either an alarm message window or a message line must be configured.

The position and size of the alarm message window cannot be configured.

Event message window

The event message window is the window in which event messages appear. The window is only displayed when a function is called. You can switch the event message window on or off by choosing *System* → *Screen/Keys*. You can change the position of the window.

Message line

The message line is the area in which alarm and event messages are displayed. You can switch the message line on or off by choosing *System* → *Screen/Keys*. You can change the position of the window.

Icons (not PC)

Icons can be placed on the display for soft keys (keys assigned functions locally).

4.7 Editing projects

4.7.1 Which projects can you convert?

Windows based system → Windows based system

You can use menu command *File* → *Convert* to convert a ProTool project that you created for a Windows based device into a project for a different Windows based device. As a necessary precondition, the source and destination devices must have the same screen resolution.

You can convert the following projects:

Source:	Destination (with the same screen resolution):
OP37/Pro	→ PC, MP270
PC	→ OP37/Pro, MP270
MP270	→ PC, OP37/Pro
TP070	→ TP170
TP170	→ TP070

Device having a graphics display → Windows based system

You can even create a new project for a Windows based system (such as an OP37/Pro) from an existing project for a device having a graphics display (such as an OP37). You do this by selecting from the source project window all the screens and objects that you wish to reuse. Drag and drop the selected objects into the destination project window. ProTool will tell you if there are any objects and functions that cannot be converted.

Having completed the copying procedure, you can then adapt the way screen objects are arranged and displayed

4.7.2 Example: How to convert an OP37/Pro project

To convert an OP37/Pro project into an MP270 project, proceed as follows:

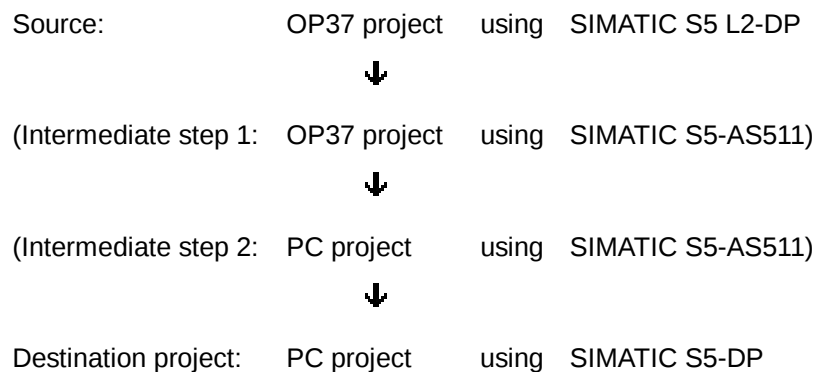
1. Open the existing OP37/Pro project.
2. Choose the *File* → *Convert* menu command.
3. Enter a directory and name for the new project.
4. At *Device type* select MP270.
5. Click *Save*. If you confirm the query that appears in response to this, the project is converted and the MP270 project window opens.

4.7.3 Example: How to convert an OP37/Pro project for the PC

You want to convert an OP37 project for a standard PC and use a different connection.

If you are using the same PLC, the tag addresses may be discarded even when changing the connection type.

To prevent this, follow the sequence given below:



Example:

Tag VAR_4 will be renamed VAR_11 if tags VAR_1 through VAR_10 already exist in the destination project.

What is copied?

You can copy the following via the clipboard:

- All objects listed in the project window, such as screens, text or graphic lists, tags etc.
- Objects from screens (trends, fields, graphics etc.) in the screen editor.
- Messages and objects from messages (message text, fields, info text etc.) in the message editor.

An object is copied complete with its attributes and all cross-referenced objects. Special situations encountered during copying are reported in the *system message window* under *Clipboard*. This gives you information about any objects that have not been copied or renamed, for example.

Special situation with screens

If the object to be copied refers to a screen that does not exist in the destination project, the underlying screen is not copied; instead a blank screen is created as a dummy if the destination project does not contain a screen that can be reused.

This ensures that you will not copy the complete source project by mistake along with the start screen.

Afterward, when you paste the screen via the clipboard, the dummy screen in the destination project will be automatically replaced by the proper screen.

4.7.7 Redoing the last action

To redo your last canceled action in ProTool, choose one of the three following options:

- Choose the *Edit* → *Redo* menu command
The last canceled action is shown in abbreviated form after the menu command. A longer description is given in the status bar.
-  Click the *Redo* button in the toolbar.
This opens a Tooltip which shows you the last canceled action. You are given the same information in the status bar.
- Press the *CTRL* and *Y* keys simultaneously.
In contrast to the first two options, you are not given any feedback about which action has been restored.

If you keep executing the *Redo* command, you can successively restore all the recorded cancellations.

Configuration techniques

5

Overview

In this chapter you will learn how to

- create screens
- configure controls and display elements
- use tags
- configure messages

After that we will show you, for example, how you

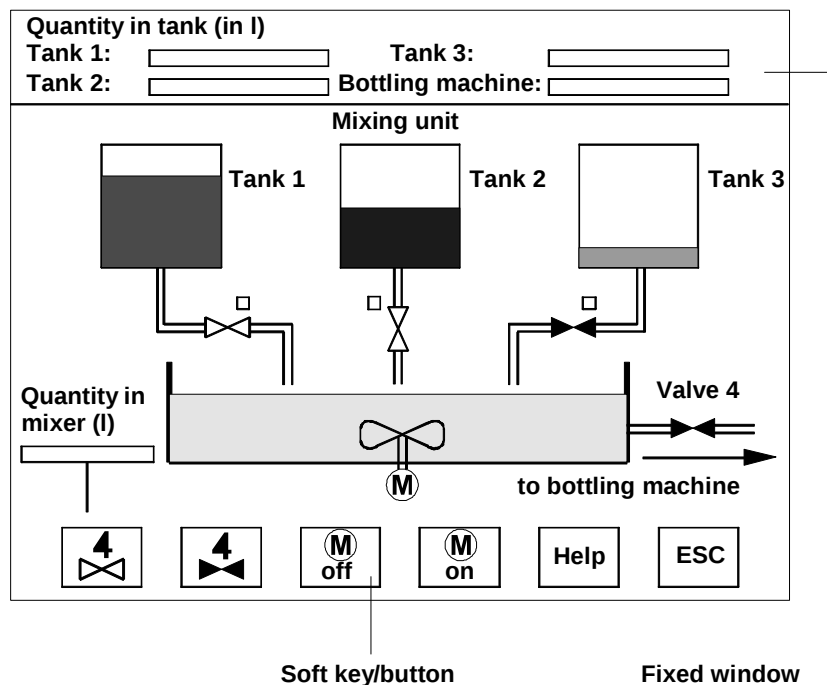
- use functions
- create archives
- create recipes
- assign operator authorization
- create multi-lingual projects

5.1 Creating screens

5.1.1 What are screens?

Example

Screens are an image of the process. You can display processes on screens and specify process values. The figure below shows an example of a mixing unit for producing different juices. Ingredients are filled into a mixer from different tanks and then mixed. The liquid levels in the tanks and in the mixer are displayed. The intake valves can be opened and closed by means of the operating unit. The motor for the mixer can be turned on and off in a similar manner.



Example of a Screen: Mixing Station

