We are everywhere you need us

KW-Software

Innovative, global leaders in automation in Europe, Japan, China and the United States rely on MULTIPROG® and ProConOS® as the foundation for their most critical products and systems. Each day, our products prove their quality and reliability in thousands of different applications in nearly all of the industrial branches.

The main application fields of the software are: automotive, mining, printing machines, building automation, industrial robotics, presses, process controls in steel and chemical works, turbines, packaging machines, weighing technology and wind wheels.
IEC 61131 programming languages

- Instruction List (IL)
- Structured Text (ST)
- Function Block Diagram (FBD)
- Ladder Diagram (LD)
- Sequential Function Chart (SFC)

All programming languages can be mixed within one project.

Machine Sequential Function Chart (MSFC)

Machine Sequential Function Chart is an additional programming language in MULTIPROG®, which offers the following advantages:

- Reduced commissioning times by easy programming and cyclically running processes in machines
- Reduced downtimes by an extended diagnostic
- Easy handling by extended modes, such as automatic and manual mode

Intuitive programming

MULTIPROG® runs as a 32 bit application on all standard PC Windows® systems and allows intuitive programming and provides a clear structure:

- User interface and use are strictly oriented to the Windows® standard.
- The Edit Wizard displays the available elements in all editors.
- An extensive context-sensitive HTML help system supports you on all levels: from questions about the general use, via information about function blocks, up to the background of the IEC 61131 regulations.

Cross references automatically create an overview of the used data.

- Multiple document interface (MDI) with an unlimited number of dockable windows
- Self-definable and dockable toolbars
- In a few minutes you will learn the basic steps to create a PLC program by in the online help integrated video sequences.

Clearly structured project administration

The project administration of MULTIPROG® offers a user-friendly structuring by:

- Representing the project tree according to the IEC 61131 software model
- Using of the project tree according to the Windows® Explorer
- Displaying of the different project parts by different views
- Reusability of function blocks in user and firmware libraries
- Know-how protection using password handling or firmware libraries
- Integration of several controllers in one project.

Cross references allow a clear display of the objects which are used in the project.
The IEC 61131 programming system

MULTIPROG

The use of MULTIPROG® offers you many advantages. Our long-term experience in the automation industry guarantees you a sophisticated software product.

Textual languages
The text editor allows you to create your programs fast and easily. You are supported by various functions:
- Syntax highlighting indicates the keywords of the program.
- IntelliSense automatically completes your variable names, structure elements and function block parameters.
- The Edit Wizard eases the editing by displaying the available elements and function blocks.
- The menu adapts itself context-sensitively.

Graphic editor
The fully graphic editor allows a completely free placing of objects as well as a network-oriented handling. You may choose the method which suits best to your application, and use the functions of the editor by which you can quickly create your programs in LD/FBD or SFC.

Cross-compiling
The basic languages of the IEC 61131 standard, i.e. FBD, LD and IL, can be cross-compiled to each other including their comments. Program code which has been written in ST can be compiled to any of the three basic languages.

Multi user functionality shortens programming times
It is possible to have different function items of a plant created in parallel by several users. The multi user functionality allows them to work simultaneously in the same project.

Online language switching for true international support
The software including help systems and documentation is available in English, German, French, Spanish, Japanese and Chinese language. Online, even the user-generated project documentation can be switched into any language as well.

- The Edit Wizard displays the objects which are available in the appropriate programming language
- Different colors for functions and function blocks from the firmware library, the user library and the project.

Contact Information

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IT and Instrumentation for industry
The multi target automation software
MULTIPROG®

MULTIPROG® supports the integration of different Hardware systems. It is suited for the programming of distributed controller applications.

Extended diagnostic reduced start-up times
Extensive diagnostic functions reduce commissioning times and downtimes:
• Logic Analyzer
• Recipes
• Breakpoints
• Address debug
• Single step
• Overwriting and forcing
• Online changes
• PLC simulation

Management of distributed controls
MULTIPROG® supports projects of distributed heterogeneous controls:
• Several configurations/resources can be simultaneously administered, programmed, debugged and taken into operation in one project.
• All connected controls can be administered in one dialog. For example the program can be downloaded with one mouse click to all connected controls and then be started, and much more.

Network variables:
Easy powerful configuration of distributed communication
Based on the German research project MDVA (Modular, open, distributed function block systems for the automation industry) and its successful realization, the network variables have allowed KW-Software to apply a new standard in the configuration of distributed control systems.

Network variables offer you the following possibilities:
• Easy realization of distributed PLC applications with several configurations and resources
• Automatic organization of the data transfer
• No additional programming effort, as the structure of the distributed system does not have to be considered when the system is designed
• The program can be started, stopped and changed in online mode in each PLC within the network, independent from the other existing PLCs.
The open architecture of MULTIPROG® provides a new direction in the creation of automation software. It is possible to create tools which lead to real competitive advantages in the engineering sector - beyond PLC programming itself.

**Automation interface guarantees consistent data**
Modern automation suites include software tools for nearly all projection phases and tasks: E-CAD, fieldbus/network configurator, PLC programming, SCADA, etc. They all access partly the same objects. However, there is often a lack of data exchange, i.e. a common pool which is available equally for all components. The solution for this challenge is called 'automation interface'.
- Via the automation interface, MULTIPROG® opens its data to other tools
- MULTIPROG® allows external creation and modification of its project data. Furthermore specific attributes can be added.
- As all essential data can be displayed in MULTIPROG®, a frequent switching among different tools during PLC programming and commissioning is not needed any longer.
- Observers guarantee data consistence with other tools

Thus the engineering effort for the programming of PLCs is reduced.

**Integration through ActiveX and Add-Ins**
Different tools of different manufacturers are often applied in different automation tasks. ActiveX controls can be integrated as control bars, which allow MULTIPROG® to work without any problems in the individual suites. The MULTIPROG® Add-In interface allows the integration of ActiveX controls or the implementation of additional customer-specific functionalities.

Would you like it even more flexible?
MULTIPROG® allows different adaptations and extensions, from brandlabelling of the software up to the adaptation of customer-specific controllers (PLCs) having their own code execution and online monitoring. Even concepts which take care of the integration of customer-specific programming languages are supported.

**Full documentation support**
Successful integration requires more than technology, so extensive and comprehensive documentation is available for all different steps of the integration and adaptation of MULTIPROG®. Many significant projects have been successfully completed by this documentation.

**Documentation of the automation interface in the HTML help**
Sample application: project "Observer" as a sequence diagram

MULTIPROG® as a container for ActiveX control applications: Integration of a bus configurator
Reliability by experience
ProConOS® has been applied in the automation industry since 1991. Thus a sophisticated and reliable product is available, which matches current requirements and which is continuously adapted to new technologies.

Advantages due to a clear structure
The modular software structure offers:
- Multiple interfaces for system development engineers
- Easy realization of manufacturerspecific features
- Fast integration into existing systems such as CNC, robotics’, motion control, etc.

Standard real-time operating systems by well-known manufacturers form the base of ProConOS®.

Preemptive multitasking
ProConOS® is based on a standard multitasking operating system and supports preemptive scheduling. This allows the exact prediction of the time behavior of user tasks. A watchdog is assigned to each user task and will activate the appropriate system tasks to realize corrective action if a realtime violation arises. In this way supervision is guaranteed. The programming of system tasks allows a differentiated reaction from the application towards runtime errors (exception handling: watchdog, division by zero, etc.) and changes in the operational mode (e.g. stop to run, boot sequence). Highly efficient communication functions support OPC, remote maintenance and programming. ProConOS® supports the multi client functionality.

High performance
ProConOS® ensures real-time within the context of preemptive scheduling and thus makes sure that always sufficient machine time is available for communicating with the programming system, OPC and debug functionalities. Thanks to native code, ProConOS® guarantees fastest execution (see tables).

Installing the PLC operating system ProConOS® (Programmable Controller Operating System), a standard hardware platform as well as specific hardware platforms will become a highly efficient PLC. This includes the loading and processing of PLC programs, the supply of debug functionalities for the programming, commissioning and maintenance of PLC controlled machines and plants.

<table>
<thead>
<tr>
<th></th>
<th>BOOL</th>
<th>BOOL/BYTE</th>
<th>INT</th>
<th>DINT</th>
<th>REAL</th>
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<td>3.4</td>
<td>2.6</td>
<td>2.6</td>
<td>8.6</td>
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<tr>
<td>Pentium PIII 800 MHz</td>
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<td>1.6</td>
<td>1.6</td>
<td>5.2</td>
<td>38</td>
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<tr>
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<td>12</td>
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<td>12</td>
<td>249</td>
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<tr>
<td>SH3 SH7709 (SH2) 25 MHz</td>
<td>1440</td>
<td>700</td>
<td>760</td>
<td>800</td>
<td></td>
</tr>
</tbody>
</table>

ProConOS® performance values (in microseconds) for 1000 IL commands
ProConOS® memory
The partition of the ProConOS® memory covers all requirements towards the data management of a modern PLC:

- Inputs
- Outputs
- Flags
- Shared memory flags
- System flags
- Retentive memory

Peripheral and file system support
- Reading of inputs and writing of outputs via a separate I/O image
- Update synchronous to the tasks
- Open I/O interface for the connection of a wide-range periphery
- Storage of the bootproject in order to realize the PLC specific startup behavior
- Storage of the user program as an archive project within the internal file system
- Storage of any file within the internal file system with access functions for further processing.

Test & commissioning
Various debug functions support design, programming, test, commissioning and service:

- Variable status
- Address status
- Breakpoints
- Single cycle
- Step and trace mode
- Overwriting
- Forcing
- Online changes with the process running
- Watch windows
- Recipes and realtime Logic Analyzer

ProConOS®: The communication talent
A highly efficient and flexible interface for the integration of network communication drivers allows an easy realtime data exchange via variables. As variables are assigned within groups of different communication characteristics, ProConOS® can communicate simultaneously with different controllers within the network. Thus ProConOS® is perfectly integrated into both existing and new automation concepts.

ProConOS® embedded – The solution for your hardware:
ProConOS® embedded is available for a wide range of different processors and realtime operating systems. ProConOS® supports different processors: from INTEL x86/Pentium 32Bit, via Motorola 68xxx, PowerPC, Hitachi SH03, up to StrongARM and NetARM.

The available realtime operating systems are listed below:
- INTEL x86/Pentium 32Bit processors: VxWorks, VxWin, VenturCom, RTX, Windows® NT Realtime (KWRTK), Windows® NT native, Windows® CE, RTXDOOS 32, QNX and Linux
- INTEL x86 16 Bit processors: RTXDOOS 16 and KWRTK
- Motorola 68xxx processors: VxWorks, pSOS and VRTX
- PowerPC processors: VxWorks, pSOS and VRTX
- Hitachi SH03 processors: ThreadX and Windows® CE
- ARM7, StrongARM and NetARM processors: ThreadX, VxWorks, Windows® CE and pSOS
Integration into individual control systems
The integration of ProConOS® embedded into your control system accomplished with the ProConOS® Toolkit. It offers the possibility:

• To adapt ProConOS® to different target systems and
• To add specific functionalities.

ProConOS® WIN RT – The soft PLC with hard realtime
The industrial PC is a sophisticated solution for operating and supervising tasks in many machines. Using ProConOS® WIN RT a separate PLC is no longer necessary. For this purpose the software PLC ProConOS® WIN RT - which allows realtime operation - is installed on Windows® NT and leads through the control tasks of the PLC.

Hard realtime under Windows® NT
In order to realize the deterministic behavior necessary for automation tasks, the PLC operating system ProConOS®, which has been successfully applied in the automation industry for many years, uses the Windows® NT real-time extension which has been developed by KW-Software (KW Realtime Kernel: KWRTK). A switching from Windows® NT applications to the ProConOS® WIN RT PLC (kernel mode driver) is usually done within 1 ms. If the PLC needs more than 1 ms to realize a task, it will get the required processor time.

Blue Screen operation
ProConOS® WIN RT “survives” the exception violation of the Windows® NT kernel. The appropriate reaction can be defined in the PLC program. The automatic routing of the communication connection to the RS232 port with help of MULTIPROG® allows to bring the plant into a fail-safe status.

Fieldbus connections
ProConOS® WIN RT supports fieldbus connections of different manufacturers for:

• Interbus
• Profibus DP
• CANopen
• DeviceNet

The open I/O interface allows the adaptation of a wide-range customerspecific I/O and peripheral devices.

Easy handling
Compared to many other realtime operating systems, Windows® CE offers the advantage to develop and operate software for various processors, using the traditional development tools and user interfaces. ProConOS® and this concept perfectly complement one another. ProConOS® runs on Windows® CE 3.0 systems.

The following processors are supported by ProConOS® WIN CE:

• INTEL 32
• Hitachi SH03
• ARMS compatible
The base of various solutions

ProConOS®

ProConOS® WIN MC - SoftPLC with PLCopen Motion Kernel for Windows XP and CE
ProConOS® WIN MC supports the motion kernels built by the companies Eckelmann and ISG. With this, a complete motion solution based on the PLCopen motion blocks is available - depending on the user’s wish.

PLCopen Motion Blocks
The PLCopen motion blocks have been developed to provide a set of standardized function blocks which is identical on all motion controls. This standardization considerably simplifies the application of Motion Control. The PLCopen blocks include single drive motions, e.g. Move_Absolute, Move_Relative and Move_Velocity, as well as multi-axis motions, such as gearing or camming. Sercos is supported as drive bus.

ProConOS® embedded CLR - The open PLC Runtime System for Drives and small Controllers
Based on the standardized Microsoft Intermediate Language (MSIL ISO/IEC 23270:2003), ProConOS® embedded CLR can be used as unified runtime system for industrial automation. The PLC runtime system is available for Altera Cyclon II Nios II and Texas DSP TMS320F2812. ProConOS® embedded CLR requires 64 to 128 KB of memory - no additional real-time operating system is necessary.

PROCONOS VC.png

PLCopen Motion Control FB MC_GearIn

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ProConOS® Toolkit: Install - compile - run!
ProConOS® Toolkit is the easiest way to quickly create your own automation solution based on ProConOS®. Depending on the target system, it is very easy to create a running system.

ProConOS® Toolkit consists of the following components:

  Complete documentation of the ProConOS® API functions as well as of the operation behavior of ProConOS®

- ProConOS® library
  The ProConOS® kernel is available as object library and adapted to a specific processor type and a real-time operating system.

- Main module and public header in source
  A template of the main routine is available for starting of ProConOS® as well as the definition of the ProConOS® API functions.

- Make file
  Template for the linking process for the creation of the executable ProConOS®

In order to integrate customer-specific and industry/application specific know-how, ProConOS® Toolkit offers the following ProConOS® API functions:

- Integration of I/O drivers
- Integration of firmware functions and firmware function blocks

- Integration of specific communication drivers
- Integration of file device drivers
- Extension of the internal exception handling of ProConOS®
- Integration of ProConOS® system hooks

Contact us for the availability of the ProConOS® Toolkit for your hardware and software.

Would you like it even more flexible? ProConOS® open architecture allows to integrate:

- Additional processors
- New operating systems
- Customer-specific extensions
- and much more

These adaptations can be either done as a service by KW-Software or by the customers themselves.

Individual systems
In regard to the open architecture and scalability of ProConOS®, customerspecific systems can be generated, which range from small controllers to high end systems.

Full documentation support
Successful integration requires more than technology, so extensive and comprehensive documentation is available for all different steps of the integration and adaptation of ProConOS®. Many significant projects have been successfully completed by this documentation.