By Martin Gottschlich,
Manager MULTIPROG® development department,
KW Software.

Engineering Data Pool

The wish for open and yet integrated systems in the field of automation arises more and more, as these systems make it possible to combine the components of different manufacturers, to have a wide range of products to select from, which then (optimally integrated) represent a suitable, individual automation solution. With MULTIPROG® wt KW Software has developed a platform to integrate different tools for programming, visualization and bus connection purposes.

OPEN AUTOMATION PLATFORM

Complex automation systems consist of a great number of single components, starting with electronic CAD and documentation systems, via bus configuration up to engineering of the visualization and PLC programming. Usually each of these tools has its own data pool. In this way, however, the data used by several tools in common has to be entered several times. Regardless of the amount of necessary work, this procedure bears an increased risk of errors and is rather cost-intensive. And it is at least the information on the variables which is needed by any of these tools and which the programmer thus would like to enter only once. To meet these requirements, an open system is needed which - on the one hand - integrates the tools themselves and - on the other hand - their data.

CALL E: BASIC TECHNOLOGY FOR A COMMON DATA POOL

KW Software, in cooperation with its partner companies GTI (visualization) and Hilscher (fieldbus configurator), has developed a solution exactly meeting these requirements. On the basis of CALL E by the Open Control Foundation a common data pool for all integrated tools has been realized. Furthermore, with help of CALL E any additional tool can be easily integrated into the system and thus function as a part of the whole. Single precondition: the tool has to support the CALL E interfaces required. The center of this solution are the automation objects representing a combination of parts of the bus configuration, of the PLC and the visualization. All automation objects are stored in a CALL E data base and can be used instance-oriented. In this way all data is integrated in the object oriented world of the IEC, allowing an optimized and easy engineering. The data transfer during runtime is effected via OPC. The OPC Server also exploits the common data pool of all tools, is thus integrated in the system and requires no further configuration.

TOOL INTEGRATION: THE CURRENT SITUATION . . .

One example for the integration of components in MULTIPROG® wt represents the Logic Analyzer. It has been integrated into the programming tool as a standard Active-X component, including its own menus and toolbars. This has been effected by means of add-ins. These COM objects can be easily integrated into

Figure 1. The data integration of programming, visualization, bus configuration, motion control and Internet is done via the CALL E data base. The tool integration can be effected by the project manager.

the system and considerably increase its functionality. This also applies to special editors which are not included in the standard scope of supply, and yet can be integrated even as supplements. The context menus can be further extended. In this way functionalities of different tools can be made available throughout the system. The work with the Open Control solution including bus configurator and visualization has shown in particular that the possibility of switching from one tool to another by means of context-sensitive jumps bears great advantages for the handling of the system. The integration in complex suites can nowadays be effected with help of a number of DDE services. They allow projects and their data to be manipulated remotely, e.g. in order to exchange variables, create new POUs, print a project or effect a program download.

. . . AND THE FUTURE SITUATION

The connection to a PLC represents another kind of integration. Whether you choose ProConOS® as SoftPLC or as embedded solution, or any other "classic" PLC, the connection is established via a defined interface offering interfaces for code generation, online operation and further specific settings. In this way all functionalities integrated in the kernel can be mapped on the corresponding PLC, and the user interface and the data can be integrated to form a complete system. According to the slogan "Integrated Automation

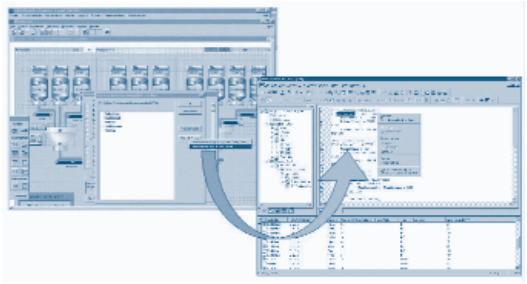

Figure 2. Extended context menu entries in the visualization allow jumps into the programming tool; there the corresponding variable is displayed in the cross reference list.

Software for Open and Distributed Systems", KW Software continuously progresses the development of modular components. The 32 bit technology used allows - besides the DDE interface - an automation interface to be established. With this automation interface the project can be browsed and thus single PLCs, POUs or variables comfortably accessed. VBA-compatible automation interfaces offers the system integrator a great number of possibilities for an integration - even when high-level languages such as Visual C++ or Visual Basic are used. Simpler tasks like the programming of macros or the automation of recurring actions can be effected with help of a script-compatible automation interface. Furthermore 32 bit technologies like ADO or COM/DCOM allow a deep integration of tools and their data. ActiveX-Controls can be easily integrated into systems or started in standard applications like the Internet Explorer. To establish a connection among the tools, Active Document Servers/Containers are required, one of which is a new 32 bit pagelayout editor implemented as Active Document Server. The Active Document Container in MULTIPROG® wt allows this new editor to be integrated into the system. With help of an ADO interface CALL E can be connected to any data base such as Oracle, Access or an SQL server, not even necessarily requiring a real database running in the background. The data pool can be individually selected and there does not even have to be a central data pool, but it can be distributed throughout a network. With all these interfaces and possibilities MULTIPROG® wt as automation platform represents the basis for the tool integration. In combination with CALL E a complete integrated system is built up. All components can be easily accessed from MULTIPROG® wt, suitably extended context menus allow to switch tools fast and easily, and project-oriented actions like printing or archiving can be easily effected. Furthermore, common library, version and user administrations can be realized, and data concerning several tools are automatically stored in a CALL E data base belonging to the corresponding project.

Figure 3. The Logic Analyzer represents an example for the integration of different components in MULTIPROG® wt.

COST CUTTING BY OPEN AUTOMATION PLATFORM

The SoftPLC ProConOS® by KW Software can be completely integrated into the system, both as NT-realtime version including the KW realtime kernel and as embedded solution, running e.g. on VxWorks, RTXDOS, QNX or Windows CE. In any of these cases, the connection to MULTIPROG® wt is established via standard communication channels such as TCP/IP or COM/DCOM. The same communication channels are used by the visualization to access ProConOS® via the OPC/CALL-R Server - be it in distributed networks via several resources or in an individual station. And here it is also the CALL E data base that supplies the common data. The Internet also becomes more and more important. Operational states of machines and processes are to be accessed and monitored from remote stations. In this case the PLC has the function of a Web server providing the data in the WWW. Via a proxy server such as the ProConOS® Gateway, it can be accessed even from the supervisory level. An open automation platform allows a free and individual choice among the distributors of automations tools. In this way the best possible tools for a corresponding project can be selected, thus facilitating of a cost-effective engineering. The high integration of all tools involved results in a closed, consistent and complete system. Work expenditure and errors during project development can be reduced, due to the global availability of project data. This again results in a considerable reduction of project costs. In this way solutions for the field of automation are developed which allow the integration of different automation tools, the connection of controllers on Windows CE or embedded Windows NT via TCP/IP, and the accessibility of all components up to the supervisory level through the Internet. So open interfaces and standards like CALL E allow open and integrated solutions which could never be supplied by a single manufacturer or distributor ■

Martin Gottschlich, Manager of the MULTIPROG® development department at KW Software.