Compact Control Builder
AC 800M and S800 I/O
Compact Control Builder

The Compact Control Builder, is a powerful tool for creating control solutions and reusable control libraries for the AC 800M Process PLC. It is all done in a Windows-based environment, offering a wide range of control functionality for ABB’s industrial Process PLC, AC 800M. From binary logic to advanced regulatory control, from discrete process signals to high-level process objects. In any choice of no less than six programming ‘languages’, whichever are the most suitable for the tasks at hand. These are Instruction List, Structured Text, Function Block Diagram, Sequential Function Chart, Ladder Diagram, and Control Modules, the latter being ABB’s own contribution to higher application engineering efficiency and ease of use.

Control Diagram Editor

Control Diagram Editor in the next generation editor which increase engineering efficiency, reduce engineering mistakes, and enable the creation of logic which is easy to read and maintain. By allowing the user to combine Structured Text, Function Blocks, Functions, Sequential Function Charts and ABB’s Control Modules into the same block-based editor, the benefits of each language can be combined. Control modules in combination with Control Diagram Editor supports forward and feedback signals in one and the same variable. The result is powerful and easy to read control logic.

Features and Benefits

- Promotes re-use of code by means of user-defined libraries of data- and function-block types
- Intuitive, graphical navigation by a Windows Explorer-like Project Explorer
- Libraries of ready-for-use functions for efficient programming
- Supplements the five standard languages with Control Modules for high-level configuration of control applications graphically
- Supports all the five IEC 61131-3 programming languages in a single integrated environment
- Supports multitasking, multicontroller and multi-user application development
- Offers powerful simulation and on-line facilities for testing and troubleshooting
- Alarm and Event handling
- Sequence of events
- Extensive on-line help

Hierarchical Object Orientation

AC 800M application software is object-oriented in a structured way, which means that changes made to an object type or instance thereof only affects that type (and all of its instances) or that instance only. For this reason, subsequent bug fixes, updates, improvements, expansions etc. can be performed quickly and easily. It also means that the different program sections can be assigned their own priorities and cycle times with a large measure of freedom.

All solutions run in a common language runtime environment (CLR) in the controller, making it possible to access information between solutions in different languages seamlessly. So each contributing project engineer can develop solutions in the preferred language for each task without having to consider which languages related modules are written in.
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For Both Large and Small Projects
Compact Control Builder is intended for both large and small projects by not only efficiently supporting the development of “flat” and “linear” applications but also structured ones, solution libraries, multi-controller applications, multi-user applications, and multi-engineer projects. To safeguard investments made in applications development, the resulting user software can be exported to and imported from other control systems featuring the AC 800M controller, e.g. ABB 800xA systems.

Users can create their own data types and functions and these can be re-used over and over again to increase engineering efficiency and quality. A Windows Explorer-like Project Explorer offers graphical navigation through the entire project, easy configuration of the system hardware and rapid creation/identification of program modules to be developed/edited. On-line, context-sensitive help speeds up data- and program-code entry.

A search engine makes it easy to find anything of interest, from entire program modules, to tiny symbols, including deployment locations of parameters and variables. Programs can be developed off line and execution be simulated without having the controller hardware connected. The entire project, including hardware settings, functionality libraries, and applications can be translated to MS Word™ documents for printing or further editing/reformatting.

When done, the application can either be stored on a non-volatile flash memory card and the card simply be plugged into the target controller for easy commissioning. Or it can be downloaded to battery backed-up RAM in the Process PLC for applications where frequent changes/upgrades are envisaged in the future.

The execution of the application can be reviewed and optimized off-line or during the download to the controller, to avoid conflicts between different tasks.

A number of on-line facilities for testing, program modification and commissioning are offered, and the status of I/O signals, variables, etc. can easily be inspected in real time. Faulty hardware is marked red, manually overridden inputs and outputs are marked yellow.

Data Types, Variables and Functions
Compact Control Builder supports data types such as Booleans, integers, floating-point numbers, strings, time, date, etc. All in accordance with the IEC 61131-3 standard. These basic data types can be combined into new structured data types, which in turn may contain other structured data types. Variable identifiers may be up to 32 characters long.

The library of functions available is probably the industry’s largest, containing everything from simple AND and OR gates to ready-for-use self-tuning – adaptive – PID controllers. Not to forget unique elements for direct interfacing with variable-speed drives and for easy handling of all the software-related redundancy features the AC 800M process PLC offers.

Basic functions can be combined into new, user-defined functions and these be re-used over and over again, currently or in the future.
AC 800M — scalable and flexible process PLC with high availability

Challenging business goals require a flexible and powerful process PLC. Working individually or in combination, AC 800M helps you control a broad spectrum of industrial processing applications thanks to its high flexibility, scalability, and availability.

AC 800M is a modular process PLC with a rich set of communication functions as well as full redundancy and support for a large range of I/O systems. When configured with Compact Control Builder software, AC 800M is open to participate in any kind of control solution. Re-use of code and libraries of ready-to-use functions also promotes an efficient configuration and setup.

The AC 800M family is based on rail-mounted modules and comprises the CPUs plus communication modules, power supply modules and a series of accessories.

A flash card can be used as a removable storage of applications and data. Flexible, cost-effective control solutions that are easy to implement and change are the hallmark of Compact Product Suite. Like other products in this range, the AC 800M Process PLC is built with openness in mind. Individually or in combination with other products on the market, it creates reliable control solutions that are easy to afford and manage. Its rich set of functions help improve production control, maximize availability and minimize maintenance.

Features and benefits

- Full modularity and flexibility for all environments. Many options make AC 800M exceptionally open. Its flexibility comes into its own when control applications change, expand or contract.

- Scalable design for easy expansion. Simple to set up and easy to expand, AC 800M scales up as your control needs grow. Just add the extra modules your application requires.

- Powerful control solutions and reusable libraries. Compact Control Builder software offers a wide range of powerful control solutions for the AC 800M Process PLCs. Code re-use and libraries of ready-to-use functions promote efficient configuration.

- Fault tolerance gives maximum availability. Robust design and redundancy options in all critical areas of the controller and its components eliminates single-point failures and secures maximum availability.

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AC 800M process PLC, PM858

High Performance AC 800M Process PLC, PM891
Full modularity and flexibility for all environments
Rail-mounted modules comprise CPUs, communication modules, power supply modules and accessories. Connectivity and expansion options make AC 800M exceptionally open and scalable; easy to connect and easy to adapt according to your changing control needs.

The nine CPU modules vary in terms of processing power, memory size, and redundancy support from low-cost, medium power to high-power, full redundancy. Each is equipped with built-in Ethernet ports for communication with other controllers and for interaction with operators, engineers, managers and higher-level applications. These ports can be configured for redundancy when availability is of paramount importance.

Relevant communication and I/O modules include additional RS-232C ports to connect further third-party systems and devices, PROFINET I/O, DeviceNet and MODBUS interfaces to integrate I/O systems and access a wide range of field devices, and S800 I/O family modules as direct and remote I/Os.

Scalable design for easy expansion
Scalability is a key attribute of the AC 800M Process PLC. Its modular design makes it just as effective for small systems as for large, integrated automation applications. For a simple Compact Product Suite application, a basic controller station may consist of a process PLC, a power supply module and local I/O modules. To scale up, simply add the CPU, I/O, communication module and power-supply options you need. The AC 800M family makes it easy to match controller configuration with control need.

Fault tolerance gives maximum availability
Redundancy is available in all critical areas of the AC 800M Process PLC and its associated components such as the power supply, CPUs, communication links and I/O circuits. Implementing all redundancy options eliminates single-point failures, thus helping secure maximum availability. The end result is seen in increased productivity and greater profit.

Powerful control solutions and reusable libraries
AC 800M Process PLC is configured using the Compact Control Builder, a powerful software tool for creating logic, sequential and analog control-intensive automation solutions. Its powerful libraries are easily extended, making it the perfect tool for automation solution suppliers where standardization and reuse are the keys to cost-effective solutions. Compact Control Builder supports flash memory cards for loading applications direct into the target controller. Six programming languages are available; simply choose the one most suitable for your application.
S800 I/O meet all automation needs

S800 I/O is a open comprehensive, distributed, process I/O system that communicates with controllers by direct connection or over industry-standard field buses. Thanks to its open connectivity it fits a wide range of process controllers from ABB and others. And it bears the name ABB, the world leader in process automation.

By permitting installation in the field, close to sensors and actuators, S800 I/O reduces the installation cost by reducing the cost of cabling. And thanks to benefits such as:

• Flexibility, permitting a virtually infinite number of installation arrangements, small or large, indoors or outdoors, wall mounting or floor standing,
• Modularity, permitting step-by-step expansion without bottlenecks ever developing,
• Cost-effectiveness, making for savings on hardware, cabling, installation and maintenance,
• Reliability thanks to features such as auto-diagnostics and redundancy with bumpless, automatic, change-over, it helps industrial operators get a tighter grip on production and thereby improve profitability.

Features and Benefits

• Comprehensive: S800 I/O offers costeffective solutions to practically all needs for field-device interfacing, including basic analog and digital I/O, as well as intrinsic-safety and high-integrity solutions.
• Structurally flexible: S800 I/O is highly modular and offers a number of ways in which the modules can be interconnected. Consequently, S800 I/O networks can be built in a near-infinite number of ways, from highly centralized to highly distributed.
• Supports industry-standard field bus PROFIBUS DP which makes S800 I/O compatible also with non-ABB controllers.
• S800 I/O supports also ABB’s Advant Fieldbus 100.
• Easy to configure: S800 I/O devices are configured transparently as part of their parent controllers, like local I/O. No additional knowledge or skills are required.
• Reliable: Comprehensive diagnostics, hot swapping of modules and redundancy solutions are available, ensuring that both the I/O system and the production plant will stay up.
Comprehensive and flexible

Flexible installation
Three mechanical designs are available:

- Compact (plug-in modules with a basic I/O signal termination area).
- Extended (plug in modules with ample space for I/O cable termination, fuses, jumpering and field power distribution).
- S800L (all-in-one modules and bases with detachable screw terminal blocks for I/O signals) for installations not requiring hot-swap capability.

Reliable
S800 I/O offer availability-improving features such as:

- Input/Output Set as Predefined (ISP/OSP). Each input/output can be set individually to default to a predefined value or freeze in case of communication loss.
- Hot swap of modules. A faulty I/O module can be replaced live, i.e. without powering the station down and without the rest of the station being affected. A hardware key ensures that only modules of the right type can be inserted.
- Hot configuration in run (HCIR). An S800 I/O station can be reconfigured while in full normal operation, i.e. without having to switch it over to configuration mode.
- Redundancy options in all areas: power supply, fieldbus media, fieldbus interfaces and I/O modules.
- To withstand harsh environments, all S800 modules are compliant to G3 severity level of ISA-S7.04, Environmental Conditions for Process Measurement and Control Systems.

Accurate
S800 I/O modules can time-stamp events, i.e. input signal transitions, at the source with millisecond accuracy. Thereby providing the basis for meaningful sequence-of-events recording by the host system. In tightly interlocked processes this is essential to finding the root causes of production disturbances.

Analog or digital I/O
Digital process interfacing modules typically provide 16 channels while analog modules offer 8. Since an S800 I/O station can accommodate 12 I/O modules, this means up to 192 digital or 96 analogs per station or any mix between the two extremes.

With optional Modulebus expansion, up to 24 I/O modules can be accommodated, thus doubling the above-mentioned I/O capacity.

The I/O modules of a station can all be mounted on a single rail or be distributed across several, in the latter case using plug-in interconnecting cables.

These alternatives make S800 I/O fit a wide range of standard wall-mounting and floor-standing enclosures. A fiber-optic Modulebus even makes it possible to break up S800 I/O stations into clusters installed hundreds of meters apart. A cost-effective and noise-immune way of implementing distributed control.

There are inputs and outputs for industry-standard d.c. and a.c. signal levels and devices, including resistance-temperature sensors and thermocouples. There are even pulse and frequency counters as well as intrinsic safety supporting modules. So just about all the process devices we can think of can be wired up to S800 I/O stations with a minimum of field cabling and intermediate signal conditioning.