Advant 800xA | Advant OCS | Bailey Infi 90 Bailey Net 90 | Contronic | Master | Procontic Procontrol | Taylor MOD 30 and Mod 300

Distributed Control Systems for Industrial Automation

ABB

Product PDF
Presented by – DCScenter.com

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Reaching new levels of productivity with System 800xA

You're under more pressure than ever before to run your operation profitably – to achieve greater results with fewer resources.

Extended automation
System 800xA's 'xA' stands for Extended Automation and utilizes the Industrial IT architecture which was built for integration in a fully redundant, reliable environment.

System 800xA extends the reach of traditional automation systems - beyond control of the process - to increase energy efficiency, asset utilization, energy savings and operator effectiveness.

The power of integration
In order to be competitive, various plant entities, departments and personnel have to work as one flexible, integrated, collaborative team. For this to be accomplished, an automation platform with incredible connectivity capabilities is necessary. Integration of systems and applications where all actionable information is available for use in the system can be provided to users in a variety of roles.

System 800xA Extended Automation is an integration platform with unparalleled connectivity to enterprise and plant systems, applications, and devices that improves operations, engineering, control and maintenance and provides a collaborative environment where real-time decision making is a reality. This is the Power of Integration.

Support for life
ABB's superior lifecycle policies, services and products ensure the highest possible return over the entire life of the system.

System 800xA is the latest installment on ABB's 25+ year commitment to our DCS users. Our pledge of evolution through enhancement ensures that future advances in systems technologies will enhance rather than compromise your current investments.

Where others promote "rip and replace" migration strategies, we deliver true system evolution, allowing you to build on your strong DCS foundation.

System 800xA Extended Automation
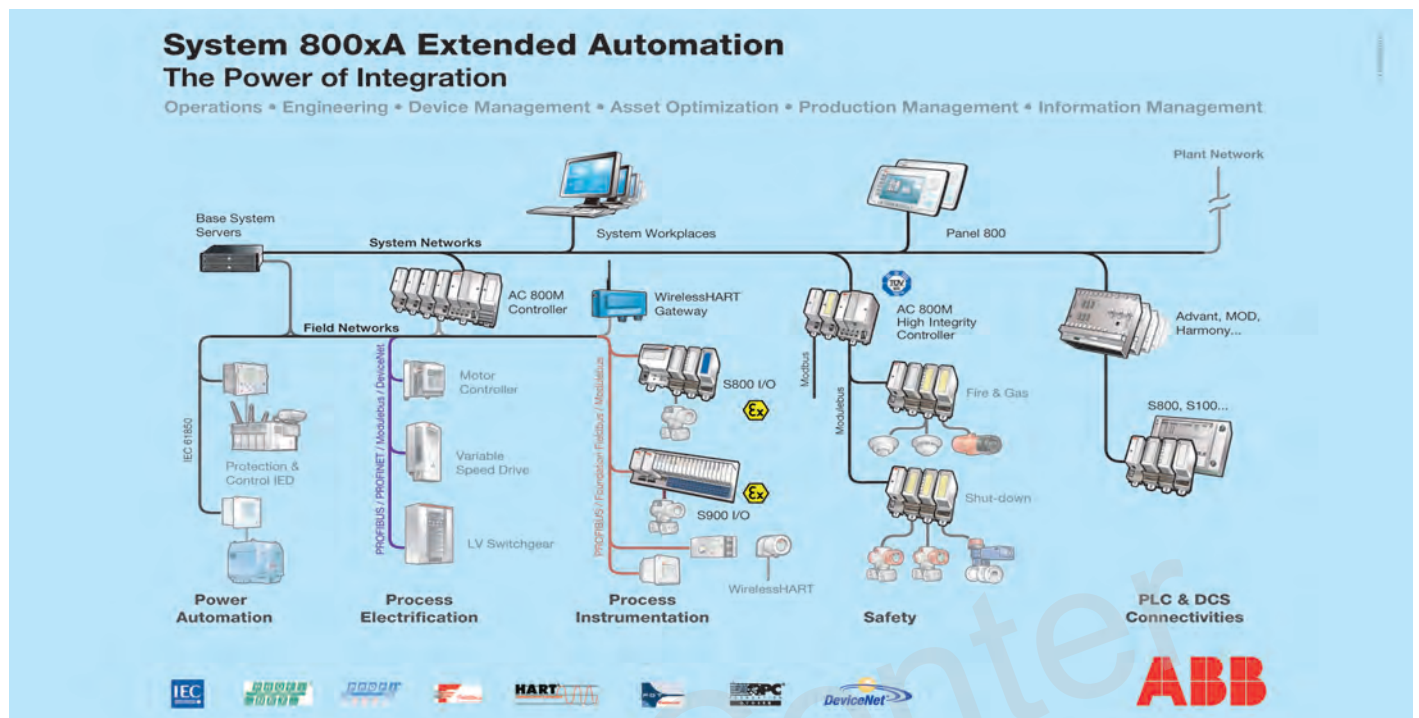
System 800xA Extended Automation was built for integration

System 800xA - The Power of Integration
Removing the barriers of traditional distributed control systems, System 800xA provides the integrated environment that is required to increase productivity while reducing risk and total cost of ownership.

System 800xA dramatically improves plant-wide productivity through the following powerful, integrated core functions.

Operations
800xA Operations, the industry's most intuitive system interface, provides a consistent method for accessing enterprise-wide data and for interacting with multiple applications from any connected workstation in the plant or office.

Engineering
System 800xA's integrated engineering environment efficiently supports the complete lifecycle of the automation project, from planning, through configuration and library management, to commissioning and operation to minimize system ownership costs.

Safety
A complete, scalable IEC 61508 and IEC 61511 compliant SIS (Safety Instrumented System) that spans the entire safety loop, including SIL rated field devices, I/O modules, controllers, and field actuators. Powerful system functions as well as operator and engineering tools reduce plant risk through management of the human factor.

Knowledge management
Powerful knowledge management software collects, stores, retrieves and presents current and historical process and business data to support reporting, KPI visualization, and analysis.

Batch management
800xA Batch Management's enterprise level planning coordinated with production system scheduling provides the agility, speed, and the quality control needed to respond to increasing production demands.

Asset optimization
Asset optimization software exploits the wealth of plant resident information to monitor, assess, and report equipment conditions in real time to reduce costly corrective and preventive maintenance and optimize maintenance and calibration work flows.

Control and I/O
Comprehensive suite of standards-based hardware and software meets the needs of total plant control. Controllers are complimented with a full line of industrial I/O interfaces to meet all plant environments.

Device management
Support of digital fieldbus standards and intelligent device management provides significant cost savings throughout the design, implementation and operation of field equipment.

Promoting collaboration

Process and power automation

Process automation and electrical integration is the next frontier in delivering a unified environment that will drive improvements in productivity, increase safety, and reduce costs. With the growing number of complex plant system interfaces and fewer employees to maintain such systems, a need for one system to serve both process automation and electrical applications has arisen. The next generation of plant operators will no longer make decisions based only on voltages and temperatures but on dollars and cents. For example, Shell Oil has realized a 20% productivity improvement through improved operator visibility of entire plant assets. Only ABB can deliver the power of one fully integrated control system.

Electrical integration and the process control industry

Typical process control plants can be divided into three areas: Process Control, Process Electrification, and Power Distribution and Management. In the past, each of the areas has been handled by separate systems with unique communication protocols. Today, ABB seamlessly integrates the three areas to make their information available to all other system functions. ABB has created a solution with System 800xA that integrates electrical control with process control within a plant by taking advantage of the IEC 61850 standard.

Is process automation and electrical integration for me?

Different industries have different objectives for electrical integration. The oil and gas industry wants to maximize production by keeping the process running. Load shedding during power interruptions is critical. Pulp and paper, steel, aluminum, and cruise ship industries consume large quantities of energy. They need to manage electricity as a raw material cost through peak shaving and power consumption prediction. All industries are looking for ways to lower installation, engineering, and lifecycle costs with simpler more efficient system designs.

## System 800xA and IEC 61850 communications

There is a distinct advantage when using System 800xA with the IEC 61850 integration. System 800xA's AC 800M controller is transformed into an Intelligent Electrical Device (IED). As an IED, the AC 800M communicates horizontally with other IEC's using the GOOSE protocol for the fast time-critical data.

Benefits of integration

The benefits of process and power automation integration include:

– Single system that promotes collaboration and operator effectiveness
– Total plant visualization through a single controller and HMI for DCS and ECS
– Common supplier of automation and electrification needs
– Consistent strategy for asset management
– Enhanced visibility into power consumption

ABB's unified approach combines process control, process electrification and power management
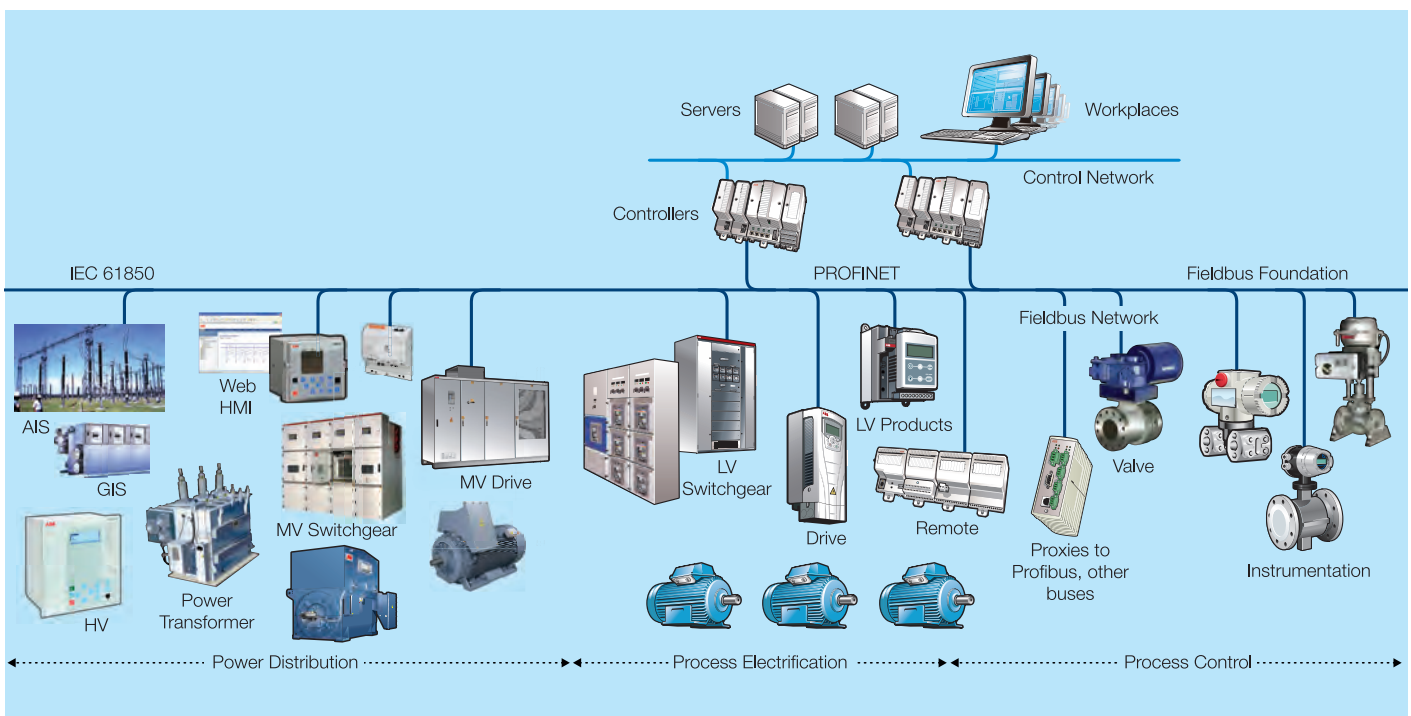
Achieving seamless control through

Traditionally, production facilities maintained many controller subsystems; each meeting specific plant needs. However, as business goals have changed, using a scalable controller platform possessing multi-functional capabilities, adaptability to changing requirements, openness, and maximum availability, is critical for success. The System 800xA family of controllers, communication interfaces and I/O modules match the most challenging requirements in all these areas.

High performance controller

System 800xA's flagship controller, the AC 800M, has the ability to integrate various networks, fieldbuses, serial protocols, and I/O. It provides seamless execution of advanced and process control strategies as well as safety, electrical, quality control, and power management applications.

The latest controller in the AC 800M family is not only significantly faster with more memory than earlier models, but easier to engineer as well. This provides significant value in large applications when a centralized approach is required.

Comprehensive communications protocols

Designed from the ground up to leverage the power of industry standard fieldbuses and open communication protocols, System 800xA's open architecture allows for the easy integration of a wide variety of devices and systems. This extensive portfolio of modules enables seamless integration of fieldbus devices, traditional technology controllers from ABB and 3rd parties, as well as electrical equipment. Extended automation solutions such as integrated process and power automation are now easily engineered and deployed and can leverage both the 800xA applications and hardware (IEC 61850 communications module).

System 800xA I/O provides a wide variety of input/output and signal conditioning capability

Flexible I/O options

System 800xA I/O, available for local and remote mounting, provides a wide variety of input/output, ranging from standard analog and digital to HART, FOUNDATION Fieldbus H1/HSE, PROFIBUS PA/DP, PROFINET and IEC 61850 protocol devices. Intrinsically safe I/O, SIL rated I/O, and modular packaging options allow for System 800xA to be installed anywhere in the plant. These protocols enable integration of data and devices from almost any compliant source.

WirelessHART

System 800xA enables customers to utilize technologies such as WirelessHART to more easily capture diagnostic data as well as access wireless process variables. System 800xA's integration platform enables users to acquire WirelessHART diagnostic and process data and use it within any System 800xA control or monitoring application. Asset optimization features can be used to support advanced maintenance strategies and improve device performance.

System 800xA's WirelessHART integration, combined with ABB Instrumentation WirelessHART adapters and Wireless consulting services offerings, delivers the complete package necessary to help customers implement a solution tailored to their needs.

System 800xA supported communication types	
Serial communications (CI853)	MODBUS TCP (CI867)
PROFIBUS DP (CI854A)	PROFINET (CI871)
FOUNDATION Fieldbus (CI860)	IEC 61850 (CI868)
Ethernet/IP (CI873)	MasterBus 300 (CI855)
S100 I/O (CI856)	TRIO I/O (CI862)
Satt I/O (CI865)	INSUM (CI857)
DriveBus (CI858)	

integrated fieldbus communications

Vertical device integration

System 800xA provides device integration through numerous communications gateways and protocols. This enables the process and diagnostic data from the field devices (instrumentation, drives, IEDs etc.) to become part of the 800xA system making that data available for all integrated applications. There is significant value in having this diagnostic data available real time for an operator trying to diagnose a problem.

Some of the specific communications modules supported by System 800xA include:

IEC 61850

IEC 61850 defines interoperable function blocks which communicate over a network with other functions regardless on which suppliers' device they are implementing. System 800xA's IEC 61850 communications module is a key addition to AC 800M communications that enables users to finally optimize the use of their electrical subsystems within a facility relative to the power utilization required by the process manufacturing needs in real time.

Foundation Fieldbus

System 800xA's support for Foundation Fieldbus (FF) includes both HSE and H1 networks. Foundation Fieldbus offers the unique capability to fully distribute control into the field

devices with the use of function blocks similar to those used in most DCSs today. System 800xA is the only DCS that offers a full implementation of FF HSE and FF H1 that provides significant benefits to the user unmatched by a direct FF H1 only solution. These include:

– No controller requirements
– Further wiring reductions
– Elimination of peer-to-peer data sharing
– Flexible architectures for FF with robust communications
– Separated control and field device networks for independent commissioning
– Virtual signal marshalling concept – not tied to individual controllers
– Ability to withstand higher noise levels especially for communications between H1 links
– Built for "Control in the field" without being restricted to one H1 link

System 800xA not only provides freedom of choice of fieldbus protocol, but of Foundation Fieldbus networks as well.

Profibus/Profinet

PROFIBUS DP & PA are used for many applications including remote I/O with S800 and S900 products, connectivity to PB/PA devices like transmitters and valves, and solutions with AC & DC drives.

Available in the latest System 800xA release, PROFINET now provides many of the features of PROFIBUS DP on an Ethernet backbone using the same tools and seamless connectivity features users of PB/DP & PB/PA already know. PROFINET is one of the key networking infrastructure protocols that users will have to integrate a wide range of automation networked products and solutions.

Ethernet IP / Device Net

Also in the latest release of System 800xA are Ethernet IP and Device Net communications modules. EtherNet/IP is the TCP/IP Ethernet extension of DeviceNet (and ControlNet). In addition to the speed increases achievable with Ethernet, the protocol also includes standard object and device models to simplify the communication message structures. A primary application of EtherNet/IP within System 800xA will be to provide high speed connections to PLC's and Motor Control Centers (MCC's) that use this protocol.

System 800xA supports multiple communication modules
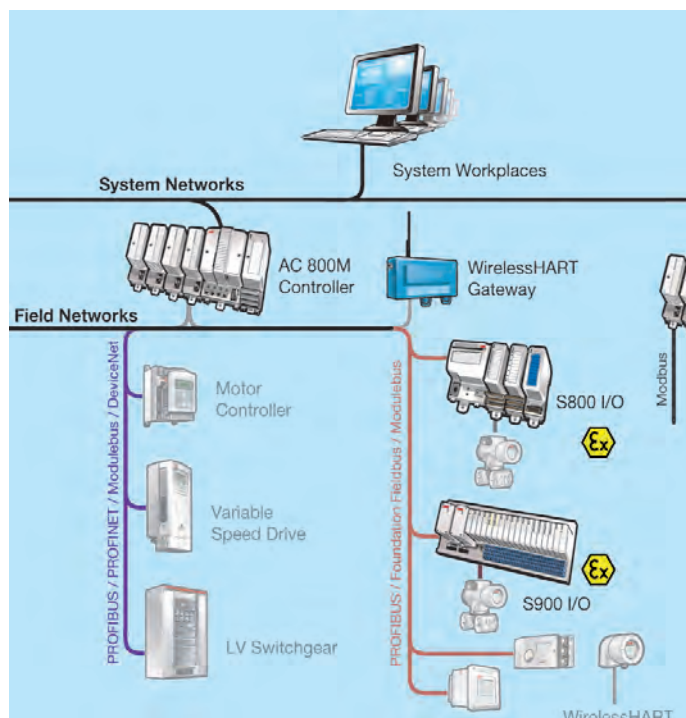
Providing a flexible evolution path...

Continuous productivity improvements and increased profitability are the driving forces behind the selection of today's automation systems. Traditionally, production facilities maintained many controller subsystems; each meeting specific plant needs.

However, to succeed in today's changing business environment, you need a controller possessing multi-functional capabilities, adaptability to changing requirements, openness, availability, programmability and maintainability.

Installed base compatibility

System 800xA builds upon the leading brands and technologies that have made ABB number one in automation systems installed base. This includes control and I/O compatibility for most installed systems from ABB, Bailey, Hartmann & Braun, Taylor, Fischer and Porter, and Alfa Laval Automation. The result: maximum leverage from installed components as you evolve to new functionality!

System 800xA supported controllers

AC 800M series	AC 870P series
Advant Master series	MOD 300 series
Freelance series	Melody series
Safeguard 400 series	SATT & Sattline series
Symphony DCI series	Symphony Harmony series

With the largest installed base of traditional DCSs in the world, ABB has designed the 800xA system to allow for implementation with its entire line of control and I/O products

Expanding functionality

By evolving to System 800xA, the traditional system functionality can now be extended to include asset optimization, alarm management, and knowledge management capabilities. Certified hardware and applications from ABB and 3rd parties provide additional value for the installed base including Advant Master, Symphony Harmony / INFI 90, Symphony DCI, Freelance, Contronic, and MOD 300 control systems as well as the latest AC 800M series controllers.

ABB offers evolution paths for the installed base through its common HMI (System 800xA Operations), controllers and I/O subsystems. Controller level peer-to-peer communication between traditional and AC 800M controllers allows for the incremental evolution and expansion to System 800xA. In addition to its products, ABB has an evolution services division that offers its customers low risk evolution programs to System 800xA including hardware, software, application upgrades, modernization and implementation.

Traditional "rip and replace" upgrades	ABB control library for AC 800M upgrades
Re-engineering or translation of control applications	Minimal to no engineering required
New algorithms result in new process control behaviors	Process control is same as before
Long commissioning and startup periods	Minimal commissioning and startup
Create new documentation	Documentation converted and enhanced
Results in:	Results in:
– Greater loss of production	– Minimal loss of production
– Increased risk	– Minimal risk
– Higher project costs	– Lower project costs

Comparison of evolution strategies

Control libraries

ABB is committed to providing its system owners with extended automation solutions while protecting the capital equipment and intellectual property investments made in their installed systems. Control libraries are one of the solutions ABB offers for protection of investment in control applications. These libraries allow for step-wise evolution of control configurations to System 800xA using the same control algorithms as the original system.

In addition, an automation control configuration conversion utility transforms the existing control logic diagrams to like diagrams within AC 800M's graphical engineering environment. Through the use of these libraries and the conversion tools, traditional system owners can evolve their control strategies to the latest technology without the project costs or production risks associated with 'rip and replace" control upgrade methods.

Investment protection

ABB's automation solutions help sustain and extend your control system to meet today's business challenges. We are focused on keeping your system as vital and productive today as it was the day you bought it. This dedication is realized in a number of ways. ABB has:

– A defined lifecycle support policy
– A history of providing a forward evolution path for all of our systems
– New technology that seamlessly integrates with and enhances our existing systems
– Tools and libraries that convert existing graphics, control code and documentation
– The lowest risk solution for the life of your system

Stepwise execution

ABB's evolution strategy is realized through our lifecycle programs ensuring that your control system is always current and serves your business needs. We are committed to working with our customers through our evolution planning and execution process to ensure that you can:

– Make informed decisions
– Better control lifecycle costs
– Extend the life of your existing automation systems
– Remove uncertainty to create predictable budgets
– Eliminate unplanned upsets and trips due to system interruption

Through ABB's evolution strategy, lifecycle policy, software management, and evolution planning programs, our installed automation systems remain viable and sustainable.

The power of integration: evolving to System 800xA

At the core of System 800xA is its integration platform. It is this platform which enables ABB to provide a powerful evolution path for its large installed base of control systems to System 800xA Operations. There are significant benefits in evolving to the latest hardware and software versions if you own one of ABB's traditional control systems. However, these benefits extend even further when integrating other equipment such as 3rd party controllers and PLCs. Once all areas of a plant / unit are controlled by and visualized within System 800xA, operators will become more effective, maintenance and troubleshooting will become easier and collaboration for real-time decision making will become standard good practice.

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