

# SYMPHONY/DCI Enhanced with Industrial<sup>IT</sup>

The Enterprise Management & Control System  
for Optimizing Process & Business Operations



# Reaching New Levels of Productivity

Within ABB's new family of integrated software and hardware solutions – collectively known as Industrial IT – the ABB SYMPHONY™ DCI Enterprise Management and Control System positions customers to optimize process, plant and enterprise operations. While reaping the benefits of the innovative, enhanced Industrial IT *strategy*, customers will retain both the process security and the value of their new or existing SYMPHONY DCI *system*.

SYMPHONY DCI enhances the real-time sharing of knowledge between related, but divergent, enterprise operations. Fully equipped with an integrated set of decision-making tools, Industrial IT makes it possible for real-time information to be shared – and its value compounded – throughout an organization. The result is better and faster decisions that optimize company assets, whether people, raw material, process, or infrastructure.

## Open Architecture for Seamless Integration

Industrial IT applications are designed to be used as stand-alone or integrated solutions, enabling the flexibility to implement the required functions today and the agility to add on as needs evolve. ABB's diligent use of open standards simplifies the task of interfacing with existing automation and information systems, while the proven SYMPHONY DCI progression ensures an additional layer of established investment protection.

## The Evolution Continues...

Industrial IT is the latest installment on a 20-year commitment that ABB has honored with its DCS users. The company's pledge of *Evolution through Enhancement* ensures that future advances in system technologies will not compromise the customer's current investments. While other vendors may talk about investment protection, ABB's proven program is truly unique in the industry. All told, from the introduction of DCI-4000 in 1979, through each of the evolution steps of DCI-5000, DCI System Six and SYMPHONY DCI, to the introduction of Industrial IT, this family of systems represents a significant contiguous installed base of process automation systems in the world – an installed base exceeding USD \$1 billion!

## A Global Leader

Today, *Evolution through Enhancement* has expanded to include the latest products and services from the world's largest automation supplier; including instrumentation, analytical devices, meters, robotics, drives, motors, machines, manufacturing execution systems, and control products and systems. Backed by common Industrial IT technology and industry specific expertise, ABB's automation portfolio provides the seamless link between process and business management to deliver knowledge-based solutions.



**Industrial<sup>IT</sup>**

today

**symphony<sup>TM</sup>**

1997

**Bailey.  
DCI SYSTEM  
SIX**

1992

Fischer & Porter  
**DCI 5000**

1985

Fischer & Porter  
**DCI 4000**

1979

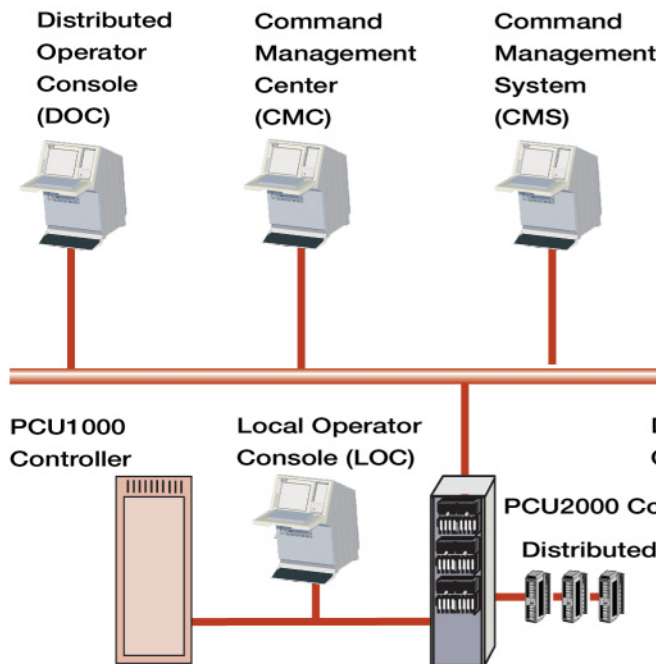
evolution  
*through*  
enhancement

# Two Decades of Enhancements

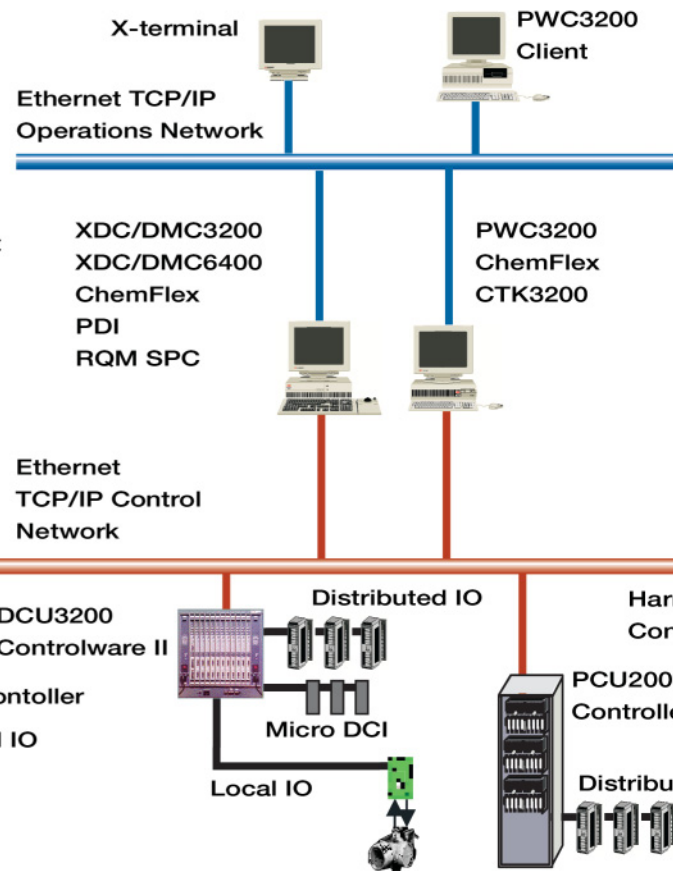
Making real-time business decisions to prevent or limit process upsets requires a consistent infrastructure for data, operations, configuration, and maintenance across the entire enterprise. The foundation of this consistent infrastructure is ABB's Aspect Object™ technology provided by the Aspect Integrator Platform (AIP) component. Every Industrial IT software product is based upon the AIP component. Symphony DCI fully participates in an integrated Industrial IT

environment by leveraging the full power of the Aspect Object technology by employing an open, enterprisewide architecture that supports a seamless communications fabric to every level of control – from field I/O to plantwide and multi-plant systems. SYMPHONY DCI essential security and proven availability at the control level are integrated with enterprise network strategies for total enterprise communication.

## DCI-5000 Control System



## DCI System Six Control System



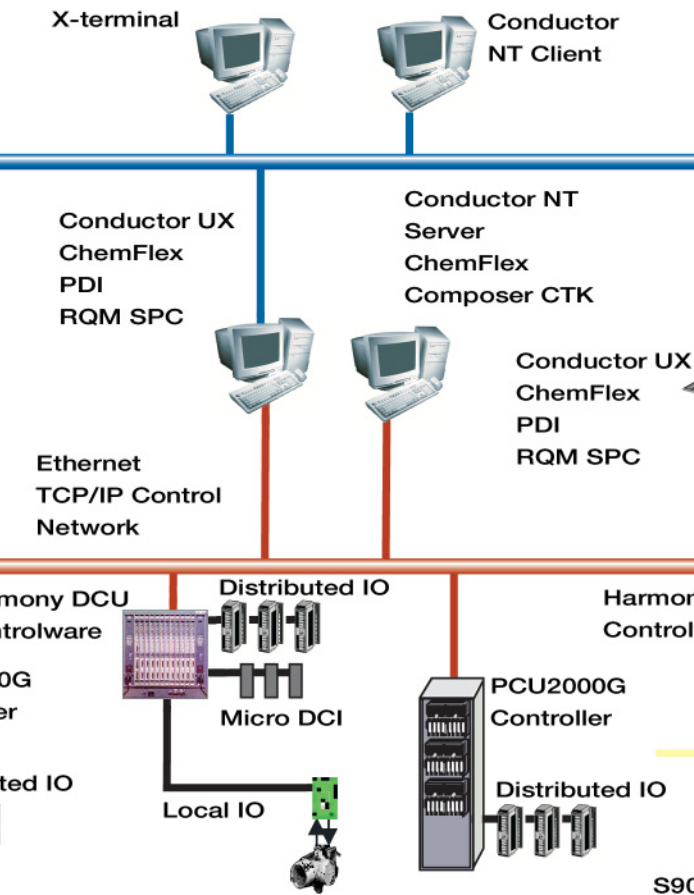
1985

1992

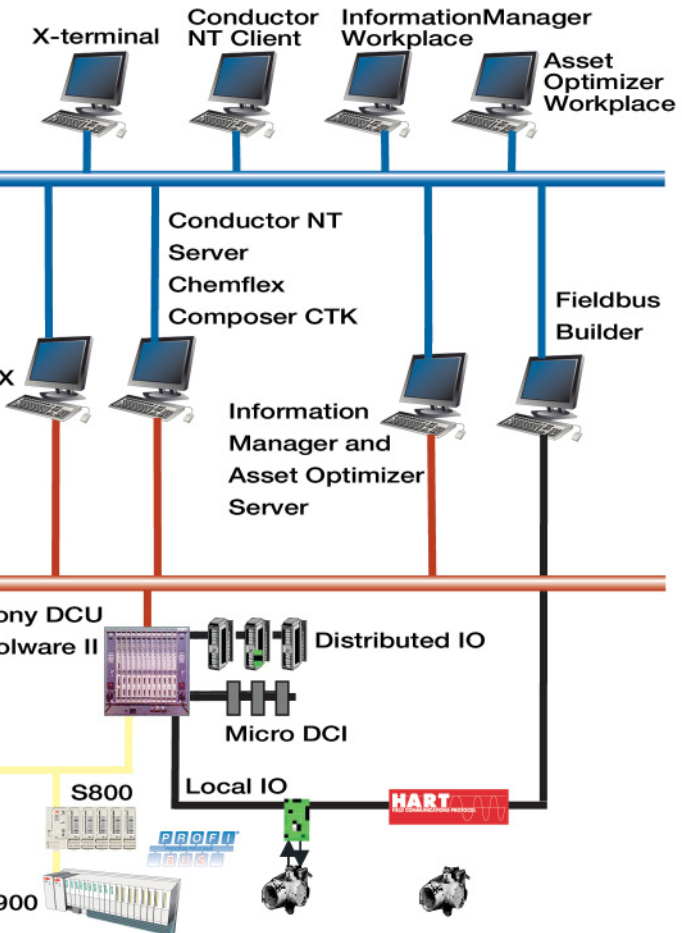


The scalable SYMPHONY DCI architecture allows for easy integration of ABB Industrial IT components, such as Operate IT, Produce IT, Inform IT, and Optimize IT. In addition, non-traditional DCS functional areas, such as field device management and PLC controls, simply “plug-and-produce” in the SYMPHONY DCI architecture via other ABB Industrial IT components, such as Engineer IT and Control IT.

## Symphony DCI Control System



## Symphony DCI Enhanced with Industrial IT



1997

2003

# Powerful Tools for Enterprise Management and Control

ABB's Industrial IT with SYMPHONY DCI solutions reach beyond the traditional boundaries of distributed control systems to support the platform, application and professional service needs of total enterprise management and control.

SYMPHONY DCI's multi-tiered span of control provides a secure foundation with robust, but flexible, base level regulatory and sequence control. Solutions continue through the full range of higher level management and advanced control functions to include: flexible batch production management, maintenance management, simulation, historian, and network management. The integration of these powerful features is achieved through SYMPHONY DCI's integrated "plant-centric" architecture. Embodied in the principles of open, real-time

networking, the SYMPHONY DCI architecture provides a scalable communications fabric that spans and integrates loop, unit, area, plant, and interplant controls.

Industrial IT with SYMPHONY DCI dramatically improves enterprisewide productivity through four powerful, integrated classes of products:

*Harmony Series Area Management and Control Products* – a comprehensive set of traditional process, regulatory, sequence and batch control services and I/O interfaces

*Composer Series System Engineering Tools* – an integrated suite of engineering and maintenance tools designed to support the complete automation project, including network administration, configuration management, library management, commissioning, and operation

*Operate IT/Conductor Series Human System Interfaces* – a range of console products for accessing and viewing data from multiple operating environments, from process control and I/O to plant and enterprise information

*Industrial IT Plant Optimization and Information Management Solutions* – a powerful suite of products and services for plant management and control focused on increasing asset utilization and on optimal management of plant capacity







**Plant Optimization  
& Management**



**Engineering, Operation  
& Maintenance Tools**



**Human System  
Interfaces**



**Area Management  
& Control**

# Control Products



The Harmony DCU is a proven, robust, and reliable platform that integrates microprocessor-based controllers and I/O boards with flexible control software to handle a wide range of applications. Thirty-two bit processing, coupled with modular scalability, make the Harmony DCU a powerful and versatile performer.

The Harmony DCU is available as a rack-mounted frame assembly that houses key system components, including the controller and local frame mounted I/O modules. The controller board also supports redundant Ethernet™ TCP/IP network communications for interfacing with other controllers and computer applications. A modular power system provides efficient, replaceable power for both control and I/O functions. The Harmony DCU is designed with one-to-one selective redundancy as an integral concept, providing the control system user with the highest level of availability.

The Controlware II software used by the Harmony DCU features an extensive library of over 200 pre-defined advanced control algorithms and user-definable functions.

These functions provide the power to easily configure complex control strategies to fit any control application including continuous, sequential, batch, and advanced control. Controlware II also supports CCL, a powerful structured text language for implementing advanced strategies for batch and multi-variable control. The multifaceted Harmony DCU communicates simultaneously with numerous serial device communication protocols as well as Profibus DP.

The Harmony DCU accepts a wide variety of I/O from local frame mounted and remote modular form factor options. Both form factors support signal conditioning capability, ranging from standard analog and digital I/O to specialty I/O like pulse. Frame mounted redundant I/O uses common field-wired connections per channel and provides a high level of I/O availability. Modular I/O, located as far as 2 miles away, communicates to the DCU via redundant Profibus DP network trunk lines at up to 12 Mbaud using S800 I/O. S900 I/O can be used for hazardous applications.

Symphony DCI's control products support ABB's *Evolution through Enhancement* strategy by providing backward compatibility with DCU3200 control processors with the ability to fully execute their control strategies. Tools to migrate previous generation DCI-4000 and DCI-5000 Controlware software to Controlware II enable cost effective migration towards the Harmony DCU. The addition of Industrial IT components, when used for non-traditional DCS plant control applications such as AC800 for motor controls and remote terminal unit (RTU) operations, complement the Symphony DCI system. Data exchange between these areas of control is facilitated at both the controller and operator interface level through an OPC data link connection.



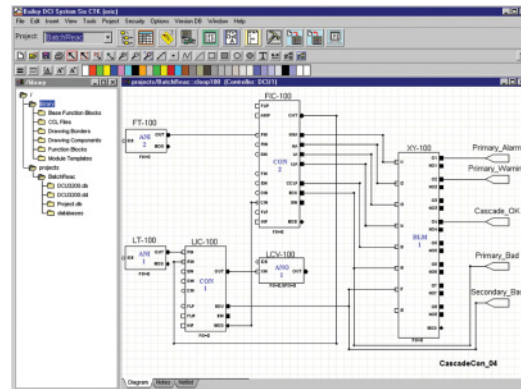
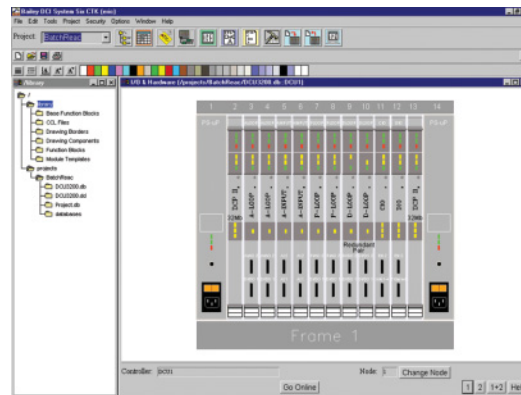
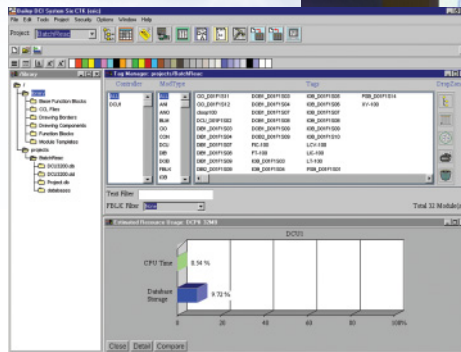
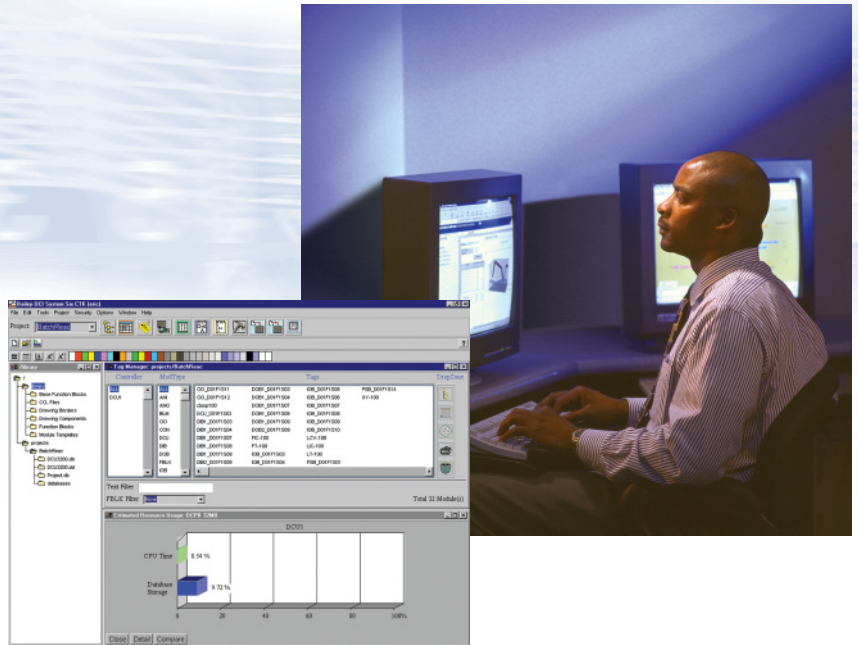
# Engineering Tools

To ensure that the SYMPHONY DCI system can be efficiently configured and maintained, ABB has designed a comprehensive suite of Composer Series tools supplied in a Configuration Toolkit (CTK). The toolkit provides a visual environment for easy configuration of control system strategies, global configuration databases and operator interface graphics, and manage system libraries of reusable software components.

The working environment of Composer CTK simplifies the configuration and maintenance of SYMPHONY DCI systems by providing a standard Microsoft® Windows environment, which enables the user to easily explore the current system configuration and configure new elements. The use of a common system, or project-wide database, eliminates the duplication of data entry and automates the configuration of many interrelated tasks. Composer CTK also provides complete system documentation of the “as installed” and “commissioned” systems.

Composer CTK provides two key features for system configuration. By using a multiuser client/server architecture, they allow configuration information to be accessed, created and modified simultaneously by different users. Composer CTK integrated explorer presents a single, unified view of the SYMPHONY DCI system architecture, and allows the appropriate tool for each system element to be invoked directly from that element.

Consistent with ABB’s commitment to *Evolution through Enhancement*, the Composer Series is designed to integrate with ABB’s Industrial IT products, while maintaining compatibility with SYMPHONY DCI systems. Planned integration with other components of ABB’s Engineer IT suite will allow Composer CTK to further enhance design and maintenance efficiencies throughout the enterprise.



# Operator Interface



## Conductor Series

Conductor provides an incremental series of platforms for operator interface that complement the inherent functionality of the control system with the basic suite of operator directed features and functions. These versatile features and functions are ergonomically designed to facilitate process monitoring, control, fault mitigation, and optimization. They provide system users with expanded dynamic access to all plant-wide or enterprise-wide information through open system connectivity.

For DCI Systems, two Conductor operator interfaces are available: Conductor NT and Conductor UX. Both of these products provide the same managed multi-windows user experience with the only notable difference that Conductor NT is Windows based while Conductor UX is Unix based. These reliable yet flexible operator interfaces have a proven track record for providing secure and up-to-date information for plant operations, maintenance, and management access. Meeting the traditional needs for plant automation control, Conductor

supports hierarchical displays for summary, group, and point displays, custom process graphics displays, trend displays, alarm review displays, event history displays, automatically generated system status displays, spreadsheet style reporting, and open data access via DDE with @aGlance.

Conductor also provides for the highest in process availability with automatic redundancy built-in when used with the DCI system. Any change made in one server can automatically be synchronized with another. If one server should fail, the other is already in operation and able to automatically take over the management of those clients that were attached to the faulted server.

In an era where network accessibility can potentially lead to unauthorized access, it is critical that a control system provide the necessary tools to mitigate such access. Conductor, with the Harmony DCU, combine to provide a flexible yet intuitive security system. Layered within Conductor is a nine level security system focused towards process automation user accounts for Operators, Engineers, and Supervisors. Users can log-in and log-out of Conductor while maintaining their view of the plant operation. What truly makes this security system unique is that every attribute in the Harmony DCU such as a set-point, a controller operation mode, or a start command, is associated to one of the nine level security accounts. Even if an unauthorized user gets access on the Ethernet, the Harmony DCU provides a last line of defense by validating the user access level against each attribute access level. Only users with appropriate access can effect a change to the controller attributes.

Included within Conductor is a data historian that collects and stores data for use by it's own trends and reports, and for external data access. This historian provides a cost



effective solution for typical operator interface needs without demanding the purchase of a high-end historian. The historian can collect data for periods of weeks or months and provides a manual or scheduled archiving function. Automatic backfill of data takes place when an offline historian recovers and is brought back online.

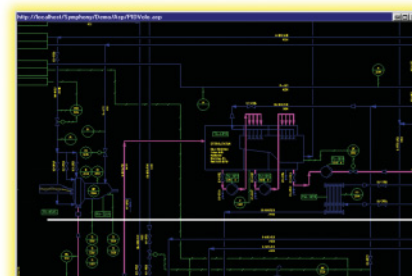
With the flexibility and power of Conductor, it is no wonder that users today already understand that they have a system that is enhanced by Industrial IT.

## Operate IT Process Portal

Process Portal is a feature rich web-enabled operator interface available today for many ABB control systems that is also planned for use with DCI Systems in the near future. Designed as a native Windows based product, Process Portal provides a managed windows workplace supporting its users with intuitive navigation and compatible integration with other ABB and third-party web enabled applications, allowing users to efficiently access and monitor information flow through the control system, the process, the plant, and the entire enterprise. As part of an open system, Process Portal embraces OPC™ to provide a standard interface method with third party devices, and incorporates OPC client connectivity.

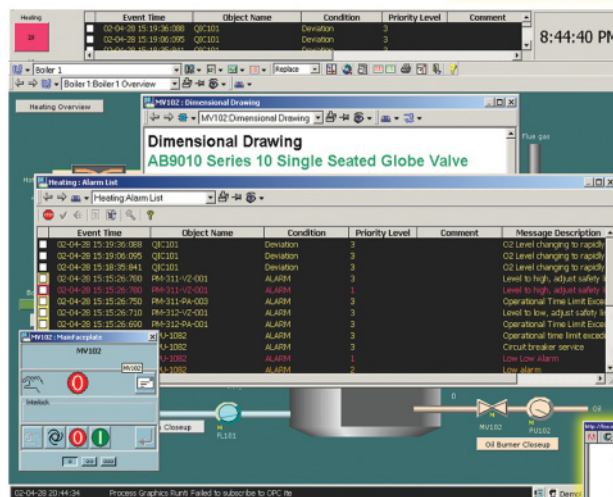
Process Portal supports the full spectrum of plant and enterprise personnel needs including graphical user interface, process data collection, storage and analysis tools, an advanced alarm management system, a comprehensive historian, and

an advanced reporting package. Through the use of ABB's unique Aspect Object™ technology, Process Portal provides integrated information access and sharing, intuitive navigation and efficient engineering. Aspect Objects represent a physical or logical part of the automation installation, such as a valve or pump, but also combinations of them. All information, or aspects, belonging to those objects is configured once and is consistently available to the operator by a right mouse click no matter where or how the aspect object is represented in a graphic, in a trend, in an alarm list, or in a third party application like a Word document.



CAD specifications

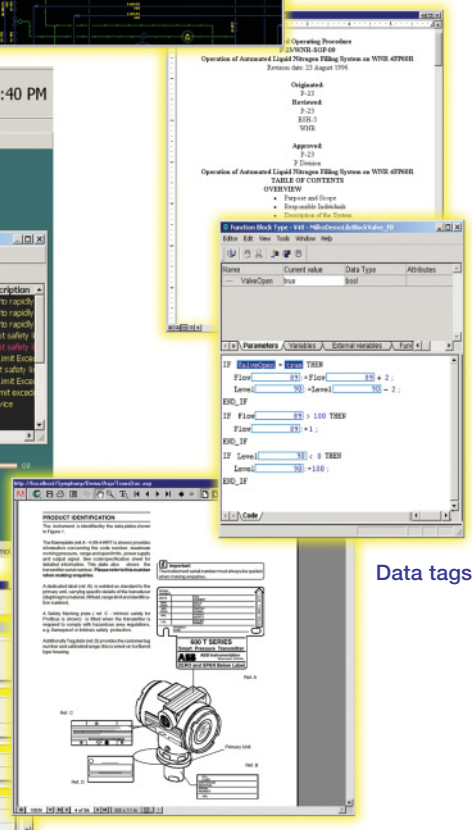
Word documentation



Operators gain the advantage of single-click access to information-rich aspect views...



ERP interfaces



PDF technical documentation

# Data Management

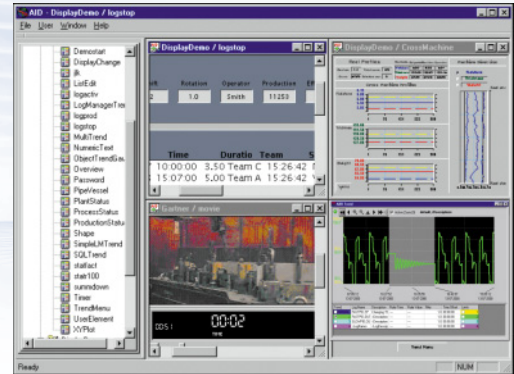
To achieve true enterprise automation, Industrial IT with SYMPHONY DCI components go beyond traditional process control to tightly integrate both control and management functions from the plant floor to the executive staff. To achieve this increased span of control, ABB offers a suite of plant management and control products, ranging from plant information management to plant optimization applications.

Industrial IT plant management and control products improve enterprise productivity by:

- Providing secure, tightly integrated base regulatory and sequential controls
- Scaling advanced control across a range of technologies
- Facilitating process information propagation throughout the enterprise
- Providing for both adaptive and predictive decision support practices
- Supporting E-commerce and B2B strategies with real-time enterprise data
- Imparting protected web access when and where appropriate

## Advanced Control for Increased Efficiency

Advanced control packages provide optimum production management solutions. From multi-variable control applications at the controller level to enterprise spanning Pavilion solutions, Industrial IT delivers a foundation for advanced control techniques in real-time. Backed by industry specific experience and know-how, Industrial IT advanced control applications designed to insure that plants will operate more efficiently, profitably and competitively.



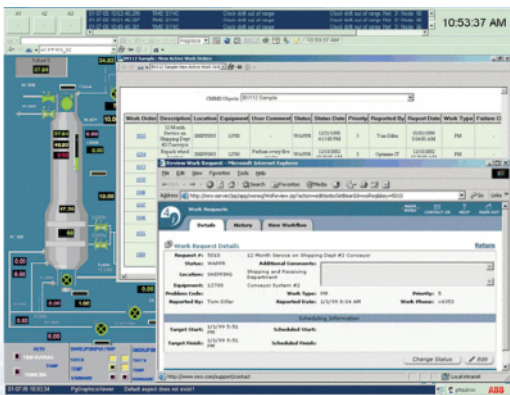
## Inform IT

Inform IT is the key element of information management. Information management is essential for understanding asset performance and designing procedures for optimizing assets over their life cycles. With Inform IT, users increase engineering efficiency by working in a flexible distributed environment offering both high data security and remote access. The platform provides tools to capture, archive, model, and analyze data to create informative reports and to make better decisions.

ABB provides industry specific extensions of Inform IT – such as profile and contour visualization for paper and flat sheet processing – as well as other applications where quality gauging systems are required.

Process Information Web Server (PIWS) supports controlled intranet information access across the enterprise. PIWS can assist customers who have a constant need for process information and status as well as customers with temporary requirements.





## Optimize IT

Optimize IT's advanced optimization solutions address the need for real-time economic optimization in the multi-period, multi-plant enterprise.

*Asset Optimization* includes integration of field instruments to the control system via fieldbus protocols, maintenance triggers, interfaces with maintenance management systems, documentation management, and audit trails

*Process Optimization* provides the means to create and manage process models that have been optimized using a range of solutions. This allows users to address yield accounting, waste, safety, regulatory compliance, and economic issues

*Dynamic Simulation and Training* assists operator training and certification and aids with design validations

*Supply Chain Optimization* includes integrated planning, scheduling and utilization algorithms and decision tools for production of specified component quality and quantity to support E-commerce requirements

## ChemFlex

ChemFlex is a flexible batch automation and management application for use with Conductor series consoles with DCI systems that supports recipe creation / editing, equipment database creation / editing, batch scheduling, unit operations monitoring, and batch reporting. Based upon the S 88 standard and its definitions, ChemFlex supports the visual creation of recipes based on procedures that are linked to phases supported by equipment defined in the equipment database. The visual depiction of the recipe is then used to monitor the

recipe as it progresses from one procedure to the next. Batch records are then collected based upon the unique Batch ID supplied when the batch was scheduled. This data can then be accessed for Conductor reports or by external applications through DDE via @aGance.

## Produce IT

Produce IT Batch provides batch production management solutions available today for many ABB control systems that is also planned for use with DCI Systems in the near future. Produce IT Batch delivers unsurpassed batch-to-batch consistency, quality and productivity. These measurable results are achieved through unmatched level and scope of batch control integrated with scheduling, electronic batch records, operator interface, history, and controllers. Whether a process is manual, automated, or both, Produce IT batch offers solutions for stand-alone environments or for integrated operation with ERP, DCS, etc.



## Linking Process Control with Enterprise Management

Enterprise Production Management Software capabilities permit facilities to link process control with enterprise management and other information systems to support regulatory compliance and collaborative commerce, facilitate decision-making and permit optimal capacity utilization and supply chain management. Offerings are available for both Windows and UNIX platforms.

These Industrial IT optimization technologies can be added to a customer's SYMPHONY DCI system today, helping to achieve the competitive advantage necessary to operate in the dynamic global marketplace. ABB leverages its expertise in various industry segments to offer customized optimization applications and products to power utilities, water and wastewater, pulp and paper, chemical processing, hydrocarbon processing, and other industrial markets.

# Global Support & Services

As a leading global provider of industrial asset and optimization services for power and automation systems, ABB maintains a unique position to offer innovative and diverse solutions for improved facility performance and effective maintenance systems management. With an unparalleled scope of automation products, systems and services, we provide performance-based service packages that increase production, reduce maintenance costs and improve return on existing assets.

## Asset Management Services

ABB Asset Management Services move beyond a cost-cutting approach, offering customized performance-based services focused on a specific need, an entire asset classification or complete plant maintenance responsibility. Optimizing asset management through outsourcing designed to deliver improved operation and maintenance effectiveness, helps to deliver a lighter balance sheet and increased cash flow, while providing maximum value and profitability.

## Asset Management Services

### Consulting Services

- Plant Performance Benchmarking
- Performance Improvement Delivery
- Cultural Change Management
- Sustainable Maintenance Excellence
- Shutdown Excellence
- Safety, Health & Environmental Excellence

### Total Equipment Management

- Motor Condition Monitoring
- Drive Management
- Rotating Machine Management
- Instrumentation Management
- Control Systems Management

### ABB Full Service

- ABB Full Service™ Partnership Agreements
- Single Shutdown Contracts
- Multiple Shutdown Partnership Agreements

## Product And System Services

A wide variety of services are available locally providing total system as well as tailored user support. From complete management services to just-in-time technical support, ABB offers unequalled services for power and automation systems. Our diverse industry and application knowledge acquired through a strong global presence can benefit your operation through improved overall performance, increased uptime and reduced costs.

## Product and System Services

### Customer Support Services

24x365

- Hardware/Software
- Contract & Demand
- Web, On-line & Remote Services
- Telephone Services
- Upgrades, Expansions & Modifications

### Training Services

- ABB Product Training
- Process & Application Training
- General Technology Training
- Training Contracts
- Training Assessment Programs

### Parts & Repair Services

- Parts Services
- Reconditioning & Repair Services
- Version Management
- Legacy Product Support
- Parts Management Support

### Application Services

- Installation & Commissioning
- Product Application Services
- Product Environmental Adaptation Support
- Process Application Services
- Product Migration Services





## Evolution Services

### StepUp

StepUp Programs provide a cost effective means to migrate to the latest ABB products and help position your automation system for new technology as it becomes available.

This allows you to continuously evolve your system to higher levels of control, operations, information management, and connectivity.

### SoftCare

The SoftCare software management program continuously provides you with immediate access to the latest productivity enabling software. In keeping your software current, SoftCare positions you for the constantly changing industry and IT standards by providing constant enhancements, better integration, and more efficient support.

### Conversion Services

In development of new products, it has always been ABB's philosophy and commitment to provide an evolution path for the installed base. We continue with that commitment by providing conversion and interface services that assist in graceful migration.

These services help simplify the evolution process, reduce engineering cost, reduce installation time, and reduce risk.





**For additional information,  
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