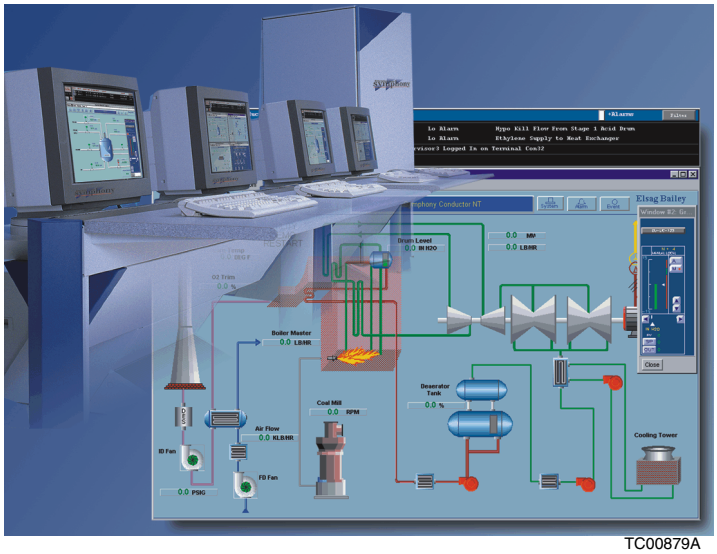
symphony™

Conductor NT
Overview

Features and Benefits

- **Full function human system interface for enterprise management and control:**
  - Process monitoring and supervision.
  - Alarm reporting and management.
  - Trending and tuning.
  - Data historian and archiving.
  - Logging and report generation.
  - System diagnostics.
  - Context sensitive help.
  - Direct communication with Windows™ third-party control devices.
  - Open data export and import.
  - ChemFlex™ batch automation.
- **Optional Advanced security:**
  - Support of 21 CFR Part 11 requirements for Symphony DCI.
- **Industry standards:**
  - Intel® Pentium® III PC platform.
  - Windows® 2000 operating system.
  - TCP/IP protocols.
  - DDE access to industry standard API (@aGlance/IT™).
  - Client/server architectures.
  - IEEE 802.3 Ethernet™.
  - OPC connectivity.
  - ISA™ S88 batch control standard.
- **High performance dynamic color graphics:**
  - User-friendly, intuitive graphic editor.
  - Standard symbol libraries.
  - Animation.
  - Scalable objects and text.
  - Embedded display logic.
- **Ease of use:**
  - Intuitive point-and-click navigation.
  - Object-oriented configuration.
  - Help and on-line documentation.
  - International language support.
  - Integrated utilities.



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Conductor NT is a Microsoft® Windows 2000-based, full featured Human System Interface (HSI). It complements the inherent functionality of the control system with a suite of operator directed features and functions that are ergonomically designed to facilitate: monitoring, control, fault mitigation, and optimization of the process. Conductor NT provides system users with expanded dynamic access to plant-wide or enterprise-wide information. It offers more than just a way for operators to interact with machines. This powerful HSI provides an interface to all enterprise data through open system connectivity.

Custom graphic, alarm review, and historical and real-time trend displays provide users immediate access to process status and operations information. Multiple priority alarms allow efficient response to abnormal transient conditions. Operator configurable displays enable situation dependent groupings of critical data elements. Specially designed Conductor NT displays provide on-line status and trouble-shooting and status diagnostics for Symphony/Harmony, Symphony/DCI and Freelance 2000™ systems. The OPC scanner opens Conductor NT to direct connection to PLCs and other intelligent control systems.

With Conductor NT, an open platform has been created to combine ABB's expertise of process control with a suite of applications developed for the Microsoft Windows 2000 environment. The DDE server introduces and produces a new era of transparent, seamless integration between the worlds of information and process control systems.

ABB

Introduction

Conductor NT represents a major advancement in the domain of integrated process control and management information systems, based on a foundation of nonproprietary hardware, operating system software, and industry standard open-data-exchange technologies. It expands the capability to meet and exceed the demanding needs of the process operator while seamlessly exchanging real-time process information and operations directives with other key members of the operating enterprise. There has been no compromise on Conductor NT performance as an operator-process interface. All of the customary functions such as alarming, logging, trending, reporting, and controls interface have been designed with special emphasis on efficiency, ergonomics, and process security. Conductor NT functions equally well with Symphony/Harmony (INFI 90™ OPEN-based), or Symphony/DCI (DCI System Six-based), and Freelance 2000 technologies.

On-line availability is enhanced by the use of redundant servers. The compatibility between Windows 2000 and abundant third-party applications empowers the information systems integrator with a myriad of solutions for formerly difficult systems control and management situations. Conductor NT is a client/server architecture with object-oriented principles in its basic design. Conductor NT extends this principle into the domain of OPC, employing its fully developed OPC scanner client application to request data from PLCs and other intelligent control systems that act as OPC data servers. The resulting configuration versatility and scalability enables solutions ranging from a single server supporting multiple clients to a single processor client/server unit for small or high reliability applications. The full functionality and design attributes of Conductor NT result in a human system interface that is easy to learn, easy to use, easy to configure, and low in cost of ownership.

Process Monitoring and Control

Process monitoring and control is the prime application focus for Conductor NT. This is achieved by providing process and control status visibility and manipulative access to the process via custom and fixed graphic display representations of the I/O and control functions. The control network (Cnet), a high speed and secure communication network links the Conductor NT to area controllers providing the operator with a continual real-time link to process information and controller functions.

Windowing System

The windowing system allows one to four process windows (Fig. 1) to be shown on a single display or spread across two monitors in either a vertical or horizontal configuration. The user can configure a personalized array of windows to be presented at log-on with up to 15 additional prearranged arrays using the CRT Context feature. Text and graphical objects within the process windows are fully scalable and support TrueType® fonts. This results in smooth and evenly scaled visual elements regardless of the desired window size. Popup controls may be dragged and dropped to adjacent displays, should the operator desire to keep full view of his current display.

User-Friendly

Conductor NT functionality is designed with the operator in mind. There are several operational features that may be configured by each operator according to their personal preferences. For example, the ADP and QuickKey (Fig. 2) features allow the operator to pop up a key pad that can be configured to invoke a specific process graphic or trend display. The software annunciator display panel (Soft ADP) provides popup displays representing up to four panels, each one with 64 function keys. These keys are backlit with either red or amber indication. By coordinating the key's display destination with the alarms or events that backlight the buttons, the operator can be

Figure 1. Windowing System Showing Four Process Windows

quickly alerted to take corrective action with one or two keystrokes. The hardware based ADP is also supported via the computer serial port.

The intuitive, user-friendly, graphic interface provides a consistent, easy to learn and use navigation system for transitioning among process, controller, trend, alarm, log, and utility displays. All operations are performed using a pointing device (mouse or trackball) allowing the operator to focus on the process interface and not the machine interface. Preassigned function keys allow shortcuts for common operator actions.

Conductor NT supports fixed and free-format display hierarchies. The fixed hierarchy of Summary, Group, and Point displays allows the operator to easily navigate the process in a simple repeatable pattern. The free format or custom hierarchy allows any interconnection of standard and custom displays. Custom displays can have any combination of dynamic, faceplate, ISA standard or custom ABB symbols along with imbedded real-time process parameter values. Control faceplates may be viewed from any desired location in the control process graphics.

Logging and Report Generation

Conductor NT has a powerful, intuitive logging and report generation application. There are two logging types: Event and Spreadsheet. Each type may be stored or printed as they occur or as scheduled.

Data Trending and Archiving

Trending

Trend displays (line charts) are one of the most important tools customarily used in operating and analyzing industrial processes. Conductor NT addresses this need by presenting the operator with an extensive set of trending functions and features. Trends may represent minimum, maximum,

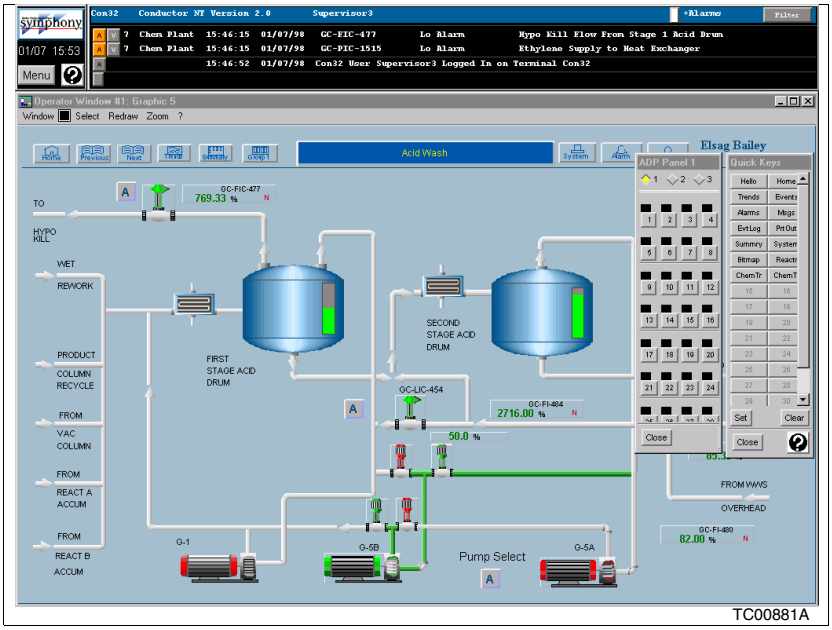

Figure 2. QuickKey and ADP Pop-ups

Table 1. Log and Report Types

Type	Class	Description
Fixed-format	Process alarm System alarm Operator message Operating errors Operating action Priority Area	Reports current and historical events which occurred in a time period. Events include: Process alarms, system alarms, operator actions, diagnostics, and operator messages. Events may be filtered by priority, process area, or type. Event logs can be printed based on a triggering event or scheduled on an hourly, daily, weekly, and/or monthly basis.
Spreadsheet		An optional log which combines the mathematical and charting functionality of EXCEL with data from the Conductor NT historian or directly from the controller via tagname and attribute. This provides the user with a wide range of calculation, format, and reporting options. Custom tailored logs can be easily developed and maintained using a universally understood tool. Spreadsheet logs may be scheduled to execute and print on an event and/or periodic time or event basis.

average, or instantaneous process values. One to eight trends may be shown in a single display. Segments of a trend may be selected and ***zoomed*** to give magnified details of an event or process excursion. A time cursor allows the user to move back and forth in time and display the numeric values corresponding to the cursor's location in time. Traces are easily toggled from view to allow operators to see precise values when traces are in close proximity.

The ***historical database*** is the collection point for data supplied for trending displays, logs and special reports. It supports an extensive data archiving facility. Collection and storage rates, retention spans, and collection type (i.e., Min., Max., Avg., and instantaneous) are assignable. Data may be collected at time intervals ranging from one second to one day. (Provision is made for longer intervals.) Data may be stored with the following calculations: average, minimum, maximum, and standard deviation.

A powerful feature is the historical block database which allows a single identifier for a group of tags (up to 500). These grouped tags may have computations applied with the resultant values stored and accessible for trending and other applications.

Archiving

Archiving capability provides for long term storage of historical trend data on a removable DAT cartridge.

Alarm Management

The Conductor NT alarm management and presentation package assists operators in understanding the severity of abnormal process and system associated state conditions. Dedicated displays, presentation techniques, and filtering controls reduce the alarm overload burden thus enabling operators to concentrate on the highest priority controlling factors associated with the process or system excursion. Vectoring from an alarm message allows the operator to move to any control display in the system with a single mouse click. Sixteen assigned priority levels allow operators to quickly move to the center of the upset. Configurable tones allow the operator to audibly ascertain the importance of the alarm.

Alarm Filtering

Alarms may be filtered at the Mini-Alarm Window according to classification (i.e., process, system event, priority, and area). Each classification has different filtering options. This easy to use classification process greatly reduces operator response times as well as enabling segregation of events on a process unit (area) basis. Operators responsible for multiple units can easily scan and react to alarms exclusively related to the area of interest.

Alarm Inhibit

In addition to filtering individual alarms may be inhibited manually or by other alarms. This feature reduces the impact of alarm showers and nuisance alarms to relieve the burden on operators during upset conditions.

Mini-Alarm Window

Conductor NT is capable of supporting most software packages written for Microsoft 32-bit applications that may be used within an operating enterprise. However, its primary role is that of a process interface where alarms must always be immediately accessible. The Mini-Alarm Window (Fig. 3) is permanently located at the top of the screen. It allows operators to monitor any process and system alarms regardless of the number and type of windows currently on the display.

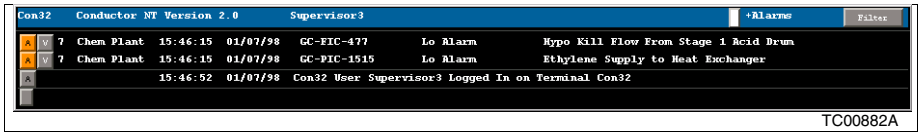

Figure 3. Mini-Alarm Window

Special features include:

- Single click access to any system display.
- Dedicated system alarm acknowledge.
- Operator settable filters to eliminate nuisance alarms.

Alarm Review Display

A complete alarm review display (Fig. 4) is always available to the operator in any open process window by a single point-and-click operation. This display contains a listing of all active or unacknowledged process related alarms in the system. The alarms can be reviewed, sorted, and acknowledged individually or by window. Each alarm can have an associated display that can be invoked via the specific alarm listing. A freeze feature allows the operator to stop fast-moving alarm streams for easy reading. In addition to the alarm review page that is dedicated to process alarms, an event historian is also available for reviewing the last 10,000 system events. System events include not only process alarm occurrence and acknowledgment, but also system events such as a device failure, and operator actions such as making a set point change.

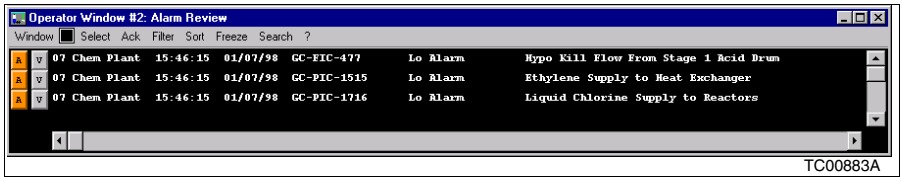

Figure 4. Alarm Review Display

Open Standard Data Export

Any data associated with a real-time or historical tag name within Conductor NT can be accessed by a client running @aGlance/IT client software. This access can be via the Ethernet LAN or an Internet/intranet WEB browser located remotely from the control room or plant site.

Operation and System Security

Conductor NT has a comprehensive password-based security system. The user password (up to seven characters) is assigned to one of nine levels of operational privileges. Each of the levels can be assigned access to all, or combinations of, 60 access functions, some of which are listed below:

- Password assignment.
- Security system activate/deactivate.
- Operator/engineer/supervisor access to Conductor NT functions.
- Process control functions.
- Area access/alarm assignment.
- Priority access.
- Log-on window array.
- Message class.
- 64 QuickKey assignment.
- 16 CRT context key assignments.
- Configure, tune, and view.
- Manual data entry.
- Historical database maintenance access.
- Network device assignment access.
- ADP configuration.

Also supported for Symphony DCI is an optional advanced Security feature that supports 21 CFR Part 11 requirements. Included with this option are password ageing, password minimum length, no-activity time out, expanded audit trail data capture for alarm acknowledge, batch management, and backup/restore action. It also includes batch area re-assignment on unit operations.

Configuration

Conductor NT utilizes object-oriented software making it easy to configure and use. Configuration is done by filling in the blanks. All global operating functions execute on the basis of tag names. A built-in, contemporary graphics editor supports the on-line development of custom graphic displays using static, dynamic, and animated industry standard symbols. Displays may be created or edited and invoked on-line without impacting console functions. Configurations may be backed up or restored via floppy disk, DAT tape, or to Ethernet mounted storage devices.

Batch Automation

Conductor NT (DCI System Six compatible) makes use of ChemFlex, a powerful S88 based batch management software package which provides the tools to configure a batch application, schedule and monitor the execution of batches, and store and document the results of a batch execution. ChemFlex handles the simplest single product, single train processes as well as the complex multi-product, multitrain processes. Batch recipes are developed as graphical representations using an object-oriented approach employing user-definable color-coded recipe procedures that are dynamically updated during batch execution. Automatic recipe version numbering and history removes any doubt as to the origin of a recipe, or whether the latest version of a recipe is being used. Batch events and process data are automatically collected and retrieved on a Batch ID basis.

OPC Client Connectivity

Conductor NT has an optional OPC (OLE for process control) standard-based interface for direct connection to third-party control devices such as programmable controllers, small control systems and other intelligent devices which support an OPC server interface. With this option enabled, the Conductor NT becomes an OPC standard client to devices which support an OPC standard server. The OPC connection is transparent to the user. Processed data is presented and operates exactly as data coming from the Symphony or Freelance systems. User-friendly, interface configuration tools are included with this option.

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