symphony™

Conductor VMS
Overview

Features and Benefits

- **Full function human system interface for enterprise management and control:**

  Process monitoring and supervision.

  Alarm management.

  Analog and discrete trending.

  Data historian and archiving.

  Parameter and event logging.

  System level diagnostics.

- **Industry standard:**

  Compaq® Alpha™ workstation

  Compaq OpenVMS™ operating system.

  Windows NT® and Windows 2000.

- **Open data access:**

  TCP/IP and DECnet™ protocols.

  DDE/OLE access to industry standard API (@aGlance/IT™).

  X Windows™.

  Client/server architectures.

  Ethernet™.

- **Multiple client platforms:**

- Clients (servers in X terminology) can be Windows® based PCs or X-Terminal processors.

- **High performance dynamic color graphics:**

  One-second display call-ups.

  Standard symbol libraries.

  Animation.

  Scalable objects.

- **Ease of use:**

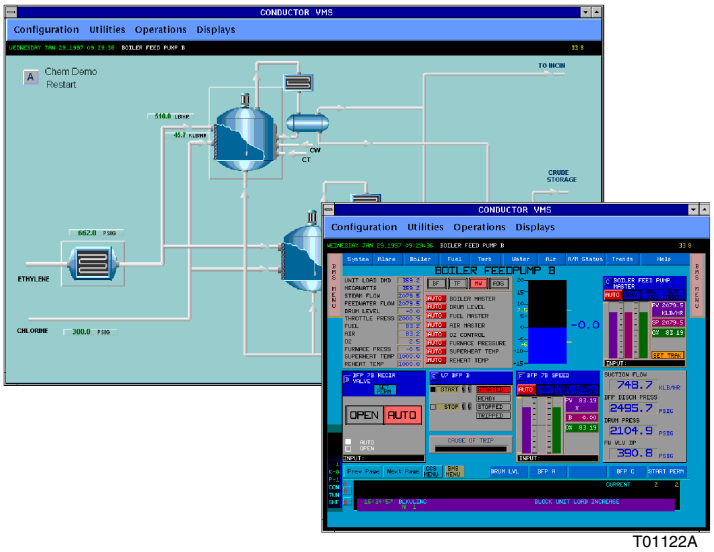
  Intuitive point-and-click navigation.

  Operator configurable displays.

  Display assignment to annunciator display panels.

  Special purpose alarm and operator keyboards.

  Native languages and Integrated utilities.



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Conductor VMS is a full-featured Human System Interface (HSI) specifically designed for the ABB Symphony™ Enterprise Management and Control System. It complements the inherent function of the Symphony system with a suite of operator directed features and functions that are ergonomically designed to facilitate process monitoring, control, fault mitigation and optimization. Conductor VMS provides Symphony system users with 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.

Custom-tailored process displays, alarm summaries, 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 VMS displays provide on-line status and troubleshooting for Symphony systems.

ABB

Conductor VMS is based on OpenVMS, Windows NT and Windows 2000, performance optimized graphics and open systems standards along with ABB's extensive years of application experience.

As a result, Conductor VMS can accommodate medium to large scale applications that are highly dependent on speed and special functions to formulate a powerful and cost effective solution. Because of Conductor VMS's capacity, speed and X Windows client/server conformity, these solutions can extend from unit control applications to enterprise wide information and control.

Conductor VMS represents a major step forward in the domain of integrated process control and management information systems. It is based on a combination of the Compaq (DEC) 64-bit Alpha processor with its 64-bit field-proven OpenVMS operating system and industry standard ***open data exchange*** technologies. Conductor VMS can satisfy the most demanding needs of the process operator while seamlessly exchanging real-time process information and operations directives with other key members in the operating enterprise with unmatched performance and display speed. At the same time, there has been no compromise on 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 VMS monitors and provides control input support to live systems data through flexible, dynamic, interactive color graphic displays. It provides comprehensive alarm management and problem mitigation features.

The industry standard X Window graphic system provides both client-side vendor independence with built-in remote accessibility through either an Ethernet LAN or modem connected communications. Popular desktop applications interface directly to live sources of current process data or historical manufacturing data from process control systems. Using @aGlance, hundreds of PC-based Windows applications supporting DDE/OLE communications can be linked to the Conductor VMS database. @aGlance is an Application Program Interface which uses familiar desktop tools to access, explore and analyze plant data using common spreadsheet applications. In addition, other higher level third-party packages such as Plant Management Systems and Expert Systems can be linked via a TCP/IP network to the Conductor VMS database using a client/server architecture.

Capabilities of Conductor VMS bridge the gap between plant process information by combining in a single workstation secure access to process control and management along with the convenience and functionality commonly associated with globally networked PCs. It communicates on the Symphony Control Network (Cnet) and INFI 90® OPEN (INFI-NET) for secure process monitoring and control as well as user connected networks (e.g., www, Intranets, for plant/world-wide information interchange). Business information and other real-time data provided by third-party software packages can be accessed within the process environment through the Ethernet link. ABB was the first distributed controls system vendor to provide mechanisms for truly bridging the gap between plant process information and business information available on an operator console through the use of X Windows.

Additional Benefits

- **Single window to the process and plant:** The Conductor VMS platform is a full-featured, X Windows-based HSI using Alpha processor technology from Compaq (DEC), Windows NT and Windows 2000. It provides a true single window to the process through the Symphony Harmony control unit or INFI 90 OPEN process control unit for process information. It also provides a single window to all Performer Series applications including information management, network management and process web browsers for both intraplant and interplant control and data access.

- **Full access and operability with X-Windows:** The NT and Windows 2000 based client software provide full access and operability with the X-Windows generated by Conductor VMS servers (clients in X-Windows terminology). In addition, this software exclusively from ABB supports the full functionality of the traditional mylar operator keyboard, alarm display panels, tones and local relay contact outputs. (Additional hardware may be required in certain desktop configurations.)

- **Fast operator response:** Exception report-based information updates, fast display call-up times and single pushbutton alarm display panels minimize operator response time to critical process events.

- **Upward compatibility:** Functional upgrade of INFI 90 OPEN Operator Interface Stations. This provides an upward migration path for existing ABB process automation systems.

- **Enhanced information presentation:** Flexible, dynamic, interactive color graphic displays with up to 400 graphic symbols present data in a format that best displays the process and decision support information to the operations staff.

- **Minimized engineering costs:** A CAD-based console utilities package for creating displays, tag lists and report formats reduces the time required to configure an operator console.

- **Minimized maintenance costs:** On-board diagnostics and console status displays find problems quickly and suggest corrective actions in easy to understand statements.

- **Reduced operator training:** Incorporates familiar faceplates (emulation of panel board instruments), advanced alarm handling (dynamic prioritizing and inhibiting), interactive graphics, and operator messaging that includes both process and system help information.

Alarm Management

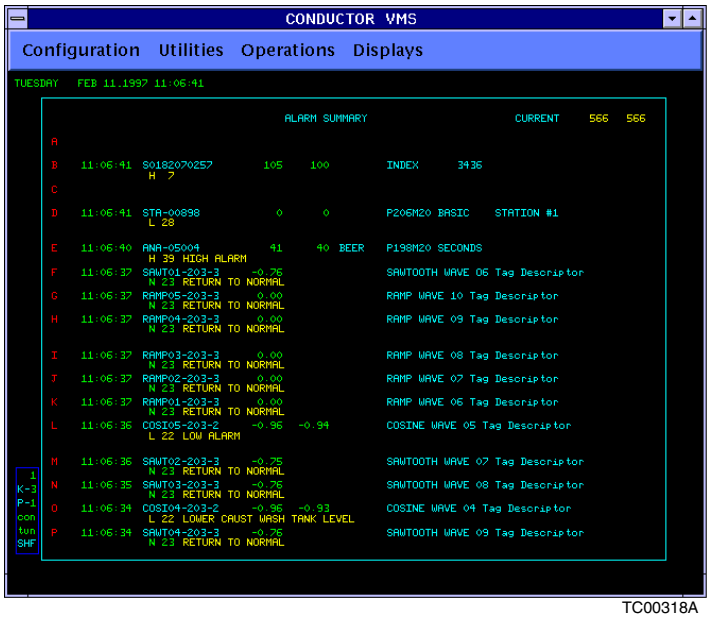

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Figure 1. Alarm Management

The alarm management function (Fig. 1) allows quick operator response to abnormal process system conditions. The alarm management configuration sets console indications and responses to

alarm conditions for operator ease of alarm processing. Features of the alarm management function help minimize nuisance alarms and ensure proper operator response to process alarms.

Table 1. Alarm Functions

Function	Description
Automatic tag inhibiting	Select tags that automatically inhibit the alarm conditions of another tag based on its current condition or state. This can be used to eliminate duplicate alarms or conditions (i.e., low and low-low) or eliminate nuisance alarms when off-line.
Global alarm acknowledge	Manual alarm acknowledgment, alarm inhibit, or scan on/off functions performed from the operating parameters display on one console can have the same action performed on other consoles through a global broadcast mechanism.
Alarm tones	Assign an alarm tone to an alarm group or an alarm priority. Trigger an alarm tone either by group or priority.
Management options	Use to configure the triggering of alarm tones and relays, enable or disable alarm group indicators at the top of the window, enable or disable the alarm priority indicators along the left edge of the window, and determine how to display the alarm priority indicators.
Alarm priorities	Use to identify and group alarms by priority for easier management. Assign a priority level, from one to 12, to each alarm level or the alarm state of a tag and to the return-to-normal condition of a tag.
Alarm relays	Assign alarm relays to an alarm group or an alarm priority. Trigger an alarm relay by either group or priority.
Alarm summary report	Contains a list of up to 1,000 most recent acknowledged or unacknowledged alarms. A summary appears as an element of a user-created or operator configurable display, and also as a complete display. The configurable characteristics are line option, character height and type, and color and position of alarm line elements.
Alarm groups	Each tag in the database is user-assignable to one of 99 alarm groups. When an alarm condition exists, the alarm group number appears at the top of the monitor. It flashes until all alarms within that alarm group are acknowledged. The alarm status line appears on all monitors. Assign each alarm group to one of five alarm tones per keyboard and configure them to one of six external alarm relays. By assigning alarms for a process or major equipment, nuisance alarms can be eliminated by inhibiting the group when the process or equipment is off-line.
Alarm summary display	Alarm summary displays can be created for each alarm group or priority or set of combined alarm groups or priorities. This display shows changes in alarm states and the times that changes occur for tags in a related alarm group. Arrange the alarm summary to list alarms by time or priority. Summary includes the 1,000 most recent alarm states. Single key access from any alarm point of the alarm summary to its primary display is a standard feature.
Central event archive	A Conductor VMS server can be assigned to function as a central event archive. Up to 500 k events can be collected from other servers to form one central event repository that can be subsequently queried for generating filtered event summaries.
Remote alarm silencing	Silences alarms using remote acknowledge. Defines up to five tags that are to be used as remote acknowledge tags. When these digital tags change from zero to one, the alarms are silenced. The remote acknowledgement can be used on the server workstation and its supported client workstations.

Trending

The trending package offers an historical view of the process for analysis of current operations. It displays (Fig.2) historical or current data as a function of time, or as a function of other process variables. Trending functions are shown in Table 2.

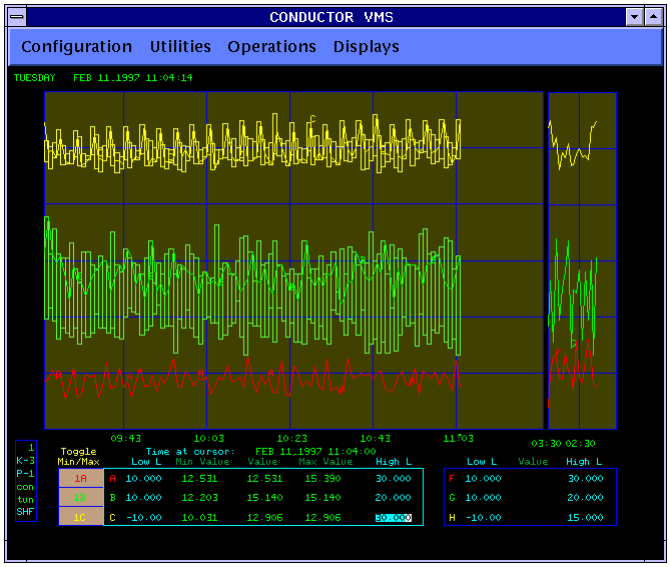

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Figure 2. Figure Trend Display

Table 2. Trending Functions

Function	Description
Trend display element	Compose trend displays from standard trend display elements. Each trend element on a display can present historical data for up to five separate process variables. The display presents the historical data as a continuous line on an X-Y graph
Custom trend display	Configuration options exist to create customized trend elements. Items such as display resolution, number of trend indices, number of trend samples, direction and color of the trend lines, scale limits, and trend grid are all configurable.
Operator assignable real-time trends	The operator can enter real-time trends to help analyze a process event. The operator interface station updates real-time trends at two-second intervals and stores them for up to two hours. Assignment of tags to the operator assignable trend function can be made directly from a graphic or faceplate display.
Global trend changes	Broadcast trend scale limit changes from one console to another to avoid having to make the change at all consoles that have the trend display loaded.
Min/max trend display	Show information in the form of a vertical bar along with the standard trend. Select the source of trend information for the trace, as well as for the limits of the vertical bar.
Trend control	Allows moving, expanding, shrinking and magnifying a trend presentation. Specific functions are move time cursor, modify scale range, magnify, pan and zoom.
X-Y graphs	Operator interface station trending includes X-Y graph elements that compare up to five process variables as a function of a sixth process variable. Trend collections can be triggered for a specific time duration to facilitate the collection and display of equipment data in an operating curve format.
Central trend archive	A Conductor VMS server can be assigned to function as a central trend archive. Up to 10 k trends can be collected from other servers to form one central trend archive.

Report Generation

The report generation package automatically documents process operations. Report generation creates system events logs, custom reports and sequence of event logs. Report functions are shown in Table 3.

Table 3. Report Functions

Function	Description
Custom logs	Available custom logs are snapshot, trend and trip logs derived from periodic, standard and trip log types. A snapshot log takes a sample of current process values at a designated time, on demand, or when a specific process event occurs. A trend log records data collected from the distributed trending system. The trend log can also contain snapshot process values. A trip log retrieves historical, trended data to record pre-trip event information and collects current data to record post-trip event data.
Custom reports	Produce periodic and event-triggered summaries in a spread sheet format. Periodic produces hourly, daily, weekly and yearly operation summaries. Event-triggered produces summaries of a particular operation such as a batch report or pre-fault and post-fault log. A set time, an event or an operator can trigger data gathering and printing for each report. Nine of the most recent reports can be saved on the hard disk drive. Custom reports include trend, trip and snapshot logs.
Sequence of events logging (SOE)	Provides a means to retrieve, store and print data collected by a sequence of events recorder or function block. Sequence of events report provides one-millisecond resolution time tagging for critical events. Report types include standard, summary, prefault and postfault.
System events log	Provides a sequential list of process and system alarms, process events, operator actions and operation notes. System events logs can be set to print continuously, periodically or on demand. The system can save a maximum of 1,000 of the most recent events on the hard disk drive and then archive these events for long-term storage.

Archival Storage and Retrieval

Conductor VMS provides long-term digital storage of trends, logs, events and tag data in any combination, on an optional cartridge tape or optical disk. Archived trend and log data can be read back into the console for printing or display. Database summaries made from archived database snapshots can be displayed or printed. Archived logs can also be printed. Table 4 shows the archiving functions.

Table 4. Archiving Functions

Function	Description
Information storage	The system transfers archival data from the hard disk to a portable archive medium. A message is displayed when the archive medium is nearly full.
Information retrieval	Archived data to be retrieved is moved to the hard disk drive. The platform moves only the data for the specified search criteria. Retrieved trends can be displayed.

X Windows

The X Windows feature (Fig. 3) combines Symphony HSI functionality with TCP/IP, DECnet, and X Windows to monitor and control a process and open a window to access other applications on the Ethernet network. It allows the operator to work in one window while monitoring another. With X Windows displays, entering and exiting windows is done easily and quickly. Background windows continue to be updated behind the active window. Up to eight active windows can be tiled or cascaded on a single monitor.

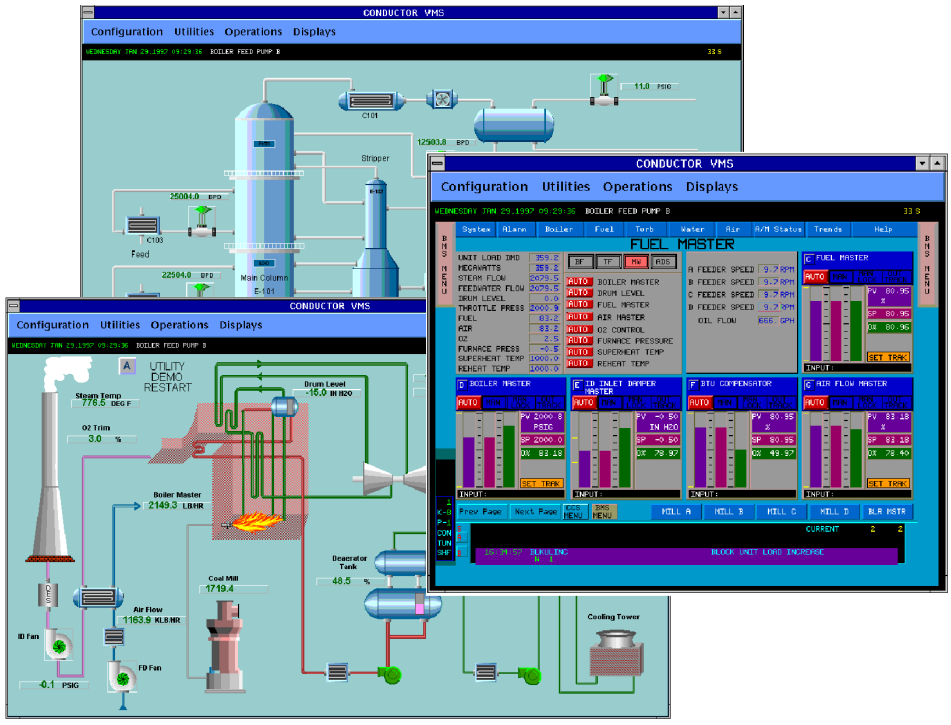

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Figure 3. Dynamic, Interactive Graphic and Information Displays

X Windows allows access to Conductor VMS graphics exported to remote auxiliary workstations (NT PCs or X-Terminals), other Conductor Series consoles, Alpha technology, personal computers or other devices communicating on Ethernet. X Windows also allows running an application on an external computer and viewing the application on a Conductor VMS console. Viewing the application will not tie up the processing capabilities of the console where the viewing is taking place. For instance, an application running on an Alpha computer can be initiated and viewed through a window on the Conductor VMS. Each window can be configured to use the DECnet or TCP/IP transport.

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