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FOXBORO®

PSS 21A-1C1 C2

I/A Series® Overview
Software Overview



Easily tailored to meet your specific control requirements and plant management needs, I/A Series software provides the high quality, wide-range functionality desirable for complete process automation and integrated information management.

The I/A Series software is a sophisticated set of software that provides you with optimum process control and management capability for a virtually unlimited range of applications. The software takes full advantage of the I/A Series distributed client/server architecture, which is an object-based communications structure built on an Open Systems Interconnection (OSI) framework. It allows the distribution of functionality and computing power to a wide geographic area, provides networking capability to computer systems from different manufacturers, and provides a broad platform for third-party industrial applications.

The functionality of the system is based on:

- SOFTWARE PORTABILITY supported by an industry standard UNIX operating system and a distributed data object management facility.
- CONNECTIVITY AND INTEROPERABILITY USING INDUSTRY COMMUNICATION STANDARDS for applications support using Foxboro SPECTRUM systems and other manufacturer's products and computer systems.

Invensys
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Product Specifications

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- X WINDOW SYSTEM handled by the intuitive, easy-to-use OPEN LOOK graphical user interface which spans the I/A Series systems as well as the connected information networks.
- FRIENDLY AND CONSISTENT HUMAN INTERFACE using menus, easy-to-use displays, and dialogue boxes.
- GRAPHICS AND DISPLAY TOOLS for generating sophisticated, interactive process control and management displays.
- INTEGRATED CONTROL TOOL SET for total control solutions spanning logic, sequence, and continuous control domains.
- FIELD DEVICE ACCESS to controllers and intelligent sensors, meters, and transmitters.
- SYSTEM-WIDE INFORMATION MANAGEMENT using a relational database.
- EASY-TO-USE SYSTEM CONFIGURATION allowing system start-up without programming as well as flexibility, compatibility, and connectivity for future system growth.
- DATA ACCESS SECURITY to support plant organization and task assignments.
- SYSTEMS AND NETWORK MANAGEMENT for monitoring remote and distributed systems and for system administration.
- BROAD PLATFORM for third-party industrial applications.
- PRODUCTION CONTROL AND PLANT INFORMATION MANAGEMENT SOLUTIONS via a wide range of integrated application packages:
  - Analyzer Management Software
  - Automation Equipment Manager
  - Batch Plant Manager
  - Data Validator
  - FoxCAE
  - Historian
  - Mathematics Library
  - Path Management
  - Physical Properties Library
  - Process Optimizer
  - Production Model
  - RBATCH II
  - Report Writer
  - Spreadsheet
  - Statistical Process Control
- PROGRAMMING LANGUAGES AND SOFTWARE DEVELOPMENT TOOLS for developing custom solutions.
- ON-LINE HELP allowing ready access to helpful text pertinent to the current function.
- SELF-HOSTING automatic software management and downloading.
- SINGLE SOFTWARE ARCHITECTURE expandable from small to very large systems.

Figure 1 illustrates the extensive set of I/A Series software.

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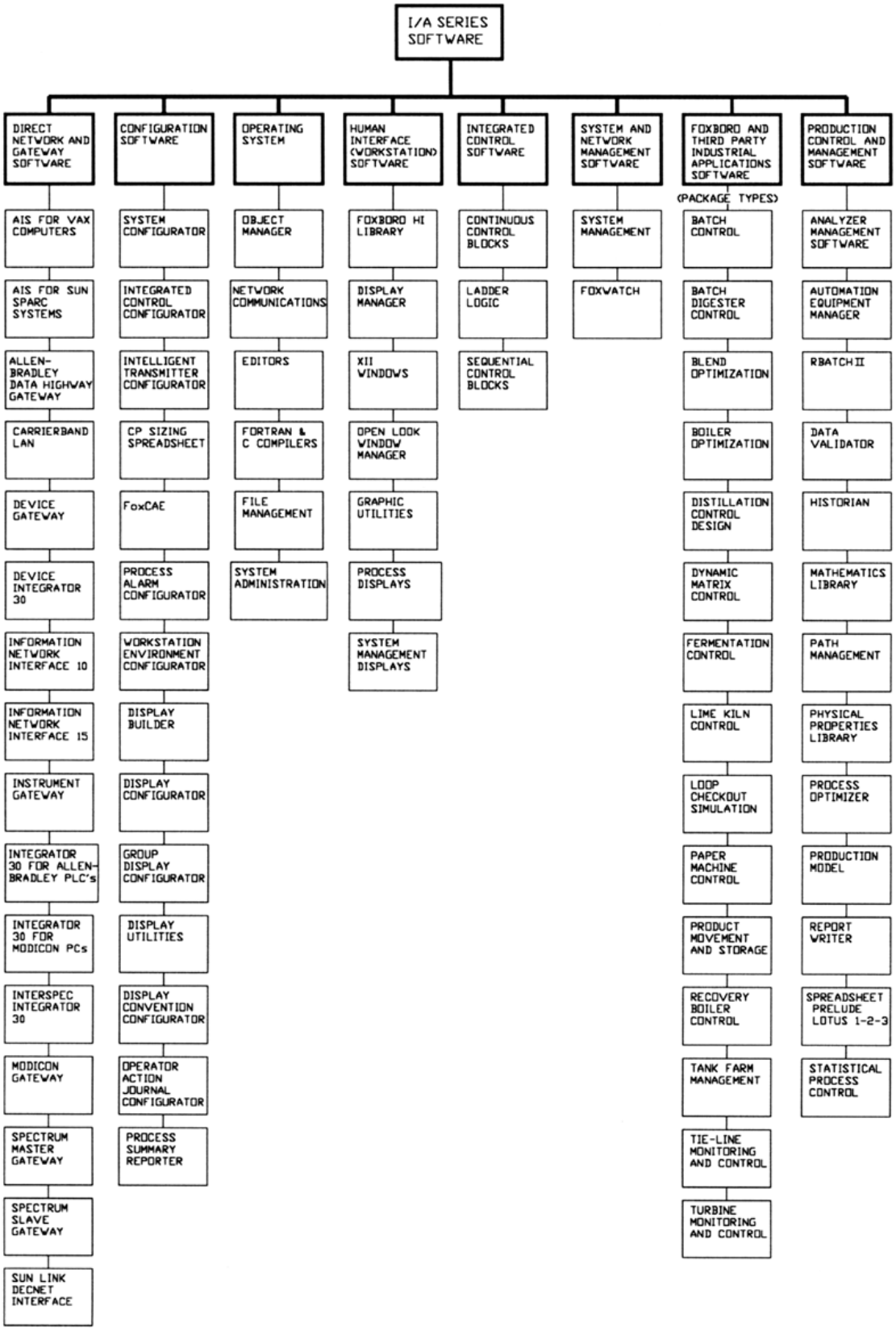


Figure 1. I/A Series Software Overview

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OPERATING SYSTEM

All 20/30 Series system processors have an I/A Series Virtual Real-Time Executive (VRTX) operating system enabling operations for the real-time environment. The Real-Time Executive is essential in the time-critical processors. VRTX provides up to 255 priority levels and 350 ms context switching. Integrated with VRTX is our layered communications subsystem, based on ISO standards. Included in this subsystem is a Class 4 transport layer, which guarantees end-to-end data delivery and integrity.

The transaction processing needs of Workstation Processors (WPs), Application Processors (APs), and Personal Workstations (PWs) are handled by a real-time Application Executive. This Application Executive is based on the VENIX operating system, which is compatible with UNIX System V.

Also part of the Real-Time software is a unique subsystem that provides data object management across the entire network including optionally connected external networks. The Object Manager provides location-independent access to all data objects in the system. Data objects can be process variables, calculated variables, or devices. Portability of applications is assured as data access is by name, and the Object Manager resolves linkage to the actual location of the object. The data object management and communication subsystems provide completely consistent and uniform communications across I/A Series systems as well as connected systems.

The 50 Series system processors – Application Processors, Application Workstations, and Workstation Processors (AP51, AW51, and WP51) – run the Solaris operating system based on UNIX System V Release 4. It is a 32-bit multitasking, operating system with extensive functionality in areas such as symmetrical multi-processing, real-time extensions, increased security, enhanced network performance, and improved system administration. The Solaris operating system is able to quickly process larger amounts of information and support increased disk storage.

Solaris's core networking technology provides an extensive family of protocols and distributed services allowing I/A Series systems connection compatibility to an external information network.

The ability to modify the system kernel provides access to devices and services of other networks in addition to those currently supported by the I/A Series system.

Also included with the Solaris operating system is an industry standard X Window System (X11) easily accessed using the OPEN LOOK graphical user interface as well as a development toolkit providing advanced windowing functionality (across I/A Series systems and connected information networks).

I/A Series system and communications standards offer:

- Hardware independence to the applications. This allows hardware upgrades to be provided by Foxboro while preserving investments in existing applications.
- Portability of applications, to run on Personal Workstations and computers running UNIX.
- Portability of applications, not only within an I/A Series system, but also across other I/A Series systems. This allows corporate-wide standard applications to be developed for use at multiple sites.
- Support for multiple languages in the software development environment. Languages supported are C and FORTRAN/FORTRAN 77.
- Ability to integrate within the system standard UNIX-compatible third party software packages.
- Easy access to multiple applications using the user-friendly OPEN LOOK graphical user interface to the X Window System.
- Connectivity to the hardware of other manufacturers as well as compatibility of software for increased flexibility in providing application solutions and information management.

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INTEGRATED CONTROL

I/A Series systems offer an integrated control package that simplifies the construction of complex control strategies and safety systems. I/A Series control is based on the concept of compounds and blocks where each compound is a logical collection of blocks that performs a control function. The Integrated Control Configurator provides a combined tool set with numerous control blocks for integrating continuous, ladder logic, and sequential functions within compounds to design effective control schemes. Figure 2 shows the set of Integrated Control Blocks.

Continuous control blocks have fixed algorithms that provide functions such as the following:

- regulatory control
- device control
- input and output
- alarming
- signal selection
- dynamic compensation
- sequence of events
- calculations

Included in the regulatory control are several versions of Foxboro's EXACT controller. The EXACT multivariable (EXACT_MV) controller controls processes with variable gains and dynamics, multivariable interactions, measured load upsets, and unmeasured disturbances. It enables one or more PID controllers to automatically adjust to the gains and dynamics of a process achieving closer control to set points.

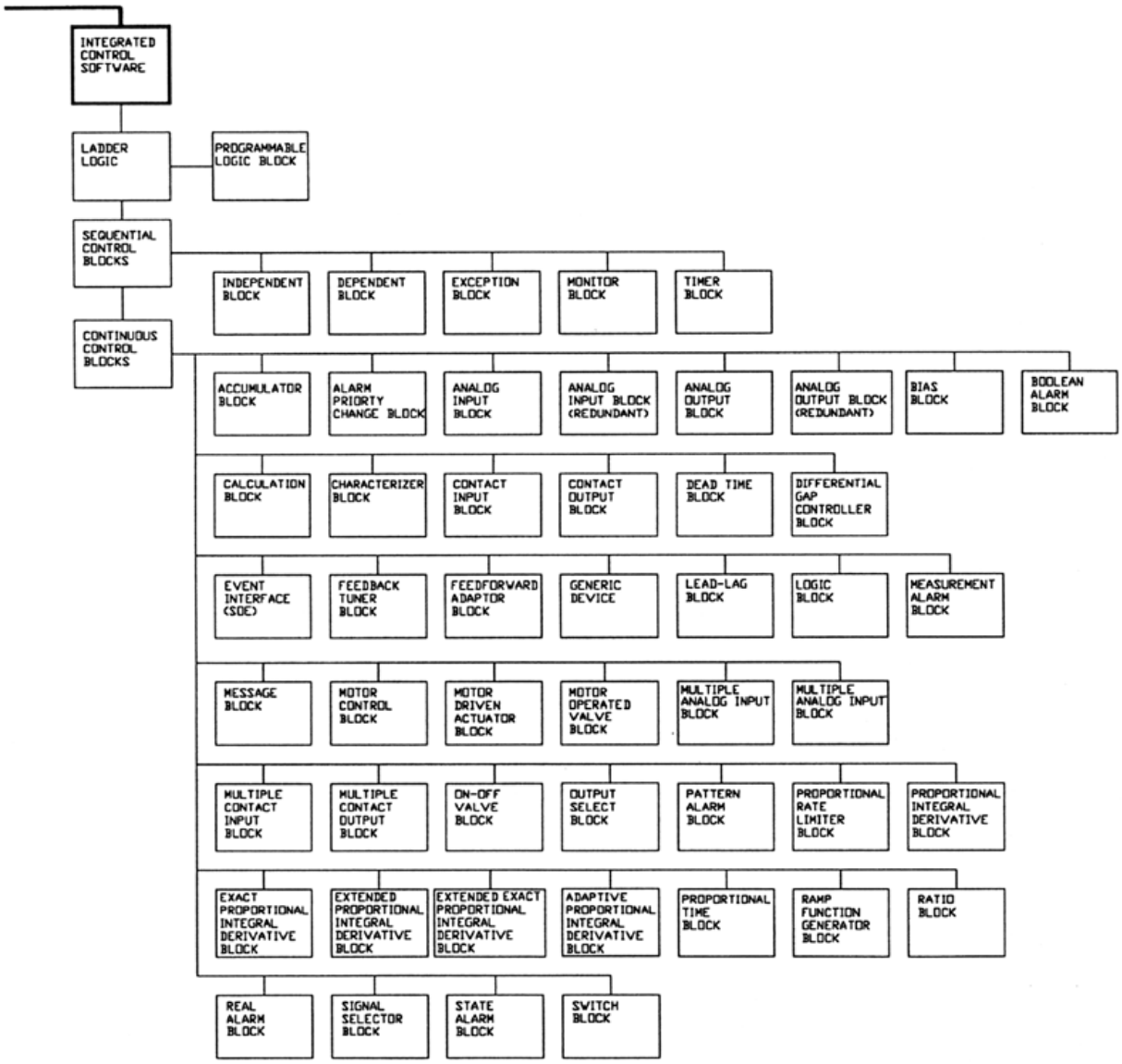


Figure 2. Integrated Control Blocks

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Ladder logic can be configured in modules with approximately 390 elements per ladder with a nominal execution rate of 5 milliseconds. This forms an ideal base for device handling, permissives, and interlocks in sequential or batch operations.

Sequence logic control complements continuous and ladder logic control with regulatory feedback applications. Sequence control blocks have user-defined algorithms enabling the user to:

- define a sequence of events
- monitor process conditions, taking corrective action when necessary
- time events
- manipulate any parameter or shared variable
- output messages to any logical device or historian

The FoxCAE software is an easy-to-use engineering tool that allows you to generate both control loop diagrams and compounds and blocks required in the control strategy. Utilizing detailed device tag lists and pre-defined values for block parameters, FoxCAE enables you to configure blocks and generate control loop drawings documenting the data flow between the I/A Series blocks. The configured compounds and blocks are transferable to the I/A Series control database. In addition, FoxCAE software can provide loop documentation for existing I/A Series control databases.

The Intelligent Transmitter Configuration/ Maintenance Environment supports configuration and maintenance tasks for Intelligent Field Devices (IFDs), e.g., mass flowmeters, temperature transmitters, and pressure transmitters. Total digital communications from these devices are integrated into the I/A Series control blocks for use in displays, reports, and other I/A Series functions.

With the wide range of I/A Series direct and gateway interface software, control integration is further expanded to include input from non-I/A Series networks and devices, such as the SPECTRUM network, INTERSPEC network, 760/761 SINGLE STATION MICRO controllers and other instruments, and Allen-Bradley and Modicon programmable controllers.

Input from over 100 other devices (such as gas analyzers, gas turbines, and bar code readers) is also available for direct peer-to-peer integration into the control process scheme using object-based communications.

Complete instrument maintenance and management is also possible ensuring lowest commissioning and ongoing cost-of-ownership.

NETWORKING

The I/A Series open network architecture and communication software provide communication links to all remote and local I/A Series systems via a copper or fiber optics Carrierband LAN. This networking capability supports high speed data packet transmission allowing large volumes of data to be sent. All data communications is exception based, minimizing unnecessary network traffic and ensuring optimum throughputs.

The I/A Series software also provides a direct communication link to the computer systems of other manufacturers via industry-standard protocols. The integration of I/A Series networks with existing computer networks, such as TCP/IP and DECnet, provides access to information from the other network.

The Open Application Platform allows I/A Series process information to be incorporated into application programs on the host computers of other manufacturers using Information Network Interface hardware and Application Interface Software on the host computer.

INFORMATION MANAGEMENT

The Information Management subsystem is founded on the Real-Time Database Manager, which, in turn, is based on the INFORMIX relational database management system and coupled with a Historian to manage time-based information.

Use of this powerful software subsystem in the real-time environment allows the user to separate the data storage view from the data access view. This allows the user of the data a relational access without having to worry about the data format or the storage methodology used. The access method employs the ANSI Standard Query language (SQL), both in the interactive mode for ad hoc queries and for programmed access. The separation of storage from access greatly simplifies program development and program maintenance.

The Historian stores data in history files that are controlled by the Real-Time Database Manager making it readily available to other application software (e.g., Statistical Process Control, Spreadsheet, Report packages). The Historian supports data reduction techniques; it collects real-time process data directly from the Object Manager as well as system messages and other system data, allowing for complete profiles of the operation of the plant.

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The distributed nature of I/A Series systems is supported by distributing the databases to meet functional requirements by location. The Real-Time Database Manager allows collection of all system data in a consistent and uniform manner. An associated Report Writer allows easy configuration of reports to be output either on a scheduled basis or on demand.

PRODUCTION CONTROL AND PLANT MANAGEMENT

The challenge of satisfying production control and plant management objectives is met with a wide offering of application packages. Utilizing readily available system information, the various application packages provide support for such production control and management functions as:

- process optimization
- quality control
- forecasting inventory requirements
- cost accounting
- equipment performance analysis
- inventory management
- lost time analysis
- maintenance scheduling and reporting
- material accounting
- process analysis
- production reporting

Application packages such as Process Optimizer, Data Validation, and Statistical Process Control address the issues of process optimization and quality control. An integrated spreadsheet, based on Prelude or Lotus 1-2-3, handles manipulation and graphing of data to support production control functions such as, energy balance calculations, process flowsheets, inventory management.

Figure 3 illustrates the Lotus 1-2-3 worksheet and graph screens as well as a printout of the information.

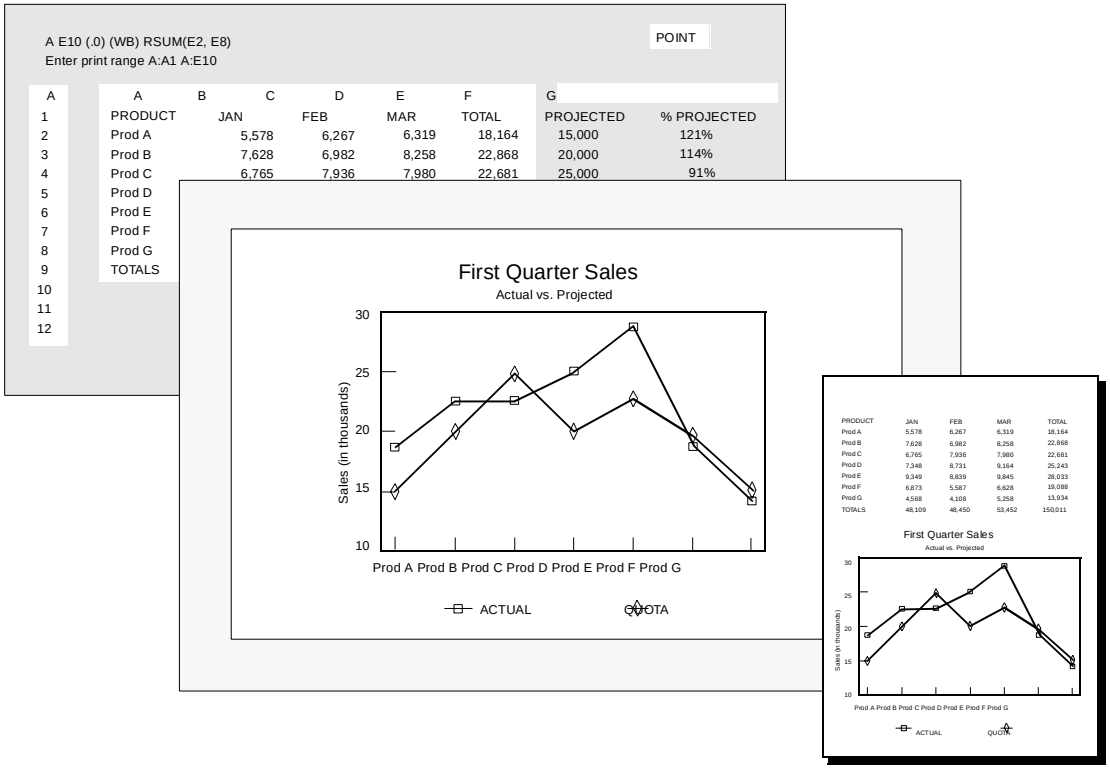


Figure 3. Example of a Lotus 1-2-3 Spreadsheet and Graph

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Using historical reduction group data and process data, Report Writer provides scheduled reports containing values. The results of mathematical calculations on these values, such as averaging and totaling, can occur in the report as well. A sample daily report is shown in Figure 4.

Sample Daily Report - daily Page 1

From Thu Dec 5 00:00:00 1991 To Thu Dec 5 23:59:59 1991
Dec 6 1991 11:27:43

TIME	HT1:CALC1.RI01 avg	HT1:CALC1.RI02 max	HT1:CALC1.RI03 min	HT1:CALC1.RI04 sum
0:00	16.47	42.58	51.61	4597.69
1:00	16.52	41.79	47.90	4586.61
2:00	16.68	42.17	49.99	4608.38
3:00	16.52	40.84	50.97	4597.04
4:00	16.26	42.07	51.85	4582.49
5:00	16.44	42.09	51.06	4581.38
6:00	16.25	42.32	50.83	4611.38
7:00	16.15	42.56	50.91	4569.75
8:00	16.44	43.48	50.92	4609.42
9:00	17.09	41.82	51.02	4586.43
10:00	16.44	42.98	47.59	4585.81
11:00	16.52	44.94	51.42	4577.25
12:00	16.46	41.28	51.52	4592.08
13:00	16.47	42.85	51.13	4578.99
14:00	16.06	42.70	52.37	4576.28
15:00	16.49	41.63	50.50	4548.07
16:00	16.59	43.35	50.08	4557.87
17:00	16.70	43.76	51.71	4583.42
18:00	16.28	45.10	50.50	4609.58
19:00	16.62	41.32	51.86	4591.19
20:00	16.50	44.02	50.55	4618.59
21:00	16.21	42.78	49.94	4586.18
22:00	16.17	41.51	52.00	4590.60
23:00	16.79	40.30	51.26	4596.76
DAILY AVERAGE	16.46	42.51	50.81	4588.47
DAILY MAXIMUM	17.09	45.10	52.37	4618.59
DAILY MINIMUM	16.06	40.30	47.59	4548.07
DAILY TOTAL	395.12	1020.24	1219.48	110123.20

Figure 4. Example of Report Writer Daily Report

The I/A Series application offerings also include a Mathematical Library and a Physical Properties Library. These libraries provide collections of timesaving subroutines for use in I/A Series application packages or in user-defined application programs.

In addition, you can use programming languages, such as C and FORTRAN, along with software development tools to provide user-defined solutions to production control and plant management requirements.

BATCH CONTROL

The I/A Series System provides a comprehensive solution to all types of batch and sequential control problems. Supervisory batch control functions such as recipe management, production information management, process management and unit supervision are taken care of by the RBATCH or RBATCH II packages. The real time batch process control functions such as sequential control, discrete control, and continuous control along with process monitoring are taken care of by control blocks running in Control Processors (CPs). The personnel and environment protection are handled by fast ladder logic running in Fieldbus Modules (FBMs). The I/A Series batch control offerings follow the emerging batch control standards.

The automation of a batch plant using the I/A Series System with the RBATCH II package can provide significant advantages:

- faster batch processing resulting in greater production capability
- more consistent product that meets tighter tolerance
- flexibility of manufacturing different products and quick switch over between products
- extensive data collection and reporting

ON-LINE CONFIGURATION SOFTWARE:

Comprehensive, Easy to Use and Install

I/A Series configuration software allows you to get the system up and running without programming. Also, the configuration software requires definitions to be made only once. Thus, you can tailor the entire system to your specific requirements . . . quickly and easily.

The Foxboro configuration package is comprehensive. It provides a number of different configurators, each aimed at a particular part of the configuration effort. For example, the system configurator helps the system get started by providing the database of hardware and software included in the specified system.

Other configurators break down tasks into easily handled packages:

- an integrated control configurator
- an Intelligent field device configurator
- historian configurator
- network and gateway configurators
- display configurators
- application configurators

Configurators are designed for ease of use. Tabular and graphic displays as well as dialogue boxes make interaction simple. Input is speeded by features that allow similar configurations to be copied quickly and easily. Consistency of operational design and on-line help add to the ease of understanding and using I/A Series configurators.

An important feature for projects with extremely tight time schedules and limited resources is the capability of the configuration software to run on a standalone personal computer based workstation – so systems can actually be configured before they are delivered.

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WINDOWS ENVIRONMENT INTERFACE SOFTWARE:

Simple, Consistent, and Efficient

In the 50 Series Workstation Processors and Application Workstations, the icon-based OPEN LOOK graphical user interface to the X11 window environment provides easy, simultaneous access to multiple applications. Using intuitive popup menus, buttons, and application icons, OPEN LOOK provides a common look and feel across all applications. Users can work quickly and easily performing tasks within and among multiple windows on a single screen.

In addition to support for multiple application windows, the 50 Series workstations (WP51 and AW51) support multiple Display Manager windows for easier, simultaneous access to process information. See Figure 5.

INTERFACE SOFTWARE:

Powerful, Secure, and Flexible

To provide consistency of operation across the network, I/A Series systems utilize a single human interface package regardless of whether it runs in modular industrial workstations, desk top workstations, or even personal computers used as workstations.

The features of the human interface package include:

- flexible workstation configuration
- access security
- progressive menus on-line help
- interactive displays
- configurable faceplates and graphics displays
- alarm notification and system messages

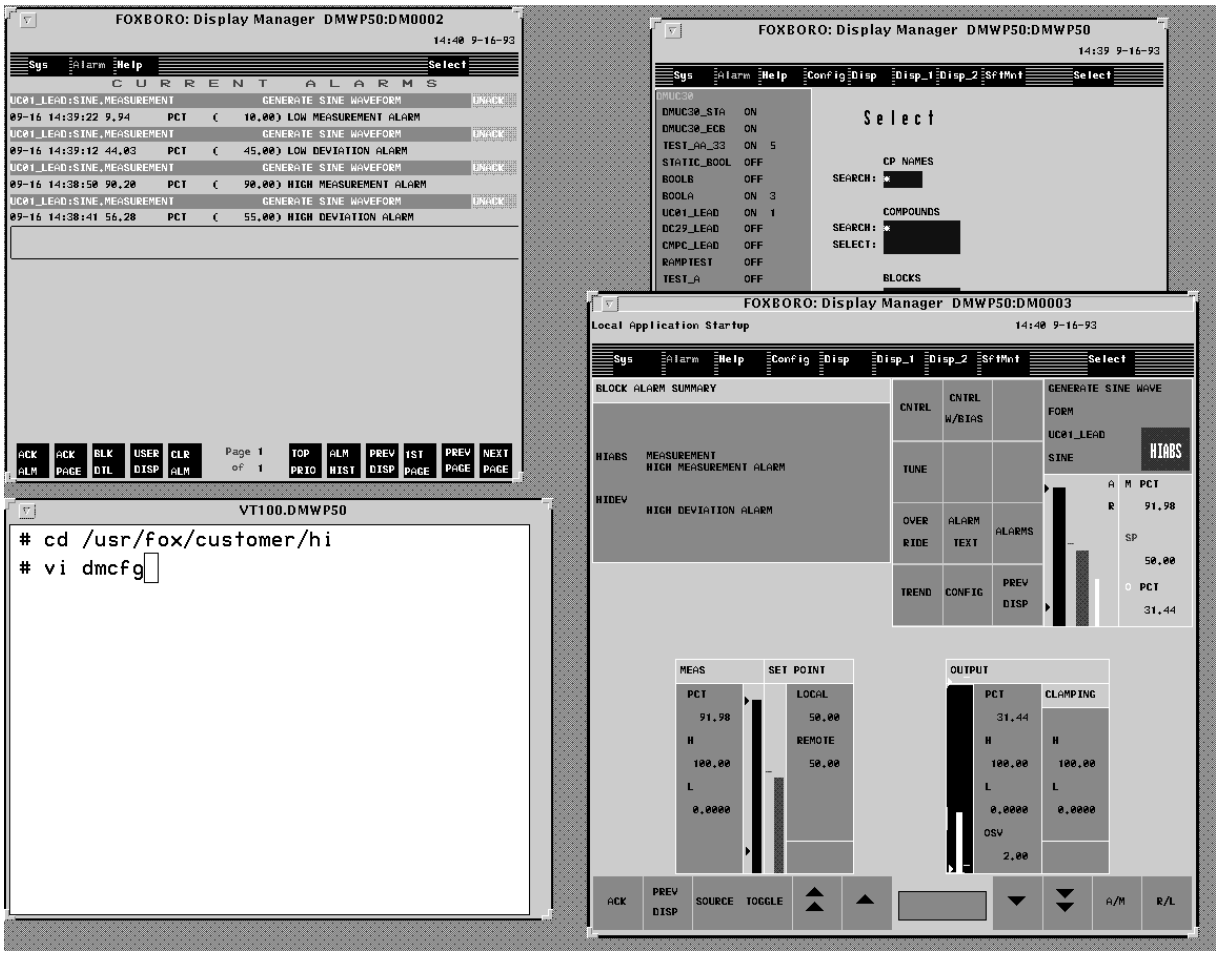


Figure 5. Workstation Screen with Multiple Display Manager Windows Open

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Flexible Workstation Configuration

The I/A Series workstation configuration software allows the design of workstation groupings to match the various operating environments in the plant.

A workstation can be configured as an operating center with multiple bays for the process operator, or as a desktop model for the plant manager. No matter what the configuration, each of the workstations works in the same manner.

Starting with a basic workstation package, an engineer decides which combination of elements best fits the plant layout. The range of options includes either a desktop layout with a 16- or 19-inch screen or a modular workstation layout with 19-inch screens, alphanumeric keyboards, annunciator and annunciator/numeric keyboards, and pointing devices such as a touchscreen, trackball, or mouse.

The I/A Series software, supporting either single-screen or multiple-screen operation, provides for workstations to operate independently or as part of a coordinated group supporting single or multiple users.

Access Security

Every person in the plant must have access to the data necessary to do his or her job. However, access beyond that subset of total plant information must be restricted.

I/A Series systems offer you the capability to configure access to the system by password or workstation. Each user can be assigned an operating environment, which defines the accessible functions and database available to that user. Multiple environments can be created and password access can be to a single environment or many environments. Within an environment, select actions may be restricted by assigning access protection codes.

Foxboro offers a standard set of default environments that can be modified and/or added to by configuration – matching the system to the job requirements of the user.

The default environments provided are for process engineering, process operators, operation and production management, and software development. These default environments allow easy system startup.

Interactive Displays

Displays are based on object orientation. With graphic utilities and display building software, a standard set of primitives is combined to form objects that can be further combined to form more complex objects. Standard object libraries can be created allowing complex graphics displays to be built with these combined pre-defined objects.

Attributes (color fill, visibility, pickability, etc.) can be assigned to objects. These attributes are then linked to system data using a display configuration process. Data is linked by name only and is independent of any location specification meaning it can be used on a number of workstations in a number of displays.

The link of user-defined objects to process control data allows operators to view changes and perform required functions via selectable objects using interactive pointing techniques (mouse, trackball, or touchscreen). Actual process data can appear in any desired presentation with alarm states and full manipulation via graphics and pre-formatted loop and group displays.

These object based displays are transportable across a range of high resolution and performance workstations.

Progressive Menus

State-of-the art interaction techniques make I/A Series system operation practically self-taught. "Pick and point" interaction and the use of menu bars with pull-down, detailed menus simplify operations so that procedures are self-evident.

By specifying the content of display menus, you can provide access to a user-defined hierarchy of operational displays.

On-Line Help

The Help field, readily available from the top menu bar, provides on-line information on the use of the functions and applications currently running.

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Easy-To-Use Process, System Management, and User Defined Displays

Standard displays provide a basic operating environment, a collection of displays around which the entire plant display structure can be built. Examples include engineering, operations, and maintenance displays.

I/A Series software offers a comprehensive set of detail displays that allow immediate access to the process control scheme comprised of compounds of integrated control blocks. From a compound overview display, compound detail displays and block detail displays provide information regarding every compound and block configured. Figure 6 is an example of a PIDA block detail display. Detail displays are also available for Equipment Control Blocks (ECBs) that provide the software interface to Fieldbus Module (FBM) information or the devices supported by the FBM.

Preformatted group displays featuring block faceplates, trends, and X/Y plots are easily created to support process control requirements.

Displays specific to unique plant structure or operational philosophy are also needed. The display building software makes the building of intricate graphics displays an easy matter by utilizing user-friendly icons, or pictographs, for selection of the graphics operations to be performed. It also supports storage and retrieval of user-defined symbols as well as rotation, reduction and expansion, and other powerful graphics functions. User-defined objects as well as Foxboro supplied objects (trends, X/Y plots, profile plots, function keys) reside in template files to support display building and standardization.

Once displays are built and the objects configured as desired, the individual displays and overlays can be linked to create a hierarchy of displays specific to your plant operating requirements.

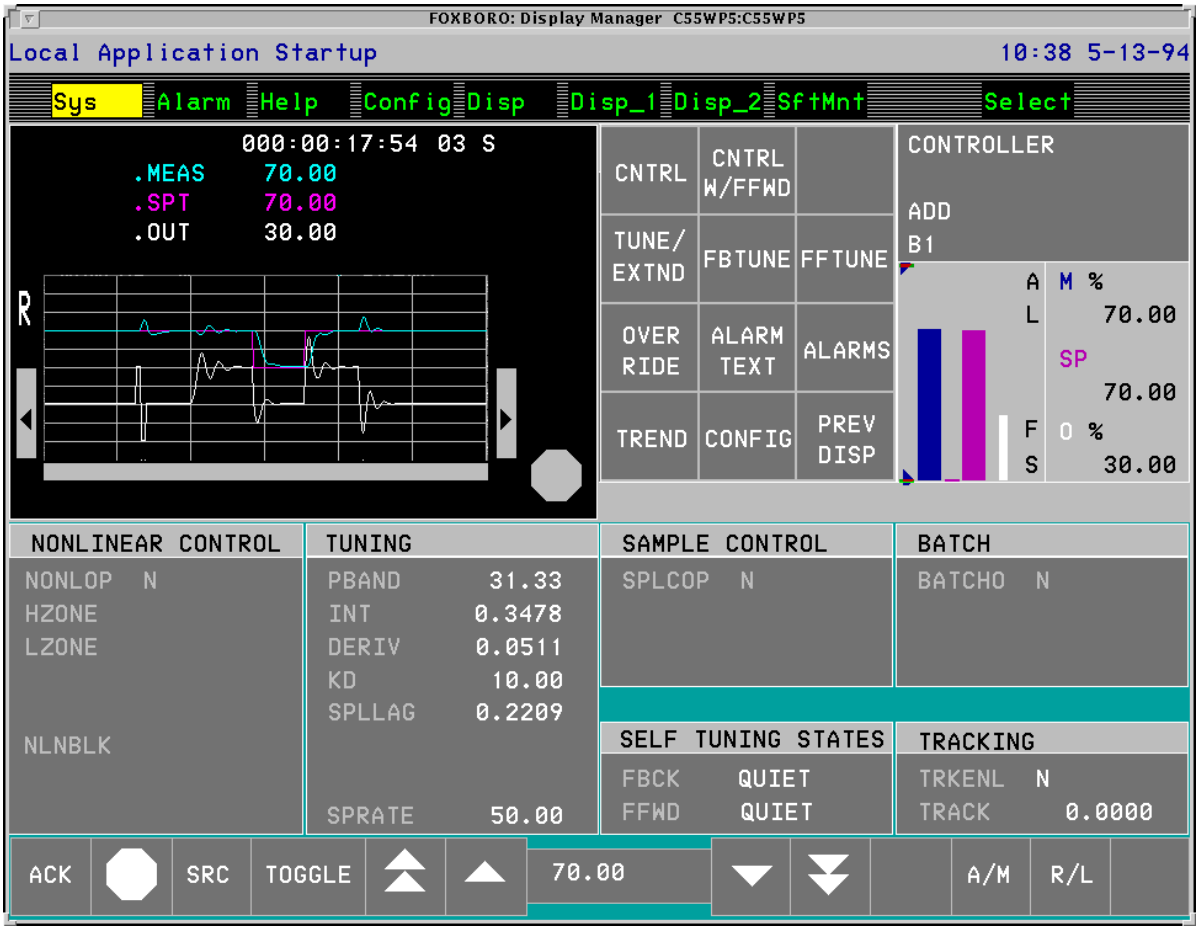


Figure 6. Example of PIDA Block Detail Display

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To support system management tasks, I/A Series software offers a hierarchy of displays depicting all the stations and peripherals within the system network. Initial displays provide immediate indication of both system and network health as well as access to communication information, type-specific information for each piece of equipment, and diagnostic testing.

From the system management displays, operator functions such as rebooting a station, uploading a database, placing a peripheral on or off-line, and inhibiting/enabling equipment alarming are easily performed.

FOXWATCH is a unique remote system management and systems administration package that provides up-to-the-minute expert service and support as part of Foxboro service agreements.

System and Process Alarms

The I/A Series software provides comprehensive system and process alarming notification and acknowledgment capabilities. System alarm conditions signaling equipment failure are readily visible at the workstation environment level and when configured, sound a horn. System and network failures are easily seen on the system management displays and acknowledged. For maintenance purposes, alarming can be inhibited on an individual basis for both system and network equipment.

The wide range of process alarming capabilities includes options such as five priority alarm levels, alarm inhibit options at the compound or block level, and significant re-alarming. Indication of process alarm conditions is readily evident on the detail displays as well as on easily configurable user-defined displays.

Annunciator LEDS, horns, the current alarm display, and printed messages also signal process alarm conditions. Immediate acknowledgment of process alarm conditions is via display keys or annunciator keys. For efficient alarm handling, alarm acknowledgment and horn silencing are by the workstation, multi-workstation cluster, or user-defined workstation grouping.

System Messages and Reports

During system operations, the comprehensive set of messages included with the I/A Series software provides you with necessary information related to system software and hardware events – directives, information regarding routine priorities or equipment limitations, and error messages.

These messages appear on the screen and/or at a designated printer.

The I/A Series software also provides an Operator Action Journal for maintaining a record of operator actions related to control of the process, such as ramping or direct entry of point values, changing block status, and acknowledging block alarms.

The Process Summary Reporter provides summary information relating to exception conditions of specified compounds and blocks. This reporter provides a snapshot of those compounds and blocks that are in alarm, in manual, or not in control in both a process summary file and a printed report.

HIGH LEVEL APPLICATION PACKAGES:

Where Process Information Management, Optimization, and Plant Management Are Done

Analyzer Management Software

The Analyzer Management Software is an easy-to-use collection of interface tools that allow you to effectively manage and maintain multiple 931D Process Gas Chromatographs (PGCs) on an I/A Series System. The tools allow you to perform tasks such as editing instrument configuration, obtaining status information, controlling the instrument, and viewing the results of an analysis.

Automation Equipment Manager

The Automation Equipment Manager provides the necessary database management system for integrating information required for equipment management and a systematic preventive maintenance program. In addition to maintaining detailed equipment information and scheduling maintenance tasks, the package generates a variety of management reports.

Data Validator

The Data Validator ensures more accurate data for process control and higher-level accounting and analysis tasks. It accomplishes this by computing and correcting data on process variables, using statistical techniques based on contextual relationships that verify mass and energy balance.

FoxCAE

The FoxCAE software provides easy-to-use configuration tools and routines for developing control loop drawings. Compounds and blocks can be generated for transfer into the I/A Series control database. Alternately, information from an existing I/A Series control database can be used to develop loop drawings.

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Historian

The Historian collects, stores, processes, and archives process data from the control system. This collection of data is widely used by other application programs. It can be used in trends, Statistical Process Control (SPC) charts, logs, production reports, and spreadsheets as well as in user and third-party applications.

Mathematics Library

The Math Library, which is based on Math Advantage, provides a standard set of mathematical subroutines that are commonly used to support the engineering and evaluation functions in a process plant. This library includes an exten-sive set of mathematical routines such as Fourier Transforms, matrix operations, and curve fitting.

Path Management

Path Management provides supervisory control or resource management for processes which transfer raw materials, fluids, and products between process equipment utilizing various routes. Route selection can depend on factors such as product type, equipment available, or transfer volume.

Physical Properties Library

The Physical Properties Library gives convenient access to relevant chemical properties, such as thermodynamics for crude oil, and to complex data, such as information from steam tables.

Process Optimizer

The Process Optimizer provides for real-time optimization of process parameters using linear programming and mixed integer programming techniques.

Production Model

The Production Model allows a logical model of the activities of a plant to be built using three basic constructs: units, operations, and connections.

RBATCH II

RBATCH II is a fully configurable graphical package that performs supervisory batch control functions. RBATCH II runs on an AP51 or AW51 and performs supervisory batch control functions such as management and unit supervision. It provides an easy-to-use environment for the configuration and execution of recipes in graphical Sequential Function Chart (SFC) format from 50 Series display stations (WP51, AW51, WP50, AW50). (The RBATCH package runs on an AP20, AP50, AW50, or a PW.)

Relational Database Manager Package

INFORMIX Version 1.10 supported on the AP20, INFORMIX Online Version 4.1 on the AP50/AW50, and INFORMIX Version 5.01 on the AP51/AW51 organize, access, and manipulate plant information and support updates, queries, and reports. Standard interfaces are provided between the user or application programs and the database files.

Report Writer

The Report Writer is a general purpose report package that allows report definition and generation at regular intervals or on demand. Report data comes from Historian reduction group data available from any Historians on the network or directly from the process. The results of mathematical operations on the data can also be included. The Report Writer also provides an interface for archiving, restoring, printing, and deleting reports.

Spreadsheet

The Spreadsheet package provides manipulation of data in a row/column format allowing for "what if" calculations and the graphing and printing of data. It includes functions for accessing real-time, historical, and relational database data. The spreadsheet package is either Lotus 1-2-3 on the 50 Series AP/AW, PW, or Prelude on the AP20.

Statistical Process Control Package

The SPC package provides a wide range of on-line displays of Statistical Process Control charts for analysis of process variables. Included are charts such as: Xbar and range, Xbar and sigma, and cumulative sum charts; individuals histograms; scatter diagrams; and Pareto diagrams. Cause and Effect diagrams may also be created. The SPC package provides open-loop advisory capability for the analysis of quality problems in a plant.

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DIRECT NETWORK AND INTERFACE SOFTWARE:

Transparent, Reliable

Allen-Bradley Data Highway Gateway

The Allen-Bradley Gateway software and hardware provide communication to the Allen-Bradley data highway. Data is transferable between I/A Series processors and AB Programmable Logic Controllers for control integration and supervisory control.

Application Interface Software

The Application Interface Software (AIS) for DEC VAX computers resides on host VAX computers.

Along with Information Network Interface modules, AIS allows computer programmers to write application programs incorporating routines for two-way access to I/A Series objects, files, and the virtual terminal interface. A number of popular third-party applications use this proven Application Programming Interface (API).

The AIS for Sun Microsystems SPARCstation and SPARCserver Products provides an application program interface resident on the host computer making communication requirements transparent to application developers. A number of popular third-party applications use this proven Application Programming Interface.

Carrierband LAN Interface

The Carrierband LAN Interface software and hardware allow multiple I/A Series system nodes to be interconnected on a Carrierband LAN. This interface provides the sharing of information across the local area network.

Device Gateways

The Device Gateway software and hardware provide network interfacing with more than 100 foreign devices (e.g. gas analyzers and turbines) for collection and storage of data that is available to all processors on the I/A Series system or other connected networks. Devices fall into three categories: receive only, scanned devices, and read/write devices.

Device Integrator 30

The Device Integrator 30 software and hardware provide a high performance, optionally fault tolerant interface to numerous foreign devices for the collection and storage of data that is accessible to I/A Series processors and other connected networks. In addition, the Integrator 30 sends data to the foreign device from the database within the integrator.

Information Network Interface Software

The Information Network Interface software and hardware allow communication with other host computers providing the host access to files and data residing in the I/A Series system for application program development.

The Information Network Interface 15 software and hardware additionally provide an I/A Series system access to information on remote I/A Series system processors over a Wide Area Network (WAN).

Instrument Gateway Software

The Instrument Gateway software and hardware allow for the transfer of data between I/A Series processors and 760/761 SINGLE STATION MICRO controllers and other devices (indicators, recorders). Up to 60 controllers are supported.

Integrator 30 for Allen-Bradley Programmable Logic Controllers

The Integrator 30 for Allen-Bradley PLCs software and hardware provide a high performance, optionally fault tolerant interface to the Allen-Bradley Data Highways for the integration of data from Allen-Bradley PLCs into I/A Series databases.

Integrator 30 for Modicon Programmable Controllers

The Integrator 30 for Modicon PCs software and hardware provide a high performance, optionally fault tolerant interface for the integration of data from Modicon PCs into I/A Series databases.

INTERSPEC Integrator 30

The INTERSPEC Integrator 30 software and hardware provide a high performance interface to INTERSPEC devices for the integration of INTERSPEC process data into I/A Series databases. The data provided by the INTERSPEC devices connected via the INTERSPEC network is the same as process data provided by I/A Series FBMs and can be incorporated into I/A Series plant management functions and operator displays.

Modicon Gateway Software

The Modicon Gateway software and hardware allow communication between I/A Series processors and devices utilizing the Modbus protocol.

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SPECTRUM Slave Gateway

The SPECTRUM Slave Gateway software and hardware allow communication between the Control Processors of the I/A Series system and a SPECTRUM system host. By emulating a MICROSPEC Unit Control Module (UCM), the interface allows SPECTRUM hosts which support UCM to communicate with I/A Series CPs without requiring any reprogramming.

SPECTRUM Master Gateway

The SPECTRUM Master Gateway software and hardware support the transfer of data between I/A Series processors and SPECTRUM slave stations. The I/A Series processors can access, read, and write process data in the slave stations.

SunLink DNI

SunLink DNI as part of the Sun network software allows integration of Sun based 50 Series stations into existing computer networks using standard communications protocols. 50 Series workstations and servers can communicate and share resources with DECnet Phase IV endnode systems.

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