

**Experion Process Knowledge  
System (PKS)**

**Experion Server Specifications and  
Technical Data**

**EP03-200-210**

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## Experion Server Specifications and Technical Data

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## Revision History

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Revision	Date	Description
1.0	November 2004	Release Revision
1.1	May 2005	Update with minor corrections

## Introduction

### Experion Process Knowledge System

The Experion™ Process Knowledge System (PKS) is a next-generation process automation system that unifies people with process, business and asset management to help process manufacturers **increase profitability and productivity**. It is the only process automation system to focus on people – making the most of the knowledge they hold. Experion **improves business performance and peace of mind** by collecting and integrating process and business data across the entire facility, making information and knowledge available where and when needed, thereby enabling people to make the right decisions. At the heart of the Experion PKS is the **Experion platform**, which provides a foundation for integrating all process control and safety management (including non-Honeywell systems) into a single, unified architecture. The Experion platform embeds **advanced applications** to improve process performance, asset and people effectiveness and business agility.

### Experion Platform

The Experion™ platform provides the foundation for the Experion Process Knowledge System (PKS), integrating all process control and safety management (including non-Honeywell systems) into a single, unified architecture. Robust and scalable, the Experion platform is built on Honeywell's 30 years of experience in delivering process control and safety system expertise. It takes customers well beyond Distributed Control System capabilities by providing next generation automation control through embedded decision support and diagnostic technology that drives information to the decision maker. The safety component maintains the security of an independent environment from the mainline control system, increasing security and system dependability. The result is a **unified automation platform** that elevates safety and process availability, as well as production and profitability.

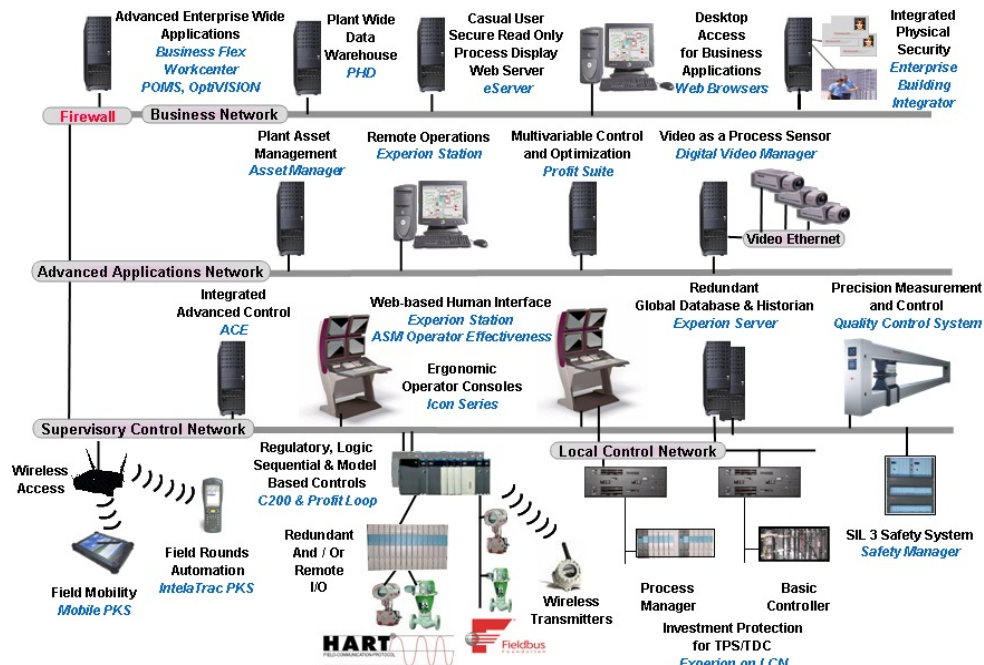


Figure 1. Experion PKS Overview Architecture Diagram

### Architecture Overview

Experion comprises many different integrated hardware and software solutions depending upon the needs of the installation. Figure 1 is a representation of the many possible nodes that can be utilized in the flexible and highly scalable Experion architecture.

## Server Overview

This document describes the specifications and technical data for the Experion Server hardware and software. The Server is a required component of Experion. All the functionality described in this document, including the options, are core functionality. That is, it is developed as a system and licensed as options to allow users to simply purchase what is necessary.

Options can be purchased at any time and added to a system with a simple license key. Most options do not even require an additional software installation. These include functions such as:

- **Server Redundancy** – an on-line synchronized backup provides high availability to your process.
- **Distributed Systems Architecture (DSA)** – DSA brings multiple “systems” together in a seamless manner.
- **Honeywell System Integration** – Honeywell Systems such as TDC 2000, TDC 3000, TPS, and FSC are comprehensively integrated into Experion.
- **OPC Connectivity Options** – the Experion Server can serve data and alarms and events to OPC clients or it can act as a client to other OPC servers.
- **SCADA Interfaces** –multiple interfaces to RTUs, PLCs, and other devices to integrate these devices into your control system.
- **21 CFR Part 11 Functions** – Experion provides the necessary functions, such as Electronic Signature support, for regulated industries.
- **Alarm Pager** – send alarms directly to your maintenance crew’s pagers, e-mail, and more.
- **Open Data Access** – Whenever you need to get Experion data into a spreadsheet or database, for example, Open Data Access is required.
- **On-process Migration** – migrate the Server software from a current release to the next available release without taking Experion off-line.

For more information about Experion, please refer to:

- EP03-100-210 Experion Process System Overview
- EP03-210-210 Experion Station Specification and Technical Data
- EP-3-300-210 Experion Platform CEE-based Controller Specifications and Technical Data
- EP03-310-210 Experion Application Control Environment
- EP03-400-210 Experion Chassis I/O Modules - Series A Specification and Technical Data
- EP03-410-210 Experion Rail I/O Modules - Series A Specification and Technical Data
- EP03-420-210 Experion Galvanically Isolated/Intrinsically Safe Rail I/O Modules - Series H Specification and Technical Data
- EP03-430-210 Experion PM I/O Specifications and Technical Data
- EP03-440-210 Experion DeviceNet Specification and Technical Data
- EP03-450-210 Experion PROFIBUS DP Specification and Technical Data
- EP03-500-210 Honeywell Fault Tolerant Ethernet Specification and Technical Data

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## Product Description and Features

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### **Real Time Database**

At the heart of the Experion Server software is the real time database. The following information is stored in the real time database:

- Acquired Data – data read from or related to controllers
- Process History – historical store of acquired data
- Alarms and Events
- System Status
- Configuration Data – details on how the Experion Server subsystems have been configured to operate
- User Defined Data – structures to store application specific information

To maintain data integrity, memory resident portions are periodically written to the hard disk in a process known as checkpointing.

The Experion Server software consists of a number of functional subsystems as shown in Figure 2.

### **Executive Subsystem**

Time keeping and scheduling is the major function of the Executive subsystem. In essence, this subsystem manages all scheduled tasks throughout the server. This includes items such as requesting

display updates, requesting scheduled reports, watch dog timers for custom applications.

### **User Interface Subsystem**

For server-connected Stations, this subsystem manages two tasks:

- Keyboard requests, and
- Writing data to the Station and reading data entered at the Station

### **Acquisition and Control Subsystem**

For Control Execution Environment (CEE) devices, such as the C200 controller and The Application Control Environment (ACE) node, this subsystem manages a dynamic cache of data for display on graphics, for history, and for use by external applications. This cache grows and contracts dynamically depending on the needs of its users – Station displays, applications, etc. This is an extremely powerful mechanism as it means that not all data is polled from the C200 controller (and other CEE devices). Rather, data is only subscribed and updated by exception based on a need from a user. And, if more than one user or application requires the same set of data, the cache provides this data without making duplicate requests to the controller. When users stop requesting data, the cache no longer asks for the data.

Data acquisition and control for SCADA devices is also handled by this subsystem. When points are downloaded to the server using Quick Builder, scan tables are built that define how data will be acquired. The server polls the devices (RTUs, PLCs, etc.) at periodic rates. Depending on the interface, report by exception and other scanning mechanisms are supported.

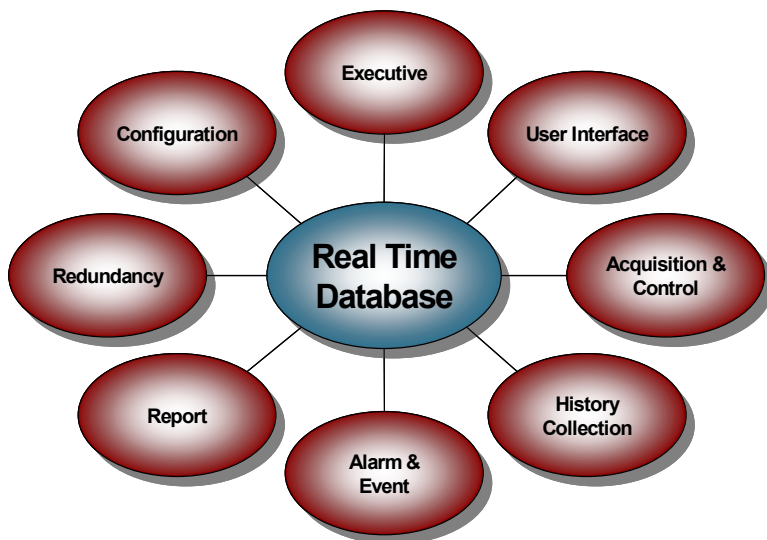


Figure 2. Server Subsystems

### History Collection Subsystem

The on-board history collection system of the Experion server is composed of three history classes.

- Standard History
  - ✓ 1 minute snapshot
  - ✓ 6 minute average
  - ✓ 1 hour average
  - ✓ 8 hour average
  - ✓ 24 hour average
- Fast History
  - ✓ User selected – 1, 2, 3, 4, 5 (default), 10, 15, or 30 second snapshot
- Extended History
  - ✓ 1 hour snapshot
  - ✓ 8 hour snapshot
  - ✓ 24 hour snapshot

Historical data can be archived. The archiving capabilities include the ability to retain archives on the server hard drive, move the archive to another drive after a defined period of time, or to delete the archive after a defined period of time. Archiving will not occur if the hard drive falls below a configurable amount of free space.

Once collected, historical data is seamlessly accessible by

- Trend displays
- Custom displays
- Reports
- Application programs
- Spreadsheets
- ODBC compliant database

The archiving capabilities provide effectively unlimited duration of historical storage.

If additional history features are necessary, Honeywell's Uniformance<sup>®</sup> PHD is optimally suited for the task.

### Alarm and Event Subsystem

Alarming for points from CEE devices, known as Process points, are alarmed and time stamped at the controller. SCADA point alarms are initiated, time stamped, and acknowledged by the server.

Each of the configured alarms can be assigned a priority ranging from Journal, Low, High to Urgent. An alarm sub-priority

(0 to 15) can also be assigned to further differentiate alarms.

All alarms are recorded as events. Additionally, login actions, operator actions, and configuration changes are logged in the event journal.

### Report Subsystem

The report subsystem is designed to create reports from a list of standard and optional reports. This subsystem maintains the report configuration for scheduled or on-demand execution.

### Redundancy Subsystem

The redundancy subsystem is designed to fail over to a backup server in the event of a single failure of the primary or controlling server. Please see the section titled Server Redundancy on page 13 for more details on this optional function.

### Configuration Subsystem

The real time database manages the configuration information downloaded by Configuration Studio.

### Point Structures

For process points (those points resident in CEE devices such as the C200 controller), a standard database point structure is built in the Real Time Database upon download to the device. This point structure includes a minimum of necessary parameters. Additional parameters are dynamically added to the point database as needed when requested for display, history collection, etc. This supports the dynamic cache (see the Acquisition and Control Subsystem section) by providing an explicit link to the data. In this way, the cache does not have to learn where to get the data each time it is subsequently requested.

The database also provides the following standard point structures:

- Analog point structure
- Status point structure
- Accumulator point structure
- User defined structure
- Algorithms
- Container points
- OPC advanced points

For further detail on the parameters associated with Analog, Status, and Accumulator point structures, please see page 29 in the Specification section of this document.

Each point in the database has a number of associated parameters, all of which can be referenced relative to a single tag name or 'composite point'.

### **User-defined Parameters**

With each of the above point types, it is possible to add user-defined parameters to the existing pre-built parameters. This enables tags to be extended to contain free format values, constant values, or values used by applications and scripts to store calculated or derived plant information. User defined parameters can be assigned to history collection.

### **User-defined Structure**

In order to support other types of data such as user entered or calculated data from application programs, the server provides a user-definable database area that is fully integrated into the system. Data contained in this database is accessible by:

- Custom Graphics
- Custom Reports
- Server based Application Programs
- Network based Applications Programs
- Composite points

### **Algorithms**

In addition to standard point processing functions and VB scripting, the system allows additional processing through the use of standard algorithms that may be attached to an analog, status or accumulator point. Functions provided by these algorithms include:

- Arithmetic calculations
- Boolean calculation
- Maximum/minimum value
- Integration
- Run hours totalization
- Group alarm inhibit
- Report request
- Application program request

### **Container Points**

Container Points support the Template Display capabilities. A container point combines a group of logically associated points into a single point structure. The container point parameters are flexible. For example, a container point could be built for a tank that includes the:

- Level
- Temperature
- Fill valve status
- Drain valve status
- Agitator status

### **Point Scripting**

With each standard SCADA and Process point, an easy-to-use VBScript can be attached to enable powerful point based scripts to be processed. These scripts can be enabled: OnAlarm, OnChange, OnNormal, OnAcknowledge and more. The powerful scripting environment also enables Library scripts to be created, enabling repetitive logic to be simply applied on many points. For further details, please refer to the section titled Server Scripting on page 9.

### **User-defined Data Formats**

Data formats convert field values into values that are more useful for operators and other applications. In addition to a wide range of standard data formats appropriate for the optional SCADA interfaces, you can create user-defined data formats for the OPC Client, Allen-Bradley, and Modicon Interfaces.

When a SCADA point is configured to use an unscaled user-defined data format, the value is formatted, but not scaled, prior to loading it into the parameter. Therefore, the scaling for each parameter that uses the format must be defined. Scaled user-defined data formats will format and scale a field value before loading it into the parameter.

### ***Enterprise Model***

With the volume of process and business information growing rapidly and pressure for increased efficiency continuing, the Experion Enterprise model provides sophisticated data support for today's operators and engineers. The enterprise model delivers a

consistent definition of all the data in the plant or mill, ranging from a high-end business view down to individual points. The enterprise model goes well beyond Distributed Control System capabilities by providing a unified framework for decision and diagnostic support that is used by engineers, operators, and applications.

Two unique components form the base of the enterprise model: the asset model and alarm groups. Details of the implementation and use of asset model and alarm groups are given in the sections below.

### **Asset Model**

The asset model represents the hierarchical organization of items in the enterprise, for example process units, individual pieces of equipment or facilities etc.

The operator navigates and manages the process from this intuitive hierarchical representation. Alarms are grouped and visualized using the asset model and similarly, when configuring an operator or station scope of responsibility, the engineer has the ability to manage this from the same hierarchical representation.

Assets and the asset model form the core of the Experion Enterprise Model and replace the flat area structure that was available in previous releases of Experion.

### **Alarm groups**

The alarm group functionality provides a mechanism to aggregate and indicate alarm status for a disparate collection of points. For example, points contained by several different assets may be in use on a single graphic. If the operator needs to have this graphic linked to an operator keyboard button, the Alarm Group can be used to represent the LED alarm states for all the points in use on the graphic.

## **Networking**

### **Fault Tolerant Ethernet**

Honeywell's patented Fault Tolerant Ethernet (FTE) network utilizes off-the-shelf networking hardware to allow Ethernet to

provide "DCS network" functionality. FTE provides a robust and high availability network infrastructure for communicating to Experion Stations, C200 controllers, ACE Nodes, etc. Refer to page 13 for more information about FTE. An FTE software license is bundled with the Server base software. FTE hardware can be added to implement the solution.

### **Ethernet**

Experion Servers also support an Ethernet network to communicate to nodes throughout the system.

### **ControlNet**

As an option, ControlNet can be used to communicate with C200 controllers. For more information, please refer to document EP03-300-200, Experion Controller Specification & Technical Data.

## **Server Scripting**

Server Scripting encompasses two features. The first provides scripting support to allow the behavior of the Server-resident subsystems and its run time objects to be extended. Examples of server objects are:

- Server
- Points and Parameters (described in the section titled Point Scripting)
- Reports
- Assets
- Tasks (Application Programs)

The user configures these scripts to be run by the server either periodically or when a specified event occurs. In addition, standard displays are supplied to allow the user to monitor the status of running scripts.

Example scenarios of when to use server scripts include:

- Raising an Urgent Alarm when Related Points Go into Alarm
- Changing the Ranges of Related Points
- Checking a Point's Value after It has Gone into Alarm
- Using Auxiliary Parameters to Store and Display Data
- Reading Data from a Text File
- Checking a Value at Regular Intervals

- Generating and Emailing Reports (see Figure 3)
- Capturing and Storing Data in a Text File
- Emailing in Response to Unacknowledged Alarms
- Launching an External Application
- Performing the Same Calculation on a Set of Points

Server's run time environment. Automation Controllers include products such as Microsoft Visual Basic, Word, Excel, Access and any programming environment that can use Microsoft COM objects.

Server scripting uses the Server OLE Automation Object Model as the means by which it interacts with the server objects. These two features together form the Server



**Figure 3. Server Scripting Editor**

The second feature is the Server OLE Automation Object Model that allows Automation Controllers to access and manipulate objects that exist within the

Scripting support. The architecture employed by Server Scripting gives it great flexibility and functionality. There are some tasks however, that are better suited to a custom application.

Consult Table 1 to help classify tasks into those that are well suited to Server scripting and those that are better addressed by a custom application. Some tasks qualify for both categories, and the rules are flexible when deciding what tasks can and cannot be

performed by Server scripts. Where possible, existing server functionality should be used in preference to writing Server scripts. Standard server functionality optimizes the task implementation.

**Table 1. Server Scripting versus Custom Application**

Task	Server Script	Custom Application
Extend server functionality via information transfer	Yes	Yes
Relatively short processing (< 50 lines of code)	Yes	Yes
Used to provide linkage to other applications via automation servers	Yes	Yes
Code is interpreted at run-time.	Yes	No
Code is compiled and optimized at build time.	No	Yes
Computationally intensive	No	Yes
Optimized for supervisory control	No	Yes
Iterative code	No	Yes
Relatively complex user interface requirements	No	Yes
Extensive file handling	No	Yes
Script (program) state preserved on failover	No	No
Language	VBScript	Visual Basic, C++, etc.

### ***Extended Event Archiving***

Extended Event Archiving may be used when the events logged by the system must be archived for later review. Storage capacity is dependent upon media capacity, but storage of over 1 million events is easily achievable. Approximately 60 Mb of hard disk space is required for every 100,000 events archived.

Archived events can be restored so that they are available for reporting. Event archives are restored to a playback database. They are then available for reporting and can be viewed on the Event Summary display.

### ***System Management***

The Experion infrastructure includes multiple PC-based nodes. To manage the PC based infrastructure as one system, Experion includes two key components to monitor PC performance in an integrated manner.

#### **System Performance Server**

The System Performance Server (SPS) collects real-time system information such as CPU usage and available free memory, from any Windows 2000 or Windows XP node. The SPS data is exposed as OPC data items and available to be historized, trended or displayed on a process graphic in a manner consistent with process data access. Additionally, any OPC Data Access Client has access to the data for use of the data in other applications.

#### **System Event Server**

Similarly to the SPS, the System Event Server (SES) collects and consolidates Windows 2000 and Windows XP Event Log information and exposes them as OPC alarms and events. For example an event can be generated when a node reports, via the Windows event log, that a disk is nearly full.

The Experion Alarm and Event subsystem is integrated with the System Event Server such that system related alarms or events can be viewed from the Alarm Summary display. The unique features of the alarm

summary display that apply to process alarms and messages can now be utilized with Windows system events. For example the system can be configured such that the operator must acknowledge a system alarm from the Alarm Summary display in the same manner that a process alarm is acknowledged.

### ***Configuration Studio***

Experion hosts an integrated environment that substantially improves engineering and configuration management.

Configuration Studio exposes engineering activities as tasks rather than tools to the user. All tasks are applied at a system level meaning that you can configure all the servers in your system from one location. A system is defined as one or more Experion servers, networked together and designated by the user to work together in a unified way.

Common tasks in Configuration studio will be performed within the Configuration Studio framework itself or launch specific applications such as Control Builder, Quick Builder or HMIWeb Display Builder.

Additions and modifications to the Experion database can be made while the system is on-line and Station and Configuration Studio can be accessed remotely using a Remote Engineering and Station Server.

#### **Control Builder**

Control Builder enables the configuration of control strategies in the Control Execution Environments (CEE) of the C200 and Application Control Environment (ACE). It is used to configure hardware – such as networks, I/O modules, controllers, and fieldbus devices – as well as control points – like regulatory control, device (motor) control, discrete logic, sequential logic and special user-defined functions. Further details about Control Builder can be found in the CEE-based Controller Specification & Technical Data document.

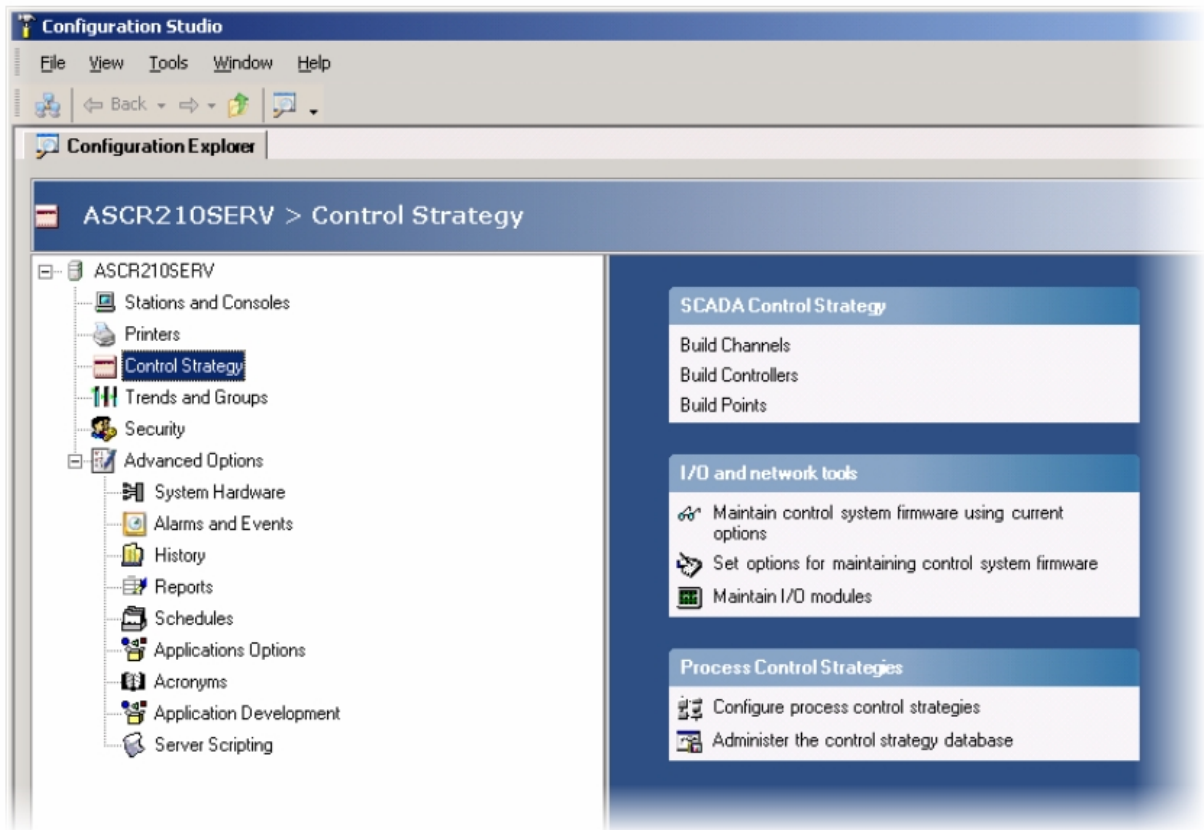


Figure 4. Configuration Studio sample display

### Quick Builder

Quick Builder allows users to configure points, communication links to controllers/RTUs, stations and printers. Quick Builder leverages a relational database engine to provide greater productivity through capabilities such as filtering user views of the database, multipoint edit facilities and the intuitive Windows style interface. Other features that

the relational database provide are the user-defined fields that can be used for termination schedules, wire numbers, etc., and a standard set of reports.

### HMIWeb Display Builder

HMIWeb Display builder is a powerful tool to create custom displays. Details about HMIWeb display builder can be found in document the Experion Station Specification & Technical Data document.

## Options

### Server Redundancy

The Experion Server is optionally redundant. The redundancy subsystem provides a high availability platform by enabling a pair of similarly configured servers to support each other in a primary/backup fashion. Should the Primary fail, a fully functioning Backup assumes the Primary role. Primary refers to the specific server that is actively acquiring data from the controllers/RTUs and serving data to the clients. The Primary propagates all database transactions to the Backup over a redundant network so that both databases remain in complete synchronization.

The backup server takes over from the primary server if one of the following conditions occurs:

- The primary server hardware fails and the backup cannot communicate with it
- All network links between the primary and backup server are broken
- The primary loses C200 communications
- A user does a manual failover

In addition to synchronizing necessary database files, the redundancy subsystem is capable of automatically copying user files from the primary server to the backup.

### Fault Tolerant Ethernet

As an alternative to conventional Ethernet redundancy schemes that typically employ two separate Ethernet networks, Experion can be deployed using FTE. The FTE software license is bundled into the Server license, so only FTE networking hardware is needed to implement the solution.

The FTE solution employs a single logical network over redundant media and does not require a server or station to re-establish a network connection. By providing more communication paths between nodes, FTE tolerates more faults, including all single faults and many multiple faults. In addition, FTE is transparent to higher-level

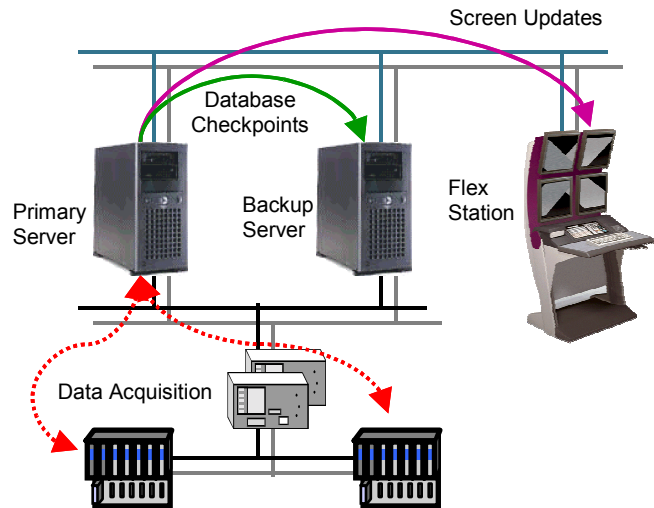


Figure 5. Server Redundancy

applications, which benefit from the high network availability FTE provides, without requiring any additional software configuration. Normal Ethernet nodes (non-FTE) can also connect to an FTE network and benefit from a more available communications environment than conventional Ethernet redundancy schemes offer.

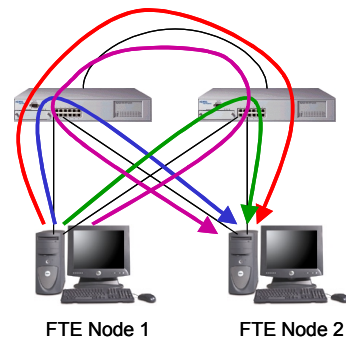


Figure 6. Sample FTE Configuration Showing Four Data Paths from One FTE Node to Another

For additional FTE information, refer to the FTE Specification & Technical Data document.

### ***Distributed Systems Architecture***

Distributed Systems Architecture (DSA) is the ideal solution for integrating processes when there are multiple control rooms, or for segmenting control across units. DSA provides the ultimate flexibility for both operations and control using an integrated security model, providing consolidated alarms and seamless data access amongst many other features.

Distributed Systems Architecture also provides the maximum flexibility for geographically distributed sites. For example, it allows multi-segment pipelines and oil and gas fields with a large number of wells to be managed from multiple remote locations, as well as a central control room – another industry first from Honeywell.

The figure below shows an example of a distributed system connected using a wide area network. The master control center accesses data from the servers at each remote site. It may or may not have its own locally connected controllers. The servers at the remote sites may also exchange information with each other logically creating a global database including:

- Global real time data access
- Trending of real time and historical system wide data, on a single trend
- Global alarming
- Global system messages

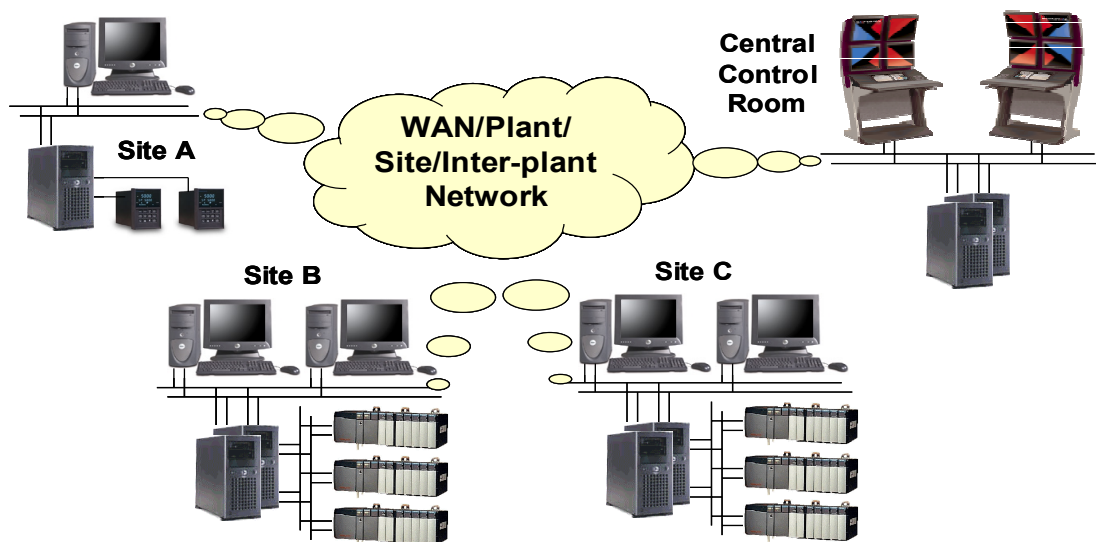
### **Consolidated Alarm Summary and Trending**

The Alarm Summary (for details on the Station Alarm Summary, please refer to the Experion Station Specification & Technical Data document) shows a consolidated list of local and remote alarms. The remote alarms displayed to an operator are those from the remote areas for which alarms are enabled on the local server, and which have been assigned to the Station or operator. Local and remote alarms can be filtered in the same way. The Station Alarm Zone shows the highest priority unacknowledged alarm, regardless of whether it is a local or remote alarm.

An operator can navigate directly to the Associated or Point Detail display for a remote alarm, just as for a local alarm.

Similarly, when a trend includes a remote point, historical data for that point is retrieved from the remote server in real time.

**Figure 7. Distributed Systems Architecture Example**



## Honeywell Systems Integration

Experion continues to provide a range of options for integrating Honeywell systems.

### TotalPlant Solution (TPS) System Integration

Experion provides full-scale integration of TPS using the Experion Server TPS and Experion Station – TPS. The details of these nodes are available in the Experion TPS Integration Specification & Technical Data document.

### Honeywell TDC3000 Data Hiway Integration

Experion provides a tight integration with a wide range of Honeywell TDC3000 Data Hiway devices. No other system can meet the level of integration provided by Experion for existing Data Hiway equipment.

Experion's Integration with TDC3000 begins at the Hiway layer. Using a Data Hiway

Ethernet Bridge, Experion is enabled as a preferred access device on the Hiway. This Bridge provides Experion with efficient Ethernet access to Hiway data and can coexist with other preferred access network devices, like the Basic Operator Station or Extended Operator Stations. The Data Hiway Ethernet Bridge is a Honeywell product, so it provides reliable, stable integration with the existing Data Hiway equipment. Bridges may be redundant for any Data Hiway. Multiple Data Hiways are supported with additional Data Hiway Ethernet Bridges.

All box/slot configurations on each box can be performed via system displays in Experion. No custom displays are required. Box status information can also be displayed directly in Experion with the supplied system displays. If Box errors are reported, a full description is immediately displayed on the Controller Summary Display, allowing an operator or engineer to take remedial action.

**Table 2. Supported TDC3000 Data Hiway Devices**

Controller Type	Acronym	Description/Notes
Basic Controller	CB	The Basic Controller handles continuous Input/Output operations. It accommodates I/O for eight modulating slots, plus eight analog inputs.
Extended Controller	EC	The Extended Controller handles continuous Input/Output and logical operations. It provides 16 modulating slots, 16 status outputs (8 SOA, 8 SOB), and 16 optional status inputs.
Multifunction Controller	MC	The Multifunction Controller (MC) and Advanced Multifunction Controller (A-MC) handle continuous Input/Output operations, logical operations, and sequential control for batch operations. Each MC and A-MC has the capacity to control 16 modulating slots and can handle: up to 32 analog inputs, up to 72 analog outputs, up to 256 digital inputs, and up to 64 counter inputs.
Advanced Multifunction Controller	A-MC	
Low Level Process Interface Unit (PIU)	LLPIU	PIUs are used when a large number of process variables need to be monitored or fed to a higher-level module.
High Level Process Interface Unit (PIU)	HLPIU	
Low Energy Process Interface Unit (PIU)	LEPIU	
Data Highway Port	DHP	The Data Hiway Port (DHP) and LCS 620 Hiway Interface Module (HIM) provide a generic interface for non-Honeywell devices, for example: programmable controllers, analyzers, tank gauging systems, machinery monitoring systems, emergency shutdown systems, data acquisition systems, and compressor control systems.
LCS Hiway Interface Module	HIM	The 620 LCS programmable controller can optionally interface directly to the Data Hiway using a Hiway Interface Module (HIM) that plugs into the processor rack of the controller.
Reserve Basic Controller Director	RCD	The Reserve Basic Controller Director, Reserve Extended Controller Director and Reserve Multifunction Controller Director are used to monitor the status of the primary and backup controllers when redundant controllers are configured. They are also used to switch control from the primary controller to the backup, and back again to the primary if required.
Reserve Multifunction Controller Director	RMCD	
Reserve Extended Controller Director	RECD	

Experion provides a CL/MC (Control Language for Multifunction Controller) compiler, which has the same capability as the CL/MC compiler used in TPS systems. This allows the user to write, compile and manage control strategies for the Multifunction and Advanced Multifunction Controllers, in Experion. The compiler also allows the CL/MC source code from a TPS system to be re-compiled on the Experion Server after TPS specific tags have been replaced with their Experion equivalents. While Experion is not able to compile SOPL programs (the language used by EOS Stations), it can be used to upload and download the compiled object code to the controllers.

Services are also available with the Experion TDC3000 Integration to electronically convert your existing EOS/BOS Hiway databases and perform SOPL to CL conversions. This unique service takes your existing 8" or 5 1/4" database images and builds a compatible version in Experion.

#### **Honeywell Safety Controller Integration**

Honeywell provides two safety controller platforms:

- Fail Safe Controller (FSC) - the proven safety controller, with a installed base of more than 5000 systems and
- Safety Manager - the next generation safety controller.

Experion can unify with both safety controller platforms into a single plant-wide safety system architecture. The safety controller platforms, with its high diagnostic-based Quadruple Modular redundancy

(QMR™) technology, increase system diagnostic capabilities and improve system tolerance for critical applications.

The safety controller platforms integrate into the Experion platform in two ways:

- Single or redundant Ethernet connection to the Experion Server (with or without FTE)
- Single or redundant fault tolerant serial link to the Experion Server

A redundant Ethernet integration with Experion delivers a TÜV approved redundant, fault tolerant integration, irrespective of whether the safety controller is redundant or not. Detailed safety controller status and extended diagnostics are available to Experion Station. The redundant safety controller contains two separate TÜV AK 6 (SIL3) approved Ethernet communication interfaces (covered by sophisticated diagnostics) communicating real time fault tolerant data synchronously to Experion. If a connection via Ethernet is not possible, a redundant, fault tolerant, RS232 or RS485 serial link is supported.

The safety controller Sequence of Events (SOE) functionality is integrated with Experion. Signals configured for SOE are time stamped by the safety controller and transferred to the Experion Server upon read request. The request frequency is configurable. Additionally, the safety controller and Experion Server can be configured to implement time synchronization. Data acquisition and control is managed as described in earlier sections with the advanced capabilities of report by exception scanning for high performance.

### ***On-Process Migration***

This optional feature provides the ability to migrate the software from a current release to the next available release without taking the Experion System off-line. In other words, Experion stays on-line allowing the operators to maintain their view and control of the process during the upgrade procedure.

On-Process Migration is available for the Experion Servers and controllers when configured with redundancy. This section expands upon the Server On-process Migration capabilities. Please refer to document EP03-300-200, Experion Controller Specification & Technical Data for more information regarding the controller On-process Migration capabilities.

When configured for redundancy, this feature allows the Server's software to be upgraded. This involves the following process:

1. The backup Server node will be taken offline and upgraded to the new release and restarted.
2. The newly upgraded Server will then be synchronized with the running primary (previous release) Server node.
3. The Server nodes will be placed in a dual primary mode. In this mode the upgraded Server node's operation may be tested and confirmed against the previous release Server node.

4. Once the upgraded Server node's operation is confirmed the previous release Server node can be stopped and upgraded to the latest release software.
5. The Server node last upgraded is then started and synchronized returning the system to a standard redundant configuration.

### ***OPC Connectivity Options***

#### **About OPC**

OPC (OLE for Process Control) consists of a set of standards that define interoperability amongst different automation and control applications, field systems and devices, and business and office applications. For



detailed information about OPC, visit the OPC Foundation's

Web site, <http://www.opcfoundation.org>.

OPC provides data from a data source (server) and communicates the data to any client application in a standard way, thereby eliminating the requirement for an application to have specific knowledge about a particular data source, such as its internal structure and communications protocols.

Experion integrates OPC with DCS technology to create the most flexible and powerful OPC suite available, with a broad range of Client, Server and redundancy OPC technologies as highlighted in the table below.

**Table 3. OPC Connectivity Options**

OPC Connectivity Tool	Features	Version support	OPC Data Access Clients	OPC Alarms & Events Clients	OPC Data Access Servers	OPC Alarm & Event Servers	Ancillary OPC applications
<b>OPC Advanced Client</b>	Integrates complex data structures and their corresponding alarms into Experion.	Supports OPC A&E version 1.01, and OPC DA version 2.0	√ (mapped to OPC advanced points)	√			
<b>OPC Display Data Client</b>	Brings OPC Data into displays without having to build points.	Supports OPC DA version 2.0	√ (display only)				
<b>OPC Client Interface</b>	Maps information from an OPC Data Access server into Experion SCADA points for the purposes of historization, control and alarming.	Supports OPC DA versions 1.0 and 2.0	√ (mapped to Experion SCADA points)				
<b>OPC Data Access Server</b>	Allows OPC Data Access Clients to view Experion point data and the hierarchical asset.point.parameter structure	Supports OPC DA versions 1.0 and 2.05			√		
<b>OPC Alarm &amp; Event Server</b>	Exposes Experion's alarm & event data via the OPC Alarm & Event Standard	Supports OPC A&E version 1.01				√	
<b>OPC Integrator</b>	An open method allowing bi-directional data transfer between two or more systems for the purpose of supervisory monitoring, alarming and control.	Supports OPC DA version 2.0					√
<b>Redirection Manager</b>	Provides OPC Server redundancy by transparently redirecting client requests to a secondary OPC Server when the primary OPC Server is unavailable.	Supports OPC DA versions 1.0 and 2.05. Supports OPC A&E version 1.01					√

**OPC Advanced Client**

The OPC Advanced Client option contains the OPC Advanced Alarm & Event Client and the OPC Advanced Data Client. The OPC Advanced Client solution provides the unique capability to integrate complex data structures and their corresponding alarms into Experion.

OPC alarms are displayed and acknowledged in the same way as Experion alarms, giving operators a uniform user interface. For example, when an OPC alarm is received, it appears in the Alarm Summary; and when an operator acknowledges the alarm, confirmation of the acknowledgement is sent to the OPC alarm and event server.

**OPC Advanced Alarm & Event Client**

The OPC Advanced Alarm & Event Client allows Experion to seamlessly integrate Alarm & Event Data from other OPC Alarm & Event Servers directly into the Experion Alarm Summary.

Facilities are provided for mapping assets from the source OPC Alarm & Event Server into Experion assets. Functionality is also provided to map alarm attributes from the

source OPC Alarm & Event Server into Experion's alarm attributes.

### **OPC Advanced Data Client**

The Experion OPC Advanced Data Client is primarily designed for integrating complex subsystems, such as distributed control systems. Such systems typically have point-like structures that are defined as complex data structures.

OPC items are mapped to OPC advanced points. OPC advanced points are built in Configuration Studio and licensed as SCADA points. The OPC advanced point supports creating arbitrary point parameter names to reference OPC items.

After the OPC advanced points are built, they can be added to trends, custom displays, group displays, similar to other point types in Experion.

### **OPC Display Data Client**

The OPC Display Data Client is standard functionality in Experion and allows the user to insert OPC Data into a display without the need to build points (the user is not required to purchase points for when accessing OPC data using this client). This is ideal for data that just needs to be visualized by the operator and does not need to be alarmed, historized, etc. OPC Data that is acquired in this fashion supports both reads and writes.

OPC data items can be added directly to custom displays without having to build points in Configuration Studio.

### **OPC Client Interface**

The Experion OPC Client Interface is primarily designed to integrate low-complexity subsystems, such as PLCs, RTUs, single loop controllers etc. Configuration involves individually mapping OPC items to Experion SCADA points (analog, status and so on). If alarming is required, configure the associated point's alarm properties.

This interface should be used whenever there is a requirement for Alarming and there is no OPC Alarm & Event Server present.

### **OPC Data Access Server**

The OPC Data Access Server functionality allows OPC Data Access Clients to view Experion Point data for control, plant-wide historization, etc.

The OPC Data Access specification's optional point browse section has been implemented, allowing OPC Data Access Clients to view the hierarchical Asset.Point.Parameter structure of the Experion Server.

### **OPC Alarm & Event Server**

The OPC Alarm & Event Server is designed to expose Experion's Alarm & Event data in an open manner to applications that require this information.

### **OPC Integrator**

OPC Integrator is an open method allowing bi-directional data transfer between two or more systems for the purpose of supervisory monitoring, alarming and control. This type of interface is commonly called an OPC Double Headed Client.

OPC Integrator is valuable in the following scenarios:

- A system provides an OPC data access server, but not an OPC client. The system needs to retrieve data from Experion.
- Experion data needs to be transferred to a third-party OPC server whenever it changes, irrespective of the reason for the change (including when the data is changed by an operator).
- A system includes Experion process controllers and needs to transfer data efficiently between those controllers and some SCADA interfaces at the supervisory control layer.

OPC Integrator has many built-in features to ensure robust communication between OPC Servers. OPC Integrator supports redundant Experion Servers and is therefore itself redundant. OPC Integrator also supports redundant third party OPC Servers natively. While OPC Integrator supports redundant OPC Servers natively,

for the ultimate in OPC redundancy support, Redirection Manager (RDM) is recommended, offering benefits outlined below.

There are many engineering timesaving features included with OPC Integrator, such as:

- The ability to browse assets, points and parameters that exist on the source or destination OPC Server,
- The ability to browse OPC Server ProgID's on a particular server, and
- Bulk item, import and export utilities.

While OPC Integrator could be used to transfer data between two or more Experion Servers, DSA has been specifically built for this application. DSA allows data to be transferred, and also transfers alarms, history, security, and messages, in a secure efficient manner.

### **Redirection Manager**

Redirection Manager (RDM) provides OPC Server redundancy by transparently redirecting client requests to a secondary OPC Server when the primary OPC Server is unavailable.

RDM is typically used by third party OPC Data Access and Alarm & Event Clients when connecting into the Experion OPC Server. Because the Experion OPC Server is redundant, third party clients don't intuitively know how to handle Experion's redundancy schema. When a third party client connects into the Experion OPC Server using RDM, handling of Experion's redundancy schema is handled transparently.

RDM can be used by Experion OPC Clients that don't handle redundant OPC Servers natively such as the OPC Display Data Client and the OPC Advanced Client. Other Experion Clients that are redundancy aware can also take advantage of RDM for its superior redundancy capabilities.

RDM features include:

- Support for both OPC Data Access and Alarm & Event standards.

- Group and Item synchronization across two active OPC Data Access servers.
- RDM will start the OPC Server if the secondary node is available but does not have the OPC server running.
- Consolidates OPC connections instead of OPC Clients making separate connections into an OPC Server.

### **SCADA Interfaces**

In addition to a wide range of OPC tools, Experion provides dedicated Data Acquisition and Control facilities to communicate with a wide range of controllers and Remote Terminal Units (RTUs), listed in Table 4.

Experion supports acquisition of data using either:

- Periodic Scanning – utilizing this technique, Experion optimizes communications traffic by automatically calculating the minimum number of scan packets required to collect the data.
- Report by Exception (RBE) – where supported by the controller, this technique is used to reduce the scanning load of the system while improving system response.

If necessary, periodic scanning may be used in conjunction with RBE to ensure data integrity.

### **On-line Configuration**

Given a sufficient level of system privilege, it is possible for users to view, manipulate and analyze all data related to the SCADA interfaces. For example a user at any Operator Station in the system (including those operating remotely) could change an alarm limit for a point in an RTU.

### **Diagnostics**

Once a controller or RTU is configured and placed in service, Experion automatically performs diagnostic scanning of the device. Additionally, Experion performs checks on data integrity of all data acquired from the controller. Should an invalid or timed-out response be received, the data is ignored and the transaction is recorded as an error. Statistics are kept and displayed by the

system on communication errors by means of a communications barometer. The barometer value will increment for every failed call and will decrement for each successful call. In addition, the system alarms separate *marginal* and *failure* conditions based on user-defined limits to advise the operator of a controller that is in error. Communications statistics are

displayed on a standard system display and are available through the reporting sub-system or custom displays. If a controller fails, all point parameter values that are sourced from it are indicated as bad to the operator.

**Table 4. Interfaces with Connection Details**

SCADA Interface Software	Connection Type
Honeywell FSC and Safety Manager Integration	Serial and Ethernet
Honeywell S9000 Integration	Ethernet
Honeywell 620 LCS Serial and Ethernet Interface	Serial and Ethernet
Honeywell UDC 3000/5000/6300 Integration	Serial ASCII
Honeywell Micromax LPU & Video Paperless Recorder	Serial
Honeywell XLNET HVAC Controller Interface Software	CBus
Honeywell DPR Recorders (DPR 100, 180, 250, 3000)	Serial
Honeywell RM7800 Flame Safeguard	Serial (to Q7700 Network Interface)
Honeywell Universal Modbus Interface (HC900, UMC800, Trendview, DPR180/250, UDC2300/3300, DR4300/4500)	Serial and Ethernet
Allen-Bradley Serial Interface (Does not require RSLinx)	Serial
Allen-Bradley RSLinx Interface	Serial, Ethernet, DH+, and ControlNet
Applicom Interface	Proprietary
Asea Interface	Serial
Bristol Babcock RTU Interface	Serial
DNP3 Protocol Interface	Open Standard Serial and Ethernet (UDP)
GEC GEM80 PLC Interface	Serial
GE Fanuc Series 90 PLC via Ethernet (requires MZ-AUIF01)	Ethernet
HITACHI Interface	Serial
Modbus (RTU, Plus, ASCII, & TCP) Interface	Serial, Modbus+, Ascii and Ethernet
Moore 351,352,353,383 Interface	Serial
Moore APACS Interface	Ethernet and Modulbus
Siemens S5/S7 & TI PLC Via H1 / TF API	H1/Industrial Ethernet
YamatakeMA500 Interface	Serial

**Open Data Access**

Whenever another application requires data from the Experion database, Open Data Access is required. For example, Open Data Access is required when:

- Reading data into a Microsoft Excel Spreadsheet
- Running a query on the database from Microsoft Access
- A user written application is accessing the database

Each is considered a 'user' of Open Data Access. The two main components to Open

Data Access are the ODBC Driver and the Network Server.

**ODBC Driver**

ODBC is a standard set of function calls for accessing data in a database. These calls enable utilizing Structured Query Language (SQL) queries on the database. ODBC can be used in any client/server architecture, regardless of whether the database and client application are resident on the same computer, separated by a network, or even if

they are on different computers using different operating systems.

The ODBC Driver allows the Server database to be queried using SQL commands from ODBC client applications, such as Microsoft Access. Additionally, custom application written in Visual Basic or C++ can also access the server database via the ODBC Driver. The Server database is exposed as a number of read-only ODBC tables including Points, Event History and Process History. Driver features include:

- Open read-only access to plant real-time and historical data
- Throttling to prevent performance impact
- Redundancy of data storage
- Fully functional examples for productivity improvements

It is optimized for Microsoft Access and other ODBC ad hoc query/report applications.

The Experion ODBC driver has two parts: the ODBC Server and the ODBC Client. The ODBC Client handles the ODBC call made by a client application and passes it to the ODBC Server. The ODBC Server processes the ODBC calls, queries the Experion server database and returns the information to the client application. The ODBC Server always runs on the Experion server computer. The Experion

ODBC Client can run on the server or on any other computer on the network. Figure 8 shows a basic Experion ODBC driver configuration.

### Network Server

The Network Server provides extremely efficient, access to the Experion database for network based applications such as Microsoft Excel Data Exchange and Network API options.

- Microsoft Excel Data Exchange allows Microsoft Excel to obtain real-time and historical data from the Experion system. This option provides read and write access to data in one or more Experion Databases, providing a powerful data consolidation and reporting tool. Wizards for Microsoft Excel are included to help set up the data to be collected.
- Applications executing on other network-connected platforms may easily access Experion real-time data over the network using the Network API. The API provides high-level subroutine calls in Visual C/C++ or Visual Basic to allow read/write access to Experion data in a networked environment.

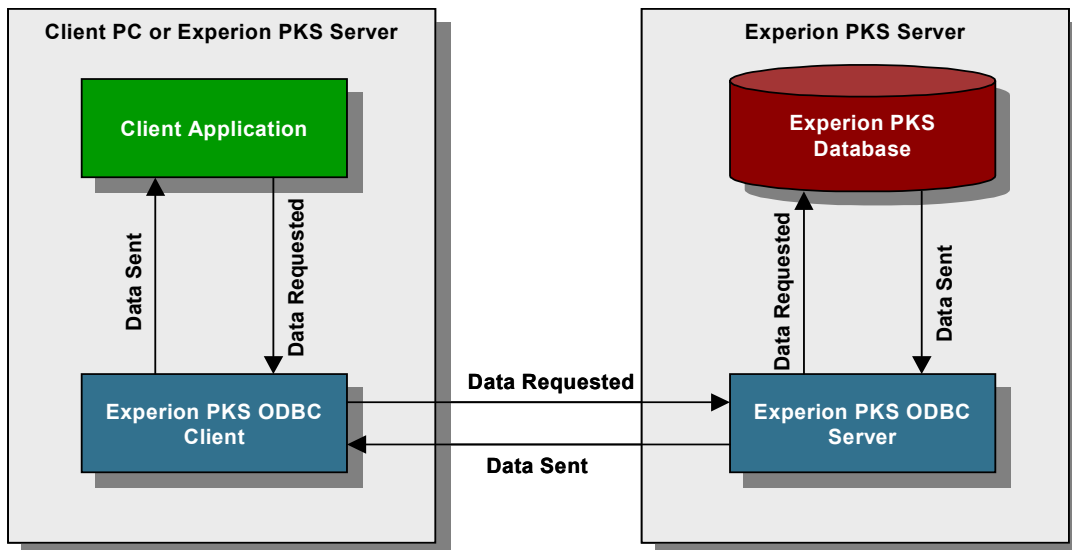


Figure 8. Accessing Data via the ODBC Driver

## **21 CFR Part 11**

The Experion Server provides enhanced capabilities to support the Pharmaceutical industry and other FDA regulated industries and their unique requirements related to regulations such as 21 CFR Part 11. These features may be employed in any industry but are specifically designed to meet the guidelines of 21 CFR Part 11.

### **Electronic Signature Option**

This option enables the following:

- Electronic Signatures on C200 Messages
- Electronic Signatures on SCADA points
- Journaling of OPC Server changes to the database
- Journaling of Network Server changes to the database
- Electronic Signatures on Point Scheduler
- Support for reason sets for control actions on SCADA points
- Journaling of changes that have been made to the Server database using Quick Builder. Full Printed name of the user that performed the download will be recorded.
- Ability to securely enable and disable Electronic Signatures by location.

In addition to the electronic signature option the following technical controls to meet 21 CFR Part 11 compliance are available as standard functionality:

- System must be running to perform Quick Builder downloads.
- Only windows users that are also Experion operators can perform Quick Builder downloads.
- The system will default to using Full Operator name in events on startup and the field to change this setting is not shown on the system configuration display.

### **Application Enablers**

The Experion Server provides powerful application enablers with configurable (rather than programmatic) facilities to support individual application requirements. Application implementation time is greatly

reduced, providing extremely cost effective automation.

### **Batch Reporting**

Batch Reporting enables integrated reporting of batches or lots of a production process run, to be compiled and archived automatically by the Experion Server. This feature enables batch history and events to be output either as a CSV file or directly into Microsoft Excel, if available. The Batch Report option is designed as a simple discontinuous batch or lot reporting option. For a complete batch solution with Experion, please refer to TotalPlant Batch (TPB), which is completely integrated with Experion providing advanced batch control and advanced reporting tools.

### **Recipe Management**

Recipe Management provides facilities to create recipes and download them to nominated process units. Each recipe may have up to thirty items, with recipes chained together to form larger recipes, if required. Recipe items may be used to set ingredient targets, set alarm limits, set timers and place equipment into correct operating state. Items may be individually enabled for scaling.

### **Point Control Scheduler**

The Scheduler option allows point supervisory control to be automatically scheduled to occur at a specified time. This may occur on a "one-shot" basis, daily, workday, weekend, holiday, or a day of the week.

### **Alarm Pager**

The Alarm Pager option provides the ability to page, SMS or email Experion operational and system alarms.

Alarms can be forwarded to one or multiple recipients, and can be escalated to another recipient if an alarm remains unacknowledged. The availability of each recipient can be defined such that alarms are only sent to those that can attend to them.

Alarm pager can be configured to use a service provider or a local base station for the broadcast of pages or SMS messages.

The information that is forwarded can be custom designed to include values such as Time, Date, Point ID, Alarm, Priority, Description and Value etc

The Alarm pager option can be used in a variety of ways. For example it allows operators to move away from their control room desk or can be used to alert non-operational personnel to specific alarms.

### **ODBC Data Exchange**

This option enables two-way exchange of data between the Experion Server database and an ODBC-compliant local or network third-party database. It uses standard Structured Query Language (SQL) commands. The Experion Server acts as a client application in this configuration, in contrast with the ODBC Driver option where the Experion Server acts a server application. Data from an Experion Server database can be transferred to a third-party database, and data from a third-party database can be transferred into the Experion Server database. Information exchanged includes point values, point history, and user file data. Databases that include ODBC drivers include Microsoft SQL Server, Oracle 7, Microsoft Access, and Sybase 10. This option can be configured to periodically exchange data or exchange on request.

### ***Application Toolkit***

Two application-programming interfaces (API) are available. The first is for applications written to execute on the Experion Server and the second is for applications that are required to run on network-based clients (that are not necessarily operator stations).

The API (programmed in C/C++) on the server includes the following functions:

- Read and write to point parameters in the database
- Access to historical data
- Initiate supervisory control actions
- Access to the alarm/event subsystem
- Access to user-defined database
- Provide a prompt for operator input

The API (programmed in Visual Basic or Visual C/C++) on the network-based clients includes the following functions:

- Read and write to point parameters in the database
- Access to historical data
- Initiate supervisory control actions
- Access to user-defined database
- Create alarms/events

## Specifications and Sizing

### Server PC

A PC must meet the following specifications to be used as an Experion Server. These guidelines are intended to provide a minimum baseline. Honeywell-supplied platforms will meet these specifications but may not necessarily be the example platforms listed below. PCs purchased directly through Honeywell carry full support as a qualified offering.

The table below lists suggestions per system size configuration.

#### Minimum System

This is the minimum hardware necessary to run the Experion components. It should be used for small configurations that may consist of 1 non-redundant Experion Server with 1 Station or 1 Redundant Experion Server pair with 1 Station. The system typically only includes passive monitoring and occasional report generation from a single screen.

#### Standard System

Configurations will consist of non-redundant Experion Server and multiple Stations or a Redundant Experion Server pair with up to 1 DSA Server. A non-redundant Server can support up to 10-12 Stations or a Redundant Server can support 6-8 Stations. This type of system includes 1 or 2 Stations with a single or dual screen actively monitoring and occasional report generation.

#### Performance System

An advanced configuration may consist of a Redundant Experion Server pair, multiple DSA Servers, and greater than 12 Stations with single, dual, or quad screen configurations. This system typically includes active monitoring from multiple Stations and random report generation.

System Configuration	Minimum Server/eServer	Typical Server/eServer/Remote Engineering and Station Server	Performance
Processor	Dual 2 GHz Xeon or Faster	Dual 2.4 GHz Xeon or Faster	Dual 3 GHz Xeon or Faster
RAM	1 GB <sup>1</sup>	2 GB	2 GB
Networking	100 Mb Ethernet	100 Mb Ethernet	100 Mb Ethernet 1000 Mb Ethernet
Video Resolution	1024 x 768, 65K colors	1024 x 768, 65K colors	1024 x 768, 65K colors
Hard Drive	36 GB	36 GB	36 GB
Operating System	Windows 2000 Server	Windows 2000 Server	Windows 2000 Server
Example Hardware <i>Please contact your Honeywell representative for Honeywell-supplied platform details.</i>	Dell PowerEdge 1600, Dual CPU	Dell PowerEdge 1600, Dual CPU or Dell PowerEdge 2600, Dual CPU	Dell PowerEdge 1800, Dual CPU or Dell PowerEdge 2850 Dual CPU
<i>Note 1 – In these configurations, paging may occur on these systems. Based on the intended usage of the platform, this configuration is acceptable. For better performance, users should upgrade the systems with an additional 512 MB of RAM.</i>			

### Redundancy Performance

The Experion Server redundancy option is an extremely robust and mature subsystem designed to provide the highest possible availability with the following specifications:

	Specification
Checkpoint Period	Default setting is 300 seconds (5 minutes)
User-defined File Backup Period <sup>1</sup>	Default setting is 60 minutes
<i>Note 1 – This is the file backup for user-defined files. This is not to be confused with the automatic synchronizing of database files between the primary and backup servers.</i>	

### Database Sizing

The Experion Server database is sized per the following specifications:

Database Item	Default Size	Maximum Size
Point Count <sup>7</sup>	50 → 20,000 Process Points 50 → 65,000 SCADA Points	Process Points + SCADA Points ≤ 65,000 Points
Experion Station – Flex Connections	1 → 40	40 <sup>2</sup>
Experion Station – Console Connections	0 → 10	10 <sup>3</sup>
Experion Station – Console Extension Connections	0 → 3 per ES-C	0 → 3 per ES-C <sup>3</sup>
Printer Connections	50	50
Channels	90	99
SCADA RTUs (Controllers)	100	255
Algorithm Blocks	6000	6000
Assets	4000	4000 <sup>4</sup>
Assignable assets <sup>5</sup>	1000	1000
Nesting depth for asset hierarchies	10	10
Children per asset	No Limit ( up to the 4000 total assets)	No Limit ( up to the 4000 total assets)
Alarm groups <sup>5</sup>	5000	5000
Nesting depth for alarm group hierarchies	5	5
Children per alarm group	500	500
DFDs (Dynamic Objects) on Named Displays	1000	1000
Trend Sets	3000	3000
Operating Groups	16000	16000
Reports	1000	1000
Point Control Schedules	1000	1000
Operators	1000	32767
Recipes	500	32767
Concurrent Alarms	1000	1000
Concurrent Messages	1000	1000
Stored Events	32000	32767
Extended Events	Limited by hard disk size	Limited by hard disk size
STD History Point Parameters	2000	10000
EXTD History Point Parameters	2000	10000
FAST History Point Parameters	1000	10000 <sup>7</sup>
Number of User Files	3	150
Number of Application Tasks	80	80
Point Lists	2000	2000
SOE Entries	10000	32767

- Note 1 – The Experion database can be comprised of a mix of SCADA and Process Points in increments of 100 Points.*
- Note 2 – When a system includes Process Points, the number of Stations connections may need to be limited to keep the data access performance within specified limits (see the Data Access Performance table). Servers with large numbers of Process Points may be limited to supporting a maximum of 20 Station connections.*
- Note 3 – The total number of Stations connected to one Experion Server is limited to 40. Stations counting toward this limit include both ES-F, ES-C nodes and ES-CE nodes. Total of ES-C and ES-CE nodes combined cannot exceed 20. No more than 10 ES-C nodes are supported within the server.*
- Note 4 – The asset model represents the hierarchical organization of items in the enterprise, for example process units, individual pieces of equipment or facilities etc. This specification is a limit for a system that could be comprised of multiple servers.*
- Note 5 – Assignable assets provide a way to assign assets to an operator's scope of responsibility. An assigned asset includes all asset children of the assigned asset including any points associated with those assets or any alarm groups that have been designated by that asset for scope of responsibility purposes.*
- Note 6 – This specification is a limit for a system that could be comprised of multiple servers.*
- Note 7 – This is a server limitation only. The actual amount of data that can be retrieved depends on the data source.*

### **History Collection**

The on-board history collection system of the Experion server is composed of three history classes. To support daylight savings and time zones, all collected data is historized in Universal Coordinate Time (UCT) time stamp.

<b>History Class</b>	<b>Size</b>
Standard History	<ul style="list-style-type: none"> <li>• 1 minute snapshot</li> <li>• 6 minute average</li> <li>• 1 hour average</li> <li>• 8 hour average</li> <li>• 24 hour average</li> </ul>
Fast History	<ul style="list-style-type: none"> <li>• Stores snapshots at regular intervals — called the fast history interval. This user selected interval can be 1, 2, 3, 4, 5 (default), 10, 15, or 30 second snapshot</li> </ul>
Extended History	<ul style="list-style-type: none"> <li>• 1 hour snapshot</li> <li>• 8 hour snapshot</li> <li>• 24 hour snapshot</li> </ul>

## History Sizing

The Experion Server history subsystem meets the following specifications:

	Default Duration	Default Number of Samples	Maximum Duration	Maximum Number of Samples
<b>Standard History</b>				
1 minute snapshot	24 hours	1442	69 days	100,000
6 minute average <sup>1</sup>	7 days	1682	416 days	100,000
1 hour average <sup>1</sup>	1 month	746	11.4 years	100,000
8 hour average <sup>1</sup>	3 months	281	91.2 years	100,000
24 hour average <sup>1</sup>	1 year	368	273.8 years	100,000
<b>Extended History</b>				
1 hour snapshot	3 months	2233	11.4 years	100,000
8 hour snapshot	1 year	1099	91.2 years	100,000
24 hour snapshot	3 years	1831	273.8 years	100,000
<b>Fast History <sup>2</sup></b>				
1 second snapshot	2 hours	7262	27.8 hours	100,000
2 second snapshot	4 hours	7262	55.6 hours	100,000
3 second snapshot	6 hours	7262	3.5 days	100,000
4 second snapshot	8 hours	7262	4.6 days	100,000
5 second snapshot	10 hours	7262	5.8 days	100,000
10 second snapshot	20 hours	7262	11.6 days	100,000
15 second snapshot	30 hours	7262	17.4 days	100,000
30 second snapshot	60 hours	7262	34.7 days	100,000
<p>Note 1 – The averages are calculated using the 1-minute base interval. That is, 6-minute averages are calculated on six 1-minute values.</p> <p>Note 2 – Only one of the Fast History intervals can be configured per server. The 5-second snapshot is the default Fast History interval.</p>				

### **Real Time Database SCADA Point Structures**

The following point structures and associated parameters are provided in the Real Time Database when interfacing to SCADA devices.

Point Structure	Standard Parameters		
<b>Analog</b>	• Point Name	• Scan Status	• SP Low Limit
	• Point Description	• OP High Limit	• 0% & 100% Range
	• Control Deadband	• Scan Period	• Operator Control Level
	• Process Variable	• Scan Address	• OP Low Limit
	• Setpoint	• Control Timeout	• PV Clamp Flag
	• Normal Mode	• Alarm Permit Flag	• Engineering Units
	• Output	• Alarm Status	• Drift Deadband
	• Mode	• Up to 8 Alarm types <sup>1</sup>	• Alarm Deadband
	• SP High Limit	• Alarm Status	• Associated Display
<b>Status</b> <sup>3</sup>	• Up to 4 user definable inputs	• PV Last Processed Time <sup>2</sup>	
	• Point Name	• Output	• Output Pulse Width
	• Point Description	• Scan Status	• Re-Alarm Status
	• Output Width	• Normal Mode	• Associated Display
	• Process Variable	• Scan Period	• Alarm Permit Flag
	• Control Timeout	• Scan Address	• Input Width
	• Mode	• Alarm Priority	• Control Failure Alarm Priority
<b>Accumulator</b> <sup>4</sup>	• PV Last Processed Time <sup>2</sup>	• Operator Control Level	
	• Point Name	• Scan Status	• Output Pulse Width
	• Point Description	• Normal Mode	• Re-Alarm Status
	• Output Width	• Scan Period	• Associated Display
	• Process Variable	• Scan Address	• Input Width
	• Control Timeout	• Mode	• Alarm Priority
	• Output	• Alarm Permit Flag	• PV Last Processed Time <sup>2</sup>
• Operator Control Level	• Control Failure Alarm Priority		
<p><i>Note 1 – Supported alarms include: PV Hi, PV Lo, PV HiHi, PV LoLo, Deviation Hi, Deviation Lo, Transmitter Hi, Transmitter Lo, Rate of Change, Control Fail, and Control Timeout. Each of the configured alarms can be assigned a priority ranging from Journal, Low, High to Urgent. An alarm sub-priority (0 to 15) can also be assigned to further differentiate alarms.</i></p> <p><i>Note 2 – Each time the PV is polled from the RTU, Experion will track and maintain the time/date of <u>when the value last changed</u>, or more specifically, was last processed. If the Analog point in Experion, has a drift deadband of 1%, then the last processed time is not updated until the PV moves by &gt;1%. Similarly, if the drift deadband is 0%, then the last processed time is not updated until the PV moves slightly.</i></p> <p><i>Note 3 – The PV of a status point can range from a single bit to a three bit digital input, allowing up to eight possible states.</i></p> <p><i>Note 4 – Data associated with pulsed inputs are stored in the system in an accumulator point type that will provide automatic tracking of instrument rollover.</i></p>			

### Data Access Performance

The following specifications apply to the acquisition and control subsystem of the Experion Server:

	Specification
Maximum PPS from all Experion Controllers (C200, FIMs, and IOLIMs); not including ACE <sup>1</sup>	4000 PPS
Maximum PPS from all ACE nodes (Ethernet and FTE)	2000 PPS
Maximum DSA PPS from each remote DSA Server	1000 PPS
Maximum OPC PPS from all configured OPC Servers	1000 PPS <sup>2</sup>
Maximum number of remote OPC Data Access Servers subscribed to by the Experion PKS Server (OPC Data Access Client)	15
Maximum OPC PPS published to all OPC Clients	2000 PPS <sup>3</sup>
Maximum number of remote OPC Data Access Clients supported by the Experion PKS Server (OPC Data Access Server)	5
OPC Display Data Client: Maximum number of data values per display	40
OPC Display Data Client: Total number of data values per OPC server	1000 <sup>2</sup>
<i>PPS – Average parameters per second</i>	
<i>Note 1 – Not including SCADA interfaces to the server (i.e. A-B PLC 5, FSC, etc.)</i>	
<i>Note 2 – This figure represents the theoretical maximum performance of the Experion OPC clients. Third Party OPC Server performances vary considerably. Please check the performance of the target OPC Server for precise performance figures</i>	
<i>Note 3 – This figure represents the theoretical maximum performance. Parameter data from a given communications subsystem can be retrieved no faster than the performance capabilities of that subsystem.</i>	

### Notification Performance

The following specifications apply to the Alarm & Event subsystem of the Experion Server:

	Specification
Maximum number of events (burst condition)	1000 events <sup>1</sup>
Maximum number of sustained events/second	40/sec
Maximum number of sustained alarms/second <sup>2</sup>	20/sec
Maximum number of remote OPC A&E Servers subscribed to by the Experion Server	5 <sup>3</sup>
Maximum number of remote OPC A&E Clients supported by the Experion OPC A&E Server	15
<p><i>Note 1 – The Experion Server Alarm System will handle an event burst of up to 1000 events, with a minimum time between consecutive bursts. An “event burst” is defined as a group of events greater than 40/sec, received from all connected Event Servers in a period of less than 3 seconds. The time period required between consecutive bursts, to allow for event processing, can be calculated using the following formula:</i></p> $\Delta T = BS / (40 - ER)$ <p><i>Where:</i></p> <p><math>\Delta T</math> = # of seconds required between bursts  <math>BS</math> = Burst Size (number of events in the burst)  <math>ER</math> = Event Rate between bursts</p> <p><i>Examples:</i></p> <ol style="list-style-type: none"> <li>1) 1000 Event burst and no events between bursts: <math>\Delta T = 1000 / 40 = 25</math> seconds</li> <li>2) 500 Event burst with 30 events/sec between: <math>\Delta T = 500 / 10 = 50</math> seconds</li> </ol> <p><i>Note 2 – Up to two events are also generated for every alarm, including one event for entering the alarm condition and one for return to normal.</i></p> <p><i>Note 3 – The Experion Server includes the option to support OPC Alarms &amp; Events in addition to native Experion notifications. When the Experion Server is configured to receive alarms and events from an OPC Alarm &amp; Event Server, the notification limits noted in this table are applicable to the combined set of events received from all connected event sources.</i></p>	

### ***Distributed Systems Architecture***

DSA performance specifications are as follows:

#### **DSA Publishing Server Communications Performance**

<b>Available Network Bandwidth <sup>1</sup></b>	<b>Maximum Network Throughput (Param/Second) <sup>2</sup></b>	<b>Maximum Throughput/Server (Param/Second) <sup>3,4</sup></b>	<b>Maximum Subscribing Servers</b>
64 Kb	100	100	1
128 Kb	200	200	2
256 Kb	400	400	3
512 Kb	800	800	8
1Mb	1,000	1,000	9
2 Mb	2,000	1,500	9
10 Mb	10,000	2,000	9
100 Mb	100,000	2,000	9

*Note 1 – “Available Network Bandwidth” means dedicated continuously available bandwidth for DSA use between the Servers, and not shared bandwidth with other applications such as Station access or Control Builder Multi-User access.*

*Note 2 – Maximum traffic on any individual network segment.*

*Note 3 – For Experion Servers with Process Points, the total parameter throughput caused by remote station displays, local station displays, fast history, etc., cannot exceed 1000 parameters/sec.*

*Note 4 – A subscribing Station is one that displays data from another publishing server through DSA. A larger number of Stations subscribing to remote data will result in a greater amount of network traffic. Absolute maximum number of subscribing Stations/publishing Server is 20.*

#### **DSA Subscribing Server Communications Performance**

<b>Available Network Bandwidth <sup>1</sup></b>	<b>Maximum Network Throughput (Param/Second) <sup>2</sup></b>	<b>Maximum Publishing Servers</b>
64 Kb	100	1
128 Kb	200	2
256 Kb	400	4
512 Kb	800	6
1Mb	1000	8
2 Mb	2000	9
10 Mb	10000	9
100 Mb	100000	9

*Note 1 – “Available Network Bandwidth” means dedicated continuously available bandwidth for DSA use between the Servers, and not shared bandwidth with other applications such as Station access or Control Builder Multi-User access.*

*Note 2 – Maximum traffic on any individual network segment.*

#### **Miscellaneous DSA Specifications**

	<b>Specification</b>
Maximum alarm/notification rate	20/sec/server

### **Alarm Pager**

The following specifications apply to the alarm paging option.

<b>Protocols</b>	<b>Remarks</b>
Paging Entry Terminal (PET) <sup>1</sup>	
Telocator Alphanumeric Protocol (TAP) <sup>1</sup>	
UCP protocols <ul style="list-style-type: none"><li>• UCP 01</li><li>• UCP 30</li><li>• UCP 51</li></ul>	Mainly used in Europe. The two-digit suffixes refer to the EMI command numbers being used by the provider.
<i>Note 1 – Service Providers in North America generally use the PET or TAP protocols.</i>	

## Model Numbers

### Server Hardware

Model Number	Description
MZ-NTPC51	Dual processor Server with Windows 2000 Server (Dell 1800)
MZ-NTPC81	Dual processor Server with Windows 2000 Server, RAID-1 (Dell 1800)
MZ-NTPC71	Dual processor Server with Windows 2000 Server, RAID-5, 2U rack (Dell 2850)
TP-DFP202	Desktop 20.1" Flat Panel Display
MZ-PCEB23	Single port Ethernet Comm. Board, 100 Mbps for Server PCs
NE-NICS01 <sup>1</sup>	Dual port Ethernet Comm. Board, 100 Mbps (for FTE)
MZ-PCEM34	1 GB Memory Module for MZ-NTPC51, -81
MZ-PCEM42	2 GB Memory Module for MZ-NTPC51, -71, -81
MZ-PCDT03	Terminal Server-8 RS232 Ports, RJ45
MZ-PCEB12	8 Port RS-232/422/485 Serial Board PCI Bus
MZ-PCEB11	8 Port RS-232/422/485 Expansion Module
MZ-PCDD06	Trackball w/PS-2 Connector

<sup>1</sup> See Fault Tolerant Ethernet Specifications and Technical Data document for FTE hardware

### Server Database

Model Number	Description
EP-DBASE1	Database Base Software
EP-DPR100	100 Process Point Adder to Database Size
EP-DPR01K	1,000 Process Point Adder to Database Size
EP-DPR02K	2,000 Process Point Adder to Database Size
EP-DPR05K	5,000 Process Point Adder to Database Size
EP-DPR10K	10,000 Process Point Adder to Database Size
EP-DSC100	100 SCADA Point Adder to Database Size
EP-DSC01K	1,000 SCADA Point Adder to Database Size
EP-DSC02K	2,000 SCADA Point Adder to Database Size
EP-DSC05K	5,000 SCADA Point Adder to Database Size
EP-DSC10K	10,000 SCADA Point Adder to Database Size

### Server Redundancy

Model Number	Description
EP-RBASE1	Redundancy Base Software
EP-RPR100	100 Process Points Redundancy Adder
EP-RPR01K	1,000 Process Points Redundancy Adder
EP-RPR02K	2,000 Process Points Redundancy Adder
EP-RPR05K	5,000 Process Points Redundancy Adder
EP-RPR10K	10,000 Process Points Redundancy Adder
EP-RSC100	100 SCADA Points Redundancy Adder
EP-RSC01K	1,000 SCADA Points Redundancy Adder
EP-RSC02K	2,000 SCADA Points Redundancy Adder
EP-RSC05K	5,000 SCADA Points Redundancy Adder
EP-RSC10K	10,000 SCADA Points Redundancy Adder

### ***Distributed System Architecture***

<b>Model Number</b>	<b>Description</b>
EP-XRSVR1	DSA 1 Remote Server License

### ***Additional Honeywell Device Integration***

<b>Model Number</b>	<b>Description</b>
EP-IHWFSC	Honeywell FSC and Safety Manager Integration
EP-IHWS9K	Honeywell S9000 Integration
EP-IHW620	Honeywell 620 LCS Serial and Ethernet Interface
EP-IHWUDC	Honeywell UDC 3000/5000/6300 Integration
EP-IHWMMX	Honeywell Micromax LPU & Video Paperless
EP-IHWXLN	Honeywell XLNET HVAC Controller Interface
EP-IHWDPR	Honeywell DPR Recorders (DPR 100, 180, 3000)
EP-IHWFSG	Honeywell RM7800 Flame Safeguard
EP-IHUMB	Honeywell Universal Modbus Interface (HC900, UMC800, Trendview, DPR180/250, UDC2300/3300, DR4300/4500)

### ***SCADA Interfaces***

<b>Model Number</b>	<b>Description</b>
EP-IDNP3P	DNP3 Protocol Interface
EP-IMDBUS	Modbus (RTU, Plus, ASCII, & TCP) Interface
EP-IABSER	Allen-Bradley Serial Interface (Does not require RSLinx)
EP-IABRSL	Allen-Bradley RSLinx Interface (requires EP-IRSL24)
EP-IABINT	Allen-Bradley Integration (requires EP-IABSER or EP-IABRSL)
EP-IRSL24	Allen-Bradley RSLINX Software, Ver. 2.4 <sup>1</sup>
EP-IGES90	GE Fanuc Series 90 PLC via Ethernet (requires EP-IGEAPI)
EP-IGEAPI	GE API License
EP-ISMNS5	Siemens S5/S7 & TI PLC Via H1 / TF API
EP-IGEM80	GEC GEM80 PLC Interface
EP-IYTMA5	Yamatake MA500 Interface
EP-IBBRTU	Bristol Babcock RTU Interface
EP-IMR35X	Moore 351, 352, 353, 383 Interface
EP-IAPLCM	Applicom Interface
EP-IHTCHI	HITACHI Interface
EP-IASEAI	Asea Interface
EP-IMAPAC	Moore APACS Interface

*Note 1 – RSLinx is available in a variety of packages with varying degrees of functionality. One feature of RSLinx is the exposure of underlying device data via an OPC Data Access Server. RSLinx OEM, the package provided with this model number only allows non-remote (OPC client resident on the same PC as RSLinx) OPC clients to connect to the OPC Server. If the OPC Data Access Server of RSLinx is required and must be accessed by remote OPC clients, please purchase the RSLinx Gateway version directly from Rockwell Automation or a distributor.*

### ***Application Enablers***

<b>Model Number</b>	<b>Description</b>
EP-AERMGR	Recipe Manager
EP-AESHED	Point Control Scheduler
EP-AEODBX	ODBC Data Exchange
EP-AEPAGE	Alarm Pager
EP-AEBRPT	Batch Report

### ***Application Toolkit***

<b>Model Number</b>	<b>Description</b>
EP-AEAPTK	Application Development Toolkit

### ***Open Data Access***

<b>Model Number</b>	<b>Description</b>
EP-UODA1U	Open Data Access, per User

### ***OPC***

<b>Model Number</b>	<b>Description</b>
EP-OPCCLI	OPC Client Interface
EP-OPCCAD	OPC Advanced Client
EP-OPCINT	OPC Integrator, per Connection
EP-OPCSDA	OPC Data Access Server, per Connection
EP-OPCSAE	OPC Alarm & Event Server, per Connection
TP-RDM000	Redirection Manager

### ***Engineering Tools***

<b>Model Number</b>	<b>Description</b>
EP-TQBLDR	Quick Builder – SCADA database builder
EP-TDSPBD	HMIWeb Display Builder

### ***On-Process Migration***

<b>Model Number</b>	<b>Description</b>
EP-OPM0BS	Base On-Process Migration Support
EP-OPM100	100 Point On-Process Migration Support
EP-OPM01K	1,000 Point On-Process Migration Support
EP-OPM02K	2,000 Point On-Process Migration Support
EP-OPM05K	5,000 Point On-Process Migration Support
EP-OPM10K	10,000 Point On-Process Migration Support

### ***21 CFR Part 11 Option***

<b>Model Number</b>	<b>Description</b>
EP-ESIG01	Electronic Signature Option

## Glossary

Term or Acronym	Description
ACE	Application Control Environment
C200	Experion Controller
CEE	Control Execution Environment
Cache (dynamic cache)	Performance feature of the Experion Server that allows it to read and write only to currently required parameters. This is in contrast to constantly polling the controllers for all data.
Checkpoint(ing)	A cyclic process that copies the contents of the memory-resident part of the database to the backup server. This is not to be confused with the constant update of the backup server's database while the servers are synchronized.
COM	Component Object Model
Composite Point	The Experion point structure that contains many parameters such as PV, SP, Mode, etc.
DCS	Distributed Control System
DSA	Distributed Systems Architecture
Electronic Signature	The legally binding equivalent of an operator's handwritten signature
Experion Station - TPS	The HMIWeb Station that is directly connected to a TPS System and Experion Server - TPS. Acronym: ES-T
Experion Server - TPS	An Experion Server directly connected to a TPS System. Acronym: ESVT
HTML	HyperText Markup Language
ODBC	Open Data Base Connectivity
OLE	Object Linking and Embedding
OPC	OLE for Process Control
PLC	Programmable Logic Controller
Process Points	Points originating in a CEE device such as a C200 or ACE.
RDM	Redirection Manager
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SCADA Points	Points configured to access devices via optional SCADA interfaces.
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
System Event Server	The System Event Server exposes Windows events as OPC events so they can be integrated into the Experion Alarm and Event subsystem. Acronym: SES
System Performance Server	The System Performance Server exposes Windows performance data as OPC data so it can be integrated into Experion History and Displays. Acronym: SPS
SQL	Structured Query Language
TPS	<b>TotalPlant</b> Solution

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