I/A Series® Software

PSS 21S-3A8 B3

OPC® Client Driver for Field Device System Integrator Modules

The Field Device System Integrator (FDSI) Object Linking and Embedding for Process Control (OPC®) client driver integrates OPC servers into an I/A Series® system.

FEATURES

Key features of the FDSI OPC client driver are:

- Integration of a combination of multi-vendor devices at the fieldbus level
- Capability of devices to exchange real-time data with the I/A Series system via OPC servers, including the AIM*OPC™ server
- Compliance with the globally accepted and widely used OPC Data Access (DA) Specification 2.x
- Availability of standard I/A Series plant management functions and operator displays to multi-vendor devices
- Ethernet connections allow access to plant-floor data from anywhere on the Enterprise network
- Simplex (FBM232) or Redundant (FBM233) operation of FDSI Fieldbus Modules
- Heartbeat facility for detection of connection failures between individual devices and FBMs
- Ability to handle long tag names
- Integrated diagnostics application allows you to view all OPC groups and points and facilitates configuration and troubleshooting from a local and/or remote PC.

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OVERVIEW

Field Device System Integrator (FDSI) OPC client drivers enable the integration of OPC servers into an I/A Series system. OPC servers communicate with vendor-independent field devices, and must comply with the OPC Data Access (DA) Specification 2.x.

The OPC client driver allows the I/A Series system to obtain real-time data from attached third-party devices, manipulate the data using state-of-the-art control algorithms, and write output data to the field devices. Figure 1 illustrates a typical configuration in which an OPC client FBM232 is communicating with field devices via an OPC server.

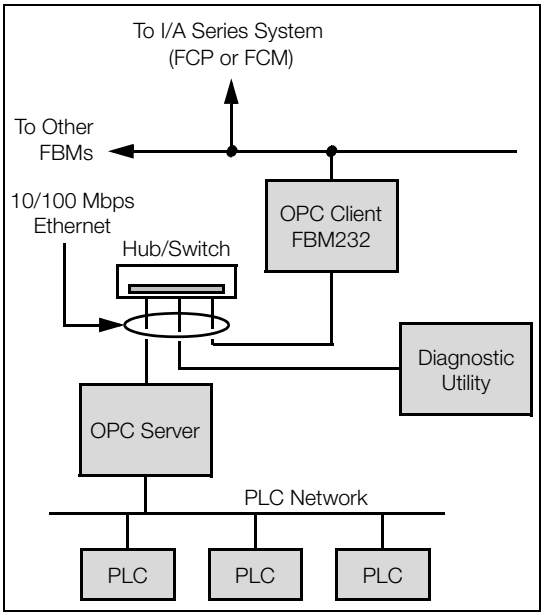

Figure 1. Simplex FBM Configuration

The OPC client driver is dynamically downloaded to the appropriate single or redundant FBM, and allows the FBM to translate the data sent to the I/A Series system from the field device or vice-versa.

Communication is performed via an Ethernet connection between an FDSI FBM and the third-party OPC server.

HARDWARE

The OPC client driver can be downloaded to one of the following FBMs, depending on redundancy requirements.

FBM232

The FBM232 provides an Ethernet interface between the I/A Series system and the OPC server. One server is allowed per OPC client FBM232. Refer to PSS 21H-2Z32 B4.

FBM233

Two FBM233s can be used to implement a redundant Ethernet interface between the I/A Series system and one non-redundant OPC server or a pair of redundant OPC servers. Refer to PSS 21H-2Z33 B4.

OPC CLIENT DRIVER BENEFITS

Using the OPC client driver with FDSI FBMs provides the benefits described in the following subsections.

Easy Integration of OPC Devices

The OPC client driver allows you to include new or existing OPC-compliant devices in your process, regardless of device manufacturer. Incorporating an open communication standard like OPC in your system provides a wide range of options when selecting the best field devices for your process.

Redundancy

A pair of FBM233 modules combines to provide redundancy at the FBM level. The FBM233 supports single or redundant OPC servers.

In redundant configurations, one FBM serves as the Master module and the other as the Tracker module. A communication link between the two modules allows each module to monitor the other's health and to share information about the health of the attached slave devices.

Faults are detected in the FBMs when devices do not update their heartbeat points. If a fault is detected in either the Master or Tracker module, the faulty module or network connection can be repaired without upsetting field input or output signals on the functional side.

There is separate alarming for loss of device connection to the OPC server and for loss of connection to the entire OPC server.

Fully Redundant Operation

A fully redundant link uses two independent OPC servers or one OPC server with redundant capability. If problems are detected, such as a loss of communication between the FBM in the Master role and an attached field device, the Master requests an automatic role switch and generates a system alarm. Alternatively, you can manually initiate a role switch between Master and Tracker modules using I/A Series system displays.

Figure 2 shows a typical configuration composed of redundant FBMs communicating with redundant OPC servers. The workstation running the diagnostic utility for the OPC client can be connected to either switch, allowing you to easily asses the health of each network individually. It is recommended that you use two separate hubs or switches, as illustrated in Figure 2, to isolate the networks and ensure proper redundant operation.

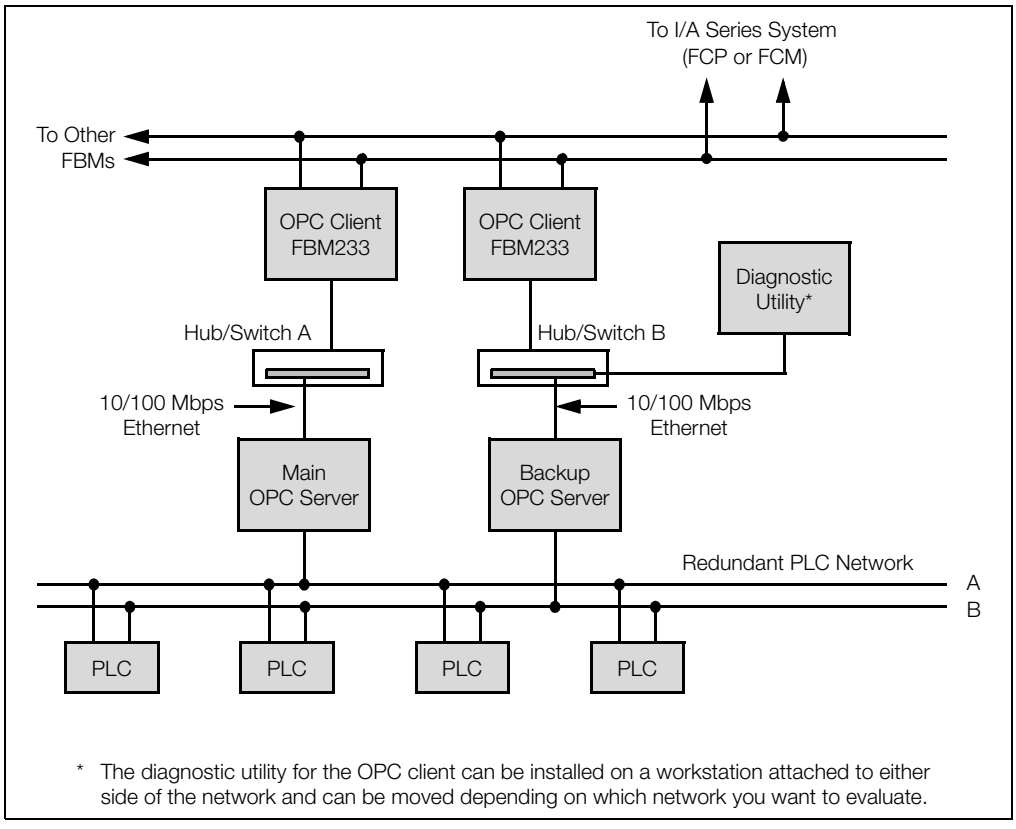

Figure 2. Fully Redundant Configuration

Redundant FBM with a Non-Redundant OPC Server

Figure 3 shows a typical configuration composed of redundant FBMs communicating with a single OPC server. This type of configuration provides redundancy at the processor level, and can be used if a redundant OPC server is not available.

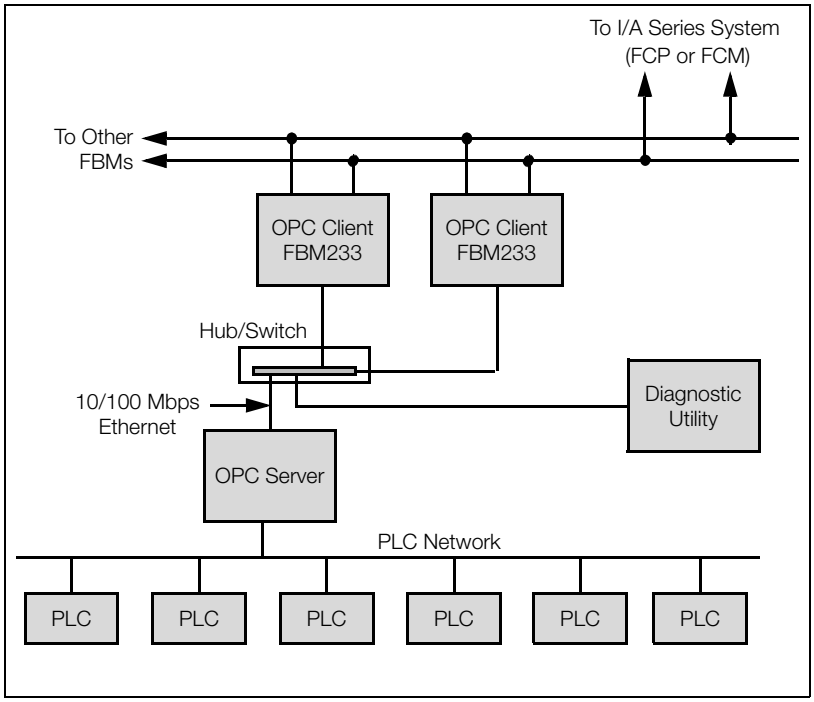

Figure 3. Redundant FBM Configuration with a Single OPC Server

Flexibility

OPC uses Ethernet and TCP/IP communication technologies. The simplicity and low cost of Ethernet hardware combined with the high speeds and reliability characterized by Ethernet networks greatly improves plant efficiency and provides the flexibility required to constantly keep up with changing technology. Using an Ethernet network, you can provide remote access to process data over the network.

I/A Series System Support

I/A Series software provides standard plant management functions and operator displays for the third-party OPC devices, in addition to startup and communication fault detection and display using System Monitor.

Tag Name Aliasing

Many times, the required OPC specified syntax for tag names is long and may not be descriptive enough to suit your needs. The OPC client driver handles long tag names by allowing you to provide more descriptive tag names for your devices.

Diagnostics

There are several methods to analyze system and health information for OPC systems. You can view System Monitor displays, use control blocks to learn the quality and status of OPC data, or use the diagnostic utility for the OPC client.

System Monitor

System Monitor watches for a loss of communication between the FBM and OPC server, as well as between the OPC server and field devices if the heartbeat mechanism is configured in the devices. If a loss of communication is detected, System Monitor displays show that the server or device has failed.

Data Quality and Status

In the I/A Series system, each connectable DCI block has a value record that contains various parameter attributes, including its status. The status parameter defines the validity of the data, and can be good, bad, or out-of-service (OOS).

Block status is set to Bad when the OPC Server indicates the value is bad.

The OOS status indicates that OPC data points are "disconnected." OPC data points appear in displays with an OOS indication if an FDSI FBM is out-of-service or the data point is not configured correctly.

Diagnostic Utility for the OPC Client

The FDSI OPC client software package is supplemented with a diagnostic utility, which can be installed on any Windows-based station and can connect remotely to the FDSI system via a TCP/IP connection (refer to Figures 1, 2, and 3). Up to two diagnostic utilities can be connected to the FDSI system at any one time. If the network permits, one could be used by a remotely located expert.

The diagnostic utility for the OPC client provides two very useful displays: the I/A Diagnostics window and the Browse OPC Servers window.

The I/A Diagnostics window, shown in Figure 4, allows you to view the points configured for each group in a spreadsheet-like format. Along with each point's tag name, you can view each point's value, timestamp, quality, and status. The lower portion of the I/A Diagnostics display provides information specific to the FBM, the selected server, and the selected group.

The diagnostic application provides a browser window, in which you can view all OPC connectable tags in your entire system. The item tag names contain the syntax required to support a proper OPC connection, and the browser window allows you to conveniently "copy and paste" the browsed tags into other applications, such as the FDSI Configurator. This is a useful method to check and correct the syntax of any misconfigured tags you may encounter.

The diagnostic utility for the OPC client also allows you to log errors and events. The log files include descriptive information, and they also list configuration and connection errors to help you troubleshoot problems.

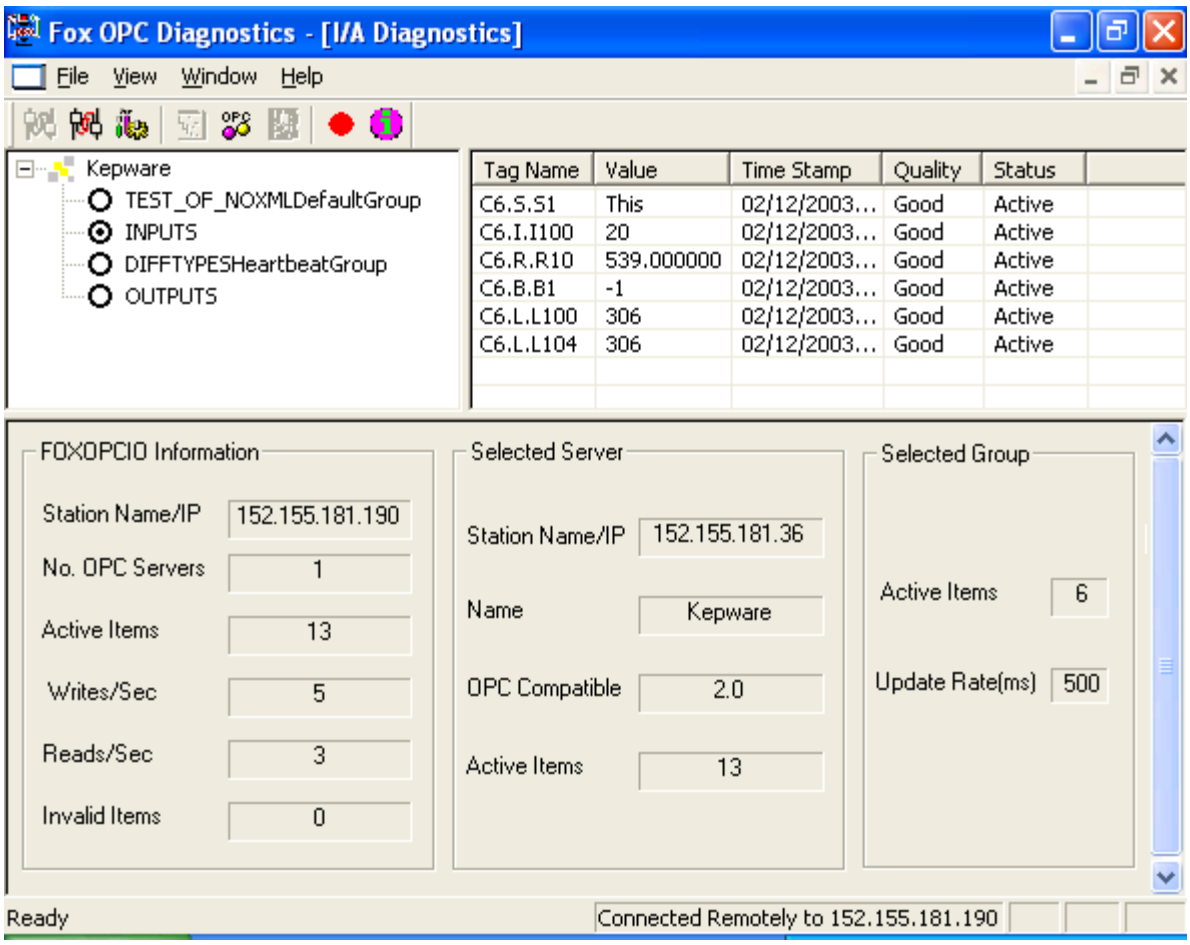

Figure 4. Diagnostic Utility for the OPC Client – I/A Diagnostics Display

OVERVIEW OF OPC TECHNOLOGY

The OPC specification is an interface built on Microsoft's® OLE (Object Linking and Embedding) and DCOM (Distributed Component Object Model) technology. OPC specifies which DCOM functions that OPC servers must implement in order to exchange plant-floor data with OPC clients requesting that data.

OPC Operation

OPC clients, such as the FBM232 and 233, request data from external field devices from one central source: the OPC server. The server collects data from its connected devices using each device's specific communication protocol, interprets the data according to the OPC specification, and sends it to the FDSI FBM. An OPC server can communicate with a wide variety of industrial automation equipment including remote terminal units, programmable logic controllers, and power monitoring equipment.

Key concepts of the OPC specification are the concepts of items and groups. An OPC "item" represents a data point on a field device, and a "group" is simply a logical collection of OPC items. Groups allow clients to organize their data. For example, one group could represent all input data points, and another, all output data points. A group could also represent different aspects of the control scheme within one PLC.

One concept that the OPC standard does not support, but the Invensys Foxboro implementation does, is the concept of a device connected to the OPC server. Support for this concept allows the I/A Series system to provide separate alarming capabilities in the System Monitor for the OPC server and the devices, if so configured.

Installation and Download

Installation of the driver does not require shutting down the I/A Series software or rebooting the I/A Series workstation. Furthermore, any updated driver can be downloaded to the FBM or FBM pair without disrupting the rest of the I/A Series system.

CONFIGURATION

To configure the OPC client driver, you must use the FDSI Configurator software, which can be installed on a workstation running the Windows XP®, Windows NT®, or Windows 2000® operating system. The FDSI Configurator is required for configuring FBM port properties, enabling and configuring device heartbeat settings, and defining tag name aliases.

SPECIFICATIONS

Number of Devices

The FDSI OPC client connects to a single OPC server, which in turn may be connected to multiple devices. (The number of actual devices is performance dependent.) Refer to Figures 1, 2, and 3 for examples of OPC client driver configurations.

Number of Points

FDSI FBMs 232 and 233 can handle up to 2,000 I/O points. The practical limit on the number of points supported depends on the performance of the connected OPC Server.

OPC Data Access Specifications

The OPC client is designed to the OPC Data Access (DA) Specification 2.05A. OPC servers integrated into an I/A Series system must support OPC DA Specification 2.x.

Control Block Support

Table 1. ECBs Supported by the OPC Client Driver

ECB200	Parent ECB representing the FBM232
ECB202	Parent ECB representing the FBM233
ECB201	Child ECB representing a device

Table 2. DCI Blocks Supported by the OPC Client Driver

BIN	Binary Input block
BINR	Redundant Binary Input block
BOUT	Binary Output block
IIN	Integer Input block
IOUT	Integer Output block
PAKIN	Packed Input block
PAKOUT	Packed Output block
PLSOUT	Pulse Output block
RIN	Real Input DCI block
RINR	Redundant Real Input DCI block
ROUT	Real Output DCI block
STRIN	String Input DCI block
STROUT	String Output DCI block

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