Foxboro Evo™ Process Automation System

Product Specifications

Foxboro® by Schneider Electric

PSS 31S-3A9 B3

FDSI Triconex® Integrator Driver for Field Device System Integrator Modules

The Field Device System Integrator (FDSI) Triconex® Integrator driver integrates Tricon™ and Trident™ devices using the Triconex System Access Application (TSAA) protocol into Foxboro Evo™ or I/A Series™ systems.

FEATURES

- Support for the standard Triconex System Access Application (TSAA) protocol
- Integration of Tricon and Trident devices into a Foxboro Evo or I/A Series system using Ethernet connectivity
- Simplex (FBM232) or Redundant (FBM233) operation of FDSI Fieldbus Modules
- Availability of standard Foxboro Evo or I/A Series plant management functions and operator displays
- Support for device diagnostic displays similar to TriStation™
- System Monitor detection of device connectivity
- Support for multiple Tricon and Trident devices from simplex or redundant FDSIs
- Support for multiple-point writes in a single write command to a device from FDSI
- Access to device I/O points in Tricon or Trident controllers using TriStation tag names or Modbus® aliases.
- Triconex Enhanced Diagnostic Monitor Support

OVERVIEW

The FDSI Triconex Integrator driver enables the integration of Tricon and Trident devices into an I/A Series system via the TSAA protocol.

TSAA was designed specifically for safety applications by Triconex, and allows the Foxboro Evo or I/A Series system direct access to real-time data in a Triconex Safety System (Tricon and Trident) via an FDSI FBM.

TSAA supports typical control applications such as READ/WRITE from an operator interface.

HARDWARE

The FDSI Triconex Integrator driver can be downloaded to one of the following FBMs, depending on redundancy requirements:

- The FBM232 provides an Ethernet interface between the Foxboro Evo or I/A Series system and the Triconex Safety System. Refer to *FBM232 Field Device System Integrator Module, 10/100 Mbps Ethernet, Single* (PSS 21H-2Z32 B4).
- Two FBM233s can be used to implement a redundant Ethernet interface between the I/A Series system and the Triconex Safety System. Refer to *FBM233 Field Device System Integrator Module, 10/100 Mbps Ethernet, Redundant* (PSS 21H-2Z33 B4).

The Triconex Integrator supports the following Triconex controllers:

- Tricon Controllers, version 9.7.x and later
- Trident Controllers, version 1.2. and later (see Note for exceptions)
- Tri-GP Controllers, version 2.1.2 and later

NOTE

The following Trident versions are not supported: Trident 2.0, 2.0.1, 2.0.2, 2.1.0, and 2.1.1. The time synchronization functionality is incompatible with these Trident versions.

SOFTWARE

The FDSI Triconex Integrator driver is compatible with all releases of I/A Series software v8.4 or later or Control Core Services v9.0 or later. It can be installed on any Foxboro Evo or I/A Series workstation or server running the Windows 7®, Windows Server® 2008 R2, Windows XP®, or Windows Server® 2003 operating systems

FDSI TRICONEX INTEGRATOR DRIVER BENEFITS

Using the FDSI Triconex Integrator driver with FDSI FBMs provides the benefits described in the following subsections.

Easy Integration

Simply downloading the FDSI Triconex Integrator driver to a FDSI FBM allows you to exchange data between the Triconex device and the Foxboro Evo or I/A Series system, thus taking advantage of both the power of the Foxboro Evo or I/A Series system and the triple-redundant protection of the Triconex system.

Foxboro Evo and I/A Series System Support

Foxboro Evo and I/A Series systems support the TSAA protocol, which accommodates the transfer of data to and from Tricon/Trident devices.

Foxboro Evo and I/A Series software also provides standard plant management functions and operator displays for these devices, including startup, and communication fault detection and display using System Manager.

Triconex Enhanced Diagnostic Monitor Support

The Triconex® Enhanced Diagnostic Monitor (EnDM) is a software program for monitoring the hardware, communication, and application status of Tricon™, Trident™, and Triconex General Purpose (Tri-GP) controllers. When the Triconex EnDM software is installed on a Foxboro Evo or I/A Series workstation. System Manager is able to directly launch Triconex EnDM to the specific Triconex node as configured. Triconex EnDM connects to the Triconex node using the IP Address and node number associated with the FDSI FBM232/233 ECB201 object.

The FDSI FBM232/233 gathers aggregate alarm status from the Triconex devices, and this system alarm places the FDSI ECB201 object (device) in Warning status within System Manager. EnDM is then launched from System Manager using either a context based or a menu driven approach by clicking on the flashing Triconex device. Multiple instances of EnDM can be launched from System Manager - one for each Tricon/Trident/Tri-GP device listed in System Manager.

The ability to launch Triconex EnDM directly from System Manager requires the following minimum software versions:

- System Manager 2.5
- Triconex EnDM 2.8.0

The Triconex EnDM software can be still used as a standalone application on a Foxboro Evo or I/A Series workstation even if the above System Manager and/or Triconex EnDM versions are not met.

When installed on a Foxboro Evo or I/A Series workstation, Triconex EnDM will need to use a non-MESH network interface card (NIC) for its communication to the Triconex node.

Redundancy

A pair of FBM233 modules provides redundancy at the FBM level. In a redundant configuration, 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. Refer to Figure 1 for general network configurations.

Scanning of points takes place from both the Master and Tracker FBMs. Output points will only be written from the Master FBM.

If a device failure is detected, the Master requests an automatic role switch and generates a system alarm. Role-switching occurs without a loss of data. Alternatively, you can manually initiate a role switch between Master and Tracker modules using System Manager.

If the System Monitor alerts you to FBM or network connection failures, you can replace the faulty FBM or repair the network connection without upsetting field input or output signals to the functional side.

Diagnostics

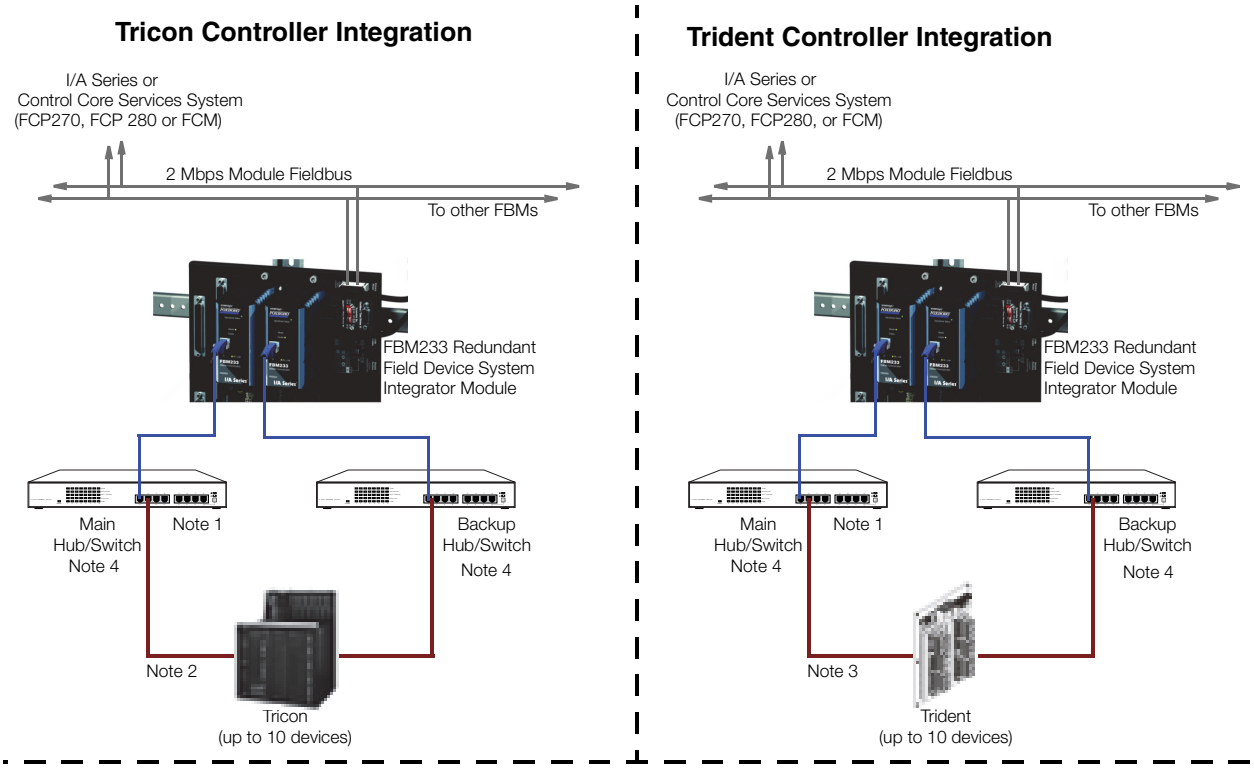
All diagnostic data for the Tricon/Trident devices is made available through Distributed Control Interface (DCI) input blocks. The workstation/server driver software contains tools that enable easy and rapid development of FoxView™ process graphics that display device diagnostics and status.

OPERATION

The FBM232/233 collects the required data from the devices, performs the necessary conversions, and then stores the converted data in its database for incorporation into the plant management functions and operator displays. Data may also be written out to the individual devices from the Foxboro Evo or I/A Series system.

Installation and Download

Installation of the driver does not require shutting down the system software or rebooting the workstation/server. Furthermore, any updated driver can be downloaded to the FBM232/233 without disrupting the rest of the Foxboro Evo or I/A Series system.



Configuration Notes

1. A hub or switch is necessary for configuration of the Tricon/Trident controller using the TriStation Configurator.
2. Connect the main hub/switch to the NET2 port on the NCM or TCM on the left side of the Tricon chassis.
   Connect the backup hub/switch to the NET2 port on the NCM or TCM on the right side of the Tricon chassis.
3. Connect the main hub/switch to the CM on the left side of the Trident chassis.
   Connect the backup hub/switch to the CM on the right side of the Trident chassis.
4. The Trident V3.0 CIM module only supports a switch. The Trident V3.0 CIM module does not support a network hub.

Figure 1. Redundant Configurations for Tricon and Trident Controller Integration

NOTE

Connections are similar for the FBM232 in Figure 1 and Figure 2; the FBM232 has the same connections as one module in the FBM233 redundant pair shown in these figures. Refer to *FBM232 Field Device System Integrator Module, 10/100 Mbps Ethernet, Single* (PSS 21H-2Z32 B4) for details on FBM232 connections.

COMMUNICATION

Communication to a Tricon Controller

For successful communication between Tricon controllers and the Foxboro Evo or I/A Series system, a Network Communications Module (NCM) or Tricon Communications Module (TCM) must be installed in the Tricon controller.

The NCM or TCM plugs directly into the Tricon backplane and communicates with the triple-redundant Tricon bus. In addition to this direct connection, the NCM or TCM can simultaneously connect the controller to TriStation and the supported workstation/server.

Communication to a Trident Controller

For successful communication between Trident controllers and the Foxboro Evo or I/A Series system, a Communication Module (CM) must be installed in the Trident baseplate for communication with the triple-redundant Trident bus. In addition to this direct connection, the CM can simultaneously connect the controller to TriStation and the supported workstation/server.

Sequence of Events

Sequence of Events (SOE) messages originating in the Tricon or Trident system can be logged to an AIM*Historian instance or to a AlarmProvider application using the Aprint mechanism. The TSAA-SOE Workstation driver software on the supported Foxboro Evo or I/A Series workstation/server contains the Aprint mechanism.

CONFIGURATION

FDSI Configurator

To configure the FDSI Triconex Integrator driver, you must use the FDSI Configurator software, which can be installed on a workstation or server with I/A Series software v8.4 or later or Control Core Services v9.0 or later running the Windows 7®, Windows Server® 2008 R2, Windows XP®, or Windows Server® 2003 operating systems. The FDSI Configurator is required for configuring Ethernet port properties.

TriStation Configurator Application

The TriStation application is not required to configure the FDSI Triconex Integrator driver; however, you must use the TriStation application to configure Tricon/Trident devices.

SOE Configuration File

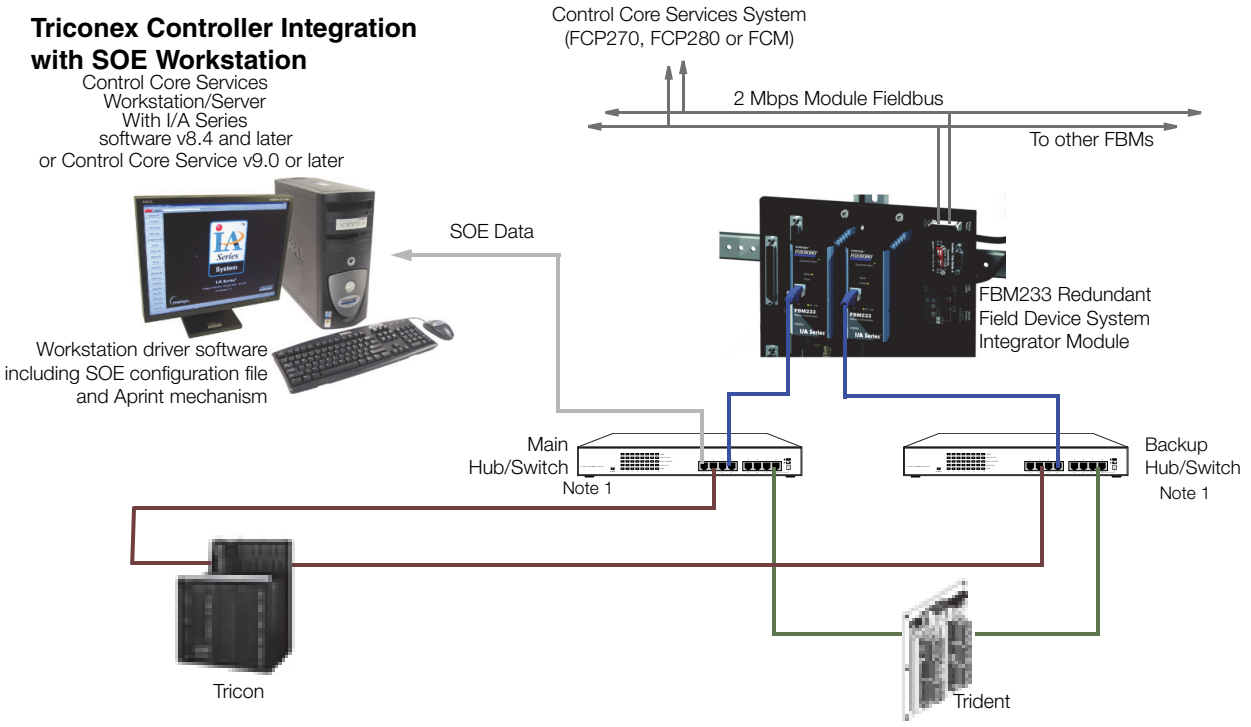
All SOE point configuration and Triconex device configuration information is maintained in an XML configuration file located on a supported Foxboro Evo or I/A Series workstation/server (Figure 2). The configuration of the SOE information on the supported workstation/server occurs outside of the control applications, such as the Integrated Control Configurator (ICC). DCI blocks are not used to configure these SOE points.

The SOE configuration file on the supported workstation/server includes:

- IP address of the Triconex devices
- Aprint event destinations that must be informed when an SOE point is updated
- Device alarm block, the input parameter of an I/A Series block (such as a CIN or BLNALM block) that triggers a process alarm in the event

of a device failure. A separate device alarm block is usually configured for each device

- Time zone details to provide adjustment for time synchronization and for local timestamp processing
- List of SOE points to be serviced.



Configuration Notes

1. The Trident V3.0 CIM module only supports a switch. The Trident V3.0 CIM module does not support a network hub.

Figure 2. Redundant Configuration with Supported Workstation/Server for Sequence of Events

SPECIFICATIONS

Data Type and Format

The FCP 270 or FCP 280 that hosts the FBM232/233 can make up to 2,000 DCI connections to read data from or write data to the Triconex controllers. The connections can be:

- An analog input or output value (integer or IEEE single-precision floating point)
- A single digital input or output value.

Number of Devices

Up to 10 devices per FBM232/233 maximum. The number of actual devices is performance and configuration dependent.

Number of Points

Foxboro Evo or I/A Series control stations can access up to 2,000 analog system and I/O values, or up to 32,000 digital I/O values, or a combination of digital and analog values using FBM232/233.

When the FBM232/233 is requesting data from the Triconex controller, the controller can send data as fast as every 50 milliseconds, but not faster than the controller's scan rate. The default Triconex controller scan rate is 200 milliseconds. If the controller does not receive a request for data every 2 minutes, the controller stops sending data.

The TSAA Workstation Driver supports up to 10,000 Triconex tags for SOE data collection.

Control Block Support

The FBM232 and FBM233 offer support for the standard Equipment Control Blocks (ECBs) listed in Table 1 and the DCI blocks listed in Table 2.

Table 1. ECBs Supported by the FDSI Triconex Integrator Driver

ECB200	Parent ECB, representing the FBM232
ECB202	Parent ECB, representing the FBM233
ECB201	Child ECB, representing a Tricon/Trident

Table 2. DCI Blocks Supported by the FDSI Triconex Integrator Driver

BIN	Binary Input
BINR	Redundant Binary Input
BOUT	Binary Output
IIN	Integer Input
IINR	Redundant Integer Input
IOUT	Integer Output
PLSOUT	Pulse Output
RIN	Real Input
RINR	Redundant Real Input
ROUT	Real Output
PAKIN	Packed Input
PAKINR	Redundant Packed Input
PAKOUT	Packed Output

TSAA Supported Commands

Table 3. TSAA Supported Commands

FBM/ Work Station[a]	Function Code	Function Name	Description
FBM	1	TRICON_DATA	Response to TRICON_DATA_REQ containing Triconex data values.
FBM	2	TRICON_DATA_REQ	Query used to request data from the Triconex Controller.
FBM	3	WRITE_TRICON_DATA	Query used to write data to the Triconex Controller.
FBM	4	WRITE_TRICON_DATA_RSP	Response to WRITE_TRICON_DATA containing success / failure.
FBM/ Work Station	5	READ_TRICON_CLOCK	Requests the time in the TRICON controller.
FBM/ Work Station	6	READ_TRICON_CLOCK_RSP	Response to READ_TRICON_CLOCK, containing the time in the TRICON controller.
FBM/ Work Station	9	ADJUST_TRICON_CLOCK	Adjust the clock in the TRICON controller by a number of milliseconds.
FBM/ Work Station	10	ADJUST_TRICON_CLOCK_RSP	Response to ADJUST_TRICON_CLOCK, containing the new time in the controller.
FBM/ Work Station	22	TRICON_GET_SYMBOL_REQ	Trident only. Requests symbol data from the Trident controller.
FBM/ Work Station	23	TRICON_GET_SYMBOL_RSP	Trident only. Response to the TRICON_GET_SYMBOL_REQ containing Trident symbol data.
Work Station	13	TRICON_SOE_REQ	Request SOE data from the controller.

Table 3. TSAA Supported Commands

FBM/ Work Station[a]	Function Code	Function Name	Description
Work Station	14	TRICON_SOE_RSP	Response to TRICON_SOE_REQ containing Triconex SOE data.
Work Station	17	TRICON_SOE_DATAAVAIL	Broadcast sent the Triconex Controller when SOE data is available.

(a) In this table, “Work Station” is a workstation or server with I/A Series software v8.4 or later or Control Core Services 9.0 or later.

Foxboro®

by Schneider Electric

Invensys Systems, Inc
10900 Equity Drive
Houston, TX 77041
United States of America
http://www.invensys.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: http://support.ips.invensys.com

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