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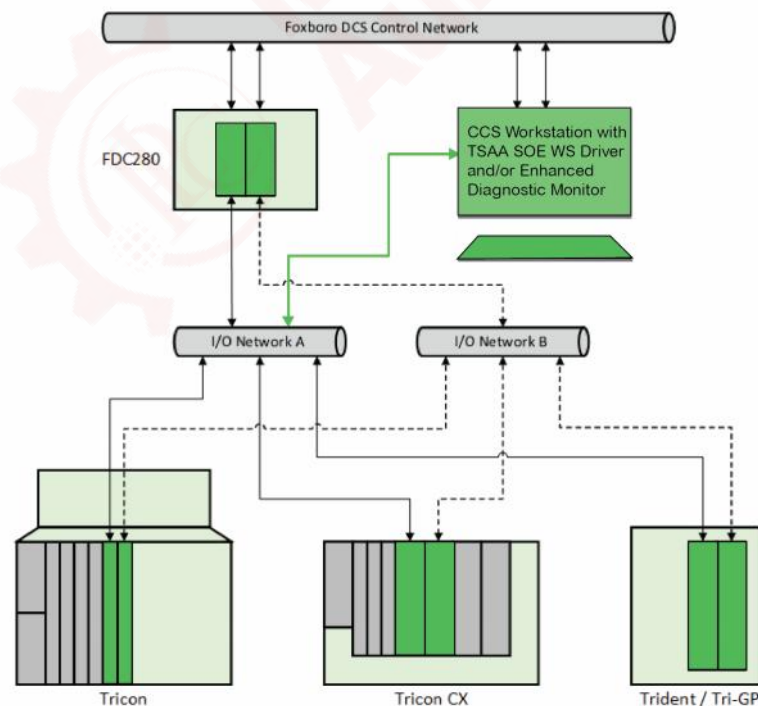
Foxboro™ DCS

Triconex™ System Access Application Driver for Field Device Controller 280

PSS 41S-3FDCTSAA

Product Specification

May 2023

Schneider Electric

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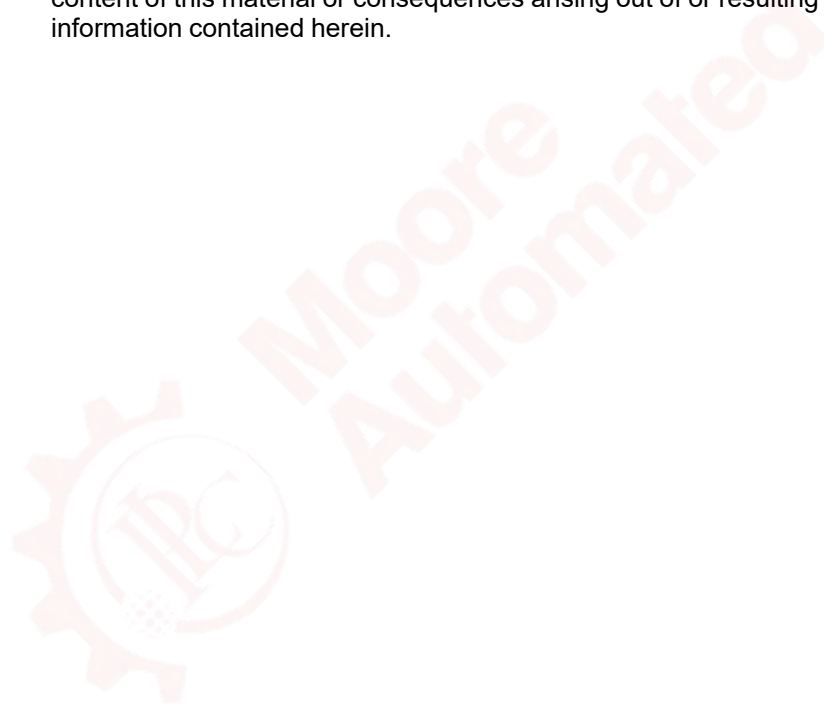
Overview

The Triconex™ System Access Application (TSAA) protocol was designed specifically for safety applications by Triconex, and allows the Foxboro DCS direct access to real-time data in a Triconex safety system.

The Field Device Controller 280 (FDC280) enables the integration of the Foxboro DCS with Triconex SIS systems, creating an integrated SIS. The Foxboro DCS sends commands to the Triconex controllers via UDP/IP and the Triconex controllers respond with the appropriate information. The FDC280 supports communication with Triconex controllers including Tricon™, Tricon CX, Trident™, and Triconex General Purpose (Tri-GP).

Sequence of Events (SOE) data from the Triconex controller is provided to Foxboro DCS through the TSAA Device Integration SOE Workstation driver.

Features

- Supports the standard TSAA protocol used with these Triconex controllers:
  - Tricon 11.0 or later
  - Tricon 10.6.4 (MP build 401, TCM build 346)
  - Tricon CX 11.3 or later
  - Trident/Tri-GP 3.1 or later
- Integration of Triconex controllers into a Foxboro DCS using Ethernet connectivity
- Support for up to 16 Triconex controllers from an FDC280
- Support for up to eight FDC280s interfacing to the same Triconex controller
- Up to 8,000 block tags for a single device; with the use of PAKIN and PAKOUT blocks, more than 8,000 I/O connections are supported
- Availability of standard Foxboro DCS plant management functions and operator displays
- System Monitor detection of device connectivity
- Support for launching the Triconex Enhanced Diagnostic Monitor from System Manager
- Block names in the Foxboro DCS correspond to TriStation 1131 tagnames
- Access to device I/O points in Triconex controllers using Modbus® aliases
- Support for 5– and 6–digit (also known as legacy and extended) aliases independently and concurrently
- Time sync support with accuracy up to 25 ms with time strobe
- Support for TriStation 1131 v5.1 and later
- Support for concurrent operation with Modbus TCP and RTU drivers in a single FDC280
- Support for the FDC280 Sizing Application, which provides the maximum feasible update rate, and associated CPU usage, for a set of devices. This information can then be used to determine how many FDC280 controllers will be required to meet the needs of your project

Ease of Integration

FDC280 with TSAA driver support enables you to exchange data between Triconex controllers and Foxboro DCS, thus taking advantage of both the power of the Foxboro DCS and the triple-redundant protection of the Triconex system.

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

The FDC280 with TSAA driver support can be configured as either simplex or fault-tolerant, as shown in *Field Device Controller 280 (FDC280)* (PSS 41H-2FDC280).

To maintain separation between the control processes and the external device communication processes, the TSAA driver is run on Core 2 of the FDC280's CPU and communicates to the control process running on Core 1 via an internal bus.

Hardware

To add TSAA driver support to earlier releases of FDC280, a major image update is required. See *Field Device Controller 280 (FDC280)* (PSS 41H-2FDC280).

Software

The FDC280 TSAA Driver is compatible with all releases of:

- Foxboro DCS Control Core Software v9.3 and later
- Control Software v7.1.1 and later

The TSAA Device Integration SOE Workstation Driver can be installed on any CCS v9.4 and later workstation.

System Manager 2.13 or later is required to support the launch of the Enhanced Diagnostic Monitor.

Communications

The FDC280 and the workstation hosting the SOE driver connect to Triconex controllers over a user-supplied network connection.

Communication with Triconex Controllers

For successful communication within an integrated SIS, communication modules are required in the Triconex system.

- For Tricon controllers, a Tricon Communications Module (TCM) or Unified Communications Module (UCM) must be installed in the Tricon Main chassis

- For Trident and Tri-GP controllers, a Communication Integration Module (CIM) must be installed on the Trident/Tri-GP baseplate

- For Tricon CX controllers, a TCM or UCM must be installed in the Tricon CX Main chassis

These communication modules support communication with the triple redundant Triconex bus and can simultaneously connect the controller to TriStation 1131, the supported workstation/server, and the FDC280.

> **NOTE:** For a complete list of compatible TCMs, UCMs, and CIMs, refer to the *Product Release Notice* on the Global Customer Support website (*https:// pasupport.schneider-electric.com*) for your Triconex controller version.

TSAA Device Integration SOE Workstation Driver

The SOE messages originating from the Triconex system can be logged to the Alarms and Events database or an AIM*Historian instance. The TSAA Device Integration SOE Workstation Driver is supported on workstations running the Windows® 10 or Windows Server® 2016 operating systems.

TSAA Device Integration SOE Workstation Driver Configurator

This configurator is used to specify the Triconex controllers, the SOE data in those controllers, and the historian destinations for that information. The configuration of the SOE information on the supported workstation/server occurs outside of the control applications. DCI blocks are not used to configure these SOE points. The configurator can import TriStation 1131 project files and includes:

- IP address of the Triconex controllers

- Collector destination

- Device alarm block, the input parameter of an 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 (Tricon and Trident/Tri-GP)

- List of SOE points to be serviced

Configuration

FDC280 Configurator

Control Core Services (CCS) v9.3 or later and Control Software (CS) v7.1.1 or later are required to support the FDC280 image that introduces TSAA driver support. To configure the FDC280 TSAA driver, use the CCS FDC280 Configurator, as described in *FDC280 TSAA Driver User's Guide* (B0700HT).

TriStation 1131

TriStation 1131 is not required to configure the FDC280 TSAA; however, you must use TriStation 1131 to configure the Triconex controllers. Project files from TriStation 1131 can be exported to the CCS FDC280 Configurator to create the DCI block database. Project files created in TriStation 1131 5.1.0 and later can be imported to the FDC280 sizing application.

Operation

The FDC280 collects the required data from the devices, performs the necessary conversions, and then stores the converted data in its database for incorporation into the Foxboro DCS plant management functions and operator displays. Data can also be written out to the individual devices from Foxboro DCS.

Installation and Download

There are two types of driver installation (Minor and Major Image Update) that are explained in *Field Device Controller 280 (FDC280) Product Specification* (PSS 41H-2FDC280).

Depending on the type of installation required, installation of the driver may require either a download operation that does not disrupt the rest of Foxboro DCS (Minor) or an operation that involves full, double-sided reboot of the FDC280 (Major).

Product Support

The FDC280 TSAA Driver and TSAA Device Integration SOE Workstation Driver can be ordered from BuyAutomation. The product includes media and documentation. Engineering assistance can be provided through the normal channels.

Diagnostics

All diagnostic data for the Triconex controllers is made available through Distributed Control Interface (DCI) input blocks. It also enables debugging any device interface issues, by logging all messages exchanged with a device for analysis, in the diagnostic application on a workstation connected to the I/O network.

Triconex Enhanced Diagnostic Monitor Support

The Triconex Enhanced Diagnostic Monitor is a software application used for monitoring the hardware, communication, and application status of Triconex controllers. The integration of the Enhanced Diagnostic Monitor with System Manager enables you to extract and view information on detected faults and alarms for a Triconex controller from within System Manager, without having to open another application. For example, when a fault is detected in a safety system, you can invoke the Enhanced Diagnostic Monitor from System Manager to view detailed information about it.

To start the Enhanced Diagnostic Monitor directly from System Manager, it must be installed on a Foxboro DCS workstation. Triconex system and node configuration must be done in the Enhanced Diagnostic Monitor before it can be launched from System Manager.

The FDC280 gathers aggregate alarm status from the devices connected to the Triconex controller. Active system alarms place the FDC280 ECB201 object (device) in Warning status within System Manager.

When the Enhanced Diagnostic Monitor is invoked from System Manager by clicking on a flashing Triconex device, it automatically opens to the Triconex node associated with the FDC280 ECB201.

Multiple instances of the Enhanced Diagnostic Monitor can be launched from System Manager — one for each Triconex controller listed in System Manager.

The ability to launch the Enhanced Diagnostic Monitor directly from System Manager requires the following minimum software versions:

- System Manager v2.13
- Triconex Enhanced Diagnostic Monitor v2.8.0

The Enhanced Diagnostic Monitor can still be used as a standalone application on a Foxboro DCS workstation even if the above System Manager and/or Enhanced Diagnostic Monitor Version requirements are not met.

When installed on a Foxboro DCS workstation, the Enhanced Diagnostic Monitor must use a network interface card (NIC) for its communication with the Triconex controller. This connection into the SIS must be separate from the Foxboro Control Network.

Specifications

Number of Devices	Up to 16 Triconex controllers with up to 256 connected field devices through concurrent drivers. The actual number of field devices is performance and configuration dependent. For sizing guidelines, see *Field Device Controller 280 (FDC280) Sizing Guidelines and Excel Workbook* (B0700GS).
Number of Points	The FDC280 can support up to 8,000 blocks, depending on sizing.
Control Block Support	The FDC280, used with the TSAA Driver, supports the Foxboro DCS Equipment Control Block (ECBs) and DCI blocks.
Performance	The FDC280 TSAA Driver, through the use of DCI blocks, supports communication for a fully loaded Tricon CX controller (43,000 aliases, 200 ms cycle time, and 200 ms update rate). The FDC280 TSAA Driver, through the use of DCI blocks, supports communication for two nearly fully loaded Tricon CX controllers (43,000 aliases, 200 ms cycle time, and 300 ms update rate).
SIS Interface	A single FDC280 supports communication with up to 16 Triconex controllers. Up to eight FDC280s may concurrently interface to a single Triconex controller.
ECBs Supported by the Driver	• ECBP: Primary ECB, representing the FDC280's Ethernet port • ECB200: Parent ECB, representing the TSAA Driver • ECB201: Child ECB, representing a Triconex device
DCI Blocks Supported by the TSAA Driver	• BIN: Binary Input DCI block • BOUT: Binary Output DCI block • BINR: Redundant Binary Input DCI block • IIN: Integer Input DCI block • IOUT: Integer Output DCI block • IINR: Redundant Integer Input DCI block • PAKIN: Packed Input DCI block • PAKOUT: Packed Output DCI block • PAKINR: Redundant Packed Input DCI block • PLSOUT: Pulse Output DCI Block • RINR: Redundant Real Input DCI block • ROUT: Real Output DCI block • RINR: Redundant Real Input DCI block
TSAA Device Integration SOE Workstation Driver Capacity	20,000 Triconex tagnames for SOE data collection from up to 16 Triconex controllers.
Part Numbers	• Triconex TSAA Driver Media for FDC280: K0177DE • TSAA Device Integration SOE Workstation Driver: K0177DF
Regulatory Compliance	Security ISASecure™ Certification, EDSA Level 1

TSAA Supported Commands

FDC280/ Workstation[a]	Function Code	Function Name	Description
FDC280	1	TRICON_DATA	Response to TRICON_DATA_REQ containing Triconex data values
FDC280	2	TRICON_DATA_REQ	Query used to request data from the Triconex controller
FDC280	3	WRITE_TRICON_DATA	Query used to write data to the Triconex controller
FDC280	4	WRITE_TRICON_DATA_RSP	Response to WRITE_TRICON_DATA, containing success/failure
FDC280/ Workstation	5	READ_TRICON_CLOCK	Requests the time in the Tricon controller
FDC280/ Workstation	6	READ_TRICON_CLOCK_RSP	Response to READ_TRICON_CLOCK, containing the time in the Tricon controller
FBDC280/ Workstation	7	SET_TRICON_CLOCK	Requests setting of the controller clock
FDC280/ Workstation	8	SET_TRICON_CLOCK_RSP	Response to SET_TRICON_CLOCK message, containing success/failure
FDC280/ Workstation	9	ADJUST_TRICON_CLOCK	Adjust the clock in the Tricon controller by a number of milliseconds
FDC280/ Workstation	10	ADJUST_TRICON_CLOCK_RSP	Response to ADJUST_TRICON_CLOCK, containing the new time in the controller
Workstation	13	TRICON_SOE_REQ	Requests SOE data from the controller
Workstation	14	TRICON_SOE_RSP	Returns SOE data in response to TRICON_SOE_REQ message
Workstation	15	TRICON_CPSTATUS_REQ	Requests TriStation 1131 application name and version number
Workstation	16	TRICON_CPSTATUS_RSP	Returns program information in response to TRICON_CPSTATUS_REQ message
Workstation	17	TRICON_SOE_DATAAVAIL	Sends a message to the client when SOE data is available. The message is sent when SOE data is put into an empty SOE block, and is sent every 10 seconds while data is available in any block.
FDC280/ Workstation	22	TRICON_GET_SYMBOL_REQ	Requests part of a symbol table from the controller For Trident and Tri-GP only.
FDC280/ Workstation	23	TRICON_GET_SYMBOL_RSP	Sends part of a symbol table as requested by a type 22 message. For Trident and Tri-GP only.
(a) In this table, "Workstation" is a workstation or server with CCS v9.4 or later or CS v7.1.1 or later.			

Related Documents

Document Number	Description
PSS 41H-2FDC280	*Field Device Controller 280 (FDC280)*
B0700HT	*FDC280 TSAA Driver User's Guide*
B0700HU	*Device Integration SOE for Triconex*
B0700GS	*Field Device Controller 280 (FDC280) Sizing Guidelines and Excel Workbook*
9720147-002	*Triconex Diagnostic Expert User's Guide*

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