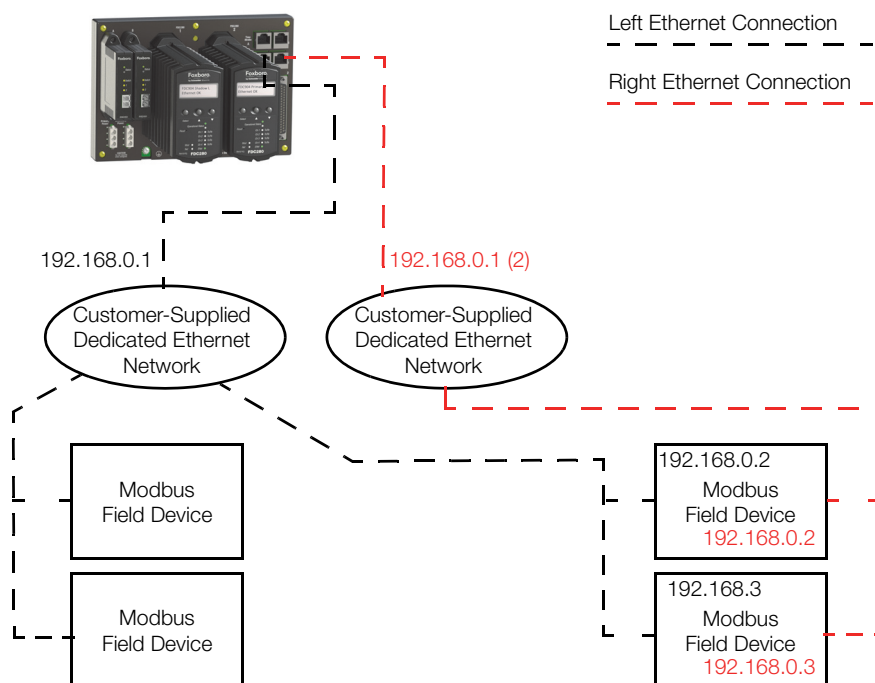


Modbus Master TCP Driver for Field Device Controller 280



The Modbus Master TCP Driver enables the Field Device Controller 280 (FDC280) to integrate Modbus devices into the Foxboro Evo system over Ethernet via the standard TCP/IP protocol.

OVERVIEW

The Modbus Master TCP Driver for the Field Device Controller 280 (FDC280) interfaces the Foxboro Evo system with field devices that use the Modbus TCP protocol over Ethernet IEEE standard 802.3 (supporting TCP/IP), connected over 10/100 Mbps or 1 Gbps copper Ethernet via customer-supplied switches.

The driver supports devices that fully implement the Modbus protocols as well as those that are more restrictive. This flexibility allows you to support many different device capabilities simultaneously.

The driver provides ease of integration, full Foxboro Evo support and redundancy options.

Ease of Integration

A simple download of the Modbus Master TCP Driver to the Field Device Controller 280 (FDC280) enables you to exchange data between the Modbus field devices and the Foxboro Evo system, thus taking advantage of both the power of the Foxboro Evo system and the flexibility of the Modbus field devices.

The FDC280 has the intelligence to optimize device communications by grouping points into single Modbus requests, thereby reducing the device load.

By utilizing the FDC280's ability to manage different scan rates for different groups of points within a single device, the Foxboro Evo system can be tuned for optimum performance.

The driver is downloaded to an FDC280 for any of the configurations shown in *Field Device Controller 280 (FDC280)* (PSS 31H-2FDC280).

To maintain separation between the control processes and the external device communications processes, the Modbus 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.

Foxboro Evo System Support

The Foxboro Evo system supports the Modbus TCP protocol over Ethernet IEEE standard 802.3 (supporting TCP/IP), which facilitates the transfer of data to and from the Modbus field devices.

Foxboro Evo software also provides standard plant management functions and operator displays for these devices, in addition to startup and communication fault-detection and display using System Manager.

Communications

The FDC280 connects to the Modbus field devices over a customer-supplied network using various Ethernet network configurations, shown in *Field Device Controller 280 (FDC280)* (PSS 31H-2FDC280), to connect with supported field devices. The FDC280 can connect directly to field devices with Ethernet I/O, or to field devices with serial I/O via a protocol-specific gateway which performs the Ethernet-to-serial I/O bridging.

The Modbus TCP driver has been qualified with the following Schneider Electric gateways and bridges:

- ▶ To enable connection to serial Modbus slave devices, use an Ethernet to Serial Gateway (e.g., Schneider-Electric's TSXETG100).
- ▶ To enable connection to serial Modbus Plus devices, use a Schneider Electric Modbus Plus Ethernet Bridge, part number 174CEV20040.

FEATURES

Features of the Modbus Master TCP Driver are:

- ▶ Integration of Modbus field devices into the Foxboro Evo system over Ethernet
- ▶ Field Device Integration support for Modbus TCP. Refer to *Modbus TCP Client Driver for FDC280 User's Guide* (B0700GT) for details.
- ▶ Non-redundant or redundant operation of FDC280 controllers over the I/O network to the field devices
- ▶ Availability of standard Foxboro Evo plant management functions and operator displays
- ▶ Monitoring of status for Modbus field devices using Foxboro Evo Control HMI software.
- ▶ Support for reading and writing of multiple points in a single TCP/IP message

HARDWARE

The Modbus Master TCP Driver can be downloaded to the FDC280, which is described in *Field Device Controller 280 (FDC280)* (PSS 31H-2FDC280).

SOFTWARE

The Modbus Master TCP Driver is compatible with all releases of the Foxboro Evo Control Core Software software starting with V9.3.

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 Evo plant management functions and operator displays. Data may also be written out to the individual devices from the Foxboro Evo system.

Installation and Download

There are two types of driver installation (Major and Minor Image Update) which are explained in *Field Device Controller 280 (FDC280)* (PSS 31H-2FDC280).

Depending on the type of installation required, installation of the driver may require either a download operation which does not disrupt the rest of the Foxboro Evo system, or an operation which involves shutting down the Foxboro system and rebooting the FDC280.

PRODUCT SUPPORT

The Modbus Master TCP Driver can be ordered from BuyAutomation. The product includes media and documentation. Engineering assistance can be provided through the normal channels.

SPECIFICATIONS

Number of Devices

Up to 256 field devices maximum. The actual number of field devices is performance and configuration dependent. (For sizing guidelines, refer to *Field Device Controller 280 (FDC280) Sizing Guidelines and Excel Workbook* (B0700GS).)

Number of Points

The FDC280 can support up to 8000 I/O points, depending on sizing.

Control Block Support

The FDC280, used with the Modbus Master TCP Driver, supports the following Foxboro Evo Equipment Control Block (ECBs) listed in Table 1 and the DCI blocks listed in Table 2.

Table 2. DCI Blocks Supported by the Modbus Master TCP Driver

IINR	Redundant Integer Input DCI block
IOUT	Integer Output DCI block
PAKIN	Packed Input DCI block
PAKINR	Redundant Packed Input DCI block
PAKOUT	Packed Output DCI block
PLSOUT	Pulse Output DCI Block

Table 1. ECBs Supported by the Modbus Master TCP Driver

ECBP	Primary ECB, representing the FDC280's Ethernet port
ECB200	Parent ECB, representing the Modbus TCP Client Driver
ECB201	Child ECB, representing a Modbus field device

Table 2. DCI Blocks Supported by the Modbus Master TCP Driver

RIN	Real Input DCI block
RINR	Redundant Real Input DCI block
ROUT	Real Output DCI block
BIN	Binary Input DCI block
BINR	Redundant Binary Input DCI block
BOUT	Binary Output DCI block
IIN	Integer Input DCI block

RELATED DOCUMENTATION

For reference purposes, Table 3 lists the documentation for additional hardware and software elements in the 200 Series subsystem.

Table 3. Related Documentation

Document Number	Title
PSS 31H-2FDC280	Field Device Controller 280 (FDC280)
N/A	Modbus Application Protocol Specification V1.1b3 http://www.modbus.org/docs/Modbus_Application_Protocol_V1_1b3.pdf
N/A	Modbus Messaging On TCP/IP Implementation Guide V1.0b http://www.modbus.org/docs/Modbus_Messaging_Implementation_Guide_V1_0b.pdf

MODBUS FUNCTION CODES SUPPORTED

Table 4. Supported Modbus Function Codes

Function Code	Function Name	Description
1	Read Coil Status	Reads the ON/OFF status of discrete outputs (0x references, coils)
2	Read Input Status	Reads the ON/OFF status of discrete inputs (1x references)
3	Read Holding Registers	Reads the binary contents of holding registers (4x references).
4	Read Input Registers	Reads the binary contents of input registers (3x references)
5	Force Single Coil	Forces a single coil (0x reference) to either ON or OFF
6	Preset Single Register	Presets a value into a single holding register (4x reference).
8	Diagnostic	Sub Function 00 only
15	Force Multiple Coils	Forces each coil (0x reference) in a sequence of coils to either ON or OFF.
16	Preset Multiple Registers	Presets values into a sequence of holding registers (4x references).
23	Read Write Multiple Register	Reads the binary contents of multiple input registers (5x reference) and writes the values into multiple registers (6x reference).



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