Foxboro Process Automation System

Foxboro_®

by Schneider Electric

Product Specifications

PSS 31S-2M11

Foxboro Remote Terminal Unit (RTU) Station



OVERVIEW

Foxboro Remote Terminal Unit (RTU) Station is Windows-based configuration software that helps to centrally manage Foxboro SCD6000 and RTU50 SVX, and Foxboro SCD5200 and RTU50. Foxboro RTU Station allows technical staff and system engineers to configure and maintain Foxboro remote devices. These Foxboro remote devices are used as data concentrators, gateways, and substation controllers by the high and medium voltage industrial power market. The SCD6000 and RTU50 SVX inherit the functionality of the compact SCD5200 while providing more dynamic RAM to achieve higher performance. Foxboro RTU Station creates new configurations and programs for the SCD6000 and RTU50 SVX while preserving the existing IPs created for the SCD5200 and RTU50 products. The block diagram shows a simple flow chart.

Foxboro RTU Station provides configuration of:

- State and Logic Language (SALL) programs and timing setup
- Core Database and Intrinsic Database Functions (IDF) design
- IO and Electrobus Structure creation
- IEC 61850 text file import and mapping activities
- Protocol definitions and configurations for embedded protocols

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Foxboro RTU Station utilities operate in conjunction with the Foxboro Remote Terminal Viewer (RTV) and Foxboro RTU Connect Secure software products to manage the uploading and downloading of files, and the user authentication of the RTU connection.

INTRODUCTION

Foxboro RTU Station allows the configuration of field I/O and communications assignments to the RTU. Foxboro RTU Station works mostly offline with support for the online configuration of a set of key parameters. Through an easy to use Graphical User Interface (GUI), Foxboro RTU Station supports general data entry, editing, and availability of an offline database.

Foxboro RTU Station generates an RTU configuration definition (.CFG file) for all I/O communications and calculation data points. This file can then be loaded into the RTU Flash File System through RTV (see PSS 31S-2M13). When the RTU is online, all input modules are polled for data, which is processed according to the configuration definition and is used to update the RTU database. The distributed processing architecture of the RTU helps ensure that these updates are done efficiently with high I/O or communications activity and regardless of the RTU's size.

FEATURES

- Provides user-friendly navigation with pull-down menus and tree-type functional display.
- Includes online Help that is easily accessible and context-sensitive.
- Right-click menus provide easy access to commonly used operations (such as generating a .CFG file, creating and editing a module).
- GUI provides user-friendly data entry and editing.
- A simple interface lets user enter valid Windows credentials for Foxboro RTU Station.

- Offers database backup utility by using the User Authentication window.
- Easily creates and views configurations of standalone RTUs, or OptoNet networks of multiple RTUs.
- Identifies all I/O points by a user-assigned name, not by index numbers.
- Allows import of .CFG file(s) to populate the configuration database.
- Allows the configuration database to be exported and imported as .CSV files.
- Allows creation of the Online Configuration file (.ON file) used to reconfigure selected parameters in every protocol without restarting SCD6000 and RTU50 SVX type RTUs. (This feature is not supported for SCD5200 and RTU50 RTUs.)
- Allows configuration of DNP3 SAv2 and SAv5 parameters and creation of a users file (.KEY file) to configure users, roles, and keys (for SCD6000 only).
- Allows the configuration and compilation of Intrinsic Database Functions (IDF) and State and Logic Language (SALL) calculations.
- Provides simple steps for upgrading to a newer version of Foxboro RTU Station by retaining the existing configuration database.
- Duplicates Intelligent Electronic Device (IEDs) and saves time with the IED copy-paste feature.
- Allows communication only to the Trusted hosts using IP address white lists. You can modify the trusted host IPs in online configuration mode.
- Provides support for configuring the Electrobus Expansion for SCD6000.

 Retrieves the value of physical and virtual points mapped to different slave protocols configured in a standalone RTU or RTUs in an OptoNet network using Protocol Listing Mapping (.CSV file).

GENERAL COMPATIBILITY

Foxboro RTU Station can be used to fully configure existing SCD5200 and RTU50 RTUs except for instances of IsaGRAF, which is no longer supported.

IsaGRAF3 project calculations used by the RTU50 and SCD5200 have to be implemented using any equivalent SALL or IDF equations for SCD6000/RTU50 SVX.

The existing SCD5200 text file programs that are compatible with SALL, IDF, and IEC 61850 SCL languages can be imported and compiled with the new configuration tool. The Foxboro RTU Station allows for the subsequent re-export and upload of files into the existing SCD5200 and RTU50 RTUs.

FUNCTIONAL DESCRIPTION

Foxboro RTU Station is an offline tool designed to allow technical staff and system engineers to configure and maintain RTUs and the associated plant.

Generating Configuration Files

You first create the configuration of an RTU (either as a standalone RTU or member of an OptoNet network of RTUs), then generate the .CFG and .ON files. You can view the content of these files after the generation process is over. You can generate .CFG files for all the RTUs in an OptoNet or all standalone RTUs at a site.

Importing Configuration File(s)

The configuration of an existing RTU can be loaded for modification in Foxboro RTU Station by reading the existing .CFG file(s). Some parameters that are configurable in the Foxboro RTU Station do not appear in the .CFG file. On importing a .CFG file, if parameters cannot be read, the application leaves them empty or provides a default value.

Each parameter is validated during creation of the configuration database from the .CFG file(s).

Multiple .CFG files for an OptoNet or site can be imported through a single command in a similar way.

Bulk Import and Export

The configuration database can be exported in the form of .CSV files and these files are imported to recover the database. These .CSV files provide a mechanism for modifying or creating bulk data through external tools. The .CSV import/export feature is limited since not all IO modules or protocols are supported. Refer to Table 2, Table 3, and Table 4 for the hardware modules, protocols, and functions that support .CSV import.

Configuring a Module Using the GUI

Modules (protocols, cards, calculations, and so on) are configured by specifying where they are to be created and configuring the parameters for that module.

When configuring an I/O card, all I/O points are identified by a user-assigned name and not by index numbers. Alternatively, default names can be accepted for accelerated configuration entry.

Configuring IEC 61850

Foxboro RTU Station allows you to incorporate both IEC 61850 Client/GOOSE Subscriber and IEC 61850 Server/GOOSE Publisher. Foxboro RTU Station also allows you to incorporate the IEC 61850 (.SCD and .CID) files that are created using third party IEC 61850 IED.

Foxboro RTU Station can configure IEC 61850 by importing standard IEC 61850 Substation

Configuration Language (SCD and CID) .XML files.

The IEC 61850 database object definitions are automatically created from these files and the RTU configuration can be generated.

Window Manipulation

The main and right panel windows can be brought into focus, sized, minimized, maximized, and closed through familiar window operations.

Utilities

The Database Backup Utility that is bundled with the Foxboro RTU Station installation can be used to back up the database configuration and also restore any database configuration.

Calculation Tasks

Foxboro RTU Station performs many tasks, such as:

- Enable the RTU to perform calculations (SALL tasks) by linking the calculation source files (.SAL) to the configuration file (.CFG)
- Create calculated database points that are defined in the linked .SAL files
- Allow access to a text editor for editing .SAL files
- Configure and compile IDF and SALL calculations

File Names and Types

The Foxboro RTU Station uses or generates the files shown in Table 1.

File Name and Suffix	Function	Input/Output
.CFG	Configuration File	Input/Output
.CID	Configured IED Description (for IEC 61850)	Input
.CNX	Connection File	Input
.CSV	Comma Separated Values	Input/Output
.ELF	SALL Logic Executable File	Output
.ISA	IsaGraF Logic Source File	Input
.ON	Online Configuration File	Output
.SAL	SALL Logic Source File	Input
.SCD	Substation Configuration Description (for IEC 61850)	Input
.MAP	It provides mapping to RTU database points	Output
.KEY	Key for DNP3 Secure Authentication	Output
.PEM	Public Key for DNP3 Secure Authentication	Input/Output
.RIAF	This is a readable format of the configuration files	Output

Table 1. Files Supported by the Foxboro RTU Station

System Requirements

The Foxboro RTU Station application is supported on Windows[®] 7 (32-bit and 64-bit), Windows[®] 10 (64-bit), Windows Server[®] 2008 (64-bit), and Windows Server[®] 2016 (64-bit) operating systems.

The Foxboro RTU Station supports:

- SCD6000 using firmware SY-1101207_A or later
- RTU50 SVX using firmware SY-1101207_A up to SY-1101207_C1
- SCD5200 and RTU50 using any version of firmware SY-1101205 or firmware SY-1101155 Rev K or later

Foxboro RTU Station SY-1101211 supports the hardware modules, communications protocol, and input output modules in Table 2, the software modules in Table 3, and the functions in Table 4.

Part Number	Subsystem	SCD5200/ RTU50	SCD6000	RTU50 SVX	CSV Import Support	
	AC Transduce	r Modules	1			
SY-0399142	3 Phase AC Transducer Module 5 Amp Module Assembly	Yes	Yes	Yes	No	
SY-0399142R	3 Phase AC Transducer Module 5 Amp Module Assembly (RoHS)	Yes	Yes	Yes	No	
SY-0399140	3 Phase AC Transducer Module 1 Amp Module Assembly	Yes	Yes	Yes	No	
SY-0399140R	3 Phase AC Transducer Module 1 Amp Module Assembly (RoHS)	Yes	Yes	Yes	No	
	Multiple I/O Modules					
SY-0399095	Multi Input Output Module 129V 8 Mini Pilot Relay	Yes	Yes	Yes	Yes	
SY-0399095R	Multi Input Output Module 129V 8 Mini Pilot Relay (RoHS)	Yes	Yes	Yes	Yes	
SY-0399094	Multi Input Output Module 48V 8 Mini Pilot Relay	Yes	Yes	Yes	Yes	
SY-0399094R	Multi Input Output Module 48V 8 Mini Pilot Relay (RoHS)	Yes	Yes	Yes	Yes	
SY-0399088	Multi Input Output Module 24V 8 Mini Pilot Relay	Yes	Yes	Yes	Yes	
SY-0399088R	Multi Input Output Module 24V 8 Mini Pilot Relay (RoHS)	Yes	Yes	Yes	Yes	

Part Number	Subsystem	SCD5200/ RTU50	SCD6000	RTU50 SVX	CSV Import Support	
SY-0399097	Multi Input Output Module 129V 6 Paired Pilot Relay	Yes	Yes	Yes	Yes	
SY-0399097R	Multi Input Output Module 129V 6 Paired Pilot Relay (RoHS)	Yes	Yes	Yes	Yes	
SY-0399096	Multi Input Output Module 48V 6 Paired Pilot Relay	Yes	Yes	Yes	Yes	
SY-0399096R	Multi Input Output Module 48V 6 Paired Pilot Relay (RoHS)	Yes	Yes	Yes	Yes	
SY-0399089	Multi Input Output Module 24V 6 Paired Pilot Relay	Yes	Yes	Yes	Yes	
SY-0399089R	Multi Input Output Module 24V 6 Paired Pilot Relay (RoHS)	Yes	Yes	Yes	Yes	
	Analog Input Module					
SY-0399085	20 Channel Analog Input Module (Isolated)	Yes	Yes	Yes	No	
SY-0399085R	20 Channel Analog Input Module (Isolated) (RoHS)	Yes	Yes	Yes	No	
	Analog/Digital Ir	nput Modul	e			
SY-0399160	4 Analog/32 Digital Input Module (24 V to 129 V)	Yes	Yes	Yes	Yes	
SY-0399160R	9160R 4 Analog/32 Digital Input Module (24 V to 129 V) (RoHS)		Yes	Yes	Yes	
SY-0399222	4 Analog/32 Digital Input Module (24 V to 129 V) Deep Wiring Channel Module	Yes	Yes	Yes	Yes	
SY-0399222R	99222R 4 Analog/32 Digital Input Module (24 V to 129 V) Deep Wiring Channel Module (RoHS)		Yes	Yes	Yes	

Part Number	Subsystem	SCD5200/ RTU50	SCD6000	RTU50 SVX	CSV Import Support
	Digital Outpu	t Modules			
SY-0399086	12 Pilot Relay Digital Output Module	Yes	Yes	Yes	Yes
SY-0399086R	12 Pilot Relay Digital Output Module (RoHS)	Yes	Yes	Yes	Yes
SY-0399087	12 Magnetically Latched Relay Digital Output Module	Yes	Yes	Yes	Yes
SY-0399087R	12 Magnetically Latched Relay Digital Output Module (RoHS)	Yes	Yes	Yes	Yes
SY-0399136	8 Digital Output 10 Amp Module	Yes	Yes	Yes	Yes
SY-0399136R	8 Digital Output 10 Amp Module (RoHS)	Yes	Yes	Yes	Yes
	Analog Outpu	ut Module	1	I	
SY-0399084	4 Channel Analog Output Module	Yes	Yes	Yes	No
SY-0399084R	4 Channel Analog Output Module (RoHS)	Yes	Yes	Yes	No
	Processor I	Modules			
SY-0399143	SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module	Yes	NA	NA	NA
SY-0399144	SCD5200 CPU OptoNet Ethernet (COE) Module	Yes	NA	NA	NA
SY-0399151	51 SCD5200 CPU OptoNet Ethernet (COE) Module with 64 MB SDRAM		NA	NA	NA
SY-0399152	SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module with 64 MB SDRAM	Yes	NA	NA	NA
SY-60399001R	01R SCD6000 CPU OptoNet Power Supply Ethernet (COPE) Module (RoHS)		Yes	No	NA
SY-60399002R	SCD6000 CPU OptoNet Ethernet (COE) Module (RoHS)	NA	Yes	No	NA

Part Number	Subsystem	SCD5200/ RTU50	SCD6000	RTU50 SVX	CSV Import Support
SY-60399003R	RTU50 SVX CPU OptoNet Ethernet Module (RoHS)	NA	No	Yes	NA
	8 Channel Ser	ial Module	1		
SY-0399132	8 CH Serial Module RS-485/RS-232	Yes	Yes	Yes	No
SY-0399132R	8 CH Serial Module RS-485/RS-232 (RoHS)	Yes	Yes	Yes	No
	Dual Communica	tions Modu	les		
SY-0399122 ^(a)	DCB DNP Glass Optical supporting DNP3 Master/Slave	Yes	Yes	Yes	No
SY-0399122R ^(a)	DCB DNP Glass Optical supporting DNP3 Master/Slave (RoHS)	Yes	Yes	Yes	No
SY-0399127	DCB IEC 60870-5-103 Glass Optical supporting IEC 60870-5-103 Master	Yes	Yes	Yes	No
SY-0399127R	DCB IEC 60870-5-103 Glass Optical supporting IEC 60870-5-103 Master (RoHS)	Yes	Yes	Yes	No
SY-0399163 ^(a)	DCB DNP V.11 supporting DNP3 Master/Slave	Yes	Yes	Yes	No
SY-0399163R ^(a)	DCB DNP V.11 supporting DNP3 Master/Slave (RoHS)	Yes	Yes	Yes	No
SY-0399192	Communications Module V.28 Conitel C2020/C2025 Master/Slave, C300/C3000 Slave	Yes	Yes	Yes	No
SY-0399192R	Communications Module V.28 Conitel C2020/C2025 Master/Slave, C300/C3000 Slave (RoHS)	Yes	Yes	Yes	No
SY-0399194 ^(a)	Communications Module V.28 DNP3 Master/Slave	Yes	Yes	Yes	No
SY-0399194R ^(a)	Communications Module V.28 DNP3 Master/Slave (RoHS)	Yes	Yes	Yes	NO

Part Number	Subsystem	SCD5200/ RTU50	SCD6000	RTU50 SVX	CSV Import Support
SY-0399196	Communications Module V.28 IEC 60870-5-101 Slave	Yes	Yes	Yes	NA
SY-0399196R	Communications Module V.28 IEC 60870-5-101 Slave (RoHS)	Yes	Yes	Yes	NA
SY-0399198	Communications Module V.28 WISP+ Master/Slave	Yes	No	Yes	NA
SY-0399198R	Communications Module V.28 WISP+ Master/Slave (RoHS)	Yes	No	Yes	NA
SY-0399224 ^(a)	Communications Module V.11 DNP3 Master/Slave (Ignore DCD)	Yes	No	No	No
SY-0399224R ^(a)	Communications Module V.11 DNP3 Master/Slave (Ignore DCD) (RoHS)	Yes	No	No	No
SY-0399225R ^(b)	SCD6000 Communications Module V.11 DNP3 Master/Slave Type 2 (RoHS)	No	Yes	No	NA
SY-0399226R ^(b)	SCD6000 Communications Module V.28 DNP3 Master/Slave Type 2 (RoHS)	No	Yes	No	NA
SY-0399227R ^(b)	SCD6000 Communications Module Glass Optical DNP3 Master/Slave Type 2 (RoHS)	No	Yes	No	NA
	Electrobus Expan	nsion Modu	le		
SY- 60399004R ^(c)	SCD6000 Electrobus Upper IO Expansion Module	No	Yes	No	NA
SY- 60399005R ^(c)	SCD6000 Electrobus Lower IO Expansion Module	No	Yes	No	NA
SY-60399007R	RTU50/RTU50 SVX Electrobus Lower Expansion Module Type II	Yes	No	Yes	NA
SY-1025072	RTU50/RTU50 SVX Electrobus Upper End Expansion Module	Yes	No	Yes	NA
SY-1025073	RTU50/RTU50 SVX Electrobus Lower End Expansion Module	Yes	No	Yes	NA

(a) These modules support SCD6000 firmware version SY-1101207-A up to SY-1101207-C.

(b) These modules support SCD6000 firmware version SY-1101207-D.

(c) These modules support SCD6000 firmware version SY-1101207-F and later.

	Foxboro RTU	Station Suppo	CSV Import Support		
Subsystem	SCD5200	SCD6000	RTU50 SVX	SCD5200	SCD6000 & RTU50
C2025 Conitel Master	Yes	Yes	Yes	Yes	Yes
C2025 Conitel Slave	Yes	Yes	Yes	Yes	Yes
C300 Conitel Slave	Yes	No	No	Yes	No
DNP3 Master ^(a)	Yes	Yes	Yes	Yes	Yes
DNP3 Slave ^(a)	Yes	Yes	Yes	Yes	Yes
IEC 60870-5-101 Master	Yes	Yes	Yes	No	No
IEC 60870-5-101 Slave	Yes	Yes	Yes	No	No
IEC 60870-5-103 Master	Yes	Yes	Yes	Yes	Yes
IEC 60870-5-104 Slave	Yes	Yes	Yes	No	No
IEC 60870-5-104 Master	No	Yes	No	No	No
IEC 61850 Client / GOOSE Subscriber	Yes	Yes	Yes	No	No
IEC 61850 Server / GOOSE Publisher	Yes	Yes	Yes	No	No
Modbus Master	Yes	Yes	Yes	No	No
Modbus Slave	Yes	Yes	Yes	No	No
OptoNet	Yes	Yes	Yes	No	No
SNTP	Yes	Yes	Yes	NA	NA
TCP/IP	Yes	Yes	Yes	NA	NA

Table 3. Communication Protocols Supported by Foxboro RTU Station

(a) SCD6000 supports DNP3 Secure Authentication (SAv2 and SAv5) from SY-1101207-D firmware version.

Feature	Foxboro RTU Station Support	CSV Import Support	Function			
Calculations						
Intrinsic Database Functions	Yes	Yes	Intrinsic Database Functions (IDF) allow you to produce analog and digital values (result points) through the manipulation of the previously specified analog and digital inputs (source points).			
			IDF enables you to implement several kinds of calculations within the RTU configuration, without the need to create application programs using SALL.			
SALL Calculations	Yes	Yes	State And Logic Language (SALL) allows you to implement your own control and data processing logics for execution of your RTUs.			
			A SALL program defines a sequence of instructions that is executed from the beginning to end. This sequence is executed either at regular intervals (at a periodic rate stipulated by the programmer) or on demand, whenever there is a change in an input value referenced by the program.			
IEC 61131-3 (ISaGRAF) ^(a)	Yes	No	The supported version is ISaGRAF Workbench V3.xx (3.32 or higher, but lower than 4.00)			
			SCD6000 does not support ISaGRAF			
		Misce	ellaneous			
Analog Logger	Yes	No	Analog Logger allows you to configure the analog input logs, which are created in the RTU prior to and after a change in the digital input point. This configuration occurs at a configurable sample interval and for a configurable period. The sampled values are dumped into the Flash File System in .CSV format.			
Serial Event Logger	Yes	No	Event Logger allows you to record the events related to a configured set of digital Sequence-of-Events (SOE) points. Recorded events can be saved to a file in the remote device's flash file system or written to a serial port either in real-time or when requested.			

Table 4. Functions Supported by Foxboro Remote Devices

Feature	Foxboro RTU Station Support	CSV Import Support	Function
Control Interlock	Yes	Yes	Control Interlock provides mutual exclusion and supervises control points according to its dependencies. Additionally, interlocking schemes restrict alarming operations that might otherwise damage primary equipment. Only authorized users can override interlocking and other locked operations.
System Monitor (SysMon)	Yes	No	System Monitor provides information on various parts of the system, such as battery status, system configuration, and memory statistics. This data can be telemetered to the Master station using SCADA protocol.

Table 4. Functions Supported by Foxboro Remote Devices (Continued)

(a) Not supported by SCD6000 and RTU50 SVX.



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