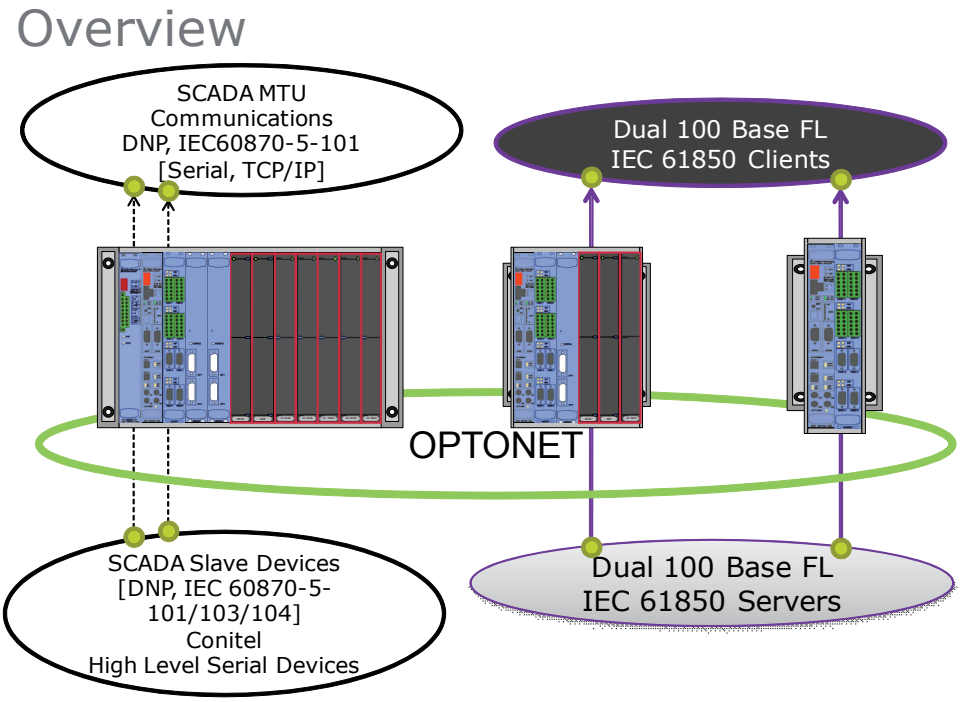
Foxboro Evo™
Process Automation System

Product Specifications

Foxboro®
by Schneider Electric

PSS 31H-8G1

Remote Terminal Unit (RTU)
Station Computing Device (SCD) SCD5200 Architectural Overview



OVERVIEW

The SCD5200 is a multi-nodal Remote Terminal Unit with advanced data integration, time synchronization, and programming capabilities. Its primary slave interfaces are based on the dual communication module which provides DNP3 Slave and IEC 60870-5-101 Slave functions. The SCD5200 uses these protocols to communicate and integrate with multiple remote master control centres.

Each SCD5200 rack mounted cardfile can support Power, CPU, Communications and IO modules. The range of IO modules is extensive, covering all aspects of IO at a wide range of input voltage levels. Each IO processor is intelligent, providing on board pre-processing and capture of sequence of events information.

More than just handling IO modules, the SCD5200 is an embedded computing and networking platform, which serves as a distributed Station Computing Device. The system architecture inherits and complements its predecessor, the RTU50. The SCD5200 continues support of the RTU50 firmware and tools, and incorporates new features to support the latest systems networking requirements.

The architecture as shown in the figure provides continued support for OptoNet and includes additional support for the high speed internet protocols required to support integration of IEC 61850 Station LANS. The OptoNet is transparent to the user and provides any user programming environment complete access to any IO or

communications information on any node at any time. IEC61850 Station LANs can be introduced into any node on either of the Dual Optic base Ethernet ports.

The SCD5200 can be password protected against any end user access on any TCP/IP or serial port. Passwords can be assigned against individual users and common roles such as Maintainer, Browser, and Superuser.

Up to 50 SCD5200s can be interconnected on the OptoNet ring. Backward compatibility of the OptoNet is maintained with the RTU50. This allows the user to include a mix of older RTU50 cardfiles with the newer SCD5200 cardfile.

The SCD5200 includes both IEC61850 Client and Server services and data structures. These data structures are created by the import of a standard. SCD file format and are included with the configuration file. Either the IEC 61850 Client or Server or both may be configured for use on any node.

REAL-TIME DATABASE AND ENVIRONMENT

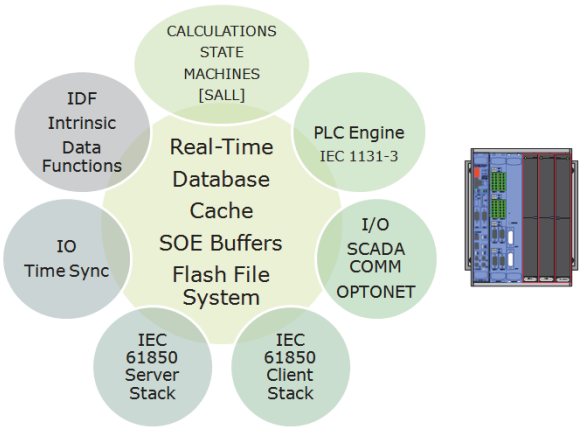


Figure 1. Real-Time Database and Environment

As shown in Figure 1, the SCD5200 environment consists of a central real-time database which is kept up to date by a variety of independent processes. These processes are supported by the embedded operating system executive.

- IO Time Sync – The real-time clock on each processor is used to synchronize the clocks on all intelligent IO modules.
- IDF Intrinsic Data Functions – Event driven pre-configured functionality is very fast and often used for implicit conversions of IO information.
- Calculations – Up to 3 calculations tasks can be programmed by the user. Each task is written as a State Machine or a Procedural Logic using the dedicated State and Logic Language [SALL].
- PLC Engine – In addition to state transition calculations, the SCD5200 provides a PLC executive which operates in a more traditional PLC cycle, reading input snapshots, calculating outputs, writing outputs. The engineering of IEC1131 programs is provided using 3rd party programming tools.
- IO/COMMS/OptoNet – Almost all functionality is provided through the Electrobus and OptoNet interfaces. The Electrobus interface supports the IO and Communications modules and the OptoNet functionality supports the transparent transmission of the real-time database from node to node.
- IEC61850 Client Stack – A separate stack process is maintained to allow the IEC61850 Client services to operate.
- IEC61850 Server Stack – A separate stack process is maintained to allow the IEC61850 Server services to operate.

The real-time database accepts incoming data and with a time based comparison records changes in any of the change-driven protocol stacks. The real-time database is supported at start-up and run-time by a flash based file system.

A complete set of diagnostic interfaces is provided to allow both remote and local diagnostic tools to establish a secure connection with the unit at any time. The on board flash file workspace allows for multiple files to be downloaded and used as current, past or future intended running configurations. The diagnostic interface allows for the SCD5200 to be reset remotely and re-started with a new or test configuration.

FILE FORMATS

Multi-Slot Cardfile Formats

The SCD5200 is provided with a passive parallel backplane which makes it possible to provide a number of formats with varying number of IO slots. Each format allows for one CPU.

The most popular cardfile format for the SCD5200 is a 19" rack file which includes a wide range Power Supply, a COE [CPU, OptoNet, Ethernet] variant of the CPU module, and space for up to 10 standard width IO modules.

Each rack can be interconnected by use of OptoNet cables which allow for a scalable solution involving multiple computing nodes.

Higher communications densities can be accommodated by the use of the 5-slot cardfile. In this case a COPE [variant of the CPU module] supplies backplane power which avoids the need for a separate wide range power supply. This 5 slot file can be located in smaller spaces where a 19" rack solution might not be feasible.

Higher availability architectures demand alignment of the CPU with specific areas of plant control and distributed among many locations on a site using OptoNet or High Speed Ethernet. The 3-Slot cardfile provides an ability to create highly distributed architectures where minimal communications and IO are required.

Multi-Backplane Cardfile Formats

The SCD5200 may be constructed in a semi distributed available architecture by using Multiple Backplanes in a 19" Rack. The following Multi-Backplane cardfiles are available:

- 2 x 5-slot – providing up to 2 COPE modules per 19" rack
- 3 x 3-slot – providing up to 3 COPE modules per 19" rack.

Single-Slot Cardfile Format

With the advent of IEC61850 Server or Client, it is possible to have the SCD5200 act as a data-concentrator whereby all external interaction occurs on the dual Ethernet. In this case the single slot card file is most appropriate.

Customized File Formats

File formats may be customized for special order.

FILE POWER SUPPLY

In the smaller format files (up to five I/O modules), the COPE's integral 40 W wide input voltage supply powers the system.

Optional Power Supply (0399131)

A Standalone Power Supply Module is required to power the I/O modules and provide the field supply in the 10 I/O module file format.

These power supplies operate from 18 to 164 V dc.

CPU OPTONET AND ETHERNET (COPE AND COE) MAIN PROCESSOR MODULE

The SCD5200 COPE Board has an industrial processor with an Electrobus Interface and includes:

- 32-bit industrial processor (including cache and floating point co-processor)
- 2 serial ports (configurable RS-232/RS-485)
- 128 KB of non-volatile static RAM
- 16 MB or 64 MB RAM (64 MB RAM versions required when using configurations supporting IEC 61850)
- 8 MB internal flash file
- Dual 10BaseFL/100BaseSX Ethernet ports with auto negotiation support
- On-board real-time clock
- 40 W regulated wide input voltage dc power supply
- Single OptoNet node (2 optical ports).

The SCD5200 COPE Board supports the following:

- OptoNet
  High-speed optical redundant token passing local area network
- COM1 port RS-232
  Diagnostic Utility Foxboro Evo™ Remote Terminal Viewer (RTV)
- COM2 port RS-232/RS-485
  DNP3 Master
  DNP3 Slave
  Modbus Master
  Modbus Slave
  IEC 60870-5-101 Master
  GPS Clock
  User configurable serial interface
- Ethernet
  DNP3 Master on TCP/IP
  DNP3 Slave on TCP/IP
  IEC 60870-5-104 Slave
  KEMA Certified IEC 61850 Server and Client
  KEMA Certified IEC 61850 GOOSE Publisher and Subscriber
  Modbus/TCP Master
  Diagnostic Utility over TCP/IP.

Input/Output Assemblies (I/O)

CPU interfaces with I/O modules through Electrobus. For details, refer to PSS 31H-8G2.

Dual Communication Board (DCB)

DCB provides communication interface between SCD5200 and Master station. For details, refer to PSS 31H-8G5.

State and Logic Language (SALL)

SALL provides a means to implement individual control and data processing logic for execution on SCD5200.

Intrinsic Database Functions (IDF)

IDF provides the uses of predefined functions for control and data processing logic for execution on SCD5200.

Foxboro Evo Remote Terminal Viewer (RTV)

- Password based Authentication for Diagnostic Utility RTV to prevent unauthorized access to RTU
- Three level access privilege for RTV with a log of access and diagnostic activities.

CPU (COPE/COE)

Part Number	Description
SY-0399143	SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module
SY-0399144	SCD5200 CPU OptoNet Ethernet (COE) Module (10 I/O file only)
SY-0399151	SCD5200 CPU OptoNet Ethernet (COE 64 MB) Module (10 I/O file only)
SY-0399152	SCD5200 CPU OptoNet Power Supply Ethernet (COPE 64 MB) Module

I/O FILES

Part Number	Description
SY-2003092	SCD5200 2 x 5 I/O Module Card File (2 COPE, 10 I/O)
SY-2003098	SCD5200 10 I/O Module Card File (requires 0399131 Power Supply)
SY-2003100	SCD5200 5 I/O Module Card File
SY-2003102	SCD5200 3 I/O Module Card File
SY-2003104	SCD5200 1 I/O Module Card File
SY-2003107	SCD5200 3 x 3 I/O Module Card File (3 COPE, 9 I/O)

POWER SUPPLY

Part Number	Description
SY-0399131	SCD5200 Wide Input Range Power Supply (required for 2003098)

I/O ASSEMBLIES

Part Number	Assembly	I/O Count
SY-0399084	4 Analog Output	4AO
SY-0399085	20 Analog Input (Isolated)	20AI
SY-0399086	TDO 12 Pilot Relays	12DO
SY-0399087	TDO 12 Magnetically Latched Relays	12DO
SY-0399088	Multi I/O 24 Digital Inputs 24 V 6 Analog Inputs 8 Mini-pilot Relays	24DI/6AI/8DO
SY-0399089	Multi I/O 24 Digital Inputs 24 V 6 Analog Inputs 6 Paired Relays	24DI/6AI/6DO
SY-0399094	Multi I/O 24 Digital Inputs 48 V 6 Analog Inputs 8 Mini-pilot Relays	24DI/6AI/8DO

Part Number	Assembly	I/O Count
SY-0399095	Multi I/O 24 Digital Inputs 129 V 6 Analog Inputs 8 Mini-pilot Relays	24DI/6AI/8DO
SY-0399096	Multi I/O 24 Digital Inputs 48 V 6 Analog Inputs 6 Paired Relays	24DI/6AI/6DO
SY-0399097	Multi I/O 24 Digital Inputs 129 V 6 Analog Inputs 6 Paired Relays	24DI/6AI/6DO
SY-0399136	Digital Output Module 8DO 10 Amp Relays	8DO
SY-0399160	SCD5200 32 Digital Inputs 4 Analog Inputs (24 V to 129 V)	32DI/4AI
SY-0399222	SCD5200 4 Isolated Analog Inputs and 32 Digital Inputs (Deep Wiring Channel) Module	32DI/4AI

RTU50 70 mm ASSEMBLIES

Part Number	Assembly	I/O Count
SY-0399010	TDO 12 Digital Output Module with 10A Relays	12DO
SY-0399137	TDO 12 Digital Output Module with 10A Relays and MOVs	12DO
SY-0399140	3 Phase Digital Transducer Module (1 Amp, 0.5% Accuracy)	2DI/2DO
SY-0399142	3 Phase Digital Transducer Module (5 Amps, 0.5% Accuracy)	2DI/2DO

The CTVT and 10 Amp Relay assemblies may be used. These 70 mm assemblies occupy 2 adjacent slots in the SCD52000 I/O card files; therefore, they cannot be fitted into the last slot in the I/O file. Available only with the RTU50 aluminum handle type front panel.

COMMUNICATIONS BOARDS

Part Number	8 Channel Serial Module
SY-0399132	Four isolated RS-485 2-wire ports on screw terminals Four non-isolated RS-232 / RS-485 (2-wire / 4-wire) on DB9 connectors supporting: ▸ DNP3 Master ▸ DNP3 Slave ▸ Modbus Master ▸ Modbus Slave ▸ User configurable serial interface ▸ IEC 60870-5-101 Master ▸ Event Logger ▸ IED Pass-Through / Terminal Server.

Dual Communications Modules

Part Number	Description
SY-0399122	DCB DNP Glass Optical supporting DNP3 Master/Slave
SY-0399127	DCB IEC 60870-5-103 Glass Optical supporting IEC 60870-5-103 Master
SY-0399163	DCB DNP V.11 supporting DNP3 Master/Slave
SY-0399192	SCD5200 Communications Module V.28 Conitel C2020/C2025 Master/Slave, C300/C3000 Slave
SY-0399194	SCD5200 Communications Module V.28 DNP3 Master/Slave
SY-0399196	SCD5200 Communications Module V.28 IEC 60870-5-101 Slave
SY-0399198	SCD5200 Communications Module V.28 WISP+ Master/Slave

Associated Product Specification Sheets include

Part Number	Description
PSS 31H-8G2	Station Computing Device (SCD) SCD5200 Input/Output Modules
PSS 31H-8G3	Station Computing Device (SCD) SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module/SCD5200 CPU OptoNet Ethernet (COE) Module
PSS 31H-8G4	Station Computing Device (SCD) SCD5200 Wide Range Input Power Supply Module
PSS 31H-8G5	Station Computing Device (SCD) SCD5200 Dual Communications Modules
PSS 31H-8G6	Station Computing Device (SCD) SCD5200 8 Channel Serial Module

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