PSS 21H-8G3 B4

I/A Series® Station Computing Device (SCD)
SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module/
SCD5200 CPU OptoNet Ethernet (COE) Module

FEATURES

CPU

- Industrial Processor
- 16 MB or 64 MB RAM
- 128 KB non-volatile RAM parameter memory
- 8 MB internal flash file storage
- 512 KB protected mode BIOS
- 8 CPU status indicators
- Watchdog timer
- Dedicated RS-232 diagnostic port
- RS-232/RS-485 programmable serial port
- Real-time calendar clock
- 7-year battery backup.

OptoNet

- Deterministic, token-passing network protocol
- Dual ring network, with up to 63 nodes per network
- Total network length up to 5.8 km, maximum of 500 m between nodes
- Optical fiber (multi-mode glass) cables
- Fault tolerant to a single point of failure
- High speed data transfer
- Enables distributed data
- I/O data available to all nodes.

Power Supply (COPE only)

- Wide range input supply: 18 to 164 V dc
- 40 W output capacity
- Compact high efficiency switching design
- Withstands 4 ms dead shorted power input
- Withstands 10 ms open circuit power input
- Over-current and over/under voltage protection

- Input supply and internal voltage monitoring drives front panel LEDs and external fail alarm
- On-board power supply disconnected when external Wide Range Input Power Supply Module is used (refer to PSS 21H-8G4 B4).

Ethernet

- Dual 10BaseFL/100BaseSX Ethernet interface for local and wide area network applications
- Terminated with ST connectors.

INTRODUCTION

A key feature of the SCD5200 is the integration of CPU, OptoNet, Power Supply, and dual Ethernet (COPE) into a compact main processor board. The COPE module is the heart of each node in a distributed station computing device network. Each COPE node manages its associated database, communications, local applications, and RTU I/O Modules. When utilized as a DCIU (Data Control and Interchange Unit), the COPE Module provides data concentration capability, SCADA communications, and communications to IEDs (Intelligent Electronic Devices) over RS-232/RS-485 and two 10/100Mbps10BaseFL/100BaseSX Ethernet links. The COPE Module also supports high performance, reliable peer-to-peer communications between SCD nodes using its on-board OptoNet fiber optic network connectivity.

The COE module is a variant of COPE module with the power supply section unpopulated. The COE is used in the 10 I/O slot card file with a separate power supply.

FUNCTIONAL DESCRIPTION

CPU

The powerful industrial processor with 16 KB of cache memory and interfaces to 16 MB or 64 MB of RAM, 512 KB of flash BIOS and 8 MB of flash file storage delivers powerful and scalable processing capability to the SCD5200. Eight front panel LEDs indicate system status for rapid fault identification. An RS-232 serial port allows local connection of the Remote Terminal Viewer (RTV) diagnostic utility (refer to PSS 21S-2M4 B3). A second serial port, link selectable as RS-232 or RS-485, is available for interfacing to intelligent electronic devices or for communication to a SCADA Master Station. In addition to support for industrial standard DNP3 Slave, DNP3 Master, Modbus Slave, Modbus Master, and IEC 60870-5-101 Master protocols, this port allows the implementation of proprietary protocols via State and Logic Language High Level Serial Interface (SALL HLSI - refer to PSS 21S-4A1 B3). This port supports logging of sequence of events (SOE) to a printer or terminal.

OptoNet

The OptoNet subsystem of the COPE module utilizes a high speed, high isolation, and noise immune optical dual ring network interface and an ARCNET (token ring) data link layer to provide peer-to-peer communications between SCD nodes. Configuration of the network at startup is automatic. The ARCNET controller chip in the OptoNet subsystem handles all network tasks, such as token passing, message acknowledgment, and error checking.

An OptoNet network may consist of between 2 and 63 nodes, no greater than 500 m apart. The maximum total network length is 5.8 km. The information from each SCD node on an OptoNet network is available to all other nodes on the network, to Remote Terminal Viewer diagnostic utility, and to SCADA Master Stations connected to any node.

Link redundancy is built into the network topology. Where a single failure in the network occurs, the logical ring topology is maintained and data continues to be available to all nodes. On clearance of the network fault, the network self-heals and

resumes normal operation. Diagnostic LEDs provide indication of activity on transmit and receive channels.

Power Supply

The wide input range (18 to 164 V dc) of the power supply subsystem allows the SCD to be powered from 24, 48, or 129 V dc nominal power sources. Switched mode design of the power supply is utilized to minimize size and weight, while offering high power conversion. The power supply subsystem can supply up to 40 W, which provides the capability to power up to five I/O or communications modules.

Built-in voltage monitors ensure the SCD is held in reset mode should suitable operating voltages not be available. A wide range input power supply module (refer to PSS 21H-8G4 B4) is used to power larger card file configurations using the COPE or COE module.

Ethernet

The COPE module features dual 10/100Mbps 10BaseFL/100BaseSX Ethernet ports that provide a cost-effective and versatile fiber optic Ethernet interface with auto negotiation for the SCD5200. The optical interface maintains the high electrical isolation characteristics of the SCD5200. The dual communication channels can function as primary and backup paths to deliver fault-tolerant communications for critical processes.

Diagnostic LEDs provide Tx and Rx indications for each fiber optic channel. The Ethernet ports support communication to a master stations or TCP/IP enabled IEDs. The Remote Terminal Viewer diagnostic utility (refer PSS 21S-2M4 B3) can also be connected using TCP/IP via the Ethernet ports.

A maximum of 200 TCP/IP connections are supported simultaneously.

FUNCTIONAL SPECIFICATIONS CPU

Processor
AMD SC520 (32-bit Am5x86 core, integrated with chipset and peripherals)

Operating System
AMX386

BIOS
Invensys/Foxboro protected mode

Memory System
16 MB or 64 MB SDRAM
8 MB flash file storage
128 KB Non-volatile RAM
512 KB FLASH BIOS

Peripheral Controllers
16550 type UARTs integrated with CPU
DP83816 Ethernet controllers
COM20022 ARCNET controller

Bus Specifications
Foxboro Electrobus

Watchdog Timer
1 second timeout to reset the SCD

Front Panel
RUN and FAIL LED
Eight diagnostic LEDs
COM1 and COM2 serial ports
Sense/Reset switch

Serial Ports
DB9 male sockets wired per TIA/EIA-574 (DTE)

COM1
RS-232
Provides local or dial-up connection to RTV for diagnostics/configuration

COM2
RS-232/RS-485 (2- or 4-wire) link selectable
Provides general purpose user configurable communications port

SUPPORTED PROTOCOLS
DNP3 (Master & Slave)
IEC 60870-5-101 (Master)
Modbus (ASCII & RTU, Master & Slave)
HLSI (Generic configurable protocol interface)
GPS Clock (NEMA, Tekron, TrueTime, and others)

Real-Time Clock
IBM PC/AT compatible, with 7.5 ppm accuracy, also provides Electrobus synchronizing and SOE clocks.

Backup Time
Real-time clock and non-volatile RAM are maintained during power outage via a user-replaceable lithium battery. The battery lasts 1 year in storage and 7 years in use. A software battery low alarm is provided.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature

STANDARD
0°C to 60°C (32°F to 140°F)

Cooling
Natural convection, no forced cooling required

Humidity
10 to 95% (noncondensing)

PRODUCT SAFETY

This product complies with the U.S. Standard for Safety UL 61010-1 - Safety requirements for Electrical equipment for measurement, control, and laboratory use - PART 1: GENERAL REQUIREMENTS - Edition 2 - Revision Date 2008/10/28 and CSA C22.2 NO. 61010-1 - Safety requirements for Electrical equipment for measurement, control, and laboratory use.

PHYSICAL SPECIFICATIONS

Physical Size

The module requires frame space of 35 mm. The modules plug into a backplane (Electrobus) via a DIN 41612 connector and are double Eurocard size (233.4 x 160 mm board, 261.8 x 185 x 35.3 mm module).
FUNCTIONAL SPECIFICATIONS POWER SUPPLY (COPE only)

Power Requirements

MAXIMUM POWER INPUT
60 W

MAXIMUM POWER OUTPUT
40 W

Input Voltage

Wide range 18 to 164 V dc

Current Limit

Shutdown at maximum power with auto-recovery

Over-Voltage Protection

Crowbar protection on +5 V

Under-Voltage Protection

Shutdown at low input voltage

Hold-up Time

Withstands 4 ms dead shorted power supply input
Withstands 10 ms open circuit power supply input

Ripple and Noise

50 mV peak-to-peak (+5 V)
100 mV peak-to-peak (±15 V)

Output

+5 V at 4.5 A
+15 V at 1.0 A
–15 V at 0.15 A

Maximum Input Current

3.3 A at 18 V
0.34 A at 164 V

Efficiency

>65% at full load

Isolation

2000 V ac RMS for 1 minute Primary to chassis and Primary to Secondary isolation

Transient Protection

IEC 61000-4-4 Level 3 (2 kV)
IEC 61000-4-5 Level 3 (2 kV)

EMC Conducted Noise

EN50011 Class B

FUNCTIONAL SPECIFICATIONS OPTONET

Configuration

ARCNET optical ring arrangement

Ports

Two ports each containing a transmit channel and a receive channel support a dual ring ARCNET configuration

Maximum Length Between Nodes

500 meters

Maximum Size of OptoNet Network Ring

UP TO 12 NODES
5800 meters

FOR 12 TO 63 NODES
6280 - [40 x Number of nodes] meters

Optical Cable

Glass fiber, multi-mode, 820 nm wavelength, dual 50/125 or 62.5/125 µm, ST connectors

FUNCTIONAL SPECIFICATIONS ETHERNET

Interface

TRANSMIT POWER
-12 dBm

RECEIVE LEVEL
-27 dBm at bit error rate of 10^{-9}

RANGE
2000 m for 10BaseFL
300 m for 100BaseSX

Ports

Dual 10/100 Mbps 10BaseFL/100BaseSX Ethernet ports.

SUPPORTING PROTOCOLS
DNP3 (Master & Slave)
IEC 60870-5-104 (Slave)
Modbus/TCP (Master)
Diagnostic interface
IED pass-through
IEC 61850 (Server/Client/GOOSE)(1)

Optical Cable

Glass fiber, multi-mode, 820 nm wavelength, dual 50/125 or 62.5/125 µm, ST connectors

Indicators

2 LEDs per port indicating Tx and Rx status (link, activity)

NOTE
AT-MC115XL from Allied Telesyn is the preferred media converter.

ORDERING INFORMATION

Part Number	Description
SY-0399143	SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module
SY-0399144	SCD5200 CPU OptoNet Ethernet (COE) Module
SY-0399151	SCD5200 CPU OptoNet Ethernet (COE) Module with 64 MB SDRAM
SY-0399152	SCD5200 CPU OptoNet Power Supply Ethernet (COPE) Module with 64 MB SDRAM

OPTICAL PATCH CORDS

Part Number	Description
SY-1051002	Optical Cable Assembly Multimode two ST to two ST(2) L meters

(1) Requires 64 MB RAM version of CPU
(2) Length as per cable schedule

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