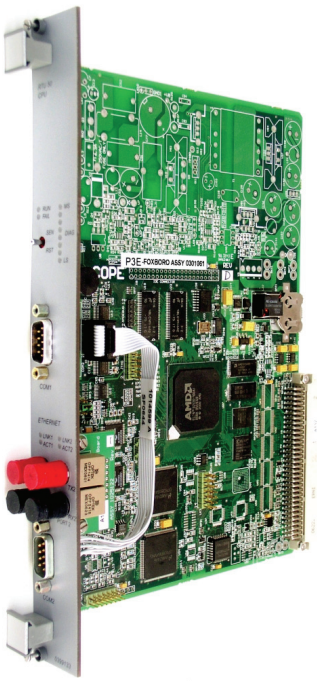
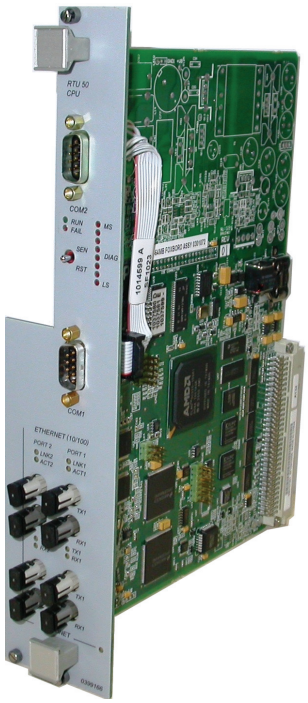
I/A Series® Remote Terminal Unit (RTU)
RTU50 P3E and P3OE Master Processor Modules





FEATURES

CPU

- Industrial Processor
- 16 MB or 64 MB RAM (64 MB RAM versions required when using configurations supporting IEC 61850 protocol)
- 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 (P3OE only)

- 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.

Ethernet

- Dual 10BaseFL/100BaseSX Ethernet interface with Auto negotiation support for local and wide area network applications
- ST Tx and Rx connector.

INTRODUCTION

The Master Processor Module is the heart of the RTU50, delivering features such as user-defined calculations and database; system maintenance and diagnostics; real-time operating system for deterministic monitoring and control; industry standard processor; and a 10BaseFL/100BaseSX dual Ethernet interface with Auto negotiation support for local (LAN) and wide (WAN) area network applications.

The P3E Master Processor Modules uses standard industry architecture, incorporating a 32-bit processor and flash technology to deliver powerful and flexible intelligence to the RTU50.

The P3E module is a direct replacement for the PII and PIIE Master Processor Modules (Part Number SY-0399066 and SY-0399067).

The P3OE module is a variant of P3E module. The P3OE module combines the function of the P3E and OptoNet modules.

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 RTU50. Eight front panel LEDs indicate system status for rapid fault identification. An RS-232 serial port allows local or modem 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, IEC 60870-5-101 Master, Modbus Slave, and Modbus Master protocols, this port allows implementation of proprietary protocols via the State and Logic Language High Level Serial Interface (refer to PSS 21S-4A1 B3). This port supports logging of sequence of events (SOE) to a printer or terminal.

Ethernet

The P3E/P3OE module features dual 10BaseFL/100BaseSX Ethernet ports that provide a cost-effective and versatile fiber optic Ethernet interface for the RTU50. The optical interface maintains the high electrical isolation characteristics of the RTU50.

The dual communication channels can function as primary and backup paths to deliver fault-tolerant communications for critical processes.

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

OptoNet (P3OE only)

The OptoNet subsystem of the P3OE 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 RTU nodes. Configuration of the network at startup is automatic.

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 RTU node on an OptoNet network is available to all other nodes on the network, to the 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. The P3OE occupies the CPU slot and Slot 1 of the RTU chassis. It provides identical operation to the combination of a P3E CPU and a separate OptoNet module in slot 1.

Replacement of PII and PIIE

The SY-0399066 RTU50 PII Master Processor Module and SY-0399067 RTU50 PIIE Master Processor Module with Dual 10BaseFL Ethernet are no longer available. These modules are replaced by the P3E Master Processor Module.

The SY-0303393 OptoNet module is no longer available. The P3OE module combines the functions of P3E and OptoNet modules and replaces the previous separate master processor module and OptoNet combination. The P3OE should be used in any RTU requiring OptoNet connectivity. The P3E can be used where OptoNet connectivity is not required.

While the P3E/P3OE modules are a direct replacement for the PII and PIIE, the following limitations should be noted.

Limitations

Flash memory is 8 MB on-board. The Flash Cards used in PI, PII, and PIIE are no longer supported.

The module supports the existing RTU50 Electrobus slot-addressing scheme of up to 4 files. Internal board identification and the module's boot firmware provides compatibility with firmware 1101155 L and later. Dual ST Connectors of the PIIE are retained in the new version of the P3E module's Ethernet ports.

Refer to the Ordering Information section for part numbers of matching patch cords.

Performance Benefits

These module are derivatives of the SCD5200 COE (CPU, OptoNet, and Ethernet) module (refer to PSS 21H-8G3 B4). A separate power supply per card file continues to be used for RTU50 configurations using the P3E or P3OE modules.

Ethernet and processor performance is improved. Power consumption is reduced by 35% compared with the RTU50 PIIE module and 10% compared with the RTU50 PII module.

The temperature range of -20 to 70 degrees C and relative humidity of 10% to 95% (non-condensing) of the replacement part exceed that of PII and PIIE parts.

Type Test Compliance

The P3E module meets the EMC tests required for the CE mark. The applicable EMC standard is EN 61326 (Annex A industrial), and the electrical safety standard EN 61010-1.

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
The 64 MB RAM versions are required when using configurations supporting IEC 61850
8 MB flash file storage
128 KB Non-volatile RAM
512 KB FLASH BIOS

Peripheral Controllers
16550 type UARTs integrated with CPU
DP83815/DP83816 Ethernet controllers
COM20022 ARCNET controller

Bus Specifications
Foxboro Electrobus

Watchdog Timer
1 second timeout

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 for connection to GPS clock, IED, or SCADA Master Station
Supported protocols: DNP3 (Master and Slave), IEC 60870-5-101 (Master), Modbus (ASCII and RTU, Master and Slave), HLSI (Generic configurable protocol interface), and GPS Clock (such as NMEA 0183, Tekron, TrueTime)

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
0°C to 60°C (32°F to 140°F)

Cooling
Natural convection, no forced cooling required

Humidity
10 to 95% (noncondensing)

PHYSICAL SPECIFICATIONS

Physical Size

The P3E module requires frame space of 30 mm. The P3OE module requires the CPU slot and the adjacent slot 1 cutout below the power supply, an overall module width of 55 mm (reverse L-shaped). The modules plug into a backplane (Electrobus) via a DIN 41612 connector and are double Euro card size (233.4 x 160 mm board, 261.8 x 185 mm module).

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

Optical Cable

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

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

FUNCTIONAL SPECIFICATIONS ETHERNET

Interface

ST connectors for TX and RX per port

TRANSMIT POWER
–15 dBm ±3 dB

RECEIVE LEVEL
–12 dBm to –32.5 dBm at bit error rate of 10^{-9}

RANGE
2000 m for 10BaseFL
300 m for 100BaseSX

Optical Cable

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

Ports

Dual 10 Mbps 10BaseFL / 100 Mbps 100BaseSX Ethernet ports
Supported protocols: DNP3 (Master and Slave), IEC 60870-5-104 (Slave), Modbus/TCP (Master), Diagnostic Interface, IED Pass-Through, IEC 61850 (Client)(1), IEC 61850 (Server)(1) and GOOSE (Publisher / Subscriber)(1)
Maximum 200 TCP/IP connections are supported simultaneously

Indicators

2 LEDs per port indicating Tx and Rx activity

NOTE

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

(1) Requires 64 MB RAM version of CPU

ORDERING INFORMATION

RTU50 MASTER PROCESSOR MODULES

Part Number	Description
SY-0399145	RTU50 P3E Master Processor Module
SY-0399165	RTU50 P3OE Master Processor Module
SY-0399153	RTU50 P3E Master Processor Module (64 MB)
SY-0399166	RTU50 P3OE Master Processor Module (64 MB)

OPTICAL PATCH CORDS

Part Number	Description
SY-1051002	Optical Cable Assembly Multimode two ST to two ST L[(a)] meter

(a) Length as per cable schedule

The P3E and P3OE Master Processor Modules use the same type of Ethernet connectors (ST) as were used on the superseded PIIE Master Processor Module (SY-0399067).

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