

# EOTec 2000 Expandable ControlNet™ Fiber/Coax Communications Modules

## With Support for Enhanced Physical Media Layer



### Key Features:

- ▶ **Industrial Design for High Reliability**
  - Fully compliant with ControlNet specification
  - Modular, flexible, scaleable
  - FM approved for hazardous locations
  - Stand alone 35 mm DIN-rail mounting
  - Operating temperature range -40 to +85 °C
- ▶ **Enhanced Physical Layer Attributes**
  - Single/Multi-mode conversion possible
  - Real-time 4-20 mA diagnostic output (available as an option)
  - 850 nm and 1300 nm optical wavelength
  - High/Low optical power settings
  - Long lifetime – Class 1 LED
- ▶ **Flexible Network Topologies**
  - Point-to-point (Branch)
  - Daisy-chain (Linear)
  - Copper/Fiber Star
  - Cascading Tree
- ▶ **Universal Power Supply Modules**
  - 90-260 VAC 50/60 Hz and 120-260 VDC or 15-30 VDC power input
  - UL/cUL Recognized (2A06/2A16)
  - UL/cUL Listed (2A08/2A18)
- ▶ **Optional accessories available**
  - Fiber optic expansion modules (Multi-mode and Single mode)
  - Redundant power supplies
  - Power Supply with alarm relays
  - Optical power level diagnostic ports (4-20 mA)

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EOTec 2000 Communications Modules

## Overview

Ultra Electronics' EOTec 2000 ControlNet communications modules are designed to provide networking solutions in harsh industrial environments. The 2C20 ControlNet electrical interface module can be used alone for electrical communications on the physical media layer of a ControlNet trunk line, or with any EOTec 2000 optical interface module for greater distances and higher reliability between ControlNet devices. Problems such as ground loops, EMI/RFI noise and lightning strikes are eliminated by using fiber optic cables in lieu of copper coaxial cables. Create your own "stack" to build a ControlNet repeater, extend the length of a ControlNet network via copper or fiber, create a STAR or daisy-chain topology using copper

or fiber, or, combine all three topologies in one network.

Each EOTec 2000 communications module features a truly scalable DIN-rail mount package that allows for up to five modules to be snapped together on one stack powered by one or several power supply modules.

Communications takes place through its unique "backplane port" with no external wiring between modules. LED indicators are provided for local determination of communication failures. In addition, Ultra Electronics offers optional modules with

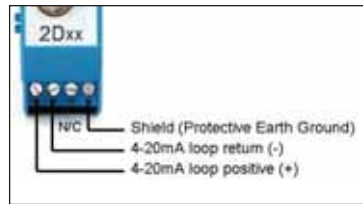
enhanced diagnostics that can be wired to provide failure information at a remote location.



Easy Plug-In Connector

## Enhanced Diagnostics Modules for Real-Time Fault Prediction

A ControlNet communications stack can be equipped with up to four standard optical interface modules (2Exx series) or optical interface modules with enhanced diagnostics (2Dxx series). Optical interface modules with diagnostic outputs have an internally powered 4-20 mA output, which provides indication of the received optical power level (light intensity) from the fiber.



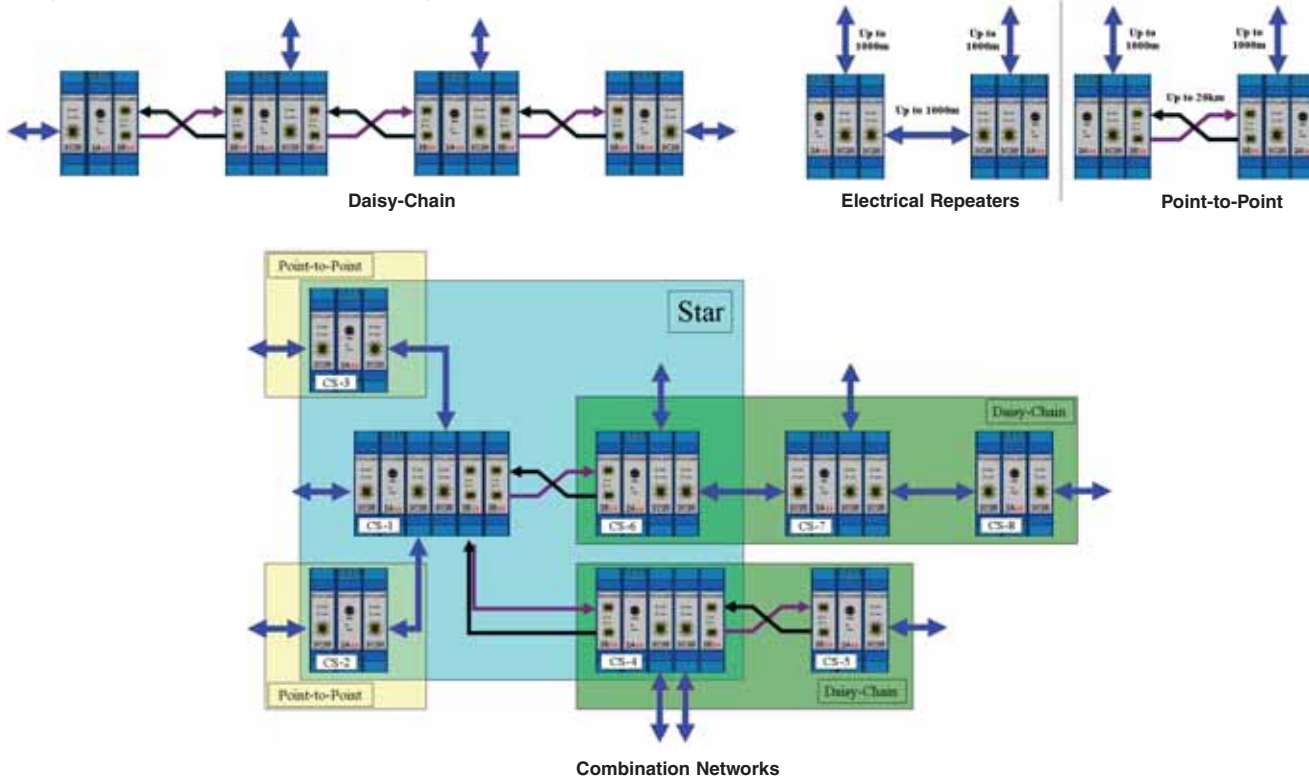
EOTec 2000 Optical Module with Diagnostic Output

The output is calibrated for each model so that a reading of 4mA means the optical receiver is at its threshold for recovering the optical signal (optical link failure is imminent). A reading of 20mA corresponds to the full optical budget being available at the optical receive port (very healthy optical link).

## Multiple ControlNet Network Structures Possible

The EOTec 2000 system can be used to create many different network topologies using copper coax cable or glass fiber cable. Adding additional modules provides users with a string of communication stations or communication to an array of stations (STAR) from a centrally located "hub". In

the simplest case, the modules can be used to convert a copper line to a fiber optic cable to increase the noise immunity of the system. Depending on the application other networks are possible.



## Technical Specifications:

### 2G20 Electrical Interface Module (EIM)

#### Cabling and Operation ControlNet Specifications /Requirements Apply

**Maximum nodes**

48 (using coax cable length of 250m)

**Maximum coax cable length**

1000m (when connected to only 1 node)

**Trunk connection**

Anywhere on the trunk via ControlNet Tap with 1m drop cable required

**Coax cable connection**

BNC

**Data rate**

5M baud

**Propagation delay**

1µs maximum per modem pair

**Fiber propagation delay**

5µs/km

1.5µs/1000ft

**Power indicator**

Green LED illuminates with power applied

**Com indicator**

Green LED illuminates with data from the coax cable input

#### Environmental

##### DIN rail mounting

**Power input**

Nominal 9 VDC via Interconnection Bus

**Input power, maximum**

1.8 W

**Operating temperature range**

-40 to +85 °C

**Storage temperature range**

-40 to +85 °C

**Humidity (non-condensing)**

5 to 95% RH

**EMC immunity**

IEC61326-1:1998

**Hazardous locations**

UL/cUL and FM; Class I, Division 2, Groups A, B, C, D, T4

**Packaging (polyamide)**

UL 94V-0

### Optical Interface Modules (OIM)

**Optical Wavelength**

See table following

**Communications Data Range**

9.6K to 12 Mbps

**Optical Port Connection**

ST Compatible

**Optical Dynamic Range**

See table following

**Optical Transmit Indicator**

Green LED

**Optical Receive Indicator**

Amber LED

#### Environmental

##### DIN rail mounting

**Power input**

Nominal 9 VDC via Interconnection Bus

**Operating temperature range**

-40 to +85 °C

**Storage temperature range**

-40 to +85 °C

**Humidity (non-condensing)**

5 to 95% RH

**EMC immunity**

IEC61326-1:1998

**Hazardous locations**

UL/cUL and FM; Class I, Division 2, Groups A, B, C, D, T4

**Packaging (polyamide)**

UL 94V-0

### Power Supply Modules (PSM)

#### Power Requirements:

**Input Voltage**

90-260 VAC 50/60 Hz and  
120-260 VDC (2A06/2A16)  
15-30 VDC (2A08/2A18)

**Input Current**

250 mA (2A06/2A16)  
400 mA (2A08/2A18)

**Input Fuse**

400 mA Slow-Blow

**Nominal Output**

9 VDC, 1.1A Max.  
to backplane connector

**Alarm Relay**

Form C, 175 VDC, 1A Continuous  
(2A16 and 2A18 only)

**Indicators**

Power On (Green LED)

#### Environmental and Safety:

##### DIN rail mounting

**Operating temperature range**

-40 to +85 °C

**Storage temperature range**

-40 to +85 °C

**Humidity (non-condensing)**

5 to 95% RH

**Electrical Safety**

UL Recognized (2A06/2A16 only)  
CE Approved

**Hazardous locations (2A08/2A18 only)**

UL/cUL and FM; Class I, Division 2, Groups A, B, C, D, T4

**Packaging (polyamide)**

UL 94V-0

### Optical Interface Modules (OIM)

OIM Model	Wavelength	Fiber Type	Fiber Connector	Max Optical Dynamic Range, Fiber Size	Typical Max Distance
2E07, 2D07	850nm	Multimode	ST*	12dB, 62.5/125µm	2mi/3.4km
2E09, 2D09	1300nm	Multimode	ST*	12dB, 62.5/125µm	5mi/8km
2E10, 2D10	850nm	Multimode	ST*	17dB, 62.5/125µm	3mi/4.8km
2E19, 2D19	850nm	Multimode	ST*	17dB, 62.5/125 µm	7mi/11.3km
2E36, 2D36	1300nm	Single-mode	ST*	10dB, 9/125µm	12mi/20km
2E46, 2D46	1300nm	Single-mode	ST*	16db, 9/125µm	12mi/20km*

## Ordering Information:

### Electrical Interface Module (EIM):

- 2C20 Electrical Interface Module, ControlNet, BNC

### Optical Interface Modules (OIM):

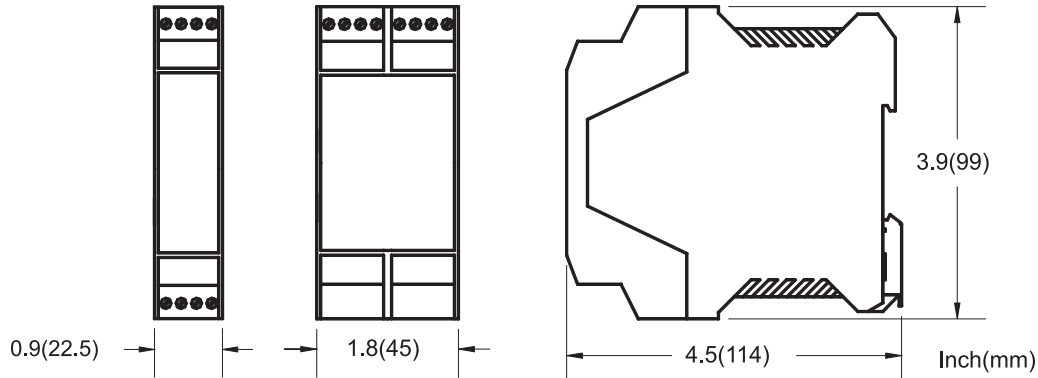
- 2E07 Optical Interface Module, 850nm, MM, ST
- 2D07 Optical Interface Module, 850nm, MM, ST, w/ diagnostics
- 2E10 Optical Interface Module, 850nm, MM, ST, Hi power
- 2D10 Optical Interface Module, 850nm, MM, ST, Hi power, w/ diagnostics
- 2E09 Optical Interface Module, 1300nm, MM, ST
- 2D09 Optical Interface Module, 1300nm, MM, ST, w/ diagnostics
- 2E19 Optical Interface Module, 1300nm, MM, ST, Hi power
- 2D19 Optical Interface Module, 1300nm, MM, ST, Hi power, w/ diagnostics

- 2E36 Optical Interface Module, 1300nm, SM, ST
- 2D36 Optical Interface Module, 1300nm, SM, ST, w/ diagnostics
- 2E46 Optical Interface Module, 1300nm, SM, ST, Hi power
- 2D46 Optical Interface Module, 1300nm, SM, ST, Hi power, w/ diagnostics

### Power Supply Modules (PSM):

- 2A06 Power Supply Module, 90-260VAC 50/60Hz, 120-260VDC
- 2A16 Power Supply Module, 90-260VAC 50/60Hz, 120-260VDC, w/ alarm
- 2A08 Power Supply Module, 24VDC
- 2A18 Power Supply Module, 24VDC, w/ alarm

## Mechanical Dimensions:



Weed Instrument Company, Inc.  
 d/b/a **Ultra Electronics, Nuclear Sensors & Process Instrumentation**  
 707 Jeffrey Way, PO Box 300  
 Round Rock, TX 78680-0300 USA  
 Tel +1 512 434 2800, Fax +1 512 434 2801  
 E-Mail: nuclear@ultra-nspi.com  
 www.ultra-nspi.com

Specifications subject to change without notice.



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