

Training and Education with Contemporary Controls Networking and Control Equipment



At Contemporary Controls, we take great pride in our commitment to HVACR education and training. To support HVACR programs, Contemporary Controls has worked with several affiliated colleges and technical schools to create practical classroom/lab experiences that merge traditional HVACR knowledge with the computer and IT skills needed in today's high-tech building automation industry.

Contemporary Controls designs and manufactures the system building blocks for networking, integrating and controlling automation processes where performance and reliability are important.

Our products are built upon open technologies, such as BACnet®, Ethernet, Modbus®, Sedona, and are typically found in building and industrial automation industries. With years of field-proven reliability, our products do not require a license and are available to all without restrictions.

Combined with award-winning technical support, an educational discount on hardware, and free software tools, our networking and control products are perfectly suited for training and education applications.

Control without Restrictions

Contemporary Controls is committed to open controls. Our BASautomation line of controllers feature:

- BACnet - an open protocol
- Sedona - an open source drag-and-drop component-based programming language
- BAScontrol Toolset - a set of free software tools to configure, test, emulate, and archive controller operation on a Windows PC

BASautomation controllers offer simple webpage configuration, and are freely programmable using the BAScontrol Toolset which consists of:

Sedona Application Editor (SAE) is a free drag-and-drop editor for creating control sequence wiresheet applications in Sedona. Students will use this editor to create control logic.

The **BASemulator** emulates the BAScontroller operation on a PC and allows students to work on their automation projects even when they do not have access to a real controller. Then the project can be transferred to a real BAScontroller and the control sequence, channel configuration, IP configuration, and BACnet points can be tested in the classroom/lab.

BASbackup is used to backup and restore the entire project (configuration + control sequence wiresheet) between real or emulated controllers making project management easy. BASbackup can also be used by students to submit their projects to the instructor as a single zip file.

Also available as a free download, our pre-built Sedona applications include support documentation, a pre-assigned BACnet points list, sequence of operation, system schematic and suggested device list. These can be used as examples to students of a full automation project implementation and project submittal.

BAScontrol Unitary Controllers

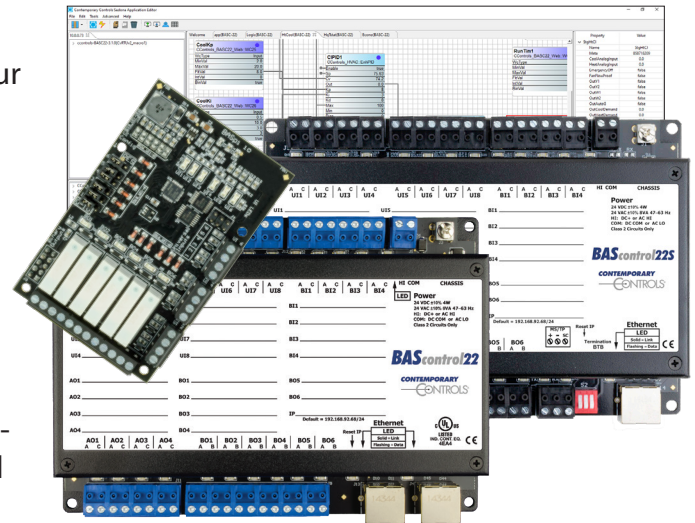
The BAScontrol series of unitary controllers are ideal for general purpose applications, such as controlling fan coils, heat pumps, lead-lag pump sequences, and constant volume air-handlers and RTUs.

They are housed in a rugged low-profile metal enclosure with wide temperature operation, making them suitable for indoor or outdoor use.

All models support BACnet/IP server operation. Newer models feature 22 points of I/O, and support BACnet client/server operation over BACnet/IP or BACnet MS/TP.

Versatile Control Device

- BACnet/IP compliant with newer models that support BACnet/IP or BACnet MS/TP client/server operation
- BACnet B-ASC device profile
- Resident Sedona Virtual Machine (SVM)
- Free BAScontrol Toolset programming and backup tool
- Configurable with a common web browser
- Direct connection to Ethernet network
- NTP or manually-settable real-time clock
- COV subscriptions – 14 binary and 2 analog
- Outdoor temperature operation -40°C to +75°C

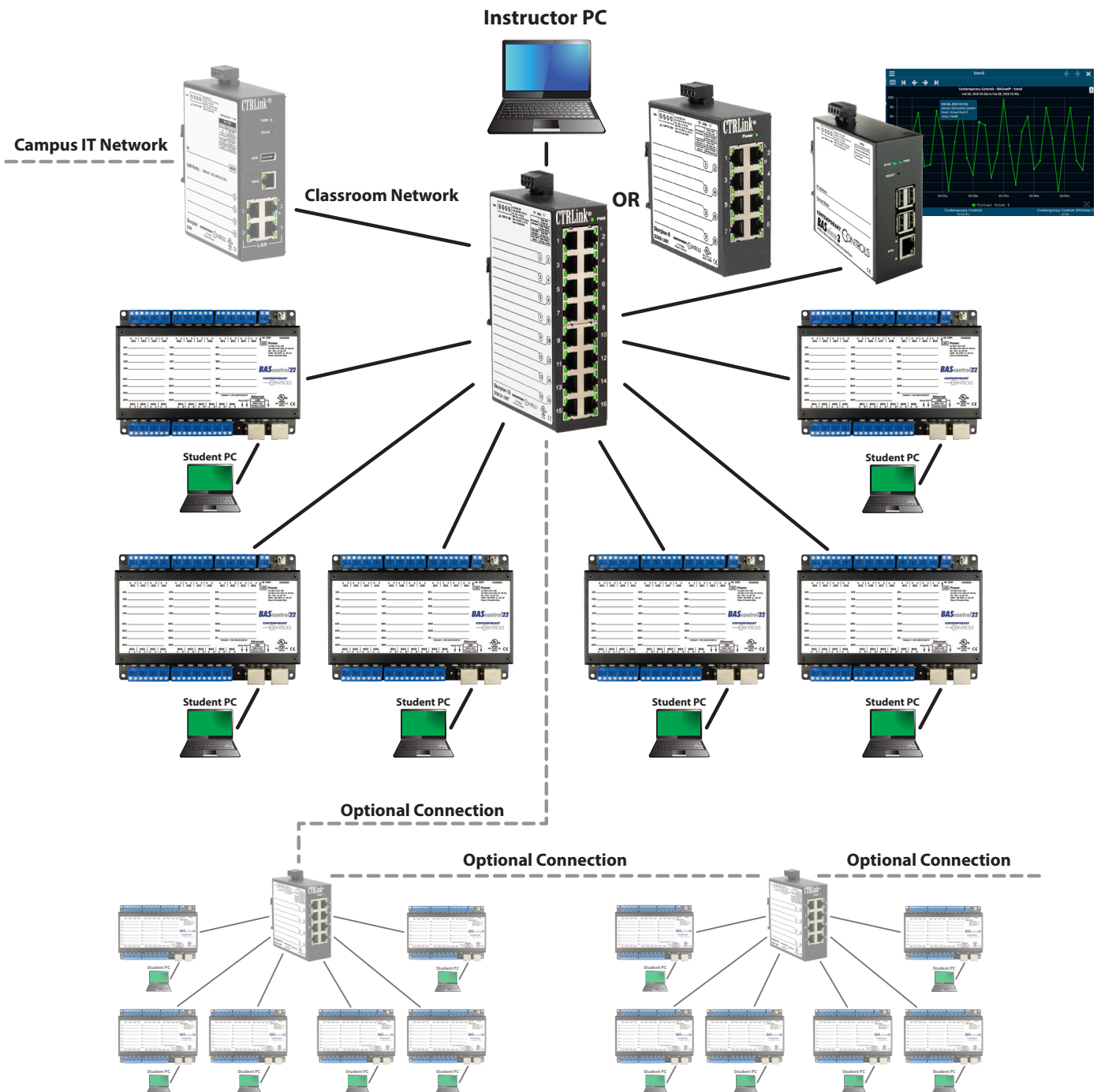


Flexible Input/Output — 20 or 22 points of physical I/O

- Eight configurable universal inputs: thermistor, resistance, analog voltage, binary input, pulse inputs (4 max)
- Four binary inputs
- Four analog outputs
- Four or six relay or four triac outputs (model dependent)
- 24 virtual points communicate with a BACnet client
- 48 web components communicate with web browser

The controllers are BACnet/IP connected and communicate over Ethernet. Incorporating Ethernet switches to interconnect the controllers, the instructor can observe student progress from a central location without having to connect individually to each controller. A model with BACnet/IP and BACnet MS/TP is also available.

Classroom Setup Example Using BAScontrollers



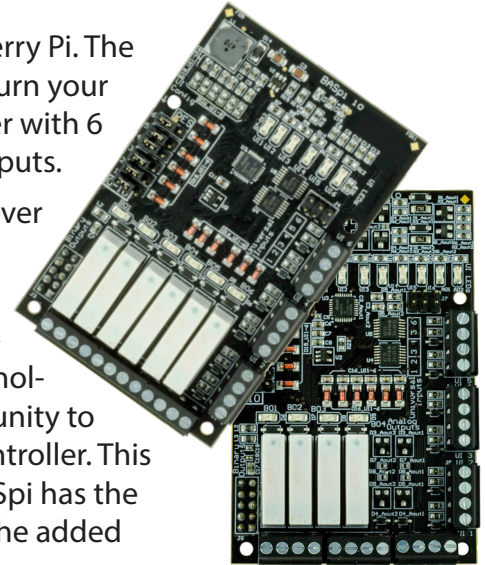
In addition to 22 physical points, the BAScontrol series (Models 22C, 22D, and 22S) offers 24 Virtual Points available to BACnet client supervisors (such as BASview3). Although each physical I/O point on the controller can appear as a BACnet analog input (AI), analog output (AO), binary input (BI) or binary output (BO) with real live data to a headend, the student can create a “soft-point” such as an intermediate calculation or setpoint and bring it out to a BACnet analog or binary variable (AV or BV) for supervisor monitoring. This shows the student the difference between physical points and Virtual Points.

Micro PC Edge Controllers

The BASpi I/O boards are 12-point BAS expansion HAT boards for Raspberry Pi. The I/O boards, plus the firmware files provided by Contemporary Controls turn your Raspberry Pi into a BACnet-networked, Sedona-programmable controller with 6 Universal Inputs and either 6 Relay Outputs or 4 Relay and 2 Analog Outputs.

All 12 physical I/O points, in addition to 24 Virtual Points, are served up over BACnet/IP using Ethernet or Wi-Fi. BASpi is web page configurable over Ethernet or Wi-Fi connections.

The BASpi is a next generation controller with powerful platform characteristic which allows students to learn about next generation open technologies. Its open software and open DIY nature gives students the opportunity to assemble their own DDC Sedona-programmable BACnet-networked controller. This enables students to learn about new technologies on their own. The BASpi has the same resilient and field proven I/O circuit as the BAScontrol series with the added power and open possibilities of the Raspberry Pi platform.



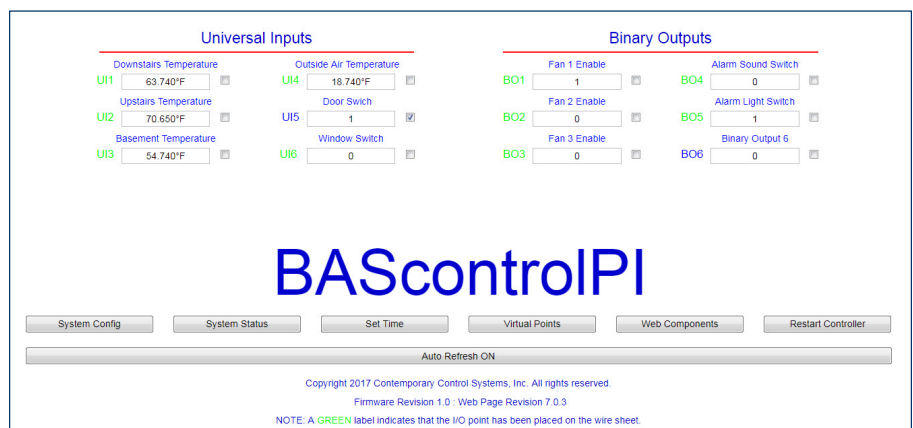
Versatile Control Device

- BACnet/IP Server over 10/100 Mbps Ethernet or Wi-Fi
- Resident Sedona Virtual Machine (SVM)
- Web page configurable with a common web browser over Ethernet or Wi-Fi
- Email alarms/notifications
- NTP server or manually-settable clock
- Free BAScontrol Toolset programming and backup tool

Flexible Input/Output — 12-points of physical I/O

- Six configurable Universal Inputs: Analog Input, Binary Input, Resistance, Thermistor (10KT2, 10KT3, 20K), Pulse Input (40Hz)
- Six Relay Outputs or 4 Relay and 2 Analog Outputs
- 24 Virtual Points communicate with BACnet clients and supervisory workstations
- 48 Web Components communicate with web browser for monitoring and configuration

The BASpi is web page configurable over wired Ethernet IP connection, or wirelessly over Wi-Fi. The web page allows for ease configuration, live monitoring, and control of physical points, virtual points, and web components.



Ethernet and IP Network Connection

The BASrouters series of BACnet multi-network routers provide stand-alone routing between BACnet/IP, BACnet Ethernet and BACnet MS/TP which allows students to install and troubleshoot a mix BACnet network technologies within a single BACnet internetwork.

Field-proven circuit design and ANSI/ASHRAE BACnet operation with BTL certification provide outstanding reliability. Enhanced BASrouter features (version 3.0 and newer) provide built-in BACnet diagnostic capabilities with visual analytics, MS/TP status table, routing status table, network errors count, and traffic statistics. This allows robust BACnet networks to be installed with ease.



The BACnet routers are available in three different versions. The compact BASrouter is DIN-rail mounted and powered from a 24 VAC/VDC source, while the Portable BASrouter is USB powered for easy commissioning and troubleshooting of field devices. The BASrouterLX is DIN-rail mounted, powered from a 24 VAC/VDC and includes a more powerful processor that supports advanced features.

Versatile Routing Between

- BACnet/IP and BACnet MS/TP
- BACnet Ethernet and BACnet MS/TP
- BACnet/IP and BACnet Ethernet
- BACnet/IP and BACnet Ethernet and BACnet MS/TP
- Two BACnet/IP networks (between two UDP ports)

Flexible Communications

- 10/100 Mbps Ethernet with auto-negotiation and Auto-MDIX
- Optically isolated MS/TP port
- MS/TP baud rates range from 9.6-76 kbps or 9.6-115.2 (BASrouterLX)

IP Network Support

- Web server for commissioning and troubleshooting
- DHCP option to automatically acquire IP address
- BACnet/IP Broadcast Management Device (BBMD)
- Foreign Device Registration (FDR)

Portable BASrouter includes additional support for network commissioning and troubleshooting:

- Diagnostic web page with graphical MS/TP device status, Network Error count, and BACnet network traffic statistics
- BACnet Routing Table web page

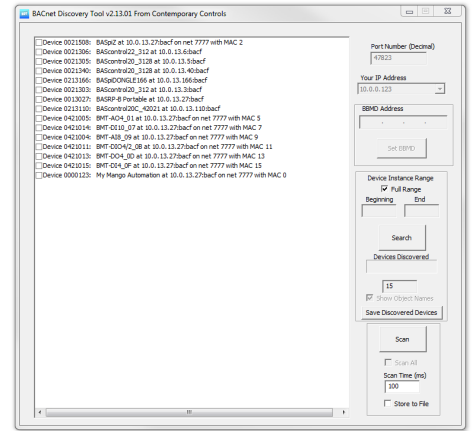
BASrouterLX includes advanced features:

- MS/TP Backbone
- Backward Routing
- Allowlist
- MS/TP slave auto-discovery and proxy
- MS/TP capture using Wireshark®
- Support for 50 BDT and 147 FDR entries

BACnet Device Discovery

The BACnet Discovery Tool (BDT) is a free BACnet/IP application for Windows that is easy to install and use. BDT is a Windows-based program that can operate from the student's or instructor's laptop. Through the computer's Ethernet or Wi-Fi port, the student or instructor can discover all the BACnet devices on the network and objects within a discovered device. It is an excellent means for verifying communication with MS/TP devices that are being accessed through BACnet/IP routers.

All devices found on the network will show their BACnet device instance, IP address, and BACnet device description. Then, the student can focus on a specific device to investigate the objects contained by the discovered device, as well as the properties and behavior of a specific object. This tool helps students gain a better understanding of a device and its capabilities, and thus gain a better understanding of how BACnet works.



Graphical Supervision

BASview3 is a stand-alone, embedded, web-based graphical supervisor that provides both BACnet/IP client functionality and control in one package. It is accessed from any web browser—providing client functionality to BACnet/IP and Modbus TCP systems. It is license-free, simple to install, and its intuitive graphical interface allows students to access supervisory features with no prior training.

Features

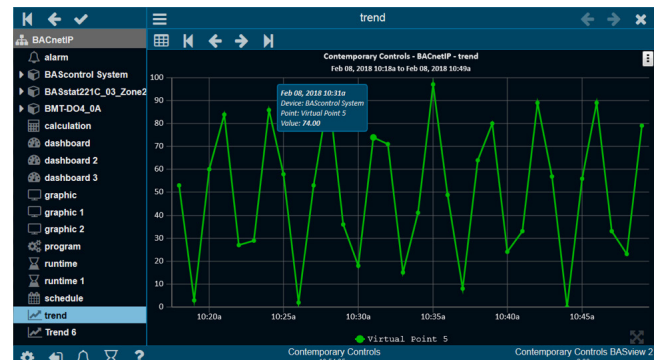
- BACnet/IP and Modbus TCP network supervisor
- Animated graphics & dashboards
- Schedules with sunrise/sunset offsets
- Trend collection, display and export
- Runtime accumulation with email notification
- Alarm condition monitoring with email notification
- Calculated point values (average, min, max, etc.)
- Simple scripting language for light control logic
- Database of up to 100 users and 100 user groups
- Multiple user permission levels
- Activity log for tracking important user actions
- Template system for quickly cloning points and graphics
- Support for up to 1,000 points
- No licensing requirements
- Convenient Installation – 24VAC/VDC powered and DIN-rail mountable
- Internal Flash memory
- Real time clock for time retention during power loss



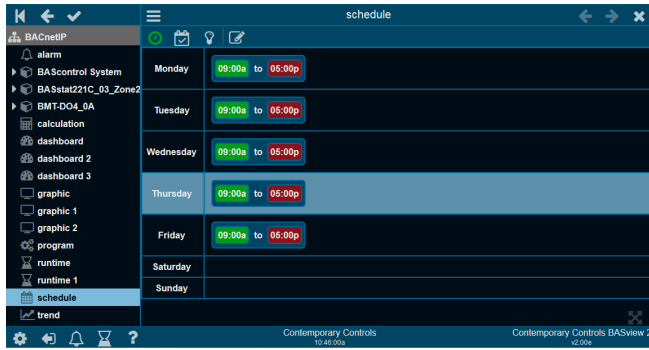
Dashboard Graphics



Trends



Schedules



Animated Graphics



Ethernet Network Expansion

Industrial Ethernet switches are the core building blocks of industrial and control networks, and they are optimized for harsh environments. The Skorpion series of unmanaged switches provide a simple, cost-effective method of expanding Ethernet networks and interconnecting Ethernet devices. These plug and play units can be put into service without any configuration and are ideal for building an automation network in the classroom.

Features

- 10BASE-T/100BASE-TX
- Auto-MDIX on all copper ports
- Auto-negotiated data rate, duplex and flow control on twisted-pair
- DIN-rail mountable
- Compact size
- Full or half-duplex
- Activity/link and data rate LEDs
- Industrial environment EMC
- UL 508 Listed, c-UL Listed Industrial Control Equipment, CE Mark
- 10-36 VDC or 24 VAC ($\pm 10\%$) 47-63 Hz power is provided through a quick disconnect terminal strip



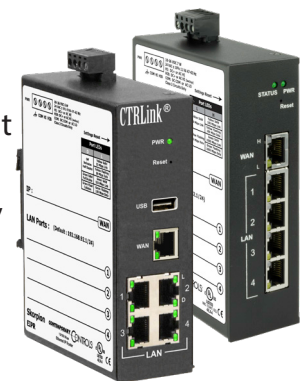
Skorpion switch models EISK8-100T or EISK16-100T are ideal for interconnecting the BAScontrol22, BASpi, or BASrouter units in the classroom over Ethernet. They are DIN-rail mountable and 24VAC/DC powered for simple installation and mounting in a standard building automation enclosure. These switches are commonly found in control panels in industry applications. The EISK8 switches can be cascaded to interconnect all of the BAScontrol22 units in the classroom along with the instructor's PC. Optionally, this Ethernet network could be connected to any standard Wi-Fi router to allow for student/instructor access to the devices over Wi-Fi.

IP Network Control within the Classroom

The proliferation of digital Ethernet and IP connected HVACR control devices can create a need for many IP addresses in your classroom/lab. The campus IT department may have reservations about assigning a high number of IP addresses on their IT network, or they lack the capacity to provide that many IP addresses. Other concerns, such as high broadcast traffic and cyber security, may also discourage the campus IT department to allow these devices on their IT network.

The Skorpion series of IP routers allow instructors to create an IP network within the classroom/lab, while securely connecting to the campus IT network —passing appropriate traffic while blocking all other traffic using either a wired or wireless connection.

Skorpion IP router models EIPR (10/100Mbps) or EIGR (10/100/1000Mbps) connect your classroom to the campus IT network and requires a single IP address from the campus IT network for Internet access.



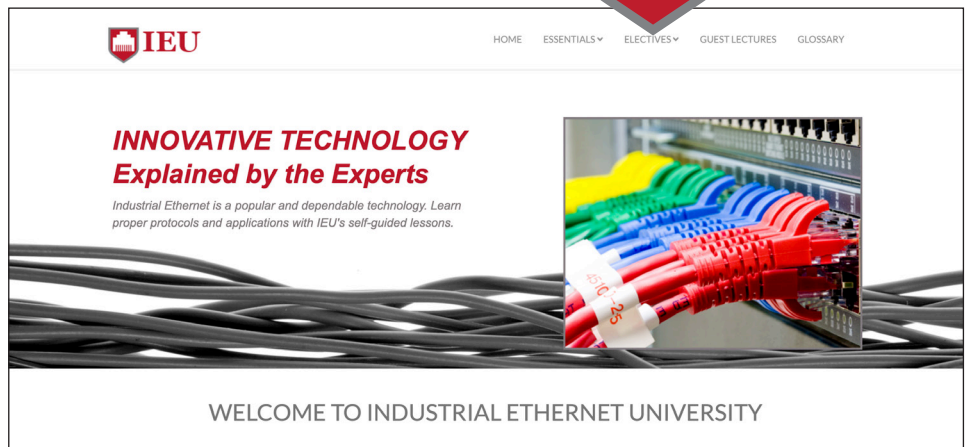
All classroom/lab IP devices will be connected to the EIPR or EIGR IP router, giving the instructor full IP administration capability of their classroom/lab.

Features

- Web page configuration
- 10/100 Mbps WAN port (1000 Mbps in EIGR models)
- 4-port 10/100 Mbps Ethernet LAN switch (1000 Mbps in EIGR models)
- PAT, NAT and Port Forwarding
- NAT Loopback
- Remote Router Access
- Allowlist
- Stateful firewall
- DHCP client (WAN) and DHCP server (LAN)
- DIN-rail mounting
- Diagnostic LEDs
- CE Mark, RoHS, UL 508, C22.2 No. 142-M1987
- 24 VAC/VDC powered
- Wired/Wireless IP Router with Wireless connectivity via USB port (EIPR models)

The built-in web page tools and configurations allows the administrator to manage the IP network with one login to the EIPR or EIGR router. IP addresses can be dynamically assigned on the LAN side thanks to DHCP server functionality, so the instructor and the students do not have to set IP addresses every time they connect to the IP network. The IP router can dynamically obtain an IP address on the WAN side connected to the campus IT network without the need for a static IP address. IP router statistics, dynamic or static IP address assignment can be checked via the webpage to help easily manage the IP network and speed up any troubleshooting. For Internet access, the IP router is connected to the campus IT network through its WAN port which provides internet access to all of the devices connected to the LAN switch.

Contemporary Controls also offers an excellent resource to expand knowledge on industrial Ethernet networks. Visit our free educational website and step through the free courses at Industrial Ethernet University. IEU was created to educate the public on the benefits of deploying Industrial Ethernet in a variety of solutions for applications. The material is vendor-neutral and provided free of charge. Learn the basics of Industrial Ethernet from the physical and data link layers up through the network, transport and application layers.



Worldwide Locations

United States Contemporary Control Systems, Inc.

Tel: +1 630 963 7070

Fax: +1 630 963 0109

info@ccontrols.com

Germany Contemporary Controls GmbH

Tel: +49 341 520359 0

Fax: +49 341 520359 16

ccg.info@ccontrols.com

United Kingdom Contemporary Controls Ltd

Tel: +44 (0)24 7641 3786

Fax: +44 (0)24 7641 3923

ccl.info@ccontrols.com

China Contemporary Controls (Suzhou) Co. Ltd

Tel: +86 512 68095866

Fax: +86 512 68093760

info@ccontrols.com.cn

www.ccontrols.com