

BASautomation®

Building on BACnet®



About BASautomation

Contemporary Controls can complete your BACnet project with solutions that take you from device to the Internet. Freely-programmable Sedona Framework™ controllers, predefined Modbus device profiles that ease integration to BACnet, flexible visualization platforms including Niagara Framework® for alarming, scheduling and trending, BACnet routing to wired and wireless IP networks, and a complete portfolio of our CTRLink® — Ethernet Built for Buildings — infrastructure products that are ideally suited for the BAS industry.

Communicate

BASview
Web-based
Graphical Interface

Visualise

BASsupervisorAX
Network
Server

Powered by
niagara
FRAMEWORK



EIPR
IP Router



EISK5
Unmanaged
Switch

BACnet MS/TP

Integrate

BASrouterLX
BACnet Router



VAV Controllers



Programmable
Thermostats

BACnet IP
Ethernet

Modbus Serial

BASgatewayLX
Modbus Gateway



Boiler Controllers



Energy Meters

BASintegratorAX
Integration Controller

Powered by
niagara
FRAMEWORK



EISK8M
Managed
Switch



EISX8M
Outdoor
Temperature
Switch



EIPE-1
PoE Injector

Power
Ethernet

Control

BAScontrol20
Field Controller

POWERED BY
SEDONA
FRAMEWORK



BASremote
Controller/Gateway



EIBA5
Low-profile
Switch



Fibre

Life Safety



EIS6
UL 864
Switch



CTRLink® — Ethernet Built for Buildings

The **BASview** offers a simple web-based graphical interface to a web browser for scheduling, trending, alarming, and graphics generation. It requires no specialized training or licensing.

For a more comprehensive head-end, the **BASsupervisorAX** Network Server or the **BASintegratorAX** Integration Controller along with web browsers is the solution. By incorporating Niagara Framework® in our Scalable Building Strategy, any size project is within reach.

Not all building automation devices are BACnet/IP compliant so there is a need for gateways and routers.

The **BASrouterLX** High Performance BACnet Router allows connection of BACnet MS/TP and BACnet Ethernet devices to BACnet/IP. By having BBMD support, the BASrouterLX allows BACnet devices to operate over a sub-netted IP network.

The **BASgatewayLX** Modbus to BACnet Converter interfaces Modbus TCP and Modbus Serial (RTU or ASCII) devices to BACnet/IP. By using predefined Modbus device profiles that were developed by Contemporary Controls, configuration only requires checking off boxes on a web page.

For tougher integration challenges there is the **BASintegratorAX** which can take almost any other protocol up to BACnet/IP. There is no need to worry about that one device in the specification that must be included in the system.

Having controllers at the IP level provides convenient web page configuration and monitoring over an Ethernet network. The **BAScontrol20** is a BACnet/IP compliant 20-point controller that is freely-programmable using Sedona Framework™. Using a workbench tool, control schemes are developed by dropping and dragging components onto a wiresheet. With less I/O, the **BASremote** provides much the same capability along with a Modbus gateway port. As an option, it can be powered over Ethernet.

In order to connect general purpose networks with life safety Ethernet networks, an intervening Ethernet switch is required. The **EIS** Ethernet Switch series is UL-864 and cUL-864 recognized for Control Units and Accessories for Fire Alarm Systems 9th Edition.

CTRLink®

Ethernet Built for Buildings

Because of Ethernet's popularity in intelligent buildings, Contemporary Controls designed the CTRLink line of Ethernet managed and unmanaged switches, media converters, PoE injectors and splitters and IP routers that meet the unique requirements of the building automation industry. You have all the building blocks needed to get your device up on the Internet economically. All products can be powered from 24 VAC/VDC Class 2 circuits. DIN-rail or panel mounting options exist. Data rates as high as 1000 Mbps are supported. Cabling options include copper, single-mode and multimode fibre. Wireless technologies such as Wi-Fi and cellular technologies are supported with the installation of USB stick adapters.

By using CTRLink to make connections to your chosen BASautomation devices, you can provide a complete solution for your client.

Integrate

BACnet Routing — Routing Between BACnet/IP, BACnet Ethernet and BACnet MS/TP

The **BASrouter**, **Portable BASrouter** and **BASrouterLX** provide stand-alone routing between BACnet networks such as BACnet/IP, BACnet Ethernet, and BACnet MS/TP — thereby allowing a mix of BACnet network technologies within a single BACnet internetwork. All models have a 10/100 Mbps Ethernet port for BACnet/IP and BACnet/Ethernet, and an isolated EIA-485 port for BACnet MS/TP. A total of 31 full-load or 63 half-load devices can be attached to the MS/TP network over a shared two- or three-wire EIA-485 network. Data rates from 19.2 to 76.8 kbps are supported with the **BASrouterLX** supporting the higher 115.2 kbps rate. Commissioning of all **BASrouters** is accomplished using a standard web browser.

For basic BACnet routing, the **BASrouter** can be used with support for 5 BBMD entries in its BDT (Broadcast

Distribution Table). This small unit can be DIN-rail mounted and powered from a low-voltage 24 VAC/VDC supply.

For temporary connections while commissioning or troubleshooting a MS/TP network, the **Portable BASrouter** can be used. With the portable unit, power is derived from the USB port on a laptop computer although data communications occurs over the laptop's Ethernet port.

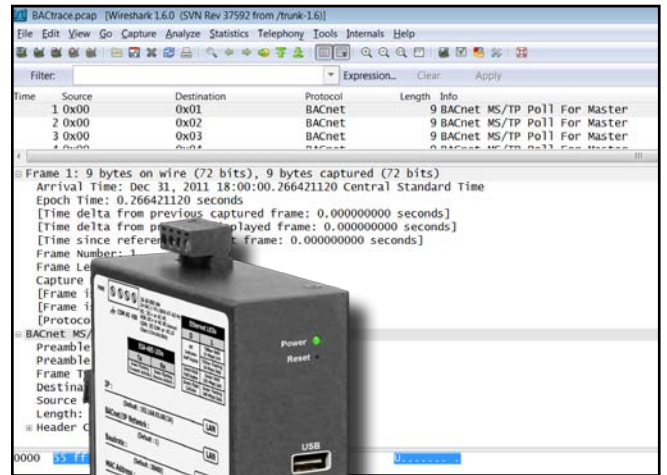
The **BASrouterLX** differs in that it supports both master and slave BACnet MS/TP devices, has a larger BDT table for up to 50 entries and has higher performance due to its faster processor and larger memory. As an aid in troubleshooting MS/TP issues, it can capture MS/TP traffic which can be viewed using Wireshark®.



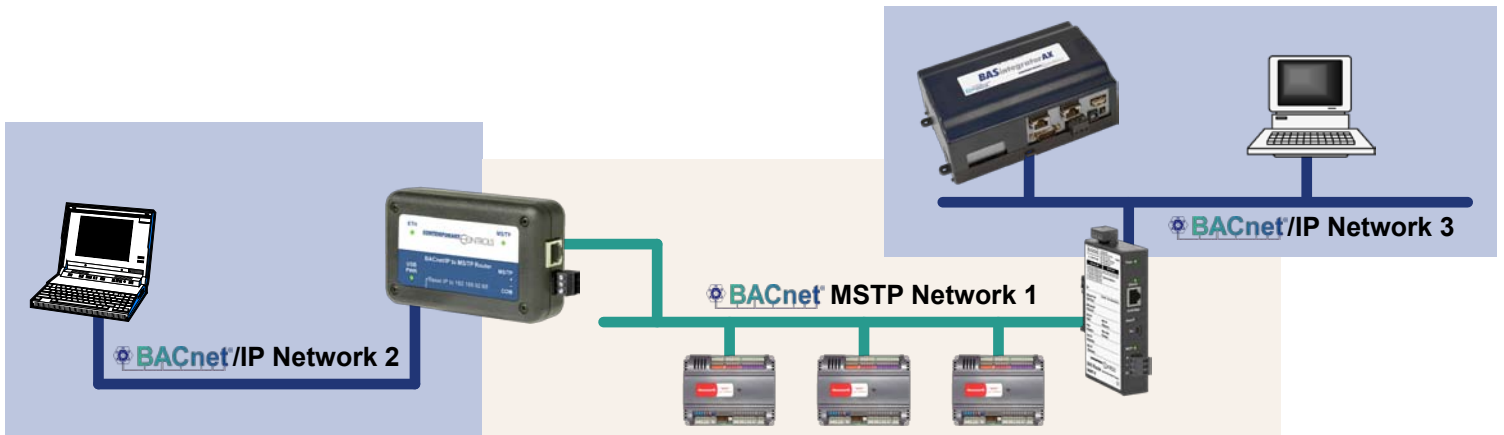
BASrouter



Portable BASrouter



BASrouterLX



Modbus to BACnet Conversion

Modbus remains a popular network technology. It is commonly found on jobs such as boiler control, variable speed drives, and metering applications, but these devices lack BACnet compliance. To make Modbus devices appear as individual BACnet devices a BASgatewayLX is used. This device has one 10/100 Mbps Ethernet for both Modbus TCP and BACnet/IP and an opto-isolated Modbus EIA-485 serial port for Modbus RTU or Modbus ASCII devices.

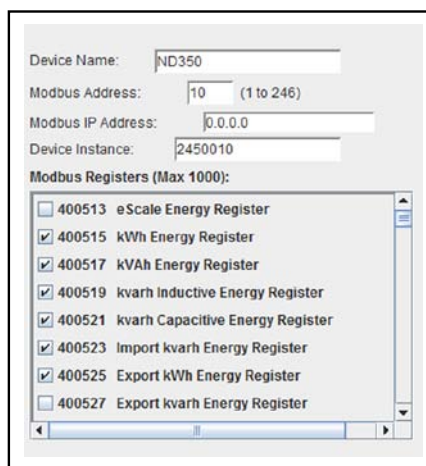
Up to 30 Modbus serial devices (represented by up to 1000 polled points) can share the single Modbus port on the BASgatewayLX. The virtual routing feature in the

BASgatewayLX allows each connected Modbus device to appear as an individual BACnet-compliant device. What is needed is a device profile for each Modbus type device. Contemporary Controls maintains a library of common device profiles. If one is not available, Contemporary Controls will provide it upon request. Custom device profiles can be uploaded to the BASgateway.

Using web pages and a resident database of common Modbus device profiles, Modbus data points from Modbus Serial or Modbus TCP devices can be mapped to BACnet objects.



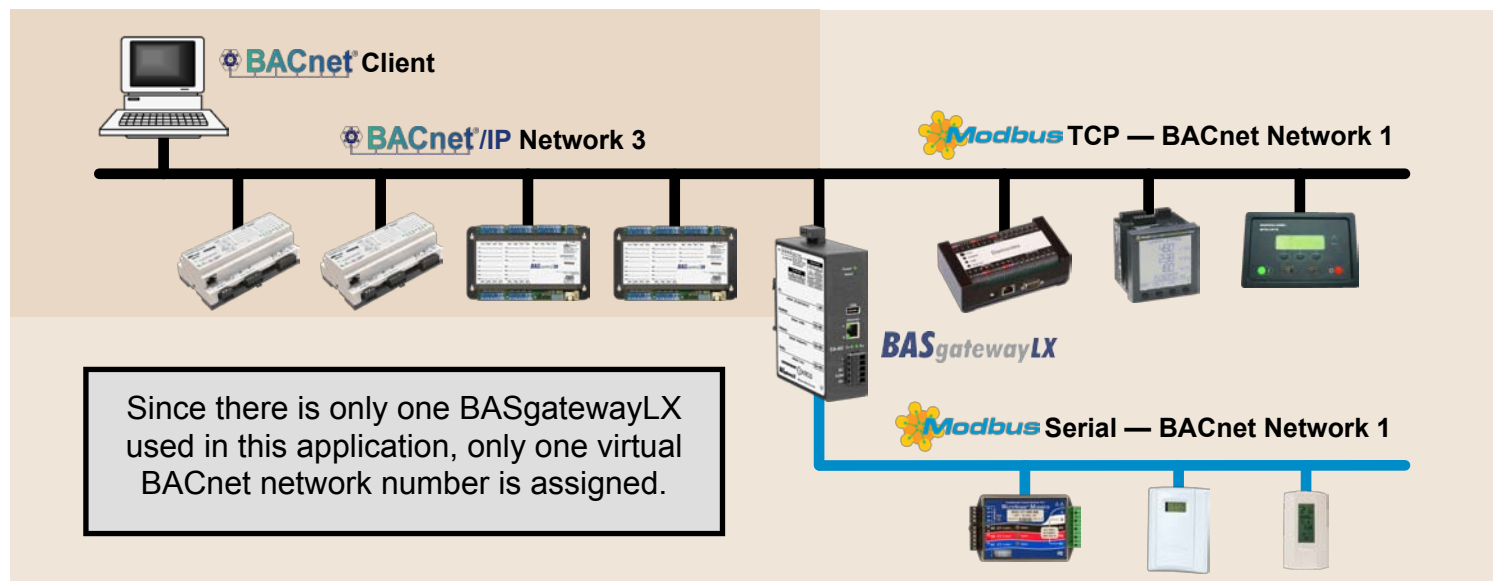
BASgatewayLX



Application Example — Mixing Modbus TCP and Modbus Serial

A single BASgatewayLX can handle both Modbus TCP devices and Modbus Serial devices simultaneously as long as the 30 device/1000 polled point limit is maintained. In this application the Modbus TCP connection is called a “one-armed gateway” because both Modbus TCP and BACnet/IP messages transfer

through the same Ethernet port. Configuration is similar to that of a Modbus serial device. However, this time the IP address of the Modbus TCP device must be entered as well as a Modbus slave address. Notice that all Modbus devices — TCP and serial — are assigned to a unique BACnet network number.



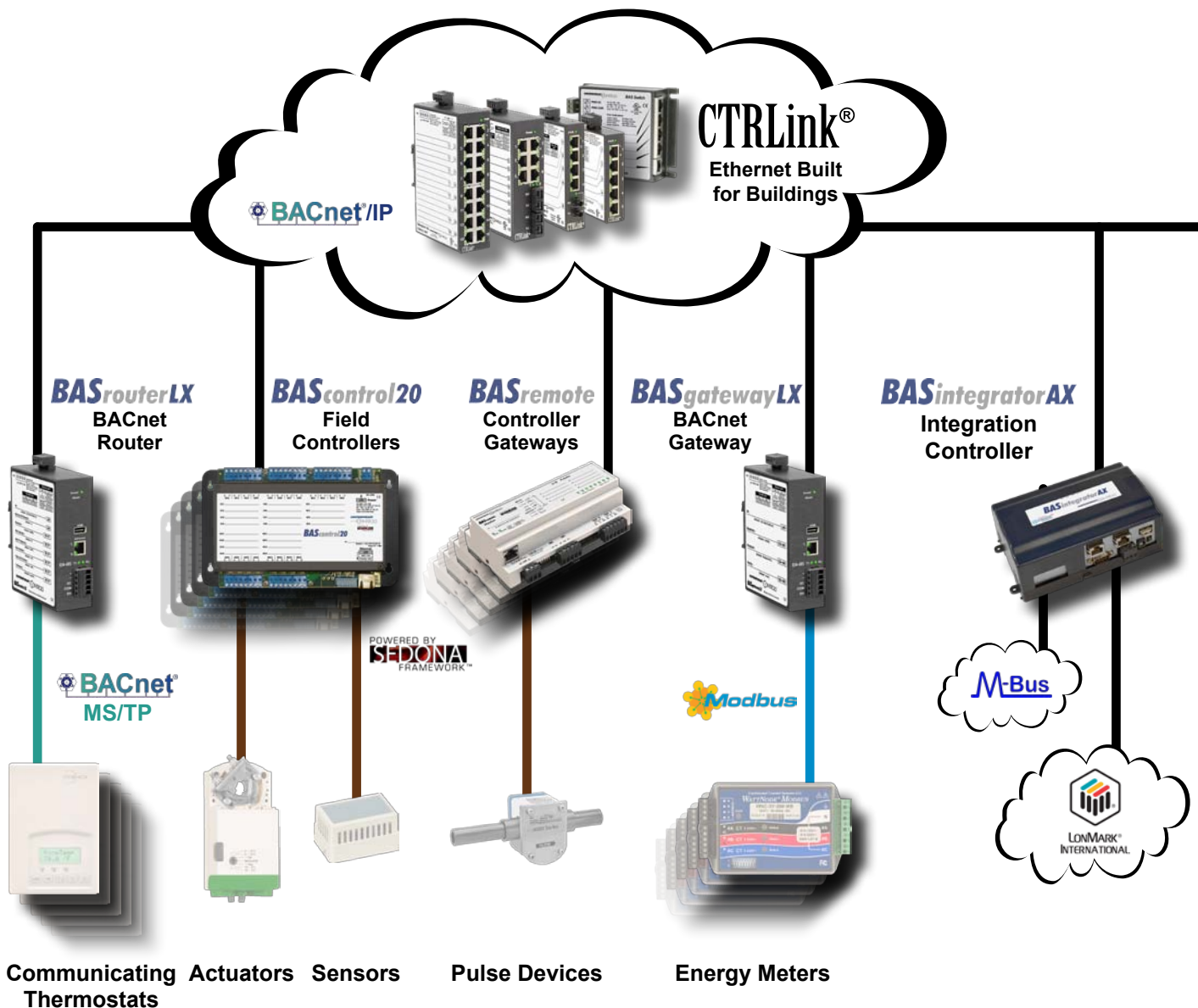
Visualise

Scalable Building Strategy — a complete building automation solution

Contemporary Controls has developed a Scalable Building Strategy that incorporates Niagara^{AX} Framework and Sedona Framework in a modern device-to-Internet solution that is suitable for any size project. Using a BACnet/IP backbone of wired and wireless Ethernet, Contemporary Controls has assembled a complete solution with all the necessary building automation elements — communication, integration, control and visualization.

An Opportunity for Electrical-Mechanical Contractors

As a licensee of Niagara^{AX} Framework from Tridium, Contemporary Controls has created an Authorized Systems Integrator Program to recruit contractors that will purchase, install and commission building automation systems for end users. This is an opportunity for electrical and mechanical contractors to gain access to one of the most popular building automation technologies thus allowing them to bid on the controls portion of a project.



Powered by Niagara^{AX} Framework[®]

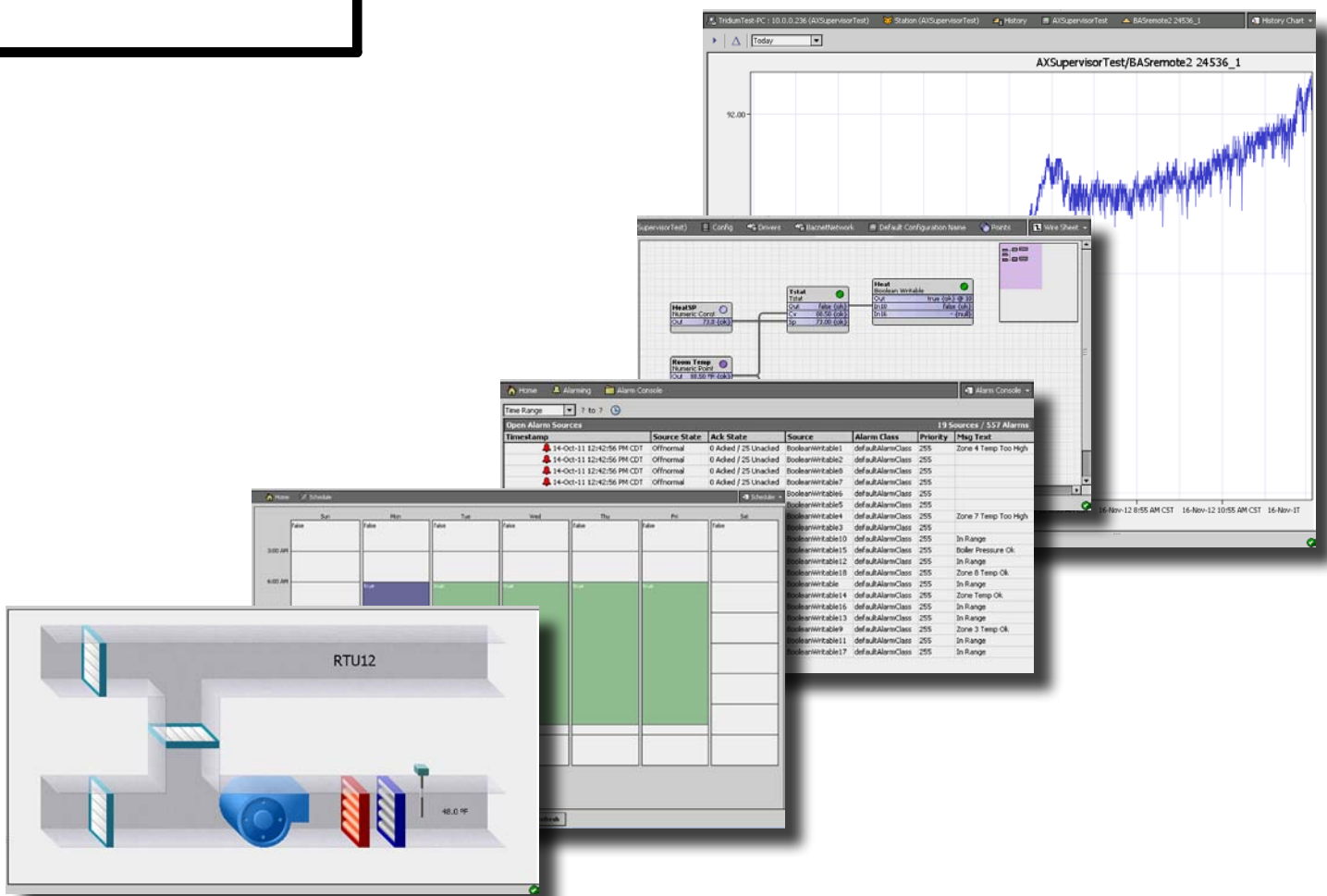
The Niagara^{AX} Framework[®] is a software platform that integrates diverse systems and devices regardless of manufacturer, or communication protocol into a unified platform that can be easily managed and controlled over the Internet using a standard web browser. By integrating diverse building systems such as environmental controls, security, lighting, energy, video, fire and life safety, Niagara is creating better buildings — ones that are smarter, use less energy, are more efficient.

Contemporary Controls utilizes Niagara^{AX} Framework in its scalable building strategy because of the wealth of integration options and its flexible control hierarchy. The BASsupervisorAX network server provides centralized data logging, alarming, scheduling and real-time displays to web browser clients. The BASintegratorAX building controller provides local supervision over BACnet routers, gateways and Powered by Sedona Framework field controllers. Control programming and configuration are accomplished using a single tool — BASworkbenchAX.



Powered by
niagara^{AX}
FRAMEWORK[®]

Powered by
niagara^{AX}
FRAMEWORK[®]



Control

The BASremote and BAScontrol20 provide a direct connection to an IP/Ethernet network. Ideally suited for structured wiring systems, both controllers are BACnet/IP compliant with a B-ASC device profile. Having a resident Sedona Virtual Machine (SVM), the units are freely programmable using tools such as Niagara Workbench or Sedona Workbench.

The BAScontrol20 provides a convenient mix of universal inputs, binary inputs and outputs as well as analog outputs. Models exist for both triac and relay binary outputs. The unit is ideal for unitary control or for expanding I/O points in the field via an Ethernet connection. The BASremote has fewer I/O points but can serve as a Modbus gateway to BACnet.

Powered By Sedona Framework™

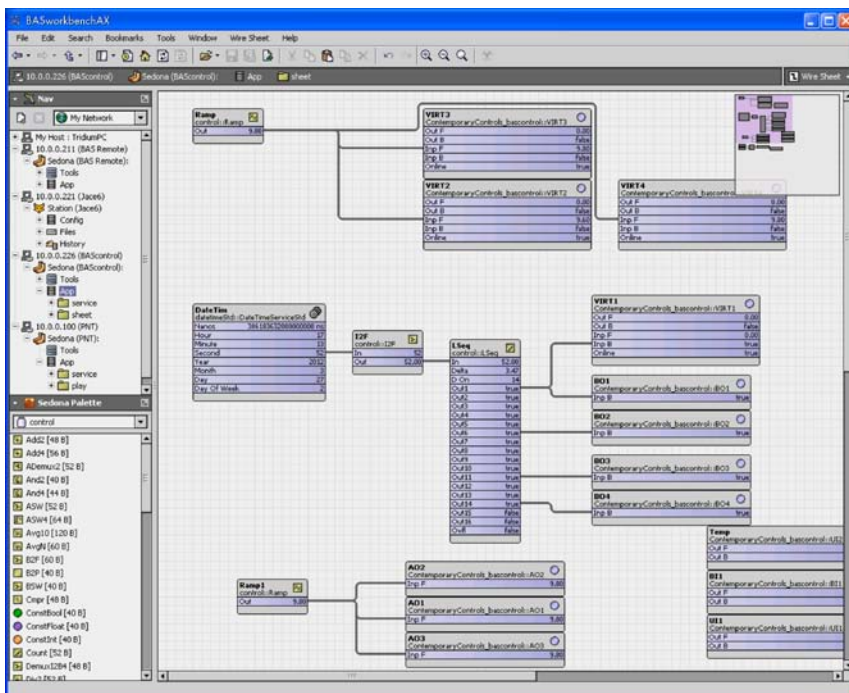
Sedona Framework is a software environment designed to make it easy to build smart, networked, embedded devices which are well suited for implementing control applications. For those familiar with Niagara^{AX} Framework®, understanding Sedona Framework will be easy. The systems integrator's role is to create a freely programmable control sequence by assembling components on a wire sheet and connecting and configuring these components using a graphical programming tool such as BASworkbenchSX or BASworkbenchAX. There are over 70 predefined components to choose from and it is possible to develop custom components if they are needed. Applications can be developed live on a target device such as the BASremote or BAScontrol20, or offline and then saved and uploaded via an IP connection. Because the BASremote and BAScontrol20 are both BACnet/IP compatible, these Sedona Framework compatible devices will operate in both BACnet and Niagara Framework environments.



BASremote



BAScontrol20



Manage Your Entire System with Just One Tool!

By combining Niagara and Sedona Framework technologies together in a scalable building strategy, only one management tool is required. The BASworkbenchAX is all that is needed to manage Niagara and Sedona Framework device databases, develop control applications on wire sheets, and to develop real-time graphics in assisting operators in monitoring and controlling their buildings. A single tool offers convenience and minimizes training needs. For simply programming Powered by Sedona Framework controllers, the BASworkbenchSX is sufficient.

Simple web-based interface


BASview is a stand-alone, embedded, web-based graphical interface for building automation and process automation systems. It can be accessed from any web browser — providing client functionality to any BACnet/IP or Modbus TCP system. By using Contemporary Controls' BASrouter or BASgateway products, additional protocols such as BACnet MS/TP and Modbus RTU and Modbus ASCII are supported. Additional USB modules are available which allow the BASview to communicate directly with MS/TP, Modbus RTU and LON devices.

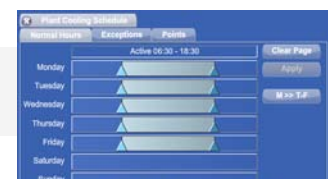
The BASview is simple to install and use. A 10/100 Mbps Ethernet connection is all that is needed. Client features include animated graphic screens, scheduling, historical trending, runtime accumulation and alarm


monitoring. BASview will automatically toggle outputs and change setpoints on schedule, collect runtime and trend data, and monitor alarm conditions. As an embedded device, BASview uses Flash memory for internal storage instead of a hard disk to maintain its ruggedness. The BASview is totally self-contained, requiring no external PC or application for its use. Any number of web browser users can access the device. The only requirement is the installation of an Adobe Flash player in the browser. There are no other licensing requirements to use the product.

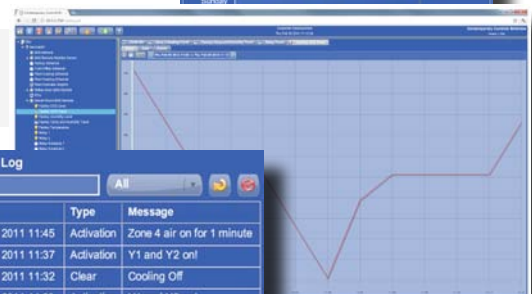
The BASview is ideal for small to medium buildings or processes that require a simple-to-use graphical interface with no licensing requirements.




 **Schedules** — Allows for control of several points based on the time of day.




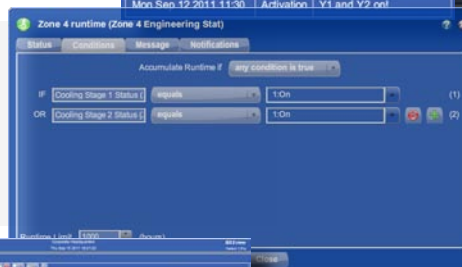
 **Trends** — Automatically records point values at specified intervals to allow for later viewing.




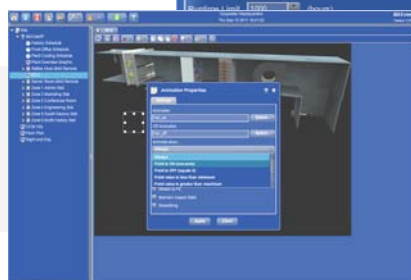
 **Alarms** — Monitors specified conditions and then generates alarm message and optional email alerts.

Time	Type	Message
Mon Sep 12 2011 11:45	Activation	Zone 4 air on for 1 minute
Mon Sep 12 2011 11:37	Activation	Y1 and Y2 on!
Mon Sep 12 2011 11:32	Clear	Cooling Off
Mon Sep 12 2011 11:30	Activation	V1 and V2 on!

 **Runtimes** — Monitors specified conditions and accumulates the amount of time the conditions are true, and generates a message and optional email alerts when a limit is reached.



 **Graphics** — Used to display information from the system and to control equipment.



Ethernet Built for Buildings



Skorpion Series Switches
Unmanaged Ethernet Switches



BASswitch
Low-Profile Switches

Managed Switches
Managed Ethernet Switches



PoE Injector or Splitter
Power Over Ethernet

Wired or Wireless IP Routers
Wi-Fi and Cellular



Media Converters
Ethernet Media Converters



Fire and Smoke Rated Switches
Unmanaged Ethernet Switches

CTRLink®

Ethernet has rapidly become the network of choice for intelligent buildings due to its high speed, familiarity among users, ease in connecting to wireless networks, support for structured wiring, the ability to share power and data over one cable, and its use with Internet protocols. The equipment must be inexpensive but robust, reliable, and also easy to install, maintain and use. It must carry proper regulatory approvals and, in some instances, withstand outdoor temperatures. Office-grade equipment, with its frequent model changes and inconvenient mounting, will not do.

For simple systems, Plug-and-Play Switches will suffice. These products operate “right out of the box” and can be put into service without adjustments. Auto-negotiation is standard where data rate (10/100/1000 Mbps) and duplex (half or full) are set between link partners without user intervention. LED indicators identify link status. DIN-rail and panel-mounting are available, as is 24 VAC/VDC power.

The **Skorpion** series provides a wide range of options from 5 to 16 copper ports, including models specifically intended to monitor the BACnet/IP protocol using Wireshark®. For campus installations with the need to interconnect distant buildings, copper/fibre models exist supporting either multimode or single mode fibre with distances up to 15 km. The **BASswitch** series is intended for shallow depth control panels where the devices are either panel or DIN-rail mounted. With either series, power can be derived from a shared DC power supply or Class 2 transformer.

More demanding applications require **Managed Switches** that support the simple network management protocol (SNMP) — providing data on the network’s health and the ability to configure the network to meet the needs of the system. Advanced functions like RapidRing® cable redundancy to guard against a single cable break, IGMP snooping, virtual local-area-networks (VLANs), port mirroring for connecting a network analyser, and priority tagging can be found in managed switches from Contemporary Controls.

For long runs up to 15 km and inherent immunity to electromagnetic interference, **media converters** with low latency can be used between copper ports. Both single-mode and multimode fibre are supported. For powering a single-port Power-over-Ethernet (PoE) device, a **PoE Injector** can be used. For generating power from a PoE source, a **PoE Splitter** can be used.

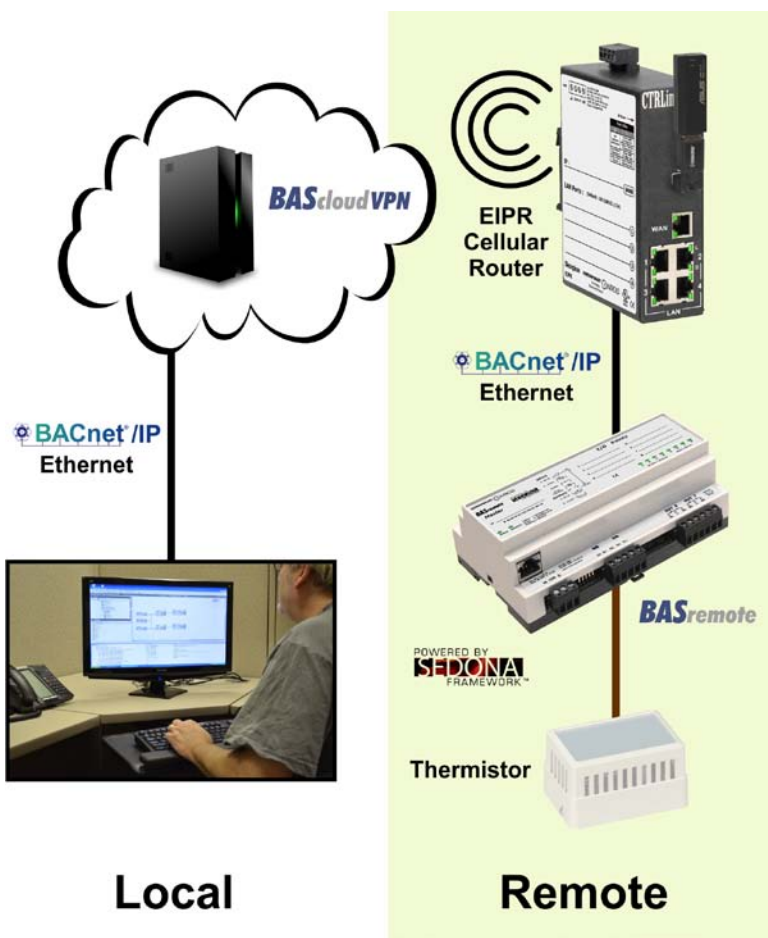
An **IP Router** connects two Internet Protocol (IP) networks, passing necessary traffic while blocking all other traffic. Ethernet-to-Ethernet routing is supported via a four-port internal switch. For passing messages over the cellular or Wi-Fi network, a **USB adapter** can be installed.

Contemporary Controls has worked with OEMs in obtaining **UL 864** Control Units and Accessories for Fire Alarm Systems compliance using our Ethernet switches. By specifying a **fire and smoke rated switch**, achieving UL 864 system compliance is made easier.

Remote Monitoring via **BAScloudVPN**

A systems integrator working from his office needs to view a recently installed building automation system at his client's location. In order to access this remote site, he is going to use a Cloud-VPN to facilitate communications. The Cloud-VPN consists of a virtual private network (VPN) server provided by Contemporary Controls. Using his local Internet service, he first opens up VPN client software on his computer which provides a VPN tunnel connection to a Cloud-VPN. A similar VPN tunnel connection to this same Cloud-VPN already exists at the remote site. Using Niagara Workbench on

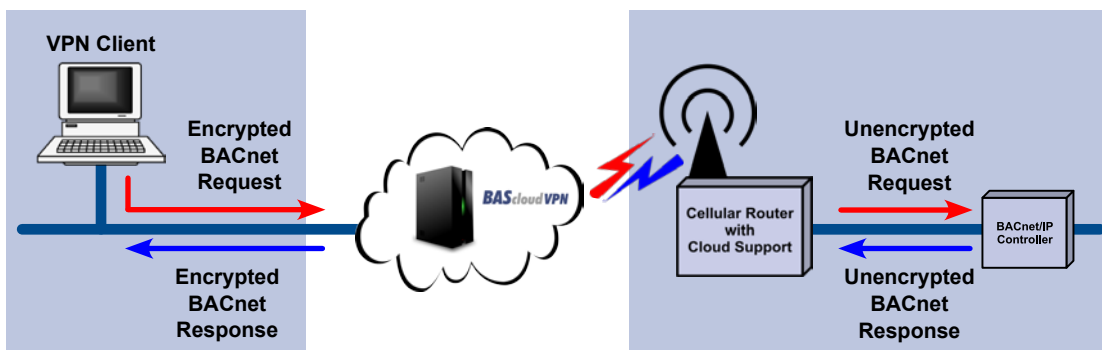
his computer he can then access a Sedona Framework controller at the remote site in order to examine a temperature point of interest. The Cloud-VPN makes the necessary connection between the two VPN tunnels. Once a connection is made, he can service the remote site as if he was physically there. The remote site accesses the Cloud-VPN using a cellular network while the systems integrator simply needs some way of accessing the Internet. The BAScloudVPN provides an effective secure method of remote access without concern for intervening firewalls.



Why Use the BAScloudVPN?

Accessing machines at remote sites can be a challenge since firewalls block messages that originate from the Internet. Although it is possible to open up ports in the firewall using Port Forwarding, it is better to use a Virtual Private Network or VPN. A VPN tunnel encrypts TCP/IP communications so messages can be sent over the Internet. A simple VPN can exist between two end points. One is a VPN client while the other is a VPN server. Between the VPN client and server, the communications are encrypted — so only authorized devices can communicate over the VPN. Once the VPN connection is made, messages can originate from either side — eliminating the need for port-forwarding.

Having the VPN in the cloud allows access from anywhere on the Internet. Using a cellular connection from the remote site to the cloud is easier to accomplish. Contemporary Controls provides a complete remote monitoring solution by supplying the cellular routers, hosting the Cloud-based VPN server and by recommending a data plan from a cellular provider.



Trademarks — Contemporary Controls, ARC Control, ARC DETECT, BASautomation, CTRLink, EXTEND-A-BUS and RapidRing are trademarks or registered trademarks of Contemporary Control Systems, Inc. Specifications are subject to change without notice. BACnet is a registered trademark of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers Inc. (ASHRAE). Powered by Sedona Framework and Powered by Niagara Framework are trademarks of Tridium, Inc. Other product names may be trademarks or registered trademarks of their respective companies.

Original Design Manufacturing Service

Let us provide the product you require under your brand. With 35 years of experience in electronics design, development and manufacturing, we have a rich inventory of intellectual property that can be tapped for your next project. Two design and manufacturing locations provide private label, ODM and electronics manufacturing services. Leverage our design and manufacturing resources to reduce your costs and time-to-market.

Design to Worldwide Standards

Two design centres — one in China and the other in the United States — cooperate on product designs from concept to production. Capabilities include:

- Schematic capture and printed circuit board layout
- Firmware and programmable logic development
- Mechanical design
- Design for Test (DFT)
- Design for Manufacturing (DFM)
- Environmental testing
- Electromagnetic Compatibility (EMC)
- Safety and performance testing

We assist in obtaining regulatory approvals, including UL, CE and CCC markings.

Worldwide Electronics Manufacturing

Contemporary Controls offers lead-free surface-mount-technology (SMT) electronics manufacturing in the United States and China while complying with the requirements for the Restriction of Hazardous Substances (RoHS) European Union directive. Through-hole assembly and wave soldering are also supported. Contemporary Controls adheres to the workmanship standards established by IPC — Association Connecting Electronics Industries.

The Downers Grove, IL manufacturing plant focuses on lower-volume, higher-mix products or those products requiring Made-in-America compliance or a North American Free Trade Agreement (NAFTA) certificate.

For higher-volume, lower-mix, cost-sensitive requirements, our Suzhou, PRC plant offers the highest production capacity as well as global logistics support. This plant is ISO 9001:2008 registered.

Both plants are under Underwriters Laboratories (UL) surveillance. Your intellectual property (IP) is protected at either plant location.



Worldwide Locations



Contemporary Controls Ltd
14 Bow Court
Fletchworth Gate
Coventry CV5 6SP
United Kingdom
info@ccontrols.co.uk
www.ccontrols.eu

Contemporary Controls GmbH
Fuggerstraße 1 B
04158 Leipzig, Germany
info@ccontrols.de
www.ccontrols.eu



Contemporary Control Systems, Inc.
2431 Curtiss Street
Downers Grove, IL 60515
USA
info@ccontrols.com
www.ccontrols.com

Contemporary Controls (Suzhou) Co. Ltd
11 Huoju Road
Science & Technology Park
New District, Suzhou
PR China 215009
info@ccontrols.com.cn
www.ccontrols.asia



Quality Policy

Contemporary Controls develops, manufactures and markets innovative networking and control products to the benefit of our automation customers worldwide. We are committed to delivering products and services that meet customer requirements and strive to exceed their expectations through our continuous improvement efforts.

CONTEMPORARY CONTROLS®

© Contemporary Control Systems Inc. March 2013

BR-BBAC0000-BC1