



NEW SOFTWARE
Celebrating three releases

SMART BUILDINGS
A cybersecurity liability



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RUNtime

The quarterly magazine of Reliable Controls

Q4-2020

New hardware

Four new products for today's sustainable buildings



Reliable[®]
controls

PRESIDENT'S MESSAGE

Building for all



Tom Zaban, P.Eng, LEED Green Associate

Most of us in the Northern hemisphere recently adjusted our clocks back 1 hour to revert daylight savings time. As dark as the ensuing winter months might be, they will naturally provide opportunities to pause and reflect on this unprecedented year. After all the chaotic activity that building owners experienced in 2020—drastic initial responses to the pandemic, safety plans written and policies implemented, physical barriers and signage installed, monitoring and ventilation equipment upgraded, face masks and disinfectants stocked and distributed—perhaps now is a good time to exhale, seize on some of the positive news in the world, and muster the troops.

As the second wave of COVID-19 takes lives and reinitiates lockdowns, we are learning about the prospects of innovative vaccines. At the time of this writing, Pfizer/BioNTech and Moderna have each announced vaccine candidates with promising phase three clinical trial results. The trial vaccines demonstrate upward of 90 percent effectiveness at preventing COVID-19 in studies with enrollments of 30,000 or more participants. The Herculean effort of scientists to develop an approved vaccine gives hope

that by the end of 2021, perhaps as many as a billion mostly vulnerable earthlings (health-care workers, emergency responders, and older adults) will be vaccinated. This, along with the aforementioned activities of building owners to provide workers with sufficient confidence to return to work en masse, will allow everyone to regain the higher levels of collaboration and productivity enjoyed prior to the pandemic. In turn, the travel, tourism, and events industries will be able to re-establish themselves after nearly a year of punishing curtailment, and life will feel a bit more normal. These future milestones, along with newly adopted global trade agreements such as the Regional Comprehensive Economic Partnership, will inspire renewed investment and business growth. Renewed business growth will lead to more buildings, and more buildings will lead to more—you guessed it—greenhouse gas emissions.

As agents of change and survivors of this horrible pandemic, business owners and building operators can seize this moment, too, and acknowledge that we are truly all in this together. It is up to us working together to build more resilient communities that can adapt to and withstand climate change. In doing so we can create communities with updated buildings, systems, and infrastructure that are resilient and sustainable. As NASA commander Mike Hopkins stated minutes before liftoff of the SpaceX Crew *Dragon*, “By working together through these difficult times, you’ve inspired the nation, the world, and in no small part the name of this incredible vehicle, *Resilience*. And now it’s time for us to do our part, Crew 1 for all.”

As building owners and operators, now is the time to do our part and start building for all.

*People and technology
you can rely on™*

WELCOME

New Reliable Controls® Authorized Dealers

BYNAMIC
BRIGHT IDEAS FOR DYNAMIC SOLUTIONS

BYNAMIC
Cairo, Egypt
bynamic.net

**Commercial
Control
Solutions**

Commercial Control Solutions
Yukon, OK, United States
oescx.com

CORECONTROLS

Core Controls
Charleston, WV, United States
corecontrols.net



Empowered Buildings

Empowered Buildings
Bronxville, NY, United States
empoweredbuildings.com

**Xerox
Engineering
Services**

Xerox Engineering Services (Pvt) Ltd.
Pahaka Keembiya, Sri Lanka
xeroxengineeringervicespvtltd.business.site

Reliable Controls sales, installation, service, and support are all performed by a growing network of independent, factory-trained Authorized Dealers. Each dealer is committed to the green building controls industry and to providing total customer satisfaction.



SMART-SENSOR™ AND SPACE-SENSOR™ TEMPERATURE DEVICES

Reliable Controls is pleased to announce that SMART-Sensor and SPACE-Sensor Temperature devices can now be ordered with a micro-USB connector. The new connector option includes network terminations that allow local access to a host controller using an X-Port™-2 Converter with additional custom cables.

The SMART-Sensor and SMART-Sensor EPD deliver a modern communicating-sensor solution that allows users to connect with up to 10 configurable parameters related to a space. The SPACE-Sensor Temperature is a traditional temperature-sensor device with a wide range of options to help users achieve comfort and energy efficiency in their facilities.

Reliable Controls SMART-Sensor and SPACE-Sensor Temperature devices are ideal for a variety of applications in the built environment.



Micro-USB connector option

SMART-Sensor and SPACE-Sensor Temperature devices



Micro-USB connector option on SMART-Sensor and SPACE-Sensor Temperature devices

MEDIUM GENERAL CONTROL PANEL

The Medium General Control Panel is a complete assembly of controllers and lighting relays wired and ready for installation. This medium-size control panel can be customized with a range of controllers, relays and wiring, panel door, and transformer input voltage to meet any lighting control, HVAC, or security strategy.

The Medium General Control Panel can include one MACH-ProView™ controller, up to two MACH-ProLight™ or MACH-ProZone™ controllers, and up to three additional Reliable Controls controllers. It supports industry standard Panasonic WR-6161K-84 relays, suitable for all types of lighting loads, and is UL 508A Listed for common line-voltage connections up to 347 VAC. Users can switch up to four relays with each relay driver output and easily add and remove as many as eight relays with quick-release spring-clip mounting. The Medium General Control Panel has a NEMA 1 enclosure with standard electrical knockouts and ships fully assembled with complete low-voltage terminations.



Better by design™

MACH-ProView LCD OPERATOR DISPLAY

The MACH-ProView LCD Operator Display is a powerful, elegant BACnet Building Controller (B-BC) and BACnet Operator Display (B-OD) designed to provide a cost-effective user interface to a building automation system when a facilities manager does not need direct control of equipment.

Like the MACH-ProView LCD, the MACH-ProView LCD Operator Display provides a plenitude of attractive, high-resolution graphical interfaces that allow users to gather system insights using a variety of configurable views, such as EQUIPMENTview, SPACEview, LISTview, STATview, and more. What makes the Operator Display model different is that it has no inputs or outputs and therefore provides a less expensive way to interact with the energy, comfort, and security systems in a facility.

With multiple available onscreen themes and several enclosure colors, the MACH-ProView LCD Operator Display fits a wide range of design environments.

Base models reside on MS/TP, Ethernet, Power over Ethernet, or Wi-Fi networks. The MACH-ProView LCD Operator Display with Router supports connectivity to BACnet MS/TP devices, Modbus RTU devices, or any MACH-ProPoint expansion module.

The device includes a dedicated onboard 10 kΩ thermistor, with available options for CO₂, humidity, occupancy, and VOC sensing.



MACH-ProView PANEL MOUNT KIT

The MACH-ProView Panel Mount Kit accessory allows users to seamlessly integrate a MACH-ProView controller in a flush-mounted application. It provides a simple way to install a touchscreen controller on the door of a metal control cabinet and affords a higher level of environmental protection than the MACH-ProView alone. A vinyl mounting template protects against scratches and provides error-free installation.

MACH-ProView Panel Mount Kit is durable and aesthetically pleasing, constructed from cold-rolled steel with a high-quality powder coat.



To explore all Reliable Controls hardware products, please visit reliablecontrols.com.



All Reliable Controls hardware products are backed by an industry-recognized 5-year warranty and a worldwide network of certified Authorized Dealers.

OFFICIAL RELEASE RCStudio® 3.7

RC-Studio® is a multivendor, multiprotocol integration solution for database, alarming, scheduling, trending, and sequence of operation programming. This easy-to-use, easy-to-learn BACnet Advanced Workstation (B-AWS) allows users to develop a complete and customized graphical user interface for monitoring and controlling any application at any scale. Its real-time energy management and integrated fault detection and diagnostic capabilities improve operational efficiency and occupant comfort in sustainable facilities. RC-Studio 3.7 contains a number of new features and improvements to help building operators maintain and expand their control systems with ease.

RC-Studio has come a long way since initial software development began in December 1996. We launched version 1.0 to great success in November 2000 as an all-in-one engineering tool for building owners and operators, and for the past 20 years we have made continual improvements that make the software easier to learn and use, always with the goal of empowering users to take greater control of their built environment.

In RC-Studio 3.7, we introduce System Group features that increase engineering productivity, file synchronization through BACnet File Services (BFS), embedded BACnet traffic capture, the ability to bulk edit net ins and outs, and support for the Reliable Controls SMART-Net™ Relay, MACH-ProLight™, EQUIPMENTview on the MACH-ProView™ LCD, and RC-GrafxSet FlexTiles™.

The File Sync function automatically synchronizes all enhanced System Group and Workstation Group content changes for RC-Studio workstations using the BFS transfer method. Users can select the BFS protocol for file sharing in MACH-ProWebCom™ and MACH-ProWebSys™ controllers, eliminating the need for the additional port configurations required for FTP transfers. The feature also provides access to a MACH-ProWebCom or MACH-ProWebSys controller from anywhere in the BACnet internetwork.



RC-Studio can now capture BACnet communication received by and sent from the application to .pcap files. This information makes it easier to analyze network traffic and diagnose issues. Users can select **Capture Traffic** in the BACnet Preferences dialog box (Figure 1) before they connect to a system. Enabling this option in RC-Studio reduces the need to install separate software, such as Wireshark, to perform these captures.

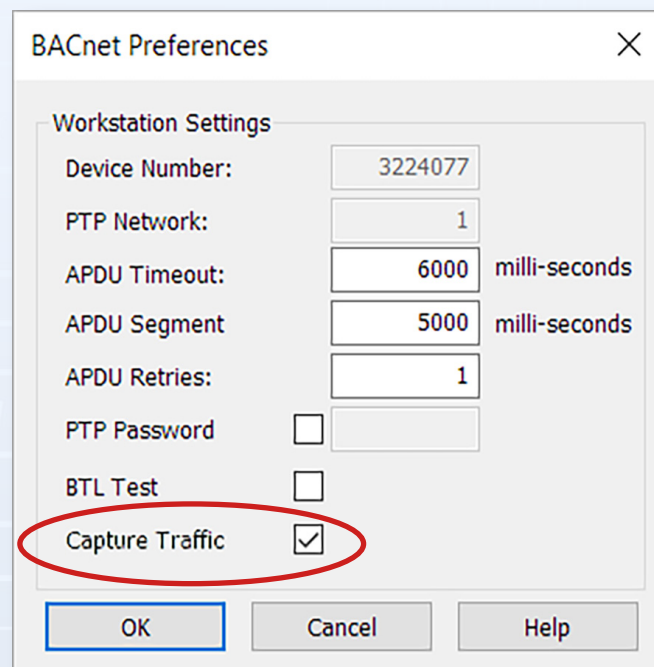


Figure 1: Capture Traffic check box in the RC-Studio BACnet Preferences dialog box.



Bulk edit Net Ins
and Net Outs



File Sync

BACnet
capture traffic

In addition, the ability to bulk edit entries in the Net Ins and Net Outs worksheets streamlines integration (Figures 2-4).

Figure 2: Bulk edit the function in the Net Ins worksheet to update all selected rows.

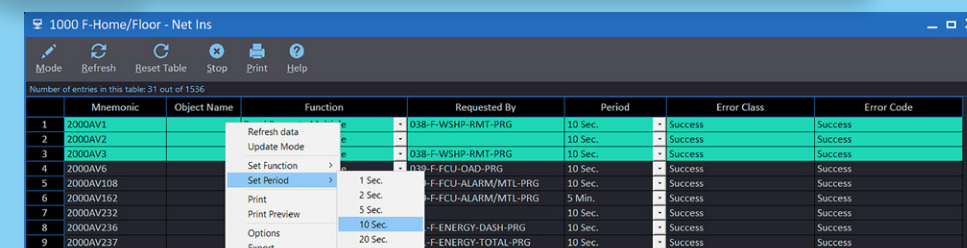
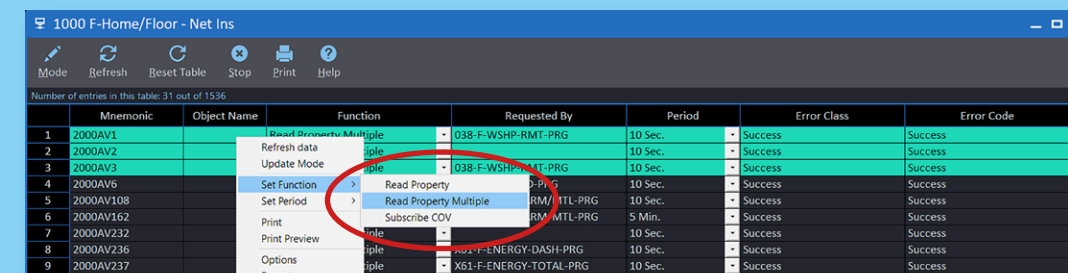


Figure 3: Bulk edit the period for multiple rows in the Net Ins worksheet.

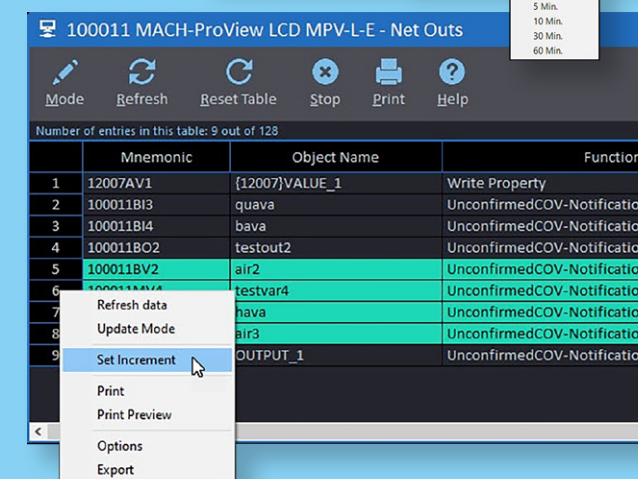


Figure 4: Bulk edit the increment in the Net Outs worksheet.



RC-Studio 3.7 includes improvements to the following features:

- Simulate mode
- Control-BASIC editor
- Points Report worksheet
- Worksheet data imports and exports
- Send Multiple function
- Intrinsic Alarms dialog box
- Templates



RC-Studio is the ultimate all-in-one engineering tool. To learn more, please visit reliablecontrols.com/RCST.

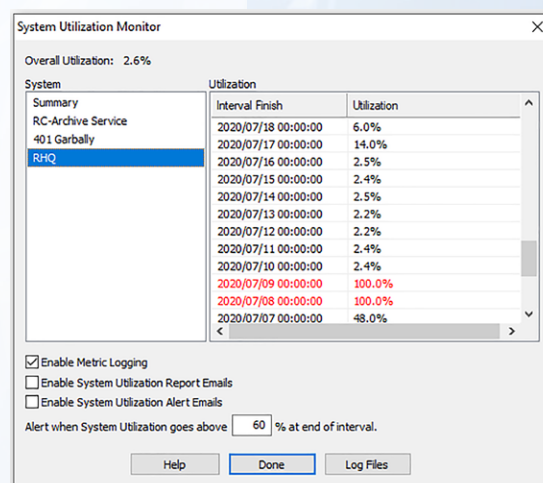


OFFICIAL RELEASE RCArchive® 3.11

RC-Archive® software empowers users with continuous preservation of building data logs to an industry-standard SQL Server database and delivers a robust record of performance for any internet-connected BACnet facility.

Included in version 3.11 is the System Utilization Monitor feature, which provides a summary of overall system performance and identifies systems that require further investigation. This new feature allows users to determine how well RC-Archive is performing so they can tune it for better performance. The System Utilization Monitor dialog box (Figure 1) shows a summary of overall performance for a specific system and lists the utilization values for each archive interval. Users can set a threshold to indicate when the system is in an alert state and configure email alerts when that threshold is reached.

Figure 1: System Utilization Monitor dialog box.



RC-RemoteAccess® support for RC-Archive data collection service

In our continuous effort to provide seamless integration across products and services, RC-Archive and RC-RemoteAccess are now even more compatible. RC-RemoteAccess now has the ability to send B/VPN configuration changes to connected devices, and the RC-Archive data collection service now accepts those configuration changes as a connected device.

Improved In RC-Archive 3.11

RC-Archive no longer considers its B/VPN connection as a single routable address for calculating simultaneous communication throughput. When connected to RC-RemoteAccess 3.4.3.1 or later, RC-Archive is now able to use the RC-RemoteAccess BACnet routing table to determine its throttled throughput. The result is faster archiving of trend and runtime logs.

Logging Configuration dialog box change

The Disable All Logging check box in the Logging Configuration dialog box is now the Disable Service Runtime Logging check box to more accurately distinguish the system logging used for this option from the function of metric logging.

TLS 1.2 support

RC-Archive now installs and uses Transport Layer Security (TLS) 1.2, the accepted standard for secure internet communications.

SQL Server Express 2016 SP2 support

The RC-Archive installation now deploys SQL Server Express 2016 SP2 rather than SQL Server Express 2014. The new version provides performance improvements and no longer requires .Net Framework.

.Net Framework 4.7.1 support

The Database Utility and the RC-Archive Windows Service now use .NET Framework 4.7.1.



For robust data recording performance, visit reliablecontrols.com/RCAR to learn more.



OFFICIAL RELEASE RCGrafXSet® 3.5

RC-GrafXSet® software saves building operators time and money by allowing them to quickly and easily create custom graphical interfaces. Users can choose from thousands of professionally rendered images and animations across a broad spectrum of categories in the RC-GrafXSet libraries, drop them into System Groups, and link them to objects or other System Groups to create interactive opening pages, navigation menus, dashboards, and more. Building managers can also use RC-GrafXSet to develop interactive HVAC, lighting, and security graphics; build real-time integrated fault and diagnostic interfaces; and integrate analytics and charting components into System Groups.

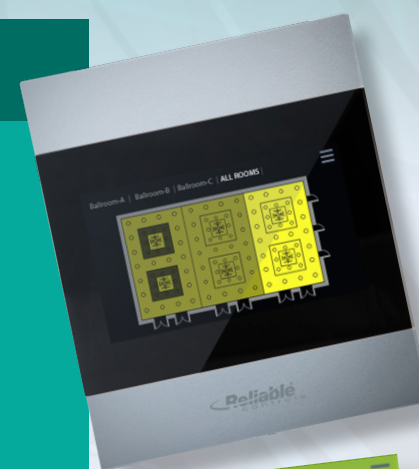
NEW FEATURES

New HMI Console folder that simplifies the creation of EQUIPMENTviews with common application templates and formatted background images

New graphical user interface with improved navigation in the Isometric and Conical libraries

Access to more than 1,700 new assets, including an additional 406 images and 1,303 animations since version 3.4

Newly updated RC-GrafXSet Software Manual with instructions for using the RC-GrafXSet Flash Utility to automatically replace existing Flash animations with HTML5 animations



RC-GrafXSet makes graphical interfaces look great!

Empower your creativity with RC-GrafXSet. Visit reliablecontrols.com/RCGFX to learn how.

SMART BUILDINGS

A CYBERSECURITY LIABILITY

Citizens are concerned about the ability of public and private institutions to adequately protect their data, particularly after the high-profile LifeLabs data breach in 2019 and the devastation brought by Ryuk malware on three hospitals in Ontario the same year.¹ In the hospitality industry, a breach of data at Marriott exposed the privacy of nearly half a billion guests who stayed at the hotel chain between 2014 and 2018.² It is crucial for organizations to be proactive when it comes to cybersecurity.

Security breaches are often the result of blind spots for IT and security teams. This is especially the case when organizations don't manage their own assets or are not aware of their existence. Internet of Things (IoT) devices are a prime example of such assets. Building owners and operators rely on many types of IoT devices, such as refrigeration, HVAC, and lighting systems, to diagnose faults, collect data, and remotely operate and service equipment. Each of these systems offers a tempting open pathway for an attacker. In 2017 a casino's high-roller database

was exposed to hackers who infiltrated the network through a smart thermostat and pulled data to the cloud.³ It is more important than ever for building owners and designers to map their smart buildings' attack surface, expose that shadow risk, and eliminate all attack vectors.

Smart buildings collect data from equipment and sensors and analyze them to improve operational efficiency, reduce waste, and ensure occupant comfort—all worthy efforts. An example of the many government and non-profit efforts to improve building energy efficiency and environmental impact is the Government of Canada's Smart Buildings Initiative, part of a broader goal to make federal buildings energy efficient and reduce greenhouse gas emissions.⁴ But as smart buildings and IoT devices gain momentum in the market, unless we carefully consider their security, we risk exposing our data and privacy to malicious actors.

BACnet protocol

Smart buildings need smart devices to deliver the information needed for energy analytics, fault detection, and remote operations management. These devices communicate over Wi-Fi, Ethernet, Bluetooth, EIA-485, and a variety of other networks. Smart devices also provide information to direct digital control (DDC) controllers for status, temperature, CO₂ levels, and various other parameters. DDC controllers operate everything from large air handlers to small light sensors using a centralized, network-oriented approach and open protocol languages such as BACnet, Modbus, and KNX.

Open protocol languages are the cornerstone of easy integration and plug-and-play installation. BACnet protocol, developed and maintained by ASHRAE, has become an industry standard for smart buildings and was ISO certified in 2003. BACnet is used to control lighting, security access, elevators, HVAC, and life-safety devices. However, as with devices that use Modbus and other open protocols, BACnet-controlled devices offer little to no security in the way they integrate and communicate. This makes smart buildings vulnerable to attacks and system breaches.

Secure communications

Product owner Faisal Hamood and the RC-RemoteAccess team have been improving the way encrypted BACnet networks are managed. Reliable Controls was one of the first organizations to encrypt BACnet communications and develop a server-

based router that can manage multiple systems. RC-RemoteAccess is unique in that it does not rely on additional devices to route and manage encryption; it provides security within the building as well as secure access into it. Our encrypted BACnet networks are

interoperable with any standard BACnet device, and many of the IP challenges of BACnet/IP, such as static IP addresses and broadcast management, are eliminated. This not only secures a smart building's network but also simplifies its architecture.

As smart-building technology advances, we can expect cybersecurity challenges to increase. Think of encryption as a lock on your door. It can only delay a determined malicious actor. The bigger and stronger the lock, the more specialized tools and knowledge

the malicious actor needs to break it. It is not enough to rely on encryption. Smart-building designers need to supplement encryption with network segmentation, social engineering training for staff and operators, and a strong IT policy with contingencies and alarms. Segmentation limits the damage of a break-in, and alarms alert you of suspicious activity on the network, but cybersecurity is not just a technological challenge; it also has a human element. The best lock can't protect you if the robber has the key.

SMART CITIES

Today, cities are beginning to use digital technologies to make better decisions and improve quality of life. Smart cities collect data from citizens, buildings, and assets and use it to monitor, track, and optimize energy, water and waste, traffic, comfort, safety, and a variety of other aspects of our daily lives. The more interoperability that occurs between devices, buildings, and infrastructure, the more opportunity for our data and information to be vulnerable; the challenge of cybersecurity is ever present. Future cybersecurity systems will likely be based in artificial intelligence, but they will always rely on fundamental safeguards like encryption and alarming—and on our ability to adapt our human defenses.



1. Ikeda, Scott. "The LifeLabs Data Breach," *CPO Magazine*, January 8, 2020. cpomagazine.com/cyber-security/lifelabs-data-breach-the-largest-ever-in-canada-may-cost-the-company-over-1-billion-in-class-action-lawsuit
2. "Marriott's Data Breach Points to Cybersecurity Complacency: Stealthcare." *BloT Canada*, December 11, 2018. biotcanada.ca/marriotts-data-breach-points-to-cybersecurity-complacencystealthcare/1002880346
3. Beck, Kellen. "Hackers Exploit Casino's Smart Thermometer to Steal Database Info." *Mashable*, April 15, 2018. mashable.com/2018/04/15/casino-smart-thermometer-hacked/
4. Government of Canada. "Smart Buildings Initiative." February 12, 2020. tpsgc-pwgsc.gc.ca/biens-property/intelligents-smart/index-eng.html

Secure your network with RC-RemoteAccess. Visit reliablecontrols.com/RCRA to learn how.

SIHAI CHINATOWN

XI'AN, SHAANXI, CHINA

RETAIL

OVERVIEW

The Sihai Chinatown complex is a large tourism and cultural center in Xi'an, China, that integrates open commercial streets, a centralized shopping mall, boutique hotels, office buildings, a metro station, and apartment buildings. The complex comprises nine buildings and three sunken squares in a four-section design that fuses concepts of global modern architecture with Chinese tradition.

PROJECT DETAILS

Authorized Dealer Xi'an SENG Electric Co. Ltd. installed a Reliable Controls system in the new Sihai Chinatown center.

Strategically distributed MACH-ProSys and MACH-ProCom controllers with MACH-ProPoint expansion modules are connected via BACnet/IP and host MS/TP networks for MACH-ProLight and MACH-ProZone devices that control the center's lighting and mechanical equipment.

Facility managers use RC-Archive and RC-Reporter to monitor energy consumption and improve operational efficiency. RC-Studio provides operators with a flexible, easy-to-use engineering tool that integrates Reliable Controls and third-party devices into one graphical user interface. This suite of Reliable Controls software is ideal for the complexities of a large project like Sihai Chinatown.

Reliable Controls and Xi'an SENG Electric Co. Ltd. are proud to have commissioned the building automation system in this large business complex.

To learn more about projects that use Reliable Controls, visit
reliablecontrols.com/projects/overview



PROJECT TYPE
New construction

TOTAL AREA
190,000 m² (2,045,142 ft²)

INSTALLATION TYPE
HVAC, lighting, power

EQUIPMENT INSTALLED
35 MACH-ProCom™ controllers
20 MACH-ProLight™ 48R controllers
15 MACH-ProPoint™ Input expansion modules
51 MACH-ProPoint Input/Output expansion modules
3 MACH-ProSys™ controllers
18 MACH-ProZone™ 44 controllers
58 MACH-ProZone 84 controllers
19 MACH-ProZone 88 controllers
RC-Archive® software
RC-Reporter® software
RC-Studio® software

NETWORK
EIA-485, Ethernet

PROTOCOL
BACnet, Modbus

BACNET
YORK chillers, McQuay air-cooled heat pumps

POINTS
2,300

RELIABLE CONTROLS AUTHORIZED DEALER
Xi'an SENG Electric Co. Ltd.

