

# ENGINEERING

## S Y S T E M S O L U T I O N S

*As the industry moves to embrace open, standard protocols, McQuay is the first to offer Protocol Selectability™ with our MicroTech II™ unit controllers. You select from industry standard protocols such as BACnet® or LonTalk® for easy integration of our equipment into your customer's building automation system of choice, without additional gateways.*

*Embracing open, standard protocols helps move the industry toward cost-effective building integration and ultimately helps reduce the cost to own, operate and maintain a building for years to come. However, the movement has not progressed as quickly as building owners would desire. This article helps explain why open, standard protocols are a necessity, even with the inherent difficulties in establishing them. It also explains that you as Engineers can help by insisting that BAS and equipment manufacturers use open, standard protocols and that all integrated components strictly comply with the standard objects and services prescribed by those protocols. It is the path to deliver long term, sustainable value to your customers.*

*For more information on MicroTech II controls and Protocol Selectability, contact your local McQuay Representative or visit [www.mcquay.com](http://www.mcquay.com).*

*Mark Bergman  
Director of Controls  
McQuay North America*

## Open, Standard Protocols – A Requirement For Cost- Effective Building Integration

In a world where the computer that you buy today is a dinosaur in three to five years, it's no wonder that the commercial building industry is up in arms about building automation. What is the right protocol? What building automation system (BAS) best meets the requirements of a particular building? Will it ever be possible to integrate all intelligent building equipment and services into a cost-effective package that doesn't become a financial burden or extinct within three to five years?

The answer is quite simply, "yes, one day... and we are making progress every day." In parallel with rapid changes in information technology, a BAS must be able to respond to changing requirements for energy efficiency and indoor air quality, as well as the operational and structural upheavals brought on by changes in occupied space use. Effectively integrating building functions into a single BAS in this environment is a difficult task, let alone maintaining that BAS over a sustained period.

A necessary step in the journey for buildings of today and tomorrow is standardization of the communication protocol that enables the BAS to orchestrate sophisticated subsystems and mechanical equipment. Unfortunately, there are currently dozens of different protocols for various intelligent building services and equipment – many of which are proprietary, and some that are open standards. And even though BACnet® and LonTalk® are the most recognized open, standard protocols, compliance with these protocols doesn't necessarily mean that integrating intelligent building services and equipment will be easy or cost-effective. An open, standard protocol takes time to develop and become accepted. Complexities are inherent as the protocol attempts to enable communications between everything from a smart sensor, to a complex unit controller, to a workstation and on to global communications over the Internet. Even the cable that most cost-effectively enables communications may be different. For example, a lighting system most cost effectively communicates over a twisted pair of wires. PC workstations communicate typically over an Ethernet LAN.

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**McQuay**  
Air Conditioning

## What does your customer want?

All in all, it's quite a quandary and probably the most difficult challenge facing the commercial building industry today. As with any business challenge, the question that needs to be asked is "What does your customer want?"

For the HVAC industry, the answer rings loud and clear. Building owners want good indoor air quality and quiet, reliable comfort so they can attract and keep tenants. They also want high energy efficiency to help keep operating costs down, and the lowest possible initial and life cycle costs. In one sentence or less – *they want a cost-effective building that just simply works.*

ASHRAE Standards and Guidelines help define what constitutes acceptable indoor air quality and high energy efficiency. The rest is the result of good design, good equipment and proper installation. Ongoing updates to ASHRAE Standards continuously raise the bar on what is required of HVAC equipment and manufacturers follow suit with solutions. The result is that HVAC equipment has become very sophisticated, requiring microprocessor-based controls and comprehensive logic to sense and properly respond to building or space conditions. For example, the following options have been introduced for McQuay applied rooftop products in the past two years:

- DesignFlow™ Precision Outdoor Air Measurement System measures outdoor air mass at the intake damper with an accuracy of  $\pm 2.5\%$  of actual. Accurate airflow measurement reduces energy consumption since only the required amount of ventilation air is treated.

- SuperMod™ 20:1 Turndown Gas Burner provides low temperature rise heat in VAV, 100% make-up air and dehumidification systems to minimize hot and cold spots and improve occupant comfort.
- A factory integrated energy recovery wheel recoups up to 80% of the heat and moisture from the exhaust air stream. Significant energy savings result from reduced mechanical cooling, heating and humidification.

Each of these system features is designed to accommodate ASHRAE Standard 62.1 ventilation requirements and/or ASHRAE Standard 90.1 energy efficiency guidelines. They are factory-installed and fully integrated with our MicroTech II™ unit controller, meaning they require no extra engineering, field labor or commissioning before they are up and running. Efforts to duplicate the capabilities provided by these systems would require significant engineering time and added field labor and commissioning – all of which translate into higher cost and risk for the building owner.

These unique systems bring innovative solutions to the engineer, contractor or building owner. In the end, the building owner benefits by being able to choose the options that best meet their requirements at competitive installed and life-cycle costs.

## Building automation is not easy

Ideally, the same rules that apply to HVAC and other building equipment would apply to the BAS. However, there are important differences. First, a BAS integrates several building sub-systems that can include HVAC, lighting, security, access control, energy monitoring and

## Open, Standard Protocols And McQuay

At McQuay, we strongly support open, standard protocols as a way to deliver long term value to our customers over the life of our equipment. We were the first HVAC supplier to offer open protocols with our MicroTech™ controls almost two decades ago. Our new MicroTech II™ controls with Protocol Selectability™ are both BACnet® compliant and LonMark® certified. Both protocols are supported through robust points lists, protocol integration information, software interface files (LonTalk® XIF), and local and corporate technical support. We make our integration information freely available to all interested parties via our website at [www.mcquay.com](http://www.mcquay.com). We are also openly engaging with BAS suppliers to simplify the integration of our products into their systems through proactive integration testing, followed by documentation of the integrated system architecture and specific network commissioning requirements.

The benefit of this approach is that engineers and building owners have the flexibility to choose the products, systems and services that best meet their building's requirements at lower commissioning and installed costs.

With our long support of the open exchange of a robust data set from McQuay equipment to BAS manufacturers, and with our MicroTech II unit controllers and Protocol Selectability, we support cost-effective integration between our HVAC equipment and the BAS of your building owner's choice. This helps minimize the cost to own, operate and maintain a building today and for years to come.

For more information on MicroTech II controls and Protocol Selectability, contact your local McQuay Representative or visit [www.mcquay.com](http://www.mcquay.com).

more. Many of these intelligent building services and equipment have their own controls to integrate equipment functions. If any of these equipment controls cannot speak the language of the BAS, then gateways or “translators” are required. The result is added programming and commissioning which results in higher cost for the building owner. For example, each gateway requires duplicate programming of the BAS and gateway databases.

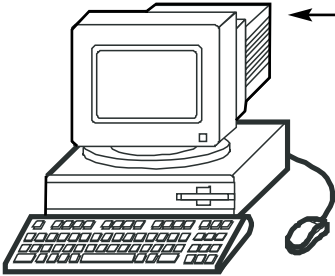
Second, the design life for various building systems can range from 2 to 50 years. For BAS communications and information technology it ranges from 3 to 5 years. Unless upgrades to a BAS are backward compatible with existing communicating systems and equipment in the building, this discrepancy will result in significant, costly re-commissioning through multiple BAS upgrades. Even worse, the building owner may have to replace equipment that cannot be supported through its useful life. Given that every building is somewhat unique, and that there are hundreds of manufacturers of building equipment, the complexity and costs could be staggering.

protocols. Embracing open, standard protocols in this manner helps move the industry toward cost-effective building integration while helping to make sure that equipment can be supported over its useful life in the building. It can also help even the playing field and promote healthy competition for BAS equipment and services.

Work is underway to simplify the move to open, standard protocols and reduce system commissioning costs. Today, the LonMark® Interoperability Association has established Functional Profiles which define the data that should be passed between devices of similar functionality – such as air conditioning units that provide “Space Comfort Control”. Units can be LonMark®

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**Building Automation System Of Your Choice!**

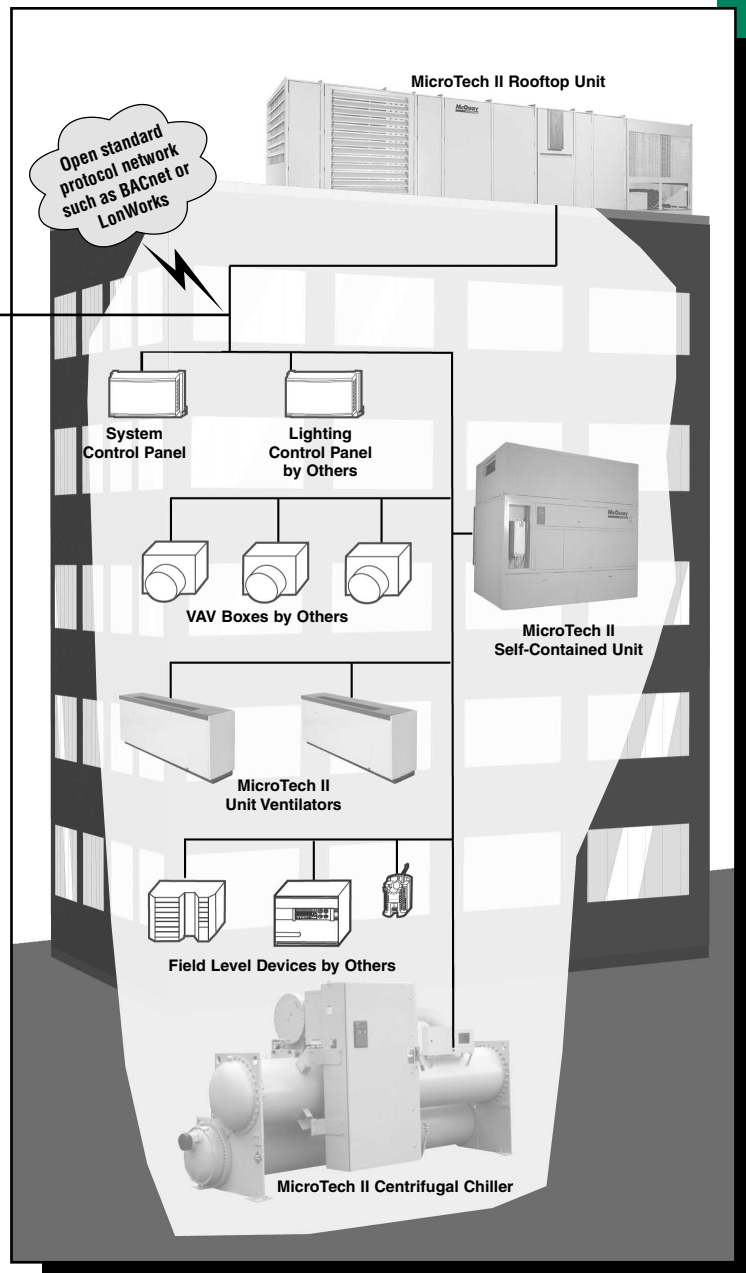


**Alerton, Automated Logic, Delta Controls, Honeywell, Invensys, Johnson Controls, Siemens...and more**

The reason many systems are not backward compatible is that manufacturers have chosen to use a closed, proprietary protocol as their basis of design. This has been the lowest first cost solution, but as technology has changed it has become cost prohibitive to go back and update these old proprietary protocols. Hence, the advantages of standardizing on an open, standard protocol become very clear.

**Open, Standard Protocols Are Necessary**

It is obvious that standardization is required and that the focus should be at the lowest common denominator – the communications protocol. Engineers, contractors and building owners should demand that BAS and equipment manufacturers communicate using open, standard protocols (such as BACnet® and LonTalk®) and comply with the standard objects and services supported by those



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certified per a given Functional Profile. This effort and others provide a path to protocol conformance and help lead to efficient system integration and cost-effective commissioning of building automation systems.

This begs the question “Which protocol do I choose?” Unfortunately, there is no single right answer to this question today. The correct answer varies by each customer and should take into account several factors, including: the current BAS system investment, the size of building or campus, the existing network media, the amount of integration to other sub-systems that is desired, whether it is a new construction or retrofit project, and the customer’s satisfaction with (or the quality of) the local systems integrator/control contractor.

Perhaps a second question should be considered. Is the industry best served by a single standard protocol? To date,

both BACnet® and LonTalk® have been embraced by various players in the building industry. Given the fact that they have been in the making for nearly two decades, they will more than likely be around for some time.

### **Conclusion**

While the movement has not progressed as quickly as building owners would desire, the commercial building industry has made significant progress toward cost-effective integration of intelligent systems, services and equipment. As an Engineer, you can help by insisting that the BAS and equipment manufacturers use open, standard protocols and that all integrated components strictly comply with the standard objects and services prescribed by those protocols. It is the path to deliver long term, sustainable value to your customers.

For comments or suggestions, please call or write:

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