

Synergy[®] Lighting Control System



SYNERGY™



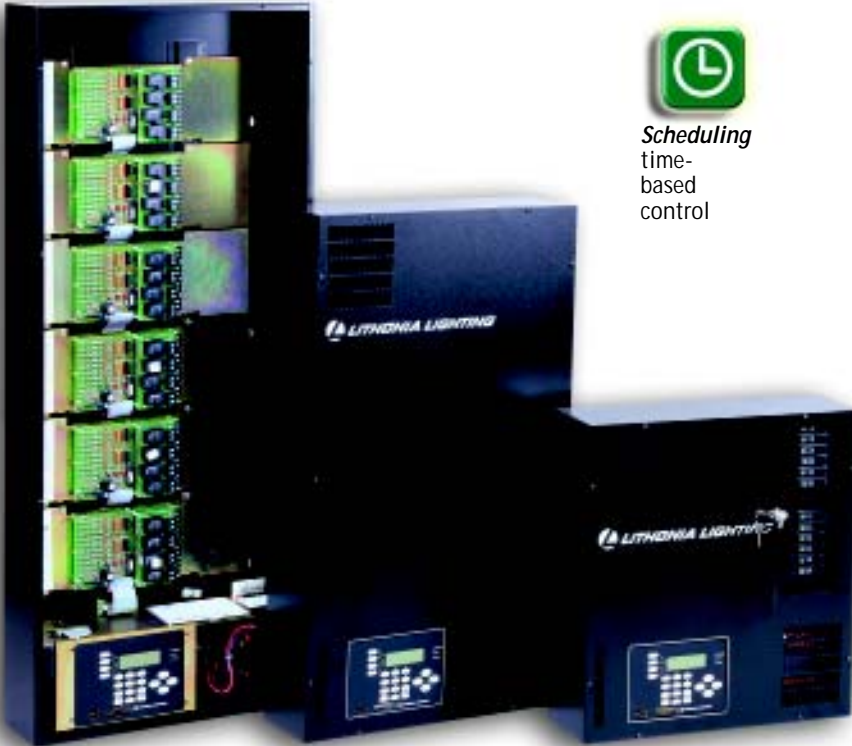
Dimming
variable
light level
control



Switching
on/off
lighting
control



Network
system-
wide
integration



Scheduling
time-
based
control



*Occupancy
Sensing*
occupancy-
based
control



*Photo
Sensing*
daylighting,
dusk/dawn
control



*Telephone
Override*
personal
schedule
bypass

One system. Infinite possibilities.

Building construction today continues to grow in complexity, creating a diverse set of challenges. Designing compatible lighting systems in this environment requires attention to a range of competing demands. Building owners want the lowest installed cost, reduced cost of operation and the greatest possible return on investment. Building occupants insist on visual comfort, ease of use and greater individual control. Reconciling these demands with other aspects of the building infrastructure requires artful integration of available technologies.

The Synergy lighting control system from Lithonia Lighting offers flexible and scalable solutions that satisfy the requirements of both owners and occupants. The Synergy system integrates all aspects of lighting control including low-voltage switching, architectural dimming, occupancy sensing and daylight harvesting into a single platform. And with BACnet® protocol native to its design, Synergy controls seamlessly integrate with building automation systems (BAS).

From basic low-voltage switching to complex networked dimming systems, Synergy lighting controls provide economical solutions that meet the diverse demands of owners and occupants over a broad range of applications from schools, churches and office buildings to arenas and convention centers.

As a member of the Lithonia Lighting family of products, the Synergy system is backed by the largest manufacturer of lighting products for commercial and industrial applications with more than fifty years of providing excellence in lighting.

Our cover illustrates an integrated approach to lighting control. The Synergy system yields substantial benefits over uncoordinated lighting control strategies.



Audio Visual interface with lighting



Theatrical DMX512 interface with lighting

Open Office Area



Prioritized Logic

A powerful feature of the Synergy system is its ability to specify the priority level at which functions will operate. High priority is useful for actions relating to security or load shedding. Low priority allows actions to be conditionally disabled.

For example, a switch set to low priority cannot turn off lighting that is currently on due to a schedule operating at a higher priority level.

To simplify setup, Synergy controls automatically assign priority levels to all functions that are suitable for normal operation. These can be modified through the system controller keypad or via the PC configuration software.

Prioritized logic ensures desired functionality is achieved with minimal programming.

For detailed application information, visit the Application Design Center at www.lithonia.com/controls.



Scheduled Zone Control

General illumination for open office areas is controlled by the Synergy system on a zone basis. Lighting automatically comes on in the morning to greet arriving employees. After a warning blink at the end of the workday, lighting is automatically switched off. The potentially harmful effects of inrush generated by switching large fluorescent loads is nullified by the Synergy control system's zero-cross switching technology.



Manual Zone Control

Manually switching on lighting in the morning maximizes energy savings and eliminates the need to program holidays into the schedule. To prevent tampering, the switch is disabled during normal work hours. Later in the evening, the cleaning crew uses the same switch to turn on lighting for a programmed period of time.



Touch-Tone Phone Override

Employees working after hours conveniently respond to the warning blink of the lighting by pressing a few keys on their phone and extending the lighted period.



Occupancy-Based Override

Occupancy sensors provide automatic override of lighting during after-hours periods, eliminating the need for manual override by employees or the cleaning crew. Sensor operation is automatically limited to after-hours operation by Synergy controls. Adjacent sensor zones are logically linked for simultaneous operation to eliminate the discomfort of a lone employee working in a small pool of light.



Distributed Personal Control

Office occupants enjoy personal on/off and dimming control of their fluorescent lighting from convenient Digital Equinox™ wall stations. All stations for an entire floor share a single network wire. Since the signals for the dimming ballasts and the local relay packs are provided directly by the station, no additional home run wiring is required.



Occupancy Reporting

Energy savings in small areas like offices is maximized through the use of occupancy sensors. Lighting is automatically turned off when the occupant leaves the office for an extended length of time. Since the Synergy control system has “visibility” of the occupancy status, it can be passed on to the HVAC controls via the BACnet protocol.



Daylight Harvesting

The natural light made available through glazing can be harvested by a local photocell that dims the fluorescent lights in proportion to the ambient light present. The daylighting logistics are handled automatically by logic built into the Digital Equinox wall switch station.

The occupant manually adjusts the lighting in the office to the desired level using raise/lower push buttons on the wall switch station. The system automatically maintains the light level by varying the control signal to the light fixtures in response to signals from the photocell. The user interface is familiar because it is similar to that of a thermostat.

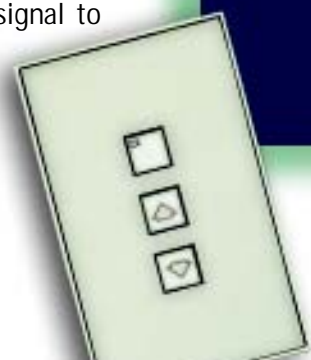
Distributed Control

The control of fluorescent lighting is a key element in a responsible energy program. Synergy controls with Digital Equinox provide an effective means to integrate the control of many individual zones of fluorescent lighting into the overall building control strategy.

The Digital Equinox wall station provides local control and acts as a hub for connection of the additional control devices. Since the signals for the dimming ballasts, photocells, occupancy sensors and the local relay packs are provided directly by the station, no additional home run wiring is required.

All stations for an entire floor share a single twisted pair LAN-connection with Synergy lighting controls. This provides central monitoring and override capability, and allows for exchange of data with the building automation system.

For detailed application information about Digital Equinox, visit the Application Design Center at www.lithonia.com/controls.



Lobby and Foyer



Customized Functionality

Often field conditions will dictate a requirement for functionality that is not designed into the base system. The Synergy lighting control system allows for customized functions with a unique **Script Logic** feature.

This application language allows customization of system controller operation to suit special requirements. Using familiar scripting terms like IF, AND, OR and ELSE, logical statements can be created to modify system output based on a combination of tested conditions.

A script logic file is created using the Synergy PC configuration software or a word processor. Once transferred to the system controller's permanent memory, the custom logic becomes integral to the operation of the controller.

Script logic is an innovative feature that can enhance the functionality of a Synergy system in any application, often without the need for additional hardware.

For detailed application information about the unique script logic feature of Synergy controls, visit the Application Design Center at www.lithonia.com/controls.



Automatic Contrast Control

Lobby lighting is often a compromise between aesthetics and saving energy. In this case, the photocell is set to increase the level of feature lighting in the lobby during the day to maintain a pleasant balance with the level of sunlight. This photocell operation is automatically disabled during weekends.



Manual Remote Control

Time schedules or occupancy sensors may not be appropriate for controlling randomly used spaces such as the loading dock. A set of switches with LED status lights are conveniently located near the reception desk to control and monitor the lighting in these areas. For security reasons, the lighting on the loading dock cannot be switched off unless the loading doors are locked.



Programmed Visual Interest

A time schedule automatically sets the lobby lighting to appropriate levels to enhance the exterior visual appeal of the building during early evening hours. Later in the evening, the schedule turns off all lighting in the lobby except for security lighting.



Preset Scene Convenience

Dimming control stations with preset scenes provide the appropriate light levels for all activities held in the auditorium. Projected presentations require low light levels, while meetings call for bright lighting. Smooth transitions between preset scenes are made simply by touching a button on the control station.



Theatrical Flair

Corporate presentations often call for theatrical lighting effects for impact or to add a festive mood to the occasion. A small theatrical control desk provides more than enough flexibility for these occasions. The lighting system responds to the DMX control signal from the console when required, then automatically reverts to the preset controls when the console is switched off.



Integration with A/V

A touch screen control unit and infrared remote transmitter allow the presenter complete access to all audio/visual functions as well as integrated lighting control. The A/V system and the lighting system are interfaced through a standard RS232 serial data connection.

Architectural Dimming

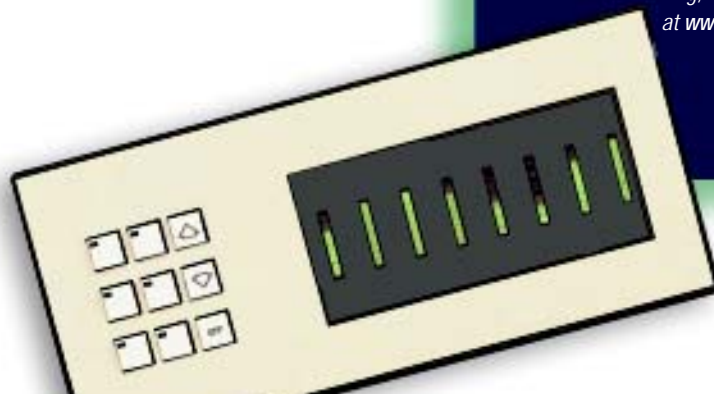
Using high-quality digital dimming modules and a variety of architecturally styled control stations, the Synergy system can be configured for a wide range of applications including meeting rooms, conference centers, auditoriums, churches, restaurants and multi-function rooms with movable wall partitions.

Synergy dimmers are compatible with most lamps and ballasts and offer smooth, quiet dimming performance including 1% dimming of linear fluorescent and 5% dimming of compact fluorescent sources.

Control choices include schedule-based dimming, photocell dimming, compatibility with theatrical control devices, digital integration with audio/visual systems, in addition to simple manual dimming and multi-preset scene dimming with adjustable fade times.

Minimal hardware and control wiring is required even in applications with large quantities of dimming channels and multiple presets. A compact handheld transmitter is all that is required to set up preset scenes on single gang wall stations. An excellent choice for high-end finish areas that require sophisticated control without obtrusive control devices.

For detailed application information about Synergy dimming, visit the Application Design Center at www.lithonia.com/controls.



Exterior and Site



Exterior Lighting

Today, issues like sky glow, light trespass, glare, over lighting and wasted energy are increasingly the subject of codes and legislation. While much depends on luminaire selection, lamps and design practices, the use of effective lighting controls can have a significant impact on a number of these issues.

The International Dark Sky Association estimates that more than \$1 billion is wasted each year on unnecessary energy use for outdoor lighting. While much of this is attributed to lamp and fixture issues, turning off lighting when it is not required saves a substantial amount of energy and reduces sky glow.

The use of simple dusk-to-dawn controls eliminates the waste of burning lighting during daylight hours, but falls short of maximizing the savings that are available. The Synergy system can turn on exterior lighting at dusk, then stage lighting off over time to suit security requirements as employees leave the property.

For detailed application information, visit the Application Design Center at www.lithonia.com/controls.



Dusk to Time Operation

The exterior and site lighting is automatically turned on in the evening by the schedule. An astronomic feature in the logic allows the system to calculate sunrise and sunset times for the local. All exterior lighting is utilized during early evening hours. Later, most of the exterior lighting is turned off by the schedule to conserve energy and reduce sky glow.



Adjusts to Environmental Conditions

Stormy or overcast conditions may call for exterior lighting and signage to turn on earlier than scheduled. A building-mounted photocell monitors these conditions and passes light-level information to the Synergy control system. On weekends and holidays, photocell overrides are ignored.

Because the site lighting is spread out over a large area, multi-pole lighting circuits are required to efficiently distribute power to the lighting poles. The Synergy relay panel provides integral control of multi-pole circuits without external contactors.



Building-Wide Integration

An occupancy sensor turns on lighting in an area in response to someone entering. The change in lighting status causes the HVAC system to open a damper and adjust other parameters necessary to provide conditioned air to the space. A lighting icon on the BMS workstation screen changes color to show the change in status.

The operation manager controls and monitors the HVAC, fire protection, access and lighting controls throughout the building on a single workstation from his desk. The Synergy system performs sophisticated lighting control functions on its own, while seamlessly sharing data and inter-operating with the other building systems.

All this is made possible because the controls in the building, including lighting, are interconnected using the ANSI standard BACnet communication protocol.

Open Protocol Systems

To address the issue of interoperability between control devices in buildings, an "open" communication protocol has been developed as an industry standard allowing control devices from different manufacturers to be used together in the same system. BACnet, the ANSI standard, is currently supported by most building automation equipment manufacturers.

Synergy is the first lighting control system to be designed from the ground up around the BACnet protocol. As a result, Synergy lighting controls can seamlessly interoperate with most popular building automation systems. Relays, dimmers, switches, photocells and occupancy sensors are all network-visible as "points" and can be mapped into the BAS workstation logic.

Because BACnet is native to the operation of Synergy controls, the system can function optimally as a lighting control system, yet still share status and control with the BAS. This seamless integration is unencumbered by the restraints imposed by "gateway" devices often used to interface lighting to building automation systems.

For detailed application information about BACnet and integrating Synergy controls with building automation systems, visit the Application Design Center at www.lithonia.com/controls.



System Architecture

Fixture with Dimming Ballast



Remote Relay



Photocell



Occupancy Sensor



Digital Equinox Station
Use with dimming ballast, photo sensor, relay pack and occupancy sensor for distributed fluorescent control functions.

Digital Remote Station
Use for a variety of dimming and switching functions. Optional infrared receiver permits operation and programming of preset scenes from a handheld transmitter.



Preset Control Station
Permits saving and recalling preset lighting scenes. Stations have six presets and up to 16 control channels.



Local Area Network
Each controller supports a local area network bus for connection of I/O devices.

System Enclosure
Three capacities, up to 48 relays or 30 dimmers each.



System Controller
Plug-in unit provides for user interface, program storage, clock and connection to Synergy LAN components.



Synergy Gateway
Provides connectivity between a Synergy BACnet network and Lithonia legacy or third-party systems.



RS232 Interface
Provides serial communication between Synergy controls and laptop computer or outside systems such as audio/visual.



Telephone Interface
Optional voice modem provides remote PC access and override of lighting via any touch-tone telephone.



DMX Theatrical Control
Optional DMX interface allows Synergy relays and dimmers to be controlled by theatrical systems.





Relay Module
Eight single-pole relays with zero-cross switching and eight switch and two analog input terminals.



Multi-Pole Relays
Up to four 30 amp contactors with either two or four poles each.



Relays with Breakers
As above with either six 120-volt or four 277-volt or four 347-volt branch circuit breakers.



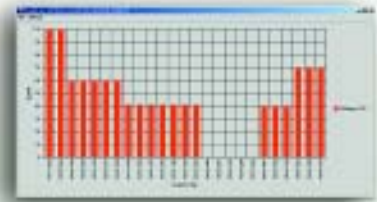
Ballast Control Module
Eight channels of on/off and dimming control for fluorescent lighting equipped with compatible solid-state controllable ballasts. Also available with 120, 277 or 347-volt circuit breakers.



Dimmer Module
Universal load digital dimmers suitable for incandescent, low voltage, neon, cold cathode and fluorescent loads.



Main Lug Option
Allows several Synergy enclosures to share a single main feed up to 300 amps three phase.



Kwh Usage and Trending
Monitor kwh, trend and graph usage of lighting loads with this optional add-in to the Synergy CONFIG application.



Interactive Graphics
Monitor and control lighting via virtual control panel screens created with simple on-board tools, or import graphic image backgrounds to suit project requirements.

BACnet WAN

This communication backbone allows any number of Synergy relay and dimmer panels to interact as an integrated system. Standard inter-

connection is EIA485 twisted pair wire bus and can be extended between buildings with fiber optics, campus-wide over Ethernet or world-wide via the Internet.



Synergy CONFIG Software
Configure, control and monitor Synergy lighting control panels on site or remotely via phone lines or WAN with this easy-to-use Windows® application.

BAS Integration

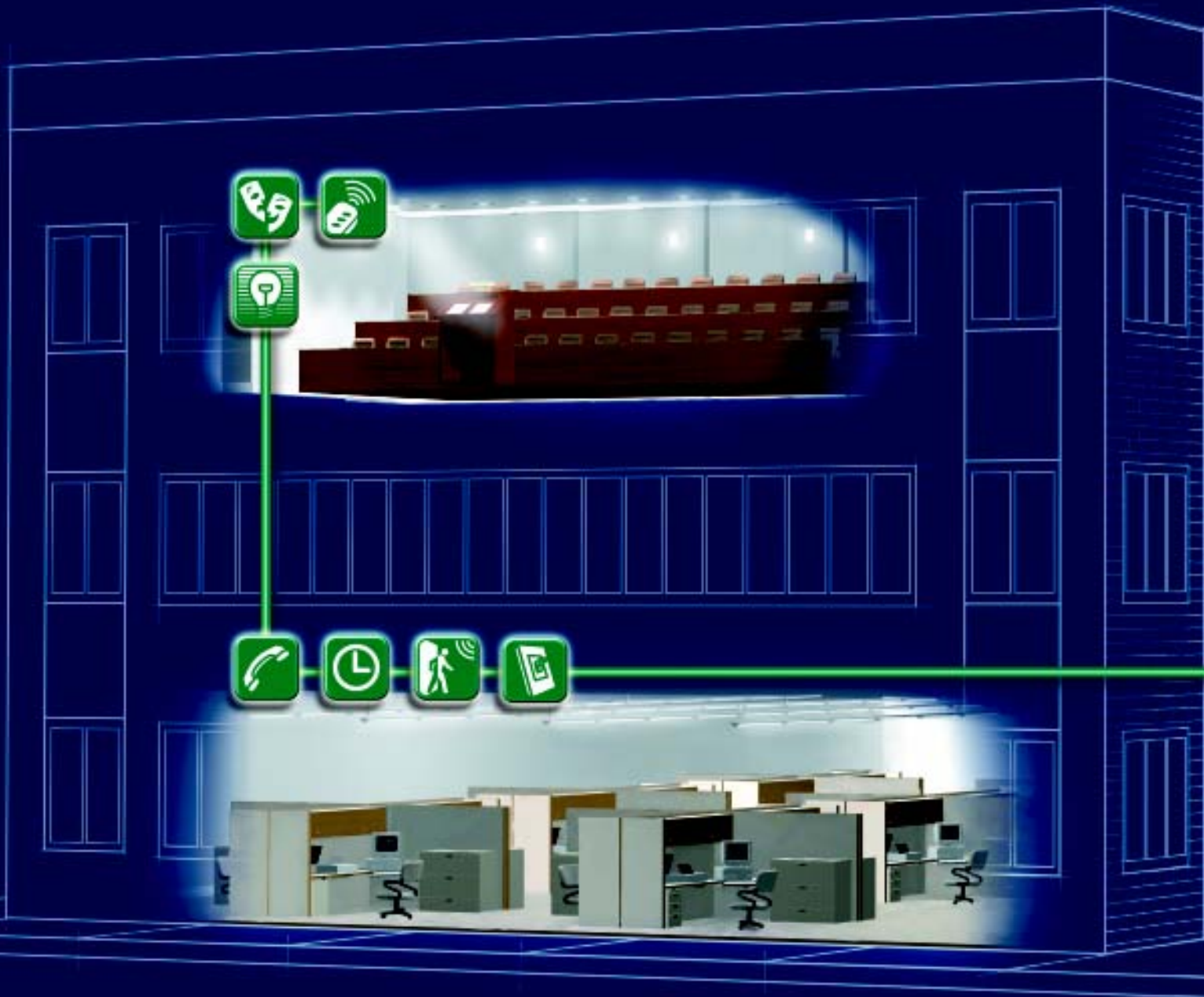
All Synergy inputs and outputs are available for interoperation with any BACnet-compatible building automation system without additional programming.

Legacy Lithonia Products

Digital Ballast Interface

DMX512 Output Signal

Other Manufacturers' Product



BACnet® is a registered trademark of ASHRAE.



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