

SECTION 25 15 16 INTEGRATED AUTOMATION SOFTWARE FOR CONTROL OF MONITORING NETWORKS

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PART 1 GENERAL

1.1 SUMMARY

- A. Section includes central server network lighting and energy management software integrating with the following:

Specifier: Edit list below to reference work associated with network connected to lighting management software. Crestron FUSION-EM Server Edition is able to integrate with Crestron's Cresnet building-wide automation network, BAS, building security systems, and a variety of equipment and devices.

1. Window treatments
2. Network power switching controls
3. Network lighting controls
4. Network HVAC automation systems
5. Network electronic safety and security systems

- B. Related Information:

Specifier: Related Information paragraph is optional. If retaining, edit and coordinate list of sections below to correspond to Project requirements.

1. Division 12 Section "Window Treatments" for window treatments controlled by network microprocessor controllers.
2. Division 25 Section "Integrated Automation Network Servers" for server hardware.
3. Division 25 Section "Integrated Automation Instrumentation and Terminal Devices" for integrated sensors and input devices.
4. Division 26 Section "Electrical Power Monitoring" for integrated power meter devices.
5. Division 26 Section "Network Lighting Controls" for network-connected light dimming control panels.
6. Division 26 Section "Network Power Switching Controls" for network-connected light control panels.
7. Division 26 Section "Common Work Results For Electrical".
8. Division 26 Section "Lighting Control Devices" for occupancy sensors, photoelectric sensors.

9. Division 27 Section "Communications Horizontal Cabling" for communications cabling requirements for network devices.

1.2 REFERENCES

Specifier: References Article is optional. If retaining, edit and coordinate list of sections below to correspond to Project requirements.

- A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)
 1. C62.41-1991 – Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

1.3 DEFINITIONS

- A. Control: Effecting a change in state by one PC program onto a microprocessor or device.
- B. Daylight Harvesting: The dimming of electric lighting sources when natural daylight is available.
- C. Dynamic Host Configuration Protocol (DHCP): is a computer networking protocol used by hosts (DHCP clients) to retrieve IP address assignments and other configuration information.
- D. Load Shedding: Intentional reduction of power consumption to avoid total power disruption due to overloading the circuits or reduction of power consumption to avoid crossing an agreed on threshold of power usage. Load shedding lighting ballasts reduce the light level in response to a signal on the power line.
- E. Monitor: Acquisition and presentation of status or operating condition of microprocessors or electrical devices in the network of the monitoring device or program.
- F. Scene: Predetermined position of shades and light levels.
- G. Scene Selection: Grouping of lighting and window shade controls into groups that will respond to a single scene command.
- H. Secure Sockets Layer (SSL): A communications encryption protocol for managing the security of message transmissions over the internet or a local area network.
- I. Shading Groups: Grouping rooms for common control of window shades.
- J. Transmission Control Protocol/Internet Protocol (TCP/IP): Networking protocols for exchanging data over the World Wide Web and Local Area Networks.

1.4 ACTION SUBMITTALS

Specifier: Action submittals require responsive action by A/E or Owner.

- A. Software Product Data: Provide full description of network lighting management software including available screens, commands, room schedules, room-by-room access tree, monitoring capabilities, and controls.

1. Describe total capacity of software to manage multiple rooms, building zones, campus- and enterprise-wide lighting, and to coexist with multiple PCs, touchpanels, and keypads with simultaneous access.
 2. Describe security features that limit access to the system and limit authorized users to assigned duties.
 3. Describe services available on software. Describe supervisors' capabilities to create new user accounts, back up program, and establish separate program and user accounts to be used under differing circumstances.
 4. Provide documentation that software complies with the full intent of this Section.
- B. Shop Drawings: Indicated the following:
1. Flow chart of software instructions and sequence of operations.
 2. Schematic diagram showing complete networked system of hardware connections.

1.5 INFORMATIONAL SUBMITTALS

Specifier: Informational submittals require review, but not response, by A/E or Owner.

- A. Buy American Act certificate.
- B. Sample of manufacturer's warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operating and maintenance instructions.
- B. Record drawings of network system. Show physical routing of cables and location of touch panels, keypads, window shade controllers, lighting control panels.
- C. Provide copy of warranty and software licenses for the specified term.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualification: Manufacturer of network lighting management software with minimum [five] year record of satisfactory installation and support of software comparable to basis of design system.

Specifier: Retain paragraph below if Owner allows substitutions but requires strict control over qualifying of substitutions.

- B. Manufacturer Qualifications: Approved manufacturer of lighting management software listed in this Section with minimum [five] year record of software engineering with satisfactory performance in similar installations to that specified.
 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Written description of the functions and controls provided by software.
 - b. Sample submittal from similar project.
 - c. Project references: Minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.
 - d. Sample warranty.

- e. Sample software licensing agreement.
 - 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 - 3. Approved manufacturers must comply with separate requirements of Submittals Article.
- C. Source Requirements: Provide network lighting management software and license from single manufacturer.

Specifier: Retain paragraphs below when Project requirements include compliance with Federal Buy American provisions. Crestron components comply with requirement.

- D. Buy American Act Certification: Submit documentation certifying that products comply with provisions of the Buy American Act 41 U.S.C 10a – 10d.

1.8 COORDINATION

1.9 WARRANTY

Specifier: Retain this article if project includes Crestron field commissioning in Part 3 Field Quality Control. Delete this article if warranty is limited to Contractor's one-year correction period with no participation from Crestron in field commissioning of system. Coordinate requirements with requirements of Manufacturer's Extended Support and Maintenance Program if included in project.

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of wireless dimming and environmental controls system that fail in materials or workmanship within the specified warranty period following substantial completion.

- 1. Warranty Period: Other components, 8 years.

Specifier: Below describes basic support service available to Owner. Several additional levels of support and maintenance are available from Crestron, including on-site parts and labor, onsite rapid response and annual maintenance options, and remote diagnostics and programming; consult Crestron representative.

- B. Manufacturer's Basic Support Service: Telephone support: Unlimited period.

Specifier: Crestron offers three levels of extended support and maintenance; consult Crestron representative for recommendations based upon critical nature of facility operations and control system.

- C. Manufacturer's Extended Support and Maintenance Program: Provide proposal to Owner for manufacturer's annually-renewable extended support and maintenance program to consist of the following:

- 1. Parts and labor required for system maintenance.
- 2. Technical hotline support.
- 3. Remote diagnostics and programming support.

Specifier: Services below available with Crestron Levels 2 and 3 support programs. 24 hour response available with Crestron Level 3 support program.

- 4. Annual on-site maintenance visit to provide preventive maintenance, staff training, and limited re-programming.

Specifier: 24 hour response option available with Crestron Level 3 support program.

- 5. Response time for on-site system maintenance: [24 hour] [72 hour].

1.10 SOFTWARE SUPPORT AGREEMENT

- A. Software Agreement: Manufacturer to provide software and firmware updates and onsite software and firmware support for a period of 5 years from the date of substantial completion at no charge to the Owner.
- B. Provide proposed extended service agreement including fees for support beyond the five years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of **Crestron Electronics, Inc., Rockleigh, NJ 07647**, Phone (800)237-2041, Fax: (201)767-1903, www.crestron.com [or comparable products from a single manufacturer approved by Architect prior to bidding], with the following components and characteristics.

2.2 NETWORK LIGHTING AND ENERGY MANAGEMENT SOFTWARE

- A. Basis of Design Product: **Crestron, FUSION-EM** lighting and energy management software.
- B. General: Web-accessible, network-connected, Windows-based energy and lighting management software running on Microsoft Server 2008 R2 communicating over TCP/IP networks to provide lighting and window shade control, daylight harvesting, load shedding, occupancy sensing, and occupied/unoccupied lighting schedules, with the following features:
 - 1. Real-time and historical energy consumption tracking.
 - 2. Dynamic automation – lighting and controlled building automation based on calendar data, occupancy, and energy usage.
 - 3. Network connectivity with lighting control panels, automation controllers, window shade controllers, light sensors, occupancy sensors, and local touch screens and keypads.
 - 4. Dynamic Host Configuration Protocol (DHCP) device recognition and IP addresses assignment.
 - 5. Secure Sockets Layer (SSL) network security.
 - 6. Administration:
 - a. User Accounts: Administrator privileges allow the creation of new user accounts and editing of existing accounts.
 - b. Backup and Importing Backup: Program allows the administrator to import and backup program settings.
- C. System Requirements:
 - 1. Operating System Requirements. PC running Windows 2008 Server R2.
 - a. Memory: 8 GB of RAM.
 - b. Monitor Color: 256 color setting.

- c. Screen Resolution: 1024 by 768 Minimum.
 - 2. Hardware Requirements:
 - a. Dell PowerEdge R310 (or equivalent) Processor: X3470 Xeon Processor 2.93 GHz, 8M Cache RAM: 8GB Storage: Onboard SATA, 1-4 Hard Drives connected to onboard SATA Controller; Usable Drive Space: 200GB Network Interface: On-Board Dual Gigabit Network Adapter
 - 3. Database Server: Microsoft SQL Server 2005 or 2008 version R2.
 - 4. Scheduling Server: Exchange 2007; Exchange 2010; Lotus Notes/Domino Server versions 7.03, 8.0 and 8.5; FUSION-EM internal scheduler.
 - 5. Browser Requirements: IE 8 and newer or Firefox.
- D. Building Configuration:
- 1. Program automatically recognizes connected devices in the TCP/IP network using DHCP network protocol.
 - 2. Develop schedule of building spaces and display as a file tree.
 - 3. Assign rooms to zones.
 - 4. Program load shedding schedules and daylight harvesting algorithms.
 - 5. Capture and control lighting control panels, automation computers, occupancy and light sensors, local touch panels, and keyboards.
 - 6. Assign building assets (lighting control modules, electrical automation computers, and local touch panels) to individual rooms.
 - 7. Group spaces into common occupied-unoccupied schedules for turning lights on and off at the beginning and end of the day.
 - 8. Schedule lighting equipment for emergency lighting and night lighting.
 - 9. Group spaces that share common solar exposure and assign to window shade groups.
 - 10. Define demand response rules for integrated devices.
- E. Energy Metering facilitated by hardware power meter unit by same manufacturer:
- 1. Power calculated by real voltage and current readings.
 - 2. Simulated power calculations are not acceptable.
 - 3. View historical energy consumption by time period.
- F. Shade control facilitated by shade motor and hardware interface by same manufacturer:
- 1. Shade status provided by real-time feedback.
 - 2. Shades control network protocol shall be native to Automation Software hardware controllers.
 - 3. Shades operating without true feedback are not acceptable.
- G. Programming and Monitoring Screen:
- 1. Occupancy monitoring and control.
 - a. Turn lighting on-off based on 7-day occupancy schedule.

- b. Report irregular occupancy condition and override lighting status accordingly.
 - c. Schedule night lighting and emergency lighting.
 - 2. Lights and Shades Control
 - a. Report daylight readings and dim lights and scroll window shades accordingly.
 - b. Report glare condition and scroll window shades accordingly.
 - c. Dim lights and lower shades in response to commands from local touch screen.
 - d. Assign rooms to lighting and window shade scene presets.
 - 3. Program time clock module
 - a. Display calendar and timeclock.
 - 4. Load shedding
 - a. Program load shedding targets and assign targets to individual rooms.
 - b. Permit local override.
 - 5. Demand Response
 - a. Initiate preset demand response state.
 - 6. Global Control
 - a. Real time system wide master control.
- H. Dynamic Automation
 - 1. User preset conditions trigger automatic events.
 - a. Conditions defined using:
 - 1) Sensor status
 - 2) Schedule data
 - 3) Demand response state
 - 4) Energy usage data
- I. System Reporting.
 - 1. Power usage by selected spaces.
 - 2. Comparative energy usage graphic.
 - 3. Fluorescent lamp usage statics.
 - 4. Report lamp failure.
 - 5. Report status of system devices.
- J. Integrated Lighting and Shade Control:
 - 1. Daylight harvesting algorithm.

- a. Program different lighting scenes that automatically change lighting and window shade positions according to Owner's requirements and industry standards.
 - 2. Solar glare reduction algorithm.
 - a. Adjust window shade positions according to Owner's requirements and industry standards.
 - 3. Groups and Zones
 - a. Develop window shade group presets for different space usage.
 - b. Develop load shedding zones for different space usage.
 - c. Assign spaces to load shedding zones.
- K. System Administration
 - a. Multiple levels of authorization:
 - 1) Full access
 - 2) Standard access
 - 3) Reporting access
 - b. User Groups
 - 1) Group by user role and authorization level.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Prior to installation, examine host computer to confirm that it meets requirements for installation of manufacturer's software.

3.2 PREINSTALLATION MEETING

Specifier: Adjust the following paragraph to reflect the size and complexity of the

- A. Manufacturer and installer of Network Lighting Management Software to coordinate a meeting of the mechanical and electrical engineer, mechanical and electrical contractor, lighting, window shade and HVAC equipment manufacturers. Include any designers and contractors for any other direct digital control system designed to interact with product of this Section.
 - 1. Discuss interconnection and interoperability of other equipment with lighting management software.

3.3 SOFTWARE INSTALLATION

- A. Install and program software in accordance with this Section to meet the Owner's requirements. Provide current licenses and backup copies of the software for the Owner's use.

3.4 ADJUSTING

- A. Within 2 months of the date of Substantial Completion provide onsite service to adjust the system to account for actual occupied conditions.

3.5 DEMONSTRATION

- A. Factory authorized service representative to instruct owner's staff to adjust, operate and maintain lighting management software.

3.6 FIELD QUALITY CONTROL

Specifier: Retain Manufacturer's Field Services paragraph below when required by Owner; minimum 1-visit field commissioning described in this paragraph is required for Crestron Extended 8-year warranty listed under Part 1 Warranty article.

- A. Manufacturer's Field Services: Qualified manufacturer's field representative to perform on-site system inspection, startup, and owner demonstration and training.

Specifier: The following subparagraphs describe Crestron's available 3-visit and 5-visit field commissioning service packages. Subparagraphs 2 and 3 below are included in the 5-visit package available to owners. Consult Owner and Crestron representative for Owner's requirements and costs for services.

1. Participation in Preinstallation Conference and pre-wire inspection.
2. [Installation inspection.]
3. [Owner programming conference.]
4. Installation of system software and database and system startup.
5. Owner demonstration and training.

3.7 CLOSEOUT ACTIVITIES

Specifier: Delete demonstration and training requirements under Manufacturer's Field Services above and retain below if Contractor and subcontractor installer provide services.

- A. Demonstration: Schedule demonstration with Owner.
- B. Training: Train Owner's personnel to operate, maintain, and program network lighting management software.
 1. Furnish set of approved submittals and record drawings of actual installation for Owner's personnel in attendance at training session.

END OF SECTION 25 15 16