SECTION 25 50 00

INTEGRATED AUTOMATION FACILITY CONTROLS

Equipment Specified in this section:

CONTROL PROCESSOR TYPE 1: Crestron PRO3

CONTROL PROCESSOR TYPE 2: Crestron AV3

CONTROL PROCESSOR TYPE 3: Crestron CP3N

CONTROL PROCESSOR TYPE 4: Crestron CP3

CONTROL PROCESSOR TYPE 5: Crestron MC3

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SECTION 25 50 00

INTEGRATED AUTOMATION FACILITY CONTROLS

Specifier: The Specifier/Design Professional is responsible for the accuracy of all project specifications, including system application and coordination with related sections. This guide specification is provided as a convenience and requires editing to match actual project requirements. CRESTRON ELECTRONICS, INC. SHALL NOT BE LIABLE FOR ANY DAMAGES ARISING OUT OF THE USE OF ANY OF ITS GUIDE SPECIFICATIONS. For Crestron design assistance and design review please contact Sales Support Services Department at 800.237.2041 or techsales@crestron.com.

1. GENERAL
   1. SECTION INCLUDES
      1. Control Processor
         1. Central control processor for automation and control systems. Control processor is capable of integrated system control including native intersystem communication with equipment and processors by same manufacturer as well as scheduling and management servers. Control processor shall be the central connecting point for equipment and devices under control in a specified system. As the central element of communication for system devices under control, and all devices and sensors providing status, and feedback, the control processor integrates multiple disparate devices and systems without requiring multiple third party protocol adaptors, translators, or gateways. The control processor is also capable of sharing status, state, and feedback information from other connected devices.

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

* + 1. Related Requirements
       1. Section 12 24 13 — Roller Window Shades
       2. Section 23 09 23 — Direct Digital Control System for HVAC
       3. Section 25 08 00 — Commissioning of Integrated Automation
       4. Section 25 10 00 — Integrated Automation Network Equipment
       5. Section 25 11 13 — Integrated Automation Network Servers
       6. Section 25 13 13 — Integrated Automation Control and Monitoring Network Supervisory Control
       7. Section 25 13 16 — Integrated Automation Control and Monitoring Network Integration Panels
       8. Section 25 13 19 — Integrated Automation Control and Monitoring Network Interoperability
       9. Section 25 15 16 — Integrated Automation Software for Control and Monitoring Networks
       10. Section 26 09 43.13 — Digital-Network Lighting Controls
       11. Section 26 05 00 — Common Work Results for Electrical
       12. Section 26 09 23 — Lighting Control Devices
       13. Section 26 09 36 — Modular Dimming Controls
       14. Section 26 09 43 — Network Lighting Controls
       15. Section 27 15 00 — Communications Horizontal Cabling
       16. Section 27 41 00 — Audio-Video Systems

1. PRODUCTS
   1. CONTROL PROCESSOR TYPE 1
      1. Manufacturers
         1. 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](http://www.crestron.com) **[**or comparable products from a single manufacturer approved by Architect prior to bidding**]**, with the following components and characteristics.
      2. Basis of Design Product:
         1. **Crestron PRO3**
      3. Minimum Characteristics:
         1. Operating System:
            1. Modular architecture supports multiple simultaneous running programs.

Number of simultaneously running user programs: 10

* + - * 1. Real-time, preemptive multithreaded/multitasking kernel.
        2. Vector floating point coprocessor.
        3. Utilize a real time, event driven, multi-tasking, multi-threaded operating system.
      1. Communication:
         1. Control Processor shall support direct communication with the following devices:

Connected Ethernet devices.

Devices connected to built-in control ports.

Proprietary control network devices.

BACnet IP devices.

Control processors of same type.

* + - 1. Native BACnet/IP

Specifier:

A free license for 50 BACnet objects is available for the PRO3. The PRO3 processor may be upgraded to support a maximum of 2000 BACnet IP objects.

* + - * 1. Number of BACnet objects supported: 2000
      1. File Structure:
         1. Transaction-safe extended FAT32 file system
      2. Memory:
         1. RAM:

1 GB

* + - * 1. Flash:

Built-In: 4 GB

USB or MMC slot: up to 32 GB

* + - * 1. External Storage

Supports up to 1 TB.

* + - 1. Network:
         1. Two built-in 10/100/1000BaseT Ethernet ports.

Primary LAN port:

Isolated WAN connection

Control Subnet Port

The control processor shall automatically discover and assign IP addresses to compatible devices.

Subnet port shall support Isolation Mode

* + - * 1. Ethernet

auto-switching

auto-negotiating

auto-discovery

full/half duplex

industry-standard TCP/IP stack

UDP/IP

CIP

DHCP and DNS Support

SSL

TLS

SSH

SFTP (SSH File Transfer Protocol)

FIPS 140-2 compliant encryption

IEEE 802.1X

SNMP remote management

BACnet/IP

IPv4 or IPv6

Active Directory authentication

IIS v.6.0 Web Server

SMTP e-mail client

* + - * 1. Remote Diagnostics
        2. Remote Program Loading and Administration
        3. Support user assigned or dynamic IP address.
    1. External Ports

The control system shall be equipped with the following external connection ports:

* + - 1. Infrared Output Port
         1. Number of built-in ports: 8
         2. Connector: 2-pin 3.5mm detachable terminal blocks.
         3. Signal:

One-way infrared: up to 1.2 MHz

One-way serial output: TTL/RS-232 (0-5 Volts)

Baud rate: 9600 to 115,200 baud

* + - 1. Serial Communication Port - Type 1
         1. Number of built-in ports: 2
         2. Connector: 5-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: 1200 to 115,000 baud

Software handshaking: off or XON

Bidirectional RS-422 or RS-485

Baud rate: 1200 to 115,000 baud

Hardware handshaking: CTS, RTS, or RTS/CTS

Software handshaking: off or XON

* + - 1. Serial Communication Port - Type 2
         1. Number of built-in ports: 4
         2. Connector: 3-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: up to 115,000 baud

Software handshaking.

* + - 1. Input Output Port
         1. Number of built-in ports: 8
         2. One 9-pin 3.5mm detachable terminal block.
         3. Individual programmable 2Kohm pull-up resistor.
         4. Individually configurable to one of three modes.
         5. Digital Input Mode

Digital contact closure inputs

Rating:

0-24 VDC

Impedance: 20Kohm

Logic threshold High: >3.125V

Logic threshold Low: < 1.875V

Rated for 0-24 Volts DC, referenced to GND.

* + - * 1. Digital Output Mode

Rating:

250 mA sync from maximum 24 VDC

* + - * 1. Analog Input Mode

Rating:

0-10 VDC

Protection: 24 VDC maximum

Impedance: 21Kohm

* + - 1. Relay Port
         1. Number of built-in ports: 8
         2. Two 8-pin 3.5mm detachable terminal blocks.

Normally open, isolated relays.

Rating:

1 Amp, 30 Volts AC/DC.

MOV arc suppression across contacts.

* + - 1. Ethernet
         1. Number of built-in ports: 2

Port 1: Primary LAN

Port 2: Control Subnet

* + - * 1. Two 8-wire RJ45 with 2 LED indicators.

10/100/1000BaseT Ethernet port.

Connection speed LED indicator.

Ethernet activity LED indicator.

* + - 1. Communication Network
         1. Number of built-in ports: 1
         2. Four 4-pin 3.5mm detachable terminal block.

Master net communications port.

* + - 1. USB Type 1
         1. Programming and configuration interface.

Number of built-in ports: 1

Connector:

USB Type-B female USB 2.0

* + - 1. USB Type 2
         1. Memory storage device port.
         2. Number of built-in ports: 1
         3. Connector:

USB Type-A female USB 2.0

* + 1. Memory Expansion Card Slot
       1. Number of built-in slots: 1
       2. Slot Type:
          1. MMC
       3. Slot Capacity
          1. 32 GB maximum
    2. Control Port Expansion Card Slot
       1. Number of built-in slots: 3
    3. BACnet Protocol Implementation:
       1. BACnet Standardized Device Profile:
          1. Application Specific Controller (B-ASC)
       2. BACnet Interoperability Building Blocks Supported:
          1. Data Sharing-ReadProperty-A (DS-RP-A)
          2. Data Sharing-ReadProperty-B (DS-RP-B)
          3. Data Sharing - ReadProperty Multiple - A (DS-RPM-A)
          4. Data Sharing - ReadProperty Multiple - B (DS-RPM-B)
          5. Data Sharing-WriteProperty-A (DS-WP-A)
          6. Data Sharing-WriteProperty-B (DS-WP-B)
          7. Data Sharing – COV – A (DS-COV-A)
          8. Data Sharing – COV – B (DS-COV-B)
          9. Device Management-Dynamic Device Binding-A (DM-DDB-A)
          10. Device Management-Dynamic Device Binding-B (DM-DDB-B)
          11. Device Management-Dynamic Object Binding-B (DM-DOB-B)
          12. Device Management-DeviceCommunicationControl-B (DM-DCC-B)
       3. Standard Object Types Supported:
          1. Device Object
          2. Analog Input Object
          3. Analog Value Object
          4. Binary Input Object
          5. Binary Value Object
          6. Multi-State Input
          7. Multi-State Value
       4. Data Link Layer Options:
          1. BACnet IP
          2. BACnet IP, Foreign Device
       5. Network Options:
          1. BACnet/IP Broadcast Management Device (BBMD)

Supports registration by foreign devices.

* + - 1. Character Set Supported:
         1. ANSI X3.4
    1. Mounting
       1. Standard 19 inch rack mount, 2 rack units high.
       2. Rack mounting ears shall be removable for free standing applications.
    2. Front Panel User Interface
       1. Color LCD for processor setup and diagnostics.
       2. Display navigation: 7 buttons
    3. Front Panel Controls
       1. Hardware reset button.
       2. Software reset button.
       3. Communication network fault indicator reset button.
    4. Front Panel Indicators
       1. Power
       2. Control Network Communication.
       3. Control Processor Error.
       4. Communication network fault indicator.
       5. Expansion port card 1-3 status indicator.
  1. CONTROL PROCESSOR TYPE 2
     1. Manufacturers
        1. 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](http://www.crestron.com) **[**or comparable products from a single manufacturer approved by Architect prior to bidding**]**, with the following components and characteristics.
     2. Basis of Design Product:
        1. **Crestron AV3**
     3. Minimum Characteristics:
        1. Operating System:
           1. Modular architecture supports multiple simultaneous running programs.

Number of simultaneously running user programs: 10

* + - * 1. Real-time, preemptive multithreaded/multitasking kernel.
        2. Vector floating point coprocessor.
        3. Utilize a real time, event driven, multi-tasking, multi-threaded operating system.
      1. Communication:
         1. Control Processor shall support direct communication with the following devices:

Connected Ethernet devices.

Devices connected to built-in control ports.

Proprietary control network devices.

BACnet IP devices.

Control processors of same type.

* + - 1. Native BACnet/IP

Specifier:

A free license for 50 BACnet objects is available for the AV3. The AV3 processor may be upgraded to support a maximum of 2000 BACnet IP objects.

* + - * 1. Number of BACnet objects supported: 2000
      1. File Structure:
         1. Transaction-safe extended FAT32 file system
      2. Memory:
         1. RAM:

1 GB

* + - * 1. Flash:

Built-In: 4 GB

USB or MMC slot: up to 32 GB

* + - * 1. External Storage

Supports up to 1 TB.

* + - 1. Network:
         1. Two built-in 10/100/1000BaseT Ethernet ports.

Primary LAN port:

Isolated WAN connection

Control Subnet Port

The control processor shall automatically discover and assign IP addresses to compatible devices.

Subnet port shall support Isolation Mode

* + - * 1. Ethernet

auto-switching

auto-negotiating

auto-discovery

full/half duplex

industry-standard TCP/IP stack

UDP/IP

CIP

DHCP and DNS Support

SSL

TLS

SSH

SFTP (SSH File Transfer Protocol)

FIPS 140-2 compliant encryption

IEEE 802.1X

SNMP remote management

BACnet/IP

IPv4 or IPv6

Active Directory authentication

IIS v.6.0 Web Server

SMTP e-mail client

* + - * 1. Remote Diagnostics
        2. Remote Program Loading and Administration
        3. Support user assigned or dynamic IP address.
    1. External Ports

The control system shall be equipped with the following external connection ports:

* + - 1. Infrared Output Port
         1. Number of built-in ports: 8
         2. Connector: 2-pin 3.5mm detachable terminal blocks.
         3. Signal:

One-way infrared: up to 1.2 MHz

One-way serial output: TTL/RS-232 (0-5 Volts)

Baud rate: 9600 to 115,200 baud

* + - 1. Serial Communication Port - Type 1
         1. Number of built-in ports: 2
         2. Connector: 5-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: 1200 to 115,000 baud

Software handshaking: off or XON

Bidirectional RS-422 or RS-485

Baud rate: 1200 to 115,000 baud

Hardware handshaking: CTS, RTS, or RTS/CTS

Software handshaking: off or XON

* + - 1. Serial Communication Port - Type 2
         1. Number of built-in ports: 4
         2. Connector: 3-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: up to 115,000 baud

Software handshaking.

* + - 1. Input Output Port
         1. Number of built-in ports: 8
         2. One 9-pin 3.5mm detachable terminal block.
         3. Individual programmable 2Kohm pull-up resistor.
         4. Individually configurable to one of three modes.
         5. Digital Input Mode

Digital contact closure inputs

Rating:

0-24 VDC

Impedance: 20Kohm

Logic threshold High: >3.125V

Logic threshold Low: < 1.875V

Rated for 0-24 Volts DC, referenced to GND.

* + - * 1. Digital Output Mode

Rating:

250 mA sync from maximum 24 VDC

* + - * 1. Analog Input Mode

Rating:

0-10 VDC

Protection: 24 VDC maximum

Impedance: 21Kohm

* + - 1. Relay Port
         1. Number of built-in ports: 8
         2. Two 8-pin 3.5mm detachable terminal blocks.

Normally open, isolated relays.

Rating:

1 Amp, 30 Volts AC/DC.

MOV arc suppression across contacts.

* + - 1. Ethernet
         1. Number of built-in ports: 2

Port 1: Primary LAN

Port 2: Control Subnet

* + - * 1. Two 8-wire RJ45 with 2 LED indicators.

10/100/1000BaseT Ethernet port.

Connection speed LED indicator.

Ethernet activity LED indicator.

* + - 1. Communication Network
         1. Number of built-in ports: 1
         2. Four 4-pin 3.5mm detachable terminal block.

Master net communications port.

* + - 1. USB Type 1
         1. Programming and configuration interface.

Number of built-in ports: 1

Connector:

USB Type-B female USB 2.0

* + - 1. USB Type 2
         1. Memory storage device port.
         2. Number of built-in ports: 1
         3. Connector:

USB Type-A female USB 2.0

* + 1. Memory Expansion Card Slot
       1. Number of built-in slots: 1
       2. Slot Type:
          1. MMC
       3. Slot Capacity
          1. 32 GB maximum

Specifier:

Additional control expansion slots may be added to the AV3 using the optional accessory Control Card Expansion Cage (CAGE3).

* + 1. Control Port Expansion Card Slot Option
       1. Capable of adding card cage for expansion cards.
       2. Number of card slots in optional card cage: 3
    2. BACnet Protocol Implementation:
       1. BACnet Standardized Device Profile:
          1. Application Specific Controller (B-ASC)
       2. BACnet Interoperability Building Blocks Supported:
          1. Data Sharing-ReadProperty-A (DS-RP-A)
          2. Data Sharing-ReadProperty-B (DS-RP-B)
          3. Data Sharing - ReadProperty Multiple - A (DS-RPM-A)
          4. Data Sharing - ReadProperty Multiple - B (DS-RPM-B)
          5. Data Sharing-WriteProperty-A (DS-WP-A)
          6. Data Sharing-WriteProperty-B (DS-WP-B)
          7. Data Sharing – COV – A (DS-COV-A)
          8. Data Sharing – COV – B (DS-COV-B)
          9. Device Management-Dynamic Device Binding-A (DM-DDB-A)
          10. Device Management-Dynamic Device Binding-B (DM-DDB-B)
          11. Device Management-Dynamic Object Binding-B (DM-DOB-B)
          12. Device Management-DeviceCommunicationControl-B (DM-DCC-B)
       3. Standard Object Types Supported:
          1. Device Object
          2. Analog Input Object
          3. Analog Value Object
          4. Binary Input Object
          5. Binary Value Object
          6. Multi-State Input
          7. Multi-State Value
       4. Data Link Layer Options:
          1. BACnet IP
          2. BACnet IP, Foreign Device
       5. Network Options:
          1. BACnet/IP Broadcast Management Device (BBMD)

Supports registration by foreign devices.

* + - 1. Character Set Supported:
         1. ANSI X3.4
    1. Mounting
       1. Standard 19 inch rack mount, 2 rack units high.
       2. Rack mounting ears shall be removable for free standing applications.
    2. Front Panel Controls
       1. Hardware reset button.
       2. Software reset button.
       3. Communication network fault indicator reset button.
    3. Front Panel Indicators
       1. Power
       2. Control Network Communication.
       3. Control Processor Error.
       4. Communication network fault indicator.
       5. Expansion port card 1-3 status indicator.

Specifier: This indicator is only functional when the optional CAGE3 (expansion card cage) is installed. The CAGE3 allows installation of up to 3 expansion cards.

* 1. CONTROL PROCESSOR TYPE 3
     1. Manufacturers
        1. 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](http://www.crestron.com) **[**or comparable products from a single manufacturer approved by Architect prior to bidding**]**, with the following components and characteristics.
     2. Basis of Design Product:
        1. **Crestron CP3N**
     3. Minimum Characteristics:
        1. Operating System:
           1. Modular architecture supports multiple simultaneous running programs.

Number of simultaneously running user programs: 10

* + - * 1. Real-time, preemptive multithreaded/multitasking kernel.
        2. Vector floating point coprocessor.
        3. Utilize a real time, event driven, multi-tasking, multi-threaded operating system.
      1. Communication:
         1. Control Processor shall support direct communication with the following devices:

Connected Ethernet devices.

Devices connected to built-in control ports.

Proprietary control network devices.

BACnet IP devices.

Control processors of same type.

* + - 1. Native BACnet/IP

Specifier:

A free license for 50 BACnet objects is available for the CP3N. The CP3N processor may be upgraded to support a maximum of 1000 BACnet IP objects.

* + - * 1. Number of BACnet objects supported: 1000
      1. File Structure:
         1. Transaction-safe extended FAT32 file system
      2. Memory:
         1. RAM:

512 MB

* + - * 1. Flash:

Built-In: 4 GB

USB or MMC slot: up to 32 GB

* + - * 1. External Storage

Supports up to 1 TB.

* + - 1. Network:
         1. Two built-in 10/100/1000BaseT Ethernet ports.

Primary LAN port:

Isolated WAN connection

Control Subnet Port

The control processor shall automatically discover and assign IP addresses to compatible devices.

Subnet port shall support Isolation Mode

* + - * 1. Ethernet

auto-switching

auto-negotiating

auto-discovery

full/half duplex

industry-standard TCP/IP stack

UDP/IP

CIP

DHCP and DNS Support

SSL

TLS

SSH

SFTP (SSH File Transfer Protocol)

FIPS 140-2 compliant encryption

IEEE 802.1X

SNMP remote management

BACnet/IP

IPv4 or IPv6

Active Directory authentication

IIS v.6.0 Web Server

SMTP e-mail client

* + - * 1. Remote Diagnostics
        2. Remote Program Loading and Administration
        3. Support user assigned or dynamic IP address.
    1. External Ports

The control system shall be equipped with the following external connection ports:

* + - 1. Infrared Output Port
         1. Number of built-in ports: 8
         2. Connector: 2 8-pin 3.5mm detachable terminal blocks.
         3. Signal:

One-way infrared: up to 1.2 MHz

One-way serial output: TTL/RS-232 (0-5 Volts)

Baud rate: 9600 to 115,200 baud

* + - 1. Serial Communication Port - Type 1
         1. Number of built-in ports: 1
         2. Connector: 5-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: 1200 to 115,000 baud

Software handshaking: off or XON

Bidirectional RS-422 or RS-485

Baud rate: 1200 to 115,000 baud

Hardware handshaking: CTS, RTS, or RTS/CTS

Software handshaking: off or XON

* + - 1. Serial Communication Port - Type 2
         1. Number of built-in ports: 2
         2. Connector: 3-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: up to 115,000 baud

Software handshaking.

* + - 1. Input Output Port
         1. Number of built-in ports: 8
         2. One 9-pin 3.5mm detachable terminal block.
         3. Individual programmable 2Kohm pull-up resistor.
         4. Individually configurable to one of three modes.
         5. Digital Input Mode

Digital contact closure inputs

Rating:

0-24 VDC

Impedance: 20Kohm

Logic threshold High: >3.125V

Logic threshold Low: < 1.875V

Rated for 0-24 Volts DC, referenced to GND.

* + - * 1. Digital Output Mode

Rating:

250 mA sync from maximum 24 VDC

* + - * 1. Analog Input Mode

Rating:

0-10 VDC

Protection: 24 VDC maximum

Impedance: 21Kohm

* + - 1. Relay Port
         1. Number of built-in ports: 8
         2. Two 8-pin 3.5mm detachable terminal blocks.

Normally open, isolated relays.

Rating:

1 Amp, 30 Volts AC/DC.

MOV arc suppression across contacts.

* + - 1. Ethernet
         1. Number of built-in ports: 2

Port 1: Primary LAN

Port 2: Control Subnet

* + - * 1. Two 8-wire RJ45 with 2 LED indicators.

10/100/1000BaseT Ethernet port.

Connection speed LED indicator.

Ethernet activity LED indicator.

* + - 1. Communication Network
         1. Number of built-in ports: 1
         2. Four 4-pin 3.5mm detachable terminal block.

Master net communications port.

* + - 1. USB Type 1
         1. Programming and configuration interface.

Number of built-in ports: 1

Connector:

USB Type-B female USB 2.0

* + - 1. USB Type 2
         1. Memory storage device port.
         2. Number of built-in ports: 1
         3. Connector:

USB Type-A female USB 2.0

* + 1. Memory Expansion Card Slot
       1. Number of built-in slots: 1
       2. Slot Type:
          1. MMC
       3. Slot Capacity
          1. 32 GB maximum
    2. BACnet Protocol Implementation:
       1. BACnet Standardized Device Profile:
          1. Application Specific Controller (B-ASC)
       2. BACnet Interoperability Building Blocks Supported:
          1. Data Sharing-ReadProperty-A (DS-RP-A)
          2. Data Sharing-ReadProperty-B (DS-RP-B)
          3. Data Sharing - ReadProperty Multiple - A (DS-RPM-A)
          4. Data Sharing - ReadProperty Multiple - B (DS-RPM-B)
          5. Data Sharing-WriteProperty-A (DS-WP-A)
          6. Data Sharing-WriteProperty-B (DS-WP-B)
          7. Data Sharing – COV – A (DS-COV-A)
          8. Data Sharing – COV – B (DS-COV-B)
          9. Device Management-Dynamic Device Binding-A (DM-DDB-A)
          10. Device Management-Dynamic Device Binding-B (DM-DDB-B)
          11. Device Management-Dynamic Object Binding-B (DM-DOB-B)
          12. Device Management-DeviceCommunicationControl-B (DM-DCC-B)
       3. Standard Object Types Supported:
          1. Device Object
          2. Analog Input Object
          3. Analog Value Object
          4. Binary Input Object
          5. Binary Value Object
          6. Multi-State Input
          7. Multi-State Value
       4. Data Link Layer Options:
          1. BACnet IP
          2. BACnet IP, Foreign Device
       5. Network Options:
          1. BACnet/IP Broadcast Management Device (BBMD)

Supports registration by foreign devices.

* + - 1. Character Set Supported:
         1. ANSI X3.4
    1. Mounting
       1. Standard 19 inch rack mount, 1 rack unit high.
       2. Rack mounting ears shall be removable for free standing applications.
    2. Front Panel Controls
       1. Hardware reset button
       2. Software reset button
    3. Front Panel Indicators
       1. Power
       2. Control Network Communication
       3. Control Processor Error
    4. Power Requirements:
       1. 15 Watts at 24 VDC
  1. CONTROL PROCESSOR TYPE 4
     1. Manufacturers
        1. 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](http://www.crestron.com) **[**or comparable products from a single manufacturer approved by Architect prior to bidding**]**, with the following components and characteristics.
     2. Basis of Design Product:
        1. **Crestron CP3**
     3. Minimum Characteristics:
        1. Operating System:
           1. Modular architecture supports multiple simultaneous running programs.

Number of simultaneously running user programs: 10

* + - * 1. Real-time, preemptive multithreaded/multitasking kernel.
        2. Vector floating point coprocessor.
        3. Utilize a real time, event driven, multi-tasking, multi-threaded operating system.
      1. Communication:
         1. Control Processor shall support direct communication with the following devices:

Connected Ethernet devices.

Devices connected to built-in control ports.

Proprietary control network devices.

BACnet IP devices.

Control processors of same type.

* + - 1. Native BACnet/IP

Specifier:

A free license for 50 BACnet objects is available for the CP3. The CP3 processor may be upgraded to support a maximum of 1000 BACnet IP objects.

* + - * 1. Number of BACnet objects supported: 1000
      1. File Structure:
         1. Transaction-safe extended FAT32 file system
      2. Memory:
         1. RAM:

512 MB

* + - * 1. Flash:

Built-In: 4 GB

USB or MMC slot: up to 32 GB

* + - * 1. External Storage

Supports up to 1 TB.

* + - 1. Network:
         1. One built-in 10/100/1000BaseT Ethernet port
         2. Ethernet

auto-switching

auto-negotiating

auto-discovery

full/half duplex

industry-standard TCP/IP stack

UDP/IP

CIP

DHCP and DNS Support

SSL

TLS

SSH

SFTP (SSH File Transfer Protocol)

FIPS 140-2 compliant encryption

IEEE 802.1X

SNMP remote management

BACnet/IP

IPv4 or IPv6

Active Directory authentication

IIS v.6.0 Web Server

SMTP e-mail client

* + - * 1. Remote Diagnostics
        2. Remote Program Loading and Administration
        3. Support user assigned or dynamic IP address.
    1. External Ports

The control system shall be equipped with the following external connection ports:

* + - 1. Infrared Output Port
         1. Number of built-in ports: 8
         2. Connector: 2 8-pin 3.5mm detachable terminal blocks.
         3. Signal:

One-way infrared: up to 1.2 MHz

One-way serial output: TTL/RS-232 (0-5 Volts)

Baud rate: 9600 to 115,200 baud

* + - 1. Serial Communication Port - Type 1
         1. Number of built-in ports: 1
         2. Connector: 5-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: 1200 to 115,000 baud

Software handshaking: off or XON

Bidirectional RS-422 or RS-485

Baud rate: 1200 to 115,000 baud

Hardware handshaking: CTS, RTS, or RTS/CTS

Software handshaking: off or XON

* + - 1. Serial Communication Port - Type 2
         1. Number of built-in ports: 2
         2. Connector: 3-pin 3.5mm detachable terminal blocks.
         3. Signal:

Bidirectional RS-232

Baud rate: up to 115,000 baud

Software handshaking.

* + - 1. Input Output Port
         1. Number of built-in ports: 8
         2. One 9-pin 3.5mm detachable terminal block.
         3. Individual programmable 2Kohm pull-up resistor.
         4. Individually configurable to one of three modes.
         5. Digital Input Mode

Digital contact closure inputs

Rating:

0-24 VDC

Impedance: 20Kohm

Logic threshold High: >3.125V

Logic threshold Low: < 1.875V

Rated for 0-24 Volts DC, referenced to GND.

* + - * 1. Digital Output Mode

Rating:

250 mA sync from maximum 24 VDC

* + - * 1. Analog Input Mode

Rating:

0-10 VDC

Protection: 24 VDC maximum

Impedance: 21Kohm

* + - 1. Relay Port
         1. Number of built-in ports: 8
         2. Two 8-pin 3.5mm detachable terminal blocks.

Normally open, isolated relays.

Rating:

1 Amp, 30 Volts AC/DC.

MOV arc suppression across contacts.

* + - 1. Ethernet
         1. Number of built-in ports: 1
         2. One 8-wire RJ45 with 2 LED indicators.

10/100BaseT Ethernet port.

Ethernet Link LED indicator.

Ethernet activity LED indicator.

* + - 1. Communication Network
         1. Number of built-in ports: 1
         2. Four 4-pin 3.5mm detachable terminal block.

Master net communications port.

* + - 1. USB Type 1
         1. Programming and configuration interface.

Number of built-in ports: 1

Connector:

USB Type-B female USB 2.0

* + - 1. USB Type 2
         1. Memory storage device port.
         2. Number of built-in ports: 1
         3. Connector:

USB Type-A female USB 2.0

* + 1. Memory Expansion Card Slot
       1. Number of built-in slots: 1
       2. Slot Type:
          1. MMC
       3. Slot Capacity
          1. 32 GB maximum
    2. BACnet Protocol Implementation:
       1. BACnet Standardized Device Profile:
          1. Application Specific Controller (B-ASC)
       2. BACnet Interoperability Building Blocks Supported:
          1. Data Sharing-ReadProperty-A (DS-RP-A)
          2. Data Sharing-ReadProperty-B (DS-RP-B)
          3. Data Sharing - ReadProperty Multiple - A (DS-RPM-A)
          4. Data Sharing - ReadProperty Multiple - B (DS-RPM-B)
          5. Data Sharing-WriteProperty-A (DS-WP-A)
          6. Data Sharing-WriteProperty-B (DS-WP-B)
          7. Data Sharing – COV – A (DS-COV-A)
          8. Data Sharing – COV – B (DS-COV-B)
          9. Device Management-Dynamic Device Binding-A (DM-DDB-A)
          10. Device Management-Dynamic Device Binding-B (DM-DDB-B)
          11. Device Management-Dynamic Object Binding-B (DM-DOB-B)
          12. Device Management-DeviceCommunicationControl-B (DM-DCC-B)
       3. Standard Object Types Supported:
          1. Device Object
          2. Analog Input Object
          3. Analog Value Object
          4. Binary Input Object
          5. Binary Value Object
          6. Multi-State Input
          7. Multi-State Value
       4. Data Link Layer Options:
          1. BACnet IP
          2. BACnet IP, Foreign Device
       5. Network Options:
          1. BACnet/IP Broadcast Management Device (BBMD)

Supports registration by foreign devices.

* + - 1. Character Set Supported:
         1. ANSI X3.4
    1. Mounting
       1. Standard 19 inch rack mount, 1 rack unit high.
       2. Rack mounting ears shall be removable for free standing applications.
    2. Front Panel Controls
       1. Hardware reset button
       2. Software reset button
    3. Front Panel Indicators
       1. Power
       2. Control Network Communication
       3. Control Processor Error
    4. Power Requirements:
       1. 15 Watts at 24 VDC
  1. CONTROL PROCESSOR TYPE 5
     1. Manufacturers
        1. 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](http://www.crestron.com) **[**or comparable products from a single manufacturer approved by Architect prior to bidding**]**, with the following components and characteristics.
     2. Basis of Design Product:
        1. **Crestron MC3**
     3. Minimum Characteristics:
        1. Operating System:
           1. Modular architecture supports multiple simultaneous running programs.

Number of simultaneously running user programs: 10

* + - * 1. Real-time, preemptive multithreaded/multitasking kernel.
        2. Vector floating point coprocessor.
        3. Utilize a real time, event driven, multi-tasking, multi-threaded operating system.
      1. Communication:
         1. Control Processor shall support direct communication with the following devices:

Connected Ethernet devices.

Devices connected to built-in control ports.

Proprietary control network devices.

BACnet IP devices.

Control processors of same type.

* + - 1. Native BACnet/IP

Specifier:

A free license for 50 BACnet objects is available for the MC3. The MC3 Processor may be upgraded to support a maximum of 500 BACnet IP objects.

* + - * 1. Maximum number of BACnet objects supported: 500
      1. Registered Emerge Alliance wireless system controller.
      2. Wireless Communication
         1. Built-in RF transceiver

Communication with up 100 wireless devices.

* + - 1. Video Graphics Engine
         1. Built-in graphics engine:

Support for custom control graphics for onscreen control using a separate remote.

* + - 1. Audio
         1. Playback of the following file types:

WAV

MP3

WMA

* + - * 1. Stereo pass through switching using built-in analog stereo audio input and output. The following parameters shall be supported:

Switch between digital file playback and input connectors.

* + - * 1. Analog to Digital Conversion:

24-bit 48,000 Hz.

* + - * 1. Digital to Analog Conversion:

24-bit 48,000 Hz.

* + - * 1. Frequency Response:

20Hz – 20,000Hz plus or minus 2dB

* + - * 1. Signal to Noise Ratio:

Greater than 93dB, 20Hz to 20,000Hz A-Weighted

* + - * 1. Total Harmonic Distortion plus Noise:

Less than 0.01 percent, 20Hz to 20,000Hz

* + - * 1. Stereo separation:

Greater than 91dB

* + - 1. File Structure:
         1. Transaction-safe extended FAT32 file system.
      2. Memory:
         1. RAM:

256 GB

* + - * 1. Flash:

Built-In: 2 GB

* + - * 1. External Storage

Supports up to 1 TB.

* + - 1. Network:
         1. Two built-in 10/100/1000BaseT Ethernet ports.
         2. Ethernet

auto-switching

auto-negotiating

auto-discovery

full/half duplex

industry-standard TCP/IP stack

UDP/IP

CIP

DHCP

SSL

TLS

SSH

SFTP (SSH File Transfer Protocol)

FIPS 140-2 compliant encryption

IEEE 802.1X

SNMP remote management

BACnet/IP

IPv4 or IPv6

Active Directory authentication

IIS v.6.0 Web Server

SMTP e-mail client

* + - * 1. Remote Diagnostics
        2. Remote Program Loading and Administration
        3. Support user assigned or dynamic IP address.
    1. External Ports

The control system shall be equipped with the following external connection ports:

* + - 1. Infrared Output Port
         1. Number of built-in ports: 5
         2. Connector: 3.5mm mini-jack.
         3. Signal:

One-way infrared: up to 1.2 MHz

One-way serial output: TTL/RS-232 (0-5 Volts)

Baud rate: 9600 to 115,200 baud

* + - 1. Infrared Input Port
         1. Number of built-in ports: 1
         2. Connector: 3.5mm TRS mini-jack.
         3. Signal:

One-way infrared RC-5 protocol

* + - 1. Serial Communication Port - Type 3
         1. Number of built-in ports: 2
         2. Connector: 9-pin DB9 male connector.
         3. Signal:

Bidirectional RS-232

Baud rate: 600 to 115,200 baud

Software handshaking: off or XON

Hardware handshaking: CTS, RTS, or RTS/CTS

* + - 1. Input Port
         1. Number of built-in ports: 2
         2. One 3-pin 3.5mm detachable terminal.
         3. Individual programmable 2Kohm pull-up resistor.
         4. Digital Input Mode

Digital contact closure inputs

Rating:

0-24 VDC

Impedance: 2,200 ohm

Logic threshold High: >1.2V DC

Logic threshold Low: < .46V DC

* + - 1. Relay Port
         1. Number of built-in ports: 2
         2. One 4-pin 3.5mm detachable terminal blocks.

Normally open, isolated relays.

Rating:

1 Amp, 30 Volts AC/DC.

MOV arc suppression across contacts.

* + - 1. Ethernet
         1. Number of built-in ports: 1
         2. One 8-wire RJ45 with 2 LED indicators.

10/100BaseT Ethernet port.

Connection status LED indicator.

Ethernet activity LED indicator.

* + - 1. Communication Network
         1. Number of built-in ports: 1
         2. Four 4-pin 3.5mm detachable terminal block.

Master net communications port.

* + - 1. USB Type 1
         1. Programming and configuration interface.

Number of built-in ports: 1

Connector:

USB Type-B female USB 2.0

Front Panel mounted

* + - 1. USB Type 2
         1. Memory storage device port.
         2. Number of built-in ports: 2
         3. Connector:

USB Type-A female USB 2.0

* + 1. Video Output
       1. Number of built-in connectors: 4
       2. Connector Type: RCA female
       3. Number of supported signal Types: 2
          1. Component (YPbPr)

Resolutions:

720x480 at 30 Hz (480i)

720x576 at 25 Hz (576i)

720x480 at 60 Hz (480p)

720x576 at 50 Hz (576p)

Output Level:

Y: 1 Volt p-p

Pb: 0.7 Volt p-p

Pr: 0.7 Volt p-p

Output Impedance:

75 Ohms nominal

* + - * 1. Composite

Resolutions:

480i

576i

Output Level:

Y: 1 Volt p-p

Output Impedance:

75 Ohms nominal

* + - 1. Output Formats:
         1. NTSC
         2. PAL
    1. Audio Input
       1. Number of built-in connectors: 2
       2. Connector Type: RCA female
       3. Supported signal Type:
          1. Single ended analog audio
          2. Channels:

Stereo

* + - * 1. Level:

2 Volts RMS Maximum

* + - * 1. Impedance:

7,000 Ohms nominal

* + 1. Audio Output
       1. Number of built-in connectors: 2
       2. Connector Type: RCA female
       3. Supported signal Type:
          1. Single ended analog audio
          2. Channels:

Stereo

* + - * 1. Level:

2 Volts RMS Maximum

* + - * 1. Impedance:

100 Ohms nominal

* + 1. BACnet Protocol Implementation:
       1. BACnet Standardized Device Profile:
          1. Application Specific Controller (B-ASC)
       2. BACnet Interoperability Building Blocks Supported:
          1. Data Sharing-ReadProperty-A (DS-RP-A)
          2. Data Sharing-ReadProperty-B (DS-RP-B)
          3. Data Sharing - ReadProperty Multiple - A (DS-RPM-A)
          4. Data Sharing - ReadProperty Multiple - B (DS-RPM-B)
          5. Data Sharing-WriteProperty-A (DS-WP-A)
          6. Data Sharing-WriteProperty-B (DS-WP-B)
          7. Data Sharing – COV – A (DS-COV-A)
          8. Data Sharing – COV – B (DS-COV-B)
          9. Device Management-Dynamic Device Binding-A (DM-DDB-A)
          10. Device Management-Dynamic Device Binding-B (DM-DDB-B)
          11. Device Management-Dynamic Object Binding-B (DM-DOB-B)
          12. Device Management-DeviceCommunicationControl-B (DM-DCC-B)
       3. Standard Object Types Supported:
          1. Device Object
          2. Analog Input Object
          3. Analog Value Object
          4. Binary Input Object
          5. Binary Value Object
          6. Multi-State Input
          7. Multi-State Value
       4. Data Link Layer Options:
          1. BACnet IP
          2. BACnet IP, Foreign Device
       5. Network Options:
          1. BACnet/IP Broadcast Management Device (BBMD)

Supports registration by foreign devices.

* + - 1. Character Set Supported:
         1. ANSI X3.4
    1. Front Panel Controls
       1. Hardware reset button
       2. Software reset button
       3. Wireless device setup button
    2. Front Panel Indicators
       1. Power
       2. Control Network Communication
       3. Wireless device setup status
       4. Wireless network activity
    3. Wireless Network Antenna
       1. Antenna shall be removable.
       2. Antenna shall be extendable using approved RF coaxial extension cable.
    4. Power Requirements:
       1. 9 Watts at 24 VDC
  1. CONTROL PROCESSOR TYPE 6
     1. Manufacturers
        1. 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](http://www.crestron.com) **[**or comparable products from a single manufacturer approved by Architect prior to bidding**]**, with the following components and characteristics.
     2. Basis of Design Product:
        1. **Crestron RMC3**
     3. Minimum Characteristics:
        1. Operating System:
           1. Modular architecture supports multiple simultaneous running programs.

Number of simultaneously running user programs: 10

Specifier:

A license is required for running multiple programs.

* + - * 1. Real-time, preemptive multithreaded/multitasking kernel.
        2. Vector floating point coprocessor.
        3. Utilize a real time, event driven, multi-tasking, multi-threaded operating system.
      1. Communication:
         1. Control Processor shall support direct communication with the following devices:

Connected Ethernet devices.

Devices connected to built-in control ports.

Proprietary control network devices.

BACnet IP devices.

Control processors of same type.

* + - 1. Native BACnet/IP

Specifier:

A free license for 50 BACnet objects is available for the MC3. The MC3 Processor may be upgraded to support a maximum of 500 BACnet IP objects.

* + - * 1. Maximum number of BACnet objects supported: 500
      1. Registered Emerge Alliance wireless system controller.
      2. File Structure:
         1. Transaction-safe extended FAT32 file system.
      3. Memory:
         1. RAM:

256 GB

* + - * 1. Flash:

Built-In: 4 GB

* + - * 1. External Storage

USB mass storage

* + - 1. Network:
         1. Built-in 10/100/1000BaseT Ethernet port.
         2. Ethernet

auto-switching

auto-negotiating

auto-discovery

full/half duplex

industry-standard TCP/IP stack

UDP/IP

CIP

DHCP and DNS Support

SSL

TLS

SSH

SFTP (SSH File Transfer Protocol)

FIPS 140-2 compliant encryption

IEEE 802.1X

SNMP remote management

BACnet/IP

IPv4 or IPv6

Active Directory authentication

Web Server

SMTP e-mail client

IEEE 802.3af and 802.3at Type 1 compliant

* + - * 1. Remote Diagnostics
        2. Remote Program Loading and Administration
        3. Support user assigned or dynamic IP address.
    1. External Ports

The control system shall be equipped with the following external connection ports:

* + - 1. Infrared Output Port
         1. Number of built-in ports: 2
         2. Connector: 3.5mm mini-jack.
         3. Signal:

One-way infrared: up to 1.2 MHz

One-way serial output: TTL/RS-232 (0-5 Volts)

Baud rate: Up to 115,200 baud

* + - 1. Serial Communication Port
         1. Number of built-in ports: 1
         2. Connector: 5-pin 3.5mm mini-jack.
         3. Signal:

Bidirectional RS-232

Baud rate: Up to 115,200 baud

Software handshaking: off or XON

Hardware handshaking: CTS, RTS, or RTS/CTS

* + - 1. Input Port
         1. Number of built-in ports: 2
         2. One 3-pin 3.5mm detachable terminal.
         3. Individual programmable 2Kohm pull-up resistor.
         4. Digital Input Mode

Digital contact closure inputs

Rating:

0-24 VDC

Impedance: 2,200 ohm

Logic threshold High: >2.0V DC

Logic threshold Low: < 1.1V DC

* + - 1. Relay Port
         1. Number of built-in ports: 2
         2. One 4-pin 3.5mm detachable terminal blocks.

Normally open, isolated relays.

Rating:

1 Amp, 30 Volts AC/DC.

MOV arc suppression across contacts.

* + - 1. Ethernet
         1. Number of built-in ports: 1
         2. One 8-wire RJ45 with 2 LED indicators.

10/100BaseT Ethernet port.

Connection status LED indicator.

Ethernet activity LED indicator.

* + - 1. Communication Network
         1. Number of built-in ports: 1
         2. One 3-pin 3.5mm detachable terminal block.

Master net communications port.

* + - 1. USB
         1. Programming and configuration interface.
         2. Memory storage device port.
         3. Number of built-in ports: 1
         4. Front Panel mounted
         5. Connector:

USB Type-Mini AB female

* + 1. BACnet Protocol Implementation:
       1. BACnet Standardized Device Profile:
          1. Application Specific Controller (B-ASC)
       2. BACnet Interoperability Building Blocks Supported:
          1. Data Sharing-ReadProperty-A (DS-RP-A)
          2. Data Sharing-ReadProperty-B (DS-RP-B)
          3. Data Sharing - ReadProperty Multiple - A (DS-RPM-A)
          4. Data Sharing - ReadProperty Multiple - B (DS-RPM-B)
          5. Data Sharing-WriteProperty-A (DS-WP-A)
          6. Data Sharing-WriteProperty-B (DS-WP-B)
          7. Data Sharing – COV – A (DS-COV-A)
          8. Data Sharing – COV – B (DS-COV-B)
          9. Device Management-Dynamic Device Binding-A (DM-DDB-A)
          10. Device Management-Dynamic Device Binding-B (DM-DDB-B)
          11. Device Management-Dynamic Object Binding-B (DM-DOB-B)
          12. Device Management-DeviceCommunicationControl-B (DM-DCC-B)
       3. Standard Object Types Supported:
          1. Device Object
          2. Analog Input Object
          3. Analog Value Object
          4. Binary Input Object
          5. Binary Value Object
          6. Multi-State Input
          7. Multi-State Value
       4. Data Link Layer Options:
          1. BACnet IP
          2. BACnet IP, Foreign Device
       5. Network Options:
          1. BACnet/IP Broadcast Management Device (BBMD)

Supports registration by foreign devices.

* + - 1. Character Set Supported:
         1. ANSI X3.4
    1. Front Panel Controls
       1. Hardware reset button
       2. Software reset button
    2. Front Panel Indicators
       1. Power
       2. Control Network Communication
       3. Wireless network activity
    3. Power Requirements:
       1. Ethernet IEEE 802.3at Type 1 (802.3af compatible) Class 0; 12.95 Watts PoE

1. EXECUTION

Not Used

END OF SECTION 25 50 00