**SECTION 27 41 16**

**INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT**

**GUIDE SPECIFICATION**

*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.*

*Specifier: Please see PART 4 for a listing of products specified in this Guide Specification.*

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# **GENERAL**

*NOT USED in this Guide Specification. Specifier shall Specify PART 1 administrative and procedural requirements as needed.*

# **PRODUCTS**

## **Basis of Design 4K HD Scaling Auto-Switcher and Extender**

### Crestron HD-MD-4K-200

### Crestron HD-MD-4K-400

### Crestron HD-MD-4K-200-1G

### Crestron HD-MD-4K-300-2G

## **Components of HD Scaling Auto-Switcher and Extender Kits**

### Type 1 Kit

#### Basis of Design: Crestron HD-MD-4K-200

##### HD-TX-101-C-E

##### HD-RX-4K-210-C-E

### Type 2 Kit

#### Basis of Design: Crestron HD-MD-4K-400

##### HD-TX-301-C-E

##### HD-RX-4K-210-C-E

### Type 3 Kit

#### Basis of Design: Crestron HD-MD-4K-200-1G

##### HD-TX-101-C-1G-E

##### HD-RX-4K-210-C-E

### Type 4 Kit

#### Basis of Design: Crestron HD-MD-4K-300-2G

##### HD-TX-201-C-2G-E

##### HD-RX-4K-210-C-E

## **Transmitter and Receiver Devices**

### Kit Type 1 Transmitter

#### Basis of Design

##### Crestron HD-TX-101-C-E

#### Device Architecture

##### Physical Form factor

###### Freestanding low-profile enclosure

###### Surface mount or single rack rail mount via integrated flange

#### Functions

##### Single UTP/STP cable transmission

###### Signal transmission up to 230 feet.

###### Minimum cable type supported: UTP/STP CAT5e

#### Connectors

##### The device shall include the following connectors:

###### One (1) HDMI input with support for the following:

CEC Pass-through and CEC management

HDMI with Deep Color, 3D and 4K

HDCP 1.4 compliant

DisplayPort Dual-Mode

Dolby Digital, Dolby Digital EX, DTS, DTS-ES, DTS 96/24, LPCM up to 8 channels

DVI-D with adaptor

EDID

Common resolutions: 1920x1080 30Hz to 4096x2160 DCI 4K 4:4:4 30Hz

Custom resolutions: pixel clock rates up to 300 MHz

###### One (1) RJ45 shielded female connector with support for the following:

Link port for connection to compatible transmission device by same manufacturer

Power sharing option for connected remote transmission device

###### One (1) DC power input jack with support for:

Power connection shall support power sharing with connected transmission device

###### One (1) USB Type A connector with support for:

USB power port (500 mA maximum output)

Supplies power to a USB powered device

#### Power

##### Power supply modes:

###### Local or remote DC power source

###### Remote power supplied by opposite end of TX/RX pair.

#### Compliance

##### UL Listed for US & Canada, CE, IC, FCC Part 15 Class B digital device

### Kit Type 2 Transmitter

#### Basis of Design

##### Crestron HD-TX-301-C-E

#### Device Architecture

##### Physical Form factor

###### Freestanding low-profile enclosure

###### Surface mount or single rack rail mount via integrated flange

#### Functions

##### The transmitter shall support input switching with the following options:

###### Automatic switching to active input

###### Manual switching via integrated selection buttons

###### Remote switching via control processor by same manufacturer

*This option requires a LAN connection at the compatible receiver device connected to a Crestron control processor.*

##### Single UTP/STP cable transmission

###### Signal transmission up to 230 feet.

###### Minimum cable type supported: UTP/STP CAT5e

#### Connectors

##### The device shall include the following connectors:

###### Two (2) HDMI inputs with support for the following:

CEC Pass-through and CEC management

HDMI with Deep Color, 3D and 4K

HDCP 1.4 compliant

DisplayPort Dual-Mode

Dolby Digital, Dolby Digital EX, DTS, DTS-ES, DTS 96/24, LPCM up to 8 channels

DVI-D with adaptor

EDID

Common resolutions: 1920x1080 30Hz to 4096x2160 DCI 4K 4:4:4 30Hz

Custom resolutions: pixel clock rates up to 300 MHz

###### One (1) DB15 input with support for the following:

VGA video

Component video via breakout adaptor

Formats: RGBHV, RGBS, RGsB, YPbPr

Common resolutions: up to progressive 1920x1200 WUXGA 60Hz

Custom resolutions: pixel clock rates up to 165 MHz

###### One (1) 3.5 mm TRS mini phone jack input:

Signals supported:

Unbalanced stereo line-level analog audio

Audio requirements:

Input Impedance: 44k Ohms

Analog-To-Digital Conversion: 24-bit 48 kHz

Maximum Input Level: 2 Vrms

Minimum Audio Performance:

Frequency Response: 20 Hz to 20 kHz ±0.5 dB

S/N Ratio: >93 dB, 20 Hz to 20 kHz A-weighted

THD+N: <0.005% @ 1 kHz

Stereo Separation: >80 dB

###### One (1) RJ45 shielded female connector with support for the following:

Link port for connection to compatible transmission device by same manufacturer

Power sharing option for connected remote transmission device

###### One (1) DC power input jack with support for:

Power connection shall support power sharing with connected transmission device

###### One (1) USB Type A connector with support for:

USB host port for compatible control connection interface by same manufacturer

Service and firmware update connection

#### Power

##### Power supply modes:

###### Local or remote DC power source

###### Remote power supplied by opposite end of TX/RX pair.

#### Compliance

##### UL Listed for US & Canada, CE, IC, FCC Part 15 Class B digital device

### Kit Type 3 Transmitter

#### Basis of Design

##### Crestron HD-TX-101-C-1G-E

#### Device Architecture

##### Physical Form factor

###### Wall mount device, mounts in a 1-gang (or larger) 2-1/4 inch (57 mm) deep U.S. electrical box

#### Functions

##### Single UTP/STP cable transmission

###### Signal transmission up to 230 feet.

###### Minimum cable type supported: UTP/STP CAT5e

#### Connectors

##### The device shall include the following connectors:

###### One (1) HDMI input with support for the following:

CEC Pass-through and CEC management

HDMI with Deep Color, 3D and 4K

HDCP 1.4 compliant

DisplayPort Dual-Mode

Dolby Digital, Dolby Digital EX, DTS, DTS-ES, DTS 96/24, LPCM up to 8 channels

DVI-D with adaptor

EDID

Common resolutions: 1920x1080 30Hz to 4096x2160 DCI 4K 4:4:4 30Hz

Custom resolutions: pixel clock rates up to 300 MHz

###### One (1) RJ45 shielded female connector with support for the following:

Link port for connection to compatible transmission device by same manufacturer

Power sharing option for connected remote transmission device

###### One (1) DC power input jack with support for:

Power connection shall support power sharing with connected transmission device

###### One (1) USB Type A connector with support for:

USB power port (500 mA maximum output)

Supplies power to a USB powered device

#### Power

##### Power supply modes:

###### Local or remote DC power source

###### Remote power supplied by opposite end of TX/RX pair.

#### Compliance

##### UL Listed for US & Canada, CE, IC, FCC Part 15 Class B digital device

### Kit Type 4 Transmitter

#### Basis of Design

##### Crestron HD-TX-201-C-2G-E

#### Device Architecture

##### Physical Form factor

###### Wall mount device, mounts in a 2-gang, 2-1/4 inch (57 mm) deep U.S. electrical box

#### Functions

##### The transmitter shall support input switching with the following options:

###### Automatic switching to active input

###### Manual switching via integrated selection buttons

###### Remote switching via control processor by same manufacturer

*This option requires a LAN connection at the compatible receiver device connected to a Crestron control processor.*

##### Single UTP/STP cable transmission

###### Signal transmission up to 230 feet.

###### Minimum cable type supported: UTP/STP CAT5e

#### Connectors

##### The device shall include the following connectors:

###### One (1) HDMI input with support for the following:

CEC Pass-through and CEC management

HDMI with Deep Color, 3D and 4K

HDCP 1.4 compliant

DisplayPort Dual-Mode

Dolby Digital, Dolby Digital EX, DTS, DTS-ES, DTS 96/24, LPCM up to 8 channels

DVI-D with adaptor

EDID

Common resolutions: 1920x1080 30Hz to 4096x2160 DCI 4K 4:4:4 30Hz

Custom resolutions: pixel clock rates up to 300 MHz

###### One (1) DB15 input with support for the following:

VGA video

Component video via breakout adaptor

Formats: RGBHV, RGBS, RGsB, YPbPr

Common resolutions: up to progressive 1920x1200 WUXGA 60Hz

Custom resolutions: pixel clock rates up to 165 MHz

###### One (1) 3.5 mm TRS mini phone jack input:

Signals supported:

Unbalanced stereo line-level analog audio

Audio requirements:

Input Impedance: 44k Ohms

Analog-To-Digital Conversion: 24-bit 48 kHz

Maximum Input Level: 2 Vrms

Minimum Audio Performance:

Frequency Response: 20 Hz to 20 kHz ±0.5 dB

S/N Ratio: >93 dB, 20 Hz to 20 kHz A-weighted

THD+N: <0.005% @ 1 kHz

Stereo Separation: >80 dB

###### One (1) RJ45 shielded female connector with support for the following:

Link port for connection to compatible transmission device by same manufacturer

Power sharing option for connected remote transmission device

###### One (1) RJ45 pass-through LAN connection

###### One (1) DC power input jack with support for:

Power connection shall support power sharing with connected transmission device

#### Power

##### Power supply modes:

###### Local or remote DC power source

###### Remote power supplied by opposite end of TX/RX pair.

#### Compliance

##### UL Listed for US & Canada, CE, IC, FCC Part 15 Class B digital device

### Receiver Unit

#### Basis of Design

##### Crestron HD-RX-4K-210-C-E

#### Device Architecture

##### Physical Form factor

###### Surface mount via integrated flange

#### Functions

##### The receiver shall support input switching with the following options:

###### Automatic switching to active input

###### Manual switching via integrated selection buttons

###### Remote switching and control via control processor by same manufacturer

###### Remote switching and control via web interface

##### Single UTP/STP cable transmission receiver

###### Signal transmission up to 230 feet.

###### Minimum cable type supported: UTP/STP CAT5e

##### 3rd party System Integration

###### When integrated with a control processor and Touch 10 Routing and Control Program by same manufacturer the unit shall be capable of integrating with the Cisco Touch 10, providing routing and expanded inputs and switching control.

*Specifier Note:*

*The Crestron and Cisco® Touch 10 Routing and Control Program is a program that allows Crestron® A/V switcher devices to be integrated into a Cisco room control solution and controlled via the Cisco Touch 10 touch screen, increasing the available HDMI® inputs within the room. The Crestron and Cisco® Touch 10 Routing and Control Program requires no custom programming and can be scaled to easily configure thousands of Cisco rooms through the provided user interface.*

*Please see link below for additional info and comaptible products:*

*https://www.crestron.com/Products/Control-Hardware-Software/Software/Development-Software/Crestron-and-Cisco-Touch-10*

#### Connectors

##### The device shall include the following connectors:

###### One (1) HDMI output with support for the following:

HDMI with Deep Color and 4K

HDCP 2.2 compliant

4K Video scaling

Intelligent frame rate conversion

Deep Color support

Content-adaptive noise reduction

3:2/2:2 pull-down detection and recovery

DVI-D with adaptor

EDID

Scaler output resolutions: Auto (EDID preferred), 1280x720p@50Hz (720p50), to 4096x2160p@60Hz

###### One (1)) HDMI input with support for the following:

HDMI with Deep Color and 4K

HDCP 2.2 compliant

DisplayPort Dual-Mode

DVI-D with adaptor

EDID

Common resolutions: 1920x1080 60Hz to 4096x2160 DCI 4K 4:4:4 30Hz

Custom resolutions: pixel clock rates up to 300 MHz

###### One (1) RJ45 single cable HDMI transmission input with support for the following:

Link port for connection to compatible transmission device by same manufacturer

Power sharing option for connected remote transmission device

HDMI with Deep Color and 4K

HDCP 2.2 compliant

EDID

Common resolutions: 1920x1080 60Hz to 4096x2160 DCI 4K 4:4:4 30Hz

Custom resolutions: pixel clock rates up to 300 MHz

###### One (1) Aux. Stereo output

###### Two (2) Control i/o connection ports

###### Two (2) Control relay ports

###### One (1) Control IR output port

###### One (1) Control Serial port

###### One (1) 1.25 A @ 24 VDC, power input jack

Power connection shall support power sharing with connected transmission device

###### One (1) USB Type A connector with support for:

Service and firmware update connection

###### One (1) RJ45 100BASE-TX/1000BASE-T Ethernet ports

###### One (1) RJ45 100BASE-TX/1000BASE-T PoE+ Power Sourcing Equipment (PSE) Ethernet ports

IEEE 802.3at Type 2 PoE+ Class 4 (25.5 W) compliant

#### Power

##### Power supply

###### External 24 VDC power supply

###### Power supply shall support device and connected equipment

#### Compliance

##### UL® Listed for US and Canada, CE, IC, FCC Part 15 Class B digital device

# **EXECUTION**

*NOT USED in this Guide Specification. Specifier shall Specify PART 3 On-Site work as needed.*

# **APPENDICES**

## **SPECIFIED PRODUCTS**

*Specifier Note: This Article includes Crestron products specified in this Guide Specification document. This Article is for reference only and should not be required in actual project manual unless included in an overall system equipment list.*

### Crestron HD-MD-4K-200

### Crestron HD-MD-4K-400

### Crestron HD-MD-4K-200-1G

### Crestron HD-MD-4K-300-2G