

November, 2019

Lehigh University

Audiovisual Functional Narrative

Non-VTC-Capable Single Screen Standard Classroom

Introduction and Overview

This document will serve to provide a written description and functional explanation of the standard classroom system for simple (non-VTC) Single Screen spaces on the campus of Lehigh University.

The audiovisual system has been engineered to make the most simple and reliable user experience possible. Faculty and students will spend little time learning the system given its intuitive user interface design and technology-assisted connection options.

Required Non-AV Systems

A. Lighting

The University will provide and/or maintain a lighting system that will allow for adequate control of lighting in the area of the projected image.

Overall lighting for the room must be controlled to allow for the adequate illumination of students and the lecture space during video-captured sessions.

B. Network Infrastructure

The University will provide at least (5) Ethernet LAN connections for use by the audiovisual, voice, and computing equipment. This provision includes designating an IP address range for the AV devices (up to 5 devices), subnet, gateway, and DNS server information. This connection will allow for remote-controlled access by the campus AV and IT teams for status monitoring and control of the room's audiovisual systems.

The Ethernet connections will encompass PC data, AV control and VOIP telephony for the technology station.

Audiovisual System Description

A. Presentation System

1. Projector and Screens DaLite 21807LS Tensioned Advantage Electrol

screens are the common standard for non-lecture style classrooms. These feature a 5' x 8' image area and a HD Progressive .9 fabric spec. that will enable greater image contrast in a relatively uncontrolled lighting environment. Specific projects can and will dictate other screen specifications.

(1) Panasonic Laser-Phosphor LCD projector will be installed. The projector will be installed approximately 12' from the image surface. A Chief CMA440 Drop-tile plate, a RPMAU Mount, and a fixed extension column are to be used.

2. Video Switching and Scaling

Crestron DMPS3-4K-350-C-Airmedia 9x4 AV Matrix Switcher will be installed. It can switch up to 6 HDMI sources, 2 Crestron DigitalMedia Sources, and a network-streamed collaboration feed to 4 unique displays.

In this case, the switcher will allow for connection of a document camera, a desktop PC, and Laptop and other BYOD sources. It will feed the projector via its DigitalMedia output.

The system will be set to a video resolution of 1920x1200 at a 60Hz refresh rate. This is native to the resolution of the digital projector and the physical screen aspect ratio.

A scaling Crestron DigitalMedia receiver will be utilized to assure fast-display when switching sources for the projector. All source EDIDs will be configured for 1920x1200 resolution, reducing the need for display-side video scaling except in rare cases.

Video sources' digital audio streams will be decoded and amplified for room loudspeaker amplification.

3. Desktop PC

The classroom desktop PC will be connected to the system via its DisplayPort++ output. Extended desktop display is not available in the room.

4. Wireless Presentation

The Matrix switcher's Airmidia processor will allow for BYOD connections to the classroom through the campus' wireless network. The LAN connection to this device will be separate from other AV devices in order to ensure proper subnet discovery of the Airmidia protocol by user devices.

5. Physical Imagery

A WolfVision VZ-8 Light Document Camera will be installed to accommodate physical document and object projection.

6. Laptop and Bring-Your-Own-Device (BYOD) Connection

An Extron IN1604 HD will be utilized to enable connection of all Laptop and BYOD sources, whether VGA, HDMI, Mini DisplayPort, or DisplayPort. This switcher will feature (1) mini analog audio connection as well. The laptop sound source will fail-over to this connection should a device's embedded digital audio not be present, or in the case of a VGA connection.

The laptop and BYOD connection will be provisioned as a bundled wire set in the top surface of the technology station. Each will be labeled specifically to their connector type.

The Extron IN1604 will automatically detect and switch to the signal connected from any (1) of the four video sources. The user will be able to override this input selection if necessary.

The IN1604 will have its Extended Display Identification Data (EDID) set to request the appropriate video resolution and audio format from the source devices, reducing the possibility of conflicting signal types.

The IN1604 will also scale-to-fit any signal that is not matching the system standard, allowing for reliable display of all BYOD sources. Its output will be 1920x1200 @ 60Hz.

B. Integrated Control System

1. Control Processor

The Crestron DMPS3-4K-350-C-Airmedia features an integrated control processor. This processor features hardwired and ethernet control of devices via touchscreen integration and remote access capabilities across campus. RS232 and ethernet control of devices will be utilized.

RS232 will be utilized for the Extron IN1604, and the projector. Built-in contact closure will provide for control of the projection screen. This will typically be tied to system startup and shutdown with manual override provided on the touchscreen.

A Crestron CEN-SW-POE-5 5-Port PoE Switch will be utilized to connect the AV IP devices. The Touchpanel and DM endpoints will be powered via the Crestron PW-4830DUS PoE injector. The touchpanel will be connected to the AV Subnet port on the DMPS3.

2. User Interface

A Crestron TSW-760-B-S Touchpanel will be utilized to enable touch-screen system control of all display and screen control, source selections, and sound manipulation. The programmed user interface will be developed and provided to the integrator by Lehigh.

The touchscreen will be mounted in the Crestron tabletop kit.

3. Energy Efficiency and Automatic Shutdown

A long-distance Crestron GLS-ODT-C-CN occupancy sensor installed in the room's ceiling will allow for automatic shutdown of the system in the event of departure of all participants without prior shutdown. This will be timed to occur after 3 hours of no motion detected in the room.

C. Sound System

1. DSP

A Biamp TesiraForte Digital Signal Processor will be installed. It allows for program audio mixes and audio sends to the room speakers and the USB video codec. Sources include the processed video system audio and microphone sources.

2. Amplification

An Extron XPA-2001 70v amplifier will be used to allow for up to 10 ceiling speakers to be installed and used around the room for voicelift and program material amplification.

3. Loudspeakers

JBL Control 26T ceiling speakers will be installed to achieve sound reinforcement of program audio material and video-conferencing audio.

4. Lectern Microphone

A Shure MX418S/C microphone will be installed in the lectern for sound reinforcement of the presenter and for VTC audio purposes. A mute switch is included for presenter privacy.

D. System Infrastructure

1. Cabling

All new digital video wire will be pulled and terminated throughout the space. In the case of upgraded classrooms, existing wire will serve as pull strings through the existing conduit if applicable.

2. Power Conditioning

A SurgeX SX-1115-RT power conditioner will be installed in the technology station.

3. Equipment mounting

A small 10-space equipment rack will be installed to allow for mounting of the integrated switcher, BYOD scaler, network switch, accessories and power conditioning. The rack size limitation is countered by any restrictions in the furniture size at the determined technology location.

Non-VTC-Capable Dual Screen Standard Classroom

Introduction and Overview

This document will serve to provide a written description and functional explanation of the standard classroom system for simple (non-VTC) Single Screen spaces on the campus of Lehigh University.

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(2) Panasonic Laser-Phosphor LCD projector will be installed. The projector will be installed approximately 12' from the image surface. A Chief CMA440 Drop-tile plate, a RPMAU Mount, and a fixed extension column are to be used.

2. Video Switching and Scaling

Crestron DMPS3-4K-350-C-Airmedia 9x4 AV Matrix Switcher will be installed. It can switch up to 6 HDMI sources, 2 Crestron DigitalMedia Sources, and a network-streamed collaboration feed to 4 unique displays.

In this case, the switcher will allow for connection of a document camera, a desktop PC, and Laptop and other BYOD sources. It will feed the projector via its DigitalMedia output.

The system will be set to a video resolution of 1920x1200 at a 60Hz refresh rate. This is native to the resolution of the digital projector and the physical screen aspect ratio.

A scaling Crestron DigitalMedia receiver will be utilized to assure fast-display when switching sources for the projector. All source EDIDs will be configured for 1920x1200 resolution, reducing the need for display-side video scaling except in rare cases.

Video sources' digital audio streams will be decoded and amplified for room loudspeaker amplification.

3. Desktop PC

The classroom desktop PC will be connected to the system via its (2) DisplayPort++ output. Extended desktop display is not available in the room.

4. Wireless Presentation

The Matrix switcher's Airmedia processor will allow for BYOD connections to the classroom through the campus' wireless network. The LAN connection to this device will be separate from other AV devices in order to ensure proper subnet discovery of the Airmedia protocol by user devices.

5. Physical Imagery

A WolfVision VZ-8 Light Document Camera will be installed to accommodate physical document and object projection.

6. Laptop and Bring-Your-Own-Device (BYOD) Connection

An Extron IN1604 HD will be utilized to enable connection of all Laptop and BYOD sources, whether VGA, HDMI, Mini DisplayPort, or DisplayPort. This switcher will feature (1) mini analog audio connection as well. The laptop sound source will fail-over to this connection should a device's embedded digital audio not be present, or in the case of a VGA connection.

The laptop and BYOD connection will be provisioned as a bundled wire set in the top surface of the technology station. Each will be labeled specifically to their connector type.

The Extron IN1604 will automatically detect and switch to the signal connected from any (1) of the four video sources. The user will be able to override this input selection if necessary. The IN1604 will have its Extended Display Identification Data (EDID) set to request the appropriate video

resolution and audio format from the source devices, reducing the possibility of conflicting signal types.

The IN1604 will also scale-to-fit any signal that is not matching the system standard, allowing for reliable display of all BYOD sources. Its output will be 1920x1200 @ 60Hz.

B. Integrated Control System

1. Control Processor

The Crestron DMPS3-4K-350-C-Airmedia features an integrated control processor. This processor features hardwired and ethernet control of devices via touchscreen integration and remote access capabilities across campus. RS232 and ethernet control of devices will be utilized.

RS232 will be utilized for the Extron IN1604, and the projector. Built-in contact closure will provide for control of the projection screen. This will typically be tied to system startup and shutdown with manual override provided on the touchscreen.

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2. User Interface

A Crestron TSW-760-B-S Touchpanel will be utilized to enable touch-screen system control of all display and screen control, source selections, and sound manipulation. The programmed user interface will be developed and provided to the integrator by Lehigh.

The touchscreen will be mounted in the Crestron tabletop kit.

3. Energy Efficiency and Automatic Shutdown

A long-distance Crestron GLS-ODT-C-CN occupancy sensor installed in the room's ceiling will allow for automatic shutdown of the system in the event of departure of all participants without prior shutdown. This will be timed to occur after 3 hours of no motion detected in the room.

C. Sound System

1. DSP

A Biamp TesiraForte Digital Signal Processor will be installed. It allows for program audio mixes and audio sends to the room speakers and the USB video codec. Sources include the processed video system audio and microphone sources.

2. Amplification

An Extron XPA-2001 70v amplifier will be used to allow for up to 10 ceiling speakers to be installed and used around the room for voicelift and program material amplification.

3. Loudspeakers

JBL Control 26T ceiling speakers will be installed to achieve sound reinforcement of program audio material and video-conferencing audio.

4. Lectern Microphone

A Shure MX418S/C microphone will be installed in the lectern for sound reinforcement of the presenter and for VTC audio purposes. A mute switch is included for presenter privacy.

D. System Infrastructure

1. Cabling

All new digital video wire will be pulled and terminated throughout the space. In the case of upgraded classrooms, existing wire will serve as pull strings through the existing conduit if applicable.

2. Power Conditioning

A SurgeX SX-1115-RT power conditioner will be installed in the technology station.

3. Equipment mounting

A small 10-space equipment rack will be installed to allow for mounting of the integrated switcher, BYOD scaler, network switch, accessories and power conditioning. The rack size limitation is countered by any restrictions in the furniture size at the determined technology location.

VTC-Capable Single Screen Standard Classroom

Introduction and Overview

This document will serve to provide a written description and functional explanation of the standard classroom system for Video Teleconference (VTC)-Capable Single Screen spaces on the campus of Lehigh University.

The audiovisual system has been engineered to make the most simple and reliable user experience possible. Faculty and students will spend little time learning the system given its intuitive user interface design and technology-assisted connection options.

Required Non-AV Systems

A. Lighting

The University will provide and/or maintain a lighting system that will allow for adequate control of lighting in the area of the projected image.

Overall lighting for the room must be controlled to allow for the adequate illumination of students and the lecture space during video-captured sessions.

B. Network Infrastructure

The University will provide at least (5) Ethernet LAN connections for use by the audiovisual, voice, and computing equipment. This provision includes designating an IP address range for the AV devices (up to 5 devices), subnet, gateway, and DNS server information. This connection will allow for remote-controlled access by the campus AV and IT teams for status monitoring and control of the room's audiovisual systems.

The Ethernet connections will encompass PC data, AV control and VOIP telephony for the technology station.

Audiovisual System Description

A. Presentation System

1. Projector and Screens

DaLite 21807LS Tensioned Advantage Electrol screens are the common standard for non-lecture style classrooms. These feature a 5' x 8' image area and a HD Progressive .9 fabric spec. that will enable greater image contrast in a relatively uncontrolled lighting environment. Specific projects can and will dictate other screen specifications.

(1) Panasonic Laser-Phosphor LCD projector will be installed. The projector will be installed approximately 12' from the image surface. A Chief CMA440 Drop-tile plate, a RPMAU Mount, and a fixed extension column are to be used.

2. Video Switching and Scaling

Crestron DMPS3-4K-350-C-Airmedia 9x4 AV Matrix Switcher will be installed. It can switch up to 6 HDMI sources, 2 Crestron DigitalMedia Sources, and a network-streamed collaboration feed to 4 unique displays.

In this case, the switcher will allow for connection of a document camera, a desktop PC, Laptop and other BYOD sources, and PTZ camera sources. It will feed the projector via its DigitalMedia output.

The system will be set to a video resolution of 1920x1200 at a 60Hz refresh rate. This is native to the resolution of the digital projector and the physical screen aspect ratio.

A scaling Crestron DigitalMedia receiver will be utilized to assure fast-display when switching sources for the projector.

All source EDIDs will be configured for 1920x1200 resolution, reducing the need for display-side video scaling except in rare cases.

Video sources' digital audio streams will be decoded and output as analog signals and fed to the room DSP for inclusion in loudspeaker amplification and other destinations.

3. Desktop PC

The classroom desktop PC will be connected to the system via its DisplayPort++ output. Extended desktop display is not available in the room.

4. Wireless Presentation

The Matrix switcher's Airmedia processor will allow for BYOD connections to the classroom through the campus' wireless network. The LAN connection to this device will be separate from other AV devices in order to ensure proper subnet discovery of the Airmedia protocol by user devices.

5. Physical Imagery

WolfVision VZ-8 Light Document Camera will be installed to accommodate physical document and object projection.

6. Laptop and Bring-Your-Own-Device (BYOD) Connection

An Extron IN1604 HD will be utilized to enable connection of all Laptop and BYOD sources, whether VGA, HDMI, Mini DisplayPort, or DisplayPort.

This switcher will feature

(1) mini analog audio connection as well. The laptop sound source will fail-over to this connection should a device's embedded digital audio not be present, or in the case of a VGA connection.

The laptop and BYOD connection will be provisioned as a bundled wire set in the top surface of the technology station. Each will be labeled specifically to their connector type. The Extron IN1604 will automatically detect and switch to the signal connected from any (1) of the four video sources. The user will be able to override this input selection if necessary.

The IN1604 will have its Extended Display Identification Data (EDID) set to request the appropriate video resolution and audio format from the source devices, reducing the possibility of conflicting signal types.

The IN1604 will also scale-to-fit any signal that is not matching the system standard, allowing for reliable display of all BYOD sources. Its output will be 1920x1200 @ 60Hz.

B. Integrated Control System

1. Control Processor

The Crestron DMPS3-4K-350-C-Airmedia features an integrated control processor. This processor features hardwired and ethernet control of devices via touchscreen integration and remote access capabilities across campus.

RS232 and ethernet control of devices will be utilized. RS232 will be utilized for the Extron IN1604, the Biamp TesiraForte, and the projector. Crestnet to RS-232 adapters will be used for the HDBaseT cameras. Built-in contact closure will provide for control of the projection screen. This will typically be tied to system startup and shutdown with manual override provided on the touchscreen.

A Crestron CEN-SW-POE-5 5-Port PoE Switch will be utilized to connect the AV IP devices. The Touchpanel and DM/HDBaseT endpoints will be powered via the Crestron PW-4830DUS PoE injector. The touchpanel will be connected to the AV Subnet port on the DMPS3.

2. User Interface

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The touchscreen will be mounted in the Crestron tabletop kit.

3. Energy Efficiency and Automatic Shutdown

A long-distance Crestron GLS-ODT-C-CN occupancy sensor installed in the room's ceiling will allow for automatic shutdown of the system in the event of departure of all participants without prior shutdown. This will be timed to occur after 3 hours of no motion detected in the room.

C. Sound System

1. DSP

A Biamp TesiraForte Digital Signal Processor will be installed. It allows for program audio mixes and audio sends to the room speakers and the USB video codec. Sources include the processed video system audio and microphone sources.

2. Amplification

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4. Lectern Microphone

A Shure MX418S/C microphone will be installed in the lectern for sound reinforcement of the presenter and for VTC audio purposes. A mute switch is included for presenter privacy.

5. Wireless Microphone

A Shure ULX-S wireless microphone system will be installed for mobile sound reinforcement of the presenter and for VTC audio purposes. This includes a lavalier mic and bodypack transmitter. The J1 frequency band is required on the Lehigh campus.

D. Lecture Capture

1. Distance Learning

(2) Lumens VC-A70H PTZ Cameras will be installed that allow for audience and presenter-view of the room participants for videoconferencing. An Extron MediaPort 200 will be utilized to feed this signal to the local PC via USB 2.0 for use with any software-based video collaboration system (Zoom, Skype, etc.). The MediaPort will also receive audio from the Biamp TesiraForte as a mix-minus of microphone sources only for integration into the videoconference.

The cameras will be connected to the Crestron DMPS3 and routed as sources to the videoconference interface via the Touchpanel.

Pre-set configuration of the cameras' focus points will be enabled via a hidden menu on the Touchpanel and/or a long-press of the preset button itself.

2. Camera Placement

The presenter camera will be mounted on the wall at the rear of the classroom, away from sign-line obstruction by audience participants. The audience camera will be mounted on the wall behind the technology station. Each should be no lower than 80" to meet ADA requirements.

E. System Infrastructure

1. Cabling

All new digital video wire will be pulled and terminated throughout the space. In the case of upgraded classrooms, existing wire will serve as pull strings through the existing conduit if applicable.

2. Power Conditioning A SurgeX SX-1115-RT power conditioner will be installed in the technology station.

3. Equipment mounting A small 10-space equipment rack will be installed to allow for mounting of the integrated switcher, BYOD scaler, network switch, accessories and power conditioning. The rack size limitation is countered by any restrictions in the furniture size at the determined technology location.

VTC-Capable Dual Screen Standard Classroom

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