

AUDIO/VISUAL GUIDELINES

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C. Medium Room (8-12 Seats) are typically outfitted with:

D. Large Conference Room (13 or more seats) vary greatly in approach. Typically a projector/screen combination is specified, but depending on pedagogy and room layout:

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Multipurpose Spaces vary greatly in approach. Typically a projector/screen combination is specified, but depending on pedagogy and room layout:

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A. Zoom Ready - BYOD user connects their laptop as the Zoom host

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PART 1 GENERAL

1.1 SUMMARY

A. Space Types:

Installed AV design for classroom, meeting, hybrid, and multi-purpose spaces are inherently tied to the specific space in question. For the purposes of this document, the following are brief definitions of the types of spaces:

1. Classroom - space that is solely used for classes (teaching & learning)
2. Meeting - space that is solely used for meetings
3. Hybrid - space that is used for both classes and meetings
4. Multi-purpose - space that is used for classes, meetings, seminars, lectures or performances

B. Guidelines:

Factors such as ambient light control, sound reflectivity, size and shape all play a role in determining appropriate display tools.

1. Designs should reflect the industry standard DM (digital media) signal transmission.
2. Designs should recognize the need to refresh AV equipment and cabling on average every five years.
3. Projects that result in spaces that will be scheduled by the Registrar are required to add a room control system with LCD touch panel interface as well as programming to add spaces(s) to the OIT Remote Server and allow for remote access.
4. All networked AV devices (cameras, mics, projectors, soundbars/speakers, touch panel interface) require an assigned network tap that runs to a managed switch.

C. Updates:

This document is reviewed periodically, maximum once every 2 years, to ensure that the content is updated, relevant and consistent with the use of the agreed upon AV technology being deployed and supported in Brown University spaces. Changes to this document are first reviewed and approved by the AV Steering Committee within the Office of Information Technology (OIT) before they are published. The AV Steering Committee is composed of OIT representatives from Endpoint Engineering, Hardware Services, Information Technology Support Consultants (ITSCs), Media Services, with an advisory post for the university preferred AV integrator (currently Shanix Technologies).

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings / wiring diagrams indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Warranty: Submit manufacturer's standard warranty. We require 2 years parts & labor extended warranty on all installations. Include labor and materials to repair or replace defective materials. Warranties must be submitted as a project deliverable.
- D. Maintenance Data: Submit manufacturer's maintenance data, including maintenance schedule.
- E. Extra Stock: Submit extra stock equal to 2 percent of total used.

1.3 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Wherever and whenever possible, install materials and systems in proper relation with adjacent construction, fittings, color scheme, materials, and with uniform appearance. Coordinate with work of other sections.
- B. Restore or replace damaged components and finishes. Test for proper operation. Clean and protect work from damage.
- C. All ethernet cables (in-wall, conduit, or exposed) should be upgraded to a minimum of Cat 6 cables and should be certified.
- D. Spaces that require network taps must be surveyed by CommOps (part of The Networking Team with the Office of Information Technology) to determine:
 - 1. If cabling can be installed in-wall or if conduits would be required
 - 2. If the taps and cabling can terminate at a Managed Network Switch home location in a Telecoms Room (TR) or if the taps will terminate to a Managed Network Switch within the space with an uplink to a larger Network switch in the TR.

1.4 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 780, "Definitions" Article.

PART 2 PRODUCTS

2.1 CLASSROOM/HYBRID SPACE SPECIFICATIONS

- A. Small spaces (up to 20 seats) are typically outfitted with:
 - 1. Large format digital flat panel display (LED commercial/professional models) sized per [Avixa Standards](#).
 - 2. Direct input HDMI
 - 3. Flat panel displays have built-in speakers for audio playback.
 - 4. Depending on room size, installed room speaker(s) may be required for audio playback. (Sized/quantity to space; ceiling-voice; wall-program).
 - 5. Conference Camera with microphone mounted above/below display to capture view of room and audio in Zoom hybrid/remote communication activities (Sized to space).
 - 6. Ethernet connection is also needed for remote access / room-control.
 - 7. HDMI wall plate / digital media transmitter for local laptop connections.
 - 8. Digital presentation system
 - 9. Wireless projections
 - 10. LCD touch panel (7 inch). Button panel may be an appropriate alternate control device vs. LCD touch panel depending on complexity of install.
 - 11. Install requires dedicated data taps for each network enabled device connected to a

Managed network switch approved by Network Ops.

12. USB over Network Wall Plate with Routing to connect camera(s) and microphones over longer distances (USB wire routing that requires an extension for more than the standard 6-9 ft USB cable provided.)
 13. Wireless presentation system requires a dedicated hard-wired Ethernet connection on appropriate Open Spaces VLAN (172.xx.xx.xx) established by Network Ops.
 14. Install of new Middle Atlantic RLNK for network power control.
 15. Occupancy sensor in ceiling to turn off system when no motion is detected
 16. Consideration of Zoom Ready install ([detailed below](#))
 - For a current list of recommended equipment, please reference [this sheet](#).
- B. Medium spaces (21-49 seats) vary greatly in approach. Typically a projector/screen combination is specified, but depending on pedagogy and room layout:
1. Laser projector with minimum 5000 lumens is appropriate for most spaces (appropriate lenses will be spec-ed for applicable throw distances).
 2. Installed projection screen, recessed/powered where appropriate.
 3. Depending on room size, installed room speakers may be required for audio playback. (Sized/quantity to space; ceiling-voice; wall-program).
 4. Installed room microphone(s) for audio capture in Zoom hybrid/remote communication activities (Sized/quantity to space). Additional microphone(s) may be needed if the room will also include Lecture Capture (lesson recording).
 5. Ethernet connection is also needed for the remote access / room-control.
 6. HDMI wall plate / digital media transmitter for local laptop connections.
 7. Equipment rack can either be free standing or contained within a room podium/credenza.
 8. Digital presentation system
 9. Wireless projection
 10. LCD touch panel (7 inch). Some spaces may require larger touch panels (10 inch).
 11. Install requires dedicated data taps for each network enabled device connected to a Managed network switch approved by Network Ops.
 12. USB over Network Wall Plate with Routing to connect camera(s) and microphones over longer distances (USB wire routing that requires an extension for more than the standard 6-9 ft USB cable provided.)
 13. Wireless presentation system requires a dedicated hard-wired Ethernet connection on appropriate Open Space VLAN (172.xx.xx.xx) established by Network Ops.
 14. Installed Middle Atlantic RLNK for network power control.
 15. Occupancy sensor in ceiling to turn off system when no motion is detected
 16. The digital room control system in the rack requires network connectivity for remote access
 17. Installed PTZ conferencing camera for use with Zoom web conferencing. Brown Media Services (MS) to specify make/model at time of system design.
 18. Zoom Ready install ([detailed below](#))
 19. Some spaces of this size may be considered for lecture capture installation. Network connectivity to the rack-mounted capture device is required. Inputs from the content, microphones, and installed cameras needed for this service. Annual licensing is not included in these specs, but is required.
 - For a current list of recommended equipment, please reference [this sheet](#).

- C. Large spaces (50+ seats) dependent on room configuration and materials to be displayed:
1. Multiple projectors are positioned so as to enable projection and simultaneous use of whiteboards. This requires projectors capable of creating viewable images in rooms lit for note-taking. Laser projector with minimum 6000 lumens is appropriate for most spaces (appropriate lenses will be spec-ed for applicable throw distances). In larger venues that double as event spaces (very large screens, very long throw distances, film screenings etc.) a laser projector with 12,000 lumens or better is required.
 2. Installed motorized projection screen(s), recessed/powered where appropriate.
 3. Audio reinforcement is required in larger spaces, especially spaces that are dual-purposed for classroom and event activities. These spaces would require minimum (2) channels of wireless audio – (4-6) is optimal. Additional audio reinforcement elements to consider/include are:
 - a. Speakers
 - b. Wireless lavalier mics with subminiature condenser omnidirectional mic heads for each channel
 - c. Wireless handheld mics for each channel
 - d. Powered antennas system
 - e. Loudspeaker size, location and quantity are space-specific.
 - f. Assistive listening system, per ADA requirements for room size.
 4. Teaching podium outfitted with a condenser gooseneck microphone. Consider an installed computer with a dedicated monitor (touch monitor on articulating arm). The touch monitor can be configured to double as a monitor for installed computers as well as a confidence monitor, Zoom. Inclusive of laptop connections HDMI, power, and Ethernet for end users.
 5. Digital soundboard is required to manage these audio signals. AV programming to accommodate the need for ‘live’ mode (mic mixing) and ‘auto’ mode - basic presentations with podium mic and 2-4 wireless channels. (Live mode/Auto mode in admin page. Along with pre-fader and post-fade selection for Media record out.)
 6. Spaces of this size may be considered for lecture capture installation. Network connectivity to the rack-mounted capture device is required. Inputs from the content, microphones, and installed cameras needed for this service. Annual licensing is not included in these specs, but is required.
 7. USB over Network Wall Plate with Routing to connect camera(s) and microphones over longer distances (USB wire routing that requires an extension for more than the standard 6-9 ft USB cable provided)
 8. Equipment racks are to be kept to a minimum size to accommodate required equipment. Depending on room size/complexity, a media booth may be required. Rooms with media/control booths should have network connectivity for remote Crestron network and event support. Also require HDMI inputs for event support.
 9. Control Processor.
 10. LCD digital room controller (7 inch). More complex spaces may require larger touch panels (10 inch) or additional wall control panels if the podium is removable.
 11. Laptop inputs HDMI.
 12. Audio processing gear (digital sound processors, amplifiers, network version for remote power management)
 13. Proper rack mounted cooling (multiple fans) may be required to avoid overheating from concentration of rack equipment processing gear.
 14. Wireless presentation system requires a dedicated hard-wired Ethernet connection on Open

Spaces VLAN (172.xx.xx.xx) established by Network Ops.

15. Install requires dedicated data taps for each network enabled device connected to a Managed network switch approved by Network Ops.
 16. Loose audio support equipment should be part of project bids (wired dynamic & panel gooseneck mics, floor/table mic stands/bases, XLR cabling, audio monitor for Q&A applications.)
 17. Installed PTZ conferencing camera and room microphones for use with virtual web conferencing. MS to specify make/model at time of system design.
 18. Accessible audio (XLR) and content video (HDMI) record 'outs' for Media Services recording/streaming functionality.
 - a. Consideration of output(s) for installed camera(s).
 19. Zoom Room install ([detailed below](#))
 - For a current list of recommended equipment, please reference [this sheet](#).
- D. Ambient light control and adjustment is critical to managing the quality of the projected/displayed image in a given space. Where exterior windows are present it is recommended that both light-filtering and room-darkening shades be installed. Room lighting should be banked such that the fixtures closest to the screen/display can be turned off/dimmed, leaving some light banks available for task lighting/note taking. In a large space with many/large windows, tying the control of these shades/screens/lights to the room touch panel is required.
- E. Network connectivity should include room wireless access. In spaces outfitted with room control touch panels, adequate rack space is required to house room controllers, audio amps and auxiliary inputs. Equipment rack location will require at minimum (2) data ports – (Touch Panel and installed computer).
- F. Proper power to support all equipment, rack equipment and motorized screen. Low voltage power control for lighting, shades. Media Services (AV): Specification of current equipment models must be MS approved or equivalent.

2.2 MEETING SPACE SPECIFICATIONS

- A. Huddle Room (2-4 Seats) are typically outfitted with:
1. Digital flat panel display (LED commercial/professional models) sized per [Avixa Standards](#).
 - a. With HDMI auto-detect function to power On/Off TV
 2. Swivel/Tilt Wall Mount for TVs
 3. Conference camera with built-in speakers and microphone for audio playback
 4. USB-C hub to connect TV HDMI output cable and Soundbar USB cable
 5. One-cable laptop link to the USB-C hub
 6. Power adapter to supply power to the USB-C hub and devices connected to it
 7. Under the table bracket to store the USB-C hub and cables
 8. Ethernet connection is also needed for remote access / room-control
 - For a current list of recommended equipment, please reference [this sheet](#).

- B. Small Room (4-8 Seats) are typically outfitted with:
1. Large format digital flat panel display (LED commercial/professional models) sized per [Avixa Standards](#).
 - a. With HDMI auto-detect function to power On/Off TV
 2. Swivel/Tilt Wall Mount for TVs
 3. Conference camera with built-in speakers and microphone for audio playback
 4. HDBaseT extender kit for HDMI and USB
 5. USB-C hub to connect TV HDMI output cable and Soundbar USB cable
 6. One-cable laptop link to the USB-C hub
 7. Power adapter to supply power to the USB-C hub and devices connected to it
 8. Under the table bracket to store the USB-C hub and cables
 9. Ethernet connection is also needed for remote access / room-control
 - For a current list of recommended equipment, please reference [this sheet](#).
- C. Medium Room (8-12 Seats) are typically outfitted with:
1. Large format digital flat panel display (LED commercial/professional models) sized per [Avixa Standards](#).
 - a. With HDMI auto-detect function to power On/Off TV
 2. Swivel/Tilt Wall Mount for TVs
 3. Conference camera with built-in speakers and microphone for audio playback
 4. HDBaseT extender kit for HDMI and USB
 5. USB-C hub to connect TV HDMI output cable and Soundbar USB cable
 6. One-cable laptop link to the USB-C hub
 7. Power adapter to supply power to the USB-C hub and devices connected to it
 8. Under the table bracket to store the USB-C hub and cables
 9. Ethernet connection is also needed for remote access / room-control
 - For a current list of recommended equipment, please reference [this sheet](#).
- D. Large Conference Room (13 or more seats) vary greatly in approach. Typically a projector/screen combination is specified, but depending on pedagogy and room layout:
1. Large flat panel (85"+ LED commercial/professional models) sized per [Avixa Standards](#).
 2. Laser projector with 5000 lumens or better are appropriate for most spaces (appropriate lenses will be spec-ed for applicable throw distances).
 3. Installed projection screen, recessed/powered/tensioned where appropriate (DaLite).
 4. Depending on room size, installed room speakers may be required for audio playback.
 5. Wall microphones for smaller spaces
 6. Ceiling microphone(s) for larger spaces
 7. PTZ cameras for use with Zoom web conferencing. To capture the view of the room (Audience & Presenter view)
 8. Equipment rack can either be free standing or contained within a room podium/credenza.
 9. Digital room system
 10. HDMI wall plate transmitter or HDMI passthrough
 11. LCD touch panel (7 inch or 10 inch depending on complexity of installation).
 12. The room control system in the rack requires network connectivity for remote access
 13. Install requires dedicated data taps for each network enabled device connected to a Managed network switch approved by Network Ops.

14. USB over Network Wall Plate with Routing to connect camera(s) and microphones over longer distances (USB wire routing that requires an extension for more than the standard 6-9 ft USB cable provided)
15. Wireless presentation system requires a dedicated hard-wired Ethernet connection on appropriate Open Spaces VLAN (172.xx.xx.xx) established by Network Ops.
16. Install of new Middle Atlantic RLNK for network power control
17. Occupancy sensor in ceiling to turn off system when no motion is detected
18. Consideration of Zoom Ready or Zoom Room ([detailed below](#))
 - For a current list of recommended equipment, please reference [this sheet](#).

2.3 MULTIPURPOSE SPACE SPECIFICATION

Multipurpose Spaces vary greatly in approach. Typically a projector/screen combination is specified, but depending on pedagogy and room layout:

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5. Wall microphones for smaller spaces
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7. PTZ cameras for use with Zoom web conferencing. To capture the view of the room (Audience & Presenter view)
8. Equipment rack can either be free standing or contained within a room podium/credenza.
9. Digital room system
10. HDMI wall plate transmitter or HDMI passthrough
11. LCD touch panel (7 inch or 10 inch depending on complexity of installation).
12. The room control system in the rack requires network connectivity for remote access
13. Install requires dedicated data taps for each network enabled device connected to a Managed network switch approved by Network Ops.
14. USB over Network Wall Plate with Routing to connect camera(s) and microphones over longer distances (USB wire routing that requires an extension for more than the standard 6-9 ft USB cable provided)
15. Wireless presentation system requires a dedicated hard-wired Ethernet connection on appropriate Open Spaces VLAN (172.xx.xx.xx) established by Network Ops.
16. Install of new Middle Atlantic RLNK for network power control
17. Occupancy sensor in ceiling to turn off system when no motion is detected
18. Consideration of Zoom Ready or Zoom Room ([detailed below](#))
 - For a current list of recommended equipment, please reference [this sheet](#).

2.4 ZOOM READY VS. ZOOM ROOM

- A. Zoom Ready - BYOD user connects their laptop as the Zoom host
 - 1. Laptop HDMI connection
 - 2. Installed webcam(s) with USB connection for laptop
 - 3. Computer audio or conference phone
 - 4. Consider soundbar with integrated web camera & microphones & speakers

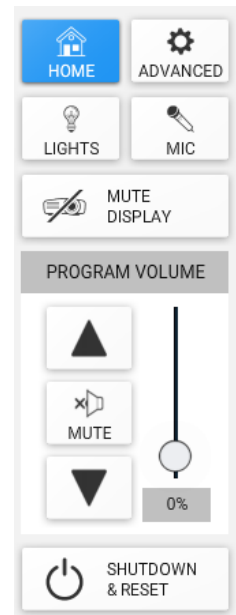
- B. Zoom Room - All inclusive room where the room is the Zoom host
 - 1. Installed Mac Mini
 - 2. Installed webcam(s) connected to Mac Mini
 - 3. Ability to share any projected source for content feed to Zoom
 - 4. Ceiling mics/USB connection to PZM mic

PART 3 OPERATION

3.1 USER EXPERIENCE - CLASSROOMS & MULTIPURPOSE SPACES

- A. Room Functionality (small / medium classrooms)
 - 1. Rooms will be equipped with an occupancy sensor. This is to wake the touch panel as well as shut down the AV system, and put the touch panel to sleep when the room is vacant for more than 30 minutes.
 - 2. Auto connect feature: When an input is detected (laptop/wireless projection) the projector will turn on and the motorized screen will drop and the system will unmute audio.
 - 3. When a source is manually selected (wireless projection/laptop/installed PC) the projector will turn on and the motorized screen will drop.
 - 4. When the auto source is disconnected the system will default to wireless projection.

- B. Simplified graphical user interface (GUI)
 - 1. An integral part of the classroom AV design is a simplified, easy-to-use GUI. The main GUI page allows users to connect & teach with little or no interaction. Users can access an 'advanced' menu page for more control over how and where their presentations are displayed.
 - 2. The right sidebar stays in place during all page selections. This is where the common controls and subpage buttons will be found
 - a. Home
 - 1). Return to the main auto select page
 - b. Advanced
 - 1). A/V routing
 - 2). Audio mixer
 - 3). Lecture capture (if installed)
 - 4). Display controls
 - 5). Admin Panel
 - c. Lighting (if the room has lighting control interface available)
 - d. Microphone (if the room has an active mic)
 - 1). If the room does not have an active microphone, then the mic



volume will be under the advanced menu - audio mixer subpage page. To allow for a temporary install of a microphone

- e. Mute Display
 - 1). When muted the icon should flash selected state
- f. Program volume
 - 1). When muted the icon should flash selected state
 - 2). Adjusting volume up will unmute the system
- g. System Shutdown / Reset
 - 1). Shut down will
 - a). Power off / unmute projector
 - b). Raise projector screen
 - c). Return lights to all on
 - d). Reset system to auto mode
 - e). Mute room audio (with mute button selected)
 - 2). System reset will
 - a). Unmute projector
 - b). Return lights to all on
 - c). Reset system to auto mode
 - d). Unmute room audio

C. Wireless Projection

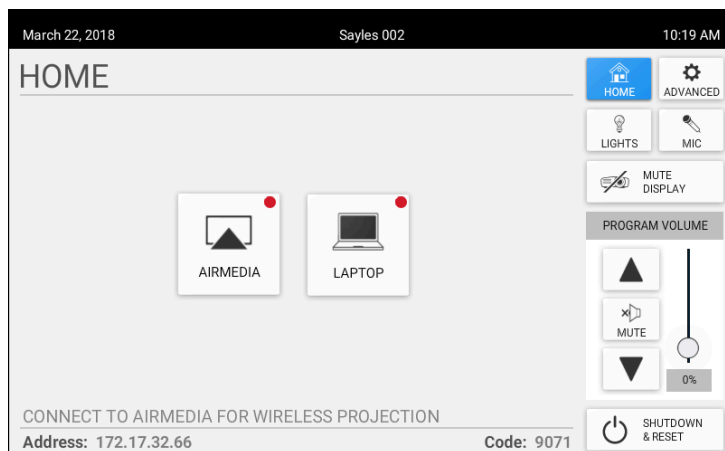
- 1. Standard teaching & learning spaces will be outfitted with wireless projection. This allows presentations from any device, but does require a dedicated Ethernet port for the device as well as a strong wireless network signal in the space.

D. Variables

- 1. On a room-by-room basis, in collaboration with Media Services team members, the number and location of display devices (flat panel monitor vs. projector), the addition of lecture capture/audio reinforcement (speakers and/or microphones), live annotation capabilities (Planar touch screen monitors for installed instructor station computers) and web conferencing (cameras, microphones) will be evaluated for inclusion.

E. Examples of GUI Design

1. Standard Classroom GUI



2. Standard Classroom GUI with limited room controls



END OF SECTION