UIT POLICIES AND PROCEDURES DIVISION 27 41 16

STANFORD COMMUNICATIONS AUDIO VISUAL STANDARD

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<th>ISSUE</th>
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<tr>
<td>1</td>
<td>Paul Narcisse/Blake Gentner, 12/26/19</td>
<td>Erich Snow, 02/20/20</td>
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Part 1: General

1.1 Summary
A. Audiovisual systems are integral to many aspects of Stanford, from classrooms, conference rooms and performance spaces. Through advance planning and design activities, Stanford Video Services can engineer systems that meet the needs of the end users and provide a high-quality experience for all participants.

B. An audiovisual system should be designed with end-users as part of the facility design process to assure that all electrical, architectural and design criteria are included and considered.

C. Advance planning of audiovisual systems in key to a successful system and seamless integration into the room environment.

1.2 References
A. Audiovisual design and installation practices shall comply with the following standards issued by AVIXA (Audiovisual and Integrated Experience Association) and ANSI/INFOCOMM:
   a. INFOCOMM 2014 - AV/IT Infrastructure Guidelines for Higher Education.
   b. AVIXA A102.01:2017 - Audio Coverage Uniformity in Listener Areas.
   c. AVIXA F501.01:2015 - Cable Labeling for Audiovisual Systems.
   d. AVIXA V202.01:2016 - Display Image Size for 2D Content in Audiovisual Systems.
   e. ANSI-J-STD-710 - 2015 - Audio, Video and Control Architectural Drawing Symbols
   g. ANSI/INFOCOMM 3M-2011 - Projected Image System Contrast Ratio

Part 2: Products

1.1 Summary
A. To drive product standardization across campuses to ensure a simple, consistent end user experience, regardless of location.

1.2 Approved Manufactures
a. Professional displays (projectors and flat panels): NEC, Panasonic
b. Display Mounts: Chief (preferred), Peerless
c. Video switching: Extron
d. Control: Extron, QSC (pending)
e. Audio DSP: QSC (preferred), Extron
f. Wireless Microphones: Shure ULX-D, Microflex complete wireless
g. Fixed microphones: Shure MXA310/910, Shure MX202, Cisco Table Microphone
h. Video Conferencing: Cisco Room Kit series (Mini, Plus, Pro), WebEx boards (on prem registration) 55, 70, 85
i. Audio Amplifiers: Extron, QSC
j. Speakers: QSC

Part 3: Execution

1.1 Video Conferencing
   A. Summary
      a. Cisco Room Kit series and its derivatives are the only allowable video teleconferencing solutions supported on campus.
      b. Per University guidelines, 30% of total conference room space should be video enabled. A minimum of one room type (see below) should be video enabled by default. A general rule is 100% of large rooms, 100% of medium rooms and 25% of small rooms should be so equipped.
      c. IT Infrastructure is currently evaluating video-over-IP standards. No definitive decision has been made. If the project calls for video-over-IP, then please contact IT Infrastructure early in the process so that the appropriate resources can be allocated.

1.2 Equipment Mounting
   A. Summary
      a. Regardless of equipment location, audiovisual systems typically require specialized racks to secure the equipment. Depending on the program and architectural demands, a rack that can be configured in a wide variety of ways is required.
      b. A detailed AV design is required to properly configure the racks needed for the system in advance of final architectural planning. In some cases, in-wall or above ceiling storage systems may be needed or desired. FSR and other manufacturers provide solutions for non-traditional AV rack systems.
      c. For rooms where AV equipment can be stored in an under-counter height credenza, the space allocated for an AV rack shall be 30-inch-wide and 30 inch deep. Depending on the AV system design complexity, more than one rack may be needed. The rack should be accessible by the means of casters or silicone sliding strips on the base of the rack.
      d. If an AV equipment closet is planned for the space, the closet dimensions shall be at minimum 36-inch-wide by 36 inch deep. The rack should be able to be pulled out of the closet by the means of casters or silicone sliding strips on the base of the rack. Appropriate cable service lengths must be provided to enable the rack to be pulled out for service.
      e. For any AV equipment locations (credenza, AV rack closet or projection booth), proper cooling in the space should be considered depending on the system components planned. A heat load calculation can be performed by the AV designer to enable proper cooling for the space. In some cases, passive cooling may be sufficient but in other areas a dedicated cooling system (or separate AV space zone) should be provided to prevent damage to electronics from heat generated by the AV system components.
   B. Equipment standards
c. Electrical: See FDG Division 26: Electrical

A. Summary

a. To properly specify the electrical needs for an AV system, a full system design must be completed with input from end users and AV system designers. Depending on the complexity of the overall project, an electrical engineer may be required to enable the proper services for the AV system.
b. This is especially true for full renovation or new construction projects. This design must be done in advance of the final room design and pricing by general contractors to prevent change orders related to AV system requirements.
c. Dedicated circuits must be provided for any outlets that will connect to the AV system. This includes AV rack power, image displays (projectors and flat panels), end-user device connection locations (power outlets for laptops, tablets or other portable devices). These input locations may be spread around the room and final locations must be determined with the end-users, AV designer, architect and electrical engineer.
d. All AV related power circuits must be on the same electrical phase to reduce the potential of audio and video interference developing in the AV system. This is evident in 60 Hz audio buzz in the sound system or rolling dark bands in video displays.
e. Isolated grounds are not required for AV equipment.
f. Electrical outlet quantities are dependent upon the size of the AV system. In general, a quad outlet is required for AV rack closets or credenza locations. Each outlet shall be rated at 20-amp level unless otherwise specified. See FDG Division 26: Electrical
g. At image display locations, at least a duplex outlet is required. Depending on the system components, a quad outlet is often desired to power peripheral devices at the display location.
h. Ceiling mounted outlets shall be accessible at below ceiling level, either in a ceiling mounting system or outlet integrated into the ceiling.

1.3 Pathways

A. Summary

a. To properly connect AV system components together, proper wiring infrastructure should be provided. Refer to FDG Division 27: Communications Services. In the case of new or renovation construction, metal conduit must be used from point to point (ex. from an AV rack closet to speaker, microphone and display locations).
b. Conduits shall be sized appropriately to avoid over filling, based on National Electrical Code requirements.
c. Conduit is required above any ceiling spaces that are not accessible after construction to enable expansion in the future.
d. Conduit riser diagrams shall be developed by the AV designer and included on the electrical drawings for construction.

e. Conduit must be used for microphone or speaker wiring, to protect them from electromagnetic interference and hums and buzzes in the audio systems. Other system wiring may also require conduit for similar reasons.

f. At a minimum, 1-1/2 inch diameter conduit should be provided for small systems. A series of 1-1/2 inch or larger diameter conduits should be provided for more complex systems.

i. Although AV system wiring is low voltage wiring, it should be run in conduit specifically designated for AV and NOT mixed with other low voltage wiring, such as data networks.

h. All conduits shall be provided with pull strings to enable easy cable pulls.

j. In some cases, conduits can be run up walls of a space and stub up above the ceiling if the room ceiling is accessible usually with a ceiling grid system. Stub-up conduit shall have plastic bushings placed on them to prevent cables from being damaged.

k. In more basic AV systems, typically in offices or small conference rooms, the use of “ring and string” approaches to AV wiring is sufficient or even preferred. This method uses an electrical mud ring device that allows the inserting of AV connection devices. A variety of manufacturers make options that can be considered.

l. If in-wall boxes are to be provided for AV connection points, they should be specified to be extra deep to allow for space for AV devices. The AV design process will determine the proper depth of the box based on the device planned.

B. Equipment standards


1.4 Data

A. Summary: Refer to FDG Division 27: Communications Services

a. To properly connect AV system components together, proper wiring infrastructure should be provided. In the case of new or renovation construction, metal conduit must be used from point to point (ex. from an AV rack closet to speaker, microphone and display locations).

b. Conduits shall be sized appropriately to avoid over filling, based on National Electrical Code requirements.

c. Conduit is required above any ceiling spaces that are not accessible after construction to enable expansion in the future.

d. Conduit riser diagrams shall be developed by the AV designer and included on the electrical drawings for construction.
1.5 Projectors

A. Summary

a. Display technologies are updated on a regular basis. The audiovisual system design process will help determine the correct display technology for each location.

b. Recent developments in laser based light sources for projectors make these an attractive option over the traditional lamp-based systems commonly used in the past. There are no lamps to purchase during the life of the projectors (rated at 20,000 hours) and no hazardous mercury-based lamps for disposal. Unless specifically requested and approved, no bulb-based projectors are allowed to be installed at Stanford.

c. In some cases, systems are being designed for 4K resolution content. For systems that have the programmatic direction to include 4K or higher image quality, the AV system design will be developed to meet this need. The remaining components of the AV system must also be 4K capable, including switching, signal transmission devices and cabling.

d. As of January 2020, the following projectors are currently being recommended and installed in a variety of locations at Stanford.

B. Equipment standards

<table>
<thead>
<tr>
<th>Panasonic</th>
<th>Projector Style</th>
<th>Brightness</th>
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<tr>
<td>PT-RZ570</td>
<td>1 chip DLP WUXGA</td>
<td>5,000 lumen laser</td>
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<tr>
<td>PT-RZ770</td>
<td>1 chip DLP WUXGA</td>
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<td>PT-RZ970</td>
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<td>PT-RZ120</td>
<td>1 chip DLP WUXGA</td>
<td>12,000 lumen laser</td>
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<tr>
<td>PT-RZ21K</td>
<td>3 chip DLP WUXGA</td>
<td>20,000 lumen laser</td>
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1.7 Projector screens

A. Summary

a. Projection screen aspect ratio shall be 16:10 for applications. Alternate ratios would be 16:9 (if customer requires it).

b. Projector screens should be sized at 109" or larger diagonal. Anything smaller can be served by a 98" flat panel (see below section). If the room layout won’t allow for a
screen that large (for example if there are windows in the way), then a smaller screen can be installed.

c. The advantage line of screens allows for recessing in either drop or hard ceiling systems, with the ability to install the screen housing during the rough-in phase of construction, followed by the screen fabric and motor once the room is in a cleaner condition.

d. In general, Stanford uses the HD Progressive 1.1 projection surface in the Da-Lite line of screens. Alternate screen surfaces can be selected depending on the requirements of the room environment

B. Equipment standards (add electrical requirement for screen, screen comes in a 120V and 220V)


b. For most flat floor classroom and conference room environments that call for a wall or ceiling mounted screen, with the size of 109” diagonal or more, the Da-Lite Tensioned Contour Electrol is specified: https://www.legrandav.com/products/da-lite/screens/electric_screens/wall_and_ceiling Mounted_electric_screens/tensioned_contour_electrol

c. For ceiling recessed screens, the Da-Lite Tensioned Advantage Electrol is specified: https://www.legrandav.com/products/da-lite/screens/electric_screens/ceiling_recessed_electric_screens/tensioned_advantage_electrol

1.8 Flat Panels

A. Summary

a. The widespread use of flat panel displays has, in some cases, enabled audiovisual systems to become less complicated. This is due to the ability to use a large (65-98” diagonal dimension) flat panel in rooms that had traditionally been equipped with a projection screen and projector. These changes allow for a reduction in overall cost for the project due to reduced power needs as there is no power needed for a projection screen and a projector, only for the panel and peripheral equipment. Flat panels are increasingly energy efficient as their use of LED lighting systems vs. early fluorescent lighting reduces their energy usage.

b. Flat panels installed at Stanford must be from a manufacturer’s line of professional equipment. These have a full range of connection types and feature RS-232 control capability, which enables integration with other professional AV system components. They are also rated for (a minimum) of 16/7 operation (16 hours a day, 7 days a week) and offer a longer native warranty period (usually a minimum of 3 years).

c. As of 2019, there is no reason to install a flat panel with a native resolution of 1920x1080. 4K (3840x2160) professional displays are the standard for deployment on Stanford projects.

d. Bottom of display must not be lower than at 47 inches above the finished floor.
e. Behind each display there must be:
   a. AV
   b. 4 port Data
      i. Refer to FDG Division 27: Communication Services
   c. Quad power
f. Vertical center of these boxes shall be 3.5” below the top edge of the display; group of boxes shall be centered horizontally on the display
g. AV shall be at a minimum a 4 11/16” x 2-1/8” deep box with a 1-gang mud ring - 1-1/2” conduit minimum where applicable
h. 4 Port Data
   a. Refer to FDG Division 27 10
i. Power shall be a quad receptacle; power shall be the same phase as the rest of the AV equipment in that system where applicable.
   a. Refer to FDG Division 26
j. Unless otherwise required or if the dimensions of the room make it impossible, displays should be mounted on the centerline of the room.
k. Wall mount for display shall be installed centered horizontally and vertically.
l. Display mounts shall be of commercial/professional quality and built for the intended use specified by the end user/client, as well as designed to accommodate the specified display.
m. Approved and supported display mount manufacturers are Chief Manufacturing and Peerless-AV are recommended unless specific needs dictate otherwise.
   a. For monitor sizes 26” to 47” the bracket must be able to support monitors up to 126lbs. (Chief MTM1U)
   b. For Monitors 37” to 63” the bracket must be able to support monitors up to 200 lbs. Chief LTM1U
   c. For Monitors 55” to 82” the bracket must be able to support monitors up to 250 lbs. Chief XTM1U

B. Flat Panel Standards

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Product</th>
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<tr>
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<td>NEC</td>
<td>75-inch panel</td>
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<td>NEC</td>
<td>86-inch panel</td>
<td>C861Q</td>
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### Video Walls

#### A. Summary

- Each system is uniquely designed with the end user’s programmatic needs in mind. Specific equipment for video walls is developed during the design process. The budget for video walls should include at least one spare panel to enable quick swapping in case of an equipment failure in the future and obsolescence in future panel models.

- Shall be 16:9 format, 1080P minimum resolution

- Minimum 1.9 dot pitch, 1.5 or smaller preferred

- Must have spare tiles left behind

- Must allow HDCP content

- Must allow single HDMI input to drive the entire pixel space

- If multiple inputs / muxing of signals required, a video wall controller will be installed (Extron Quantum or equivalent that supports customer requirements)

#### B. Equipment standards


#### 1.10 Control

#### A. General

- Regardless of third-party UI/UX, a control processor configured and connected to all devices and patched to the AV management network is required in all spaces.
i. Most rooms are able to be controlled with the Cisco Touch 10 - there is no need for third party control.
   a. Wall mounted Cisco Touch 10
   b. Wall mounted Cisco Touch 10 when back box is needed in conjunction with the Five Gang ring also use:

j. If a third-party control system is required, then Extron is the preferred vendor. A third-party solution should only be considered if the room does not have video conferencing capability or is too complex for a Touch 10 to control.

k. Extron offers an enhanced support and purchase program to higher education institutions like Stanford.

l. The appropriate processor required for the job should be chosen based on connectivity needs

m. The IPCP should be patched to a TSO configured for the AV VLAN. Devices should be set up as DHCP, and the following information should be provided to Video Services no less than two weeks prior to commissioning:

   n. MAC address
   o. Vendor Name / Model Number / serial number
   p. Location (quad/building/room/rack)
   q. Login information (full admin access)
   r. The IP schema for control is as follows:
      1. DSP: 169.254.101-105
      2. IPCP AV Lan: 169.254.1.245
      3. Extron touch panels: 169.254.1.121-125
      4. Shure microphones: 169.254.1.126-150
      5. Shure charging hub: 169.254.1.151-155

B. Equipment standards

   a. Examples of control surfaces:
      7. Hard button control panel:
         https://www.extron.com/product/mlcplus100

      8. Touch Screen control surface:
         https://www.extron.com/product/tlppro1025t?subtype=604
9. **Control Processor:**

C. Theme/Design
   a. Stanford has standardized on the ‘Fuel’ theme from Extron as it mimics the Touch 10 interface used in the bulk of our conference rooms. This helps with user acceptance and usability having a uniform UI/UX across systems regardless of their size or underlying complexity. Full functionality should be available to end users, with advanced pages available for more control over the individual components of the system. [https://www.extron.com/article/fuelguiresourcekit?tab=download](https://www.extron.com/article/fuelguiresourcekit?tab=download)

1.11 Video Input

A. Summary
   a. HDMI is the only allowable video input to be installed on the customer-facing side.
   b. Any cable run >15’ must be first converted via Extron media converters
   c. If recording and streaming is required, an Extron SMP 351/352 series 400gig version shall be installed.

1.12 Audio

A. Summary
   a. Depending on the size of the AV system, audio requirements can be very basic or complex. Below is a sampling of commonly used audio components for different room types.

B. Speaker Systems: (use ceiling wire or 12-gauge wire to secure speaker)
   a. QSC in ceiling speakers (AD-C6T-LP)
      a. 16/2 cabling (Belden Cable #)
   b. QSC pendant speakers (AD-P6T)
      a. 16/2 cabling (Belden Cable #)
   c. QSC surface mount: [https://www.qsc.com/systems/products/lo...mount-loudspeakers/acousticsign™-series-surface-mount/](https://www.qsc.com/systems/products/lo...mount-loudspeakers/acousticsign™-series-surface-mount/)
      a. 16/2 cabling (Belden Cable #)

C. Amplifiers:
   a. Extron XPA XTRA series (XPA2001 or similar, depending on speaker count and zone requirements)
   b. Extron NetPA 1001-70V AT Dante-enabled amplifier
   c. QSC CX-Qn series Q-Sys enabled amplifier

D. DSP:
a. Stanford has standardized on the QSC Core line of DSP for any systems that require management of a large number of audio signals through the system. https://www.qsc.com/systems/products/q-sys-ecosystem/products-peripherals-accessories/q-sys-cores/

b. Proper design of the system is required to correctly specify the components necessary and associated programming resources necessary to create the system.

E. Microphones:

   a. Stanford uses a variety of microphones depending on the system requirements. Systems should be right-sized based on feedback from the end users to deliver the experience they desire in-room. A mixture of handheld, lavalier and installed microphones is often required to do so.

   b. For installed microphones, we allow choice between 3 model lines.
      i. Shure MicroFlex Advanced (MXA910 for ceilings)
      ii. Shure MX202 with appropriate cartridge
      iii. Cisco Table Microphone (CS-MIC-TABLE-J= or CS-MIC-TABLE-E= depending on termination requirement)
      iv. Shure MicroFlex Complete Wireless

   c. For user microphones, we support:
      i. Shure ULX-D system
      ii. Handheld microphones should have SM58 capsule
      iii. Lavalier microphones should have a 183 omnidirectional cartridge
      iv. Gooseneck base shall have a 10” gooseneck microphone with a cardioid cartridge

1.13 Network

A. General

   a. Stanford supports the Dante audio network standard.

1.14 Documentation

A. General

   a. Within 2 weeks after the completion of a project, a USB flash drive (or equivalent) shall be provided IT Infrastructure that consists of:
      i. Uncompiled raw control / programming file
      ii. All art assets used in control file
      iii. Configuration backup for audio DSP, matrix video switches, etc.
      iv. As-built drawings consisting of updated documents in native DWG that show RCP, wiring schematic, elevation and all configuration information provided.
      v. All login and password information for all devices (schema will be provided).
Part 4: Meeting space requirements

1.1 General

Stanford University defines their general administrative collaboration and conference spaces as small, medium, and large rooms. These are broken up based on rough square footage of the space.

1.2 Room standards

A. Small Room: <120 square feet
   a. Backing centered on wall starting at 42” AFF and extending to 78” AFF, 36” wide suitable for > 100 lbs. of hanging weight
   b. A single display <=65” (4K LED) mounted where the bottom of the display should be at 47” AFF
   c. Extron MLC Plus 100 shall be wall mounted adjacent to light switch at 48” AFF
   d. Single HDMI input in the floor box
   e. If no floor box, then an HDMI decora transmitter shall be centered below the display at 18” AFF
   f. No additional audio in room (display speakers)

B. Small room with Video Teleconferencing (VTC)
   a. Backing centered on wall starting at 42” AFF and extending to 78” AFF, 36” wide suitable for > 100 lbs. of hanging weight
   b. A single display <=65” (4K LED) mounted where the bottom of the display should be at 47” AFF
   c. A Cisco Room Kit Mini shall be mounted below the display
   d. Single HDMI input in the floor box
   e. If no floor box, then an HDMI decora transmitter shall be centered below the display at 18” AFF
   f. Touch 10 connected through the floor box
   g. If no floor box, then a wall plate and or wall plate and Five Gang box (when environment requires a back-box) shall be provided where the Touch 10 can be connected.
      a. Ring for wall mounted Cisco Touch 10
      b. Back Box for Cisco Touch 10 (when back box is needed in conjunction with the Five Gang ring) use:
   h. No additional microphone / audio in room (integrated Room Kit Mini microphones / speakers)
i. Extron IPCP control for monitoring system (connected to displays via RS232, codec via IP)
   a. Use Belden 22/4 cable (Belden Cable #)
   b. Use RS-232 connectors

C. Medium Room: <240 square feet
   a. Backing centered on wall starting at 42” AFF and extending to 78” AFF, 36” wide suitable for > 150 lbs. of hanging weight
   b. 2 x 65” or 75” displays (4K LED) mounted where the bottom of the display should be at 47” AFF. Size dependent on physical space
   c. Single HDMI input in the floor box
   d. If no floor box, then an HDMI decora transmitter shall be centered below the display at 18” AFF
   e. 4 x ceiling speakers (pendant or flush, depending on the ceiling type)
   f. 3 x pendant microphones or 3 x table microphones
   g. Cisco Room Kit Plus Video Conferencing system with Quad Camera Array
   h. Touch 10 to be the primary interface for control. If at all possible, shall be located at the table
   i. If table location is not available, then a wall plate can be mounted adjacent to the light switch is an acceptable secondary location
      a. Ring for wall mounted Cisco Touch 10
         b. Back Box for Cisco Touch 10 (when back box is needed in conjunction with the Five Gang ring) use:
   j. Extron IPCP control for monitoring system (connected to displays via RS232, codec via IP)
      a. Use Belden 22/4 cable
      b. Use RS-232 connectors

D. Large room: <600 square feet
   a. Backing centered on wall starting at 42” AFF and extending to 78” AFF, 96” wide suitable for > 450 lbs. of hanging weight. An alternate for this single backing would be two separate installations, totaling the above dimensions
   b. 2 x 86” or 98” displays (4K LED) mounted where the bottom of the display should be at 47” AFF. Size dependent on physical space
   c. Single HDMI input in the floor box
   d. If no floor box, then an HDMI decora transmitter shall be centered below the display at 18” AFF
e. Secondary HDMI input shall be placed on rear wall centered at 18” AFF
f. 8 x ceiling speakers (pendant or flush, depending on the ceiling type)
g. 6 x pendant microphones or 6 x table microphones
h. Cisco Room Kit Pro Video Conferencing system with Quad Camera Array
i. Touch 10 to be the primary interface for control. If at all possible, shall be located at the table
k. If table location is not available, then a wall plate can be mounted adjacent to the light switch is an acceptable secondary location
   a. Ring for wall mounted Cisco Touch 10
   b. Back Box for Cisco Touch 10 (when back box is needed in conjunction with the Five Gang ring) use:
j. Extron IPCP control for monitoring system (connected to displays via RS232, codec via IP)
   a. Use Belden 22/4 cable
   b. Use RS-232 connectors
E. Extra Large Room: <1200 square feet
   a. There are two display options for an extra-large room. Ceiling height and seating capacity will dictate which of the two options is appropriate.
   b. If flat panels are chosen, then please see below for requirements.
   c. Backing centered on wall starting at 42” AFF and extending to 78” AFF, 96” wide suitable for > 450 lbs of hanging weight. An alternate for this single backing would be two separate installations, totaling the above dimensions
   d. 2 x 98” displays (4K LED) mounted where the bottom of the display should be at 47” AFF.
   e. If the room is more suitable for projectors, then please see below for requirements.
   f. One ceiling-recessed, tab-tensioned, electric screen of appropriate size per Avixia viewing standards
   g. One approved projector of adequate brightness to produce a minimum of 100 fL measured at center and corner of the screen.
   h. Two HDMI inputs in the floor box
   i. If no floor box, then (4) HDMI decora transmitters shall be centered on each wall @ 18” AFF
   j. 12 x ceiling speakers (pendant or flush, depending on the ceiling type)
   k. 4 x Shure MXA910 ceiling mounted beamforming microphone system
l. QSC Core 510i with Dante interface card, 2 x analog interface card and 2 x analog output card
m. QSC Q-Lan switch for audio, control, and PoE
n. Cisco Room Kit Pro Video Conferencing system with Quad Camera Array and second camera facing front of room (presenter, Panasonic AW-UE150KPJ)
o. Touch 10 to be the primary interface for control. If at all possible, shall be located at the table
p. If table location is not available, then wall mounted adjacent to the light switch is an acceptable secondary location
   a. Ring for wall mounted Cisco Touch 10
   b. Back Box for Cisco Touch 10 (when back box is needed in conjunction with the Five Gang ring) use:
q. Extron IPCP control for monitoring system (connected to displays via RS232, codec via IP)
   a. Use Belden 22/4 cable
   b. Use RS-232 connectors

OPTIONAL:

i. 2 x wireless microphone receivers (one handheld / one lavalier)
ii. Gooseneck microphone @ lectern (wired)

F. Divisible Room

a. A divisible room is similar to a large room x 2, with extra equipment provided to allow for dual / combined mode operation. A locking rack located in room is required to house all equipment.
b. There are two display options for an extra-large room. Ceiling height and seating capacity will dictate which of the two options is appropriate.

Below would be needed per side.

c. Flat Panels
iii. Backing centered on wall starting at 42” AFF and extending to 78” AFF, 96” wide suitable for > 450 lbs of hanging weight. An alternate for this single backing would be two separate installations, totaling the above dimensions

iv. 2 x 98” displays (4K LED) mounted where the bottom of the display should be at 47” AFF.

d. Projectors
   i. One ceiling-recessed, tab-tensioned, electric screen of appropriate size per Avixia viewing standards
   ii. One approved projector of adequate brightness to produce a minimum of 100 fL measured at center and corner of the screen.

e. Audio
   i. XLR output (summed of voice and program audio) on back wall for recording
   ii. 8 x ceiling speakers (pendant or flush, depending on the ceiling type)
   iii. 2 x Shure MXA 910 per side (for coverage)
   iv. Gooseneck microphone @ lectern (wired)
   v. 4 x wireless microphone receivers (two handheld / two lavalier)

f. Video
   i. 1 x Cisco Room Kit Pro Video Conferencing system with front and rear cameras (Panasonic AW-UE150KPJ)
   ii. Single HDMI input in the floor box adjacent to lectern. If more than one lectern location, then HDMI inputs shall be available at every location
   iii. Secondary HDMI input shall be placed on rear wall centered at 18” AFF

g. Control
   i. 2 x Extron 10” touch panels using the ‘Fuel’ theme to mimic a Cisco Touch 10, with an initial page asking if the room is to be divided or not.
   ii. One panel would be located on / at the lectern, one panel would be wall mounted in the rear of room

   1. Rear room wall mounted Cisco Touch 10

   1. Ring for wall mounted Cisco Touch 10

2. Back Box for Cisco Touch 10 (when back box is needed in conjunction with the Five Gang ring) use:

Below would be shared between the two rooms

   i. Audio DSP (QSC Core 510i with appropriate cards)
   ii. Video matrix switch (Extron DXP HD 4K Plus series, 16x16)
   iii. QSC Q-Lan switch for audio, control, and PoE
   iv. Extron IPCP control for monitoring system
   v. OPTIONAL: Additional wireless microphones per user request / requirement