University of Colorado Colorado Springs

UCCS AUDIO VISUAL SYSTEMS

GENERAL STANDARDS & GUIDELINES

Prepared by UCCS OIT Services

Revision: 23.03.22

Last Updated: March 22, 2023

Contents

Introduction, References and Thanks 5
Integrator Requirements 6
Physical Requirements for AV Systems 7
Equipment Racks 7
Sample Rack Layout 7
Power 8
Ceiling Mounted Racks 8
Lecterns 8
ADA Lectern Layout 9
Ventilation 9
Room Layout 9
Projection Surfaces 10
Screen Size 10
Single Screen Projection 10
Dual Screen Projection 10
Specialty Screens 10
Display Devices 10
Projectors 10
Flat Panel Displays 11
Flat Panel Display Mounts 11
AV Control 11
Audio 11
Microphones 11
Lighting 11
Standard Room Configurations 12
Standard Classroom 12
Small Classroom 12
Large Classroom 13
Lecture Capture (HyFlex) Add-On 13
Active Learning Add-On 13
Meeting Room 13
Conference Room 13
Network and Security Infrastructure Requirements 14

Floor Boxes 14
Wall Plates 15
Phone Locations 15
AV Equipment Passwords 15
Audio Visual Systems Cabling Installation Specifications 15
Cabling 15
Conduit and Floor Tracks 15
Cable Labeling 16
Cable specifications 16
Network Cable specifications 16
ADA Compliance and Facilities Integration 16
ADA Compliance 16
Wall-Mounted Equipment 16
Facilities Integration 16
Lighting 16
Shades 17
Occupancy Sensors 17
System Programming 17
Touch Panel Interface 17
Hardware Administrative Rights 17
AV System Programing 17
AV Equipment Configuration 17
Audio Visual System Design and Installation Process 18
General Guidelines 18
System Upgrades 18
Project Coordination 18
Commissioning 18
Inspection and Testing 18
Operator Training 18
Deliverables 19
Programming 19
Pre-Installation 19
Project Documentation 19
Purchasing, registering devices and A+ Rewards 19
Warranty, Service Support 19

Acceptable Equipment List 20
Display Options 20
Projectors 20
Projection Screens Recessed 20
Displays 20
Interactive Displays 20
AV Control & Switching Options 20
AV Controller 20
User Interfaces 20
Video Switching 20
Audio 21
Audio Processor 21
Amplifiers 21
Microphones 21
Soundbars 21
Speakers 21
Assistive Listening System 21
Video 21
Document Camera 21
Source Devices 21
Rack Cabinets/Frames 21
Free Standing Rack 21
Wall Mount Racks 22
Power Conditioner/Distribution 22
Other 22
Lecterns 22
VTC Cameras 22
Whiteboard or Whiteboard Material 22
Hyflex Solution (Lecture Capture) 22
Spectrum Freedom-One Sit-to-Stand Lectern SKU 22
Definitions 23

Introduction, References and Thanks

This document was created to ensure that all new and upgraded audiovisual spaces are made to the same standard that UCCS OIT is trying to set in conjunction with Academic Support.

If there are any questions or deviations from this document, UCCS OIT must be consulted before any installation.

UCCS OIT uses the following documents from AVIXA to help define industry standards related to AV design and installation.

Document Title	Version	Created By
Audio Coverage Uniformity in Listener Areas	A102.01:2017	InfoComm International® AVIXA™
Audiovisual Systems Energy Management	4: 2012	InfoComm International® AVIXA™
Audiovisual Systems Performance Verification	10:2013	InfoComm International® AVIXA™
Cable Labeling for Audiovisual Systems (CLAS)	F501.01:2015	InfoComm International® AVIXA™
Display Image Size for 2D Content in Audiovisual Systems (DISCAS)	V202.01:2016	InfoComm International® AVIXA™
Projected Image System Contrast Ratio	3M-2011	InfoComm International® AVIXA™
Rack Building for Audiovisual Systems	F502.01:2018	AVIXA™
Rack Design for Audiovisual (AV) Systems Standard	F502.02:2020	AVIXA™
Recommended Practices for Security in Networked AV Systems	RP-C303.01:2018	AVIXA™
Standard Guide for Audiovisual Systems Design and Coordination Processes	2M-2010	InfoComm International® AVIXA™

We would also like to thank the University of Nebraska-Lincoln Information Technology Services Audio Visual Design Build team for letting UCCS use their “Audio Visual Systems General Standards & Guidelines” document as a template for our own.

Integrator Requirements

AV Contractor must have a documented minimum of seven (7) years of successful AV installation experience with projects utilizing communications structured cabling, media systems, infrastructure, raceway, and equipment required for a project. Supply documentation that you meet this requirement.

Supply a list of manufacturers/products for which the Contractor is a dealer. Provide the duration of the relationship and the extent of the manufacturer/product training.

Contractor must have access to AVIXA standards.

Contractor must have a Crestron certified programmer. Provide documentation.

Contractor must provide a technician with an active CTS certification, on-site, during installation.

Contractor must provide two (2) references for the contractor's service department.

Contractor must provide equipment for testing and verification of AV systems according to "ANSI/InfoComm 10:2013 Audiovisual Systems Performance Verification."

The company shall have a fully staffed office with technical installations support personnel within 100 miles of UCCS main campus. Provide statement that office is located within 100 miles of UCCS main campus.

Provide a personal resume of formal education or certifications and experience of the contractor Project Manager who would be project lead on UCCS projects. Project Manager assigned to a project must have a minimum of three (3) years continuous contracting project management experience on projects of comparable size and complexity.

Provide a personal resume of formal education or certifications and experience of the contractor's supervisor who would be working on UCCS projects.

Provide a description of the Contractor's capabilities for rack assembly, shop fabrication, repair, and servicing of Systems.

Provide a description of the Contractor's capabilities for generating CAD (or other high-quality graphics) documentation for the Shop Drawings and As-Built Drawings.

Programmer Certification: The Contractor shall have Manufacturer certified programmers for all equipment requiring programming. The Contractor shall provide evidence of the same.

In-House Capabilities: The Contractor shall have in-house capabilities and facilities for rack assembly, shop fabrication, and programming. The Contractor shall provide a signed statement stating the same.

Product Dealer Information: Provide a list of manufacturers/products for which the Contractor is a Dealer. Provide the duration of the relationship and the extent of manufacturer/product training.

Shipping: UCCS will not accept delivery of any equipment. The equipment must be delivered to the integrator's facility and installed by the integrator at UCCS.

Physical Requirements for AV Systems

Equipment Racks

All equipment racks should be installed according to "AVIXA F502.01:2018 Rack Building for Audiovisual Systems." Audiovisual equipment will be mounted in standard 19-inch racks. There needs to be a minimum clearance to one side, the front, and the rear of the rack of 36 inches. Some equipment installed may not have rack mounts or the capability to attach rack mount wings/brackets to them. If this is the case a 1RU shelf needs to be installed, and the equipment must be secured to the shelf using adhesive Velcro.

In support of future growth at the University, only 80% of rack space shall be used. Blank panels shall be installed in those spaces that are not being utilized.

If there is not adequate space for equipment, consult with OIT to determine an appropriate solution during the design phase.

All racks and furniture must be locked with a lock/keyset provided by OIT specifications. Two keys for every lock will also be provided. If the furniture is from Spectrum Industries, then the keys provided by this manufacturer are acceptable.

The audiovisual equipment is to be mounted in suitable 19-inch-wide racks, within the lectern rack area. Specific mounting layouts will be determined during the design phase.

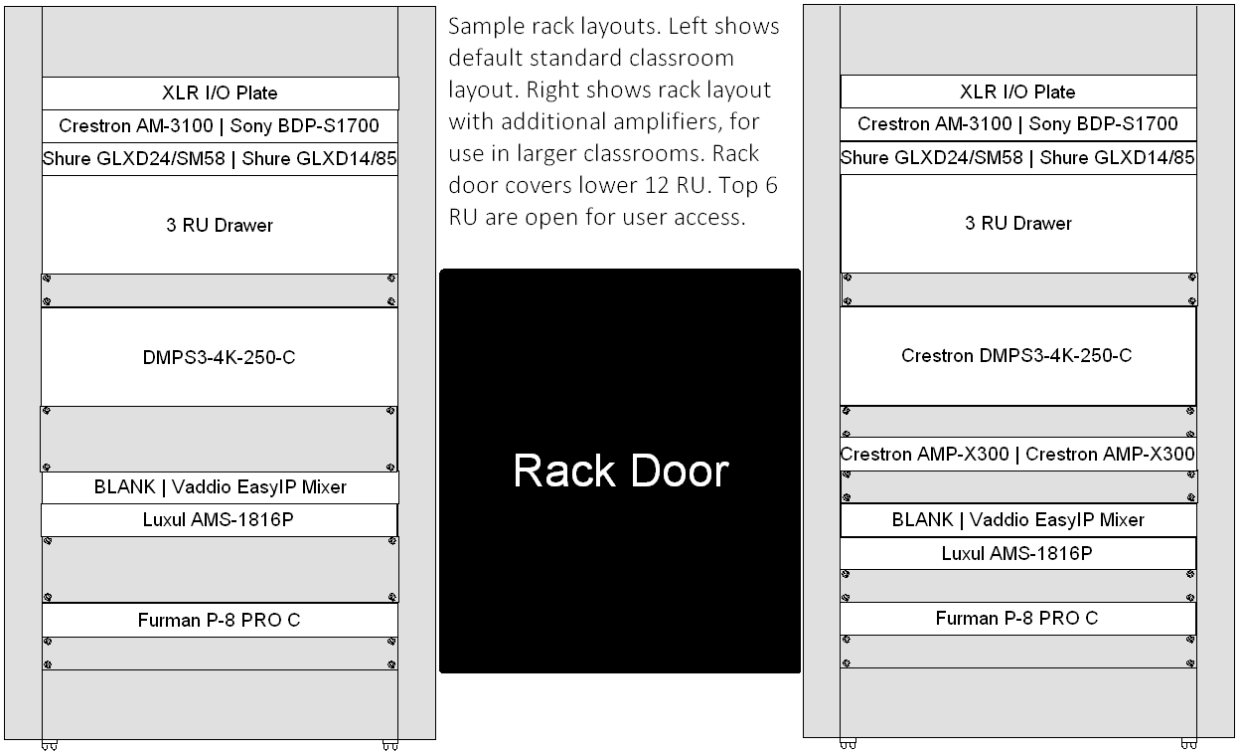
In those circumstances where rear rack access cannot be provided, there must be a slide out option for easy servicing. There also must be enough width and depth for the rack and loop of cables. This is to clear any obstruction and hinges.

For equipment that cannot be installed in an AV rack (user accessible or display mounted) it is acceptable to mount equipment behind a display or on a lectern surface, pending OIT approval. For AV systems with limited equipment requiring storage, it is acceptable to place all equipment in a backbox, pending OIT approval.

Rack location will be determined during the design phase and must be approved by OIT.

Sample Rack Layout

Below is a sample rack layout for a Standard Classroom using the standard ADA lectern and rack. Note that the user-accessible equipment (Blu-ray player, XLR plate, wireless mice receivers, drawer) are all located above the rack door, with all other AV equipment located behind the door.



Power

120V AC rack mounted power conditioners with power overload switches will be added, as required, for equipment installed. Power conditioners will have no more than 77% of load to allow for high start-up loads. Load calculations will be provided to OIT before installation of equipment.

Additional power conditioners must be added if additional outlets are required, or load limits are reached. Power strips and extension cords may not be used unless written permission is obtained from UCCS OIT.

Ceiling Mounted Racks

Ceiling mounted racks should not be used in AV systems due to heat and serviceability concerns. It is preferred that floor racks or in-cabinet racks be used and suitable ventilation be provided.

Lecterns

Each learning space must have a rack and a lectern. If a lectern is to be excluded, written permission from OIT must be provided in advance. Smaller rooms, such as breakout rooms, may use a wall-mounted station for the “podium PC.”

Lectern location will be determined during the design phase and must be approved by OIT.

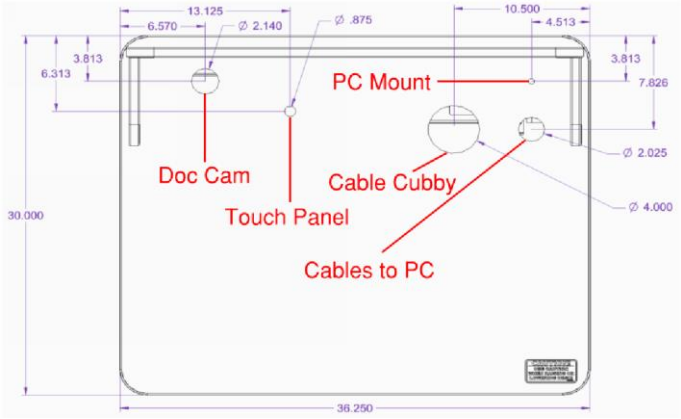
Equipment being used by the faculty will be installed above the rack door and equipment not being used by the faculty will be placed below the door. A drawer should be installed in the rack for use by faculty.

All power, network, audio, and relay cables required for the AV equipment must be terminated inside the equipment rack, not at the lectern or behind lectern kick-plates.

ADA Lectern Layout

Cables for each device must be routed through their designated cutouts on the lectern and must be long enough to reach their destination (switcher, data port, outlet). Extension cables will not be accepted.

Right Hand: Right hand lecterns are for when the PC is on the right side of the lectern, but the lectern is placed on the left-hand side of the classroom.



Right-handed lectern layout

The left-handed layout will be like the above, except lectern will be placed on the right side of the room with the equipment mirrored on the opposite side. For clarification, please contact OIT. For any clarification or instruction regarding installation of equipment please refer to manufacturer's installation guides.

Ventilation

Regardless of location, there must be enough ventilation to prevent temperatures exceeding manufacturer recommendations. With the currently standardized lecterns, this should not be a problem, except when the current standard lectern cannot be used or if specialized equipment is installed.

All equipment should remain at an acceptable operating temperature to prevent the equipment from:

a. Failure due to overheating

b. Reduced life expectancy due to prolonged overexposure to elevated temperatures.

As per AVIXA Standard F502.01 Rack Building standards: "The minimum consistent internal operating temperature of the rack should be defined by the AV equipment with the highest recommended minimum operating temperature. Maximum consistent internal operating temperature of the rack should be the maximum operating temperature of the lowest rated piece of AV equipment or 30° C (85° F), whichever is lower."

Room Layout

Any final lectern position must comply with ADA regulations and laws. The lectern must be out of view of any screen and positioned either stage right or stage left. Any design with a center positioned lectern will not be approved.

Sightlines must be checked in both plan and elevation documents to ensure all students have an unobstructed view of all areas of the screen and whiteboard. This includes the placement of the lectern and all mounted AV equipment.

Projection Surfaces

Screen Size

Screen sizes need to be determined in advance per AVIXA “DISCAS” standards. Screens that do not meet these standards will require written permission from OIT.

Single Screen Projection

Image and screen will be centered and provide acceptable viewing angles and sightlines to all seating positions.

Final screen position will be determined during the design consultation process, and any variation to this will not be accepted unless written permission is supplied by OIT before installation.

Dual Screen Projection

Final screen positions need to be consulted with OIT to make sure desired specifications are achieved for maximum viewing capabilities and sightlines for students.

In dual screen projection systems, both screens must provide acceptable viewing angles and sightlines to all seating positions.

Specialty Screens

For any screen that is not an OIT standard, consult with OIT during the design phase. These applications include screening rooms as well as huddle space rooms.

Display Devices

All display devices must have a minimum native resolution of 1920x1080.

All display devices must be in 16:9 format.

All display devices must have the required type and number of digital inputs for the program plan of that specific space, without the use of adapters or converter boxes.

Projectors

UCCS OIT requires laser projectors for all our classrooms and breakout rooms. Model will be determined by the room size and needs.

Projectors should be placed such that the screen can be filled with a projected image, using the standard lens for that model. If this is not possible, please consult with OIT to obtain approval for any nonstandard lens configuration.

All Projectors must have ports for RS-232C, LAN, and HDbT connections and support for Crestron RoomView.

Final product selection and mounting position will be determined during the design consultation process and any variation to this will not be accepted unless written permission is supplied to OIT before installation.

Flat Panel Displays

All flat panel displays must have RS-232C and LAN for control. Displays must support variable audio output.

All display devices must have the required type and number of digital inputs for the program plan of that specific space, without the use of adapters or converter boxes.

Flat Panel Display Mounts

Flat panel mounts must be installed per the manufacturers' recommended specifications and should not exceed the recommended weight capacity. Displays should be installed using a mount that is rated for a maximum capacity that is 5x the weight of the panel being used, as per AVIXA Audiovisual Information Technology (AV/IT) Infrastructure Guidelines for Higher Education.

Final product selection and mounting position will be determined during the design consultation process and any variation to this will not be accepted unless written permission is supplied to OIT before installation.

AV Control

OIT control equipment is exclusively Crestron. If Crestron has no product able to meet specifications and needs of the room, consult with OIT to find an acceptable product. OIT will not accept a nonstandard control system from the AV integrator without written permission prior to installation. Extron is the preferred alternative control solution.

Audio

Due to variants of room space and size, consultation with OIT must be used during the design phase to support audio for voice reinforcement and playback. In general, mono audio is preferred to provide a uniform audio experience everywhere in the room. Only when specified in the functionality of a space would stereo or surround sound be appropriate.

Final speaker specification and installation location must be determined in consultation with OIT during the design process. The audio in each space will need to be individually tuned to maximize the audio quality for each room. The audio system should adhere to **AVIXA A102.01:2017 Audio Coverage Uniformity in Listener Areas.**

Microphones

Microphones and lavalier mics are dependent on the room space and the room use. Please consult with OIT during the design phase to see if the room requires voice reinforcement. All microphone lines must be balanced with XLR inputs.

Each microphone transmitter must have its own receiver such that there is no interference due to multiple mics on the same channel. It is typical to include one handheld and one lavalier mic in a standard classroom, however the number and style of mics is dependent on the needs of the space.

In conference rooms and classrooms, ceiling microphones are preferred for audience pickup.

All microphones must integrate with the classroom "hyflex" system if present. See Lecture Capture (HyFlex) Add-On for more information.

Lighting

All rooms with projection screens must have board lights that can be turned off.

Standard Room Configurations

Each of these spaces is required to have every item listed in the feature set. If any changes are made, written approval must be provided by OIT.

All classrooms (does not apply to conference rooms) must be equipped with a telephone provided by UCCS OIT to be wall mounted at ADA height near the lectern or podium PC.

All rooms should be designed for mono audio unless specified by the program plan.

Standard Classroom

Required Features:

- Stationary ADA Lectern
- Sources
    - Podium Computer (specs provided by UCCS OIT)
    - Document Camera
    - Blu-ray Player
    - Wireless Presentation Device
    - Cable Caddy for user input
        - HDMI
        - USB-C
        - Ethernet
        - Power
- User-accessible rack drawer
- Touch Panel AV Controller
- AV Switcher and control system
- ADA sound reinforcement input/output
- Wireless lavalier and handheld microphones with 2 separate receivers
- 16:9 electric recessed screen
- Laser Projector
- In-ceiling Speakers

Small Classroom

These are standard classrooms that are flexible spaces in that they do not have an installed lectern and can be configured for any purpose, with or without the use of the AV system.

Required Features:

- Sources
    - HDMI Input
    - Wireless Presentation Device
    - Wall mounted PC
        - May be replaced by display with built-in pc
- Display (to be determined by room size and needs)
    - Wall display
    - Interactive Display with built-in PC
    - Short-throw interactive projector
    - Regular projector with projector screen
- AV Control System with wall mounted control panel
- In-ceiling Speakers

Large Classroom

A large classroom has an occupancy of greater than 50 people.

Requires all features of standard classroom plus:

- Assistive Listening System
- Multiple displays (if applicable to room usage and furniture layout)

Lecture Capture (HyFlex) Add-On

All newly constructed classrooms should include lecture capture (hyflex system) unless not required by the program plan. To add a lecture capture system to any classroom or large classroom, the following features should be added to the base system:

- PTZ camera
- Audio DSP (or utilize control system dsp)
- Array Microphone to capture audience members
- An AV bridge device to capture the camera, program audio, and microphone output and connect over USB to the podium PC
- Control added to touch panel to select instructor, audience, or all microphone inputs

Active Learning Add-On

An active learning space includes:

- Movable chairs/tables or tables configured into groupings (often referred to as pods)
- Multiple projection/viewing systems
- Multiple whiteboards/writing surfaces

Required features include all features of a standard classroom or breakroom depending on the program plan. Additional features may include:

- Movable furniture
- Multiple displays to meet program plan needs
- Multiple inputs to meet program plan needs
- Matrix switching system or distribution amp

Meeting Room

A Meeting Room is a small space for meeting with 2-10 people.

These rooms include:

- Commercial Flat Panel Display
- Wireless Presentation Device
- Wall button panel
- HDMI Input at 18 inches AFF
- Speakerphone/soundbar with wide-angle camera.

Conference Room

A Conference Room is a meeting space for 5-25 people. This space includes functionality for local and remote meetings with a VTC system included.

These rooms include:

- Meeting room required functionality
- Interactive display with a built-in PC OR Microsoft Teams Room

- Camera
- Microphones
- Soundbar or Ceiling Speakers

Network and Security Infrastructure Requirements

Registration of devices will be managed through OIT. All devices when deployed will have the latest stable version of firmware installed. Serial numbers and MAC addresses for all devices must be provided to OIT at least two weeks prior to installation.

It is preferred that network switches be included in any AV system with 3 or more network-connected devices. Switch specifications and configuration will be provided by UCCS OIT. Devices that require POE power should receive power from the in-rack switch.

Network cabling should adhere to UCCS Construction Standards: Division 27 – IT/Communications.

Floor Boxes

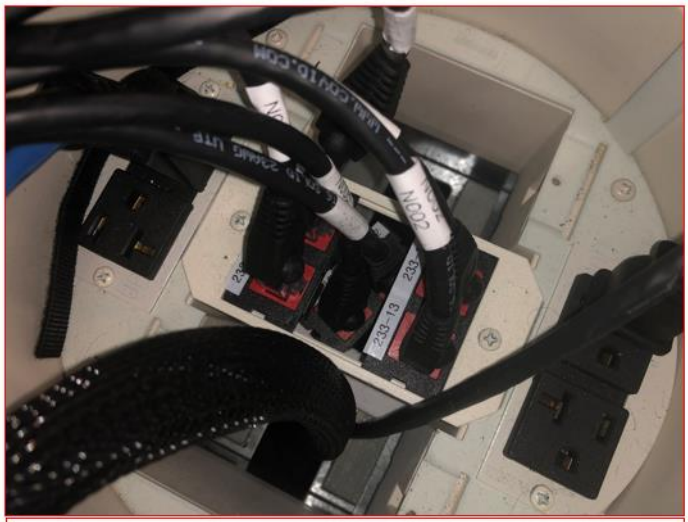
Floor boxes shall provide the interface for power, communication and/or audio/visual cabling in an above grade floor. Floor boxes shall be flush style, exceed UL scrub water exclusion requirements for tile and carpet floors, and complete with covers, brackets, and hardware to support installation as shown on drawings.

Floor boxes must be installed in a location determined by AV design and positioned so that all AV equipment does not interfere with sight lines. Please see Room Layout specifications above.

Floor boxes may be combined for use by both power and communications where shown on the drawings. When combined, provide metal dividers separating power from communications and provide separate conduits for power and communications.

Floor boxes shall be complete with brackets, cover plates, and/or other means to support power, communications, and/or audio-visual type connectors shown on the drawings or called for in the specifications. All connections in the floor box must be terminated at an interface plate. Pass through cables will not be accepted.

Acceptable: Floor box with all cables terminated at connection plates.



Not Acceptable: Floor box with unterminated cables passing through floor box.

Wall Plates

Wall plates are preferred over floor boxes when equipment racks are flush against the wall or when an existing AV system already uses a wall plate. In this case, new wall plates should be installed as close as possible to the existing wall plates and at the same elevation. Any cables passing through a wall plate must be terminated at the wall plate, like the floor box requirements above.

If the existing system uses a floor box, the existing floor box must be used instead of adding a new wall plate. Please consult with UCCS OIT when determining the location of new wall plates.

Phone Locations

Please consult with OIT Academic Support to determine if a phone is needed in a room. If a phone is needed, please see the following criteria.

Phones will be mounted on the wall close to the lectern or podium pc, installed to meet ADA requirements. If needed, OIT can provide a phone for assistance in determining a location for port.

AV Equipment Passwords

All AV equipment that is on the network will be required to have the default password changed to one provided by OIT. Once the AV design is approved, OIT will provide the passwords that should be set for the specific equipment included in the design. As a standard, each type of equipment (dmps, touch panel, AirMedia, etc.) will share a password.

Audio Visual Systems Cabling Installation Specifications

Cabling

All cables must be secure and routed in a way that meets AVIXA standards. Cables terminating at the equipment racks or lecterns will have 1-meter slack provided so any moving of the lectern will not damage equipment.

Cables installed in plenum spaces need to be rated properly as such. The contractor is responsible for verifying the installation requirements.

Hook and loop fasteners must be used to secure cabling at/inside racks. Cable ties are completely unacceptable. Cables terminating at the equipment, data projectors, speakers etc. must have a 1-meter tail provided. Any cable not contained in a rack, above the ceiling, or behind a wall display should be wrapped in a cable snake.

Any in-ceiling cabling must be suspended above ceiling tiles on cable trays. J-hooks may be used as an alternative. No cables should be left hanging so that they touch the ceiling tiles below. At least one pull string must be run from the AV rack to the ceiling space.

Conduit and Floor Tracks

It is preferred that all cabling be routed through in-wall or in-floor conduit. On-wall conduit is not preferred but may be approved after consultation with UCCS Facilities Services. Cables should be routed through walls wherever possible.

If floor tracks are required, UCCS Facilities must be consulted to determine an acceptable solution.

Cable Labeling

All cables must be labeled according to F501.01:2015 “Cable labeling for Audiovisual System (CLAS)” from AVIXA. Any deviation from this publication requires consultation with OIT for permission.

Cable specifications

It is preferred that manufactured cables be used. If a cable is terminated by the integrator, the cable must be tested, and test results documented and provided to OIT.

All cables must be commercial grade from a reputable manufacturer.

Network Cable specifications

For all UCCS Network cabling standards, please consult with UCCS OIT Network Team.

ADA Compliance and Facilities Integration

ADA Compliance

UCCS Facility Services must be consulted prior to both AV design and installation on ADA Compliance.

Wall-Mounted Equipment

Any wall-mounted equipment that is greater than 27" above the floor, or less than 80" above the floor, must not protrude more than 4" from the wall. This includes wall-mounted displays and any protruding objects on the wall. This requirement is described in Section 307 – Protruding Objects of “2017 ICC A117.1 Accessible and Usable Buildings and Facilities”

UCCS recommends the Chief TS525TU Large THINSTALL Dual Swing Arm Wall Display Mount which is compatible with displays up to 75”. The mount must be paired with the Chief TA500 which is an in-wall mounting box for the mounting arm. This allows the mount to fold completely into the wall so the display will be flush with the wall, essentially a 0” depth mount. This would not be a substitute for a back box as the mount would fill the mounting box completely. For larger displays, such as an 86”, UCCS recommends the Chief RXF2 at 0.8” depth or the Chief LSTU at 0.39” depth.

Facilities Integration

Many AV systems would benefit from integration with other building systems. This practice is encouraged and supported by both OIT and Facilities Services. However, both OIT and Facilities Services must be consulted before integration is approved.

Facilities Services handles all lighting/shading/occupancy sensor system. This includes the physical hardware, and programming needed to operate the system, and any connection to the system. OIT is only responsible for supplying the integration in AV programming.

Lighting

Rooms with programmed lighting controls (multiple lighting “scenes”) or rooms with multiple lighting zones should have control functionality programmed into the AV touch panel. These controls should be simple to use and should include the following functionality:

- Preset lighting scenes should be selectable and should mirror the selections on wall switches.

- When projection begins board lights should turn off to enhance screen contrast (this may be overridden by the user).

Shades

Rooms with programmed shade controls should have control functionality programmed into the AV touch panel. These controls should be simple to use and should mirror the selections on wall switches.

Occupancy Sensors

Rooms with occupancy sensors should provide feedback to the AV processor. This feedback may be used for a variety of functionalities including:

- Turning on/off the AV system is small spaces (conference rooms/huddle spaces) when no other AV controls are needed.
- Occupancy information for Creston Fusion tracking
- System power off after a period of room inactivity (30 minutes)

System Programming

Touch Panel Interface

Please refer to the Touch Panel Interface Standards for specific requirements and layouts for the Crestron touch panel. A sample VisionTools Pro-e file will be provided by UCCS OIT for touch panel layout.

Hardware Administrative Rights

UCCS OIT will supply credentials for setting up all network-connected AV equipment. Should any credentials be created by an AV installer, these must be provided to UCCS OIT prior to any system commissioning.

AV System Programing

AV system programming may be completed either by an AV contractor or UCCS OIT, pending on AV project scope. This should be discussed during the program plan phase and agreed upon in the project scope.

All AV systems must be programmed per UCCS AV programming standards. A copy of these standards will be provided by UCCS OIT.

AV Equipment Configuration

Some AV equipment requires configuration for use at UCCS. Specifically, AV sources such as wireless presentation, podium PCs, and document cameras may require configuration for a uniform user experience. UCCS OIT should be consulted when configuring this equipment.

Audio Visual System Design and Installation Process

General Guidelines

The audiovisual integrator is to install all equipment for the audiovisual system as outlined throughout this scope of work/specification. All work must follow AVIXA standards.

System Upgrades

When upgrading an AV system, the equipment and functionality of the existing AV system shall not be altered or affected unless specified in the design. Likewise, any part of the system that is intended to be replaced according to the scope must have all old equipment and cabling removed during the installation of the new/upgraded AV system. For example, if the audio system in a space is upgraded with new speakers, the old speakers and speaker wire must be removed.

Project Coordination

Coordination process adheres to *ANSI/INFOCOMM 2M-2010 Standard Guide for Audiovisual Systems Design and Coordination Processes*.

Commissioning

The audiovisual integrator must provide the University with a commissioning schedule/program before commencement of the project. The University will approve this schedule before the contractor fully commissions the system. All necessary equipment used by the audiovisual integrator to competently test and commission the system is to be outlined in its provided commissioning schedule/program. It is expected that video signals would be tested and commissioned using a video generator and audio signals would be tested using an audio generator.

Inspection and Testing

If at any time during the project OIT wants to assess the works performed, OIT will coordinate with the integrator to make sure that assessment will not interfere with any work being completed.

Prior to system verification, UCCS OIT will provide the AV contractor with a system verification checklist used to determine system acceptance. The audiovisual integrator must perform a full test of all equipment and operating functions as part of system handover. The system should be tested, and full functionality verified, before any acceptance or verification meetings occur.

Facility Services will determine who must be present for this test in addition to OIT Staff. OIT will also conduct a detailed test of the system in which we will document any defects, issues, and improvements.

ANSI/INFOCOMM 10:2013 Audiovisual Systems Performance Verification provides a list of acceptable system verification processes.

Operator Training

The integrator must also provide training to OIT and any other UCCS faculty/staff who are directly involved in the use of the room. This training will be conducted at the end of the project at the handover stage after every issue, defect and improvement has been made or accepted. Depending on the project size, the training will vary in length. This will be determined at the start of the project before any installation has been done.

Deliverables

Programming

All complete programs in un-compiled format, including graphics files, must be supplied to the University on a USB memory stick and via email upon completion of project.

Pre-Installation

Power and PoE load calculations will be provided to OIT before installation of equipment.

Completed and approved construction drawings and equipment lists must be provided to UCCS prior to installation.

Project Documentation

A project folder needs to be given to OIT at the end of the project. This folder needs to include the following (if applicable):

Section 1: A list of equipment and support numbers of manufacturers for an easy reference guide for any warranty work that may need to be done after the warranty period has ended (explained in Section 9.6). The list should include warranty end date as well as important product information (serial number, mac address, building, room number, etc.).

Section 2: All equipment manuals, software and all items that came with each piece of equipment.

Section 3: A copy of all testing and verification of system functionality performed by the integrator.

Section 4: A copy of the as-builts. This is usually a copy of the design documents OIT agreed upon, as deviations needed to be agreed upon by UCCS OIT. The only exception is with written permission from OIT. This should be supplied on a USB drive with an un-compiled copy of the Crestron programming/graphics.

Section 5: The complete, un-compiled copy of the Crestron program is to be supplied on a USB memory stick. This includes graphics as well.

Section 6: Any other documentation that we may have missed.

Purchasing, registering devices and A+ Rewards

1. All purchases from Crestron equipment should include our A+ Rewards number. That number is **1009236**

Warranty, Service Support

The audiovisual integrator will be responsible for all labor costs and transportation of equipment costs within 100 miles of the UCCS Campus during the 12-month warranty period.

All equipment supplied under the audiovisual contract must be guaranteed free of defects in hardware and software arising from faults in materials or poor workmanship/programming for 12 months from the date of project handover.

All reasonable efforts must be made by the audiovisual integrator to have faulty equipment repaired and returned to the University within 5 working days. If a part is available, and as part of this warranty section, the integrator is required to temporarily install a University supplied replacement to any faulty component, ensuring teaching space audiovisual system down time is kept to a minimum. This replacement process should be done within 48 hours if the classroom is available. OIT will work with integrator to schedule a time that works for both parties.

Acceptable Equipment List

This list contains acceptable equipment already in-use or approved by UCCS OIT. Consult with UCCS OIT if other equipment or manufacturers are to be included in an AV system, or if newer models are available.

Display Options

Projectors

Type	Description	Manufacturer
Pro L-series	Laser Large Venue	Epson
L630U	Standard laser projector	Epson
Brightlink 1485	Short Throw Interactive Laser Projector	Epson
VMZ-50	Alternative Laser projector	Panasonic

Projection Screens Recessed

Type	Description	Manufacturer
Tensioned Advantage Electrol	Tensioned Screen for standard classrooms	Da-Lite

Displays

Type	Description	Manufacturer
NEC 43” C431	1080p Commercial Television	NEC
NEC C Series 4K Displays	4K UHD Commercial Display	NEC
43” SL43604K	4K UHD Commercial Display	Planar

Interactive Displays

Type	Description	Manufacturer
7065X	Clear Touch 7000X Series Interactive Panel w/PC Module	Clear Touch
7055X	Clear Touch 7000X Series Interactive Panel w/PC Module	Clear Touch

AV Control & Switching Options

AV Controller

Type	Description	Manufacturer
DM-RMC-Scaler-C	DM Receiver	Crestron
RMC4	AV Controller	Crestron
MPC3	AV Controller	Crestron

User Interfaces

Type	Description	Manufacturer
TSW770 or larger	Wall and Table Touch Screen (standard rooms)	Crestron
MPC3-302-B	Physical button Media Presentation Controller	Crestron
MPC3-102-B	Touch button Media Presentation Controller	Crestron

Video Switching

Type	Description	Manufacturer
DMPS3-4K-250-C	DMPS Digital Media Presentation System for Multiple Screens	Crestron
DMPS3-4K-350-C	DMPS Digital Media Presentation System for Multiple Screens	Crestron

Audio

Audio Processor

Type	Description	Manufacturer
HD-XSP	7.1 HD Sound Processor	Crestron
HD-XSPA	7.1 4K Surround Processor	Crestron
DSP-XX	Crestron DSP Series	Crestron

Amplifiers

Type	Description	Manufacturer
Amp-XXXX	Crestron modular amplifier for standard rooms	Crestron

Microphones

Type	Description	Manufacturer
MX418/C	Shure Microphone Gooseneck	Shure or Audio Technica equivalent
GLX/D1/D2 w/ GLXD4 receiver	Wireless microphone (include a spare SB902 for each mic)	Shure
MXA910	In-ceiling microphone array	Shure

Soundbars

Type	Description	Manufacturer
SAROS SB-200-P-B	Powered, uncontrolled sound bar (requires a variable Line in)	Crestron
UC-SB1-CAM	Soundbar with camera and microphone	Crestron

Speakers

Type	Description	Manufacturer
Saros ICT Series	Ceiling In-tile Recessed Speakers	Crestron
FF 120 T	Flat Field Ceiling Speakers	Extron

Assistive Listening System

Type	Description	Manufacturer
XLR Male	XLR Output Wall Plate	Extron
XLR Female	XLR Input Wall Plate	Extron
	Hearing loop system	Consult with UCCS

Video

Document Camera

Type	Description	Manufacturer
Podium	VZ-3neo	WolfVision
Podium	VZ-8	WolfVision

Source Devices

Type	Description	Manufacturer
AM-3100	Wireless Presentation Device	Crestron
BDPS1700	Blu-Ray Player	Sony
TT-101	Cable Caddy for BYOD. Includes 120V outlet plus cables	Crestron
CTI-PCMOD-PC45-XX	Clear Touch PC Module for Interactive Panel	Clear Touch

Rack Cabinets/Frames

Free Standing Rack

Type	Description	Manufacturer
Freedom One Equipment Rack	Attaches to Spectrum Lectern – 2x18RU	Spectrum

Wall Mount Racks

Type	Description	Manufacturer
Consult with OIT	Consult with OIT	Consult with OIT

Power Conditioner/Distribution

Type	Description	Manufacturer
Surge/conditioning	Power Conditioner	Furman

Other

Lecterns

Type	Description	Manufacturer
Freedom-One Sit-to-Stand	ADA lectern	Spectrum
Left	SKU: 55542FMFMBS2000000F3002 Reference #: 55375-20036	Spectrum
Right	SKU: 55542FMFMBS2000000F3002 Reference #: 55375-20035	Spectrum
CareFit Enclosure	Wall mounted PC (for classrooms without a lectern)	Ergotron

VTC Cameras

Type	Description	Manufacturer
RoboSHOT 12E HDBT	PTZ camera	Vaddio
UC-SB1-CAM	Soundbar with camera and microphone	Crestron
EasyIP 10 Camera	Hyflex camera (1 is included with the base kit)	Vaddio

Whiteboard or Whiteboard Material

Type	Description	Manufacturer
Idea Screen	Whiteboard	Da-Lite

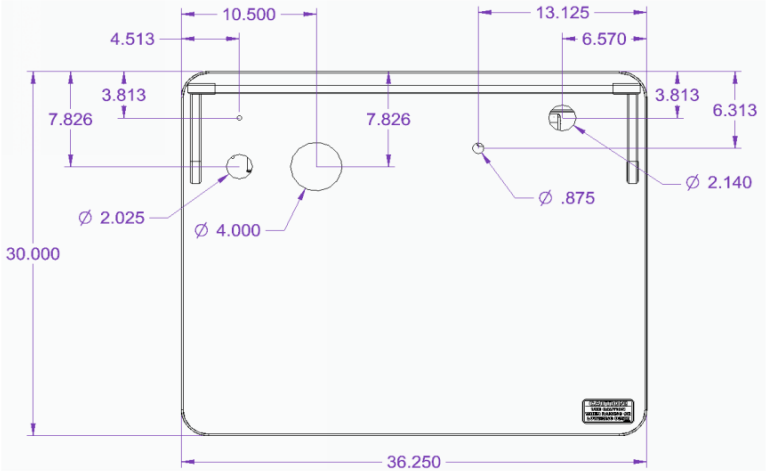
Hyflex Solution (Lecture Capture)

Type	Description	Manufacturer
EasyIP 10 Camera	Hyflex camera (1 is included with the base kit)	Vaddio
EasyIP 10 Mixer Base Kit	AV Mixer/Bridge	Vaddio

Spectrum Freedom-One Sit-to-Stand Lectern SKU

Spectrum item #: 55542-20033

Item 55542-20033 for UCCS .pdf



Layout with rack on the right side of the lectern.

Definitions

OIT– UCCS Office of Information Technology or comparable authority.

Active Learning Spaces – Student–centered, interactive, integrated, flexible learning spaces.

ADA – Americans with Disabilities Act

Audio Visual Integrator – Any person or company commissioned by UCCS to perform work on audio video systems apart from UCCS Staff

Auditorium – A large venue theater in which the primary purpose is to teach. It should be versatile enough to accommodate large events.

Breakout Room – Any space on campus that seats less than 20 people and has the primary purpose of teaching. Breakout rooms are typically next to larger classrooms for group work amongst students.

Conference Room -- A small space designed for meetings with an AV control system. This space does not have the primary purpose of teaching.

Film Screening Room – The purpose of this room is for viewing films of the highest quality. This includes an upgraded 4k projector and surround sound, preferably up to 7.1.

HDBaseT – promoted and advanced by the HDBaseT Alliance, is a consumer electronic (CE) and commercial connectivity standard for transmission of uncompressed high-definition video (HD), audio, power, home networking, Ethernet, USB, and some control signals, over a common category cable (Cat5e or above) using the same 8P8C modular connectors used by Ethernet

HDCP – High-bandwidth Digital Content Protection is a form of digital copy protection developed by Intel Corporation to prevent copying of digital audio and video content as it travels across connections

HDMI – High-Definition Multimedia Interface is a proprietary audio/video interface for transmitting uncompressed video data and compressed or uncompressed digital audio data from an HDMI-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television, or digital audio device

AVIXA InfoComm International – Trade association representing the professional audiovisual and information communication industries worldwide

POE –Power over Ethernet (POE) is a technology that lets network cables carry electrical power-to-power small electrical devices

RU – Rack unit equivalent to 1.75 inches of vertical space in an AV rack

Standard Classroom – Any space on campus that seats more than 20 students and has the primary purpose of teaching

Uncontrolled Conference Room – A small space designed for meetings with no AV control system. This space does not have the primary purpose of teaching.

VTC – Video Teleconference