FLORIDA INTERNATIONAL UNIVERSITY

APPENDIX “C”

AV Standards
Conference Room

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AV Standards – Conference Room

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Miami's public research university

Contents

Programming and Planning Requirements

Primary Areas of Coordination

There are a few areas of construction coordination pertaining to audiovisual requirements for the typical FIU Course Capture Classroom. These are below:

- Conference Table Leg and Floorbox location
- Display Location
    - PTZ Camera mounted below display
- Credenza location
- Coordinated Ceiling AV Devices
    - Recessed Ceiling Speakers
    - Ceiling Mounted Microphone (1 typical)
    - Recessed Ceiling Mounted Occupancy Sensor

Infrastructure requirements for all the items above are listed in the Definition of Infrastructure Requirements section, along with engineering requirements that will dictate their placement within the space.

High Cost of Failure Items

The following items should be addressed early and monitoring often. They have demonstrated a potential to create undesirable situations that are costly or impossible to rectify when not properly addressed in design.

- Separation of adjacent raceways in slab to table floorbox
- Consideration of acoustics for RT60 and adjoining wall STC values
- Consideration of mechanical noise (specifically HVAC)

Acoustics

Meeting spaces should have background noise levels of <35dBA (measured as 1 hr steady-state) RT60 and not exceed 0.6s. **Specify ceiling tiles with an NRC of 0.75**

In rooms with a focus on video conferencing, acoustical diffusion is also important. This can be achieved, be reducing the number of flat continuous surfaces, with decorations or furniture.

Baseline recommendations

- Low noise light ballasts are recommended to meet the above requirements
- Mechanical noise should be isolated from conference areas wherever possible, including:

- Distancing mechanical and electrical equipment rooms from learning spaces.
- Distance restrooms from meeting spaces
- Do not run plumbing pipes above conference spaces
- Utilize cast iron waste water pipes where possible

STC Ratings

STC ratings are critical in meeting spaces. **A minimum STC rating of 50 should be required for all walls surrounding meeting spaces**. This will typically require different construction methodology for walls around meeting spaces, relative to the surrounding spaces, to achieve the required levels of privacy. It should be clearly noted that any walls must extend fully above the finished ceiling all the way to deck above, with no opening.

Minor construction defects frequently cause issues that totally negate the STC rating. At a minimum, the following must be avoided during design and construction.

- Leaking of sound through acoustical tiles where wall construction is not carried fully from wall to ceiling
- Providing junction boxes to both sides of adjoining spaces within a single stud cavity without additional treatment.
- Failure to treat all joints and penetrations with acoustical sealant.

The design team may reference Annex B of ANSI S12.60-2002 for further details. Aside from STC ratings, IIC (Impact Insulation Class) ratings of floor-ceiling assemblies should comply with section 4.5.6 of ANSI S12.60-2002.

HVAC Noise

Careful design of HVAC systems is central to achieving the background noise levels indicated above. In particular, **all VAV boxes should be located outside of meeting spaces.**

The ASHRAE Handbooks, including "A Practical Guide to Noise and Vibration Control for HVAC Systems", are especially helpful to assist in achieving an HVAC system design that will conform to the required minimum level of steady background noise. HVAC manufacturers should be able to provide useful design noise-rating information for their systems or components.

Raceway Separation

In a typical meeting space, there will be a minimum of (2) conduit stubs to both the television and the conference table floorbox. One will carry 120V power, while the other will carry low voltage AV cabling. **These conduits should be separated by 12"** to prevent EMI.

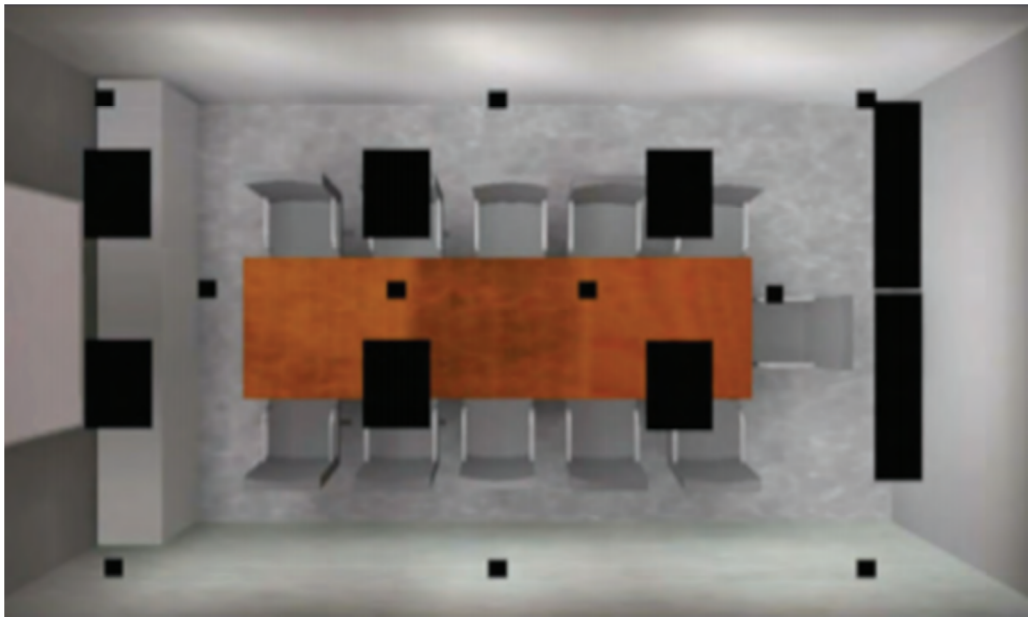
Lighting Coordination for Video Conferencing

The minimum brightness of the room should be 400 Lux (preferably 500), with a color temperature 3000-4000 Kelvin. Avoid glare. Do not mix lighting types or fixtures with different color temperature. Shade systems should be provided for any room with exterior windows.

Fittings should provide a higher level of illumination in front of the participants than either above or behind them to prevent face shadowing. No direct lighting or glare into the PTZ camera lens. This will cause the auto iris to close or generate visible reflections within the lens system.

Diffusers to eliminate all sharp shadows and create uniform brightness are recommended, preferably incorporating uplighting and specifically to avoid striking on any display surface (television).

Creating the correct shadowing is critical for video conference lighting. The following 3 step process is recommended, excerpted from Technical Report: An Analysis on the Use of LED Lighting for Video Conferencing, by Jim Yorgey, PE Frank Neher, Joe Volkert, and Christina Katrinak.



1. Wallwash fixtures—Uniformly illuminate rear and side walls from task height to ceiling, providing good contrast between participants and the background for a quality video image.

2. Indirect wash fixtures—Illuminate participants with vertically focused lighting (between a 45º and 60º angle), minimizing shadows on their faces

3. Recessed downlights—Illuminate the tabletop surfaces horizontally, minimizing shadows on faces and providing adequate task lighting, illuminate the presentation area with flexible lighting, and adjust contrast on presenters and wall displays.

For further information, reference IES DG-17-05

Illumination Levels

Measured at tabletop height 40 foot-candles horizontal minimum all across the seating area of the room. Measured from 40-inches to 80-inches above the finished floor 50 to 70 foot-candles vertical all across the seating area. This would be as you look towards the display from the conference table. From the presentation area looking towards the seating area a minimum of 40 horizontal foot-candles at the lectern work surface height. 40 to 60 foot-candles vertical measured from 40-inch to 80-inch above the finished floor. 0 to 10-15 foot-candles on displays.

Wall wash on all but the projection screen wall should have a wash of 30 to 50 foot-candles. Note to achieve the required vertical lighting goals the tabletop horizontal foot-candle lighting levels will typically be 40 percent higher than the achieved vertical foot-candle level. For instance if there 50 vertical foot-candles of light at a seating location there would typically be 70 horizontal foot-candles of light on the tabletop at that location.

Interior Finishes

The reflectance values of paints, vinyl coverings, laminates and other finish materials should be selected to enhance ambient illumination and the illumination at work surfaces. The following values are recommended:

- Ceilings 70 percent - 90 percent
- Walls 40 percent - 60 percent
- Floors 30 percent - 50 percent
- Desktops 35 percent - 50 percent
- Chalkboards 20 percent - 30 percent

Camera and Display Placement Considerations

If video conference is a primary function of the room, then this should drive certain factors when laying out the space. Movement and reflections will be very distracting. Because video conferencing relies on compressing a video signal, movement will cause the camera image to “break up” continuously.

- Do not place the camera facing a doorway
- Avoid facing the camera toward any area where you anticipate continuous movement (glass partition wall or drapes in a draft, etc)

- Use wall treatments with neutral color, medium contrast, and soft texture
- Use a tabletop with a color that is light, but not reflective (ie: natural wood)
- The PTZ camera must be located at centerline of the display, preferably directly below
- The PTZ camera should be located as close to eye height as possible

Screen Size

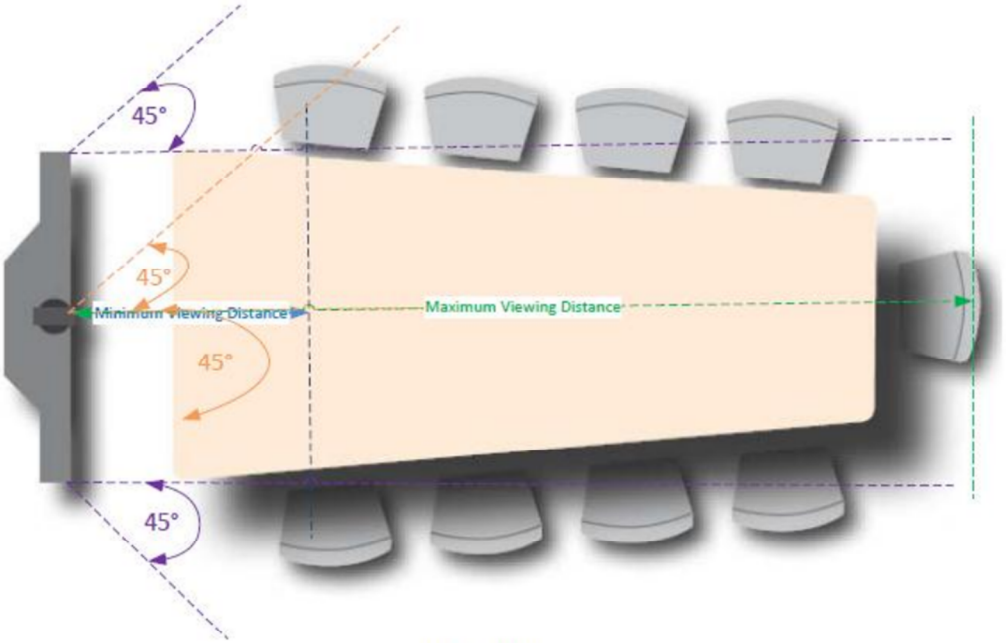
Screen Height

1. Measure from the center of the screen location to the furthest viewer
2. Divide this distance by 6
3. The result is the minimum required screen height for comprehension (does not include frame)

Screen Width

1. Start with the screen height as determined by the instructions above
2. Multiply by 1.78
3. The result is the width of the screen, not including frame.

FIU meeting space standards no longer utilize projectors.



Single Screen:
All seats must be within specified viewing ranges

Definition of AV Infrastructure Requirements

Conference table floorbox

Location Criteria

Center of table. Coordinate with AV. For new construction, raceway should be run in slab. For retrofit applications, surface mount raceway will be used.

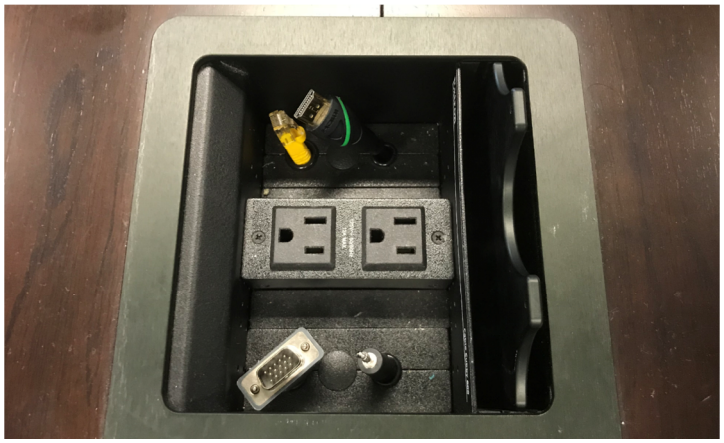
AC Power Requirements

(1) 20A / 120V duplex outlets inside floorbox (see Raceways below)

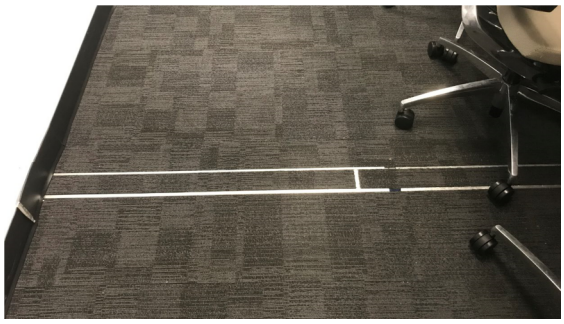
Raceways

Provide (1) FSR FL500P-6 recessed floorbox at lectern location, with the following:

- Provide (1) 1.5" EMT stub ups for AV cabling
- Provide (1) 1.25" EMT stub up for Data cabling
- Provide (1) 20A / 120V circuits on one quad outlet
- Provide min 12" between 120V power and any AV raceways within slab



Note that table boxes utilize cabling, rather than fixed connector. Cable reels are not utilized, due to bulkiness underneath the table.



Credenza Requirements

Location Criteria

Directly below display. Credenza houses AV equipment rack and assists in meeting ADA requirements where display protrudes more than 4” from the wall.

AC Power Requirements

(1) 20A / 120V duplex outlets coordinated at AV rack location, adjacent to raceways below.

Raceways

- Provide (2) 1.5” EMT stub ups for AV cabling
  - These conduits to run through
- Provide (1) 1.25” EMT stub up for Data cabling
- Provide min 12” between 120V power and any AV raceways

Recessed Ceiling Speakers (2 typical)

Location Criteria

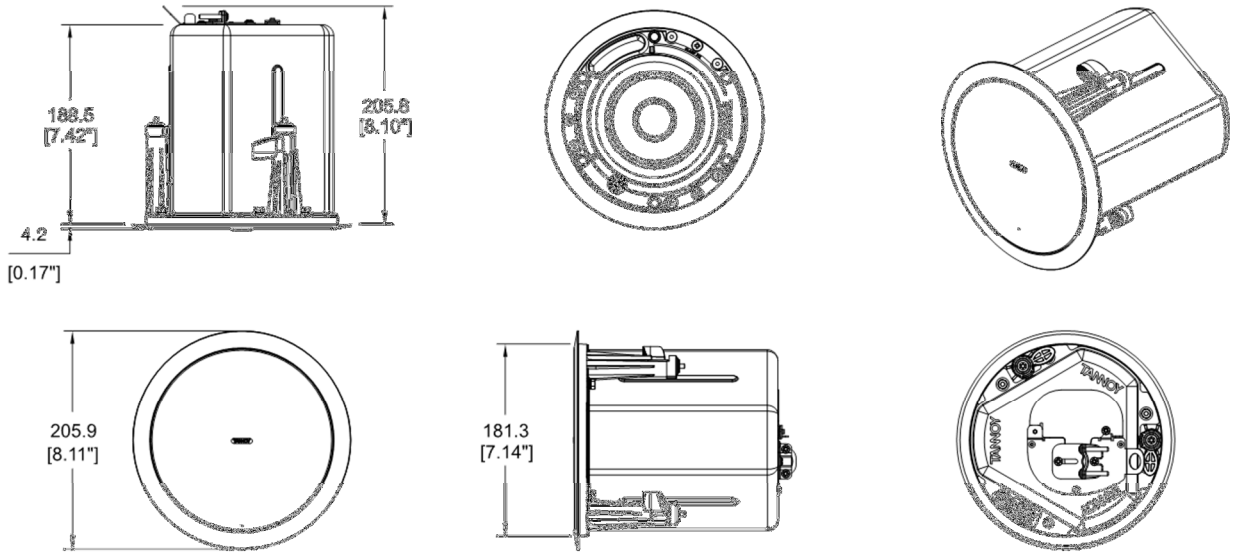
Evenly spaced over conference table seating. Increase spacing by 1.5x between speakers and perimeter walls. Set transformer tap to OFF position.

Dimensions and Weight (Approx)

*8.*11" Bezel diameter, 12 lbs

AC Power Requirements

NONE



Ceiling Mounted Microphones (1 typical)

Location Criteria

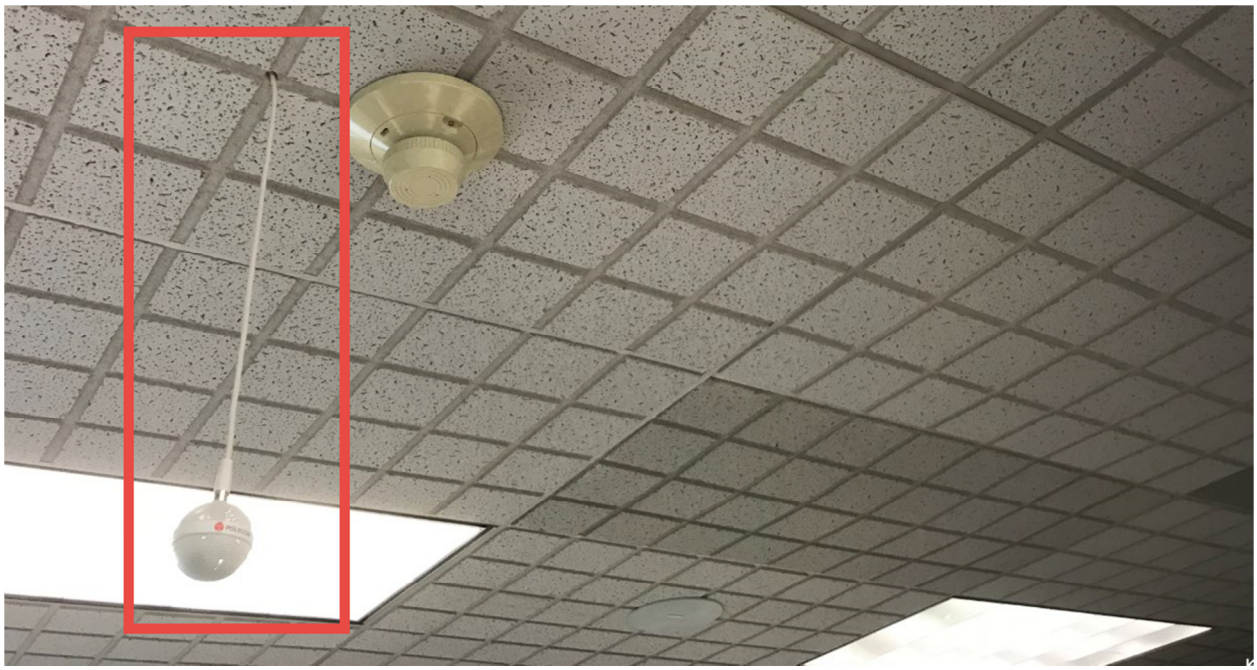
A single ceiling hung microphone will protrude through the finished ceiling on a cable. This microphone will be mounted in the center of the conference table.

Dimensions and Weight (Approx)

Diameter – 6", Weight – <1 lb

AC Power Requirements

NONE



Wall Mounted PTZ (pan/tilt/zoom) Camera

Location Criteria

Mount directly above or below display at horizontal centerline. Ideal vertical position is +/- 15 deg of eye level.

Dimensions and Weight (Approx)

6 ½" W x 7 ½"H x 6 ½"D

AC Power Requirements

(1) Duplex outlet – 1.2A / 120V

Room Scheduling Touchpanel

Location Criteria

Mount 48" AFF **outside** conference room, directly adjacent to the main doorway.

Dimensions and Weight (Approx)

Provide 2 gang box for touchpanel to mount

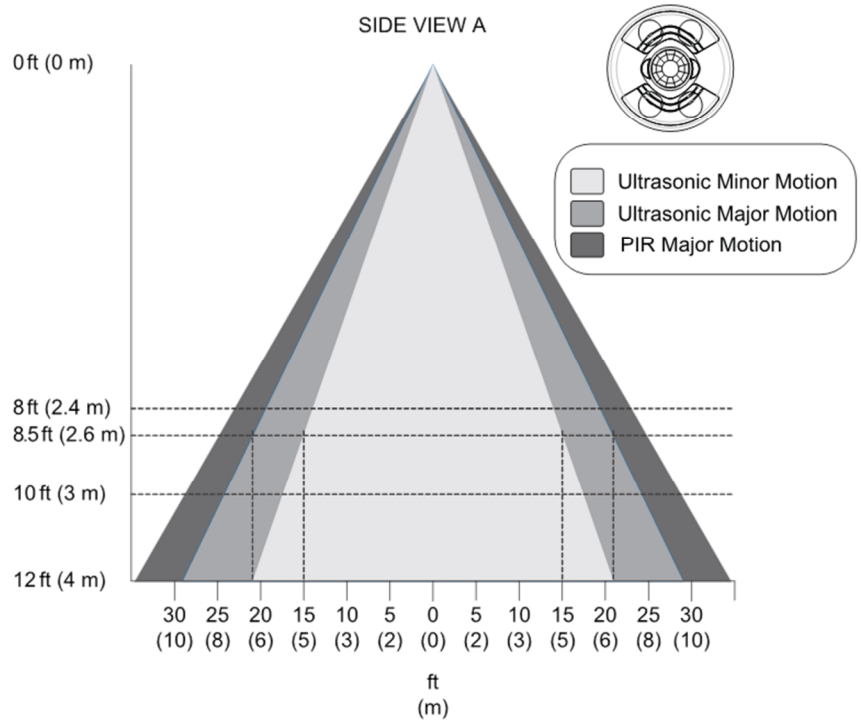
AC Power Requirements

None

Recessed Ceiling Mounted Occupancy Sensor

Location Criteria

Ceiling mount centered between primary room entries. See diagram below:

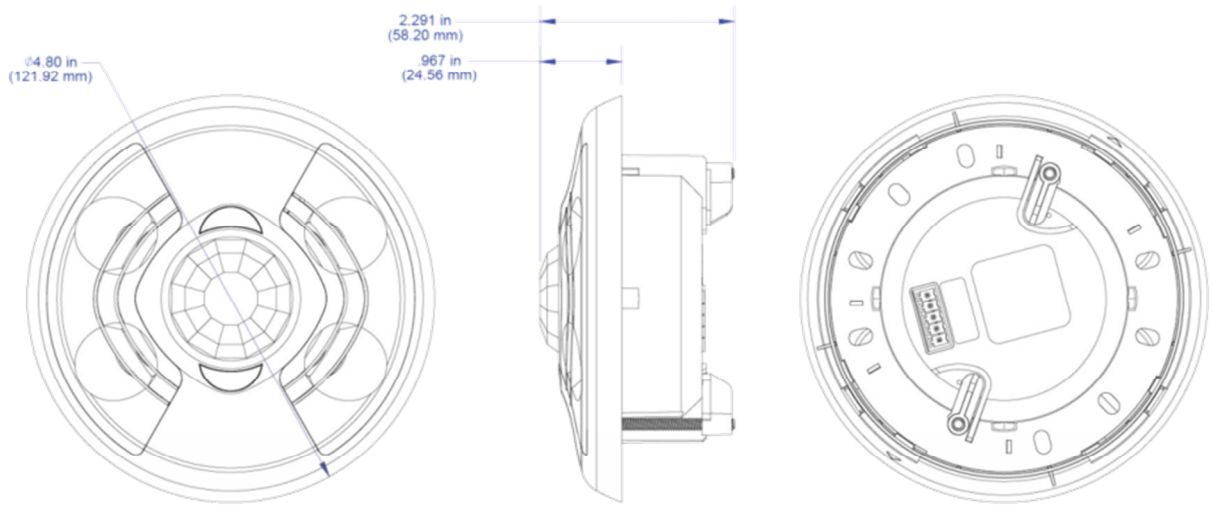


Dimensions and Weight (Approx)

*4.*80” diameter, 5.1 oz

AC Power Requirements

NONE



Division of Scope / Responsibility Matrix

Item	Furnished By				Installed By				Notes
	GC	EC	AV	IT	GC	EC	AV	IT	
Raceways, conduit, junction boxes, and wireways		x				x			
All related rough-in for above									Provide 2 weeks notice after completion for AV inspection
Specialty backboxes and floorboxes			x			x			
Speaker backcans			x				x		
All wall, floor, and ceiling mounted AC power receptacles		x				x			EC to abide by AV raceway seperation guidelines
Power distribution within racks and teaching consoles			x				x		
All low voltage AV cabling			x				x		
All low voltage AV terminations			x				x		
Wall blocking and structural hang points for AV devices	x				x				See detail drawings in AV documents
Provision of OFE PCs			?				x		

AV System Functional Narrative

Overview

The FIU Standard Meeting Room allows users to choose between (3) video sources (Desktop PC, BluRay, and Tabletop laptop connections (either HDMI or VGA). When selected, the source will be displayed on the TV display.

The audio feed from these video sources is sent to a pair of recessed ceiling speakers. This signal is combined with a single ceiling hung microphone to feed the video conference codec.

The FIU Standard Meeting Room consists of the following primary subsystems:

- Source Devices
- Switcher / Control Processor
- Audio System
- Display

The function of these systems is described below:

Source Devices

Source Devices include:

- Desktop PC in credenza
- BluRay
- Tabletop Connections
    - HDMI
    - VGA
    - Audio (VGA)

Switcher / Control Processor

The current FIU standard is the Crestron DMPS3-300C. This device provides all audio and video routing, control processing, and amplification in a single package. A touchscreen control sits on top of the credenza and is connected to the control processor via the network.

Device control is provided for the BluRay, TV, and PTZ Camera via RS232. An occupancy sensor connects via Cresnet.