Design Guidelines

Technology Design Standards

These Technology Design Guidelines are intended for use by Architectural and Engineering design teams as they design new building projects for the District. The guidelines are produced in an effort to standardize Technology types and functions throughout the District. The guidelines provide parameters regarding the District's requirements for Audiovisual Systems, Telecommunications Systems and Electronic Surveillance & Security Systems.

As part of the Facilities Master Plan, this document is meant to be used for establishing consistency in all new construction and renovation projects that may occur on any of the campuses within the MCCCD purview. This is intended to be a dynamic document that accommodates changes in system technology throughout the years and should be revised and updated as required for each new milestone change. The general items such as infrastructure and concept should remain relatively static.

Audiovisual Design Standards – Typical Classroom

These classroom design guidelines are intended for use by Architectural and Engineering design teams as they design classrooms, meeting and conference rooms and other AV-equipped spaces for the District. The guidelines are produced in an effort to standardize Audiovisual Technology types and functions throughout the District. The guidelines provide parameters regarding the District's requirements for classrooms, but will require interpretation and adjustment to suit the specific situations presented by individual classroom design projects. General classroom types shall accommodate the instruction of a variety of different subjects and instructional styles while maintaining common technology types and standard interfaces to technology. The standardization of equipment and interfaces to technology will promote ease of use for faculty and staff as they transition to classrooms throughout the District.

Communications System Requirements

Each AV-equipped room will provide for connectivity to the District's data network. Both wired and wireless connections will be accommodated. Communications outlets are to be installed in the following classroom locations:

a) Front Wall/Teaching Wall – provide a minimum of (2) communications outlet

b) Side Walls – provide a minimum of (2) communications outlets at each side wall

c) Rear Wall – provide a minimum of (2) communications outlets

d) Side Wall adjacent to Instructor Station - provide a minimum of (2) communications outlets at wall.

e) Instructor Station floor box - provide a minimum of (4) communications outlets at floor box.

f) Ceiling mounted projector – provide (2) communications outlet

g) AV Equipment Cabinet – provide a minimum of (6) communications outlet (in rooms with dedicated AV equipment cabinet locations). Provide (4) if in a space with videoconferencing.

h) Wireless Access Point outlet – provide minimum of (2) communications outlet located above an accessible ceiling location within the classroom. Depending on the size of the classroom (number of potential wireless users, multiple access points may be justified.

Note: Rooms to be used as computer labs require additional communications outlets at student seating locations. Computer labs shall be designed to provide the distribution of power and communications to each student seat.

Architectural and Engineering teams should also view the following AHC standards and design guidelines that refer to communications requirements:

a) Communications Cabling, AHC Standard Specification

b) Technology Room Design Requirements, Guidelines

General Room Audiovisual System Requirements

Audiovisual (AV) capabilities will support the use of integrated audio, video and computer based media for group instruction. The audiovisual system will support the display of images with the use of a ceiling mounted projector and projection screen. Voice reinforcement, where required, and audio reproduction will be provided using sound distribution through ceiling recessed loud speakers. The audiovisual system will be operated from the front of the room by the instructor. Media source and monitoring equipment will be located in the instructor station. Processing and control electronics will be located in the instructor station or in a separate equipment cabinet. A room dedicated computer will be located at the instructor station.

Specific AV system examples for typical rooms found across the campus are shown in figures within this document.

Typical audiovisual system and equipment details are as follows:

Video/Computer Display:

A ceiling-mounted video projector will be used to display video and computer images on a motorized roll-down projection screen. Video

projector requirements are as follows:

a) Minimum light output requirements for projectors in classrooms are 4,000 ANSI lumens. (Large rooms and rooms with high ambient light may require a video projector with higher light output such as 6,500+ lumens.)

b) Data network connection for network control and future media display transport

c) Minimum resolution: WXGA (1280 x 800 pixels)

d) Preferred resolution: WUXGA (1920 x 1200 pixels) to support 1080p video formats and higher computer resolutions

e) Projector security (Peerless PSMU-PRS, Chief RPMC, or suitable for projector)

f) Projector mount: Ceiling panel mount. The Ceiling Panel shall feature two knockout panels for electrical and audio video boxes and shall contain a 1 1/2" NPS lock nut welded in place. It shall include a 1 1/2" x 3" NPS threaded pipe. BMS LCD LOCII or equivalent

g) Source connection types to include a high-definition input such as DVI-D or HDMI, and to include VGA inputs for legacy computing equipment for the short-term.

h) Projection equipment is to support wired data networking and is being limited to two manufacturers to control consumables and to provide consistency in support. Currently Epson and Panasonic are being considered but all brands to be confirmed with the District before ordering for ensuring compliance.

Ceiling Media/Voice Playback Speakers:

A 70V ceiling-recess mounted speaker system will be deployed within spaces requiring audio support. Coverage will be dependent on ceiling height and audience locations and will drive the number of speakers to be deployed accordingly. Speaker requirements are as follows:

a) 70 volt system for even monaural playback

b) Minimum 4" diameter cone

c) Frequency range (-10bd): 75 Hz – 20 kHz

d) Nominal sensitivity level 89dB SPL, 1W @ 1m (3.3 ft)

e) Include plenum back can, speaker and grill

f) Manufacturer to by JBL, Model #CT-26

g) Minimum of two speakers

Projection Screens:

Rooms shall be designed to accommodate a minimum of one projection screen. Screen requirements are as follows:

a) Size – screens shall be sized to accommodate good viewing at student seat locations. Minimum screen image height is 50" with a student seat location 25' from screen. (standard rule is 1' of screen image height for every 6' of distance from screen.) Bottom of screen image shall be no less than 4' above the finished floor.

b) Aspect Ratio – typical aspect ratio shall be 16:10 (widescreen format) for computer content and video content viewing.

c) Screen location – screen shall be located at front wall at an off-center position. Screen location shall accommodate a minimum 6' width of writing board surface adjacent to screen. This design is intended to allow an instructor to use the writing board while a projected image is being shown.

d) Screen material – screen material shall be a matte white with a black border. Screen material shall have a gain of approximately 1.0. Screen material shall have a solid black backing to prevent rear light sources (windows, etc.) to pass through.

e) Installation – manual screens shall be ceiling or wall mounted per the room conditions. Typical classroom and meeting/conference space screens shall be manual with a Controlled Spring Return (CSR) for smooth screen retraction. Where required on larger (auditoria) image sizes, motorized ceiling recessed projection screens with a manual switch located near the instructor station and a low voltage parallel interface for AV system connection can be used. In either case, screen should be pushed away from the wall where required to accommodate whiteboard trays and other wall mounted equipment that may reside behind the screen.

f) Manual screen manufacturer to be Da-Lite wall mounted type and should be the Model-C with CRS. Wall mount spacer brackets to be used as required.

g) Motorized screens shall be recessed ceiling mounted type manufacturer to be Da-Lite and should be the Tensioned Advantage Electrol series (Matte White) or equivalent from Stewart Filmscreen or Draper, Inc..

AV Source Equipment:

Displayed computer images will be generated from a room dedicated computer or a laptop computer connected at the instructor station. Standard video playback equipment will include a DVD player. Detailed requirements for source equipment are as follows:

a) Room dedicated computer – the classroom dedicated computer shall be installed at the instructor station. The computer shall be controlled from a wired keyboard and mouse. Wireless devices may be coordinated with the Campus IT Department for their use. A USB extension cable shall be provide from the computer to provide the ability to connect USB keys at the instructor desktop.

b) Blu-ray DVD Player – This source equipment shall be installed in the instructor station. Instructor will load media manually and select the source from the push button control panel.

c) Auxiliary audio/video input – Auxiliary audio/video inputs will be located at the instructor station desktop and will include a VGA HD-15 and 3.5mm audio connection for a portable laptop computer and HDMI connections for digital video. Power and data local to the connection points should be included.

d) An WXGA or 1080p resolution document camera will be a common auxiliary equipment type required in classrooms. (Note: Where required, instructor stations shall include a lockable drawer also accommodating the permanent and secure installation of a document camera.) See Instructor Station requirements for additional details of auxiliary AV input connection types.

e) Auxiliary equipment will be selected from the push button control panel for display on the projection screen and distribution through speakers.

Audio Reproduction:

Audio will be reproduced with the installation of a 70V distributed system as part of the classrooms dedicated AV equipment. Loudspeakers shall be recessed in the ceiling of the classroom

reproducing sound from computer, audio and video playback sources. Audio distribution to the ceiling speakers is monaural. Audio source equipment may be connected to the system temporarily through the auxiliary audio/video input connector panel at the instructor station. Larger rooms, such as Lecture Halls or Auditoriums, will also require voice reinforcement as well as wall mounted speakers for more advanced stereo or surround sound source playback. Wireless microphones will be used by instructors in rooms requiring voice reinforcement. Assistive Listening Systems (ALS) will be included in all buildings. At least one portable will be required per building to support ADA requirements in spaces with less than 50 occupants. In presentation/instruction rooms with 50+ occupants, and integrated ALS system will be required in that space. For both portable and installed ALS systems a minimum amount of headsets to accommodate of 4% of the total room occupants (but no less than 2) will be required per location. The ALS system will be RF based and will be 72mHz.

AV System Control:

Media source selection, volume control, screen functions and other control options will be selected and controlled using a push button panel control panel located at the instructor station. The mka e and model of the control panel should be coordinated with the Campus' Media Services Department before implementing and control panel button layouts are to be submitted to the College for review and comment to help maintain consistency. The buttons on the control panel shall include (but not be limited to):

a) System On/Off

b) Screen Up/Down

c) Source selection (PC, Laptop, DVD, Aux., Doc Cam, etc.)

d) Program Volume Up/Down/Mute

e) Microphone Mute (if space allows, Vol Up/Down)

f) Image Mute (to hide projector image if only audio is required)

g) Source control (space permitting)

Control panel should have provisions for Ethernet connection for future IP-based system control or remote management system implementation.

Secondary control of the projector will be available through built-in user interface pages within the projector that can be accessed (permissions granted by the IT department) via a web page from a standard PC.

Specialty AV Equipment:

The classroom AV system shall be designed to allow for the connection of specialty equipment. The specialty equipment items currently identified include the following:

a) Assistive Listening Equipment (ALS) - Portable ALS equipment shall be connected at the Instructor Station or AV equipment cabinet.

b) Wireless laptop or tablet mirroring – in certain spaces, the instructor may prefer wireless collaboration and presentation capabilities to support a more dynamic classroom with interactive instruction. The use of AppleTV™ or other wireless collaborative tools from Extron such as ShareLink shall be used and configured on the IT network and shall comply with the District network security protocols.

c) Interactive whiteboard projectors – these shall be either wall or ceiling mounted and projecting on a fixed ceramic or solid surface whiteboard surface (preferably a matt or semi-gloss surface). These shall be WXGA resolution or higher and a minimum of 3,200 ANSI lumens in brightness. To include annotation pens and touch module. Epson 1430wi or approved equivalent.

d) Annotation tablet – the AV system shall be design such that an annotation tablet, capable of providing electronic whiteboard functions from a tablet located at the instructor station, may be permanently connected.

AV Cabling

To support digital transports for extending HDMI signals, shielded Category 6 cabling will be used. This should be per the manufacturer's standards to ensure compliancy but many other solutions are available and acceptable upon review. Current manufacturer preference is Extron.

AV Equipment

The following details specific furniture used for or housing the AV Equipment:

Instructor Station Requirements:

A common instructor station will be used in each of the typical classroom types described in this document. The instructor station will be semi-permanent furniture that will provide desktop space and work area that supports both installed and portable audiovisual equipment. The instructor station should be located adjacent to a side wall for distribution and connectivity from the side wall to instructor station or if centered in the front of the classroom, an adequate floor box should be provided to facilitate conduit and AV/data/power connections. It is a requirement that the station have lockable storage and equipment space. For ADA compliancy, a side fold-down surface will facilitate a shorter work surface. The following list of equipment will be used at the Instructor station:

a) Visual Presenter/Document Camera (dedicated tabletop space or locking equipment drawer required)

b) CPU (to be located within station)

c) AV source equipment (to be located within station)

d) PC Monitor (to be located at desktop or on articulating arm)

e) AV Control panel (to be located at desktop)

f) Internal multi-outlet power strip with surge protection and power switch

g) Laptop and portable equipment area (required at desktop)

h) Keyboard drawer (lockable) for wired keyboard and mouse

i) Ventilation on both PC and AV compartments

j) Connections located at the desktop shall include the following :

   • Power – duplex power outlet

   • Audiovisual – (2) VGA connections, (1) USB connection from room dedicated computer, (1) Composite Video/Audio connections, (1) HDMI connection, (1) blank plates for future AV connections

k) Connections located on the side near the fold-down shelf shall include the following :

- Power – duplex power outlet

- AV and data cabling can be extended down from the desktop to facilitate connections if used as a work table

Instructor presentation system consoles manufacturers to be: Design Media Presentation cart, Spectrum Industries Computer Security Station, or equivalent from DWI Enterprises, etc.

Refer to Figure 1.

Equipment Cabinet Requirements:

In meeting and conference rooms not requiring a presenter/instructor location but still having the need to house AV equipment, a locking portable enclosure will be included. The following list of equipment will be used at the equipment rack:

a) Front locking door

b) Minimum of 12 rack units (RUs) of 19" wide equipment space

c) CPU (to be located within station on rack shelf)

d) AV source equipment (to be located within rack)

e) Internal multi-outlet power strip with surge protection and power switch

f) Ventilation on both PC and AV compartments

g) Pass-through wire-way to accommodate AV, power and voice/data cabling to wall or floor for remote devices.

If custom millwork or cabinetry is made specific to a building project, the same guidelines as above can be followed but a separate equipment mounting frame will be required. This would be a pull-out-and-pivot style for easier support access. Refer to Middle Atlantic model #SRSR style units or equivalent.

Rolling equipment cabinet manufacturers to be: VFI, Middle Atlantic, or equivalent from DWI Enterprises, etc.
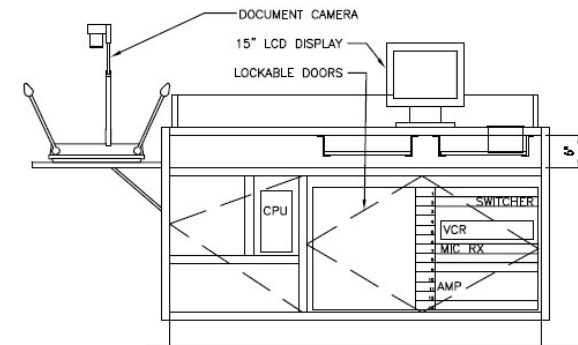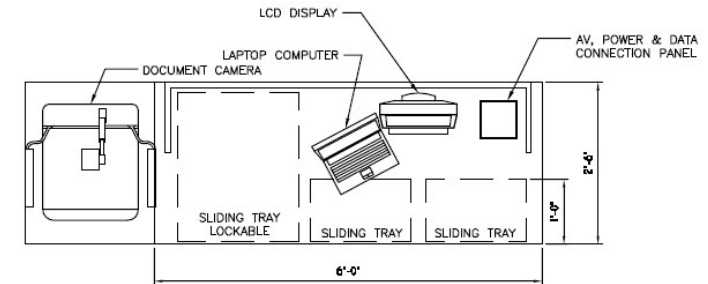
01 — TYPICAL INSTRUCTOR'S STATION — NTS
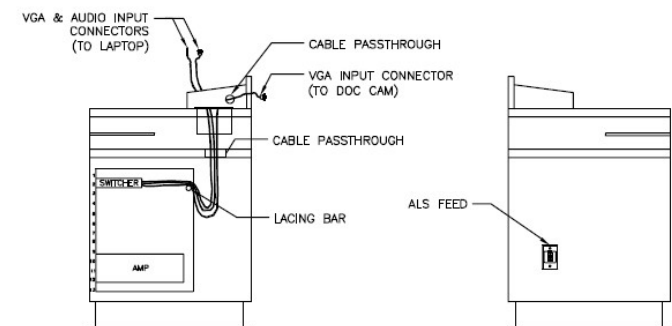
02 — TYPICAL INSTRUCTOR'S STATION — NTS

Systems Furniture Equipment

Typical AV systems furniture will include the following:

a) AV Equipment Cabinet - Lecture halls and typical classrooms that do not have an instructor station at an adjacent wall shall have an AV equipment cabinet used for storage of processing and switching equipment. Use of the AV cabinet will help to minimize conduit pathways to the instructor station. All AV system dedicated conduit will terminate in a pull box location behind the AV equipment cabinet. The cabinet will be used to house room dedicated processing and control electronics. A room dedicated computer and other portable equipment may be secured in this lockable space if necessary.

Helpdesk / Remote Network Management Software

Remote network management system software is required to control, manage and support all attached AV control systems and their related networked AV peripheral devices. This should support to tie into any Owner building management systems. This application must also be able to accommodate other Owner existing or future AV systems or components integrated with a compatible control system. Please note that this service is provided as part of the control system master quote and to coordinate with the manufacturer. The current standard for the District is Extron's Global Viewer.

This system shall be configured to monitor and manage (but not limited to):

a) System or individual peripheral status including power on/off state, network status (disconnected)

b) Projector lamp hours remaining vs. total estimated lamp life. Must be configured to notify by email the appropriate Campus staff or service technician when to order spare lamps (at 75% of lamp life is spent at each projector), to change lamp at 95% or use or when a lamp has blown.

c) System or peripheral temperature. An email notification will also be sent to the appropriate Campus staff or service technician when critical limits are triggered.

d) Archival system storage capacity notification. Where applicable, provide an email notification will also be sent to the appropriate Campus staff or service technician and Campus IT department when the storage capacity

of the archival server is near maximum limits. This is different from and not including the Campus content server but rather the individual room or portable video servers tied to the network or integrated in the room AV system(s).

e) Other key elements included within each room that are tied to the AV system and can be controlled or monitored.

AV Related Lighting and Low Voltage Interfacing

Lighting:

a) Lighting switches shall be located adjacent to the instructor station.

b) Lighting shall be circuited to allow a reduction of overall room light levels during allowing dimming during use of projector. Light levels dimmed through switching should still maintain enough light to allow students to take notes or work from documents located at their desktop.

c) Higher level functioning rooms (typically Lecture Halls/Auditoriums) that require dimming capabilities should have lighting control connections to the AV control system.

d) Lights in AV rooms should be circuited to allow fixtures adjacent to projection screens to be turned off during projection. Fixtures at writing board spaces and instructor stations should remain on during projection.

e) Light fixtures should provide maximum directivity of illumination and minimal surface brightness to reduce the opportunity for glare and distribution of stray light onto image display screens.

Lighting Control:

a) Where lighting is controllable through the AV control system, redundant wall-mounted controls shall also be provided per Architect's specification.

b) Where designated, provide a Low Voltage Interface for remote switching of lights from the AV system in designated AV facilities. (See Low Voltage Remote Control Interfacing)

Day light control:

a) Where window glazing allows exterior daylight or lighting from adjacent interior spaces into an AV space, window coverings should be provided to control the visual display environments. This can include manual or motorized shades (i.e. Mecco Shade) for scrim or blackout materials.

b) Where shades and drapes are controllable through the AV control system, redundant wall-mounted controls shall also be provided per Architect's specification.

c) Where designated, provide a Low Voltage Interface for remote switching of shades from the AV system in designated AV facilities. (See Low Voltage Remote Control Interfacing)

Low Voltage Cabling:

a) All low voltage cabling for AV systems will be routed through conduit, wireways or other dedicated containment.

b) Flush floor power distribution outlets and signal connection boxes will be required at locations where connections cannot reasonably be made at wall outlets.

c) Flush floor electrical boxes will be required at designated locations for audiovisual signal and power connections. The size and density of cabling and connections will preclude the use of standard "poke-thru" type fittings.

Low Voltage Remote Control Interfacing:

a) Where required as part of the AV system integration into the room, lighting and shade/drape system low voltage interfacing will be included. This may include relay interface for motor control or RS232 conversion equipment.