Part 1   General

1.1   Summary

.1   Unless otherwise indicated, follow the guidelines below when planning for Standard Audio-Video Products. These guidelines are not intended to restrict or replace professional judgment.

.2   Audio, video, control equipment, and infrastructure of various kinds has been standardized by McGill to maximize the ease of use for the students and staff of the University, and to provide continuity between AV systems from room to room. Within this section, unless an equivalent product is mentioned, the AV Contractor shall supply only the product specified. In some cases, due to special project requirements, equipment proposed by the AV Contractor may fall outside of this standardization; however, this is subject to approval by IIS-AVS. Any equipment not explicitly specified in this section is also subject to approval by IIS-AVS.

Part 2   Cable

General Note: All cabling must be fire rated (FT6) whether run inside EMT conduit or not.

2.1   Video Cable

.1   Coaxial cable

Coaxial cable for Analog and Digital video applications shall be of RG-6/U type, 75 Ohm, Plenum rated. Belden 1695A or Delco equivalent. This cable shall be terminated with crimp style BNC or RCA connectors of the type specified in section **27 41 01; Part 3**

.2   HDMI cable

HDMI cable shall be of the pre-molded type and shall be HDMI Version 2.0 (18.0 Gbps) compatible or later. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the **Extron HDMI Pro or Ultra series** cables. **Note:** No HDMI cable shall have locking connectors. Flexible cables are required for applications where the users of the room are manipulating them (Ex. pull out cables within a table monument). For HDMI cable lengths longer than 20 feet, an extender must be used to extend the HDMI signal.

.3   VGA cable

VGA cable shall be of the pre-molded type. There is no set manufacturer; however, the specifications of the selected cable should be equivalent to those of the **Extron VGA M-M MD series** cables, and **MVGA M-M** for cables used directly by the end users (Ex. pull out cables within a table monument). For VGA cable lengths longer than 25 feet, an extender must be used to extend the VGA signal.

*In both VGA cables above, the cable must allow for the extension of computer signals and EDID bits.

.4   DVI cable

DVI cables shall be of the pre-molded type. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the **Extron DVID DL Pro series** cables. For DVI cable lengths longer than 25 feet, an extender must be used to extend the DVI signal.

.5   S-Video cable

S-Video cables shall be of the pre-molded type. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the **Extron MHR-2 SVM-M series** cables for within a conduit, or **MHR-2P SVM-M** for plenum applications.

.6   DisplayPort cable

Display port cables shall be of the pre-molded type. Typically, since DisplayPort connections are more commonly used for computer graphics resolutions, and the AV systems on campus at McGill commonly use HDMI as the prevalent connection type for digital video, a DisplayPort to HDMI adapter cable is preferable (Ex. **Liberty E-DPM-HDM-X**) to avoid adaptors. DisplayPort M-M cables shall be 1.2 compliant and support data rates up to 21.6 Gbps. There is no set manufacturer for this cable type; however, the specifications of the selected cable should be equivalent to those of the **Extron DisplayPort Ultra series** cables. For DisplayPort cable lengths longer than 12 feet, an extender must be used to extend the DisplayPort signal.

.7   HDbaseT cable

If available, the AV Contractor shall use the HDbaseT cabling made by the manufacturer of the equipment using the cable. If the manufacturer in question does not make HDbaseT cabling, the AV Contractor shall recommend an alternate product, subject to approval by IIS-AVS. (Example for Crestron equipment: Crestron DM-CBL-8G-NP [non-plenum], or DM-CBL-8G-P [Plenum].)

2.2   Audio Cable

The composition of audio cables depends on the intended installation/use of the cable, which falls into two different cases:

- Permanent installation: Fixed in a conduit or behind a wall, the cable will not move after the initial installation, or need to stand up to any significant abuse. In this case, it would be preferable to have a foil-shielded cable.

- Movable installation: Moved regularly, potentially walked on, and needs to stand up to abuse that is more significant. In this case, a braided shield would be preferable.

.1   Microphone Cables

Microphone level cables shall be 75 Ohm, Star Quad (4 conductor):

.1   Permanent: Canare L-4E6AT or equivalent Belden product. (Foil shield)

.2   <u>Movable:</u> Canare L-4E6S or equivalent Belden product. (Braided shield)

.2   Line level audio cables (Balanced)

Balanced analog line level audio cables shall be 75 Ohm (2 conductor):

.1   <u>Permanent:</u> Canare L-2E5AT or equivalent Belden product (Foil shield)

.2   <u>Movable:</u> Canare L-2T2S or equivalent Belden product (Braided shield)

.3   Line level audio cables (Unbalanced)

Unbalanced analog line level audio cables shall be 75 Ohm impedance. For most applications involving unbalanced audio, 2 channels (Stereo: Left and Right) will be on the same cable. If this is the case, and the cable is custom, the same cables as specified above for balanced line level audio cables shall be used (2 channels) and terminated using the connectors specified in section **27 41 01; Part 3**. If pre-molded cables are used, then the following shall apply:

.1   <u>Terminated with 3.5mm (TRS) connectors:</u> There is no set manufacturer for this cable type, however, the specifications of the selected cable should be equivalent to those of the Extron Mini Audio Cables series (Model 'A Mini/2', etc.) Note: **This example is not relevant when considering the audio pullout cable within a cable cubby at a podium.** (Please see section **27 41 02; Part 7.1**)

.2   <u>Terminated with (2x) RCA connectors:</u> There is no set manufacturer for this cable type, however, the specifications of the selected cable should be equivalent to those of the **Extron RCA Audio Cables series** (Model 'A RCA/6', etc.)

*Unbalanced connections involving cable runs that exceed 15' in length shall be converted from unbalanced to balanced, and then back to unbalanced again at the destination.

.4   Digital audio cables

Digital audio cables, intended to carry formats such as AES/EBU, SP/DIF, etc., shall be 110 Ohm (2 conductor):

.1   <u>Permanent</u>: **Canare DA202AT** or equivalent Belden product (Foil shield)

.2   <u>Movable</u>: **Canare DA202** or equivalent Belden product (Braided shield)

.5   Speaker cable

Depending on the type of speaker, active or passive, there are two different cable types specified for speakers:

.1   <u>Active speakers:</u> The same cable as specified in section **27 41 01; Part 2.2.2** should be used.

.2   <u>Passive speakers:</u> Depending on the cable run length, most applications should use a 14 or 16 AWG cable, Belden 1307A (2 conductor) or Canare 4S8 (4 conductor)

2.3   **Control Cable**

.1   Serial control cable

For custom cable assemblies for RS-232 or RS-422 serial control, **Belden 1419A** or equivalent shall be used.

.2   Crestron control cables

For all control cables required for Crestron automation systems, only **Crestron certified products** shall be used.

.3   Network cable

For audio, video or control implemented via network cabling (Example: AVB installations) only **Belden 2412** (FT4) or **Belden 2413** (FT6) shall be used.

Part 3   **Connectors**

3.1   **Video Connectors (in-line)**

.1   BNC connectors

Coaxial cables for analog and digital video applications, and some types of digital audio applications, must be terminated with 75 Ohm BNC crimp type connectors only. **Canare BCP-C55A** or Neutrik equivalent.

.2   HD15 (15 pin) connectors

HD15 (D-sub 15 pin) connectors for custom VGA or RGB cable assemblies shall be solder type and shall have a metal housing with the appropriate stand-off screws or thumb screws.

.3   RCA connectors

RCA connector for terminating coaxial cable shall be 75 Ohm crimp type connectors only. **Canare RCAP-C53** or Neutrik equivalent.

.4   Pre-molded connectors (HDMI, DVI)

For HDMI and DVI connectors, only cables of the pre-molded type shall be used. See sections **27 41 01: Parts 2.1.2** and **2.1.4** for specifications.

3.2   **Audio Connectors (in-line)**

.1   XLR connectors

Neutrik XX series, solder type XLR connectors shall be used for balanced audio connections of the following types:

.1   Microphone:

        .1   Male: **Neutrik NC3MXX-B** (black metal housing, gold contacts)

        .2   Female: **Neutrik NC3FXX-B** (black metal housing, gold contacts)

.2   Line Level

        .1   Male: **Neutrik NC3MXX-BAG** (black metal housing, silver contacts)

        .2   Female: **Neutrik NC3FXX-BAG** (black metal housing, silver contacts)

.3   Digital

        .1   Male: **Neutrik NC3MXX** (nickel housing, silver contacts)

        .2   Female: **Neutrik NC3FXX** (nickel housing, silver contacts)

.2   RCA connectors

As specified in section **27 41 01; Part 2.2.3** (Line level audio cables (Unbalanced)), audio cables terminated with RCA connector will predominantly be of the pre-molded type, unless there is special requirement for a custom cable assembly. Custom cable assemblies shall use the following connectors, depending on what kind of cable they are terminated on:

.1   Coaxial cable: see section **27 41 01; Part 3.1.3**

.2   Other audio cable: Canare F-09 or F-10 (solder type) or Neutrik equivalent.

.3   1/4 inch TS connectors

For 1/4 inch unbalanced connections, the solder type Neutrik NP2X-BAG (black shell) or Canare F-15 shall be used.

.4   1/4 inch TRS connectors

For 1/4 inch balanced connections, the solder type Neutrik NP2X-BAG (black shell) or Canare F-16 shall be used.

.5   3.5mm (1/8 inch) TRS connectors

As specified in section **27 41 01; Part 2.2.3** (Line level audio cables (Unbalanced)), stereo unbalanced audio cables terminated with a 3.5mm TRS connector shall use the solder type **Canare F-12** connector.

.6   speakON connectors

For use with passive speaker systems where the speakers use the twist-lock style connections, the following Neutrik speakON SPX series connectors shall be used, depending on the selected speaker cable:

.1   2 conductor: Neutrik NL2FX

.2   4 conductor: Neutrik NL4FX

3.3 Control connectors (in-line)

.1 DB9 (9 pin) connector

For custom RS-232 cable assemblies, a solder type DB9 (D-sub 9 pin) connector with metal housing and appropriate standoff screws or thumb screws shall be used.

3.4 Panel connectors

All panel connectors shall be of the Neutrik D series. Connection types not available in the D series, but required to be mounted on a panel, shall be specified by the Supplier, subject to approval by IIS-AVS.

.1 Video

The panel connectors for video are as follows:

.1 BNC: **NBB75DFB** (grounded) or **NBB75DFIB** (isolated).
.2 RCA: **NF2D-B-4** (yellow insulation washer)

.2 Audio

The panel connectors for audio are as follows:

.1 XLR (Microphone):
.1 Male: **NC3MD-L-B-1** (Black metal housing, gold contacts)
.2 Female: **NC3FD-L-B-1** (Black metal housing, gold contacts)

.2 XLR (Line level, analog):
.1 Male: **NC3MD-L-BAG-1** (Black metal housing, silver contacts)
.2 Female: **NC3FD-L-BAG-1** (Black metal housing, silver contacts)

.3 XLR (Digital audio):
.1 Male: **NC3MD-L-1** (Nickel housing, silver contacts)
.2 Female: **NC3FD-L-1** (Nickel housing, silver contacts)

.4 RCA:
.1 **NF2D-B-9** (white insolation washers)
.2 **NF2D-B-2** (red insolation washers)

.5 1/4 inch TS and TRS:
.1 **NJ3FP6C-BAG** (Black metal housing, silver contacts)

.6   speakON:

.1   2 conductor: NL2MD-H or NL2MD-V

.2   4 conductor: NL4MD-H-1 or NL4MD-V

3.5   Network connectors

.1   Panel mount connectors specified for use with network cables terminated in RJ45 line connectors shall be **Neutrik NE8FDV-B**.

Part 4   Video Equipment

4.1   Projectors

All projectors, unless otherwise specified below, shall be commercial grade Panasonic Laser products, at a minimum able to project a resolution of 1920x1080 60p.

.1   Standard (Long) Throw

Standard (Long) throw projectors shall be commercial grade **Panasonic Laser** products and shall at minimum be capable of projecting a resolution of 1920x1080 60p. The projector shall include the valet service. (Example: **Panasonic PT-MZ680**)

.2   Short Throw Projectors

The **Epson Powerlite Laser** series shall be used when short throw projectors are required. Should there be a requirement for the short throw projector to project full HD resolution; or should another manufacturer be required, since the projector is part of an Interactive Board assembly (See section **27 41 01; Part 4.8.2**), exceptions may be made. All exceptions subject to approval by IIS-AVS.

4.2   Projector/Display

.1   Projector mounts

Chief brand projector mounting products shall be used for mounting long throw projectors, unless otherwise approved by IIS-AVS.

.2   Display mounts

When mounting flat panel displays, either ceiling or wall mounts may be used, depending on the required application. **Chief** products or approved equivalent shall be used.

.3   Monitor arms

On projects with McGill standard large podia (section **27 41 01; Part 13,** section **27 41 02; Part 7,** and **Division 12, section 12 50 10** of the McGill Building Design Standards), and where a podium computer has been specified, a desk mounted monitor arm is required for the display. The **Chief K1D120BXRH** monitor arm shall be used in this case.

4.3   **Projection screens**

All projection screens, including manual, electric, rear projection and other specialty screens shall be manufactured by Da-Lite, with an aspect ratio of 16:9, unless due to specific requirements and approved by IIS-AVS. HD Progressive 1.1 fabric must be used when using a Laser projector.

.1   Manual

Manual screens shall be **Da-Lite Model C**.

.2   Motorized

Whenever possible, electric projection screens shall have low voltage controllers built into the screen, with the motor assemblies recessed into the ceiling, and shall have **Da-Lite's Standard Silent Drive System**. (Example: **Da-Lite Tensioned Advantage Electrol**)

.3   Ceiling/Wall mount

When it is not possible to recess the projection screen into the ceiling, ceiling or wall mounting the motor assembly is possible. These screens shall have **Da-Lite's Standard Silent Drive System**. (Example: **Da-Lite Tensioned Contour Electrol**)

.4   Acoustically perforated

When the design of an AV system requires a projection screen to be mounted in front of one or more speakers, thus obstructing the audio path, an acoustically perforated screen shall be used. (The examples in the sections above for *Motorized* and *Ceiling/wall* mount projection screens above both have acoustically perforated versions)

.5   Fixed screens

If there are no requirements for the screen to move, such as to access a blackboard or whiteboard behind the screen, the screen may be permanently fixed to the wall. (Example: **Da-Lite Cinema Contour**). On occasion, likely in conjunction with the use of an Ultra short throw projector, white boards may be used as the projection surface. (Example: **Da-Lite IDEA series screens**)

4.4   **Video Displays**

There are no specific standard models of video display that have been selected by IIS-AVS; however, all video monitors must be commercial grade Panasonic products, at a minimum 1920x1080 60p in resolution. Depending on the requirements and budget, monitors shall be equivalent to the **Panasonic TH-xxSQ1 series** or **TH-xxEQ1 series**.

Note: For Public Display Screen (PDS) applications, 24/7 rated monitors must be used.

4.5   **Video cameras**

As with projectors, and video displays, video cameras shall be commercial grade Panasonic products, unless there are requirements that cannot be met by Panasonic's range of products. Selection of a different product shall be subject to approval by IIS-AVS. Video cameras shall be able to output 1920x1080 60p at a minimum.

.1   Movable cameras

Cameras operated manually by the user must be easy to use and durable. The camera should have the required audio and video outputs to interface with the AV system without the use of any in-line adapters, or special breakout cables. The camera shall be able to be mounted on a standard tripod or used handheld. (Example: **Panasonic AG-CX10 4K** or **Wolfvision Eye 14**)

.2   Fixed cameras

In applications where the video camera does not need to be manually repositioned, a fixed camera shall be specified. This camera can be ceiling or wall mounted but shall be able to output 1920x1080 60p at a minimum. (Example: **Panasonic AW-UE4**)

.3   Mechanical cameras

When the remote control of a video camera is required, a Pan/Tilt/Zoom (PTZ) camera shall be used. (Example: **QSC PTZ12X72** or **Panasonic AW-UE100**) Unless otherwise specified by the requirements of the project, the camera shall be controlled via the AV automation system (Crestron touch panel).

4.6   **Video switchers and routers**

On occasion, there are requirements for user operated video presentation switchers or routers for analog and digital signal types including, but not limited to: VGA (or RGB), DVI, HDMI. In this case **Extron** or **Crestron** products, capable of handling a minimum resolution

of 1920x1080 60p, shall be specified. **Crestron NVX** is a preferable solution for routing Audio/Video signals.

4.7   **Document cameras**

Unless otherwise specified in the requirements of a project, classroom AV systems shall have a document camera located at a podium. This document camera shall have the following specifications:
- Discrete on and off function
- Compatibility with network control
- Motorized optical zoom
- Output resolution of at least 1080 60p

.1   Desktop Document Cameras

In classrooms where a document camera may be mounted on a desk or on a podium, the model specified shall be the **Wolfvision VZ-3neo.UHD, version B**.

.2   Ceiling mount Document Cameras

As an alternative to the desktop document camera, the **Wolfvision Eye 14** ceiling mount document camera may be used; however, special lighting must be considered for this option, since the camera does not come equipped with its own lighting.

4.8   **Interactive displays**

There are currently many interactive display products of various styles in the marketplace. Until recently, McGill University used SMART products exclusively; however, at this time, IIS-AVS is evaluating a variety of products in the category of interactive display to establish new standardized products. The following sections give examples of products used on campus recently. Should the AV Contractor wish to recommend a product other than that specified in the design for a project, IIS-AVS would be happy to review it. Any such recommendations are subject to approval by IIS-AVS and shall be at a resolution of 1920x1080p at a minimum.

.1   Interactive monitors

On recent projects, IIS-AVS has been specifying the **Planar Helium PCT2435** touch monitor. In some medium sized classroom installations, a touch monitor is installed at the podium to provide two functions: The monitor allows the presenter to see the PC video source while it is shown on the Main Display; and the presenter can use their fingers to control the PC it is connected to.

When digital inking or other annotation functions are required, a **SMART Podium 624** interactive monitor can be used. The interactive monitor allows the presenter to write notes or make illustrations on the screen with a wireless pen.

Note: In the case of integrating an interactive monitor on a podium within a classroom where there is a podium PC, it shall only be connected to the Podium PC. The interactive display shall be fed a video signal from one of the PC's two video outputs, while the PC's second video output shall feed the room's AV system directly.

.2   Interactive white boards

Depending on the size of display required, IIS-AVS specifies either interactive projectors, or SMARTboard interactive displays. The **Epson Brightlink Laser** series shall be specified in the case of interactive projectors. These interactive ultra-short throw projectors offer the presenter digital inking via a stylus or finger, digital whiteboard functionality, control of the connected computer, and many other features all on a large (up to 100-inch diagonal) surface. The interactive projector is mounted on the wall for general viewing and is generally connected directly to a Local computer. Depending on the exact nature of the project's requirements for the AV system, this interactive projector may or may not be controlled by the AV system's automation. Similar to this, when a SMARTboard is used, it shall be the **MX series**.

4.9   Other video components

.1   Blu-ray Players

In audiovisual installations where a dedicated Blu-ray Player is required, Panasonic **Panasonic DP** or **DMP series** players shall be used. If a rack mounted unit is required, **TASCAM BD series** or equivalent should be used.

Part 5   Audio Equipment

The audio equipment listed below is user facing or operated directly by the user. It is understood by IIS-AVS that other audio equipment will be required for the AV system to function. Any audio equipment specified by the AV Contractor that is not mentioned in this list shall be subject to approval by IIS-AVS.

5.1   Microphones

.1   Tabletop (Podium– Gooseneck)

Tabletop wired microphones, also called gooseneck microphones, are permanently installed at the podium in rooms large enough to require sound reinforcement for the presenter to be heard by the students. These microphones can also be installed in smaller rooms where the Lecture recording system has been installed in order to capture the presenter's audio. In such cases the microphones shall be **Shure MX418/C**.

.2   Tabletop (Student- Push to Talk)

Some classrooms, notably those with Videoconferencing/Web conferencing capabilities, require microphones in the student seating areas. In cases such as this, the **Shure MXA310** shall be used. If a Push to Talk (PTT) function is required, a separate PTT button shall be used (Ex. **Clockaudio** touch switches).

.3   Headset

In the past, headset microphones were often installed on the classroom's podium, in lieu of the fixed tabletop microphone, to allow the presenter more flexibility. This is no longer a standard feature installed, unless required specifically on a project. In that case, the headset microphone shall be the **Shure WH20XLR.**

.4   Ceiling mount

Ceiling mount microphones are necessary for some installations involving the Lecture Recording System (LRS), Videoconferencing, or Web conferencing, to capture questions from the student seating area properly. Ceiling mount microphones shall be the **Shure MXA910** or **710 series.**

.5   Wireless

Wireless microphones are used in many classrooms and lecture halls on campus. IIS-AVS has standardized on **Shure QLX series** microphone systems for this category. The wireless receiver (**Shure QLXD4-G50**) is installed as a standard across campus in order to allow professors to sign out transmitters (body pack: **QLXD1;** or handheld: **QLXD2**) for use throughout the semester. The most prevalent transmitter type on campus is the body pack (**QLXD1**) with a headset microphone (**Shure SM35-TQG**).

5.2   Loudspeakers

There are no set standard manufacturers for Loudspeakers; however, the examples given in the sections below give basic guidelines on the specifications required. All speakers specified by an AV Contractor shall be subject to approval by IIS-AVS.

.1   Active speakers

Active speakers are deployed in medium and large sized classrooms, as well as lecture halls and auditoriums. (Example: **QSC K.2 series** (medium sized rooms) or equivalent, and **QSC KW series** (Large rooms) or equivalent.)

.2   Ceiling mount speakers (passive)

Round speakers flush mounted into the ceiling are to be used in small and medium sized rooms only. Unless there are space constraints in the ceiling, 4- or 6-inch diameter speakers shall be used in sufficient quantity to provide audio coverage to every seat in the room. (Ex. **QSC AD-C4T** / **AD-C4T-LP** or **QSC AD-C6T** / **AD-C6T-LP**)

.3   Wall mount speakers (passive)

In large rooms, it is not sufficient to rely on the ceiling mounted speakers from the previous section for audio playback and sound reinforcement. For large rooms, wall mounted speakers or speakers hung from the ceiling shall be used. (Example: **QSC AD-S8T** or better)

5.3   Amplifiers

As with speakers, there is no set standard for audio amplifiers; however, the amplifier should be able to provide at least (2x) 180W of power. (Example: **QSC SPA or MP-A Series**). Where a more powerful amplifier is required, the **QSC CX / CMX / CX-Q or CXD-Q series** must be used. The AV Contractor may specify an amplifier of different manufacturer and model than that of the listed example; however, it is subject to approval by IIS-AVS.

5.4   Transformer isolators

In cases where there are unbalanced audio connections, IIS-AVS may require the use of transformer isolation to eliminate RF or Grounding issues. Transformer isolation (1:1) between the laptop and the system, shall be implemented whenever there is an unbalanced analog audio connection provided (3.5mm TRS). Depending on the system in question, IIS-AVS may require the use of transformer isolation between the system and inputs to the amplifiers driving the speakers (in the case of passive speakers) or the inputs of the speakers themselves (in the case of active speakers). The transformer isolation shall be the **RDL AV-HK1** or equivalent.

5.5   Digital Signal Processing (DSP) systems

There are several different kinds of Digital Signal Processing (DSP) systems that have been deployed across the campus to date. If a DSP engine is required as part of the function of the AV system, the AV Contractor should use products from the **QSC Q-SYS ecosystem**. Selection of DSP systems are subject to approval by IIS-AVS.

Part 6   Videoconferencing and Web conferencing systems

6.1   Videoconferencing

Existing videoconferencing systems on campus have either been integrated into automated AV systems or are operated as stand-alone systems. **Cisco Systems** are now the standard manufacturer for videoconferencing at McGill University.

**Note: In the case of private installation of videoconferencing systems, the users shall be required to retain their own service contracts. IIS-AVS recommends a duration of three (3) years on service contracts related to videoconference systems. **

6.2   Web conferencing

The pace at which the technology is changing in the field of Web Conferencing has made it impractical to specify model information for exact systems; however, McGill Unified Communications (UC) systems shall remain software agnostic, if possible. Typically, MS Teams or WebEx are the platforms used for staff meetings, while McGill's academic community prefers Zoom. That said, web conferencing systems must be compatible with the most common UC platforms on the market.

.1   Private meeting/Conference rooms:

Recently, McGill ITS has defined three web conferencing system types for private meeting rooms, based on room size:

.1   Huddle room / Small Conference room / Mobile cart <20ft

For rooms of this type and size (maximum viewing distance less than 20 feet), the **Bose VB1** shall be used with a USB-C cable to connect to User's laptop, which leverages the UC platform of their choice.

.2   Medium Conference Room <25ft

For this room type and size (maximum viewing distance less than 25 feet), the **Crestron UC-MX70-T-L** should be used as simple user experience with one-touch meeting joins and an easy operation system. This system also offers a Bring Your Own Device (BYOD) function, where conference room visitor can connect their laptop to use their own UC conference platform.

.3   Large Conference Room with Crestron Automation

This is the most flexible system, able to accommodate any room size and shape. It should be equipped with a **Crestron Flex UC Integrator Kit** system, the latest streaming technology, an audio DSP, a tabletop touch panel (for a simple room operation), a table monument for BYOD connections, a wireless presentation device, ceiling microphones, ceiling speakers, two PTZ cameras and two large displays.

***The AV Contractor may specify models other than those listed above; however, equipment selection is subject to approval by IIS-AVS.

.2   Public Classrooms

In public classrooms, web conferencing systems must be software agnostic, and should therefore leverage the room's local PC as the engine to host the web conferencing platforms, not proprietary hardware. For this particular use case, the **QSC Q-SYS** ecosystem must be used to handle the audio and video bridge to the local PC. The system typically has two **QSC PTZ12x72** cameras, one to capture the presenter and one to capture the audience/students. For the audio capture, teacher and student microphones are routed to the Q-SYS USB Bridge.

***The AV Contractor may specify models other than what is listed above; however, this is subject to approval by IIS-AVS.

Part 7   Lecture Recording Systems (LRS)

Across campus, some public classrooms are equipped with Lecture Recording Systems (LRS). These systems are computers that are physically located in the classroom's AV equipment rack or podium and are part of a centrally automated system via the McGill network.

There are two different room types equipped with LRS: "one source" and "two source" rooms. A "one source" room is a room with an AV system capable of displaying one input source at a time, on at least one display.   A "two source" room is a room with an AV system able to display two input sources simultaneously, on at least two displays. Some general requirements for attributes and implementation of LRS with the AV system in a classroom follow:

- LRS systems in either room type shall capture the same video feeds that shown on the main displays in the room. (Unless otherwise required by the project as stipulated in the AV design drawings or IT Services Needs Assessment document.)

- The audio fed to the LRS shall match what is heard in the room; microphone mutes and unmutes, and audio from the selected input source shall match what is heard in the room.

- The video feeds from the AV system to the LRS shall be scaled such that a fixed resolution of 1280x720 p60 is fed to the LRS inputs. (Unless otherwise required by the project as stipulated in the AV design drawings or IT Services Needs Assessment document.)

- Within the AV system, there shall be a discreet level control for the audio being fed to the LRS. This level control shall be located on the Crestron touch panel, in the hidden page containing the audio controls.

- The audio fed from the AV system to the LRS shall be transformer isolated to avoid potential problems with different electrical grounding.

7.1   LRS in "One Source" Rooms

The LRS capture station deployed in a "one source" room shall be a 1 RU, rack-mounted computer. This computer shall have two (2) HDMI inputs for the video fed from the AV system, and one 3.5 mm audio connection for audio. In the case of the standard "one source" room, however, only one of the two HDMI inputs will be used. The second HDMI input shall be present for possible future use, or for any possible exceptional user requirements such as "talking head". The LRS in a "one source" room shall have a 3.5 mm connection for the audio being fed by the AV system.

7.2   LRS in "Two Source" Rooms

The LRS deployed in a "Two source" room shall be of the same specification as that found in the section above on "One source" rooms. In the case of two source rooms, however, both HDMI inputs will have video being fed to them in addition to the audio via the 3.5mm connection.

7.3   LRS Systems with "Talking Head"

In legacy LRS deployments on campus, some systems have what is referred to as "Talking head". This term refers to an LRS system in which one of the inputs has been dedicated to a camera showing the presenter. In this implementation, two video feeds are recorded: 1) The video of the presenter; 2) The feed from the AV system. Since the camera on the presenter is a fixed source to the recorder, and the user can only change the source from the room's AV system, this system is still considered "One Source".

A dedicated camera on the presenter (or "Talking head") is no longer a standard LRS configuration deployed on campus. This option shall only be implemented if required by the user on a case-by-case basis.

.1   "Talking Head" in "One Source" rooms

If a dedicated presenter camera is required by the user in a "one source" room, it shall be implemented within the AV system in the follow way:

- The output of the camera shall be split using a 1x2 distribution amplifier.

- One half of the camera split shall be implemented as an input into the AV system.

- The other half of the camera split shall be connected directly to the second HDMI input on the LRS.

.2   "Talking Head" in "Two Source" rooms

Since only two-input LRS recorders are available at this time, if a dedicated presenter camera ("Talking head") is required in a "Two Source" room, it shall only be implemented as one of the inputs into the AV system or shall replace one of the two room feeds.

Part 8   Local recording systems

In some installations, there are requirements for audio and video recording systems, controlled locally by the user. At this time, the preferred product, which may be integrated directly into and controlled by the Crestron automation system, are the products from the Extron SMP series. Selection of recorder systems are subject to approval by IIS-AVS.

Part 9 **Wireless presentation systems**

By McGill's definition, "wireless presentation system" is the term given to a device, hard wired into the AV system, that connects to a mobile device brought by the user (I.e., Laptop, Tablet, Smartphone) via WIFI and allows the user's device to be displayed through the AV system. Crestron AirMedia (AM-3200) shall be used when this function is required.

Part 10 **Automation systems**

Crestron systems are used exclusively across campus for the automation of AV systems. The AV Contractor shall specify and/or supply all Crestron equipment as necessary, given the requirements and the AV design; subject to the approval of IIS-AVS.

10.1 **Control surfaces**

.1 Button Panel Control Surfaces

In rooms without a podium, where small AV systems with limited input sources are installed, one option is to use a button panel controller, flush mounted in the wall. The button panel that shall be used in this case is the **Crestron MPC3-302-B**. Please see section **27 41 03; Part 3.2** of the master format for the standard button layout and behaviour.

.2 Touch Panel Control Surfaces

.1 Desk mount

In rooms where there is a podium or a main desk, touch panel controls shall be used. These touch panels shall be secured to the podium or desk via the appropriate tabletop kit, swivel mount and security screws. The size of the touch panel will vary by project. (Example: **Crestron TS series**)

.2 Wall mount

In rooms with either a compact podium, or no podium at all, a lockable wall mount touch panel may be used as an alternative to the **Crestron MPC3-302-B** or the Crestron Fliptop. In such a case, the **Crestron TS series** shall be used.

10.2 **Other Crestron components**

Given the vast number of products available from Crestron, and the variety of scenarios in which they are used on campus at McGill University, it is not possible to list all models used

at this time. For all equipment types other than those listed above, models selected shall be subject to approval by IIS-AVS.

Part 11   **Equipment Racks**

For most projects, most of the equipment will be housed in an equipment rack either inside the room or in an AV/Telecom closet. This equipment rack shall be a **Middle Atlantic** product.

*For standard installation practice of equipment in equipment racks, see section **27 41 02; Part 8.**

Part 12   **Audio-Video Monuments**

12.1   **Table monuments**

When a table monument is required for a podium or conference room table, the **FSR RT6-S4** shall be used.

12.2   **Floor monuments**

Floor monuments are typically the purview of the electrical discipline to specify, procured by the General Contractor, and are usually products made by Hubbell, Wiremold, etc. The specified product must be reviewed and approved by IIS-AVS.

**Part 13**   **Podia (McGill standard)**

For public classroom projects, IIS-AVS has designed standard podia, in consultation with McGill Facilities Design services, and Teaching and Learning Services (TLS). These standard podia shall be used on all public classroom projects where a podium is required. No modifications to this design shall be made without approval by IIS-AVS. Depending on the size and envisioned usage of the room itself, there are two sizes of standard podia proposed by IIS-AVS: Small and Large. For private projects, custom podia may be designed by the project; however, they should follow the McGill design criteria.

13.1   **Requirements for Podium Construction Materials**

For detailed requirements concerning the materials that must be used to construct the standard McGill podia, see section **12 50 10** of McGill Building Design Standards.

13.2   Standard podium models (sizes)

See section **12 50 10** of the McGill Building Design Standards for more information on the standard McGill podium models (sizes). The follow sections show basic wireframe drawings, for reference only.

.1   Small podium
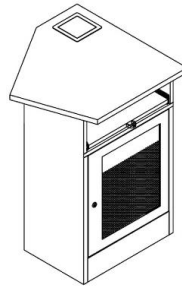
.2   Large Podium
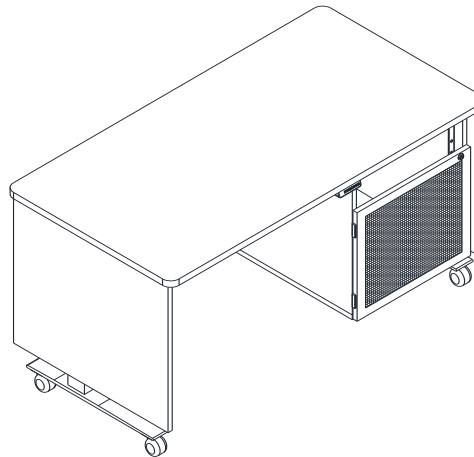
Note: On a per project basis, details concerning holes needed in the podium for AV cabling or equipment management may be found in the architectural drawings. No holes are to be made without approval from the architect and IIS-AVS.

Part 14   Network switches

Network switches for AV, or otherwise, shall be subject to approval by McGill IIS. IIS-TIS shall provide the network switch and subsequent network jacks needed by the AV system for communication and control.

Part 15   AV over IP

AV over IP promises to take full advantage of the convergence of AV and IT, with the ability to distribute video, audio, and control signals over traditional network infrastructure. Recently, IIS-AVS has moved to integrating AV streaming devices on the network within their AV designs, especially when scalability or overflow is required. This technology is typically used for medium and large classroom AV systems.

15.1   Video over IP

To distribute video signals or HDBaseT, etc., **Crestron DM** is still used for simple AV systems, or when streaming is not an option. Otherwise, the current preferred solution is to distribute video over the McGill network with **Crestron NVX** technology.

15.2   Audio over IP

Analog audio distribution is still being implemented on campus, especially between amplifier and speakers; however, for auxiliary audio inputs and outputs, or for microphones, the AV Contractor must use the **QSC Q-SYS ecosystem** along with Dante devices over the McGill network.

Part 16   Definitions

.1   **AV Contractor:** An AV firm external to McGill University, qualified by IIS-AVS to procure and install AV equipment in the context of renovation projects on campus. These external partners may also be called upon to provide other services periodically (i.e., AV design, programming, technical support). AV Contractors may be mandated by IIS-AVS directly, or by a General Contractor in the context of construction projects managed by McGill Facilities, in which case they are referred to as the "AV Subcontractor".

.2   **AVS:** *Audiovisual Services*. AVS, is one of the teams making up IT Infrastructure and Information Security (IIS), a unit within McGill's Information Technology Services (ITS). The Audiovisual Services portfolio provides professional AV services for new builds and renovation projects including AV project management, design and programming; and provides technical support for existing public classroom AV systems across campus. AVS is also referred to as **IIS-AVS**.

.3   **IIS**: *IT Infrastructure and Information Security*. IIS is a division of McGill Information Technology Services (ITS) that encompasses 7 unique teams including, but not limited to, Audiovisual Services (AVS) and Telecommunications Infrastructures and Systems (TIS). IIS was formerly known as Network and Communication Services (NCS).

.4   **ITS**: *Information Technology Services.* McGill IT Services (or ITS) serves McGill students, faculty, academic and administrative support staff, and alumni. It is composed of six units that work together to provide comprehensive IT services (including Wi-Fi, email, campus printing, software, and more) as well as client care (such as the IT Service Desk, IT Knowledge Base, and IT project management and delivery) to the McGill community. IT Infrastructure and Information Security (IIS) is one of the units within McGill ITS.

.5   **TIS:** *Telecommunications Infrastructures and Systems***.** TIS is one of the teams making up IT Infrastructure and Information Security (IIS), a unit within McGill's Information Technology Services (ITS). TIS installs and maintains physical network and physical security components across McGill's campus. TIS is also referred to as **IIS-TIS**.

Part 17   Related Technical Sections

The technical sections of the McGill Building Design and Technical Standards should be consulted with the current document, most notably (but not limited to) the following:

Section Number	Title of Section
12 50 10	**Podiums**
27 40 01	**Scope of Work for Audio-Video Design**
27 40 02	**Scope of Work for Audio-Video Installation**
27 41 02	**Standard Audio-Video Installation Practices**
27 41 03	**Standard Audio-Video Automation System Implementation**

END OF SECTION