1.0 GENERAL

1.1 Related UBC Guidelines

.1 UBC Learning Space Design Guidelines

1.2 Coordination Requirements

.1 Audio-Video system design shall be coordinated with Architectural, Structural, Interior Design, Electrical and Mechanical to provide a safe and functional operation.

1.3 Description

.1 General requirements for Sections 27 41 16 to 27 41 52.

2.0 MATERIALS AND DESIGN REQUIREMENTS

2.1 General

.1 Provide only new equipment and material approved for the installation and suitable for continuous operation. Where the guidelines do not describe a required item, furnish equipment or material consistent with the quality of other specified products, and best suited to the purpose required. Submit these products for review by UBC IT Audio Visual.

.2 The terms “Approved Products” and “Approved Manufacturers” indicate that products/manufacturers described are the UBC standard, and any alternate products must be reviewed and approved in writing by UBC IT Audio Visual.

.3 The terms “Typical Products” and “Typical Manufacturers” indicate that the products/manufacturers described are commonly used at UBC, but are not necessarily an enforced standard. Alternate products may be used, provide they are of equal or greater quality and approved by UBC IT Audio Visual.

.4 User accessible rack mount equipment will be fitted with security covers and tamper proof rack screws to prevent tampering

2.2 Energy Efficiency

.1 The University of British Columbia pursues energy efficiency in audio and video equipment where ever possible. Audio and video products that offer the performance described in these technical guidelines with greater energy efficiency will be of interest, and should be submitted to UBC IT Audio Visual for technical review.

.2 AV systems should incorporate energy conservation measures so that the display equipment in the systems are not left in an operational state when the rooms are unoccupied. An end of day shutdown shall be implemented in the AV system code to ensure equipment is not unnecessarily running after business hours.

.3 Provide Energy Star compliant equipment were available, and where the Energy Star power management feature does not compromise the function of the AV systems.

.4 LEED Gold, when applied to a project, will require the AV systems operation to be included in Whole Building Energy Usage Data gathering.
2.3 Shop Drawings

.1 Submit prints of the following drawings for review by the Owner, or their designated Consultant before proceeding with the work:

.1 Manufacturer's specification cuts and quantity schedule for all items furnished under the contract.

.2 Detailed schematic diagram showing all specified components including manufacturers, model numbers, signal types, wiring types, rack elevations, and connector panel drawings.

.3 Cable logs showing destinations at both ends and cable identifiers.

.4 IP Network design and list of equipment requiring IP address on UBC LAN.

.5 Drawings for all custom fabricated equipment indicating dimensions, hardware, labelling and finish.

.6 Suspension details for all suspended equipment, with relevant engineering stamps.

.7 Details for all mounting and equipment integration that interfaces with base building structures, as requested by the consultant team.

.8 Manufacturer's catalogue/specification cut-sheets indicating the part number, accessories and options pertinent to the project.

.9 Example programming files including GUI samples, verbiage and program flow/function map. All requested programming revisions prior to final approval of the programming example files will be considered the responsibility of the winning bidder, and must be undertaken at no additional cost.

.2 Coordinate documents of related divisions when joint submissions are required.

2.4 Project Record Drawing Requirements

.1 Instruct the Contractor to mark in red ink on one set of white prints any changes, additions, and omissions not contained in the original documents, and any other pertinent information affecting future work. Maintain the record set on site at all times.

.2 Within 30 days of Substantial Performance, the contractor to submit a clean set of marked up As-Built prints. Instruct them to certify with signature and turn them over to the Owner, or their designated Consultant, one (1) set of white prints so revised. Instruct the contractor to include in each operating and maintenance manual one set of white prints so revised.

2.5 AV Operation and Maintenance Manuals

.1 Provide an electronic copy of the manual, formatted as follows:

.1 List of equipment provided in each room, with recorded serial numbers (including any AV equipment supplied by UBC or other trades. UBC IT Audio Visual will provide an itemized inventory to the Audio-Visual Contractor).

.2 Simplified Operating Instructions
.3 As-Built and Reviewed Shop Drawings

.4 Performance Measurements

.5 Service and Adjustment Instructions

.6 Provide list of Rooms, IP addresses used, and CCT port connection numbers and locations for equipment connected to any VLAN.

.7 Identify power source locations of any devices powered via remote power supplies.

.8 Return all product remote controls, rack keys, cables, and any other miscellaneous accessories not permanently installed on site to UBC IT Audio Visual. Loose items left on site will be considered lost, and subject to replacement at integrator’s expense.

.9 Digital copies of all product configuration software, and configuration files, along with compiled and uncompiled Crestron code and VTP files.

.2 Use standard 8 1/2 inch x 11 inch post binders, labelled for project and date. Neatly fold oversized drawings into individual plastic sheet holders properly punched and inserted into the binders.

.3 Provide a schedule of terminations, cross-referenced to test results.

3.0 EXECUTION

3.1 Installation

.1 Secure all equipment, except portable equipment, in place with a safety factor of at least five (calculate mounting based on object weight x 5). Adequately ventilate all equipment for worst case power dissipation. No item of equipment shall produce residual noise in excess of NC-30 when measured from the centre of the enclosing room.

.2 Install all equipment in such a manner as to present no safety hazard to operating personnel.

3.2 Mounting, Rigging and Seismic Restraint

.1 All overhead mounting or rigging installations of video projectors and flat panel display equipment must have received the approval of a Professional Engineer registered in British Columbia, at the shop drawing stage prior to installation.

.2 Rigid and fixed mounting systems (brackets, tube and clamp, frames etc.) used for any piece of suspended equipment must have a safety cable attached between the suspended device and the superstructure used to support the mounting system. The size and construction of the safety cable, and attachment points must be suitable to support the weight of the equipment being restrained.

.3 Flexible rigging systems (chain and aircraft cable) must be installed by a Certified Rigger. Flexible mounting systems must have suitable seismic restraint sway bracing provided. Seismic restraint systems must be approved by a Professional Engineer registered in British Columbia.

.4 All free standing equipment racks, trolley or caster equipped racks intended for permanent locations, free standing or platform mounted loudspeakers, video projectors, and other
equipment with significant mass and freedom of movement must be equipped with a seismic restraint system that can be disconnected for servicing the equipment.

3.3 **Wiring**

.1 Neatly arrange cables with Velcro cable wraps. Avoid tight bundling, and twist cable bundles into a spiral configuration before installing cable ties. Allow a minimum of a 1 metre spiral bound slack service loop when entering racks or panels. Exercise care to avoid damage to wiring or equipment.

.2 Make all signal connections within systems with rosin-core solder or approved mechanical connectors. Untidy or cold solder joints will be rejected. Use proper crimping tools for mechanical connectors.

.3 Do not splice cables except with permission of the Owner, or their designated Consultant.

.4 All RJ-45 connections shall be terminated in accordance with this TIA/EIA-568B standard.

.5 Refer to AVSK-05, AVSK-06 and AVSK-07 for AV wiring details.

.6 For AV equipment racks with more than three (3) wall wart power supplies of the same voltage, provide DC power distribution system. Distribution system shall include a DIN rail power supply and DIN rail termination block. Refer to AVSK-04 for DC power distribution detail. DC power supply shall have the following features:

   .1 DIN rail mountable
   .2 Isolation class II
   .3 Input voltage: 120 VAC
   .4 Output voltage: as required by AV equipment
   .5 Protections: short circuit, overload, over voltage and over temperature
   .6 Cooling: free-air convection

3.4 **Grounding and Shielding**

.1 Isolate all racks containing sound system equipment from the building and electrical grounds. Bond adjacent equipment racks with #6 AWG insulated ground cable.

.2 Conduit and tray systems containing audio, video and control wiring will be permanently connected to the electrical ground.

.3 Do the utmost to prevent ground loops of any type, including use of ground isolators when necessary.

.4 Isolate the shields of all shielded cables from both the conduit system and any other shielded cables.

.5 Provide continuous shield from source to input point, with shields lifted at the source and grounded at the input point.

3.5 **Marking**

.1 Mark all wiring with PVC or neoprene slip-on sleeves, or with tape type markers with a clear heat shrink boot, indicating approved circuit number. All labels must be machine printed. Hand written labels will be rejected.
.2 Mark all remote or outboard power supplies with permanent labels to indicate which devices they power, and mark all power cables at the U-GND connector where plugged in to the power outlets to indicate which devices they power.

.3 Log IP address and other relevant network info of all network enabled devices, and include IP table of all system IP info with as-built documentation.

.4 Record circuit numbers and wire destinations on as-built drawings and schedules. List spare circuits.

3.6 Nameplates

.1 Dymo labels are not acceptable. Decal type labels (Brother P-touch) are not acceptable in high traffic or high wear applications. All nameplates shall be printed on a black background, with white text.

.2 Identify all racks and panels as specifically noted on the drawings.

.3 Submit all nomenclature to the Owner, or their designated Consultant for approval prior to installation.

.4 All blank rack panels shall be solid black, and include no logos or company advertising. Integrator(s) may not install custom logos, decals, stickers, or electronic images on any equipment, and will remove any such items at their own expense.

3.7 Finishes

.1 Finish all components exposed to the public with colours and finishes approved by the Owner, or their designated Consultant.

***END OF SECTION***