

2.28 VIDEO PROJECTORS

1. Retain existing projector and provide new DVI interface to realize minimum native resolution of 1080P.

2.29 FLAT PANEL VIDEO DISPLAYS AND MOUNTS

1. Provide a minimum native resolution of 1080P with ability to display 16:9 and 4:3 aspect ratio images.
2. Provide native resolution display of HDTV images at 1080P.
3. Provide HDMI Inputs.
4. Provide identical models within a given size.
5. At non desk locations, Provide seismically rated mount, mechanically attach display to mount and mount to structure as directed by manufacturer. Submit shop drawings of attachment method to structural engineer as part of shop drawings.
6. For desk locations, applications, provide mount allowing independent vertical, tilt and axial adjustment with display mounted to bracket and accommodate service of displays without removal of display.
7. Provide size as indicated on the Drawings.
8. Provide device compatible with 105VAC/125VAC, 60Hz power.
9. Acceptable Product for desk mount displays at delegate positions:
  - a. Samsung DB-22-P.
  - b. Equivalent by LG.
10. Acceptable Product for confidence monitor at control room:
  - a. Boland Model BVB 25 OLED DS.
11. Acceptable Products for selection, outgoing image and preview monitors:
  - a. Samsung DB-22-P.
  - b. Equivalent by LG.
12. Acceptable Products for Mounts at desk mount delegate displays:
  - a. Peerless LTC 100S.
  - b. Equivalent by Chief.

2.30 VIDEO CAMERAS

- A. Provide pan tilt zoom focus with presets.
- B. Acceptable Models:
  - 1. Vaddio Model RoboShot 30.
  - 2. Sony Model SRG-300H with Vaddio One-Link for OEM Cameras part number 999-9530-000 and Black magic Mini converter model W-CONM-02 HDMI to SDI converter or AJA HA5-Plus HDMI to 3G-SDI Mini-converter.
  - 3. Panasonic Model AW-HE130 with Vaddio One-Link for OEM Cameras part number 999-9530-000 and Black magic Mini converter model W-CONM-02 HDMI to SDI converter or AJA HA5-Plus HDMI to 3G-SDI Mini-converter.

2.31 VIDEO CAMERA CONTROLLER - CHAMBERS

- A. Vaddio Model ProductionVIEW precision camera controller.

2.32 VIDEO PRODUCTION SWITCHER- CHAMBERS

- A. Black Magic Model ATEM 2 M/E Production Video Switcher 4K with ATEM 1 M/E broadcast control panel.

2.33 HARD DRIVE VIDEO RECORDER PLAYER

- A. DataVideo Modle HDR-70.

2.34 BLU-RAY VIDEO PLAYER AND RECORDER PLAYER

- A. JVC model SRHD-2700US.

2.35 MOBILE CART - ALTERNATE BID

- A. Provide Vaddio Model ProductionVIEW HD-SDI MV controller.
- B. Provide Vaddio TeleTouch 22 touch screen control with rack mount.
- C. Provide Quick connect CCU HD-20 color correction device.
- D. Provide Automatic Mixer as defined herein.
- E. Provide Mackie Model 802VLZ4Stereo Audio Mixer with rack mount kit.
- F. Provide connectorized panels for connection to portable equipment.
- G. Provide Boland Model LB17-G confidence monitor with rack mount.
- H. Provide one pan tilt zoom camera as defined herein.

- I. Provide Black Box Model URSA Mini 4K-EF, Hand Held camera with Canon Model EF 24-70mm f/4L IS USM Lens, Lens hood, lens cap, lens carrying case, camera power supply, battery and mini shoulder kit and all accessories, cables adaptors and miscellaneous devices to realize a working camera system.
- J. Retain existing desk mount microphones from admin locations as defined herein.
- K. Provide one hand held microphone as defined herein.
- L. Provide hard drive video recorder as defined herein.
- M. Provide one Calzone ATA rack with Modular Interlocking Case System, (M.I.C.S.) Road case with attaching table style lid and castor base:
  - 1. Provide 1/4" water resistant construction with pressure relief valve.
  - 2. Provide a minimum of 60" overall height.
  - 3. Provide a detachable method of mounting pan tilt zoom camera at top of rack to act as base for camera.
  - 4. Provide drawers for portable cables, cameras and microphones.
  - 5. Provide steel ball corners and locking latches.
- N. Provide interconnecting cables, mounting hardware, set up, and training.

2.36 FLAT PANEL DISPLAYS AT CHAMBERS - ALTERNATE BID

- A. Provide LG model 84WS70BS-B with seismic rated mount.
- B. Locate at same position as existing rear projection screen.
- C. Provide FSR Model PWB-270 rough in box and locate video interface at new display location.
- D. Coordinate blocking and support requirements with Owner for support framing, drywall and finish work to be provided outside this scope of work. Coordination will include coordinated placement of rough in box to realize a concealed condition for cables and equipment.

**PART 3 - EXECUTION**

3.1 GENERAL

- A. Perform this work in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein.
- B. Furnish and install all materials, devices, components, and equipment required for complete, operational systems.

- C. Maintain a competent supervisor and supporting technical personnel, acceptable to the Owner during the entire installation. Change of supervisor or programmer during the project shall not be acceptable without prior written approval from the Owner.
- D. Coordinate all efforts with those of related trades. In the event of any conflicts, delayed or improper preparatory work by others, notify the Owner; the Owner's decision will be binding. Verify all field conditions.

### 3.2 WIRE AND CABLE INSTALLATION

- A. Except as indicated herein, conduit wireways and cable bundles shall contain only wiring of this system.
- B. Cables will be installed within conduit or cable tray or provided with support hooks throughout the project with a separate, continuous, galvanized steel conduit path for all microphone circuits from receptacle to equipment rack.
- C. All wiring and cable shall be continuous and splice-free for the entire length of run between designated connections or terminations.
- D. All shielded cables shall be insulated. Do not permit shields to contact conduit, raceway, boxes, panels or equipment enclosures. Tin terminated shield drain wires and insulate with heat shrinkable tubing.
- E. Directly terminate video cables at equipment.
- F. Make any connections to screw-type barrier blocks with insulated crimp-type spade lugs. Size all lugs properly to assure high electrical integrity, i.e. low resistance connections. Connect only one (1) wire per spade lug and not more than two (2) lugs per screw terminal. Screw-type connections are not acceptable for microphone or line level interconnection unless required for interconnection at input or output of a system component.
- G. Solder all microphone and line level connections except at punch block connectors specifically designed for stranded wire use; use only rosin core 60/40 tin/lead solder. In the event a microphone or line level connection is made to a screw-type barrier strip, solder the spade terminal after crimping. Tin all connections to screw-type compression connectors where a stranded conductor is utilized.
- H. Lace, tie, or harness wire or cable as required herein, and in accordance with accepted professional practice. Dress, lace or harness all wire and cable to prevent mechanical stress on electrical connections; no wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.
- I. Verify that all coaxial cables have been properly routed, dressed and secured to preclude stress and/or deformation.
- J. Correct any and all of the following unacceptable wiring conditions:
  - 1. Deformed, brittle, or cracked insulation.
  - 2. Insulation shrunken or stripped further than 1/8-inch away from the actual point of connection within a connector, or on a punch block.

3. Cold solder joints.
  4. Flux joints.
  5. Solder splatter.
  6. Ungrommetted, unbushed or uninsulated wire or cable entries.
  7. Deformation or improper radiusing of wire, or cable.
- K. Verify that all conduit has been de-burred and properly joined, coupled, and terminated prior to pulling of cables.
- L. Inspect all conduit bends to ensure proper radiusing, in accordance with recommendations of the wire, cable, fiber and conduit manufacturers; in no case shall the radius be less than twelve (12) times the conduit diameter.
- M. Coordinate the landing position of conduit to boxes to realize the required minimum bend radius with work installed within the boxes.
- N. Verify that all conduit is clear of foreign matter and substances prior to pulling of wire or cable.
- O. Verify permanent identification of conduit destination at all conduit terminations provided by the Electrical Contractor.
- P. Apply a chemically inert conduit lubricant to all wire and cable prior to pulling. Do not subject wire and cable to tension greater than recommended by the manufacturer. Under no circumstances shall wire or cable be "jerked" through conduit.
- Q. Provide a box loop for all wire and cable routed through junction boxes or distribution panels. Cable loops and bends shall not be bent at a radius smaller than that recommended by the manufacturer.
- R. Identify all wire and cable clearly with permanent labels wrapped about the full circumference within one (1) inch of each connection. Indicate the number designated on the associated field or shop drawings. Assign wire or cable designations consistently throughout a given system; i.e., each wire or cable shall carry the same labeled designation over its entire run, regardless of intermediate terminations. Labels shall be by Brady or Thomas and Betts.
- S. Secure all wire and cable run vertically in conduit for continuous distances greater than thirty (30) feet at the vertical run terminations. Non-coaxial cables shall be secured by screw-flange nylon cable ties or similar approved devices, Thomas and Betts or equal. Symmetrical clamping devices with split, circular or other wire conforming, non-metallic bushings shall be provided for all coaxial cables. Support racks shall be Unistrut or Kindorf.

### 3.3 BOX, PANEL, AND ENCLOSURE INSTALLATION

- A. Install all boxes, panels, and enclosures square and plumb. Mount boxes, panels, and trim so that there are no gaps, cracks, or obvious lines between the trim and the adjacent finished surface, and ready them to receive final finish, as applicable.

- B. All floor boxes shall support 1500 lb./sq. ft. over the entire cover, without failure of the cover, frame or its mounting. Boxes shall be flush to finished floor level and shall include carpet escutcheon or trim plates.
- C. Prior to installing any cable, verify insulating terminations have been provided by on all conduit terminating in equipment racks or consoles provided as part of this section. All signal circuit boxes, panels, enclosures, wireways, and conduit shall be grounded through Building Ground only, unless otherwise noted herein. Removal and reinstallation of cable to allow installation of insulated bushings will be at the expense of this contractor and will be required for acceptance of the work.
- D. Provide access panels where needed to access boxes, panels and enclosures in walls or ceilings, and indicated and dimensioned on the shop drawings. Finish panels to match the adjoining surfaces.

### 3.4 EQUIPMENT RACK INSTALLATION

- A. Install a full-height, isolated ground outlet strip with not less than ten (10) outlets and in-line "work light", both ready to be served by separate isolated ground, branch circuits via a duplex receptacle box at the base of each equipment rack. The outlet strip and light shall be electrically isolated from the rack, mounted near the left framing member, as viewed from the rear, of each rack.
- B. Provide each equipment rack with a locking rear door.
- C. Install matching blank panels in all spare panel spaces.
- D. Install access covers, hinged panels, or pull-out drawers to ensure complete access to terminals and interior components. In no case shall such access require de-mounting or de-energizing of same, or adjacent equipment.
- E. Provide an unobtrusive permanent label on the front of each equipment rack section including its designation, as assigned and referenced consistently throughout this project, and the circuit breaker number and associated electrical distribution panel designation servicing the console section.
- F. Elevate floor supported equipment racks on risers where required for conduit termination discrepancies, inter-rack wiring and non-level floor conditions. Mounting of equipment racks must be executed by methods that preserve the integrity of the isolated ground provisions.

### 3.5 EMERGENCY SHUT DOWN AND POWER

- A. Provide separate power strips for amplifiers, connected via fail in off position contactors to cut all audio power in the event of fire alarm. Provide outlets and compatible power cords for all amplifiers that prevent amplifier from connection to wrong power source within rack.
- B. Provide a UPS for all microprocessor based and other power quality sensitive products to provide power conditioning maintain safe status in the event of shut down for any reason. UPS is to be provided un sufficient capacity to maintain energy to equipment for a period of thirty minutes and allow orderly shut down after that minute of any equipment that requires shut down procedure beyond termination of power.
- C. Provide power sensing with adjustable delay to enact shut down via the control system in the event of power failure of a duration of more than thirty minutes.

- D. Connect UPS to rack mounted PC equipment provided by the Owner and support load for a period of not less than five minutes. Shut down requirements will not apply to Owner furnished PC equipment.

### 3.6 SIGNAL GROUNDING PROCEDURES

- A. Connect all equipment chassis and equipment racks of this section shall be connected to Signal Ground by a single, green #14 TW stranded wire unless internally connected to the ground pin of the power cord serving the device. Each ensemble of enclosures shall include a single labeled ground buss bar to land the individually labeled chassis and equipment rack grounds. Coordinate interconnection of the insulated ground feed from the isolated ground power distribution load center serving the equipment racks power circuit (by Electrical Contractor) to the ground buss bar. An isolated signal ground will be furnished and installed to each ensemble of equipment racks by the Electrical Contractor.
- B. Equipment enclosures of this section shall not be permitted to touch each other unless bolted together.
- C. Shielded cables of this section shall be grounded exclusively to Signal Ground.
- D. Only where specifically designated, shields shall be permitted to carry low duty cycle DC control signals.
- E. Shields shall be tied to Signal Ground at one end only, i.e., at the low potential end of run, unless otherwise noted.
- F. There shall be no Signal Ground current paths, unless otherwise noted.
- G. Signal and electrical system grounds shall be isolated except at the project ground field connection.
- H. Signal Ground provisions shall realize less than 0.20 ohms to the primary ground connection.
- I. All signal circuit conduit of this section shall be grounded exclusively to Building Ground, then insulated at the entry to Equipment Racks. Coordinate installation of conduit, including entry points to devices and equipment and termination methods with Electrical Contractor prior to installation of the conduit.

### 3.7 TEST EQUIPMENT

- A. Furnish, store, and maintain test equipment at the jobsite as required for both routine and performance testing of this work, thereafter, remove all of the latter equipment from the site. Include professional grade versions of the following at a minimum, provide test equipment as required to make systems operational and demonstrate the systems are functioning within the performance parameters as described elsewhere herein:
  - 1. Multimeter.
  - 2. Pink Noise Generator/Real Time Analyzer.
  - 3. Low Impedance Microphone with Cable.
  - 4. Portable Amplified Loudspeaker.

5. RGB, RGBHV and composite video test signal generator.
6. Portable HDMI video 5" to 13" color Video Test Monitor.
7. Oscilloscope.
8. Laptop computer with cables and software required to manipulate systems as specified herein with an operator trained in the set up procedures for the installed software.

### 3.8 PRELIMINARY CHECKS AND TESTING

- A. Conduct preliminary checks and testing prior to acceptance testing. Repeat these tests and make corrections to system and documentation subsequent to completion of related or adjacent work of other trades. Verify safe and proper operation of all components, devices or equipment, nominal signal levels within the systems and the absence of extraneous or degrading signals.
- B. Perform the following verification and testing procedures:
  1. Proper grounding of devices and equipment.
  2. Integrity of signal and electrical system ground connections.
  3. Proper provision of power to devices and equipment.
  4. Integrity of all insulation, shield terminations and connections.
  5. Integrity of soldered connections.
  6. Absence of solder splatter, solder bridges, debris of any kind, tools, etc.
  7. Proper routing and dressing of wire and cable.
  8. "Wire-checking" of all circuitry, including phase and continuity, with reference to cable designations on field and shop drawings.
  9. Mechanical integrity of all support and positioning provisions.
- C. Determine the proper sequence of energizing systems to minimize the risk of damage.
- D. After successfully energizing the systems, make all preliminary adjustments and document the setting of all controls, parameters of all corrective networks, voltage gains and losses, as applicable. Tabulate all data along with an inventory of test equipment, a description of testing conditions, and a list of test personnel as itemized below. Copies of preliminary test data shall accompany copies of performance testing data as part of the final submittal.
- E. Verify the performance parameters of the individual systems following established professional procedures, in addition to those specified herein.

- F. Document all acceptance testing, calibration and correction procedures described herein with the following information:
1. Performance date of the given procedure.
  2. Condition of performance of procedure.
  3. Type of procedure, and description.
  4. Parameters measured and their values, including values measured prior to calibration or correction, as applicable.
  5. Parameters associated with calibration or corrective networks, components, or devices.
  6. The names of personnel conducting the procedure.
- G. Provide permanent "wedge" type labels on all controls, as applies, to indicate correct settings after performance testing and adjustment procedures have been successfully completed. Provide records of all control settings as part of as-built documentation.

### 3.9 SYSTEMS PERFORMANCE TESTING AND ADJUSTING PROCEDURES

- A. Conduct testing and adjusting procedures to realize and verify the performance criteria specified herein. Notwithstanding any other requirements, standards, and miscellaneous criteria provided elsewhere within these specifications, performance testing, adjusting and documentation shall include the procedures itemized below.
1. Perform testing, adjustment, measurement and documentation. Procedures for distributed sound reinforcement and background music systems shall include, as applies:
    - a. Electronic and acoustic frequency responses/one-third octave equalization; refer to International Electrotechnical Commission Recommendations No. 179 and 225.
    - b. Verify maximum continuous sound pressure level 4'-0" A.F.F., with Total Harmonic Distortion less than 0.5%, at 1,000 Hertz is not less than; 100dB SPL, A-weighted, in the Ballroom; 85dB SPL, A-weighted, in the other areas after equalization of systems.
    - c. Signal-to-noise ratio referenced and extrapolated to the specified maximum continuous sound pressure level 4'-0" A.F.F.; utilize a source of two (2) octaves of pink noise centered at 2,000 Hertz with mechanical systems unoperated; not less than 70dB.
- B. Conduct all necessary performance testing; adjustment and documentation procedures to verify and realize compliance with the performance specifications herein. Make available at least one (1) technician familiar with this work, and all required test equipment for the duration of performance testing verification, at the convenience of the Owner.

3.10 SOUND REPRODUCTION SYSTEMS

- A. General: The chambers shall be provided with sound reinforcement capability. Microphones, remote volume/source controls, signal processing systems, power amplifiers and loudspeaker assemblies in each area will reproduce sound input to the audience areas.
- B. Provide normalled, patchable, inputs and outputs for all microphone and line level devices and receptacles to allow flexible setup as well as providing for all systems to be operational in the event of Control System failure.
- C. The system will be equipped with an amplified stereo loudspeaker system and volume control to allow monitoring of the audio program from any of the rooms or areas served as well as line level patch points. Selection of the audio program to be monitored will be executed from the touch panel located at the equipment rack. The monitor panel will accommodate adjustment of program level from the equipment room as well as allowing the operator to listen to the audio source (by patch interruption) before introduction to an area if necessary.
- D. The preset level for remote control systems will be compatible with the marked control positions on mixers and amplifiers as well as the standard microphone and conference microphone system utilized by the facility.
  - 1. The digital audio processor will provide independent outputs for each of the amplifiers.
  - 2. Manipulate the existing digital audio processor programming to adjust signal delay and relative level from audio sources to the overhead loudspeakers. The purpose is to allow alignment with each of the loudspeaker groups to sound from the dais.
- E. Provide audio output for connection to future close captioning systems input.

3.11 VIDEO DISPLAY SYSTEM

- A. Provide the Video Display system as described herein and as indicated on the Drawings.
- B. Provide audio output from selected devices to the audio systems.
- C. Provide connection points for portable equipment input.
- D. Provide Blue-ray DVD player and player recorder.
- E. Provide hard drive recording and playback.
- F. Provide the routing of HDMI format video inputs to HDMI video outputs with all necessary interfaces, power supplies, accessories, cables and devices needed.
- G. Provide scan conversion interface devices for all outputs.
- H. Displays as described herein and as indicated on the Drawings.
- I. Refer to Control Systems and Sound Reproduction Systems for additional requirements affecting this portion of the work.

- J. Provide television feeds to the service providers point of demarcation.
- K. Provide input for future close caption input and provide macro command programming to incorporate the text as a key input superimposed on display output and external feed outputs to the lobby, internet server, internet streaming and TV broadcast feed.

### 3.12 REMOTE CONTROL SYSTEM

- A. General: Provide the remote control system as described herein and as indicated on the drawings.
- B. Provide the control of each of the system functions as described elsewhere herein. Refer to product requirements for Control Systems, Digital Audio Processor, HDMI Switchers and interfaces, Control Panels, Video Projectors as well as Systems Descriptions for Video Display Systems, Sound Reproduction Systems and other systems and equipment as described herein for additional required functions.
- C. Provide control of all devices where indicated on the drawings.
- D. Provide control of of HDTV receivers as indicated on the Drawings.
- E. Provide a status indication (on or off) of each controlled device. Display these indications via the control panel located within the equipment racks and to Control Room via Room Manager program.
- F. Provide control of lighting in each area served in the form of recall of presets, programmed within the Lighting Control System. Replicate preset and overall commands as provided for areas served by the lighting system.
- G. Where controls include volume or audio source, provide positive indication of volume setting as well as audio source selected.
- H. Control Tracking and interaction: Where a control action can be effected at more than one location, the other locations will show the current status, regardless of command origin location.
- I. Allow graphic selection of individual monitors for source control.
- J. Submit the control panel layouts showing menu interaction for each area served. The Owner reserves the right to group command functions and label as needed to realize productivity. This will occur during each phase as well as at the end of the project to coordinate the action of similar commands with the adjustments needed to accommodate construction phase decisions regarding operational modes.
- K. Provide a working interactive demonstration of control functions for the staff prior to final programming of panels.
- L. Provide for a total of three rounds of follow up programming for control systems after operator has utilized system functions in a real time environment.
  - 1. Include all requests for re-label of commands to the extent allowed by font, space, etc.
  - 2. Include moving specified commands to other control pages.

3. Accommodate additional remote controllable functions for provided devices as required by operator. Additional interfaces required to perform functions beyond those specified are not included in this scope of work.
- M. Provide interfaces to all systems and equipment as indicated herein and as indicated on the Drawings.
- N. Programing:
1. Provide a combined control system, fulfilling the control system requirements of the Audio Visual Systems Contract Documents as described herein and as shown on the Drawings as well as the related external control requirements of the Lighting Control Systems.
  2. Provide the equipment required to execute the recall of presets from equipment provided under the lighting systems scope of work and coordinate the interface with the Lighting Control Systems Manufacturer.
  3. Retain and identify a Crestron certified programmer for control systems with specific background in systems of this type and scope to:
    - a. Provide direct communication to the identified team members with a copy of all correspondence, including equipment review, required submittal items and coordination of any user interface or reliability and service issues with the Audio Visual Equipment and Lighting Control Equipment directly to the identified team members.
    - b. Review the suitability of control systems and associated interfaces to fulfill the requirements of the Audio Visual Systems and Lighting Control Systems.
      - (1) Include specific review of all control equipment selected by the audio visual contractor and dimming systems contractor.
      - (2) Including specific review of interface devices for the equipment to be controlled and provide direction where fulfillment of contract requirements, hardware compatibility, service life, identification of responsibility for malfunction or ease of operation via the remote control system is at issue.
    - c. Include specific review of the control requirements as expressed herein and the available pre-programmed modules that allow efficient programming by utilizing control layouts that have been coordinated and de-bugged on a preliminary basis.
    - d. Advise where any discrepancies exist between the requirements of this section and the pre-programmed modules such that the impact of use of the pre-programmed modules and or adaptation can be verified for acceptability. The intent is to maximize the use of standard pre-programmed modules but adapt these to the project requirements to allow minimal confusion in the event the program must be altered at a later date these modules as needed to realize the required functions.

- e. In the event discrepancies between any pre-programmed modules and the requirements specified herein and as indicated on the Drawings are not acceptable to the Owner, provide programming to realize the requirements as specified herein and as indicated on the Drawings.
- f. Provide the necessary coordination to realize the external control provisions required under the Lighting Control Systems:
  - (1) The Lighting Control System is provided with control stations as well as the connection facilitated by the AV Control Systems Work.
  - (2) These provisions will serve to provide a second means of operation of lighting control systems in the event of failure of the AV control systems.
  - (3) The programming and interfaces are to be configured to release control in the event of remote control system failure and accept over ride of lighting commands as well as pre-set programming initiated by the Lighting Control System back of house control stations and portable control stations or microprocessor connection at the wall mounted receptacles.
- g. Coordinate room and area names with the Owner and Audio Visual Contractor to realize the coherent and consistent naming of equipment and controls in conformance with the operational names determined by the operator. Provide pass-code authorized capability to change room and area names at a later date as part of the "Administrator" menu described below.
- h. Determine the method of communication for the various control panels and if the devices are to be on a dedicated network or via IP. Coordinate the resultant with the Audio Visual Contractor.
- i. Coordinate the programming and hardware configuration to realize full feedback for all commands affecting devices with bi-directional capability. Provide feedback of controlled device with not more than 0.5 seconds of lag between touch command and status change.
- j. Coordinate the access to music input sources and audio associated with video sources provided as part of the Sound Reproduction Systems for the various areas with the Audio Visual Contractor as well as the equipment and associated programming.
- k. Prepare control panel layouts in a pdf format with associated operating instructions defined for each function to support the Shop Drawing requirements of this specification section.
  - (1) Incorporate written step by step, lay level operating instructions for all control panels.
  - (2) These will eventually be included with the instructions by the Audio Visual Contractor for all systems described herein.

- (3) Provide these as hard copy written text, supplemented with drawings of control panel layouts as needed.
  - (4) Provide brief operating instructions pertaining to the selected control page when the "Help" button is selected on the control panel. Where the instruction can be explicit at this level, images of the instruction screens and image of the associated control panel layouts will be acceptable for this portion of the written operating instructions. When Help is selected the display will also indicate the extension to dial (default to "Dial 0 For Assistance") to receive assistance.
- I. Prepare and submit the control system program for certification by the Manufacturer and adjust as required to obtain the certification.
  - m. Program the control systems associated with the Audio Visual Systems, Video Display Systems and pre-set access to Lighting Control Systems.
    - (1) Provide the following levels of access to systems from the wall mounted, desk mounted and rack mounted control panels as well as Owner Provided tablet device via x-panel interface:
      - a) General Staff: No access code required unless placed in secure mode- Active controls at side of panels as indicated herein and as shown on the Drawings:
        - ((1)) Audio source.
        - ((2)) Video.
        - ((3)) Vol+
        - ((4)) Vol-
        - ((5)) Help.
        - ((6)) Lights.
        - ((7)) Panel on.
        - ((8)) Panel off.
        - ((9)) Secure.
        - ((10)) Staff: This button brings up Regional control or "Macro Commands". Include "Open", "Close", "Clean" and all" at a minimum with six additional macro commands to be named by the operator. Lighting Control, Video Display, Projector Control and Audio Systems will all respond to macro commands.
        - ((11)) AV: Brings up text to "enter password" and allows functions for AV staff below.

- b) AV staff - access code required - Active Controls:
  - ((1)) Re-set system: Provides warning, then upon confirmation re-sets control system to a known operational status. The warning is to be in bold red text with "Warning" a minimum of 3/4" high text. The warning is to include an advisory to disconnect all equipment from system and indication that meetings will be disrupted by this action with instructions to verify each of the affected areas is not occupied as well as verification of the action with the General Manager or Director of Meeting Services that this will not disrupt an anticipated event, prior to executing this command.
  - ((2)) Other commands as may be reassigned to this level of security to control operations.
  - ((3)) Administrator: Brings up text to "enter password" and allows functions for Administrative staff below.
- c) Administrator:
  - ((1)) Provide ability to re-name music sources, rooms and areas with a fill in table that exports the names to the various appropriate control and area labels within the control panel programming.
  - ((2)) Provide ability to enter preferred text for the general help menu and the assistance message which may include up to five lines of text, each. Provide the default text as indicated herein with the ability to enter different messages if desired by the operator.
  - ((3)) Provide the ability to enter and delete passwords for each level of access.
  - ((4)) Provide the ability to create, edit and name macros with button to recall macro pre-established on touch panels.
  - ((5)) Edit Help menus to bring up specific operating instructions for that panel "mode" when any of the operational panels are active.
  - ((6)) Provide other commands as may be reassigned to this level of security to control operations.
- (2) Provide the ability to save and recall up to fifteen different "macro" configurations of the video switcher and production switcher.

- (3) Verify the operation of the systems and interaction with the programming.
  - (4) Demonstrate the control of Lighting Control Systems:
    - a) Basic operation.
    - b) Override of the Crestron based control systems by lighting control systems.
    - c) Surrender of control to lighting systems control panels in the event of failure of control system and ability of lighting control system to maintain last setting before failure.
  - (5) De-bug and correct any operational deficiencies.
  - (6) Correct any issues required for certification.
  - (7) Provide corrected operating instructions as needed to resolve identified conflicts.
- n. Training and follow up support:
- (1) Provide initial training to the Audio Visual Contractor and end user.
  - (2) Provide a follow up training session on control system operation for each phase of the work after a period of not less than two weeks of review of operating instructions by the end user or their designated representative. The follow up training may be conducted off premises via telephone support.
- o. Provide a minimum of one follow up programming session to accommodate minor changes to systems realized during acceptance testing for each phase and start up operation of the facility by the end user. This may be conducted off premises. Provide updated operating instructions, including update of any affected help menu displays that are impacted by the updated programming.
- p. Provide copies of licensed software for all control systems including any software written under this scope of work with disclosure of all required authorization codes to a party to be identified by the Owner. This software shall be permanently deemed the transferable property of the Owner with the right to utilize same without additional fee or royalty for the duration of the life of the facility and future expansion of the facility.
- (1) Provide direction regarding the procedure to update operating systems and control system software.

- (2) Include this information as a lay level direction in the operating instructions as well as a follow up resource to verify progressive changes in information of this nature.
  - (3) Include this information in detail within the maintenance portion of the operating instructions.
- q. Provide additional programming and support as identified by the Audio Visual Systems Contractor responsible for the work of this section to realize a complete and working system as specified herein.
- O. Include all Documentation, Training, Warranty and Service responsibility for the external control portion of the Lighting Control Systems in The Work of this Section.
- P. Define the means to trouble shoot the interface the lighting control interface between the systems in the event of failure of lighting control functions and identify the party to notify for service in operating the operating instructions, based on the trouble shoot evaluation procedure.

END OF SECTION 274000