DATE: July 26, 2011

TO: All Prospective Bidders
Cc: Procurement File

FROM: Mallela Ralliford/Sharon Quinn

RE: UMBC PAHF – Classroom Systems – BID # BC-20744-Q
ADDENDUM # 1

The following amends the above referenced Bid documents. Receipt of this addendum must be acknowledged by completing the enclosed "Acknowledgement of Receipt of Addenda" form and submitting it along with the Technical Offer you return to the University.

The deadline for questions to be submitted to the University remains as **THURSDAY JULY 28, 2011 by 4:00 p.m.** to the issuing office.

The due date and time for the Bid to be submitted to the University has been **EXTENDED to WEDNESDAY AUGUST 10, 2011 by 2:00 p.m.** to the issuing office.

A. The following questions have been submitted to the University for a response:

1. **QUESTION:** Please confirm that the drawing title page (TQ-0.01) provided in the specifications is correct? If not, please provide correct title page.

   **ANSWER:** The TQ Drawings are on file with CMC Repro for this project. You may ask for the drawings/specifications referencing the UMBC Bid Number.

2. **QUESTION:** Please provide a project number that corresponds with the drawings that CMC is to provide vendors. CMC does not have a project number or a project title that corresponds with this project. Please advise.

   **ANSWER:** This situation has been corrected. The TQ Drawings are on file with CMC Repro for this project. You may ask for the drawings/specifications referencing the UMBC Bid Number.

3. **QUESTION:** There is some discrepancy in some the items specified. How would you like us to handle this?

   **ANSWER:** Please see Item-B below.
4. **QUESTION:** Is it possible for the University to select one document to take precedence over the documents issued for this bid?

**ANSWER:** Please see Item-B below.

5. **QUESTION:** Some of the products that have been specified have been discontinued. How would you like to handle this?

**ANSWER:** Please see Item-B below.

6. **QUESTION:** There are some incompatibilities in the connectors for this project. How would you like us to handle this?

**ANSWER:** Please see Item-B below.

7. **QUESTION:** Are we to contact Patty Carper at Whiting-Turner in order to get the documents

**ANSWER:** No. This information is contained in the Whiting-Turner Project Manual and was for their initial meeting in January 2010.

8. **QUESTION:** What is the touch-panel control interface system for the AV System?

**ANSWER:** AMX. The signal processor is EXTRON.

B. **CLARIFICATION:** In **SECTION IV, Specifications**, **DELETE** in its entirety “Section 27 4100 - AUDIO-VISUAL SYSTEMS” and **REPLACE** with attached “**Revised** Section 27 4100 - AUDIO-VISUAL SYSTEMS”, dated July 26, 2011.

C. The Pre-Bid Sign-In for the meeting held on Thursday, July 21, 2011, is included as a part of this Addendum.

Enclosures: 
- Acknowledgement of Receipt of Addenda Form
- Revised Specification Section 27 41 00 – Audio Visual Systems
- Pre-Bid Sign-in Sheet

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**END OF ADDENDUM # 1 DATED 07/26/11**

This Addendum was posted on the University’s eBid Board and was submitted to eMaryland Market on 07/26/11

(Originals with enclosures were not mailed)
ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

The undersigned, hereby acknowledges the receipt of the following addenda:

Addendum No. 1 dated 07/26/11
Addendum No. _____ dated ______
Addendum No. _____ dated ______
Addendum No. _____ dated ______
Addendum No. _____ dated ______
Addendum No. _____ dated ______

As stated in this Addendum, this form is to be returned with your Bid Price Sheet.

____________________________
Signature

____________________________
Printed Name

____________________________
Title

____________________________
Date

END OF FORM
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**DATE:** THURSDAY, 07/21/11, AT 2:00 P.M.

**SOLICITATION NUMBER:** BID # BCS-2074-0

**UMBC PARC CLASSROOM SYSTEM**

**PRE-BID MEETING**

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SECTION IV
UMBC PERFORMING ARTS AND HUMANITIES FACILITY – PHASE 1
BID # BC-20744-Q

CONTRACT DOCUMENTS

REVISED SPECIFICATIONS

Revised SECTION 27 4100 – AUDIO-VISUAL SYSTEMS – Listed on the following pages

Note: Specifications dated July 26, 2011 are on file at CMC Repro for Bidders reference.
SECTION 27 41 00 - AUDIO-VISUAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Complete and operational audiovisual (A/V) and remote control systems, including:
   1. Video projection
   2. Remote controls
   3. Program and speech audio reinforcement
   4. AV recording
   5. Baseband/broadband distribution systems

B. Related Sections
   1. Division 26 Electrical Sections for conduits, wire pathways, connection boxes, pull boxes, junction boxes, and outlet boxes permanently installed in walls, floors, and ceilings.
   2. Division 11 Projection Screens
   3. Division 27 Telecommunications Cable Systems
   4. Specification Section 274100.23- Audiovisual Systems, Black Box Theatre, Proscenium Theatre, and theatre support spaces.
   5. Division 26 Electrical Sections for room lighting fixtures, power receptacle outlets, interconnecting wiring for these circuits and electrical breaker panels powering the audiovisual equipment.

C. Bid Proposals: Reference Division 01 specifications.

1.2 REFERENCES


B. Electronic Industries Association/Telecommunications Industry Association (EIA/TIA) -568A, "Commercial Building Telecommunications Wiring Standard"

C. EIA/TIA -569, "Commercial Building Standard for Telecommunications Pathways and Spaces"

D. EIA/TIA-606, “Administration Standard for the Telecommunications Infrastructure of Commercial Buildings”

E. EIA/TIA-607, “Commercial Building Grounding/Bonding Requirements”

F. National Fire Protection Agency (NFPA) 70 - National Electrical Code (NEC), 2002

G. Institute of Electrical and Electronic Engineers (IEEE) 802.3 Carrier Sense Multiple Access with Collision Detection (Ethernet and 10BASE-T)

I. National Institution for Communications Engineering Technology (NICET)

J. International Communications Industry Association (ICIA).

1.3 DEFINITIONS

A. The term “NIC” shall refer to material and work which is Not In Contract and for which the Installer is not responsible except as otherwise detailed herein.

B. The term “OFE” shall refer to “Owner Furnished Equipment” which will be provided by The Owner. Be responsible for installing and integrating this equipment as detailed herein.

C. The term “OFIC” shall refer to “Owner Furnished Contractor Installed” Equipment which will be provided by The Owner. Be responsible for installing and integrating this equipment as detailed herein.

D. The term “shall” is mandatory; the term “will” is informative; the term “should” is advisory; and the term “provide” means furnish and install.

E. The term “Installer/ AV Contractor” refers to the successful A/V vendor/installer.

F. The term “AV Consultant” refers to Convergent Technologies Design Group, Inc.

G. The term “Bidder” refers to a qualified firm intending to tender a bid on the systems described herein.

H. The term “Owner” refers to UMBC.

I. The term “Construction Manager” or GC refers to the representative responsible for general building construction and onsite coordination between sub-contractors.

1.4 SYSTEM DESCRIPTION

A. Design Standards:
1. The Owner’s goal is to have available the most commonly used A/V equipment as a cohesive system. Therefore, part of the development efforts for successfully implementing the A/V systems should include:
   a. Installing the system in a manner that will comply with BiCSi, ICIA and routing all audio, video and control cabling elements of the final design in a subtle, unobtrusive manner to maintain the architectural and visual integrity of the building.
   b. Except where plenum cable is used above finished ceilings, it is required that cabling for microphone and line inputs, wideband RGBHV video, and other A/V-related cabling be routed inside the comprehensive system of conduit indicated on Drawings and installed by construction manager. Floor and wall boxes shall serve as the primary interface points to the A/V system.
   c. Provide and install cover plates, connectors, and associated cabling to link all floor and wall boxes to all affiliated local and remote A/V components. Necessary conduit, power and workboxes shall be installed by the construction manager. No wiremold or surface-mounted raceway will be permitted.
d. Provide and install security covers on any electronics with front panel controls that should not need to be adjusted after initial set-up. Back rack Remote Control CPU and Furman power distribution while loading associated front of rack spaces with blank panels. All components permanently mounted to rack rail systems shall be installed with industry accepted security screws. Each instructor’s station shall include a 4” low-noise fan unit.

e. Provide 8 ½ x 11 Instruction card, approved by the Owner, and laminated with step-by-step instructions outlining system operations for each room that has AV systems. Provide editable file of card to Owner.

f. Provide a rack mounted uninterruptible power supply (UPS) device in each equipment rack included in this project. Device shall meet a minimum of thirty-minutes as back up for full active mode usage. 30-minutes back up and not to exceed three rack units in size. Projectors shall be mounted using security screws and stranded steel cables with padlocks

g. Above finished ceiling AV equipment shall be secured to building structure only.

h. No more than thirty-lamp hours shall be expired for projection system set-up.

i. Steel cable security systems and padlocks to secure structure shall be provided for all surface loudspeakers, document cameras, video cameras, flat panel displays, and LCD projectors. All padlocks provided for security shall be keyed to a single master key.

j. Provide editable versions of all master source code for any digital signal processing, remote control or microprocessor-based systems included on this project. Provide CD-ROM copy, as well as, loading software onto Owner furnished personal computer.

k. Provide necessary audio, video, RGBHV, USB, and control signal repeaters, extenders, and amplifiers for any run greater than 30’ as needed to maintain required signal levels for receipt at destination device. All audio lines shall be balanced at the source, prior to any cable pull longer than twenty feet. There are no exceptions.

l. Low voltage transformers within 60 feet of associated video camera location shall receive AC power from above finished ceiling or from an associated equipment rack.

B. Performance Standards: Unless restricted by the published specifications of a particular piece of equipment, or unless otherwise required, the following minimum performance standards shall be met by each system:

1. Audio:
   a. S/N (including crosstalk and hum): 75 dB minimum
   b. Total Harmonic Distortion: 0.5% maximum from 30 Hz to 15,00Hz.
   c. Frequency Response: Flat within +1.0 dB, 30 Hz to 15,000Hz.

2. Video (signal):
   a. S/N (peak to RMS) unweighted DC to 4.2 MHz: 45-dB minimum
   b. Crosstalk, unweighted DC to 4.2 MHz:45 dB minimum
   c. Frequency Response(composite): Within +0.5 dB to 10 MHz
   d. Frequency Response(component) Within +0.5 dB to 100 MHz
   e. Line and Field: 2% maximum
   f. Differential Gain: 3% maximum
   g. Differential Phase:2 degrees maximum

3. Performance Test Signal Paths: The signal paths for the above Performance Standards shall be as follows:
a. Audio: From any and all source inputs (for microphones, audiotape units, videotape units, etc.) through all audio distribution amplifiers (ADA), mixers, switchers, codec, etc., to all signal destinations.
b. Video: From all source inputs (for cameras, computers, videotape units, etc.) through all distribution amplifiers (VDA), processors, switchers, etc., to all signal destinations.

4. Remote Control Standards: As a minimum, the remote control system for each space shall be programmed to include the following:
   a. AM/PM Clock Settings
   b. Automatic System Shutdown
   c. Owner Logo on first page
   d. LAN IP Address
   e. Separate Program and Microphone Audio Level Control with mute function.
   f. Panel layout to include user screens, as well as, password protected technician pages
   g. Raise and lower projection screen when projection is powered on/off respectively
   h. Assign room computer as default system source upon power up
   i. Activate a minimum of three (3) presets for each installed remote controllable video camera.
   j. Provide AMX RMS Classroom Manager media and room management software and full licensing agreement as needed.
   k. Configure system to provide control and monitoring information to the existing UMBC Extron Global Viewer Enterprise Server.
   l. Full function control of all source components, display units, processing devices and switching electronics.
   m. Touchpanel page layouts shall be submitted for approval. Prior to designing touchpanel layouts, meet with the Owner and review existing control system standards on campus and determine a basis of design.
   n. Provide intellectual property release and install editable source code for the entire remote control program and associated panel layouts on two (2) personal computers. Editable source code is intended to enable the owner to make additions, modifications and changes to the remote control system after the warranty period has elapsed.
   o. Follow-up programming and modifications as requested by the Owner shall be provided 6 months after system acceptance. Provide and install updated editable source code to the Owner.
   p. Per function status feedback indicating active/passive modes of operation.
   q. In the event the remote control system programming becomes compromised during the warranty period, provide the necessary effort to make the system fully functional once again.

1.5 SUBMITTALS

A. Comply with requirements of Division 1 Section Submital Procedures.

B. Product Data: Manufacturer’s literature and catalog cuts indicating manufactured equipment and accessories including materials, fabrication, test results, operational ratings, and other pertinent information.
C. In order to develop a user interface which is both functional and useable, it will be necessary for the contractor to provide working “Beta” copies of system software for review and comment by the owner, architect and their consultants as per the below listed schedule:

1. This is anticipated to be an “interactive” process, requiring at least (but not limited to) three submittals prior to first beneficial use. At a minimum, the software development process will have the following milestones:
   a. Submit project milestone schedule within 2 weeks after contract award and submit conduit verification for all spaces within 4 weeks of contract award.
   b. Initial Submittal for Review
   c. First Beta Review: Timing (four weeks after return of the initial submittal)
   d. Second Beta Review; Timing (four weeks after return of the First Beta submittal)
   e. Final Implementation and On-Site Training: Prior to Final Acceptance
   f. Follow-up programming review and updates; Timing (within sixty-days from final acceptance)

D. Shop Drawings: Prior to fabrication submit custom designs pertaining to the system. Shop drawings are required to include Penetration Control Plan drawings in their backgrounds. These designs include, but are not limited to, the following:

1. All panels, plates, and designation strips, including details relating to terminology, engraving, finish and color.
2. All equipment racks, cabinets, consoles, tables, carts, support bases, and shelves.
4. All unusual equipment modifications.
5. Front mechanical drawings of each equipment rack.
6. Equipment location drawings.
7. System functional block drawings, including those for audio and video subsystems.
8. Cable labeling plan.
9. Penetrations

E. Quality Assurance Submittals

1. Training plan. Develop a training plan meeting the requirements of sub section 1.10 below. The training will be both technical staff and users, plan the training sessions to the level of the technical abilities of each group. The technical staff training and end-user training will be separate and unique to the requirements of each group.

2. Pre-acceptance testing plan. The contractor will develop a internal testing plan for the installed system to test the function and operation of the system after completion of the install to verify proper operation of the system before requesting final acceptance. The plan will include but not limited to continuity, signal to noise, gain structure, DSP function, audio equalization, setting of audio dynamics controls, audio and video switching of all inputs and outputs, operation of control systems. List the documentation procedure to be used for the tests.

3. Final-acceptance testing plan. Provide a plan for the owner/consultant for final acceptance and verification testing. The plan will include the results of the pre-acceptance testing, the list of personnel the contractor will have on site to assist in the testing, and the test equipment the contractor will have on site.

F. Closeout Submittals: At the completion of the installation, but before Final Acceptance, provide for review and approval five (5) copies each of the following, in compliance with Division 1 Section Closeout Procedures.
1. Equipment manufacturer’s operation and service manuals for each make and model of equipment.

2. System Operation Manual. Produce this manual specifically for the subsystems detailed herein. The manual shall describe all procedures necessary to activate each system to provide for the functional requirements, except as specifically excluded by the Owner. This section shall provide a simple “How-to” users guide for the procedures needed to operate the system. This document shall contain a section on operating the systems equipment in the event of control system failure. Control system touchpanel layouts shall be accompanied by narrative text describing “step-by-step” function engagement.

3. Include record diagrams for all systems including, but not limited to:
   a. Schematic wiring diagrams with cable markings.
   b. Internal wiring diagrams of the equipment rack cabinets.
   c. Custom equipment modifications.
   d. Final test results and nominal settings for all adjustable controls as outlined in the “Quality Assurance” article of this Section.
   e. Provide editable electronic copies of all software associated with audiovisual systems. Load editable source code software on Owner’s personal computer as well as DVD copy.

4. Materials shall be submitted as indicated in sections above. One copy of each submittal will be returned within a reasonable time from receipt thereof of bearing one of the following codes:
   a. “Approved” - Approved for manufacture.
   b. “Approved as Noted” - Approved for manufacture incorporating noted modification.
   c. “Revise and Resubmit” - Not approved. Submittal to be revised in accordance with comments and resubmitted.
   d. When the submittal receives the “approved” or “approved as noted” status, the AV Vendor shall contact the Construction Manager to coordinate the project schedule.
   e. No ordering/ manufacturing of equipment shall take place prior to approval of submittals.

1.6 QUALITY ASSURANCE

A. Demonstrate at least three- (3) years experience in the fabrication, programming, assembly, and installation of audiovisual presentation and remote control systems of similar magnitude and quality as specified for the subject job, and shall submit documentation to this effect with the bid return. Also, a qualified firm shall be authorized sales and service center for all listed components, offerings in this specification.

B. References: Furnish no less than three (3) references for installations of similar size (dollar amount & quantity of spaces receiving integrated technology) and scope, performed throughout the Baltimore, DC Metropolitan Area within the past three- (3) years. At a minimum, reference information will include the reference company or institute name, contact person’s name and title, telephone number, address, and detailed project description, project manager’s name, and contact information of the organization that is responsible for day-to-day operation of the audiovisual installation.

C. Submit, attached to an email addressed to the construction manager, weekly progress reports detailing audiovisual system installation progress against milestones dates as per installation schedule. This requirement is separate from any requirements from Division 1.
D. State of the Art Development
   1. Supply only the manufacturer’s latest developed product. Where product development surpasses the criteria of the specification, inform the AV consultant. In no case shall discontinued or obsolete equipment be acceptable. The same requirement applies to software programs developed/updated during the warranty period. Owner must give final approval of all products.
   2. Should the product recall by the manufacturer require temporary or permanent replacement of a product specified under this section, notify the Architect at the earliest reasonable time and arrange to replace the product in question at the earliest possible time.
      a. Equipment found defective or subject to recall prior to scheduled installation shall not be delivered to the jobsite.
      b. Equipment defect or intended recall shall not relieve the manufacturer from his contractual obligation with regard to delivery schedule of product.
      c. Under no circumstances shall arrangement for alternate product necessarily require the Owner to accept superseded equipment except on a temporary basis.

E. During the warranty period, advise the Owner in writing each time any software program is updated, giving the Owner the opportunity to upgrade the software should they so desire.

1.7 DELIVERY STORAGE AND HANDLING

A. Delivery:
   1. Supply, transport, deliver, unload, move to the installation location, unpack, place, assemble, secure, connect, and install all equipment needed to complete the installation. Be responsible for transportation, parking, delivery, and on-site storage of the system’s equipment. Be responsible for all transportation of personnel to and from the site.
   2. Reconfirm before delivery that hallways, stairways, passages, doorways, rooms, entries, elevators and foyers are of sufficient size to accommodate the passage and installation of the equipment and systems. Off-site pre-staging of goods is encouraged.
   3. The Owner’s acknowledgment of delivery of goods and any payment made on account of such delivery shall not constitute acceptance (partial or otherwise) and shall not diminish obligations as specified.
   4. The actual dates of delivery shall be under the absolute control of the Owner. The dates and times for delivery/installation are critical to the successful completion of the project. Deliveries shall normally be accepted only Monday through Friday 8:00 a.m. to 4:00 p.m. In the event it becomes necessary for goods to be installed outside these hours comply with the instructions of the Owner. Deliveries attempted outside these hours without prior consent of the Owner may be turned away. Comply with all instructions of the Owner and the Contractor concerning time of arrival at the site; which entrance shall be utilized for delivery; routes to be taken to reach the installation location; and other matters relating to the orderly and timely installation of the system.

1.8 STAGING

A. Installation shall commence immediately upon delivery of materials to the jobsite, except as directed by Construction Manager. Time required from delivery date to completion of project shall be in accordance with the approved schedules.

1.9 WARRANTY
A. The system warranty shall be for twenty-four (24) months from the date of system acceptance by The Owner. Provide all equipment, material, and labor required to uphold the warranty at no charge to the Owner. All manufacturers’ equipment warranties shall be activated in the Owner name and shall commence on the date of system acceptance. In the case of modified equipment, the manufacturer’s warranty is normally voided. In such cases, provide the Owner with a warranty equivalent to that of the original manufacturer.

1.10 OWNER’S INSTRUCTIONS

A. Training: Provide a minimum of 24 hours of training in the operation and maintenance of the system for personnel designated by the Owner. The training shall be organized as follows:

1. Two (2) two hour training class for system technical operation and maintenance. Record owner training sessions in DVD or other agreed upon media. This class shall cover the following topics:
   a. Review of signal flow diagrams.
   b. Review of all equipment functions, relevant to the function in this system.
   c. Review of initial equipment settings.
   d. Demonstration of all functional connections from a user perspective.
   e. Review & demonstration of replacement procedures for consumables (e.g., lamps).
   f. Review of manufacturers’ recommended routine maintenance procedures.

2. Two (2) two-hour training classes for system engineering concerns.

3. Two (2) five-day training classes for AMX touch-panel programming. This class shall cover the following topics:
   a. Basic techniques for programming AMX control systems
   b. Review of signal flow diagrams.
   c. Review of all equipment functions, relevant to the installation.
   d. Review of initial equipment settings.
   e. Review of manufacturer’s recommended routine maintenance procedures.
   f. Review & demonstration of replacement procedures for consumables (e.g., lamps).

4. Review of system software replacement/upgrade procedures.

5. Four (4) four-hour training classes addressing AV system operations. The classes will demonstrate and describe the following:
   a. System set-up and operations
   b. Control system operation
   c. How to edit and display videotape and computer images
   d. How to attach microphones, record A/V signals, and control the sound system
   e. Videoconferencing operation & capabilities (if applicable)
   f. Audio monitoring and ADA system operations
   g. Cable antenna television system (CATV)

6. Engineering Training may take place at any time (chosen by the Owner) after the systems are operational, up to a year following system acceptance.

7. System Operation and Service Manuals shall be provided for this training.

8. The Owner will detail additional specifics of the training session(s).

9. The Owner may take advantage of the training at anytime before acceptance, or within one (1) year of acceptance.

1.11 MAINTENANCE
A. Service Contract: Submit the costs for a one-year service contract, commencing with the completion of the two-year warranty. These contracts shall be fixed-cost, and can be accepted at the option of the Owner anytime during the two year warranty period. Each contract shall include the following services:

1. Provide a total of eight (8) one-day visits per year, or a total of sixty-four (64) engineering/service labor hours to conduct preventive maintenance and the Owner directed system adjustments. Each visit will include cleaning video and audio heads, checking and replacing projection lamps and indicators, checking and repairing microphones and microphone cables, and conducting subjective and objective tests of the audio, video, and control systems of the installed audiovisual systems. The Repair and/or adjust any malfunctioning components located by the technician during this testing. Include control system programming updates and modifications as part of this service contract, providing an updated editable copy of the source code.

2. Provide a service telephone number, staffed by a qualified technician familiar with the equipment installed by the vendor in the Owner Facility. Staff this number during normal business hours.

3. Respond with an on-site technician within 24-hours of a service call (including Saturdays and Sundays) for all equipment and system failures.

4. There shall be no cost to the Owner for maintenance performed under these service contracts beyond the fixed cost of the contracts.

5. Include under normal service contract visits, updates to both control and video wall system programming.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Equipment Lists: Refer to the following list of materials and equipment required to complete the work of this Section. Refer to TQ series drawings for equipment quantities and locations.

1) Ceiling Installed Microphone
   - Omnidirectional flush-mount boundary microphone
   - 20Hz to 20kHz Frequency Range
   - 25mV/Pa (-32dBV) sensitivity
   - 78dB A-weighted signal/noise ratio
   - XLR phantom power adapter

   Product: **AKG C 562 CM** or approved comparable product.

2) Rack Mount Audio Mixer
   - Eight (8) channel input
   - Balanced Outputs
   - 48 V Phantom Power front panel
   - Mic/line inputs

   Product: **Ashly MX-508** or approved comparable product.

3) Remote Control System w/Programming
   - Provide expansion cards as needed
   - **Netinx Studio** PC software
4) Remote Control System w/Programming
   - Provide expansion cards as needed
   - Netlinx Studio PC software
   - AMX PSN 4.4 power supply
   - AMX NXD-500i Wall-mounted touch panel interface
   - Ethernet cables as needed for NXD-500i
   - AMX CB-TP5i Wall-mounting wallbox for NXD-500i
   - AMX CB-TP5ib Back cover for CB-TP5i
   - AMX RK5 Rack Mount kit for NXD-500i

   Product: AMX Netlinx NI-4100 or approved comparable product.

5) DSP Speaker Processor
   - 10 balanced mic/line inputs
   - 6 balanced mic/line outputs
   - RS232 controllable

   Product: Biamp Nexia CS or approved comparable product.

6) Data/Video Projector w/ Mount
   - 6500 ANSI lumens
   - WXGA 1366 x 800 native resolution
   - 2500:1 contrast ratio
   - Provide mount
   - Provide Surge X Flat Pack surge protector and power conditioner
   - Inputs: Composite video, 15-pin D-Sub, S-Video, Component Video
   - RS-232 controllable
   - Provide Christie Lens: Standard Zoom 121-107109-01

   Product: Christie Digital LW650 or approved comparable product.

7) Eight-Channel Audio Amplifier
   - 200W at 8-ohm per channel
   - 20Hz-20kHz at 1 watt +/- 0.5dB
   - 100dB unweighted signal to noise ratio
   - 2RU

   Product: Crown CTs 8200 or approved comparable product.

8) Dual Channel Audio Amplifier
80W at 8-ohms per channel
20Hz-20kHz at 1 watt +/- 0.25dB
100dBA-weighted signal to noise ratio
1RU

Product: **Extron XPA 2004** or approved comparable product.

9) HDMI Audio De-Embedder
- Input: single HDMI female video connection.
- Output: single HDMI female video connection, with stereo audio on captive screw connectors.
- 1RU, ½ Rack Width

Product: **Extron HAE100** or approved comparable product.

10) Surface-Mountable Enclosure for Cables and AC Power Outlet
- Low profile with tilt-up lid
- Flush-mountable
- Include Architectural Adapter Plates (AAP) as needed

Product: **Extron Cable Cubby 600** or approved comparable product.

11) DSP Speaker Processor
- 6 Mono, balanced/unbalanced mic/line inputs
- 4 Mono, balanced/unbalanced mic/line outputs
- RS232 controllable

Product: **Extron DMP 64** or approved comparable product.

12) 10X3 Digital/Analog Video/Stereo Audio Matrix Switcher
- 10X3 Digital/Analog Video I/O
- Video Inputs: Two (2) composite on BNC, two (2) S-Video on Mini-DIN, two (2) RGBHV on 15-pin HD, two (2) DVI-I
- Video Outputs: Two (2) simultaneous RGBHV on 15-pin HD female connectors, one (1) DVI-I.
- 600MHz (-3dB) Bandwidth, Fully Loaded
- RS-232 control
- 2 RU

Product: **Extron DVS-510** or approved comparable product.

13) Two Output VGA Distribution Amplifier
- Accepts VGA and RGBHV video signal on 15-pin HD female connector
- Outputs 2 simultaneous VGA or RGBHV video signals on four (4) 15-pin HD female connectors
- Rack mountable (with 1RU Rack Shelf), 1RU, ½ rack width

Product: **Extron P/2 DA2xi** with rack shelf or approved comparable product.

14) Four Output VGA Distribution Amplifier
• Accepts VGA and RGBHV video signal on 15-pin HD female connector
• Outputs 4 simultaneous VGA or RGBHV video signals on four (4) 15-pin HD female connectors
• Rack mountable (with 1RU Rack Shelf), 1RU, ½ rack width

Product: **Extron P/2 DA4xi** with rack shelf or approved comparable product.

15) High Resolution Computer-To-Video Scan Converter
• Accepts VGA and RGBHV video signal on 15-pin HD female connector
• Outputs RGBHV, Composite, and Component on Six (6) female BNC, and S-Video on Mini-DIN
• Rack mountable (with 1RU Rack Shelf), 1RU, ½ rack width

Product: **Extron VSC 500** with rack shelf or approved comparable product.

16) Universal Twisted Pair Transmitter
• Transmits HDMI, VGA, S-video/composite/component video, audio, and RS-232
• One (1) RGBHV, RGBS, RGsB, s-video/component/composite video input
• One (1) S-video input
• One (1) composite video input
• One (1) HDMI input
• Two (2) Stereo unbalanced RCA audio inputs

Product: **Extron MTP/HDMI U T A D** or approved comparable product.

17) Universal Twisted Pair Receiver
• Receives video and audio proprietary analog signals from Extron MTP/HDMI U T A D
• One (1) RGBHv, RGBS, Component video, S-Video, or Composite Video output
• One (1) HDMI output
• Two (2) Mono, balanced/unbalanced analog audio outputs with 3.5 mm captive screw connectors

Product: **Extron MTP / HDMI U R** or approved comparable product.

18) RGBH Twisted Pair Transmitter
• Transmits video and audio proprietary analog signals to Extron MTP 15HD A
• One (1) RGBH Video Input
• One (1) Stereo unbalanced audio input through a single 3.5 mm mini stereo jack
• Decora wallplate

Product: **Extron MTP T 15HD A D** or approved comparable product.

19) RGBH Twisted Pair Receiver
• Receives video and audio proprietary analog signals from Extron MTP T 15HD A D
• One (1) RGBH Video Output
• One (1) Stereo unbalanced audio output through 3.5 mm direct insertion captive screw connector, 5 pole
• 1RU, ¼ Rack Width

Product: **Extron MTP RL 15HD A** or approved comparable product.
20) HDMI Twisted Pair Transmitter  
- Transmits video and audio proprietary analog signals to Extron HDMI 201 AD Rx  
- One (1) HDMI Input  
- One (1) Stereo unbalanced audio input through a pair of female RCA jacks  
- Decora wallplate  

Product: **Extron HDMI 201 AD Tx** or approved comparable product.

21) HDMI Twisted Pair Reciever  
- Receives video and audio proprietary analog signals from Extron HDMI 201 AD Tx  
- One (1) HDMI Output  
- One (1) Stereo unbalanced audio output through a pair of female RCA jacks  
- Decora wallplate  

Product: **Extron HDMI 201 AD Rx** or approved comparable product.

22) S-Video Twisted Pair Transmitter  
- Transmits video and audio proprietary analog signals to Extron MTP R SVA  
- One (1) S-Video Input  
- One (1) Stereo unbalanced audio input through a pair of female RCA jacks  
- Decora wallplate  

Product: **Extron MTP T SVA AAP** or approved comparable product.

23) S-Video Twisted Pair Reciever  
- Receives video and audio proprietary analog signals from Extron HDMI 201 AD Tx  
- One (1) S-Video Output  
- One (1) Stereo unbalanced audio output through a pair of female RCA jacks  
- 1RU, ¼ Rack Width  

Product: **Extron MTP R SVA** or approved comparable product.

24) Universal Computer-Video Interface  
- 300MHz RGB bandwidth  
- RS232 controllable  
- 1 analog RGBHV 15 Pin HD inputs  
- 1 analog RGBHV output  
- “Y” Type Cable  
- Provide **Extron AAP 102** Two-Gang Mounting Frame  

Product: **Extron RGB 580xi SI AAP** or approved comparable product.

25) Media Presentation Switcher  
- 8x6 RGB/VGA with audio  
- 6x6 S-video/composite video with audio switcher  
- 14x6 stereo matrix  
- 350 MHz (-3dB) RGB bandwidth  
- RS-232 controllable  
- 2RU
Product: **Extron MPX 866A** or approved comparable product

26) Component to RGBHV Converter
- Converts Analog component video to RGBS or RGBHV
- Inputs: Component video on BNCs
- Outputs: RGBHV, RGBS or RGsB on BNCs
- User selectable color space format
- Rack mountable, 1RU, ¼ rack width

Product: **Extron CVC300** with rack shelf or approved comparable product.

27) Surround Sound Processor
- 7.1 Surround sound compatible
- Stereo (two-channel) compatible
- Eight (8) analog audio inputs, Eight (8) digital audio inputs
- Built-in 8-channel 24-bit Digital-To-Analog Converter
- RS-232 controllable

Product: **Extron SS7.1** or approved comparable product.

28) Interactive Annotation & Digitizer Tablet
- Serves as PC Monitor
- Lectern Mount Brackets
- 19” Diagonal Interactive Screen
- WXGA
- Battery-free, tethered pen w/built-in holder
- Control Panel and Annotation Software

Product: **Hitachi, T19WX** or approved comparable products

29) DVD Recorder
- DVD and Mini-DV Cassette recordable
- Three (3) component video outputs
- Three (3) analog stereo audio outputs
- Two (2) S-Video output terminals
- One (1) S-Video/Video/Stereo Audio input
- RS-232 controllable

Product: **JVC SR-DVM700** or approved comparable product.

30) DVD / VHS Player/Recorder
- DVD recording and playback
- ATSC built in tuner
- Provide Middle Atlantic RSH series rack mount

Product: **JVC DR-MV150B** or approved comparable product.

31) Portable Public Address System
• Two (2) **JBL EON 510** Self-powered 10” Two-Way Loudspeakers with built-in 3-channel mixer without phantom power capability
• **JBL EON10-SYS-3G** transport bag with telescoping tow handle and wheels
• Provide dynamic speech microphones as needed

Product: **JBL Eon 500 series** or approved comparable product

32) Custom Instructors Station
• KSI Lectern model number ESL32
• Clear Maple finish

Product: **KSI ESL32** or approved comparable product.

33) 35”H Laminated Rack
• 20 RU
• 29.5” overall height; 18” depth; 20.4” overall width
• Provide security screws and locking castered base
• Provide quiet exhaust fan top 4”
• Provide **Middle Atlantic PD-915R** rack-mount distribution
• Provide Middle Atlantic U2MS rack shelf
• Provide Middle Atlantic U3 rack shelf
• Provide Middle Atlantic VTF1 vented panel
• Provide rack mount UPS to support a minimum of 30 min. backup time.

Product: **Middle Atlantic BRK20** or approved comparable product.

34) 52”H Laminated Rack
• 8 RU
• 52” racking height; 18” depth
• Provide security screws and RSH series mounts as needed
• Provide rack mount UPS to support a minimum of 30 min. backup time.

Product: **Middle Atlantic BRK 8** or approved comparable product.

35) 52”H Laminated Rack
• 20 RU
• 52” overall height; 18” depth; 20.4” overall width
• Provide security screws and locking castered base
• Provide quiet exhaust fan top 4”
• Provide **Middle Atlantic PD-915R** rack-mount distribution
• Provide Middle Atlantic U2MS rack shelf
• Provide Middle Atlantic U3 rack shelf
• Provide Middle Atlantic VTF1 vented panel
• Provide rack mount UPS to support a minimum of 30 min. backup time.

Product: **Middle Atlantic ERK-2725** or approved comparable product.

36) 52” Half-Height Equipment Rack
• 36 3/4” useable rack space, 18 RU
- 40 7/8” overall height; 20” overall depth; 22” overall width
- Provide security screws
- Provide quiet exhaust fan top 4”
- Provide **RSH series** rack mount kits as needed
- Provide rack mount UPS to support a minimum of 30 min. backup time.
- Provide **Furman PL-Pro DMC** power distribution
- Provide ERK Castor Base

Product: **Middle Atlantic ERK-2120** or approved comparable product.

37) 74” Equipment Rack
- 70 1/8” useable rack space, 40 RU
- 74 1/8” overall height; 25” overall depth; 22” overall width
- Provide security screws
- Provide quiet exhaust fan top 4”
- Provide **RSH series** rack mount kits as needed
- Provide rack mount UPS to support a minimum of 30 min. backup time.
- Provide **Furman PL-Pro DMC** power distribution

Product: **Middle Atlantic ERK-4025** or approved comparable product.

38) 52” Equipment Rack
- 65” useable rack space, 35 RU
- Provide security screws
- Provide quiet exhaust fan top 4”
- Provide **RSH series** rack mount kits as needed
- Provide rack mount UPS to support a minimum of 30 min. backup time.
- Provide **Furman PL-Pro DMC** power distribution
- Provide ERK Castor Base

Product: **Middle Atlantic ERK-3525** w/locking casters and power distribution or approved comparable product.

39) 17” Preview Monitor
- One (1) RGB Analog video input
- 600:1 Contrast Ratio
- 1280 x 1024 resolution

Product: **NEC LCD1770NXM-2** or approved comparable product.

40) 52” LCD Display (ALTERNATE)
- 1920 x 1080 resolution
- 2000:1 contrast ratio
- 89 degree viewing angle
- Provide **Surge X Flat Pack** surge protector and power conditioner
- 16:9 aspect ratio
- Secure with security screw, steel cable and padlocks on the mount

Product: **NEC LCD5220-2-AV** or approved comparable product.
41) Pan, Tilt, Zoom HD Video Camera w/ Wall mount (ALTERNATE)
   - 1280 x 720 resolution at 60fps
   - 12x zoom
   - 180 degree panning radius
   - Provide Vaddio IN-Wall Polycom EagleEye enclosure system wall mount

   Product: Polycom Eagle Eye or approved comparable product.

42) Video Conferencing Codec (ALTERNATE)
   - 1280 x 720 resolution
   - Max bandwidth 6 Mbps
   - 4-way Multipoint
   - HD H.264 Content

   Product: Polycom HDX 9004 or approved comparable product.

43) Digital Document Camera
   - 1/3” 3-CCD Progressive Scan
   - 1024 x 768 resolution
   - 20 frames per second
   - 1034 line (H); 799 lines (V)
   - VGA Input/Output
   - RS232 Controllable

   Product: Samsung SDP-860 or approved comparable product.

44) 32” LCD Display
   - 1366 x 768 resolution
   - 4000:1 contrast ratio
   - 170 degree viewing angle
   - 16:9 aspect ratio
   - Includes embedded PC with media player
   - Secure with security screw, steel cable and padlocks on the mount
   - Provide Surge X Flat Pack surge protector and power conditioner
   - Two (2) displays located in 1CO3, one located near the entrance to PT House 103 and the other near the entrance to Black Box 127, are to be mounted horizontally. The remainder of these displays are to be mounted vertically.

   Product: Samsung 320MXn-2 or approved comparable product.

45) 52” LCD Display
   - 1920 x 1080 resolution
   - 5000:1 contrast ratio
   - 176 degree viewing angle
   - Provide Surge X Flat Pack surge protector and power conditioner
   - 16:9 aspect ratio

   Product: Sharp PN-E521 or approved comparable product.
46) Portable Projector with Folding Screen
   • 1280 x 800 native resolution
   • 3000 ANSI lumens
   • 16:10 Aspect Ratio
   • Up to 2200:1 contrast ratio
   • RS-232 Controllable
   • Provide Surge X Flat Pack surge protector and power conditioner
   • DVI-D Digital/RGB/HDCP, Component Video, S-video, and RCA pin-type video inputs
   • RCA Stereo audio inputs
   • Provide Draper UFS Portable Projections Screen, in 16:10 format 95” diagonal size

   Product: Sharp PG-F325W or approved comparable product.

47) DLP Data/Video Projector w/Ceiling Mount
   • 1280 x 800 native resolution
   • 4000 ANSI lumens
   • 16:10 Aspect Ratio
   • Up to 2200:1 contrast ratio
   • RS-232 Controllable
   • 1:1.15x manual zoom lens with 1:1.5~1.7 throw ratio
   • Provide Surge X Flat Pack surge protector and power conditioner
   • One (1) RGB input (15-pin; BNC; DVI-D w/HDCP)
   • Two (2) Video Inputs (Composite; S-Video; Component)
   • Provide ceiling mount with vibration isolation
   • Secure with security screw, steel cable and padlocks on the mount

   Product: Sharp PG-D40W3D or approved comparable product w/ mount.

48) Wireless Microphone System (Lapel Type)
   • ULXP4 Ratio Diversity Receiver
   • Automatic Frequency Selection
   • ULX1 Body pack Transmitter
   • WL-51 Lavalier microphone
   • Removable ½-wave antennas (2)

   Product: Shure ULXP-14/51 w/rack mount or approved comparable product.

49) Wireless Microphone System (Handheld Type)
   • ULXP4 Ratio Diversity Receiver
   • Automatic Frequency Selection
   • ULX1 Body pack Transmitter
   • Wireless Handheld microphone
   • Removable ½-wave antennas (2)

   Product: Shure ULXP-24/58 w/rack mount or approved comparable product.

50) Lectern microphone
   • 18” gooseneck electret condenser microphone
   • Frequency Response: 50Hz to 17kHz
• Cardioid cartridge
• Shock mount, flange mount, windscreen
• Mute switch and LED

Product: **Shure MX418S/C** w/shock mount or approved comparable product.

51) HD Pan/Tilt/Zoom Video Camera
• 10x optical, 40x with digital zoom
• 8 to 70 degrees horizontal angle of view
• RS-232 controllable
• HD-SDI, Analog Component HD video outputs, VBS, Y/C SD video outputs

Product: **Sony EVI-HD1** or approved comparable product.

52) Digital Compact Disc Recorder with MP3 Playback
• 24 bit A/D, D/A Converters
• Unbalanced I/O, S/PDIF digital I/O
• Sample rate conversion
• Adjustable gain on digital I/O
• MP3 playback
• 2RU

Product: **Tascam CD-RW901** or approved comparable product.

53) Wall Mounted Program Loudspeakers
• 4 ½” ICT transducer
• 9.47” x 6.1” x 6.38” system
• 90 Hz – 25 kHz ±3dB
• 100 watts program power handling
• 90 degree conical dispersion
• Grille finish to match room wall covering.
• Provide Omni-mount 50 series wall mount

Product: **Tannoy Di5** or approved comparable product.

54) Wall Mounted Loudspeaker
• 6” point source dual concentric driver
• 90Hz to 22kHz ± 3 dB response
• 200 watts programme power handling
• 90 degree conical dispersion

Product: **Tannoy V6** or approved comparable product.

55) Low Frequency Subwoofer
• 10” PowerDual
• 39Hz to 110Hz ± 3 dB response
• 400 watts programme power handling

Product: **Tannoy VS 10BP assembly** or approved comparable product.
56) Twisted-Pair Multi-Media Transmitter Interface
   • CAT 5 transfer of video, power, IR and control
   • EZ Camera Interface Module
   • Y Gain Control

   Product: **Vaddio-Quick Connect Pro** or approved comparable product.

57) Custom Multi-Gang AV plates
   • Plate connections to match or exceed “TA” signal flow drawings

   Product: **Whirlwind Custom** or approved comparable product.

58) Ceiling Mounted Digital Document Camera
   • Progressive scan 1/3” CCD, RGB
   • Native XGA signal output (1024 x 768) and DVI video output
   • 30 frames/second
   • Provide Ceiling Tile Bridge w/trim ring

   Product: **Wolfvision EYE-12** or approved comparable product.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

   A. Designate to the Owner in writing, the responsible person who shall ensure timely and consistent communication with the Owner on progress of the contract. The designated representative shall have full knowledge of all engineering and production procedures and shall report status of the installation and upcoming work plans to the Owner’s Project Manager and consultant on a weekly basis. Project manager shall have successfully managed not less than two (2) projects of similar size and scope as defined in previous sections. Bid submission shall detail the percentage of time that the project manager and other key personnel will be involved with the project.

3.2 PREPARATION

   A. Where the work is to be installed in, wired to, fitted to, attached to, or in any manner integrated with the work of another Trade Contractor or General Contractor, so advise the Owner in sufficient time to permit the installation, fitting, attachment, or integration of said work in an orderly manner, and shall furnish the other firms details and instructions required to complete their work. Where the work of another contractor is to be installed in, wired to, fitted to, attached to, or in any manner integrated with your work, coordinate with the other trades in a timely manner.

3.3 INSTALLATION

   A. General:
      1. All installation work shall be in accordance with, but not limited to, this specification and drawings. Work practices shall be performed in accordance with applicable standards, requirements, and recommendations of Federal and Local authorities having jurisdiction.
2. All discrepancies discovered and any discrepancies which are apparent at the date of submission of bids shall be immediately corrected without additional charge to the Owner.

3. Clearly label all user controls for intended use and nominal setting. These labels shall be engraved and filled, or equal. Note: “Dymo” labels are not acceptable. Accessible controls that should not be changed (audio equalizer settings, etc.) shall be covered.

4. All equipment to be rack mounted shall be supplied with the appropriate rack mount kits. Each instructor’s station and rack enclosure to have a single button on/off power distribution panel to include pull out lights and LED voltage indicator (Furman PL-Pro DMC or equal) located in the first available rack unit. All equipment racks to include removable, locking front doors and a 30-minute uninterruptable power supply (rack mount or free-standing at bottom of rack). Each instructor’s station or equipment rack shall include a 4” diameter, low-noise fan. All rack and instructor stations shall include “security type” screws to secure rack-mounted components.

B. Physical Installation:
   1. Provide plate as shown. Plate to occupy first available rack unit in all AV equipment racks. If more than two (2) racks are positioned together, one (1) plate for every two racks is acceptable. Product: Liberty Cable # C2121-28046-RHIM-Template

   2. All equipment shall be firmly secured in place unless requirements of portability dictate otherwise. Unless granted specific permission by the Owner, install and secure all boxes, equipment, etc., plumb and square.

   3. Fastenings, mounting brackets and supports shall be adequate to support their loads with a safety factor of at least three (3). A safety chain or cable will be tied to all equipment suspended from above.

   4. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.

3.4 AUDIOVISUAL CABLE INSTALLATION

A. General: Because of the great number of possible variations in grounding systems, follow good engineering practice, as outlined above, and to deviate from these practices only when necessary to minimize crosstalk and to maximize signal-to-noise ratios in the audio, video, and control systems. Inform the Contractor and the Owner in the event that there is a deviation from the standard grounding practices prior to actually performing the work.

B. Routing of raceways and cables shall be in accordance with Penetration Control Plans. Penetrations through acoustically significant construction shall be sealed airtight in accordance with the Penetration Control Plan, Resiliently Sealed Penetration Details and section 079005-Joint Sealers.

C. All cables, regardless of length, shall be marked with wraparound cable markers at both ends. There shall be no unmarked cables at any place in the system. Marking codes used on cables
shall correspond to codes shown on “as-built” drawings and/or run sheets. The labeling and numbering system will be coordinated with the Owner.

D. All microphones to include 30ft. cable with heavy-duty jacket and XLR connectors.
E. Loudspeakers operating @ 8Ohm shall be installed with 12AWG cable as a minimum size/diameter.
F. Wall/ floorbox I/ O panels shall be installed with audio/ video line drivers on runs exceeding 35ft.
G. All cabling shall be neatly strapped, dressed, and adequately supported. Any exposed cabling shall be neatly enclosed in a protective covering.
H. Terminal blocks, boards, strips, or connectors shall be furnished for all cables, which interface, with racks, cabinets, consoles, or equipment modules. All audio signal lines shall be balanced at AV I/O plates.
I. All cables shall be grouped according to the signals being carried. In order to reduce signal contamination, separate groups shall be formed for the following cables:
   1. Power cables
   2. RGBHV, Video cables and Control cables. 75 and 110 Ohm cable 0 to 10 Mhz 1 volt peak to peak. 0 to 5 volt 0 to 10 Mhz control cables
   3. Data cables (when applicable) and 75 Ohm RF CATV cables, 47 to 890 Mhz
   4. Audio cables carrying low level (Microphone) signals below -30 dBu, 20 to 20,000 Hz.
   5. Audio cables carrying line and high level signals -30dBu to +24dBu, 20 to 20,000Hz
   6. Loudspeaker cables 20 to 20,000 Hz less than 70 volts
Microphone cables that are not in steel conduit will be routed to keep a minimum of 24” between the cables and AC power, transformers, and lighting ballasts. Microphone cables that are not in steel conduit will be kept a minimum of 12” from the loudspeaker cables. All other signal type must be routed to keep a minimum or 6” between the cable bundles and AC power, transformers, and lighting ballasts. In all cases the crossing of signal cable and power will occur at 90 degree perpendicular to each other.
J. Supply cables that meet the overall specifications, and approval by the Owner. Any cabling installed in walls or ceilings shall be plenum rated. All cables shall be cut to the length dictated by the run plus the required “slack” to permit future equipment movement and relocation. For equipment mounted in drawers or on slides, the interconnecting cables shall be provided with a service loop of appropriate length.
K. No cable shall be installed with a bend radius less than that recommended by the cable manufacturer. Notify the Contractor in the event that a field condition interferes with the proper installation of any cables or equipment.
L. Grounding Procedures: In order to minimize problems resulting from improper grounding and to achieve maximum signal-to-noise ratios, the following grounding procedures shall be adhered to:
   1. General: Because of the great number of possible variations in grounding systems, follow good engineering practice, as specified herein, and to deviate from these practices only when necessary to minimize crosstalk and to maximize signal-to-noise ratios in the audio,
2. System Ground: A single “system ground” shall be established for the system. All grounding conductors shall connect to this system ground. The system ground shall be provided in the equipment rack, and shall consist of a copper bar of sufficient size to accommodate all secondary ground conductors.

3. A copper conductor, having a maximum of 0.1 Ohms total resistance, shall connect the system ground bar to the nearest grounded, metallic electrical conduit of at least 2 inches in diameter. Be responsible for determining if the metallic conduit is properly electrically bonded to the building ground system, and shall show the grounding path of a document that is provided with the system documentation.

4. Secondary system grounding conductors shall be provided from all ungrounded equipment in each area, to the primary system grounding point for the area. Each of these grounding conductors shall have a maximum of 0.1 Ohms total resistance.

5. Under no conditions shall the AC neutral conductor, either in the power panel or in a receptacle outlet, be used for a system ground.

M. Audio Cable Shields: All balanced audio cable shields shall be grounded at one point only. All audio lines shall be balanced at the source, prior to any cable pull longer than twenty feet. There are no exceptions. For ungrounded portable equipment, such as microphones, the shield shall be connected at both ends but grounded at only one end.

N. Video Receptacles: All video receptacles shall be insulated from the mounting panel, outlet box, or wireway.

3.5 REPAIR/RESTORATION

A. Any damage to any installed work or product caused by the unpacking, transporting, assembly, connecting, or configuring of the product shall be repaired at no charge to the Owner.

3.6 FIELD QUALITY CONTROL

A. Once installed and the System Checkout is complete, the system shall be tested by the Owner.

1. If the A/V system fails to meet the requirements of this document or those stated by the technical documentation, then the Owner shall reject the installed system and then be given notice (either oral or in writing) to correct the failure as soon as possible.

2. If unable to overcome repeated performance deficiencies within thirty (30) days, and if requested to do so by the Owner, remove the equipment at no expense to the Owner.

3. No warranties shall begin until the Owner or AV Consultant has authorized acceptance in writing.

4. Right to Revoke Acceptance: If any equipment and/or goods which have been previously accepted, specifically or by the making of payment, are found to have defects, damage, deficiencies or fail to conform to the specification, for any cause not attributable to the Owner may revoke acceptance.

B. Acceptance Test: Testing will be performed with the Owner (or its designees) to determine that the A/V system equipment satisfies the manufacturers’ performance specifications and that the A/V system installed satisfactorily performs the functions required by this specification. Conduct formal pre-acceptance tests prior to the Owner’s acceptance testing to ensure that the performance and functional specifications are satisfied by the installed system and the system is...
ready for the Owner’s acceptance. The Owner will verify that the installed audiovisual system satisfies the performance and functional requirements through formal acceptance testing.

C. Conduct all pre-acceptance tests: The Owner / AV Consultant, may witness the pre-acceptance tests. The Owner / Architect may inspect and operate system components in order to evaluate installation progress and technical compliance prior to acceptance testing. Provide equipment necessary to demonstrate correct system performance. The Owner may conduct formal acceptance tests, and provide skilled technicians and test equipment as requested to assist the tests.

D. Contractor System Checkout
1. Perform system checkout before acceptance tests are scheduled. Furnish all required test equipment and perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification.
2. During performance testing, all equipment shall be operated under standard conditions as recommended by the manufacturer.
3. Test all audio and video systems for compliance with the Performance Standards using the following test procedures that follow later in this specification.
5. At the conclusion of the tests, return all equipment settings to previously calibrated positions.
6. Provide written records of all test results in spreadsheet form.
7. Check all control functions, from all controlling devices to all controlled devices, for proper operation.
8. Adjust, balance, and align all equipment for optimum quality and to meet the manufacturer’s published specifications. Establish and mark normal settings for all level controls, and record these settings in the “System Operation and Maintenance Manual.”
9. Provide testing results and settings for all equipment and systems to the AV Consultant at least three (3) business days prior to System Acceptance Testing.
10. Provide the AV Consultant with all test results, manuals, software, as-built documentation, etc. prior to acceptance testing in accordance with the dates and/or lead-times listed within this document.
11. Inform the PM and AV Consultant that the works are ready for System Acceptance Testing by the AV Consultant. The works shall be considered ready for acceptance testing when the following conditions are met:
   a. AV Contractor has pre-tested all systems such that all sub-systems, functions, software, and equipment are de-bugged and operational
   b. AV Contractor has supplied the AV Consultant with the written test results and documentation as listed above for all rooms and systems
   c. AV Contractor has supplied the AV Consultant with manuals, training materials, and other as-built documentation revised to reflect comments and/or revisions arising from the review cycles listed elsewhere within this document
12. Should the systems not be ready for testing by the AV Consultant at the date(s) and time(s) indicated by the AV Contractor, system acceptance testing may be rescheduled at the sole discretion of the AV Consultant. The AV Contractor shall pay for the labor and expenses of the AV Consultant and other project team members assembled at the project site for the purpose of system acceptance testing for the date(s) of the original scheduled testing plus the labor and expenses of the AV Consultant and other project team members for the rescheduled testing date(s). The labor rate for the AV Consultant shall be a flat
rate of $200.00/hour including travel time. Other project team member labor costs shall be at their respective published rates. The PM an/or Owner shall be entitled to deduct any money owed to the Owner, PM, AV Consultant, or other project team members under this contract from any sum which may become due or is payable to the AV Contractor under this Contract for the purposes of satisfying the charges listed above.

E. Test Equipment
1. Assemble the following test equipment (or equivalent) on site.
   a. Video signal generator, Leader 410C
   b. RGBS signal generator, Extron VTG 150
   c. Portable Signal Level Meter, Syncore SLM1476CM
   d. Combined waveform monitor/vectorscope, Leader 5872A
   e. Prerecorded Blu-Ray disc
   f. Prerecorded DVD
   g. Blank DVD
   h. RGB HV cable, Extron BNC-5-6’HR
   i. Audio and Video cable, terminations, adapters, etc
   j. Signal generator, Leader LAG-120B
   k. AC millivoltmeter, Leader LMV-181A
   l. Audio test set, Audio Precision P1PLUS
   m. Prerecorded cassette tape
   n. Audio Test CD
   o. 35mm Calibrated Test Slide
   p. Programmable Video & Audio Test Generator, Extron VTG-400D

F. Audio
1. Absolute Impedances:
   a. Set any speaker level controls at zero attenuation. Measure absolute impedance value of each speaker line at 250, 500, 1000, 2000, 4000 Hz without the amplifier connected but with all speakers connected. Impedance must not be below the rated load impedance of respective amplifier and may be any value equal to or above that. Check resistance of lines to all speakers and microphone receptacles with receptacles open and short-circuited.

2. Hum and Noise Level
   a. Test overall hum and noise, it should be at least 60 dB below rated power output of each amplifier with amplifier controls set for optimum signal to noise and full output and with inputs terminated with proper shielded resistor. (150 and 600 ohms).

3. Electrical Distortion:
   a. Load power amplifiers with resistors matching nominal impedance of output terminals used in system in place of actual loudspeaker loads.
   b. Adjust gain controls as for hum and noise level test.
   c. Apply 250, 500, 1000, 2000, 4000 Hz sine-wave signal from an oscillator having less that 0.1% T.H.D. to each microphone and line level input at level required to produce full amplifier output.
   d. Distortion must measure less than 1%.

4. Parasitic Oscillation and RF Pickup
   a. Set up system for each specified mode of operation.
   b. Use 5 MHZ band with oscilloscope and speaker monitoring.
c. Check to insure that the system is free of spurious oscillation and RF pickup in the absence of any input signal and also with the system driven momentarily to full output at 160 Hz.

5. Buzzes, Rattles, Distortions:
   a. Apply high quality music signal to the system. Adjust the sound system for frequent peaks at its specified maximum sound pressure level.
   b. Apply sine-wave sweep from 50 to 5,000 Hz to 6 dB below full amplifier power.
   c. In both cases, listen carefully for buzzes, rattles and objectionable distortion.
   d. Correct all causes of such defects. If cause is not from system, promptly notify the architect indicating cause and suggested corrective procedures.

6. Level Balance:
   a. Adjust all items of similar equipment for identical measured voltage gain.
   b. Unless otherwise specified, render tamper proof using security covers on all controls effecting overall system level balance and signal to noise ratio, such as power amplifier input level control, and input-output level controls for equalizers etc. Some controls may require readjustment as the result of “Acceptance Testing”.

7. Equalize all audio systems for maximum gain before feedback in all room configurations.

8. Record all systems settings for inclusion into systems manuals

G. Video
1. Signal Paths
   a. Utilizing a NTSC color bar generator and waveform analyzer with the video signal set at 100% saturation and 75% amplitude check that the video performance specifications are met at the display devices from all source inputs to all system outputs. Connect the combined waveform monitor/_vectorscope to a final output point, e.g. an input to a picture monitor or video projector. Ensure that the test signal is routed to the selected output.

2. Level Balance:
   a. Adjust all video projection equipment to produce the best image possible. Ensure that horizontal sweep circuitry is not over driven to the point of audible sweep frequencies being emitted.
   b. Adjust all video monitor and videocassette players, video sources to produce the best image possible.
   c. Record all systems settings for inclusion into systems manuals

H. RGBHV:
1. For all RGBHV inputs, connect the RGBHV output of the signal generator to a floorbox/table/rack connector and select the SMPTE & PLUGE signal at the following computer scan rates:
   a. 1024 x 768 XGA
   b. 1280 x 1024 SXGA
   c. 1366 x 768 WXGA
   d. 1400 x 1050 SXGA+
   e. 1440 x 900 WXGA+
   f. 1600 x 1200 UXGA

2. Check that the image is correctly displayed at all system outputs including the monitor(s) and/or by the video projector.
3. Repeat using Crosshatch, Checkerboard, and H Pattern Signals
I. Optical

J. All optical projection systems shall meet the following performance standards:
   1. The total averaged light output from a projector, in lumens, shall be within plus-or-minus 15% of that specified by the projector manufacturer.
   2. The light fall-off from the center of the projected image to all four corners, as measured at the projected image plane, shall not exceed 35% for slide projector images. The light intensity shall be measured at all five positions of the projected image after the projector has been adjusted to provide the light output as specified above.
   3. The “corner” locations shall be defined as the four points determined by intersecting lines drawn 5% of the distance in from the focused edges of the image.
   4. The light meter used for the above measurements shall be properly calibrated footcandle (or lux) meter and shall be cosine-corrected.
   5. Projectors, lenses, and mirrors shall be solidly mounted and braced so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.

K. Qualification Methods: Three methods will be used to qualify the A/V system for acceptance.
   1. Inspection - A critical observation of qualifying factors, such as quality of workmanship, equipment placement, routing of cables, adequacy of technical documentation, etc., that do not lend themselves to demonstration or measurement.
   2. Demonstration - A process of showing by reason or evidence that a given condition clearly satisfies the requirement.

L. Measurement - A process of determining the actual dimension, capacity, or amount of something, by measuring using calibrated standards.

3.7 SCHEDULES

A. 40-SEAT SUITE CLASSROOM W/ VTC (108)

   1. General: This paragraph describes audiovisual system to be contained in the 40 Seat Suite Classroom with VTC. In general, this room will be used for teaching presentations and video teleconferencing utilizing audiovisual presentation and VTC system technology. The room shall be outfitted with a data/video projection system (as an add alternate) along with separate monaural speech and stereo program audio reinforcement to enhance presentations within the space.

   2. The data/video projection system shall include a ceiling-mounted projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room. A program/speech audio reinforcement system shall be provided. An instructor’s station has been specified for the front of the room, to include all AV sources and connections. The room shall include wall mounted pan/tilt/zoom video cameras for use during video teleconferencing. A control system to include a touchscreen remote has been specified for the room and shall be located at the instructors station. System inputs include, but are not limited to: personal computers, digital document camera, annotation devices, DVD/BLU-RAY Player/Recorder, HD TV Tuner, videoconferencing device, wall mounted video cameras, along with both wired and wireless microphones. The 40 Seat Suite Classroom with VTC shall contain a custom floorbox for system access.
3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details
   a. Control System: The Control System will be controlled from a lectern mount color LCD touchscreen that shall terminate at the specified custom instructor’s station. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

   b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

   c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

   d. Program/Speech Reinforcement Loudspeakers: Wall- mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired and wireless microphones.

   e. Data/Video Projector: The data/video projector shall be installed on the ceiling of the 40 Seat Suite Classroom with VTC. The video projector shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure.

   f. LCD Displays: The LCD displays shall be installed as detailed on “TQ” series drawings. The display shall be capable of displaying 1920 X 1080 resolution and 2000:1 contrast ratio with 16:9 native aspect ratio.

   g. Room Video Cameras: Wall mounted video cameras shall be provided at the front and back of the room as detailed on “TQ” series drawings for use during presentations.

   h. Instructor’s Station: This station is to be located at the front the room. At this position, the station will have AV patch points via an associated room floorbox for connection to the room’s system.
1) The specified instructor’s stations will house the following: remote control touchscreen, digital annotation device, keyboard/mouse, and gooseneck microphone.

2) The station will be equipped with a task light. Unit to include a single duplex AC power receptacle on the work surface. Laptop access shall be provided.

i. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

B. 40-SEAT SUITE CLASSROOM (107)

1. General: This paragraph describes audiovisual system to be contained in the 40 Seat Suite Classroom. In general, this room will be used for teaching presentations utilizing audiovisual presentation system technology. The room shall be outfitted with a data/video projection system along with program/speech audio reinforcement to enhance presentations within the space.

2. The data/video projection system shall include a ceiling-mounted projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room. A program/speech audio reinforcement system shall be provided. An instructor’s station has been specified for the front of the room, to include all AV sources and connections. A control system to include a touchscreen remote has been specified for the room and shall be located at the instructors station. System inputs include, but are not limited to: personal computers, digital document camera, annotation device, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired and wireless microphones. The 40 Seat Suite Classroom shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details
a. Control System: The Control System will be controlled from a lectern mount color LCD touchscreen that shall terminate at the specified custom instructor’s station. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

d. Program/Speech Reinforcement Loudspeakers: Wall-mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired and wireless microphones.

e. Data/Video Projector: The data/video projector shall be installed on the ceiling of the 40 Seat Suite Classroom. The video projector shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure.

f. Room Video Cameras: Wall mounted video cameras shall be provided at the front and back of the room as detailed on “TQ” series drawings for use during presentations.

g. Instructor’s Station: This station is to be located at the front of the room. At this position, the station will have AV patch points via an associated room floorbox for connection to the room’s system.

1) The specified instructor’s stations will house the following: remote control touchscreen, digital annotation device, keyboard/mouse, and gooseneck microphone.

2) The station will be equipped with a task light. Unit to include a single duplex AC power receptacle on the work surface. Laptop access shall be provided.

h. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.
7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

C. 20 SEAT SEMINAR CLASSROOM (123, 124) and English Large Seminar Classroom (428)

1. General: This paragraph describes audiovisual system to be contained in the 20 Seat Seminar Classrooms. In general, these rooms will be used for teaching presentations utilizing audiovisual presentation system technology. These rooms shall be outfitted with a data/video projection system along with speech/program audio reinforcement to enhance presentations within the space.

2. The data/video projection system shall include a ceiling-mounted projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room. A program/speech audio reinforcement system shall be provided. An equipment rack has been specified for the front of the rooms, to include all AV sources and connections. A control system to include a touchscreen remote has been specified for the room and shall be located at the presentation wall. System inputs include, but are not limited to: personal computers, digital document camera, DVD/BLU-RAY Player/Recorder, HD TV Tuner. The 20 Seat Seminar Classrooms shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in these areas shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details
   a. Control System: The Control System will be controlled from a wall mount color LCD touchscreen that shall terminate at the specified custom instructor’s station. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

   b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.
c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

d. Program/Speech Reinforcement Loudspeakers: Wall-mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, and an HD TV Tuner.

e. Data/Video Projector: The data/video projector shall be installed on the ceiling of the 20 Seat Seminar Classrooms. The video projectors shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure.

f. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer's component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

D. WRITING LAB (314, 317, 318)

1. General: This paragraph describes audiovisual system to be contained in the Writing Labs. In general, this room will be used for teaching presentations utilizing audiovisual presentation system technology. These rooms shall be outfitted with a data/video projection system along with program/speech audio reinforcement to enhance presentations within the spaces.

2. The data/video projection system shall include a ceiling-mounted projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room. A program/speech audio reinforcement system shall be provided. An instructor’s station has been specified for the front of the room, to include all AV sources and connections. A control system to include a touchscreen remote has been specified for the room and shall be located at the instructor’s station. System inputs include, but are not limited to: personal computers, digital document camera, annotation device, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired microphones. The Writing Labs shall contain a custom floorbox for system access.
3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in these areas shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details
   a. Control System: The Control System will be controlled from a lectern mount color LCD touchscreen that shall terminate at the specified custom instructor’s station. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

   b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

   c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

   d. Program/Speech Reinforcement Loudspeakers: Wall-mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired microphones.

   e. Data/Video Projector: The data/video projector shall be installed on the ceiling of the Writing Labs. The video projectors shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure.

   f. Instructor’s Station: This station is to be located at the front the room. At this position, the station will have AV patch points via an associated room floorbox for connection to the room’s system.
      1) The specified instructor’s stations will house the following: remote control touchscreen, digital annotation device, keyboard/mouse, and gooseneck microphone.
      2) The station will be equipped with a task light. Unit to include a single duplex AC power receptacle on the work surface. Laptop access shall be provided.

   g. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a
complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

E. HUMANITIES STUDY ROOM (212)

1. General: This paragraph describes audiovisual system to be contained in the Humanities Study Room. In general, this space will be used as a student study area. The room shall be outfitted with flat panel displays along with integrated program audio reinforcement to enhance student presentations within the space. The Humanities Study Room shall contain custom wall plates for system access.

2. System Interconnection: The functional interconnections of the RGBHV, video and audio systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

3. Equipment Layout: The equipment in these areas shall be located as detailed on the “TQ” series drawing sheets associated with this space.

4. Owner Furnished Equipment (OFE): Laptop Computer

5. System Details
   a. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.
   b. Integrated Program Reinforcement Loudspeakers: Integrated loudspeakers will be provided for the flat panel displays for program audio signals. Take care not to damage the flat panels during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: laptop computers, DVD/Blu-Ray Player/Recorder, and an HD TV Tuner.

6. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s
component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

F. HUMANITIES CONFERENCE ROOM (216)

1. General: This paragraph describes audiovisual system to be contained in the Humanities Conference Room. In general, this room will be used for conferencing related presentations utilizing audiovisual presentation system technology. The room shall be outfitted with a video display system along with program/speech audio reinforcement to enhance presentations within the space.

2. The video display system shall include A LCD projector and projection screen at the front of the room. A program/speech audio reinforcement system shall be provided. A control system to include a touchscreen remote has been specified for the room and shall be located along the presentation wall. System inputs include, but are not limited to: laptop computers, digital document camera, DVD/BLU-RAY Player/Recorder, and an HD TV Tuner. The Humanities Conference Room shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details

a. Control System: The Control System will be controlled from a wall mount color LCD touchscreen that shall terminate at the presentation wall. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

b. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be custom floorboxes and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

c. Data/Video Projector: The data/video projector shall be installed on the ceiling of the Humanities Conference Room. The video projector shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure

d. Program/Speech Reinforcement Loudspeakers: Wall-mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during
installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired and wireless microphones.

e. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

G. COSTUME LAB RECITATION (205b)

1. General: This paragraph describes audiovisual system to be contained in the Costume Lab Recitation space. In general, this room will be used for presentations utilizing audiovisual presentation system technology. The room shall be outfitted with a video display system along with integrated program/speech audio reinforcement to enhance presentations within the space.

2. The video display system shall include a wall mounted flat panel display installed at the front of the room. A program/speech audio reinforcement system shall be provided. A control system to include a touchpanel remote has been specified for the room and shall be located along the presentation wall. System inputs include, but are not limited to: laptop computers, digital document camera, DVD/BLU-RAY Player/Recorder, and an HD TV Tuner. The Costume Lab Recitation space shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details

a. Control System: The Control System will be controlled from a wall mount pushbutton touchpanel that shall terminate at the presentation wall. From this touchpanel, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to
be detailed in the control drawing associated with these rooms. Touchpanel programming to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

b. LCD Display: The LCD display shall be installed as detailed on “TQ” series drawings. The display shall be capable of displaying 1920 X 1080 resolution and 2000:1 contrast ratio with 16:9 native aspect ratio.

c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

d. Integrated Program Reinforcement Loudspeakers: Integrated loudspeakers will be installed for program audio signals. Take care not to damage the flat panel display during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired and wireless microphones.

e. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

H. THEATRE CONFERENCE ROOM (319)

1. General: This paragraph describes audiovisual system to be contained in the Theatre Conference Room. In general, this room will be used for conferencing related presentations utilizing audiovisual presentation system technology. The room shall be outfitted with a video display system along with program/speech audio reinforcement to enhance presentations within the space.

2. The video display system shall include wall mounted flat panel displays installed at the front of the room. A program/speech audio reinforcement system shall be provided. A control system to include a touchscreen remote has been specified for the room and shall be located along the presentation wall. System inputs include, but are not limited to: laptop computers, digital document camera, DVD/BLU-RAY Player/Recorder, Compact
disc Recorder with MP3 playback and an HD TV Tuner. The Theatre Conference Room shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details
   a. Control System: The Control System will be controlled from a wall mount color LCD touchscreen that shall terminate at the presentation wall. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.
   b. LCD Display: The LCD display shall be installed as detailed on “TQ” series drawings. The display shall be capable of displaying 1920 X 1080 resolution and 2000:1 contrast ratio with 16:9 native aspect ratio.
   c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.
   d. Integrated Program Reinforcement Loudspeakers: Wall-mounted loudspeakers will be installed for program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, HD TV Tuner, along with both wired and wireless microphones.
   e. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s
component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

I. THEATRE REHEARSAL SPACE (102)

1. General: This paragraph describes audiovisual system to be contained in the Theatre Rehearsal Space. In general, this room will be used for theatre instruction utilizing audiovisual presentation system technology. The room shall be outfitted with a data/video projection system along with separate monaural speech and stereo program audio reinforcement to enhance presentations within the space.

2. The data/video projection system shall include a ceiling-mounted LCD projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room as well as a portable projector with a portable projection screen. A separate stereo program and monaural speech audio reinforcement system shall be provided. An AV rack has been specified to include all AV sources and connections. The room shall include wall mounted pan/tilt/zoom video cameras for use during presentations. A control system to include a touchscreen with video preview has been specified for the room and shall be located at the AV systems rack. System inputs include, but are not limited to: personal/laptop computers, DVD/VHS Player/Recorder, HD TV Tuner, wall mounted video cameras, along with wireless microphones. The Theatre Rehearsal Space shall contain a custom rackplate for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details

   a. Control System: The Control System will be controlled from a hardwired rack mount color LCD touchscreen that shall terminate at the AV systems rack. From this touchscreen, users shall have full function control of all room source and system functions (including a light dimming system) with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

   b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

   c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates and the necessary cabling connecting to the system’s equipment.
There shall be a custom rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

d. Program/Speech Reinforcement Loudspeakers: Ceiling mounted loudspeakers will be installed for monaural speech. Wall mounted loudspeakers will be installed for program reinforcement. Take care not to damage the ceiling and walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal/laptop computers, DVD/VHS Player/Recorder, HD TV Tuner, along with wireless microphones.

e. Data/Video Projectors: A data/video projector shall be installed on the back wall of the Theatre Rehearsal Space. Mounting height shall be as detailed in the architectural series drawings. A portable projector shall be cart mounted for use with the portable projection screen. The video projector shall be installed and adjusted to produce an image that fills the projection screen.

f. Room Video Cameras: Wall mounted video cameras shall be provided at the front and back of the room as detailed on “TQ” series drawings for use during presentations.

g. Equipment Rack/Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

J. ACTING DIRECTING STUDIO (105)

1. General: This paragraph describes audiovisual system to be contained in the Acting Directing Studio. In general, this room will be used for theatre instruction utilizing audiovisual presentation system technology. The room shall be outfitted with a data/video projection system along with separate monaural speech and 5.1 surround sound program audio reinforcement to enhance presentations within the space.

2. The data/video projection system shall include a ceiling-mounted LCD projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room as well as a portable projector with a portable projection screen. A separate surround sound program and monaural speech audio reinforcement system shall be provided. An AV rack has been specified to include all AV sources and connections. A control system to include a touchscreen with video preview has been specified for the room and shall be located at the AV systems rack. System inputs include, but are not
limited to: personal/ laptop computers, DVD/VHS Player/Recorder, surround sound processor, HD TV Tuner, along with wireless microphones. The Acting Directing Studio shall contain a custom rack plate for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details
   a. Control System: The Control System will be controlled from a hardwired rack mount color LCD touchscreen that shall terminate at the AV systems rack. From this touchscreen, users shall have full function control of all room source and system functions (including a light dimming system) with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

   b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

   c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates and the necessary cabling connecting to the system’s equipment. There shall be a custom rack plate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

   d. Program/Speech Reinforcement Loudspeakers: Ceiling mounted loudspeakers will be installed for monaural speech. Wall mounted loudspeakers will be installed for program reinforcement. Take care not to damage the ceiling and walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal/laptop computers, DVD/VHS Player/Recorder, HD TV Tuner, surround sound processor along with wireless microphones.

   e. Data/Video Projector: The data/video projector shall be installed on the back wall of the Acting Directing Studio. Mounting height shall be as detailed in the architectural series drawings. The video projector shall be installed and adjusted to produce an image that fills the projection screen.

   f. Equipment Rack/Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution
and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

K. TECHNICAL DESIGN LAB (201)

1. General: This paragraph describes audiovisual system to be contained in the Technical Design Lab. In general, this room will be used for teaching presentations utilizing audiovisual presentation system technology. This room shall be outfitted with a data/video projection system along with speech/program audio reinforcement to enhance presentations within the space.

2. The data/video projection system shall include a ceiling-mounted projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room. A program/speech audio reinforcement system shall be provided. An equipment rack has been specified for the front of the rooms, to include all AV sources and connections. A control system to include a touchscreen remote has been specified for the room and shall be located at the presentation wall. System inputs include, but are not limited to: personal computers, digital document camera, DVD/BLU-RAY Player/Recorder, HD TV Tuner. The Technical Design Lab shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details

a. Control System: The Control System will be controlled from a wall mount color LCD touchscreen that shall terminate at the specified custom instructor’s station. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.
b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

d. Program/Speech Reinforcement Loudspeakers: Wall-mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, and an HD TV Tuner.

e. Data/Video Projector: The data/video projector shall be installed on the ceiling of the Technical Design Lab. The video projectors shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure.

f. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions. The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

L. TECHNICAL AREA SUPPORT (B009)

1. General: This paragraph describes audiovisual system to be contained in the Technical Area Support space. In general, this room will be used for teaching presentations utilizing audiovisual presentation system technology. This room shall be outfitted with a data/video projection system along with speech/program audio reinforcement to enhance presentations within the space.

2. The data/video projection system shall include a ceiling-mounted projector that will display an image onto a ceiling hung electric projection screen installed at the front of the room. A program/speech audio reinforcement system shall be provided. An equipment rack has been specified for the front of the rooms, to include all AV sources and connections. A control system to include a touchscreen remote has been specified for the room and shall be located at the presentation wall. System inputs include, but are not
limited to: personal computers, digital document camera, DVD/BLU-RAY Player/Recorder, HD TV Tuner. The Technical Design Lab shall contain a custom floorbox for system access.

3. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with this space.

4. Equipment Layout: The equipment in this area shall be located as detailed on the “TQ” series drawing sheets associated with this space.

5. Owner Furnished Equipment (OFE): Personal/Laptop Computer

6. System Details

   a. Control System: The Control System will be controlled from a wall mount color LCD touchscreen that shall terminate at the specified custom instructor’s station. From this touchscreen, users shall have full function control of all room source and system functions with one button operation. These sources and associated electronics are to be detailed in the control drawing associated with these rooms. Touchscreen layouts to be approved prior to installation. It is intended to have the control system programmed to turn power on/off for all system components with a single function button.

   b. Projection Screen: The projection screen will be provided and installed by the Construction Manager. Projection screen shall be electric operated “permanently tensioned” type controlled by the remote control system.

   c. Electrical Boxes and Conduit: Electrical Contractor to provide electrical boxes and conduit below the floor, in the walls, and above the ceiling. Be responsible for all custom AV plates cabling connecting to the system’s equipment. There shall be a custom floorbox and rackplate location for input/output hook-ups during presentations. Confirm on site conditions with General Contractor.

   d. Program/Speech Reinforcement Loudspeakers: Wall- mounted loudspeakers will be installed for speech/program audio signals. Take care not to damage the walls during installation, and repair or replace any damage caused during the installation. Audio inputs include, but are not limited to: personal computers, DVD/BLU-RAY Player/Recorder, and an HD TV Tuner.

   e. Data/Video Projector: The data/video projector shall be installed on the ceiling of the Technical Design Lab. The video projector shall be installed and adjusted to produce an image that fills the projection screen. Install on fixed pole mount secured to building structure.

   f. Equipment Rack Hardware: Provide rack and all equipment rack hardware, including vent panels, slide-out shelves, rack mounts and miscellaneous hardware for a complete and finished system. Unit shall include a (Furman PL-Pro DMC) power distribution strip in the first RU space in the enclosure. Back rack power distribution and control system processor with blanks located in associated front panel positions.
The equipment rack for this room shall be located as detailed on the “TQ” series drawings. Provide cable management from the rack to associated wall plate.

7. Equipment List: On the following pages is the equipment list for this space. Each of these items shall be priced using both the equipment make and model shown, or components with equivalent functionality and of newer make. Meet or exceed the performance characteristics that are outlined for each component in the list. If an item is listed as “Custom,” this means that the Contractor may use any manufacturer’s component appropriate for the function and quality required for that item. Submit a “build” quality shop drawing for approval, on any custom items.

M. Lobby and Circulation areas (0C01, 1C03, 2C02, 2C03, 3C02, 3C03, 4C02, 3L01)

1. General: This paragraph describes audiovisual system to be contained in the listed Lobby and Circulation areas. These areas shall be outfitted with video display systems to provide digital signage.

2. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with these spaces.

3. Equipment Layout: The equipment in these areas shall be located as detailed on the “TQ” series drawing sheets associated with this space.

4. System Details
   a. LCD Displays: The LCD displays shall be installed as detailed on “TQ” series drawings. The display shall be capable of displaying 1366 X 768 resolution and 4000:1 contrast ratio with 16:9 native aspect ratio.

   b. The media players necessary to the digital signage functionality of these displays shall be included in the LCD displays.

N. Small Seminar Classroom (422)

1. General: This paragraph describes audiovisual system to be contained in the Small Seminar Classroom area. This area shall be outfitted with video display systems to provide display functionality from a dedicated input wallplate.

2. System Interconnection: The functional interconnections of the RGBHV, video, audio, and control systems shall be as detailed on the “TQ” series drawing sheets associated with these spaces.

3. Equipment Layout: The equipment in these areas shall be located as detailed on the “TQ” series drawing sheets associated with this space.

4. System Details
   a. LCD Displays: The LCD displays shall be installed as detailed on “TQ” series drawings. The display shall be capable of displaying 1366 X 768 resolution and 4000:1 contrast ratio with 16:9 native aspect ratio.
b. The media players necessary to the digital signage functionality of these displays shall be included in the LCD displays.
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