

SECTION 274020
SCREENING ROOM AUDIOVISUAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this section shall be performed by the Screening Room Audiovisual Contractor and shall comply with General Conditions, Supplementary Conditions, Summary of Work, Drawings, and other Contract Documents. See Division 1 for General Requirements..

1.2 SUMMARY

- A. Furnish all labor, materials, services, shipping, and application equipment necessary to complete all audiovisual systems as shown on the drawings, specified herein, and required by job conditions. Provide fully professional systems, installed, working to specified performance levels, and acceptance tested, including, but not limited to:
1. video projection system
 2. surround-sound cinema sound system
 3. projection screen and adjustable masking
 4. HDBaseT HDCP-compliant video distribution system
 5. comprehensive audiovisual control systems
- B. Work includes all control system programming. Provide complete control system programming including touch screen layout design. Submit draft layouts for Owner review. Assume two revisions. Provide minor program adjustments after shake-down period at no additional charge within the first year of operation. Provide different touch screen layouts for different touch screens locations. Provide control system source code for owner's own use. Control system shall provide at least the following functions:
1. system power (via device control interface. AC power switching is not required)
 2. video projector
 3. audio modes
 4. video modes
 5. input selection
 6. lens, masking, and projector presets for six projection formats
 7. masking preset recall, preset record, and jog functions
 8. DVD transport controls
- C. Work includes projection screen and motorized masking. All materials shall be inherently flame retardant. Masking frames shall be aluminum. Masking motor shall include position encoders.
- D. Work includes all projection screen and masking components including support frame and speaker shelf.
- E. Provide one year warranty and one year service contract at no additional cost to Owner. Submit cost for additional renewal of service contract after one (1) year has passed.
- F. It is the intent of these specifications to provide for the Owner audiovisual facilities complete in every detail. The Screening Room Audiovisual Contractor shall assure himself that he understands completely the functional requirements of the audiovisual facilities specified herein, and shall verify the completeness of the equipment specified, the correctness of type numbers, and the overall suitability of the equipment to meet the purpose of the specifications. Any

additional accessories or services, even if not specifically mentioned herein or on the drawings, shall be provided if required, without claim for additional compensation.

- G. Review the contract documents and notify the Owner of any system design errors or potential incompatibilities of components before start of work.
- H. Provide additional hardware, interconnecting components, brackets, fittings, or other minor items needed to meet the requirements for systems, but not specifically mentioned herein or in the drawings, without claim for additional payment.
- I. Drawings accompanying these specifications are diagrammatic and intended to show the general arrangement and scope of work. Exact locations necessary to secure the best conditions and results shall be determined at the job site. Intended layouts that differ from those on the drawings shall be reviewed by the Architect before installation.
- J. Perform verification tests and initial adjustments prior to acceptance testing, participate in acceptance testing, and perform final adjustments as required.
- K. Comply with all local fire codes. Provide fire mutes or equipment shut downs as required by local codes.

1.3 BIDDER QUALIFICATION

- A. Each bidder who elects to qualify for work of this specification shall be a manufacturer, systems designer, or dealer, and shall maintain an engineering/design service equipped for installation, continuing contract maintenance, repair, and training for operators of audiovisual systems.
- B. Workmen involved in assembly, installation, and adjustment of audiovisual systems shall be qualified technicians skilled in the trades involved. Workmen not meeting the standards of top quality results shall not be employed on the work.
- C. The Architect or the Owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish the Architect or Owner all such information and data for this purpose as may be requested before and/or during the bidding period. Requests for information may include previous experience in performing similar or comparable work, business and technical organization, financial statement of resources, plant available to be used, and the amount of work to be performed by the bidder's own forces in the performance of the contemplated work.
- D. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of such bidder fails to satisfy the Owner that the bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.

1.4 QUALITY ASSURANCE

- A. The materials and equipment to be furnished shall be new and unused or fabricated from new materials and shall conform to applicable provisions of standards published by Underwriters' Laboratories, Inc. (UL), National Electrical Manufacturers' Association (NEMA), American National Standards Institute (ANSI), and the National Electrical Code (NEC). The entire installation shall conform to the latest applicable national, state, and local codes and regulations.
- B. When a manufacturer's product has been replaced by a newer model, the later model shall be furnished, provided the new model retains or exceeds all of the specified characteristics of the item specified herein.

- C. All software shall be the latest updated stable versions.
- D. Equipment may be inspected by Owner at manufacturer's plant prior to shipment. Equipment found not in accord with specifications and reviewed shop drawings may be rejected. Rejected equipment shall be removed and new acceptable equipment provided at no additional cost to Owner.
- E. Dimensions, voltages, electrical power requirements, and utility connections are based on the items specified. The Audiovisual Contractor is responsible for all costs for dimensional adjustments and for providing or arranging for additional electrical or utility services or equipment required as a result of using approved substitute products.

1.5 SUBSTITUTIONS

- A. Throughout the specifications, types of materials, items of equipment, technical components, hardware, wire, cable, and connectors may be specified by manufacturer's name and catalog number in order to establish standards of quality and performance, or to provide for essential interconnections and interactive operation between system elements. Brand names and model numbers are not used for the purpose of limiting competition. Unless specifically stated otherwise, the bidder may assume the phrase "or approved equal", except that the burden is upon the bidder to prove such equality.
- B. If the bidder elects to prove equality of a substitution, he must request the Architect's approval in writing to substitute such item for the specified item, with supporting data, and samples, if requested, to permit a fair evaluation of the proposed alternate with respect to quality, performance, serviceability, and warranty.
- C. The bidder may request the Architect's approval for a substitution before bids are due, with his tender, or after award of contract.
 - 1. If the bidder requests approval of a substitution before bids are due, he avoids the risk of his bid being rejected for disapproved substitutions.
 - 2. If the bidder requests approval of a substitution with his tender and the substitution is disapproved, his bid will be rejected.
 - 3. If the bidder requests approval of a substitution after award of contract and the substitution is disapproved, the bidder must provide the brand named article specified herein at no additional cost to the Owner.
- D. Unless the bidder clearly indicates in his bid that he is offering a different article, his bid shall be construed as offering the brand named article specified herein.

1.6 BID SUBMITTALS

- A. Bid form: Each bidder shall complete the bid form and include it in his bid submittal.
- B. Bidder qualifications: Each bidder shall include in his bid submittal documentation attesting to his experience in audiovisual projects of equivalent magnitude and technical content and shall furnish the names of four or more such projects with references and addresses.
- C. Subcontractors: In the event the bidder intends to employ one or more subcontractors, he shall furnish their names and qualifications and their scope of work in his bid submittal, for approval by the Owner.

- D. Equipment list: Each bidder shall include an equipment list in his bid submittal. The equipment list shall list the brand name and model number of each piece of equipment which the bidder is offering.

1.7 PROJECT DOCUMENTATION

- A. Shop drawings:
1. Prepare shop drawings for proper and complete installation of the work of this section in accordance with Division 1.
 2. Furnish shop drawings of all custom assemblies, furniture, and cabinets. Obtain Architect's review before proceeding with ordering or fabrication of such items.
 3. Verify at the job site all dimensions affecting the work. Field dimensions that are at variance with those on reviewed shop drawings shall be brought to the attention of the Architect. Obtain decision by the Architect regarding corrective measures before the continuation of work affected.
 4. Shop drawings shall include details of special enclosures, brackets, supports, and load-bearing hardware, indicating as necessary mounting accessories and methods of construction and attachment.
 5. Shop drawings shall include, but are not limited to, the following:
 - a. equipment layout drawing
 - b. audio wiring diagram
 - c. video wiring diagram
 - d. connection panel details
 - e. audio and video patch bay layouts
 - f. equipment rack elevations
- B. Samples: Furnish samples of custom finishes and of the materials used for custom assemblies. Samples to be submitted shall include, but are not limited to, the following:
1. projection screen material
 2. curtain material
 3. masking fabric
 4. connection panel material with finish and lettering
 5. cable labeling sample
- C. As-built drawings: Furnish record drawings including, but not limited to, the following:
1. system block diagrams
 2. rack layouts (back as well as front where connectors and terminal blocks are present)
 3. console layouts, including control panels
 4. floor layouts
 5. cable and interconnection wire lists
 6. connector and terminal-block pin identification with signal or function
 7. jack-field identification with signal or function
 8. final equipment list by brand and model with serial numbers in Excel format
- D. Reports: Furnish reports including the following:
1. test reports for testing and inspecting as specified in Paragraph 3.07 Testing and Inspection
 2. variation report listing all differences between the systems as installed and the design shown on the contract drawings and specified herein, including but not limited to product substitutions and system alterations
- E. Product data: Furnish operating and maintenance instructions as specified in Paragraph 3.09, Operating and Maintenance Instructions.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Provide for shipment of equipment to project site including safe and expeditious handling, loading, and unloading.
- B. Coordinate shipments and delivery to project site with project conditions and scheduling requirements. Equipment shall be shipped in manufacturers' original labeled containers.
- C. Provide for safe, weathertight, ventilated storage of materials and make certain that the work of this specification is not delivered until the building and other work is sufficiently complete and ready for placement of this work.
- D. Protect items of equipment and furniture during shipment and installation. After installation in their proper locations, all protection shall be removed and all surfaces thoroughly cleaned.

1.9 JOB CONDITIONS

- A. The spaces designated herein as audiovisual spaces are designed with dimensions adjusted for the close interrelationship between architectural, audiovisual, electrical, and HVAC components and other work as specified. Where the Audiovisual Contractor's work is associated with the work of others, he shall confer with the persons affected and shall furnish them with necessary information, drawings, templates, dimensions, etc. Minor deviations from the drawings may be made to accomplish coordination, but changes of magnitude shall not be made without the Architect's approval.
- B. The job shall be adequately staffed at all times. Unless illness, loss of personnel, or other circumstances beyond the control of the Audiovisual Contractor intervene, he shall keep the same individual in charge of the work throughout installation.
- C. It shall be the responsibility of the Audiovisual Contractor to cooperate with all appropriate parties in order to achieve well coordinated progress and satisfactory final results. He shall watch for conflicts with work of other trades and subcontractors on the job and execute, without claim for additional payment, moderate moves or changes as necessary to accommodate other equipment or preserve symmetry and pleasing appearance.
- D. Procure and pay for all necessary permits, licenses, and inspections and observe any requirements stipulated therein.
- E. Maintain a complete set of audiovisual system drawings and specifications at the job site.
- F. Examine all substrates and conditions under which the work of this section is to be performed and notify the Architect in writing if any conditions exist that may be considered detrimental to the proper and expeditious installation of the work. Installation shall not continue until unsatisfactory conditions have been corrected in a manner acceptable to the Audiovisual Contractor and the Architect.
- G. Coordinate with the General Contractor for access to site, use of building elevators, allocation of limited storage space, and use of temporary services of toilets, water, light, and power.
- H. Coordinate with adjacent work of other trades to facilitate construction and prevent conflicts, affording other trades reasonable opportunity for installation of work and storage of materials.
- I. Abide by the decision of the Architect in case of conflict or interference with other trades.

- J. The Owner will designate space or spaces in the basic building available to the Audiovisual Contractor for the storage of materials and equipment. Storage, other than temporary storage immediately prior to or during installation work, must be provided by the Audiovisual Contractor off-site and at his expense.
- K. If materials or equipment are stored off the premises, the Audiovisual Contractor shall be solely responsible for safeguarding same and shall pay all costs for damage or loss of such materials or equipment.
- L. The Audiovisual Contractor shall protect all building finished surfaces, including the jambs and soffits of all openings used as passageways or through which materials are handled, against any possible damage resulting from his work.
- M. The Audiovisual Contractor shall be responsible for finished surfaces of equipment supplied, which shall be clean and not marred upon delivery or installation. The Audiovisual Contractor shall, without extra compensation, replace, repair, or refinish (as determined by the Architect) all such surfaces where paint or finishes have been inadequately protected and are damaged.
- N. Refuse shall be removed from the job site to the satisfaction of the Architect and the Owner.

PART 2 - PRODUCTS

2.1 INSTALLATION SCHEDULE

064 Projector Room

- 1 ALS IR receiver charging and storage case
Listen Technologies LA-380
- 6 ALS IR receiver headphone
Listen Technologies LA-402
- 2 ALS IR receiver inductive loop with DSP
Listen Technologies LA-430
- 6 ALS IR receiver, single channel
Listen Technologies LR-4200-IR
- 2 audio power amplifier, 170Wx4, vari-speed fan
QSC DCA1824
- 3 audio power amplifier, 300Wx2, vari-speed fan
QSC DCA1622
- 1 audio power amplifier, 700Wx2, vari-speed fan
QSC DCA3422
- 1 cinema audio processor with AES, SPDIF, and HDMI inputs
QSC Audio DPM100H
- 1 computer Ethernet switch, 10G, 24-port, layer 3, SFP up-link
Cisco Catalyst
- 1 computer, KVM in rack drawer, 17"

APC APC5717

- 1 computer, rack-mount, fanless
Super Logics
- 1 connection panel, rack-mount
Contractor
- 1 control system 17" touch screen and video monitor, rack-mount
Extron TLP Pro 1720MG
- 1 control system processor
Extron IPCP Pro 350
- 1 equipment rack fan, 10" variable speed
Middle Atlantic MW-10FT-FC
- 2 equipment rack plug strip, 20-amp, j-box
Middle Atlantic PD-1220J
- 1 equipment rack, 41-space, 32" deep, gangable, with side panels and rear
Middle Atlantic BGR-4132
- 1 miscellaneous parts and accessories
varies
- 1 uninterruptable power supply, rack-mount, 1000VA
Middle Atlantic UPS-1000R
- 2 video Blu-ray player
Oppo BDP-103
- 2 video HDBaseT receiver
Extron DTP HDMI 4K 330 Rx
- 1 video HDMI matrix switcher, 8x4
Extron DXP 84 HD 4K
- 1 video patch bay, blank panel, 2x24 1RU
Canare VJ2-L241U
- 8 video patch bay, jack pair, straight-thru, 3G SDI
Canare DVJB-S
- 1 video projector isolation mount
Nigel B
- 1 video projector, 3xSXRD, 4096x2160 resolution, 5,000 lumens
Sony VPL-VW5000ES
- 1 video projector, ceiling projector mount
Chief VCM

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- 1 ALS IR transmitter and emitter combo
Listen Technologies LT-84
- 3 audio speaker, 2-way cinema loudspeaker
JBL 4722

- 6 audio speaker, cinema surround speaker
JBL 8320
- 2 audio speaker, miniature system
JBL Control 1
- 2 audio speaker, subwoofer 1x18"
JBL 4645C
- 1 computer monitor, 27" 4K IPS
LG 27UD88-W
- 1 computer, Mac Pro, 6-core, 16GB, 1TB, 6G dual video
Apple Mac Pro
- 1 connection panel, speaker
Contractor
- 2 connection panel, wall
Contractor
- 1 control system 7" touch screen, table top
Extron TLP Pro 725T
- 1 masking material, acoustically transparent IFR
Frankel Stardust
- 1 masking motor, multi-stop,
Marcel Desrochers HS-443K
- 1 masking motorized track, CWANA
ADC
- 1 masking panel, fixed top and bottom
Contractor
- 1 masking panel, side adjustable
Contractor
- 1 projection screen frame, aluminum lace-and-grommet
Harkness
- 1 projection screen material, matte, micro-perf
Harkness Matt Plus Micro Perf Digital
- 1 screen and masking frame and speaker stand
steel channel
- 3 video HDBaseT transmitter wall plate with display port, 4K
Extron DTP T DWP 4K 332 D
- 1 wire and cable

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Follow manufacturer's printed instructions or drawings in all cases where items or details are not indicated in specifications or drawings.
- B. Locate all operating devices and audiovisual equipment requiring adjustments, cleaning, or similar attention so that it will be accessible. Position equipment racks to permit full access to front and interior rear sections unless otherwise shown on drawings.
- C. Furnish and supervise installation of brackets, braces, and supports as required for proper mounting. Minimum fastening and support factor shall be three (3). Design shall be reviewed by the Architect.
- D. Provide stiffeners to custom panels as required to prevent panel deformation or excessive deflection during normal plugging or switching operations. All operating panel nomenclature shall be engraved, etched, or screened.
- E. Provide blank and vent panels to fill all unused spaces in equipment racks.
- F. Color and finish of supplied materials that are exposed to public view shall be as selected by the Architect.
- G. Color and finish of blank and custom panels shall match adjacent equipment to the extent possible.
- H. All enclosures and support structures not having a standard factory paint finish shall be field painted. Color of factory paint and field paint shall be as selected by the Architect.
- I. All permanently installed boxes, wireways, conduit, cabinets, equipment, and related wiring shall be plumb and square.
- J. Switches, connectors, jacks, receptacles, boxes, wireways, conduits, outlets, cables, and cable terminations shall be logically and permanently marked. Cables shall be marked at both ends. Legends shall be in the form of standard abbreviations and/or as shown on the as-built wiring diagrams.
- K. All wires and cables used in assembling custom panels and equipment racks shall be formed into harnesses that are tied and supported in accordance with accepted engineering practice.
- L. Harnessed cables shall be combed straight. Harnesses with intertwined members will be deemed unacceptable. Each cable that breaks out from a harness for termination shall be provided with a service loop.
- M. Harnesses shall be formed in either a vertical or horizontal relationship to equipment, controls, components, or terminations.
- N. All cables shall be labeled at both ends using industry standard methods such as Brady Labels with heat-shrink tubing or equivalent.
- O. All system components and related wiring shall be located with due regard for the minimization of induced electromagnetic and electrostatic noise, the minimization of wiring length, proper

ventilation, and reasonable safety and convenience of the operator. In the event unsatisfactory conditions exist with respect to hum, ventilation, and safety that are beyond the Audiovisual Contractor's control, he shall call them to the attention of the Owner with a request that they be corrected. All equipment shall be installed in a manner that will comply with the Owner's safety requirements.

- P. Cables shall be free of splices between terminations and continuity of shields shall be maintained through each cable run.
- Q. Wiring terminations shall be made with industry standard solderless connectors.
- R. Perform all cutting and patching necessary for proper installation of the systems, repair any damage done during installation, and be responsible for cleanup of the work area.
- S. Equipment specified herein is designed for operation in environments of normal humidity, dust, and temperature. Avoid installing equipment in areas where extreme environmental conditions can occur and be responsible for protection of installation and related wiring from such conditions.
- T. Verify all audiovisual and power circuits, grounds, and extensions for correct connection, continuity, phasing, and isolation.
- U. Where an item of equipment is furnished without power cord or plug, an electrical power junction box shall be provided on the equipment, or extended from it as necessary to be within three feet of rough-in junction box, and a flexible connecting power cable shall be provided.
- V. Conduit for audiovisual wiring shall be installed by the electrical contractor for systems being furnished under this section. The Audiovisual Contractor shall make such extensions to equipment as necessary for a properly interconnected and completed system. Electric power conduits with wiring complete and in place shall be installed by the Electrical Contractor and terminated at point of use.

3.2 GROUNDING

- A. Definitions
 - 1. The "equipment ground" shall be the ground or grounds used to connect the non-current-carrying metal parts of equipment, raceways, and other enclosures to the earth.
 - 2. The "signal ground" shall be the ground or grounds used to connect cable shields and the grounded conductor of unbalanced signal conductors to earth.
 - 3. "Earth" shall be defined as the point of connection to the building's grounding electrode system.
- B. The calculated DC resistance of the equipment ground for permanently installed audiovisual equipment racks shall not exceed 0.01 ohms to earth. All other equipment grounds shall not exceed 0.1 ohms to earth. This may require the installation of heavier gauge grounding conductors than required by the applicable electrical code.
- C. All audiovisual equipment mounted in permanently installed audiovisual equipment racks shall be effectively bonded to those racks.
- D. Signal grounds shall connect individual cable shields and individual grounded signal conductors to earth at one and only one point so as to minimize the likelihood of so-called "ground loops". This may require the use of audio isolation transformers on unbalanced audio equipment.

- E. The point of connection of signal ground to cable shield or grounded signal conductor shall be:
 - 1. within the equipment rack if the signal cable runs from an equipment rack to a point external to that equipment rack;
 - 2. at the sending end for signal cables run between equipment racks or within an equipment rack; or
 - 3. as determined by standard audiovisual practice if not as described in 1. or 2. above.
- F. Signal jacks and receptacles mounted external to equipment racks shall be of the bulkhead type, meaning that cable shields and grounded signal conductors shall be insulated from the panel, back box, and conduit in which the jack or receptacle is mounted.
- G. Equipment grounding conductors shall never be defeated. The use of 3-prong to 2-prong ground-lift adapters is strictly forbidden.

3.3 AUDIO

- A. Loudspeakers, enclosures, and mountings shall be free of buzzes and rattles when the speaker is swept with sine wave tones over its rated bandwidth at half its maximum rated power.
- B. Make all adjustments and modifications necessary for proper system gain structure per recommendations of major equipment manufacturers, and record settings of all variable controls. This record shall constitute "normal" system conditions referred to hereinafter.
- C. Mark all applicable variable controls with press-apply dots or arrows to indicate normal system conditions.
- D. All system outputs at "normal" shall be free from audible noise and spurious signals including non-audible oscillations and unintentional RF signals.
- E. The audio system at "normal" shall be free of audible clicks, pops, and other noises when any operating control is activated, with or without input signal.
- F. Nominal level audio circuits shall be low impedance output and high impedance input, except that nominal level outputs shall be terminated into a low impedance if an induced noise problem exists. Microphone level circuits shall be low impedance output and input. Output and input impedances and terminating resistors (when used) shall be identified on the as-built drawings.
- G. Music and sound track reproduction systems shall be equalized in an open loop fashion as follows. Pink noise shall be reproduced over the channel of the sound system to be equalized. An omnidirectional, random incident test microphone shall be located in the audience and connected to a real time constant percentage bandwidth power spectral density analyzer. Playback level shall be adjusted for a level of 70dBa SPL at the test microphone. The equalizer shall be adjusted for a power spectral density flat from 50Hz to 2kHz and falling at a rate of 3dB per octave from 2kHz to 12.5kHz. A deviation from the above response of ± 2 dB is acceptable. If the specified equipment has response below 50Hz or above 12.5kHz, the above requirements shall be extended accordingly.

3.4 AUDIOVISUAL

- A. Projectors shall be centered on screen areas and there shall be no noticeable shift in image position when dissolving between identical formats on paired projectors.
- B. Projection screens shall be clean and flat and free of any stains, dirt, discoloration, wrinkles, or creases.

- C. Motorized screens and masking shall have limit stops and preset stops adjusted for all anticipated formats.
- D. All optical components of projection systems shall be completely clean of dirt, dust, and fingerprints.

3.5 TESTING AND INSPECTION

- A. Perform initial testing of all equipment and wiring before official acceptance testing. Provide report of initial results.
- B. Perform acceptance testing during prearranged appointment with the Architect.
- C. Have high quality prerecorded material for all media formats available on site during the testing period.
- D. Have all necessary test equipment on site during the testing period. Test equipment shall include at least the following:
 - 1. walki-talkies
 - 2. audio and video test signal generators
 - 3. video waveform monitor with eye pattern analyzer
 - 4. cable verifier/tester for all cable types including fiber, UTP, coax, and twisted pair such as Fluke MicroScanner 2
 - 5. HDMI tester such as Quantumdata 780
 - 6. spot color and luminance meter such as Konica Minolta CS-100A.
 - 7. audio real time constant percentage bandwidth power spectral density analyzer
- E. Be prepared to verify that any piece of equipment or system meets the performance specifications of Part 2 and the requirements of Part 3 by subjective evaluation and instrumented measurements.
- F. Permit the Owner's personnel to observe testing and adjustment and explain, where feasible, the significance of each test.
- G. If the need for additional adjustments becomes evident during testing, the Audiovisual Contractor's work shall be continued until the systems comply with these specifications.
- H. Submit a written report to the Architect, for his audiovisual consultant to review, confirming the results of acceptance testing.

3.6 GUARANTEE AND MAINTENANCE

- A. All systems and components shall be guaranteed to be free of defects in materials and workmanship for a period of twelve (12) months from the date of acceptance and will be repaired or replaced promptly following notification of such defect by the Owner.
- B. Parts shall be guaranteed against defects in workmanship or materials not caused by accident, misuse, fault, or negligence on the part of the Owner for a period of twelve (12) months after acceptance. Defective parts shall be replaced without charge for either labor or materials.
- C. Where the manufacturer's warranty exceeds twelve (12) months, the manufacturer's warranty shall be transferred to the Owner after the expiration of the Audiovisual Contractor's warranty.

- D. Provide emergency service on an on-call basis for twelve (12) months. All emergency service calls shall be answered within twenty-four (24) hours. When an emergency call is necessitated by equipment failure it shall be made at no cost to the Owner. If the call is due to personnel error or misuse of equipment, the Audiovisual Contractor shall bill for his services on a basis to be set forth with his tender.
- E. A service call shall be considered to be due to personnel error or misuse of equipment when it is necessitated by such things as: use of equipment in a way not recommended by the manufacturer; damage due to mishandling of equipment, such as dropping; damage due to signal overload, such as blown drivers; and damage to equipment caused by operation in extreme environmental conditions, such as excessive temperature and humidity.
- F. If repairs of defective equipment covered under this warranty cannot be performed on site, the Audiovisual Contractor will provide replacement equipment on loan without charge for rental or transportation, during the period required to repair the defective equipment.
- G. Provide maintenance service at no charge for twelve (12) months from date of handover, and arrange for continuing maintenance upon expiration of this period at a cost to be set forth with the Audiovisual Contractor's tender.

3.7 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Conduct a training session for operating personnel explaining the function of all operating controls and techniques necessary to insure proper operation of all systems. This shall include familiarization with system diagrams and manufacturers' literature.
- B. Conduct a demonstration before an audience simulating an actual major activity event.
- C. Provide both hard and soft copies of all relevant manufacturers' specification sheets, schematics, circuit diagrams, drawings, and equipment manuals for the use of the Owner's operating and maintenance technicians. Hard copies to be neatly bound. The intent is to provide the Owner's operating and maintenance technicians with all support information needed to permit prompt and effective servicing of all systems and subsystems. Manuals shall include four complete sets of:
 - 1. step by step instructions for setting up and operating the systems (These instructions need not duplicate the details contained in the manufacturers' operating instructions, but reference to those instructions shall be made where appropriate).
 - 2. a schematic diagram for each system or subsystem as built, with all input and output terminations and patch points identified and designated as installed
 - 3. a functional description of each system or subsystem
 - 4. all available manufacturers' service literature for each major system component
 - 5. recommended daily and periodic procedures for cleaning, lubricating, and adjusting equipment, where applicable
 - 6. all source code for all system programming (soft copy only)

**** END OF SECTION ****

END OF SECTION