SOUND, VIDEO, AND THEATRICAL LIGHTING SYSTEMS SPECIFICATION

SECTION 11

1.0 GENERAL

1.1 DESCRIPTION

A. This specification covers the sound,lighting, and Video systems as described below . The objective of this specification is the provision of complete systems, installed, tested and ready for use. The specification manual, drawings and any addendum shall be referred to as the Contract Documents. The Sound System Contractor, herein referred to as the A/V/L Contractor, shall provide all necessary equipment, miscellaneous materials and labor, whether specified or not to complete functioning systems. In the event of a conflict between the written specification and the drawings, the Contractor must seek clarification from the Systems Consultant. In the event the Contractor fails to obtain such clarification, the interpretation of the System Consultant shall prevail.
All workmanship must be neat and of the highest quality and shall conform to E.I.A. standards.

B. Manufacturers names and model numbers are listed herein to establish a standard of quality. The products of other manufacturers are not acceptable where noted (NS/ No substitution).Substitutions must be submitted 10 days previous of bid date for consideration. It will be determined by the System Consultant if substitute product is of equal or better quality than the material specified, and will serve the intended purpose with equivalent efficiency and dependability.

1.2 RESPONSIBILITIES

A. Specifications and drawings are detailed only to the extent necessary to show design intent and signal flow. It is understood and agreed by the Contractor that the work described herein shall be complete in every detail and that a complete and working system will be supplied.

B. Equipment not mentioned within theses specifications, nor shown on the drawings, but necessary to meet the requirement of providing a complete working system, shall be provided without claim for additional payment.

C. Contractor shall furnish and install all materials, and provide all labor, tools, equipment, permits, etc., necessary to provide complete systems as described herein or illustrated on the drawings.

D. All materials, unless otherwise specified, shall be new, free from any defects and the best quality of their respective kind. All like materials shall be of the same manufacturer, model, finish and quality unless otherwise specified.

F. All manufactured articles, material and equipment shall be applied, installed, connected, erected, operated, cleaned, adjusted and conditioned as recommended by its respective manufacturer, or as indicated in their published literature, unless herein specifically specified to the contrary.

G. A thorough and complete installation will be provided with all work performed by competent workmen and executed in a neat a workmanlike manner. All work shall be properly protected during construction, including the shielding of soft or fragile materials. At completion, the installation shall be thoroughly cleaned and all tools, equipment, obstructions and debris, present as a result of this work, shall be removed from the premises.

H. The Owner is responsible for providing all conduit, gang boxes, pull boxes, pull strings along with the installation of all AC power circuits, outlets, power panels and interconnection of power to the sound, Lighting, and video systems.

I. The Contractor shall supply and install , all low voltage cabling (wiring) for the sound, lighting , and video systems . The Contractor will provide and install all AV wall Panels and floor pockets along with floor pocket panels.

1.3 SYSTEM DESCRIPTION

A. Base Bid Sanctuary Sound System

The Sanctuary Sound System shall provide sound reinforcement for use during live worship services, concerts, and assemblies, etc. All Sanctuary Wire shall be plenum rated.

B. Base Bid Sanctuary Video Systems
There shall be video projection in the sanctuary. One VGA input in Alter floor pocket and and one input in the A/V/L booth. Screens are part of Alternate #1
All Sanctuary Wire shall be plenum rated.

C. Base Bid Youth Basement Sound System
Sound system shall be provided for the youth area.

D. Base Bid Youth Basement Video Projection
Video projection provided on wall has shown , Screens are part of Alternate #1

E. Base Bid Sanctuary Theatrical Lighting Package
A/V/L contractor shall supply Modular Dimmer system, Control stations, theatrical fixtures,theatrical connector strips and lighting controller in A/V/L booth. A/V/L contractor responsible for: Hanging of theatrical connector strips, Hanging and aiming of theatrical fixtures.To provide and pull and terminate low voltage wire, A/V/L contractor is to coordinate and supply system check out programming and training by a certified

manufacture representative.The electrical contractor shall provide installation of the Dimmer system, wire and termination to theatrical connector strips.

G. Base Bid Youth Lighting System

F. Alternate #1 Fixed Projection Screens
Shall supply Fixed wall mounted projection screens for Sanctuary and Youth Projection systems.

G. Alternate #2 Distributed Video
To provide Home run cabling system to each TV locations, Some locations include Tv's per drawing AV2. Others are Panels only. Plenum area.

H. Alternate #3 Distributed 70v speaker system/ Paging System.
Remove existing ceiling speakers in sanctuary and relocate in halls and rooms per drawings. Include paging mic in office. Volume controls located per contract documents. This is a plenum area.

I. Alternate #4 Chapel Sound System.
Shall include additional equipment to be used in conjunction with the base bid delay speaker system This will allow the church to use the ceiling speakers that are part of the base bid as the Chapel sound system. All Sanctuary/chapel wire shall be plenum rated.

J. Alternate #5 Chapel Sound System
This is a separate sound system from Base bid or alternate #4. This system is to be used for chapel use only, for contemporary worship use which includes sub woofers and a sound operator location. All Sanctuary/chapel wire shall be plenum rated.

K. Alternate #6 Camera PZT, Monitor
supply and install a complete functioning two camera system. Used for feeding TV locations through out the facility. Control located in A/V/L booth. All Sanctuary/chapel wire shall be plenum rated.

L) Alternate #7 Cabling For Sanctuary P3 Projector Location (Future Use)
To include Plenum cabling for future projection use

1.4 SCOPE OF WORK

A. Furnish all materials, labor and services necessary in order to provide complete and professionally installed systems in working order as described herein. Labor furnished shall be trained and experienced in audio/video/lighting dimmer control systems rigging and installation.

B. Furnish and install all support necessary for speaker ,video projection and theatrical Connector strip supports along with TV Blocking.

C. Furnish and install all necessary wire and cable.

D. Furnish any additional items not specifically mentioned herein to meet the requirements as specified without claim for additional payment. Such items may include hardware, rack panels, transformers, and other devices necessary for a proper installation.

E. Furnish shop drawings.

F. Perform initial adjustments and verification test.

C. Perform final adjustments.

H. Provide system documentation including copies of all drawings and equipment manuals.

I. Guarantee all equipment and components for the specified period of one year from the date of acceptance.

J. Coordination with the Electrical Contractor is required to assure correct conduit routing, back box locations, and clean power circuit locations as specified.

K. System training in the amount of 4 Hours (One trip) and the attendance of the first service use. The training may be completed on the same day has the first service use.

1.5 SUBMITTALS

A. Within thirty days after contract award, submit five (3) copies of shop drawings to the System Consultant for approval. Indicate complete details and dimensions of work to be performed and indicate types and locations of equipment, fabricated equipment, and other details to completely describe the work to be performed. Do not begin fabrication or installation without the approval of the System Consultant. Shop drawings to include EASE Documentation including speaker location, orientation and mounting details. Shop drawings shall also contain rack layout and location diagrams with overall dimensions. Schematic Diagrams including all wiring labels and a schedule of terminations for all systems (Wire pull list) .

B. Submit manufacturer product data sheets for each item of equipment.

C. Review of shop drawings shall not constitute final approval of system functions. Said review does not in any way relieve the Contractor from the responsibility of furnishing material or performing work as required by the Contract Documents.

D. Failure of the Contractor to submit shop drawings in ample time for evaluation shall not entitle the Contractor to an extension of contract time, and no claim for extension by reason of such default will be allowed.

E. Contract Close-out Submittals: Prepare and submit two copies of manuals containing:

1. Warranties, guarantees, and manufacturer's directions on equipment and material provided.
2. Replacement parts list of major items of equipment.
3. Equipment brochures, As Built wiring diagrams, and control diagrams including cable numbers and signal levels.
4. Approved shop drawings including details of fabricated items.
5. Initial test and adjustments as specified.
6. Operation instructions and description of system components and their relationship to system function (bound separately).
7. Other data and drawings required during construction.

2.0 PRODUCT

WIRE:Substitutions (Belden)

#292	West Penn	Microphone Wiring
#291	West Penn	Line Level Wiring
#227	West Penn	Main Loudspeaker
#210	West Penn	Sub woofer Loudspeaker
#226	West Penn	Monitor Loudspeaker
#292	West Penn	Com Systems
#810	West Penn	Remote Antenna
#819	West Penn	Video
#819	West Penn/Tec Nec	RGBHV
#224	West Penn	70 Volt systems

All 1st floor areas require plenum rated cable.

3.1 INSTALLATION

A. Furnish and install all necessary brackets, braces, suspension hardware and supports. Minimum fastening and suspension safety factor of at least five (5) to one (5:1).

B. It shall be the responsibility of the contractor to verify the safety of custom speaker frame and suspension hardware. Drawings shall be submitted for review but the review shall not exclude the contractor from there obligation for safety measures.

C. Finish on all blank panels shall match adjacent equipment panels.

D. Contractor shall provide protection for equipment and all related wire and cable at all times against extreme environmental conditions. Equipment racks will not be placed on site until such time that the equipment's normal operating environment levels of humidity, dust and temperature can be maintained.

E. Contractor shall provide to the Owner, a minimum of four (4) hours of complete operational training on systems.

F. Review and coordinate electrical power requirements with the Electrical Contractor to ensure proper operation of the sound systems.

C. Install any supports so that the installation does not weaken or overload the building structure. Drilling, cutting or welding of the structural steel is prohibited unless authorized in writing by a Structural Engineer .

H. Coordinate work with other trades to avoid causing delays in the construction schedule.

I. Mount equipment and enclosures plumb and square. Permanently installed equipment to be firmly held in place.

J. Mount equipment in racks and fully wire and tested before delivery to the job site.

K. Sound System Mic and speaker wire shall be run in separate conduit.

L. Loudspeaker and video wire may be run across the ceiling joists using bridle rings in a neat and consistent manner.

3.2 CODE COMPLIANCE and REFERENCES

A. Electrical work will conform to the National Electric Code (N.E.C.) and all applicable local ordinances.

B. National Fire Protection Association (N.F.P.A.)

C. American National Standards Institute (A.N.S.I.)

D. Electronics Industries Association (E.I.A.)

E. Sound System Engineering, Davis & Davis, SAMS 1987

F. Handbook for Sound Engineers (The New Audio Cyclopedia) Ballou, SAMS 1991

RACEWAYS AND CABLES

A. All 120 volt electrical conductors shall be installed in galvanized electrical metallic tubing with compression type fittings and couplings, minimum 1/2" size conduit.

B. All low voltage wires and cables concealed in walls shall be run in conduit from flush outlet boxes to above accessible ceilings. Provide conduit and sleeves where cables penetrate fire walls above ceilings. All conduit shall be sized for a maximum 40% fill or less if required by code.

C. All EMT entering boxes shall be served with insulating throat connectors and locknuts.

D. No raceway shall be located near hot water lines or excessive heat.

E. Where raceways cannot be run concealed in walls, use Wire mold surface raceway complete with all fittings, box extension rings, and required accessories. Coordinate routing of surface raceways with the Architect/Engineer.

F. Minimum separation between power circuits and low voltage wiring is as follows:

1. Telephone, Video, Data circuits 12"
2. Loudspeaker circuits 6"
3. Microphone circuits 12"
4. Line level circuits 6"
5. All other circuits 6"

NOTE: Minimum separation between low voltage wiring and dimmer lighting circuits shall be at least 24"

NOTE: The above wiring types must be kept separate and never run within the same conduit!

G . Splicing of cables is not permitted between equipment terminations.

H. All wires shall be logically, legibly and permanently identified at each wire end by marking with crimp-on or adhesive markers. This applies to all system cabling including cable within the rack assembly.

I. Wire ends shall be wrapped with heat shrink tubing. Each shield or drain wire shall be covered to avoid system shorts.

J. Take precautions to prevent and guard against electromagnet and electrostatic hum. For line level audio signals, float cable shields at the output of the source device. Shields not connected to be folded back over cable jacket and covered with heat shrink tubing. Do not cut off unused shields.

3.4 HANGERS AND SUPPORTS

A. Use Cast "C" clamps, "U" straps, or ring hangers attached to rods, and/or brackets fastened to structure.

B. No perforated straps or tie wires permitted for supporting raceways.

C. Use wire ties for supporting low voltage cables run concealed above ceilings. Do not run cables loose on ceiling tiles. Support from structure above. Group cables in bundles
.

D. Tie mounts, plates, and anchors shall be used.

3.5 GROUNDING

A. Ground all electrical apparatus in accordance with the National Electric Code.

B. **All AC power circuits for the Audio/Video equipment must have isolated ground receptacles. Each receptacle shall be connected to the AC isolated ground.**

C. All power circuits for the sound and video systems shall originate from one power panel.

D. Audio shields between AC powered pieces of equipment shall be connected to ground at one end only.

E. Audio signal paths between AC powered equipment shall be connected using balanced lines and/or transformer isolation as required.

F. Audio equipment chassis shall be connected to AC isolated ground buss bar in equipment rack frames.

G. Audio equipment rack frames shall be connected to the AC isolated ground.

3.7 QUALITY ASSURANCE

A. Manufactures: shall be firms that are regularly engaged in manufacture of audio, video,lighting systems and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. The contractor shall be CTS, Nicet or NSCA certified.The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

B. All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the

manufacturer's complete service notes and drawings, detailing all interconnections.

C. Installer's Qualifications: shall be firms with at least eight (8) years of successful installation experience with projects utilizing the specified systems and equipment similar to that required for this project. The Contractor shall have previously installed at least twenty (20) jobs of similar magnitude, within the last eight years. A list of these projects shall be part of the Bid Submittal documents

E. The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

3.8 SERVICE AND MAINTENANCE WARRANTY

A. The Contractor shall guarantee that all systems and components be free from defects in material and workmanship for a period of not less than one full year from the date of acceptance. All defects shall be repaired or replaced within forty-eight hours following the Owners report of such defects. When repairs can not be executed within the 48 hour time period, the Contractor shall provide all necessary loaner equipment required to maintain the operation of the effected system until such time as the necessary repairs can be completed. All labor shall be provided at no additional expense to the Owner during normal hours.

B. The Contractor shall, at the Owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

C. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

3.9 EQUALIZATION, ELECTRONIC & ACOUSTIC TESTS

A. GENERAL REQUIREMENTS: Provide the test equipment as specified along with qualified and trained personnel to successfully complete the system tests, adjustments and equalization. The Owner and Systems Consultant will be present during the equalization and final acceptance testing and must be given five (14) days notice of the equalization and final testing date.

B. INSPECTION PRIOR TO BEGINNING TEST Contractor shall verify the following:

1. All electronic devices are properly grounded.

2. Powered devices have AC power from the proper circuit with hot, neutral and ground conductors connected properly.
3. Shields are lifted where required.
4. Insulation and shrink tubing are present where required.
5. All dust, debris, solder splatter, whisker shorts, etc. are removed.
6. All cable is dressed, routed, and labeled: all connections are consistent with regard to polarity.

C. TEST EQUIPMENT REQUIRED

The Contractor shall provide the following test equipment on site for final acceptance testing. Test equipment to be available for the entire testing period through equalization and final system acceptance.

1. Two (2) portable VHF business band radios for use during the testing.
2. Volt/Ohm meter
3. Impedance meter or other means of measuring impedance
4. Sine Wave generator
5. Oscilloscope
6. Pink Noise generator
7. Polarity Checker
8. Sound Level meter
9. 1/3 octave Real time spectrum analyzer
11. TEF analyzer or other device capable of measuring Energy-Time curves or graphs

D. TESTS PRIOR TO EQUALIZATION

1. Measure and record the impedance of each loudspeaker/speaker line circuit terminating at the equipment rack. Use 100 Hz for sub-woofers, 250 Hz for low frequency loudspeakers, 1 kHz for mid-range loudspeakers, 4 kHz for high frequency loudspeakers. For full range devices, use 1 kHz.

2. With all wireless and hearing assistance devices powered ON, and no input signal, observe the output of each power amplifier with an oscilloscope and check for the presence of hum, noise or parasitic oscillation. While driven with a 400 Hz sine wave, to within 10dB of full power, check for the presence of distortion. Document any anomalies.

3. Apply a full range swept sine wave signal to each loudspeaker system, listening for mechanical rattles or noise. Correct as required.

4. Check and document the polarity of all loudspeaker drivers with an electronic polarity checker, TEF or other suitable device.

5. Measure and record the variations in acoustic level throughout the seating area while walking through the transition areas of coverage from one loudspeaker to the next. Transitions should be smooth with no apparent shift in source from one speaker to the next. Record any location where the level varies more than +/-3dB of the desired level.

E. HOUSE CURVE EQUALIZATION

1. Turn off amplifiers and/or disconnect loudspeaker lines until you are left with only one (1) driver per pass band operating. Set all EQ filters & gain to unity.

2. Place a calibrated microphone as near to, and as on-axis as possible, to the loudspeaker. Using full range pink noise as a test signal and a 1/3 octave real time analyzer, record the unequalized House Curve. Adjust the equalizer for a reasonably flat (+/-3dB) and smooth response from 250Hz to 5kHz, allowing for the natural "roll-off" at high frequencies and ignoring any crossover notch. Record the equalizer filter settings and the equalized House Curve.

3. Bring all the Main System loudspeakers online and balance the low

   frequencies aurally, using a test CD or program material and by having someone 'talk into a system microphone.

4. Relocate the calibrated microphone to the audience area at a distance of at least twice the Critical Distance (Critical Distance is typically 25-30 feet). Move the microphone side to side around the audience area while watching

   the display on the RTA and note any "bumps" in the response that are common to all areas. Reduce the energy at these frequencies and see if the sound improves. If improvement is noticed, record the new equalizer filter settings.

5. Using a variety of house microphones, bring the system up to feedback while playing pink noise and note which frequencies are commonly ringing. Try reducing these frequencies by not more than 3dB. If an improvement in stability is noticed without sacrificing significant overall tonal quality, record the Final House Curve and filter settings.

6. Further equalization testing as directed by the Audio Systems Consultant.

4.0 FINAL ACCEPTANCE & DOCUMENTATION

A. Acceptance testing shall include operation of each major system and any other components deemed necessary. Contractor shall assist in this testing and provide required test equipment. Contractor shall supply at least two technicians familiar with the installation, available for the entire testing period, to assist in tests, adjustments, and final modifications. The Contractor shall furnish tools and material required to make any necessary repairs, corrections or adjustments.

B. The following additional procedures will be performed by the Contractor on each system.

1. Control functions shall be checked for proper operation, from controlling devices to controlled devices.

2. Adjust, balance, and align equipment for optimum quality and to meet the manufacturer's published specifications.

3. Gain stage the system to optimize the signal to noise ratios and so that all equipment in the signal chain clips at the same time and operates within it's nominal signal level range. Establish and mark normal settings for each control in the rack, using map dots or similar permanent markers. Record these settings in the "System Operation and Maintenance Manual."

.

4. Installed and loose equipment shall be inventoried and checked for correct quantities

5. Any other test on any piece of equipment or system deemed appropriate by the Audio Systems Consultant/Owner.

C. In the event the need for further adjustment or work becomes evident during the equalization or acceptance testing, the Contractor will continue his work, at no additional cost, until the system is acceptable.

D. DOCUMENTATION to be provided by Contractor

1. All owner's manuals, wiring diagrams and schematics.
2. Normal settings for all level controls.
3. The recorded Impedance of all loudspeaker lines.
4. The recorded polarity of all loudspeakers.
5. The list of microphones polarity tested.
6. The recorded observations of the amplifier outputs. (hum, noise, RFI etc.)
7. The unequalized House Curve.
8. The final equalized House Curve.
9. The equalizer filter settings.

10. Print outs and backup file copies (on disc) from all DSP type equipment
11. "As Built" complete wiring diagram showing all wire marker numbers.
12. "As Built" functional block diagram showing main signal routing.

5.0 ADDITIONAL COMMENTS

A. All conduit sizes and locations shall be confirmed by the Contractor

B. Contractor shall be responsible for confirming existing rack sizes, configurations and available space.

C. Contractor will be responsible for all safety factors and concerns regarding the loudspeaker installation, hardware, hanging, mounting and positions, including any reconstruction of the ceiling, both during and after the installation.

D. Contractor shall confirm AC power requirements and will coordinate the project with the Electrical Contractor.

E. Conduit will not be required in the ceiling areas.

F. All custom panel lettering shall be engraved or laser

END OF SECTION

Please email all questions in writing to:

Greg Schmid
gregschmid@poulosarchitects.com

Poulus & Assoc.
1717 E Perkins Ave
Sandusky Ohio 44870
419-625-0009

Bid Proposal for Sound, Video, and Theatrical Lighting Systems

Bid Date _____ 2;00Pm

Submitting Contractor

_____
Name

_____
Address

_____
State, City, Zip

_____
(Telephone) (Fax) Email

Proposal :

In compliance with the instructions to bidders and after carefully reviewing the bidding documents, Addenda and bulletins. The under signed agrees to enter into an agreement with the owner and to complete the work specified for the sum of:

Base Bid Includes
Sanctuary Sound System
Sanctuary Video System
Youth Basement Sound System
Youth Basement Video Projection
Sanctuary Theatrical Lighting System
Youth Theatrical Lighting system

_____
Sum to be written

Dollars$_____

Alternate #1 Fixed Projection Screens

_____

Sum to be written

Dollars$_____

Alternate #2 Distributed Video

_____

Sum to be written

Dollars$_____

Alternate #3 Distributed 70v speaker system/ Paging System.

_____

Sum to be written

Dollars$_____

Alternate #4 Chapel Sound System.

_____

Sum to be written

Dollars$_____

Alternate #5 Chapel Sound System

_____

Sum to be written

Dollars$_____

Alternate #6 Camera PZT, Monitor

_____

Sum to be written

Dollars$_____

Alternate #7 Cabling For Sanctuary P3 Projector Location (Future Use)

Sum to be written

Dollars$_____

1) I have included My CST,or Nicet or NSCA certification.

2) I have included 20 projects for reference that are similar in size and complexity.

3) My bid is per spec, per plans with no unauthorized substitutions.

4) I have attached a line items equipment list in alphabetical order per system.

Signature_____ Printed_____