CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS

ADDENDUM NO. 4

PROJECT NAME: DISTRICT 3 COMMUNITY CENTER

DATE: August 4, 2015

This addendum should be included in and be considered part of the plans and specifications for the name of the project. The contractor shall be required to sign an acknowledgement of the receipt of this addendum and submit with their bid.

CIMS PROJECT NO.: 40-00348

This addendum shall be included in and be considered part of the plans and specifications for the above named project. The Contractor shall be required to sign an acknowledgment of the receipt of this addendum at the time he receives it.

GENERAL NOTE

1.		The Owner will engage a testing agency to conduct special test and inspections required on sheet S1.03. This statement will supersede all statements in the specifications indicating otherwise.

DRAWINGS

1.	A3.05	Doors 109 and 110 are PLAM faced doors in aluminum frames.
2.	A3.05	Remove Frame Type 3 from A3.05 door type schedule.
3.	A7.01	Remove detail 04/A7.01. There is no aluminum cloud suspended ceiling panels.
4.	A3.04	Fitness Classroom 114 utilizes laminate wood floor. See room finish schedule.
5.	T3.01	Remove Coaxial Cable Locations in Conference Room 102 and Computer Classroom 109.
6.	AV5.01	Add detail 5/AV5.01 to this sheet.
7.	AV5.02	Change detail 1/AV5.02 on this sheet.
8.	AV5.02	Change detail 4/AV5.02 on this sheet.

CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS

SPECIFICATIONS

1.	015000	Contractor is not required to provide separate field office for owner/architect for the duration of the construction.
2.	072726	Include BASF Wall Systems, Enershield – HP has an appropriate substitute manufacturer and product for Fluid-Applied Membrane.
3.	096813	Remove Accent Carpet Tile. There is only one field carpet.
4.	27 41 00	Replace original Specification with new 27 41 00 Specification in its entirety.
5.	129300	Include Hannan Specialities, Inc.'s DBR-SQ has an appropriate substitute product for bike racks.

Note: Addenda Acknowledgement Form for Addendum 4 is attached herein. This form must be signed and submitted with the bid package.

CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS

RECEIPT OF ADDENDUM NUMBER(S) 4 IS HEREBY ACKNOWLEDGED FOR PLANS AND SPECIFICATIONS FOR CONSTRUCTION OF:
DISTRICT 3 COMMUNITY CENTER PROJECT 40-00348

FOR WHICH BIDS WILL BE OPENED ON **TUESDAY, AUGUST 11, 2015 AT 2:00 P.M.**

THIS ACKNOWLEDGEMENT MUST BE SIGNED AND RETURNED WITH THE BID PACKAGE.

Company Name: _____

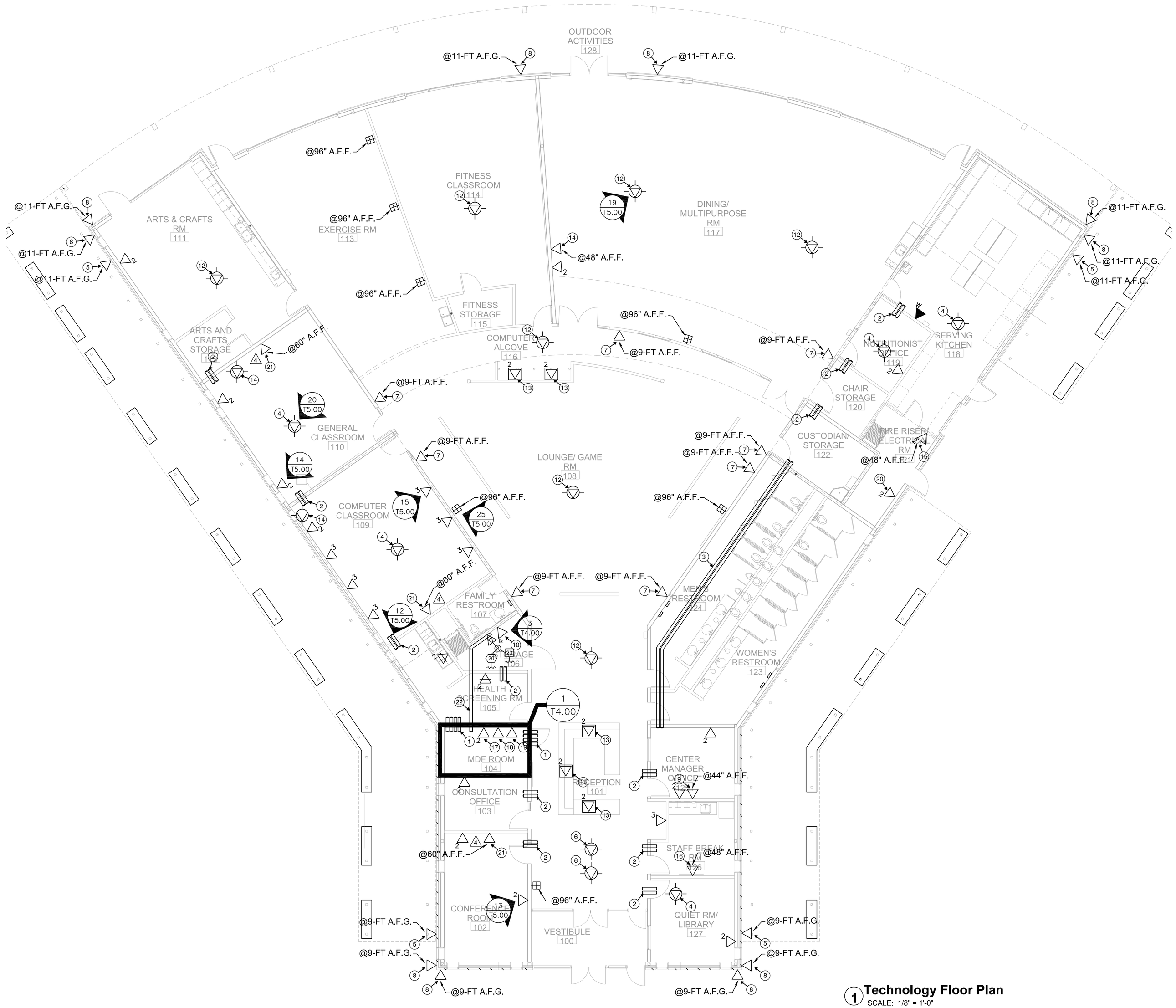
Address: _____

City/State/Zip Code: _____

Date: _____

_____
Signature

_____
Print Name/Title



1 Technology Floor Plan
SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. ALL CONDUIT PATHWAYS, ROUGH-INS, CONDUIT SLEEVES, ETC. INDICATED ON THE TECHNOLOGY AND SECURITY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
2. ALL POWER INDICATED ON THE TECHNOLOGY AND SECURITY DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY DIVISION 26.
3. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH FIRE RATED WALLS/STRUCTURES FOR DATA, VOICE, AND SECURITY CABLING BACK TO THE ORIGINAL RATING.
4. CONTRACTOR SHALL RESTORE ALL PENETRATIONS PROVIDED THROUGH NON-RATED WALLS/STRUCTURES FOR DATA, VOICE, AND SECURITY CABLING FOR SOUND TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS.
5. CABLING FOR DATA, VOICE, AND SECURITY SHALL BE ROUTED IN SEPARATE PATHWAYS IN J-HOOKS, CONDUITS, CONDUIT SLEEVES, CORES, ETC. THROUGHOUT THE ENTIRE PATHWAY. DIFFERENT MEDIA TYPES (DATA, VOICE, SECURITY, ETC.) SHALL NOT SHARE THE SAME J-HOOK, CONDUIT, CONDUIT SLEEVE, CORE, ETC.
6. ALL CONDUITS FOR DATA, VOICE, A/V, AND SECURITY DEVICES SHALL ROUTE FROM THE DEVICE LOCATION AND TERMINATE ABOVE AN ACCESSIBLE CEILING IN THE SAME ROOM WHERE THE DEVICE IS LOCATED. IF THE ROOM WHERE THE DEVICE IS LOCATED DOES NOT HAVE AN ACCESSIBLE CEILING, THE CONDUIT SHALL ROUTE TO THE NEAREST ACCESSIBLE CEILING OFF A MAIN CORRIDOR. CONDUIT PATHWAY SHALL TAKE THE SHORTEST ROUTE TO THE APPLICABLE MDF/IDF ROOM TO MINIMIZE CABLE LENGTH. IF A ROOM HAS A CLOUDED CEILING, HARD CEILING, OR THE ROOM IS OPEN TO ROOF DECK THESE ARE NOT CONSIDERED AN ACCESSIBLE CEILING ENVIRONMENT.
7. CONDUIT SEGMENTS SHALL BE NO MORE THAN 100-FEET IN LENGTH WITH NO MORE THAN THE EQUIVALENT OF (2) 90 DEGREE BENDS BETWEEN PULLING POINTS.
8. CONDUITS SHALL MAINTAIN A BEND RADIUS OF 6 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS 2-INCHES OR SMALLER AND 10 TIMES THE DIAMETER OF THE CONDUIT FOR CONDUITS GREATER THAN 2-INCHES.
9. ALL CONDUITS SHALL HAVE A PULL STRING INSTALLED FOR PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.
10. ALL SPARE CONDUITS OR CONDUITS FILLED WITH LESS THAN THE MAXIMUM ALLOWED FILL RATIO SHALL HAVE A PULL STRING INSTALLED AND LEFT FOR FUTURE PULLING OF CABLE. CLEARLY LABEL AS "PULL STRING" INDICATING OPPOSITE END LOCATION.

KEYED NOTES

1. (4) 4-INCH EMT CONDUIT SLEEVES ABOVE ACCESSIBLE CEILING WITH NYLON BUSHINGS ON EACH END AND SECURED TO WALL. CONDUIT SLEEVES SHALL BE PROPERLY SEALED ON THE EXTERIOR AND INTERIOR TO RETURN WALL BACK TO ORIGINAL RATING. IF WALL IS NOT RATED, CONDUIT SLEEVES SHALL BE PROPERLY SEALED ON THE EXTERIOR AND INTERIOR TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS. CONDUIT SLEEVES SHALL BE USED FOR LOW VOLTAGE DATA, VOICE, AND SECURITY CABLE ONLY.
2. (2) 2-INCH EMT CONDUIT SLEEVES ABOVE ACCESSIBLE CEILING WITH NYLON BUSHING ON EACH END AND SECURED TO WALL. CONDUIT SLEEVES SHALL BE PROPERLY SEALED ON THE EXTERIOR AND INTERIOR TO RETURN WALL BACK TO ORIGINAL RATING. IF WALL IS NOT RATED, CONDUIT SLEEVES SHALL BE PROPERLY SEALED ON THE EXTERIOR AND INTERIOR TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS. CONDUIT SLEEVES SHALL BE USED FOR LOW VOLTAGE DATA, VOICE, AND SECURITY CABLE ONLY.
3. (2) 2-INCH EMT CONDUIT SLEEVES RUNNING THOUGH OPEN CEILING WITH NYLON BUSHING ON EACH END AND SECURED TO WALL. CONDUIT SLEEVES SHALL BE PROPERLY SEALED ON THE EXTERIOR AND INTERIOR TO RETURN WALL BACK TO ORIGINAL RATING. IF WALL IS NOT RATED, CONDUIT SLEEVES SHALL BE PROPERLY SEALED ON THE EXTERIOR AND INTERIOR TO REDUCE NOISE TRAVELING THROUGH PENETRATIONS. CONDUIT SLEEVES SHALL BE USED FOR LOW VOLTAGE DATA, VOICE, VIDEO, AND SECURITY CABLE ONLY.
4. DATA CABLE (WHITE) WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR OWNER PROVIDED / OWNER INSTALLED CEILING MOUNTED WIRELESS ACCESS POINT. CONTRACTOR SHALL PLACE A GREEN ADHESIVE DOT ON THE CEILING GRID DIRECTLY BELOW THE OUTLET LOCATION FOR FUTURE IDENTIFICATION OF THE OUTLET LOCATION.
5. DATA CABLE (WHITE) FOR OWNER PROVIDED / OWNER INSTALLED WALL MOUNTED EXTERIOR WIRELESS ACCESS POINT.
6. DATA CABLE (RED) WITH 20-FEET OF SLACK NEATLY COILED AND STORED ON J-HOOK ABOVE ACCESSIBLE CEILING FOR INTERIOR CEILING MOUNTED VIDEO SURVEILLANCE CAMERA. CONTRACTOR SHALL PLACE A YELLOW ADHESIVE DOT ON THE CEILING GRID DIRECTLY BELOW THE OUTLET LOCATION FOR FUTURE IDENTIFICATION OF THE OUTLET LOCATION.
7. DATA CABLE (RED) FOR INTERIOR WALL MOUNTED VIDEO SURVEILLANCE CAMERA. COORDINATE EXACT TERMINATION REQUIREMENTS WITH THE SECURITY CONTRACTOR PRIOR TO TERMINATION. MUST BE INSTALLED IN ACCORDANCE WITH GENERAL NOTE NUMBER 6.
8. DATA CABLE (RED) FOR EXTERIOR WALL MOUNTED VIDEO SURVEILLANCE CAMERA. COORDINATE EXACT TERMINATION REQUIREMENTS WITH THE SECURITY CONTRACTOR PRIOR TO TERMINATION. MUST BE INSTALLED IN ACCORDANCE WITH GENERAL NOTE NUMBER 6.
9. DATA CABLES (YELLOW) FOR HVAC CONTROL PANEL. COORDINATE EXACT LOCATION FOR CONDUIT ROUGH-IN AND TERMINATION REQUIREMENTS WITH SECURITY CONTRACTOR PRIOR TO INSTALLATION.
10. DATA CABLES (VIOLET) AND FOR AUDIO/VISUAL EQUIPMENT CABINET.
11. DATA CABLE (YELLOW) FOR MECHANICAL CONTROLS. COORDINATE EXACT LOCATION FOR CONDUIT ROUGH-IN AND TERMINATION REQUIREMENTS WITH THE MECHANICAL CONTRACTOR PRIOR TO INSTALLATION.
12. DATA CABLE (WHITE) IN OPEN CEILING FOR OWNER PROVIDED / OWNER INSTALLED CEILING MOUNTED WIRELESS ACCESS POINT. MUST BE INSTALLED IN ACCORDANCE WITH GENERAL NOTE NUMBER 6.
13. DATA DROPS (YELLOW) PULLED TO A FLOOR BOX. CONDUIT SHALL RUN FROM THE FLOOR BOX TO NEAREST ACCESSIBLE CEILING. MUST BE INSTALLED IN ACCORDANCE WITH GENERAL NOTE NUMBER 6.
14. DATA CABLES (VIOLET) FOR AUDIO/VISUAL CONTROL PANEL.
15. DATA CABLE (RED) AND ROUGH-IN FOR FIRE ALARM CONTROL PANEL.
16. DATA CABLE (YELLOW) AND ROUGH-IN FOR OWNER PROVIDED / OWNER INSTALLED KRONOS CLOCK.
17. DATA CABLE (RED) FOR ACCESS CONTROL SYSTEM PANEL. CONTRACTOR SHALL COORDINATE EXACT LOCATION FOR DROP TERMINATION REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. NO CONDUIT ROUGH IN IS NEEDED FOR THIS DROP.
18. DATA CABLE (RED) FOR OWNER PROVIDED / OWNER INSTALLED WALL MOUNTED VIDEO SURVEILLANCE SYSTEM SERVER. CONTRACTOR SHALL COORDINATE EXACT LOCATION FOR DROP TERMINATION REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. NO CONDUIT ROUGH IN IS NEEDED FOR THIS DROP.
19. DATA CABLE (RED) FOR OWNER PROVIDED / OWNER INSTALLED INTRUSION DETECTION SYSTEM PANEL. CONTRACTOR SHALL COORDINATE EXACT LOCATION FOR DROP TERMINATION REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. NO CONDUIT ROUGH IN IS NEEDED FOR THIS DROP.
20. DATA CABLES (YELLOW) FOR LIGHTING CONTROL PANEL.
21. DATA CABLES (VIOLET) FOR AUDIO/VISUAL DISPLAY.
22. (1) 2-INCH EMT CONDUIT FROM MDF 104 TO STORAGE 106 FOR TIME WARNER CABLE ONLY.

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SAN ANTONIO, TEXAS 78210

REVISIONS
4 ADDENDUM #4
- DELETED COAX DROP LOCATIONS

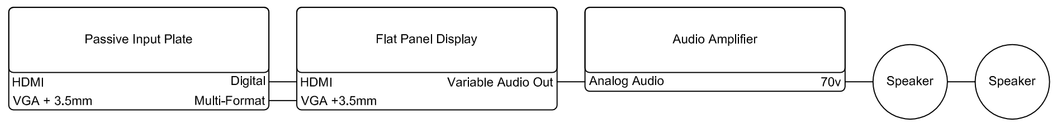
PROJECT NO.
13-04

PHASE
CONSTRUCTION DOCUMENTS

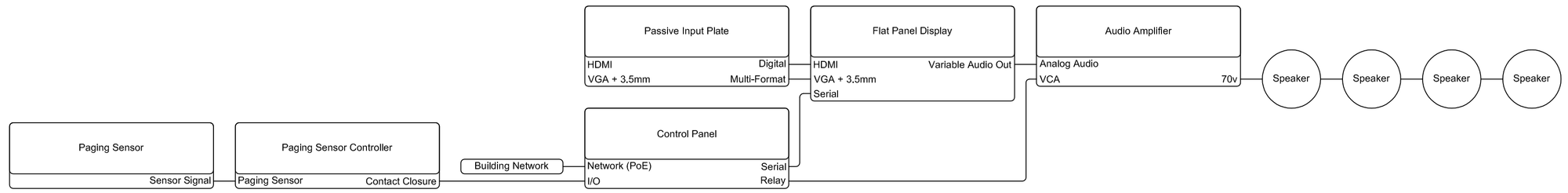
DATE
JUNE 2015

DESCRIPTION
TECHNOLOGY FLOOR PLAN

T3.01

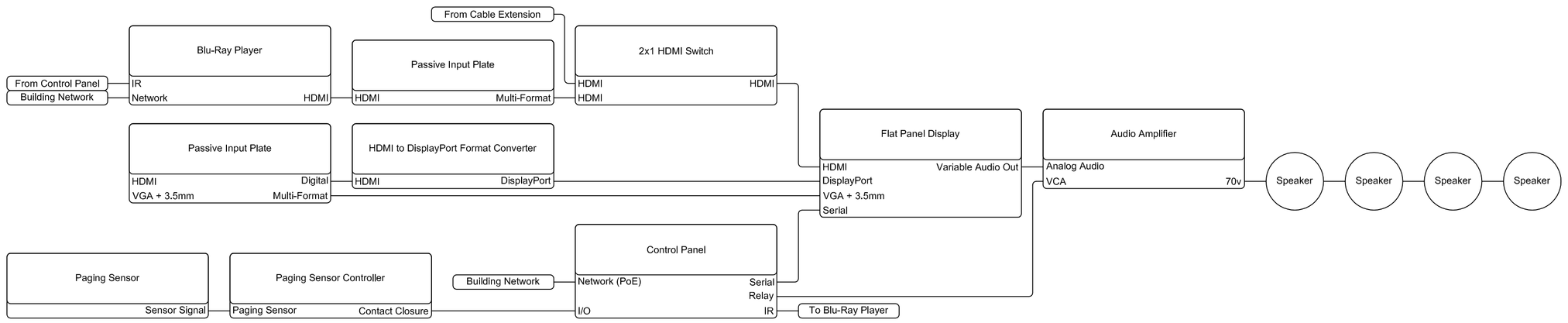


1 AV5.01 Conference Room 102 Signal Flow Diagram
N.T.S.

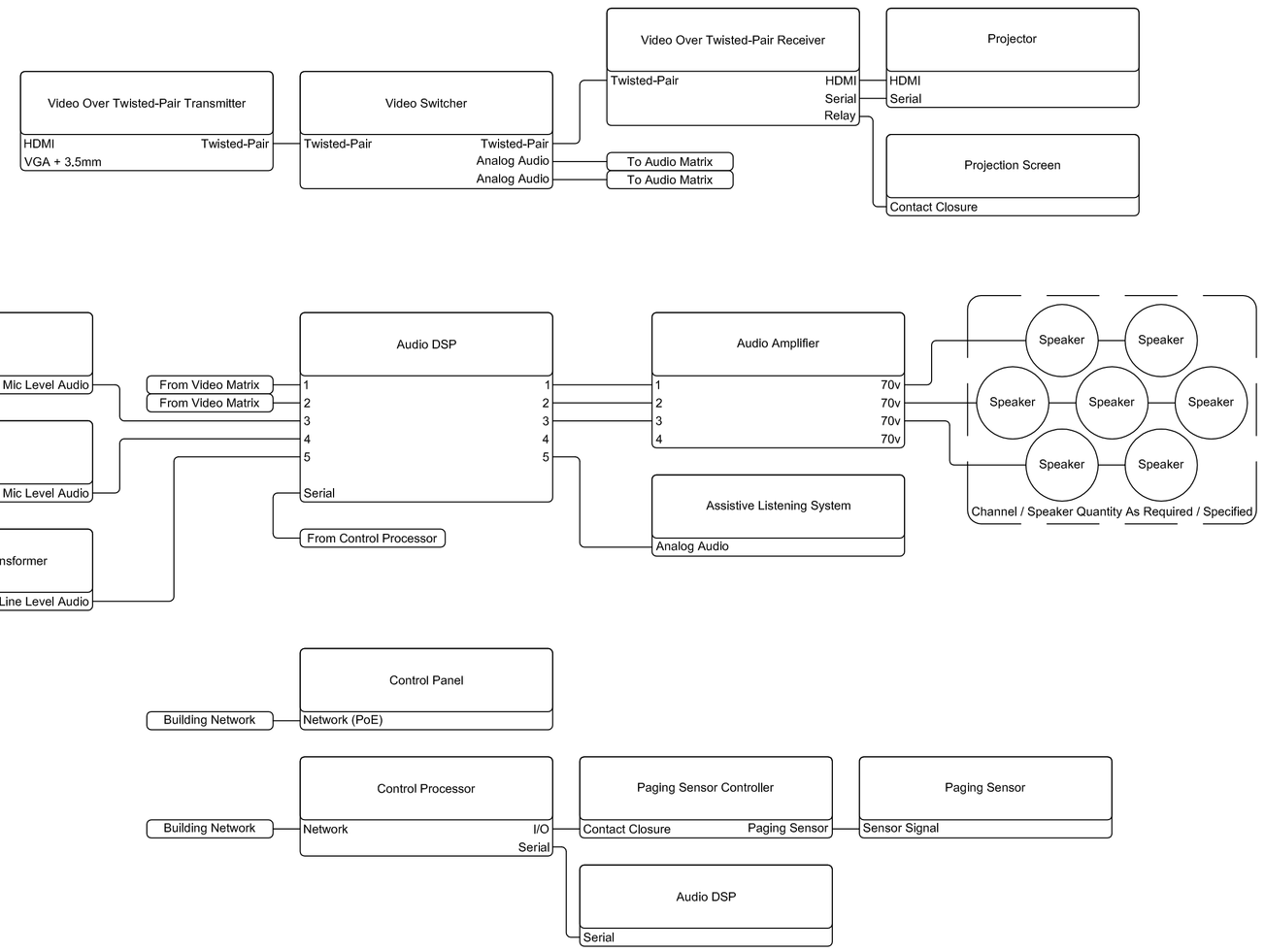


2 AV5.01 Computer Classroom 109 Signal Flow Diagram
N.T.S.

4

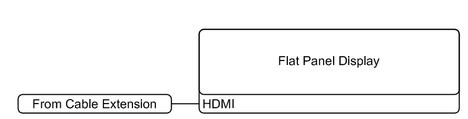


3 AV5.01 General Classroom 110 Signal Flow Diagram
N.T.S.



4 AV5.01 Dining / Multipurpose Room 117 Signal Flow Diagram
N.T.S.

4



5 AV5.01 Typical Stand-Alone Flat Panel Display Signal Flow Diagram
N.T.S.

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REVISIONS
4 ADDENDUM #4
- REVISED SIGNAL FLOW DIAGRAMS

PROJECT NO.
13-04

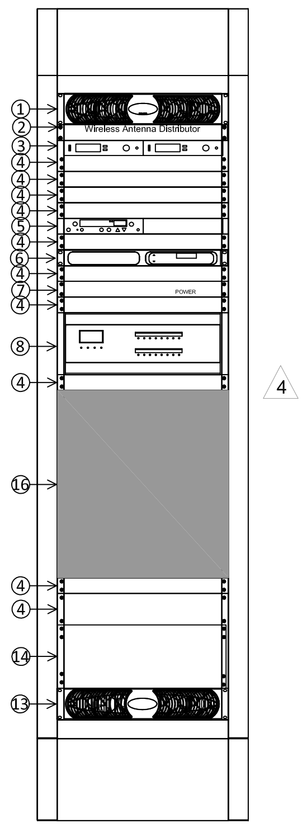
PHASE
CONSTRUCTION DOCUMENTS

DATE
JUNE 2015

DESCRIPTION
AUDIO/VISUAL SIGNAL FLOW DIAGRAMS (ALTERNATE #3)

AV5.01

(1) RACK MOUNT EXHAUST FAN PANEL - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(2) WIRELESS MICROPHONE ANTENNA DISTRIBUTION - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(3) WIRELESS MICROPHONE RECEIVER(S) - QUANTITY AS REQUIRED - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(4) BLANK PANEL, SIZE AS REQUIRED - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(5) ASSISTIVE LISTENING TRANSMITTER(S) - QUANTITY AS REQUIRED - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(6) AUDIO DSP - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(7) RACK MOUNT POWER DISTRIBUTION UNIT - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(8) VIDEO SWITCHER - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(9) A|V NETWORK SWITCH - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(10) CONTROL PROCESSOR - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(11) RACK MOUNT DRAWER, SIZE AS REQUIRED - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(12) AUDIO POWER AMPLIFIER - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(13) RACK MOUNT INTAKE FAN PANEL - MANUFACTURER / MODEL NUMBER AS SPECIFIED.
(14) PAGING SYSTEM HEAD END EQUIPMENT AS SPECIFIED.
(15) PAGING SYSTEM AUDIO AMPLIFIER - NOT SHOWN - MOUNTED IN BACK OF EQUIPMENT RACK.
4 (16) SPACE RESERVED FOR CABLE BOXES. PROVIDE MIDDLE ATLANTIC VRS SERIES RACK SHELVES AND SHELFMOUNT POWER STRIPS AS REQUIRED TO ACCOMMODATE THE CABLE BOXES.



1 AV5.02 AUDIO/VISUAL EQUIPMENT RACK ELEVATION
N.T.S.

Room #	BiAMP 301 3-Input Audio Mixer with Remote Master Level	BiAMP RP-L1 Single Volume Control Decora Panel	RDL TX-J2 Unbalanced to Balanced Summing Transformer	Extron 60-887-01 Priority Page Controller	Ashly TRA-2150 2-Channel, 150w / channel @ 70v Audio Power Amplifier	SoundTube RS1001i-II-T Open-Ceiling Subwoofer	SoundTube RS600i Open-Ceiling Loudspeaker
Fitness Classroom 114	1	1	1	1	1	2	8
Totals:	1	1	1	1	1	2	8

2 AV5.02 FITNESS EXERCISE EQUIPMENT SCHEDULE
N.T.S.

Room #	Samsung DM55D 55" Diagonal Flat Panel Display with RS232 and Variable Audio Output	Chief LTTU Large Flat Panel Tilting Wall Mount Bracket
Reception 101	1	1
Lounge / Game Room 108	2	2
Fitness / Exercise Room 113	3	3
Dining / Multipurpose Room 117	1	1
Totals:	7	7

3 AV5.02 STAND ALONE FPD EQUIPMENT SCHEDULE
N.T.S.

Room #	RapidRun HDMI and VGA + 3.5mm Connectivity (Provide Plenum-Rated Runners and Input Plates / Flying Leads As Required)	RapidRun HDMI Connectivity (Provide Plenum-Rated Runner and Input Plate / Flying Lead(s) As Required)	Crestron MPC-M10 Keypad Control Processor with Volume Knob (Provide Mounting Hardware As Required and Custom Engraved Button Covers)	Samsung BD-H5100 Consumer Blu-Ray Player	Extron 60-845-01 40 Watts @ 70v Mono Audio Amplifier	Extron 60-841-21 2x1 HDMI Switch (Configure for auto switch and give priority to local input.)	Extron 60-887-01 Priority Page Controller	Samsung DM75D 75" Diagonal Flat Panel Display with RS232 and Variable Audio Output	C2G 54179 HDMI to DisplayPort Format Converter	Chief LSTU Large Flat Panel Wall Mount Bracket	Atlas Sound FAP62T Ceiling-Mount Loudspeaker
Conference Room 102	1	0	0	0	1	0	0	1	0	1	2
Computer Classroom 109	1	0	1	0	1	0	1	1	0	1	4
General Classroom 110	1	1	1	1	1	1	1	1	1	1	4
	3	1	2	1	3	1	2	3	1	3	10

4 AV5.02 ROOM 102, 109, 110 EQUIPMENT SCHEDULE
N.T.S.

Room #	Crestron DM-TX-200-C-2G Video Over Twisted-Pair Wall Plate Transmitter	Crestron DMPS-200-C Video Presentation Switcher with Integrated Control Processor (Provide PoDM Power Supply)	Crestron DM-RMC-200-C Video Over Twisted-Pair Receiver with Relay Control	Crestron TSW-750 7" Touch Screen Control Interface (Provide Mounting Hardware As Required)	BiAMP TesiraFORTE AVB AI Audio DSP	Shure SLX124/85/SM58 Wireless Microphone Combination Kit (Handheld and Lavalier Transmitters) *Coordinate Frequency Band/Group/Channels for Local Conditions*	Shure UA844SWB Four-Way Active Antenna Splitter	Shure UA8*xx* or UA8*xxx* Antenna Extension Cable *Provide Sufficient Length to Reach From AV Equipment Rack to Each Antenna Location*	Shure UA830USTV Active Antenna Amplifier *Set the Amplifiers to the +10db Position Mount One Amplifier in Each Multi-Fuction Space*	Shure UA820H4 1/2 Wave Antenna *Mount One Antenna in Each Multi-Fuction Space*	Listen Technologies LS-58-*xxx* Advanced Level II Stationary RF System *Coordinate Frequency Configuration for Local Conditions Mount One Antenna in Each Multi-Fuction Space*	Listen Technologies LR-5200-*xxx* Advanced Intelligent DSP RF Receiver with Battery *Provide Quantity of Receivers to Meet ADA Requirements*
Storage 106	0	1	0	0	1	2	1	2	0	0	0	0
Dining/Multipurpose 117	1	0	1	1	0	0	0	0	2	2	1	4
	1	1	1	1	1	2	1	2	2	2	1	4

Room #	Listen Technologies LA-166 Inductive Neck Loop *Provide Quantity of Receivers to Meet ADA Requirements*	RDL TX-70A 70v to Line Level Audio Transformer	Extron 60-887-01 Priority Page Controller	Ashly TRA-4150 4-Channel, 150w/channel @ 70v Audio Power Amplifier	Epson Z11000WNL 11000 Lumen, 1280x800 Projector (Provide lens as required for room / screen / mounting location)	Draper 101782QL 120" x 192" Surface-Mount, Tab-Tensioned, Electric Projection Screen with Matt/Matte White Projection Surface and Built-In Low-Voltage Control Interface	Chief CMA345 / CMA395 Ceiling Plate *Provide 1.5" NPT-Threaded Mounting Column Of Proper Length*	Chief VCMU Ceiling Projector Mount	Equipment Rack As Specified	Chief CMA480 Column-Mounted Equipment Shelf	SoundTube RS600i Pendant-Mount Ceiling Loudspeaker
Storage 106	0	1	1	1	0	0	0	0	1	0	0
Dining/Multipurpose 117	2	0	0	0	1	1	1	1	0	1	7
	2	1	1	1	1	1	1	1	1	1	7

5 AV5.02 DINNING MULTIPURPOSE ROOM 117 EQUIPMENT SCHEDULE
N.T.S.

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REVISIONS
4 ADDENDUM #4
- CHANGED ROOM 102, 109,110 SCHEDULE
- REVISED RACK ELEVATION

PROJECT NO.
13-04
PHASE
CONSTRUCTION DOCUMENTS
DATE
JUNE 2015
DESCRIPTION
AUDIO/VISUAL EQUIPMENT SCHEDULES (ALTERNATE #3)

AV5.02

SECTION 27 41 00

AUDIO VISUAL SYSTEMS

PART 1 - GENERAL

1.01 This section identifies the requirements, technical design, and specifications for the audio visual systems at the District 3 Community Center, located in San Antonio, Texas ("Owner"). The audio visual systems as specified are Industry-Standard and include flat panel displays, flat panel display mounting hardware, projectors, projector mounting hardware, projection screens, projection screen mounting hardware, control equipment and audio visual cabling as specified.

1.02 The Contractor shall provide a Manufacturer's Performance Certification for the installed audio visual systems.

1.03 Contractor shall include materials, equipment, and labor necessary to provide a complete and functional 'turn-key' audio visual system regardless of any items not listed or described in this specification or associated drawings.

1.04 Contractor shall familiarize themselves with all existing / Owner-Furnished equipment. Contractor shall verify presence and proper operation of all existing / Owner-Furnished equipment prior to beginning work. Contractor shall inventory all existing equipment and turn over all unused equipment to Owner.

1.05 It is strongly recommended that each prospective Contractor perform a site visit to determine any site conditions that may impact the installed system cost prior to submitting a bid. Failure to perform a site visit does not release the Contractor from responsibility for any existing conditions.

1.06 Contractor shall provide separate pricing for a 2-year support/maintenance/service plan beginning at the end of the standard warranty period. The extended support/maintenance/service plan shall cover all materials, labor, workmanship, and preventative maintenance.

1.07 WARRANTY

A. The Contractor shall provide a 1 year (5-days x 8 hours x NBD) parts and services warranty on the audio-visual systems and all installed components.

1.08 REQUIREMENTS

A. Contractor Experience Requirements

B. Submittal Requirements

C. Acceptable Manufacturers

D. Codes, Standards and Regulations

E. General Requirements

F. System Requirements

G. Testing Requirements

H. Project Closeout Documentation

I. Attachments

1.09 SYSTEM DESCRIPTION

A. Stand-Alone Flat Panel Display Location(s):

1. Standard TV Viewing locations will consist of a flat panel display with CATV connectivity.

a. Lounge / Game Room 108.

b. Fitness / Exercise Room 113.

c. Dining / Multipurpose Room 117.

B. Meeting Room(s):

1. The meeting room(s) will consist of a flat panel display with two (2) A|V input locations. The table-mounted A|V input will provide HDMI and VGA + 3.5mm connectivity and the wall-mounted A|V input will provide HDMI connectivity. Overhead distributed Loudspeakers will provide program audio reinforcement. A wall-mounted control will provide system control.

a. Conference Room 102.

C. Computer Education Room(s):

1. The Computer Education Room(s) will consist of a flat panel display with one (1) A|V input location. The wall-mounted A|V input will provide HDMI and VGA + 3.5mm connectivity. Overhead distributed Loudspeakers will provide program audio reinforcement. A wall-mounted control will provide system control. Overhead loudspeakers will mute while paging audio is present.

a. Computer Classroom 109.

D. Classroom(s):

1. The Classroom(s) will consist of a flat panel display with two A|V input locations. One (1) A|V input will provide HDMI and VGA + 3.5mm connectivity and the other A|V input will provide HDMI connectivity. A Blu-ray player will be connected to the dedicated HDMI input. Overhead loudspeakers will provide program audio reinforcement. A wall-mounted control will provide system control. Overhead loudspeakers will mute while paging audio is present.

a. General Classroom 110.

E. Large Presentation Space(s):

1. This space will feature two (2) wall-mounted HDMI and VGA + 3.5mm A|V input locations. Distributed overhead loudspeakers will be zoned to facilitate audio reinforcement in these spaces. Paging audio will play through the overhead loudspeakers and program audio will mute/duck while paging audio is present. These spaces will feature lighting and drapes control. Two (2) wireless microphones with associated distributed antennas will be available for use in these spaces.

a. Dining / Multipurpose Room 117 will include one (1) ceiling-mounted projector with an associated wall-mounted electric projection screen. Two (2) wall-mounted control panels will be mounted as shown on floor plans.

F. Fitness / Dance Room(s):

1. Fitness / Dance Room(s) will feature a wall-mounted 3.5mm audio input and a wall-mounted volume control. Overhead distributed loudspeakers will provide audio reinforcement. Overhead loudspeakers will mute while paging audio is present.

    a. Fitness Classroom114.

G. Building Paging System:

Coordinate A|V systems installation with 27 51 00 contractor. All A|V systems will be configured to provide paging audio priority.

1.10 RELATED REQUIREMENTS

A. The Drawings, Specifications, General Conditions, Supplementary General Conditions, and other requirements of Division 1 apply to the work specified in Division 27, and shall be complied with in every respect. The Contractor shall examine all of the items which make up the Contract Documents, and shall coordinate them with the work on the project.

B. Contractor Experience Requirements

1. The Contractor shall possess all relevant Manufacturer Certifications (i.e. projectors, projector mounting hardware, projection screens, control systems installation and programming, audio and video transport and switching installation and commissioning, etc.) for both the company and individual technicians prior to submitting a bid for the work.

2. The Contractor shall have been in business for a minimum of five (5) years.

3. The Contractor shall have a local office with local technicians and an adequate workforce to complete this project within a 75-mile radius of the project site.

4. The Contractor shall have completed a minimum of five (5) projects similar in size and scope to the Owner's installation, where the systems have been in continuous satisfactory operation for at least one (1) year.

C. Subcontractors shall be identified at the time of bid and comply with the requirements and intentions of these specifications, associated drawings, and related contract documents.

1.11 SUBMITTAL REQUIREMENTS

A. Pre-Installation Submittal

1. Contractor shall not order, purchase, or install any equipment until pre-installation submittals have been accepted in writing by the Architect/Engineer.

2. Manufacturer product data sheets for each proposed system component.

    a. For product data sheets containing more than one (1) part number or product, the Contractor shall clearly identify the specific part number or product being submitted.

3. Crestron DM Switcher Configuration Sheet.

    a. Contractor shall provide a Crestron DM Switcher Configuration report completed by a DMC-D/DMC-E.

4. Shop drawings of the proposed system installation.

a. Shop drawings shall be provided clearly depicting any proposed modification to the project drawings. Any modifications shall be highlighted on the shop drawings.

b. Shop drawings shall be provided indicating proposed mounting arrangements and details of all equipment, including positioning devices, framework supports and interface with adjacent architecture.

c. Shop drawings shall include equipment locations, equipment mounting method, wall elevations, outlet locations, etc., preliminary cable numbers, proposed cable pathways, system schematics, wiring diagrams, and riser diagrams. Shop drawings shall be submitted on 30" X 42" bond paper.

d. Contractor shall maintain a set of shop drawings on site at all times and shall update the shop drawings on a weekly basis. Shop drawings shall be made available for inspection at the request of the Architect/Engineer.

5. Itemized list of all equipment, materials and labor required for the installation of the audio visual system as specified herein.

   a. This list shall be provided in printed and electronic format (Microsoft Excel) and shall contain: Part Number, Description, Unit of Measure, Unit Cost, Quantity, Labor Cost and Extended Cost to provide a complete and functional audio visual system.

      1) Attachment "A" of this specification shall be completed and returned with bid.

      2) Provide broken-down pricing on a room-type basis.

6. Manufacturer Product Certifications for Company.

   a. Submitting contractor must have a Crestron DMC-D or DMC-E on staff.

   b. Control System Programmer must be Crestron Certified, and must provide proof of current certification.

7. Manufacturer Product Certifications for Installers.

   a. Project manager must hold InfoComm CTS-I or CTS-D certification as well as Crestron DMC-E certification and must provide proof of current certification with bid.

   b. Lead technician(s) must hold InfoComm CTS certification and must provide proof of current certifications with bid.

   c. Control System Programmer must be Crestron Certified, and must provide proof of current certification with bid.

8. Manufacturer Warranty letter.

9. Documentation indicating that Contractor has been in business for (5) years.

10. Address of Contractor's local office within a 75-mile radius of the project site.

11. Quantity of full time local technicians within a 75-mile radius of the project site.

12. List of five (5) contractor-installed projects of a similar size and scope in operation for at least (1) year. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project

Completion Cost, Brief Description of Project, Client Point of Contact Name and Phone Number.

13. List of completed and ongoing projects with the Owner. The Contractor shall provide the following information for each project: Project Name, Project Location, Project Start Date, Project Completion Date, Project Start Cost, Project Completion Cost, and Brief Description of Project.

14. Proposed touch panel/keypad control layouts for each room/panel.

    a. Contractor will design control interface(s) based on Owner feedback. Contractor shall participate in an initial control system kick-off meeting along with progress meetings to review control system layout and design with the owner to ensure the control system fully meets the Owner's needs and expectations.

    b. Contractor will also be expected to make reasonable adjustments to completed control systems based on Owner feedback once system is in use.

15. System commissioning plan detailing the proposed testing and calibration to verify satisfactory system operation.

B. Post-Installation Submittal

1. The Contractor shall provide three (3) sets of comprehensive drawings accurately depicting the "as-built" condition of the audio-visual systems as it was installed to the Architect/Engineer at the time of substantial completion. Final payment will not be made until these as-built documents are received and approved by the Architect/Engineer.

    a. As-built drawings shall include but not be limited to:

        1) Equipment layouts

        2) Wall elevations

        3) System schematics

        4) Wiring diagrams

    b. As-Built drawings must be provided in original hardcopy format and on a CD-ROM in AutoCAD rel. 2010 or higher.

    c. The Contractor shall provide three (3) sets of as-built documentation for the audio-visual systems to the Architect/Engineer at the time of substantial completion. As-Built documentation shall be provided in original hardcopy format and on a CD-ROM.

    Documentation shall include but not be limited to:

        1) Equipment O & M manuals

        2) Installed equipment list (manufacturer model numbers, serial numbers, installed locations, etc.)

        3) Configuration information (MAC addresses, IP addresses, etc.)

        4) Warranty support information

5) Documentation shall be bound, sectioned and tabbed in the following order (when applicable):

a) Equipment O&M Manuals

b) Installed Equipment List

c) Configuration Information

d) Warranty Support Information

(1) The Contractor shall furnish the original Letter of Warranty to include the name, address and phone number contacts for warranty call outs to the Architect/Engineer at the time of substantial completion.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The following sections specifically list the acceptable equipment types and items for this project.

B. Architect/Engineer will have final determination of acceptability of all proposed equipment and must approve submitted equipment prior to purchase or installation.

C. Proposed equivalent items must be approved in writing by the Architect/Engineer prior to submitting a bid. Proposed equivalent items must meet or exceed these specifications and the specifications of the specified item.

D. In the event a manufacturer's specified product or part number has changed or is no longer available, Contractor shall substitute the appropriate equivalent manufacturer's part number.

E. Contractor shall call out all changes and substitutions.

F. In the event of a discrepancy between the specifications and the drawings, the greater quantity and/or better quality will be furnished.

G. For listed products with no part number specified, Contractor shall provide a product that meets the performance requirements of these specifications, industry standard practices, and intended application.

H. All wiring, equipment, and installation materials shall be new and of the highest quality.

I. Labels on all wiring, materials, and equipment must indicate a nationally recognized testing laboratory.

J. Any Owner-furnished materials or equipment not installed in the project shall be returned to the Owner.

K. Original Equipment Manufacturer (OEM) documentation must be provided to the Architect/Engineer which certifies performance characteristics and compliance with industry standards.

L. All new equipment shall be received, stored, and staged at the Contractor's facility until delivered and installed. Contractor shall store all materials and equipment in accordance with manufacturers' instructions in a weather-tight, secure enclosure. Contractor shall be responsible for safety and security of all Owner-furnished materials until project is complete and accepted by Owner.

2.02 ACCEPTABLE MANUFACTURERS

A. HDMI to Display Port Format Converter(s)

1. Type 1:

    a. C2G HDMI to Display Port Format Converter with Audio – Part Number 54179

B. Control Panel(s)

1. Type 1:

    a. Crestron 7” Touch Screen – Part Number TSW-750

        1) Provide Mounting Hardware as Required.

        2) Coordinate Finish with Architect.

2. Type 2:

    a. Crestron 10-Button Keypad Control Panel with Volume Knob and Integrated Control Processor – Part Number MPC-M10

        1) Provide Control Port Expansion Module(s) and Cresnet Power Supplies As Required. Control Port Expansion Module – Part Number C2N-IO

        2) Provide Mounting Hardware as Required.

        3) Provide Custom-Engraved Labeling

        4) Coordinate Finish with Architect

C. Network Switch/PoE Power Supply

1. Type 1:

    a. Crestron 16-Port Managed PoE Switch – Part Number CEN-SW-POE-16

D. Twisted-Pair Video Matrix Transmitter

1. Type 1:

    a. Crestron Digital Media Wall-Plate Transmitter – Part Number DM-TX-200-C-2G

        1) Coordinate Finish with Architect.

2. Type 2:

    a. Crestron Digital Media Surface-Mount Transmitter – Part Number DM-TX-201-C

E. Twisted-Pair Video Matrix Switching Frame(s)

1. Type 1:

    a. Crestron Digital Media Modular Matrix Switcher with capacity for up to 8 inputs and up to 8 outputs – Part Number DM-MD8X8

F. Twisted-Pair Video Matrix Expansion Cards:

1. Input Cards

a. Type 1:

1) Crestron DM-8G+ Input Card with Down-Mixing – Part Number DMC-C-DSP

b. Type 2:

1) Crestron HDMI Input Card with Down-Mixing - DMC-HD-DSP

2. Output Cards

a. Type1:

1) Crestron 2 DM-8G+ and 2 HDMI w/2 Stereo Analog Audio Output Card – Part Number DMCO-53

G. Twisted-Pair Video Matrix Receiver

1. Type 1:

a. Crestron Digital Media Receiver with Scaler and Relay Control – Part number DM-RMC-200-C

H. Presentation Switcher(s)

1. Type 1:

a. Crestron Digtal Media Presentation Switcher with Integrated Control Processor – Part Number DMPS-300-C

1) Provide PoDM Power Pack as Required – Part Number PW-4818DU

2. Type 2:

a. Crestron Digital Media Presentation Switcher with Integrated Control Processor – Part Number DMPS-200-C

1) Provide PoDM Power Pack as Required – Part Number PW-4818DU

I. Control Processor

1. Type 1:

a. Crestron 3-Series Control System Processor with Control Subnet – Part Number CP3N

J. Control Port Expansion Module(s)

1. Type 1:

a. Crestron Control Port Expansion Module with 1x RS232, 1 x IR, and 2x Relay – Part Number C2N-IO

1) Provide Connection Block(s) and Power Supply(ies) as Required

K. Audio DSP(s)

1. Type 1:

a. BiAMP Fixed Audio Matrix with Acoustic Echo Cancellation and POTS or VoIP Interface – Part Number TesiraFORTEAVB AI

L. Analog Audio Mixer(s)

1. Type 1:

a. BiAMP 3-Input Analog Audio Mixer with Remote Master Level – Part Number 301

1) Provide BiAMP Single Volume Control Mounted In Decorator-Style Insert – Part Number RP-L1

M. 3.5mm Audio Stand-Alone Input(s)

1. Type 1:

a. Custom Decorator-Style Input Plate with One (1) 3.5mm Input

1) Coordinate Finish with Architect.

2) Mount unbalanced to balanced audio transformer in back box behind plate.

N. Wireless Microphone System(s)

1. Type 1:

a. Wireless Microphone Combo System:

1) Shure Wireless Microphone Combination Kit with Handheld and Lavalier Transmitters – Part Number SLX124/85/SM58

a) Coordinate Frequency/Band/Group/Channels for Local Conditions

b. Active Antenna Splitter System:

1) Shure Four-Way Active Antenna Splitter – Part Number UA844SWB

2) Shure Antenna Extension Cable – Part Number UA8xx or UA8xxx

a) Provide Sufficient Length to Reach from AV Equipment Rack to Each Antenna Location

3) Shure Active Antenna Amplifier – Part Number UA830USTV

4) Shure ½ Wave Antenna – Part Number UA820H4

O. Assistive Listening System(s)

1. Type 1:

a. Listen Technologies Advanced Level II Installed FM System – Part Number LS-58-*xxx*

1) Coordinate Frequency Configuration for Local Conditions

2) Provide Sufficient Antenna Extension Cable Length to Reach from AV Equipment Rack to Each Antenna Location

b. Listen Technologies Inductive Neck Loop – Part Number LA-166

1) Provide Sufficient Quantity of Neck Loops to Meet ADA Regulations

c. Listen Technologies Advanced Intelligent DSPRF Receiver – Part Number LR-5200-*xxx*

1) Provide Sufficient Quantity of Portable RF Receivers with Ear Speaker to Meet ADA Regulations.

P. Unbalanced to Balanced Audio Transformer(s)

1. Type 1:

a. Radio Design Labs Unbalanced Stereo Inputs to Summed Balanced Mono Output – Part Number TX-J2

1) Provide rack mounting hardware as required – Part Number TA-RA5

Q. 70v to Line Level Audio Transformer(s)

1. Type 1:

a. Radio Design Labs 70v to Line Level Audio Transformer – Part Number TX70A

1) Provide rack mounting hardware as required – Part Number TX-RA5

R. Audio Power Amplifier(s)

1. Type 1:

a. Ashly Two Channel Audio Power Amplifier, 150 Watts Per Channel @ 70v – Part Number TRA-2150

2. Type 2:

a. Ashly Four Channel Audio Power Amplifier, 150 Watts Per Channel @ 70v – Part Number TRA-4150

3. Type 3:

a. Extron Electronics MPA 401 40 Watts @ 70v – Part Number 60-845-01

4. Type 4:

a. Ashly Eight Channel Audio Power Amplifier, 250 Watts Per Channel @ 70v – Part Number ne8250.70

S. Speaker Attenuator(s)

1. Type 1:

a. Atlas Sound 100 Watt Rack-Mount Rotary Volume Control Attenuator – Part Number AT100-RM

1) Provide Rack Mounting Plate(s) as Required – Part Number ATPLATE-052

T. Priority Page Controller(s)

1. Type 1:
    a. Extron Priority Page Controller Kit with Paging Audio Sensor – Part Number 60-887-01

U. Loudspeaker(s)

1. Type 1:
    a. Atlas Sound In-Ceiling 6” Coaxial Speaker System – Part Number FAP62T
        1) Coordinate Finish with Architect.
2. Type 2:
    a. Atlas Sound In-Ceiling Subwoofer Speaker System – Part Number FAPSUB-1
        1) Coordinate Finish with Architect.
3. Type 3:
    a. Sound Tube 6.5” Open-Ceiling, Pendant-Mount Loudspeaker System – Part Number RS600i
        1) Coordinate Finish with Architect.
4. Type 4:
    a. Sound Tube Open-Ceiling, Pendant-Mount Subwoofer System – Part Number RS1001i-II-T
        1) Coordinate Finish with Architect.
5. Type 5:
    a. Atlas Sound Surface-Mount Indoor/Outdoor Loudspeaker – Part Number SM52T
        1) Coordinate Finish with Architect.

V. Flat Panel Display(s)

1. Type 1:
    a. Samsung 55” Diagonal Flat Panel Display with RS232 and Variable Audio Output – Part Number DM55D
2. Type 2:
    a. Samsung 75” Diagonal Flat Panel Display with RS232 and Variable Audio Output – Part Number DM75D

W. Flat Panel Display Mounting Hardware

1. Type 1:
    a. Chief Fixed, Ultra-Thin Wall Mount Bracket – Part Number LSTU
2. Type 2:
    a. Chief Tilting, Ultra-Thin Wall Mount Bracket – Part Number LTTU

X. Blu-ray Player(s)

1. Type 1:

a. Samsung Consumer Blu-ray Player – Part Number BD-H5100

Y. Projector(s)

1. Type 1:

a. Epson 11000 Lumen, 1280x800 Projector – Part Number Z11000WNL

1) Provide lens as required to best fit room / screen / mounting location

2) Mount projector as close as practicable to projection screen. Mount projector as high / close to ceiling as practicable.

2. Type 2:

a. Epson 2800 Lumen, 1280x800 Projector – Part Number Power Lite W17

1) Mount projector as close as practicable to projection screen. Mount projector as high / close to ceiling as practicable.

Z. Projector Mounting Hardware:

1. Type 1:

a. Projector Ceiling-Mount – Part Number VCMU

b. Verify Projector/Mount Compatibility Prior to Ordering/Installation

1) Provide Custom Length Mounting Column and Custom Mounting Structure to Support Projector from Overhead Structure

a) Custom Column and Custom Mounting Structure MUST Be Capable of Supporting a Minimum of 5 Times the Total Combined Weight of the Projector and Mounting Solution.

b) Provide Chief Column-Mounted Equipment Shelf – Part Number CMA480

c) Provide Chief Ceiling Plate – Part Number CMA345 or Chief Cathedral Ceiling Adapter – Part Number CMA395

(1) Custom Column and Mounting Hardware to Match Ceiling Finish

2. Type 2:

a. Projector Ceiling-Mount – Part Number RSMAU

b. Verify Projector/Mount Compatibility Prior to Ordering/Installation

1) Provide Custom Length Mounting Column and above-tile suspended ceiling mounting kit.

a) Chief Speed-Connect Above Tile Suspended Ceiling Kit – Part Number CMS440

b) Support mounting plate by four (4) discrete cables.

(1) Each cable to be attached to a discrete corner of the plate.

(2) Each cable to be secured to the structure at a discrete location.

AA. Projection Screen(s)

1. Type 1:

a. Draper 120" x 192" Surface-Mount, Tab-Tensioned, Electric Projection Screen with Matte/Matt White Surface, Quiet Motor and Built-In Low Voltage Control Interface – Part Number 101782QL

1) Coordinate finish with Architect

2) Provide screen with opaque backed surface to prevent light intrusion from behind screen.

3) Mount projection screen with bottom of projection surface @ 48" A.F.F.

a) Provide additional black drop as necessary.

4) Coordinate power connection with Division 26.

2. Type 2:

a. Draper 50" x 80" Ceiling-Recessed, Tab-Tensioned, Electric Projection Screen with Matt/Matte White Projection Surface and Built-in Low Voltage Control Interface – Part Number 118345QL

1) Coordinate finish with Architect

2) Provide Custom Mounting Structure to Support Projector from Overhead Structure

a) Custom Mounting Structure MUST Be Capable of Supporting a Minimum of 5 Times the Total Combined Weight of all supported equipment and hardware.

3) Provide screen with opaque backed surface to prevent light intrusion from behind screen.

4) Mount projection screen with bottom of projection surface @ 48" A.F.F.

a) Provide additional black drop as necessary.

5) Coordinate power connection with Division 26.

BB. Wall-Mounted Equipment Rack(s)

1. Middle Atlantic Products 40RU, 32" Deep (30" Useable) Wall-Mounted Equipment Rack – Part Number SR-40-32

2. Provide Middle Atlantic 40RU Large Perf Front Door – Part Number LVFD-40

3. Provide 9-Outlet Rack-Mounted Power Distribution Unit on Single 20 Amp Circuit – Part Number PD-920RC-20

4. Provide Middle Atlantic Custom Configured MPR Raceway:

    a. Configure Raceway With the Following Equipment on a total of four (4) circuits (Each Switched Module Will Be On Its Own Circuit).

        1) One (1) MPR-6A Raceway

        2) One (1) MPR-SEQA Sequencer

        3) Three (3) RLM-20IGA Switching Modules

        4) Two (2) M-2x20IGA Un-Switched Modules

        5) Four (4) MPR-SS Single Circuit Surge Suppressor

        6) Provide MPR Mounting Bracket(s) as required

        7) Provide Wiring Tails and Jumpers as required

        8) Provide Power Cabling and Connectors as Required to Connect All Circuits to Mains Power.

            a) Connect Uncontrolled Circuit to UPS Power Source (If Present)

            b) Connect Controlled Circuit(s) to Generator Power Source (If Present)

5. Provide Middle Atlantic Fan Kit with two (2) 4½" Fans and Vent Blockers – Part Number DWR-FK32

    a. Provide Fan Cord(s) as Required

6. Provide Middle Atlantic FC Series Thermostatic Fan Control – Part Number FC-4-1CA

7. Provide Middle Atlantic Ultra-Quiet Exhaust Fan Panel with Display – Part Number UQFP-4DRA

    a. Provide Middle Atlantic Ultra-Quiet Intake Fan Panel as required – Part Number UQFP-4RIS

8. Provide Middle Atlantic Blank Panels for All Unused Spaces – Part Number EB1, EB2, EB3, etc. As Required.

9. Provide minimum clearance latch – Part Number DWRSR-ZL

10. Provide Rack mount Drawers as Indicated – Part Number D2, D3, D4, Etc.

    a. Provide Foam Inserts for Rack mount Drawers

    b. Configure Foam Inserts to store equipment when not in active use.

11. Provide Light-Blocking Vented Blank Panels as Indicated / Required – Part Number VTB1, VTB2, VTB3, etc.

12. Provide Vented, Clamping Rack Shelves as Indicated / Required – Part Number RC-2, RC-3, RC-4, CAP5, CAP6, CAP7, CAP8, etc.

13. Provide Flanged Blank Panels for All Unused Spaces – Part Number EB1, EB2, EB3, etc. As Required.

14. Provide Middle Atlantic Vertical and Horizontal Cable Lacing Bars as Required

CC. HDMI Cabling

1. Provide HDMI cable/signal transport of sufficient length to reach from source device to destination device. Plenum spaces will require plenum-rated cabling.

a. Native HDMI Cable – Crestron / AMX / Extron / Equal

b. Rapid Run Digital Plenum-Rated Runner Cable with Rapid Run Digital HDMI Flying Lead(s) or Input Plate(s) to Build a Complete Digital Cabling System

1) Active or Passive as Required

2) HDMI or DVI Flying Leads as Required

3) Coordinate Plate Finish with Owner

c. Equal

DD. VGA + 3.5mm Cabling:

1. Provide VGA + 3.5mm cable/signal transport of sufficient length to reach from source device to destination device. Plenum spaces will require plenum-rated cabling.

a. Native VGA + 3.5mm Audio Cable – Crestron / AMX / Extron / Equal

b. Rapid-Run Multi-Format Runner Cable with Rapid Run Multi-Format Flying Lead(s) and /Or Input Plate(s) to Build a Complete VGA + 3.5mm Cabling System

1) Provide Proper Number of Flying Lead(s) or Wall Plate(s) to Build a Complete VGA + 3.5mm Cabling System.

2) Coordinate Plate Finish with Owner

c. Or Equal.

EE. Digital Audio Visual Extension Cabling/Connectors

1. Cabling:

a. Crestron Digital Media 8G Cable, Plenum-Rated 350MHz Shielded Cat5e – Part Number DM-CBL-8G-P

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect

b. Belden Shielded Category 6 Cable – Part Number 2413F

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect

c. Belden Shielded Category 6A Cable – Part Number 10GX63F

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect

d. Or Pre-Approved Equal

2. Connectors:

a. Crestron Digital Media 8G Cable Connectors – Part Number DM-8G-CONN

b. Belden RJ45 Plug – Part Number HIPMP-RJ45SH

c. Or Pre-Approved Equal

FF. Analog Audio Cabling

1. Liberty 22AWG Shielded Pair – 2 twisted conductors with drain – Part Number 22-1P-CMP

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2. Belden 22AWG Shielded Pair – 2 twisted conductors with drain – Part Number 6500FE

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3. Or Equal

GG. Serial Control Cabling

1. Liberty 24AWG 4-Pair Shielded Low Capacitance Plenum Cable – Part Number 24-4P-PLSH

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2. Liberty 24AWG 2-Pair Shielded Low Capacitance Plenum Cable – Part Number 24-2P-P485

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3. Belden 24AWG 2-Pair Shielded Low Capacitance Plenum Cable – Part Number 82842

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

4. Or Equal

HH. Interconnect/Patch Cables

1. Provide interconnect/patch cables as required to support all connectivity present at each input plate.

2. Each input plate shall be provided with 12’ patch cables to allow connection of user equipment.

3. Floor Box / Table locations shall be provided with sufficient length interconnect cables from floor box to table. Cabling shall be dressed neatly and routed to avoid damage. Follow cable handling and signal separation best practices.

II. Cresnet Control Cabling

1. Crestron Plenum-Rated Cresnet Cable – Part Number CRESNET-P

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2. Liberty Plenum-Rated 22AWG 1-Pair Shielded and 18AWG 2-Conductor Cable – Part Number LLINX-U-P

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3. Belden Plenum-Rated 22AWG 1-Pair Shielded and 18AWG 2-Conductor Cable – Part Number 1392P

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

4. Or Equal

JJ. Coaxial Cabling

1. Liberty Plenum-Rated RG6 Quad-Shielded Coaxial Cable – Part Number RG6-QUAD-CMP

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2. Belden Plenum-Rated RG6 Quad-Shielded Coaxial Cable – Part Number 1189AP

a. Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3. Or Equal

KK. Speaker Level Audio Cabling

1. 70v Speaker Cabling:

a. Liberty 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 16-2C-P

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

b. Belden 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 6200UE

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

c. Or Equal

2. Exterior 70v Speaker Cabling:

a. Liberty 16 Gauge, 2 Conductor Outdoor-Rated Cabling – Part Number 16-2C-DB

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

b. Or Equal

3. 8-Ohm Speaker Cabling:

a. Liberty 16 Gauge, 2 Conductor Plenum-Rated Cabling – Part Number 16-2C-P

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

b. Belden 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 6200UE

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

c. Or Equal

LL. Pathway Wire Support

1. Panduit J-Mod Cable Support System
2. Erico – CADDY CAT LINKS J-Hook Series
3. Panduit Plenum Rated Hook & Loop (Black)

MM. 2x1 HDMI Switch(es)

1. Type 1:
   a. Extron 2x1 HDMI Switch – Part Number 60-841-21
      1) Configure for auto switching and give priority to local input.

NN. Rack Shelf for Cable Boxes:

1. Type 1:
   a. Middle Atlantic Vertical Rackshelf – Part Number VRS
      1) Provide one (1) shelf-mount power strip per rack shelf – Part Number PD-815SC-PBSH

PART 3 - EXECUTION

3.01 CODES, STANDARDS, REGULATIONS

A. TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant – OFSTP-7 - (February 2002)

B. TIA-526-14-A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant – OFSTP-14 - (August 1998)

C. TIA/EIA-568-B.1 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements – (May 2001)

D. TIA/EIA-568-B.1-1 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements - Addendum 1 – Minimum 4-Pair UTP and ScTP Patch Cable Bend Radius - (May 2001)

E. TIA/EIA-568-B.1-2 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 2 – Grounding and Bonding Requirements for Screened Balanced Twisted-Pair Horizontal Cabling - (February 2003)

F. TIA/EIA-568-B.1-3 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 3 – Supportable Distances and Channel Attenuation for Optical Fiber Applications by Fiber Type - (February 2003)

G. TIA/EIA-568-B.1-4 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements > Addendum 4 – Recognition of Category 6 and 850 nm Laser Optimized 50/125 µm Multimode Optical Fiber Cabling - (February 2003)

H. TIA/EIA-568-B.1-5 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 5 – Telecommunications Cabling for Telecommunications Enclosures – (March 2004)

I. TIA/EIA-568-B.1-7 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements Addendum 7 - Guidelines for Maintaining Polarity Using Array Connectors – (January 2006)

J. TIA/EIA-568-B.2 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components - (December 2003)

K. TIA/EIA-568-B.2-1 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 1 – Transmission Performance Specifications for 4-Pair 100 ohm Category 6 Cabling - (June 2002)

L. TIA/EIA-568-B.2-2 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 2 – Revision of Sub-clauses - (December 2001)

M. TIA/EIA-568-B.2-3 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 3 – Additional Considerations for Insertion Loss & Return Loss Pass/Fail Determination - (March 2002)

N. TIA/EIA-568-B.2-4 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 4 – Solderless Connection Reliability Requirements for Copper Connecting Hardware - (June 2002)

O. TIA/EIA-568-B.2-5 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 5 – Corrections to TIA/EIA-568-B.2 – (January 2003)

P. TIA/EIA-568-B.2-6 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 6 – Category 6 Related Component Test Procedures – (December 2003)

Q. TIA/EIA-568-B.2-11 Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components – Addendum 11 - Specification of 4-Pair UTP and SCTP Cabling – (December 2005)

R. TIA/EIA-568-3 Optical Fiber Cabling Components Standard - (April 2002)

S. TIA/EIA-568-3.1 Optical Fiber Cabling Components Standard – Addendum 1 – Additional Transmission Performance Specifications for 50/125 μm Optical Fiber Cables – (April 2002)

T. TIA-569-B Commercial Building Standard for Telecommunications Pathways and Spaces - (October 2004)

U. TIA-598-C Optical Fiber Cable Color Coding - (January 2005)

V. TIA/EIA-606-A Administration Standard for Commercial Telecommunications Infrastructure - (May 2002)

W. ANSI J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications - (October 2002)

X. TIA-758-A Customer-owned Outside Plant Telecommunications Infrastructure Standard - (August 2004)

Y. AIA

Z. Local

AA. NEC

BB. ISO

CC. FCC

DD. UL

EE. OSHA

FF. NFPA

GG. NEMA

HH. Plenum Applications

II. Applicable Flame Test: UL 910 (NFPA 262 1990).

JJ. In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify the Architect/Engineer in writing of any such occurrences before purchasing or installing any equipment or materials. The Architect/Engineer will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications.

KK. The Contractor will provide all materials, equipment and installation in compliance with the latest applicable standards from ANSI, FCC, ASTM, TIA/EIA, IEEE, NEC, NFPA, NEMA, REA and UL including but not limited to:

1. American National Standards Institute (ANSI)
2. ANSI T1.404 (DS3) and CATV Applications
3. Institute of Electrical and Electronics Engineer (IEEE)
   a. IEEE 802.4 Broadband Applications and 802.7 Broadband Specifications Standard
4. Federal Communications Commission (FCC)
   a. FCC Part 15Rules and Regulations: Radio Frequency Devices
   b. FCC Part 76Rules and Regulations: Cable Television Service
5. National Cable television Association (NCTA)
   a. NCTA-02 NCTA Recommended Practices for Measurements on Cable Television Systems
6. National Electric Code (NEC)
   a. Article 250, Grounding.
   b. Article 300, Part A. Wiring Method.
   c. Article 310, Conductors for General Wiring.
   d. Article 800, Communication Systems.
7. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) Publications (Latest revisions and pertinent addendum's)
8. Underwriters Laboratories (UL)
   a. Contractor will comply with requirements of UL 50. The communication system supplied shall be listed by Underwriter's Laboratories under UL Standard 1459. A copy of the UL listing card for the proposed system shall be included with the contractor's submittal.
9. National Association of Broadcasters Engineering Handbook (Latest revisions and pertinent addendums)
   a. In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify in writing to the Architect/Engineer of any such occurrences before the purchasing of any equipment, materials and/or installation by the Contractor. The Architect/Engineer will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications.

3.02 GENERAL REQUIREMENTS

A. Contractor shall comply with the requirements of local Authority Having Jurisdiction (AHJ), State of Texas, the National Fire Protection Association (NFPA), and the National Electrical Code (NEC). If the Contractor identifies any item in the plans or specifications that will not strictly comply with the

aforementioned laws, ordinances, and rules, the matter shall be referred to the Architect/Engineer for direction before proceeding with that part of the work.

B. The Contractor shall install the materials in accordance with these specification and the manufacturer's installation guidelines.

C. No deviations from the plans or specifications shall be made without full consent in writing of the Architect/Engineer. The Contractor shall have written approval from the Architect/Engineer for any additional work beyond the Contract Documents prior to beginning such work. If the Contractor does not obtain written approval from the Architect/Engineer prior to proceeding with the work, the contractor shall not be reimbursed for the work.

D. The Contractor shall obtain written permission from the Architect/Engineer before proceeding with any work that would necessitate cutting into or through any part of the building structure such as, but not limited to girders, beams, floors, walls, roofs, or ceilings.

E. Contractor shall notify the Architect/Engineer a minimum of (2) weeks prior to beginning work and will participate in a pre-construction meeting with the Architect/Engineer to perform a walkthrough, review the scope of work, schedule, and escalation procedures.

F. The Contractor shall maintain a work area free of debris, trash, empty cable reels, scrap wire, etc., and dispose of such items on a daily basis and return the site to the original state of cleanliness. The Contractor shall not use Owner's facilities for the disposal of excess or scrap materials.

G. The Contractor shall be certain that all work areas are in compliance with the Occupational Safety and Health Administration (OSHA) regulations.

H. Equipment and materials installed by the Contractor shall be new and free of defects and damage.

I. Contractor shall be responsible for the repair of any damage caused by the contractor during the installation.

J. Contractor shall test all equipment prior to installation. By failing to perform this testing operation, the Contractor shall accept the equipment as compliant and assume all liability for the replacement of equipment at no cost to the Owner should it be found defective at a later date.

K. Contractor shall maintain a set of working specifications, design drawings, and shop drawings to be kept on site at all times and shall update the shop drawings on a weekly basis. Shop drawings shall be made available for inspection at the request of the Architect/Engineer.

L. Equipment and materials shall be consistent throughout the installation. Where multiple units of the same type of equipment and materials are required, these units shall be a standard product with the same manufacturer and model number.

M. Equipment and materials shall be delivered and stored in accordance with the manufacturer's guidelines at the Contractor's expense.

N. Contractor shall make all stored equipment and materials available for inspection at the request of the Architect/Engineer.

O. All equipment and material used in the installation shall be approved by the manufacturer for the environment in which it is being installed.

P. Cables shall be properly supported in accordance with industry standards at all times. Improperly supported cables shall be corrected by the Contractor at no cost to the Owner.

Q. Contractor shall be responsible to properly protect equipment from damage by other trades during construction.

R. Contractor shall cooperate with all appropriate parties in order to achieve well-coordinated progress with the overall construction completion schedule and satisfactory final results.

S. Contractor shall watch for conflicts with work of other contractors on the job and execute, without claim for extra payment, moderate moves or changes as are necessary to accommodate other equipment or to preserve symmetry and aesthetically pleasing appearance.

T. Contractor shall immediately report to the Engineer any design or installation irregularities, particularly architectural elements that interfere with the intended coverage angles of loudspeakers and projector, so that appropriate action may be taken.

U. Contractor shall immediately report to the Engineer any design or installation irregularities which may interfere with the operation of the installed system.

V. Cables shall be routed at 90-degree angles to the building structure. At no time shall a diagonal pull be installed.

W. Contractor shall observe all HDBaseT Alliance cable type, length, bundling, termination, and patching requirements and limitations when installing audio/video over twisted-pair cabling.

X. Contractor shall observe signal separation and signal separation best practices at all times.

Y. Any cabling found to be damaged shall be replaced at no cost.

Z. Signals shall be separated and grouped according to type and voltage level.

AA. Contractor shall provide all required conduit.

BB. Contractor shall not install cables in conduits or sleeves without nylon bushings. Cables installed through conduits or sleeves without nylon bushings shall be removed and replaced at no cost to the Owner.

CC. Contractor shall provide and utilize rear rack rails, lacing bars, and any other required cable dressing equipment/supplies to ensure proper industry-standard signal separation is achieved.

DD. Contractor shall integrate OFE equipment as directed by Owner/Design Team.

3.03 PROJECTOR INSTALLATION

A. Projector(s) shall be installed as high and close to projection screen as practicable.

B. Projector(s) shall be installed square in relation to the screen, and shall be adjusted to fit and fill the screen fully. Projector(s) shall be over scanned slightly into the screen border (if applicable). Projected image shall be square and level. Projector(s) shall be installed so that digital keystone correction is not required.

1. In situations where keystone correction may be required, notify Architect/Engineer and coordinate solution prior to installation.

C. Projector(s) shall be installed in such a way that the axis of the lens is perpendicular to the plane of the projection surface.

D. In case of mismatch between projector aspect ratio and screen aspect ratio, projector shall be configured to output at screen aspect ratio.

E. In case of mismatch between display device and signal aspect ratio, system shall be configured such that the source image best fits and fills the display device.

F. Unless noted otherwise, all projection screens shall be mounted with the lower edge of the viewable image area at 48" A.F.F.

1. Provide additional black drop as required.

3.04 AUDIO VISUAL CONTROL SYSTEM

A. Contractor shall furnish, install and configure a complete turn-key audio/video switching, transport and control system as specified and indicated on the technology drawings.

B. Switching fabric shall be programmed so that the displays can work independently or in unison for presentation material presented from any source input.

C. Contractor is responsible for all ancillary A/V switching or active components necessary to provide a complete and functional A/V system.

D. Contractor is responsible for all A/V specific cabling, interconnects, patch cords and other ancillary devices required to provide a turn-key system.

E. Contractor shall coordinate the programming of the touch panels with the Owner/Design Team. Touch panels shall be branded to reflect the colors and logos of the Owner. This coordination may consist of multiple in-person meetings to ensure that the finished product fully meets the Owner's needs and expectations.

F. Contractor shall install the entire Audio-Visual control system as specified in accordance with manufactures guidelines and industry best practices.

G. Control processor(s) shall be connected to an unswitched power outlet. Control processor(s) shall be connected to UPS outlet(s) if available.

H. Control system shall be programmed in a manner consistent with current industry best practices.

1. Control functions include (but are not limited to) the following:

a. System/Device Power On/Off.

b. Display Source and Sink Switching.

c. Program Volume Adjustment.

d. Audio DSP Control.

e. Full control of Audio Conferencing Systems

f. Full control of Videoconferencing Systems

1) Duplicate OEM Remote Control Functionality.

g. Full control of PTZ Camera(s).

h. Full control of DVD/Blu-ray/Media Player(s).

i. Full control of lighting system(s).

j. Full control of drapes/blinds system(s).

k. Full on/off scheduling of A|V system(s) and components.

I. All network-enabled control systems shall be provided with virtual 'soft' control panel client(s)

J. All network-enabled control systems shall be provided with mobile device control panel client(s)

K. All control system programming shall be delivered to the Owner. The Programmer shall transfer all source code/files related to the system. All programming shall be delivered in both compiled and uncompiled form. Upon system acceptance, ownership of the control programming shall be transferred to the Owner for their future use or modification. No claim shall be made by the programmer for continued licensing or other ongoing fees for continued usage of the control system program.

3.05 SYSTEM REQUIREMENTS

Any quantities listed are for reference only, contractor is responsible for furnishing all materials required to provide a complete functioning system. Where quantities are not noted, they may be obtained from the drawings. In the event of a discrepancy between the specifications and the drawings, the greater quantity and or higher quality shall be furnished.

A. HDMI to Display Port Format Converter(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) C2G HDMI to Display Port Format Converter with Audio – Part Number 54179

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

B. Control Panel(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron 7" Touch Screen – Part Number TSW-750

a) Provide Mounting Hardware as Required.

b) Coordinate Finish with Architect.

b. Type 2:

1) Crestron 10-Button Keypad Control Panel with Volume Knob and Integrated Control Processor – Part Number MPC-M10

a) Provide Control Port Expansion Module(s) and Cresnet Power Supplies As Required. Control Port Expansion Module – Part Number C2N-IO

b) Provide Mounting Hardware as Required.

c) Provide Custom-Engraved Labeling

d) Coordinate Finish with Architect

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

C. Network Switch/PoE Power Supply

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron 16-Port Managed PoE Switch – Part Number CEN-SW-POE-16

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

D. Twisted-Pair Video Matrix Transmitter

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron Digital Media Wall-Plate Transmitter – Part Number DM-TX-200-C-2G

a) Coordinate Finish with Architect.

b. Type 2:

1) Crestron Digital Media Surface-Mount Transmitter – Part Number DM-TX-201-C

2. Contractor shall coordinate installation with furniture contractor.

3. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

4. Contractor shall load the latest firmware updates on all equipment and components.

5. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

6. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

E. Twisted-Pair Video Matrix Switching Frame(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

   a. Type 1:

      1) Crestron Digital Media Modular Matrix Switcher with capacity for up to 8 inputs and up to 8 outputs – Part Number DM-MD8X8

2. Contractor shall provide installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer's instructions and guidelines.

5. The Contractor shall provide a copy of the following information in order to verify the AV switching equipment has been installed and configured correctly:

   a. The number of HDCPKSVs ("Keys") supported by each source

   b. The video timing, HDCP use and audio format of each source when operating (not needed for walk-in equipment)

   c. The video timings and supported audio formats for each connected sink

   d. The video timings and supported audio formats presented in the EDID to each source – the preferred video timing shall be indicated

   e. The length of cable used on all shielded twisted pair cable used for AV distribution

   f. The data rate supported by each shielded twisted pair cable used for AV distribution

6. Control system shall be connected to an unswitched power source.

7. The contractor shall provide AV source equipment with support for enough KSVs so that it can be routed to all sinks simultaneously.

   a. If a particular AV source cannot be found to support enough KSVs to route to all sinks simultaneously, the contractor shall:

      1) Notify the Engineer

      2) Configure the AV switching equipment so that it shall not send an AV source more KSVs than it supports.

8. The contractor shall configure the EDID presented to each AV source to indicate only the video timings supported by ALL sinks used for viewing and distributing video.

9. The contractor shall configure the EDID presented to each AV source to indicate support for only the audio formats actually supported by ALL the sinks used for distributing audio.

10. The contractor shall verify the data rate supported by each shielded twisted pair cable used for AV distribution.

11. Contractor shall provide final adjustments. Upon completion, the equipment shall be clean, adjusted and left in perfect operating condition.

F. Twisted-Pair Video Matrix Expansion Cards:

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Input Cards

1) Type 1:

a) Crestron DM-8G+ Input Card with Down-Mixing – Part Number DMC-C-DSP

2) Type 2:

a) Crestron HDMI Input Card with Down-Mixing - DMC-HD-DSP

b. Output Cards

1) Type1:

a) Crestron 2 DM-8G+ and 2 HDMI w/2 Stereo Analog Audio Output Card – Part Number DMCO-53

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

G. Twisted-Pair Video Matrix Receiver

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron Digital Media Receiver with Scaler and Relay Control – Part number DM-RMC-200-C

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

H. Presentation Switcher(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron Digital Media Presentation Switcher with Integrated Control Processor – Part Number DMPS-300-C

a) Provide PoDM Power Pack as Required – Part Number PW-4818DU

b. Type 2:

1) Crestron Digital Media Presentation Switcher with Integrated Control Processor – Part Number DMPS-200-C

a) Provide PoDM Power Pack as Required – Part Number PW-4818DU

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

I. Control Processor(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron 3-Series Control System Processor with Control Subnet – Part Number CP3N

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

J. Control Port Expansion Module(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Crestron Control Port Expansion Module with 1x RS232, 1 x IR, and 2x Relay – Part Number C2N-IO

a) Provide Connection Block(s) and Power Supply(ies) as Required

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

K. Audio DSP(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) BiAMP Fixed Audio Matrix with Acoustic Echo Cancellation and POTS or VoIP Interface – Part Number TesiraFORTEAVB AI

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

L. Analog Audio Mixer(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) BiAMP 3-Input Analog Audio Mixer with Remote Master Level – Part Number 301

a) Provide BiAMP Single Volume Control Mounted In Decorator-Style Insert – Part Number RP-L1

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

M. 3.5mm Audio Stand-Alone Input(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Custom Decorator-Style Input Plate with One (1) 3.5mm Input

a) Coordinate Finish with Architect.

b) Mount unbalanced to balanced audio transformer in back box behind plate.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

N. Wireless Microphone System(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Wireless Microphone Combo System:

a) Shure Wireless Microphone Combination Kit with Handheld and Lavalier Transmitters – Part Number SLX124/85/SM58

(1) Coordinate Frequency/Band/Group/Channels for Local Conditions

2) Active Antenna Splitter System:

a) Shure Four-Way Active Antenna Splitter – Part Number UA844SWB

b) Shure Antenna Extension Cable – Part Number UA8xx or UA8xxx

(1) Provide Sufficient Length to Reach from AV Equipment Rack to Each Antenna Location

c) Shure Active Antenna Amplifier – Part Number UA830USTV

d) Shure ½ Wave Antenna – Part Number UA820H4

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

O. Assistive Listening System(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Listen Technologies Advanced Level II Installed FM System – Part Number LS-58-*xxx*

a) Coordinate Frequency Configuration for Local Conditions

b) Provide Sufficient Antenna Extension Cable Length to Reach from AV Equipment Rack to Each Antenna Location

2) Listen Technologies Inductive Neck Loop – Part Number LA-166

a) Provide Sufficient Quantity of Neck Loops to Meet ADA Regulations

3) Listen Technologies Advanced Intelligent DSPRF Receiver – Part Number LR-5200-*xxx*

a) Provide Sufficient Quantity of Portable RF Receivers with Ear Speaker to Meet ADA Regulations.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

P. Unbalanced to Balanced Audio Transformer(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Radio Design Labs Unbalanced Stereo Inputs to Summed Balanced Mono Output – Part Number TX-J2

a) Provide rack mounting hardware as required – Part Number TA-RA5

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

Q. 70v to Line Level Audio Transformer(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

    a. Type 1:

        1) Radio Design Labs 70v to Line Level Audio Transformer – Part Number TX70A

            a) Provide rack mounting hardware as required – Part Number TA-RA5

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

R. Audio Power Amplifier(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

    a. Type 1:

        1) Ashly Two Channel Audio Power Amplifier, 150 Watts Per Channel @ 70v – Part Number TRA-2150

    b. Type 2:

        1) Ashly Four Channel Audio Power Amplifier, 150 Watts Per Channel @ 70v – Part Number TRA-4150

    c. Type 3:

        1) Extron Electronics MPA 401 40 Watts @ 70v – Part Number 60-845-01

    d. Type 4:

        1) Ashly Eight Channel Audio Power Amplifier, 250 Watts Per Channel @ 70v – Part Number ne8250.70

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

S. Speaker Attenuator(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

    a. Type 1:

1) Atlas Sound 100 Watt Rack-Mount Rotary Volume Control Attenuator – Part Number AT100-RM

a) Provide Rack Mounting Plate(s) as Required – Part Number ATPLATE-052

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

T. Priority Page Controller(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Extron Priority Page Controller Kit with Paging Audio Sensor – Part Number 60-887-01

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

U. Loudspeaker(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Atlas Sound In-Ceiling 6" Coaxial Speaker System – Part Number FAP62T

a) Coordinate Finish with Architect.

b. Type 2:

1) Atlas Sound In-Ceiling Subwoofer Speaker System – Part Number FAPSUB-1

a) Coordinate Finish with Architect.

c. Type 3:

1) Sound Tube 6.5" Open-Ceiling, Pendant-Mount Loudspeaker System – Part Number RS600i

a) Coordinate Finish with Architect.

d. Type 4:

1) Sound Tube Open-Ceiling, Pendant-Mount Subwoofer System – Part Number RS1001i-II-T

a) Coordinate Finish with Architect.

e. Type 5:

1) Atlas Sound Surface-Mount Indoor/Outdoor Loudspeaker – Part Number SM52T

a) Coordinate Finish with Architect.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

V. Flat Panel Display(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Samsung 55" Diagonal Flat Panel Display with RS232 and Variable Audio Output – Part Number DM55D

b. Type 2:

1) Samsung 75" Diagonal Flat Panel Display with RS232 and Variable Audio Output – Part Number DM75D

2. Contractor shall ensure that flat panel display does not protrude 4" or more from wall surface.

3. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

4. Contractor shall load the latest firmware updates on all equipment and components.

5. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

6. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

W. Flat Panel Display Mounting Hardware

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Chief Fixed, Ultra-Thin Wall Mount Bracket – Part Number LSTU

b. Type 2:

1) Chief Tilting, Ultra-Thin Wall Mount Bracket – Part Number LTTU

2. Contractor shall ensure that flat panel display does not protrude 4" or more from wall surface.

3. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

X. Blu-ray Player(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Samsung Consumer Blu-ray Player – Part Number BD-H5100

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

Y. Projector(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Epson 11000 Lumen, 1280x800 Projector – Part Number Z11000WNL

a) Provide lens as required to best fit room / screen / mounting location

b) Mount projector as close as practicable to projection screen. Mount projector as high / close to ceiling as practicable.

b. Type 2:

1) Epson 2800 Lumen, 1280x800 Projector – Part Number Power Lite W17

a) Mount projector as close as practicable to projection screen. Mount projector as high / close to ceiling as practicable.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

Z. Projector Mounting Hardware:

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Projector Ceiling-Mount – Part Number VCMU

2) Verify Projector/Mount Compatibility Prior to Ordering/Installation

a) Provide Custom Length Mounting Column and Custom Mounting Structure to Support Projector from Overhead Structure

(1) Custom Column and Custom Mounting Structure MUST Be Capable of Supporting a Minimum of 5 Times the Total Combined Weight of the Projector and Mounting Solution.

(2) Provide Chief Column-Mounted Equipment Shelf – Part Number CMA480

(3) Provide Chief Ceiling Plate – Part Number CMA345 or Chief Cathedral Ceiling Adapter – Part Number CMA395

(i) Custom Column and Mounting Hardware to Match Ceiling Finish

b. Type 2:

1) Projector Ceiling-Mount – Part Number RSMAU

2) Verify Projector/Mount Compatibility Prior to Ordering/Installation

a) Provide Custom Length Mounting Column and above-tile suspended ceiling mounting kit.

(1) Chief Speed-Connect Above Tile Suspended Ceiling Kit – Part Number CMS440

(2) Support mounting plate by four (4) discrete cables.

(i) Each cable to be attached to a discrete corner of the plate.

(ii) Each cable to be secured to the structure at a discrete location.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

AA. Projection Screen(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

   a. Type 1:

      1) Draper 120" x 192" Surface-Mount, Tab-Tensioned, Electric Projection Screen with Matte/Matt White Surface, Quiet Motor and Built-In Low Voltage Control Interface – Part Number 101782QL

         a) Coordinate finish with Architect

         b) Provide screen with opaque backed surface to prevent light intrusion from behind screen.

         c) Mount projection screen with bottom of projection surface @ 48" A.F.F.

            (1) Provide additional black drop as necessary.

         d) Coordinate power connection with Division 26.

   b. Type 2:

      1) Draper 50" x 80" Ceiling-Recessed, Tab-Tensioned, Electric Projection Screen with Matt/Matte White Projection Surface and Built-in Low Voltage Control Interface – Part Number 118345QL

         a) Coordinate finish with Architect

         b) Provide Custom Mounting Structure to Support Projector from Overhead Structure

            (1) Custom Mounting Structure MUST Be Capable of Supporting a Minimum of 5 Times the Total Combined Weight of all supported equipment and hardware.

         c) Provide screen with opaque backed surface to prevent light intrusion from behind screen.

         d) Mount projection screen with bottom of projection surface @ 48" A.F.F.

            (1) Provide additional black drop as necessary.

         e) Coordinate power connection with Division 26.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

BB. Wall-Mounted Equipment Rack(s)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

    a. Middle Atlantic Products 40RU, 32" Deep (30" Useable) Wall-Mounted Equipment Rack – Part Number SR-40-32

    b. Provide Middle Atlantic 40RU Large Perf Front Door – Part Number LVFD-40

    c. Provide 9-Outlet Rack-Mounted Power Distribution Unit on Single 20 Amp Circuit – Part Number PD-920RC-20

    d. Provide Middle Atlantic Custom Configured MPR Raceway:

        1) Configure Raceway With the Following Equipment on a total of four (4) circuits (Each Switched Module Will Be On Its Own Circuit).

            a) One (1) MPR-6A Raceway

            b) One (1) MPR-SEQA Sequencer

            c) Three (3) RLM-20IGA Switching Modules

            d) Two (2) M-2x20IGA Un-Switched Modules

            e) Four (4) MPR-SS Single Circuit Surge Suppressor

            f) Provide MPR Mounting Bracket(s) as required

            g) Provide Wiring Tails and Jumpers as required

            h) Provide Power Cabling and Connectors as Required to Connect All Circuits to Mains Power.

                (1) Connect Uncontrolled Circuit to UPS Power Source (If Present)

                (2) Connect Controlled Circuit(s) to Generator Power Source (If Present)

    e. Provide Middle Atlantic Fan Kit with two (2) 4½" Fans and Vent Blockers – Part Number DWR-FK32

        1) Provide Fan Cord(s) as Required

    f. Provide Middle Atlantic FC Series Thermostatic Fan Control – Part Number FC-4-1CA

    g. Provide Middle Atlantic Ultra-Quiet Exhaust Fan Panel with Display – Part Number UQFP-4DRA

        1) Provide Middle Atlantic Ultra-Quiet Intake Fan Panel as required – Part Number UQFP-4RIS

    h. Provide Middle Atlantic Blank Panels for All Unused Spaces – Part Number EB1, EB2, EB3, etc. As Required.

    i. Provide minimum clearance latch – Part Number DWRSR-ZL

    j. Provide Rack mount Drawers as Indicated – Part Number D2, D3, D4, Etc.

1) Provide Foam Inserts for Rack mount Drawers

2) Configure Foam Inserts to store equipment when not in active use.

k. Provide Light-Blocking Vented Blank Panels as Indicated / Required – Part Number VTB1, VTB2, VTB3, etc.

l. Provide Vented, Clamping Rack Shelves as Indicated / Required – Part Number RC-2, RC-3, RC-4, CAP5, CAP6, CAP7, CAP8, etc.

m. Provide Flanged Blank Panels for All Unused Spaces – Part Number EB1, EB2, EB3, etc. As Required.

n. Provide Middle Atlantic Vertical and Horizontal Cable Lacing Bars as Required

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

CC. HDMI Cabling

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Provide HDMI cable/signal transport of sufficient length to reach from source device to destination device. Plenum spaces will require plenum-rated cabling.

1) Native HDMI Cable – Crestron / AMX / Extron / Equal

2) Rapid Run Digital Plenum-Rated Runner Cable with Rapid Run Digital HDMI Flying Lead(s) or Input Plate(s) to Build a Complete Digital Cabling System

a) Active or Passive as Required

b) HDMI or DVI Flying Leads as Required

c) Coordinate Plate Finish with Owner

3) Equal

DD. VGA + 3.5mm Cabling:

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Provide VGA + 3.5mm cable/signal transport of sufficient length to reach from source device to destination device. Plenum spaces will require plenum-rated cabling.

1) Native VGA + 3.5mm Audio Cable – Crestron / AMX / Extron / Equal

2) Rapid-Run Multi-Format Runner Cable with Rapid Run Multi-Format Flying Lead(s) and /Or Input Plate(s) to Build a Complete VGA + 3.5mm Cabling System

a) Provide Proper Number of Flying Lead(s) or Wall Plate(s) to Build a Complete VGA + 3.5mm Cabling System.

b) Coordinate Plate Finish with Owner

3) Or Equal.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

EE. Digital Audio Visual Extension Cabling/Connectors

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Cabling:

1) Crestron Digital Media 8G Cable, Plenum-Rated 350MHz Shielded Cat5e – Part Number DM-CBL-8G-P

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect

2) Belden Shielded Category 6 Cable – Part Number 2413F

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect

3) Belden Shielded Category 6A Cable – Part Number 10GX63F

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect

4) Or Pre-Approved Equal

b. Connectors:

1) Crestron Digital Media 8G Cable Connectors – Part Number DM-8G-CONN

2) Belden RJ45 Plug – Part Number HIPMP-RJ45SH

3) Or Pre-Approved Equal

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

FF. Analog Audio Cabling

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

   a. Liberty 22AWG Shielded Pair – 2 twisted conductors with drain – Part Number 22-1P-CMP

      1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

   b. Belden 22AWG Shielded Pair – 2 twisted conductors with drain – Part Number 6500FE

      1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

   c. Or Equal

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

GG. Serial Control Cabling

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

   a. Liberty 24AWG 4-Pair Shielded Low Capacitance Plenum Cable – Part Number 24-4P-PLSH

      1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

   b. Liberty 24AWG 2-Pair Shielded Low Capacitance Plenum Cable – Part Number 24-2P-P485

      1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

   c. Belden 24AWG 2-Pair Shielded Low Capacitance Plenum Cable – Part Number 82842

      1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

   d. Or Equal

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

HH. Interconnect/Patch Cables

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

   a. Provide interconnect/patch cables as required to support all connectivity present at each input plate.

b. Each input plate shall be provided with 12’ patch cables to allow connection of user equipment.

c. Floor Box / Table locations shall be provided with sufficient length interconnect cables from floor box to table. Cabling shall be dressed neatly and routed to avoid damage. Follow cable handling and signal separation best practices.

2. Contractor shall furnish installation in accordance with Manufacturer’s installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

II. Cresnet Control Cabling

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Crestron Plenum-Rated Cresnet Cable – Part Number CRESNET-P

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

b. Liberty Plenum-Rated 22AWG 1-Pair Shielded and 18AWG 2-Conductor Cable – Part Number LLINX-U-P

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

c. Belden Plenum-Rated 22AWG 1-Pair Shielded and 18AWG 2-Conductor Cable – Part Number 1392P

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

d. Or Equal

2. Contractor shall furnish installation in accordance with Manufacturer’s installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

JJ. CATV Cabling

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Liberty Plenum-Rated RG6 Quad-Shielded Coaxial Cable – Part Number RG6-QUAD-CMP

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

b. Belden Plenum-Rated RG6 Quad-Shielded Coaxial Cable – Part Number 1189AP

1) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

c. Or Equal

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

KK. Speaker Level Audio Cabling

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. 70v Speaker Cabling:

1) Liberty 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 16-2C-P

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2) Belden 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 6200UE

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3) Or Equal

b. Exterior 70v Speaker Cabling:

1) Liberty 16 Gauge, 2 Conductor Outdoor-Rated Cabling – Part Number 16-2C-DB

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2) Or Equal

c. 8-Ohm Speaker Cabling:

1) Liberty 16 Gauge, 2 Conductor Plenum-Rated Cabling – Part Number 16-2C-P

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

2) Belden 16 Gauge, 2-Conductor Plenum-Rated Cabling – Part Number 6200UE

a) Provide Cable with Black Jacket – Coordinate Cable Color with Architect.

3) Or Equal

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

4. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

LL. Cable Support

1. All cables shall be installed and supported in conduit systems, cable trays, cores, sleeves, etc.

2. When cables leave the main pathway systems, they shall be installed and supported in Contractor furnished and installed j-hooks or saddle straps.

3. No cable pathway shall exceed 40% fill ratio.

4. The contractor shall furnish a separate j-hook or saddle strap pathway for each cable type (data, voice, video and security).

5. J-hooks and saddle straps shall be installed no more than five-feet (5') apart on center, using only manufacturer-approved installation methods and hardware.

6. J-hooks shall be furnished with closure clips.

7. Maximum sag between supports shall not exceed twelve-inches (12").

8. Contractor shall establish j-hook and saddle strap pathways and shall coordinate pathways with all other disciplines. Under no-circumstances shall these pathways be used to support other low-voltage applications not included in this specification.

9. Cable Dressing

   No nylon cable ties shall be used at any time during the installation of the cable.

   Signal separation guidelines and best practices shall be observed for the complete length of all cable runs.

   a. Above Ceiling

      1) Contractor shall furnish and install plenum-rated hook & loop straps in plenum-rated airspaces.

         a) The Contractor shall install no more than (1) hook & loop strap between each j-hook or saddle strap or at service loop locations.

   b. Equipment Rooms / Telecommunications Rooms

      1) The Contractor shall bundle all visible cables with Contractor furnished and installed hook & loop straps.

         a) Hook & loop straps shall be installed twenty-four (24) inches apart on center.

MM. 2x1 HDMI Switch(es)

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

   a. Type 1:

      1) Extron 2x1 HDMI Switch – Part Number 60-841-21

         a) Configure for auto switching and give priority to local input.

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

NN. Rack Shelf for Cable Boxes:

1. Contractor shall furnish and install the following as indicated on the technology drawings, and associated equipment schedules and diagrams.

a. Type 1:

1) Middle Atlantic Vertical Rackshelf – Part Number VRS

a) Provide one (1) shelf-mount power strip per rack shelf – Part Number PD-815SC-PBSH

2. Contractor shall furnish installation in accordance with Manufacturer's installation instructions.

3. Contractor shall load the latest firmware updates on all equipment and components.

4. Contractor shall energize and commission equipment in accordance with manufacturer instructions.

5. Contractor shall provide final adjustments to the system. Upon completion, the system shall be clean, adjusted and left in perfect operating condition.

3.06 TESTING REQUIREMENTS

A. Audio Visual System Testing and Configuration

1. Contractor shall un-pack and pre-test equipment prior to installation into the production environment. All configurations shall be re-verified prior to the units being placed into service.

2. Contractor shall test and commission each component per the specifications and manufacture's installation instructions.

3. Audio conferencing systems shall be configured to provide excellent audio performance. Verify POTS or VoIP phone system with Owner/Architect/Engineer prior to ordering and installation. Contractor shall place test calls utilizing the audio conferencing system to the system manufacturer for system calibration and testing.

4. Video conferencing systems shall be configured to provide excellent audio performance. Contractor shall place test calls utilizing the video conferencing system to the system manufacturer for system calibration and testing.

5. Contractor shall test and verify for full operational and network support control functionalities and connections per the specifications and manufacturer's installation instructions.

6. All A/V network devices shall be verified for link and auto negotiation to the highest connection rate.

7. Contractor shall test and verify all audio-visual functionalities as installed per the specifications and manufacturer's installation instructions.

8. All Crestron Digital Media demonstration and acceptance tests shall be performed by a Crestron Digital Media Certified Engineer (DMC-E).

9. Projector(s) shall be installed square in relation to the screen, and shall be adjusted to fit and fill the screen fully. Projector(s) shall be over scanned slightly into the screen border (if applicable). Projected image shall be square and level. Projector(s) shall be installed so that digital keystone correction is not required.

    a. In situations where keystone correction may be required, notify Architect/Engineer and coordinate solution prior to installation.

10. Projector(s) shall be installed in such a way that the axis of the lens is perpendicular to the plane of the projection surface.

11. In case of mismatch between projector aspect ratio and screen aspect ratio, projector shall be configured to output at screen aspect ratio.

12. In case of mismatch between display device and signal aspect ratio, system shall be configured such that the source image best fits and fills the display device.

13. Unless noted otherwise, all projection screens shall be mounted with the lower edge of the viewable image area at 48" A.F.F.

    a. Provide additional black drop as required.

14. Video display system(s) minimum test protocols:

    a. Test each video display system with test signal generating equipment capable of outputting the following resolutions.

        1) 4:3 - 640x480, 800x600, 1024x768

        2) 16:9 - 1280x720 (720p), 1366x768, 1600x900, 1920x1080 (1080p)

        3) 16:10 - 1280x800, 1440x900, 1680x1050, 1920x1200

    b. Test signal generator must be capable of outputting the correct signal protocol using the applicable connectivity (RCA/BNC, S-Video, VGA, DVI, HDMI, Display Port, Etc.).

    c. The test signal generator must be capable of outputting a standard set of color bars, grid pattern, grayscale, checkerboard and multiburst.

3.07 AUDIO VISUAL SYSTEMS TRAINING

A. Contractor shall provide a proposed training schedule to the Architect/Engineer prior to substantial completion.

B. Contractor shall provide a proposed training syllabus for both administrative users and end-users prior to substantial completion.

C. Training shall include all aspects of the systems as specified and installed.

D. Contractor shall include provisions within the total cost proposal for a minimum of two (2) System Administrator training session. It is anticipated these trainings will cover advanced functions of the system, trouble-shooting techniques and other subject matter pertinent to the on-going support of the video conference system at the installed facility. System administration training sessions should be planned for approximately 5 persons and at least four (4) hours per session.

E. Contractor shall include provisions within the total cost proposal for a minimum of three (3) End-User training sessions. It is anticipated this training will cover basic function and operation of the system by faculty. This would include event display management, source control and general systems operation for all installed system. User training sessions should be planned for approximately 10 persons each session and at least four (4) hours per session.

3.08 PROJECT CLOSEOUT DOCUMENTATION

A. As-Built Drawings

1. Drawings shall be provided to the Architect/Engineer at the time of substantial completion. Final payment will not be recommended until drawings are received and approved by the Architect/Engineer.

2. Three (3) sets of drawings depicting the condition of the audio visual system as installed.

3. As-Built drawings shall be produced in AutoCAD 2010 or higher and provided in hardcopy and electronically in .dwg and PDF format.

4. Hardcopy drawings shall be provided in the original size as issued by the Architect/Engineer.

5. Drawings shall retain the formatting and title block of the original drawings as issued by the Architect/Engineer.

6. Drawings shall be provided utilizing the original scale and shall include the exact dimensions and locations of all projectors, projector mounts, projection screens, wall elevations, cable tray, sleeves, pathways, workstation locations, and labeling scheme.

B. Control System/Audio|Visual Switching System Submittals:

1. Compiled and uncompiled control system programming code shall be delivered to the Owner, and shall become property of the Owner for their usage without claim for further payment.

2. Control system interface screen shots/layouts for each panel/keypad/control interface.

3. The following information in order to verify the A|V switching equipment has been installed and configured correctly:

a. The number of HDCPKSVs (“Keys”) supported by each source.

b. The video timing, HDCP usage and audio format of each source when operating.

c. The video timings and supported audio formats presented in the EDID to each source – the preferred video timing shall be indicated.

d. The length of cable used on all twisted pair cable used for A|V distribution.

e. The data rate supported by each twisted pair cable used for A|V distribution.

C. Contactor’s Statement of Warranty

1. Statement of warranty shall be provided to the Architect/Engineer at the time of substantial completion. Final payment will not be recommended until statement of warranty is received and approved by the Architect/Engineer.

2. Contractor shall furnish a minimum of a two (2) year warranty on all materials, labor and workmanship starting at final system acceptance.

3. One original and two copies of Contractor's warranty terms and conditions to include contact information (i.e. Contractor name, Point of Contact, address, phone number and email address) and start and end date for warranty call outs.

D. Contractor's Extended Maintenance/Service Plan

1. Statement of service plan coverage shall be provided to the Architect/Engineer at the time of substantial completion. Final payment will not be recommended until statement of warranty is received and approved by the Architect/Engineer.

2. Contractor shall furnish a minimum of a two (2) year extended service plan. The extended maintenance/service plan shall cover all materials, labor, workmanship, and preventative maintenance.

3. Statement of extended service plan coverage terms and conditions to include contact information (i.e. Contractor name, Point of Contact, address, phone number and email address) and start and end date for service plan call outs.

Attachment "A"

Provide an itemized listing of all equipment and material required to meet the specifications for the Audio Visual System. This listing shall include Part Number, Description, Unit of Measure, Unit Cost, Quantity, Labor Cost, and Extended Cost.

Part Number	Description	Unit of Measure	Unit Cost	Quantity	Labor Cost	Extended Cost
Total Equipment and Materials					**$ -**	
Total Labor and Installation					**$ -**	
Grand Total					**$ -**	

END OF SECTION – 27 4100