PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Some information contained in this specification is also found on the associated drawings and in the following specification sections. Work shown on drawings or described in other spec sections is deemed to be in both.

B. Related Specification Sections:
1. 27 41 00 – General Conditions for Audio-Video Systems
2. 27 41 10 – Training for Audio-Video Systems
3. 27 41 25 – Audio-Video Control Systems

1.2 SUMMARY

A. DEMOLITION BY AV CONTRACTOR
1. Some of the existing rack mounted and installed equipment is to be removed. Any equipment removed will be turned over to the school. Major items to be removed/upgraded:
a. Biamp audio DSP(s)
b. Crown audio amplifier(s)
c. Crestron control system and touch panels
d. Crestron video distribution system and endpoints
e. Crestron AV network switch
f. Wall mounted displays/TVs and mounts
2. Remove and dispose of all unused AV cabling (inside rack and rooms) including video cabling to projectors and cameras.
3. Remove unused AV connection plates and associated cabling. Cover unused location with blank plate.
4. Remove existing speakers as noted in print set.

B. OWNER RESPONSIBILITIES
1. Owner is responsible for removing or abandoning in place the following existing items:
a. Projectors & motorized lifts
b. Motorized projection screens
c. PTZ camera system
2. Internet cable connection at rack location for remote service ability by AV Contractor.
3. Recessed backboxes with 120V outlet, as specified, for wall mounted TV locations.

C. AV INSTALLATION DESCRIPTION – ROOM A
1. Dual wall-mounted 98” TVs will be installed onto the south wall of the room. These displays will function as the primary presentation displays in the room.
2. A large 10” touch panel will be wall mounted next to the main west entry door to the room. This controller will handle all audio and video controls within the room as well as room setup (combine/uncombine).

3. Three locations on the south wall will be set up for direct video connection in the room. These locations will be on the outer left/right of the displays along with one in between the displays. Each location will offer HDMI and USB-C video connections. Any video connection location in the system can be displayed onto any display in the entire system.
4. Ethercon connection locations will be evenly distributed around the perimeter of the room. These locations will provide the ability to connect an assortment of additional portable audio and video devices (explained later) to the system. This creates virtually infinite expansion and future capabilities to the room's AV system.
5. New ceiling speakers will be installed in the room to provide a higher quality of sound and audio coverage.

D. AV INSTALLATION DESCRIPTION – ROOMS B1 & B2 (EACH)
1. A 98" TV will be installed onto the west wall in the room while a 75" TV will occupy the east wall. These displays will function as the primary presentation displays in the room. Displays in this configuration allow for presentation on the larger 98" TV while utilizing the smaller 75" TV as a Confidence Monitor.
2. A large 10" touch panel will be wall mounted on the west wall next to the 98" TV. This controller will handle all audio and video controls within the room as well as room setup (combine/uncombine).
3. A location under the 98" TV will be set up for direct video connection in the room. As always, this location will offer HDMI and USB-C video connections and can be displayed onto any display in the entire system.
4. Ethercon connection locations will be evenly distributed around the perimeter of the room. These locations will provide the ability to connect an assortment of additional portable audio and video devices (explained later) to the system. This creates virtually infinite expansion and future capabilities to the room's AV system.
5. New ceiling speakers will be installed in the room to provide a higher quality of sound and audio coverage.

E. AV INSTALLATION DESCRIPTION – ROOM C
1. A 98" TV will be installed onto the west wall in the room and can function as the primary presentation display in the room.
2. A large 10" touch panel will be wall mounted on the west wall next to the 98" TV. This controller will handle all audio and video controls within the room as well as room setup (combine/uncombine).
3. A location under the 98" TV will be set up for direct video connection in the room. As always, this location will offer HDMI and USB-C video connections and can be displayed onto any display in the entire system.
4. Ethercon connection locations will be evenly distributed around the perimeter of the room. These locations will provide the ability to connect an assortment of additional portable audio and video devices (explained later) to the system. This creates virtually infinite expansion and future capabilities to the room's AV system.
5. New ceiling speakers will be installed in the room to provide a higher quality of sound and audio coverage. Additional speakers will be added in the curved bulkhead in Conference C where the current speaker system lacks coverage.

F. AV INSTALLATION DESCRIPTION – ROOM D
1. This room will not contain any installed video.

2. A small wall mounted touch panel with handle audio control needs in the room.
3. New ceiling speakers will be installed in the room to provide a higher quality of sound.

G. AV INSTALLATION DESCRIPTION – HALLWAY, MEN/WOMEN TOILET, ROTARY HALL
1. These areas will re-use the existing ceiling speakers and wiring, as noted on print set.
2. The existing surface mounted speakers (and wiring) on the catwalk in Rotary Hall will be replaced with new higher output speakers. This will allow for a higher level of intelligibility during events held in that space.
3. A new 98" display would be installed in place of the existing 65" TV mounted between the steel columns.
4. An ethercon connection location will be on the back side of the pillar under the TV. This location will provide the ability to connect an assortment of additional portable audio and video devices (explained later) to the system. This creates virtually infinite expansion and future capabilities to the room's AV system.

H. AV INSTALLATION DESCRIPTION – RACK ROOM
1. The upgraded AV systems will utilize the existing racks in this room to house the necessary electronics. If possible, the new system should economize down to utilizing just a single equipment rack allowing for the second rack to be removed and handed over to the Owner. The removal of this second rack will add precious usable space in the room.
2. The existing Assistive Listening system will be re-used and integrated into the new system.
3. A new control system, audio DSP, touch panel, and supporting electronics will be installed in the rack(s) to provide a fully functional AV system.

I. AV INSTALLATION DESCRIPTION – PORTABLE SYSTEM COMPONENTS
1. An important aspect of the updated AV systems is the ability for any of the rooms to leverage the use of portable AV interface devices. These devices offer enormous amounts of flexibility to the how the spaces can be used and set up. Each of these device options are designed to connect to ANY of the distributed wall mounted Ethercon connections installed throughout the spaces.
2. Portable dvLED Screens
    a. Two (2) mobile high-definition mobile LED video wall that is 10 feet wide and just under 6 feet tall will be provided. These displays can be utilized in any room but will primarily be used in the highly windowed Room C and Exhibition Hall.
3. Portable Video Inputs
    a. Two (2) portable video connection boxes each with an attached 15' cable will be provided. These boxes are identical to the video connections installed in the walls. They offer HDMI and USB-C video connections. These boxes allow for video connections to be brought out to where the presenters are such as podiums or tables. This solves the problem of distance limitations with HDMI and especially USB-C video cabling.
4. Portable Audio Inputs
    a. Three (3) small portable audio interface boxes are provided as part of the design. These boxes cover all the different audio connection possibilities such as XLR microphone inputs, XLR audio out, RCA, 3.5mm, and Bluetooth. Of course, all the devices will have permanently attached cables to connect to the Ethercon connections in the rooms.

J. AV INSTALLATION DESCRIPTION – WIRELESS MICROPHONES
1. This item replaces the existing eight (8) channels of wireless microphones with eight (8) new channels of digital wireless microphones. Handheld mics, beltpacks with earset mics, and podium/desktop style wireless gooseneck microphones will handle almost any presentation situation that may arise.
2. A new antenna system will allow for any microphone to be safely used in any of the rooms without the fear of audio dropouts or interference.
3. The wireless microphone receivers and battery charger will be installed in the main equipment rack however all the wireless metrics (battery & signal level) will be able to be monitored on the touch panels for added confidence.

PART 2 - PRODUCTS

2.1 ALLOWANCES

A. ***Contractors shall include a $1500 allowance for changes that may be directed by the Consultant during the installation and completion of the project.***

Commented [TJH1]: Edit allowance amount

2.2 AUDIO EQUIPMENT

A. See appendix A for specific Manufacturer and Model numbers for each system and subsystem.

B. Cross reference all drawings to the equipment list as shown in Appendix A. Contractor shall provide a complete and functional system as designed regardless of whether a specific component is specifically noted in the Appendix(s).

C. Following are general categories of equipment that will form the system. See drawings for quantities and sizing of all equipment.
1. Equipment Racks
    a. Full size (44 RU) gang and stand-alone racks
    b. Wall-mounted equipment racks
    c. Desktop equipment racks
    d. Podium/lectern mounted equipment racks
2. Power sequencing and distribution
    a. Power sequencing panel
    b. Power raceway
    c. Distributed power outlets
    d. Rack mounted Power & Lights
    e. Rack mounted Power outlets
3. Mixers and Mixing Consoles
4. Loudspeakers
    a. Line Array Speakers
    b. Point Source Speakers
    c. Digitally steered column arrays
    d. Distributed Speakers
        1) Wall-mounted

2) Ceiling
5. Amplifiers
6. Digital Signal Processors
   a. Fixed input/output configuration
   b. Expandable systems
   c. Fixed internal architecture
   d. Open/flexible internal architecture
7. Wireless microphones
8. Audio Sources & Outboard Equipment
9. Intercom System
   a. Main Station/Power Supply
   b. Belt-packs
   c. Headsets
   d. Wireless Intercom

2.3 VIDEO EQUIPMENT

A. See appendix(s) for specific Manufacturer and Model numbers for each system and subsystem.

B. Cross reference all drawings to the equipment list as shown in Appendix A. Contractor shall provide a complete and functional system as designed regardless of whether a specific component is specifically noted in the Appendix(s).

C. Following are general categories of equipment that will form the system. See drawings for quantities and sizing of all equipment.
   1. Displays
      a. Projectors and Lens
      b. Screens and Control Modules
      c. Direct View Monitors
      d. LED Video Walls
   2. Switching
      a. Presentation Switchers
      b. Matrix Switchers
   3. Video Distribution
      a. HDBT
      b. Digital Media
      c. DTP
   4. Cameras
      a. Pan/Tilt/Zoom
      b. Fixed
      c. Professional Tripod
   5. Video Conferencing
      a. Codecs
      b. Interface boxes
   6. Control System
      a. Touchpanel Controls
      b. Button Panel Controls

c. Processors
d. Input/Output converters and transport
7. Table Top boxes
a. Inserts
b. Modules
c. Cabling

D. CORDS AND ADAPTERS
1. Provide all necessary cords, adapters, cables, and interfaces to accept the input and output signals from the specified equipment to the rest of the system.

E. CABLING & WIRE – Not all cabling types listed below will necessarily be used. Some cables may not be used in this project. Additional cabling requirements may be noted in related spec sections, drawings, and in the equipment appendix.
1. Mic/Line Wire: 22 AWG 2-conductor twisted pair with drain wire, foil shield, and overall jacket. Provide plenum version in all required spaces.
a. Belden 9451 (Plenum -- 9451P)
b. West Penn 454 (Plenum – D25454)
2. Speaker Wire: 12 AWG 2-conductor twisted pair with overall jacket. Provide plenum version in all required spaces.
a. West Penn 227 (Plenum – 25227)
b. Belden 6000UE (Plenum – 6000UE)
3. Speaker Wire: 14 AWG 2-conductor twisted pair with overall jacket. Provide plenum version in all required spaces.
a. West Penn 226 (Plenum – 25226)
b. Belden 6100UE (Plenum – 6100UE)
4. Speaker Wire: 16 AWG 2-conductor twisted pair with overall jacket. Provide plenum version in all required spaces.
a. West Penn 225 (Plenum – 25225)
b. Belden 6200UE (Plenum – 6200UE)
5. HDMI cable: Pre-terminated HDMI cable. Confirm length in field prior to ordering. Limit cable length to less than 4.5 meters. Confirm long cables are within manufacturer's specifications for signal type in the specific application
a. Comprehensive NanoFlex Pro AV/IT Integrator Series
b. Or specified in BOM
6. Cat6 UTP: Eight Conductor, 24 AWG, non-shielded, twisted pair cable with overall jacket. Provide plenum version in all required spaces.
a. Belden 7883A (Plenum – 1352A)
b. Windy City Wire Cat6 (Plenum – Cat6P)
7. Cat7a S/UTP: Eight Conductor, 24 AWG, shielded, twisted pair cable with overall foil shield. Provide plenum version in all required spaces.
a. Extron XTP DTP 24/1000 (Plenum – XTP DTP 24P/1000)
b. Crestron DM-CBL-8G-NP-SP1000 (Plenum DM-CBL-8G-P-SP1000)

F. CONNECTORS
1. All connectors shall be manufactured by Neutrik unless expressly noted on the drawings or in the specifications. All panel mounted connectors should be compatible with Neutrik D-Series holes.

a. Audio – XLR type
   1) Cable: NC3FX-BAG or NC3MX-BAG
   2) Panel: NC3FDL-1-BAG or NC3MDL-1-BAG
b. Audio – ¼" type
   1) Cable: NP3C-BAG
   2) Panel: NJ3FP6C-B
c. Audio – RCA type
   1) Cable: NF2C-B-2
   2) Panel: NF2D-B-9 and NF2D-B-2
d. Audio – Speakon type
   1) Cable NL4FC
   2) Panel: NL4MP
e. Video – BNC type:
   1) Cable: match part number to manufacturer's cable
   2) Panel: NBB75DFIB or Canare BCJ-JRU
f. Video – Ethercon type
   1) Cable: NE8MC6-MO
   2) Panel: NE8FDY-C6-B

PART 3 - EXECUTION

A. COORDINATION
   1. Coordinate will all other building trades to facilitate a smooth and complete installation.
   2. Coordinate all power requirements and locations with the Electrical Contractor. Contractor shall provide appropriate direction to the Electrical Contractor pertaining to the location and quantity of electrical outlets serving Audio-Video Equipment

B. EXECUTION
   1. Provide a service loop of cable between any racks and the associated cabling/infrastructure on the nearby wall such that the rack can be moved away from the wall a sufficient distance to facilitate easy service of the rack and equipment.

C. APPENDIX A & B – EQUIPMENT LISTS
   1. See the attached appendix(s) for the equipment lists for the Audio-Video Systems. Lists are provided as a reference. Confirm all quantities with the related drawings. In case of conflict between the equipment lists and the related drawings, the contactor shall furnish the greater quantity or price impact. Note any quantity conflicts and bring to the attention of the Consultant as appropriate.

Appendix A - Audio & Control			
Qty	Make	Model	Description
Demolition			
1	Contractor	Demolition	Remove all unused cabling and provide blank covers for all unused AV locations

Speakers & Amplifiers			
42	QSYS	AD-C6T-LPZB-WH	6.5" Two-way ceiling speaker, 70/100V transformer with 16Ωbypass, zero bezel design, low profile, 150° conical **[areas A, B1, B2, C, D]**
4	QSYS	AD-S8T-WH	8" Two-way surface speaker, 70V w/ 8Ω bypass, 105° conical , includes X-Mount™ and weather input cup. Color - White. **[Rotary Hall]**
1	Zero-Ohm	2K2	2-channel, 2,000W **[areas A & C]**
1	QSYS	CX-Q 4K8	8-Channel 500W/CH Q-SYS Network Amplifier, Lo-Z, 70V, 100V direct drive, FlexAmp™, with Mic/line Inputs, 100-240V.
1	QSYS	SPA-Qf 60x4	4-ch, 60W/ch Q-SYS network audio Amplifier, Lo-Z, FlexIO, with Mic/line Input, 100-240v
Audio Inputs			
1	Symetrix	80-0224	Dante I/O endpoint, 2 mic/line in, 0x2 Dante, PoE, Decora single-gang US version, black **[Portable]**
1	Symetrix	80-0222	Dante I/O endpoint, 1 mic/line in, 1 line out, 1x1 Dante, PoE, Decora single-gang US version, black **[Portable]**
1	Symetrix	80-0191	Dante I/O endpoint, Bluetooth media in, Bluetooth phone I/O, stereo RCA I/O, stereo 3.5mm I/O, 4x4 Dante, PoE, Decora double-gang, black **[Portable]**
3	FSR	DSKB-1G	1-gang desktop mounting box **[for Portable]**
3	ProCo	DURACAT-15NB45	15ft, RJ45 to Ethercon **[for Portable]**
Wireless Mics			
2	Shure	ULXD4=-xx	Quad digital wireless receiver
4	Shure	ULXD2/B87A=-xx	Handheld transmitter w/ BETA 87 microphone
4	Shure	ULXD1=-xx	Digital bodypack transmitter
4	Shure	ULXD8=-xx	Wireless gooseneck microphone base
8	Shure	SB900B	Rechargeable battery
1	Shure	SBRC-US	Rack battery charger
4	Shure	SBC-AX	AXIENT® Charging Module for SB900A Batteries
4	Shure	MX410LP/S	10" Shock-Mounted Gooseneck, Supercardiod, less Preamplifier
2	Shure	DH5C/O-MTQG	DuraPlex Omnidirectional Subminiature Headset Microphone, Cocoa
2	Shure	MX153C/O-TQG	Omnidirectional earset microphone, Cocoa
1	RF Venue	4ZONE	4 zone antenna combiner

3	RF Venue	D-ARCW	Diversity Architectual Antenna, Install - White
6	RF Venue	RG8Xxx	RG8X15 BNC to BNC cable - length as needed
			Control
1	QSYS	CORE 8 FLEX	Core w/ 8 local audio I/O, 64x64 network I/O channels, 8x8 Dante included, USB AV bridging, dual LAN ports, 8x8 GPIO, 8 AEC. **[in OFE rack]**
1	QSYS	SLDAN-16-P	Q-SYS Software-based Dante 16x16 Channel License, Perpetual
1	QSYS	SLQUD-8N-P	Q-SYS Core 8 Flex, Core Nano, NV-32-H (Core Capable). UCI Deployment Software License, Perpetual.
1	QSYS	SLQSE-8N-P	Q-SYS Core 8 Flex, Core Nano, NV-32-H (Core Capable). Scripting Engine Software License, Perpetual.
5	QSYS	TSC-101-G3	Q-SYS 10.1" PoE Touch Screen Controller for In-Wall Mounting. Color - Black only **[A, B1, B2, C, Rack Room]**
1	QSYS	TSC-50-G3	Q-SYS 5" PoE Touch Screen Controller for In-Wall Mounting. Color - Black only **[D]**
1	Netgear	GSM4248UX-100NAS	40x1G PoE++ 2,880W and 8xSFP+ Managed Switch **[in OFE rack]**
1	QSYS	REFLECT	QSYS Reflect monitoring service. Term to match length of service contract
1	ALPHA LABS	DE-FEEDBACK v1 PRO	Pre-configured PC (Pro) w/ A.I. zero-latency gain before feedback + anti-reverberation
			Racks
2	OFE	OFE	40 RU gangable equipment rack
			Labor
1			*Programming - **[qty as needed]**
1			*Engineering/PM - **[qty as needed]**
1			*Custom Plates - **[qty as needed]**
1			*Lift Rental - **[qty as needed]**
			Wiring
1			*Network wire **[qty as needed]**
1			*Control wire - **[qty as needed]**
1			*Mic wire - **[qty as needed]**
1			*Speaker wire - **[qty as needed]**

****Product equipment list is provided as a reference. Report any conflicts in quantities to the consultant. Some products may not be listed above. See project drawings for items used, part numbers, quantities, and further details.**

Appendix B - Video

Qty	Make	Model	Description
Displays & Mounts & Rx			
2	NEC	E758	75", 3840 x 2160 (UHD), 18/7, High Haze, 350 cd/m2, RS-232C, LAN, Speakers, Integrated Ambient Light Sensor **[B1 & B2 Confidence]**
6	NEC	E988	98",3840 x 2160 (UHD), 24/7, High Haze, 350 cd/m2, RS-232C, LAN Speakers, Integrated Ambient Light Sensor **[A, B1, B2, C, Rotary Hall]**
7	Chief	AS3LD	Tempo™ Flat Panel Wall Mount System, no PDU **[A, B1, B2, C]**
1	Chief	XTM1U	Extra-Large Fusion® Micro-Adjustable Tilt Wall Mount **[for Rotary Hall TV]**
1	Chief	CSMP9X12	Proximity™ Component Storage Panel, Interface **[for Rotary Hall TV]**
8	AMX	AMX-N26D001	4K60 MWC/Dante AV-A & 1080p H.26x Multi-Codec Decoder
8	Comprehensive	MHD48G-3PROBLK	MicroFlex™ Pro AV/IT Integrator Series™ Certified Ultra High Speed 8K 48G HDMI Cable with ProGrip™ Jet Black 3ft
8	FSR	PWB-203-B	Wall Box w/ 6 IPS and 2 AC / Gang, Thin Wall - no cover **[coordinate w/ electrician for installation]**
dvLED - Mobile			
2	ATS-Pro	Collaborate 136-S	1.5mm Flip Chip COB, HD, 9.84'x5.54', all-in-one LED display on mobile cart
2	AMX	AMX-N26D001	4K60 MWC/Dante AV-A & 1080p H.26x Multi-Codec Decoder
2	ProCo	DURACAT-25NB45	25ft, RJ45 to Ethercon **[dvLED Cart to wall]**
2	ProCo	E143-25	E-CORDS: Black Electrical Extension Cords **[LED Cart]**
2	Contractor	Snakeskin	Snakeskin style cable wrap for TV cart cables, BLACK
Video Inputs			
6	AMX	AMX-N26E011	4K60 MWC/Dante AV-A Encoder Wallplate **[Wall Mounted]**
2	AMX	AMX-N26E013	4K60 MWC/Dante AV-A Encoder Wallplate **[Portable]**
2	FSR	DSKB-3G	3-gang desktop mounting box **[for Portable]**
2	ProCo	DURACAT-15NB45	15ft, RJ45 to Ethercon **[for Portable]**
Labor			
1			*Programming - **[qty as needed]**
1			*Engineering/PM - **[qty as needed]**
1			*Custom Plates - **[qty as needed]**
1			*Lift Rental - **[qty as needed]**

Wiring			
1			*Network wire **[qty as needed]**
1			*Control wire - **[qty as needed]**
1			*Mic wire - **[qty as needed]**
1			*Speaker wire - **[qty as needed]**

****Product equipment list is provided as a reference. Report any conflicts in quantities to the consultant. Some products may not be listed above. See project drawings for items used, part numbers, quantities, and further details.**

END OF SECTION