
Part 1 General

1.1 RELATED SECTIONS

- .1 Section 27 51 16 - Public Address and Mass Notification Systems.

1.2 PRODUCTS TO PROVIDE

- .1 The products listed in this section are to be delivered to site.
 - .1 Provide products quantities as indicated.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for products and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Packaging Waste Management: remove for recycling packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Divert unused metal materials to metal recycling facility.

1.5 ACCEPTABLE PRODUCTS AND MATERIALS

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products.

Part 2 Products

2.1 MULTIPURPOSE ROOM

- .1 Surround sound:
 - .1 Digital sound console: Behringer Digital Mixers X32 Producer.
 - .1 The mixing console must have 40 audio inputs and 18 audio outputs.
 - .2 Shall have a digital virtual processor stereo multi-effects, including the simulation of facilities already known for their reference effects (Lexicon 480L, PCM70, EMT250 Quantec QRS).
 - .3 The desk will be equipped with 17 faders of 100 mm and completely automated.
 - .4 The desk will be equipped with a high-definition 5 inch TFT LCD.
 - .5 The desk will be equipped with a remote control for iPad and iPhone.
 - .6 Mixing console will be connected to amplification systems with a network cable 6th class. See description below:
 - .7 The number of processing channels
 - 16 input channels;
 - 8 auxiliary channels;
 - 8 return channels of sound effects;
 - 16 auxiliary bus;
 - 6 masters matrices.
 - .8 Treatment internal sound effects: Stereo (8) and mono (16).
 - .9 Master Control 6 matrix bus and 16 mix buses, including dynamic processing of parametric EQ 6 bands. Over 8 groups of 6 DCA mute. Internal programming scene including the pre-amplification and potentiometers. Quantity of scenes: 100.
 - 40 bit signal processing.
 - A / D and D / A conversion 24 bit @ 44.1 / 48 kHz (Cirrus Logic A / D CS5368 D / A CS43825).
 - Local latency I / O: 0,8ms.
 - Network latency I / O: Treatment 1.1 ms.
 - .10 Connectors descriptions:
 - XLR3 programmable input (16).
 - XLR3 "Talkback" input (1).
 - RCA input / output (2/2).
 - XLR3 outputs (8)
 - Jack balanced inputs and outputs ¼ (6/6).
 - Jack ¼ output for stereo headset (1).
 - AES50 port, super MAC (2).
 - 32 expansion card standard variable audio input and output channels.
 - P-16 Ultranet connector (1).
 - Midi input and output (1/1).
 - Ethernet, RJ45 for assisted control (1).
 - USB type A for audio and "data export / import."

- .11 Microphones entries features:
 - Input impedance for XLR3 and Jack balanced and unbalanced 1/4 5 kohm and 10 kohm.
 - "Phantom Power" for inputs assignable 48V
 - Noise level of -128 dBu inputs XLR3.
 - CMRR, XLR3 @ 20 dB gain (typical) - 70 dB.
 - CMRR, XLR3 @ 40 dB gain - 80 dB.
- .12 Characteristics of inputs and outputs:
 - Frequency range @ 48 kHz sampling ratio 0 dB
 - 1 DB = 10 Hz to 22 kHz.
 - Dynamic range of analog input to analog output = 106 dB.
 - Dynamic range of A / D converted to preamplified = 109 dB.
 - Dynamic range of D / A converted output = 108 dB.
 - Amplitude diophonie @ 1 kHz adjacent channel = 100 dB.
 - XLR3 nominal output levels and maximum = + 4dBu / + 21 dBu.
 - XLR3 output impedance balanced and unbalanced + 75 ohm / 75 ohm.
 - TRS Jack input impedance, balanced and unbalanced = 20 kohm / 40 kohm.
 - Entry level: TRS maximum without clipping = +16 dBu.
 - Nominal output level: TRS = +4 dBu / +16 dBu.
 - Output Impedance: TRS balanced and unbalanced = 150 ohm / 300 ohm.
 - Output impedance level for the earphone = 40 ohm / 25 dBm (stereo).
 - Residual noise level XLR and TRS = -87 dBu weighted sound pressure.
- .13 Display screen 5 inch 800 x 480 262 K TFT color.
- .14 Main counter 18 segments (-45dB before clipping).
- .15 Power 100 to 240 V and 50 Hz to 60 Hz, 70 W. consumption
- .16 Mixing console to be equipped with a high performance X-Dante expansion card, 32 channels of 48 kHz bi-directional IP networks for high-speed signal transmission with 24 bit low latency.
- .17 Quantity: 2.
- .2 Storage bin for digital sound console: multi custom bins. Custom made with high density foam. To contain all cabling and accessories. Lifting handles and latch locks. Labeled contents.
 - .1 Quantity: 2.
- .3 Rack unit wireless receiver: Shure ULXD4Q (Base).
 - .1 Wireless receiver, RF signal stability, 4 RF channels with gain control. Ethernet for multi-channel network use such as Dante. To be installed in wall rack.
 - .2 RF Carrier Range: 470–932 MHz, varies by region.
 - .3 Image rejection: >70 dB, typical.
 - .4 Latency <2.9 ms.
 - .5 RF sensitivity: -98 dBm at 10-5 BER.
 - .6 Working range: 100 m (328 ft).
 - .7 Auto frequency response: 20 Hz to 20 kHz.

- .8 Dynamic range: >120 dB, (A-weighted).
- .9 (System Gain @ +10) Dante™ digital output: 130 dB, typical, (A-weighted).
- .10 Total harmonic distortion : <0.1%.
- .11 Quantity: 2.
- .4 Wideband antenna: Shure UA864 US.
 - .1 Wideband RF antenna, works with ULX-D digital, UHF-R and ULX and Axient wireless management network. Supplied with antenna and coaxial cables: lengths TBD.
 - .2 4-position selectable gain.
 - .3 100 degrees coverage.
 - .4 3dB beam width.
 - .5 BNC-BNC RG8X/U 50 ohms coaxial cables.
 - .6 Quantity: 2.
- .5 Handheld wireless microphone: Shure ULX D2-Sm58.
 - .1 RF handheld wireless, 8-hour battery life, backlit LED display (group, channel, battery level). AES 256-bit encryption.
 - .2 Range: 100 metres in ideal conditions.
 - .3 Frequency response: 25 Hz to 15 kHz ± 2 dB.
 - .4 Output level: mic = line: 20 dB.
 - .5 Receive output: deviation ± 38 KHz, ± 1 kHz).
 - .6 Impedance : ULXP4 output, 50 ohms line, 200 ohms mike.
 - .7 FM deviation: ± 38 kHz pre-equalization compressor expander system.
 - .8 RF sensitivity: 1.26 μ V for 12 dB SINAD, typical.
 - .9 Image rejection: 80 dB, typical.
 - .10 Interference rejection: 75 dB, typical.
 - .11 Attenuation limit: (ref.: deviation ± 38 kHz): 105 dBA, typical.
 - .12 Power requirements: 14-18 Vc.c. (tip positive), 550 mA.
 - .13 Operating temperature range: -20°C to 49°C.
 - .14 Power: 1 mW, 10 mW, 20 mW, option.
 - .15 Quantity: 4.
- .6 Wireless bodypack transmitter: Shure Beltpack ULX D1.
 - .1 Beltpack with wireless RF audio signal backlit LED display (group, channel, battery level) 8-hour battery life. AES 256-bit encryption.
 - .2 Range: 100 metres in ideal conditions.
 - .3 Frequency response: 25 to 15.000 Hz ± 2 dB.
 - .4 Transmitter gain: 25 dB.
 - .5 Receiver output level (deviation ± 38 kHz at 1 kHz): XLR (600 ohm) connector : +3.9 dBV (line), -17 dBV (mic), jack 6.35 mm (3,000 ohms): 2 dB.

- .6 RF sensitivity: 1,26 μ V for 12 dB SINAD, typical.
- .7 Image rejection: 80 dB, typical.
- .8 Interference rejection: 75 dB, typical.
- .9 Attenuation limit: (ref.: deviation \pm 38 kHz): 105 dBA, typical.
- .10 Total harmonic distortion (deviation \pm 38 kHz, à 1 kHz) : 0,3 %, typical.
- .11 Power supply: alkaline battery 9 V.
- .12 Battery NiCad : 8.4 V optional. Battery life: 8 to 9 hours (with 9 V alkaline battery).
- .13 Operating temperature range: -20 °C to 49 °C.
- .14 Quantity: 8.
- .7 Headworn vocal microphone: Shure WBH 54B or WH30.
 - .1 Supercardoid microphone, specific frequency response to extreme sound pressure.
 - .2 Transducer: static.
 - .3 Polar pattern: supercardoid.
 - .4 Frequency response: 20 Hz - 20 kHz.
 - .5 Sensitivity (1 kHz): -52 dBV/Pa / 2.5 mV/Pa.
 - .6 Equivalent noise level: 39 dB(A).
 - .7 Sound pressure: wire: 149 dB, wireless: 144 dB.
 - .8 Quantity: 4.
- .8 Wired microphone: Shure SM-58-S.
 - .1 Dynamic unidirectional cardoid, voice pause. Shock-mount to cut down noise.
 - .2 Transducer: dynamic.
 - .3 Polar pattern: cardoid.
 - .4 Frequency response: 50Hz - 15 KHz.
 - .5 Sensitivity (1 KHz): 54.5 dBV/Pa /1.88 mV/Pa.
 - .6 Quantity: 6.
- .9 Wired microphone: Shure SM-57.
 - .1 Dynamic unidirectional cardoid, for instruments.
 - .2 Isolates main sound source and minimizes background noise. Shock-mount to minimize mechanical noise and vibrations.
 - .3 Transducer: dynamic.
 - .4 Polar pattern: cardoid.
 - .5 Frequency response: 40 Hz - 15 kHz.
 - .6 Sensitivity (1 kHz): 54.5 dBV/Pa /1.88 mV/Pa.
 - .7 Quantity: 6.

- .10 Wired microphone: Shure Beta 56A.
 - .1 Dynamic unidirectional super cardioid, minimizes background noise. Shock-mounted to minimize mechanical noise and vibrations.
 - .2 Transducer: dynamic.
 - .3 Polar pattern: super cardioid.
 - .4 Frequency response: 50 Hz - 16 kHz.
 - .5 Sensitivity (1 kHz): 51dBV/Pa / 2.8 mV/Pa.
 - .6 Quantity: 2.
- .11 Wired microphone: Shure Beta 52.
 - .1 Uniform super cardioid microphone, for big speakers, minimizes background noise. Optimized for base frequencies. Shock-mounted to minimize mechanical noise and vibrations.
 - .2 Transducer: dynamic.
 - .3 Polar pattern: super cardioid.
 - .4 Frequency response: 20 Hz - 10 kHz.
 - .5 Sensitivity (1 kHz): 64 dBV/Pa / 0.6 mV/Pa.
 - .6 Quantity: 1.
- .12 Wired microphone: Sennheiser MD 421-II.
 - .1 Cardioid microphone, for miscellaneous use, bass attenuation. Internal shock resistant suspension system to minimize vibrations.
 - .2 Transducer: dynamic.
 - .3 Polar pattern: cardioid.
 - .4 Frequency response: 00 Hz - 17 kHz.
 - .5 Sensitivity (1 kHz): 2 mV/Pa +- 3 dB.
 - .6 Quantity: 2.
- .13 Wired microphone: Sennheiser MD 441-U.
 - .1 Super cardioid microphone, for instruments and vocals. Internal shock resistant suspension system to minimize vibrations.
 - .2 Transducer: dynamic.
 - .3 Transducer: super dynamic.
 - .4 Frequency response: 30 Hz - 20 kHz.
 - .5 Sensitivity (1 kHz) : 1.8 mV/Pa +- 2 dB.
 - .6 Quantity: 2.
- .14 Direct box microphone: Whirlwind IMP2.
 - .1 Passive direct box, 1 channel converts a line or instrument level unbalanced signal to a low impedance mic level balanced signal, including ground lift.
 - .2 Input: 1 ¼ in connector, TS unbalanced.
 - .3 Output: 1 XLR3 male and 1 phone ¼ in balanced.
 - .4 Output level: 20 dB under input level.

- .5 Frequency response: 20 Hz - 20kHz \pm 1 dB.
- .6 Quantity: 4.
- .15 Digital snake enclosure for microphone 16-8: DIGITAL SNAKE S 16.
 - .1 Anodized aluminum enclosure, black color, frame type, installed in a black painted wooden box.
 - .2 Enclosure to be controlled remotely by Ethernet via Cat 5E cable or higher shielded.
 - .3 Enclosure shall be able to support 48-way CAT5 cable channel at 48 kHz.
 - .4 Enclosure shall be able to support 24 bidirectional CAT5 cable channels at 96 kHz.
 - .5 Enclosure shall be able to support error detection and network redundancy management.
 - .6 It shall also be compatible with Ethernet TCP / IP protocol for the auxiliary channels.
 - .7 Enclosure to meet the aligned accurate clock distribution phase.
 - .8 Enclosure capable of vibration network capacity ultra-low and latency.
 - .9 Enclosure to include 16 XLR3 inputs and 8 XLR3 analog outputs servo-balanced.
 - .10 Enclosure provided with two-way communication for MIDI inputs and outputs.
 - .11 Enclosure to be compatible with audio mixing console (Behringer X 32 Producer).
 - .12 Enclosure: 16 Neutrik connectors XLR3 female + 8 XLR3 male.
 - .13 Cable: Category 5e or higher, shielded, length of 150 ft. Quantity: 2.
 - .14 Wooden storage box for Snake S-16 enclosure. Quantity: 2.
- .16 Storage bins for wireless microphones: custom bins.
 - .1 Custom made high density foam storage bins for wireless microphones. Capacity: 12 wireless microphones and accessories. Lifting handles and latch locks. Label.
 - .2 Dimension: TBD.
 - .3 Construction: Plywood $\frac{3}{8}$ in minimum, metal corners.
 - .4 Finish: Black vinyl.
 - .5 Quantity: 1.
- .17 Storage bins for wireless microphones: custom bins.
 - .1 Custom made high density foam storage bins for wireless microphones. Capacity: 24 wireless microphones and accessories. Lifting handles and latch locks. Label.
 - .2 Dimension: TBD.
 - .3 Construction: Plywood $\frac{3}{8}$ in minimum, metal corners.
 - .4 Finish: Black vinyl.

- .5 Quantity: 1.
- .18 Microphone stand with boom: K&M #210/6.
 - .1 Adjustable height microphone stand, 31 in boom, steel.
 - .2 Colour: black.
 - .3 Boom arm length: 31 in.
 - .4 Usable height: 36 in- 64 in.
 - .5 Quantity: 25.
- .19 Microphone stand: K&M #232.
 - .1 Microphone stand, anti-vibration, 6 in high, steel.
 - .2 Colour: black.
 - .3 Height: 6 in.
 - .4 Antivibration.
 - .5 Quantity: 6.
- .20 Microphone on base: K&M# 260/1.
 - .1 Microphone on base with round base, antivibration, variable height, steel.
 - .2 Colour : black.
 - .3 Variable height: 34.25 in - 62 in.
 - .4 Base diameter: 9.8 in.
 - .5 Antivibration.
 - .6 Quantity: 4.
- .21 Storage bins for wireless microphone stands: custom bins MIC-STANDS-CASE2.
 - .1 Custom made high density foam storage bins for wireless microphones. Capacity: 30 wireless microphone stands. Lifting handles and latch locks. Label.
 - .2 Dimension: 44 in x 35 in x 24 in.
 - .3 Rollers: 3.5 in locking.
 - .4 Construction: Plywood $\frac{3}{8}$ in minimum, metal corners.
 - .5 Finish: black vinyl.
 - .6 Quantity: 1.
- .22 XLR3F - XLR3M microphone cables: Digiflex N-XX Series.
 - .1 XLR3 microphone cables, 24 AWG, coiled, shielded 95%, flexible, Tourflex quality. Sizes: 15 ft - 25 ft - 50 ft.
 - .2 Colour: black.
 - .3 Connecters: XLR3F - XLR3M.
 - .4 Shield: 95% pure copper spiral.
 - .5 Jacket: flexible PVC.
 - .6 Quantity: 20 of 15 ft, 20 of 25 ft, and 10 of 50 ft.

- .23 Storage bins for microphone cables: standard.
 - .1 Storage bins for microphone cables. Separators for different lengths. Heavy duty rollers, lifting handles and latch locks. Label.
 - .2 Dimensions: 44 in x 30 in x 28 in.
 - .3 Rollers: 3.5 in locking.
 - .4 Construction: Plywood $\frac{3}{8}$ in minimum, with metal corners.
 - .5 Finish: black vinyl.
 - .6 Compartments: minimum three, adjustable.
 - .7 Quantity: 1.
- .2 Lighting - surround and small events:
 - .1 Dimmer rack: ETC Sensor3-48.
 - .1 Houses 48 double dimmers, total 96 2.4 kW dimmers.
 - .2 Distortion under 1%. 96.5% efficient at full charge. HMI ballast and load. Circuit specific for use with LED. Protection against load changes or breaker trips.
 - .3 Capacity: 48 double modules for total 96 dimmers.
 - .4 Heavy duty construction: 16 gauge.
 - .5 Capacity: 100 000 A SCCR.
 - .6 Advanced configuration.
 - .7 Presetting: 128 in memory.
 - .8 Ethernet direct control.
 - .9 Two DMX512-A inputs.
 - .10 Power supply: 120/208 V/3 phases.
 - .11 CEM+ electronic module.
 - .12 Interface in language RS-232 interface language, DMX by Durand 4201-B.
 - .13 Quantity: 2.
 - .2 Dimmer: ETC D-20.
 - .1 Designed for use with Sensor plus racks.
 - .2 Sensors to monitor circuit status information. Interchangable during operation, without interruptions. Capacity for low-voltage incandescent, halogen, neon, fluorescent lighting.
 - .3 Override.
 - .4 Temperature for each dimmer.
 - .5 24 double density D20 modules.
 - .6 350 μ S (risetime toroidal filters).
 - .7 High density module.
 - .8 Aluminum housing.
 - .9 Magnetic breakers.

- .10 100,000a SCCR.
- .11 Quantity: 48.
- .3 Stage projectors: ETC Source four 15-30.
 - .1 ERS 15°-30° biconvex double lens. Faceted dichroic reflector removes 90% of IR heat from beam. Anti-reflective coating and impact resistant. Each projector equipped with 6 ft cable with Twist Lock. NEMA L5-20P.
 - .2 Die cast aluminum housing.
 - .3 Focus lock.
 - .4 Locking mechanism.
 - .5 Rotation de l'obturateur de $\pm 25^\circ$.
 - .6 750 W.
 - .7 C hook.
 - .8 Gel extender.
 - .9 Gobo support.
 - .10 Security cable.
 - .11 Black.
 - .12 Quantity: 40.
- .4 Stage projectors: ETC Par EA
 - .1 Per type stage projector, interchangeable lens: very narrow, narrow, medium and wide. Die cast aluminum housing, 750 or 550 W HPL bulbs. Each projector equipped with 6 ft cable with Twist Lock. NEMA L5-20P.
 - .2 Die cast aluminum housing.
 - .3 Locking mechanism.
 - .4 750 W.
 - .5 C hook.
 - .6 Gel extender.
 - .7 Security cable.
 - .8 Lens: very narrow, narrow, medium and wide.
 - .9 Black.
 - .10 Quantity: 30.
- .5 Stage projectors: ETC Fresnel.
 - .1 Fresnel type stage projectors, adjustable. 750 or 575 W HPL. 6-ft cord (Twist Lock) NEMA L5-20P.
 - .2 Die cast aluminum housing.
 - .3 Zoom and focus.
 - .4 Locking mechanism.
 - .5 750 W.
 - .6 C hook.

- .7 Gel extender.
- .8 Security cable.
- .9 Black.
- .10 Quantity: 30.
- .6 Lighting console: ETC smart fade 2496.
 - .1 DMX, 2496 dimmers, 24 channels, 24 two-scene, 96 single scene. Memory and preset.
 - .2 24 Channels, 2-scene, 96 normal mode.
 - .3 512 DMX outputs.
 - .4 512 DMX inputs.
 - .5 576 normal mode.
 - .6 199 sequences.
 - .7 4 faders x 12 pages.
 - .8 10 (Snapshot).
 - .9 Undo function.
 - .10 24 (step sequences).
 - .11 1 SD card for show backup.
 - .12 1 LCD for configuration and preview.
 - .13 1 USB.
 - .14 1 input.
 - .15 1 MIDI output.
 - .16 Quantity: 2.
 - .17 Control wiring to connect lighting consoles to the dimmers, length of 150 ft each.
- .7 Storage bin for lighting console: multi bins. Custom made with high density foam. To contain 1 lighting console with cables and accessories. Lifting handles and latch locks. Labeled contents.
 - .1 Quantity: 2.
- .8 Storage bins for gel filters and lighting frames: custom.
 - .1 Equipped with separators for different colours. Latch handles and locks. Contents indicated on drawers.
 - .2 Dimension: TBD.
 - .3 Construction: Plywood $\frac{3}{8}$ in minimum, metal corners.
 - .4 Finish: black vinyl.
 - .5 Capacity: 100 projectors.
 - .6 Quantity: 2.
- .9 Stage lighting cables: NEMA L5-20P/20R extension cords.
 - .1 Rubber extension cables, three 12 AWG conductors, variable length, Hubble connectors, twist lock 125 V/20 A. Colour and number coded. Thermoplastic sheathing.

- .2 Extension cords: 1 male HBL2315 @ 1 female HBL2313.
 - .1 10 ft: quantity: 40.
 - .2 25 ft: quantity: 50.
 - .3 50 ft: quantity: 50.
 - .4 75 ft: quantity: 30.
- .3 Y type splitters: 1 male HBL2315 @ 2 female HBL2313.
 - .1 2 ft: quantity: 20.
 - .2 3 ft.: quantity: 20.
- .10 Storage bins for lighting cables: standard.
 - .1 Storage bins for lighting cables. Separators for different lengths. Heavy duty rollers, lifting handles and latch locks. Label.
 - .2 Dimensions: 44 in x 30 in x 28 in.
 - .3 Rollers: 3.5 in locking.
 - .4 Construction: Plywood $\frac{3}{8}$ in minimum, with metal corners.
 - .5 Finish: black vinyl.
 - .6 Compartments: minimum 4 adjustable.
 - .7 Quantity: 2.
- .3 Video.
 - .1 Projector: Christie DHD951-Q.
 - .1 1 chip DLP projector, 8500 lumens, HD 1 920 x 1 080 pixels native resolution. Operational 7/7, 24 hours. Two lamps and sealed lens. Lens TBD (1.2 @ 1.8:1). Support for round tube 1.9 in and security cable.
 - .2 Colour wheel: high brightness.
 - .3 Contrast: 2500:1.
 - .4 1 0.65 DMD chip.
 - .5 Resolution: 1 920 x 1 080 pixels native resolution.
 - .6 Double lamps: 370 W.
 - .7 Cadence: pixels 27 MHZ - 150 MHZ.
 - .8 1 DVI-D, 2 HDMI, 1 DB15, 1 3G-SDI, 1 BNC composite.
 - .9 Lens: 1.2 @ 1.8:1.
 - .10 Cables: DVI-D @ DVI-D, 25 ft.
 - .11 Quantity: 1.
 - .2 Screen: Draper model 383291.
 - .1 Portable projection screen, 11 ft x 20 ft with stand.
 - .2 Finish: M1300.
 - .3 Format: HD.
 - .4 Dimensions: 11 ft x 20 ft.
 - .5 Frame: aluminum.
 - .6 Dressing Kit.

- .7 Quantity: 1.
- .4 Control.
 - .1 Touch screen: Crestron TSW-750.
 - .1 7" touch screen, edge to edge glass, compatible with Streaming H.264. PoE and standard gang-box installation. Each TSW screen may be installed on wall or stand.
 - .2 Screen: TFT Active ACL colour.
 - .3 Format: 7 in, diagonal.
 - .4 Aspect Ratio: 15:9 WVGA.
 - .5 Resolution 800 x 480 pixels.
 - .6 Brightness: 300 nits (cd/m²).
 - .7 Contrast: 350:1.
 - .8 Colour depth 18-bit, 262k colours.
 - .9 Illumination Edgelit LED.
 - .10 Angle: ±70° horizontal, ±65° vertical.
 - .11 Touch screen: capacitive.
 - .12 Ram: 1 GB.
 - .13 Flash memory: 4 GB.
 - .14 Ethernet: 10/100 Mbps.
 - .15 PoE: IEEE 802.3 TYPE 1 - RJ45 10/100 Mbps.
 - .16 Quantity: 4.
 - .2 Touch tablet: IPAD AIR 32GB Wifi Apple.
 - .1 Ipad Wi-Fi 32 Gig with Retina 9.7 in.
 - .2 Chip: A7.
 - .3 Video camera: 1080 P.
 - .4 Wi-Fi: 802.11n.
 - .5 O/S: iOS7.
 - .6 Quantity: 2.

2.2 LOBBY

- .1 Surround sound.
 - .1 Rack unit wireless receiver: Shure ULXD4Q (Base).
 - .1 Wireless receiver, RF signal stability, 4 RF channels with gain control. Ethernet for multi-channel network use such as Dante. To be installed in wall rack.
 - .2 RF Carrier Range: 470–932 MHz, varies by region.
 - .3 Image rejection: >70 dB, typical.
 - .4 Latency <2.9 ms.
 - .5 RF sensitivity: -98 dBm at 10-5 BER.

- .6 Working range: 100 m (328 ft).
- .7 Auto frequency response: 20 Hz to 20 kHz.
- .8 Dynamic range: >120 dB, (A-weighted).
- .9 (System Gain @ +10) Dante™ digital output: 130 dB, typical, (A-weighted).
- .10 Total harmonic distortion : <0.1 %.
- .11 (-12 dBFS input, System Gain @ +10).
- .12 Quantity: 1.
- .2 Handheld wireless microphone: Shure ULX D2-Sm58.
 - .1 RF handheld wireless, 8-hour battery life, backlit LED display (group, channel, battery level). AES 256-bit encryption.
 - .2 Range: 100 metres in ideal conditions.
 - .3 Frequency response: 25 Hz to 15 kHz ± 2 dB.
 - .4 Output level: mic = line: 20 dB.
 - .5 Receive output: deviation ± 38 KHz, à 1 kHz).
 - .6 Impedance : ULXP4 output, 50 ohms line, 200 ohms mike.
 - .7 FM deviation: ± 38 kHz pre-equalization compressor expander system.
 - .8 RF sensitivity: 1.26 μ V for 12 dB SINAD, typical.
 - .9 Image rejection: 80 dB, typical.
 - .10 Interference rejection: 75 dB, typical.
 - .11 Attenuation limit: (ref.: deviation ± 38 kHz): 105 dBA, typical.
 - .12 Power requirements: 14-18 Vc.c. (tip positive), 550 mA.
 - .13 Operating temperature range: -20°C to 49°C.
 - .14 Power: 1 mW, 10 mW, 20 mW, option.
 - .15 Quantity: 2.
- .3 Wireless bodypack transmitter: Shure Beltpack ULX D1.
 - .1 Beltpack with wireless RF audio signal backlit LED display (group, channel, battery level) 8-hour battery life. AES de 256-bit encryption.
 - .2 Range: 100 metres in ideal conditions.
 - .3 Frequency response: 25 to 15.000 Hz ± 2 dB.
 - .4 Transmitter gain: 25 dB.
 - .5 Receiver output level (deviation ± 38 kHz at 1 kHz): XLR (600 ohm) connector : +3.9 dBV (line), -17 dBV (mic), jack 6.35 mm (3.000 ohms): 2 dB.
 - .6 RF sensitivity: 1,26 μ V for 12 dB SINAD, typical.
 - .7 Image rejection: 80 dB, typical.
 - .8 Interference rejection: 75 dB, typical.
 - .9 Attenuation limit: (ref.: deviation ± 38 kHz): 105 dBA, typical.
 - .10 Total harmonic distortion (deviation ± 38 kHz, à 1 kHz): 0.3%, typical.

- .11 Power supply: pile alkaline 9 V.
- .12 Accu NiCad : 8.4 V optional.
- .13 Battery life: 8 to 9 hours (9 V alkaline battery).
- .14 Operating temperature range: -20 °C to 49 °C.
- .15 Quantity: 2.
- .4 Headworn wireless microphone: Shure WBH 54B or WH30.
 - .1 Supercardoid microphone, specific frequency response to extreme sound pressure.
 - .2 Transducer: static.
 - .3 Polar pattern: supercardoid.
 - .4 Frequency response: 20 Hz - 20 kHz.
 - .5 Sensitivity (1 kHz): -52 dBV/Pa / 2.5 mV/Pa.
 - .6 Sound pressure: wire: 149 dB, wireless: 144 dB.
 - .7 Quantity: 2.
- .5 Wideband antenna: Shure UA864 US.
 - .1 Wideband RF antenna, works with ULX-D digital, UHF-R and ULX and Axient wireless management network. Supplied with antenna and coaxial cables: lengths TBD.
 - .2 4-position selectable gain.
 - .3 100 degrees coverage.
 - .4 3 dB beam width.
 - .5 BNC-BNC RG8X/U 50 ohms coaxial cables.
 - .6 Quantity: 2.
- .6 Passive antenna splitter: Shure UA 221.
 - .1 Passive antenna splitter combiner kit, splits RF signal into two outgoing signals. Works with UCA, SLX4, ULXS4, ULXP4, U4S, U4D, R4S and UR4D. Supplied with antenna and coaxial cables: lengths TBD.
 - .2 Quantity: 1.
- .2 Surround lighting.
 - .1 Grazer Color Kinetics MX4 Powercore lighting.
 - .1 DEL RGBW, 4-ft, supporting DMX512 protocol.
 - .2 60 x 30 beam lighting. Wiring and accessories for ceiling installation.
 - .3 Type: RGBW.
 - .4 Length: 4 ft.
 - .5 Control: DMX 512.
 - .6 Angle: 60 x 30 degrees.
 - .7 Junction cable: TBD.
 - .8 Cable splice: TBD.
 - .9 Terminal : TBD.

- .10 Quantity: 4.
- .3 Control.
 - .1 Touch screen: Crestron TSW-750.
 - .1 7 in touch screen, edge to edge glass, compatible with Streaming H.264. PoE and standard gang-box installation. Each TSW screen may be installed on wall or stand.
 - .2 Screen: TFT Active ACL colour.
 - .3 Format: 7 in, diagonal.
 - .4 Aspect Ratio: 15:9 WVGA.
 - .5 Resolution 800 x 480 pixels.
 - .6 Brightness: 300 nits (cd/m²).
 - .7 Contrast: 350:1.
 - .8 Colour depth 18-bit, 262k colours.
 - .9 Illumination Edgelit LED.
 - .10 Angle: $\pm 70^\circ$ horizontal, $\pm 65^\circ$ vertical.
 - .11 Touch screen: capacitive.
 - .12 Ram: 1 GB.
 - .13 Flash memory: 4 GB.
 - .14 Ethernet: 10/100 Mbps.
 - .15 Quantity: 2.
 - .2 Touch tablet: IPAD AIR 32GB Wifi Apple.
 - .1 Ipad Wi-Fi 32 Gig with Retina 9.7 in.
 - .2 Chip: A7.
 - .3 Video camera: 1080 P.
 - .4 Wi-Fi: 802.11n.
 - .5 O/S: iOS7.
 - .6 Quantity: 2.

2.3 MEMORIAL HALL

- .1 Surround sound.
 - .1 Wideband antenna: Shure UA864 US.
 - .1 Wideband RF antenna, works with ULX-D digital, UHF-R and ULX and Axient wireless management network. Supplied with antenna and coaxial cables: lengths TBD.
 - .2 4-position selectable gain.
 - .3 100 degrees coverage.
 - .4 3dB beam width.
 - .5 BNC-BNC RG8X/U 50 ohms coaxial cables.
 - .6 Control.

- .7 Quantity: 1.
- .2 Control.
 - .1 Touch screen: Crestron TSW-750.
 - .1 7" touch screen, edge to edge glass, compatible with Streaming H.264.
 - .2 PoE and standard gang-box installation.
 - .3 Each TSW screen may be installed on wall or stand.
 - .4 Screen: TFT Active ACL colour.
 - .5 Format: 7 in, diagonal.
 - .6 Aspect Ratio: 15:9 WVGA.
 - .7 Resolution 800 x 480 pixels.
 - .8 Brightness: 300 nits (cd/m²).
 - .9 Contrast: 350:1.
 - .10 Colour depth 18-bit, 262k colours.
 - .11 Illumination Edgelit LED.
 - .12 Angle: ±70° horizontal, ±65° vertical.
 - .13 Touch screen: capacitive.
 - .14 Ram: 1 GB.
 - .15 Flash memory: 4 GB.
 - .16 Ethernet: 10/100 Mbps.
 - .17 PoE: IEEE 802.3 TYPE 1 - RJ45 10/100 Mbps.
 - .18 Quantity: 1.
 - .3 Cables sets various categories and adapter.
 - .1 1 set HDMI to HDMI type cable, variable length between 6 ft and 10 ft. Quantity: 15.
 - .2 1 set of RJ45to RJ45 Cat 5e type network cable, variable length between 25 ft and 50 ft. Quantity: 25.
 - .3 1 set of XLR-3 male to XLR-3 female type cable, armored for DMX, variable length between 25 ft and 50 ft. Quantity: 25.
 - .4 XLR-3 female to XLR-5 male adapter, shielded for DMX. Quantity: 15.
 - .4 Miscellaneous equipment.
 - .1 All-purpose cables: NEMA 5-15P/15 Rextension cords.
 - .1 Rubber extension cables, three 12 AWG conductors, variable length, Hubble Straight Blade connectors, 125 V/20 A.
 - .2 Extension cords: colour and number coded. Thermoplastic sheathing.
 - .3 Extension cords: 1 male HBL2315 @ 1 female HBL2313.
 - .4 10 ft.: Quantity: 10.
 - .5 25 ft.: Quantity: 25.
 - .6 50 ft.: Quantity: 25.

- .7 75 ft.: Quantity: 10.
- .2 Storage bins, all purpose: standard multi bins.
 - .1 Cable storage bins to be provided with separators to segregate cables of different lengths. Heavy duty wheels, lifting handles and latch locks. Labeled contents.
 - .2 Dimensions : 44 in x 30 in x 28 in.
 - .3 wheels: 3.5 in, lockable.
 - .4 Construction : Plywood 3/8 in minimum, metal corners.
 - .5 Finish : black vinyl.
 - .6 Compartments : Minimum 4 adjustable spaces.
 - .7 Quantity: 2.

2.4 BASEMENT ELECTRICAL ROOM (FOR DIMMER 002)

- .1 Lighting.
 - .1 Dimmer rack: ETC Sensor3-48-12.
 - .1 Houses 12 double dimmers, total 24 2.4 kW dimmers.
 - .2 Distortion under 1%. 96.5% efficient at full charge. HMI ballast and load. Circuit specific for use with LED. Protection against load changes or breaker trips.
 - .3 Two 2.4 kW modules.
 - .4 Capacity: 12 modules for a total of 24 dimmers.
 - .5 Heavy duty construction: 16 gauge.
 - .6 Capacity: 100,000 A short-circuit (SCCR).
 - .7 Advanced configuration.
 - .8 Presetting: 128 in memory.
 - .9 Ethernet direct control.
 - .10 Two DMX512-A inputs.
 - .11 Power supply: 120/208 V/3 phases.
 - .12 CEM+ electronic module.
 - .13 Quantity: 1.
- .2 Dimmer: ETC D-20.
 - .1 Module graduable de type AF conçu pour être utilisé avec les armoires Sensor plus.
 - .2 Sensors to monitor circuit status information. Interchangeable during operation, without interruptions. Capacity for low-voltage incandescent, halogen, neon, fluorescent lighting.
 - .3 Override, temperature for each dimmer.
 - .4 24 double density D20 modules.
 - .5 350µS (risetime toroidal filters).

- .6 High density module.
- .7 Aluminum housing.
- .8 Magnetic breakers.
- .9 100,000a SCCR.
- .10 Quantity: 12.

2.5 MISCELLANEOUS LIFTING EQUIPMENT

- .1 Lighting trusses with pins and spigots.
 - .1 Trusses, 12 in x 12 in x 96 in centre with pins.
 - .2 Technical details:
 - .1 Aluminum, type 6061 T6, unpainted.
 - .2 Diagonals 1.9 in diameter with 0.20 wall thickness.
 - .3 Chords 1 in diameter with wall thickness 0.125 in.
 - .4 Allowable static load distributed over 16 ft, minimum 325 pound per linear foot, maximum deflexion 0.53.
 - .5 Static load at centre of 16 ft span based on minimum 2,600 lb, maximum deflexion 0.43 in.
 - .3 Welds certified by manufacturer.
Dolleys to transport trusses (total quantity of dollies to be confirmed with manufacturer).
 - .4 Quantities:
 - .1 Trusses: 27.
 - .2 Diagonals: 108.
 - .5 Acceptable products:
 - .1 Arcofab.
 - .2 Tomcat.
 - .3 Thomas.
- .2 Manual hoist.
 - .1 Manual 1 tonne capacity chain hoist.
 - .2 High quality hot dipped steel, Weston brake, heat treated forged steel, chain guides and zinc treated manual chain.
 - .3 Lifting height 34 ft, manual manouvouring chain, 2 to 3 ft shorter.
 - .4 Klein tools bag or other for storing chain when not in use. Quantity required: 18
 - .5 Quantity required: 18.
 - .6 Acceptable products:
 - .1 Vulcan.
 - .2 Jet.
 - .3 CM industries.

- .3 Various lifting equipment.
 - .1 Steelflex type slings.
 - .1 Capacity: 3000 lb.
 - .2 Dimension: 6 ft.
 - .3 Quantity required: 24.
 - .2 Manilles Crosby or certified imported $\frac{5}{8}$ in or $\frac{3}{4}$ tonne work load capacity.
 - .1 Quantity required: 36.
 - .3 Manille Crosby or certified imported $\frac{1}{2}$ in or 2 tonne work load capacity.
 - .1 Quantity require: 36.
- .4 Genie AWP30-S DC and AC Power platform standard lifting equipment.
 - .1 Quantity required: 2.

2.6 SECURITY GEAR FOR WORKERS

- .1 Safety harnesss with following certifications: ANSI Z359.1, NFPA 1983 class III, CSA Z259.10, CE EN 361, CE EN 358, CE EN 813, EAC.
 - .1 Quantity: 2.
- .2 Safety helmets with following certifications : CSA Z94.1-05 type 1 class E, ANSI Z89.1-2009 type 1 class E, CE*.
 - .1 Quantity: 4.
- .3 Gloves.
 - .1 Quantity: 4 including bags and fasteners.
- .4 Safety snaps.
 - .1 Quantity: 30.
- .5 Static rope for miscellaneous use, $\frac{7}{16}$ in and $\frac{1}{2}$ in, 100 ft.
 - .1 Quantity: 4.

2.7 EQUIVALENCE

- .1 Technical specifications of equipment listed in this section represent minimum performance criteria.
- .2 Provide specified equipment, or replacement materials or products approved by addendum according to Instructions to Bidders.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Lighting and equipment shall be tested on site, then put in storage bins or boxes.

- .2 Make necessary arrangements to conduct tests in the presence of Departmental Representative.

END OF SECTION