SECTION 11130

AUDIO & VISUAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The Drawings and general provisions of the Contract, including General Conditions and Division-1 Specification Sections, apply to Work of this Section.

B. Refer to the following Sections for applicability and interfaces:
1. Section 16111 – Conduit
2. Section 16120 – Wire and Cable
3. Section 16141 – Wiring Devices
4. Section 16700 - Electronics Systems General Requirements
5. Section 16755 - Door Control Systems
6. Section 16756 - Mechanical and Electrical Controls
7. Section 16760 - Control Panels
8. Section 16790 – LAN/Computer Data System

1.02 GENERAL

A. This section provides criteria and requirements for the following audio and visual systems.

B. Building 1 - Classrooms & Computer Lab AV system (typical of 5)-Each system will consist of one wall mounted interactive whiteboard. The whiteboard will serve as the projection screen in each room. A ceiling mounted, 3500 lumen LCD projector will project onto the interactive whiteboard. System connectivity and control will be performed via Crestron Quick Media components. All sources for these systems will be portable devices and OFCI. Connectivity provided via the Crestron interface will consist of one VGA w/ 3.5mm audio, one composite video and stereo audio, one S-video and stereo audio, one LAN and one AC outlet. The Crestron interface and controller will be mounted into a custom podium/instructor's desk. A two input VGA switcher will also installed to switch between the dedicated PC (OFE) and the auxiliary laptop connection. The audio system is a 70V system comprised of 6 ceiling speakers, a Crestron amplifier and one Shure wireless microphone combo.

C. Building 1 - Multi-Purpose Room AV System-This system will consist of a 58"h x 104" w, motorized, wall mounted projection screen. A ceiling mounted, 6000 lumen DLP projector will project on to screen. System connectivity and control is identical to the Classroom/Computer Lab system and will also be integrated into a custom podium/instructor's desk. The audio system will be a 70V system with 12 ceiling speakers, two wireless microphone combo systems and Crestron amplifier.

D. Building 2 – Activity Room AV System-This system is also similar to the others. This space will utilize a 58"h x 104" w, motorized, wall mounted projection screen. A ceiling mounted, 6000 lumen DLP projector will project on to screen. The Activity Room is also using Crestron's Quick Media components. A 3-gang wall plate with connectivity and control will serve as the interface for the system. The wall plate consists of one VGA w/ 3.5mm audio, one composite video and stereo audio, one S-video and stereo audio, one LAN, one AC outlet and a 12-button keypad. The audio system will be a 70V system with 12 ceiling speakers, two wireless microphone combo systems and Crestron amplifier.

1.03 SCOPE OF WORK

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with designing, furnishing, delivery and installation of the work of this section, complete as shown on the drawings and/or specified herein.

B. Rough in work (equipment back-boxes, conduit, terminal cabinets, junction boxes, and outlet boxes and other items shown on electrical drawings or specified herein) shall be supplied and installed by the electrical Contractor under another section. Electrical power to electronic equipment shall be provided by the electrical Contractor.

C. All audio and visual equipment shall be furnished by a qualified systems integration sub-contractor hereinafter referred to in this section as "the Contractor" or "Electronics Systems Contractor".

D. The Contractor shall submit a detailed system design that shall perform and operate within parameters specified. It shall ultimately be the Contractor's responsibility to ensure the submitted design meets all County of Orange criteria and feature requirements.

E. The Contractor shall design, furnish, functionally test, and document the systems of this section. The governing overall requirement is completely functioning systems.

1.04 CONTRACTOR QUALIFICATIONS

Due to the complexity and specialization of the electronic systems involved, the following qualifications are to be strictly enforced:

A. The Contractor under this section shall hold a valid C-10 Electrical Contractors License, issued by the Contractors State License Board of California. The Contractor shall have completed at least ten (10) projects of equal scope, giving demonstrable satisfactory performance, and references when requested.

B. The Contractor shall have been in business in the State of California a minimum of fifteen (15) years. The Contractor shall have been in business primarily as a professional sound systems Contractor.

C. The Contractor shall operate and maintain a competent service organization and a full inventory of all necessary replacement parts. He shall be capable of performing all warranty work within the response and "turn around" times specified elsewhere herein.

D. The Contractor must have a permanent business address at which a shop or facility suitable for routine component repairs is maintained, and is located within a fifty (50) mile radius of the project site. All rack fabrication shall be performed at contractor's facility. No home workshop, garage, or place of residence (all or part) shall be accepted as fulfilling this requirement.

E. The Contractor shall have at least one full time (1) Project Manager assigned to the project that has been extensively trained or degreed in the science and professional procedures of audio and visual system installation and design, and where applicable, programming methods and implementation of software based systems.

F. Upon request from the County or owner's representatives, the Contractor shall submit a statement from the manufacturer who supplies the equipment the Contractor is bidding, that he is an authorized vendor fully empowered to support the manufacturer's warranty program.

G. The Contractor shall be in good financial standing with all his suppliers as to not delay the project.

H. The Contractor must employ and assign a full time Crestron certified programmer.

1.05 QUALITY ASSURANCE

A. This specification includes the equipment of manufacturers who have been approved by the County and representatives and any specific units listed herein named shall be considered as meeting the requirements of this specification. This equipment was specified in keeping with established standards of quality and function both by the County and the manufacturer(s) named.

B. It shall be the responsibility of the Contractor to supply complete and operational audio and visual systems. The Contractor is responsible for verifying the completeness of the of the parts list, the correctness of the type numbers and the overall suitability of the equipment to meet the main purpose of the specification.

C. The Contractor shall review all architectural, electrical, and any related plans prior to submittal of any proposals or bids to ascertain all local and general conditions of the work to be performed. This shall include, but not be limited to the acoustical suitability, design, and treatment incorporated within the architectural design of the facility which would affect or prevent the completed system from operating as specified. Failure to do so shall not release the Contractor from responsibility for fully installing the complete and operational systems as specified without cause for additional payment.

D. The Contractor shall furnish and install all equipment and miscellaneous parts that may not be specifically enumerated herein but required for the proper integration of the systems so that each system shall perform the functions listed herein, in compliance with all the specified requirements.

E. Contractor shall comply with all applicable local, state and national codes.

F. The Contractor shall comply with applicable industry standards for systems, equipment, and components installed under this section. These standards include those of the following organizations:
   1. American National Standards Institute (ANSI)
   2. Electronics Industry Association (EIA)
   3. Institute of Electrical and Electronic Engineers (IEEE)
   4. National Electrical Manufacturer's Association (NEMA)
   5. Underwriter's Laboratories

1.06 SUBMITTALS

A. The Contractor shall prepare and submit for approval 6 (six) sets of proposal brochures. The brochures shall include a complete and accurate listing of all major items of equipment to be used in assembling the system, including all items of equipment listed in this specification, as well as Contractor's block diagrams indicating the proposed interconnection of all equipment to be furnished. All modifications of standard equipment necessary to meet specifications shall be explained fully and must be accompanied by schematic diagrams.

B. The Contractor shall submit floor plans for all systems, indicating all equipment and device locations, conduit sizes and wire quantity and type in each conduit run.

C. The Contractor shall submit elevations and details of all custom built assemblies.

D. Operation / Service Manuals: The Contractor shall furnish three (3) complete manuals for each system with the name and location of the project and/or system prominently displayed on the cover. The name, address, and phone number of the installing Contractor and manufacturers of all components utilized shall be included with the information. The manuals shall be provided within five days after the date the Contractor files a notice of completion, and shall be used to facilitate the final acceptance procedure by the owner.

E. These manuals shall contain the following minimum information for each system in this section:
   1. Operation Manual(s): A complete set of the manufacturer's instructions and procedures for proper operation shall be provided.
   2. Theory of Operation: Block diagram illustrations with text discussing the major circuit components, their function interrelation to one another, inputs and outputs, and major control parameters.
   3. Detailed Diagrams and Parts Lists: Part numbers, schematic drawings, and component parts lists for displays, annunciators, switch assemblies, electronics, and any other major components contained within the complete system.
   4. Preventative Maintenance Instructions: Periodic maintenance schedules, spare parts lists, test equipment requirements, calibrations, mechanical or electrical adjustments.
   5. Detailed Equipment Inventory: Serial numbers of all manufactured products including location and/or disposition to facilitate the County's fixed asset accounting procedure and warranty assistance.
   6. Corrective Maintenance Instructions: Test procedures for isolation of faulty components, major component replacement instructions (mechanical and electrical removal and replacement), and test equipment requirements.

1.07 IN SERVICE INSTRUCTION

A. The Contractor shall provide adequate on site instruction to end users in the operation of the equipment. A general information class and orientation shall be given to all applicable County personnel. This class will be scheduled and coordinated through the Project Manager's office at least 14 days in advance and will be take place on-site. All classes will be professionally conducted, with prepared audio-visual aids and comprehensive manuals provided to all students. Additional training may be requested for County personnel and technical personnel. The Contractor shall provide the following minimum hours of scheduled classroom instruction:
   1. 8 Hours End-User
   2. 4 Hours Technical

PART 2 – PRODUCTS

2.01 CONTRACTOR

A. Due to the complexity and specialization of the proposed audio and visual system required by the County, the County has required that an approved design/build company such as the following be utilized for the work under this Section:
   1. Edwards Technologies, 139 Maryland St, El Segundo, CA 90245. Tel: (310) 536-7070; Contact: Ravi Shankar
   2. Substitutions: See Section 01640 – Substitutions and Product Options.

2.02 MATERIALS/SYSTEMS

A. Building 1 - Classrooms & Computer Lab (typical of 5)
   1. Display

a. LCD Projector
   1) 3500 ANSI lumens.
   2) 16:9 aspect ratio.
   3) WXGA resolution
   4) Panasonic PT-FW300U or equivalent
b. A 110" diagonal interactive whiteboard, wall mount.
   1) 16:9 aspect ratio.
   2) Egan Teamboard or equivalent.
   3) Include 3rd party Wireless Bluetooth adapter.
c. Projector Mounting Hardware
   1) Chief RPM-U
   2) Chief CMA 115
   3) 1 ½" NPT Pipe-as required

2. Interfacing & Control
   a. Crestron Quick Media Line.
      1) QM-FTMC-SC-Flip Top Media Center
      2) QM-RMCRX-BA-Room Controller
      3) MK-QM-RMCRX-Rack Mount Kit
      4) FT-BTNB-L-Engraveable Buttons (as required)
      5) CNPWS-75-Power Supply
      6) CNXRMAK-Rack Mount Kit
   b. Switching
      1) Extron VSW 2VGA A-Two input VGA and stereo audio switcher or equivalent.

3. Audio System
   a. A wireless handheld/lavaliere combo microphone system
      1) Shure SLX124/85/SM58 or equivalent
   b. A 70v Amplifier
      1) Crestron QM-AMP3X80SR or equivalent
   c. 6 ceiling mounted speakers.
      1) JBL Control 26CT or equivalent
   d. Assisted listening system to meet ADA requirements.
      1) Listen Technologies LT-800-072 (1)
      2) Listen Technologies LR-400-072 (4)
      3) Listen Technologies LA-164 (4)
      4) Listen Technologies LA-122 (1)
      5) Listen Technologies LA-317-01
      6) Listen Technologies LA-362 (4)

   e. Marantz PMD560-Solid State recorder or equivalent.

4. Equipment Storage
   a. Equipment Rack
      1) Middle Atlantic SRSR-2-16 or equivalent.
   b. Ventilation panels, blank panels and mounting hardware as required.
   c. Rack equipment to include.
      1) QM-AMP3X80SR
      2) Dedicated OFE PC
      3) SLX124/85
      4) CNPWS-75 w/ CNXRMAK
      5) VSW 2VGA
      6) Furman M-8Lx-Power conditioner
      7) ALS Transmitter
      8) PMD560

B. Building 1 - Multi-Purpose Room (typical of one)
   1. Display
      a. DLP Projector

1) 6000 ANSI lumens.
2) 16:9 aspect ratio.
3) WXGA resolution
4) Dual Lamp
5) Panasonic PT-DW6300US or equivalent

b. A 58"H x 104"W wall mounted, motorized projection screen.

1) 16:9 aspect ratio.
2) White Matte
3) Tensioned
4) Low Voltage Controller
5) Dalite .Tensioned Cosmopolitan Electrol or equivalent

c. Projector Mounting Hardware
1) Chief RPM-U
2) Chief CMA 115
3) 1 ½" NPT Pipe-as required

2. Interfacing & Control
a. Crestron Quick Media Line.
1) QM-FTMC-SC
2) QM-RMCRX-BA
3) MK-QM-RMCRX-Rack Mount Kit
4) FT-BTNB-L-Engravable Buttons (as required)
5) CNPWS-75-Power Supply
6) CFNRXMAK-Rack Mount Kit

3. Audio System
a. Two wireless handheld/lavaliere combo microphone system
1) Shure SLX124/85/SM58 or equivalent
b. A 70v Amplifier
1) Crestron QM-AMP3X80SR or equivalent
c. 10 ceiling mounted speakers.
1) JBL Control 26CT or equivalent
d. Assisted listening system to meet ADA requirements.
1) Listen Technologies LT-800-072 (1)
2) Listen Technologies LR-400-072 (4)
3) Listen Technologies LA-164 (4)
4) Listen Technologies LA-122 (1)
5) Listen Technologies LA-317-01
6) Listen Technologies LA-362 (4)

4. Equipment Storage
a. Equipment Rack
1) Middle Atlantic SRSR-2-16 or equivalent.
b. Ventilation panels, blank panels and mounting hardware as required.
c. Rack equipment to include.
1) QM-AMP3X80SR
2) Dedicated OFE PC
3) SLX124/85
4) CNPWS-75 w/ CNXRMAK
5) Furman M-8Lx-Power conditioner
6) ALS Transmitter

C. Building 2 – Activity Room (typical of one)
1. Display

a. DLP Projector
   1) 6000 ANSI lumens.
   2) 16:9 aspect ratio.
   3) WXGA resolution
   4) Dual Lamp
   5) Panasonic PT-DW6300US or equivalent

b. A 58"H x 104"W wall mounted, motorized projection screen.
   1) 16:9 aspect ratio.
   2) White Matte
   3) Tensioned
   4) Low Voltage Controller
   5) Dalite .Tensioned Cosmopolitan Electrol or equivalent

c. Projector Mounting Hardware
   1) Chief RPM-U
   2) Chief CMA 115
   3) 1 ½" NPT Pipe-as required

2. Interfacing & Control
   a. Crestron Quick Media Line.
      1) QM-WMC with QM-WMIC
      2) QM-RMCRX-BA
      3) C2NDB12B
      4) DB12-BTNB-Engraveable Button
      5) CNPWS-75-Power Supply
      6) MK-QM-RMCRX-Rack Mount Kit
      7) CFNRXMAK-Rack Mount Kit

3. Audio System
   a. Two wireless handheld/lavaliere combo microphone system
      1) Shure SLX124/85 or equivalent
   b. A 70v Amplifier
      1) Crestron QM-AMP3X80SR or equivalent
   c. 12 ceiling mounted speakers.
      1) JBL Control 26CT or equivalent
   d. Assisted listening system to meet ADA requirements.
      1) Listen Technologies LT-800-072 (1)
      2) Listen Technologies LR-400-072 (4)
      3) Listen Technologies LA-164 (4)
      4) Listen Technologies LA-122 (1)
      5) Listen Technologies LA-317-01
      6) Listen Technologies LA-362 (4)

4. Equipment Storage
   a. A custom base cabinet will provide space for amplifier and misc. equipment.
   b. Sources for each room.
      1) Portable OFE DVD/VCR
      2) Laptop OFE.
      3) OFE Auxiliary microphones.

PART 3 - EXECUTION

3.01 INSTALLATION AND WORKMANSHIP

A. All installation workmanship shall meet professional as well as County standards. All

assemblies and equipment shall be installed physically square and true for proper appearance and operation.

B. All wire runs shall be made "home runs" with the minimum of mid-run splices possible observed. All splices and terminations shall be made in junction boxes specifically provided for the purpose and located on electrical drawings. No splices in conduits shall be allowed.

C. All wires, twisted pair, or cable shall be individually color coded or tagged at both ends with Thomas and Betts E-Z Markers or equal. All conductors in terminal cabinets and harnesses in equipment rack shall be carefully formed and harnessed utilizing plastic cable ties in a workmanlike manner. The appropriate cable tie "gun" set at proper tension shall be used to cut all excess. Service loops, sufficient to facilitate quick and safe access for maintenance and inspection, shall be provided at all terminal locations.

D. Proper grounding and shielding methods are to be observed to avoid ground loops in all audio circuits. "Daisy chains" or other grounding schemes that introduce ground loops shall not be tolerated. In general, the system master ground shall be located at the lowest level input. All shields shall be positively grounded at one point and positively isolated from ground at other points.

E. All wires, conductors, cables, spade lugs, etc shall be terminated according to the applicable manufacturers' instructions of the terminal product(s) used. Multiple conductors or wires shall not be installed in terminals designed for single conductors. Contractor shall not install or terminate cables of wire gauges larger or smaller than the intended gauge or gauge range for any connectors, terminal strips, or receptacles. "Kludge" or spliced pigtails or mid-run splices shall not used to circumvent using the appropriate sized termination product.

F. All surface or other exposed wiring not enclosed in conduit provided in the electrical drawings shall be covered or enclosed in Wiremold or approved equal by architect.

G. All connector plates and custom assemblies shall have engraved and filled designations describing the input function and/or input number in a logical and workmanlike manner.

H. The physical configuration, location, and installation of all system components in the system shall be such as to facilitate setup, maintenance, and repair of any component.

3.02 PERFORMANCE TESTS

A. Complete systems tests shall be conducted and reported to determine the performance level of the audio and visual systems as supplied and installed.

3.03 ACCEPTANCE PROCEDURE

A. The County shall maintain the right and option to inspect and/or inquire as to the progress of the installation throughout the period commencing with the contract award date. Any problems or deficiencies found during the course of the installation are to be submitted in writing to the General Contractor or to the appropriate party stipulated in the general provisions of this contract.

B. Following completion of the installation of all systems and systems checkout covered in this section, the Contractor shall notify the electrical or General Contractor who will, in turn, set a date 30 days hence for final acceptance/testing. The electronic systems Contractor and/or his project Manager, the electrical Contractor and/or the general Contractor or his representatives, and the owner shall be notified of the final acceptance testing date.

C. Acceptance testing shall be scheduled during regular County of Orange business hours on normal County work days. The County shall not be expected to provide personnel for testing on "flex days", weekends, evenings, or County holidays without reimbursement to the County

at current hourly County billing rates.

D. As Built Drawings, Service Manuals, and other submittals specified under "Submittals" elsewhere in this section or in related system sections under "Submittals" shall be provided to the County prior to the scheduled commencement of acceptance testing.

E. It shall be the responsibility of the General Contractor to ensure and verify that all sub-Contractors have tested their systems for completeness, functionality, and where applicable interoperability prior to scheduling acceptance testing.

F. Upon acceptance by the owner, a Notice of Acceptance shall be filed as stipulated by the general provisions in the pertinent sections of the general contract.

3.04 GUARANTEE PROVISIONS

A. All Electronic systems, including both manufactured equipment and installation shall be warranted against failure or any reduction in service arising from defects in workmanship, flaws in manufacture, or premature wearing out under normal daily use for a period of one (1) full year commencing from the date of acceptance by the owner.

B. Warranty service shall be performed during normal working hours, 8:00 a.m. to 5:00 p.m., Monday through Friday. The Contractor shall respond within eight (8) working hours for such service. It is required that the Contractor, upon responding to provide warranty service, shall restore critical systems to operational status within twenty-four (24) hours by:

1. The repair of a defective device or component.
2. By substitution of the defective components with Contractor-supplied spare components until off-site repairs can be completed.
3. Complete repair and/or full restoration of service shall be completed within five (5) working days. The Contractor shall be responsible for any expenses arising from rental, purchase, or other means necessary to restore full operation.
4. This warranty shall include, but not be limited to, travel time to and from the project site, transportation and/or handling charges applied to parts or equipment, any labor or materials used to effectuate repairs, or any other incidental expenses arising from fulfillment of this warranty. All provisions of this section shall be provided without cause for additional payment.
5. At the Owners request, the Contractor shall provide one (1) service call after full acceptance and during the warranty period for the purpose of fine-tuning and/or adjustment of displays or minor programming changes without cause for additional payment.

END OF SECTION