

City of Merced

REQUEST FOR PROPOSAL

Council Chamber PEG Audio/Visual Technology

Refresh

PROPOSAL OPENING: *April 26th, 2024*

CITY OF Merced CONTACT:
E-MAIL ADDRESS:

Jeff Bennyhoff, Director of I.T.
[bennyhoffj at cityofmerced.org](mailto:bennyhoffj@cityofmerced.org)

NOTICE TO PROPOSERS

NOTICE IS HEREBY GIVEN that the City of Merced will receive at the Information Technology Department, Merced, CA 95340 sealed proposals for the furnishing of a Council Chamber Audio/Video Technology refresh for the City of Merced.

All equipment, materials, and supplies shall be furnished F.O.B. City of Merced. Proposals shall be submitted on the proposal sheet provided or can be downloaded from the City’s Purchasing website; such proposals shall include all necessary specifications.

Each proposal shall be sealed and filed with the Information Technology Department, 678 W 18TH Street, Merced, CA 95340 no later than **April 26th, 2024 by 2:00pm** at which time proposals will be opened, read and recorded.

Proposals will be received only at the address shown above, **and prior to the time indicated**. Any proposal received at or after said time and/or date, or at a place other than the stated address cannot be considered and will be returned to the proposer unopened.

All proposals, whether delivered by an employee of the proposer, U.S. Postal Service, courier or package delivery service must be received and time stamped at the stated address prior to the time designated. The City of Merced assumes no responsibility for delay in the delivery of the proposal.

On the outside of **both the proposal envelope and courier envelope**, the proposer shall indicate the following:

NAME AND ADDRESS OF PROPOSER
Council Chamber Audio/Video Technology

MAIL TO: Information Technology
Council Chamber
Audio/Video Technology
City of Merced
678 W 18th Street
Merced, CA 95340

The City reserves the right to reject any or all proposals or to waive any informalities or minor irregularities in a proposal. No proposer may withdraw his/her proposal for a period of one-hundred twenty (120) days after the date set for the opening thereof.

CITY CONTACTS

All questions regarding these specifications, terms, and conditions shall be submitted in writing to Jeff Bennyhoff via email at: [bennyhoffj at cityofmerced. org](mailto:bennyhoffj@cityofmerced.org)

CALENDAR OF EVENTS

Event	Date
Proposal Issued	March 25th,2024
Mandatory Site Walk	April 8th @ 1:00pm 678 W 18th Street Merced, CA 95340
Written Questions Due	April 12th, 2024
Addendum Issued (if required)	April 19 th , 2024
Response Due	<u>BEFORE</u> 2:00 P.M. on April 26 th , 2024
Top three vendor presentation	Month of May
Proposal Award Date	Month of May/June

Note: Award and Implementation date is approximate.

Note: Deliver or mail proposals to the referenced address, only, as indicated in the Notice to proposers.

It is the responsibility of each proposer to be familiar with all of the specifications, terms and conditions and the site condition (if applicable). The proposer agrees and acknowledges all RFP/Q specifications, terms, and conditions and indicates the ability to perform by submission of a proposal. By the submission of a proposal, the proposer certifies that if awarded a contract they will make no claim against the City based upon ignorance of conditions or misunderstanding of the specifications.

OFFER AND ACCEPTANCE:

Seller represents his/her acceptance to provide products and/or services as follows: City's offer to purchase products and/or services is expressly conditioned upon Seller's assent to the terms and conditions set forth in City purchase order documents, specifications, supporting data, and these articles. Seller agrees that Seller's Order Acknowledgement terms and conditions received prior to, during, or after order placement by City are hereby rejected. City purchase orders signed by the City's Purchasing Manager or his designated agent and issued to Seller constitutes written notification to Seller of City's rejection of any and all of Seller Order Acknowledgements, counter offers and change to the City's terms and conditions.

PROPOSAL

ACKNOWLEDGEMENT

REQUEST FOR PROPOSAL

Council Chamber Audio/Video Technology

The City is soliciting proposals from qualified proposers to furnish its requirements per the specifications, terms and conditions contained in the above referenced proposal number. This Proposal Acknowledgement must be completed, signed by a responsible officer or employee, dated and submitted with the proposal response. Obligations assumed by such signature must be fulfilled.

1. **Preparation of Proposals:** (a) All prices and notations must be printed in ink or typewritten. No erasures permitted. Errors may be crossed out and corrections printed in ink or typewritten adjacent and must be initialed in ink by person signing the proposal. (b) Quote price as specified in proposal. No alterations or changes of any kind shall be permitted to the Proposal Form. Responses that do not comply shall be subject to rejection in total.
2. **Taxes and Freight Charges:** (a) Unless otherwise required and specified in the RFP, the prices quoted herein do not include Sales, Use or other taxes. (b) No charge for delivery, drayage, express, parcel post packing, cartage, insurance, license fees, permits, costs of bonds, or for any other purpose, except taxes legally payable by City, will be paid by the City unless expressly included and itemized in the proposal. (c) Amount paid for transportation of property to the City is exempt from Federal Transportation Tax. An exemption certificate is not required where the shipping paper shows the consignee as one (1) of the Agencies; as such papers may be accepted by the carrier as proof of the exempt character of the shipment. (d) Articles sold to the Agencies are exempt from certain Federal excise taxes. The Agencies will furnish an exemption certificate.
3. **Award:** (a) Unless otherwise specified by the proposer or the RFP gives notice of an all-or-none award, the City may accept any item or group of items of any proposal. (b) Proposals are subject to acceptance at any time within thirty (30) days of opening, unless otherwise specified in the RFP. (c) A valid, written purchase order mailed, or otherwise furnished, to the successful proposer within the time for acceptance specified results in a binding contract without further action by either party. The contract shall be interpreted, construed and given effect in all respects according to the laws of the State of California.
4. **Patent Indemnity:** Proposers who do business with the City shall hold the City, its officers, agents and employees, harmless from liability of any nature or kind, including cost and expenses, for infringement or use of any patent, copyright or other proprietary right, secret process, patented or unpatented invention, article or appliance furnished or used in connection with the contract or purchase order.
5. **Samples:** Samples of items, when required, shall be furnished free of expense to the City and if not destroyed by test may upon request (made when the sample is furnished), be returned at the proposer's expense.
6. **Rights and Remedies of Agencies for Default:** (a) In the event any item furnished by the proposer in the performance of the contract or purchase order should fail to conform to the specifications therefore or to the sample submitted by the proposer with its proposal, the City may reject the same, and it shall thereupon become the duty of the proposer to reclaim and remove the same forthwith, without expense to the City, and immediately to replace all such rejected items with others conforming to such specifications or samples; provided that should the proposer fail, neglect or refuse so to do the City shall thereupon have the right to purchase in the open market, in lieu thereof, a corresponding quantity of any such items and to deduct from any moneys due or that may there after come due to vendor the difference between the prices named in the contract or purchase order and the actual cost thereof to the City. In the event that the proposer fails to make prompt delivery as specified for any item, the same conditions as to the rights of the City to purchase in the open market

and to reimbursement set forth above shall apply, except when delivery is delayed by fire, strike, freight embargo, or Act of God or the government.

(b) Cost of inspection or deliveries or offers for delivery, which do not meet specifications, will be borne by the proposer. (c) The rights and remedies of the Agencies provided above shall not be exclusive and are in addition to any other rights and remedies provided by law or under the contract.

7. **California Government Code Section 4552:** In submitting a proposal to a public purchasing body, the proposer offers and agrees that if the proposal is accepted, it will assign to the purchasing body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2, commencing with Section 16700, of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, materials, or services by the proposer for sale to the purchasing body pursuant to the proposal. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the proposer.
8. **No Guarantee or Warranty:** The City makes no guarantee or warranty as to the condition, completeness or safety of any material or equipment that may be traded in on this order.
9. **One “Inked” Signed Original Proposal Document Required:** Failure to furnish one “inked” signed original proposal document may result in disqualification.

THE undersigned acknowledges receipt of the referenced RFP and/or Addenda and offers and agrees to furnish the articles and/or services specified on behalf of the proposer indicated below, in accordance with the specifications, terms and conditions of this RFP and Proposal Acknowledgement, for the pricing indicated on the Pricing Schedule.

Firm:
Address:
City/State/Zip:
Signature/Title/Date:

PRICING SCHEDULE

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Proposer shall submit pricing in a separate sealed envelope.

- Pricing proposal shall be the maximum fee to be charged for the proposed services, hardware and software.
- Pricing shall be broken down by task. Proposal shall list projected man hours by task required to complete the work as defined in Scope of Work along with the hourly billing rates for the various levels and staff who will be assigned to the project.
- Bill of Material shall be provided for all hardware and software required.
- Pricing proposal shall also cost summary as listed below.
- Proposal shall be signed.

Cost Summary

Costs	Total
Hardware & Software Licensing	
Third Party Software	
Documentation & Training	
Support/Maintenance	
Installation	
Integration	
Misc.	
Other (specify)	
Other (specify)	
Total:	

The undersigned acknowledges receipt of the referenced RFP and/or Addenda and offers and agrees to furnish the articles and/or services specified on behalf of the proposer indicated below, in accordance with the specifications, terms and conditions of this RFP and Proposal Acknowledgement, for the pricing indicated on the Pricing Schedule.

Company Name (Proposer):
By (Person Submitting Proposal): (Print)
By (Person Submitting Proposal): (Signature)
Title of Person Submitting Proposal:
Business Address (City/State/Zip):
Email Address:
Telephone Number:
Date / Company Name (Proposer)

REFERENCES

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Council Chamber Audio/Video Technology

All proposers must provide a list of three (3) current or former clients in the area provided below, identifying prior experience with the same type of project similar in size, application, and scope services requested by the City under **Scope of Work**. References shall have similar projects and requirements to those outlined in these specifications, terms and conditions. Proposer's failing to provide references shall be deemed unacceptable.

The City may contact some or all of the references provided in order to determine the Proposers' performance record on services similar to that described in this proposal. The City reserves the right to contact references other than those provided in the response and to use the information gained from them in the award process.

Company Name:	
Address:	
City, State, Zip Code:	
Contact Person:	
Email Address:	
Telephone Number:	
Type of Business:	
Date of Installation:	
Contract Value	\$

Company Name:	
Address:	
City, State, Zip Code:	
Contact Person:	
Email Address:	
Telephone Number:	
Type of Business:	
Date of Installation:	
Contract Value	\$

Company Name:	
Address:	
City, State, Zip Code	
Contact Person:	
Email Address:	
Telephone Number:	
Type of Business:	
Date of Installation:	
Contract Value	\$

EXCEPTIONS, CLARIFICATIONS, AMENDMENTS

REQUEST FOR PROPOSAL Council Chamber Audio/Video Technology

Exceptions, Clarifications, Amendments

List requests for proposal clarifications and exceptions below, if any, sign and submit with your proposal response.

Item No.	Reference To:		Description
	Page No.	Paragraph No.	

PROPOSER QUALIFICATIONS STATEMENT

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All vendors must provide the following information in order for their proposal to be considered:

1. A brief outline of the vendor company and services offered, including:
 - a. Full legal name of the company
 - b. Year business was established
 - c. Number of people currently employed
2. An outline of the product line-up they currently support.
3. A description of their geographical reach and market penetration.
4. An outline of their partnerships and relationships to date.
5. An outline of their current and future strategies in the marketplace.
6. Information on current clients, including:
 - a. Total number of current clients.
 - b. Evidence of successful completion of a project of similar size and complexity.

Provide a brief description of the implementation projects for each of the references provide

REQUEST FOR PROPOSAL

Council Chamber Audio/Video Technology

SYSTEM CAPABILITIES, TECHNICAL SPECIFICATIONS, AND SERVICE REQUIREMENTS

1 Introduction

The purpose of this Request for Proposal (RFP) is to invite prospective vendors to submit an offer to design, configure, and installation, and removal of old audio/video cabling/equipment for the council chambers. This RFP provides vendors with the relevant operational, performance, application, and architectural requirements of the organization's system. The ideal vendor shall have qualified experience in implementing an Audio/Video technology upgrades in local government and/or businesses of similar size and scope to City of Merced.

2 General Information

2.1 Original RFP Document

City of Merced shall retain the RFP, and all related terms and conditions, exhibits, and other attachments in original form in an archival copy. Any modifications of these, in the vendor's submission, are grounds for immediate disqualification.

2.2 The Organization

The City of Merced Information Technology Department is a centralized department that provides technology based solutions and service to all departments within the local government agency. The department is responsible for the Audio/Video technology in the council chambers. The audio/video equipment is mainly used to broadcast council meeting on the Public Education Government channel on subscription based TV services.

Currently, the City has two main components to the Audio/Video Technology in the Council chambers that connect to each other.

- 1: Audio/Video system (Crestron/Qsys)
- 2: Tri-caster Elite 2 and cameras

The City Goals are:

- Replace the aging audio/video equipment with new equipment
- Provide better viewing experience for citizens with enhanced audio/video
- Maintain the GUI and button appearance so no additional training is needed for staff

3 Scope of Work, Specifications & Requirements

The scope of work outlines below is not a detailed engineering document and may require minor changes. See the attached line diagram for audio and video input/output connections and recommended parts lists. The successful candidate will be responsible to design/deliver/install/configure/validate a complete audio/visual “turnkey system” for the council chambers.

- The successful candidate will be responsible to migrate from the old audio/video system to the new audio/video system with the least impact to City. This includes ensuring the old system is completely functional during the transition to the new system. No work shall be performed on the 1st and 3rd Mondays of any month to not conflict with City Council meeting. The Room must be clean and free of all equipment on council meetings days.
- The successful candidate, once acceptance testing has been complete and signed off on, will attend the first two council meetings to help troubleshoot and correct any problems during the meeting.
- Crestron and Q-SYS programming must be performed by a manufacturer certified programmer.
- Crestron and Q-SYS equipment must be purchased through Crestron and Q-SYS authorized dealers/resellers.
- All cabling must be Crestron certified for control and video systems. Any cabling used for Audio must be broadcast quality. All cabling run through the ceiling, walls, dais, or podium area shall be plenum rated.
- All cables and equipment not used from the old Audio/Video system will be removed and returned to the City.
- All cables installed as part of the project, greater than 6ft, will be labeled on both ends with self-laminated printed labels
- Asset tag, with City Stickers, on all equipment over \$500. Provide spreadsheet with Asset tag, Part number, Product description, and Serial number.

- A poster board (Bond and foam core) 36 x 48 showing the input/output , functional line diagram shall be mounted in the video room on the south wall.
- 3 copies of all source configuration files for all devices shall be provided on USB Drives
- The successful candidate will provide a three-hour training on the basic Technical/administrative and troubleshooting steps to the Information Technology Department.
- The successful candidate will provide a two-hour training to the Clerks Departments on the end-user administration of the system.
- All equipment will have the newest firmware installed and loaded unless there is a known issue with the firmware and the vendor gets a waiver from City staff.
- All old Audio / Visual Equipment will be removed and returned to the City, The City may or may not elect to have the vendor E-waste old product.
- In the scope listed in Exhibit “B” the vendor will physically install/configure the equipment and run the cabling to connect the equipment in a professional manner.

3.1 Overview of Proposed Solution

Provide the name of the proposed audio/video solution as well as its basic form factor (rack size, expansion options, number of ports, kinds of ports, and environmental requirements). Describe in general terms the critical attributes of the solution which will have.

3.2 Technical Specifications and Requirements

Please describe in detail how the proposed solution be provided technical support.

3.2.1 Capacity, Scalability and Physical Size

Please describe the physical U size of the equipment, the overall power requirements, the BTU requirements, and the capability for expansion of the system.

3.2.2 Equipment list

Please Attach a complete equipment list

3.4 Support

The successful candidate, once acceptance testing has been complete and signed off on, will provide 2nd tier technical support, as an augmentation of support by the Information Technology Department, Monday-Friday/8:00am-5:00pm of the system for 1 year. An acceptable call back time window would be next business day.

3.4.1 Service Provider

Please state the name of the company which will be delivering service and on-site support for the proposed solution. If service support is outsourced to another firm, how long has this relationship been in effect? List the name of the outsource firm proposed.

3.4.2 Product History

For each and all major software and hardware component list the end of support date if published by the manufacturer.

Payment Terms

1. All hardware items will have NET 60 payment terms upon installation of item
2. All non-hardware items will have payment terms governed by the Professional services agreement.

Evaluation Criteria

Responses should be complete and detailed. However, if relevant information needs to be presented to further support the proposers' case, other appropriate sections may be added in the proposers' submittal.

All proposals submitted will be reviewed by a City of Merced evaluation committee. At the completion of the proposal review, finalists may be asked to provide an in-depth presentation in Merced. Whether or not a presentation shall be performed is wholly within the discretion of the evaluation committee. The committee will select the proposal which best fulfills the City's requirements and represents the best value to the City of Merced as determined by the evaluation committee. No single factor will determine the final award decision.

Overall responsiveness to the Request for Proposal is an important factor in the evaluation process.

Evaluation Criteria	Point Value
1. Price and value of proposal	55
2. Demonstrates the ability to meet the requirements and scope of work	30
3. Relevant experience, qualifications and capabilities of the contractor and key personnel.	10
5. References	5
Total Points	100

GENERAL TERMS AND CONDITIONS

Proposers are urged to read the proposal documents very carefully and to submit their questions in writing by the due date for questions. Misinterpretations of the proposal documents by the proposer shall not relieve the proposer of the responsibility to perform the contract.

Proposers shall submit one (1) “inked” (preferably blue) signed original proposal plus 3 (3) copies.

One complete set of Financial Statements shall be submitted in a sealed separate envelope filed with the **(original proposal document)**.

FAILURE TO FURNISH ONE “INKED” SIGNED ORIGINAL PROPOSAL DOCUMENT MAY RESULT IN DISQUALIFICATION.

All costs associated with the preparation of this proposal shall be borne by the proposer.

All exceptions taken to these specifications shall be specifically and clearly identified on the Exceptions, Clarifications, and Amendments Form. **Failure to comply with this provision is grounds for proposal rejection.**

Exceptions taken shall not affect the overall performance and quality of equipment, materials and/or services required by the City. The City shall make the final decision regarding the acceptability of equipment, materials and/or services with exceptions.

5.1.1 ACCEPTANCE/REJECTION OF IRREGULAR PROPOSALS

A contract shall be awarded to the proposer whose proposal most closely satisfies the needs of the City and is deemed the most advantageous to the City. The City reserves the right to reject any or all proposals or to waive any informalities or minor irregularities in a proposal.

5.1.2 COMPLETE PROPOSAL SUBMITTAL:

The following documents constitute the makeup of a complete proposal submittal:

- Proposal Acknowledgement **(Signature Form)**
- Pricing Schedule **(Signature Form)**

- References
- Exceptions, Clarifications, Amendments
- Proposers Qualification Statement
- System Capabilities

Failure to furnish any of these documents may result in disqualification.

5.1.3 PROPOSAL PREPARATION

Proposals shall be prepared in the order listed in Section 5.1.2 Complete Proposal Submittal. Proposals should be tabbed with dividers. Tabbed dividers shall be clearly marked indicating the appropriate document.

5.2 COMPLIANCE

Proposers are required to sign the “Pricing Schedule and Proposal Acknowledgement Forms” of this proposal document, thereby acknowledging they are in full compliance with all requirements of RFP and any addendum to such proposal. **Failure to comply may result in disqualification.**

5.3 NON-COMPLIANCE

If you cannot comply with a specification requirement, note as an addendum on the Exceptions, Clarifications, Amendments Form specification paragraph, your exception, and your recommendation. The City will evaluate your recommendation. If after evaluation it is determined that the proposer is not in compliance with the specification, the proposal may be rejected.

5.4 PRICING FORMAT

- A. Pricing shall remain firm for the term of the contract.
- B. Unless otherwise stated, the proposer agrees that, in the event of a price decline, the benefit of such lower pricing shall be extended to the City.
- C. All prices shall be F.O.B. Destination, Merced, CA. Any freight/delivery charges shall be included in the unit price of the item.

5.5 PRICING SCHEDULE

Proposers shall use the Pricing Schedule Form to present their proposed pricing. No other form or format shall be accepted.

5.6 AWARD OF PROPOSAL

Proposals shall be evaluated by a committee and will be ranked in accordance with the RFP section entitled “Evaluation Criteria.”

The committee shall recommend awarding to the proposer(s) who, in its opinion, has submitted a proposal that best serves the overall interests of the City, and attains the highest overall point score. Award may not necessarily be made to the proposer with the lowest price.

The City reserves the right to decline to award a contract if it is determined that the proposed pricing is not competitively priced based on similar contracts with public agencies within the State of California.

5.7 EVALUATION PROCESS

Proposals shall be evaluated using a three (3) step process:

Level 1 – Minimum Qualifications Review: The City shall perform an initial responsiveness review to determine compliance. Proposers that do not meet the “Minimum Qualifications” requirements shall be deemed non-responsive and/or non-responsible to this RFP and will receive no further consideration.

Level 2 – Proposal Content and Cost Ratings: Proposals that meet Level 1 Minimum Qualifications Review shall be evaluated based on the evaluation criteria “Proposal Evaluation Criteria”. Proposer submittals shall be evaluated and scored. Proposer cost information shall be evaluated as part of Level 2 evaluation process.

Level 3 – Short List (Oral Presentations): At the sole discretion of the Evaluation Committee, a “short list” of proposers may be developed of the highest rated written submissions, based on Level 1 and Level 2 rankings. If the Evaluation Committee chooses, these proposers would be invited to give oral presentations. Final scoring of “short list” proposals shall be completed upon the conclusion of oral presentations.

5.8 QUANTITIES

The contract shall remain in effect until the City accepts and pays for all services requested.

5.9 INSPECTION AND ACCEPTANCE

Whenever the product or service provided by the supplier has been delivered to the delivery point, the designated agent shall make the final inspection and acceptance.

If upon initial inspection the product or service is found to be defective in its construction or deficient in any of the requirements of this specification, the supplier shall remedy or remove said product in an acceptable manner at the supplier's expense. No compensation shall be allowed for such correction of product, labor, or transportation of product.

5.10 CITY BUSINESS/DELIVERY LICENSE

Prior to beginning any service that shall be furnished under this specification and proposal, the Proposer shall secure the appropriate Business license from the City of Merced.

5.11 Registration with California Department of Industrial Relations (DIR) :

This project is subject to compliance and monitoring by the State of California DIR under the public contracting registration and reporting requirement specified in SB 854. As of July 1, 2014, the DIR established an online registration system which allows contractors and subcontractors to register. The registration form is located on the DIR's website:

<http://www.dir.ca.gov/DLSE/dlsepublicworks.html>

5.12 Prevailing Wages:

Notice is hereby given that the latest general prevailing rate of per diem wages, as determined by the Director or the Department of Industrial Relations, State of California, is to be paid to the various craftsmen and laborers employed in the construction of this project and is made a part of the specifications and contract for this project.

5.13 Professional Service Agreement: The City standard professional service agreement shall be used for this engagement. It is attached as Exhibit “A”.

6. Additional Exhibits (attached).

- Exhibit B Systems Specifications Section 27 41 16
- Exhibit C System Line Diagrams
- Exhibit D Touch Panel Examples
- Exhibit E Crestron Code on Existing System

Exhibit "A"

AGREEMENT FOR PROFESSIONAL SERVICES

THIS AGREEMENT is made and entered into this ____ day of _____, 2024, by and between the City of Merced, a California Charter Municipal Corporation, whose address of record is 678 West 18th Street, Merced, California 95340, (hereinafter referred to as "City") and _____, a _____, whose address of record is _____, (hereinafter referred to as "Consultant").

WHEREAS, City is undertaking a project to Upgrade and Replacement City Council Chambers Audio Visual Technology; and,

WHEREAS, Consultant represents that it possesses the professional skills to provide _____ services in connection with said project.

NOW, THEREFORE, the parties hereto, in consideration of the mutual covenants hereinafter recited, hereby agree as follows:

1. SCOPE OF SERVICES. The Consultant shall furnish the following services: Consultant shall provide the _____ services described in Exhibit "A" attached hereto.

No additional services shall be performed by Consultant unless approved in advance in writing by the City, stating the dollar value of the services, the method of payment, and any adjustment in contract time. All such services are to be coordinated with City and the results of the work shall be monitored by the _____ or designee. However, the means by which the work is accomplished shall be the sole responsibility of the Consultant.

2. TIME OF PERFORMANCE. All of the work outlined in the Scope of Services shall be completed in accordance with the Schedule outlined in Exhibit "B" attached hereto and incorporated herein by reference. By mutual agreement and written addendum to this Agreement, the City and the Consultant may change the requirements in said Schedule.

3. TERM OF AGREEMENT. The term of this Agreement shall commence upon the day first above written and end on _____, 2024.

4. COMPENSATION. Payment by the City to the Consultant for actual services rendered under this Agreement shall be made upon presentation of an invoice detailing services performed under the Scope of Services, in accordance with the fee schedule set forth in Exhibit "C" attached hereto and incorporated herein by reference. The Consultant agrees to provide all services required under the Scope of Services in Exhibit "A" within the compensation amount set forth in Exhibit "C". For Consultant's services rendered under this Agreement, City shall pay Consultant the not to exceed sum of \$_____.

5. METHOD OF PAYMENT. Compensation to Consultant shall be paid by the City after submission by Consultant of an invoice delineating the services performed.

6. RECORDS. It is understood and agreed that all plans, studies, specifications, data magnetically

or otherwise recorded on computer or computer diskettes, records, files, reports, etc., in possession of the Consultant relating to the matters covered by this Agreement shall be the property of the City, and

Consultant hereby agrees to deliver the same to the City upon termination of the Agreement. It is understood and agreed that the documents and other materials including but not limited to those set forth hereinabove, prepared pursuant to this Agreement are prepared specifically for the City and are not necessarily suitable for any future or other use.

7. **CONSULTANT'S BOOKS AND RECORDS.** Consultant shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services or expenditures and disbursements charged to the City for a minimum of three (3) years, or for any longer period required by law, from the date of final payment to the Consultant to this Agreement. Any records or documents required to be maintained shall be made available for inspection, audit and/or copying at any time during regular business hours, upon oral or written request of the City.

8. **INDEPENDENT CONTRACTOR.** It is expressly understood that Consultant is an independent contractor and that its employees shall not be employees of or have any contractual relationship with the City. Consultant shall be responsible for the payment of all taxes, workers' compensation insurance and unemployment insurance. Should Consultant desire any insurance protection, the Consultant is to acquire same at its expense.

In the event Consultant or any employee, agent, or subcontractor of Consultant providing services under this Agreement is determined by a court of competent jurisdiction or the California Public Employees Retirement System (PERS) to be eligible for enrollment in PERS as an employee of the City, Consultant shall indemnify, protect, defend, and hold harmless the City for the payment of any employee and/or employer contributions for PERS benefits on behalf of Consultant or its employees, agents, or subcontractors, as well as for the payment of any penalties and interest on such contributions, which would otherwise be the responsibility of City.

9. INDEMNITY.

A. Indemnity for Professional Liability. When the law establishes a professional standard of care for Consultant's Services, to the fullest extent permitted by law, Consultant shall indemnify, protect, defend, and hold harmless City and any and all of its officials, employees and agents from and against any and all losses, liabilities, damages, costs, and expenses, including legal counsel's fees and costs but only to the extent the Consultant (and its Subconsultants), are responsible for such damages, liabilities and costs on a comparative basis of fault between the Consultant (and its Subconsultants) and the City in the performance of professional services under this agreement.

B. Indemnity for Other Than Professional Liability. Other than in the performance of professional services and to the full extent permitted by law, Consultant shall indemnify, defend, and hold harmless City, and any and all of its employees, officials and agents from and against any liability (including liability for claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged or threatened, including legal counsel's fees and costs, court costs, defense costs, and expert witness fees), where the same arise out of, are a consequence of, or are in any way attributable to, in whole or in part, the performance of this Agreement by Consultant or by any individual or City for which Consultant is legally liable, including, but not limited to officers, agents, employees, or subcontractors of Consultant.

10. INSURANCE. During the term of this Agreement, Consultant shall maintain in full force and effect at its own cost and expense, the following insurance coverage:

a. Workers' Compensation Insurance. Full workers' compensation insurance shall be provided with a limit of at least One Hundred Thousand Dollars (\$100,000) for any one person and as required by law, including Employer's Liability limits of \$1,000,000.00 per accident. The policy shall be endorsed to waive the insurer's subrogation rights against the City.

b. General Liability.

(i) Consultant shall obtain and keep in full force and effect general liability coverage at least as broad as ISO commercial general liability coverage occurrence Form CG 0001.

(ii) Consultant shall maintain limits of no less than One Million Dollars (\$1,000,000) per occurrence for bodily injury, personal injury and property damage.

(iii) The City, its officers, employees, volunteers and agents are to be named as additional insureds under the policy, as respects liability arising out of work or operations performed by or on behalf of the Consultant.

(iv) The policy shall stipulate that this insurance will operate as primary insurance for work performed by Consultant and its sub-contractors, and that any other insurance or self insurance maintained by City or other named insureds shall be excess and non-contributory.

(v) Consultant shall maintain its commercial general liability coverage for three (3) years after completion of the work and shall add an additional insured endorsement form acceptable to the City naming the City of Merced, its officers, employees, agents and volunteers for each year thereafter for at least three (3) years after completion of the work. Copies of the annual renewal and additional insured endorsement form shall be sent to the City within thirty (30) days of the annual renewal.

c. Automobile Insurance.

(i) Consultant shall obtain and keep in full force and effect an automobile policy of at least One Million Dollars (\$1,000,000) per accident for bodily injury and property damage.

(ii) The City, its officers, employees, volunteers and agents are to be named as additional insureds under the policy, as respects automobiles owned, leased, hired or borrowed by the Consultant.

(iii) The policy shall stipulate that this insurance will operate as primary insurance for work performed by Consultant and its sub-contractors, and that any other insurance or self insurance maintained by City or other named insureds shall be excess and non-contributory.

d. Professional Liability Insurance. Consultant shall carry professional liability insurance appropriate to Consultant's profession in the minimum amount of One Million Dollars (\$1,000,000). Architects and engineers' coverage is to be endorsed to include contractual liability.

e. Qualifications of Insurer. The insurance shall be provided by an acceptable insurance provider, as determined by City, which satisfies all of the following minimum requirements:

(i) An insurance carrier admitted to do business in California and maintaining an agent for service of process within this State; and,

(ii) An insurance carrier with a current A.M. Best Rating of A:VII or better (except for workers' compensation provided through the California State Compensation Fund).

f. Certificate of Insurance. Consultant shall complete and file with the City prior to engaging in any operation or activity set forth in this Agreement, certificates of insurance evidencing coverage as set forth above and which shall provide that no cancellation or expiration by the insurance company will be made during the term of this Agreement, without thirty (30) days written notice to City prior to the effective date of such cancellation—including cancellation for nonpayment of premium. In addition to any other remedies City may have, City reserves the right to withhold payment if Consultant's insurance policies are not current.

11. PREVAILING WAGES.

A. Labor Code Compliance. If the work performed under this Agreement falls within Labor Code Section 1720(a)(1) definition of a "public works" the Consultant agrees to comply with all of the applicable provisions of the Labor Code including, those provisions requiring the payment of not less than the general prevailing rate of wages. The Consultant further agrees to the penalties and forfeitures provided in said Code in the event a violation of any of the provisions occurs in the execution of this Agreement.

B. These wage rate determinations are made a specific part of this Agreement by reference

pursuant to Labor Code Section 1773.2. General Prevailing Wage Rate Determinations may be obtained from the Department of Industrial Relations Internet site at <http://www.dir.ca.gov/>.

C. After award of the Agreement, and prior to commencing work, all applicable General Prevailing Wage Rate Determinations, if applicable, are to be obtained by the Consultant from the Department of Industrial Relations. These wage rate determinations are to be posted by the Consultant at the job site in accordance with Section 1773.2 of the California Labor Code.

D. Consultant agrees to include prevailing wage requirements, if applicable, in all subcontracts when the work to be performed by the subcontractor under this Agreement is a “public works” as defined in Labor Code Section 1720(a)(1) and Labor Code Section 1771.

12. ASSIGNABILITY OF AGREEMENT. It is understood and agreed that this Agreement contemplates personal performance by the Consultant and is based upon a determination of its unique personal competence and experience and upon its specialized personal knowledge. Assignments of any or all rights, duties or obligations of the Consultant under this Agreement will be permitted only with the express written consent of the City.

13. TERMINATION FOR CONVENIENCE OF CITY. The City may terminate this Agreement any time by mailing a notice in writing to Consultant that the Agreement is terminated. Said Agreement shall then be deemed terminated, and no further work shall be performed by Consultant. If the Agreement is so terminated, the Consultant shall be paid for that percentage of the phase of work actually completed, based on a pro rata portion of the compensation for said phase satisfactorily completed at the time the notice of termination is received.

14. CONFORMANCE TO APPLICABLE LAWS. Consultant shall comply with its standard of care regarding all applicable Federal, State, and municipal laws, rules and ordinances. No discrimination shall be made by Consultant in the employment of persons to work under this contract because of race, color, national origin, ancestry, disability, sex or religion of such person.

Consultant hereby promises and agrees to comply with all of the provisions of the Federal Immigration and Nationality Act (8 U.S.C.A. 1101 *et seq.*), as amended; and in connection therewith, shall not employ unauthorized aliens as defined therein. Should Consultant so employ such unauthorized aliens for the performance of work and/or services covered by this Agreement, and should any agency or instrumentality of the federal or state government, including the courts, impose sanctions against the City for such use of unauthorized aliens, Consultant hereby agrees to, and shall, reimburse City for the cost of all such sanctions imposed, together with any and all costs, including attorneys’ fees, incurred by the City in connection therewith.

15. WAIVER. In the event that either City or Consultant shall at any time or times waive any breach of this Agreement by the other, such waiver shall not constitute a waiver of any other or succeeding breach of this Agreement, whether of the same or any other covenant, condition or obligation. Waiver shall not be deemed effective until and unless signed by the waiving party.

16. INCONSISTENT OR CONFLICTING TERMS IN AGREEMENT AND EXHIBITS. In the event of any contradiction or inconsistency between any attached document(s) or exhibit(s) incorporated by reference herein and the provisions of the Agreement itself, the terms of the Agreement shall control.

Any exhibit that is attached and incorporated by reference shall be limited to the purposes for which it is attached, as specified in this Agreement. Any contractual terms or conditions contained in such exhibit imposing additional obligations on the City are not binding upon the City unless specifically agreed to in

writing, and initialed by the authorized City representative, as to each additional contractual term or condition.

17. AMBIGUITIES. This Agreement has been negotiated at arms' length between persons knowledgeable in the matters dealt with herein. Accordingly, any rule of law, including, but not limited to, Section 1654 of the Civil Code of California, or any other statutes, legal decisions, or common-law principles of similar effect, that would require interpretation of any ambiguities in this Agreement against the party that drafted this Agreement is of no application and is hereby expressly waived.

18. VENUE. This Agreement and all matters relating to it shall be governed by the laws of the State of California and any action brought relating to this agreement shall be held exclusively in a state court in the County of Merced.

19. AMENDMENT. This Agreement shall not be amended, modified, or otherwise changed unless in writing and signed by both parties hereto.

20. INTEGRATION. This Agreement constitutes the entire understanding and agreement of the parties and supersedes all previous and/or contemporaneous understanding or agreement between the parties with respect to all or any part of the subject matter hereof.

21. AUTHORITY TO EXECUTE. The person or persons executing this Agreement on behalf of the parties hereto warrants and represents that he/she/they has/have the authority to execute this Agreement on behalf of their entity and has/have the authority to bind their party to the performance of its obligations hereunder.

22. COUNTERPARTS. This Agreement may be executed in one or more counterparts with each counterpart being deemed an original. No counterpart shall be deemed to be an original or presumed delivered unless and until the counterparts executed by the other parties hereto are in the physical possession of the party or parties seeking enforcement thereof.

IN WITNESS WHEREOF, the parties have caused this Agreement to be executed on the date first above written.

CITY OF MERCED
A California Charter Municipal Corporation

BY: _____
City Manager

ATTEST:
STEPHANIE R. DIETZ, CITY CLERK

BY: _____
Assistant/Deputy City Clerk

APPROVED AS TO FORM:

BY: _____
City Attorney Date

ACCOUNT DATA:

BY: _____
Verified by Finance Officer

CONSULTANT

BY: _____
(Signature)

(Typed Name)

Its: _____
(Title)

BY: _____
(Signature)

(Typed Name)

Its: _____
(Title)

Taxpayer I.D. No. _____

ADDRESS: _____

TELEPHONE: _____

FAX: _____

E-MAIL: _____

Exhibit B

SECTION 27 41 16 INTEGRATED AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. None

1.2 IN CASE OF CONFLICT

- A. In the case of conflict between Exhibit B ("Specifications") and Scope of Work, Specifications & Requirements from Section 3, Exhibit B will be subordinate.

1.3 SUMMARY

A. General: Provide integrated audiovisual systems, including equipment and materials, whether specifically mentioned herein or not, to ensure complete and correctly operating systems in accordance with requirements of the Contract Documents.

- B. The requirements described in this section include the following:

1. References
2. Definitions
3. System Descriptions
4. Submittals
5. Quality Assurance
6. Coordination
7. Project Management and Coordination
8. Delivery, Storage, and Handling
9. Scheduling
10. Warranty
11. Maintenance
12. Project Closeout and Record Documents

C. Refer to Bidding Requirements, Contract Forms, and the Conditions of Contract. Provisions listed or specified therein apply to work under this section.

- D. Alternates: None

E. Unit Prices: Submit unit prices, as derived from the quotations in the Schedule of Values, for adjustments to the contract price. Include in unit prices, material, both explicitly specified, as well as additional components required for a complete and functional installation, labor, shipping, tax, markups (overhead, profit, job expenses, bond), labeling, records, and as-built drawing production costs.

1.4 REFERENCES

A. General

1. Codes, standards, and industry manuals/guidelines listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Consider such codes and/or standards a part of this specification as though fully repeated herein.

2. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

3. Reference to codes, standards, specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid unless otherwise specifically stated.

B. Codes: Perform work and furnish materials and equipment in accordance with applicable requirements of the latest edition of governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:

1. California Code of Regulations (CCR):

a. Title 8, “Industrial Relations”

1) Chapter 3.22, “California Occupational Safety and Health Regulations (CAL/OSHA)”

b. Title 24, “California Building Standards Code”

1) Part 1, “California Building Standards Administrative Code”

2) Part 2, “California Building Code” (CBC)

3) Part 3, “California Electrical Code” (CEC)

4) Part 11, “California Green Building Standards Code” (CALGreen)”

2. National Fire Protection Agency (NFPA)

a. NFPA 75, “Protection of Information Technology Equipment”

b. NFPA 262, “Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces”

3. Code of Federal Regulations (CFR) Title 47 “Telecommunication”, Chapter I “Federal Communications Commission (FCC)”:

a. Part 15, “Radio Frequency Devices and Radiation Limits”

- b. Part 27, “Miscellaneous Wireless Communications Services”
- 4. International Code Council (ICC):
 - a. “International Building Code” (IBC)
 - b. “International Fire Code” (IFC)
 - c. “ICC Performance Code”
- 5. Other applicable national, state, and local binding building and fire codes
- c. Perform work in accordance with applicable requirements of governing codes, rules and regulations including the following minimum standards, whether statutory or not:
 - 1. FCC Federal Communications Commission
 - 2. City, and other local codes and requirements
 - 3. UL Underwriters Laboratories
 - 4. ASTM American Society for Testing Materials
 - 5. NEMA National Electrical Manufacturers Association
 - 6. ANSI American National Standards Institute
 - 7. ETL Electrical Testing Laboratories
 - 8. SMPTE Society of Motion Picture and Television Engineers
 - 9. EIA Electronic Industries Association
 - 10. ISO International Standards Organization
 - 11. Sound Systems Engineering, 2nd Ed., Davis and Davis, Howard W. Sams Co., 1987
- D. Provide products and systems compliant with the following standards:
 - 1. ANSI/AVIXA 1M-2011: Audio Coverage Uniformity in Enclosed Listener Areas
 - 2. ANSI/AVIXA 3M-2011: Projected Image System Contrast Ratio
 - 3. NFPA 262: Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces
 - 4. UL 813: Commercial Audio Equipment
 - 5. UL 1419: Professional Use Video and Audio Equipment
 - 6. UL 1480: Speakers for Fire Alarm, Emergency, and Commercial and Professional Use
 - 7. UL 1492: Audio-Video Products and Accessories

8. UL 60065-1: Audio, Video and Similar Electronic Apparatus

1.5 DEFINITIONS

A. The following list of definitions as used in this specification are defined as follows:

1. AFF: Above Finished Floor
2. AHJ: Authority Having Jurisdiction
3. Cabling: Installed media ready for electronic or optical signal circuit use; a complete media connection comprised of cables, termination apparatus (patch panels, blocks, connectors), outlets, connecting media (path cord, cross connects), labeling
4. CBC: California Building Code (CCR Title 24 Part 2)
5. CCR: California Code of Regulations
6. CEC: California Electrical Code (CCR Title 24 Part 3)
7. Connect: To install patch cords, equipment cords, cross connect wire, etc. to complete an electronic or optical signal circuit
8. Cord: A length of cordage having connectors at each end. The term “Cord” is synonymous with the term “Jumper” and “Lead”
9. Engineer: BrookTrout Designs
10. First-in-Place: A single unit of work for the Owner’s and Engineer’s review and written approval prior to proceeding with the work of the entire project
11. Furnish: To purchase, procure, acquire, and deliver complete with related accessories
12. GC: General contractor
13. Identifier: A unique code assigned to an element of the telecommunications infrastructure that links it to its corresponding record
14. Install: To set in place, join, unite, fasten, link, attach, set up or otherwise connect together and test before turning over to the Owner, parts, items, or equipment supplied by contractor or others. Make installation complete and ready for regular operation
15. IOR: Inspector of Record
16. LED: Light Emitting Diode
17. MSDS: Material Safety Data Sheets
18. NEC: National Electrical Code (NFPA 70)
19. NEMA: National Electrical Manufacturers Association
20. NFPA: National Fire Protection Agency

- 21. NIC: Not in Contract (work or equipment)
- 22. OFCI: Owner-furnished contractor-installed; coordinate the integration of components furnished by the Owner; provide mounting hardware, cable, connectors, etc. to ensure proper integration of OFCI equipment
- 23. OFE: Owner-Furnished Equipment
- 24. Owner: The entity for whom the project is being built
- 25. PDF: A file saved in the Adobe Portable Document Format
- 26. Pigtail: A length of cordage having connectors at one end
- 27. Provide: To furnish, transport, install, erect, connect, test, and turn over to the Owner, complete and ready for regular operation
- 28. UL: Underwriters Laboratories

B. In addition to those definitions of paragraph 1.4.A, the following terms used in this specification are defined as follows:

- 1. ACEG: Alternating current equipment ground (an example of this is a ground bus within an electrical panel)
- 2. Approved Grounding Point: An approved grounding point is one that satisfies the applicable electrical code and provides a low impedance path to earth. Examples include the following though may manifest in different means: a telecommunications grounding busbar (such as for bonding an equipment rack within a telecom room), the ACEG of the electrical panel serving the equipment requiring bonding to ground (such as for bonding a credenza rack within a conference room), or the ground conductor of a branch circuit (such as for bonding a single piece of equipment).
- 3. A/R: Indicates that the quantity of an item is as required to meet the design criteria indicated in these audiovisual contract documents.
- 4. A/S: Indicates that the quantity of an item is as shown on the drawings.
- 5. Audience Area: The portion of a presentation space intended to be occupied by an audience. An audience area includes the primary seating and standing spaces and may include the adjacent circulation spaces. An audience area generally excludes spaces reserved for presenters.
- 6. BYOD: “Bring your own device”: a laptop, tablet, or smart phone a system user intends to use with an audiovisual system.
- 7. Custom: Systems or components the Contractor fabricates based on this audiovisual contract document package
- 8. EDID: Extended display identification data
- 9. HDCP: High-bandwidth digital content protection
- 10. HDMI: High-definition multimedia interface

11. Or equal: An item that is equal in function and performance to the specified device or system
12. RU: A rack unit as defined in EIA/ECA-310
13. Shall: Denotes a mandatory requirement
14. Should: Denotes an advisory statement
15. SPL: Sound pressure level
16. THD: Total harmonic distortion
17. Will: Denotes an informative statement
18. Project: The scope of work defined by this audiovisual contract document package
19. Software: Any executable programs, parameter files, user interfaces, or other coded content that are required to operate, control, or maintain the audiovisual systems in this Project
20. Custom created software: Any software, parameter files, user interfaces, or other software created for the control or operation of the audiovisual systems in this Project
21. Third-party software: Any programming developed by a party other than the AV Contractor and the Owner to be used to operate, control, or maintain the audiovisual systems in this Project
22. System: A package of audiovisual components, cabling, programming, installation and configuring efforts resulting in a package that functions in an integrated system.

1.6 SYSTEMS DESCRIPTIONS

A. General

1. Expansion and replacement of Existing Systems. This project is a new installation that utilizes existing infrastructure to replace existing equipment.
2. There are several different locations in the project. These different locations will be described in the functional descriptions, as well as by specific equipment for each location.
3. Cabling: where possible, utilize existing cabling and cable paths. Contractor is responsible to note where new cables are needed and provide/install them. This information will be available at the pre-bid site walk.
4. System Operation
 - a. The System will be used for City of Merced Council meetings. Full explanation of functions will be detailed below under “Rooms and Spaces”.
5. In circumstances where specifications and drawings conflict, the drawings govern quantity, and the specifications govern quality.

6. Rack elevations are not provided in the accompanying drawing package. Locate equipment in New Control Room racks per ergonomic and operational best practices.

7. Council Chambers Operability: Obtain the Council Chambers schedule from the Owner's Representative prior to beginning the Work. Perform all services at times and in a manner that will guarantee that meetings in the Council Chambers are not impacted. All work does not have to be completed during a two week window between meetings, but the existing system cannot be taken offline so that a meeting is missed.

B. Rooms and Spaces (overview)

1. The following provides a list of rooms and spaces included in the project and an overview of requirements for them. Detailed requirements follow.

a. Council Chambers (Dais and Seating) and Foyer. A formal meeting space used for scheduled government agency meetings. The Council Chambers encompasses the dais, audience seating and presentation podium.

During meetings, the System will operate in a conventional formal board room manner. In addition to audio/video presentation and sound reinforcement, the System will also create an internet Live Stream, and host remote participants via Microsoft Teams.

b. Control of the system will be from the Clerk's touch panel and the Mayor's touch panel. Members will also be able to control their individual microphone mutes and cast votes from individual button panels. System Tech Room. This room encompasses both the system racks and technical equipment and the system operator(s). The system racks include all of the audio/video/control head-end equipment, as well as shelves for the remote PC's used by meeting participants.

The operators will work with the NewTek Tricaster for both managing the Live Stream and camera content to the Council Chambers and ancillary room displays. Operators will also have a duplicate touch panel for control of the presentation system. A display allows the Tricaster operator to monitor the cameras and Teams systems.

c. Sam Pipes Room. The Sam Pipes rooms functions for overflow (audio only) for Council meetings and also as an audio only separate meeting room.

d. Wilbur McMurray Room. The Wilbur McMurray room functions as an audio and video overflow room for Council meetings. The Live Stream is shown on the display.

e. Hallway. There is a single display in the Hallway for video overflow of Council meetings. The Live Stream is shown on the display

C. Council Chambers

1. General

a. Since this is an update of an existing system, functionality will be a close duplicate of what is currently in place. Utilize existing infrastructure (conduit paths, existing cabling, existing displays mounts (except as noted); existing OFE displays.

2. Audio

- a. Council members 1-9 and Clerk 1 receive Shure MX418/C microphones. Members B1-B4; lectern receive Shure MX24 microphones.
- b. OFE loudspeakers to be installed in place of existing loudspeakers.
- 3.
 - a. Touch Panels: Provide 10” touch panel for Clerk; 7” touch panel for Mayor.
 - b. Provide USB extenders for keyboard/mouse control of PC’s in tech room
 - c. Provide Council Member Controls: existing wired button controllers to be replaced by wireless button controllers as follows:
 - 1) Dais positions 1-9 will received dual 1G controls for the following functions: mic mute on/off; vote yes; vote no; vote abstain
 - 2) Clerk 2 and Dais B1-B4 will receive single 1G controllers with the following functions: mic on/off.
 - 3) All buttons will have corresponding LED lights (i.e. “green = on” and “red = mute” for microphones.
- 4. Video
 - a. Council member displays will be retained. Displays will show presentation content or member’s own PC display. Signal to come from Video Matrix Switcher. Switching is controlled by Clerk 1
 - b. Provide 98” Displays behind Council to show presentation content or Teams display. Switching is controlled by Clerk 1
 - c. Provide 75” displays on side walls to show presentation content or Teams display. Switching is controlled by Clerk 1
 - d. Program video matrix system so that Presentation content will be from Document Camera or Presentation device at Lectern.
 - e. Existing PTZ cameras are currently connected to Tricaster. Confirm operation during commissioning.
- D. Hallway
 - 1. General
 - a. The hallway is used for Video Overflow for meetings. The content displayed is the Live Stream being sent out. The signal is directly from the Tricaster.
 - b. Video
 - 1) Provide Single 65” display
- E. Sam Pipes Room

1. General

a. Sam Pipes Room is used for Council Meeting Overflow and for discrete small meetings. It is audio only, and in the case of small meetings an OFE wireless system will be brought into the room for presentation use. Touch panel control of the main system will have a function for using the room apart from the main Council meeting function.

2. Audio

a. Install 10 OFE loudspeakers in 2 zones with attenuators for each zone.

F. Wilbur McMurray Room

1. General

a. The Wilbur McMurray room is used for audio and video Overflow for Council meetings. The content displayed is the Live Stream being sent out. The signal is directly from the Tricaster.

2. Audio

a. Provide 4 new ceiling speakers with an attenuator

3. Video

a. Provide new 75" display with recessed wall mount

G. Foyer

1. General

a. Extend Loudspeaker coverage from main speaker zones. No discrete attenuator. Control follows the main zone.

2. Audio

a. Provide 3 new ceiling loudspeakers.

H. System Tech Room

1. General

a. The System Tech Room includes all of the rack equipment and the Member PC's. It also includes a tech station for the operator(s) who manage the Tricaster for the live stream (audio and video); participate in Teams meetings; and secondary control of the main presentation system (via a 10" control panel that duplicates the Clerk1 touch panel).

2. Audio

a. Provide all new audio rack equipment. Install all new and OFE audio rack equipment per the system diagram.

b. Program DSP and Tricaster to send discrete audio for all Council Chambers sources to Tricaster. Microphones 1-8 arrive via analog outputs from the DSP. All other sources arrive via Dante. Tricaster to have independent mix of all sources for Live Streaming.

c. Provide Audio Recorder to receive signal via Dante from System DSP. Set up Automix inside DSP for balancing sources of varying levels.

d. Provide single ceiling speaker with attenuator

3. Control

a. Contractor to install control equipment and network switch per the system diagram.

b. Provide touch panel (from Conference System Kit below) for System Tech that duplicates Clerk 1 touch panel. Touch panels to “mirror” each other.

4. Video

a. Provide Matrix Switcher with the necessary cards to process all sources from inside Council Chambers and outside meeting participants. Program Matrix mixer to send sources to scalers/displays in room and to Tricaster for live stream.

b. Provide Flex Video Conference System Kit. 10” Touch panel to be used for system tech (above).

c. Provide Micro Desktop PC’s as noted in System Diagrams and Equipment List. Connect to USB Extenders for remote control from Dais. Connect video outputs to Matrix switcher for output to Council Member’s displays.

d. Provide 65” display for Tricaster output.

e. Integrate OFE Tricaster with new video system per system diagram.

5. Power

a. Provide Power Regulator for system rack. Power rack equipment directly from rear outlets on the Power Regulator

b. Install OFE vertical power into system rack. Power all Micro Desktop PC’s; system accessories and ancillary equipment from vertical power strip. Plug vertical power strip into Power Regulator.

1.7 SUBMITTALS

A. Bid Submittal

1. Note: Where qualifications and document submission requirement differ, RFQ supersedes specification documents.

2. Document and certify the following general qualifications:

a. Firm has been in business providing similar service required by this section for not less than five years.

b. Firm can outline the general scope of past projects, normal staffing levels, and union status of shop and field installation personnel.

c. Firm can list a minimum of three projects of similar scope successfully completed in the past 24 months, indicating the location, type of system installed, total contract amount, date completed, and include persons and telephone number to contact.

d. Firm can submit confirmation of current state or local contracting licenses, as required to perform the work under this section.

e. Firm shall be an authorized supplier and installer for all equipment.

3. Subcontract:

a. No subcontract will be permitted unless specifically identified in the bid submission.

b. The contractor assigned this Section shall have sole responsibility for the satisfactory implementation of the work in this section, regardless of any subcontract arrangement.

4. Provide bid submittals in accordance with project Bidding Requirements, in addition to any additional requirements dictated in this section.

5. Schedule of Values: Provide a Schedule of Values for equipment to be supplied. Price each piece of equipment individually. Include required modifications and accessories in equipment costs.

6. Non-Equipment Costs: Furnish separately a list of non-equipment costs for each area, by the following categories:

7. Engineering: Include costs for required design, drawings, run sheets, instruction manuals, etc.

8. Pre-Installation: Include fabrication, modification, assembly, rack wiring, etc., performed on the Contractor's premises.

9. Installation: Include on-site installation and wiring, coordination and supervision, testing, checkout, Owner training, etc., performed on the Owner's premises.

10. General and Administrative: Include General and Administrative expenses, shipping, insurance, and guarantees.

11. Fees: Include e-Waste disposal fees.

12. Service Contract: Submit service and maintenance costs as with the bid submittal.

13. Alternates/substitutions:

a. Submit bids based on the specified equipment. Submit proposals for alternates and substitutes with associated equipment costs, separate from the costs of the equipment as specified.

b. Proposals for alternate equipment will receive consideration if the differences between the specified and alternate/substituted equipment do not depart from the overall intent of the design and operation of the system and are in the best interests of the Owner.

c. Include in the proposals for alternate equipment, full technical information and cut sheets for the proposed equipment.

d. If the inclusion of substituted equipment will result in a different connection configuration than that in the bid documents, produce drawings that illustrate how the proposed system would be connected.

14. System Enhancements: Submit recommendations which will enhance the performance of the system, or reduce costs without loss of performance, in the bid submission. Suggestions that are of value to the Owner will be taken into consideration in the evaluation of the bid returns. Make such proposals as "alternates", with the appropriate cost modifications shown separately and apart from the costs of the system "as specified".

15. Required Components: Systems must be complete and fully functional. Whether these components are explicitly enumerated in this Section, audio conferencing systems must include acoustical echo cancellers per microphone unless otherwise indicated, for example. Equipment racks must include all cable management, electrical power distribution, blank and vent panels, etc.

16. Subcontract Information:

a. Identify subcontractors and their responsibilities and qualifications in the bid submission.

b. Because of the complexity of the systems, the supervision of such subcontracted work cannot be intermittent. Provide virtually continuous supervision of subcontractors during the installation.

17. Provide exceptions to these specifications and related drawings with the bid submission. In the absence of exceptions, these specifications and related drawings are binding in letter and intent. It will further be assumed that the bidder has examined the design and specifications in detail and will assume full responsibility for the performance of the complete installation as designed and specified.

18. Key Personnel:

a. Provide certification information for the Project Manager, Field Engineer/Technician, Field Installation Supervisor, and other key personnel who will be assigned to the project .

b. Indicate educational, factory, and industry certifications for involved personnel and provide certificates for each.

c. Include a list of staff that will be dedicated to the project and either their resumes or a listing of technical qualifications.

d. Designate a CTS-I (Certified Technology Specialist - Installation) certified employee to actively manage this project. Provide their current CTS-I certificate. CTS credentials will be validated at the AVIXA website.

19. Designate a Crestron DMC-E-certified employee to be actively involved in the design, implementation, and commissioning of systems in this project. The validity of DMC-E credentials will be validated at the Crestron website.

20. Notice of QSC Q-SYS Certification for projects including QSC Q-SYS components: Designate a QSYS Level 2 certified employee to be actively involved in the design, implementation and commissioning of systems in this project.

21. Utilize the Audiovisual System Software Developer defined in Part 1, Definitions, to perform audiovisual system software development, installation, and commissioning in coordination with the contractor assigned with the work of this Section.

22. Provide a list of any company-held certifications or designations.

23. Schedule of Implementation:

a. Submit a scheduling plan with the bid return indicating the various pertinent terminal dates after award of contract for completion of design, pre-installation work, on-site installation work, and testing and acceptance.

b. Obtain projected dates when the relevant areas will be available for the on-site installation.

24. Investigate potential contract, union, and scheduling questions, and guarantee compliance with requirements and regulations in effect on the job site.

25. It is possible that certain portions of the work described herein will be ready for use prior to the completion of the entire scope of this specification. The Owner reserves the right to use substantially completed systems without obligation to the Contractor and without implying final acceptance of the systems or equipment so used.

B. Pre-construction Submittals

1. Product data: Prior to purchase and installation, submit as a PDF file information (such as cut sheets, etc.) for equipment, components, products, etc., that will be installed as part of the work of this section.

a. Include in the submittal, a Table of Contents, listing equipment, components, products, etc., by room, by system, and/or by other logical designation. A continuous list of all products with no reference to where the products will be installed will be rejected. Incomplete lists will be rejected.

b. Indicate (arrow, highlight or other designator) on each product's cut sheet the manufacturer, model/part number, accessories (as applicable), options (as applicable), color (as applicable), and other information to indicate the exact item to be installed. Where this information is not already provided on the cut sheet, manually input this information and a brief description (as applicable).

2. Substitutions: Submit requests for substitution based on the specified equipment. Submit these requests with associated equipment costs, separate from the costs of the equipment as specified.

a. Where products are noted as "or equal", a product of equivalent design, manufacture, and performance will be considered. Submit product data (product information, catalog cuts, pertinent test data, etc.) to substantiate that the product is in fact equivalent to that specified. The burden of proof that the substituted product is equivalent to the specified product rests with the Contractor. Whenever material, process or equipment is specified in accordance with an industry specification (ANSI, TIA, etc.), UL rating, or other association standard, present an affidavit from the manufacturer certifying that the product complies with the particular standard specification. When requested by the Engineer, submit supporting test data to substantiate compliance.

b. Proposals for alternate equipment will receive consideration if the differences between the specified and alternate/substituted equipment do not depart from the overall intent of the design and operation of the system and are in the best interests of the Owner.

c. Include in requests for substitution, full technical information and cut sheets for the proposed equipment.

d. If the inclusion of substituted equipment will result in a different connection configuration than that in the bid documents, produce drawings that illustrate how the proposed system would be connected.

e. When the Engineer accepts a substitution in writing, it is with the understanding that the Contractor guarantees the substituted product, component, article, or material to be equivalent to the one specified and dimensioned to fit within the construction according to contract documents. Do not provide substituted material, processes, or equipment without written authorization from the Engineer. Assumptions on the acceptability of a proposed substitution, prior to acceptance by the Engineer, are at the sole risk of the Contractor.

f. Approved substitutions shall not relieve the Contractor of responsibilities for the proper execution of the work, or from provisions of the specifications.

3. Shop drawings: Electronically submit the shop drawings submittal via cloud-based project management application (such as Proliance) or as a file transfer (such as Dropbox). Submit shop drawings prior to installation, including the following.

a. Cover Letter: Accompany each shop drawing submittal with a cover letter stating that the shop drawings have been thoroughly reviewed by the Contractor and are in full compliance with the requirements of the contract documents. Have the person who prepared the submittal sign (and stamped, if applicable) the cover letter and include a drawing index.

b. Functional line diagrams for all systems – clearly tag each item with name, manufacturer, and manufacturer's model number (e.g., “Program Amplifier LabGruppen LUCIA 60/2M”) and show the terminal number or input/output designation (e.g., “Mic 1-In”, or “Record Out-Left”).

c. Provide schematic diagrams of custom circuitry such as receptacle pin numbers and component callouts; show details of custom resistive attenuation and/or combining networks, filters, or pads which may be required in the assembly; show point to point wiring drawings for control system modules and interfaces, and for switches and relays in audio, video, or control systems

d. Equipment rack elevations and patch panel assignments – clearly and consistently label rack elevations, patch panels, and on equipment controls.

e. Provide pushbutton and handheld remote-control panel layouts –tag each button with function and ID matching installed labels

f. Factory and custom panels, plates, and designation strips, showing material, finish, color and engraving (exact lettering)

g. Custom designed consoles, tables, carts, support bases, and shelves

h. Equipment modifications (if any), including details of modifications that change or void manufacturers' warranties.

i. Cable run lists – clearly show at each terminal point the type of connector to be used; include typical wiring details of each connector; note where shields are connected and where they will float to ensure

the integrity of the shielding system; indicate cable types and, where appropriate, color codes; assign wire numbers and patch bay locations to every wire and patch point in the drawing

j. Wattage tap setting per loudspeaker.

4. Touch screen menus submittal:

a. Provide a single PDF per system containing a page for each menu, submenu, and popup in that system's user interface. Include menus that are manually triggered and those that automatically appear as the result of events such as the connection of a source device. Ensure that the PDF is unlocked, so that the Engineer and Owner may annotate it.

5. Site Matrix/Network Coordination:

a. Submit on a Google Sheet, a list of equipment that will be connected to the Owner's network, including but not limited to the following (e.g., spreadsheet column headers):

- 1) Item number,
- 2) Description,
- 3) Manufacturer,
- 4) Model/part number,
- 5) MAC address,
- 6) IP address type (DHCP or static),
- 7) Hostname,
- 8) Power-over-Ethernet (PoE) requirements (yes or no; PoE type),
- 9) Specific network and/or subnet configuration requirements,
- 10) Specific QOS requirements,
- 11) Anticipated network traffic,

b. Return the completed Site Matrix to the Engineer at least one week prior to installing equipment in the field.

c. Once the completed site matrix has been provided to the Engineer, obtain their approval to connect network-enabled equipment to the Owner's network prior to connecting it.

d. When programming hostnames, capture a screen shot of the verified hostname programmed into the associated equipment. Provide screen captures to the Engineer, with room numbers included, in a single pdf prior to performing final engineering, programming, and documentation.

e. Provide any unusual or non-standard network requirements for any audiovisual devices when submitting the site matrix.

6. Testing equipment and procedures:
 - a. Submit a list of test equipment, including manufacturer, model number, and description that will be used for testing and adjustment of the installed systems.
 - b. Submit electronic documents with testing procedures to be performed during pre-functional testing and acceptance testing, including the minimum acceptable outcome for each test.
 - c. Prior to Acceptance Testing:
 1. A minimum of 10 business days prior to the scheduled "Go Live" date, submit an Initial Testing and Tuning Report showing procedures and results for tests performed to the Engineer. Provide the names of specific automated tests performed via testing tools or installed AV equipment.
 2. Provide reports generated by automated tests using both standalone testing equipment and programs running on installed AV equipment.
 3. Provide a list of the test equipment used for these tests.
 4. Coordinate with the Owner to obtain a sample of the laptop computers and other portable devices, including any types of tablets and smartphones used for presentation. Confirm presentation systems are compatible with these devices.
 - d. Project Closeout / At the Completion of the Installation:
 1. Provide written notification to the Owner and Architect when initial checkout is complete, normal settings are documented, as-built and operational documentation are complete, and systems are available for final acceptance tests. Provide a completed copy of the initial testing report included in Part 3 of this Section. Acceptance testing will follow the submission of the initial testing report.
 2. Submit equipment manufacturers' operation and maintenance manuals for each piece of equipment.
 3. Submit a single page quick-start guide, with relevant screen captures of each page of the touch screen user interface. Submit these to the Owner prior to the first day of business.
 4. Submit "as-built" drawings for systems and items indicated as "Custom".
 5. Submit a copy of control system programming, including touch screen layouts, capable of being revised and compiled.
 6. System Operation and Maintenance Manual:
 - a. Provide a system quick start guide for each room type.
 - b. Provide a list of necessary and recommended replacement parts for a normal maintenance period of one year.
 - c. Assume the reader of this manual to be technically competent, but unfamiliar with this particular facility.
 7. Provide a copy of control system software created for this project on USB portable storage drives including modifiable and clearly commented code capable of being compiled.

8. Provide a copy of audio processor configuration files created for this project on a permanently labeled USB portable storage drive.

1.8 PROJECT MANAGEMENT AND COORDINATION

A. Provide a project manager for the duration of the project to coordinate this Work with other trades. Coordination services, procedures and documentation responsibility include, but are not limited to, the items listed in this section.

B. Prepare and maintain a shop drawing review log indicating the following information:

1. The shop drawing number and a brief description of the system/material
2. The date of the review
3. The name of the individual performing the review
4. An indication whether follow-up coordination is required

1.9 DRAWINGS

A. Layout: Follow the general layout shown on the AV/Technology drawings except where other Work may conflict with these drawings.

B. Accuracy: Drawings for the Work within this Division are essentially diagrammatic within the constraints of the symbology applied.

C. The Drawings do not fully represent the entire AV systems installation. Specifically, the functional/single-line drawings indicate design intent only.

D. Complete the details necessary for detailed system design and document this work in shop drawings.

1.10 PERFORMANCE STANDARDS

A. Meet the following performance standards with each system, unless restricted by the published specifications of a particular piece of equipment. Notify the Engineer of any such restrictions.

B. ADA Compliance:

1. Display systems must meet ADA requirements for the display of closed captioning content, where applicable.

2. Control systems must meet ADA requirements for accessibility.

3. Audio systems must meet ADA assistive listening system requirements.

4. Wall-mounted devices protruding from the wall must meet ADA requirements.

C. Audio System:

1. Program Audio System:

a. Frequency Response: ± 3 dB per octave band, 100 Hz to 12,000 Hz. 3dB per octave roll off below 100Hz and above 12 kHz.

b. Total Acoustical Harmonic Distortion: Less than 2% at 90 dBC (1kHz reference) at four feet (1,220mm) above finished floor in the middle of the room.

2. Distributed Audio System:

a. Frequency Response: ± 3 dB per octave band, 125 Hz to 10,000 Hz. 3dB per octave roll off below 125 Hz and above 10 kHz.

b. Total Acoustical Harmonic Distortion: Less than 2% at 85 dBC (1kHz reference) at four feet (1,220mm) above finished floor in the middle of the room.

3. Adjust the gain structure for all audio system components (mixer input to amplifier output) to achieve the highest signal-to-noise ratio, 75 dB from 50 Hz to 15 kHz minimum.

4. Ensure that the audio frequency response of the electronics system with equalizers bypassed varies less than ± 1 dB from 50 Hz to 12 kHz.

5. The electronic system audio distortion shall be less than 0.5% at 1 kHz at the equipment's rated input signal level.

6. Sound Output Capability: Provide program levels of not less than 95 dB and speech reinforcement levels of not less than 85dB in the seating area without objectionable distortion, rattles, or buzzes, employing as test signals several different samples of recorded music and microphones applied at each system input.

7. Hum and Noise: Hum and noise shall be inaudible (below the background noise level of the space) under normal operation and as observed in normal seat locations.

D. Control:

1. Provide IP-controlled power control interfaces to devices not provided with these, whether power control accessories are listed in this Section or not. Verify functional operation for specified control operations.

2. Illuminated feedback of the active function via illuminated or shaded pushbutton at operator and wired remote control stations.

3. Wireless systems shall neither be the source of, nor be affected by, radio frequency interference to/from external signal devices.

4. Take ergonomics into account when designing user interfaces. Be aware that the level of technical knowledge will vary between users. Follow these guidelines:

5. Graphics:

a. Avoid abbreviations; obtain Engineer's authorization when they are necessary.

b. Size lettering at 1/8" minimum

c. Maintain background to lettering contrast

6. Positive logic: Provide programming that omits conditions which may cause command synchronization conflicts (i.e., alternate action (toggling) on/off without power reset of feedback.) Provide power sensors or other devices where necessary to ensure that positive logic conditions are maintained.
7. Timing: Prevent two or more commands being sent simultaneously to the same piece of equipment.
8. Linking: Provide linking of functions to require the fewest number of user actions to effectively control the equipment.
9. Clearing: Ensure that each media selection clears the previous audio and visual selection (e.g. Selecting PRESENTATION clears the audio as well as video section of the previous Blu-ray disk selection.
10. Defaults: Establish default power-up conditions for the system including device audio levels, warm-up routine, power conditions, switcher status and other default conditions as required by the Owner or Owner's representative.
11. Volume Memory: Provide easy-to-use memory for volume settings associated with each source device. These settings shall be maintained between alternate selections during each use – from power on to power off.
12. Status Indication: Buttons (hard and soft) which incorporate indicator light or inverted illumination capabilities shall be addressed through the software and programming.
13. Failsafe: No operation or sequence of operations shall cause the control system to become inoperable or interfere with further processing, correct operations or execution of commands.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Delivery

1. Deliver products to the site only when protected storage space is available.
2. Coordinate materials delivery with installation schedule to minimize storage time at jobsite.
3. Deliver materials in manufacturer's original, unopened, undamaged packaging and containers with identification labels (name of the manufacturer, product name and number, type, grade, UL classification, etc.) intact.
4. Immediately replace equipment damaged during shipping at no cost to the Owner, so as not to impact the construction schedule.

B. Storage and Protection

1. Store materials in clean, dry, ventilated space free from temperature and humidity conditions (as recommended by manufacturer) and protected from exposure to harmful weather conditions.
2. Comply with manufacturer's storage requirements for each product. Comply with recommended procedures, precautions or remedies as described in the MSDS as applicable.
3. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris, and traffic.
4. Storage outdoors covered by rainproof material is not acceptable.

5. Provide heat where required to prevent condensation or temperature related damage.

C. Handling

1. Handle materials and equipment in accordance with manufacturers' written instructions. Handle with care to prevent damage, breakage, denting, and scoring.

2. Do not install damaged materials and equipment. Replace damaged equipment at no cost to the Owner.

1.12 WARRANTY

A. Warrant the System for a minimum of one year from the date of system acceptance by the Owner. Honor component warranties per manufacturers' terms if greater than one year.

1. Warranty shall include service as described in 3.14 "Maintenance and Extended Service".

B. Activate manufacturers' warranties in the Owner's name. The warranty period shall commence on the date of System Acceptance by the Owner.

C. In the case of contractor-modified equipment (where the manufacturer's warranty could be voided), assume responsibility for that equipment's warranty.

D. Warrant the Software and version updates – see "Software" below.

1.13 SOFTWARE LICENSE

A. Obligations Governing the Software

1. The AV Contractor shall own the copyright of any custom created software/parameter files

2. ("Software") and hereby grants the Owner a royalty-free, non-exclusive license to use the Software for use with the audiovisual and other connected systems in this project. This license cannot be transferred.

3. The Owner shall not rent, loan or re-license rights to use the Software to any third party.

4. Any third-party software provided or made available to the Owner by the AV Contractor but not created by the AV Contractor is sublicensed to the Owner through the AV Contractor, and the AV Contractor agrees that such sublicense is granted with consent of the third-party at no cost to the Owner, and Owner shall be entitled to use such software under the same terms as the AV Contractor.

5. The AV Contractor and third-party suppliers are not restricted from licensing the Software or any portion thereof to other customers.

6. At acceptance testing, the AV Contractor shall provide the source code for custom created software, applications required to use the source code, descriptions of the required equipment, and instructions detailing the modification and installation of the Software to the Owner.

B. For project and custom software, the following requirements apply:

1. Provide the source code to the Owner either directly via file transfer or make it available through other means, such as cloud storage, an FTP site, etc. The Contractor must maintain older versions within a folder structure and make them available to the Owner at the Owner's request. At the end of the warranty period, release the current and older versions of the source code to the Owner. If the AV Contractor ceases to exist during the warranty period, release the source code to the Owner upon termination of the business.

2. Provide the Software in a form suitable for immediate access by the System.

3. Grants the Owner the right to modify and to enhance the Software as furnished and licensed under the terms of this Agreement at its own risk and expense, and further agrees such modifications and enhancements developed by the Owner to be the property of the Owner. Any changes to the custom created software parameter files do not affect Copyright ownership.

4. During the warranty, if the Owner discovers that the Software is no longer functioning in the same manner as had been approved at the beginning of the warranty period, they shall document the issue(s) in sufficient detail to allow them to be reproduced and notify the AV Contractor. Update the software, shall provide or post updated Software files as detailed above, shall demonstrate that the error has been resolved, and shall maintain updated Software files as detailed above within 48 hours of resolution of the error.

5. The AV Contractor is responsible to defend any suit brought against the Owner and pay any damages due to the resulting judgment from any suit brought against the Owner as it pertains to a violation of copyrights or patents of the Software or licenses. The Owner shall notify in writing the AV Contractor promptly and give authority, information and assistance at the AV Contractor's expense.

6. The AV Contractor at its own expense and option shall, if able, procure for the Owner the right to continue to use the Software as licensed or to replace it with a non-infringing release. This shall not include any agreement by the AV Contractor to accept liability for patent or copyright infringement for beyond the Software as licensed and furnished for the Project. This also excludes any agreement by the AV Contractor to accept liability for patent or copyright infringements for methods and processes to be carried out by using said Software except those inherent in the furnished System.

7. All contracts with Third-party software suppliers will transfer from the AV Contractor to the Owner at Project acceptance by the Owner.

8. The Owner shall apprise the AV Contractor of activities it takes with Third-party software providers during the warranty period. Included activities would include discontinuing the use of any Software component, installing updated or alternate versions of the Software, revising the configuration of affected systems.

9. The Owner can contact the AV Contractor for questions at no additional cost during the warranty period, providing:

- a. The queries are related to the audiovisual systems defined in this document.
- b. The query is asked by the Owner's staff or authorized representative.

c. The inquirer has attended the AV Contractor's or the manufacturer's training in the use of the systems defined in this document.

d. The question is not intended as design consultation.

10. The Owner can only make copies as backup files of the Software and they are required to include the AV Contractor's copyright notice. The Owner shall make a reasonable effort to secure this Software to prevent theft or unlicensed usage.

c. Software License Terms

1. The Software license is granted by the AV Contractor for the devices provided for the Systems. If any devices in the system fails, the license can be transferred to a replacement device on a temporary or permanent basis if the original device is to be phased out. The transference may only occur with written notification to the AV Contractor.

2. Additional licenses or changes to the Software are subject to a supplemental agreement between the AV Contractor and the Owner.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Each component shall be the latest version of the specified model or type available at the time of bidding, as long as the updated devices provide the same or better capabilities and performance required by the system design.

B. Materials and equipment shall be new and shall meet or exceed the latest published specifications of the manufacturer.

2.2 EQUIPMENT SCHEDULE

A. General:

1. Note on quantities: Determine quantities of items with an A/S (as shown) or A/R (as required) in the Qty. column by performing a take-off of these items from the audiovisual drawings, and/or an analysis of required functionality.

2. USB Cabling and Extension: Refer to the Cabling Section below for performance requirements. Provide products as required to meet distance requirements for each application.

3. Equipment Schedule:

LOCATION/SYSTEM	QTY.	NOTES
DAIS		
Audio		
Generic OFE POTS Telephone	1	OFE
JK Audio OFE THAT-2	1	OFE
QSC AD-C6T	8	
QSC QIO-L4O	1	
Shure MX418/C	10	

Shure MX424	7	
Control Systems		
Crestron TS-770-B-S	1	
Crestron Electronics CEN-GW1	2	
Crestron Electronics HZ2-KPEX-B Wireless Controller	24	
Crestron Electronics USB-EXT-2-REMOTE	11	
Dell Wired USB Keyboard and Mouse	11	OFE
Video		
BirdDog 4K HDMI	2	
Crestron DM-TX-201-C	2	
Crestron DGE-100	2	
Crestron DMC-STRO	1	
Crestron DM-RMC-4KZ-SCALER-C	15	
Generic OFE COMPUTER - LAPTOP	1	OFE
Generic OFE Document Camera	1	OFE
Generic OFE PTZ Camera	1	OFE
Generic OFE PTZ Camera - NDI	4	OFE
Sharp E988	2	
Sharp OFE LCD MONITOR	11	OFE
Sharp NEC E758	2	
Chief CSPBPTA	2	
Chief TA500	2	
Chief TAS1	2	
Chief TS525TU	2	
HALLWAY		
Video		
BirdDog 4K HDMI	1	
Sharp NEC E658	1	
SAM PIPES ROOM		
Audio		
Atlas Sound AT100	1	
QSC AD-C6T	10	
WILBUR MCMURRAY		

ROOM		
Audio		
Atlas Sound AT100	1	
QSC AD-C6T	4	
Video		
BirdDog 4K HDMI	1	
Sharp NEC E758	1	
Chief CSPBPTA	1	
Chief TA500	1	
Chief TAS1	1	
Chief TS525TU	1	
FOYER		
Audio		
QSC AD-C6T	3	
SYSTEM TECH ROOM		
Audio		
Atlas Sound AT100	1	
Denon DN-900R	1	
Listen Technologies C10-2	1	
Listen Technologies ACFB50U20	3	
Listen Technologies LT-800- 072-01	1	OFE
QSC 110F V2	1	
QSC SLMST-110-P	1	
QSC AD-C6T	1	
Q-SYS CX-Q 8K8	1	
Shure ULXD2/SM58	2	
Shure ULXD4D	1	
Shure ULXD4Q	1	OFE
Control Systems		
Crestron Electronics CEN- SWPOE-48	1	
Ubiquiti Networks 10 GbE SFP+ to RJ45 Module	7	
Crestron Electronics CP4N	1	
Crestron Electronics TS- 1070-B-S	1	
Crestron Electronics USB- EXT-2-LOCAL	11	

Startech USB31000S	1	
Video		
Crestron DMC-4KZ-C	2	
Crestron DMC-4KZ-CO-HD	9	
Crestron DMC-4KZ-HD	11	
Crestron DMC-SDI	1	
Crestron DMC-STR	1	
Crestron DM-MD32X32 - CPU3	1	
Crestron DM-RMC-4KZ-SCALER-C	1	
Crestron UC-C100-T	1	
Crestron HD-CONV-USB-300	1	
Crestron TS-1070-B-S	1	included in Flex System
Crestron Electronics ADPT-USB-ENET	1	included in Flex System
Magewell USB Capture HDMI Gen 2	1	
Shure MVX2U	1	
Crestron Electronics DMC-4KZ-HDO	1	
Dell OptiPlex Micro Desktop	11	
NewTek TriCaster 2 Elite	1	OFE
Sharp NEC E658	1	
Power		
Triplite LCR2400	1	Power Regulator
Vertical Power Strip	1	OFE

2.3 PROGRAMMING SERVICES

- A. Use the services of the Systems Software Developer (SSD) defined in Definitions to program and commission the Project's audiovisual processors and provide touchscreen menus.
- B. Provide the following as minimum coordination to the SSD:
1. Cable run lists of all systems that will include AV control processors,
 2. The Site Matrix,
 3. Complete drawing package including single-line and floor and ceiling plan drawings,
 4. Pinouts for all serial and GPI control ports,

5. The installation and commissioning schedule,
6. Contact information for a designated person with the installation team,
7. Contact information for a backup person in case the primary contact is unavailable.

2.4 CABLING

A. Cable Selection - General:

1. Refer to functional diagrams for signal type between equipment.
2. Select an appropriate cable construction, including external jacket properties and armor, when installing cables in aerial, outdoor, underground, corrosive, riser and plenum environments.
3. Select the appropriate rating and configuration of cable as required by local building code, electrical code, AHJ, and all applicable codes and regulations governing the installation.

4. Cables shall be continuous without splices

B. Manufacturers - General:

1. Crestron

2. Extron

3. Liberty

4. Belden

5. Canare

6. West Penn

7. Or approved equal

C. For systems using signal extension via STP and UTP cabling, use the extender system manufacturer's recommended cable type for the specific system and the cable run length to be used.

D. USB Cabling/Extension

1. USB 2.0 Performance

a. Meets USB 2.0 High Speed (480Mbps) Standard or greater

b. Supports mice/keyboard peripherals, controllers, cameras, mobile devices, memory hubs

c. Windows and Macintosh compatible

d. Supplies USB power from host device to receiver device

e. Active extension up to 65' distance:

1) Single-cable solution

2) No power required

3) Plenum-rated

f. Long-range extension up to 330' distance:

1) Host and receiver unit size nominally 1" x 4" x 3"

2) Utilizes manufacturer's recommended UTP or STP cabling type for the specific system and the cable run length to be used. At minimum, utilize a Category 6A type cable.

g. Manufacturers – Active extension up to 65' distance:

1) Kramer CA-UAM/UAF

2) Or approved equal

h. Manufacturers – Long-range extensions up to 330' distance:

1) Crestron USB-EXT-2

2) Or approved equal

2. USB 3.0 Performance

a. Meets USB 3.0 SuperSpeed (max 5Gbps) Standard

b. Supports touch screen peripherals, cameras, hubs

c. Supplies USB power from host device to receiver device

d. Active extension up to 50-meter distance:

1) Single-cable solution

2) No power required

e. Manufacturers - Active extension:

1) Telycam TLC-43 (30-meter)

2) Telycam TLC-45 (50-meter)

3) Or approved equal

E. The following cable manufacturers and types are listed as a reference to establish performance standards. Any of the equal manufacturers' products can be used:

1. Audio Cable:

a. Microphone, 4-conductor star quad, low impedance: Belden #1172A

b. Microphone, single-pair cable: Belden #1800F

- c. Line level, single-pair cable: Belden #9451
 - d. Microphone and line level, single-pair, plenum-rated cable: Belden #9451P
 - e. Digital audio, multi-conductor, stranded, AES/EBU cable: Belden #1350SB
 - f. Digital optical TOSLINK cable: TrippLite A102-Series
 - g. Digital coaxial, low-loss serial cable: Belden #1694A
2. Program Loudspeaker Cable:
- a. Low impedance, multi-conductor cable: Belden 5000UE-Series
 - b. Low impedance, multi-conductor, plenum-rated cable: Belden 6000UE-Series
 - c. High impedance, 70V / 100V, multi-conductor, shielded, plenum-rated cable: Belden 5000FE-
 - d. Series
 - e. High impedance, 70V / 100V, multi-conductor, shielded cable: Belden 6000FE-Series
3. Video HD-SDI, SDI, RGBHV, RGB, Y/C, Component, Composite Cable:
- a. Coax, RG-59/U type cable: Belden #1505A
 - b. Coax, RG-59/U type, plenum-rated cable: Belden #1506A
 - c. Coax, RG-6/U type cable: Belden #1694A
 - d. Coax, RG-6/U type, plenum rated cable: Belden #1695A
 - e. Coax, RG-11/U type cable: Belden #7731A
 - f. Coax, RG-11/U type, plenum-rated cable: Belden #7732A
 - g. Mini Hi-Res, RGBHV type cable: Belden #1279R
 - h. Mini Hi-Res, RGBHV type, plenum rated cable: Belden #1279P
 - i. Low skew UTP type cable: Belden #7987R
 - j. Low skew UTP type, plenum-rated cable: Belden #7987P
4. CATV / Satellite cable:
- a. Coax, RG-6/U CATV cable: Belden #9116
 - b. Coax, RG-6/U CATV, plenum-rated cable: Belden #9116P
 - c. Coax, RG-11/U CATV cable: Belden #1523A
 - d. Coax, RG-11/U CATV, plenum-rated cable: Belden #1523AP
5. Antenna Cable:

- e. Coax, RG-58A/U type cable: Belden #8240
- f. Control Cable:
- g. Control systems bus, 22AWG 1-pair + 18AWG 2-conductor cable: Belden #1502R
- h. Control systems bus, 22AWG 1-pair + 18AWG 2-conductor, plenum-rated cable: Belden
- i. #1502P
- j. Control system serial / DMX, multi-conductor cable: Belden #9841
- k. Control system serial / DMX, multi-conductor, plenum-rated cable: Belden #82841
- 5. Digital Transport SM Fiber, MM Fiber Cables:
 - a. Refer to the appropriate communications spec section for fiber optic cabling requirements.

2.5 CABLE TIES AND SUPPORTS

A. Use plenum-rated cable in plenum-rated spaces. Where plenum-rated cable is used, provide plenum-rated and approved cable ties and supports.

- 1. Manufacturer:
 - a. Thomas and Betts #TYV525M
 - b. Or approved equal
- B. Braided Sleeve
 - 1. Manufacturer:
 - a. Techflex Braided Sleeving Products #PTN2.00-BK, Flexo PET 2” braided sleeve, black
 - b. Or equal

2.6 RECEPTACLES AND CONNECTORS

- A. Manufacturers:
 - 1. Canare
 - 2. Switchcraft
 - 3. Neutrik
 - 4. Amphenol
 - 5. Pomona
 - 6. Extron
 - 7. Liberty

8. Or approved equal

2.7 MODULAR CONNECTION FRAMES AND MODULES

A. Manufacturers/Series:

1. Extron/AAP and MAAP
2. Legrand/AVIP
3. AMX/HPX
4. Crestron/FTA-CP
5. Or approved equal

2.8 LABELS

A. Manufacturers:

1. Brady
2. Thomas and Betts
3. Or approved equal

B. Wire and Cable Labels:

1. Performance

- a. Self-laminating adhesive laser labels
- b. Machine printable with a laser printer
- c. Cable size: as required
- d. Color: white label with black lettering

2. Manufacturer:

- a. Brady wire marking labels WML-211-295 and WML-311-292
- b. Or approved equal

C. Device Labels: Self-laminating, type-on tape, permanent adhesive labels. Use Helvetica 12-pt text

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine the areas to receive the Work and the conditions under which the Work would be performed. Remedy conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

B. Verify that electrical requirements including junction boxes, floor boxes, ceiling loudspeaker enclosures, empty conduit and power circuits and receptacles are in place as shown on the drawings.

3.2 INSTALLATION

A. General: Include the delivery, unloading, setting in place, fastening to walls, floors, ceilings, counters, or other structures where required, interconnecting wiring of the system components, equipment alignment and adjustment, and other work, whether or not expressly required, which is necessary to result in complete operational systems.

B. Provide any accessory products required to provide a complete and functional cabling infrastructure system.

C. Manufacturer Support: Refer to manufacturer technical support for online help with basic room programming and setup.

D. Physical Installation:

1. Firmly secure equipment in place unless requirements of portability dictate otherwise.

2. Provide adequate for fastenings and supports with a safety load factor of at least four.

3. Secure plumb and square boxes, equipment, etc.

4. Install every item so that it not only functions correctly and is serviceable and replaceable but also that the result looks neat and professional.

a. Ensure any interface ports that require access have enough space to connect/disconnect cables and/or devices.

b. When possible, install devices in a way that allows service personnel to quickly view the status lights and access control buttons.

5. Furnish the manufacturer remotes for all displays and hand them to the local IT representative.

6. Set display video settings to produce clear, natural image for computer graphics or text. Confirm the display is not set to over scan.

7. For all HDMI computer signals requiring cable runs longer than 20 feet, install approved HDBaseT or DM extension systems with the required hardware and necessary faceplates.

E. Tables and table boxes by the furniture installer:

1. Coordinate the audiovisual cable routes, device mounting, and table box integration with the furniture installer.

2. Organize cables so that users can easily push excess cable both into the table box and back through a captive opening in accessible furniture.

3. For conference rooms with an integrated table box or boxes, coordinate the installation of the HDMI cable retractors with the furniture installer. The integrated table box or boxes, depending on the table size, will have an opening and set location to accommodate the cable retractor(s).

F. Attachment of Devices to Displays and Projectors:

1. Prepare mounting surfaces per the manufacturer's instructions.
2. Where possible, mount devices inset from the sides of displays to minimize their visibility.
3. Mount devices square and plumb.
4. Mount each device such that neither the devices nor the display's cooling is impaired.

G. Equipment Configuration:

1. Scalers: Set output resolution to match that of the attached display device.
2. EDID Strategy:
 - a. The system color space will be RGB.
 - b. Program EDID management preferences for a maximum input resolution of 3840x2160 for rooms with 4k displays, otherwise use 1920x1200 or 1080p depending on the output device.

H. Security Configuration:

1. Change default passwords; coordinate with the Owner's representative to obtain passwords for all password-protected devices and systems.
2. Install the latest security patches for all included equipment and systems.
3. Disable unused communication ports and protocols.

I. Cable Installation:

1. Mark cables, regardless of length, with permanent, non-handwritten number or letter cable markers per the instructions below in Labeling. There shall be no unmarked cables in the system.
2. Furnish screw-type terminal blocks, boards, strips, or connectors, for cables which interface with racks, cabinets, consoles, or equipment modules. Terminate wires terminating at screw-type terminals with crimp-on lugs. "Telephone-style" punch-down blocks are not acceptable for signal and data wiring.
3. Group cables according to the signals being carried. In order to reduce signal contamination, form separate groups for the following cables:
 - a. Power cables
 - b. Control cables
 - c. Analog video cables
 - d. Digital audio and video cables
 - e. Analog microphone audio cables
 - f. Analog line audio cables

- g. Loudspeaker audio cables
- h. RF cables

4. Where possible, run power cables, control cables, and high-level cables on the left side of an equipment rack as viewed from the rear. Run other cables on the right side of an equipment rack, as viewed from the rear. Where wiring issues preclude this orientation, it is acceptable to deviate from the directions above, as long as separation is maintained between signal and electrical power cables.

5. Provide a service loop of appropriate length within racks and at boxes or points of termination to allow each piece of equipment to be removed from the front of the rack for servicing. Provide service loops at boxes or points of termination to allow the equipment to be removed and laid flat on a surface for servicing.

6. Install no cable with a bend radius less than that recommended by the cable manufacturer.

7. Clearly identify cable terminated in a floor pocket with permanent, indelible, computer or label printer labels within 6" of the cable connector. Provide strain relief for cables. Provide a minimum of 3' of free cable coiled in the floor pocket. Use nylon cable ties to group similar cable types.

8. Install network patch cords, provided under the structured cabling work, between the AV network switch and/or serving data/voice faceplate and audiovisual equipment. Coordinate network connections to the Owner's network with the telecom contractor. Refer to the patching matrix for information.

9. Provide cable management for all exposed cabling, and bundled cabling routed to portable or quasi-portable equipment. Protect cables with braided sleeve between feedpoint and bottom of furniture or equipment connections. Exercise caution to prevent scraping, cutting, or other damage to cable's jacket.

J. Jacks and Connectors:

1. Panel-mounted jacks must be recessed and have isolated grounds.

2. Contacts must be silver- or gold-plated over brass.

3. Unless otherwise required in these specifications and drawings, use the following types of connectors:

a. Microphones without mute controls: XLR-3 female

b. Microphones with mute controls: XLR-5 female

c. Line level audio: Combination XLR-3 or ¼" TRS

d. Loudspeaker: Neutrik Speakon or Switchcraft equivalent

e. Video: BNC

f. RF: F

K. Interface Plate Designation: Clearly engrave wall mounted interface plates with alphanumeric identification of input type (i.e., mic, line, speaker, video, etc.) and corresponding patch field designation.

L. Blank Panels:

1. Provide and install trim and blank plates in all floor, wall and furniture-mounted boxes that incorporate audiovisual connectivity within the assembly, including but not limited to:

- a. Blank standard ganged plates
- b. Blank Decora-style plates
- c. Blank modular (e.g., AAP and MAP) plates and inserts
- d. Blank vendor-specific plates and inserts

M. Grounding Procedures: To minimize problems resulting from improper grounding, and to achieve maximum signal-to-noise ratios, adhere to the following grounding procedures:

1. General: Because of the great number of possible variations in grounding systems, follow good engineering practice, as outlined above, and deviate from these practices only when necessary to minimize crosstalk and to maximize signal-to-noise ratios in the audio, video, and control systems.

2. System Grounds: Establish a single primary "system ground" for the systems in each particular area. Connect grounding conductors in that area to this primary system ground. Provide the system ground in the audio equipment rack for the area. The ground shall consist of a copper bar of sufficient size to accommodate secondary ground conductors.

3. Rack Ground:

a. Connect the No.6 insulated copper wire connected to the earth ground to the primary system ground busbar in the Equipment Rack.

b. Bond a No.12 TW stranded wire from the Equipment Rack frame to the primary system ground bus bar.

4. Equipment Grounds: Grounding methods used will be dependent upon individual equipment interconnection of chassis ground, circuit common, and power supply common within the units.

5. Provide ground method for equipment types as follows:

a. Equipment having a three-wire power cord with green wire of the power cord connected to chassis (Signal common is not internally connected to chassis): Make no connection from chassis ground to primary systems ground bus bar in Equipment Rack.

b. Equipment having a three-wire power cord with green wire of the power cord connected to chassis: Make no connection from chassis ground to primary system bus bar, but do make connection with 14AWG insulated wire from circuit common to primary system ground busbar in Equipment Rack. Separate circuit common from chassis ground.

c. Equipment having a two-wire power cord, no green wire, neutral is not tied to chassis, and circuit common is tied to chassis: Make connection from chassis to primary system ground bus bar using 14 gauge insulated wire.

d. Audio Cable Shields: Ground audio cable shields at one point only. There are no exceptions.

e. For inter- and intra-rack wiring connect the shield at one end only. For ungrounded portable equipment, such as microphones, connect the shield at both ends.

N. Recognition: Provide a single-rack-unit blank panel for each rack with the BrookTrout Designs logo, the Contractor's logo and the following text:

1. Designed by: BrookTrout Designs, www.BrookTroutDesigns.com
2. Installed by: [Contractor Name]. [Contractor telephone number].
3. Obtain the BrookTrout Designs logo by requesting it from the Engineer. Do not scale a bitmapped graphic obtained from the internet.

3.3 NETWORK

A. General

1. Coordinate audiovisual device connectivity to the Owner's network with the Owner's representative.

B. AV Port Matrix: For network-enabled devices, complete and return an AV Port Matrix which will be issued to the construction team after network labeling plans are issued.

1. Refer to the Site Matrix Submittal information provided in Part 1 for additional requirements.

C. Laptop Connectivity

1. Provide network interface card/module MAC address information for any laptops that will be directly connected to the Owner's network during the setup and programming of the audiovisual system.

2. Furnish this information to the Owner's project representative at least 3 weeks prior to the start of the system's configuration.

3. Utilize temporary network access on the Owner's network to verify network connected devices are visible and accessible for setup.

4. Notify the Owner after completing configurations on the audiovisual equipment connected to the Owner network

3.4 PROGRAMMING

A. Coordinate with the Owner's Representative regarding interfacing between AV power control devices and building management systems.

B. Devices with frequent need for the replacement of consumables, and the ability to send notifications based on equipment error, shall use the computer network for preventative maintenance.

1. Coordinate with the Owner's Representative to obtain the default email address for maintenance messages.

2. Ensure Owner's Representative can revise the maintenance email address via a simple method – using a single address for all networked AV devices. Contractor shall document this procedure in the Operations Manual.

C. Power Control and Sequencing

1. Provide power control interfaces for devices not provided with these, whether these accessories are listed in this Section or not. Specify accessories compatible with the specified control products.
2. Ensure that all non-essential items are turned off or placed in a low power consumption operation mode when system is turned off. At minimum, program the AV system to turn off the following types of devices when it is not in use.
 - a. Displays
 - b. Cameras and respective controllers
3. Sequence power on and power off cycles to ensure these take place with no audible and only minimally visible artifacts, pops, etc. When turning systems on, use the following sequence.
 - a. Turn on source devices.
 - b. Turn on processing and routing devices.
 - c. Turn on displays and projectors.
4. When turning systems off, use the following sequence.
 - a. Turn off displays.
 - b. Turn off processing and routing devices.
 - c. Turn off source devices.
- D. Touch Panel / Control System
 1. Only use the color red for alarm indicators and other buttons and indicators of special significance.
 2. Unless the Owner indicates otherwise, avoid the use of technical terms; use clear, everyday language. Instead of “System On”, for example, use “Turn System On”; instead of “Power Down”, use “Turn Power Off”, etc.
 3. Ensure items with similar functions appear consistently in all menus.
 4. Ensure all buttons are sized similarly and spaced evenly.
 5. Ensure spelling is 100% correct.
 6. Menus throughout the project should appear and function consistently, across touch panels and control system web pages.
 7. Provide web access for IP-enabled control systems. Via IP, users and/or technicians shall be able to operate all functions provided via touch and pushbutton panels. Coordinate with the Owner’s Representative to ensure a successful implementation of this requirement.
8. Video Conferencing Cameras
 - a. Coordinate with the Owner representative for camera PTZ presets.

9. Audio – General

a. Include a privacy button that is accessible from every screen in control system menus. Its function shall be to mute all outgoing audio.

b. Program the system to mute all outgoing audio upon system shut-down.

c. Provide independent volume control and mute functions for the following source types (as applicable per room type):

- 1) Teams
- 2) Program Audio (Laptop HDMI inputs)
- 3) Incoming Audio Conferencing
- 4) Ceiling microphones (mute only)

E. Audio Systems

1. Provide appropriate mixing, equalization, delay, feedback suppression, filtering, gating, limiting, number of open microphones (NOM), etc. to accommodate both room properties and system functional requirements.

2. For systems that deploy ceiling-mounted microphone arrays, setup microphone lobes to create even coverage of the room for talkers who are either sitting or standing.

3.5 COMPUTER INTERFACE/EXTENDER/TRANSMITTER CONFIGURATION

A. For computer interfaces, signal extenders and transmitters with integral input switching (DisplayPort/HDMI, for example) program each device and any other system components involved so that the analog audio input is active regardless of which video input is selected.

3.6 CUSTOM FABRICATION

A. Remote Control Panels and Interface Plates. Fabricate with 1/8 inch (3mm) thick #6061-T6 aluminum material. Finish brushed with 150 grit paper. Anodized finish to be black or as approved by the Architect.

B. Equipment Rack: Provide power receptacle strips, with "U" ground outlets. Power receptacle strips shall be mounted on the rear interior of the rack space on the left side as viewed from the rear. Insulate power receptacle strips from the rack. Power receptacle strips shall be Middle Atlantic or approved

C. equal. Provide UL-approved LED work lights magnetically attached on the upper left interior panel of each rack space.

D. Audio Transformers: Provide appropriate impedance ratio and power handling capacity for the function intended of audio transformers specified in the system.

E. Networks and Pads: Provide networks and pads as shown on the drawings or as required to achieve proper impedance matching and levels. Networks and pads shall be balanced. 0.5 watt, 5% composition resistors shall be soldered to fixed connection points at each end.

F. Loudspeaker Niches: Loosely fill with glass fiber to 2 lbs./cu. ft. density prior to installing loudspeakers.

G. Labeling: Provide permanently mounted 1/32" thick by 1/4" high black engraved or anodized, brushed aluminum labels with 1/8" engraved lettering for each piece of equipment and every user-adjustable control and input on the audiovisual equipment. Provide 3/8" to 1/2" high permanent labels on the back of each piece of equipment. Label should be white with black lettering. Label adhesive must be permanent.

H. If the serial number of a piece of rack-mounted equipment is not visible on the rear panel, provide a visible, permanently-attached label on the equipment, duplicating the serial number.

I. Rack Shelves/Mount Adapters: Provide the appropriate factory or custom rack shelves/mount adapters for equipment installed in the audiovisual equipment rack, whether specifically itemized or not. Acceptable manufacturers for custom rack adapters: Middle Atlantic, Winsted, APC/Stantron.

J. Provide security covers or shaft locks for all level controls, as appropriate, on all equalizers, crossovers, signal delays, and other adjustable signal processors.

K. System Functional Diagrams: Provide reduced-size as-built functional diagram for the control, audio and video system. Frame with acrylic cover, or laminate drawing, and mount adjacent to equipment rack.

L. Seismic Safety: Mount and brace permanently-installed equipment to the building structure per the most stringent of applicable codes and regulations to minimize potential damage to personnel or equipment from foreseeable seismic events. Bolt audiovisual equipment racks to the floor to prevent toppling. Brace hanging audiovisual and associated equipment both to minimize sway and to prevent detachment from the overhead structure.

3.7 FIELD QUALITY CONTROL

A. Initial Tests and Measurements: Before final adjustment and acceptance tests are scheduled, perform system checkout. Furnish required test equipment and perform work necessary to determine and/or modify performance of the system to meet the requirements of this specification. Include the following:

1. Adjust, balance, and align equipment for optimum quality and to meet the manufacturers' published specifications.

2. Perform the test procedure provided with this specification and return the completed form no less than one week prior to the initial punch walk.

3. Install 1/8" diameter vinyl "map dots" as indicators for nominal operating positions of rotary, slider, or switch controls available for operator adjustment. Provide multiple indicators, adequately distinguished, for controls having more than one nominal operating position.

B. Twisted-Pair Cabling Infrastructure: If audiovisual system includes twisted pair cabling infrastructure, test the twisted pair cabling using the following procedure.

C. Required Equipment: Fluke DTX-1800 or equal

D. Test Procedure:

1. Test each cable using the CAT6 Channel test

2. Ensure that each cable passes the test. Re-terminate or replace all cables that do not pass.

E. Digital Video Cabling: Follow the following procedure to test each provided digital video cable.

1. HDMI:

a. Required Equipment:

- 1) Quantum Data 780
- 2) Or approved testing device

2. DVI/SDI/HD-SDI:

a. Required Equipment:

- 1) Quantum Data 882D
- 2) Or approved substitute tester

3. DisplayPort:

a. Required Equipment: Quantum Data 882E-DP

b. Test Procedure:

- 1) Test each cable.
- 2) Discard all cables that fail.

F. Audio System:

1. Loudspeaker-Line Impedance: Measure the impedance at 63 Hz, 250 Hz, and 1 kHz and the resistance of each loudspeaker line leaving the sound equipment rack with the line disconnected from its normal driving source. For lines to full-range distributed loudspeaker systems, measure the magnitude of impedance at 1 kHz.

2. Hum and Noise Level:

a. Measure the hum and noise levels of the overall system for each microphone input channel and line-level input channel.

b. Adjust gain controls for optimum signal-to-noise ratio so that full amplifier output will be achieved with 0 dBm at a line-level input.

c. Terminate line-level inputs with shielded resistors of 150 and 600 ohms, respectively, for these measurements.

d. Disconnect loudspeaker lines and terminate power-amplifier outputs with power resistors for these measurements. The value of the load resistor shall be within 5% of the nominal load impedance of the amplifier under test. The power rating of the resistor shall equal the power rating of the amplifier.

3. System Frequency Response:

a. Measure frequency response using the audio systems described in Part 1. Adjust gain and equalization to provide octave-band sound levels as specified.

b. Programmable Equalizers: Provide necessary controller with full audio spectrum display for the adjustment of programmable equalizers during system checkout. Do not provide equalizer programmers with the systems.

4. Uniformity of Coverage: Measure octave bands of a pink noise test signal played through the loudspeaker system.

5. Power-Output and Signal-Level Adjustment within System:

a. Measure the electrical distortion of the overall system for each line-level input channel.

b. Adjust gain control as for the tests specified herein.

c. Apply a 1-kHz sine wave signal from an oscillator having less than 0.5% total harmonic distortion at the input tested, at a level required to produce full amplifier output. Note that a pad with 150-ohm output impedance is required for driving the microphone-level input in accordance with the EIA standard.

d. Use a distortion analyzer to measure the output level and the total harmonic distortion of the amplification and control equipment. In the absence of a distortion analyzer, a high input impedance measuring device such as a DMM may be used to measure the output level. Lack of clipping or apparent deformation of a sine-wave input signal at the power amplifier output, as seen on the oscilloscope, may serve as evidence that distortion of amplification and control equipment is within acceptable limits.

e. Make measurements with loads actually incurred in the system operation. Power-amplifier loads shall be power resistors equal to the nominal load impedance of the output terminals used in the system.

6. Loudspeaker Polarity

a. Perform polarity checks of loudspeaker lines by means of a polarity tester. Loudspeaker lines shall be identically polarized with respect to color coding: a positive signal at the input to all power amplifiers must result in a positive signal at all outputs.

b. Test loudspeaker polarity using a sine-wave test signal warbled about 500 Hz. The listener shall be located on axis of the loudspeaker. Switch the loudspeakers from nominally in polarity to nominally out of polarity with respect to the selected loudspeaker. With the loudspeakers in proper polarity, the quality and clarity of the music or speech should be greater, and the warble test signal should clearly come to the surrounding space from the loudspeaker.

7. Freedom from Parasitic Oscillation and Radio-Frequency Pickup:

a. With systems set up for each mode of operation specified in the functional requirements, check to ensure that systems are free from spurious oscillation and radio-frequency pickup, in the absence of audio input signal and when the system is driven to full output at 100 Hz.

b. Employ an oscilloscope having at least 5 MHz bandwidth for these checks.

c. Apply slow sine-wave sweep from 50 Hz to 5 kHz at a level of 6 dB below rated poweramplifier output voltage to each system. Listen carefully for buzzes, rattles and objectionable distortion.

d. Correct causes of these defects unless the cause is clearly from other than the sound amplification system's equipment and installation, in which case bring the cause to the attention of the Owner and Architect.

8. Audio Test Signal Paths: Verify operation from source inputs through system components to signal destinations.

G. Control System:

1. Verify operational functions at each control interface position.
2. Verify operational functions of wireless control device.
3. Verify operational functions of the control system and interfaced devices.

3.8 LABELING REQUIREMENTS

A. General Requirements

1. Label audiovisual system components. The components include, but are not limited to the following:

- a. Equipment Enclosures
- b. Rack-mounted AV Devices
- c. Portable AV Devices
- d. Batteries
- e. Wires and Cables
- f. Equipment Racks
- g. Terminal Blocks
- h. Relays
- i. Patch panels, and the termination positions within the patch panels

2. Provide labels that are consistent with the AV documentation.
3. Prior to installation, degrease and clean surfaces to receive nameplates and labels

B. Equipment Enclosures

1. Label each rack and cabinet with a designation corresponding to the system documentation.
2. Mount the label on the top of the rack or cabinet, centered horizontally.
3. Color: Black background with white lettering.

a. Example: Line 1: “AV-01” (1/2-inch high letters)

4. Audiovisual Devices

5. Label rack mounted devices associated with AV systems with a permanent, machine-generated, laminated label. Use 12-point black Helvetica text with a white background.

C. Batteries

1. Label batteries with the month and year installed.

a. Example: “April 2022”

D. Wireless Transmitters and Receivers

1. Label wireless transmitters and receivers, including, but not limited to wireless microphone systems clearly so users can identify the transmitter associated with each receiver.

2. Use an identifier that associates each transmitter with the room it is associated with, such as a room number.

a. Example: RM 230-MIC 1

E. Wire and Cable

1. Identify wire and cable clearly with permanent machine-generated labels wrapped about the full circumference within one-inch (25mm) of each connection.

2. Indicate the cable ID designated on the associated field or shop drawings and run list.

3. Assign wire or cable designations consistently throughout a given system; i.e., each wire or cable must carry the same number at both ends.

4. Position labels so they are clearly visible without the need to remove wire management devices or other obstructions.

F. Terminal Blocks

1. Label consistently with each block’s designation in the AV documentation.

G. Relays and Transformers

1. Label consistently with each relay’s and transformer’s designation in the AV documentation.

3.9 COOLING PROVISIONS

A. Utilize thermostatically-controlled active cooling devices if necessary to keep device temperatures below manufacturer-specified maximums. Systems including devices operating above manufacturer-specified limits shall be rejected. Cooling systems utilizing fans running continuously, without thermostatic controls, will be rejected.

3.10 OWNER TRAINING

- A. Provide training on the installed systems at the project site by a suitably qualified instructor, to designated personnel, to instruct them in the operation and maintenance of the systems.
- B. Arrange with the equipment manufacturer for such instruction, at no additional cost, in the event qualified instructors are not available on staff for certain sophisticated equipment.

3.11 SYSTEM ACCEPTANCE TESTS

- A. Perform system acceptance tests when initial system checkout has taken place and the Initial Testing and Tuning Report has been completed and submitted. System acceptance tests consist of the following:
 - 1. Take a physical inventory of equipment on site and compare to equipment lists in the contract documents.
 - 2. Demonstrate the operation of system equipment.
 - a. Provide on-site access to the Project Manager, Field Engineer, and Control and Audio System Programmers for the duration of the acceptance testing.
 - B. Both subjective and objective tests will be required to determine compliance with the specifications. Provide test equipment specified for these tests.
 - C. Coordinate with the Owner to obtain a computer specified for use as a test source. Use this computer in conjunction with a contractor-provided computer to verify audio and video signal stability at all computer input locations.
 - D. Provide final, "as-built" drawings, run sheets, manuals, and other required documents, as detailed in Submittals.
 - E. Provide complete testing reports generated by subsystems that provide self-testing.

Test	Description	Result	Comment
1	Record all equipment that was specified but is not present. For each item, provide a reason this equipment is not present.		
2	Confirm no sharp or jagged surfaces are accessible to a user.		
3	Confirm that each active device's external temperature, measured externally using a non-contact thermometer, is within manufacturer's guidelines.		
4	Perform and log cable inspection. Confirm each cable is labeled, dressed, included in a bundle with cables with like signals, not under stress, is serviceable, is correctly strain-relieved, is not bent beyond manufacturer's recommended bend radius, does not have tie wraps tensioned excessively or used inappropriately. Confirm labels are positioned and oriented in a consistent manner and are legible and unambiguous.		
5	Demonstrate that the full inventory is new equipment, in full compliance with the specification, or as modified by approved submission. Record test results as pass/fail, and list exceptions.		
6	Confirm rack elevation and flow drawings, cable and other labels and engravings present an accurate model of the furnished system and comply with latest revised specifications. Record test results as pass/fail.		
7	Confirm all inputs and outputs of switchers are labeled (wherever possible), so that users can easily make manual routes quickly without having to refer to the system drawings.		
8	Confirm all channels on amplifiers are properly labeled, so technicians can make quick adjustments without having to refer to the system drawings.		
9	Confirm all rack mounted equipment is labeled and that the labels match those on the drawings (equipment symbols and/or description), control system, field plates, patch panels, and any labels associated with the system.		

Test	Description	Result	Comment
10	Confirm RJ terminations are solid in their connectors.		
11	Confirm each coax cable respects a bend radius of at least 5x the cable's radius or as recommended by the manufacturer.		
12	Record ambient noise, A-weighted, slow.		
13	Confirm all power amplifiers are working within rated load. Record the impedance (and at what frequency) of each loudspeaker line on each power amplifier at 63, 250, and 1,000 Hz.		
14	Using appropriate test signals, have the sound system produce a nominal operating level of (65) dB SPL (Sound Pressure Level) for conference speech, (60) dB SPL for program material, "A" weighted at all listeners' ears $\pm(2)$ dB ("Uniformity of Coverage") (or at least (15) dB above the ambient noise, A-weighted, whichever is greater), with the control system volume control indicating "normal" or default setting. Record results for each channel and source.		
15	Confirm system can produce an additional 15 dB above this level (80) dB SPL) for each audio source, with less than 0.5% THD (Total Harmonic Distortion) plus noise. Measure THD plus noise while source is 15 dB above nominal operating level at each "destination", for all sources selected.		
16	Confirm system develops a noise level that is electrically 55 dB below the normal operating level for all audio sources. "Noise" refers to hum, electrostatic noise, RF interference, etc. Measure and record Signal to Noise ("signal" measured electrically at nominal operating level at each destination, for all sources selected.		
17	Confirm program loudspeakers are connected in the same polarity, and speech reinforcement systems are polarized such that a positive acoustic pressure on a microphone results in a		

Test	Description	Result	Comment
	positive acoustic pressure at the loudspeaker ("Polarity Test").		
18	Confirm system produces no more than a 1 dB variance in program source levels when each program source is playing audio from a calibrated medium (CD, test signal generator, etc.)		
19	Confirm there is no audible vibration caused by improper mechanical installation. <i>Use a continuous sweep signal at headroom level (from generator or test CD.) Provide a pass/fail result and document which device fails and the frequency of these artifacts.</i> ("Buzzes and Rattles Test").		
20	Confirm speech reinforcement systems are stable, with no ringing nor feedback.		
21	For audio conference systems, adjust microphone input gain to demonstrate that a "standard talker" (60 dB SPL at 1 m), positioned at each talker position in the room, produces a 0 dB level at the input of the mixer bus of the audio conference DSP device. If there is local voice reinforcement ("mix-minus"), AGC and ALC may need to be restricted. <i>Record test results as pass/fail. Inspect DSP mixer telephone line levels, both transmit and receive, when normal speech is encountered in the room.</i>		
22	For conferencing mode, at the 65 dB SPL listening level, confirm full duplex operation, with no reports of echo or "speech trails" as detected from the far end.		
23	Confirm equalizers, whether hardware or virtual, are adjusted for best intelligibility, and in accordance with the preferred acoustic level response curves. <i>Record the "house curve" before equalization, as well as after the equalizers have been tuned, with and without microphone input filters. If requested by the Consultant, produce this documentation for systems without equalizers, as this test may apply to the preamp filter settings in cases where intelligibility can be improved.</i>		

Test	Description	Result	Comment
24	If required, confirm system intelligibility, with a RSTI (Rapid Speech Transmission Index) greater than 0.85.		
25	For wireless microphone systems, with all wireless microphones turned on, confirm that throughout the specified operating area for the transmitter, there are no dropouts, intermodulation interaction between wireless systems, or RF caused artifacts.		
26	Confirm projectors are focused, centered, and evenly illuminated. <i>If requested, confirm using a calibrated light meter that the brightest measurement locations shall be no more than +10% above average, and the dimmest locations no less than -5% below average measurement. Also if requested, document that geometric distortion is within 2% tolerance. Take actual measurements if necessary (top, bottom, left, right dimensions of white portion of screen) and photograph if necessary.</i>		
27	Confirm system displays with stability, with no scaling-related visual artifacts when switching between, at a minimum, 1,920 x 1,080, 1,920 x 1,200 and 4,096 x 2,160, and 3,840 x 2,160 sources, and/or all those specified in the performance criteria for this system. <i>Record test results.</i>		
28	<p>Where HDMI, DVI, or DisplayPort signals are included in the system, confirm that an acceptable signal is being displayed on the monitor from each source position. Use an Alt Pixel test image for each resolution included in the design intent, or if not provided, by default, 1,920 x 1,080, 1,920 x 1,200, 4,096 x 2,160, and 3,840 x 2,160, each at 30 and 60 fps. Inspect each, leaving the signal on for at least 10 seconds. Fail the system if any artifacts are visible.</p> <p>Note: If the signal is going to a codec, HDCP should be turned off. If the signal is going to a display, HDCP should be turned on for a complete HDMI test to verify cables and display input.</p>		

Test	Description	Result	Comment
29	Confirm HDCP is maintained from sources to destinations except as excluded above. Confirm EDID is managed correctly and that devices output at resolutions supported by the system.		
	Confirm the control system controls all of the required equipment as specified. Confirm system performs with stability and in sync with the equipment being controlled without the need to reset any item of equipment. Confirm that user interface requirements dictated in Part 3 of the audiovisual specifications have been met.		
30	Confirm system is serviceable: all devices must be easily removable for repair by one person; all cables must be dressed neatly and be provided with adequate services looks, must be bundled in forms (refer to “Sound System Engineering”, Davis and Davis, 1987 and “Audio Systems Design and Installation, Giddings, 1990,”) having no excessive pressure on cables at termination points and connectors, and each cable number must agree with the shop drawings and cabling run list.		
31	Confirm all switches and receptacles are logically and permanently labeled.		
32	Confirm all nomenclature for consistency: drawings, touch screen, wall plates, floor boxes, patch panels, equipment, etc.		
33	Confirm all patch cables have cable numbers.		
34	Where cameras are included in system, confirm each operates correctly and provides correct image quality.		
35	Confirm camera presets are programmed as specified by the user. If no preset requirements have been presented, submit suggested presets.		
36	Confirm TV reception from all sources included in the design intent and that all channel presets are accurate.		

Test	Description	Result	Comment
37	Confirm that all codec options specified by the customer have been installed.		
38	Confirm and document IP addresses and configuration information provided by the client and loaded into systems, including IP addresses, subnet masks, gateways, time server, gatekeeper, etc. Confirm that all network functions specified by the customer function properly on the customer's LAN.		
39	Confirm all web-based system control and monitoring features, and other IP functionality of system (time servers, system-generated e-mail, etc.) are completely functional.		
40	Confirm that display devices have On-Screen Displays/Menus disabled. If the customer has directed otherwise, indicate from which person this direction came.		
41	Confirm that video projectors have blue screens or other images or colors displayed in the absence of an input signal disabled. If the customer has directed otherwise, indicate from which person this direction came.		
42	Log all test conference calls (audio and video). Log shall include time, line used, number called, success of connection, who was spoken with at the far end, success of full duplex, success of auto-disconnect, dB SPL in the room. Note static, jitter/packet loss, or any other artifacts, distortion, etc. Note if auto-disconnect functions as specified.		
43	Confirm no display device has lost pixels when a Full White Test signal is displayed (7 pixels maximum per quadrant, or per manufacturer's spec). Note number and location of lost pixels, if any. Provide photos.		
44	Check for excessive vibration on VC camera(s) at full telephoto position.		
45	Provide video recording of all non-conformances and anomalies.		
46	Confirm all visible devices are installed square and plumb.		

Test	Description	Result	Comment
47	Confirm no dust, grease, scratches, or any other signs of handling are visible on any devices		
48	Confirm assistive listening systems work throughout intended listening areas		
49	Where closed captioning is included in the design intent, confirm it is functional on all displays		
50	Where closed captioning is included in the design intent, confirm control system user interfaces provide a means to enable and disable display of closed captions		

3.12 INITIAL TESTING AND TUNING REPORT

A. Use additional pages as necessary to allow complete comments.

1. In the event further adjustment is required, or defective equipment must be repaired or replaced, tests may be suspended or continued at the option of the Owner or Owner’s representative.
2. If the need for further adjustments becomes evident during system demonstration and testing, continue work until the installation operates properly.

3.13 CLEANUP AND REPAIR

A. Upon completion of the work, remove refuse and rubbish, and shall leave the relevant areas and equipment clean and in an operational state. Repair damage caused to the premises by the installation activities, at no cost to the Owner.

3.14 PROTECTION OF WORK

A. During the installation, and up to the date of final acceptance, protect finished and unfinished work against damage and loss. In the event of such damage or loss, replace or repair such work at no cost to the Owner.

3.15 MAINTENANCE AND EXTENDED SERVICE

A. Warranty and Maintenance

1. During the initial warranty period, provide on-site technical support within 24 hours to troubleshoot system defects.
2. On a quarterly basis during the warranty period, schedule with the Owner a service visit to check and adjust equipment and systems such that they maintain the original performance.

B. Pre-emptive maintenance minimum requirements:

1. Clean filters and vents, lenses and perform a general dusting of all equipment.

2. Verify projector images fill screens appropriately and images are sharply focused.
3. Test and verify that all system controls operate as labelled and that the controlled devices respond accordingly.
4. Document and photograph any conditions that may affect the continued function and long-term operation of the audiovisual system and report to Owner

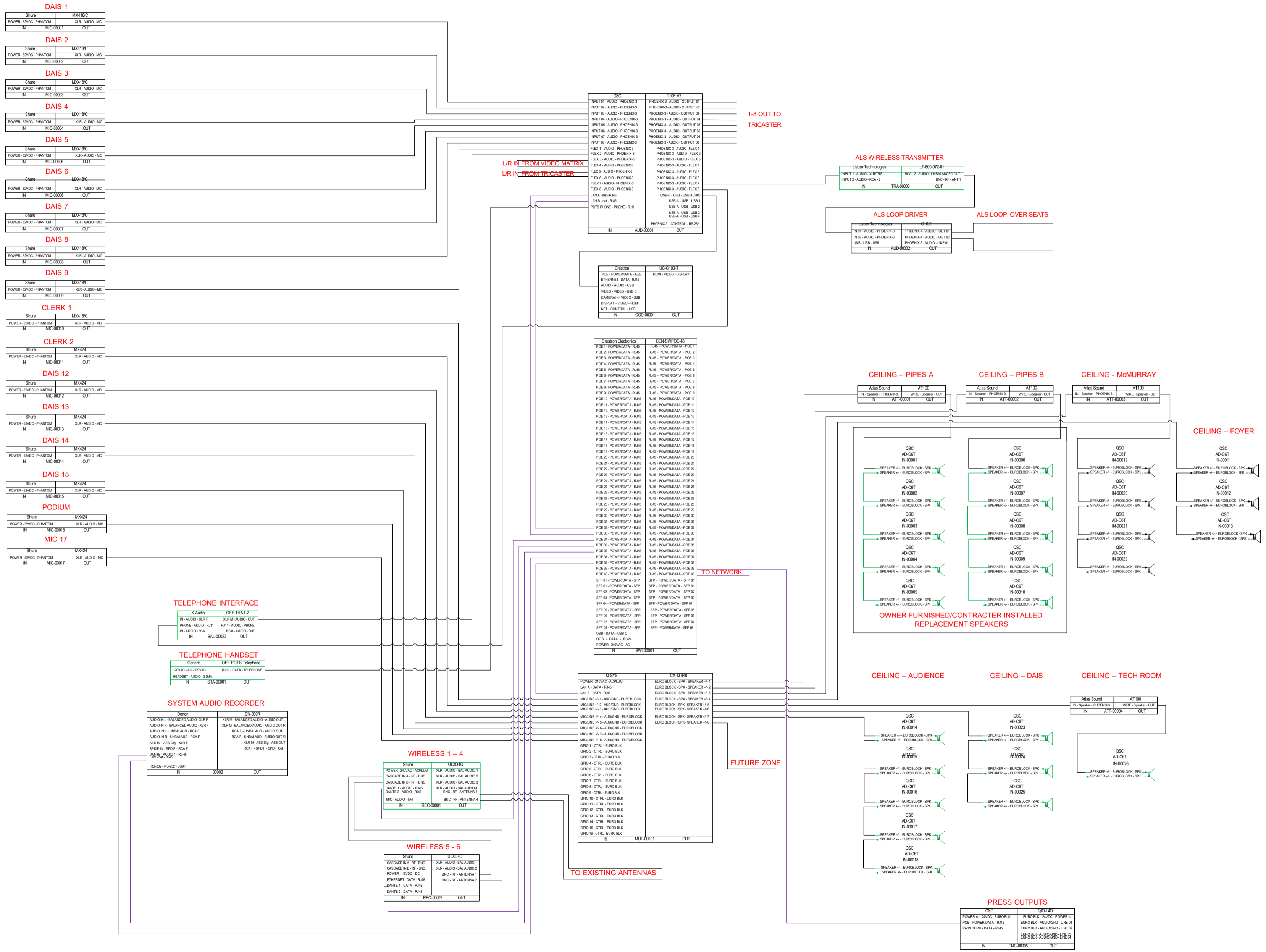
END OF SECTION

Exhibit C System Diagrams



BrookTrout Designs
Consulting Engineers

BrookTrout Designs
2008 Opportunity Drive
Suite 160
Roseville, CA 95678
800-440-3350



CABLE LEGEND

LINE
SPEAKER
HDMI
NETWORK
DM
SDI

Created 11/4/2023
Modified 1/25/2024
Printed 1/25/2024

Boardroom AV System Upgrade
678 West 18th Street
Merced, CA 95340



BrookTrout Designs
Consulting Engineers

BrookTrout Designs
2008 Opportunity Drive
Suite 160
Roseville, CA 95678
800-440-3350

New 1sk	TriCenter 2 Etk
N1 L - AUDIO - XLR F	XLR M - AUDIO - OUT 1 R
N1 R - AUDIO - XLR F	XLR M - AUDIO - OUT 1 L
N2 L - AUDIO - TRS 1/4"	TRS 1/4" - AUDIO - OUT 2 L
N2 R - AUDIO - TRS 1/4"	TRS 1/4" - AUDIO - OUT 2 R
N3 L - AUDIO - TRS 1/4"	TRS 1/4" - AUDIO - HEADPHONE
N3 R - AUDIO - TRS 1/4"	HEADPHONE - CONTROL - ITALY
N4 L - AUDIO - TRS 1/4"	DISPLAYPORT - VIDEO - Display Port 1
N4 R - AUDIO - TRS 1/4"	DISPLAYPORT - VIDEO - Display Port 2
MIC - AUDIO - TRS 1/4"	HDMI - VIDEO - HDMI
SDI IN 1 - VIDEO - SDI	SDI - VIDEO - SDI OUT 4
SDI IN 2 - VIDEO - SDI	RJ45 - VIDEO - 10GB
SDI IN 3 - VIDEO - SDI	RJ45 - VIDEO - 10GB
SDI IN 4 - VIDEO - SDI	SDI - VIDEO - SDI OUT 1
SDI IN 5 - VIDEO - SDI	SDI - VIDEO - SDI OUT 2
SDI IN 6 - VIDEO - SDI	SDI - VIDEO - SDI OUT 3
SDI IN 7 - VIDEO - SDI	SDI - VIDEO - SDI OUT 4
SDI IN 8 - VIDEO - SDI	SDI - VIDEO - SDI OUT 5
USB 1 - USB - USB 3	SDI - VIDEO - SDI OUT 6
USB 2 - USB - USB 3	SDI - VIDEO - SDI OUT 7
USB 3 - USB - USB 3	SDI - VIDEO - SDI OUT 8
USB 4 - USB - USB 3	
USB 5 - USB - USB 3	
USB 6 - USB - USB 3	
USB 7 - USB - USB 3	
USB 8 - USB - USB 3	
USB 9 - USB - USB 3	
USB 10 - USB - USB 3	
USB 11 - USB - USB 3	
USB 12 - USB - USB 3	
USB 13 - USB - USB 3	
USB 14 - USB - USB 3	
USB 15 - USB - USB 3	
USB 16 - USB - USB 3	
USB 17 - USB - USB 3	
USB 18 - USB - USB 3	
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USB 89 - USB - USB 3	
USB 90 - USB - USB 3	
USB 91 - USB - USB 3	
USB 92 - USB - USB 3	
USB 93 - USB - USB 3	
USB 94 - USB - USB 3	
USB 95 - USB - USB 3	
USB 96 - USB - USB 3	
USB 97 - USB - USB 3	
USB 98 - USB - USB 3	
USB 99 - USB - USB 3	
USB 100 - USB - USB 3	
HEADPHONE - AUDIO - TRS 1/4"	
10GB - Network - RJ45	
1GB - Network - RJ45	
N	00001 OUT

Crestron Electronics	OPIN
POWER - 24VDC - DC	TERMINAL - DATA - CRESENT G
GND - GND - SCREW	TERMINAL - DATA - CRESENT Y
LAN - DATA - RJ45	TERMINAL - DATA - CRESENT Z
USB - DATA - USB	TERMINAL - 24VDC - CRESENT POWER
MMC - DATA - CARD SLOT	TERMINAL - CTRL - RELAY 1
GPO 1 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 2
GPO 2 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 3
GPO 3 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 4
GPO 4 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 5
GPO 5 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 6
GPO 6 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 7
GPO 7 - CTRL - TERM BLK	TERMINAL - CTRL - RELAY 8
GPO 8 - CTRL - TERM BLK	TERMINAL - CTRL - GPO 1
GND - GND - TERM BLK	TERMINAL - CTRL - GPO 2
RS-232C2485 1 - CTRL - GND - TERM BLK	TERMINAL - CTRL - GPO 3
RS-232C2485 2 - CTRL - GND - TERM BLK	TERMINAL - CTRL - GPO 4
RS-232C2485 3 - CTRL - GND - TERM BLK	TERMINAL - CTRL - GPO 5
USB B - DATA - USB	TERMINAL - CTRL - GPO 6
CONTROL - SUBNET - CTRL - RJ45	TERMINAL - CTRL - GPO 7
	TERMINAL - CTRL - GPO 8
	TERMINAL - GND - GND
	TERMINAL - CTRL - INSERIAL 1
	TERMINAL - CTRL - INSERIAL 2
	TERMINAL - CTRL - INSERIAL 3
	TERMINAL - CTRL - INSERIAL 4
	TERMINAL - CTRL - INSERIAL 5
	TERMINAL - CTRL - INSERIAL 6
	TERMINAL - CTRL - INSERIAL 7
	TERMINAL - CTRL - INSERIAL 8
	TERMINAL - CTRL - RS-232C2485 1
	TERMINAL - CTRL - RS-232C2485 2
	TERMINAL - CTRL - RS-232C2485 3
N	CONV0001 OUT

RS232 TO WIRELESS DISPLAY
RS232 TO HALLWAY DISPLAY

Crestron	UCCT001
POWER - 24VDC - DC	HDMI - VIDEO - DISPLAY
ETHERNET - DATA - RJ45	
AUDIO - AUDIO - USB	
VIDEO - VIDEO - USB	
CAMERA IN - VIDEO - HDMI	
DISPLAY - VIDEO - HDMI	
NET - CONTROL - USB	
N	00000001 OUT

Crestron Electronics	CEN5WPOE-48
POE 1 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 1
POE 2 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 2
POE 3 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 3
POE 4 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 4
POE 5 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 5
POE 6 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 6
POE 7 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 7
POE 8 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 8
POE 9 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 9
POE 10 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 10
POE 11 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 11
POE 12 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 12
POE 13 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 13
POE 14 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 14
POE 15 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 15
POE 16 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 16
POE 17 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 17
POE 18 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 18
POE 19 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 19
POE 20 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 20
POE 21 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 21
POE 22 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 22
POE 23 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 23
POE 24 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 24
POE 25 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 25
POE 26 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 26
POE 27 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 27
POE 28 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 28
POE 29 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 29
POE 30 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 30
POE 31 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 31
POE 32 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 32
POE 33 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 33
POE 34 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 34
POE 35 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 35
POE 36 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 36
POE 37 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 37
POE 38 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 38
POE 39 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 39
POE 40 - POWERDATA - RJ45	RJ45 - POWERDATA - POE 40
SFP 01 - POWERDATA - SFP	SFP - POWERDATA - SFP 01
SFP 02 - POWERDATA - SFP	SFP - POWERDATA - SFP 02
SFP 03 - POWERDATA - SFP	SFP - POWERDATA - SFP 03
SFP 04 - POWERDATA - SFP	SFP - POWERDATA - SFP 04
SFP 05 - POWERDATA - SFP	SFP - POWERDATA - SFP 05
SFP 06 - POWERDATA - SFP	SFP - POWERDATA - SFP 06
SFP 07 - POWERDATA - SFP	SFP - POWERDATA - SFP 07
SFP 08 - POWERDATA - SFP	SFP - POWERDATA - SFP 08
SFP 09 - POWERDATA - SFP	SFP - POWERDATA - SFP 09
SFP 10 - POWERDATA - SFP	SFP - POWERDATA - SFP 10
DOE - DATA - RJ45	
POWER - 24VDC - DC	
N	SW-0001 OUT

Crestron	DM-MD3232-CPJ3
POWER - 24VDC - DC	CARD SLOT - CARD SLOT - CARD 12
CARD 1 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 13
CARD 2 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 14
CARD 3 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 15
CARD 4 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 16
CARD 5 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 17
CARD 6 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 18
CARD 7 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 19
CARD 8 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 20
CARD 9 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 21
CARD 10 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 22
CARD 11 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 23
CARD 12 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 24
CARD 13 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 25
CARD 14 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 26
CARD 15 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 27
CARD 16 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 28
CARD 17 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 29
CARD 18 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 30
CARD 19 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 31
CARD 20 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 32
CARD 21 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 33
CARD 22 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 34
CARD 23 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 35
CARD 24 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 36
CARD 25 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 37
CARD 26 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 38
CARD 27 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 39
CARD 28 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 40
CARD 29 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 41
CARD 30 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 42
CARD 31 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 43
CARD 32 - CARD SLOT - CARD SLOT	CARD SLOT - CARD SLOT - CARD 44
LAN - Network - RJ45	
CONTENT - Network - RJ45	
SERVICE - Network - RJ45	
USB - USB - USB	
N	MAT-0002 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00012 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00013 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00014 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00015 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00016 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00017 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00018 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00019 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00020 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00021 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00022 OUT

Crestron Electronics	USB-EXT-2-LOCAL
POWER - 24VDC - DC	USB - DATA - USB HOST
CONTROL - DATA - RJ45	
N	BAL-00023 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00001 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00002 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00003 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00004 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00005 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00006 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00007 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00008 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00009 OUT

Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R
USB 3 - USB - USB 3	
Audio L, R - AUDIO - 3.5MM	
N	CAS-00010 OUT

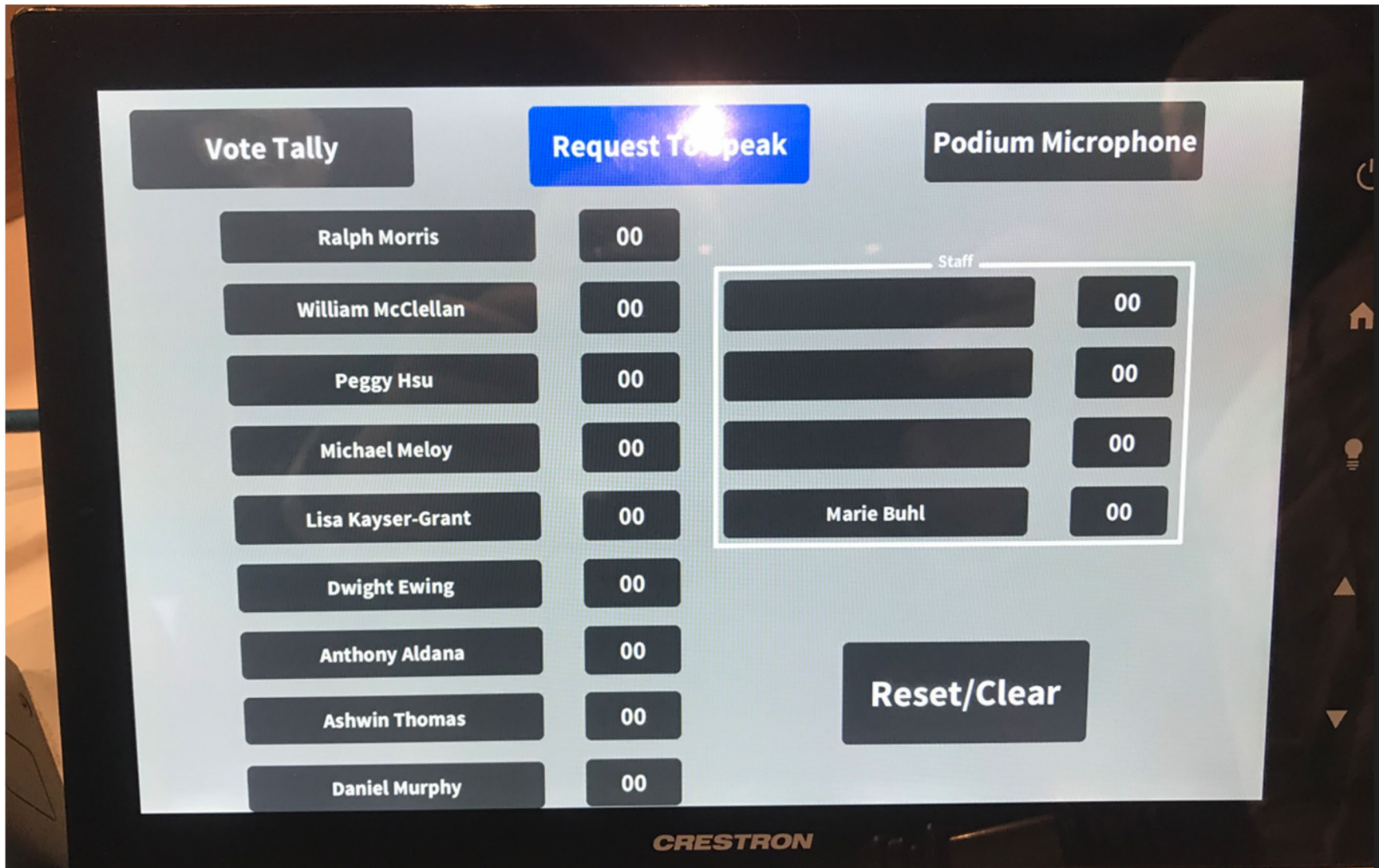
Dell	OptiPlex Micro Desktop
NET - NET - RJ45	DISPLAYPORT - VIDEO - Display Port
USB 3 - USB - USB 3	3.5MM - AUDIO - Audio L, R

Exhibit D Touchpanel Layouts

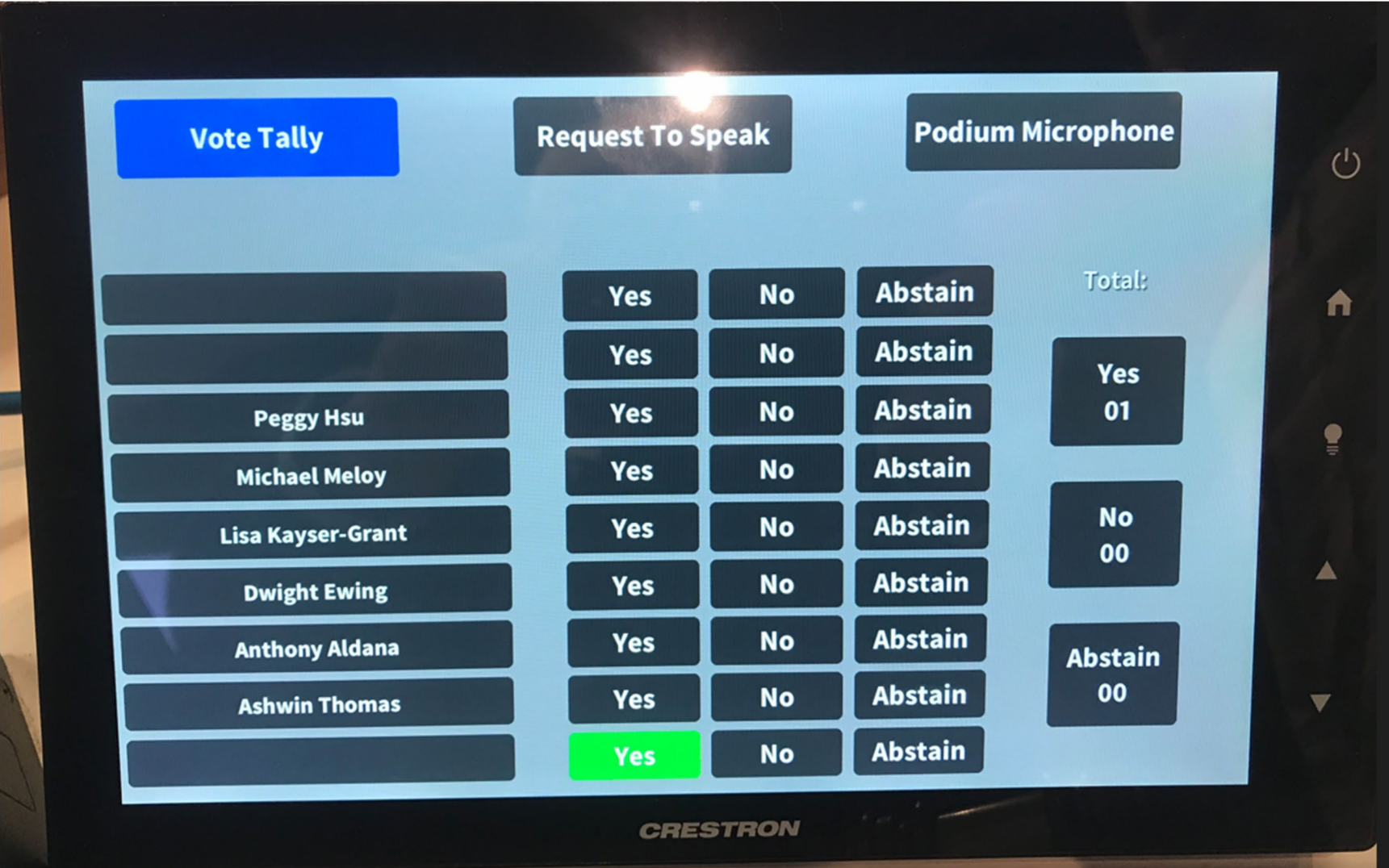
Mayor Touch panel : Podium Microphone



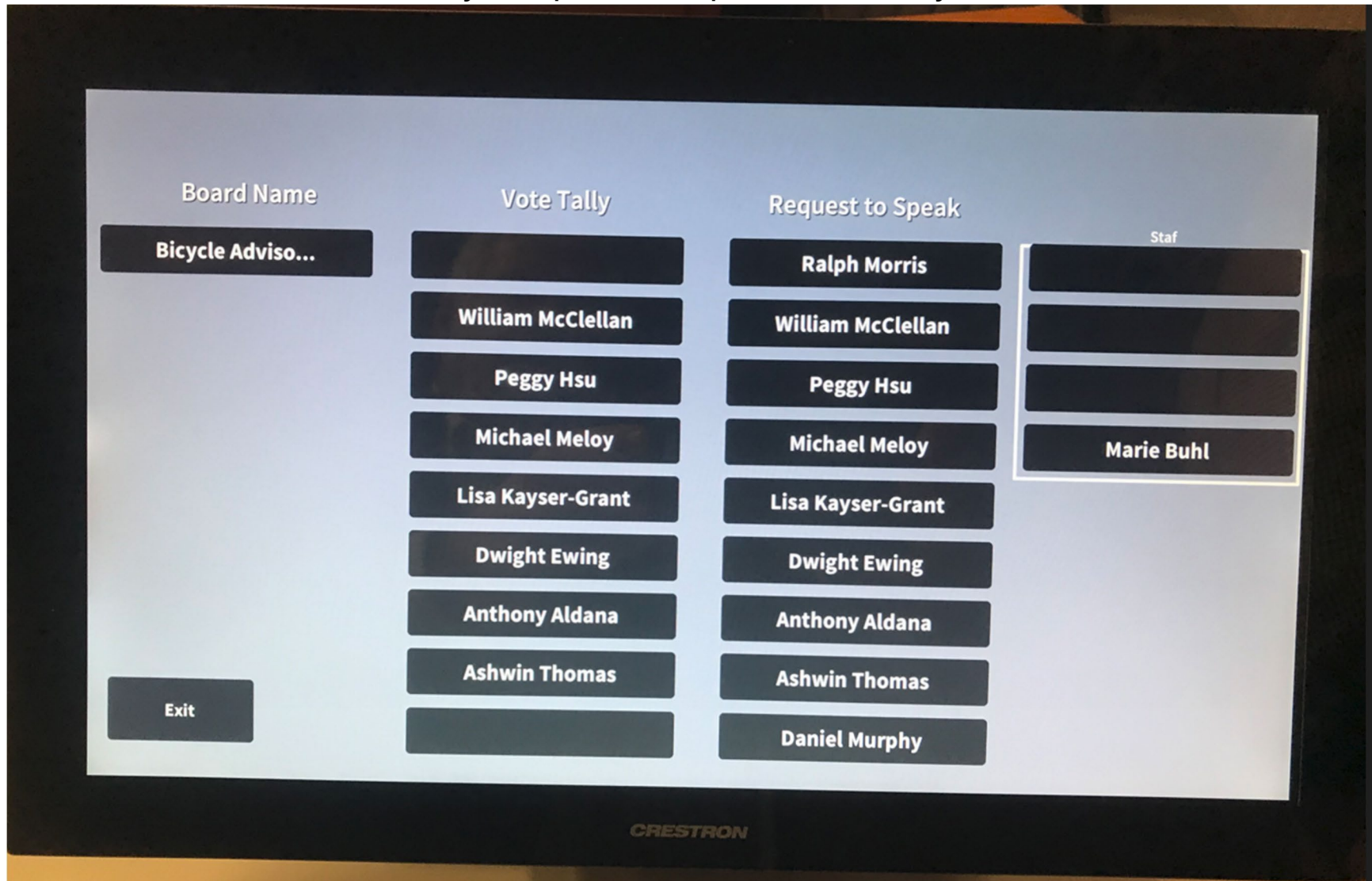
Mayor Touch panel Request To Speak



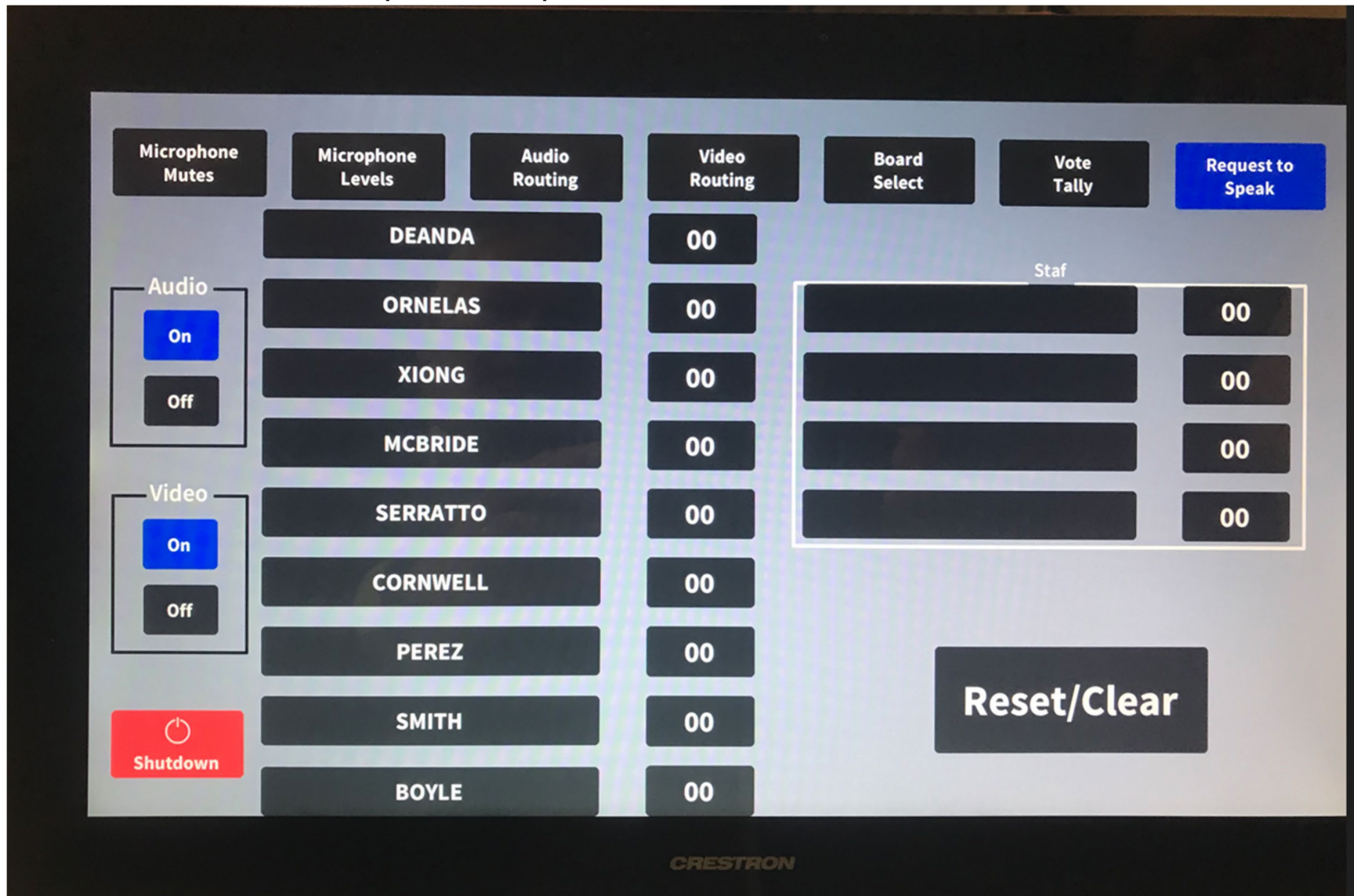
Mayor Touch panel Vote Tally



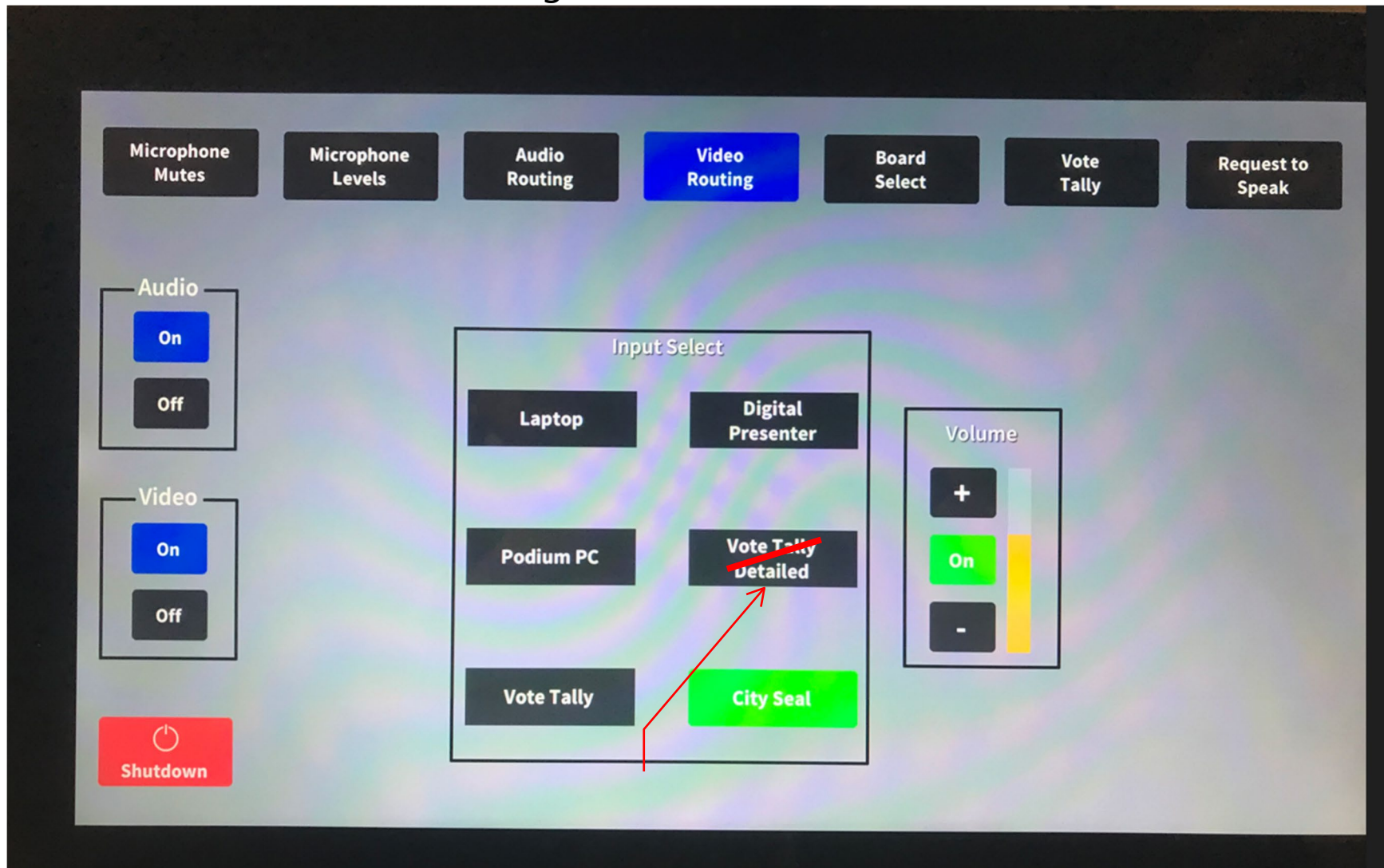
Clerk Touch Panel: Vote Tally/Request To Speak Summary



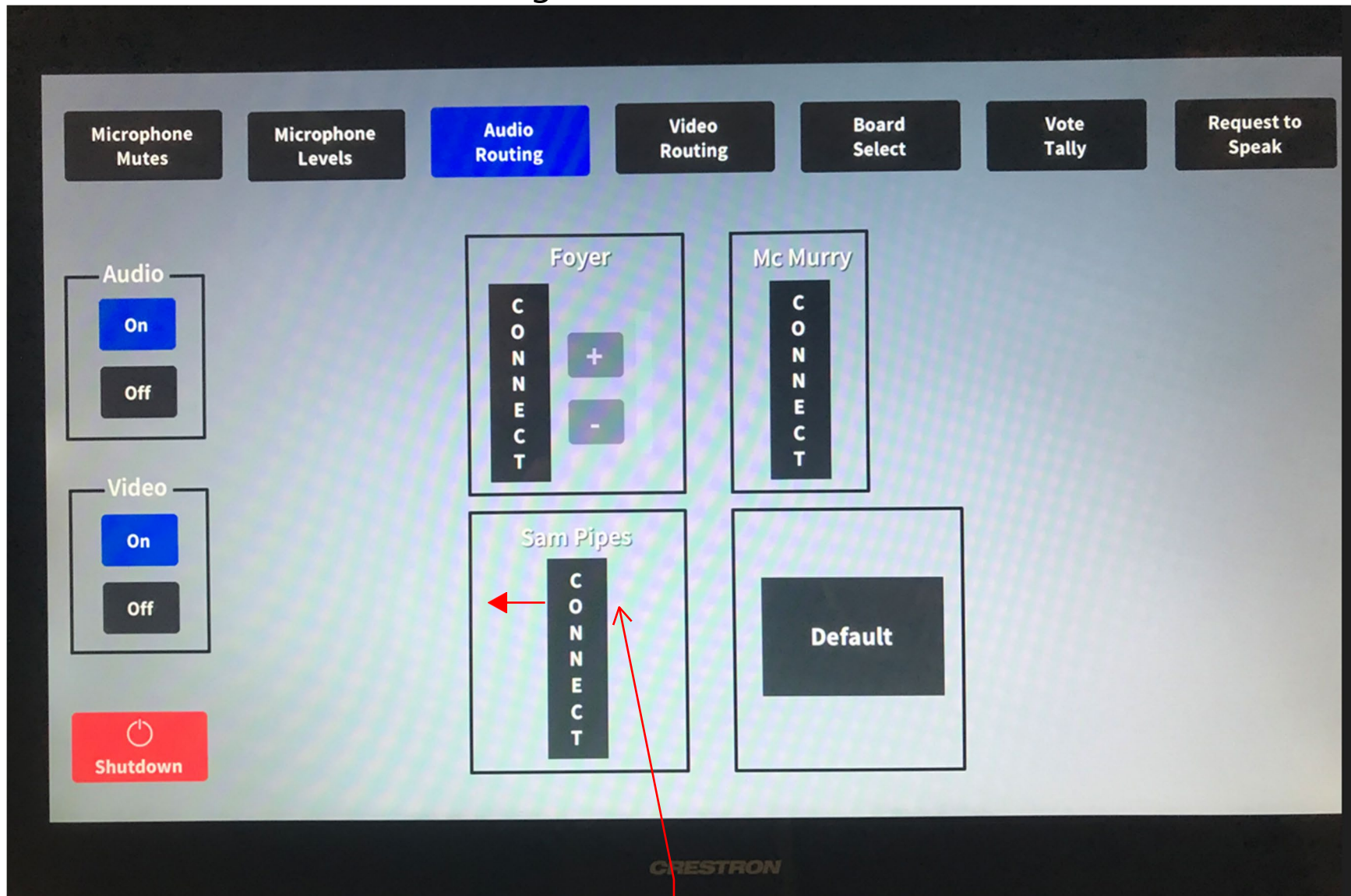
Clerk Touch Panel: Request To Speak Queue



Clerk Touch Panel: Video Routing



Clerk Touch Panel: Audio Routing



Clerk Touch Panel: Mic Levels



Clerk Touch Panel: Mic Mutes

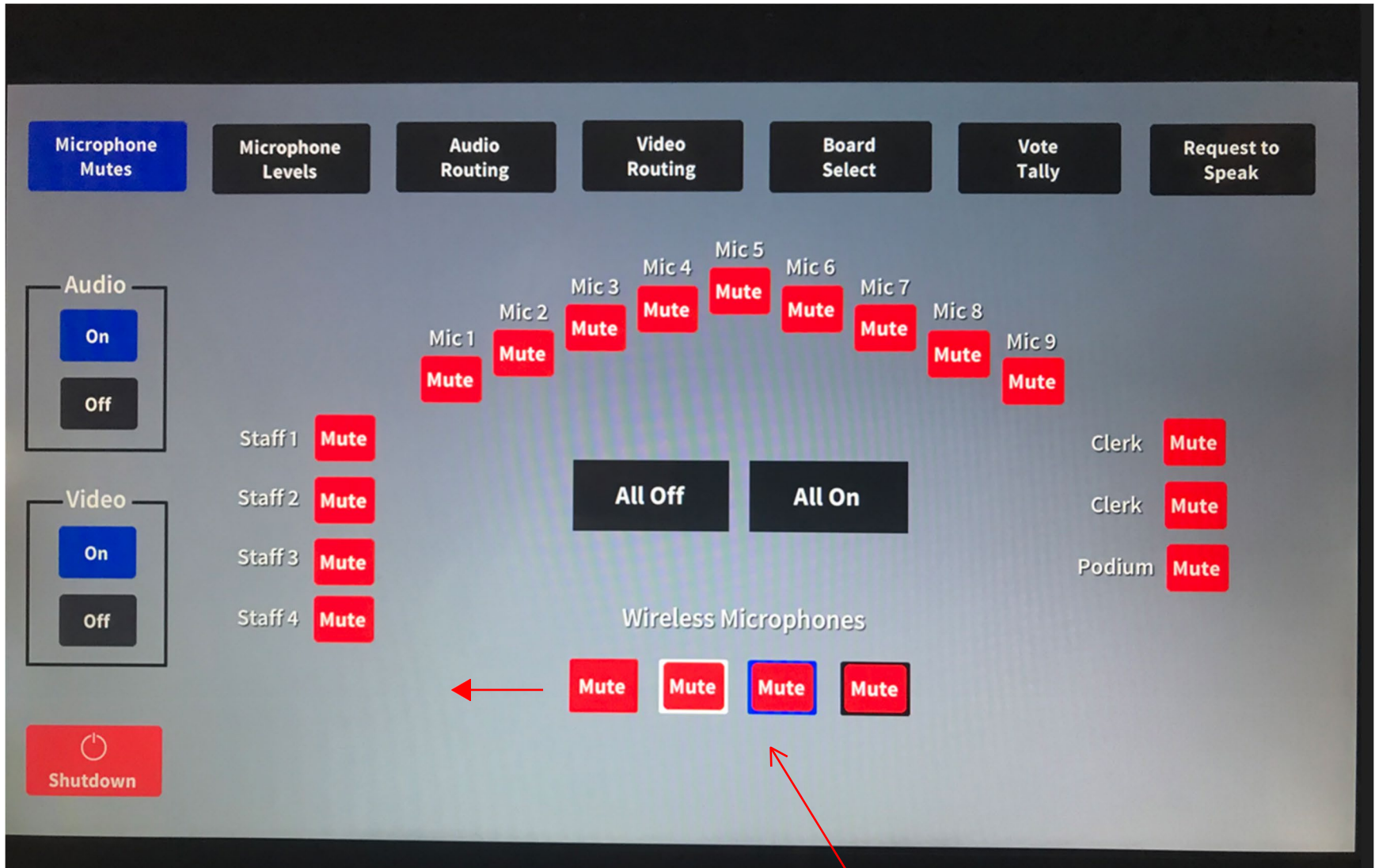


Exhibit E Crestron Code of Existing System

The Crestron Code of Existing System may be downloaded : [Here](#)

