SECTION 275122 - INTERCOMMUNICATIONS SYSTEM FOR CONSULAR WAITING AREA

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes intercommunications systems for the consular waiting area, serving consular teller window stations, as well as the paging system for general consular waiting area and associated waiting area outside of the building.

B. Related Sections:

1. Division 27 Section "Non-Consular Teller Intercommunications Systems" for teller window intercommunications at locations not associated with Consular Waiting Area.
2. Division 27 Section 16721, "TSS Intercommunications Systems" various security audio and audio/visual intercommunications systems.
3. Other Division 26 and Division 27 sections for conduits, wire ways, connection boxes, pull boxes, junction boxes, and outlet boxes permanently installed in walls, floors, and ceilings. This project is a ring and string project. Ring and string connectivity is included in this section; refer to other Division 26 and Division 27 sections for electrical breaker panels required to power the audiovisual systems.

1.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. General:

1. The intent is to provide a fully operational system with voice amplification to facilitate communication by both the teller and the requestor at the Consular Teller Window without requiring each to raise their voices, and to provide a clear audio experience via the paging system for requestors in the interior and exterior general consular waiting areas.

B. Audio Systems:

1. Audio dynamic sound processor (DSP): Provides echo cancellation and audio processing for full duplex teller window communications, as well as in office and public area paging selection.
2. Audio speaker for teller area: Provide wall mounted speaker.
3. Audio speaker for public area: Provide ceiling mounted speaker.
4. Teller Microphone: Provide gooseneck tabletop microphone. Provide base with mute button for microphone. The microphone mute shall be accomplished at the DSP and not locally at the microphone due to echo cancellation reference issues.
5. Boundary zone microphone: Provide wall mounted on public side with mounting to a single gang wall plate.
6. Provide equalization and processing for all audio sources inclusive or external to DSP processor.
7. Provide amplification for the audio speakers at two discrete channels.

8. Provide intercom connections between the operator position and operator position in the XOX CAT room.
9. Provide limited volume and muting control for teller via a fixed button control panel located in teller area.

C. Remote Control Systems:

1. Provide control system for control of the teller and public area. The control surfaces shall include one fixed button control surface at the teller location. This control surface can serve as the microphone base also. the following control surfaces. The control functions shall include the following:

   a. Speech audio level inbound volume up, down, mute
   b. Speech audio level outbound volume up, down, mute
   c. Office page selection
   d. Public page selection

D. Miscellaneous Components:

1. Provide audiovisual rack sized for the equipment.
2. Provide power line conditioning for A/V rack.
3. Provide uninterruptible power supply for all DSP and control items.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Audio:

Frequency Response:	30Hz – 18 KHz, within ± 3.0db
Signal to Noise Ratio:	55dB minimum
Total Harmonic Distortion:	1% maximum from 30Hz-15Hz (THD)

B. Digital Audio:

Signal:	AES / EBU RS-422 110Ω S/P DIF 0.5V P-P 75Ω

C. Composite Video Signal:

Signal:	1V P-P 75 Ω (3.58, 4.43MHz/NTSC)
S/N (RMS) un-weighted:	DC to 4.2 MHz, 50 dB minimum
Cross talk, un-weighted:	DC to 4.2 MHz, 50 dB minimum
Frequency Response:	Within ± 0.5 dB. 0 to 4.2 MHz

D. S-Video Signal:

Signal:	Y: 1.0V p-p, 75 Ω C: 0.286V p-p, 75 Ω (3.58, 4.43MHz/NTSC)

E. Serial Digital Video:

Signal:	SIMPTE 259M 270 Mbps. 0.8V p-p 610% 75Ω 4:2:2 Serial digital video signal

F. Component Video:

Signal:	Y: 1.0V p-p, 75 Ω PB/CB: 07V p-p, 75 Ω PR/CR: 0.7V p-p, 75 Ω

G. RGB Hs Vs Signal:

Signal:	1V P-P CGA, VGA, SVGA, XGA, SXGA, UXGA
Frequency range:	15khz.-150khz (H) 40hz.-92hz. (V)

1.4 SUBMITTALS

A. Product Data: For the following:

1. Speaker-microphone stations
2. Intercommunication amplifier
3. Paging amplifier
4. Power line conditioner.
5. Uninterruptible power supply (UPS).

B. Design Calculations: Calculate requirements for selecting seismic restraints for central control cabinets.

C. Signed and sealed by a qualified professional engineer. Complete system shop drawings depicting the following information:

1. All point-to-point wiring schematic details, equipment interconnections, component values and showing complete letter and number identification of all wire and cable as well as jacks, terminals and connectors.
2. All panels, plates, and designation strips, including details relating to terminology, engraving, finish, and color.
3. Complete sets of remote Graphical user interface control panel layouts including layouts for touch sensitive and fixed button control panels, master control pages and brief functional description of programming.
4. All custom designed consoles, tables, carts, support bases, and shelves.
5. All unusual equipment modifications.
6. Run sheets and field wiring details.
7. Wire specifications and assignment by use.
8. Patch panel assignment layout drawings.
9. Front mechanical drawings of each equipment rack.
10. Complete and detailed schematic drawing including all items of equipment.

D. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

E. Manufacturer Seismic Qualification Certification: Submit certification that central control cabinets, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

F. Qualification Data for Audiovisual Supplier/Installer:

1. Identify three similar projects of the same or greater magnitude and scope within last three years. Include statement that the Audiovisual Supplier/Installer was actively involved in those projects. Provide current contact names and telephone numbers, as well as job description.
2. Factory-trained and certified engineer for DSP Software and product line, including for training and service. Submit certificates and credentials.

G. Field quality-control test reports.

H. Closeout Submittals: At the completion of the installation, provide the following information:

1. Equipment manufacturer’s operation and maintenance manuals for each piece of equipment.
2. Equipment inventory listing manufacturer, model number and serial number for all equipment items furnished.
3. Record drawings for each system installation, showing all equipment items, interconnection of equipment and all cable label designations.
4. Functional block drawing identical to the intent of the specification drawing with addition of all input and output circuit cable and terminal block numbers as well as all jack field circuit I.D. designations. The drawing shall be in readable logical format that is understandable to both technical and non-technical staff.

    a. Provide copy of drawing under clear acrylic sheet and mount on inner surface of equipment rack door.

5. All control software, both standard and custom written, shall be the property of the Government.

I. Operation and Maintenance Data: For intercommunication equipment to include in emergency, operation, and maintenance manuals.

1. The Operation section shall describe all typical procedures necessary to activate each system to provide for the functional requirements as listed in this section.
2. The Maintenance section shall provide a recommended maintenance schedule with reference to the applicable pages in the manufacturer's maintenance manuals. Where the manufacturer provides inadequate information, the Audiovisual Supplier/Installer shall provide the information necessary for proper maintenance.
3. Provide replacement parts lists in support of all items of equipment, either a stock manufactured item or a custom built.
4. In addition to items specified in Division 01 Sections "Closeout Procedures" and "Operation and Maintenance Data," include a record of Government's equipment-programming decisions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Comply with the OBO Electrical Code.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in fully enclosed vehicles after specified environmental conditions have been permanently established in spaces where equipment is to be placed.

B. Store equipment in spaces with environments controlled within manufacturers' ambient temperature and humidity tolerances for non-operating equipment.

1.7 COORDINATION

A. Coordinate layout and installation of ceiling-mounted speaker microphones with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 MAINTENANCE SERVICE

A. During the project warranty period, the Audiovisual Supplier/Installer shall provide on site service, repair and maintenance for the audiovisual system, regardless of the number of service visits required to maintain system operation and performance. Service and maintenance consists of telephone support and assistance, on-site services, and preventative maintenance inspections. In all cases, the Audiovisual Supplier/Installer shall provide knowledgeable and capable staff technicians.

1. Telephone Assistance: The Audiovisual Supplier/Installer shall respond via telephone within 24 hours. This first contact should outline the nature of the problem or functional anomaly. The Audiovisual Supplier/Installer shall make available an individual knowledgeable with the installed system that can address specific system issues described by system operators.

2. The Audiovisual Supplier/Installer shall provide capable technicians for on-site service of systems equipment or control software. The technicians dispatched shall be familiar with the installed system with complete knowledge of the products used in the systems configuration. Technicians dispatched shall have complete ability to address the nature of the system anomaly or performance difficulty described. Provide on-site response within 72 hours. Service shall be available during normal business hours, Monday through Friday, 8:00 am until 5:30 pm.

PART 2 - PRODUCTS

2.1 AUDIO EQUIPMENT

A. Audio dynamic sound processor (DSP), rack mounted. Retain this Article for user-programmable, microprocessor-switched systems. Delete functions not required.

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Biamp Audia
b. BSS Sound Web
c. Peavey Media Matrix

2. Salient Characteristics:

a. Configurable input and output.
b. DSP includes equalization processing and remote control interfaces.
c. Selectable automatic gating for each line or microphone interfaces.
d. IP based, contact closure (I/O) or RS-232 controllable.
e. Total harmonic distortion <0.1 percent.
f. Frequency response 20 Hz – 15 kHz 62 dB.
g. Configured for inputs and outputs as shown in this section in Attachment A, “AV Line Diagram” and in Attachment B, “DSP Processing Selection Diagram”.
h. Expandable to allow for multiple window systems within same DSP environment.

i. Item to include all required network hardware and interfaces as necessary for complete and working DSP system.

B. Teller Side Speakers:

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Tannyi5AW
b. JBL Control 25
c. Klipsch CA-5T

2. Salient Characteristics:

a. Frequency response: 60 Hz – 22 kHz
b. 25 mm x 125 mm Constant Directivity Dual Concentric
c. 8 or 16 Ω impedance
d. Maximum peak program power: 150 watts.

C. Public Side Speakers:

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Tanney CMS 65-15
b. JBL Control 26C
c. Klipsch CS-650-R

2. Salient Characteristics:

a. Frequency response: 60 Hz – 22 kHz
b. 160 mm woofer and 19 mm titanium-coated tweeter minimum
c. 8 or 16 Ω impedance
d. Maximum peak program power: 140 watts
e. Grille, with tile brace and back box as necessary

D. Audio Amplifier:

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. QSC CX302
b. Crown CH1
c. Crest LT1000

2. Salient Characteristics:

a. Rack mounted
b. Two channel minimum
c. Signal-to-noise ratio 106 dB unweighted or greater
d. 20 Hz – 20 kHz frequency range

e. Less than 0.05% total harmonic distortion rom 20 hZ – 20 kHz
f. 200 watts 8Ω minimum
g. Front panel controls

E. Wired Gooseneck Microphone:

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Countryman ISOMAX M4HP5VS18EB
b. Audio Technica AT857QMLa
c. Shure MX418/S

2. Salient Characteristics:

a. Type: Condenser (back electret)
b. Polar pattern: Cardioid
c. Frequency response: 30 Hz – 20 kHz
d. Sensitivity: -43 dB (7.0 mV) re 1V at 1 Pa
e. Shock mount assembly – coordinate with millwork

F. Wired Boundary Zone Microphone:

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

a. Crown PZM-11
b. Audio Technica ES945
c. Clock Audio C004E

2. Salient Characteristics:

a. Type: Pressure zone microphone
b. Polar pattern: Hemispherical
c. Frequency response: 80 Hz – 20 kHz

2.2 REMOTE CONTROL EQUIPMENT

A. AV Function Control System:

1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. CRESTON
b. AMX

2. Salient Characteristics:

a. Custom-built user interface for DSP processor

b. Includes teller and public area volumes and page selection

2.3 MISCELLANEOUS EQUIPMENT

A. Audiovisual Equipment Rack for Under Counter Use:

1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Middle Atlantic ERK-1825 (baseline product)
   b. Atlas
   c. Winsted

2. Salient Characteristics:

   a. EIA width - 475 mm
   b. 18 rack unit height
   c. 0.76 mm steel
   d. Tapped front and rear rails, 10-32 threads
   e. Depth: 500 mm maximum
   f. Scratch-resistant powered-coated dark finish
   g. Provide low noise cooling fan for rack
   h. Provide power distribution and switching at this rack

B. Audiovisual Equipment Rack:

1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Middle Atlantic MRK-4436-MRK-2025 (baseline product)
   b. Atlas
   c. Winsted

2. Salient Characteristics:

   a. EIA width - 475 mm
   b. 20-44 rack unit height, sized based on number of systems
   c. 0.76 mm steel
   d. Tapped front and rear rails, 10-32 threads
   e. Depth: 625-900 mm
   f. Scratch-resistant powered-coated dark finish
   g. Provide low noise cooling fan for rack
   h. Provide power distribution and switching at this rack

C. AC Power Conditioning for Equipment Rack:

1. Acceptable Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

   a. Surge-X SX 1120 RT

2. Salient Characteristics:

   a. Series mode surge suppression, Grade A, Class 1, with auto tracking dual polarity voltage limiter
   b. 20 amp rating
   c. Auto-tracking dual polarity voltage limiter
   d. Dual cascaded pulse inverters
   e. Magnetic shielded enclosure
   f. EM/RFI filtering
   g. Rack mounted

D. AC Power Uninterruptible Power Supply (UPS)

1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. APC Smart-UPS 750 VA (baseline product)
   b. Triplite

2. Salient Characteristics:

   a. Sized for control system and matrix switches
   b. 450 VA/280 W rating minimum
   c. Rack mount: 1-2 RU rack mounting brackets
   d. Overload indicator
   e. Voltage requirements based on location of post
   f. Additional automatic voltage regulation by other systems

E. Power Line Conditioner: Provide power line conditioner as recommended by intercom system manufacturer.

F. Miscellaneous Components: Provide components necessary to ensure complete system that operates in accordance with the performance standards, including, but not limited to, the following:

1. Hardware
2. Switches
3. Relay panels
4. Connectors
5. Cabling
6. Lamps
7. Terminal blocks
8. Wall plates

9. Mounting brackets

G. Black boxes or unidentified components are not acceptable unless approved by the Project Director/COR during the submittal review process.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Installation includes 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 all other work whether or not expressly required herein which is necessary to result in complete operational systems.

2. Installation shall be in accordance with, but not limited to, these specifications and drawings.

B. Physical Installation:

1. Firmly secure equipment in place unless requirements of portability dictate otherwise.
2. Provide adequate fastenings and support to support load from system with a safety factor of at least three times total load.
3. Secure boxes, equipment, and similar components plumb and square.
4. Consider operational efficiency and overall aesthetic factors in the installation of equipment and cable.

C. Cable Installation:

1. Mark cables, regardless of length, with wrap-around number or letter cable markers at both ends. There shall be no unmarked cables at any place in the system. Marking codes used on cables shall correspond to codes shown on drawings and or wire run sheets.

2. Neatly strap, dress, and adequately support inter-rack cabling.

3. Furnish terminal blocks, boards, strips, or connectors for cables that interface with racks, cabinets, consoles, or equipment modules. Do not run audio cables directly to the audio patch panel jacks. Furnish audio patch panel with an audio terminal block; terminate audio cables to and from the audio patch panel on this block.

4. Group cables according to the signals being carried. To reduce signal contamination, form separate groups for the following cables:

a. Power cables
b. Control, data cables
c. Audio cables carrying signals less than -20 dBm
d. Audio cables carrying signals between -20 dBm and +20 dBm
e. Audio cables carrying signals above +20 dBm

5. Do not allow audio cables to run in the same raceway as video, computer video or power cables.

6. As a general practice, 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.

7. Cut cables to the length dictated by the run. Splices in pull boxes are not permitted without prior permission of Project Director/COR. For equipment mounted in drawers or on slides, provide interconnecting cables with a service loop of appropriate length.

8. No cable with a bend radius less than that recommended by the cable subcontractor.

D. Connection Plate Receptacles:

1. Unless otherwise detailed herein, use the following types of panel receptacles on connection boxes, panels, plates, and wire ways:

a. Audio (microphone or line level) - XLR3 type
b. Loudspeakers (70 Volt or Low Impedance) - Neutrik “Speakon” type

E. Cable Types:

1. Unless otherwise called for in these specifications and drawings, use the following cables or their approved equivalents in these systems:

a. Type 1: Canare L-4E5AT Audio: MIC/Line
b. Type 2: Belden 8477 Audio: For 16 & 8 Ω program speakers
c. Type 3: Belden 8471 Audio: 70 V ceiling speakers
d. Type 4: Canare MR202-**AT ** Pair audio multicore

2. Cut cables to the length dictated by the run, except video and pulse cables, which may need to be cut to an electrical length. Do not splice in pull boxes without prior permission of Project Director/COR. For equipment mounted in drawers or on slides, provide interconnecting cables with a service loop of appropriate length.

3.2 GROUNDING

A. 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, it is the responsibility of the Contractor, to follow the practices below, and to deviate from these practices only when necessary to minimize cross talk 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 consisting of a copper bar of sufficient size to accommodate secondary ground conductors.

3. Connect the primary system ground bar to the nearest metallic electrical conduit of at least 50 mm in diameter using a copper conductor installed in a racewayr, having a maximum of 0.1 Ω total resistance. The Contractor is responsible for determining if the metallic conduit is properly electrically bonded to the building ground system.

4. Provide secondary system grounding conductors from all racks, audio consoles, and ungrounded audio equipment in each area to the primary system grounding point for the area. Each of these grounding conductors shall have a maximum of 0.1 Ω total resistance.

5. Do not use the AC neutral conductor, either in the power panel or in a receptacle outlet, be used for a system ground; there are no exceptions.

6. Audio Cable Shields: Ground audio cable shields at one point only; there are no exceptions. For inter and intra-rack wiring, the shield be connected at one end only. For ungrounded portable equipment, such as microphones, connect the shield at both ends but grounded at only one end.

7. General: Because of the great number of possible variations in grounding systems, it shall be the responsibility of the Contractor, to follow good engineering practice, as outlined above, and to deviate from these practices only when necessary to minimize cross talk and to maximize signal-to-noise ratios in the audio, video, and control systems.

3.3 SYSTEM PROGRAMMING

A. Programming: Fully brief Project Director/COR on available programming options. Record Project Director/COR's decisions and set up initial system program. Prepare a written record of decisions, implementation methodology, and final results.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform the field tests and inspections and prepare test reports required in this Article.

C. Contractor System Checkout: Before Acceptance Tests are scheduled, the Contractor shall perform his own system checkout. He shall furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification. This work shall include the following:

1. Test all audio and related systems for compliance with the Performance Standards.
2. Check all control functions, from all controlling devices to all controlled devices, for proper operation.
3. Adjust, balance, and align all equipment for optimum quality and to meet the manufacturer’s published specifications. Establish and mark normal settings for all level controls, and record these settings in the “System Operation and Maintenance Manual”.

4. Maintain documentation of all performance tests for reference by the contracting officer and the Consultant during the System Acceptance Tests.

D. Systems Acceptance Tests:

1. System Acceptance Tests will not be performed until the Contractor's System Checkout has been completed. The Project Director/COR will monitor the System Acceptance Tests. These tests will consist of the following:

   a. A physical inventory will be taken of all equipment on site.
   b. The Contractor shall demonstrate the operation of all system equipment.
   c. Both subjective and objective tests are required to determine compliance with the specifications. The Contractor is responsible for providing test equipment for these tests.
   d. All final "as-built" drawings, run sheets, manuals, and other required documents, as detailed herein, shall be on hand. Two complete sets of these documents shall be delivered to the Project Director/COR at this time; one complete set shall have been delivered to the Project Director/COR prior to the scheduling of Acceptance Tests.
   e. In the event further adjustment is required, or defective equipment requires repair or replacement, tests may be suspended or continued at the discretion of the Project Director/COR.

2. Performance test audio signal paths for Performance Standards Tests shall be, as an example but not limited to, the following:

   a. From all source inputs (for microphones, audio tape units, etc.) through all Mixers, ADA's, switchers, etc., to all signal destinations.
   b. Test all switches and sound levels and overall intelligibility.
   c. The delineation of the above signal paths shall not exempt the Contractor from the responsibility of checking all paths and outlets for appropriate compliance with the Performance Standards.
   d. During performance testing, all equipment shall be operated under standard conditions that are recommended by the manufacturer.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service and initial system programming.

B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements.

C. Complete installation and startup checks according to manufacturer's written instructions.

3.6 ADJUSTING

A. On-Site Assistance: Engage a factory-authorized service representative to provide on-site assistance in adjusting sound levels, resetting transformer taps, and adjusting controls to meet occupancy conditions.

B. Occupancy Adjustments: At a time requested by the Project Director/COR within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

3.7 PROTECTION

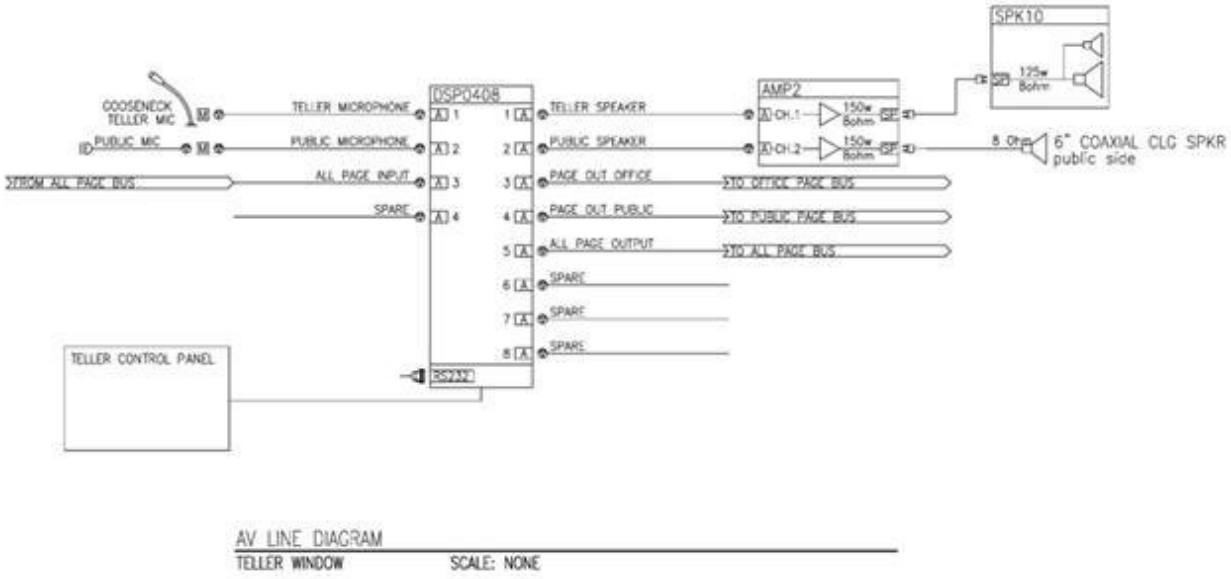
A. During the installation, and up to the date of occupancy, the Contractor shall protect the finished and unfinished work against damage and loss. In the event of such damage or loss, he shall replace or repair such work at no cost to the Government.

3.8 DEMONSTRATION

A. Provide on-the-job training by an instructor who is fully knowledgeable in the design and operation of the system(s), to a minimum of four persons designated the Project Director/COR, to instruct them in the operation and maintenance of the systems. In the event the Contractor does not have qualified instructors on staff for certain sophisticated equipment, the Contractor at no additional cost shall provide a manufacturer's representative for such instruction. All training shall take place after the systems are operational, but before the acceptance tests. There shall be a minimum of 16 hours, divided into four sessions of training on the systems included in this specification. Delete below for manually switched equipment.

ATTACHMENT A

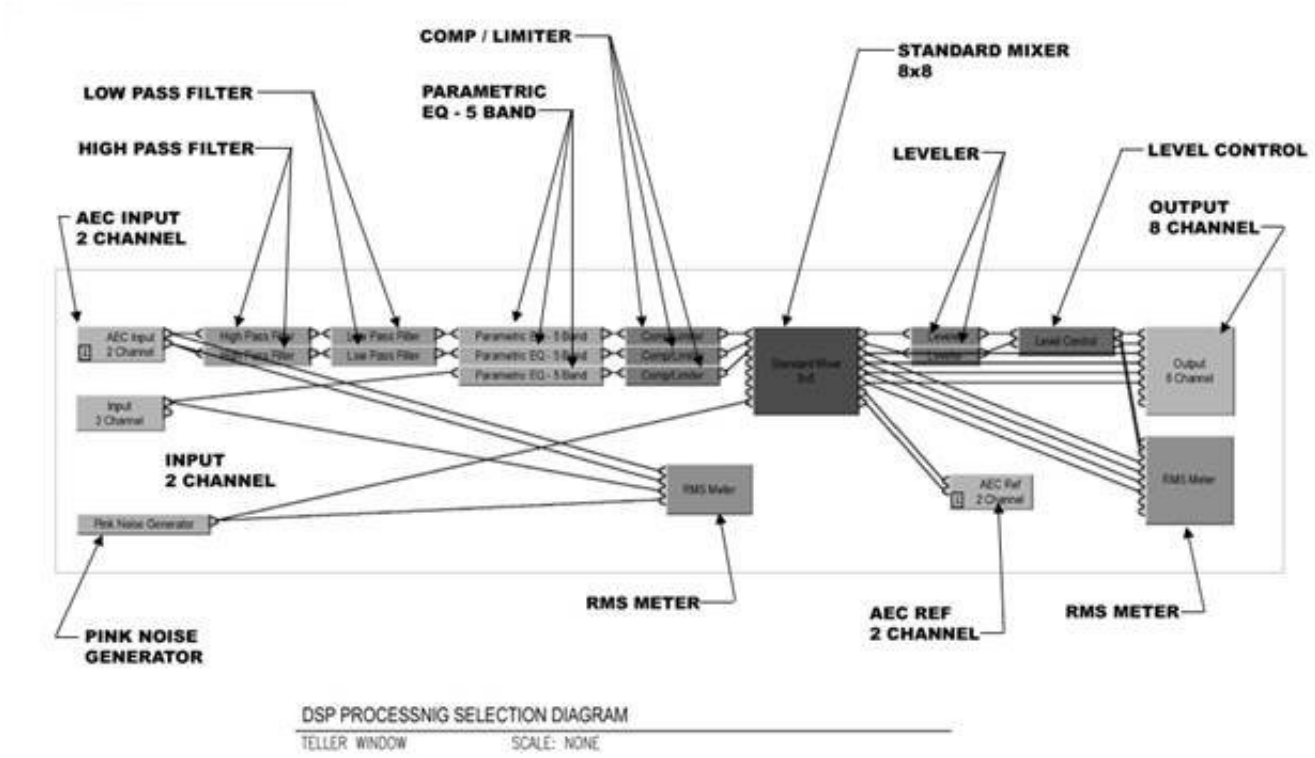
AV LINE DIAGRAM



AV LINE DIAGRAM
TELLER WINDOW SCALE: NONE

ATTACHMENT B

DSP PROCESSING SELECTION DIAGRAM



END OF SECTION 275122