275116-TC

CORE Passenger Communications Paging System

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes general requirements for modifications to the existing Passenger Communications System (PCS) and to the Emergency Evacuation System (EES). As a system, these are commonly referred to as the Public Address (PA) system.

B. The PA system is a Life Safety System. Any modifications to the system shall be designed to take full advantage of the installed MAA Fiber Optic Communications System.

C. The PA system shall follow the OT Life Safety system(s) best business practices for survivability.

D. Reference **S4- Emergency Tenant Paging System Requirements** for speaker specifications and wiring specifications

E. During design process, care shall be taken to ensure new work is closely coordinated with OT. The MAA uses different technologies (ACS and Titan) and in some instances the older core equipment will not support newer edge devices and the core equipment will need to be upgraded as part of the overall modification to the system.

NOTE: Some upgrades, especially Software, require all the attached paging equipment to be upgraded also to maintain system functionality.

F. All equipment shall be provided with redundant power supplies. These power supplies shall automatically fail over in the event of power or power supply failure.

G. Innovative Electronic Design (IED) approved, training shall be provided to OT support staff, (5 people) in the operation, programming and Tier 1 service maintenance at an OT agreeable location.

H. All PA nodes shall be interconnected using Single Mode fiber optics in a redundant architecture. All network equipment shall have dual Network Interface Cards (NIC) with the ability of automatically fail over in event of network failure on the primary link

I. All Communications Stations (paging microphones, MICs) shall be independently installed to the head end paging equipment or network switch. IE no “Slave” stations shall be permitted without OT approval.

J. All “Gate and Hold areas” shall have (2) two independent communications stations installed. One by the gate and one at the gate podium.

K. All “Gate and Hold Areas” Communications stations shall have **CAT 6 cabling** installed to OT Standards for support of digital microphones and Telecommunications Equipment (TCE).

L. All “Gate and Hold Rooms” shall be logically divided into (4) four quadrants. In the center of the quadrant closest to the gate, under the floor (ceiling of lower Level) a junction box shall be installed (2 feet by 2 feet). This shall be referred to as **“Paging Gate DEMARC”** Junction box placement shall take into consideration distance limitations of CAT 6 cabling. Designer shall allow for the additional distance of station cabling.

M. Paging Gate DEMARC shall have installed (8) port Cat 6 jack. These CAT 6 cables shall be terminated in the closest approved MAA communications closet that supports IED Paging.

N. **4 ports** shall be for designated Voice and **4 ports** shall be designated for data and shall be terminated in Communications Closets as such designation

O. At the podiums (2) CAT 6 cables shall be installed for each digital microphone placement, (1 for the mic and 1 for TCE) to the Paging Gate DEMARC. There shall also be (1) CAT 6 cable installed for the gate microphone. This cable (Station Cable) are to be installed to Paging Gate DEMARC.

P. All IP addresses and number schema shall be approved by OT Passenger Communications Administrator

Q. All paging zones shall have at a minimum (1) ambient noise sensing microphone to control volume in that zone.

R. All Rest Rooms/Bathrooms/Family Assist Restrooms shall be zoned separately from adjoining paging zones (i.e. separate zoning for each rest room). Each restroom will also include (1) ambient noise microphone.

S. All head end paging rooms (Titan and Globacom\ACS) shall have all Software and hardware installed and operational to support Emergency Tenant Paging

SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes (Cut Sheets)

B. Reflected ceiling plans showing proposed and existing speaker locations and Ambient Noise microphones

D. Shop Drawings:

1. Dimensioned plans and sections or elevation layouts.

2. Wiring Diagrams: Power, signal, and control wiring specific to this Project. Identify terminals and wiring designations and color codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features.

3. Speaker locations, placement of ambient microphones and zone boundaries must be approved by OT Engineer.

4. General design guidance for speaker placement is every 12 feet on center.

5. The OT Engineer shall assign Paging Access Point (PAP) and/or Paging Equipment nodes for terminus of all facilities.

6. A separate plan sheet(s) showing ONLY paging work shall be submitted for review and into all final construction plans to facilitate the installation of this system. ONLY relevant reference data shall be permitted.

7. OT Engineer shall approve all product cut sheets prior to purchasing and installation by contractor

1.2 QUALITY ASSURANCE

A. All design work shall be performed by an Innovative Electronic Design (IED) engineer.

All equipment and installation methods shall be in accordance with recommendations from Innovative Electronic Design (IED). Contractor is responsible for contacting this organization and including all associated cost in the bid price.

IED contact information:
Tony Satariano
IED Eastern Sales Manager
815-291-7437 cell
602-707-5296 Office
tsatariano@iedaudio.com

Reference above: The paging DEMARC requirement exceeds IED requirement and shall take precedence in design and installation

B. A copy of all correspondence, task orders, work orders, RFI, Change Orders, etc with IED shall be also provided to the OT Engineer for concurrence.

C. OT Engineer shall approve all work prior to work including cut sheets, shop drawings etc. being performed.

D. System design modifications shall be performed by a qualified Life Safety Engineer, approved by IED.

1.3 PROJECT CONDITIONS

NOTE: No work shall be performed on live system(s) including adding or removal of speakers and microphones by ANY unauthorized IED personnel.

A. Interruption of existing service shall not be permitted to interrupt the PA system service to facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify the OT Engineer and Fire Marshall in writing no fewer than 72 hours in advance of proposed interruption of PA system service.

2. Do not proceed with any interruption of PA system service without written permission.

B. Emergency Evacuation Paging shall remain operational at all times.

1. Notify the OT Engineer and Fire Marshall in writing no fewer than 72 hours in advance of proposed interruption of PA system service.

2. Do not proceed with any interruption of PA system service without written permission.

1.4 COORDINATION

A. Coordinate all PA system work with the OT Engineer and IED (or designated partner approved by OT).

1.5 MANUFACTURERS

A. The existing Public-Address System is manufactured by Innovative Electronic Designs, LLC. (IED); therefore, all PA system equipment shall be exclusively approved by Innovative Electronic Designs, LLC. only, unless noted and approved by OT otherwise. There shall be “No Exceptions or Approved Equals Allowed”.

1.6 EQUIPMENT

A. All equipment shall be in accordance with recommendations from IED. Refer to the Drawings for equipment supplier and installation requirements.

B. All equipment shall be new. Remanufactured, used or refurbished equipment shall require OT approval

C. Maintenance, Repairs, Operations Item (MORI). Designer shall verify with OT Engineer if there is available MORI available for use.

D. OT shall specify MORI in the design phase (by 60% submittal) of the project and MORI requirements shall be determined at that time. If no specific quantity reduction is noted the quantities stated in 16.E shall apply

E. MORI. Upon completion of construction the following (to be verified during design) MORI shall be provided to OT upon project acceptance.

1. Speakers. 5% of each installed speaker(s) type, mounting hardware, etc shall be MORI.

2. Paging Microphones. 10% of installed Paging Microphone(s) type (complete units) shall be MORI.

3. Ambient Noise Microphones. 10% of installed Ambient Noise Microphone(s) type, mounting hardware, etc shall be MORI.

EXECUTION

1.7 INSTALLATION

A. Conductors

1. Wire and cabling shall be plenum rated and as recommended by IED and all wire and cabling shall be installed in an enclosed conduit or raceway system.

2. Ambient Mic Sensor cabling shall be WP 25291B or Beldon 82761 or approved equal (Plenum rated) cable shall be used for all ambient mic sensor cabling.

3. Digital Microphone Stations (528 series) cabling shall follow OT standards using CAT 6 cabling.

4. Microphone and speaker wire shall not be run in the same conduit

5. Microphone cabling shall not be spliced

6. After installation and before termination, all wiring and cabling shall be tested to OT Standards

7. Visually inspect wire for faulty insulation prior to installation. Protect cable ends always with acceptable end caps except during termination.

8. Connection of new work to existing work or equipment shall only be performed by IED Certified Integrator.

9. During construction if existing work must be removed/disconnected this work shall be performed by IED Certified Integrator.

10. Installation of conductors shall comply with any of the methods listed in NFPA 72 Chapters 6.9.10.4.1, 4.2 and 4.3 for survivability. Coordination with IED Certified Integrator is essential to insure conductor compatibility with system components.

11. As built drawings, shall be updated/provided to OT showing all paging zones, labeling shall match system documentation prior to system acceptance and shall be considered part of the system acceptance.

12. System Acceptance shall be performed or witnessed by OT Engineer, at the discretion of OT.

B. **Field Quality Control**

1. The Contractor shall coordinate with IED or designee to document all components of the existing adjoining paging system operations and zones PRIOR to the start of work.

   This shall include speaker, microphone, ambient sensor and shunt trip functionality of all areas in and adjacent to a construction project area. This documentation shall be submitted to the Engineer/CMI and OT Engineer in the form of a field report from IED or designee describing findings and noting any deficiencies

   The intent of this task provides documentation of existing conditions prior to start of work, but also provides proper documentation at the end of the project that construction did not create any additional issues.

2. Coordinate all final terminations to PA system equipment with IED Certified Integrator.

3. Perform all tests on new conductors prior to contacting IED Certified Integrator.

4. Coordinate all final equipment and system testing and demonstration with IED Certified Integrator, OT Engineer and the Fire Marshal.

5. All connection points to the PA system shall be at existing or new MAA Paging Access Points (PAP), unless approved by OT, see typical drawing at end of section. If insufficient facilities exist, the current facilities shall be expanded to accommodate new work plus 100% capacity or the creation of a new PAP shall be created at the sole discretion of the OT Engineer.

6. MAA PAP shall be installed to accommodate all existing paging requirements (Terminal paging, ACS microphone or Digital Mic (if /as applicable), Ambient Sense Microphone, Shunt trip relay, Emergency paging) plus 100% spare capacity.

7. The MAA PAP install shall include all associated work and programming of attached devices to make the MAA PAP fully functional.

8. Connection of the MAA PAP to the head end paging equipment shall at a minimum be a (2) inch conduit with (1) ¾ inter duct with a pull string. The inter duct shall remain unused for future use.

1.8 START UP SERVICE

A. Engage IED Certified Integrator and OT Engineer to perform all equipment startup and system programming. Contractor shall coordinate and be on-site for all startup functions.

B. All “Gate and Hold Rooms” microphones shall have the following functionality. ***The viewing perspective is from standing at the podium facing the concourse.*** Any variance shall be approved by MAA Telecommunications Manager

1. Microphone is lifted and (nothing entered on keypad, PTT is pressed. Audio is broadcast in the hold room only
2. Microphone is lifted and 1 enter is pressed on keypad, PTT is pressed. Audio is broadcast in the hold room immediately adjacent to the left only
3. Microphone is lifted and 2 enter is pressed on keypad, PTT is pressed. Audio is broadcast in the corridor immediately in front of hold room only
4. Microphone is lifted and 3 enter is pressed on keypad, PTT is pressed. Audio is broadcast in the hold room immediately adjacent to the right only

C. OT shall make the final determination pertaining to “Message Content” and approved Permanent Digital Record & Playback (PDRP messages.IE what message plays where in the terminal.

D. All installed Paging Microphones shall have 900 level paging activated.

1.9 DEMONSTRATION

A. Engage IED Certified Integrator to demonstrate proper operation of all PA system equipment.

B. Airport Terminal Announcement Control System Testing Plan
General Requirements and Standards: Test sound system in accordance with requirements of EIA standards RS 160 and RS 219. Recording all values measured, submitting certified test reports for local,

C. Final and interface testing as described within these procedures.

Provide al necessary equipment for system test adjustments.
Manufacturer's factory trained technicians shall provide field service for system startup and programming in accordance with owner's requirements.

Defects encountered during the course of any test shall be corrected at once; corrected work shall be retested at no additional cost to the owner.

Test Personnel Required:

- **Test Operators:**
  Shall have a minimum of 3 prior installations of similar size and scope, 3 years' airport experience, IED 500ACS and GlobalCom Training completed

- **Test Director:**
  Shall have a minimum 10 prior installations of similar size and scope, 5 years' airport experience (IED Master Certified 500ACS, GlobalCom, Titan - Analog & digital Systems)

- **Test Support:**
  Shall be an authorized representative of the installing Electrical Contractor

- **Test Observer:**
  Shall be the Construction Manager (CMI) for the project and MAA Passenger Communications Administrator, MAA Fire Marshal (Any other parties having Jurisdiction over these tests

- **Speaker Testing:**

*The following tests will be performed on all speaker lines throughout the project.

A. All lines will be swept from 100 Hz to 16kHz and impedance reading will he logged.

B. All accessible wiring will be checked for jacket damage, continuity and correct numbering. All connections will he tested for integrity.

C. If readings are within normal operating parameters, the line will be logged as "Passed".

D. If readings are not acceptable or questionable, line will be logged as "failed" along with details of further service required.

- **Microphone Testing (Analog & Digital):**

*The following test will be performed on all paging stations.

A. (Analog Only) All wiring both data and audio will be checked for jacket damage, continuity and correct numbering. All connections will be tested for integrity. The installed lED system will show a red fault when a microphone has been activated and is not connected properly.

B. (Digital Only) Network CAT-5E/CAT-6 cabling will be tested from the powered switch to the paging station. Each cable will be logged on a Pass/Fail basis.

C. Each microphone will have its own dedicated terminal and local zone information entered (as supplied by COTR) and printed for reference.

D. (Analog Only) The installed lED system will send test tones to each station verifying audio strength and wire losses.

E. Each microphone will have specified numerical codes entered to check all terminal zone signal paths. Technician will note audio quality as well.

F. Each microphone will have specified numerical codes entered to check all local zone signal paths. Technician will note audio quality as well. All microphone stations must pass the above criteria to be marked accepted. Any stations that fail will be logged as such along with details of further service required.

G. After testing, has been completed and unit has passed, all permanently mounted microphones will be marked OK''. Stations without permanently mounted microphones will be disconnected, marked and stored until the tenant contractor installation is complete.

Sense Microphone Testing:

*The following tests will be performed on all ambient sensing microphones.

A. All accessible wiring will be checked for jacket damage, continuity and correct numbering.

B. All connections will be tested for integrity.

C. Each sensing microphone will have its own dedicated minimum attenuation and threshold levels checked and printed for reference.

D. The noise test will consist of an external noise source which will be used to verify proper sense mic. zone correlation.

E. The preliminary values will be entered to check IED 540 system function for calibration.

F. Any sensing microphone must pass all above tests to be marked as "OK". Any station that failed will be logged as such along with details of further service required.

Operational Testing:

- **Absolute Impedance:**

A. Absolute value of each loudspeaker line with amplifiers disconnected, measured at the amplifier output at 250, 1kHz and 4 kHz

- **Hum and Noise Level:**

A. Hum and noise level shall be measured from ACS Line input to amplifier output per specification.

- **Power Output:**

A. All test data both preliminary and final shall be recorded and submitted for approval as per specifications.

B. All tests shall be performed using a calibrated Sencore SP395 Analyzer and a 25 ohm 200-watt load resistor.

- **Parasitic Oscillation and RF Pickup:**

A. All tests shall be performed using a calibrated Fluke I 0513 20 MHz scope-meter and submitted for approval.

- **Phasing of Loudspeakers and Microphones:**

A. All tests for correct polarity will be completed as loudspeakers circuits are completed and issued for record.

B. All microphone phase testing will be completed after the system has been confirmed operating as per manufacturer recommendations and the internal polarity checks are performed.

- **Buzzes, Rattles and Distortion:**

A. All testing for buzzes, rattles and distortion are to be completed in the preliminary test process and submitted in the preliminary test per the specifications.

- **Frequency Response and Coverage Uniformity:**

A. The coverage will be checked and mapped with reflected ceiling drawings. Any variation in the coverage not complying with the specification will be noted, digital images of any area not conforming to the specification will be gathered and submitted for recommendation.

- **Gain Control Settings:**

A. All gain controls are set using the 540 system; programmable attenuators are backed up to the TACS hard drive and ACS hard drive Physical attenuator settings are logged in an excel spreadsheet and are incorporated into the operation manual under systems settings.

- **Equalization:**

A. All zones will be optimized for uniform frequency response and equalizer settings will be copied to disk and inserted into the operations manual under system settings as per the specifications.

Test Objective:

Verification of all local and final tests within the tolerances set by the specifications

Prerequisites:

Local Testing must be complete including failures corrected, documented and submitted.
Structured Cabling System Communication established
Prior to set up procedures of equipment software, the **following** must be completed:

a. Entry of port number and address
b. Assignment of each circuit name
c. Assignment of input attributes
d. Audible test levels
e. Audible deviations
f. Assignment of microphone station test input
g. Enable printer, if required
h. Assignment of test zones for both audible frequency and microphone station tests
i. System Set
j. Selection of listening levels

2.0 Final Testing and acceptance

Final Acceptance and testing of this system shall include all the following. If any test or procedure does not pass a punch list will be created. At the Fire Marshals, sole discretion if deficiencies constitute a life safety issue and possible denial of occupancy

A. Section 1.1 Summary, F-S inclusive

B. Section 1.5 Equipment, subsection D, MORI

C. Section 1.7 Start up Service, all inclusive

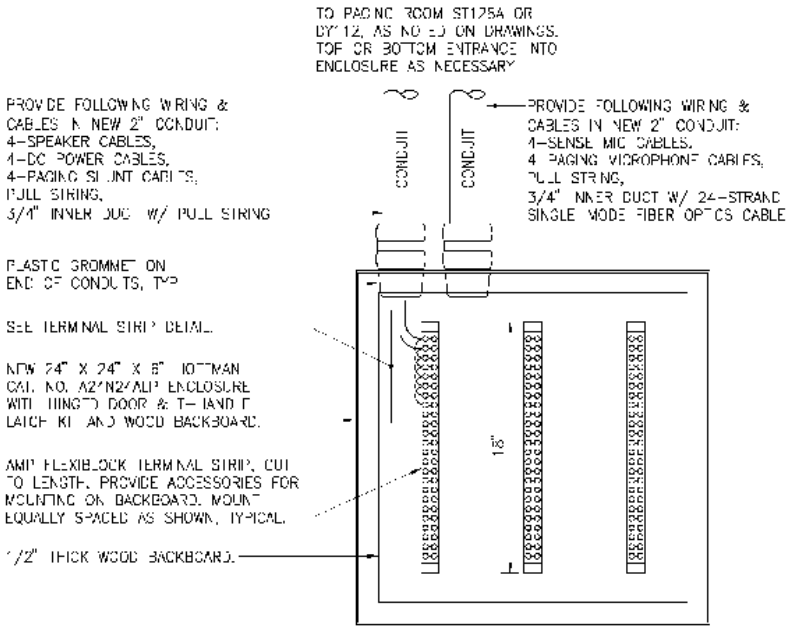
D. Section 1.8 Demonstration, all inclusive

E. All documentation and drawings shall be provided in an electronic format (AutoCAD for drawings, MS Excel for schedule, etc) and supplied on CD-ROM. PDF or scans of non-electronically sourced materials are not acceptable. If there are questions regarding acceptable electronic formats, contact MAA/OT for clarification.

F. 3.0 Typical MAA PAP

Note the purpose if this drawing is to demonstrate what a "Typical" finished installation
will look like. It shall not be interpreted as the final design.

Final design shall reflect all actual field conditions and requirements stated in Section B of this document and all shunting requirements.

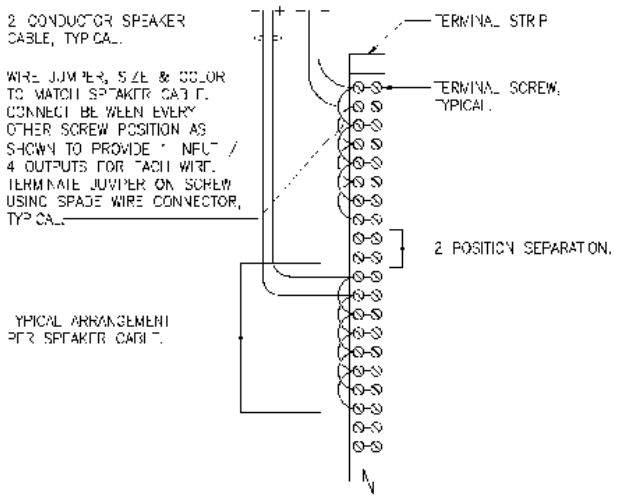


NEW EMERGENCY PAGING ACCESS POINT (PAP)
(PAGING ENCLOSURE IN COMM RM) DETAIL

NOT TO SCALE

NOTES:

1. PROVIDE CONDUITS AND WIRES/CABLES (AS NOTED IN DETAIL ABOVE) FROM EACH PAP TO PAGING ROOM ST128A OR DY112 (AS NOTED ON DRAWINGS).
2. ROUTE SENSE MIC AND MICROPHONE CABLES TOGETHER, BUT SEPARATE FROM ALL OTHER CABLES, AS NOTED IN DETAIL ABOVE.
3. SPEAKER AND SENSE MIC HOMERUNS AS SHOWN IN CORRIDORS ARE TO BE ROUTED TO PAP AS NOTED. PROVIDE SPEAKER AND SENSE MIC CABLES AS NOTED ON PLAN SHEETS, IN ADDITIONAL TO THOSE NOTED IN DETAIL ABOVE. PROVIDE ADDITIONAL CONDUITS AS NECESSARY FOR THESE CORRIDOR CIRCUITS, IN ADDITIONAL TO THESE TWO CONDUITS SHOWN IN DETAIL ABOVE.



TERMINAL STRIP DETAIL

NOT TO SCALE