

**IN-CEILING CLASSROOM AUDIO SYSTEM****1.1 REGULATORY REQUIREMENTS**

- A. Conform to (applicable) (specify specific citations) building code for requirements applicable to work specified herein.
- B. Conform to appropriate sections of (specify) with regard to applicable requirements (specify).

**1.2 QUALITY ASSURANCE****A. Qualifications**

- 1. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
  - a. Certificate: when requested, submit certificate, indicating qualification.
- 2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

**B. Acceptable Manufacturers**

- 1. Basis of Design: Lightspeed Technologies, 11509 SW Herman Road, Tualatin, OR 97062, PH 800-732-8999, FAX 503-684-3197.

- C. Manufacturer Testing: Manufacturer to provide quality assurance certification for each system and all of its components. A report for each system will be available upon request. Report will include serial numbers and pertinent testing data for all of the system functions.
- D. Successful third party installation (when needed) will be supplied with necessary training to allow for product installation certification by Manufacturer and will be installed according to Lightspeed recommendations.

**1.3 SUBMITTALS**

- A. General: Submit listed submittals in accordance with “Conditions of the Contract”.
- B. Manufacturer’s data on all products including but not limited to:
  - 1. Catalog cut sheets
  - 2. Installation instructions
  - 3. Typical wiring diagrams
  - 4. Drawings showing speaker locations
  - 5. Daily Use Guide
  - 6. Manufacturer’s warranty documents
  - 7. Manufacturer’s parts lists
  - 8. Product serial numbers

**1.4 WARRANTY**

- A. Warranty: Refer to “Conditions of the Contract” for warranty and repair provisions.

- B. Repair: Manufacturer shall offer repair service on all Classroom Audio components. Owner shall pre-pay shipping for all items returned to manufacturer for repair. The Manufacturer shall repair or replace system components as specified under warranty. Manufacturer shall ship repaired components within five (5) working days of receipt. Items returned to Owner are shipped via the same method in which they were received.
- C. Manufacturer's Warranty: All the major system components (transmitters, receiver-amplifier and speakers) must be warranted for five years against defects occurring while used in normal classroom instruction. The warranty shall be equivalent to a Lightspeed Technologies' Five-Year Warranty.
  - 1. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

## 1.5 OVERALL SYSTEM DESCRIPTION

- A. The system must have specifications and features that are equivalent to the Lightspeed Topcat Access™ In-Ceiling Classroom Audio System including the following:
  - 1. All-in-one, in-ceiling audio system with integrated amplifier, speakers and wireless audio receiver/transmitter
  - 2. Two-way hybrid speaker system with exciter technology sound panel and low frequency cone driver
  - 3. Cross over technology to deliver high speech intelligibility and full range sound with even distribution throughout the classroom
  - 4. Up to 2 microphones for whole room instruction, team-teaching or student sharing
  - 5. Pendant-style Flexmike™ classroom microphone with audio input utilizing Access Technology (1.9 GHz) for transmission. IR not acceptable
  - 6. Optional PageFirst emergency page priority
  - 7. In-Ceiling mounted
  - 8. Suitable for use in air-handling spaces (plenum-rated)
  - 9. System must have easily accessible audio output to connect with a computer or other recording device for lesson capture.
  - 10. Wireless Media Connector utilizing Access Technology (1.9 GHz) to integrate with and wirelessly transmit all classroom multimedia to be played through the Topcat
    - a. Includes 4 audio inputs with volume control
    - b. 2 audio outputs for ALD and/or recording with volume control
    - c. Tone control to remotely adjust bass/treble of Topcat
  - 11. Alternative Activate Charging Station with Access Technology, Bluetooth and Wireless Media Connectivity for integration with mobile devices and laptops:
    - a. Includes 2 channels of 2-way Bluetooth Audio
    - b. 4 audio input connections, 2 audio outputs with volume controls
    - c. Cradle charging for 2 pendant microphones, eight (8) 2-way audio Pods
    - d. USB ports to charge up to four (4) additional 2-way audio Pods
    - d. Bluetooth connection with Activate mobile app for control, streaming and audio/video recording of classroom instruction and interaction.
    - e. Mobile device control of system volume levels, Activate Pod selection, and advanced system settings

12. Optional Activate Pods with 2-way audio communication featuring the following functionality:
    - a. Integrated speaker and microphone to enable 2-way communication between the teacher and each small group
    - b. Wireless audio communication and battery power for maximum portability
    - c. Up to 12 speaker Pods can be connected to Topcat for each small student group
    - d. Enables student sharing directly from the Pods so students can be clearly heard by the whole class
    - e. Must include a call button allowing students to notify the teacher when they need assistance
  13. Optional handheld remote control to select and direct communication with small Activate Pods volume levels when mobile device is not present
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- B. The amplifier must contain a Page mute function (PageFirst™) that passively detects the audio signal of a page coming through the PA system without compromising system performance or voiding warranties. As an audio signal is sent to the PA speaker, the PageFirst™ detects that signal and immediately mutes the Topcat audio amplifier.
  - C. The system must produce high speech intelligibility and full-range multimedia quality sound with excellent distribution throughout a classroom.
  - D. The system must be capable to be installed in a classroom with no wires installed in or on the walls. The system must be fully operational without speaker wires or sensor cables.
  - E. The system must be compatible and expandable to operate with 2-way small group speaker Pods allowing interoperability between both small group and whole group instruction.
  - F. The system shall carry a “No Audio Dropout Guarantee” between the wireless microphone and the sound system. The guarantee applies to operation in any room up to its expected range of 200 feet (assuming no walls). The guarantee does not extend into other rooms separated by walls as this can limit transmission range significantly. Should any dropout within the classroom in audio transmission occur, the manufacturer would correct it at no additional charge.
  - G. The system shall carry a standard warranty equivalent to the Lightspeed 5-year Warranty.

#### 1.6 OWNER INSTRUCTION

- A. Owner’s Instruction: user training will be performed by the manufacturer’s local representative. The training will include the research and benefits of classroom amplification, system operation, simple troubleshooting guidelines, and incorporating the classroom amplification into teaching styles. The manufacturer will also provide additional training in trouble-shooting techniques and product return procedures to one specified person per campus. This service shall be rendered to the Owner at no additional cost.
- B. A Daily Use Guide is included with system to provide information on how to use the system. In addition, instruction materials and detailed Owner's manual shall be available on manufacturer’s website to cover complete operational and basic maintenance procedures.

**PART 2. PRODUCTS****2.1 IN-CEILING CLASSROOM AUDIO SYSTEM SPECIFICATIONS****A. Overall System:**

1. Power output: 20 Watts RMS
2. Acoustic Frequency response: 60 Hz to 18 kHz -10dB
3. AC Mains Power Input: 100-240V ~ 50/60Hz 1.5A
4. DC Power Input: 24V/2.5A
5. Signal-to-noise: 60 dB
6. Total Harmonic Distortion: <1%, 10 W
7. Wireless Communication: Access Technology (1.9 GHz + RF4CE)
8. Automatic power on when Flexmike is powered on and linked
9. Dimensions (W x D x H): 24" x 12" x 3.7" (Removable side spacers to fit international ceiling grids; 595mm x 295mm x 94mm)
10. Weight: 13.5 lbs. (6.1 kg)
11. Controls:
  - a. (1) Microphone volume control
  - b. (1) Tone control
  - c. (1) Audio input volume control
  - d. (1) PageFirst sensitivity adjustment
12. Connections:
  - a. (1) Direct AC mains power input
  - b. (1) Optional DC Power Input
  - c. (1) Audio input (Longer cable runs may require a ground loop isolator in order to prevent audio hum caused by a ground loop.)
  - d. (1) Optional Page mute (PageFirst™) input (Euro-block)
13. Device Registration: push button for transmitter(s), remote(s), speaker Pods, Media Connector, Activate Station
14. Wireless audio range: up to 200 feet
15. Integrated 2-Way Hybrid Speaker System:
  - a. Description: exciter technology sound panel plus low frequency cone driver
  - b. Integrated cross-over technology
  - c. Panel Size: 13.75" x 6.75"
  - d. Cone Driver Size: 5.25"
  - e. Overall Frequency Response: 60 Hz to 18 kHz -10dB
  - f. Impedance: 8 Ω
  - g. Power Handling: 25 W

B. The in-ceiling classroom audio system shall use bi-directional wireless Access Technology to communicate with up to two wireless microphones.

C. The in-ceiling classroom audio system shall use bi-directional wireless Access Technology to integrate with other audio sources in the classroom.

- D. The in-ceiling classroom audio system shall use bi-directional wireless Access Technology to send a mixed audio output to a media connector or Activate Station located at a convenient/student accessible location in the classroom.
- E. The in-ceiling classroom audio system shall use bi-directional wireless Access Technology to communicate with up to 12 optional tabletop speaker Pods available to facilitate small group instruction.
- F. The all-in-one system must contain a Page mute function (PageFirst™) that passively detects the audio signal of a page coming through the PA system without compromising system performance or voiding warranties. As an audio signal is sent to the PA speaker, the PageFirst passive sensor clip detects that signal and immediately mutes the Topcat.

## 2.2 FLEXMIKE PENDANT-STYLE MICROPHONE / TRANSMITTER

- A. Description: the pendant-style Flexmike transmitter shall contain microphone volume control on the unit allowing users to adjust volume level from anywhere in the classroom. The Flexmike shall be capable of being worn around a teacher's neck as a hands-free microphone via the lavalier cord or to be used as a handheld student pass-around microphone. The Flexmike must be rechargeable via cradle charger, computer, or Activate Bluetooth Charging Station and must have alkaline charge protection.
- B. Lanyard: adjustable length with magnetic clasp
- C. Wireless communication: bi-directional Access Technology (1.9 GHz)
- D. Audio distortion: <1%
- E. Integrated microphone type: uni-directional electret
- F. Audio input: 3.5mm
- G. Earbud output: 3.5mm (for monitoring optional Activate Pods)
- H. Push button volume control: +/- 6dB (total range = 12 dB)
- I. Power: on/off/mute button
- J. Battery Power: 2.4V NiMH battery pack
- K. Battery run time: 8 hours (fully charged)
- L. Charging: Integrated battery charger. The 5V power can be supplied via a cradle charger (charges two Flexmike transmitters)
- M. Alkaline Charge Protection: Yes
- N. USB Audio: interface with computer USB audio while charging
- O. Registration: push button for registration with Topcat
- P. Dimensions (L x W x H): 2.9" x 1.1" x 1.0" (74 x 28 x 25mm)
- Q. Weight: 1.8 oz. (51g)

## 2.3 OPTIONAL SHAREMIKE HANDHELD MICROPHONE / TRANSMITTER

- A. Description: handheld wireless microphone for student pass-around use
- B. Wireless communication: Access Technology (1.9 GHz)

- C. Audio distortion: <1%
- D. Integrated microphone type: uni-directional electret
- E. Auxiliary Input: 3.5mm
- F. Power: on/off/mute button
- G. Battery Power: 2 AA NiMH rechargeable battery pack
- H. Battery run time: up to 8 hours (fully charged)
- I. Charging: 5V USB; 3.5mm DC jack
- J. Alkaline Charge Protection: Yes
- K. Registration: push button for registration with Topcat
- L. Dimensions (L x W x H): 8.25" x 1.3" x 1.3"
- M. Weight (with batteries): 7.9 oz.

#### 2.4 WIRELESS MEDIA CONNECTOR

- A. Description: Wireless audio transmitter/receiver to integrate with classroom audio sources and send/receive the wireless to the Topcat system in the ceiling.
- B. Wireless Communication: Access Technology (1.9 GHz)
- C. Audio Inputs: (4) 3.5mm stereo jacks connect to classroom audio sources.
- D. Audio Outputs: (2) 3.5mm jack with volume control
- E. (1) Microphone volume control
- F. (1) Audio input volume control
- G. (1) Audio output volume control
- H. (1) Power button with LED
- I. (1) Tone control
- J. (1) Registration button with Registration LED and linked LED
- K. Audio frequency response: 80 Hz to 7 kHz  $\pm$ 3 dB
- L. Audio distortion: <1%
- M. DC Power Input: USB 5V/0.2A (type micro-B)
- N. Mounting: table-top or wall
- O. Dimensions (W x D x H): 7.6"x 4.1"x 1.1" (193 x 104 x 28mm)

#### 2.5 ALTERNATIVE ACTIVATE CHARGING STATION WITH ACCESS TECHNOLOGY, BLUETOOTH AND WIRELESS MEDIA CONNECTIVITY

- A. Description: Device charging station with wireless audio and Bluetooth connectivity. Activate utilizes 2-way audio communication to integrate audio sources and mobile devices with Topcat in the ceiling.

1. Integration with Activate mobile app for control, streaming and audio/video recording of classroom instruction and interaction.
  2. Mobile device control of system volume levels, Activate Pod selection, and advanced system settings.
- B. Mobile app functionality: Bluetooth interface with companion mobile application with the following functionality:
1. Control and connect to small group 2-way audio Pods
  2. Adjust system audio levels and tone control
  3. Mobile device audio streaming from audio books, podcasts, music, etc.
  4. Audio/video recording synched with microphone and Pod audio
  5. Enable advanced system features
- C. Wireless Communication: Access Technology (1.9 GHz + RF4CE), Bluetooth audio (2 channels), Bluetooth LE (2 channels)
- D. Wireless range: Up to 200 ft. (60m) from Topcat, up to 100 ft. (30m) from mobile device.
- E. Audio frequency response: 80 Hz to 7 kHz  $\pm$ 3 dB
- F. Audio distortion: <1%
- G. Cradle charging: 2 Flexmikes; 8 Pods
- H. USB charging ports: Two (2) 5V/0.3A charging for Pods, remotes, or Sharemikes; Two (2) 5V/1.0A charging for mobile devices or Pods.
- I. DC Power Input: 24V/1.75A
- J. Auxiliary Power Input: 5V USB from portable power source (no device charging)
- K. Audio Inputs: (4) 3.5mm stereo jacks with volume control
- L. Bluetooth Audio: (2) independent 2-way Bluetooth audio channels
- M. Audio Outputs: (2) 3.5mm jack with volume control
- N. Volume controls: Master microphone, audio input, audio output with 10-segment level indicator
- O. Device Pairing: (2) Push buttons for Bluetooth device pairing, (1) push button for Access device registration.
- P. Mounting: table-top
- Q. Dimensions (W x D x H): 13.3"x 5.9"x 1.9" (340 x 150 x 52mm)
- R. Weight: 1.85 lbs. (0.84kg)

## 2.6 OPTIONAL 2-WAY AUDIO PODS FOR SMALL GROUPS

- A. Description: 2-way audio Pod with integrated speaker and microphones. Up to 12 Pods can be connected to a single audio system.
- B. Wireless Communication: Access Technology (1.9 GHz)
- C. Wireless range: Up to 200 ft. (60m) from Topcat; up to 100 ft. (30m) with walls
- D. Integrated speaker: 1" high output speaker

- E. Power output: 1 Watt per Pod speaker
- F. Integrated microphones: Two (2) Omni-directional electret with noise rejection
- G. Headphone output: 3.5mm
- H. Controls: Power on/off button, volume up/down buttons, teacher call button
- I. Battery power: 2.5V NiMH rechargeable battery pack
- J. Battery charging: 2 contact for cradle charging + 5V/0.3A micro-USB
- K. Battery life: 10+ hours (fully charged)
- L. Dimensions: 5.2" x 2.1" x 1.1" (132 x 54 x 28mm)
- M. Weight: 6.4 oz. (181g)

## 2.7 OPTIONAL HANDHELD REMOTE (1-2)

- A. Description: Handheld remote control to select and direct communication with small student groups
- B. Battery Power: 2.4V NiMH battery pack
- C. Charging: 5V USB
- D. Wireless communication: Access Technology (RF4CE)
- E. Controls: Pod selection 1-6; whole class selection; microphone mute; earbud volume
- F. Registration: push button and LED for registration with Topcat
- G. Dimensions (L x W x H): 4.25" x 2.0" x 1.0" (108 x 51 x 25mm)
- H. Weight: 3.4 oz (98g)

## 2.8 REGULATORY AND CERTIFICATIONS

- A. The classroom audio system and its components shall be manufactured using lead-free processes and free of other materials harmful to the environment (RoHS and WEEE compliant).
- B. The classroom audio system and its components shall be listed to UL/CUL standards and requirements for electrical safety by Underwriters Laboratories Inc.
- C. The classroom audio system must be suitable for use in air handling spaces and carry appropriate certifications (UL 2043).
- D. The classroom audio system and its components shall be CE Certified and conform with the essential requirements of the following European Union Directives: 2014/30 EU Electromagnetic Compatibility (EMC), 2014/35/EU Low Voltage Directive (LVD) and RED 2014/53/EU.
- E. The classroom audio system and its components shall comply with Part 15 of the FCC rules as a Class B digital device (FCC Certified).



**PART 3. EXECUTION****3.1 SYSTEM PERFORMANCE**

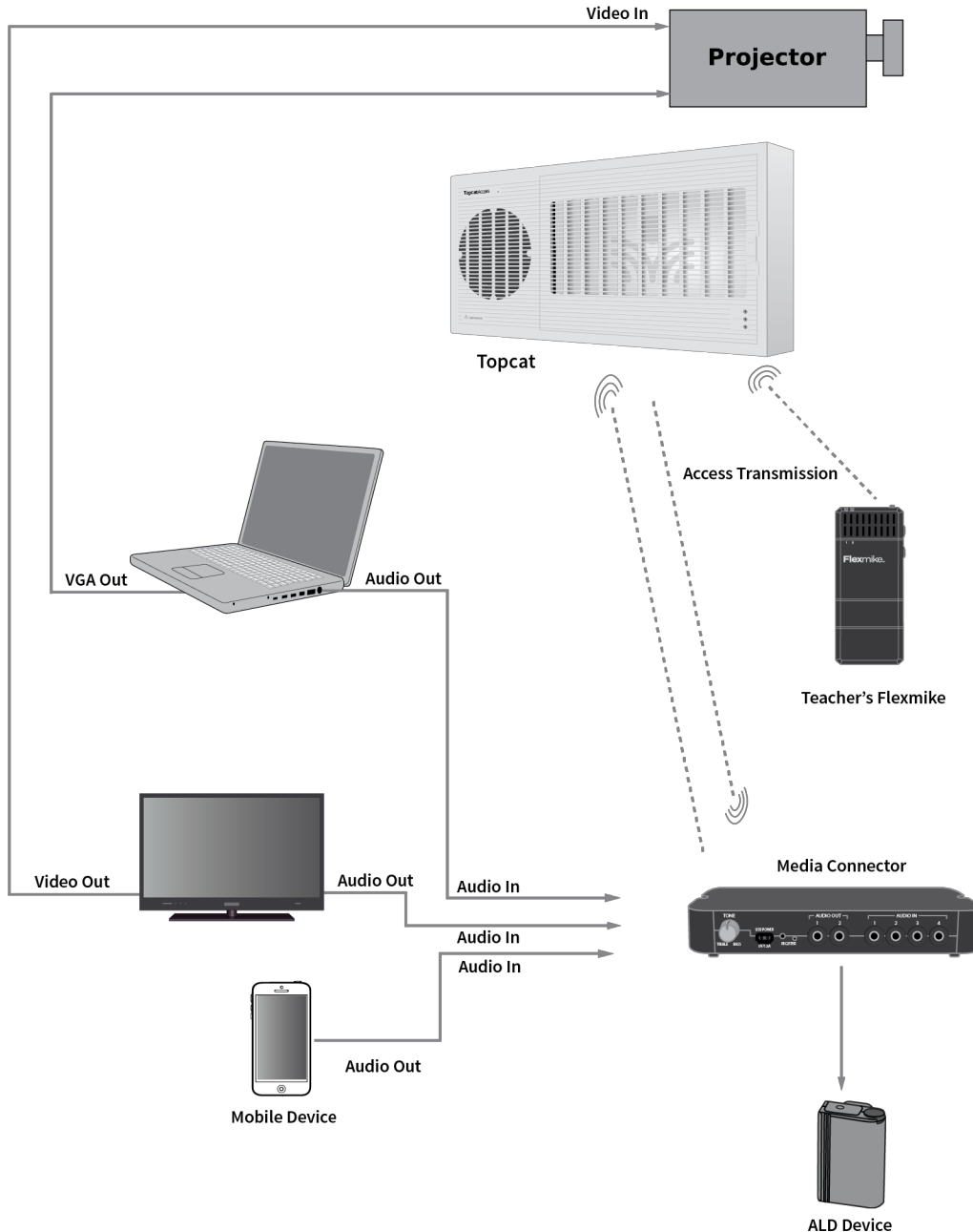
- A. Install in accordance with Manufacturer's installation instructions.
- B. Final adjustment: Upon completion, the system shall be clean, adjusted and left in perfect operating condition. Transmitters shall be plugged in and charging and Daily Use Guide should be left in a conspicuous place. The full user manual shall be available for download from the manufacturer's website.
- C. Provisions: There shall be no audible components of hum, noise, or distortion.

**3.2 INSTALLATION**

- A. Provide and install Sound Reinforcement System in the locations shown on drawings as required.
- B. All equipment and enclosures described in this specification shall be permanently attached to the structure and held firmly in place. Supports shall be adequate to support their loads per manufacturers specifications.
- C. The process of testing the Audio Sound System may necessitate moving and adjusting certain component parts (ex. loud speakers). Contractor shall provide at no additional cost to the owner.
- D. Take precautions as necessary to prevent and guard against electromagnetic and electrostatic noise interference. Long cable runs, unshielded and / or poorly shielded cable, multiple ground paths and improper grounding may all contribute to the production of a low frequency hum. In most cases a ground loop isolator (not provided) placed in line will attenuate or possibly eliminate the hum.
- E. Wireless Media Connector or Activate Charging Station shall be located per Owner's request. Contractor to ensure all Media Connectors or Activate Charging Stations have power available, are properly registered, and all volume controls are set properly via a field test in every classroom.

**3.3 TOPCAT AUDIO INTEGRATION USING MEDIA CONNECTOR**

The wireless Media Connector must have four audio inputs to allow other audio sources to be wirelessly transmitted and played through the Topcat system. Computers, laptops, DVD/VCR's, LCD displays, etc. may be connected into the Media Connector using appropriate patch cords. The Media Connector must also receive audio back from the Topcat to output the mixed audio signal of both microphone channels and multimedia for recording purposes and interface with assistive listening devices. See the systems integration chart below.


**3.4 TOPCAT AUDIO INTEGRATION USING ACTIVATE STATION**

## TOPCAT ACCESS SPECIFICATIONS

The wireless Activate Station must have four audio inputs plus 2 Bluetooth audio channels to allow other audio sources to be wirelessly transmitted and played through the Topcat system. Computers, laptops, mobile devices, DVD/VCR's, LCD displays, etc. may be connected into the Activate Station via Bluetooth or using the appropriate patch cable. The Activate Station must also receive audio back from the Topcat to output the mixed audio signal of both microphone channels as well as selected Pods for audio/video recording to the mobile device and interface with assistive listening devices. Activate Station must also communicate with mobile devices via Bluetooth LE for selection and control of small group audio Pods and system volume levels.

