

## Architectural Specifications for

### TeachLogic Matrix IPR-1650/CS4 Classroom Sound Field System

#### **PART 1. GENERAL**

##### 1.1 SUMMARY

A. Classroom Sound Field Amplification System to amplify voice and other audio sources.

The system shall include:

1. Mixer/amplifier with – two infrared receivers, two auxiliary line inputs, Assistive listening/lesson capture output, teacher priority and remote control of line input levels, security alert output, RS-232 control from wall panel, page mute & pass through and two 25 watt amplifiers, 50 watts total power, ability to power up (4) 8 ohm loudspeakers
2. Pre programmed RS-232 Remote wall control panel that allows volume/mute control on all mic and line inputs. Features built in Bluetooth receiver
3. Ergonomic design handheld transmitter microphone with dynamic uni-directional element and built-in windscreen including rechargeable NiMH batteries
4. Pendant Transmitter with a built-in cardioid Microphone for enhanced performance, an adjustable (safety) break away lanyard and rechargeable NiMH batteries
5. Drop-in Charger for both the Pendant transmitter/microphone and Handheld transmitter microphone
6. Dome sensor receives the IR transmission and sends it to the receiver/amplifier, includes 50 feet of plenum rated coaxial cable
7. Four speakers:
  - a. Ceiling speakers with tile bridge and 100 feet of plenum rated cable  
or
  - b. Wall-mount speakers with mounting brackets and 100 feet of plenum rated speaker cable  
or
  - c. Lay in speakers with pre-attached grille and tile bridge with 100 feet of plenum rated cable rated speaker cable

B. The following are well documented results of the benefits of installing a Classroom Amplification System.

1. Overcome high ambient noise level.
2. 30% of the students will hear their teacher significantly better.
3. Improved attention and increase on-task behavior.
4. Student participation and interaction increases.
5. Improved listening ability, regardless of teacher orientation
6. Improved student oral communication skills.
7. Classroom stress is lowered.
8. Behavior problems are reduced.
9. Teacher absenteeism is reduced.
10. Higher academic achievement and improved test scores.
11. English Language Learners (ELL) score higher.
12. Children with learning disabilities benefit.
13. Improve ease of teaching.
14. Reduced teacher vocal fatigue.

## 1.2 APPLICATION

A. Classroom Amplification should be installed in new schools (public or private, pre-school through university), schools scheduled for renovation, and for special needs (comprehensive needs) projects in all classrooms, learning spaces, resource rooms, media centers, and labs. Additional rooms may be considered where special needs apply (students with hearing impairments) teacher assistive devices (vocal or auditory impairments), or special room needs due to excessive ambient noise levels, size and / or location (gymnasium, cafeteria, music room, conference rooms).

B. Multiple speaker options shall be available for rooms of varying shapes and sizes, including ceiling and wall-mount types. Speakers should be placed near the instructional area so the maximum benefits of the sound amplification system are achieved by all students. All speakers shall be provided with the proper mounting hardware including support tile bridges for in-ceiling speakers and brackets for wall-mount speakers. Plenum rated wire must be provided with all speakers as standard.

C. The receiver/amplifier must be mountable above or under shelf using provide mounting tabs or free standing so it can be located anywhere in classroom without degradation of signal or sound quality. The receiver/amplifier shall be able to mount in ceiling vault plenum enclosure installations.

D. Wall mounted touch panel shall be pre-programmed and capable of surface mount or in-wall and connected via RS-232 RJ-45 cat6 cable.

E. The Infrared Sensor shall be capable of being mounted on the ceiling. The sensor is connected to the receiver/amplifier and phantom powered through a coaxial cable. The preferred location of the infrared dome sensor is on the ceiling, near the center of the classroom. The sensor shall come with a ceiling support bracket to mount the sensor flush to the ceiling.

## 1.3 DESCRIPTION

A. The classroom Amplification System shall include but not limited to the following components.

1. Infrared receiver/amplifier/mixer shall have: Two infrared receivers, two sensor inputs capable of phantom powering two sensors, two 25 watt power amplifiers, 50 watts total, ability to power up to (4) 8 ohm loudspeakers, two stereo line inputs, one front panel line Assistive listening/Lesson Capture output with gain control, security alert output, teacher priority and remote control of line level inputs via pendant transmitter, RS-232 wall panel control of line inputs, and a page over-ride / pass through feature with 25v, 70v, 100v input (switchable) with gain control.
2. Pre programmed RS-232 Remote control wall panel with built in Bluetooth receiver (CPS-120) allows control of volume and mutes of all mic and line inputs.
3. Amplifier Switching Power Supply: 19V – 4.75A, 90 watts, UL Listed. (AC-70)
4. Pendant Transmitter Microphone with a break away lanyard (IRT-60) including a built-in uni-directional microphone and including rechargeable Lithium batteries.
5. Handheld Transmitter Microphone with NiMH rechargeable batteries (IRH – 35)
6. Drop-in battery charger for Pendant or Handheld Transmitter featuring optimized charging rate and automatic full charge protection for NiMH batteries.
7. Infrared Dome Sensor with 6 large receiving diodes, ceiling mounted, with 50 feet of plenum rated coaxial cable with “RCA” connectors on each end (ICS – 55).
8. Speaker Pack with 100 feet of plenum rated cable:
  - a. Four 6.5” coaxial speakers, 30 watt power rating, 8Ω, ceiling mount with tile bridge, back can, and metal grille with trim ring (SP-628)or

- b. Four two-way wall-mount speakers with mounting brackets (SP-2000)  
or
- c. Four (1' x 2') Lay-in speaker assembly, 6.5" coaxial speakers, 30 watt power rating, 8Ω , back can, perforated metal grill and attached adjoining T-bar (SP-628L)

#### 1.4 REGULATORY REQUIREMENTS

- A. Conform to building code requirements applicable to the work specified herein.
- B. Conform to appropriate sections with regard to applicable requirements specified.

#### 1.5 QUALITY ASSURANCE

##### A. Qualifications

1. Installer Qualifications: Installer will be experienced in performing work of this nature by having completed similar installations, having the skills and the knowledge required to complete this project.

- a. Certificate of Qualification
- b. Contractor's License to be provided upon request.

2. Manufacturer Qualifications: Manufacturer is capable of providing field service delineation during construction, approving acceptable installer and approving application method.

##### B. Acceptable Manufactures

- 1. Basis of Design: TeachLogic, Inc., 1688 Ord Way, Oceanside, CA. 92056, PH 800-588-0018, Fax 760-631-1283. website: www.teachlogic.com
- 2. Substitutions must be in full compliance to specifications as written.

C. Manufacture Testing: Manufacturer to provide quality assurance certificate 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.

#### 1.6 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. Operation and maintenance manuals
- 5. Manufacturer's warranty documents
- 6. Manufacture's parts lists
- 7. Product serial numbers

#### 1.7 WARRANTY

A. Warranty: Refer to "Conditions of contractor" for warranty and repair provisions.

B. Repair: Manufacturer shall offer repair services on all Classroom Amplification System components. Owner shall prepay shipping for all items returned to manufacturer for repair. The manufacturer shall repair or replace system components as specified under the warranty. Manufacturer shall repair components within five (5)

working days of receipt. Items returned to Owner will be shipped via most appropriate method for expediency and be cost effective, cost to be paid by manufacturer.

C. Manufacturer's Warranty: All the major system components (transmitters, receiver-amplifier, sensor, and speakers) must be warranted for five (5) years against defects occurring while used in normal classroom instruction. The warranty shall be equivalent to TeachLogic, Inc. warranty.

1. Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official.
2. Warranty Period: Five (5) years commencing on Date of Substantial Completion.  
Batteries are warranted for 2 years.

## 1.8 OWNER INSTRUCTION

A. Owner's Instruction: User training will be performed by installing contractor or designated representative. The training will include a basic explanation of how infrared transmission is accomplished, comprehensive instruction of the system operation, and simple troubleshooting guidelines

B. Instruction materials and detailed Owner's manual shall be provided to cover operational and basic maintenance procedures.

## PART 2. PRODUCTS

### 2.1 RECEIVER / AMPLIFIER SPECIFICATIONS (IMA-120)

- A. Two power amplifiers: (25 watt each) 50 watts total,
- B. Frequency Response: 40 Hz to 20 kHz
- C. Power Supply: 19 V / 4.75A, 90 watts, UL Listed
- D. Signal-to-noise ratio: greater than 70dB
- E. Total Harmonic Distortion: less than 0.04% @ 4 watts per channel
- F. Speaker Minimum Load Impedance: 4Ω per amplifier
- G. Speaker Output: Short circuit protected
- H. Page input will mute all microphone and auxiliary inputs during pages
- I. Page Input: 25, 70 or 100 volt selectable with variable gain control
- J. Assistive listening/Lesson Capture output with level control
- K. RS 232 controllable via wall panel controller, cat6 RJ-45
- L. Security alert output contact closure, N.O./N.C.
- M. Bass/Treble equalizer
- N. Digital Limiter
- O. Infrared Receivers:
  - Standard FM sub-carrier frequency: Channel 1 (2.08 MHz)
  - Standard FM sub-carrier frequency: Channel 2 (2.54 MHz)
- P. Maximum Deviation: ± 15 kHz
- Q. Tone Squelch: RF carrier / tone key control
- R. Controls:
  1. Power Switch with Blue LED indicator
  2. Two IR microphone volume controls with IR reception indicator, Green LED
  3. Two Auxiliary input volume controls
  4. Audio output for Assistive Listening/Lesson Capture output with gain control
  5. Bass/Treble equalizer rotary control
- S. Connections:
  1. Phoenix Connector with 4 terminals for one or two speaker connection. Total of (4) 8 ohm speakers may be connected
  2. DC Power input
  3. Two Stereo Line Level inputs (2) 3.5 mm
  4. One Line Level output (1) 3.5mm

5. Two IR Sensor inputs (RCA-type)
6. Page over-ride input: Two terminal Phoenix connector
7. 3 pin phoenix Security Alert output, N.O./N.C.
8. RJ-45 RS-232 output, touch control panel connector
9. RS-232 on/off switch
10. USB micro 5pin for software upgrade

T. Dimensions: 6.5" W X 1.5"H X 3.5" D

U. Weight less Power Supply: 1.5 lbs.

## 2.2 WALL MOUNTED REMOTE CONTROL TOUCH PANEL (CPS-120)

- A. MIC A and MIC B IR, Amplifier Input Microphone selection
- B. AUX IN1 and AUX IN2, Amplifier Input selection
- C. LINE OUT and BT (Bluetooth), Amplifier selection
- D. AUX (Aux In 3) and MIC, Touch Panel Input selection
- E. MUTE push button
- F. Rotary encoder touch volume control
- G. Digital display
- H. RS-232 RJ-45 input connector

## 2.3 PENDANT-STYLE IR MICROPHONE / TRANSMITTER (IRT-60 Sapphire)

- A. Pendant microphone is a complete infrared transmitter with a built-in microphone and equipped with 6 emitting diodes for reliable performance. Intended to be worn around the neck.
- B. Lanyard: Adjustable and with (safety) break away clasp.
- C. Microphone/ aux input side jack, auto level detect (3.5mm)
- D. Built in uni-directional microphone for enhanced performance.
- E. Gain control for changing built in microphone volume
- F. Teacher priority instant attenuation button
- G. Emergency alert button (hold for 4 seconds)
- H. Remote control of line inputs levels
- I. Power switch: ON / OFF
- J. Channel A/B selection switch
- K. Power "on" LED:
  - a. Green = Batteries have a useable charge
  - b. Red = Batteries need to be recharged
- L. Standard sub-carrier frequencies: 2.08 MHz / 2.54 MHz
- M. Modulation: FM wide-band
- N. Audio Distortion: 0.3% (+10 kHz deviation @ 1 kHz)
- O. Battery Power: Lithium Rechargeable Batteries
- P. Micro USB connector for plug in charging
- Q. External battery contacts connect to drop in charger for auto recharging
- R. Dimensions: 1¼" W x 3" H x ¾" D
- S. Weight (with battery): 1.4 oz.

## 2.4 HANDHELD IR MICROPHONE / TRANSMITTER (IRH-35)

- A. Tubular shaped per hand ergonomics
- B. Uni-directional, Dynamic microphone element with built-in windscreen
- C. Ten (10) transmitting diodes (360° radiation)
- D. Power Slide Switch: ON / OFF
  - a. Green = Batteries have a useable charge
  - b. Red = Batteries need to be charged
- E. Standard sub-carrier frequencies: 2.08 MHz / 2.54 MHz
- F. Audio Distortion: 0.3% (+10 kHz deviation @ 1 kHz)
- G. Battery Power: Two AA Rechargeable Batteries NiMH
- H. Dimensions: 2" Dia. x 9" L
- I. Weight (with batteries): 4.8 oz.

## 2.5 DROP-IN CHARGER for PENDANT and HANDHELD TRANSMITTER (BRC-60)

- A. Triple Drop-in Charger: Simultaneous charging of up to (2) Pendant and (1) Handheld transmitters
- B. Regulated Charger:
- C. Automatic full charge maintenance
- D. Charging Indicator:
  - a. Red LED = Indicates batteries are being charged
  - b. Green LED = Indicates batteries are fully charged
- E. Charger detects non-rechargeable batteries and will not charge them
- G. Charging Rate: NiMH 245mA/hr Lithium 160 mA/hr
- H. Recharge Time: NiMH 10 hours Lithium 6 hours
- I. Power Input: 5V / 1.0A adapter, 6 watts (UL Listed)
- J. Weight: 1.0 lbs.

## 2.6 IR CEILING DOME SENSOR (ICS – 55)

- A. 6 large IR receiving LED's equally radial spaced
- B. Phantom powered from receiver / amplifier
- C. Operating frequency: 2.08 MHz & 2.54 MHz
- D. Operating range: 60 Feet line of sight
- E. Signal / Power interface connection: "RCA" type connector
- F. Green LED: Power "ON" indicator
- G. Mounting: Ceiling tile mount with support bracket
- I. Sensor cable: 50 feet coaxial plenum rated with type with "RCA" connectors

## 2.7 SPEAKERS

### A. SP-628 Ceiling Speaker

- 1. Full range, coaxial, Polymica cone with rubber suspension
- 2. 6.5" Dia. cone driver with a 1" mylar dome high frequency tweeter
- 3. Housing: Air sealed metal enclosure with white metal grille and trim ring
- 4. Frequency Response: 80 – 20,000Hz, +/- 6dB
- 5. Impedance: 8 ohms
- 6. Power Handling: 30 watts nominal, 60 watts peak
- 7. Tile Support Bridge: 20 gauge steel with re-enforced edges
- 8. Quick-mount clamps for efficient installation
- 9. Screw terminal for secure speaker wire connection
- 10. Plenum rated speaker cable, 18 gauge stranded, 100 feet

or

### B. Wall-mount Speaker and Bracket (Four) SP-2000

- 1. Description: Two-way speaker with 5.25" woofer and a high efficiency domed tweeter with a passive crossover housed in a ported enclosure
- 2. Shielded magnet to prevent video interference
- 3. Frequency Response: 80Hz – 20,000 Hz ± 6dB
- 4. Impedance: 8 ohms
- 5. Power Handling: 40 watts nominal, 80 watts peak
- 6. Structural reinforced ABS enclosure with metal mesh grille
- 7. Mounting bracket for wall-mount or desk top stance
- 8. Metal spring terminal speaker wire connection
- 9. Speaker cable, 18 gauge stranded, 100 feet

or

### C. SP-628L Lay in Ceiling Speaker

- 1. Full range, coaxial, Polymica cone with rubber suspension
- 2. 6.5" Dia. cone driver with a 1" mylar dome high frequency tweeter
- 3. Housing: Air sealed metal enclosure with white metal grille and trim ring
- 4. Frequency Response: 80 – 20,000Hz, +/- 6dB
- 5. Impedance: 8 ohms
- 6. Power Handling: 30 watts nominal, 60 watts peak
- 7. Pre integrated tile bridge and speaker with re-enforced edges. No assembly required.

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8. Quick-mount for efficient installation
9. Screw terminal for secure speaker wire connection
10. Plenum rated speaker cable, 18 gauge stranded, 100 feet

## PART 3. EXECUTION

### 3.1 SYSTEM PERFORMANCE

- A. Installation to comply with manufacturer's specifications
- B. Final Adjustment: Upon completion, the system shall be tuned and adjusted for optimum vocal clarity. Transmitters shall be plugged into charger and ready for use.
- C. Provisions: There shall be no audible components of hum, static, noise, or distortion

### 3.2 ADDITIONAL AS-BUILT DATA REQUIRED

- A. Provide as-built conditions indicating final location of speakers, remote infrared dome sensor, and amplifier.
- B. Provide serial numbers of receiver/amplifier, transmitter(s), and drop-in battery charger.

### 3.3 INSTALLATION HARDWARE

- A. Receiver/Amplifier: (IMA-120)
  - a. Can be mounted in a ceiling vault enclosure for plenum application installations.
  - b. Mounted under or atop a shelf utilizing the mounting tabs on the amplifier.
  - c. Placed at any convenient location within the classroom as a free stance unit
- B. The IR Dome Sensor: (ICS-55)
  - a. The dome sensor is designed to be flush mounted on the ceiling tile using the support bracket clipped to the metal tile support. Connect the coaxial cable via the "RCA" connector and route the cable back to the receiver/amplifier and connect to IR input.
- C. Speakers:
  - a. The SP-628 ceiling speakers or SP-628L Lay in speakers will be installed equally spaced above the listening area. Speaker with back-can to be supported by tile bridge. Speaker wire will be secured under the screw terminal. Individual speaker cable will be routed to the receiver/amplifier and connected to the phoenix connector. Be sure to observe the speaker polarity (connect printed lead to positive). Two speakers can be connected in parallel and a single cable routed to the receiver/amplifier.
  - b. The SP-2000 wall-mount speakers will be mounted square and plumb, at the height and location recommended by the manufacturer. Speaker cable will be routed to the receiver/amplifier and connected to the phoenix connector. Two speakers can be connected in parallel and then a single cable routed to the receiver/amplifier (observe polarity). All wiring and installation will be in accordance of local building and electrical code.
- D. Page Input / Pass Through:
  - a. Determine the input impedance, (25, 70, 100 volt) of the paging system
  - b. Select the appropriate impedance
  - c. Connect the paging wires to the two terminal phoenix connector
  - d. Plug into page input
  - e. Pass a page through the paging system
  - f. Adjust the page volume with gain control on back panel.

E. Wall Control Touch Panel:

- a. The Touch Panel is designed to be mounted either surface or in-wall.
- b. For surface mounting the provided box will be mounted square and plumb, at the height and location recommended by the manufacturer. The installer provided RS-232 cat6 cable will be routed from the receiver/amplifier and connected to the RJ-45 connector on the touch panel. All wiring and installation will be in accordance of local building and electrical code.
- c. For in-wall mounting, a two-gang low voltage ring or box will be mounted square and plumb, at the height and location recommended by the manufacturer. RS-232 cat6 cable will be routed from the receiver/amplifier and connected to the RJ-45 connector on the touch panel. All wiring and installation will be in accordance of local building and electrical code.

3.4 CLEAN-UP

- A. Remove unused materials and debris from the work and storage areas. Leave areas in undamaged and acceptable condition
- B. Save the shipping boxes and leave for the school to use to return product for service.