

FORUM™ 232 CLASSROOM AUDIO SYSTEM

INSTALLER AND OPERATIONS MANUAL



Amplifier

Audio Mixer

Infrared Microphone Receiver

thank you




Congratulations on the purchase of your new TeachLogic system. You can be assured that this fulfills all specifications and was produced to very high quality control standards. TeachLogic incorporates the latest state of the art technology, employs the most advanced manufacturing methodology and uses only premium quality components to assure many years of reliable performance. We appreciate your confidence by your selection of our product. It is TeachLogic's intent to uphold that confidence by providing factory assistance and dealer support.

We hope you will take the time to review this manual to familiarize yourself with the product operation and features. This manual will help you learn to use and gain the maximum benefit of the system.

TeachLogic, LLC
Longmont, Colorado, USA
teachlogic.com

contact

If you should encounter some unresolved issue, please contact TeachLogic customer service department for further assistance.

 1-760-631-7800
 support@teachlogic.com
 www.teachlogic.com





CAUTION

**RISK OF ELECTRIC SHOCK:
DO NOT OPEN**

Caution: To Reduce The Risk Of Electric Shock Do Not Remove Cover (Or Back)
No User-serviceable Parts Inside
Refer Servicing To Qualified Personnel

certifications



TeachLogic systems are manufactured using lead-free processes and are free of materials harmful to the environment. They conform to the most stringent new European guidelines for consumer products (RoHS).

caution

Recycle—Do not dispose rechargeable batteries in trash. Actually it is unlawful to do so in CA, NY & ME.

Contact: Earth911.com
1-800-CLEANUP

Save our resources and don't contaminate.
Go Green

safety instructions

Read Instructions

All safety and operation instructions should be read before operating this TeachLogic product.

Retain Instructions

Safety and operating instructions should be kept for future reference.

Water & Moisture

This product should not be operated near water.

Heat Environment

Do not subject this product to excessive heat conditions.

Power Source

This product must be connected to an AC power source per the voltage input specified and marked on the power supply.

Power Cord Caution

Power cable should be routed clear of foot traffic and supported clear of kinking or abrasion.

Object Protection

Locate the operating unit so it will not be subjected to falling objects or water entry.

Internal Service

User should not attempt to service this product. All internal service must be accomplished by a qualified technician.

Electric Shock

Do not adapt or modify the AC power plug thus lifting the earth ground connection.

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notes

Date of Purchase: _____
Model Number: _____
Serial Number: _____
Notes:



IR transmission

The IR transmitter transmits directly to the sensor. However; due to the strength of the IR transmitter, the infrared signal will bounce off the walls, ceiling and floor for reception thus providing continuous connectivity throughout the room. Benefit: total freedom of movement within the room with no restriction of orientation.

“What’s said in the room, stays in the room”.

Infrared will not penetrate a solid surface thus preventing any transmission from going out of the room.

a brief word about infrared

Infrared is a light ray that is below the visible spectrum, just like the sound spectrum extends beyond your hearing ability. An example of infrared transmission is the remote control for your TV set. When a button is pressed, a beam of infrared light is emitted by a Light Emitting Diode (LED) from the remote control. It is detected by a receiving diode in your TV set. When you press a certain command on your control, the internal electronics cause the infrared light to flicker in a programmed sequential pattern (called modulating the light beam). The modulated infrared beam is detected by the receiving diode and is electronically decoded. The decoded signal activates the circuitry to perform the command function on your TV set.

So how does this apply to the infrared communication system you are about to start using? The microphone/transmitter has several Light Emitting Diodes (LED) that emit infrared light beams to the sensor located in the corner of the room. Now when you talk into the microphone, the microphone element modulates the light beam, causing it to flicker in sync with your speech. The sensor detects the sequential signal and the electronic circuitry in the Forum 232 converts that sequential signal into a line level analog audio signal. Now that audio signal can be fed into an amplifier. The amplifier magnifies the electronic signal and sends it to the speakers. This causes the speaker cone to move in sync with your voice. The speaker replicates your voice and disperses your voice evenly throughout the room.

product description

The Forum 232 is an infrared wireless microphone sound system. It is the nucleus of the classroom sound field system which provides optimum voice reinforcement.

The addition of a Forum 232 sound field system will transform your classroom into a totally hands free, voice re-enforcement system, resulting in reduced voice fatigue, enhanced student listening and improved student learning. The wireless function permits 360° connectivity throughout the classroom regardless of body position or orientation.

The system is comprised of an infrared detecting sensor(s) installed in the ceiling. The sensor collects the IR wireless signal from the microphone/transmitter and sends a composite signal to the mixer/amplifier. The receiver transforms the composite signal into an analog audio signal which is fed to the Forum 232 mixer. Two other audio sources, such as; computer, DVD, VCR or Projector can be plugged in to the Forum 232. The volume level of each input will be controlled by the individual volume control of each input. The audio will then be fed to the speakers in the room for even voice reinforcement throughout the room.

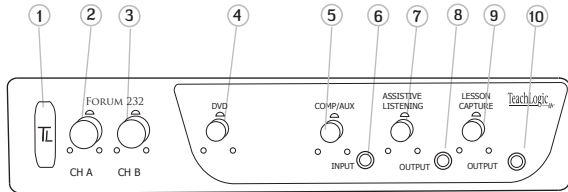
On the front panel of the Forum 232, there are two 3.5mm output jacks for interface with an assistive listening system (ALS) and lesson capture (REC).

The microphone / transmitter can be one or two Sapphires Pendant or a Handheld and a Sapphire Pendant. The rechargeable batteries will provide 6 – 8 hours of service per charge. The drop-in charger will recharge the batteries overnight, ready for another day's use.

Reliable
performance.
Use with
confidence.

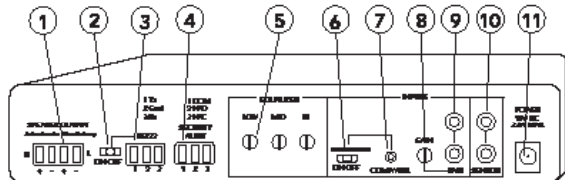
Forum 232 system

The Forum 232 system is comprised of a microphone / transmitter, either the Sapphire (IRT-60), or Handheld (IRH-35) for voice transmission to a ceiling sensor (ICS-55) that sends the signal to the receiver / amplifier (IMA-232). The receiver/amplifier processes the signal and produces an analog signal of your voice for output to the sound field speaker system.



front of IMA-232 receiver/amplifier

- | | |
|----------------------------------|--------------------------|
| 1 Power on/off | 6 Comp/Aux Input (3.5mm) |
| 2 CH A Microphone Volume Control | 7 ALS Volume Control |
| 3 CH B Microphone Volume Control | 8 ALS Output (3.5mm) |
| 4 DVD Volume Control | 9 REC Volume Control |
| 5 Comp/Aux Volume Control | 10 REC Output (3.5mm) |



back of IMA-232 receiver/amplifier

- | | |
|--|--|
| 1 Speaker Output - Two Channel Four pin Phoenix connector | 5 Three band digital equalizer ± 12 dB |
| 2 RS-232 - on/off switch | 6 Computer ANTI HUM - ON/OFF |
| 3 RS-232 - Tx, Gnd, Rx Three pin Phoenix connector | 7 Computer Input - 3.5mm |
| 4 Security Alert - Com,N/O,N/C Three pin Phoenix connector | 8 DVD gain - ± 12 dB |
| | 9 DVD dual Mono Inputs (RCA) |
| | 10 Two Sensor Inputs (RCA) |
| | 11 Power Input: 19 VDC 3.4A |

infrared microphone/transmitters

The infrared microphone/transmitter is comprised of a microphone input, signal processing circuits and several emitting diodes that transmit the vocal signal to the sensor.

The microphone/transmitter can be the Sapphire or Handheld. The rechargeable batteries will provide 6–8 hours of service per charge. Place the microphone/transmitter in the charger for overnight charge and it will be ready for another day's use.

The drop-in battery chargers are specifically designed to recharge lithium & NiMH batteries at an optimum rate for maximum operating capacity and extended service life. Charger will automatically start charging the batteries upon insertion and will shift to a maintenance charge when batteries are fully charged.

features

- Elegant design
- Only 1.4 oz. including battery
- Long life “Lithium ion” battery
- Rechargeable via USB cable to computer
- Battery level indicator – Back light under power switch
- Momentary mute button, backlight blinks in mute mode
- Push “on/off” power
- Channel “A” or “B” selectable
- Three level microphone volume switch
- (Normal, -3dB, -6dB)
- Auxiliary input (3.5mm)
- Wear with a lanyard or slide directly on neckline collar



(IRT-60) sapphire transmitter

The Sapphire's vocal clarity is unsurpassed. Its high level output is achieved by the unidirectional (Cardioid) microphone and a unique free air suspension system. With a built-in breath filter, the Sapphire can function as a pass around hand mic.

The strategic alignment of the emitting diodes assures reliable connectivity throughout the room without static or drop out.

With a tap on the power button, the microphone is muted for private conversation—tap again to restore to normal operation. The auxiliary input allows wireless playback of your iPod™ through the Sapphire. A three position slide switch provides selection of low, medium, or high microphone sensitivity.



IRT-60 remote control features

1. Moving the priority switch Up/Down will control the volume of the line inputs.

2. A momentary tap of the priority switch will duck down the line inputs 15dB. The receiver front panel power switch changes to a blinking PURPLE. A second tap will restore line input back to normal.

3. Hold in priority switch for 4 seconds closes the contact closure on the Security Alert output. The receivers front panel power switch changes to blinking GREEN. Holding the button down for another 4 sec. returns the contact to normal.

features

- Condenser microphone element
- Power “on/off” switch
- Battery level indicator—LED
- Channel “A” or “B” selectable
- 10 high-power emitting diodes
- Diodes at top and bottom of handle for increased Coverage (2 Top aimed out, 6 Bottom 360°, 2 Bottom aimed down)
- 360° IR radiation for assured connectivity
- Two “AA”, Duracell, rechargeable NiMH batteries



IRH-35 handheld transmitter

The Handheld Microphone Transmitter (IRH-35) is most applicable for student use or direct presentation. It has an “on/off” switch and a battery level indicator LED; Green=useable charge, Red=low battery. The transmitter has 10 emitting diodes: 8 around the bottom of the handle, and 2 toward the top of the handle. The metal housing provides low handling noise and insures durable longevity.

BRC-60 drop-in battery charger

This stylish desktop drop-in charging station makes it convenient and easy to recharge both Sapphire Pendant and Handheld Microphones. Charge one IRH-35 handheld transmitter and up to two IRT-60 Sapphire transmitters simultaneously. Charging indicator lights illuminate Red when charging, and Green when fully charged. The power LED illuminates Blue when plugged in.



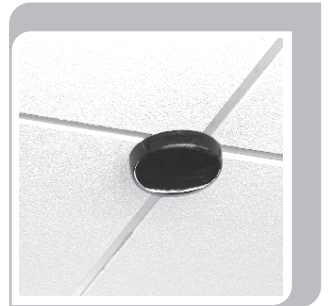
ICS-60 ceiling sensor

The ceiling sensor is the preferred infrared sensor for optimum performance. This is the unit that needs to be installed on the ceiling. It comes with a mounting/support bracket and 50 feet of plenum rated cable with RCA connector on each end. The ideal location for the dome sensor would be in the center of the ceiling. This will provide a clear signal path for the IR transmission from the transmitter to the dome sensor without obstruction. In addition, you will have 360° coverage and will minimize the transmission distance for more reliable performance. It collects the infrared transmission signal via 6 large detecting diodes.

An additional sensor and cable can be added for larger rooms. Locate and install the two sensors for optimum IR reception, install an RCA "Y" at the first sensor, run the cable to the second sensor and connect. Maximum distance from Foun to last sensor should not exceed 150'.

power "on" LED

Green light indicates that the sensor is receiving power from the receiver.



sensor cable

A Cable connects the sensor to the receiver. The cable is dual-shielded with a male RCA connector on each end and is plenum rated.

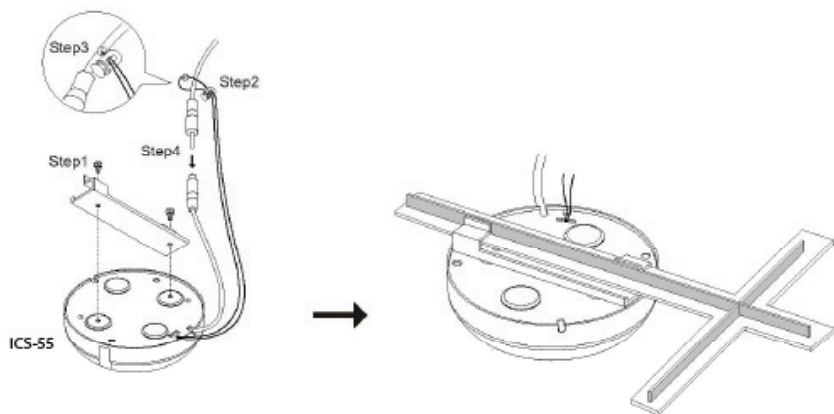


installation of ICS-55 ceiling sensor

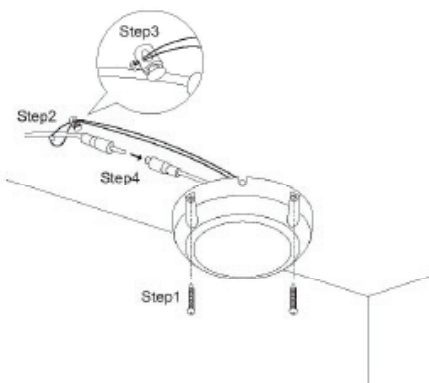
The ideal location for the ceiling sensor is in the center of the ceiling. This will provide a clear signal path for the IR transmission from the transmitter to the dome sensor without obstruction. In addition, you will have 360° coverage and will minimize the transmission distance for more reliable performance. An additional sensor can be added for large or odd shaped rooms.

Attaching the infrared ceiling sensor

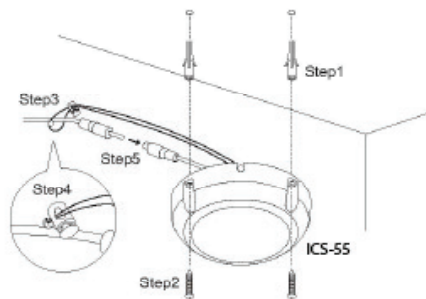
Installation 1 ----- Attach to T-bar Rail



Installation 2 ----- Attach to wood surface



Installation 3 ----- Attach to concrete surface



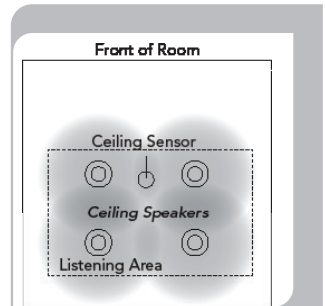
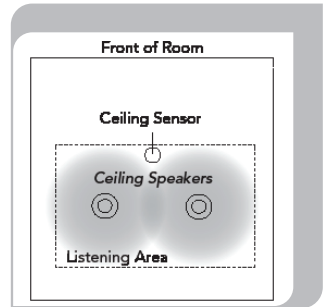
installation of speakers

Two wall mount or ceiling speakers can be powered by the receiver/amplifier. It has two amplifiers (25 watts ea.). One speaker will be connected to each amplifier.

Optional: Two additional speakers can be powered by the amplifier. Connect two speakers in parallel. Then bring a cable from each pair to the amplifier. Connect one pair to each amplifier.

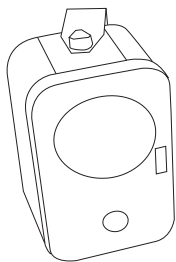
installing two SP-628 ceiling speakers

- Determine the listening area.
- Divide listening area into two quadrants
- Locate and identify the center most tile in each quadrant
- Lay ceiling tile face down on clean flat surface
- Lay tile bridge on ceiling tile and center it
- Trace and cut the large hole using a keyhole or drywall saw
- Strip the speaker cable ends, approx. ½"
- Route speaker wire from speaker opening to amplifier
- Reinstall ceiling tile with tile bridge in place above the hole
- Pull speaker cable back down through speaker hole
- With a pointed tool or paper clip, lift up and remove speaker grille
- Set speaker on top of ladder and connect speaker cable connect
- Observe speaker polarity, connect Red wire to (+) terminal and black wire to the (C) terminal
- With the mounting clamps folded back, position speaker into speaker hole
- With a #2 Phillips screwdriver, tighten the quick clamps
- Reinstall speaker grille and remove any soil or fingerprints
- Repeat same for other speaker

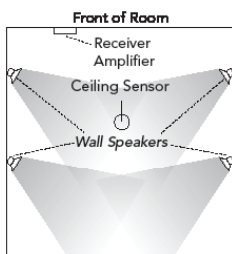
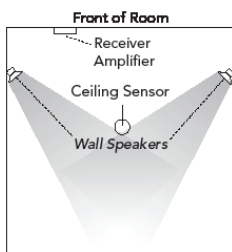


Optional:
Two Additional Speakers

installing SP-2000 wall mount speakers



- First observe the shape of the room: ceiling height, door locations, windows, mounting surface, and seating area
- Ordinary installation would be to locate the speakers on each side wall approximately even with the front row of listeners
- Mount the speakers 6–7 feet above the floor
- Install the mounting brackets in the vertical (up/down) orientation
- Mount brackets using the appropriate hardware
- Insert speaker with the tweeter in upper position
- Secure speaker in bracket with the hand fasteners
- Orient each speaker toward the center of that half of the listening area
- Strip speaker cable ends ½” and connect to speaker
- Observe speaker polarity: Connect (+) wire (with printed writing) to (+) terminal and (-) wire (unprinted & textured) to the (-) terminal
- Route speaker cable to the receiver/amplifier in a safe, least visible, tidy manner

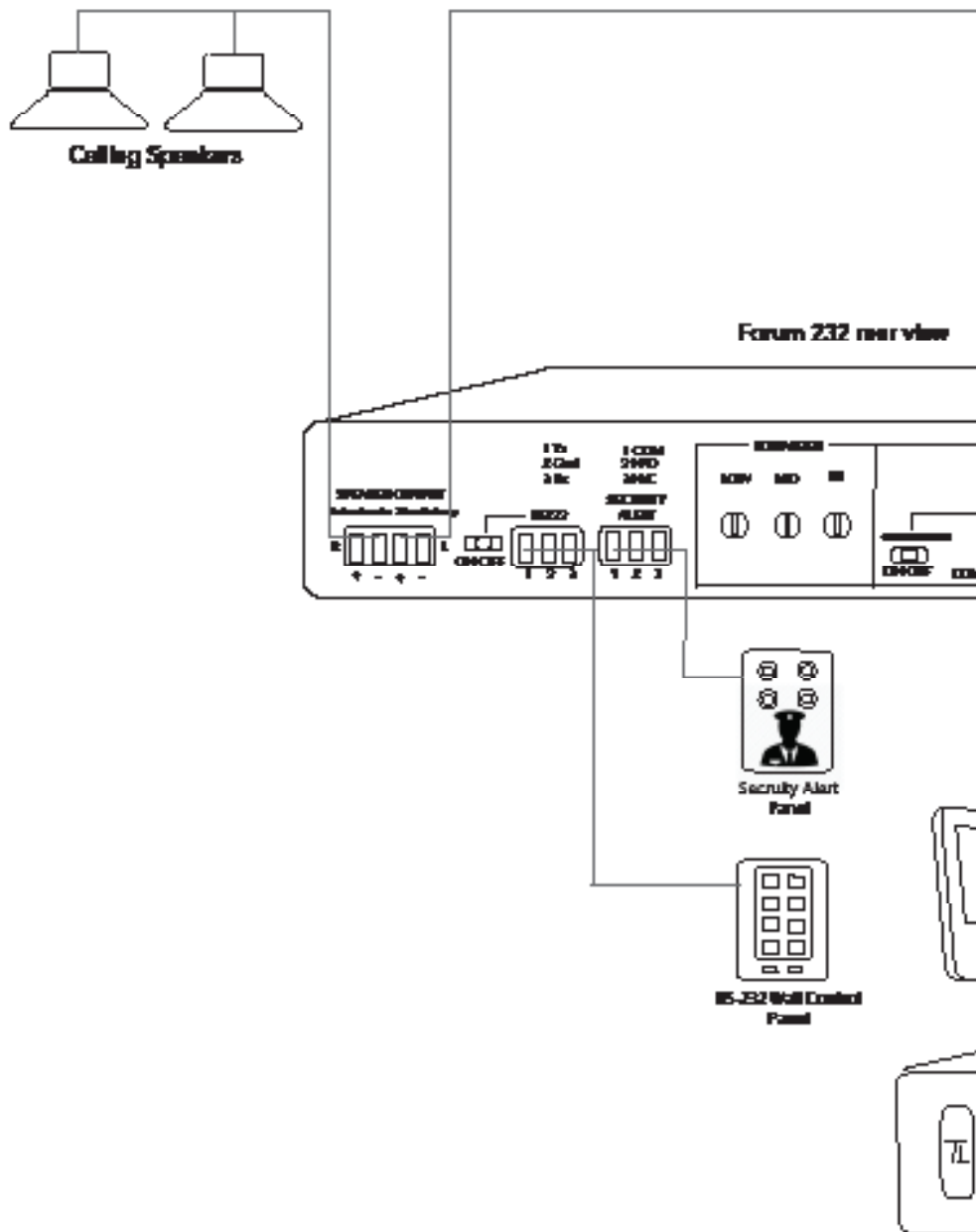


Optional:
Two Additional Speakers

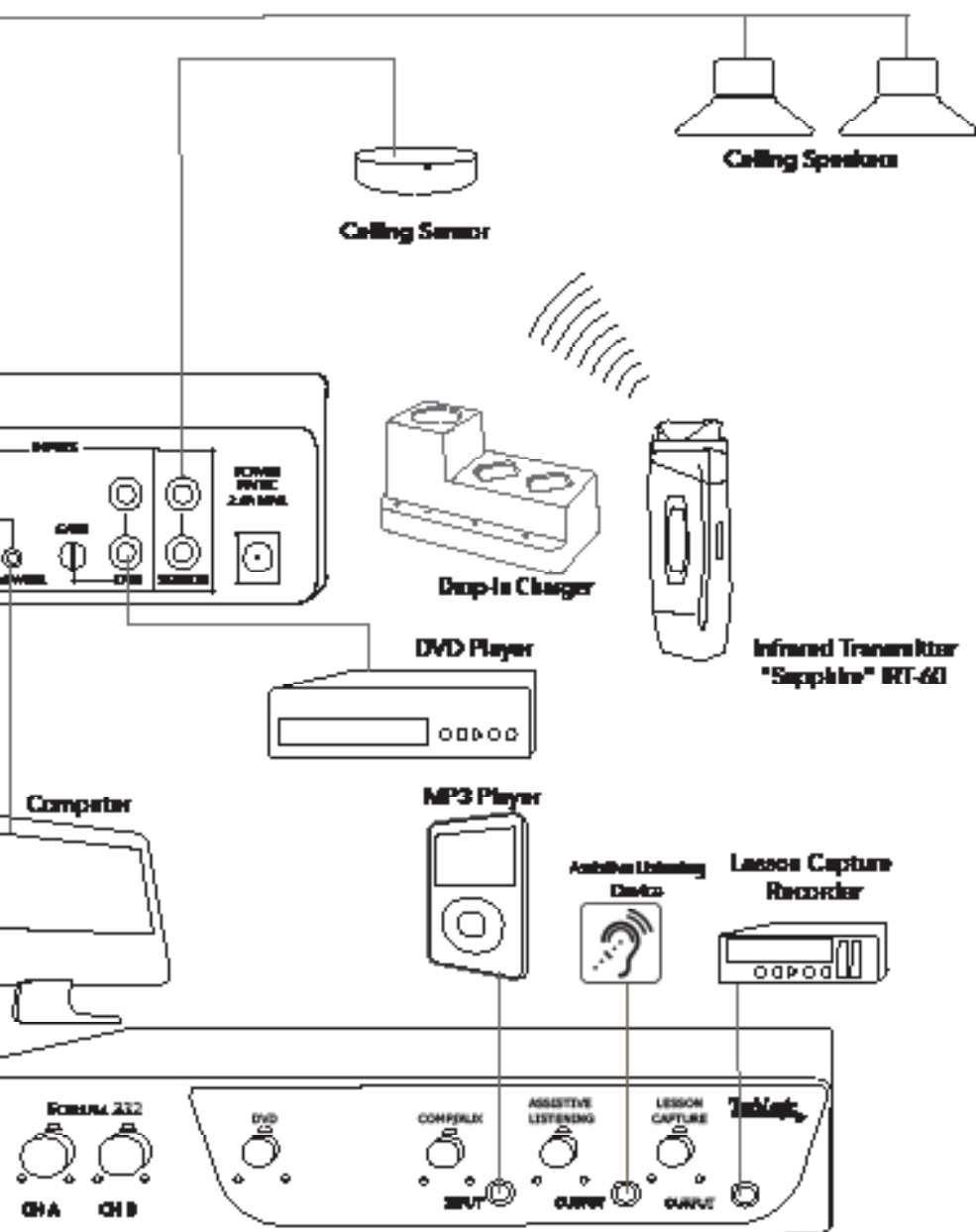
final connection of the system

With receiver/amplifier located, speaker and sensor cables neatly routed, we are ready to complete the installation.

- Cut the speaker wire to the appropriate length
- Strip about 3/8” off the end of each speaker wire.
- Twist the wire and if you have a soldering iron, tin the wire ends
- Unplug the phoenix connector, insert (+) wire (with printed writing) into either outside (+) terminal. Plug the other (-) wire into center (-).
- Tighten set screws.
- Repeat for other pair and insert plug firmly into speaker receptacle
- Plug power supply into AC outlet



system wiring

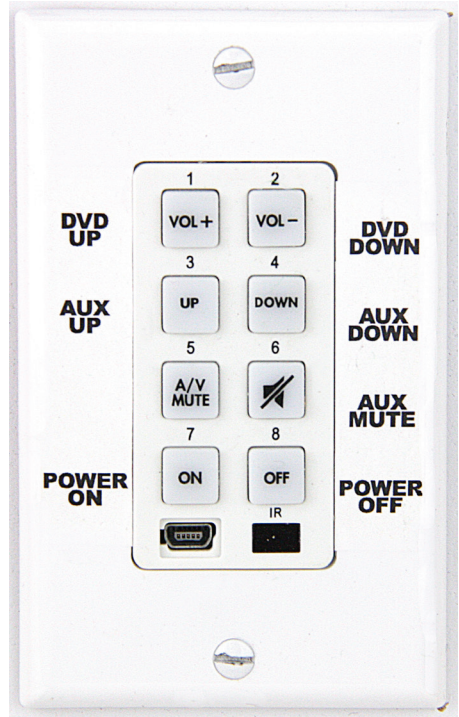


Forum 232 front view

RS-232 features

The RS-232 feature allows the user to remotely operate the line level media inputs via a convenient wall panel controller.

Audio levels very often need to be adjusted when switching from computer audio to DVD players and other audio sources. Such operations as level UP, DOWN and MUTE are easily accomplished via a typical eight button controller, as shown here. This allows the receiver/amplifier to be placed in an area or compartment that is not easily accessed by the user. Codes that are required for this setup are also available below or from TeachLogic's website.



RS-232 codes

Baud Rate : 9600

Forum 232

Parity Bit : NONE

Data Bit : 8

Stop Bit : 1

TL COMMAND - Forum 232

Product Function

ASCII command

HEX command String

OWER ON

Power:ON

4c 69 6e 6b 78 3a 50 6f 77 65 72 3a 4f 4e 0D

POWER OFF

Power:OFF

4c 69 6e 6b 78 3a 50 6f 77 65 72 3a 4f 46 46 0D

Gain DVD UP

Gain:AUX:UP

4c 69 6e 6b 78 3a 47 61 69 6e 3a 41 55 58 3a 55 50 0D

Gain DVD DOWN

Gain:AUX:DOWN

4c 69 6e 6b 78 3a 47 61 69 6e 3a 41 55 58 3a 44 4f 57 4e 0D

Gain DVD MUTE

Gain: AUX:MUTE

4c 69 6e 6b 78 3a 47 61 69 6e 3a 41 55 58 3a 4d 55 54 45 0D

Gain Computer UP

Gain:DVD:UP

4c 69 6e 6b 78 3a 47 61 69 6e 3a 44 56 44 3a 55 50 0D

Gain Computer DOWN

Gain:DVD:DOWN

4c 69 6e 6b 78 3a 47 61 69 6e 3a 44 56 44 3a 44 4f 57 4e 0D

Gain Computer MUTE

Gain:DVD:MUTE

4c 69 6e 6b 78 3a 47 61 69 6e 3a 44 56 44 3a 4d 55 54 45 0D

Gain MP3 UP

Gain:MP3:UP

4c 69 6e 6b 78 3a 47 61 69 6e 3a 4d 50 33 3a 55 50 0D

Gain MP3 DOWN

Gain:MP3:DOWN

4c 69 6e 6b 78 3a 47 61 69 6e 3a 4d 50 33 3a 44 4f 57 4e 0D

Gain MP3 MUTE

Gain:MP3:MUTE

4c 69 6e 6b 78 3a 47 61 69 6e 3a 4d 50 33 3a 4d 55 54 45 0D

Gain AUX UP

Gain:AUX:UP

4c 69 6e 6b 78 3a 47 61 69 6e 3a 4d 69 43 3a 55 50 0D

Gain AUX DOWN

Gain:AUX:DOWN

4c 69 6e 6b 78 3a 47 61 69 6e 3a 4d 69 43 3a 44 4f 57 4e 0D

Gain AUX MUTE

Gain:AUX:MUTE

4c 69 6e 6b 78 3a 47 61 69 6e 3a 4d 69 43 3a 4d 55 54 45 0D

CH A MUTE

CH:A:MUTE

4c 69 6e 6b 78 3a 43 48 3a 41 3a 4d 55 54 45 0D

CH B MUTE

CH:B:MUTE

4c 69 6e 6b 78 3a 43 48 3a 42 3a 4d 55 54 45 0D

system setup



security alert features

The security Alert features allows the teacher/presenter to send a silent wireless electronic signal with a simple press of a button, in the event of an in-classroom security incident. The signal is easily generated by the teacher who is wearing Sapphire wireless pendant microphone. This same microphone transmitter which is used for in-room amplification, has a special button (labelled PRIORITY) on the side for initiating the Security Alert. Simply holding down the button for 4 seconds, "closes" a contact closure on the rear panel of the TeachLogic amplifier and sends the Security Alert signal to the appropriate location possibly the principal's or security monitoring station. The front panel power switch on the front of the amplifier will "blink" with a soft green background.

To disengage from the Security Alert mode, simply hold the side button for 4 seconds, and the amplifier will return to its normal state with the front panel power button illuminated with a solid blue background.

The output is a three pin NO/NC contact closure labeled Security Alert.

RS-232 Switch

Turn RS-232 switch to "ON" position when using remote control wall panel.

Turn to "OFF" when not in use.

RS-232 and Security Alert contacts



operation of wireless microphone

Now that the system is installed and connected, we are ready to turn the system "ON" and test its performance. The testing will be done using an IR transmitter (Sapphire or Handheld) to confirm good connectivity and quality audio.

system operation

- On Forum 232 set Ch A & B volume controls to off (counter clock wise)
- Turn the Forum 232 "ON", Blue LED will light
- Confirm power to ceiling sensor, Green LED on edge of sensor will light
- Using a Sapphire Transmitter microphone. (Sapphire Mics are shipped in channel A)
 - Sapphire: "A-B" switch, remove battery cover on back, under battery.
 - Handheld: Unscrew barrel and remove. Note "A-B" switch on side of battery holder.
- Turn sensitivity control on Sapphire transmitter to "HI" level position
- Switch transmitter "on" by depressing and hold front button until (Blue) LED is present
- Observe signal presence LED (Orange) on Forum 232 receiver adjacent to "Mic" volume control
- Stand under or in front of a speaker
- Slowly adjust "Ch A" volume on Forum 232 while talking into microphone
- Adjust to desired listening level.
CAUTION: Beware of feedback
- Walk around the room while talking into microphone to confirm good connectivity

Upon completion of performance test, the installation is complete.

troubleshooting

| Problem | Solution |
|--|---|
| System is turned “on” but there is no sound | <ul style="list-style-type: none">• Verify AC power; the Blue LED lights when turned “on”• Check if system has been unplugged• Check circuit breaker• Call maintenance for assistance |
| System has power but no sound | <ul style="list-style-type: none">• Turn “on” microphone/transmitter• Check for IR transmission, Signal presence (Orange LED)• Check the Green LED in the sensor• If sensor LED is not lit<ul style="list-style-type: none">• Sensor has been disconnected• Power output to sensor has failed (Receiver/amplifier needs to be replaced) |
| Voice is distorted and/or signal drop-out occurs | <ul style="list-style-type: none">• Check the charge on your batteries• Verify that the diodes on transmitter or sensor are not being covered• Obstruction between transmitter and sensor |

contact

If your problem persists and this guide has not resolved the issue, call our customer service department for additional assistance. (760) 631-7800

Forum 232 (IMA-232) specs.

| | |
|---------------------------|---|
| Receiver Input Modulation | Infrared FM FM Wide-band |
| Reception Frequencies | Ch. A: 2.08 MHz, Ch. B: 2.54 MHz |
| Infrared Wavelength | 850 nm |
| Tone Signal | Ch. A: 32.768 KHz |
| De-emphasis | 50 μ s |
| Frequency Response | 50 Hz, -13KHz, C 3dB |
| S/N Ratio | >65 dB |
| THD | <1% @1KHz |
| Nominal Deviation | \pm 10 KHz |
| Maximum Deviation | \pm 25 KHz |
| External Sensor Input | Two, RCA |
| Aux Inputs | One DVD, Line Level, Dual RCA with +10dB Gain Control One Aux input with front and rear panel 3.5mm jack |
| Line Output | One ALS & One REC Output, 3.5mm with Gain Controls, Front Panel |
| Equalization | Three Band Digital \pm 12dB |
| Security Alert Output | N/O,N/C contact closures |
| RS-232 | Wall panel control of line input levels |
| Power Output | Two Amplifiers, 50 watts total (RMS), 25 watts ea. (RMS) |
| Output Impedance | 4ohm min, per channel |
| Output Connection | One Phoenix Connector, ch A & B |
| Power Supply | 19VDC /3.4A / 65W CE,CSA & UL Listed 8 1/2" W x 1 3/4" H x 7 1/2" D |
| Dimensions | 1 lb. 8oz. |
| Weight | Aluminum |
| Enclosure | |

power supply (AC-36) specs.

| | |
|----------------|----------------------------------|
| Type | Regulated Switching Power Supply |
| Input Voltage | 100-240 volts AC, 47-63Hz |
| Output Voltage | 19 volts DC, 3.4A |
| Power Output | 65 watts Max. |

Sapphire transmitter (IRT-60) specs.

| | |
|-----------------------------|--|
| Transmitting Diodes | Six |
| Operating Range | 1,600 Ft ² . 60 Ft. Line of Sight |
| Battery Discharge Indicator | |
| Blue | Full |
| Purple | Medium |
| Red | Low |
| Flashing Red | Very Low Battery |
| Battery Used | Lithium-ion (3.7V / 620mAh) |
| Battery Life | Approx. 8-9 Hrs/Charge |
| External Power Charger | DC +5V, Micro USB Connector |
| Transmission Angle | Conical |
| User Controls | |
| Power Switch (push) | On/Off |
| Mute Switch (push) | On/Off momentary push |
| Mic Switch (3 position) | Normal, -3dB, -6dB |
| Aux. Vol./Gain | Increase, Decrease |
| Security Alert | 5 second hold of priority button |
| External Aux. Input | 3.5mm Line Level |
| Dimensions | 3 5/8" H x 1 1/4" W x 3/4" D |
| Weight | 1.4 oz. Including battery |

Handheld transmitter (IRH-35) specs.

| | |
|----------------------------|--|
| 2 Channel Switchable | Field Switchable |
| Transmitting Diodes | Ten |
| Modulation | FM Wide-Band |
| Pilotone Frequency | 32.768 KHz |
| Peak Deviation | ± 25KHz |
| Operating Range | 1600 Ft ² . 60 Ft. |
| Power Switch (Slide) | On/Off |
| Battery Charge Level (LED) | Green (Useable Charge) Red (Needs Charging) |
| Battery Life | Approx. 7 Hr./Charge |
| Dimensions | 2 1/8" Dia. Head, 1 7/16" Dia. Body, 9 5/8" H |
| Weight | 10.3 oz. w/ Battery |

drop-in battery charger (BRC-60) spec


| | |
|---------------|--------------------------------|
| Charging Port | 2 Sapphire, 1 Handheld |
| Red LED | Battery being charged |
| Green LED | Battery fully charged |
| Power Supply | 5 VDC, 1 Amp |
| Dimensions | 6 3/8" L x 3 3/8" W x 3 3/8" H |
| Weight | 6.3 oz. |

five year limited warranty

Please refer to www.teachlogic.com/warranty.

contact

TeachLogic
Customer Service Dept.

 1-760-631-7800

 support@teachlogic.com

 www.teachlogic.com





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✉ support@teachlogic.com

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