

TECH TALK


While some audio products may appeal to buyers on an emotional level, the laws of physics and science still dictate performance. We are trying to come as close as possible to perfection while working within those rules.


Why does the Sapphire™ achieve so much gain before feedback occurs?


The team at TeachLogic® has decades of experience working with lavalier, lapel and podium microphones in the most challenging live sound venues. We have learned that polar pattern control and frequency response are equally important in achieving maximum gain before feedback occurs. Pattern control is mainly a function of physical construction (i.e., the classroom's physical dimensions and environment) and cannot easily be changed by complex signal processing. In the typical classroom with 10-12 ft. ceilings, for example, a true cardioid (unidirectional) pattern is optimal. With this relatively short distance from floor to ceiling, reflections off the floor create large feedback potential. With a well-designed cardioid capsule like that in the Sapphire, these floor reflections (and also side wall reflections) are minimized. Therefore, the mic capsule's focus is on the educator's voice. The Sapphire's ability to reject errant reflections results in a greater gain before feedback will occur.



In the above photo, notice the large air ports below the Sapphire mic capsule. These are the ports that create the cancellation or cardioid effect similar to a bass reflex port. The open-air mesh grille windscreen allows the microphone capsule to “breathe” and retain its directional pick-up characteristics. Simply drilling holes or cutting slits in the top of a transmitter casing does not allow a capsule to adequately reject lateral noise sources and generates a sound similar to a microphone stuffed inside a box.

 **LIGHTWEIGHT**
Weighs only 1.4 OZ

 **COMPACT**
3.5 inches in length

 **LONG LIFE**
Battery lasts 8 hours

Sapphire IRT-60



Sapphire Pendant infrared transmitter/microphone with rechargeable lithium-ion battery and unidirectional microphone for true voice reproduction and unparalleled feedback suppression.

No Audio Dropout Guarantee

The Sapphire is compatible with all existing TeachLogic infrared systems and operates on 2 carrier frequencies: 2.08 and 2.54 MHz. When the Sapphire is used with our ICS-55 Ceiling Sensor, it qualifies for our No Audio Dropout Guarantee. If audio dropout occurs in a standard classroom (enclosed classroom up to 1600 square feet with ceiling heights of 12 feet or less), TeachLogic will provide an additional sensor at no extra charge.

How does the Sapphire™ transmitter avoid “line of sight” connection problems?

Some infrared transmission devices use one or two light emitting diodes (LEDs) that are unidirectional in their output (e.g., a tv remote control). The Sapphire uses 6 powerful and high output LEDs to disseminate infrared over 270-degrees. Of the 6 LEDs, one is located on each side of the Sapphire to send infrared signals to the sidewalls of the classroom which will ultimately reflect upward to the ceiling sensor. These side LEDs are critical in maintaining a wireless connection no matter where the teacher moves in the classroom.



The Sapphire transmitter/microphone system is the highest performing product of its type in the entire sound field industry and only weighs 1.4 ounces. The Lithium Ion battery pack is rechargeable through the bottom mounted micro USB connector.



Why does the Sapphire sound so “natural”?

To start, we borrowed a concept from the world of studio recording. Similar to the “rubber band” suspensions used to isolate noise from the studio microphone, our large rubber shock suspension “floats” the capsule and isolates it from much of the clothing and body rustle often associated with pendant or lapel microphones.

The major contributor to an extremely natural sounding microphone takes into effect the actual location of the microphone relative the talker’s mouth. The Sapphire sits in a location 90 degrees off axis from the human mouth. This results in a typical loss of high frequency information and a boost in low frequencies. It is an extremely critical balance of altering the frequency response to reproduce the voice in the same tonal response as listening directly in front of the unamplified talker. Selecting a capsule that achieves this with an extremely natural sound is where our decades of microphone experience has paid off.

The result is to send the voice signal through the sound system (overhead ceiling speakers) that reproduces the voice nearly identical to the talker’s natural voice. In a small environment such as a 30’x30’ classroom with a 10 ft. ceiling, the students will hear both the teacher’s unamplified and amplified voice. It would be extremely annoying to students if they were to hear 2 differing “versions” of the talker’s voice. It would be even more irritating to both the students and the teacher if the system incorporated lots of digital circuitry that produced latency (15 ms or more of delay) on the amplified version. This is why we have chosen to work with an analog signal path which has zero latency.