



Massachusetts Commission for the Deaf and Hard of Hearing

Assistive Listening Systems (ALS) Information

Questions about ALS

TABLE OF CONTENTS

1. What are Assistive Listening System(s) (ALS)? (#1.-what-are-assistive-listening-system(s)-(als)-?)
 2. Why not just use hearing aids or public address (PA) systems? (#2.-why-not-just-use-hearing-aids-or-public-address-(pa)-systems?-)
 3. Basically, how do ALS work? (#3.-basically,-how-do-als-work?-)
 4. What are some types of ALS? (#4.-what-are-some-types-of-als?-)
 5. What are the ALS components with each type of technology? (#5.-what-are-the-als-components-with-each-type-of-technology?-)
 6. What are some listening attachments? (#6.-what-are-some-listening-attachments?-)
 7. Where can I rent or buy an Assistive Listening System? (#7.-where-can-i-rent-or-buy-an-assistive-listening-system?-)
- Contact (#contact)

1. What are Assistive Listening System(s) (ALS)?

The term Assistive Listening Systems (ALS) is a generic description of several different technologies that essentially do the same thing: they are used to improve the reception of speech for people with hearing loss in situations when it might be difficult or impossible to hear otherwise. ALS can be used by people without hearing aids, with hearing aids and with cochlear implants. Generally speaking, ALS are especially beneficial for persons who have lost some of their hearing but are still able to understand speech if it is amplified and directed appropriately.

2. Why not just use hearing aids or public address (PA) systems?

Properly fitted hearing aids are often sufficient in optimal listening situations where the user is close to the speaker or sound source, and there is little or no background noise. In a setting where there is a great deal of background noise, the acoustics are difficult or the hearing aid user is at a considerable distance from the sound source, hearing aids become less effective because they amplify everything, not just what the hearing

aid user wants to hear. Thus, while the speaker's voice will be amplified, so will every other sound in the environment, making understanding of the intended source difficult.

Public address (PA) systems are also intended to amplify sound but, as anyone who has ever been in an airport or bus terminal knows, the quality of the sound can be very questionable at times. In some instances the amplification is so extreme that it causes distortion of speech. In other cases, the poor sound characteristics of a room (bare floors, bare walls, high ceilings, no sound absorbent materials) can contribute to reverberation and echoes that can virtually make speech unintelligible.

In effect, there are many situations in which both Hearing Aids and PA systems are not as effective as an ALS, which has the ability to provide targeted amplification of the desired sound source.

Signal to Noise Ratio

"Signal" is the technical term for the sound you want to hear, whether it is a speaker at the podium, a concert pianist onstage, or your dinner date across the table from you. "Noise" is the technical term for anything that you don't want to hear but which still intrudes into the reception of the "Signal". The aim of any amplification device is to provide you with the highest possible SNR (Signal to Noise Ratio), providing you with as much of what you want to hear. The drawback of both Hearing Aids and PA systems is that they do not, for the most part, effectively manage to screen out what you *don't* want to hear in complex listening environments with a high level of ambient background noise.

Some Hearing Aid manufacturers have attempted to increase the SNR in their instruments dramatically by utilizing digital sampling circuitry, which breaks down sound into its individual frequencies and boosts those which are considered to be "signal" while filtering out as much "noise" as possible. Other manufacturers have focused on the development of directional (zoom) microphones within their hearing aids, based on the premise that narrowing the angle of the sound pickup will result in less intrusion of extraneous sounds. While both methods work, opinions diverge among users as to how much of a benefit either of these technologies provides.

3. Basically, how do ALS work?

The premise of an ALS is quite simple: to provide the highest possible SNR, the desired sound must be picked up at the source and delivered directly to the listener's ear. This generally lessens the problems associated with high ambient noise, distance from the speaker, and room acoustics.

If a room or location already has an existing PA system, then the most effective way to utilize an ALS is to connect the ALS transmitter to the output of the existing PA system. By doing this, everything that is channeled into the PA system from however many microphones are being used is also channeled into the ALS transmitter, from where it is then brought to the listener's body-worn receiver, where the listener can individually control the volume without affecting anyone around them.

4. What are some types of ALS?

Infrared (IR), Frequency Modulation (FM), Amplitude Modulation (AM), Audio Induction Loop and hardwired ALS are available. Each one of these technologies has advantages and drawbacks, and successful use of a system will depend on making the correct decision on which system to use for your particular setting.

For example, IR systems are most commonly used in cinemas as infrared light does not penetrate walls and therefore does not cause interference with the soundtrack of a different movie being shown in the adjacent screening room. If one were to use an FM system in a similar situation, it would have to be a tunable FM system to ensure that the spillover from one system did not affect the other, since FM systems use radio frequencies that readily penetrates walls. Situations where confidential matters are being discussed are also best served by using IR to prevent unauthorized interception by anyone who might happen to be within range of the transmission and be on the same wavelength.

Since Audio Induction Loop Systems feature significant electromagnetic field "spillover", they are poor choices for conference settings with adjacent rooms, cinema multiplexes, and any situation in which there are other strong EMFs present. They are also poor choices for confidential settings since anyone with a Telecoil-equipped hearing aid could intercept the signal outside the room in which it is being used. Audio Induction Loops are used, primarily, in single - location/room applications where they can be permanently installed and provide both speaker and listener with a minimally intrusive ALS that requires less maintenance and involvement than any of the other systems.

5. What are the ALS components with each type of technology?

An Infrared ALS involves a microphone or patch cord feeding sound from the source into an infrared emitter. Emitters transmit sound via harmless infrared light. A receiver then picks up this infrared light, where it again becomes sound that can be amplified at will by the listener. The receivers feature headphone, neck loop, direct audio input or ear bud attachments to meet the individual needs of the listener.

Some emitters are very small, such as those used for listening to the television; others are quite large and require professional installation and/or custom supports. These are usually found in large area applications such as concert halls or auditoriums.

An FM ALS would use a similar microphone or patch cord, but the sound would be fed into an FM transmitter using radio waves to transmit the sound. Sound is picked up at the source in several different ways: a small lapel microphone connected to a belt-worn transmitter, a hand-held microphone/transmitter combination, or a hard-wired microphone leading to a base station unit with an antenna. The receivers have to be tuned to the same channel on which the transmitter is broadcasting in order to receive the signal. As with IR systems, receivers can be outfitted with a variety of listening attachments depending on the individual needs of the user.

An Audio Induction Loop ALS starts with a microphone or patch cord feeding sound from the source into an amplifier. The signal is then fed into a loop of wire that encircles the meeting room or a portion thereof, which must be designated as such. This wire, which may be permanently installed (above ceiling panels, under carpeting, behind baseboards), blankets the surrounding area with harmless EMFs. Listeners position themselves within or near the looped area so that the Telecoils in their hearing aids or their induction receivers pick up these EMFs optimally.

An AM ALS is similar to FM ALS. The microphone or patch cord feeds sound to an AM base station transmitter. This unit broadcasts the signal on a regular AM frequency. Any AM radio receiver tuned to the broadcast then picks up these AM frequencies. Often, listeners bring their own personal AM radio receiver and listening attachments. Relatively few AM systems are available due to FM's technical superiority.

Older Hardwired ALS are found, for example, in some houses of worship. They use a microphone or patch cord feeding sound into an amplifier. At their seats, listeners locate earphone jacks that are directly wired to the amplifier. These jacks may or may not have some type of volume control and perhaps offer a choice of earphones.

6. What are some listening attachments?

These include earphones, single and double ear buds, headphones, neck loops, silhouettes, transducer button assemblies (stetoclips), and special patch cords. They must be matched to the user's needs to work effectively.

Earphones, ear buds and headphones deliver sound directly to the ear but cannot generally be worn by persons using bilateral hearing aids.

The silhouette and neck loop electromagnetically couple to telecoil-equipped hearing aids.

The patch cords connect an ALS receiver to a cochlear implant processor or a hearing aid featuring direct audio input.

7. Where can I rent or buy an Assistive Listening System?

Please see the Assistive Listening Devices and Systems (ALDS) page for a complete listing.

Contact

Massachusetts Commission for the Deaf and Hard of Hearing Contact

Phone

Voice 617-740-1600 (tel:+16177401600)

TTY 617-740-1700 (tel:+16177401700)

Toll Free - Voice 800-882-1155 (tel:+18008821155)

Toll Free - TTY 800-530-7570 (tel:+18005307570)

Fax

FAX 617-740-1810

Address

600 Washington Street

Boston, MA 02111

[Directions](https://maps.google.com/?q=600+Washington+Street%2C+Boston%2C+MA+02111) (https://maps.google.com/?q=600+Washington+Street%2C+Boston%2C+MA+02111)