- If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.

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- Clear browser cache using these instructions
- Switch to another browser
- Use a hardwired Internet connection
- Restart your computer/device

Still having issues?

- Call 800-753-2160 (M-F, 8 AM-8 PM ET)
- Email customerservice@AudiologyOnline.com

T Coils and Hearing Loops: Important to Client Satisfaction

Juliëtte Sterkens, AuD
&
Karen MacLennan, AuD/TSHH

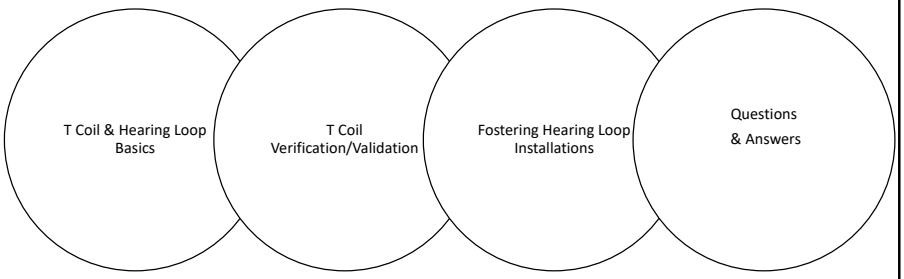
Learning Outcomes

After this course, participants will be able to:

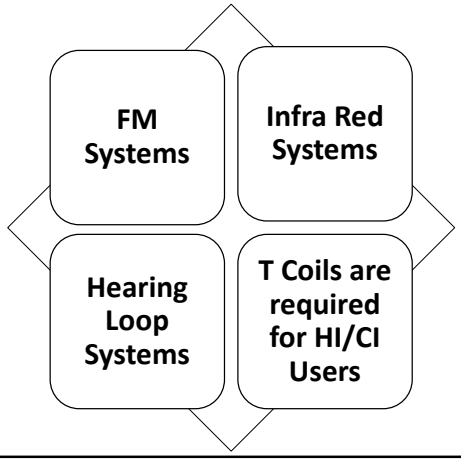
- Describe telecoil orientation in custom and behind the ear hearing instruments.
- List three telecoil programs, and when and where to use them.
- Explain one in-office and one out-of-office telecoil validation measure.

2

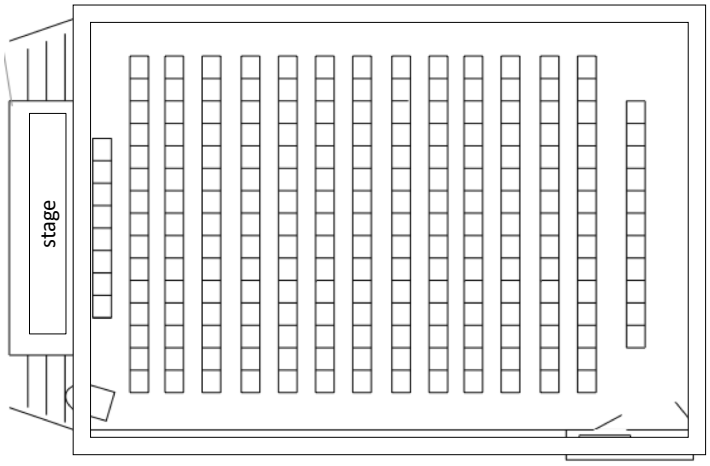
Session Outline



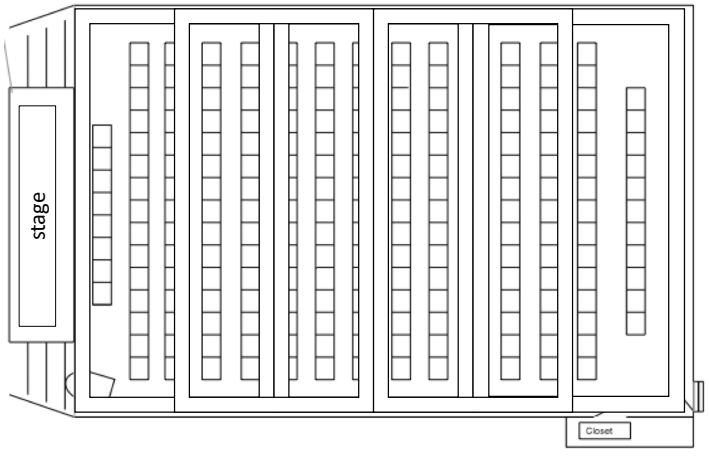
Hearing Assistance Technology (HAT) & T Coils



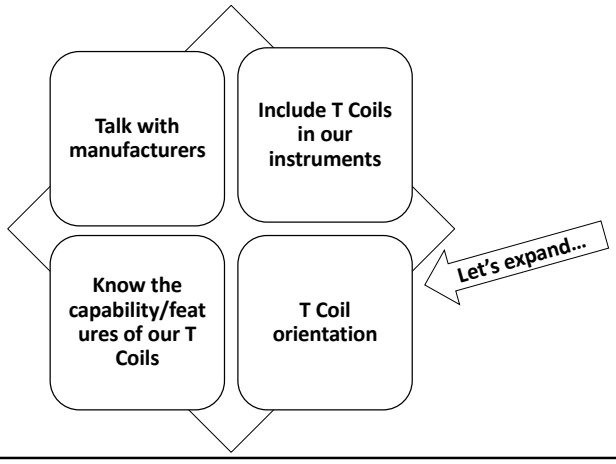
Hearing Loops: Perimeter Loop



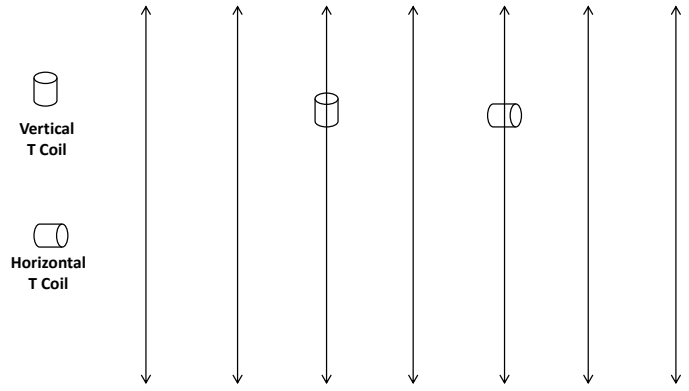
Hearing Loops: Phased Array



Specifying T Coils



T Coil Orientation in a Magnetic Field



The Importance of T-Coil Position in a Magnetic Field

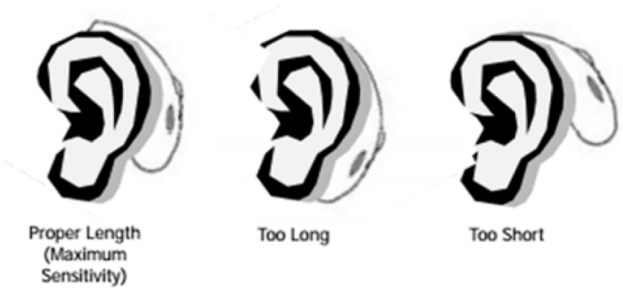


Image © C. Compton-Conley, PhD

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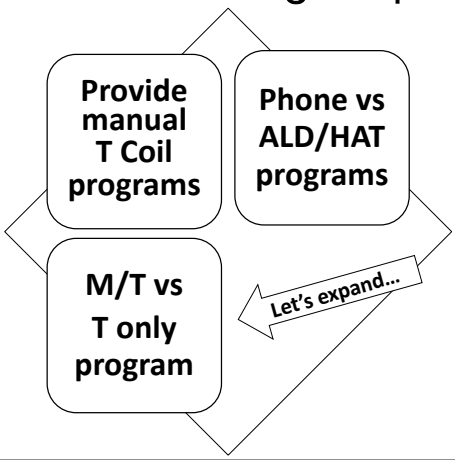
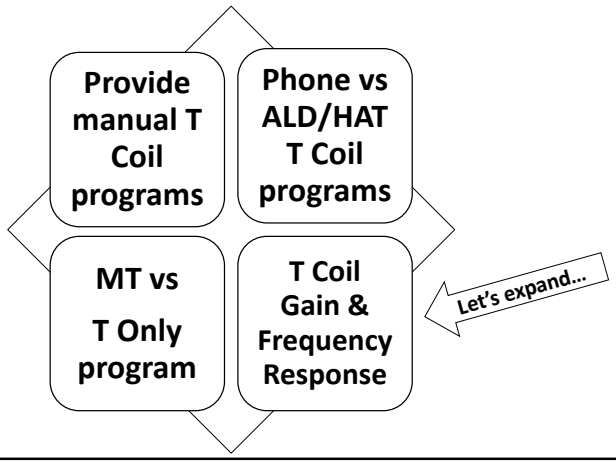
Programming T Coils For Use In a Hearing Loop



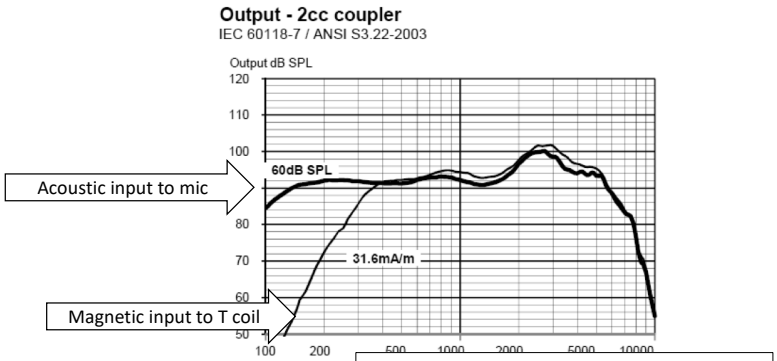
T-Coil Programming Tips

1. Open/RIC/RITE: consider manual T-coil *only* for loop program
2. Closed/Occluded Fittings: Consider manual M+T but take listening situation into account:
3. Considerations for HI/CI Users with FM & IR Receivers (Neckloops)
   - Amplified neckloops
   - Widening the neck loop
   - When a neckloop signal is just too low…..
   - explain clients have a right to a "reasonable accommodations" under the ADA

Programming T Coils For Use In a Hearing Loop

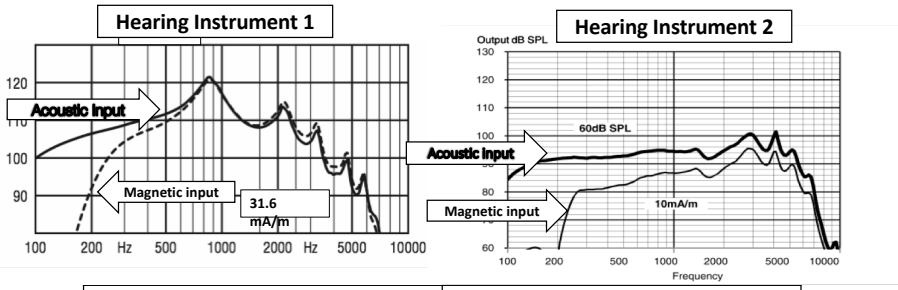


Comparing Mic & T Coil Gain/Frequency Using Spec Sheets



31.6 m/A (magnetic input) is the equivalent of 60dB (acoustic input)

Comparing Mic & T Coil Gain/Frequency Using Spec Sheets

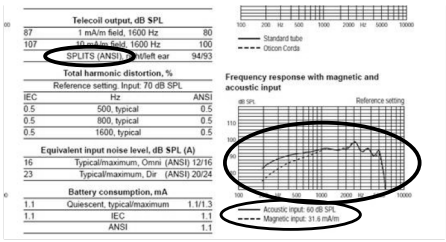


Acoustic Input		Equivalent Magnetic Input
65 dB SPL		56.2 mA/m
60 dB SPL	⇔	31.6 mA/m
50 dB SPL	⇔	10 mA/m

What is SPLITS?

Coupler SPL for an Inductive Telephone Simulator

The ANSI SPLITS test allows the MFR to orient the instrument for optimum output – this may mean holding the instrument sideways to obtain best results



Telecoil output, dB SPL		
87	1 mA/m field, 1600 Hz	80
107	10 mA/m field, 1600 Hz	100
	SPLITS (ANSI) right/left ear	94/93

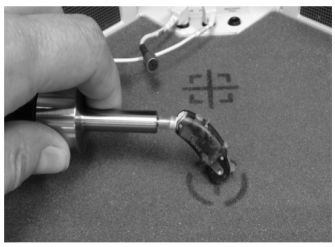
Total harmonic distortion, %		
Reference setting. Input: 70 dB SPL		
IEC	Hz	ANSI
0.5	500, typical	0.5
0.5	800, typical	0.5
0.5	1600, typical	0.5

Equivalent input noise level, dB SPL (A)		
16	Typical/maximum, Omni (ANSI)	12/16
23	Typical/maximum, Dir (ANSI)	20/24

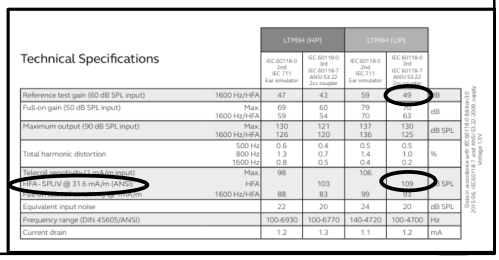
Battery consumption, mA		
1.1	Quiescent, typical/maximum	1.1/1.3
1.1	IEC	1.1
	ANSI	1.1

What is SPLIV?

SPLIV – Coupler SPL in Vertical Magnetic Field



The ANSI SPLIV test requires the instrument is oriented vertically (or as worn on the ear)

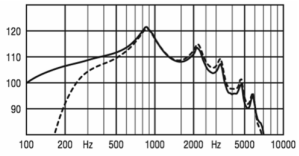


Technical Specifications		LTMiH (HP)		LTMiH (UP)		
		IEC 60118-0 2nd / IEC 711 Ear simulator	IEC 60118-0 3rd / IEC 60118-7 ANSI S3.22 2cc coupler	IEC 60118-0 2nd / IEC 711 Ear simulator	IEC 60118-0 3rd / IEC 60118-7 ANSI S3.22 2cc coupler	
Reference test gain (60 dB SPL input)	1600 Hz/HFA	47	43	59	49	dB
Full-on gain (50 dB SPL input)	Max.	69	60	79	74	dB
	1600 Hz/HFA	59	54	70	63	
Maximum output (90 dB SPL input)	Max	130	121	137	130	dB SPL
	1600 Hz/HFA	126	120	136	125	
Total harmonic distortion	500 Hz	0.6	0.4	0.5	0.5	%
	800 Hz	1.3	0.7	1.4	1.0	
	1600 Hz	0.8	0.5	0.4	0.2	
Telecoil sensitivity (1 mA/m input)	Max	98		106		dB SPL
HFA - SPLIV @ 31.6 mA/m (ANSI)	HFA		103		109	
HFA - SPLIV @ 10 mA/m	1600 Hz/HFA	88	83	99	93	
Equivalent input noise		22	20	24	20	dB SPL
Frequency range (DIN 45605/ANSI)		100-6930	100-6770	140-4720	100-4700	Hz
Current drain		1.2	1.3	1.1	1.2	mA

Determine if the HAs are capable of matching the Telecoil gain to the Mic gain

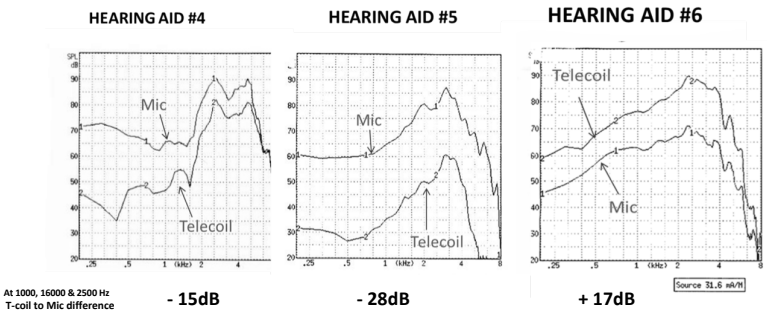
Look the ANSI Specs & compare to **Reference Test Gain (RTG)**

1. Do the SPLITS & RTG gain match?
2. **More important:** Do the SPLIV and the RTG match?
   (Ask MFR to provide in a format that makes comparing easy)
3. Note: If the T-coil is mounted vertically, or nearly so – (as is the case w/ most BTEs): *SPLITS* = *SPLIV* = *RTG*



However, ANSI Specs don't tell the whole story
Verification is needed

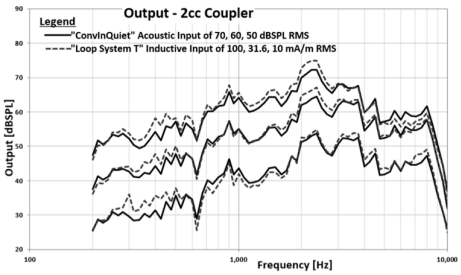
(Some hearing aids do *not* perform in T-coil mode from what you see on your fitting screen)



At 1000, 16000 & 2500 Hz T-coil to Mic difference

- 15dB **- 28dB** **+ 17dB**

Images used with permission
Ingrid McBride, AuD



Some MFRs match T-coil to mic responses very well
Query your suppliers
Insist on Mic vs. T-coil Transparency

HEARING AID #1 HEARING AID #2 HEARING AID #3

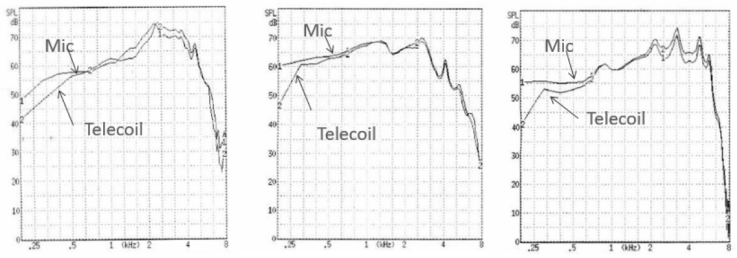


Image credits: Ingrid McBride, AuD & Scott MacIntosh (Unitron)

CONTINUED

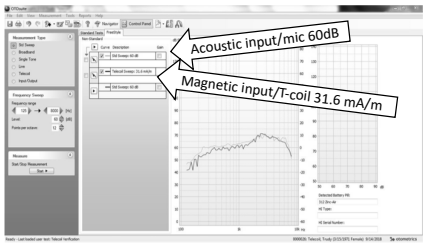
Oshkosh Convention Senior EXPO – Out of the Loop
– using the microphone on the iPhone

Oshkosh Convention Senior EXPO – in the Loop
– using the telecoil equipped LoopBuds

Verify Telecoil program
in a HIT box
once the fitting is *finalized*

CONTINUED

Verifying T Coils for hearing loop use



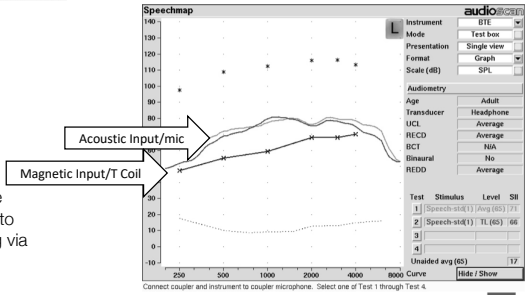
Telecoil verification with Aurical by Otometrics (in Freestyle mode)

Why match Mic to Telecoil?

Ledda K, Valente M, (in press – JAAA 2019)

Sentence and word recognition scores were improved when the t-coil was programmed to match the mic response than when listening via a t-coil set the manufacturer default setting

Telecoil verification with Verifit by AudioScan



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Telecoil Validation – is the T-coil setting right for your client?

- Call client at home and verify he/she is able to use telecoil function & hear adequately loud and clear enough
- Check telecoil setting in your calibrated waiting room loop
- Loop your receptionist's front-desk
- Install a floormat in reception area
- Refer clients to a local looped venue (or an ALS with neckloops)
- Refer clients to a local HLAA chapter Nearly all chapters utilize a hearing loop and offer CART where hearing aid users can try out their telecoil setting

Hearing Loop floor mat
Note: A microphone on your receptionist's desk is required

Waiting room TV Loop

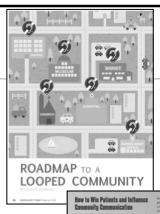
CONTINUED

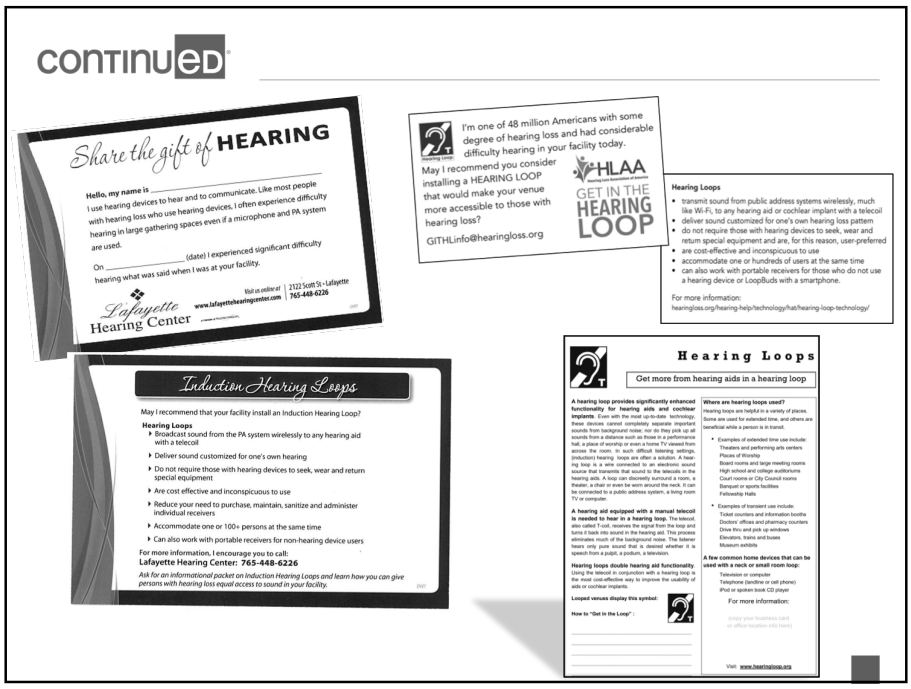
Hearing Loop vs. FM/IR system Logos

Roadmap to a Looped Community

Sterkens J, Audiology Today 26 (3): 26-31

- Familiarize yourself the IEC60118-4 Hearing Loop Standard
- Fit clients with “transparent” telecoils & verify the telecoil response in a HIT box – query HA MFRs
- Loop your waiting room to validate T-coil setting & demo
- Educate clients about rights under the ADA, the different Assistive Listening Systems & refer to local (looped) venues – see www.ALDLocator.com or www.LoopFinder.com
- Find/foster local installers – www.Hearingloop/vendors.htm
- Identify places clients would benefit from loops. Make one hearing loop happen – and build from there. Engage clients.
- Build loop awareness via community lectures (e.g. Rotary clubs) social media and post loop info on your website.
- Empower clients by providing handouts that promote self-advocacy (next slide)

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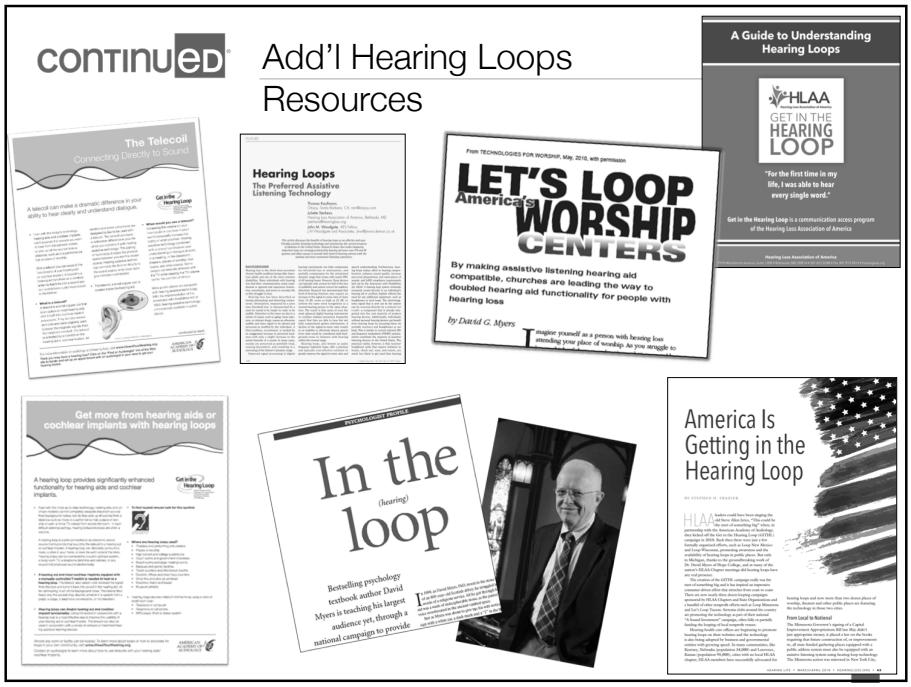
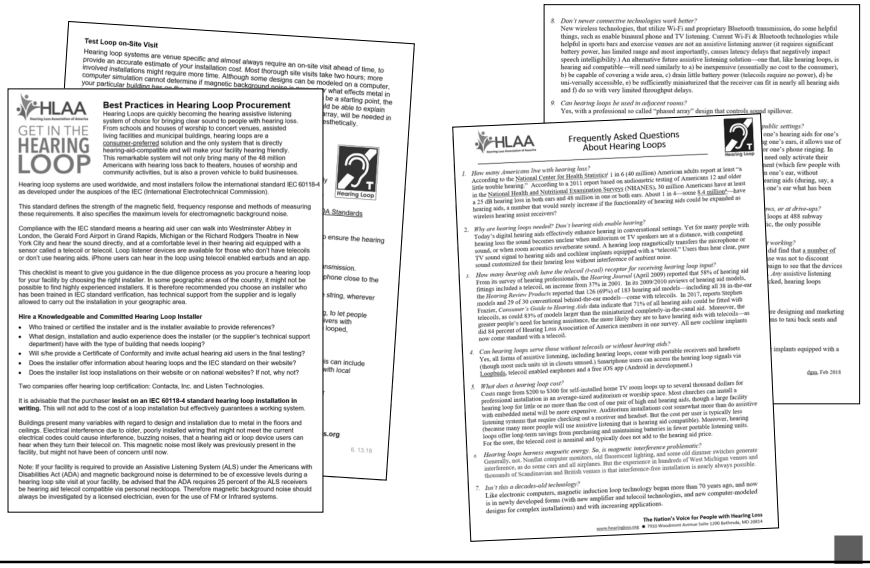
Share the gift of HEARING
Hello, my name is _____
I use hearing devices to hear and to communicate. Like most people with hearing loss who use hearing devices, I often experience difficulty hearing in large gathering spaces even if a microphone and PA system are used.
On _____ (date) I experienced significant difficulty hearing what was said when I was at your facility.
Lafayette Hearing Center
www.lafayettehearingcenter.com
Visit us online at
2722 Scott St - Lafayette
765-448-6226
I'm one of 48 million Americans with some degree of hearing loss and had considerable difficulty hearing in your facility today.
May I recommend you consider installing a HEARING LOOP that would make your venue more accessible to those with hearing loss?
GITHLinfo@hearingloss.org
HLAA
GET IN THE HEARING LOOP
Hearing Loops
transmit sound from public address systems wirelessly, much like Wi-Fi, to any hearing aid or cochlear implant with a telecoil
deliver sound customized for one's own hearing loss pattern
do not require those with hearing devices to seek, wear and return special equipment and are, for this reason, user-preferred
are cost-effective and inconspicuous to use
accommodate one or hundreds of users at the same time
can also work with portable receivers for those who do not use a hearing device or LoopBuds with a smartphone.
For more information:
hearingloss.org/hearing-help/technology/hat/hearing-loop-technology/
Induction Hearing Loops
May I recommend that your facility install an Induction Hearing Loop?
Hearing Loops
Broadcast sound from the PA system wirelessly to any hearing aid with a telecoil
Deliver sound customized for one's own hearing
Do not require those with hearing devices to seek, wear and return special equipment
Are cost effective and inconspicuous to use
Reduce your need to purchase, maintain, sanitize and administer individual receivers
Accommodate one or 100+ persons at the same time
Can also work with portable receivers for non-hearing device users
For more information, I encourage you to call:
Lafayette Hearing Center: 765-448-6226
Ask for an informational packet on Induction Hearing Loops and learn how you can give persons with hearing loss equal access to sound in your facility.
Hearing Loops
Get more from hearing aids in a hearing loop
A hearing loop provides significantly enhanced functionality for hearing aids and cochlear implants. Even with the most up-to-date technology, these devices cannot completely separate important sounds from background noise; nor do they pick up all sounds from a distance such as those in a performance hall, a place of worship or even a home TV viewed from across the room. In such difficult listening settings, (induction) hearing loops are often a solution. A hearing loop is a wire connected to an electronic sound source that transmits that sound to the telecoils in the hearing aids. A loop can discreetly surround a room, a theater, a chair or even be worn around the neck. It can be connected to a public address system, a living room TV or computer.
A hearing aid equipped with a manual telecoil is needed to hear in a hearing loop. The telecoil, also called T-coil, receives the signal from the loop and turns it back into sound in the hearing aid. This process eliminates much of the background noise. The listener hears only pure sound that is desired whether it is speech from a pulpit, a podium, a television.
Hearing loops double hearing aid functionality. Using the telecoil in conjunction with a hearing loop is the most cost-effective way to improve the usability of aids or cochlear implants.
Looped venues display this symbol:
How to "Get in the Loop" :
Where are hearing loops used?
Hearing loops are helpful in a variety of places. Some are used for extended time, and others are beneficial while a person is in transit.
Examples of extended time use include:
Theaters and performing arts centers
Places of Worship
Board rooms and large meeting rooms
High school and college auditoriums
Court rooms or City Council rooms
Banquet or sports facilities
Fellowship Halls
Examples of transient use include:
Ticket counters and information booths
Doctors' offices and pharmacy counters
Drive thru and pick up windows
Elevators, trains and buses
Museum exhibits
A few common home devices that can be used with a neck or small room loop:
Television or computer
Telephone (landline or cell phone)
iPod or spoken book CD player
For more information:
(copy your business card or office location info here)
Visit: www.hearingloop.org


CONTINUED
Add'l Hearing Loops Resources
A Guide to Understanding Hearing Loops
HLAA
GET IN THE HEARING LOOP
"For the first time in my life, I was able to hear every single word."
Get in the Hearing Loop is a communication access program of the Hearing Loss Association of America
The Telecoil
Connecting Directly to Sound
A telecoil can make a dramatic difference in your ability to hear clearly and understand dialogue.
Hearing Loops
The Preferred Assistive Listening Technology
From TECHNOLOGIES FOR WORSHIP, May, 2010, with permission
LET'S LOOP America's WORSHIP CENTERS
By making assistive listening hearing aid compatible, churches are leading the way to doubled hearing aid functionality for people with hearing loss
by David G. Myers
Get more from hearing aids or cochlear implants with hearing loops
A hearing loop provides significantly enhanced functionality for hearing aids and cochlear implants.
PSYCHOLOGIST PROFILE
In the (hearing) loop
Bestselling psychology textbook author David Myers is teaching his largest audience yet, through a national campaign to provide
America Is Getting in the Hearing Loop
From Local to National

Additional Resource Materials



Best Practices in Hearing Loop Procurement

Hearing Loops are quickly becoming the hearing assistive listening system of choice for bringing clear sound to people with hearing loss. From schools and houses of worship to concert venues, assisted living facilities and municipal buildings, hearing loops are a consumer-preferred solution and the only system that is directly hearing-aid-compatible and will make your facility hearing friendly. This remarkable system will not only bring many of the 48 million Americans with hearing loss back to theaters, houses of worship and community activities, but is also a proven vehicle to build businesses.

Hearing loop systems are used worldwide, and most installers follow the international standard IEC 60118-4 as developed under the auspices of the IEC (International Electrotechnical Commission).

This standard defines the strength of the magnetic field, frequency response and methods of measuring these requirements. It also specifies the maximum levels for electromagnetic background noise.

Compliance with the IEC standard means a hearing aid user can walk into Westminster Abbey in London, the Gerald Ford Airport in Grand Rapids, Michigan or the Richard Rodgers Theatre in New York City and hear the sound directly, and at a comfortable level in their hearing aid equipped with a sensor called a telecoil or telecoil. Loop listener devices are available for those who don't have telecoils or don't use hearing aids. iPhone users can hear in the loop using telecoil enabled earbuds and an app.

This checklist is meant to give you guidance in the due diligence process as you procure a hearing loop for your facility by choosing the right installer. In some geographic areas of the country, it might not be possible to find highly experienced installers. It is therefore recommended you choose an installer who has been trained in IEC standard verification, has technical support from the supplier and is legally allowed to carry out the installation in your geographic area.

Hire a Knowledgeable and Committed Hearing Loop Installer

- Who trained or certified the installer and is the installer available to provide references?
- What design, installation and audio experience does the installer (or the supplier's technical support department) have with the type of building that needs looping?
- Will s/he provide a Certificate of Conformity and invite actual hearing aid users in the final testing?
- Does the installer offer information about hearing loops and the IEC standard on their website?
- Does the installer list loop installations on their website or on national websites? If not, why not?

Two companies offer hearing loop certification: Contacta, Inc. and Listen Technologies.

It is advisable that the purchaser **insist on an IEC 60118-4 standard hearing loop installation in writing.** This will not add to the cost of a loop installation but effectively guarantees a working system.

Buildings present many variables with regard to design and installation due to metal in the floors and ceilings. Electrical interference due to older, poorly installed wiring that might not meet the current electrical codes could cause interference, buzzing noises, that a hearing aid or loop device users can hear when they turn their telecoil on. This magnetic noise most likely was previously present in the facility, but might not have been of concern until now.

Note: If your facility is required to provide an Assistive Listening System (ALS) under the Americans with Disabilities Act (ADA) and magnetic background noise is determined to be of excessive levels during a hearing loop site visit at your facility, be advised that the ADA requires 25 percent of the ALS receivers be hearing aid telecoil compatible via personal neckloops. Therefore magnetic background noise should always be investigated by a licensed electrician, even for the use of FM or Infrared systems.

Frequently Asked Questions About Hearing Loops

1. *How many Americans live with hearing loss?*
According to the National Center for Health Statistics' 1 in 6 (40 million) American adults report at least "a little trouble hearing." According to a 2011 report based on audiometric testing of Americans 12 and older in the National Health and Nutritional Examination Surveys (NHANES), 10 million Americans have at least a 25 dB hearing loss in both ears and 48 million in one or both ears. About 1 in 4—some 8.4 million*—have hearing aids, a number that would surely increase if the functionality of hearing aids could be expanded as wireless hearing assist receivers?

2. *Why are hearing loops needed? Don't hearing aids enable hearing?*
Today's digital hearing aids effectively enhance hearing in conversational settings. Yet for many people with hearing loss the sound becomes unclear when auditoriums or TV speakers are at a distance, with competing sound, or when room acoustics reverberate sound. A hearing loop magnetically transfers the microphone or TV sound signal to hearing aids and cochlear implants equipped with a "telecoil." Users thus hear clear, pure sound customized for their hearing loss without interference of ambient noise.

3. *How many hearing aids have the telecoil (t-coil) receptor for receiving hearing loop input?*
From its survey of hearing professionals, the *Hearing Journal* (April 2009) reported that 58% of hearing aid fittings included a telecoil, an increase from 37% in 2001. In its 2009/2010 reviews of hearing aid models, the *Hearing Review Products* reported that 126 (69%) of 183 hearing aid models—including 41 16 in-the-ear models and 29 of 30 conventional behind-the-ear models—come with telecoils. In 2017, reports Stephen Fraser, *Consumer's Guide to Hearing Aids* data indicate that 71% of all hearing aids could be fitted with telecoils, as could 83% of models larger than the miniaturized completely-in-the-canal aid. Moreover, the greater people's need for hearing assistance, the more likely they are to have hearing aids with telecoils—as did 84 percent of Hearing Loss Association of America members in one survey. All new cochlear implants now come standard with a telecoil.

4. *Can hearing loops serve those without telecoils or without hearing aids?*
Yes, all forms of assistive listening, including hearing loops, come with portable receivers and headsets (though most such units sit in closets unused.) Smartphone users can access the hearing loop signals via Loopbuds, telecoil enabled earphones and a free iOS app (Android in development.)

5. *What does a hearing loop cost?*
Costs range from $200 to $300 for self-installed home TV room loops up to several thousand dollars for professional installation in an average-sized auditorium or worship space. Most churches can install a hearing loop for little or no more than the cost of one pair of high end hearing aids, though a large facility with embedded metal will be more expensive. Auditorium installations cost somewhat more than do assistive listening systems that require checking out a receiver and headset. But the cost per user is typically less (because many more people will use assistive listening that is hearing aid compatible). Moreover, hearing loops offer long-term savings from purchasing and maintaining batteries in fewer portable listening units. For the user, the telecoil cost is nominal and typically does not add to the hearing aid price.

6. *Hearing loops harness magnetic energy. So, is magnetic interference problematic?*
Generally, not. Needier computer monitors, old fluorescent lighting, and some old dimmer switches generate interference, so do some cars and all airplanes. But the experience in hundreds of West Michigan venues and thousands of Scandinavian and British venues is that interference-free installation is nearly always possible.

7. *Isn't this a decades-old technology?*
Like electronic computers, magnetic induction loop technology began more than 70 years ago, and now is in newly developed forms (with new amplifier and telecoil technologies, and new computer-modeled designs for complex installations) and with increasing applications.

The Nation's Voice for People with Hearing Loss
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Thank You for Your attention

Questions?

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Useful websites:
www.HearingLoop.org
www.LoopWisconsin.com
www.hearingloss.org/programs-events/get-hearing-loop/

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