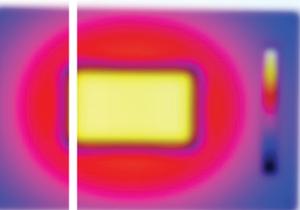


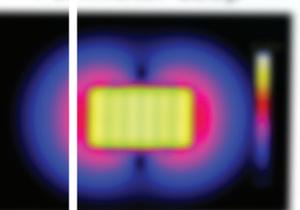
Principles – Loop Layouts



Perimeter Loop



Cancellation Loop



Low Loss MultiLoop™



Low Spill MultiLoop™

Hearing loop solutions

and best practice guide

AMPETRONIC®

Listen to the difference

Hearing loop solutions

A hearing loop, also known as an induction loop or T-Loop, is an assistive listening system that provides access to facilities for those with a hearing impairment. It takes a sound source and transfers it directly to a hearing aid without background noise, interference or acoustic distortion.

Selecting a loop solution, that will adequately meet the needs of a hearing aid user, can be easily determined by asking just a few simple questions:

What type of hearing solution is required?

An **area coverage solution**, such as a hall, theatre or meeting room, or a **service point solution** (see overleaf), such as a retail counter or reception desk?



For area coverage:

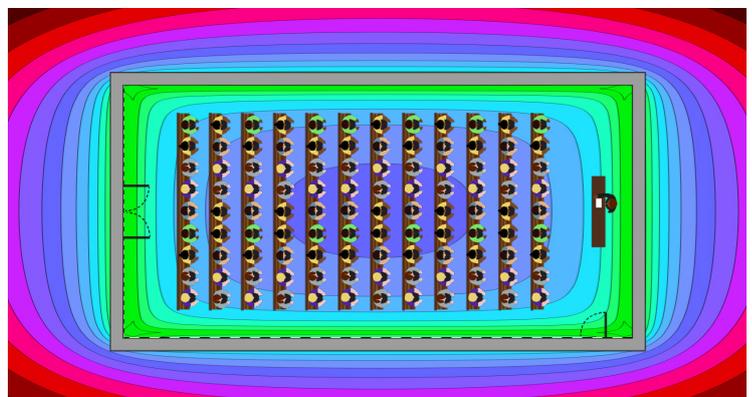
To determine which system would provide a user with the greatest level of access and intelligibility, the following information is needed:

What are the dimensions of the area to be covered?

The dimensions of an area directly affect the power required to drive a hearing loop effectively and ensure consistent coverage.

What is the construction of the floor in the area to be covered?

Metal in a floor or ceiling structure, including structural reinforcement or raised access floors and suspended ceiling grids, can cause excessive variation in signal levels across the room, if not corrected with a MultiLoop™ system. See the effects of metal in the illustration (right).



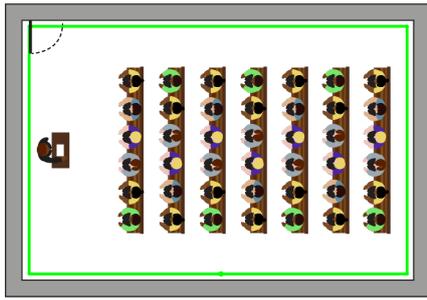
Potential effects of metal construction on signal levels, in a larger room with an incorrectly specified perimeter loop system

Is the loop to be fitted to a room where there are issues with adjacency or privacy?

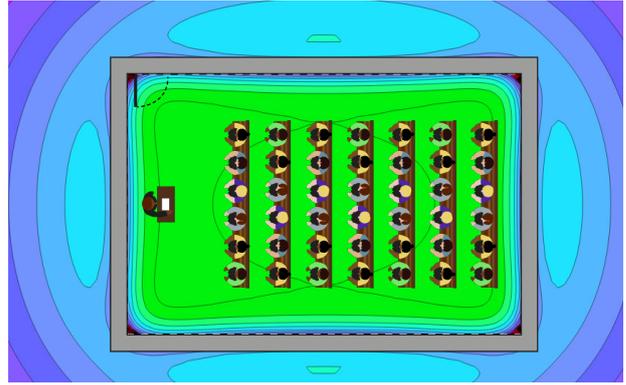
Signal from a perimeter loop will overspill beyond the borders of the intended coverage area. This can cause problems for people using hearing loops in adjacent areas, or in areas where privacy is desired. Ampetronic MultiLoop™ systems minimise the effects of overspill between areas.

Typically, MultiLoop™ systems are installed across a floor and, as such, will require access beneath the floor covering. If access is not available, due to building restrictions or expensive floor coverings, an Ampetronic Infra-red system may meet your requirements. Please contact us for expert advice on selecting the most appropriate solution.

Perimeter loops



Small room with no metal in floor structure or privacy requirement

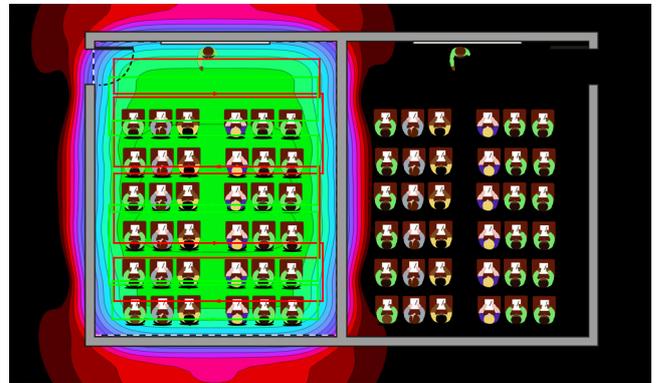


Perimeter loop field illustration, including overspill

MultiLoops™



Larger room with metal in floor structure and a requirement to prevent overspill.



MultiLoop™ field illustration

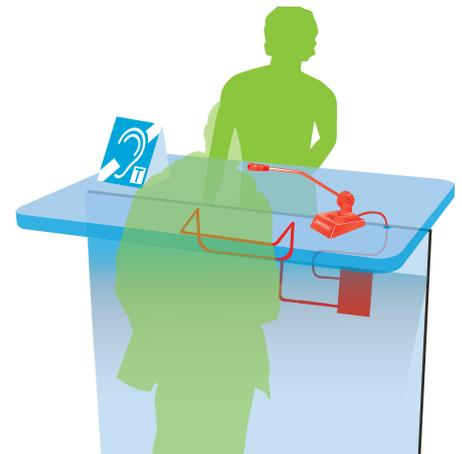
Recommended area coverage solutions:

Room dimensions	Floor construction	Adjacency and privacy	Recommended solution	Recommended loop drivers
Less than 4m across shortest dimension	<i>or</i> floor has no metal in structure	<i>and</i> no requirement	Ampetronic Perimeter loop	C5-1 C7-1 D10-1 CLS series
Greater than 4m across shortest dimension	<i>and</i> floor has metal in structure	<i>and/ or</i> risk of overspill	Ampetronic MultiLoop™	C5-2 C7-2 D7-2 D10-2 D14-2

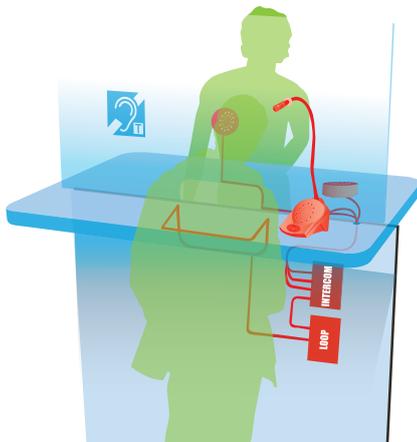
For service points and intercoms:

Dealing with background noise when faced with a busy reception desk, ticket office or audiovisual interactive display can be a challenge for a person with hearing loss. Distance from a receptionist can also cause frustration.

When combined with a preformed loop and microphone, **Ampetronic™ CLD1** service point amplifiers provide a person with hearing loss clear, intelligible sound direct to their hearing aid.



Ampetronic™ CLD1 service point amplifier



Ampetronic™ CLD1 and TalkPerfect

A security screen may also be present, which itself can interfere with communications. Intercoms, also known as speech transfer systems have microphones and speakers at each side of a screen, connected to a duplex amplifier. Such systems can resolve issues of background noise and those caused by a security screen.

Ampetronic™ TalkPerfect offers effective communication through physical barriers, supporting privacy and security in a robust and easy to use system.



Ampetronic™ HLS-2C Active Loop Panel

Intercom systems are now commonplace in a wide variety of entry, information, and service points. For those using a hearing aid, communicating with assistance staff can be made easier by discreetly linking directly to the intercom or help point, via a loop function on their hearing aid.

Service point and speech transfer

Service Points	CLD1 CLD1-AC
Speech Transfer System	TalkPerfect
Door intercoms	HLS-2C Active loop panel

For more information on service points, speech transfer systems and intercoms please call our engineers on +44 (0)1636 610062 or email sales@ampetronic.com

System design support and training:

Ampetronic™ can provide installation design drawings in collaboration with our experts, or by utilising our design creation software support. Such designs give you a fully working and regulation compliant solution, for any loop installation you may be involved with.

Alternatively, if you would like to design, test, and commission your own loop projects, then contact us to access Loopworks Design cloud based software, the world's most powerful suite of collaboration, design, and measurement software tools.



Ampetronic™ continued professional development (CPD) training services, are designed to provide technical and general awareness for end-users, clients, and consultants. CPD is also available for professional installers and system integrators.

We provide full day, in-house, training courses, covering all aspects of hearing loop systems, aimed at audiovisual professionals, specifiers, and contractors. Free educational CPD seminars are also available, for general awareness and sales team training, which can take place at a venue of your choice, or be viewed as a webinar.

Training videos and product demonstrations can be viewed online at the Ampetronic™ YouTube Channel <https://www.youtube.com/user/AmpetronicLoops>

For details of our free one hour 'Equality of access to audio for people with hearing loss' seminar and webinars or of our full day classroom based course 'Practical installer training day', please contact our office.



Ampetronic™ Loopworks™ complete productivity suite enables cost effective, dependable, and compliant system development, testing, and expedited issue resolution.

Loopworks™ offers:

- instant access to your project information
- a library of the most credible loop information
- reliable, expert support, whenever and wherever you need it.

Loopworks™ productivity suite allows you to:

Learn from the latest information, developments and support from the worlds' most credible information sources.

Connect instantly to detailed project information, in the office or the field.

Measure the performance of systems against relevant standards.

Design loops using our powerful cloud-based software tool, for expedited, credible and standard-compliant system specification and design

Why hearing loops?

Every day millions of hearing aid users utilise assistive listening devices to access equal auditory information within airports, lecture halls, theatres, points of sales and anywhere they are required to access audio services.

Despite digital advancements modern hearing aids are still primarily designed for 1 to 1 communications over short distances. This makes separating environmental background noise in busy environments from the sound that the user wishes to hear difficult or impossible. Any distance to the sound source, such as a person speaking, exacerbates the problem.

To enable people with hearing loss to have an equivalent experience, it is essential that they are provided with equal access to the same information and communication as anybody else. For example, arrival and departure broadcasts or points of sale areas need to provide assistance for those people who experience hearing loss.

Statistics from around the world reveal that approximately 16% of the population experience some form of hearing

loss, and that around 1 in 4 of those people will use hearing aids. This significant section of our society is protected by anti-discrimination legislation, requiring service providers to make reasonable adjustments to cater for people using 'assistive listening' technology. The strength of the legislation and its enforcement varies from country to country.

Hearing loops function by connecting directly to the users own receiver, their hearing aid; making them the only suitable assistive listening technology that is transient and doesn't require the handing out of special receivers.

Facility operators can find themselves in an actionable position if there is no service provision that is of a genuine benefit to those with hearing loss. The measurable performance of a hearing loop is defined in the IEC 60118-4 Standard, so it is imperative that a well-designed and fully functional system is installed.

Hearing loop system - key requirements

1. Increases signal to noise ratio

The system must greatly improve upon the signal to noise ratio that can be achieved with a standard hearing aid or cochlear implant that is not connected to a hearing loop. Examine the input source(s) and select an amplifier and adaptors to suite.

- If using microphone(s) as an audio source the microphone type and placement is crucial
- Do not use omnidirectional microphones (especially in ceiling tiles) for area coverage applications, as it will generally only achieve as good an effect as the microphone in the user's hearing aid, if not worse.

2. Provides suitable coverage for the application

As much of the available space as possible should always be looped. Providing a small looped area for hearing aid users is not acceptable as this is likely to separate users from their friends and family, which is discriminatory.

The loop itself must encompass all possible listening positions. Signal overspill outside the loop cannot be considered as coverage.

Determine what the use, or uses, of the space in which a proposed installation will be.

- If the space contains fixed seating the listening height will be approximately 1.2 meters, the systems loop design and amplifier power requirement must accommodate this.
- If the people using the loop system are free to stand and move around in the space then the listening height will be approximately 1.7 meters. This scenario also precludes the use of single array loop designs (figure of 8 etc.) which leave 'dead spots'.
- If the area contains a staged entertainment area where microphones and electrical instruments will be used then a cancellation loop or low spill Multi Loop phased array loop design is required to prevent the signal interacting with on-stage equipment.

3. Is not susceptible to interference from background noise

Magnetic background noise can be created by a number of things, such as large plant equipment, mains wiring distribution or local substations.

- Check how much electromagnetic noise is experienced in the looped area using a suitable meter. Should be less than or equal to -32dB (A-weighted) re. 400mA/m.
- Where possible, noise should be addressed at its source, such as fixing faulty wiring.

4. Generates the correct field strength

A hearing loop system functions by producing an alternating magnetic field at audio frequencies which provides an input signal for hearing aids operating with a telecoil. If the field strength is too low then intelligibility and signal to noise ratio are compromised, if the field strength is too high then the hearing aid may be overloaded.

- Field strength at the listening plane (ear height) should be 0dB (400mA/m) with a 1kHz sine wave, measured on a calibrated field strength meter.

5. Provides an even field strength

A hearing loop system should provide a constant field strength throughout the listening area so the signal doesn't vary greatly as the users of the system move around.

- Field strength must remain within a tolerance of ± 3 dB over the entire listening area or ± 6 dB for small volume systems such as counters or help points.

6. Provides a flat frequency response

Hearing loop systems can be used to transmit music, the human voice or both. Human speech produces specific frequencies to form words. It is essential that the system is capable of replicating these frequencies accurately to maintain the intelligibility of the audio broadcast to the users of the system.

- Frequency response of 100Hz – 5kHz ± 3 dB ref. level @ 1kHz must be maintained across coverage area.
- Ensure that the specified amplifier is capable of generating sufficient power and voltage headroom.
- Frequency response can be affected by metal structures on site, so must be tested with a calibrated field strength meter, and adjusted if necessary using metal loss correction (MLC).

7. Displays clear signage, no user request necessary

Induction loops are designed to be invisible. Nobody will use the system if they don't know it is there. Hearing loops are popular with users because they are a dignified solution that doesn't require them to identify themselves, if they have to ask if a hearing loop is present this advantage is lost.

- Signage should be provided at each entry point to the looped space and at least one clearly visible sign should be within it.
- The signage must clearly indicate the area where the loop can be used, if it doesn't cover the whole room.

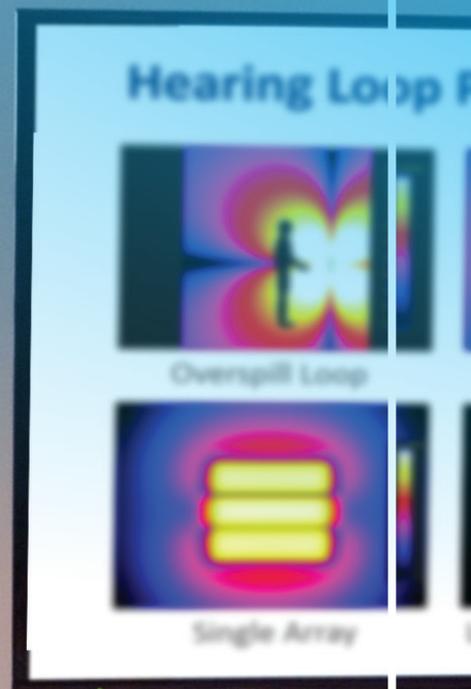
8. Can be operated and maintained by venue staff

When installing a hearing loop it is not enough to simply make sure that it is working. Staff at the venue must be trained to use systems and help customers. Although a loop system should be a fit-and-forget feature they are susceptible to 'janitorial adjustments' by untrained parties. They must therefore be regularly checked.

- A loop receiver with basic field strength indication must be provided with each loop system and staff must be shown how to use it, how often to check the system and how to make basic fixes.

For more information on hearing loops and assistive listening call **+44 (0)1636 610062** or visit **www.ampetronic.com**





Providing a genuine benefit.

To find out what we can bring to your assistive listening project, talk it through with our expert team on:

+44 (0) 1636 610062

or email us at sales@ampetronic.com

All contents, photographs and illustrations Copyright © Ampetronic 2017-2020

AMPETRONIC®

Listen to the difference

Unit 2, Trentside
Business Village,
Farndon Road, Newark,
NG24 4XB
United Kingdom

www.ampetronic.com