

Generic Assistive Listening US Specification

Hearing Loop Systems

UP60007-12 US

This document is a generic specification for any Hearing Loop System.
The text may be used in part or in full for any purpose.

While the text aims to be generic, you will need to modify sections to be specific to your application:

- The introduction should state your requirements for loop locations and areas

You may also have specific requirements to add or modify in the following areas:

- Section 1.4: add any specific Audio Inputs that are needed
- Section 1.6 : add any specific Installation requirements
- Section 1.8 : add any specific requirements for post installation maintenance or training of operating staff

Any text in orange is suggested or example requirements and should be amended or deleted as appropriate.

If you have any questions regarding the specification of hearing loop systems, please contact:

Ampetronic Ltd.
support@ampetronic.com
+44 (0) 1636 610062

1. Hearing Loop Systems (HLS)

Permanently installed Hearing Loop Systems (HLS) should be provided at the following locations and areas, or as shown on relevant small electrical drawings or room data sheets:

- L0.01 Reception Counter (amend as appropriate)
- L0.02 Meeting Room (amend as appropriate)
- L1.03 Auditorium (amend as appropriate)

1.1 Compliance

The systems or components thereof shall comply with the latest versions of:

- IEC 60118-4
- IEC 62489-1
- 2010 Americans with Disabilities Act (Section 706)
- 2018 International Building Code (Section 1108.2.7)

1.2 System design

HLS systems should be specified and designed by an experienced specialist to take account of the effect of building structure and overspill where applicable.

Where there is metal construction in use and the room is over 4m wide a single loop of wire around the perimeter of the space may not be appropriate and a MultiLoop system design may be required. A HLS specialist should be consulted if there is a concern about construction-related signal losses.

Simple perimeter loops are not acceptable in cases where there are multiple adjacent spaces with HLS installed, and a low spill MultiLoop system design should be used instead.

The Contractor shall, at the earliest opportunity in the project:

- Show that cross-talk between adjacent looped areas (whether part of this contract or not), and that magnetic spill from any HLS where the signal is defined as 'confidential' will, by design, be less than -40dB with normal signal levels.
- Provide evidence that the field strength of the proposed systems will meet the requirements of IEC 60118-4, whilst taking account of any metal within the building structure. Where necessary, the effect of metal shall be assessed by site survey and test using trial loops on relevant construction, carried out by a competent test specialist.
- If the above assessments prove that a hearing loop system may not be suitable the Contractor may suggest alternative assistive listening technologies such as infrared, this must be approved by the client before proceeding.

1.3 HLS loops

Loops connected to the hearing loop system shall meet the following requirements:

- Loop wire containment shall be of non-metallic construction, or must not create any closed circuits and only earthed in one position. This restriction does not apply to the loop feed wiring between a loop amplifier and the start of the loop itself.
- Where flat copper tape is accepted for use under carpet or other floor coverings, this does not require the use of containment and shall be installed according to the manufacturer's recommendations and current best practice.
- All cabling should be concealed within the fabric of the building, unless specified otherwise.

1.4 Audio inputs

Audio inputs should be defined by the use of the room and the requirements of the listeners. The audio provided to the HLS must always provide an improvement in signal to noise ratio over the acoustic sound within the room.

The Contractor is required to:

- Provide dedicated microphones and associated audio equipment for the HLS
- Co-ordinate with the AV contractor to obtain a line level feed from the AV system
- Provide a line level connection from the sound reinforcement system to the HLS
- Provide suitable input plates for connection into the HLS
- Take a 100V line feed from the PA system
- Interface the hearing loop amplifiers with the Dante/AES67 network

Where a sound reinforcement system is installed, a line level feed from this to the hearing loop should be used where appropriate. This feed should not vary in level with loudspeaker volume adjustment. In some cases this can be the only input, however dedicated HLS microphones may also be required.

Where microphones are being provided for the HLS they must be as close as possible to the talking position. Directional types are often most effective. In larger rooms with multiple talking positions more than one microphone is usually required, this may mean additional preamps, mixers or auto-mixing / gating facilities are needed.

A single boundary microphone mounted on the ceiling is unlikely to provide sufficient rejection of background acoustic noise in most rooms and should not be used unless it can be demonstrated that the system delivers tangible benefit to the hard of hearing.

Input levels shall not be adjustable at the signal source or connection point.

1.5 HLS drivers

Each HLS must use a dedicated hearing loop driver meeting the following general requirements plus those specific to a type A or type B driver as defined below.

- True 'current drive' output
- Frequency response from 80Hz to 6.5kHz
- Automatic gain control (AGC) optimised for speech with a dynamic range greater than 36dB
- Front panel indication of audio signal activity on the input and output of the unit

1.5.1 Type A: Area coverage loop driver

Where the horizontal loop area that must be covered is in excess of 7ft x 7ft for either a one-phase or two-phase (MultiLoop) system, each hearing loop driver shall have the following characteristics:

- Rated current and voltage capable of driving the designed loop without clipping or distortion of the signal with full power bandwidth up to at least 1.6kHz
- Capable of delivering a 1kHz sinewave at the rated current and voltage into a load for at least 20 seconds continuously without damage to the unit or interruption of the output signal.
- 2x balanced mic/line switchable inputs and 1x 100V line input shall be available. Microphone inputs shall have a minimum of 24V switchable phantom power. All analogue audio inputs shall be phoenix block connectors.
- A balanced, line level output on phoenix block connector.
- Input prioritisation available to mic/line and 100V line inputs.
- Constant status monitoring available via switched DC, NC relay or SNMP.

- Facility to attach the driver to a local area network providing remote monitoring and control. Access to the driver via local network shall require authentication.
- Support third party control via Telnet with authentication and the ability to be disabled if not required.
- Switchable 250Hz low-cut filters on microphone inputs.
- Dual-slope metal loss frequency correction filters with adjustable gain slope ranges of at least 0dB to +4dB per octave and an adjustable knee frequency.
- Class D amplifier design with automatic sleep mode.
- Height no greater than 45mm (1U of standard 19" rack space per unit).
- Power supply and transformer shall be integrated into the unit.
- Where a MultiLoop system is required, a single 1U driver shall be provided that is capable of driving two separate outputs with a 90° phase shift accurate to $\pm 1^\circ$ from 100Hz to 5kHz.
- Provide at least 5A_{RMS} and 20V_{RMS} per loop output, or 10A_{RMS} and 33.9V_{RMS} per output in case of floors with steel deck construction or raised metal tiles.
- In built test signals suitable for commissioning to the requirements of IEC 60118-4
- All drivers shall come from the same range with common controls and connections.

1.5.2 Type B: Counter / local area loop driver

Where the loop system is to assist a single end user in a defined location such as a retail counter or information point, each hearing loop driver shall have the following characteristics:

- Current capability of at least 2.2A_{RMS} with 1KHz sine signal
- Voltage output of no less than 4.5V peak at maximum current.

Ampetronic Ltd, Unit 2, Trentside Business Village, Farndon Road, Newark, Nottinghamshire, NG24 4XB, UK.
Registered Company number 02095350

Website: www.ampetronic.com Email: support@ampetronic.com
Telephone: +44 (0)1636 610062



- 2 inputs: 1 microphone input and 1 input switchable between microphone or line
- Metal loss correction with an adjustable gain slope range of at least 0dB to +3dB per octave
- Panel / wall mounting capability (using screws or other appropriate and reliable fixing)

1.6 Installation

If the proposed contractor is not experienced with hearing loop or audio systems to the level required in order to competently install and commission these systems, then some or all of the work should be sub-contracted to a specialist with the necessary experience.

The contractor shall:

- Co-ordinate with other relevant contactors to ensure that all appropriate audio signals are connected to the hearing loop system and transmitted clearly.
- Wire and connect to all items of equipment in accordance with the manufacturer's recommendations.
- Ensure complete segregation of the HLS from any other ELV or LV wiring system.
- Follow good practice to ensure that system design does not cause potential ground loops.
- All wiring between loops and equipment locations shall be installed in appropriate containment.
- All wiring, including that inside equipment enclosures or racks, will be of a neat and tidy appearance. Wiring shall be identified at both ends of each cable.
- Following installation the resistance of each loop circuit and isolation from electrical ground shall be tested and recorded. The Client shall have the opportunity to witness these tests.

1.7 Commissioning

All commissioning must be carried out using a true RMS, dedicated hearing loop field strength meter meeting the requirements of IEC 60118-4, with a valid calibration certificate available.

Each complete system must be commissioned in accordance with IEC 60118-4 and a certificate of conformity clearly stating test results and performance against this standard must be issued for each HLS. The Client shall have the opportunity to witness these tests.

1.8 Training and maintenance

All systems, methods of use and routine maintenance checks must be demonstrated to the end user.

For each loop location a loop receiver shall be provided for operational staff to check and monitor the performance of the HLS system. The receiver shall have a headphone output, low cut filter and field strength indicators as required by IEC 60118-4.

Training shall be provided that enables operational staff to understand the proper use of the HLS and how to ensure that people can make use of the system effectively.

Operation and Maintenance manuals shall be provided which include 'as fitted' drawings, data sheets and instruction manuals for all items of hardware and operational instructions for the use and testing of all systems.