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BY EDIN

Barrier-free traveling

Safety and comfort for hearing impaired passengers



Creating accessibility for people with hearing loss

Trains, trams and subways are increasing all over the world. As urban areas grow, more people rely on swift, secure and comfortable personal transportation every day.

The awareness among train builders, architects and operators about the challenges that disabled people are facing while traveling, is increasing. Decision makers are taking this into account when designing trains, stations and associated facilities. The focus of these efforts is almost always on granting access to wheelchair users and other people with reduced mobility, yet this group is only a small percentage of the total number of disabled people. The largest group by far, the hearing impaired, is almost always forgotten.

The good news: The cost and work involved to make the information transmitted through the PA systems in trains, on platforms and in station buildings accessible for the hearing impaired, are usually a fraction of the cost and work involved making the same environments accessible for people with reduced mobility. In other words – creating accessibility for the hearing impaired will help the largest group of disabled for the smallest cost.

Why install loop systems in trains?

With a loop system on board, the hearing impaired passengers get direct access to call outs, safety alarms and information transmitted by the Passenger Information System. Their journey will be safer, easier and more relaxing, especially when traveling alone.

A hearing loop system is the most practical, least expensive and lowest maintenance solution to providing quality access to on-board audio information for the hearing impaired.

Everyone wins

A hearing loop system is not only the best option for the hearing aid user – it is also the only practical one for the train operator. Considering the fact that most hearing aid users have their own personal receiver in their hearing aids (the T-coil), a loop system is always active and can be used by everyone, as it's not limited to the number of receivers. Although a loop system might demand a little more commitment at the start, it will pay back the investment many times over.



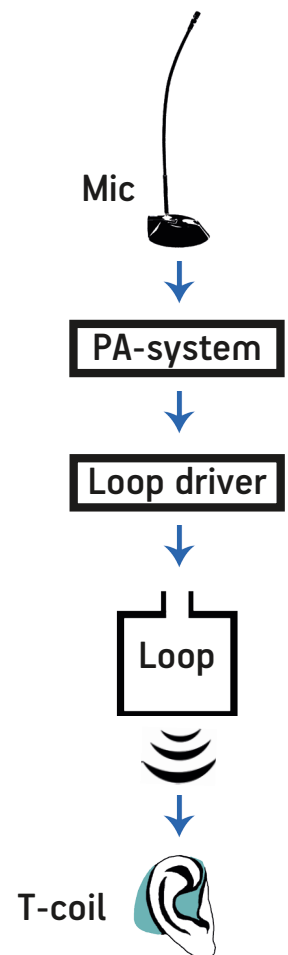


How does it work?

The hearing loop driver is connected to the source of the sound, e.g. a PA or PIS system or via the microphone. The loop driver transforms the signal into an electric current in a loop cable surrounding the listening area. The loop current sets up a magnetic field which changes in sympathy with the audio.

Most hearing aid users have a T-coil, a small wireless receiver, built into their hearing aids. When switched on to the T-mode, the hearing aid will pick up the signal from the magnetic field and convert it back into audible sound. The sound is clear and crisp and tailored for the persons hearing loss with much reduced background noise.

The basic technique was invented in the 1950's and is still the best solution for hearing aid users thanks to the development of more powerful, efficient loop amplifiers and other loop technologies.





Flashback:

The world's first loop driver designed specifically for trains

Hearing loops had been used in train cars since the late 1970's, but with standard loop amplifiers, which were not designed for the purpose. They were expensive, inefficient and underpowered. In 1998, the train manufacturer for Flytoget – the Oslo Airport Express – asked us for a new solution.

Designing a loop system to operate in this environment is challenging. Structural metal in the train absorbs the magnetic field dramatically, increasing the power demands of the amplifier. Our task was to deliver a product that would overcome this issue and be simple to install in the confined space available.

By using a customized loop amplifier it was possible for the first time to dramatically increase the efficiency of the system to fulfil the IEC standard, and also reduce the amplifier and installation costs. The Univox® TLS Transportation Loop System has developed from this experience.



Univox® TLS-2 Transportation Loop System

For public transport vehicles

Univox® loop amplifier TLS-2 is designed to drive hearing loops in vehicles completely or partially enclosed by metal, like trains, trams, buses and ships.

TLS-2 is a constant current amplifier with very high output current up to 30 A RMS providing compensation for the strong damping effect that conductive materials have on magnetic transmission. Metal loss correction is also available for high frequency slope corrections.

The rugged construction provides high immunity to mechanical vibration and shock, satisfying the requirements of EN 50155 and EN 61373 standards. All larger capacitors are glued onto the coated dust resistant PCB.

TLS-2 has an efficient fan free-cooling system, for trouble free operation. It complies with the environmental temperature requirements of EN 50155 standard (-25 to +70°C). Capacitors are temperature rated -40°C to +105°C. All relevant EMC demands are met (EN 50121-3-2) as TLS-2 has no high frequency switching components. A closed metal casing and professional connectors make TLS-2 rated IP40. The case and signal ground are isolated through a 200 V capacitor. This can be removed if higher isolation is required.

The amplifier is designed to fit and work in cramped spaces, as required in these types of environments. All the connectors and indicators are placed on one side of the amplifier to facilitate installation, service and control. The amplifier can be fixed mounted on site.

Features

- **Extremely high ability to overcome metal loss**
- **High output current**
- **Insensitive to vibrations and extreme temperatures**
- **Adapted for limited installation spaces**
- **20-50 VDC power connection**
- **Balanced and isolated inputs**
- **Rugged construction**

There are two balanced inputs (XLR and WAGO 769 series). The power supply, loop output and diagnostic system are connected to the amplifier using high quality WAGO connectors. Input and output levels are set by rugged dip-switches on the PCB where the metal loss correction potentiometer is also located.

TLS-2 can easily be connected to a computer host's diagnostic system through the opto-coupler isolated outputs for control of input and/or output signals.

Case Study

Norwegian State Railways (NSB), Oslo

When NSB purchased 75 five-part electrical trains of the FLIRT family from Swiss train manufacturer Stadler Rail, a vital concern was to find an appropriate loop system to be integrated with the Passenger Information System (PIS) supplied by the Finnish company Mitron.

Some of the trains were long local versions for the S-Bahn traffic in the Oslo area, with traveling times of up to 90 minutes. Others were regional trains covering the area of Southern Norway with traveling times of up to 3 hours. These different traffic conditions and the high ambition of user friendliness for disabled travelers along with the harsh Norwegian climate, posed a real challenge.

The NSB train cars had advanced thermal and acoustic insulation to fulfil the high requirements needed for winter operation in Norway making the installation a little easier. Careful attention was given to the design of the ceiling loop and after thorough testing of the loop system in an actual carriage, pre-set conditions for all input and output levels were established. With no additional measurements or adjustment required, installing systems in the remaining train cars was relatively simple.

Following a close collaboration with both train manufacturer and PIS supplier, 375 train cars were equipped with hearing loops, completely covering each train car. The supply of pre-set loop drivers made the installation both faster and easier, completely eliminating the risk of non-conformant loop systems.



Loop systems on board trains – a challenging environment!

As always when installing loop systems on-board rolling stock, there are a number of technical obstacles: Attenuation of the magnetic field due to the metal in the cars (in the NSB case the train cars were made of aluminium), magnetic background noise from braking systems and electrical cables, available electrical power, interface to the PIS, vibrations, temperature variations, dust, cramped installation space...

All these challenges have to be overcome by choosing the right mix of power, loop design, loop wire placement and of course – the right loop driver for the job.

With a robust construction of the driver, including dust coated PCB, glued capacitors and dip-switch settings of all levels, the TLS-2 is designed to work in these conditions.





A barrier free traveling experience

It's not just on board trains that the passengers have trouble hearing. Waiting areas, platforms, ticket offices, information desks and elevators are just a few of the facilities around a station where the hard of hearing public may also encounter difficulties, because of the poor acoustic conditions and high levels of background noise.

Univox has a range of loop systems, suitable for the various applications and conditions described. Phased array systems for large waiting areas and heavily reinforced platforms, across-the-counter systems for ticket offices and information desks and specially designed drivers for use in elevators.

Case Study

Hong Kong Underground

The MTR Corporation (Mass Transportation Railway) opened the first underground line in Hong Kong 1979. Today it keeps over 2.3 million people on the move every weekday, making it one of the most heavily utilized mass transit systems in the world.

Hearing impaired struggled to understand oral communication at information desks and on platforms due to the very high noise level.

Univox hearing loops were installed in both locations, information desks and platforms, giving the hard of hearing access throughout the stations.



Univox® CTC

Cross the Counter System

In many situations, such as at the ticket office in the subway or at the reception desk in a noisy hotel, a loop system can mean the difference between hearing nothing and understanding everything.

For desks
and cashiers

Univox® CTC is a complete induction loop system for installation in receptions, information desks, supermarket cashiers and ticket booths. When installed, the system delivers high speech perception to hearing aid users when communicating with staff.

For installation flexibility there is a choice between a goose neck microphone and a small glass/wall mount boundary microphone. Every Univox® CTC system is supplied with a loop pad which should be mounted under the counter/desk.

These systems are based on our reliable and powerful DLS 50 loop amplifier equipped with AGC function to deliver superior speech intelligibility in any situation.





Univox® CLS-5 Compact Loop System

For elevators and buses

Imagine being stuck in an elevator and not being able to understand what's going on, just because you can't hear the speaker system through all the noise. Or not being able to hear when your stop is coming up while traveling on a bus.

The Univox® CLS-5 driver is designed to operate in these environments allowing hearing aid users to access the information they need. The CLS-5 can operate on a range of supplies including battery, should the power fail.

It has seven inputs, including optical and coaxial digital inputs, providing wide system integration flexibility. It is small, powerful, efficient (with the smallest carbon footprint in class) and it complies with the relevant automotive standards, making it the perfect choice for your vehicle application.



Why Univox hearing loops?

We developed the very first specially designed constant current loop amplifier in 1969. Ever since Univox by edin has been the world's leading authority and producer of high quality hearing loop systems.

At Univox we have a strong belief that a hearing loop is the best solution to transmit sound to hearing aid users. With this belief and an ever-present emphasis on research and development, we have continued to innovate to deliver more firsts in the industry, constantly improving the performance of our products and service for hard of hearing communities worldwide.

Let us be your partner!

At Univox we know just how challenging an installation of a hearing loop system can be. But we also know how to overcome these challenges to guarantee a good result.

With industry-leading technical know-how, in-house project planning facilities and specially designed products for the use on-board rolling stock, on platforms and in station buildings, Univox is the right partner for creating barrier-free traveling for the hearing impaired.



Hearing excellence since 1965



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