



**Induction loop systems**

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*This information brochure illustrates structure and extent of the AUD program at the time of publication: see back page.*

*HUMANTECHNIK GmbH reserves the right to make technical developments and changes to the structure and scope of its delivery programme in respect of the components described here. This brochure is therefore exclusively for information about available systems, their accessories and application - but is not binding as far as orders are concerned. We will be pleased to advise you on the basis of the current programme status before you place your order.*



**Audio transmission systems for professional use - mobile and stationary**



## Madison Technologies exclusive distributor of AUDIOropa Assistive Listening Systems

### Madison Technologies

is Australian and New Zealand distributor of Assistive Listening products from AUDIOropa offers the following information to provide a more detailed understanding of the use of assistive listening devices (ALDs) across a wide spectrum of applications.

#### An Introduction

While there are a number of perceived complexities, it is important to reduce the principle of assistive listening to a clearer, more practical form of understanding in both design and use. There is no doubt that design, particularly for low overspill (LOS) induction loops, can be viewed as quite complex to installers. Madison Technologies has the expertise to assist where required and offers prompt feedback to all design queries. There are there assistive listening audio technologies available today. Each has a specific application and some limitations to specific to the installed environment.

#### What is an assistive listening system? (ALS)

Briefly, an ALS is the means by which speech clarity at the ear of those with a hearing impairment is improved, while ambient influences are reduced.

#### Hearing Aid

A device designed to improve hearing. Primarily a miniature amplifier/ speaker incorporated into the hearing aid; the Telecoil or "T" switch is designed to receive magnetic output from an induction loop.

Available as behind ear, in-ear and digital units it is estimated that between 60% to 80% of all hearing aids are "T" coil equipped.

### Induction Loop

Induction loop systems represent the major segment of assistive listening devices and have done so since the early 1950s, approximately 90% of all installation today are induction loops. This form of assistive listening is specific to those with mild to severe hearing loss and who are using a hearing aid.

#### What is an induction loop system?

The Induction loop amplifier is a specialised unit designed to transmit an audio signal into a copper loop creating a magnetic field that can be picked up by hearing aid. It is not like a voltage amplifier, having input voltage and output current, independent of load. In simple terms the induction loop amplifier provides, an audio signal into the loop by current. The current flows through the copper wire creating a magnetic field. This picked up by a small coil known as a Telecoil ("T" switch) of a hearing aid and is then converted to an audio signal & delivered directly into the ear.

#### What are the advantages of loop?

- Does not require a specialised receiver, signal is picked up directly by the hearing aid.
- Broadcasted sound will be sent directly to the hearing aid via the telecoil, thereby improving the signal to noise ratio.
- The listening area and audio characteristics can be controlled by loop design.
- Physical obstacles within the pick up area do not influence reception.

#### Disadvantages

- Loop system performance can be affected by interference from mains wiring & fluorescent lighting.

- Current required can be influenced by metal content of loop surrounds.
- There will be a spillage factor outside the induction loop area. This can be minimised by loop-design.

#### AUDIOropa by Humanteknik

AUDIOropa is a division of the Humanteknik Group, world leaders in hearing augmentation solutions. Madison Technologies has teamed up with AUDIOropa offering the relevant expertise to support the practical design of assistive listening systems covering induction loop, RF & IR.

#### Assistive Listening the Australian Standard

AS 1428.5 is the section of the Australian Access to Buildings Code which specifically addresses issues and requirements relative to Assistive Listening. It is mandatory and aimed at meeting the Federal Disability Discrimination Act 1992 (DDA) that provides protection for everyone in Australia against discrimination based on disability; this includes those with a hearing impairment. All Public buildings are required to have an ALS (assistive listening system) Induction loop design must cover 80% of floor area, IR or FM designs must cover at 95% of the floor area. An ALS must be provided at any place where a service provider deals with a client or customer.

#### Long term implications of not installing a loop system

As we move toward more stringent policing of public buildings, venues which have failed to comply with the AS 1428.5 will be forced to install an ALS after construction. This can be quite costly requiring re-construction of interiors.

### An introduction to Loop Systems

As previously indicated the most commonly used form of assistive listening is an Induction loop, some 90% of all assistive listening systems are of this type. The ability to provide diversity of loop designs addresses issues such as loop overspill and room / venue electrical characteristics. Induction loops provides direct access of audio signals for the hearing impaired by means of the hearing aid Telecoil. This means that provision of additional equipment such as a receiver device for the user is unnecessary, this addresses the issues of user sensitivity and accessory management.

Audio Frequency Induction Loop Systems (AFILS) also offer the added benefit of site flexibility, from counter to concert hall and every application in between. As examples, loop products are available for use in:

- Counter applications
- Pre-function areas
- Conference facilities
- Multi-use facilities
- Auditoria /Theatre
- Lecture Theatre
- Places of worship
- Transport facilities

There are five design criteria to follow when assessing loop application within a given space.

- Room or space size?
- Construction /equipment influences?
- Are there spillage issues? Where do they apply?
- How do we overcome them?

#### Induction Loop Types

The loop amplifier to be considered is dependent on design criteria and user requirements. For example the need for a more personalised, small system is normal in counter use and small

conference facility applications.

More powerful loop amplifiers have a broader coverage for large areas and necessary to cater for increased patron numbers.

#### Counter Loop

Can be set up in a vertical or horizontal plane or a combination of both. In many cases the vertical layout is more appropriate as it has the benefit of providing more direct communication while reducing spillage. Actual area covered can be more specific by use of a small loop amplifier and loop boom or counter-top self contained portable loop system.



#### Pre-function Areas

Generally of medium size and adjacent to main auditorium. Under normal circumstances a simple loop is adequate for this application.

#### Conference Facilities

Again a medium size loop is appropriate. In this instance however the issue of confidentiality must be considered. Where security is of importance the design concept of phased array (low overspill) is recommended. Alternatively use of infrared technology could be considered while keeping in mind aspects of user sensitivity and accessory management.

### Multi-use Facilities

These are usually associated with school, college or church applications. Due to a variety of uses such as indoor sport or assembly/performances consideration must be given to issues of loop layout, functionality and interaction with incorporated lighting/ audio systems and stage technologies. Due to seating, floor surface and construction type there needs to be attention given to loop design regarding overspill. In general a well designed cancellation loop may be of benefit.

#### Auditoria/Theatre

A well designed practical loop system will provide high quality, uniform audio access for those with a hearing impairment. If issues of overspill need to be addressed, then the team at Madison Technologies can help with the design of an appropriate Low Overspill (LOS) induction loop.

#### Places of Worship

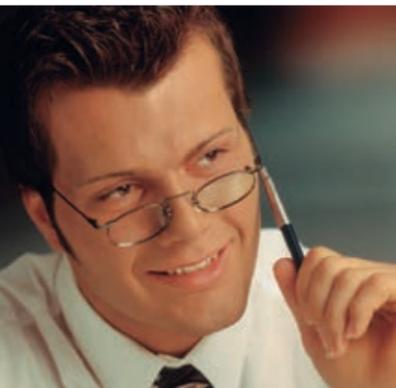
Again induction loop provides the answer to assisting those with hearing impairment. It should be noted that ageing population is strongly reflected in church congregations and accordingly, based on survey outcomes, a significant percentage of people attending church services do have a need for hearing assistance.

#### Lecture Theatres

Usually, due to proximity of other lecture facilities the use of low overspill (LOS) phased array design is a must to ensure confidentiality within each lecture space. There are instances where infrared equipment may be appropriate however this again raises issues of user sensitivity as well as that of equipment management and maintenance.



## An introduction to loop systems



## Assistive Listening Solutions

### Phase Array Installations

Low overspill in loop design is predominantly used in situations where confidentiality within given zones is a priority such as an adjacent meeting room or university lecture theatres. The overspill factor in standard induction loop perimeter design can be as much as four times the loop area. This is managed by careful loop design based on phased array principals where loop current is significantly contained within proximity of the original looped area. In recognising the benefit of low overspill installations (LOS) we should be aware of the tendency to over specify to areas such as "stand alone" auditoria and similar spaces where overspill need not be an issue. AUDIOropa loop amplifier technology reduces by half the original concept of one amplifier per loop with master and slave plus separate phase shifter. The result by using a single AUDIOropa LOS amplifier with master/slave outputs is a substantial savings in equipment cost, rack space and installation time.

### Assistive Listening Solutions

As indicated previously the major source of assistive listening is by Audio Frequency Induction loop System (AFILS). Alternative hearing access may however be provided through the following sources:

### Modulated Systems: Or FM Audio

This particular source is generally limited in application to large outdoor venues, domestic premises, or tour guide systems. In general there may be problems with provision and maintenance of suitable headsets/ receivers by venue operators.

There are also issues regarding constraint of signal area and possible crosstalk relating to other frequencies present at the location.

### Infrared (IR)

An ideal solution when confidentiality is important. Commonly used in Law Courts, and tertiary institutions where adjacent lecture facilities require audio isolation. As with other sources infrared has operational issues. For example there is a need to ensure that line-of-sight access is available for the user and sunlight interference. Further, supply and maintenance of receiver units and sensitivity of the user must be considered when setting up. Note: AS 1428.5 has a ratio of receiver allocation by room capacity which must be complied with.

### Installation Considerations

To ensure that the client is fully aware of the need to have a well designed assistive listening system, we must determine what is required as per AS 1428.5. A brief from the client regarding their expectations of the system, its scope, flexibility, modularity, budgets and deadlines are all crucial pieces of information which will influence the system design.

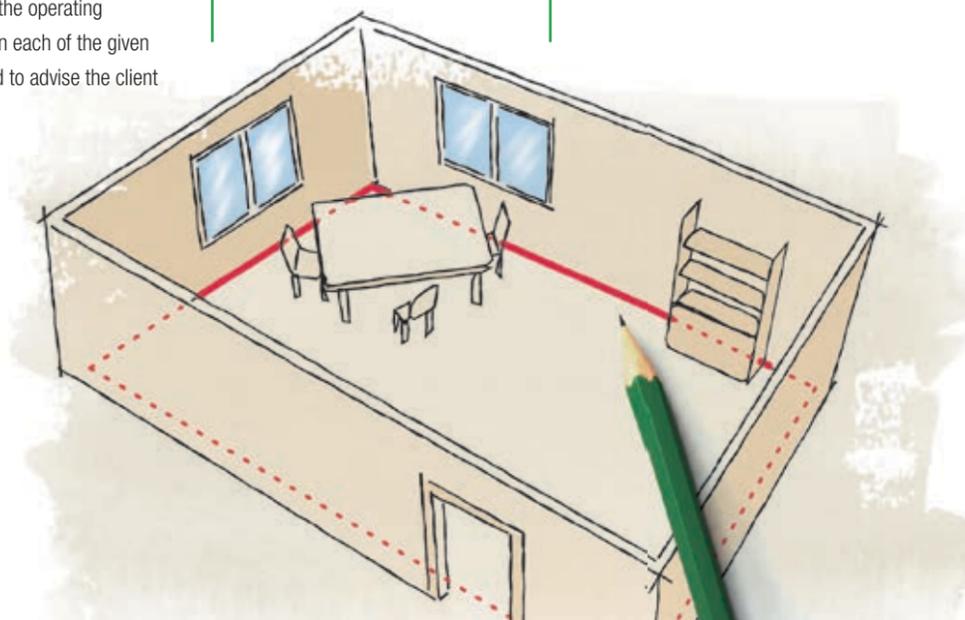
As an installer, it is of value to be fully aware of the operating specifics within each of the given ALS zones and to advise the client accordingly.

An example of questions asked might include:

- Is there metal content in the building/floor, is there air conditioning or lighting, which may influence amplifier capacity?
- If concrete flooring, what is the distance between reinforcement and surface?
- If conferencing is high priority, are conference areas adjacent?
- If an auditorium is tiered what is the floor material?
- If timber is present, is the framing made of timber or metal?
- Is the loop to be laid under carpet?
- Is there a need to reduce spill between seating and stage?
- If induction loops are not viable, is the client aware of infrared solutions as an alternative?

Major factors in design also include building elements and accurate design, based on information provided. This information gives the data needed to determine:

- (a) Amplifier type & current and capacity
- (b) Type of cable tape to be used
- (c) Design configuration



### Design Support

Almost every assistive listening application is unique in concept and may therefore require a different approach to design and product application. In circumstances where there are a number of potential influences on assistive listening design, we are sometimes asked to provide answers to the following questions:

- What does the standard (AS 1428.5) mean and what are the main requirements?
- How do we avoid interference/ feedback at the stage?
- Are we able to run a ceiling loop and if so, what do we need to take into account?
- Where should the loop amplifier be placed in an induction loop system?
- Why is a phased array (low overspill) solution needed?
- How will seating affect loop performance?
- When is Infrared an alternative to be considered?

Our design philosophy is to provide you with the best approach to design & installation of Assistive Listening Systems in line with the AS1428.5.

### Planning-Software » Loop Designer « : Developed for you

With the purchase of our PROLOOP loop amplifier you receive the opportunity to request access our webclient-based induction loop design software »Loop Designer«. With the help of »Loop Designer« you can include different materials in the room, see how much cable you need, which amount of power the amplifier must provide - and you can also create a simulation of the magnetic field along with its strength. Much easier and faster than you think!

### Selection of the amplifier:

| Area used                              | Amplifier   | Page/s       |
|--|---|--------------|
| Reception, counter:                    | LA-60 / LA-90 / LA-90 Set<br>LA-240 / Cross the Counter | 6 / 7<br>7   |
| TV rooms, nursing homes, living rooms: | LA-240 / PROLOOP C                                      | 7 / 8        |
| Conference rooms, theatres:            | PROLOOP C<br>PROLOOP DCCplus<br>PROLOOP LOSplus         | 8<br>9<br>12 |
| Very large induction loop systems:     | PROLOOP DCCplus<br>PROLOOP LOSplus                      | 9<br>12      |
| Systems with little overspill:         | LOS systems   | 10           |
| Portable induction loop system:        | LA-90, LA-90 Set<br>loop system kit                     | 6            |

*This table serves only as general orientation for selecting the amplifier. Please take advantage of our consulting services before you make your purchase.*

Using a condenser or electret microphone usually produces better results with respect to interference or acoustic feedback. A microphone with a high-quality, insulated connection cord also generally reduces magnetic feedback.

### Reduce the area of the loop!

The connection wire to the loop must be firmly twisted or closely parallel. Make a test installation.

**Make a test installation.** Always test the loop system to make sure that it is powerful enough, that the overspill does not cause any problems, etc.

**Adjust the height of the loop (1.2 to 2.0 m)** to provide for the greatest possible range with the smallest amount of overspill.

Conducting materials, such as reinforced concrete, can increase or decrease the area covered by the loop. The magnetic field strength is often increased outside the loop, while it is decreased inside. This fact considerably increases the risk of acoustic feedback. In a new building, you should try to install an LOS system. The LOS system makes it more difficult for the current to connect with large metal objects.

**Pay particular attention to metal frames.** Do not fasten the loop to structural elements made of metal or to similar objects.



## Notes on the installation of induction loop systems



## LA-90

### Induction loop kit

## LA-240

### Portable induction loop systems



All what you need for a professional application of the LA-90:

**LA-90 Set (Order No.: A-4211-0)**

Includes the LA-90, a table microphone, a handset and a special handset holder insert. Ideal for discreet consultations - also suitable for normal-hearing customers.



#### 1 LA-90

Order No.: A-4209-0

»LA-90« is a compact loop system for transmission over short distances, for example at receptions, counters or in sales areas.

Positioned between the dialogue partners, »LA-90« receives the spoken word via a built-in or optionally additionally connected microphone (e.g. table microphone page 15 or EH1205, illustration page 7). The integrated loop transmits the signals inductively to hearing devices, CI-systems or other inductive receivers (e.g. LPU-1, page 13). There is also the option of connecting a headset.

Power is supplied optionally via the mains power adapter or the integrated rechargeable battery.

#### Technical data

|  |
|--|
| Dimensions (HxWxD): 200 x 185 x 70 mm                                    |
| Weight: 635 g (incl. rechargeable batteries)                             |
| Microphone sensitivity: up to 60 dB                                      |
| Prim. power supply: 100-240 V 50-60 Hz                                   |
| Secondary: 16 V DC or via integrated 12 V 1,300 mAh rechargeable battery |
| Output power: max. 10 W  |

#### 2 Induction loop system kit

Order No.: A-4271-0

The induction loop system kit contains a complete, portable induction loop system designed for rooms up to 140 m<sup>2</sup> in size. The set includes the PROLOOP C induction loop amplifier (see p. 8) as well as two cable reels with 20 metres of loop wire each and the PROLOOP FSM measuring instrument incl. DIR under-the-chin receiver (see p. 13). The system is easy to use and ready to go »in a flash« – ideal for temporary installations.

The scope of delivery does not include a microphone; recommended microphones: e.g. table microphone (page 15) or wireless microphones UHF101 and/or UHF401 (page 23).

#### Technical data

|  |
|--|
| Power supply: 220 - 240 V              |
| Weight: 11 kg                          |
| Colour: Silver                         |
| Dimensions (HxWxD): 210 x 610 x 360 mm |
| Power cord: 2 m                        |

#### Features

|  |
|--|
| Max. power: 4.8 A RMS                    |
| Max. voltage: 31 V                       |
| Frequency range: 100 - 5,000 Hz (± 3 dB) |
| Distortion: < 1%                         |

#### 3 LA-240: Induction loop amplifier for the supply of inductive signals in small rooms or coaches

Order No.: A-4221-0

The LA-240 can supply rooms up to approx. 50 m<sup>2</sup> with inductive audio signals via the connected loop. The delivery includes a 37 metre long induction loop cable. In addition to the setting options for the basic volume and sound, the digitally controlled induction loop amplifier also supports volume stabilisation with an automatic gain control. The device has two audio-input sockets, a TOSLINK input and a coaxial connector.

It is connected to the 220 / 110 V supply via an external adapter. All settings can be made via a remote control.

#### Technical data

|   |
|---|
| Dimensions (HxWxD): 42 x 180 x 140 mm                         |
| Weight: 905 g   |
| Colour: silver-metallic                                       |
| Power supply: 12 - 30 V DC via adapter (extern)               |
| Audio-input: 2x Micro input / 2x Line In / 1x TOSLINK/ S/PDIF |



#### 4 LA-60

Order No.: A-4213-0

The LA-60 induction loop amplifier is designed for use in small rooms up to 16 m<sup>2</sup> or for partial signal coverage, at information counters, for example. It is equipped with two line/mic input jacks, which can be selected and activated by flipping a switch. The control switch is used to individually adjust the volume. Control lamps help in the operation of the system by indicating the corresponding status signals.

#### Technical data

|   |
|---|
| Power supply: 180 - 265 V AC 50 / 60 Hz 10 VA |
| Dimensions (HxWxD): 65 x 121 x 35 mm          |
| Weight: 146 g                                 |

#### Induction loop system output power

|  |
|--|
| 1.3 A RMS, 1.82 A surge output current   |
| 100 - 5 kHz – compliant with the BS6083 pt4 (IEC1 18-4) standard for a loop, with 24 / 0.2 cable (0.75 mm <sup>2</sup> ) at 0.03 Ω/m |

#### 5 Induction loop pad for the LA-60 or the LA-240

Order No.: A-4910-0

The »pad« contains a small loop. It is connected directly to the LA-240 or LA-60 induction loop amplifier and placed under the seat cushion or behind the back of a chair. The connection cord for the pad is 4.50 m long. As a result, the signal coverage can be restricted to a very small area.

#### 6 Small »Cross-the-counter« induction loop

Order No.: A-4917-0

The small »Cross-the-counter« induction loop has been designed to supply induction loop signals to small areas, such as individual service points or reception desks. The system is installed – generally underneath the table top – using adhesive clamps with a space requirement of approx. 35 x 35 cm; recommended induction loop amplifier: LA-60 or LA-240.

#### 7 »EH1205« microphone for LA-240 and LA-90

Order No.: EH1205-0

Directly connected to the induction loop amplifier, the microphone, with four meters of cable and a clip, provides a speaker with ample freedom of movement for close dialogue. It can also be ordered separately as a replacement microphone or a secondary microphone to be connected to the second microphone jack.



## LA-60

## LA-240

### Induction loop pads

### Cross-the-counter

### Induction loop amplifiers and components for small to medium-sized rooms



Microphone »EH1205«



## PROLOOP C Induction loop amplifier

- High output current:  
4.8 A RMS
- Short-circuit-proof
- Automatic fuse reset
  - Two symmetrical XLR(F) input jacks
  - One RCA input jack
  - One line output jack
  - Extra-sturdy jacks
  - Dual action AGC for excellent speech recognition
  - High availability, operating reliability and quality assurance
- Convenient monitoring of the magnetic field: Can be done using headphones or speakers
- Treble control to compensate for treble losses due to reinforcement

### PROLOOP C

Order No.: A-4246-0

The PROLOOP amplifier family is designed for professional use in medium-sized rooms (up to 170 m<sup>2</sup>) in private buildings and public facilities, in which particularly high dependability and extremely reliable operation are required.

Thanks to a 100-percent short-circuit-proof amplifier, switchable, symmetrical XLR(F) input jacks and extremely stable output performance, the **PROLOOP C** is able to meet these demands.

Automatic Gain Control (AGC) guarantees consistent field strength and reproduces stable sound with a special emphasis on clear speech, even under acoustically demanding conditions.

Corresponding test equipment can be used to evaluate the sound quality via the integrated monitor out jack.



#### Technical data for the PROLOOP C

|                                      |  |
|--------------------------------------|--|
| Mains connection:                    | 115 / 230 V AC (main transfer switch)<br>50 / 60 Hz, 7-200 W, 10 A fuse  |
| Coverage:                            | 170 m <sup>2</sup> acc. to IEC 60118-4, single-loop, free field  |
| <b>Induction loop output</b>         |  |
| Max. current:                        | 4.8 A RMS, 13.6 A peak, 1-5 ms, 1 kHz, short-circuit-proof   |
| Max. voltage:                        | 11 V RMS, 15.5 V peak  |
| Output AGC:                          | Sets voltage and power for steady signals like oscillation and sine curves after 0.6-1 seconds to -10 dB. Short pulses and normal program signals are not limited. |
| Frequency response:                  | 100 - 5,000 Hz ( ± 3 dB)   |
| Distortion:                          | < 1%   |
| Cable connection:                    | Screw connection on rear panel of the amplifier  |
| <b>Outputs</b>                       |  |
| 1. LINE OUT:                         | 0 dBm-RCA out (with AGC function)  |
| <b>Inputs</b>                        |  |
| IN 1 und 2:                          | 0.5 mV-100 mV / 10 kΩ (mic.) alt. 25 mV - 4 V / 10 kΩ (line)<br>AGC, switchable phantom voltage, XLR(F) connections  |
| IN 3:                                | 50 mV-10 V / 10 kΩ, RCA connection   |
| <b>AGC</b>                           |  |
| Dynamics:                            | > 70 dB  |
| Rise time:                           | 2 - 500 ms   |
| Fall time:                           | 0.5 - 20 dB/s  |
| <b>Controls and displays</b>         |  |
| Treble control:                      | 0 - +9 dB, potentiometer   |
| Induction loop adjustment:           | 0 - 170 m <sup>2</sup> , potentiometer   |
| Displays:                            | Mains connection: 1 green LED<br>Input level: 1 green LED<br>Induction loop power: 1 green LED   |
| <b>Induction loop monitoring</b>     |  |
| 6.3 mm jack for headphone connection |  |
| <b>Enclosure</b>                     |  |
| Dimensions:                          | 64 x 295 x 205 mm (H x W x D)  |
| Weight:                              | 3.6 kg   |
| Colour:                              | black  |



#### PROLOOP DCCplus Technical data

|   |  |
|---|--|
| Main connection                                   | 230 V AC, 45-60 Hz, 150 Watt   |
| Passive protection                                | Fuse 1.5 A   |
| Surface coverage                                  | 1000 m <sup>2</sup> acc. to IEC 60118-4  |
| <b>Induction loop output</b>                      |  |
| Max. current                                      | 12 A RMS, 34 A from peak to peak, 1-5 ms, 1 kHz  |
| Max. voltage                                      | 32 V RMS, 45 V peak  |
| Output-AGC  | Keeps the audio signal level constant within the connected loop. AGC reaction time: Sinus -10 db at 8 msec to 2 sec.                 |
| Frequency range                                   | 100 – 5.000 Hz (±3 dB)   |
| Distortion  | < 1 % at nominal output, 1KHz  |
| Cable connection                                  | 2 screw terminals on the reverse of the device   |
| <b>Outputs</b>                                    |  |
| Slave   | LINE OUT 0° / 90° Phase shift adjustable, 6.3 mm jack plug   |
| <b>Inputs</b>                                     |  |
| IN 1  | XLR (F) socket, MIC IN (symmetric, sensitivity 1 mV )  |
| IN 2  | XLR(F) socket, can be switched as a microphone or line input   |
| 100-V priority input for connection to PA systems |  |
| Slave   | SLAVE-IN (6,3 mm jack plug)  |
| <b>AGC</b>  |  |
| Dynamics  | > 36 dB  |
| <b>Control and display</b>                        |  |
| Induction loop setting                            | Rotary knob  |
| Input level                                       | IN 1 and IN 2 can be adjusted separately   |
| Display   | Main connection: 1 green LED<br>AGC / Compression<br>Input level 6 differently coloured LEDs<br>Current: 6 differently coloured LEDs |
| <b>Induction loop monitoring</b>                  |  |
| 1 headphone output                                |  |
| <b>Housing</b>                                    |  |
| Dimensions  | 90 x 430 x 270 mm (H x W x D), 19-inch rack (2 height units)   |
| Attachment  | 4 attachment points on the front plate for installation in 19-inch rack  |
| Colour  | black  |
| Weight  | 7,8 kg   |

### PROLOOP DCCplus

Order No.: A-4264-0

The **PROLOOP DCCplus** is designed for rooms of up to 1000 m<sup>2</sup> with loop signals and is the ideal solution for events and meeting venues.

We gave the **PROLOOP DCCplus** a complete overhaul and the revised model for 2015 is better than ever!

Each of the two XLR(F) inputs can be configured as LINE (symmetrical) or as microphone input (asymmetrical).

The equipment provides an output of up to 12 A RMS and guarantees secure audio transmission. The Automatic Gain Control hereby ensures good sound reproduction at constant field strength and high stability.

#### For standard and low overspill supply

Beyond the standard application the **PROLOOP DCCplus** is also suitable for the realisation of low overspill loop systems. This requires two **PROLOOP DCCplus** devices.



## PROLOOP DCCplus

### Loop amplifier – also for low overspill installations

- Simple and safe handling
- High output current:  
12 A RMS
- Main transfer switch 115 / 230 V AC
- Active protection against short circuits
- Two XLR(F)-sockets, one configurable as
  - ▶ Microphone input (amplifier setting, phantom feed) or
  - ▶ LINE-input (amplifier setting)
- 100-V-priority input for the connection of ELA systems
- Separate treble/base regulation
- Display of loop current
- 3,5-mm-headset socket to monitor audio signals
- Control to reduce metal losses
- Suitable for the set-up of low overspill systems
- 19" rack casing



## PROLOOP LOS

### Induction loop amplifier system for low-overspill installations

- Uniform coverage throughout the room (no dead spots in the middle of the room)
- No signal fluctuations when hearing-aid user moves his/her head
- Reduced sensitivity in respect to architecture-related steel reinforcements
- High efficiency, low power consumption
- 19" design
- Well suited for retrofitted installation in theatres, cinemas, concert halls, schools, conference rooms, housing, etc. (Possible for floor reconstructions only)



| Technical data                            |  |
|---|--|
| Mains connection:                         | 230 – 240 V AC, 50 Hz, 25 – 700 W  |
| Coverage:                                 | 300 m <sup>2</sup> acc. to IEC 60118-4   |
| Induction loop output                     |  |
| Max. power:                               | 2x 5 A RMS, 2x 14 A from peak to peak, 1-5 ms, 1 kHz, continuous 1 kHz, short-circuit-proof  |
| Max. voltage:                             | 2x 17 V RMS, 2x 24 V peak  |
| Output AGC:                               | Sets voltage and power for steady signals like oscillation and sine curves after 0.6-1 seconds to -10 dB. Short pulses and normal program signals are not limited. |
| Frequency range:                          | 100 – 5,000 Hz (±3 dB)   |
| Distortion:                               | < 1 %  |
| Cable connection:                         | 2 screw connections on rear panel of the amplifier   |
| Outputs                                   |  |
| Master OUT:                               | 0 dBm, RCA (with AGC function)   |
| Slave OUT:                                | 0 dBm, RCA (with AGC function)   |
| Inputs                                    |  |
| IN 1:                                     | Combined XLR(F) / 6.3 mm jack<br>MIC sensitivity 2.5 mV – 10 V RMS / 10 kΩ,<br>LINE sensitivity 37 mV – 10 V RMS / 10 kΩ<br>or phantom voltage 9 – 20 V            |
| IN 2:                                     | Dual RCA connections, 45 mV – 10 V RMS / 10 kΩ   |
| IN 3:                                     | Dual RCA connections, 45 mV – 10 V RMS / 10 kΩ   |
| AGC                                       |  |
| Dynamics:                                 | > 70 dB  |
| Rise time:                                | 2 – 500 ms   |
| Fall time:                                | 0.5 – 20 dB/s<br>Rise and fall times depend on the currently active channel  |
| Controls and displays                     |  |
| Loop setting:                             | 0 – 300 m <sup>2</sup> (with one potentiometer each for master and slave outputs)  |
| Input level:                              | IN 1 and IN 2 can be adjusted separately   |
| Displays:                                 | Mains connection: 1 green LED<br>Input level: 1 green LED<br>Induction loop power: 2 green LED   |
| Induction loop monitoring                 |  |
| Two 6.3 mm jacks for headphone connection |  |
| Dimensions                                |  |
| Size:                                     | 88 x 438 x 280 mm (H x W x D)  |
| Colour:                                   | Black  |
| Weight:                                   | 9.3 kg   |

## PROLOOP LOS

Order No.: A-4252-0

PROLOOP LOS is a complete system for the operation of low-overspill systems. It includes the full range of electronics required in a single enclosure. Thus, there is a flexibly sized, reliable low-overspill solution available to serve neighbouring event rooms and assembly halls up to 300 square metres in size.

The system is equipped with Automatic Gain Control (AGC) to produce stable sound with outstanding speech reproduction, even under difficult acoustic conditions. The integrated monitor output for the corresponding measurement technology makes it possible to easily and conveniently test the sound quality of the induction loop system.



## PROLOOP LOSplus

Order No.: A-4254-0

As a ready-for use system for operating low-overspill systems in large rooms of up to 1,000 m<sup>2</sup>, the induction loop amplifier **PROLOOP LOSplus** has all the required electronic configurations in one single casing.

The high-performance amplifier has an Automatic Gain Control (AGC) that also guarantees stable sound with excellent speech reproduction even in difficult acoustic conditions. For acoustic quality controls on the induction loop outputs A and B, the **PROLOOP LOSplus** has a monitor output for connection of headphones.

| Technical data  |  |
|---|--|
| Main connection   | 115 / 230 V AC, 50-60 Hz, 300 Watt   |
| Passive protection  | Fuse 2.5 A   |
| Surface coverage  | 1,000 m <sup>2</sup> acc. to IEC 60118-4   |
| Induction loops output  |  |
| Max. current  | 2x 12 A RMS, 2x 34 A from peak to peak, 1-5 ms, 1 kHz  |
| Max. voltage  | 2x 32 V RMS, 2 x 45 V peak   |
| Output AGC  | Keeps the audio signal level constant within the connected loop. AGC reaction time: Sinus -10 db at 8 msec to 2 sec. |
| Frequency range   | 100 – 5,000 Hz (±3 dB)   |
| Distortion  | < 1 % at nominal output, 1KHz  |
| Cable connection  | 2 screw terminals on the reverse of the device   |
| Outputs   |  |
| Slave LINE OUT  | 6.3 mm jack plug   |
| Inputs  |  |
| IN 1  | XLR(F) socket,<br>Microphone input MIC sensitivity 2.5 mV – 10 V RMS   |
| IN 2  | XLR(F) socket, can be switched as a microphone or line input   |
| 100-V priority input for connection to PA systems   |  |
| Slave   | SLAVE IN (6,3 mm jack plug)  |
| AGC   |  |
| Dynamics  | > 36 dB  |
| Control and display   |  |
| Loop setting  | Rotary knob for channel A and B  |
| Input level   | IN 1 and IN 2 can be adjusted separately   |
| Display   | Main connection: 1 green LED   |
| Input level   | 6 differently coloured LEDs  |
| Current   | 6 differently coloured LEDs per loop channel   |
| Induction loop monitoring   |  |
| 1 headphone output (left audio channel for induction loop output A and right audio channel for induction loop output B) |  |
| Dimensions  |  |
| Size (H x W x D)  | 90 x 430 x 270 mm<br>19-inch rack (2 height units)   |
| Attachment  | 4 attachment points on the front plate for installation in 19-inch rack  |
| Colour  | black  |
| Weight  | 9.3 kg   |



## PROLOOP LOSplus

### Induction loop amplifier system for low-overspill installations in large rooms

- Homogeneous signal supply to rooms up 1,000 m<sup>2</sup>
- No signal fluctuation when hearing aid wearer moves head
- Reduced sensitivity in respect to architecture-related steel reinforcements
- High efficiency, low power consumption
- 19" model

## PROLOOP D5

### Digital loop amplifier for supplying rooms of up to 300 m<sup>2</sup> with inductive audio signals

- Easy to use
  - High current output: 5.8 A RMS
  - Resistant housing
  - Compact build / requires lesser rack space
  - Low heat generation
  - Active protection against short circuits
  - Combo-XLR-3 input and
  - Input via phoenix contact, configurable for:
    - microphone (phantom power)
    - audio source
  - 100V-input for connecting to PA-systems
  - Automatic Gain Control (AGC), loop current control
  - 6.3mm headphone jack for monitoring audio signals
  - Adjuster for metal loss compensation
  - Suitable for setting up Low-Overspill-Systems
  - 19 inch rack mounting material available as accessory
- Availability:**  
Expected for February 2019

| Technical data  |   |
|---|---|
| Power supply:   | 90-265 V AC 50/60 Hz,   |
| Passive protection:   | Fuse 3, 15A   |
| Maximum area:   | 300 m <sup>2</sup> according to IEC 60118-4   |
| Loop output   |   |
| Max. current:   | 5.8 A RMS   |
| Max. tension:   | 31 V peak to peak   |
| Active protection against short circuits                                    |   |
| Automatic Gain Control (AGC) Maintains a constant level of the audio signal |   |
| Frequency range:  | 100-5000 Hz (± 3 dB)  |
| Distortion:   | < 1% at rated power output, 1 kHz   |
| Connector:  | Speakon-plug connectors   |
| Outputs   |   |
| Headphones:   | Headphone output (on front face), jack plug socket 6,3 mm   |
| 2x Slave Outwith 0° and 90° phase shift, 6.3mm jack plug socket             |   |
| FAULT-output:   | Device status via potential-free switch contact   |
| Inputs  |   |
| INPUT 1 and 2:  | 0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2) |
| 12V toggable phantom power  |   |
| INPUT 3:  | 100V-Input for connecting PA-systems  |
| Slave In, 6,3mm jack plug socket  |   |
| Automatic Gain Control (AGC)  |   |
| Dynamics:   | up to 36dB  |
| Controls and indicators   |   |
| Loop current adjustment via rotary control                                  |   |
| Amplification control for INPUT 1, 2 und 3 via rotary control               |   |
| Adjuster for the reduction of metal loss                                    |   |
| Indicators:   | Loop Error (LED, yellow)  |
|   | Protect (LED, red)  |
|   | Clip (LED, red)   |
|   | ON / OFF (LED, green)   |
|   | AGC/Compression (3 green LEDs and 1 yellow LED)   |
|   | Loop current (3 green LEDs and 1 yellow LED)  |
| Dimensions  |   |
| Size:   | 32 x 144 x 143 mm (H x B x T)   |
| Mounting:   | optionally available 19 inch rack fixtures  |
| Colour:   | black   |
| Weight:   | 1.5 kg  |

## PROLOOP D5

Order No.: A-4280-0

Highly reliable, resistant against short circuits and with great audio quality: The »PROLOOP D5« provides middle-sized rooms with stable inductive signals. Comfortable controls enable the user to take full benefit of the versatility this system offers regarding its use various rooms and deployment conditions.

The combo-XLR-3 in-port as well as a further phoenix contact are individually configurable:

- a) as audio-in (balanced)
- b) as microphone-in (unbalanced)

A 12-V phantom power feed can be activated for the supply of condenser microphones.

The Automatic Gain Control (AGC) guarantees a constant field strength, a exemplary high stability in sound volume and good sound reproduction.

A monitor port allows a direct connection with further loop amplifiers.

## PROLOOP D5-LOS

Order No.: A-4285-0

Ready-to-use digital system for setting up digital Low-Overspill-Systems in rooms up to 360 m<sup>2</sup>, incorporates all necessary electronics in a single compact housing. This loop driver is the ideal solution for use in event rooms and larger meeting rooms. Ease of use and according performance reserves enable matching the system to various conditions of spaces and room shapes.

The combo-XLR-3-port and the Phoenix contact at INPUT 1 and 2 can be configured as LINE-IN or microphone-In (balanced) konfiguriert werden. 12-V phantom power can be activated onn both both ports for the use of condenser microphones.

In addition, the amplifier has a 100 V input for the connection to according PA- and audio systems. The input amplification can be adjusted on all 3 inputs.

The powerful amplifier is equipped with Automatic Gain Control (AGC), which will provide constant sound and clear voice intelligibility even under difficult surroundings. The sound quality of the Master and Slave loop can be checked via a monitoring port for headphones.

| Technical data  |  |
|---|--|
| Power supply:   | 90-265 V AC 50/60 Hz,  |
| Passive protection:   | Fuse 3, 15A  |
| Maximum area:   | 360 m <sup>2</sup> according to IEC 60118-4  |
| Loop output   |  |
| Max. current:   | 2 x 5.8 A RMS  |
| Max. tension:   | 2 x 31 V peak to peak  |
| Active protection against short circuits  |  |
| Automatic Gain Control (AGC) Maintains a constant level of the audio signal in the connected loop |  |
| Frequency range:  | 100-5000 Hz (± 3 dB)   |
| Distortion:   | < 1% at rated power output, 1 kHz  |
| Connector:  | 2 x Speakon-plug connectors  |
| Outputs   |  |
| Headphones:   | Headphone output (on front face), jack plug socket 6.3 mm  |
| Monitor output, jack plug socket 6.3 mm   |  |
| FAULT-output:   | Device status via potential-free switch contact  |
| Inputs  |  |
| INPUT 1 and 2:  | 0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2) |
| 12V toggable phantom power  |  |
| INPUT 3:  | 100V-Input for connecting PA-systems   |
| Monitor output, jack plug socket 6.3 mm   |  |
| Automatic Gain Control (AGC)  |  |
| Dynamics:   | up to 36dB   |
| Controls and indicators   |  |
| Master-loop current adjustment via rotary control   |  |
| Slave-loop current adjustment via rotary control  |  |
| Amplification control for INPUT 1, 2 und 3 via rotary control                                     |  |
| Adjuster for the reduction of metal loss  |  |
| Indicators:   | Loop Error (LED, yellow)   |
|   | Protect / Clip M (LED, red)  |
|   | Protect / Clip S (LED, red)  |
|   | ON / OFF (LED, green)  |
|   | AGC/Compression (3 green LEDs and 1 yellow LED)  |
|   | Loop current (3 green LEDs and 1 yellow LED, each separate for Master and Slave)   |
| Dimensions  |  |
| Size:   | 8 x 215 x 215 mm (H x B x T)   |
| Mounting:   | optionally available 19 inch rack fixtures   |
| Colour:   | black  |
| Weight:   | 1.5 kg   |

## PROLOOP D5-LOS

### Digital Low-Overspill loop amplifier for rooms up to 360 m<sup>2</sup>

- Homogenous magnetic field provision for rooms up to 360 m<sup>2</sup>
- Significantly lower overspill
- No signal variations when the hearing system user moves his head
- Reduced sensibility concerning steelwork
- Compact build / requires lesser rack space
- High energy efficiency - low consumption
- Low heat generation
- High current output: 2x 5.8 A RMS
- Active protection against short circuits
- 100V-input for connecting to ELA systems
- Automatic Gain Control (AGC), loop current control
- 6.3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
- 19 inch rack mounting material available as accessory

**Availability:**  
Expected for October 2018

## PROLOOP D15

### Digital loop amplifier for large rooms up to 1.300 m<sup>2</sup>

- Easy to use
- High current output: 15 A RMS
  - Resistant housing
  - Compact build / requires less rack space
  - High energy efficiency - low consumption
  - Low heat generation
- Active protection against short circuits
- Combo-XLR-3 input and input via phoenix contact, configurable for:
  - microphone (phantom power)
  - audio source
- 100V-input for connecting to PA systems
- Automatic Gain Control (AGC), loop current control
  - 6,3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
  - Suitable for setting up Low-Overspill-Systems
- 19 inch rack mounting material available as accessory

Availability:

Expected for October 2018

## LA-70

### Digital loop amplifier for information counters, cash desks or rooms up to 40 m<sup>2</sup> with inductive audio signals

#### PROLOOP D15

| Technical data  |   |
|---|---|
| Power supply:   | 90-265 V AC 50/60 Hz,   |
| Passive protection:   | Fuse 3, 15A   |
| Maximum area:   | 1300 m <sup>2</sup> according to IEC 60118-4  |
| Loop output   |   |
| Max. current:   | 15 A RMS  |
| Max. tension:   | 42 V peak to peak   |
| Active protection against short circuits  |   |
| Automatic Gain Control (AGC) Maintains a constant level of the audio signal in the connected loop |   |
| Frequency range:  | 100-5000 Hz (± 3 dB)  |
| Distortion:   | < 1% at rated power output, 1 kHz   |
| Connector:  | Speakon-plug connectors   |
| Outputs   |   |
| Headphones:   | Headphone socket (front face), audio jack 6.3 mm  |
| 2x Slave Outwith 0° and 90° phase shift, 6.3mm jack plug socket                                   |   |
| FAULT-output:   | Device status via potential-free switch contact   |
| Inputs  |   |
| INPUT 1 and 2:  | 0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2) |
| 12V toggable phantom power  |   |
| INPUT 3:  | 100V-Input for connecting PA-systems  |
| Slave In, 6.3mm jack plug socket  |   |
| Automatic Gain Control (AGC)  |   |
| Dynamics:   | up to 36dB  |
| Controls and indicators   |   |
| Loop current adjustment via rotary control  |   |
| Amplification control for INPUT 1, 2 und 3 via rotary control                                     |   |
| Adjuster for the reduction of metal loss  |   |
| Indicators:   | Loop Error (LED, yellow)  |
|   | Protect (LED, red)  |
|   | Clip (LED, red)   |
|   | ON / OFF (LED, green)   |
|   | AGC/Compression (3 green LEDs and 1 yellow LED)   |
|   | Loop current (3 green LEDs and 1 yellow LED)  |
| Dimensions  |   |
| Size:   | 48 x 216 x 215 mm (H x W x D)   |
| Mounting:   | optionally available 19 inch rack fixtures  |
| Colour:   | black   |
| Weight:   | 1.6 kg  |



#### PROLOOP D15

Order No.: A-4281-0

The loop amplifier **PROLOOP D15** is specially conceived for deployment in public and commercial installations. The system is actively protected against short circuits and is notable for its high reliability and safety. The **PROLOOP D15** supplies rooms up to 1300 m<sup>2</sup> with steady inductive audio signals of excellent quality.

The combo-XLR-3 in-port as well as a further phoenix contact are individually configurable:

- as audio-in (balanced)
- as microphone-in (unbalanced)

The microphone mode allows the activation of phantom power for the use of condenser microphones.

The Automatic Gain Control (AGC) guarantees a constant field strength, a exemplary high stability in sound volume and good sound reproduction. A monitor port allows a direct connection with further loop amplifiers.

#### LA-70

Order No.: A-4216-0

Small but powerful, the digital loop amplifier **LA-70** is made for setting up a loop system for smaller areas like information booths, bank counters and cash areas. The slim size of the device allows for hidden installation and placement within confined spaces. However, the maximum area which can be covered is an impressive 40m<sup>2</sup>.

#### PROLOOP D15-LOS

Order No.: A-4286-0

The ready-to-use digital system for setting up digital Low-Overspill-Systems in rooms up to 3.300 m<sup>2</sup>, incorporates all necessary electronics in a single compact housing. Its power, its strong and steady inductive signal and the audio quality make the **PROLOOP D15-LOS** the ideal solution for event rooms and assembly halls.

The combo-XLR-3-port and the Phoenix contact at INPUT 1 and 2 can be configured as LINE-IN or microphone-In (balanced) ports. 12-V phantom power can be activated on both ports for the use of condenser microphones.

In addition, the amplifier has a 100 V input for the connection to according PA- and audio systems. The input amplification can be adjusted on all 3 inputs.

The powerful amplifier is equipped with Automatic Gain Control (AGC), which will provide constant sound and clear voice intelligibility even in difficult surroundings. The sound quality of the Master and Slave loop can be checked via a monitoring port for headphones.

#### LA-70

| Technical data                            |  |
|---|--|
| Power supply:                             | 180 - 265 V AC 50/60 Hz 10 VA                            |
| Dimensions (HxWxD):                       | 100 x 50 x 21 mm   |
| Weight:                                   | 78g  |
| Output power of the inductive loop system | max. 20 W, RMS 2.1 A at 1 kHz, peak output current 3.5 A |

#### PROLOOP D15-LOS

| Technical data  |   |
|---|---|
| Power supply:   | 90-265 V AC 50/60 Hz,   |
| Passive protection:   | Fuse 3, 15A   |
| Maximum area:   | 3300 m <sup>2</sup> according to IEC 60118-4  |
| Loop output   |   |
| Max. current:   | 2 x 15 A RMS  |
| Max. tension:   | 2 x 42 V peak to peak   |
| Active protection against short circuits  |   |
| Automatic Gain Control (AGC) Maintains a constant level of the audio signal in the connected loop |   |
| Frequency range:  | 100-5000 Hz (± 3 dB)  |
| Distortion:   | < 1% at rated power output, 1 kHz   |
| Connector:  | Speakon-plug connectors   |
| Outputs   |   |
| Headphones:   | Headphone output (on front face), 6.3mm jack plug socket  |
| Monitor output, 6.3mm jack plug socket  |   |
| FAULT-output:   | Device status via potential-free switch contact   |
| Inputs  |   |
| INPUT 1 and 2:  | 0,5 mV to 100 mV / 10 kOhm (MIC) or 25 mV to 4 V / 10 kOhm (LINE) phantom power configurable, Combo-XLR-3 socket (INPUT 1), Phoenix contact (INPUT 2) |
| 12V toggable phantom power  |   |
| INPUT 3:  | 100V-Input for connecting PA-systems  |
| Monitor output, 6.3mm jack plug socket  |   |
| Automatic Gain Control (AGC)  |   |
| Dynamics:   | up to 36dB  |
| Controls and indicators   |   |
| Master-loop current adjustment via rotary control   |   |
| Slave-loop current adjustment via rotary control  |   |
| Amplification control for INPUT 1, 2 und 3 via rotary control                                     |   |
| Adjuster for the reduction of metal loss  |   |
| Indicators:   | Loop Error (LED, yellow)  |
|   | Protect (LED, red)  |
|   | Clip (LED, red)   |
|   | ON / OFF (LED, green)   |
|   | AGC/Compression (3 green LEDs and 1 yellow LED)   |
|   | Loop current (3 green LEDs and 1 yellow LED, each separate for Master and Slave)  |
| Dimensions  |   |
| Size:   | 8 x 215 x 215 mm (H x B x T)  |
| Mounting:   | optionally available 19 inch rack fixtures  |
| Colour:   | black   |
| Weight:   | 1.7 kg  |

## PROLOOP D15-LOS

### Digital Low-Overspill-loop amplifier for large rooms up to 3.300 m<sup>2</sup>

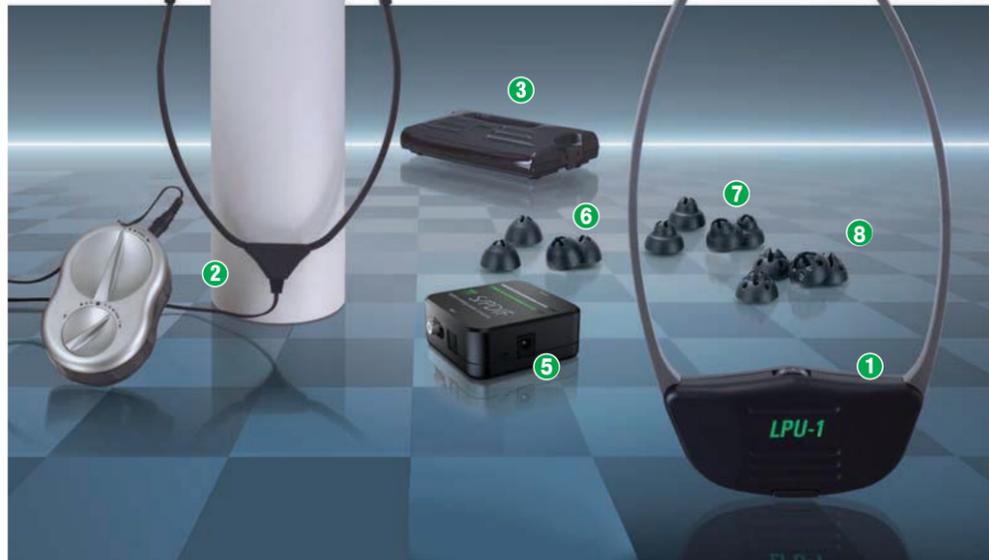
- Homogenous magnetic field for rooms up to 3.300 m<sup>2</sup>
- No signal variations when the hearing system user moves his head
- Reduced sensibility concerning steelwork
- Compact build / requires less rack space
- High energy efficiency - low consumption
- Low heat generation when in use
- High current output: 2x 15 A RMS
- Active protection against short circuits
- 100V-input for connecting to PA systems
- Automatic Gain Control (AGC), loop current control
- 6.3mm headphone jack for monitoring audio signals
- Adjuster for metal loss compensation
- 19 inch rack mounting material available as accessory

Availability:

Expected for October 2018



## »Induction loop receiver« and accessories



### 1 LPU-1: Induction loop receiver / Under-the-chin receiver

Order No.: A-4276-0

The LPU-1 takes the signals transmitted by the induction loop system directly to the ears of people who do not wear hearing aids.

The ear buds of the featherweight, ergonomically designed under-the-chin receiver can swivel to stay firmly fixed in the user's ears even when he/she moves his or her head. The flexible material used to make the ear buds also nestles gently into the auditory canal to effectively subdue any ambient noise.

#### LPU-1: Technical data

|                                     |                 |
|-------------------------------------|-----------------|
| Sound frequency transmission range: | 70 - 5,400 Hz   |
| Distortion factor:                  | < 1 %           |
| Signal-to-noise ratio:              | Typ. 60 dB      |
| Battery charging time:              | Approx. 6 h     |
| Operating time:                     | Approx. 6 h     |
| Maximum volume:                     | Approx. 120 dBA |
| Weight:                             | 47 g            |

### 2 CRESCENDO 50

Order No.: A-4202-0

The universal CRESCENDO 50 audio amplifier, which was specially designed for dialogue situations, can also be used as a pocket receiver for induction loop systems. An under-the-chin receiver serves as the listening device.

### 3 Single-bay recharger for the LPU-1

Order No.: A-4977-0

When the LPU-1 is not in use, it can be placed into the recharger to recharge.

### 4 5-bay recharger for LPU-1 under-the-chin receiver

Order No.: A-4976-0

### 5 S/PDIF Audio converter

Order No.: A-4963-0

The S/PDIF converter (operation with power supply unit) converts digital signals of respective audio sources into analogue signals, allowing their further processing by systems with analogue input.

### Silicone earpieces for LPU-1 under-the-chin receivers (also for RCI-102)

#### 6 Standard

Order No.: A-4985-0 (2 sets)

Order No.: A-4987-0 (24 sets)

#### 7 Tapered shape

Order No.: A-4988-0 (2 sets)

Order No.: A-4989-0 (24 sets)

#### 8 Perforated

Order No.: A-4993-0 (2 sets)

Order No.: A-4992-0 (24 sets)



### 1 A100: Additional battery for the LPU-1

Order No.: A-4970-0

### 2 12-battery recharger for the A100 battery

Order No.: A-4974-0

### 3 Table microphone with XLR(M) plug connection

Order No.: A-4495-0

2 AA batteries included

### 4 Aluminium case with charging stations and accommodation for 10 underchin receivers

Order-No. A-4183-0

This case contains two charging stations of type A-4976-0. 10 receivers LPU-1 or RCI-102 can be charged as well as safely stored and transported. The power connector is on the outside, the power supply unit is included.

### 5 XLR(M) adapter cord --> 3.5 mm cinch

Order No.: A-4933-0

e.g. to connect to CD players or stereo systems

### 6 Induction loop pad (description, see p. 7)

Order No.: A-4910-0

### 7 Cinch connection cord

Order No.: A-4906-0 (length: 3 m)

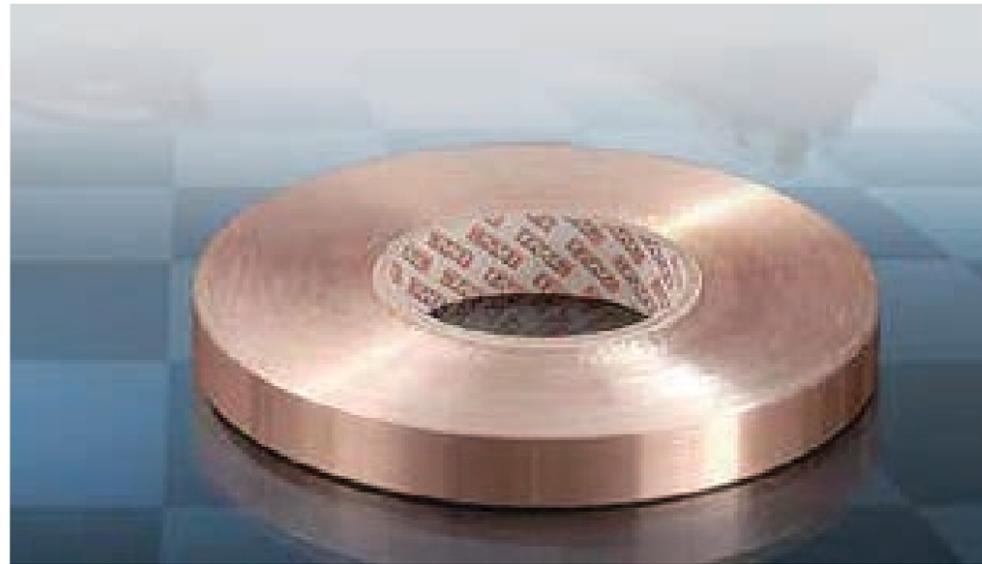
Order No.: A-4907-0 (length: 6 m)



## Multiple charge stations, storage and transport components for loop receivers



## »General accessories for induction loop systems«



### Copper ribbon cable

For loop installations underneath flooring.

**Order No.: HT-90168 (50 m)**

21 x 0,4 mm (section 5,4 mm<sup>2</sup>) insulated

**Order No.: HT-90169 (100 m)**

21 x 0,4 mm (section 5,4 mm<sup>2</sup>) insulated

### Loop cable

**Order No.: RW loop 2.5**

Section 1,5 mm<sup>2</sup>, insulated.  
Available in 10 m units

**Order No.: RW loop 2.5 twin**

Section 2,5 mm<sup>2</sup>, insulated.  
Available in 10 m units

### Adhesive Loop Marking Tape

**Order No.: A-4956-0**

The marking tape is intended to indicate the location of loop cables and conductors hidden underneath concrete or other floor materials.

Especially for buildings undergoing construction or renovation, the tape can help avoid unintended damage to loop cables, as can be caused by various tools

### PROLOOP FSMplus:

#### Measuring device for induction loop systems

**Order No.: A-4292-0**

The **PROLOOP FSMplus** is a measuring device that measures the magnetic field strength of induction loop systems according to IEC 60118-4:2006 and BS 6083, Para. 4. The device delivers reliable RMS values on the output level, response frequency, AGC function (Automatic Gain Control), distortion and background noise in the induction looped tested. In addition, it enables the user to make an acoustic evaluation of the sound using signal reproduction via earphones.



#### Features

Compliant with IEC 60118-4:2006 and BS for testing equipment used to evaluate induction loop systems.  
True RMS: 125 ms average time  
Crest factor: 3  
A filter  
Measuring range: +6 dB ...-40 dB (0 dB = 400 mA/m)  
Power supply: 2x 1.5 V AA batteries, long battery life  
Display: Battery status control via LED / field strength: via LED-scale (approx. 1 dB resolution)  
Headphone jack with volume control  
Dimensions (W x H x D): 83 x 126 x 35 mm  
Weight: approx. 170 g (incl. batteries)



Standard induction loop systems produce a magnetic field that usually exceeds the »core service area«. This so-called »overspill«, which travels horizontally and vertically, might still be audible three to four loop widths away. This effect often limits the use of this technology.

**Low-overspill systems expand the options for the application of induction loop systems.**

Low-overspill systems (LOS) considerably reduce »overspill«. They use special loop patterns to reduce the signal strength outside the loop.

For these patterns, two loops have to be operated out of phase with each other to achieve an equal distribution of the desired signal without creating any undesirable signal-free areas.

An LOS system consists basically of **two** induction loop amplifiers that are operated out of phase.

This configuration prevents the overspill and makes it possible to operate several induction loop systems in adjacent rooms without having their signals interfere with each other:

- No field strength reduction in the centre of the loop due to reinforced concrete,
- Greater reproducibility of the results,

The overspill off:

- Standard induction loop systems works in a horizontal and vertical direction. The resulting »eavesdropping effect« is often still measurable over distances of up to three induction loop widths.
- Low-overspill systems (LOS) that are completely customised and configured reduce overspill considerably to allow the operation of induction loop systems in directly adjacent rooms.

- Reduced danger of feedback due to lower power consumption,
- Extremely low overspill at reduced directional sensitivity.

#### HUMANTECHNIK service for planning low-overspill systems

Each individually optimal customisation and configuration depends on the conditions prevailing in the area of application, in other words, on the room floor plans and the sizes of the coverage areas, the number of internal loops and the demands made on low overspill.

Determining the corresponding values for the »customised« low-overspill layout and the optimal level adjustments in each case is based on a complex method of calculation and installation.

**That's why we strongly recommend that you take advantage of the services offered by HUMANTECHNIK.**

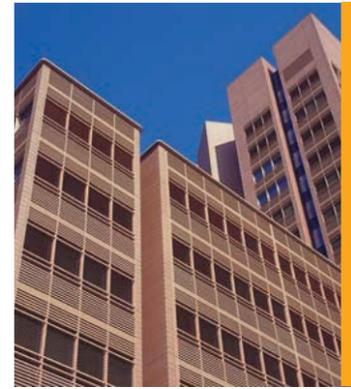
We provide competent support to architects, technicians and installers in planning LOS installations.

**Also take advantage of our loop planning software »LOOP DESIGNER«**

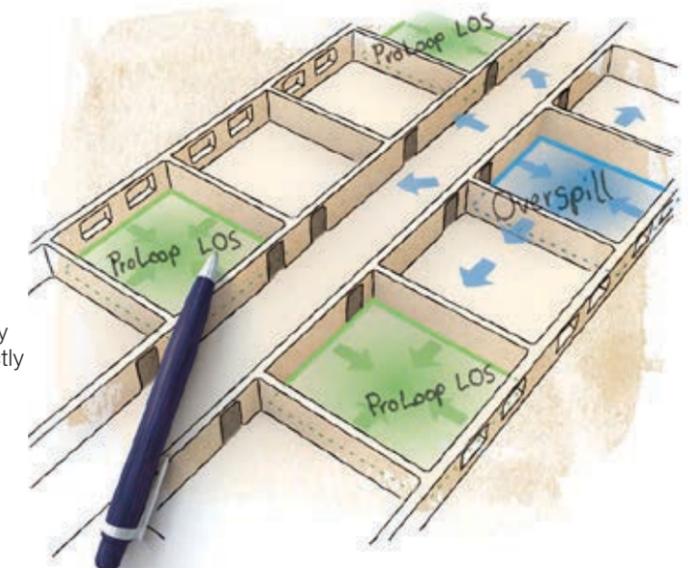
With the help of »Loop Designer«, various materials within the room can be considered, you can see how much conducting material you need, which performance the amplifier has to deliver - and you can also simulate the magnetic field with its strength.

Much easier and faster than you think!

**More information about »LOOP DESIGNER« can be found on page 5.**



**Low-overspill systems (LOS): Induction loop systems with low overspill**





## PRO IR-202

**Infrared transmission system for medium range, combined configuration possible**

### PRO IR-202 Transmitter

Order-No.: A-4082-0

The transmission energy of PRO IR-202 Transmission/Modulator unit spreads club-shaped in the room in a broad aperture angle (see illustration bottom right). The audio transmission is trouble-free due to the infrared signal modulation on 2.3 and/or 2.8 MHz. The PRO IR-202 can be combined with a further PRO-IR-202 in order of increasing the range and the dispersion angle of the infrared signals up to 240°.

A set for ceiling and wall mounting is included in the delivery. A tripod (Item-No: A-4986-0) is available as an accessory (page 25).

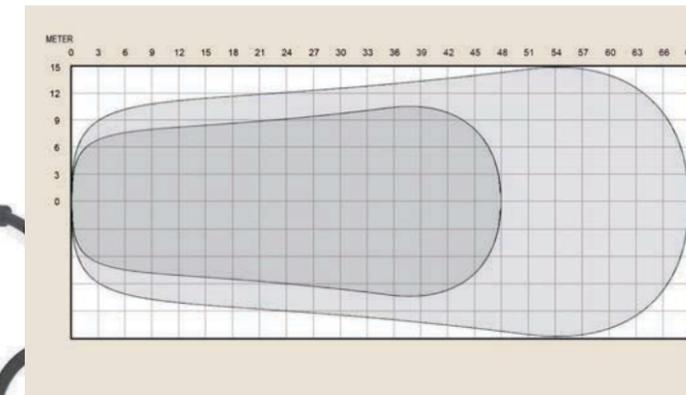
#### PRO IR-202 at a glance

- Broad exit angle of infrared signals
- Configuration with 1 and 2 channel transmission
- Combinable: Two PRO IR-202 transmitters can be linked

- Power supply of secondary unit by interconnecting cable
- Operation of combined configuration with a single power supply unit
- Usable as fixed (wall or ceiling mount) or mobile installation (e.g. tripod, see page 25).

| Specifications                  |  |
|---------------------------------|--|
| Power supply:                   | Power supply unit input: 100-240 V AC, 50-60 Hz, Exit: 24V DC, 0.5 A (2.5 mm barrel plug, centre contact »positive«)     |
| Connection cable:               | 2 x barrel plug 2,5 mm   |
| Carrier frequency:              | 2,3 MHz (channel 1) and 2.8 MHz (channel 2)  |
| Infrared transmission power:    | 0.7 W  |
| Ranges/Supply areas:            | Single transmitter: 1-channel operation 180 m <sup>2</sup><br>Combined mode (2 transmitters): 370 m <sup>2</sup>         |
| Input                           |  |
|                                 | Line-input: Cinch channel 1 and channel 2<br>Microphone input: 3.5 mm jack plug, sensitivity adjustable via control dial |
| In- / Outputs for combined mode |  |
| Primary transmitter:            | Power-out 24 V, audio-out "sync out"   |
| Secondary transmitter:          | Power-in 24 V, audio-in "sync-in"  |
| Display                         |  |
| LED:                            | Input-level indicator LEDs, 1 per channel.   |
| Mechanical data                 |  |
| Ambient conditions:             | 0 – +50 °C ambient temperature (non-condensing, non-corrosive environment)   |
| Mounting types:                 | Wall or ceiling mount: installation kit included<br>tripod (optional)  |
| Dimensions:                     | 254 x 79 x 64 mm (W x D x H) incl. front panel   |
| Colour:                         | black with white lettering, red acrylic strip  |
| Weight:                         | 300 g  |
| Certification:                  | CE, WEEE, RoHS   |

PRO IR-202: Greater range through combining two transmitters



Range example

- Single transmitter PRO IR-202
- PRO IR-202 + one further transmitter PRO IR-202 in identical orientation

### Combined mode

Combining two PRO IR-202 with each other occurs via the supplied installation kit. All necessary cables are included.

The units mounted on top of each other can be freely turned to the required angles to achieve optimal signal supply in the room. The range of the combined units is up to 370 m<sup>2</sup> at one-channel transmission - ideal for large rooms.

With the selection of the suitable receiver type (RCI-102, PR-22+ or IP-112) the range can be further influenced, depending on the sensitivity of the receiver diodes.





## PRO IR-400

### High-performance infrared transmitter

#### Possible application areas:

- Cinemas
- Parallel transfer of different languages (channel selection)
- Conference and meeting rooms, multimedia rooms
- Courts and lecture halls
- Schools, universities
- Churches



#### Infrared transmitter PRO IR-400

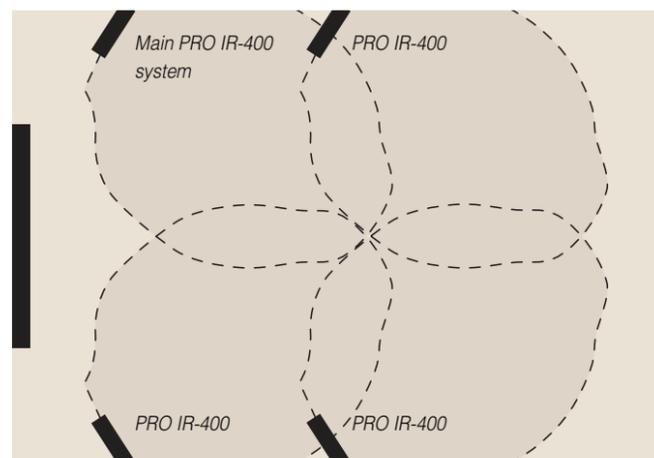
Order No.: A-4026-0

The two-channel infrared transmitter PRO IR-400 combines the modulator and transmitter in one unit in a single Housing. This design saves costs and can be mounted in a space-saving manner.

The system generates a wide exit angle for the infrared signal, which is spread efficiently throughout the supplied areas in the club shape typical for this transmission technique.

The transmission of the PRO IR-400 is realised securely at a working bandwidth of 2.3 and 2.8 MHz and without any interfering ambient light. In 1-channel mode, the transmitter supplies areas of up to 900 m<sup>2</sup>. Adding additional transmitters of the type PRO IR-400 allows the receiving range to be expanded easily. The delivery includes an attachment set for wall and ceiling mounting. There are also tripods available for free-standing installations.

| Technical data          |  |
|-------------------------|--|
| Dimensions (WxHxD)      | 41.2 x 32.7 x 7.5 cm   |
| Weight                  | 1,100 g  |
| Colour Housing          | Anthracite / front panel: dark red transparent   |
| Power supply adapter    | Primary 230 V~ 50-60 Hz, secondary 28 V DC   |
| DC-input                | Low-voltage connector, 28 V DC, middle is »+«-Pol  |
| Power consumption       | 700 mA   |
| Carrier frequencies     | 2.3 MHz (left or A-channel) and 2.8 MHz (right or B-channel)                                 |
| Input impedance         | Audio-In: 18 kΩ<br>Mic-In: 1.3 kΩ  |
| Trigger voltage of the  | Audio-In: 110 mV   |
| Input level display     | Mic-In: 1.5 mV   |
| Total range at +/- 3 dB | Lower limit: 400 mV<br>Upper limit: 6 V  |
| Audio-Inputs            | Cinch (RCA) for left and right and/or A and B-channel  |
| Sync-in / Sync-Out      | Cinch (RCA) for left and right and/or A and B-channel  |
| Microphone input        | 6.4 mm Stereo-jack plug  |
| Audio display           | Input level-LEDs, one per channel.   |
| Sender range            | 30 metre, closed room  |
| Temperature range       | 0-40°C   |
| Attachment              | Wall attachment with conventional hooks,<br>Tripod attachment via standard screw attachments |
| Conformities            | CE, WEEE, RoHS   |
| Compatible receiver     | RCI-102, IP112   |



The reception area can be multiplied by connecting several transmitters.



#### 1 Headphones with 2-channel IR-receiver »IP112«

Order No.: A-4039-0

The wireless headset with 2-channel IR-receiver is suitable for the operation with transmitters operating on 2.3 or 2.8 MHz. It reproduces audio signals in excellent sound quality. The easy to operate headset is equipped with a number of comfort functions including the adaptation of the sound pattern to individual listening preferences. The volume can be individually regulated on each side of the headset.

#### 2 Two-channel infrared under-the-chin receiver RCI-102

Order No.: A-4043-0

The RCI-102 is an ergonomically designed under-the-chin receiver that is equipped with swivelling earpieces, which means that the earpieces retain their position in the ear even when the user turns his/her head. The soft ear buds also nestles gently in the auditory canal to effectively subdue any ambient noise.

#### 3 IR-receiver »PR-22+«

Order No.: A-4037-0

The »PR-22+« (with AGC, Auto-matic Gain Control) is a high performing 2-channel receiver for infrared signals.

#### Technical data RCI-102

|                                     |                                |
|-------------------------------------|--------------------------------|
| Weight:                             | 52 g with battery              |
| Rechargeable battery, battery life: | A100 NiMH battery, approx. 5 h |
| Modulation processes:               | FM, mono or stereo             |
| Sound frequency transmission range: | 15 - 20,000 Hz                 |
| Operating frequencies:              | 2.3 MHz and 2.8 MHz            |
| Harmonic distortion:                | <1%                            |
| Signal-to-noise ratio:              | Typ. 60 dB                     |
| Maximum volume:                     | Approx. 120 dB                 |
| Main switch:                        | Integrated in the »receiver«   |

#### Technical features IP-112 / PR-22+

|  |                                     |
|--|-------------------------------------|
| Receiver frequency                       | 2.3 MHz & 2.8 MHz (can be switched) |
| Modulation                               | FM broadband                        |
| Frequency response                       | 60 Hz to 12 kHz ± 3 dB              |
| Signal-to-noise ratio 54 dB not weighted |                                     |
| Power supply                             | 2 AAA alkaline batteries            |
| Usage period, normal                     | 20 hours                            |
| Maximum output                           | 6 mW                                |
| Weight                                   | 200 g                               |

It allows using the range of the respective transmitters to its fullest. It can optionally be used with rechargeable batteries (2 x A-4966-0 per device needed).

#### 4 Single recharger for the PR-22+ infrared receiver

Order No.: A-4971-0

#### 5 Single recharger for the RCI-102

Order No.: A-4977-0

#### 6 5-bay recharger for RCI-102 receivers

Order No.: A-4976-0

Recharger with 5 independent recharging bays for the receivers.

#### 7 5-bay recharger for the PR-22+ infrared receiver

Order No.: A-4972-0

#### Silicone earpieces for RCI-102 and LPU-1

#### 8 Standard

Order No.: A-4985-0 (2 sets)

Order No.: A-4987-0 (24 sets)

#### 9 Tapered shape

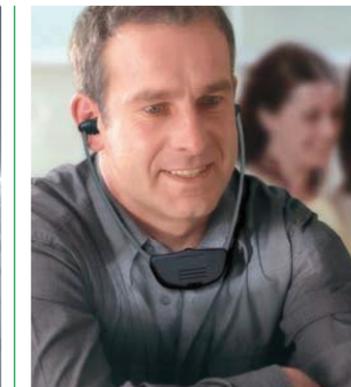
Order No.: A-4988-0 (2 sets)

Order No.: A-4989-0 (24 sets)

#### 10 Perforated

Order No.: A-4993-0 (2 sets)

Order No.: A-4992-0 (24 sets)



### Infrared receivers

compatible with all infrared transmitters with the operating frequencies of 2.3 MHz and 2.8 MHz





## Infrared receivers



### Portable pocket transmitter with PLL microphone...

#### 1 ... to be used with the UHF101 set

Order No.: A-4460-0

#### 2 ... to be used with the UHF401 set

Order No.: A-4460-0

The handy transmitters can be worn directly on the body. The speaker then simply clips the microphone to his/her collar to have both hands free.

### 2.4 GHz microphone system for up to 4/8 channels

This system allows the connection of up to 4 microphone transmitters to one receiver. Each microphone transmitter has 2 separate micro-phone ports, therefore it is possible to transmit up to 8 separate micro-phone signals to the receiver. And this in crystal-clear 2.4 GHz quality.

#### 5 2.4 GHz microphone transmitter for up to 4/8 channels

Order No.: A-4470-0

The small lightweight transmitter has two separate microphone-in ports. Included are: 1 transmitter, rechargeable battery, charger cable, plug-in microphone and belt clip. Signal range: Up to 100 m.

#### 4 2.4 GHz microphone receiver for up to 4/8 channels

Order No.: A-4471-0

The very small receiver has a 3,5 mm audio jack plug as an audio-out port. Therefore the receiver can be connected directly to a multitude of devices - even smartphones.



#### Neck Loop Mono 50 cm

Order No.: HT A-4928-0

Inductive audio transmission to hearing aids or CI systems via the T-coil. (switch set to »T« or »MT«)

Neck loop for use with receiver R863 Inductive audio transmission to hearing aids or CI systems via the T-coil (switch set to »T« or »MT«)



### Lightweight Headphones

Order No.: HT A-4905-0

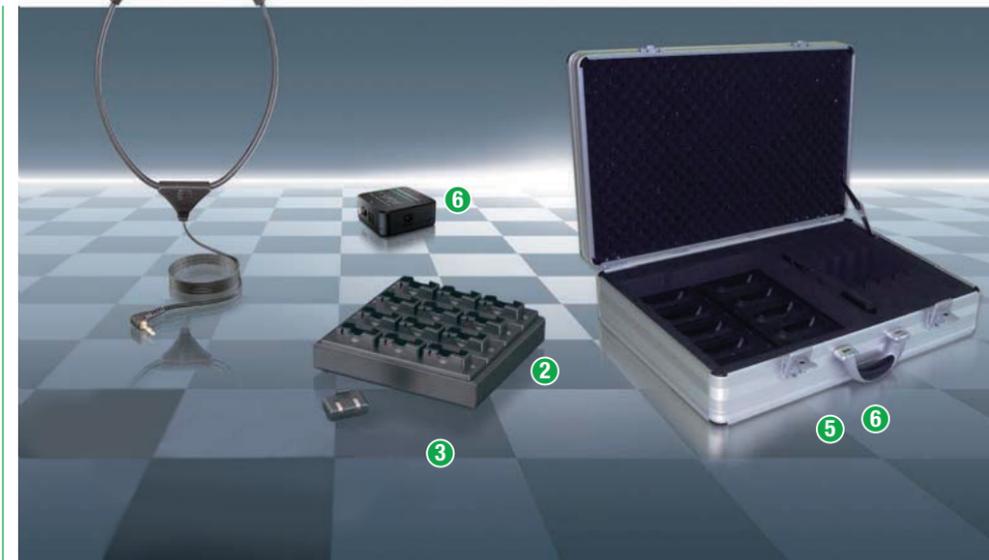
Comfortable light weight headphones to suit PR22 IR or RXI RF Receivers.

#### Neck Loop Mono 1 metre

Order No.: HT A-4927-0

Inductive audio transmission to hearing aids or CI systems via the T-coil. (switch set to »T« or »MT«)

Neck loop for use with receiver R863 Inductive audio transmission to hearing aids or CI systems via the T-coil (switch set to »T« or »MT«)



#### 1 Under-the-chin receiver

Order No.: A-4903-0

Under-the-chin receiver weighing less than 30 g, which can be connected to the PR-22+ receiver. The ergonomically shaped earpieces fit snugly into the auditory canal. Due to the 3,5 mm jack plug, this receiver can be used with a wide range of different audio devices.

#### 2 12-battery recharger for A100 batteries

Order No.: A-4974-0

Time-saving recharger for users who operate a larger number of the receivers (RCI-102).

#### 3 Replacement A100 battery for RCI-102

Order No.: A-4970-0

#### 4 S/PDIF Audio converter

Order No.: A-4963-0

The S/PDIF converter (operation with power supply unit) converts digital signals of respective audio sources into analogue signals, allowing their further processing by systems with analogue input.

#### 5 Aluminium case with charging stations and accomodation for 10 underchin receivers

Order-No.: A-4183-0

This case contains two charging stations of type A-4976-0. 10 receivers LPU-1 or RCI-102 can be charged as well as safely stored and transported. The power connector is on the outside, a power supply unit is included.

#### 6 Aluminium case with charging stations and accomodation for IR-receivers PR-22+

Order-No.: A-4189-0

This case also contains two charging stations, but of type A-4972-0 for infrared receiver PR-22+.

(Also useable for previous model PR-20+).

10 receivers PR-22+ can be

charged, safely stored and transported. The power connector is on the outside, the power supply unit is included.

#### 7 Tripod for infrared transmitters PRO IR-202 and PRO IR-400

Order No.: A-4986-0

This height adjustable tripod is equipped with mounting components matching the respective receivers.

Pulls out to a maximum of 3 m  
Maximum load 20 kg



## Accessories for Infrared Transmission Systems



## »Function and use of infrared transmission systems«

### How does an infrared audio transmission system work?

An IR audio transmission system consists of at least one transmitter and one receiver. The transmitter is connected to an audio source – to a microphone system, for example – and transmits the signals received in the form of infrared light impulses wirelessly to the receiver, which converts the light impulse received into electrical audio signals and feeds them into the reproduction device connected – into headphones, for example, or a teleloop for the inductive direct transmission to hearing aids.

### Areas of application

Apart from the **home environment**, in which the wireless reception of audio signals via infrared light has long since become a popular alternative to the corresponding radio-frequency transmission systems, this technology proves superior to all other transmission principles

### for certain large professional applications.

This applies in particular to venues and facilities, ...

... in which the confidentiality of the information exchanged there plays a decisive role, for example in courtrooms or conference rooms,

and areas, ...

... in which several transmission systems are operated parallel to one another in neighbouring rooms, such as in multiplex cinemas or in living quarters in social facilities.

In addition, infrared audio transmission systems have proven valuable in schools and universities, in large auditoriums with partial signal coverage or in city centres, in which there is a very high rate of radio-frequency emissions.

### Advantages of infrared transmission technology

- Infrared light signals cannot pass through walls, which reduces reception to the room in which the transmitter is installed.
- Transmission is reliable and absolutely free of the interference caused by electromagnetic fields or structural elements in the building, such as metal reinforcements. In addition, these systems do not produce any electromagnetic emissions themselves.
- Infrared transmission systems can be used easily in many different countries; an »obligation to register« them, similar to the allocation of radio licenses, is not required.

### Coverage

While the range of systems designed for private use is limited to about 10 or 20 metres, **high-powered infrared transmitters** are able to provide **coverage for much larger rooms**. The transmitters described in this product overview, for example, are able to provide coverage for up to 900 m<sup>2</sup>.

### Other characteristics of infrared audio transmission systems:

- Portable/mobile systems are available.
- Multi-channel operation provides for flexible use, making it possible to simultaneously transmit several different languages, for example.
- Receivers are compatible with TV listening systems for at-home use.

### Other factors affecting infrared transmission technology:

- The transmitter does not focus the emission of the infrared light impulses, i.e. it uses a very large transmission angle. As a result, there is generally no need for a specific »line of sight« between the transmitter and the receiver.
- The signals do not only travel directly between the transmitter and the receiver, but are also reflected from the walls, ceilings and floors. Nevertheless, pillars and furniture – depending on their size and position – can interfere with or even block reception under certain conditions.

**In any case, a technically correct, precise positioning of the transmitters is required for optimal signal coverage.**

- Light-coloured floor, wall and ceiling areas reflect infrared energy more strongly. This can increase the reception range.
- Dark, low-reflection floors, ceilings and walls absorb the energy and can limit reception ranges as a result.
- The carrier frequencies of 2.3 to 3.8 MHz (basic band) minimize the probability of interference resulting from powerful lighting. However, functional problems due to direct sunlight cannot be ruled out altogether.
- In order to provide coverage for areas that exceed the maximum range of the individual transmitters, it is necessary to install several transmitters at different locations and connect them in parallel.\*



## Reliable, inconspicuous audio transmission for rooms up to 900 m<sup>2</sup> in size

The transmitter sets up an »infrared signal route« to the receivers of the transmission system. The transmitter's large signal emission angle or the wide signal dispersion and the reflection from walls, ceilings and floors guarantee reliable reception – for the most part, even when smaller obstacles (furniture or pillars) block the direct »line of sight« between the transmitter and the receiver.



The signals are transmitted to the hearing aid via a special infrared receiver with audio amplification equipped with a teleloop (induction).

If the receiver is equipped with an audio output jack, it is also possible to use headphones or earphones.

Amplifying infrared audio receivers are available as pocket devices, under-the-chin receivers, headphones with reception diodes or in the LR version with a teleloop and audio output.

\* If the reception range is the main criterion for the application in this context, it is advisable to consider the use of a radio-frequency system as an alternative – also taking into consideration the cost factor (p. 30 ff.).



**NEW! xepton**

**Portable 2.4 GHz-system with large range**

**Ideal for**

- guided tours
- simultaneous transmission of different languages
- Conferences
- clear understanding, even in noisy and acoustically challenging surroundings
- Over 10 hours of battery life per charge
- Useable worldwide

With a range of up to 300 metres, **xepton** provides a wide choice of applications, for example as:

- Interpreter-system
- System for guided tours or as
- Team-teaching-system (tutoring and conference system)

The state-of-the-art 2.4 GHz-technology guarantees a high security against interferences and crystal-clear sound. As there are no country-specific limitations for 2.4 GHz devices, it can be used all over the world.

The convenient, lightweight and sturdy devices or portable use are available in the following models:

- **xepton TRX-1:** The two-directional transceiver is a transmitter and receiver in one and permits talking and listening.
- **xepton TX-1:** transmitter for 1-way-communication.
- **xepton RX-1:** Portable receiver

The system sports 40 selectable channel groups, which allows for a wide range of applications, for example a multilingual interpreter transmission. Up to 99 transceivers can

| Technical data:         | Transceiver Xepton TRX-1   |
|-------------------------|--|
| Dimensions (H x W x T): | 98 x 49 x 17 mm  |
| Weight:                 | 88 g   |
| Colour:                 | black  |
| Casing material:        | resistant plastic  |
| Battery type:           | Lithium-Ion rechargeable battery 3.7 V / 1100 mAh  |
| Battery life:           | Over 10 hours per charge   |
| Transmission frequency: | 2,4 GHz (ISM band)   |
| Modulation:             | FSK, with hopping  |
| Transmission range:     | Up to 300 m in open air / 100 m in buildings   |
| Channels:               | Up to 40 simultaneous groups   |
| Frequency response:     | 50 Hz – 7 kHz  |
| Sensitivity:            | - 95 dBm   |
| Data rate:              | 2 Mbps   |
| Connectors:             | 2 x 3,5 mm 4 contact-jack and micro-USB chargeport   |
| Indicators:             | LC display (group, channel, volume, battery status, mode, signal strength), LEDs (charging status, talk) |
| Conformities:           | FCC, CE, RoHS, WEEE  |

be used in a group, with one being defined as master transmitter and 2 further ones of free choice being able to speak at the same time.

All portable **xepton**-devices have a micro-USB charging socket, which makes it possible to charge these with any computer or the most common mobile phone chargers.

The stationary repeater **xepton TRP-1** can be used to further the transmission range.

**Portable transceiver xepton TRX-1**

**Order No.: A-5200-0**

The two-way transmitter TRX-1 can be worn on the belt by means of the carry case CC-01 (available as accessory). A sturdy and resistant plastic body protects the inner electronic components.

**Included in the package: Softcase with Transceiver TRX-1, headset HSB-01, USB-charger cable, neck strap.**

**Note: The devices of the previous systems »SPL« and »CT« are still available upon demand. Please contact us!**



**Xepton T1 Transmitter**

**Order No.: A-5230-0**

The **Transmitter T-1** offers itself for stationary applications and fixed installation.

The **T-1** with its transceiver functions can also be used for bidirectional applications, just like the TRX-1 it can be used for tour-guiding. Up to three **T-1** or TRX-1 can send/talk within the same channel group and up to 40 channel groups with 100 devices each

(receiver RX-1: unlimited) can be utilized. Control of the **T-1** via the LC-display is as easy as with all the other »xepton«-devices. For the fixed installation in a rack, we offer a rack mounting kit and a remote antenna.

**Xepton RP-1 Repeater**

**Order No.: A-5231-0**

The stationary repeater **RP-1**, a signal amplifier, extends the range of the audio transmission system »xepton« in connection with the stationary transmitter, transmitter T1 by approx. 400 meters each. Each transmitter T1 can be cascaded with a maximum of 10 repeater units and thus open up a range of up to 1000 meters. A rack mount kit and remote antennas are available for rack mounting.

**»xepton« Stationary Transmitter T-1 Specifications**

|                            |  |
|----------------------------|--|
| Dimensions                 | 37 x 230 x 124 mm (H x W x D)                  |
| Weight                     | 390 g  |
| Frequency                  | ISM 2403 - 2480 MHz                            |
| Transmission method        | ISM 2.4 GHz FSK Modulation mit Frequenzhopping |
| Transmission output        | Maximum 10 mW                                  |
| Voice codec                | 16bit / 16 KHz                                 |
| RX-sensitivity             | -95 dBm  |
| Latency                    | < 35 ms  |
| Data rate                  | 2 Mbps   |
| Frequency width            | 2 MHz  |
| Power supply               | Micro-USB-unit 5 V                             |
| Antenna                    | External antenna                               |
| Power consumption          | 100 mA   |
| Transmission range         | bis 300 m                                      |
| Frequency range            | 50 Hz - 7 kHz                                  |
| Max amount of transmitters | 3 per channel group (incl. master transmitter) |

**»xepton« Repeater RP-1 Specifications**

|                         |   |
|-------------------------|---|
| Device type:            | Repeater  |
| Dimensions (H x W x D): | 37 x 230 x 124 mm                                 |
| Weight:                 | 390 g   |
| Radio frequency type:   | ISM 2403 - 2480 MHz                               |
| Transmission mode:      | ISM 2.4 GHz FSK modulation with frequency hopping |
| Transmission power:     | Maximum 10 mW                                     |
| Voice codec:            | 16bit / 8 KHz                                     |
| RX sensitivity:         | -95 dBm   |
| Delay:                  | < 35 ms   |
| Data rate:              | 2 Mbps  |
| Frequency width:        | 2 MHz   |
| Power supply:           | USB 5V/DC / 1A                                    |
| Power consumption:      | 400 mA  |
| Range:                  | up to 150m  |
| Frequency response:     | 50 Hz - 7 kHz                                     |



**NEW! xepton**

**Xepton T-1 Transmitter**

**Xepton RP-1 Repeater**





## Accessories for xepton



6



7



8



10



### 1 Plug-In microphone PM-01

Order No.: A-5263-0

Plug-in microphone for transmitter *xepton TX-1*.

### 2 Microphone headset EBB-01

Order No.: A-5271-0

Microphone headset for transceiver *xepton TRX-1*, with earloop. Weight including cable: 22 g.

### 3 Microphone headset HSB-01

Order No.: A-5270-0

Microphone headset for transceiver *xepton TRX-1*, mit head clip and padded loudspeaker. Weight including cable: 64 g

### 4 Leather carry case CC-01

Order No.: A-5290-0

Protective case to comfortably wearing the *xepton TRX-1*. Transceiver not included. Net weight: 36 g

### 5 Arm band holder AM-01

Order No.: A-5292-0

For *xepton TX-1* und *RX-1*. Worn around the arm, velcro fixing.

### 6 USB cable UC-01

Order No.: A-5261-0

Charger cable with USB-A und USB micro-B-connectors. Length 1 m.

### 7 Belt clip BC-01

Order No.: A-5291-0

Holder with belt clip for *xepton TX-1* and *RX-1*. Depicted receiver not included. Net weight: 25 g

### 8 Earphone EHE-01

Order No.: A-5281-0

Single-sided earphone with ear loop. Weight: 12 g

### 9 Clip-on microphone CM-01

Order No.: A-5264-0

Microphone with clip, for fastening on clothing. Cable length: 110 cm

### 10 TRP-1 Stationary repeater / transmitter

Order No.: A-5230-0

Stationary transmitter for expanding the transmission range.

## Without depiction:

### RCB-20 20-bay charging bag

Order No.: A-5250-0

Charging bag for 20 LI-ION rechargeable batteries of device types *xepton TX-1* and *RX-1*.

### CB-20 20-bay charging case

Order No.: A-5251-0

Charge- and carry case for 20 pieces *xepton TX-1* or *RX-1*.

### MCB-10 10-bay charging case

Bestell-Nr.: A-5252-0

Charge- and carry case for 10 pieces *xepton TRX-1*.

### xepton LI-ION for TX-1 und RX-1

Order No.: A-5260-0

Rechargeable battery for *xepton TX-1* and *RX-1*. LI-ION 3,7 V / 1100 mAh

### EHR-01 Microphone headset

Order No.: A-5272-0

Microphone-headset for transceiver *xepton TRX-1*, with In-Ear-earphone.

### ER-01 In-ear earphones

Order No.: A-5280-0

In-Ear-earphones for *xepton RX-1*. Cable length: 125 cm

### USB-power supply

Order No.: A-5262-0

Power supply with USB-A- connector. Mains adapter for EU, US, CA und Australia included.



9



## »introson2.4« - Digital listening system with 2.4 GHz radio transmission

»introson2.4« is able to convince by its exceptionally clear audio reproduction and its differentiated high-quality sound - reliable and free of noise. This is ensured by the 2.4 GHz frequency, which permits wireless transmission of high bit rates without compression.

3 different tone presets are available at the push of a single button: Treble emphasis, bass emphasis and normal.

A special feature of the introson 2.4 is the possibility to switch from the reception of the TV sound to communication. In this case, the receiver picks up the environment's sounds with its inbuilt microphone and amplifies them. This makes it possible to converse with other people in the room at any time.

The signal range is approx. 25 metres. Due to the possibility of connecting an almost unlimited amount of receivers to one transmitter, this system is ideal for cinemas, churches and similar sized rooms.

### Technical data »Introson2.4«

|                            |                         |
|----------------------------|-------------------------|
| Transmission:              | Digital FM (stereo)     |
| Transmission frequency:    | 2,4 GHz                 |
| Frequency response:        | 30 - 20.000 Hz          |
| Distortion:                | < 0,5 %                 |
| Signal-to-noise ratio:     | > 75 dB                 |
| Operating temperature:     | 0° C - 55° C            |
| Operating time per charge: | approx. 4 h             |
| Bat. type                  | Li-Polymer 3,7V 350 mAh |
| Charging time:             | approx. 5 h             |
| Signal range:              | approx. 25 m            |
| Receiver weight:           | approx 66 g             |

### 1 »introson2.4«-Set with underchin receiver

Order No.: A-4103-S

Set with transmitter and underchin-receiver. 2 rechargeable batteries included. Volume up to 120 dB.

### 2 »introson2.4 LR«-Set with neckloop-receiver

Order No.: A-4113-S

The neckloop receiver transfers sound via induction directly to hearing aids equipped with a T-coil. An auxiliary output allows the connection of headphones or induction hooks.

### 3 Additional underchin receiver

Order No.: A-4153-S

Underchin receiver for »introson2.4«. 1 rechargeable battery included.

### 4 Additional neckloop receiver

Order No.: A-4153-S

Neckloop receiver for »introson2.4«. 1 rechargeable battery included.

### 5 Stand-alone transmitter

Order No.: A-4114-0

Transmitter without charger bay. For use with additional receivers and multiple rechargers.

### 6 Silicone earpads for »introson2.4« underchin receivers

Order No.: A-4998-0

24 sets of spare earpads.

### 7 5-bay recharger

Order No.: A-4192-0

For up to 5 »introson2.4«-receivers.

### 8 10-bay charger case

Order No.: A-4184-0

Aluminium charger case and container for up to 10 receivers and 1 transmitter of »introson2.4«. 2 chargers type A-4192-0 included. Exterior power connector.

### Technical data

|                |                            |
|----------------|----------------------------|
| Charging time: | approx. 5 hours (0 - 100%) |
| Dimensions:    | 64 x 38 x 15 cm            |



## introson2.4 Digital 2.4 GHz FM transmission system



7



8



## Function and use of radio-frequency transmission systems

### RF transmission systems

Of all the wireless transmission technologies, radio-frequency transmission has been around for the longest time. Not surprisingly, then, it is also the most common, and with respect to audio transmission systems for accessible sound, it proves to be the most powerful system with the largest ranges of coverage.

The basic configuration of a radio-transmission system consists of a transmitter and at least one receiver. The transmitter, which is connected to an audio source – to a microphone system or any other audio system, for example – picks up the audio signals to transmit them wirelessly to the receivers.

The receivers can be equipped with teleloops, which provide for the inductive transmission of the signals to the hearing aid.

Amplifying receivers with audio output jacks are also available and can be connect to the earphones or headphones.

### Areas of application

Radio-frequency audio transmission systems have already become well established as wireless headphones or TV listening systems in the home environment.

The systems described in this brochure, however, go above and beyond this, most importantly because they have been designed for professional applications – for example:

- in sport arenas or at other spacious event venues,
- in churches and other assembly halls,
- in lecture or seminar rooms, as in schools and universities,

and for open-air applications in particular, there is hardly an alternative to radio-frequency transmission.

In addition to these stationary applications, portable, so-called tour-guide systems have also proven useful in many areas. Some of the areas they can be used in include

- museums, art galleries,
- tourist attractions and special events
- or transportation.

The availability and use of several channels makes it possible to provide different information at the same time, for simultaneous interpreting into different languages, for example, or for the treatment of different topics for several listening groups located close to one another.

### Outstanding features of radio-frequency transmission technology

- Transmitter and receiver do not require a direct »line of sight«. Radio waves can pass easily through normal house and building walls. Listeners take the sound along, even when they leave the room in which the transmitter is installed.
- This means that even very large areas can be easily supplied with audio signals.
- It is relatively easy to install RF transmitters, which also makes it inexpensive. The costs for installation and hardware do not increase in proportion to the size of the area that requires coverage.
- The transmitters can be installed inconspicuously (except in metal enclosures) and do not mar or spoil the overall architectural picture.

Sunlight, artificial light and the reflection conditions inside rooms do not affect transmission.

RF transmission systems are easy and convenient to use, they are very portable and, with multi-channel functionality, they are very flexible in their uses and applications.

### Coverage

With respect to coverage, RF transmission systems are far superior to the two other transmission technologies described in this brochure.

With coverage ranges of up to more than 300 metres, it is possible to easily supply even large arenas with audio signals. The transmission distances of tour-guide systems with approximately 30 metres makes it possible to supply information even in large groups or groups in different locations.

### Factors influencing the operation of radio-frequency transmission technology

- Other RF systems or electromagnetic emissions could have a negative effect on transmission and signal quality.
- Users must make sure that their transmission channels are set correctly.

Some countries charge radio-licensing fees for the use of these systems. In this context, it cannot be ruled out that the national regulations in some countries only release certain frequency ranges for these systems (different from the standard).

### More useful information on the use of radio-frequency transmission systems

- Users of audio radio-frequency transmission systems should be aware of the fact that the coverage ranges or the signal scattering go beyond the intended coverage areas. As a result, there is no guarantee that the information transmitted will remain confidential.
- When planning the parallel use of this type of system – in neighbouring rooms, for example – the transmission must be made on different channels (compare the number of channels available with the number of channels required).



## An attractively priced, functional solution designed to provide large areas with audio signals

*Due to their ability to provide large coverage and independence from floor plans and architectural structures, radio-frequency transmission systems are also ideally suited to open-air applications.*

*Radio-frequency signals are able to easily pass through walls. The listeners can leave the room in which the transmitter is installed at any time without any problem and their RF receivers will continue to provide them with the information they need.*





## Accessible sound: Greater independence in public life for people with hearing disabilities.

### The percentage of people with impaired hearing is on the increase.

The demographic shift in age has had a decided impact on this development. Hearing loss – even if only slight – can now be detected in every fourth 50- to 59-year-old. Among people over 70, the number who are hard of hearing is already considerably higher at more than fifty percent – with significantly greater hearing loss. The percentage of people in these age groups is also expected to increase in the future.

### Right to participation in cultural life

This so-called »50plus Generation« is very active in shaping public life. They represent a group with considerable purchasing power, take advantage of a comprehensive range of cultural offers and use all contemporary media. And they also demand – quite justifiably – unlimited access to information and communication – which constitutes acoustically accessible infrastructures in the broadest sense.

### The accessible design of public and private infrastructures

The German law for the equality of disabled persons (BGG) defines accessibility as follows: »Buildings and other facilities, means of transport, technical apparatus, systems for information processing, acoustic and visual sources of information and communication facilities as well as all other areas of life are accessible when they are useable by

handicapped people in a general way, without any particular difficulty and without necessitating the help of third parties.«

Needless to say, the term accessibility also includes the access of the hearing impaired to acoustic information – starting with such elementary sounds as alarms and emergency signals to educational information and communications and right on up to acoustic participation in cultural and sporting events.

Even contemporary hearing aids are not able to guarantee good hearing and clear understanding in every situation. In noisy environments or in rooms with extreme resonance or echoes, for example, these systems often quickly reach their limits. That's why audio transmission systems that effectively include or supplement hearing aids are now often used, particularly in places where interruption-free communication is important.

These systems feed the sound either directly into a hearing aid or a CI system or make it available to the user via special receivers.

### National laws on equality and their implementation

The application of equality guidelines (anti-discrimination laws) is as diverse as the cultural attributes of the individual European states. While far-reaching measures enabling equal treatment are already common in France, the Netherlands, Great Britain and Scandinavian countries, for example, the provision of accessible infrastructures is lagging behind in other countries – as in Germany.

The equal treatment of the disadvantaged and minorities has, however, now become a central concern of the European Union (EU Basic Treaty). In this respect, the consistent implementation of accessible infrastructures – particularly in government offices, but also in restaurants, at event venues and in public transportation systems – will only be a question of time for all EU nations.

### Europe's self-image

The EU appeals to all its member states to not discriminate against anyone because of his/her personal situation. Article 26 of the Charter of Fundamental Rights of the European Union, for example, reads: »The Union recognises and respects the right of persons with disabilities to benefit from measures designed to ensure their independence, social and occupational integration and participation in the life of the community.«

### Technical solutions for accessible sound

In addition to building acoustics and electro-acoustic public address systems (DIN 18041), the following systems can be used for a significantly higher proportion of direct sound:

- Induction loop systems
- Infrared transmission systems
- Radio-frequency transmission systems

In order to ensure that the listening systems provided are effective, it is important to compare the requirements of the venue and its architectural features with the properties of the transmission systems early in the decision-making process.

### The table (below) provides a brief overview of the main selection criteria.

The main advantage of all these systems is that the sound is delivered to the listeners in a pure, undistorted form that is not influenced by the distance of the listeners to the sound source or by any annoying background noise in the room.

### AUDIOropa provides a comprehensive range of assistive listening services.

The AUDIOropa program is structured in a cross-system manner and includes components and the complete range of accessories for transmission systems using all three of the physical principles mentioned here. The following pages will present the technical

components, list their main technical data and provide you with assistance in making your purchasing decision!

Special skills or knowledge are often required in the planning, project development and installation of sound transmission systems. That's why we offer system operators and architects a comprehensive consulting and services package in this field. From qualified information to competent support in the planning process and right on up to the installation and first-time operation of the system, we will accompany you every step of the way with our consulting services to ensure the effective implementation of your professional audio transmission system.



## AUDIOropa offers a comprehensive package of technology, consulting and services for the professional use of audio transmission systems.

| A comparison of systems using different physical transmission principles    | Induction loop systems | Infrared transmission systems | Radio-frequency transmission systems |
|---|------------------------|-------------------------------|--------------------------------------|
| Small to medium-sized conference rooms                                      | ●                      | ●                             | ○                                    |
| Partial provision, e.g. information counters, reception areas, living areas | ●                      | ●                             | ●                                    |
| Cinemas (particularly multiplex cinemas)                                    | ●*                     | ●                             | ○                                    |
| Courtrooms (data confidentiality), conference rooms                         | ○                      | ●                             | ○                                    |
| City centres (high radio-frequency emissions)                               | ○                      | ●                             | ○                                    |
| Auditoriums, theatres   | ●                      | ●                             | ●                                    |
| Schools and universities  | ●*                     | ●                             | ●                                    |
| Stadiums, sport arenas  | ●**                    | ○                             | ●                                    |
| Churches  | ●                      | ●                             | ●                                    |
| Open-air applications   | ○**                    | ○                             | ●                                    |
| Direct reception in the hearing aid (without a special receiver)            | ●                      | ○                             | ○                                    |
| Tour-guide systems available  | ○                      | ○                             | ●                                    |
| Locally limited reception range   | ●*                     | ●                             | ○                                    |
| Not susceptible to electromagnetic interference                             | ○                      | ●                             | ○                                    |
| Interference-free parallel operation in neighbouring rooms                  | ●*                     | ●                             | ○                                    |
| Portable systems available  | ●                      | ●                             | ●                                    |
| Excellent sound quality   | ●                      | ●                             | ●                                    |
| Several channels available  | ○                      | ●                             | ●                                    |
| Service provided for very large areas/large range                           | ○                      | ○                             | ●                                    |
| Easy installation   | ○                      | ○                             | ●                                    |
| Inexpensive components and installation                                     | ●                      | ○                             | ●                                    |
| Inconspicuous transmitter positioning (aesthetics)                          | ●                      | ○                             | ●                                    |
| Transmitter and receiver do not require direct line of sight                | ●                      | ○                             | ●                                    |

- Optimally suited or applicable
- Limited suitability (depending on details of set-up) or limited applicability
- Suitable in exceptions or hardly applicable

\* For use of low-overspill systems (LOS) – \*\* Service provision in partial areas (selected seat rows/blocks)









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