Hearing loop drivers and accessories

AMPETRONIC®

Listen to the difference

Contents

NB: Loops shown in this document are indicative only and not to scale. They are not for use in system design. For detailed designs please contact our friendly and knowledgeable team on +44 (0) 1636 610062 or email sales@Ampetronic.co

Ampetronic™ hearing loop solutions

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

The type of hearing loop required, and therefore the loop driver (amplifier) needed, very much depends on the environment that you are providing assistive listening in. Ampetronic offer a comprehensive range of hearing loop products for all operating environments including:

- area coverage solutions for rooms and areas such as halls, theatres and meeting rooms
- service point solutions for retail counters, reception desks and OEM integration into help points, lifts and elevators and ticket machines
- transport solutions for use on trains, trams, buses, coaches and taxis

Area coverage: Perimeter loops - single channel:


C5-1

C7-1


D10-1


CLS series


ILD series

Area coverage: Multiloops™- dual channel:


C5-2

C7-2


D7-2

D10-2

D14-2


MLD series

For service points, speech transfer and OEM integration:


CLD1


TalkPerfect


HLS-2C Active Loop Panel


HLS Series

Transport solutions:


XA88

In addition, Ampetronic offer a wide selection of hearing loop test and measurement equipment and installation accessories to help configure and maintain the performance of your loop.

Backed by over 30 years of experience in developing products that are technically excellent and provide a genuine benefit, Ampetronic products have a deserved reputation for unsurpassed performance, reliability and longevity.

For more information on the types of loop available please see our website http://www.ampetronic.co/Designing-induction-loops, request our Hearing loop solutions loop types brochure via sales@ampetronic.co or call our friendly team on +44 (0) 1636 610062

Area coverage hearing loop drivers

Use the questions shown below to determine which system would provide your user with the greatest level of access and intelligibility:

What are the dimensions of the area to be covered?

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

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

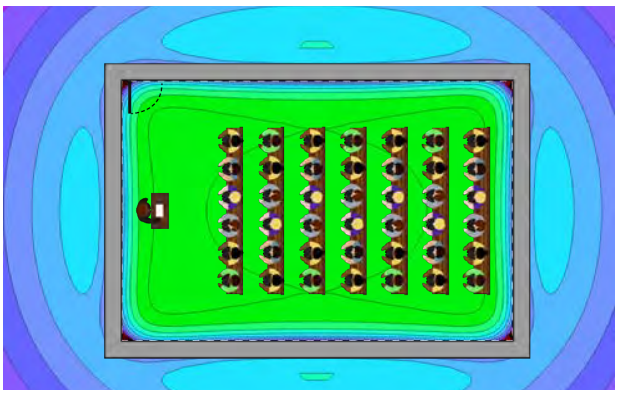
Metal in a floor or ceiling structure , including structural reinforcement or raised access floors and suspended ceiling grids, can cause excessive variation in signal levels accross the room, if not corrected with a MulitLoop™ system.

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

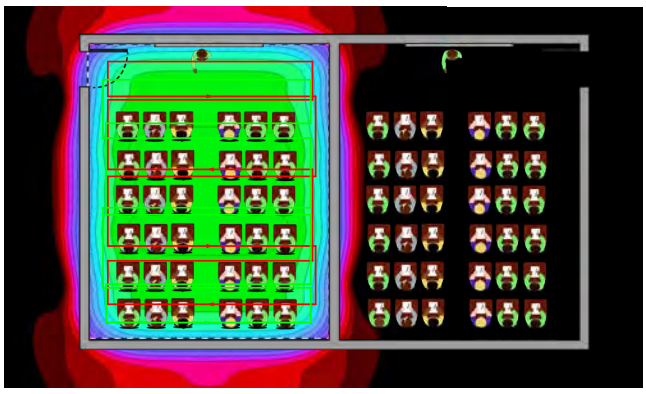
Signal coverage from a perimeter loop will overspill beyond the borders of intended area. This can cause problems for people using hearing loops in adjacent areas or, in areas where privacy is desired. Ampetronic MultlLoop™ systems minimise the effects of overspill between areas.

Recommended area coverage solutions:

Room dimensions	Floor construction	Adjacency and privacy	Recommended solution	Recommended loop drivers	Page
Less than 4m or across shortest dimension	floor has no metal in structure and	no requirement	Ampetronic Perimeter loop	C5-1	6
				C7-1	6
				D10-1	5
				CLS series	9
				ILD series	8
Greater than 4m across shortest dimension	floor has metal in structure and/or	risk of overspill	Ampetronic MultiLoop™	C5-2	6
				C7-2	6
				D7-2	5
				D10-2	5
				D14-2	5
				MLD series	7



Perimeter loop field illustration, including overspill



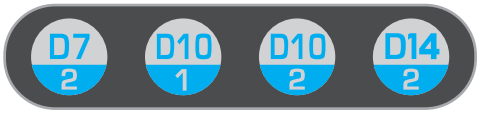
MultiLoop™ field illustration, reducing overspill

D Series

Networkable hearing loop drivers

Power, efficiency and versatility

- High power solutions for use in structures containing high quantities of metal
- Class D drivers offering 60 percent increase in energy efficiency and low heat dissipation
- Remote browser interface with real-time monitoring and periodical reporting options
- Fully networkable for easy integration into existing IT infrastructure. Dante™ option available



Features

- Advanced digital signal processing
- Multi-stage output filtering for compatibility with other systems and global electro-magnetic compatibility (EMC) regulations.
- Automatic gain control (AGC) and dual slope metal loss correction (MLC)
- Optional dual outputs enabling accurate 90° phase shift
- Elegant capacitive touch controls with intuitive menus
- Built in test signals for convenience

	Perimeter loop driver	MultiLoop™ drivers		
	D10-1	D7-2	D10-2	D14-2
Input 1 and 2	XLR balanced input, switchable between microphone and line via a menu. Selectable 12V phantom power on microphone only. Dante optional.			
Slave In	6.35mm jack socket for linking more than one amplifier. Inserting plug disables other inputs.			
Slave Out	6.35mm jack socket to connect to other slave amplifiers.			
Loop Output Drive Voltage	33.9V_{RMS} (45Vpk) at maximum output current per channel			
Loop Output Drive Current	10A_{RMS} (14.1A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >14.1A per channel Cont. pink noise 4.7A_{RMS} short term peaks >14.1A per ch.	7A_{RMS} (10A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >10A per channel Cont. pink noise 3.3A_{RMS} short term peaks >10A per ch.	10A_{RMS} (14.1A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >14.1A per channel Cont. pink noise 4.7A_{RMS} short term peaks >14.1A per ch.	14A_{RMS} (19.8A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >19.8A per channel Cont. pink noise 6.6A_{RMS} short term peaks >20A per ch.
	Level controlled via front panel menu or network			
	Drive current indicated on two 4-LED displays in 6dB increments			
Loop Connectors	Neutrik NL2 Speakons (supplied) for each output			
Loop Monitor	Provides access to monitor actual loop current via a 3.5mm stereo headphone connector on front panel Channel A on left, channel B on right.			
DC Output	Resettable, fuse protected 12V 0.1A. Operation can be configured via menu.			
Applications	Teaching spaces and meeting rooms Lecture theatres and conference facilities Stadia, sports halls, cinemas and theatres Courts rooms, airports and railway stations			

C Series

Networkable hearing loop drivers

Performance, consistency and certainty of results

- Simple digital interface for accurate setup and adjustment
- Low running and maintenance costs

Features

- Network and stand-alone options
- Built-in test tones
- Clear indicators and system diagnostics
- Compact 1U rack mount unit with internal power supply
- Optimised for speech frequencies with unmatched intelligibility and capable of high quality musical reproduction
- Industry standard Phoenix connectors
- Data compliant with IEC 62489-1 Standard
- 100V line input

	Perimeter loop drivers		MultiLoop™ drivers	
	C5-1	C7-1	C5-2	C7-2
Input 1 and 2	3 way 3.5mm euroblock screw terminal input (supplied)			
Microphone / Line	Inputs 1 & 2 switchable between mic and line modes. Selectable 24V phantom power on mic mode only			
100V Line	2 way 5mm euroblock screw terminal (supplied).			
Loop Output Drive Voltage	$20V_{RMS}$ (28Vpk) at maximum output current per channel.			
Loop Output Drive Current	$5A_{RMS}$ ($7A_{pk}$) up to 60 seconds continuous 1kHz sine wave, peak >7A per channel Cont. pink noise $2.3A_{RMS}$ short term peaks >7A per ch.	$7A_{RMS}$ ($10A_{pk}$) up to 60 seconds continuous 1kHz sine wave, peak >10A per channel Cont. pink noise $3.3A_{RMS}$ short term peaks >10A per ch.	$5A_{RMS}$ ($7A_{pk}$) up to 60 seconds continuous 1kHz sine wave, peak >7A per channel Cont. pink noise $2.3A_{RMS}$ short term peaks >7A per ch.	$7A_{RMS}$ ($10A_{pk}$) up to 60 seconds continuous 1kHz sine wave, peak >10A per channel Cont. pink noise $3.3A_{RMS}$ short term peaks >10A per ch.
Loop Connectors	4 way 5mm euroblock screw terminal (supplied) for each output, for star-quad configured feed cables			
DC Output	2 way 3.5mm euroblock screw terminal Re-settable, fuse protected 12V 0.1A			
Line Output	3 way 3.5mm euroblock screw terminal (supplied) post AGC balanced output			
Automatic Gain Control	The AGC is optimised for speech. Dynamic range >36dB			
Metal Loss Compensation	MLC up to 4dB per octave. Dual slope configurable on network models.			
Phase Shift	User selectable (network models only) at 0° or 90° between outputs			
Applications	Teaching spaces and meeting rooms Lecture theatres and conference facilities Stadia, sports halls, cinemas and theatres Courts rooms, airports and railway stations			

MLD Range

MultiLoop™ drivers

Full frequency response and crystal clear sound reproduction

- Optimised for speech frequencies with unmatched intelligibility
- Capable of high quality musical reproduction

Features

- Drives 2 output channels, selectable and highly accurate 90° phase shift
- Front panel metal loss correction adjustment for frequency dependant losses
- Active loop error monitoring and dual loop fault detection with status reporting
- Automatic Gain Control (AGC)
- Status output on all models for system integration
- Front inlet and rear exhaust fan cooling for true rack mount integration
- Tested to and compliant with IEC 62489-1 induction loop amplifier performance Standard

	MultiLoop™ drivers		
	MLD5	**MLD7**	**MLD9**
Input 1 and 2	XLR balanced input with switchable 15dB gain boost (supplied)		
Microphone / Line	Inputs 1 & 2 switchable between mic and line modes. Selectable 12V phantom power on mic mode only		
Slave In	6.35mm jack socket for linking more than one amplifier. Inserting plug disables other inputs (MLD9 only)		
Slave Out	6.35mm jack socket to connect to other slave amplifiers (MLD9 only)		
Loop Output Drive Voltage	10.2V_{RMS}(14.5V_{pk}) at maximum output current per channel	17V_{RMS} (24V_{pk}) at maximum output current per channel	31.8V_{RMS} (45V_{pk}) at maximum output current per channel
Loop Output Drive Current	5A_{RMS} (7A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >7A per channel Cont. pink noise 2.5A_{RMS} short term peaks >10A per ch.	6.4A_{RMS} (9A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >9A per channel Cont. pink noise 3.2A_{RMS} short term peaks >13A per ch.	9.2A_{RMS} (13A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >13A per channel Cont. pink noise 4.6A_{RMS} short term peaks >19A per ch.
Loop Connectors	Neutrik NL4 Speakons (supplied) for each output		
DC Output	Resettable, fuse protected 12V 0.1A.		
Automatic Gain Control	The AGC is optimised for speech. Dynamic range >36dB		
Metal Loss Compensation	Configurable MLC up to 3dB per octave		
Phase Shift	User selectable at 0° or 90° between outputs		
Applications	Teaching spaces and meeting rooms Lecture theatres and conference facilities Stadia, sports halls, cinemas and theatres Courts rooms, airports and railway stations		

ILD Range

Perimeter loop drivers

Cost effective, powerful, single loop drivers

- Superior intelligibility
- High voltage headroom avoids high frequency clipping

Features

- Low lifetime cost
- Unparalleled sound quality
- Very high output option (ILD 1000G) for the largest applications
- Metal loss correction compensates for frequency dependent loss from metal structures
- Microphone (XLR) and line inputs
- Extensive input adaptors available for any audio input requirement

	Perimeter loop drivers				
	ILD1000G	**ILD500**	**ILD300**	**ILD122**	**ILD100**
Microphone / Line	1x XLR mic, 1x XLR mic/line 6.35mm jack balanced line	1x XLR mic and 1x 6.35mm jack balanced line			2x 3.5mm jack for electret micand 2x phono line.
Slave In / Out	6.35mm jack insert point for connection of SP5 phase shifter. 0dBu signal can be used for recording.				
Loop Output Drive Voltage	31.8V_{RMS}(45V_{pk}) at maximum output current	17V_{RMS} (24V_{pk}) at maximum output current	7.8V_{RMS} (11.0V_{pk}) at maximum output current	8.5V_{RMS} (12.0V_{pk}) at maximum output current	3.0V_{RMS} (4.2V_{pk}) at maximum output current
Loop Output Drive Current	9.2A_{RMS} (13A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >13A Short term peaks >19A	6.4A_{RMS} (9A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >9A Short term peaks >13A	4.9A_{RMS} (7A_{pk}) up to 60 seconds continuous 1kHz sine wave, peak >10A Short term peaks >10A	3.5A_{RMS} (5A_{pk}) up to 60 seconds continuous 1kHz sine wave Short term peaks >7A	3.4A_{RMS} (4.8A_{pk}) up to 60 seconds continuous 1kHz sine wave Short term peaks >6.5A
Loop Connectors	Neutrik NL4 Speakon (supplied)		Wieland ST17/2 (supplied)		Lever cable clamp
DC Output	Resettable, fuse protected 12V 0.1A. +/-15V 0.15A, 3 pin DIN				
Automatic Gain Control	The AGC is optimised for speech. Dynamic range >36dB				
Metal Loss Compensation	Adjustable gain slope configurable up to 3dB per octave				
Applications	Theatres Sports halls Courts Lecture halls Meeting rooms Teaching spaces Houses of worship				Video conference facilities Television rooms Nursing homes Private homes Receptions and waiting rooms Meeting rooms Teaching spaces

CLS Drivers

Wall mounted perimeter loop drivers

Designed specifically for wall mounting

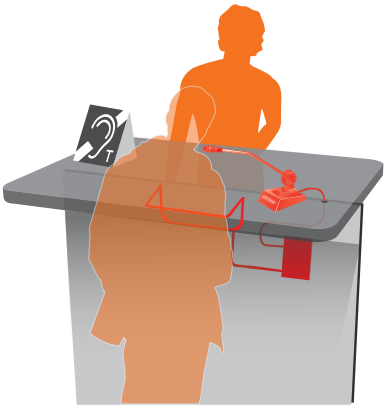
- Simple, discreet installation
- Cabling and controls behind tamper resistant cover

Features

- Quick and simple to install
- Area coverage to >400m^2
- Complies with Railway EN50121-4 safety standard (CLS2-R1)
- 4 independent configurable inputs (CLS2)
- Wall mounted
- Metal Loss Correction (MLC)

	Perimeter loop drivers		
	CLS1	**CLS2**	**CLS2-R1**
Input 1	Balanced mic, balanced or unbalanced line. Input impedance 10kΩ per side. Min level (mic / line) -73dBu / -31dBu. Max level (mic / line) -37dBu / +5dBu Phantom voltage MIC only +12V		
Input 2	Balanced or unbalanced line, expansion port Input impedance 1MΩ per channel	As Input 1 mic level Balanced mic Input impedance 10kΩ per side Phantom voltage +12V	Isolated 100V line or low impedance mono or stereo speaker Input impedance 100V line / spkr 120kΩ / 7.8kΩ
Input 3	Isolated 100V line or low impedance mono or stereo speaker Input impedance 100V line / spkr 120kΩ / 7.8kΩ	Balanced or unbalanced line, expansion port Input impedance 1MΩ per channel	Isolated 100V line or low impedance mono or stereo speaker Input impedance 100V line / spkr 120kΩ / 7.8kΩ
Input 4		Isolated 100V line or low impedance mono or stereo speaker Input impedance 100V Line / spkr 120kΩ / 7.8kΩ	
Loop Output Drive Voltage	>7.8V_{RMS} - 11.0V_{pk}	>7.1V_{RMS} - 10.0V_{pk}	>7.1V_{RMS} - 10.0V_{pk}
Loop Output Drive Current	Continuous 1kHz sine wave >3.5A_{RMS} 5.0A_{pk} Short term peaks >5A_{RMS} 7A_{pk}	Continuous 1kHz sine wave >4.9A_{RMS} 7.0A_{pk} Short term peaks >7A_{RMS} 10A_{pk}	Continuous 1kHz sine wave >4.9A_{RMS} 7.0A_{pk} Continuous Pink noise 2.3$_{ARMS}$ 7.0$_{Apk}$ Short term peaks >7A_{RMS} 10A_{pk}
Automatic Gain Control	The AGC is optimised for speech. Dynamic range >36dB		
Metal Loss Compensation	Adjustable gain slope configurable up to 3dB per octave		
Applications	Community Centres Board rooms Churches Interview rooms Meeting rooms Classrooms		Railway platform waiting areas Tram station waiting areas Bus shelters Bus station waiting areas Ski-lift waiting areas PA enabled Taxi ranks

Service points and intercoms



Ampetronic™ CLD1 service point amplifier

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

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

A security screen may also be present, which itself can interfere with communications. Intercoms, also known as speech transfer systems often have microphones and speakers at each side of a screen, connected to a duplex amplifier. Such systems can resolve issues of background noise and those caused by a security screen. **Ampetronic™ TalkPerfect** offers effective communication through physical barriers, supporting privacy and security in a robust and easy to use system.

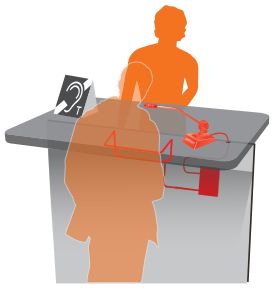
Intercom systems are now commonplace in a wide variety of entry, information, and service points. For those using a hearing aid, communicating with assistance staff can be made easier by discreetly linking directly to the intercom or help point, via a loop function on their hearing aid.

Ampetronic™ HLS-2C Active Loop Panel

Service point and speech transfer		Page
Service Points	CLD1 CLD1-AC	11
Speech Transfer System	TalkPerfect	12
Door intercoms	HLS-2C Active loop panel HLS-DM 1 and 2 (OEM)	13 14

CLD1 / CLD1-AC

Service point amplifiers



The smallest and highest performance driver in it's class

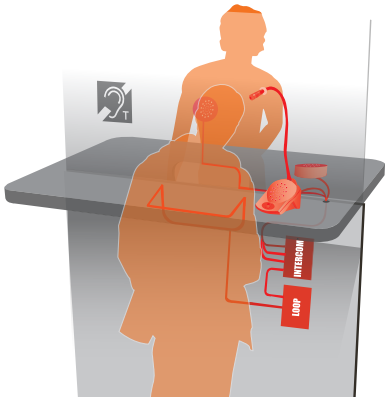
- Optimised for speech frequencies with unmatched intelligibility
- Ideal for counter systems and small area perimeter loop systems

Features

- Low lifetime cost
- 5 Year warranty
- Very compact
- Choice of microphone and pre-formed loop in counter kit
- 2 independent inputs featuring 1 mic input and 1 switchable mic/line input
- Metal loss compensation
- All connections to a single face for installation convenience
- 12V DC power supply provided as standard. CLD1-AC has an integral power supply
- Free technical support

	Counter loop drivers	
	CLD1	**CLD1- AC**
Power	12V DC @ 1.0A max. Fuse fitted to PCB, type T 1.6A L	100-240V AC 18W max.
Input 1	Microphone input Suitable for unbalanced electret microphone 3.5mm mono jack socket Input impedance 8kΩ. 6v bias via 10kΩ source Sensitivity -60dBu for max output Overload level -14dBu.	
Input 2	Switchable line / microphone Recessed switch on connector panel Microphone as for input 1 Line input: Input impedance 820kΩ Sensitivity -20dBu for max output Overload: >+20dBu.	
Loop Output Drive Voltage	>3.2V_{RMS} >4.5V_{pk} at maximum output current	
Loop Output Drive Current	2.4A_{RMS} 3.4A_{pk} continuous 1kHz sine wave. Short term peak >4.8A_{pk}	
Loop Connectors	Vibration proof clamps, accept 0.5 to 1.3mm^2	
Automatic Gain Control	The AGC is optimised for speech. Dynamic range >36dB	
Metal Loss Compensation	Configurable MLC up to 4.5dB per octave	
Applications	Ticket and service counters Retail counters Information kiosks Reception desks Interview rooms Taxis and private cars	

TalkPerfect
Speech transfer systems



Ampetronic™ CLD1 and TalkPerfect

Improve communication at fixed screen counters

- Full duplex system amplifies speech for both customer and staff
- Used in conjunction with a CLD1 induction loop, providing a fully integrated intercom and control module

Features

- Full duplex communication
- Feedback and echo suppression built in
- Multiple microphone and speaker options
- Simple integration to CLD1 loop amplifier
- Compact design
- All connections are on one panel for ease of installation
- Fully adjustable gain on both channels
- Low cost of ownership
- 5 year warranty (accessories 1 year)

	Speech transfer
	TalkPerfect DX Duplex Intercom
Mircophone Inputs	Suitable for unbalanced electret capsules DC bias voltage: 6V through 1kΩ Suitable source: 1kΩ Input impedance: 8kΩ Input noise level: -124dBu
Speaker Outputs	<0.5% THD @ 1kHz with +11dBu (1W into 8Ω) Bandwidth: 20Hz - 10kHz. Min load: 4Ω, Max output level:+14dBu
Control Port	LED output connects to combi mic speaker to indicate if system is active i.e. Mute turns LED off. +12Vdc for external module supply. 100mA fused
Staff Override	Unbalanced Line I/O using 3.5mm jack socket. Input = Tip, Output = Ring Input sensitivity -10dBu with 1kΩ source Output level max: +4dBu, typical -10dBu Output Z: 220Ω
Line Output	Unbalanced phono socket for connection to CLD1 line input - cable supplied.
Voltage (dc)	12V DC, Quiescent: 170mA 2W, Maximum: 1.0A 12W
Applications	Security reception desks Customer returns points Banks and Post Offices Cash counters Prison visitor communication desks Security screens Bureau de Change Police stations Petrol / gasoline forecourts

HLS-2C
Active loop panel door intercoms

Compliment intercoms with a functional hearing loop system

- Requires only power and an audio input to provide essential access to individuals with hearing loss
- IP rated enclosure for protection

Features

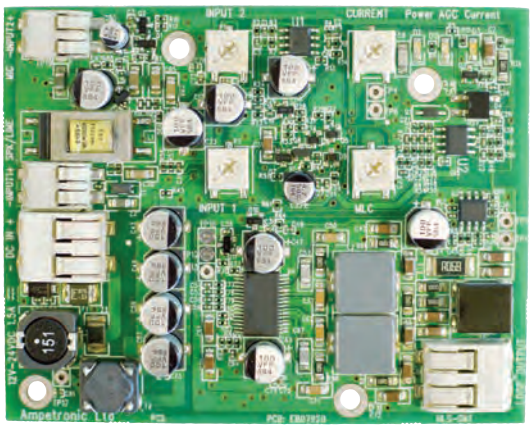
- Compact and robust design
- Compliment intercom panels
- Simple integration and installation
- Low power consumption
- Class D efficiency
- Provides a localised magnetic field
- Low lifetime cost
- Metal loss correction

Ampetronic™ HLS-2C
Active Loop Panel

	Intercoms
	HLS-2C Active panel loop
Power	Standard format: 12V DC Connector: Wago 2061 cage clamp for 0.5 -1.5mm^2 solid core or untinned fine stranded wire. Nominal voltage: 12V-24V DC Voltage range: 8-30V DC
Input 1 and 2	Wago 2060 cage clamp for 0.2 - 0.75mm^2 solid core or untinned fine stranded wire
Line Level	Rated source impedance: 1.8kΩ differential, Input isolation: 1500V Rated source EMF (sensitivity): -16dBu for full output Overload: >+22dBu SnR: >90dB Adjustment: Level control, per channel
Loop Output	Wago 2061 cage clamp for 0.5 - 1.5mm^2 solid core or untinned fine stranded wire. Compliance voltage: 4.2V_{RMS} (6V_{pk}) Max output current (sine): 3A_{RMS} Rated temperature limited output current (pink): 1.5A_{RMS} Rated time for delivery: 1min Rated THD: <1% Output Impedance: >9Ω Current Adjustment: Full range Current Indication: LED indicates 1A_{RMS}
Metal Loss Compensation	Adjustable up to 3dB per octave
Applications	Door entry intercoms Help and information points Emergency refuge points Information desks and kiosks

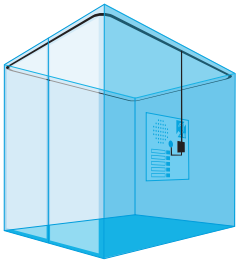
HLS-DMx / 2A

OEM Class D hearing loop drivers

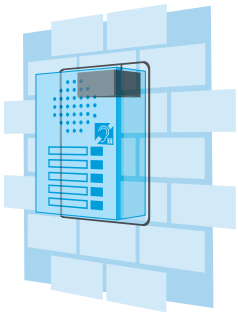


Integrate hearing loop drivers into communication systems

- Compact and lightweight. Ideal for low profile OEM integrations
- The transformer isolated balanced input allows simple integration with intercoms, help points and kiosk systems



connection to all



Features

- Low power consumption and simple integration
- Localised area loops - Counters, walls, panels etc
- Low lifetime cost
- 5 year warranty and free technical support
- Power supply 12-24V DC
- Mic Input (HLS-DM1 only)
- Metal loss correction
- Unrivalled intelligibility

	OEM Class D hearing loop drivers		
	HLS-DM1	**HLS-DM2**	**HLS-2A (DM2 in steel enclosure)**
Power	Standard format: 12V DC Connector: Wago 2061 cage clamp for 0.5 -1.5mm^2 solid core or untinned fine stranded wire. Nominal voltage: 12V-24V DC Voltage range: 8-30V DC		
Input 1 and 2 (DM2 only)	Wago 2060 cage clamp for 0.2 - 0.75mm^2 solid core or untinned fine stranded wire		
Line Level (Lo Z speaker)	Rated source impedance: 1.8kΩ differential, Input isolation: 1500V Rated source EMF (sensitivity): -16dBu for full output Overload: >+22dBu SnR: >90dB Adjustment: Level control, per channel		
Loop Output Drive Voltage	>4.2V_{RMS} >6V_{pk} at maximum output current		
Loop Output Drive Current	3.0A_{RMS}: Pink noise 1.54.A_{RMS}		
Loop Connectors	Wago 2061 cage clamp for 0.5 - 1.5mm^2 solid core or untinned fine stranded wire.		
Automatic Gain Control	The AGC is optimised for speech. Dynamic range >36dB		
Metal Loss Compensation	Adjustable up to 3dB per octave		
Applications	Intercom systems for most environments: Lifts / elevators Help and information points Refuge points Door entry systems Car parks and toll booths Security barriers and drive throughs Information points and kiosks Interactive exhibits		

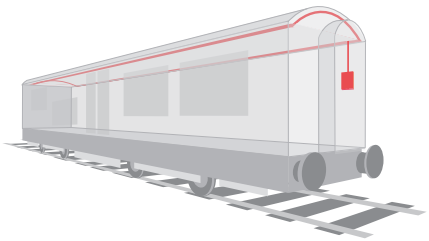
Solutions for transport

Most hearing aid users would say that when they use their aids in one to one conversations they work very well. Difficulties arise when the level of ambient noise is too great, e.g. on a moving vehicle, when the distance between the sound source and listener is increased e.g. a public address system, or when there are physical barriers between the vehicle operator and the passenger e.g. a security screen.

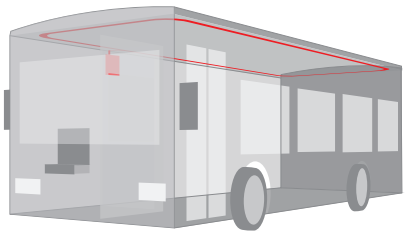
Ampetronic™ Hearing Loops:

- Offer direct communication to users via their existing hearing aid without the need for additional receivers
- Improve the experience of hearing aid users by making public announcements, information and on-board entertainment accessible
- Overcome the inherent difficulties posed by moving vehicles and deliver consistent and intelligible sound

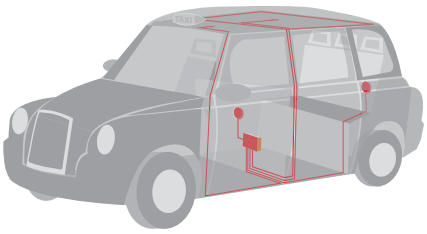
Area Type	Loop Type(s)	Product Range(s)	Page
Rail and Tram	Passenger Areas	XA88 24VDC	17
		XA88 72VDC	
		XA88 110VDC	
	Intercoms	HLS Series	14
Bus and Coach	Passenger Areas	XA88 24VDC	17
	Intercoms	HLS Series	14
	Speech Transfer	TalkPerfect	12
Taxi and Minibus	Intercoms	HLS Series	14
	Speech Transfer	TalkPerfect	12



In a rail or tram carriage, the floor, walls, and roof are usually constructed from metal which can cause a loss of energy and reduce the effectiveness of any hearing loop. To keep away from metal sheets near the loop field it is common to place the loop around the upper part of the wall. This is usually a little below the roof height to reduce signal absorption due to metal loss. The best location will depend on the exact vehicle design. It is preferable to loop the entire carriage / car where possible, so as not to discriminate by separating hearing-aid users from their travelling companions.



Like most vehicles buses and coaches are usually constructed from metal which can cause changes in the frequency response and signal energy of any loop. However, Ampetronic™ hearing loops help to overcome these issues and those caused by ambient, road and track noise, movement vibrations and temperature changes.



In taxis and minibuses, it is preferable to install Ampetronic™ hearing loops around the roof lining of the passenger area, providing coverage in any seating position and minimising any effects on the loop field caused by metal in the vehicle frame and interior i.e. energy loss and frequency response changes.

To enable those with and without assistive listening devices to communicate with the vehicle operator through physical barriers e.g. security screens, the Ampetronic™ TalkPerfect Speech Transfer System offers an effective and intelligible solution.

XA88

Audio induction loop driver

Designed for use on rail and other transport vehicles.

- Ideal for OEM rail and transport vehichle integrations
- The transformer isolated balanced input allows simple connection to the existing audio system

Features

- Area coverage (metal vehicles) 25m²-100m² (depending upon metal and loop location)
- Low lifetime cost
- Simple integration
- Power supply options: 24VDC, 72VDC, 110VDC, others possible
- 2 transformer isolated inputs for direct intercom / PA line connection / 0dBu line input
- Unrivalled intelligibility
- Free remote technical support

XA88

	XA88 Audio induction loop driver for vehicles		
	XA88-24DC	**XA88-72DC**	**XA88-110DC**
Power	Nominal voltage: 24V DC Voltage range: 14.4 - 33.6V DC Coupling: direct, no power converter Overcurrent Protection: internal replaceable fuse, T 4A L	Nominal voltage: 72V DC Voltage range: 43 - 108V DC Coupling: isolated - uses power converter Overcurrent Protection: current foldback in power converter and non-replaceable 7A fuse in converter	Nominal voltage: 110V DC Voltage range: 65 - 150V DC Coupling: isolated - uses power converter Overcurrent Protection: current foldback in power converter and non-replaceable 5A fuse in converter
Input 1		Low level / High level	
		Input Impedance: 3.6kΩ / 120kΩ	
		Sensitivity: -16dBu (130mV$_{RMS}$) / +15dBu (4.2V$_{RMS}$)	
		Overload: > +19dBu (7.3V$_{RMS}$) / > +49dBu (236V$_{RMS}$)	
Input 2		Low level / High level	
		Input Impedance: 3.6kΩ / 36kΩ	
		Sensitivity: -16dBu (130mV$_{RMS}$) / +4dBu (4.2V$_{RMS}$)	
		Overload: > +19dBu (7.3V$_{RMS}$) / > +39dBu (73V$_{RMS}$)	
Input 3	Optional - not normally fitted. Details to customer requirements		
Loop Output Drive Voltage	>7.1V$_{RMS}$ >11V$_{pk}$ at maximum output current		
Loop Output Drive Current	>11A$_{RMS}$ (15.5A$_{pk}$) with 1kHz sine		
Loop Connectors	The XA88 uses MIL-C-5015 connectors for proven reliability. CON 1 — Signal Inputs — 10-pin — 18-1 insert CON 2 — Enable and Status — 6-pin — 14S-6 insert CON 3 — Power in and Loop out — 4-pin — 14S-2 insert		
Metal Loss Compensation	Adjustable up to 4dB per octave		
Applications	Metro Systems National and Regional Railways Trams and Light Rail (LRVs) Buses and Coaches		

Measurement and testing equipment

There are a number of Ampetronic tools and accessories that will help install, commission a hearing loop system, and make performance testing easier.

ILR3+ Audio hearing loop receiver

Loop receivers: ILR3 and ILR3+ Audio hearing loop receiver - page 19

Our ILR3 is a high quality audio hearing loop receiver which allows the user to listen to an audio frequency hearing loop system, using a standard pair of stereo headphones. ILR3+ is designed to make it simpler for anyone to regularly check that a loop system is working, and has a field strength at a correct level to benefit users.

Testing and measurement systems

Ampetronic's field strength meter (FSM) - page 20

Ampetronic's FSM device is a cost effective and simple solution for measuring, setting up, and commissioning hearing loop systems, to meet requirements of IEC60118-4. There are three calibrated operational modes for assessing background noise, field strength, and frequency response. Ampetronic's FSM also doubles as a loop listener.

Field strength meter (FSM)

Loopworks™ Measure iOS app - page 22

Loopworks™ Measure iOS app

Loopworks™ Measure combines an iOS phone or tablet app with a self-calibrating receiver. When used together, Measure app and the R1 become the most accurate, dedicated field strength meter (FSM) currently available. This combination used to record field strength statistics, can help to ensure requirements of IEC 60118-4 have been met.

Loopworks™ Measure app uploads test data to the Loopworks™ online suite, allowing all results to be digitally stored in the cloud. Online storage simplifies management of rooms across multiple buildings and sites.

Loopworks™ Measure receiver field strength meter (R1) - page 22

By simply plugging into the headphone jack of your mobile device, our R1 Receiver is a high quality field strength meter and audio hearing loop receiver. R1s are designed to be used in conjunction with our Loopworks™ Measure iOS app. Contact us on sales@ampetronic.co or buy one directly from our website at www.ampetronic.co/products.

Loopworks™ R1 receiver

ILR3 / ILR3+

Audio hearing loop receivers

Listen to a hearing loop system with headphones

- Emulate the performance of a hearing aid switched to the T position
- Immediate confirmation that the loop is running

Features

- Low distortion
- Flat frequency response to 6kHz
- Low cut filter—to simulate hearing aid response
- Low and high field strength indicators according to IEC60118-4 (ILR3+)
- Volume control
- 5 year warranty
- Auto power off with headphone removal
- > 100 hours life with 2 AA batteries

ILR3+ front


ILR3+ rear


ILR3+ top

The Ampetronic loop checking system, the ILR3+, is designed to allow any user to regularly monitor a loop system. It is simple and highly cost effective, and meets the requirements of the international loop performance standard, IEC 60118-4.

No technical skills are required to perform the basic checks, which allow an operator to listen to the system through headphones, and check that the sound level provided by the loop is sufficient.

The loop checking system comes with an easy to follow procedure for checking any loop system.

	Hearing loop recievers	
	ILR3	**ILR3+**
Frequency response	Standard: Flat 85Hz - 6kHz ± 0.5dB Low Cut: 400Hz - 6kHz - ± 0.5dB	
Output power	>100mW into 16Ω load	
Distortion	<0.5% THD @ 1KHz	
Power	2 x Alkaline AA batteries (included) Battery life >100 hours with Alkaline batteries	
Magnetic field strength Indication (ILR3+ only)		To PPM type II referenced to 400mA/m rms: 'Good' 0dB Green LED 400mA/m rms with sine 'Okay' -6dB Amber LED 400mA/m rms with sine
Applications	Checking that an induction loop system is working Recording the output of a loop system Providing assistance to people without a hearing aid Locating sources of interference Checking loop coverage and signal overspill	

FSM

Field strength meter

Measuring loop system performance

- Ergonomically designed hand held instrument for measuring loop system performance
- Ideal for the assessment of background noise, field strength and frequency response

Features

- Simple assessment of any system to IEC60118-4
- Three modes of operation for three test types
  - A-Weighted background noise
  - Broad band field strength mode (50Hz - 8kHz)
  - Frequency response (100Hz, 1kHz, 5kHz)
- True RMS detection calibrated to 400mA/m = 0dB
- Resolution to 1dB
- Headphone output with volume control
- Ergonomic, rugged, light weight construction
- Soft carry case

The FSM is a cost effective and simple solution for measuring, setting up and commissioning an induction loop system to the requirements of IEC60118-4.

	Field strength meter
	FSM
Magnetic field measurement	Coil orientation: Vertical when unit held upright Reference level: 400mA/m (In Field strength mode) Frequency response 50Hz to 8kHz ±0.25dB 30Hz to 10kHz -3dB Gain stability: Better than 0.5dB over all conditions
Outputs	Display: Flying spot LED bar graph with wide viewing angle Colour coded (green for -3dB to +3dB) Audio (headphone): 16Ω min (32Ω per side) 3.5mm stereo jack connector
Power	Battery: 2 x AA alkaline (supplied) Battery monitor: Battery OK when LED illuminated Battery life: Up to 100hrs use, dependent on use pattern
Applications	Accurate set-up and commissioning System monitoring and maintenance Site surveys Certification to IEC60118-4 Assessment of frequency losses due to metal Assessment of loop coverage and overspill Assessment of background noise


12:01
87%
Select project and system
Field
Freq
Noise
Field Strength
-40
-35
-30
-25
-20
-15
-10
-5
+5
+10
0dBL = 400mA/m
Live -1.0 dBL
Audio
Hold 0.4 dBL
PASS
Reset
Type
Area Coverage
Signal
Combi
Start Test
Test Points
Results
Settings
Loopworks Measure R1
www.ampetronic.co

Loopworks™ Measure

Complete ‘end-to-end’ measurement system

iOS compatible device based test platform

Online results processing, logging, reporting and sharing

At the very heart of Loopworks™ functionality is a ground-breaking hearing loop test and measurement system, Loopworks™ Measure.

Consisting of the Loopworks Measure R1 Receiver, an iOS App and the Loopworks™ online productivity suite, Loopworks™ Measure makes it possible for you to test the functionality of a hearing loop and it’s performance against standards in the field, store and share the results online and issue reports and system certificates. If used in combination with Ampetronic C and D Series networkable drivers, Loopworks Measure enables you to control and test the driver remotely for fast and convenient commissioning and monitoring.

Featuring...

- Simple, intuitive user interface
- Standard measurement modes
  - Field strength
  - Frequency response (in 1/3rd octave bands)
  - Background noise (in 1/3rd octave bands)
- Automated test result “Pass / Fail” Verdict system
- LookLink to connect the app to C Series and D Series networkable drivers
  - Control a C or D Series driver’s test signal from the app
  - Associate a C or D Series driver with a project/system
  - Link to drivers web interface for advanced controls
- Record audio samples
- Built in protocols for standard test routines
- Automatically generated reports and certificates featuring your company logo.
- Project and system structure shared with Loopworks Design

The Loopworks™ Measure system helps those with even the most rudimentary training to either assess whether a hearing loop system is functional or to measure it against Standards for hearing loop performance.

For more advanced users, the integrated walk through guides revolutionise test, measurement and commissioning processes. The iOS App provides step by step instructions on what to measure and the type of input signal to use at each stage. Measure also has the facility to save meter readings and audio samples to the Loopworks™ portal for later analysis, enabling you to share them with colleagues or to produce professional quality technical reports and commissioning certificates.

The Receiver

The Loopworks™ Measure R1 Receiver is a high quality audio induction loop receiver with a vertically mounted pick up coil designed to be used in conjunction with the Loopworks™ Measure iOS App. The App and Receiver together become the most accurate, dedicated field strength meter (FSM) available.

Loopworks™ Measure online productivity suite

The Loopworks™ Measure online suite gives you access to the full range of Loopworks™ functionality including:

- saving data and recording audio
- setting up systems and test points
- generating technical and commissioning reports
- issuing standards compliance certificates

The App

The Loopworks™ Measure iOS App will synchronise collected data with the Loopworks online suite (subject to a wireless network being available); making it possible for you to view, analyse and share the results online, and create test and certification reports.

Loopworks™ Measure App with LoopLink also enables you to make alterations to remotely control the test signals of a connected Ampetronic C or D Series driver, change the settings via the drivers web app and see the results in the performance of the magnetic field instantly without repeated journeys between the amplifier and looped area.

Loopworks™

LEARN • COLLABORATE • MEASURE • DESIGN

Installation accessories

In addition to hearing loop drivers, Ampetronic™ can provide you with accessories needed to successfully install and commission a hearing loop system. Our range includes (but is not limited to):

- Direct burial cable
- Flat copper tape
- Printed warning tape
- Hearing loop signs
- PVC extrusion for copper tape
- Crimps and crimp tool for copper tape
- Wall mounts and rack mount equipment
- Microphones

Direct Burial Cables

Cable for laying in concrete screed, immune to the corrosive effects of concrete.

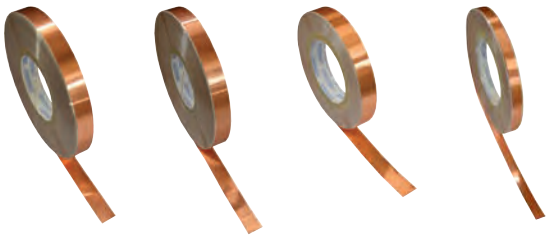
PVC cable can not be used for burial in concrete as the corrosive effects of alkalis present in cement based compounds will lead to failure of the loop over time. This specialised EPR-CSP HOFR (Heat and Oil Resistant, Flame Retardant) cable offers more durable insulation when compared to standard PVC wire and improves protection where a loop wire needs to be installed in a concrete screed. DBC 1.0mm^2 available in 100m drums only. DBC 2.5mm^2 available in 100m and 200m drums.

Flat Copper Tape

Ampetronic flat copper tape (cable) is the default choice when installing loop cable under floor coverings such as carpet, wood, laminate, tiles or vinyl. The cable will not be visible under most floor coverings and is generally secured to the floor with Printed Warning Tape that alerts tradespeople, such as carpet fitters to it's presence.

The construction of the cable is copper foil covered in bonded polyester film. There are three sizes available 1.0mm², 1.8mm² and 3.0mm²

To turn a corner, the tape is folded over. To terminate, tin the end of the tape with a good soldering iron, melting the plastic coat with the solder. Solder on a wire (or the next length of tape) to the copper tape, and insulate with electrical tape. Alternatively use our dedicated crimps and crimp tool.



The cable is supplied in 50m (160ft) or 100m (320ft) reels.

Printed warning tape

Ampetronic supply a special high quality tape, 50mm (2”) wide, colour white, printed with a warning text and hearing loop logo in blue. This tape is designed to fix the copper foil tape to the floor, indicating clearly the importance of the cable installed in that location.

The tape is cloth based, with a high strength long life rubber based adhesive, and is supplied in 50m (160ft) reels.

PVC extrusion for copper tape

This is a high density PVC extrusion, supplied in 3 metre sections, for covering the copper tape in areas where a high level of physical protection is needed, such as exposed floors.

Normal fixing is by means of the extra heavy duty adhesive strip fitted to the edges of the extrusion, but in exceptional cases screws or special fixing pins can be used in addition. It is essential that the fixing surface should be free of grease, polish or dust.

Crimps and crimp tool for copper tape

Cable crimps are used to connect feed cables from a Hearing Loop driver to flat copper tape loop(s) in a quick, easy and effective manner and without the need for a hot works permit. The crimp tool compresses the connector to the round feed cable and clamps the teeth of the crimp onto the copper tape. There are three different types of crimps, two for different gauge wires (10-12AWG and 14-16AWG) and one for extending lengths of copper tape (Termi-foil splice crimp).

Hearing loop signs

Two different sizes of the hearing loop logo are available.

- Large logo (GG00001) - double sided, printed in standard blue colour, on white rigid sheet, 0.62mm thick, 200mm (W) x 256mm (H).
- Small logo (GG00002) - double sided, printed on 0.25mm plastic sheet, with one side coated with a fully transparent adhesive for fitting to glass panels, 99mm (W) x 128mm (H).

See Signage for details on the most appropriate placement of signs.

ampetronic.co

Wall mounts and rack mount equipment

Ampetronic provide solutions for mounting drivers on a wall or in rack spaces including wall mount kits, blanking plates and rack mount trays. See www.ampetronic.co for more information.

Microphones

Ampetronic offer a small range of microphones including the EM1.2 tieclip microphone, EM195A desktop microphone and Q400 boundary microphone; primarily for use with one to one systems, counter systems and small area coverage systems.

Signage

Hearing loops provide an important service for hearing aid users and others with challenging levels of hearing loss in any environments and applications. However, loops are ineffective if hearing aid users are unaware such a facility is available for them to connect to.

Loop systems are, in effect, invisible and inaudible to potential users. Therefore, it is important that necessary signage is displayed, so users know to switch their hearing aid devices to the correct setting to utilise them, or to ask for a receiver.

There is an internationally recognised Hearing Loop sign consisting of an ear graphic with a 'T' and some brief instructions for those unfamiliar with such technology.

Signage requirements vary, dependent on application, but there is a good guide to what is both suitable and necessary:

ampetronic.co

Signage recommendations	
Application	**Recommended signage requirement**
Area coverage system (theatre, waiting area, classroom, seated area)	A sign or window sticker at average eye height to each entry point to the space (on a door is perfect), and at least one large sign at a visible point on a wall within the looped space. N.B. If the loop does not cover the entire area then a map of the coverage area should be at each entry point.
Local area service point system (service point, reception desk)	A sign displayed on the counter or as close as possible at a level that cannot be obscured by anyone standing at the service point.
Intercoms and automated audio assistance message systems (entry points)	A small sign at a level where it is visible to the person pressing the 'intercom', 'information' or 'help' button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System design support and training

System design support

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

Complex MultiLoop™ array installation designs, are normally produced within seven working days on average, and are charged at published rates, on a per room or per-independent area basis.

For each project, an installation design charge will apply to every different room design. Identical room drawings within same project, will attract only one charge. Simple perimeter loop installation designs will not be charged for.

Each full installation design gives you:

- Scale drawings of room showing precise layout of loop wires
- Layout drawings for each loop array
- Electrical connection drawings
- A set of written installation design notes detailing assumptions, project specification information, expected performance, and equipment list
- DWG and PDF files of loop layout designs

Installation designs rely heavily upon quality of information supplied. In particular, accurately scaled building drawings are essential, to give detailed information for creation of accurate quotations.

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

Training

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

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

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

For more information on hearing loop design, meeting regulations for hearing loop installations, or if you would simply like to register for Loopworks™ access, contact our friendly and knowledgeable team on **+44 (0) 1636 610062** or email **sales@ampetronic.co**

Loopworks™

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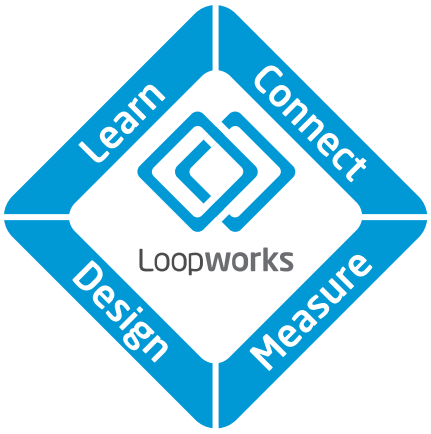
Loopworks™ suite

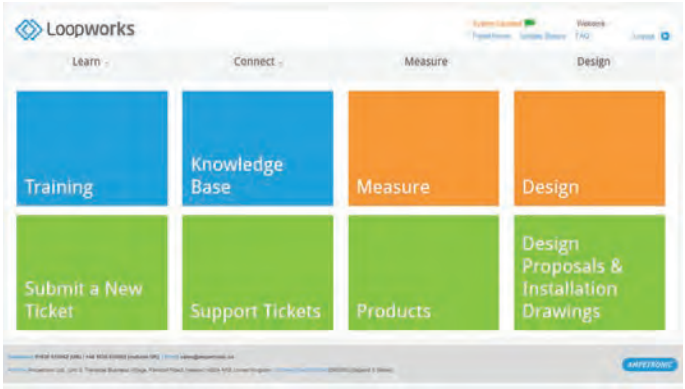
Ampetronic™ Loopworks™ complete productivity suite enables cost effective, dependable, and compliant system development, testing, and expedited issue resolution.

Loopworks™ offers:

- Instant access to your project information
- A library of the most credible loop information
- Reliable, expert support, whenever and wherever you need it.



Loopworks software suite comprises four modules, with desktop, mobile app and cloud support delivery.



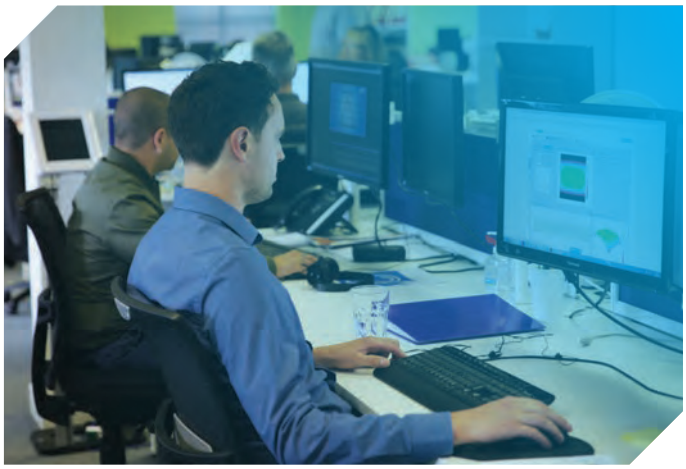
Loopworks™ productivity suite allows you to:

Learn from the latest information, developments and support from the worlds' most credible information sources. Gain accreditation for online learning.

Connect instantly to detailed project information, in the office or the field, minimising planning and administration delays. You can also connect to our dependable, expert support when and where you need it, reducing expensive interruptions in project development and implementation

Measure the performance of systems against relevant standards with Measure app and desktop support. Measure enables easy on-site information retrieval, system testing, and issue resolution.

Design loops using our powerful online cloud based design tool for expedited, credible and compliant system development.



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

Loopworks™ Design

Direct access to expert design support

Create Ampetronic™ quality designs in minutes

Save on direct design costs

Design, quote and deliver first-class Loop systems with FREE online access to Ampetronic's expertise and the worlds only complete Loop measurement and design generation tools.

Add value with Loopworks™ Design...

- Design Ampetronic™ quality Hearing Loops in minutes, without charge
- Access Ampetronic™ expertise and support whenever and wherever you need it
- Simplify quotation, ordering and installation
- Access projects and data remotely, anytime, anywhere

Design Loops to Standard

Ampetronic™ Loop systems help to safeguard the rights of people who experience hearing loss and, if installed correctly, consistently meet or exceed the performance standards set out by the International Electrotechnical Commission (IEC). In particular IEC 60118-4, IEC 62489-1 and Australia: AS 601118.4, AS 1428.5. Loopworks™ Design tool helps you to ensure that system and performance standards are met.

Automatic hardware selection

With an almost infinite number of spaces and unique hearing loop systems, Loopworks™ will help you identify and specify the right equipment needed for each loop system defined. Speed up your quotation process and accurately estimate costs with Loopworks™ Design.

View design types

Understanding what installing a designed system would entail can be difficult to envisage. Loopworks™ shows indicative loop types to enable you to estimate time and costs before finalising your plans, saving you time and money on designs and allowing you to offer full project estimates sooner.

Directly access Ampetronic™ support

There are a huge number of variables that can affect the function of a hearing loop system. Technically complex, hearing loop design requires a significant level of expertise. Ampetronic™ is unique in the quality and experience of our support teams. Gain direct access to over 100 years of combined hearing loop experience through Loopworks™.

To add value to your design services and save yourself time and money register for access to Loopworks today.

Loopworks™
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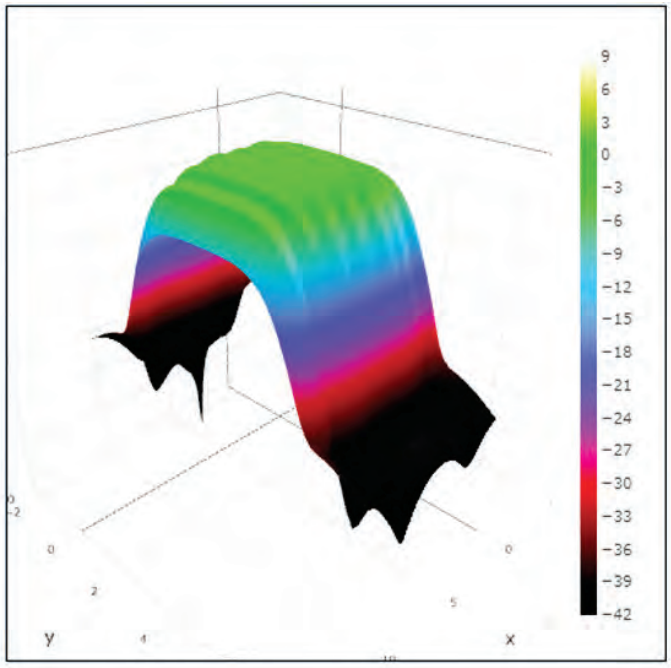


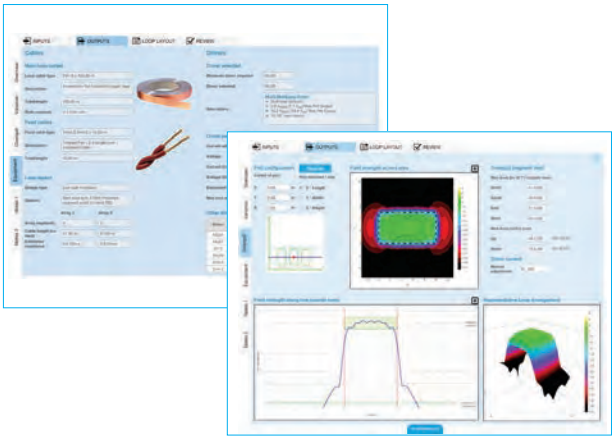
Produce comprehensive drawings and specifications

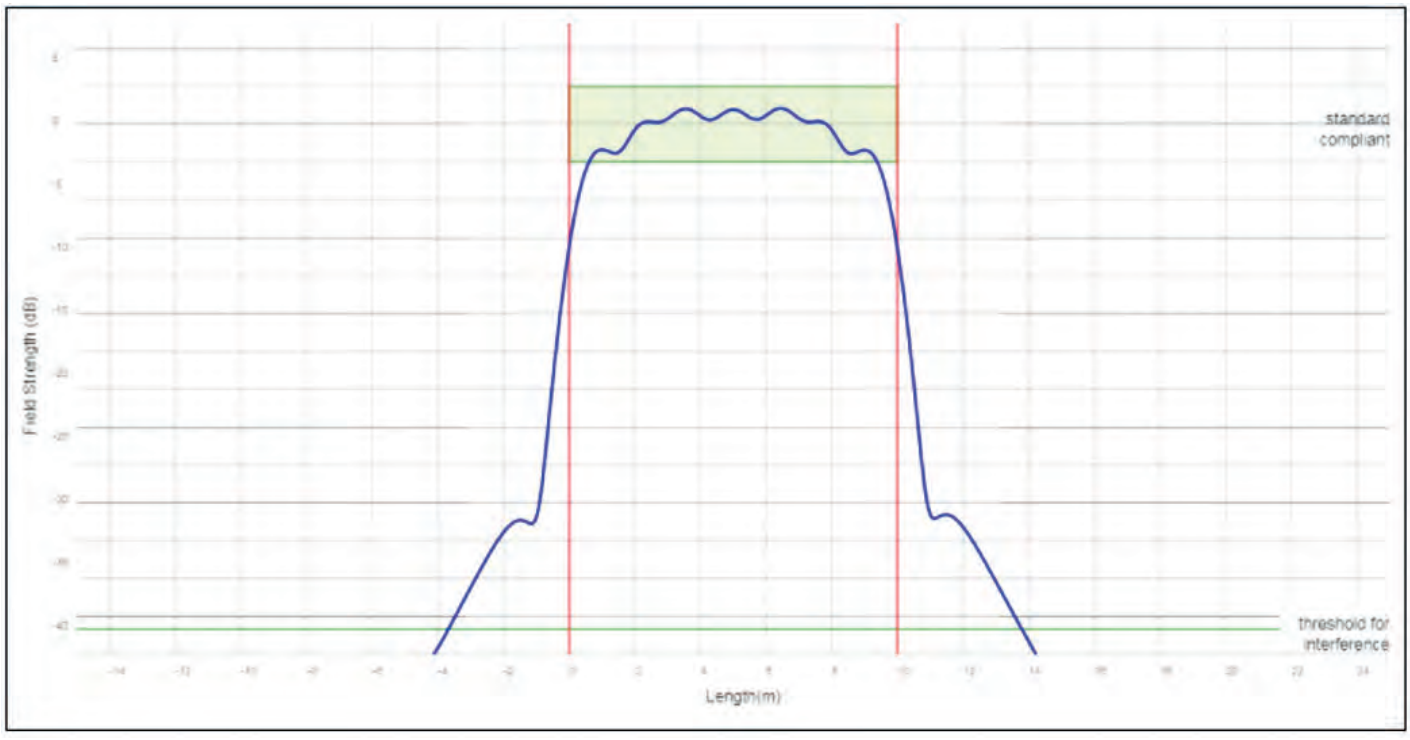
Loopworks™ Design will enable you to publish your design drawings and specifications in a full report including:

- System Design and Specification Summary
- System Performance - Field Strength
- System Performance - Overspill
- Loop(s) Installation Arrangement
- Plan View Installation Reference
- Installation Drawing: Loop Array 1
- Installation Drawing: Loop Array 2
- Electrical Connections
- Export Loop designs in DXF format

Utilise Ampetronic™ design approval service

To add value to your design, or if there is an aspect of it you are unsure of, make use of Ampetronic™ Loopworks™ approval service. A highly qualified and experienced engineer will check your designs against requirements and standards, suggest alternatives where appropriate and sign off on correct designs - demonstrating to your customer that you have our full support.





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Providing a genuine benefit.

To find out how we can help with your assistive listening project, call our expert team on:
+44 (0) 1636 610062
or email us at sales@ampetronic.co

AMPETRONIC®

Listen to the difference

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