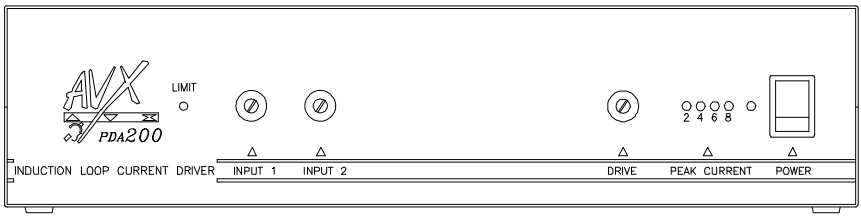
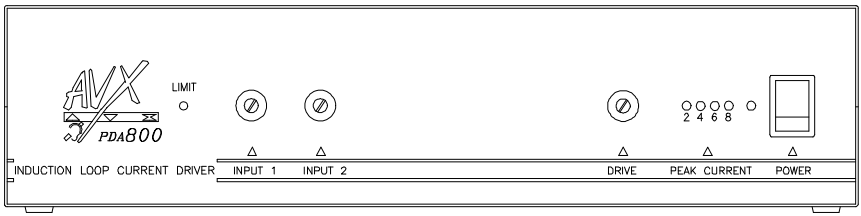
Operation Instruction Manual

PDA200 & PDA800 Audio frequency induction loop ampilifiers





Features

- PDA200 provides up to 120m^2 coverage
- PDA800 provides up to 400m^2 coverage
- Automatic tracking compressor
- Two selectable Mic/Line inputs
- Hidden controls
- X-talk connector
- Popular 5pin Din connectors
- Input peak LED
- Output current meter
- Free standing case

Technical Description

The PDA200 & PDA 800 are constant current induction loop amplifiers. They use an advanced and unique 'floating sense system' to achieve greater efficiency and to correct the phase problems created by driving an inductor.

The PDA 200 and 800 have a wide range companding system to give a constant output level for a varying input level. This is particularly useful when dealing with fixed microphones used by people moving within the space around it; the compander compensates for these changes in level.

A Compressor output is available to connect a tape recorder to the loop amplifier so that a recording can be made using the compander which is of a much higher quality than the auto gain system in many tape recorders.

CE

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AC power operation

For normal AC operation, plug the AC power supply cord in a wall outlet of 230 V specified voltage. The unit complies with BS415.

AC power cord
The wires in the mains lead supplied with the unit are coloured in accordance with the following code.

Green and Yellow	Earth
Blue	Neutral
Brown	Live

As the colours of the wires in the mains lead of this unit may not correspond with the coloured markings identifying the terminals in your plug, please connect as follows.

Wire	**Plug terminal**
Green & Yellow	'E' mark 'EARTH' symbol mark 'GREEN' mark 'GREEN AND YELLOW' mark
Blue	'N' mark 'BLACK' mark 'BLUE' mark
Brown	'L' mark 'RED' mark 'BROWN' mark

Caution
To prevent electric shock do not remove the cover

Unpacking

Upon receipt of the amplifier shipment, please inspect for any damage incurred in transit. If damage is found, please notify your local representative and the transport company immediately. State date, nature of damage and whether any damage was noticed on the shipping container prior to unpacking. Please give the waybill number of the shipping order.

The unit should not be placed in areas;
1. with poor ventilation
2. exposed to direct sunlight
3. with high ambient temperature or adjacent to heat generating equipment
4. with high humidity or dust levels
5. susceptible to vibration

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Installation

Read this manual throughally before starting installation, the following procedure should be used.

1. Install the loop (see page 6)
2. Before connecting a loop to the amplifier use a multimeter to check the loop is not shorted to ground at any point, (it will almost certainly damage the amplifier if it is).
3. Connect music or speech input signal to the amplifier. The peak line level of this signal should be approximately 1V.
4. Ensure input levels controls and drive control are fully anti-clockwise. .
5. Increase the input level controls until the 'limit' LED is just flashing. This indicates that the dynamic range processor is receiving a signal of the correct level. The compression ratio is fixed at a ratio of 20:1. If you are using both inputs the level controls act as a simple mixer.
6. Adjust the drive control until the required current peak is produced. (see page 5). **Care should be taken when doing this to ensure the current is within the recommended rating of the cable. The average current output should be approximately one quarter of the maximum peak.**
7. Using an induction loop receiver (eg SigNET Rxti2), listen to the signal inside the loop. It is also advisable to check the system with a field strength meter. Please note that the orientation of the field strength meter may influence the reading.

Mains Hum

Background hum can sometimes be heard when testing an installation especailly when testing with a induction loop reciever. This is not caused by the loop system and will NOT normally be heard by hearing aid users, due to built in filtering in most hearing aids.

The source of mains hum is most likely to be (50 Hz) mains wiring, particularly in old buildings where Live and Neutral cables may take different routes, thus creating an induction loop radiating at 50Hz.

If the client complains of mains hum simply disconnect the loop to prove that the source is unrelated.

Input connections

Two input connectors are standard 5 pin Din types. Both are mic or line selectable dependant upon the pin connections used, use the following chart or see the back of the unit which has the pin outs marked next to the relavent connector.

Unbalanced line		**Balanced line**	
pin4	signal	pin4	Hot
pin5	link to pin2	pin5	Cold
pin2	ground	pin2	ground

Unbalanced microphone		**Balanced microphone**	
pin1	signal	pin1	Hot
pin3	link to pin2	pin3	Cold
pin2	ground	pin2	ground

Phantom is supplied on pins 1 and 3. 15V, 5mA maximum per pin.

Alert input

For a simple alert signal, closing a switch across pins 1 & 2 generates a 2KHz tone at 2Hz on/off rate. The alert input can also be connected to fire alarms/doorbells etc., however when connecting to a doorbell you must use a separate isolated contact on the doorbell switch.

pin1 Trigger
pin2 Ground
pin3 5V
pin4 Tone in
pin5 Alert Tone.
Pins 4 & 5 must be linked at all times.

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Output connections

Loop output

The output is via two 30A 4mm terminal posts. Connection can be made by way of tails or 4mm plugs. Tails are recommended as they are very unlikely to be pulled out.

WARNING: The PDA amplifiers are capable of producing short term peaks of twice their rated current.

Compressor output

The compressor out connector on the rear of the case provides two identical outputs from the compressor. This facility has been designed to allow recording of the compressed signal. Pins 1 and 4 of the connector are internally linked and carry the same signal.

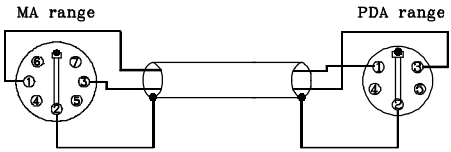
pin1 signal out
pin4 signal out
pin2 ground

X-talk

The X-talk connections allow a a PDA induction loop amplifier to be cross-connected to a MA75 \ MA150 mixer amplifier so that all 8 inputs are mixed. Both sets of controls will work independently of each other.

If the mute connection is used the PDA induction loop amplifier inputs will be muted when priority on the MA range amplifier is operated.

(see MA range manual for more detail)



Peak current calculation

To calculate the required current it is first necessary to calculate the aspect ratio of the loop. This is the width of the loop divided by the length of the loop, assuming the loop approximates to a rectangle. Circular loops should be approximated to a square. If the room is L - shaped, assume it is a square or rectangle and use the longest side and the longest width. (For this case, the calculated peak current required will be too large, so reduce the drive level slightly) It is also necessary to know the total length of the loop cable. If the connecting cable from the amplifier to the loop is the same cable as used for the loop, then this should also be included.

The calculations below assume that the loop will be approximately the same level as the receiver. (Vertical displacement) If the loop is significantly higher or lower (more than one to two metres) than the receiver, then the peak current required will be slightly higher.

Peak current calculation

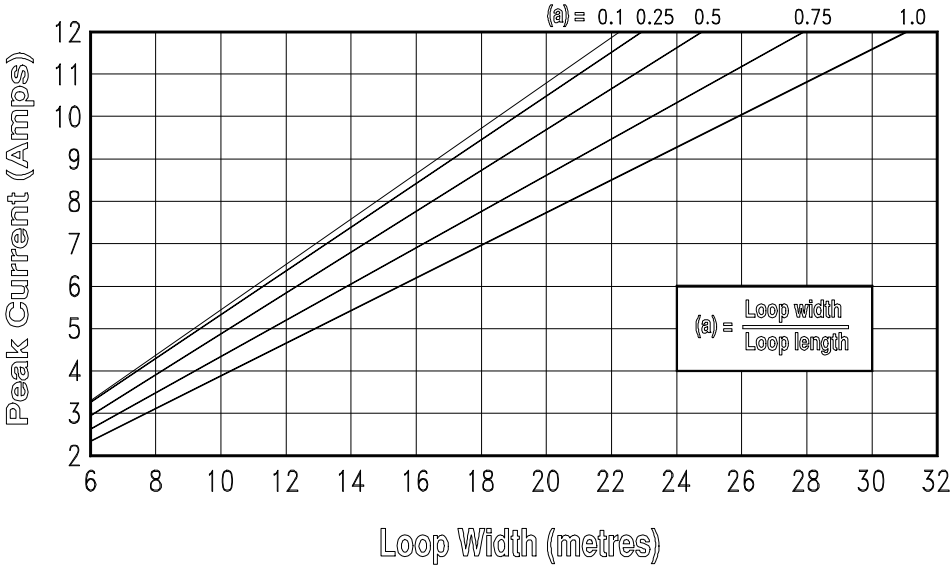
Refer to the current width- graph to establish the required peak current. The width of the loop is shown on the x-axis. The peak current is shown vertically on the y-axis.

This is the peak current. **The average current output should be approximately one quarter of the maximum peak.**

Move along the x-axis until you come to the width of your loop, then move up until you come to one of the aspect ratio lines. From this point, read the peak current required.

The D.C resistance of the loop should be between 0.2 Ohms and 2 Ohms. It is very unlikely that any loop will be less than 0.2 Ohms as this is virtually a short. It is quite acceptable to have a D.C resistance greater than two Ohms, but full current drive may not be possible.

Peak current against loop width for differing aspect ratios. (a)



Loop cables

Cable selection

Almost any single core cable (multi-strand or solid core) can be used for the loop provided it is of the appropriate impedance. Ideally the DC impedance of the loop should be 1 Ohm (<0.2 Ohm or >2 Ohm will result in a degradation in signal). The following table gives some useful approximations.

Recommended cable gauge

PDA200	0.75 -1.0mm^2
PDA800	1.5 - 2.5mm^2

Use of cables outside the recommended gauges may may result in damage to the unit, or risk of fire.

Optimum cable lengths:

Cable diameter	Optimum lengths
0.75mm^2	up to 30 metres
1.0mm^2	30 - 70 metres
1.5mm^2	70 - 100 metres
2.5mm^2	100 - 165+ metres

Only use cable diameters recommened for each unit

Use of a tri-rated cable is recommended. This is cable with a tougher than usual jacket, the reason being; damage will occur to the amplifier if at any point the loop is grounded.

Loop cable should ideally be laid at floor level but in certain circumstances this may not be possible. Any large amounts of metal (eg steel meshed reinforced concrete floors) will absorb some of the signal strength, in this case the cable may have to be mounted in the walls.

Aluminium (suspended ceilings) being para-magnetic should also be avoided, mounting a loop above a aluminium suspended ceiling will probably result in almost no coverage, turning up the output of an amplifier would just make matters worse as it will just stress the output stage (and minutely warm the aluminium) resulting in a definite shortening of the life-span of the amplifier.

Loop cables

Speaker positioning

If a speaker is placed near or beside a loop cable the cross-over in the speaker may pick up the loop signal, so try to keep speakers and loop cables as far apart as possible. Normally this does not show up in use because loop and speaker have the same programme material, only where the loop has a different signal to the speakers (e.g. stage talk back systems)will this become an issue.

Feeder Cables

When connecting an amplifier to a loop some distance away use a heavy gauge twisted pair (4-6mm^2). This will have a negligible impedance, as such the amplifier will not drive against it and the power will be fed into the loop where it can do useful work. For the cable size of the actual loop, follow guidelines opposite.

Test loops

We always recommend the laying of a test loop, there is no such thing as a standard installation and sometimes only a test loop will uncover problematic areas.

Feedback

Long lengths of unbalanced signal cable may cause feedback when placed inside the loop. This problem can be virtually eliminated by using balanced signals.

Problems may occur when using standard dynamic microphones. The coil inside may act as a receiver and cause feedback. It is advisable to use condenser microphones. These may require phantom powering, available on both microphone inputs.

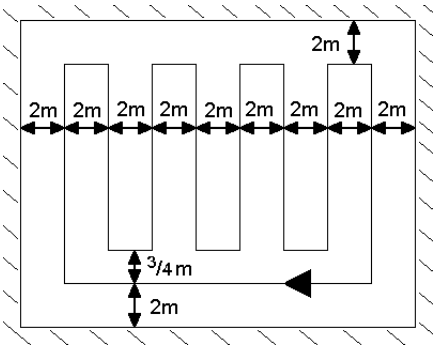
Other sources of feedback are coils in other equipment that is linked to the induction loop system, for example guitar pickups.

Loop cable class

A loop cable is classed as a 2A cable under IEEE 16th Edition wiring regulations. As such it must be sited a minimum of 600mm away from telephone, mains and control cables.

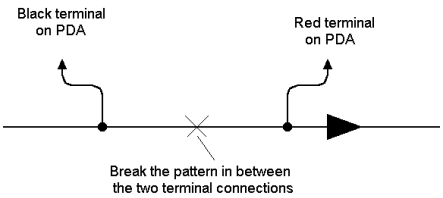
Loop patterns

A loop pattern laid on the floor is a low cost method to reduce over-spill by providing more even field strength compared to the usual single turn of cable laid around the room's perimeter. The basic pattern looks like the diagram below:



Each pattern should be considered as a many pronged fork. The pattern should be spaced approx. 2m from nearest wall / next pattern, prongs of the fork should be spaced approx. 2m apart and should be approx. 2m wide, prongs should extend to approx. 3/4m of base of fork.

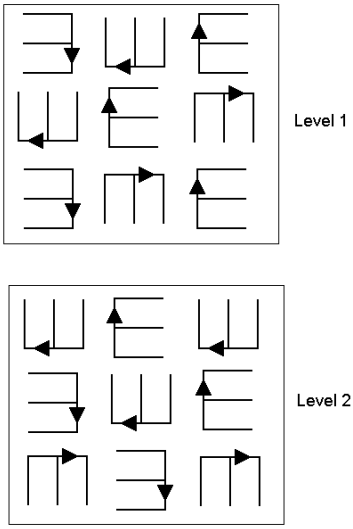
Assume the cable is being run around the edge of a room for cable diameter calculations, as the pattern restricts the amount of power which can be fed into the loop. The large black arrow shows clockwise direction of loop. Break into pattern at any point to connect PDA unit.



Loop patterns

Large areas and multiple rooms

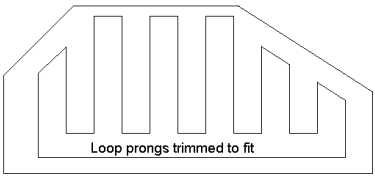
Use several loop patterns, each pattern must be connected to a separate loop amplifier. When laying out patterns, ensure each is 90 degrees out of phase with its neighbours as per the following diagrams which show a two story building:



Note. For a two storey building the *same* loop position on different floors is also 90 degrees out of phase.

Non-rectangular rooms

Layout as per a basic pattern and step back the prongs to the shape of the room.



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Specification

Inputs	Two - 5 pin 180° DIN Balanced - electronically. Mic or line selectable
Microphone	Impedance 200 Ohms - balanced. 47 K Unbalanced Sensitivity -66 dBm to -2dBm
Line	Impedance 10 K balanced; 20 K unbalanced Sensitivity-20 dBm to + 22 dBm
Performance	Bandwidth At any output level - 20 Hz to 16 KHz - 1 dB Distortion < 0.05% THD @ 1 KHz Dynamic range >90 dB Noise <-86 dB CMRR >84 dB
Input level control	Line: - ì to +6 dB Mic: - ì to + 66 dB
X-Talk	5 Pin DIN Link to PDA 200/800 or MA75
Compressor out	5 Pin DIN 300 mV
Mains voltage	230 V AC ± 20%
Power Consumption	PDA200 < 80 VA PDA800 < 200 VA
Dimensions	Width 305 mm Height 72 mm Length 200 mm.

Specification

PDA 200 Output Drive current

Max peak	> 8 A
EBU PPM	> 5.5 A
Sine - 1KHz	> 2.1 A RMS
Loop coverage	> 120m²
Loop impedance	0.2 to 2 ohms

PDA 800 Output Drive current

Max peak	> 12 A
EBU PPM	> 10 A
Sine - 1KHz	> 4 A RMS
Loop coverage	> 400m²
Loop impedance	0.2 to 2 ohms